

NASA Technology Evaluation for Environmental Risk Mitigation
Kennedy Space Center, FL 32899

**Potential Alternatives Report for
Validation of Environmentally-preferable Coatings for Launch Facilities
Final-Amended
April 20, 2012**

**NASA Contract: NNH09CF09B
Task Order: NNH12AA41D**

**ITB, Inc.
3700 N. Courtenay Pkwy
Suite 112
Merritt Island, FL 32953**



**ITB, Inc.
7333 Paragon Road
Suite 250
Dayton, OH 45459**

*International Trade Bridge, Inc. (ITB) in accordance with NASA Contract NNH09CF09B is supplying the information, to fulfill the requirements under Task Order **NNH12AA41D**. Except as required and in accordance with NASA published policies the information contained herein is submitted in confidence. It may contain trade secrets or confidential commercial or financial information exempt from disclosure by 5 U.S.C. section 552(b) (3) and (4) (Freedom of Information Act), and 18 U.S. C. Section 1905 (Trade Secrets Act).*

Export Control Notice: *Information contained herein is subject to export control laws. This document, which includes any attachments and exhibits hereto, may contain information subject to International Traffic in Arms Regulations (ITAR) or Export Administration Regulations (EAR), which may not be exported, released or disclosed to foreign nationals inside or outside the United States, without first obtaining an export license. Violators of ITAR or EAR may be subject to penalty of ten years imprisonment and a fine of \$1,000,000, under Title 22, United States Code (U.S.C.), Section 2778, Control of Exports and Imports and Title 50 U.S.C., Appendix 2410, Violation.*

**National Aeronautics and Space
Administration (NASA)
Technology Evaluation for Environmental Risk
Mitigation Principal Center (TEERM)**

Potential Alternatives Report

**For Validation of Environmentally-preferable
Coatings for Launch Facilities**

Final-Amended

April 20, 2012

*Prepared by
International Trade Bridge (ITB), Inc.
Dayton, OH 45459*

*Submitted by
NASA TEERM Principal Center*

AMENDMENTS

Page 1: Defined "PAR" as Potential Alternatives Report

Page 6: Added the word "is" to first sentence under **Cadmium**

Page 16: Replaced the word "required" with "require" in the sentence, "Stakeholders wanted "drop-in" replacements that did not require new equipment to be purchased."

Page 35: Added information to Tesla NanoCoatings Table for TESLAN Low VOC Urethane Topcoat (XUR-12041)

Page 38: Added information to Tesla NanoCoatings, sub-bullet for Topcoat: TESLAN Low VOC Urethane Topcoat (XUR-12041)

Appendix A-14: Added MSDSs for TESLAN Low VOC Urethane Topcoat (XUR-12041) Parts A and B

PREFACE

This report was prepared by International Trade Bridge, Inc. (ITB) through the National Aeronautics and Space Administration (NASA) Technology Evaluation for Environmental Risk Mitigation Principal Center (TEERM). The structure, format, and depth of technical content of the report were determined by NASA TEERM, Government contractors, and other Government technical representatives in response to the specific needs of this project.

We wish to acknowledge the invaluable contributions provided by all the organizations involved in the creation of this document.

TABLE OF CONTENTS

	Page
1. INTRODUCTION	1
1.1. Background	2
1.2. Objectives and Scope of Work	2
1.3. Isocyanate-Free Coatings Overview	3
2. CURRENT BASELINE PROCESS	8
2.1. Process Flow Diagram	8
2.2. Process Description	10
2.2.1. Surface Preparation	10
2.2.2. Priming and Curing	11
2.2.3. Intermediate Epoxy Primer.....	11
2.2.4. Topcoating	12
2.3. Process Equipment	13
2.4. Material and Energy Usage.....	13
2.5. Wastes and Emissions	14
3. IDENTIFIED ALTERNATIVES.....	16
3.1 Down-selection Process	16
3.2 Potential Alternatives Tables	16
4. SUMMARY	38
APPENDIX.....	39

LIST OF FIGURES AND TABLES

	Page
Figure 1 Process Flow Diagram of Baseline Coating Process	9
Table 1 Baseline Priming and Topcoating Material Usage	14
Table 2 Baseline Wastes and Emissions	15
Table 3 A&E Systems Alocit 28 Coatings	17
Table 4 Aremco Products Corr-Paint Coatings	18
Table 5 Carboline Carbozinc 11 WB/Carbotherm 3300/Carbocrylic 3359	19
Table 6 Carboline Carbomastic 15/Carboguard 893/Carbothane 134 MC.....	20
Table 7 Carboline Carbomastic 615/Carboguard 893/Carbothane 134 MC.....	21
Table 8 Carboline Thermaline 450.....	22
Table 9 Carboline Thermaline 451.....	23
Table 10 Dow Corning DC 3-6077 RTV.....	24
Table 11 EonCoat.....	25
Table 12 HALOX SW-111	26
Table 13 Heresite CSE 6400	27
Table 14 International Paint Intercure 202	28
Table 15 Polycoat USA.....	29
Table 16 Polyset Ply-Zinc WB 18.....	30
Table 17 Polyset Ply-Guard ME.....	31
Table 18 Pratt and Lambert Coatings	32
Table 19 TIGER Drylac TIGER SHIELD.....	33
Table 20 Shield Products Fluoropolymer Coatings.....	34
Table 21 Tesla NanoCoatings	35
Table 22 TIGER Drylac TIGER SHIELD.....	36
Table 23 Ultimate Linings UL TK 22	37

1. INTRODUCTION

Headquarters National Aeronautics and Space Administration (NASA) chartered the Technology Evaluation for Environmental Risk Mitigation Principal Center (TEERM) to coordinate agency activities affecting pollution prevention issues identified during system and component acquisition and sustainment processes. The primary objectives of NASA TEERM are to:

- Reduce or eliminate the use of hazardous materials (Haz Mat) or hazardous processes at manufacturing, remanufacturing, and sustainment locations.
- Avoid duplication of effort in actions required to reduce or eliminate Haz Mat through joint center cooperation and technology sharing.

Kennedy Space Center (KSC) is responsible for a number of facilities/structures with metallic structural and non-structural components in a highly corrosive environment. Metals require periodic maintenance activity to guard against the insidious effects of corrosion and thus ensure that structures meet or exceed design or performance life. The standard practice for protecting metallic substrates in atmospheric environments is the application of an applied coating system. Applied coating systems work via a variety of methods (barrier, galvanic and/or inhibitor) and adhere to the substrate through a combination of chemical and physical bonds.

This project will compare coating performance of the proposed alternatives to existing coating systems or standards. The objective of this effort is to demonstrate and validate environmentally-preferable alternatives in accordance with NASA-STD-5008B and KSC requirements. Qualified alternatives will then be added to the Approved Products List in NASA-STD-5008B which is used as a specification in contracts.

Identifying and selecting alternative materials and technologies that have the potential to reduce the identified Haz Mat while incorporating sound corrosion prevention and control technologies, is a complicated task due to the fast pace at which new technologies emerge and rules change. The alternatives were identified through literature searches, electronic database and Internet searches, surveys, and/or personal and professional contacts. Available test data was then compiled on the proposed alternatives to determine if the materials meet the test objectives or if further laboratory or field-testing will be required.

After reviewing technical information documented in the Potential Alternatives Report (PAR), stakeholders involved in the process will select the list of viable alternative coatings for consideration and testing under the project's Joint Test Protocol entitled *Joint Test Protocol for Validation of Environmentally-preferable Coatings for Launch Facilities at Kennedy Space Center*, prepared by ITB. Test results will be reported in a Joint Test Report upon completion of testing. The selection rationale and conclusions are documented in this PAR.

This PAR focuses on environmentally-preferable coatings for structural steel, as required by the project participants. The following subsections describe the coating systems as they relate to applications used by the participants, including description of materials, process flow diagrams, and hazardous waste generated.

1.1. Background

NASA is responsible for a number of facilities/structures with metallic structural and non-structural components in a highly corrosive environment. Regardless of the corrosivity of the environment, all metals require periodic maintenance activity to guard against the insidious effects of corrosion and thus ensure that structures meet or exceed design or performance life. The standard practice for protecting metallic substrates in atmospheric environments is the application of an applied coating system. Applied coating systems work via a variety of methods (barrier, galvanic and/or inhibitor) and adhere to the substrate through a combination of chemical and physical bonds.

Maintenance at KSC is governed by NASA-STD-5008B (*Protective Coating of Carbon Steel, Stainless Steel, and Aluminum on Launch Structures, Facilities, and Ground Support Equipment*) which establishes practices for the protective coating of ground support equipment and related facilities used by or for NASA programs and projects. The Standard is for the design of non-flight hardware used to support the operations of receiving, transportation, handling, assembly, inspection, test, checkout, service, and launch of space vehicles and payloads at NASA launch, landing, or retrieval sites. These criteria and practices contained within the Standard may be used for items used at the manufacturing, development, and test sites upstream of the launch, landing, or retrieval sites.

1.2. Objectives and Scope of Work

The primary objective of this effort is to demonstrate and validate environmentally-preferable alternatives to currently used coating systems for Zone 4a applications as defined by NASA-STD-5008B:

Zone 4a. Surfaces not located in the launch environment but located in a neutral pH corrosive marine industrial environment or other chloride-containing environments.

Successful completion of this project will result in one or more coating systems qualified for use at KSC. One of the objectives of this effort is to develop a concise, focused PAR documenting information about the baseline process and alternative coatings.

1.3. Environmental, Safety, and Occupational Health (ESOH) Overview

Each alternative was evaluated to determine the extent of its regulation under the major federal environmental laws. Based on the product MSDS, each alternative was evaluated for the following:

- Air Emissions per the Clean Air Act (CAA) and National Emissions Standards for Hazardous Air Pollutants (NESHAPs)
- Solid/Hazardous Waste Generation per the Resource Conservation and Recovery Act (RCRA)
- Reporting requirements per Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA)
- Hazardous Substances per Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)

1.3.1. Volatile Organic Compounds (VOCs)

The general definition of VOCs is any organic chemical compound whose composition makes it possible for them to evaporate under normal indoor atmospheric conditions of temperature and pressure. VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects; and can be an indoor or outdoor hazard.

The main concern indoors is the potential for VOCs to adversely impact the health of people that are exposed. While VOCs can also be a health concern outdoors, the U.S. Environmental Protection Agency (USEPA) regulates VOCs outdoors mainly because of their ability to create photochemical smog under certain conditions. VOCs are regulated by the USEPA under the Clean Air Act (CAA) [42 U.S.C. §7401 et seq. (1970)].

1.3.2. Hazardous Air Pollutants (HAPs)

HAPs, also known as toxic air pollutants or air toxics, are those pollutants that cause or may cause cancer or other serious health effects, such as reproduction effects or birth defects, or adverse environmental and ecologic effects.

National Ambient Air Quality Standards (NAAQS) were established by the USEPA under authority of the CAA that apply for outdoor air throughout the country. Primary standards are designed to protect human health, with an adequate margin of safety, including sensitive populations such as children, the elderly, and individuals suffering from respiratory diseases. Secondary standards are designed to protect public welfare from any known or anticipated effects of a pollutant.

The National Emissions Standards for Hazardous Air Pollutants (NESHAPs) are emission standards set by the USEPA for an air pollutant not covered by NAAQS. The USEPA is required to control 187 HAPs currently listed under the NESHAPs

[Section 112 of the CAA published in 40 Code of Federal Regulations (CFR) Parts 61 and 63].

1.3.3. Isocyanates

Isocyanates are compounds containing the isocyanate group (-NCO). They react with compounds containing alcohol (hydroxyl) groups to produce polyurethane polymers, which are components of polyurethane foams, thermoplastic elastomers, spandex fibers, and polyurethane paints.

The Occupational Health & Safety Administration (OSHA) states that the effects of isocyanate exposure include irritation of skin and mucous membranes, chest tightness, and difficult breathing. Isocyanates are classified as potential human carcinogens and are known to cause cancer in animals. The main effects of overexposure are occupational asthma and other lung problems, as well as irritation of the eyes, nose, throat, and skin.

OSHA requires employers to provide a work environment that minimizes or eliminates exposure to isocyanate-containing products. A major concern is that despite working safely around the same materials for years, exposure to isocyanates have been known to suddenly produce sensitivities that can be deadly.

1.3.4. Heavy Metals

Heavy metals are chemical elements that have a specific gravity at least five (5) times that of water. The heavy metals most often associated with coating applications are lead, chromium, cadmium, and zinc.

Lead

Lead is a naturally-occurring element that can be harmful to humans when ingested or inhaled. Lead poisoning can cause a number of adverse human health effects and is particularly dangerous because there may be no unique signs or symptoms. Failure to treat lead poisoning in the early stages can cause long-term or permanent health damage.

Lead particles in the environment can attach to dust and be carried long distances in the air. Such lead-containing dust can be removed from the air by rain and deposited on surface soil, where it may remain for many years. In addition, heavy rains may cause lead in surface soil to migrate into ground water and eventually into water systems.

Lead was commonly used in paints until 1977 when the U.S. government's Consumer Product Safety Commission (CPSC) banned lead paint under 16 CFR 1303. For manufacturers, the CPSC instituted the Consumer Product Safety

Improvement Act of 2008 which changed the regulations on lead content of paint from 0.06% to 0.009%.

The USEPA has established standards designed to limit the amount of lead in air. The National Institute for Occupational Safety and Health (NIOSH) also recommends that workers not be exposed to lead and limits the amount of exposure to less than 100 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) in a ten hour period.

Chromium

Chromium is a metallic element in the periodic table that is odorless and tasteless. Chromium is found naturally in rocks, plants, soil and volcanic dust, humans and animals. Chromium occurs in the environment primarily in two valence states, trivalent chromium (Cr III) and hexavalent chromium (Cr VI). Hexavalent chromium (Cr VI) is commonly used in industrial applications such as chromate pigments in dyes, paints, inks, and plastics; chromates added as anticorrosive agents to paints, primers, and other surface coatings; and chromic acid electroplated onto metal parts to provide a decorative or protective coating.

All forms of hexavalent chromium are regarded as carcinogenic to workers according to numerous regulatory and advisory bodies, including the USEPA, the National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC), and the American Conference of Governmental Industrial Hygienists (ACGIH). The risk of developing lung cancer increases with the amount of hexavalent chromium inhaled and the length of time that the worker is exposed.

Hexavalent chromium can also irritate the nose, throat, and lungs. Direct eye contact with chromic acid or chromate dusts can cause permanent eye damage. Prolonged skin contact can result in dermatitis and skin ulcers. Some workers develop an allergic sensitization to chromium such that even small amounts can cause a serious skin rash.

Cr VI is listed as a HAP under Title III of the CAA and emissions are regulated under the NESHAPs. Other regulations include the Clean Water Act (CWA), Safe Drinking Water Act (SDWA), Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Superfund Amendments and Reauthorization Act (SARA), and Emergency Planning and Community Right-To-Know Act (EPCRA). The Department of Transportation also enforces special requirements for marking, labeling, and transporting Cr VI.

In February 2006, OSHA lowered the Cr VI time weighted average permissible exposure limit for general industry from $100 \mu\text{g}/\text{m}^3$ (micrograms per cubic meter) to $5 \mu\text{g}/\text{m}^3$ under 29 CFR 1910.1026. OSHA included a special section of regulations for the aerospace industry and set a higher exposure limit of $25 \mu\text{g}/\text{m}^3$ for large scale hangar-type operations. The regulation specifically refers to painting of aircraft or

large aircraft parts in the aerospace industry. An Action Level was set at $2.5 \mu\text{g}/\text{m}^3$, and at this threshold, the use of personal protective equipment and/or the implementation of engineering controls is required.

Another requirement that affects Cr VI usage is Executive Order 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*. Federal organizations are encouraged to reduce the quantities of toxic and hazardous materials, such as Cr VI, that are acquired, used, or handled. Some Department of Defense (DoD) contracts already prohibit the use of Cr VI in finished products.

Cadmium

Cadmium is a metallic element in the periodic table that is an extremely toxic metal commonly found in industrial workplaces. Cadmium is used extensively in electroplating and is also found in some industrial paints.

Acute exposure to cadmium fumes may cause flu-like symptoms including chills, fever, and muscle aches. Symptoms may resolve after a week if there is no respiratory damage. More severe exposures can cause permanent respiratory tract damage. Inhaling cadmium-laden dust leads to respiratory tract and kidney problems which can be fatal. Ingestion of any significant amount of cadmium causes immediate poisoning and damage to the liver and kidneys. Cadmium poisoning can also cause bones to become soft, lose bone mineral density, and become weaker. Compounds containing cadmium are considered carcinogenic.

Cadmium is classified as a toxin and as a known or probable carcinogen by numerous regulatory and advisory bodies, including the USEPA, NTP, IARC, ACGIH, and NIOSH. Cadmium is also listed as a HAP under Title III of the CAA and emissions are regulated under the NESHAPs.

OSHA has published a new standard for occupational exposure to cadmium, applicable to general industry and agriculture and maritime (29 CFR 1926.63). A separate standard regulating exposure to cadmium in the construction industry was also developed, because the differences in job duration, exposure and worksite conditions warrant unique treatment.

The new standard establishes a single eight (8)-hour time weighted average permissible exposure limit of $5 \mu\text{g}/\text{m}^3$ of air for all cadmium compounds, including dust and fumes. Employers are required to comply with this limit primarily by means of engineering and work practice controls. For a small number of industries, OSHA has also established separate engineering control air limits of either $15 \mu\text{g}/\text{m}^3$ or $50 \mu\text{g}/\text{m}^3$ as the lowest feasible levels above the PEL that can be achieved by engineering and work practice controls.

Another requirement that affects cadmium usage is Executive Order 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*.

Federal organizations are encouraged to reduce the quantities of toxic and hazardous materials, such as cadmium, that are acquired, used, or handled.

Zinc

Zinc is one of the most common elements in the earth's crust. It is found in air, soil, and water, and is present in all foods. It has a number of characteristics that make it well-suited for use as a coating for protecting iron and steel products from corrosion. The excellent field performance of zinc coatings results from the dense adherent corrosion product film that they form and the fact that its rate of corrosion is considerably lower than that of ferrous materials. The zinc acts as a sacrificial barrier between the substrate and environment.

Although zinc is an essential element for humans, it can also be toxic at high exposure levels. It can cause stomach cramps, anemia, and changes in cholesterol levels. The primary effects of zinc are the development of metal fume fever and effects of zinc on copper status.

Zinc is listed by the USEPA as one of Priority Pollutants under the CWA (Appendix A to 40 CFR Part 423). Zinc is also included in the Priority List of Hazardous Substances under the CERCLA as amended by SARA [42 U.S.C. §9601 et seq. (1980)]. To protect workers, OSHA and NIOSH have set standards for worker exposure to zinc chloride fumes and zinc oxide dusts and fumes in the workplace.

Zinc can have a significant local environmental impact. In parts of the world where there are large deposits, zinc can get into the water supply at levels which are toxic to fish and potentially to humans. Zinc can accumulate in aquatic organisms but not in plants, and be toxic to such species and those that feed off them.

At KSC, soil and sediment samples from the launch pads during a RCRA Facility Investigation (RFI) in 1998 showed increased levels of zinc. The Addendums for the investigation determined that there were potential impacts to the ditch and lagoonal system surrounding the pads. The Hazard Quotients for ecological receptors is very high for zinc and the USEPA and Florida Department of Environmental Protection agreed that no further assessment would be conducted during the Space Shuttle Program (SSP). Since the completion of the SSP, additional assessments will be conducted to determine the actual risk and a decision made regarding potential clean-up.

2. CURRENT BASELINE PROCESS

This PAR focuses on currently used coating processes specified in NASA-STD-5008B, as required by the project participants. The following subsections describe the coating process as it relates to applications used by the participants, including description of materials, process flow diagrams, amounts of coatings used and hazardous waste generated.

The coating systems selected as the controls for testing will be selected from the APL in NASA-STD-5008B.

The baseline process information was gathered by method of interview of participants. The descriptions below are based on "typical" and generalized coating application processes, and are not the exact processes used by any of the participants of this project.

The current process flow diagram for a three coat system is shown in Section 2.1 and the current process description and process equipment are described in Sections 2.2 and 2.3, respectively. Material usage, and wastes and emissions are described in Sections 2.4 and 2.5, respectively.

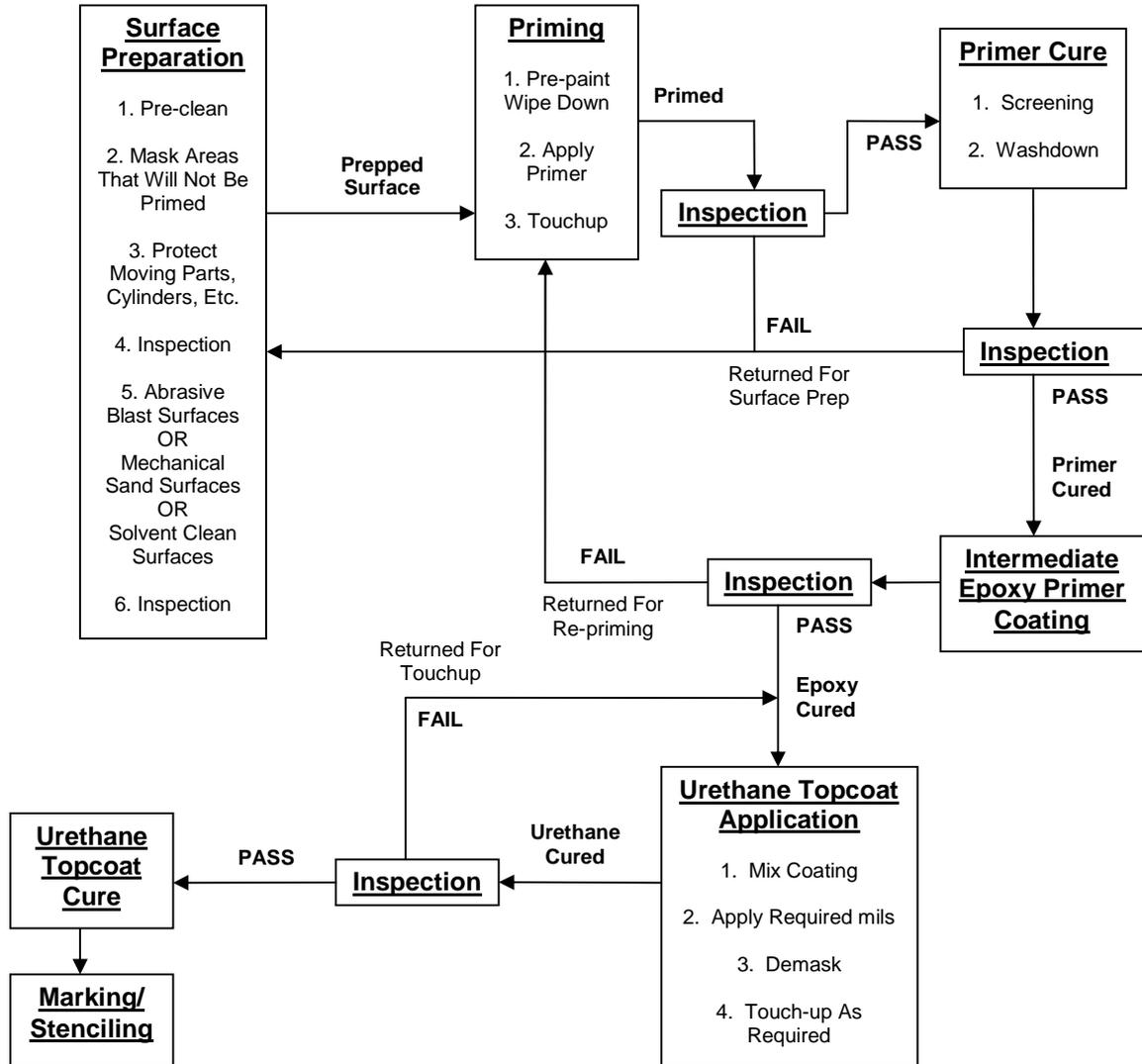
Although the typical system is three coats, there are applications where only a one coat system (primer) is used. There are also two coat systems approved (primer and topcoat) in which an intermediate coat is not required. The process steps, material usage, and wastes and emissions associated with the coating not used may be removed from consideration for those coating systems.

2.1. Process Flow Diagram

The coating process includes a standard six step coating process. First, the parts undergo surface preparation, such as cleaning, scuff sanding, or abrasive blasting and masking to protect areas on substrates that are not to be coated. Secondly, those parts requiring additional adhesion enhancement or corrosion protection receive one or two coats of primer and then are cured. Then the primed parts receive an intermediate epoxy primer coating. Next the parts are topcoated with a specified coating and cured. Markings such as equipment identification, caution and warning information, operational instructions, etc., are applied using such materials as: aerosol spray, metal data plates, and vinyl decals. The Baseline Process Flow Diagram is shown in Figure 1.

Some applications require only the use of a primer without the intermediate coating or topcoat (one coat system). In such cases, the process would end after the inspection of the primer cure. Some applications do not use an intermediate coat between the primer and topcoat (two coat system); so the steps related to the intermediate coating would not be included.

Figure 1 Process Flow Diagram of Baseline Coating Process



2.2. Process Description

As shown in Figure 1, the typical organic coating process is surface preparation, priming, intermediate epoxy primer coating, topcoating and marking operations. The coating spray process steps are described below.

Some applications require only the use of a primer without the intermediate coating and topcoat (one coat system). In such cases, the process would end after the inspection of the primer cure. Some applications do not use an intermediate coat between the primer and topcoat (two coat system), so the steps related to the intermediate coating would not be included.

In accordance with technical data requirements and coating manufacturer recommendations, coatings are not normally applied under unfavorable atmospheric conditions, such as high humidity, strong drafts, or low temperatures.

2.2.1. Surface Preparation

Surface preparation such as cleaning and masking takes place before priming. Pre-cleaning prior to any surface preparation is the first essential step in successful coating application. Pre-cleaning may be accomplished by water-based cleaning compounds or acceptable solvents to remove carbon, soils, and other contaminants that may become concentrated on the surfaces and in corners and crevices preventing proper coating adherence. Other cleaning operations include various surface preparation activities such as abrasive blasting, manual sanding, or solvent cleaning of the substrate to prepare the surfaces to accept a coating.

To enhance corrosion protection and increase coating adherence many coating manufacturers require the bare metal substrates receive a conversion coating pretreatment prior to coating. The pretreatment may range from iron or zinc phosphate for carbon steel surfaces to chromate conversion coatings or non-chromate conversion coatings for aluminum and magnesium. Zinc phosphate and chromate conversion materials are considered Haz Mat and must be treated and disposed of in accordance with the local, state, and federal requirements of the locations where the operations occurred.

Adhesive-backed crepe masking tape is typically used for surface masking of small areas not being painted. Additionally, a combination of tape, plastic sheeting, and masking paper may be used to mask large areas. An estimate of the volume of masking materials that are used will vary and is dependent on dimensions of the surface being painted. Actual hours involved in masking are dependent on the size and configuration of the surface being painted.

Waste generated as a result of the surface preparation operations may include spent abrasive media, soiled rags, and masking materials. This media will be considered a Haz Mat if the primer and topcoat being removed contains chromate and/or heavy

metals. Cleaning compound residue may contain oils, cadmium, hydraulic fluid, solvents, and other contaminants and must be treated and disposed of in accordance with the local, state and federal requirements of the locations where the operations occurred.

The equipment, materials, wastes and emissions of surface preparation will not be quantified and discussed in detail as this step will not change with the approval of any new coatings.

2.2.2. Primer

Some applications require only the use of a primer without the intermediate coating and topcoat (one coat system). In such cases, the process would only include this step and would end after the inspection of the primer cure.

After the surface of the parts are properly prepared, normally a primer is mixed, strained, and allowed to stand for a period of time to allow the different components to react. The material is then thinned to the proper viscosity (if required) and applied by brush or spraying with airless, conventional pots, or pressure feed paint spray equipment.

After priming, surfaces are allowed to cure at ambient temperature for 12 to 36 hours. Only one wet coat of primer is typically applied to a surface; however, if an engineering drawing specifies more than one coat, then that number of primer coats is applied with air curing between each coat. Excessive primer build-up is normally avoided to prevent intercoat adhesion failures.

Paint spray guns are normally flushed with the appropriate solvent prior to each operator break and at the end of each shift. Newer cleaning equipment may be able to capture VOCs at the source. If not captured, VOCs associated with equipment cleaning are exhausted to the atmosphere. Spent solvents are sometimes distilled and reused for pre-paint wipe down or paint gun cleaning.

To ensure freshly painted surfaces are not contaminated by dust and other particulate matter, painting areas are cleaned on a regular basis, with the cleaning interval dependent on usage. The painting operations debris such as over-spray materials, paint chips, abrasive media, rags, masking materials, paint strainers, floor covering paper, and leftover pre-catalyzed coatings are collected in drums and disposed of in accordance with the local, state, and federal requirements of the locations where the operations occurred.

2.2.3. Intermediate Epoxy Primer

Some applications do not use an intermediate coat between the primer and topcoat (two coat system), so this step would not be included.

After areas are sufficiently primed and cured, an intermediate epoxy primer coating is applied by brush work or spraying and then cured per the manufacturer's directions prior to being topcoated.

Spray guns are normally flushed with an approved coating solvent before each operator break and at the end of each shift. Unless captured, VOCs from equipment cleaning are vented to the atmosphere. Used solvents or thinners may be recycled if an appropriate distiller is available. Otherwise, the waste solvents or thinners are collected and disposed of in accordance with the local, state, and federal requirements for the locations where the operations occurred.

Surface coating condition should be inspected during, and at the conclusion of, the painting operations.

2.2.4. Topcoat

Some applications require only the use of a primer without the intermediate coating and topcoat (one coat system). In such cases, the process would not include this step.

After areas are sufficiently cured, a topcoat is applied by field brush, roll or spraying and then cured per the manufacturer's directions.

Spray guns are normally flushed with an approved coating solvent before each operator break and at the end of each shift. Unless captured, VOCs from equipment cleaning are vented to the atmosphere. Used solvents or thinners may be recycled if an appropriate distiller is available. Otherwise, the waste solvents or thinners are collected and disposed of in accordance with the local, state, and federal requirements for the locations where the operations occurred.

Surface coating condition should be inspected during, and at the conclusion of, the painting operations. During painting operations, wet film coating thickness is monitored manually using a wet film gauge. After coating operations are complete, parts are normally allowed to cure at ambient temperature for 72 hours. Coatings are visually inspected for appearance and coating thickness, and touchup coatings are applied as required. The Dry Film Thickness (DFT) of the coating system is verified using a non-destructive film thickness gauge.

Demasking normally does not occur for at least four hours after topcoating to ensure that the finish does not get damaged. After demasking, coating touchup may be accomplished on any areas where coatings are missing. Non-chromate containing masking materials are segregated, when possible for disposal in a landfill.

Marking or stenciling occurs after the coating has cured to the touch. Marking or stenciling may be accomplished with vinyl die-cut lettering, paint spray using HVLP stencil spray guns, or with a stencil and paint spray can. The masking tape and

paper associated with the vinyl lettering is disposed of as a solid waste. All other non-chromate containing marking or stenciling materials are segregated (when possible) for disposal in a landfill.

2.3. Process Equipment

Equipment that is required for surface preparation is not discussed, as surface preparation is unlikely to change with the viable alternatives. Current process equipment for coating specifications is brush or airless, conventional pots, or pressure feed paint spray equipment. If spray equipment is used, a compressor is required.

2.4. Materials Usage

The materials typically consumed in priming and topcoating operations are summarized in Table 1. Actual amounts of materials consumed during painting operations will vary between locations and are dependent on a number of factors.

Some applications require only the use of a primer without the intermediate coating and topcoat. In such cases, material usage would not continue after the application of the primer coating. Some applications do not use an intermediate coating so the material usage associated with the intermediate coating would not be included.

Table 1 Baseline Priming and Topcoating Material Usage	
Process Step	Material
Primer Coating	Primer
	Thinner (if required)
	Paint filters
	Lint free wipe cloths
	Appropriate primer solvent
Intermediate Epoxy Primer Coating	Intermediate epoxy primer
	Thinner (if required)
	Paint filters
	Lint free wipe cloths
	Appropriate epoxy solvent
Topcoating	Topcoat
	Thinner (if required)
	Paint filters
	Lint free wipe cloths
	Appropriate topcoat solvent

NOTE: This table does not reflect materials that are required for surface preparation, as surface preparation is unlikely to change with the viable alternatives.

2.5. Wastes and Emissions

A summary of the wastes and emissions from priming, intermediate epoxy priming and topcoating is presented in Table 2. Some applications require only the use of a primer without the intermediate coating and topcoat. In such cases, the wastes and emissions after the primer cure would not exist.

Table 2 Baseline Wastes and Emissions	
Process Step	Waste or Emissions
Primer Application	Pre-catalyzed primer (<i>may contain chromates</i>)
	Rags, debris, and paint filters (<i>residue may contain strontium chromate</i>)
	Waste paint thinner (if required)
	VOC emissions
Primer Curing	VOC emissions
Intermediate Epoxy Primer Application	Pre-catalyzed epoxy primer
	Rags, debris, and paint filters
	Waste paint thinner (if required)
	VOC emissions
Intermediate Epoxy Primer Curing	VOC emissions
Topcoat Application	Pre-catalyzed topcoat
	Rags, debris, and paint filters
	Waste paint thinner (if required)
	VOC emissions
	Masking materials (removed and disposed of after topcoat application)
Topcoat Curing	VOC emissions

NOTE: This table does not reflect wastes and emissions from surface preparation, as surface preparation is unlikely to change with the viable alternatives.

3. IDENTIFIED ALTERNATIVES

In order to identify viable alternatives to solvent-borne topcoats and primers, existing PARs and JTRs were reviewed and other surveys were performed to leverage available test and performance data for this project. Manufacturers and distributors of the identified alternatives were contacted, and technical, environmental, safety, and occupational health information about the alternatives was gathered and compared with the baseline process.

3.1 Down-selection Process

The stakeholders evaluated each potential alternative based on various aspects of environmental, health and occupational safety concerns; required process equipment; and anticipated performance.

The first requirement for all alternatives is that they are commercially available in the United States (U.S.); if not, then they were not included as a potential alternative. The alternatives were also evaluated to determine whether they are appropriate for Zone 4a applications as defined by NASA-STD-5008B.

Then the alternative systems for evaluated for environmental, health and occupational health concerns including VOC content, heavy metals, and ingredients that are subject to various regulations such as CAA, RCRA, EPCRA, and CERCLA.

Although a zinc-free system is desired, there are not many zinc-free systems available that are applicable to the stated applications. Most zinc-free systems are powder coatings that require oven curing which is not feasible on large structures. Zinc use is not banned at this time, so some alternative systems selected for testing include zinc.

The required process equipment was also considered for each alternative. For example, dual component spray equipment is not used at this time. Stakeholders wanted “drop-in” replacements that did not require new equipment to be purchased. Those alternatives that require such equipment were not selected for testing.

Finally, the anticipated performance of the coating system was considered based on a comparison of advantages and disadvantages.

3.2 Potential Alternatives Tables

Descriptions of the identified alternatives are given in the following tables. Some of the tables were not completed because the product was removed from consideration after initial information was gathered and the product was deemed inappropriate for this effort. If so, this is noted in the “Comments” section of the table.

Table 3 A&E Systems Alocit 28 Coatings							
Manufacturer: A&E Systems, LLC 150 Hilden Road, Suite #301 Ponte Vedra, FL 32081		Tel: 904.819.8985 Email: usa@ae-sys.com www.ae-sys.com/alocit.html					
Material Description:		The Alocit 28 Series is a range of coatings with outstanding adhesive and protective qualities. Its ability to succeed in difficult circumstances has made it the coating of choice for protecting challenging substrates: sweating pipes on refineries in the tropics, dripping wet bridges in northern hemisphere winters as well as sub-sea and splash-zone areas.					
	VOCs	HAPs	EPCRA	CERCLA	RCRA	Other Information	
Primer Alocit 28.14 Epoxy Coating- Zinc Primer	0 g/L	N/A	Zinc	Cyclohexanone, Zinc	Cyclohexanone	<ul style="list-style-type: none"> The representative states that we may look at either the Alocit 28.14 primer with the Alocit 28.15 or look at only the Alocit 28.15 with two coats in order to have a zinc-free system. 	
Intermediate	N/A						
Topcoat Alocit 28.15 Standard Grade Epoxy Coating Primer/Finish	0 g/L	Xylene	Xylene	Xylene	Xylene		
Recommended Surface Prep: A blast profile of between 50 and 100µ / 2 - 4 mils is the aim. Recommend SA- 2/SP-6/NACE 3 as a minimum, and SA-2.5 /SP-10/NACE 2 as the optimum.							
Other Application Notes: Typical airless spray system is Graco 68.1 airless spray pump fitted with 3/8 inch spray line with 1/4 inch whip end, XTR Graco spray gun with 19-21 thou spray tip. Recommended DFT = 16 mils							
Advantages:		<ul style="list-style-type: none"> Topcoat may be applied as two coats without primer for zinc-free system Solvent free – 0 VOCs Excellent adhesion, corrosion protection, and abrasion resistance 		Disadvantages:			<ul style="list-style-type: none"> May be difficult to apply Zinc primer (if used) Estimated coverage = 100 ft²/gal Cost
Recommended For Testing: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Comments: Recommend looking at Alocit 28.14 Zinc Primer with Alocit 28.15 Epoxy Coating as one alternative system and the Alocit 28.15 Epoxy Coating without primer as another alternative system for testing under this effort.						

Table 4 Aremco Products Corr-Paint Coatings						
Manufacturer:		Aremco Products, Inc. P.O. Box 517 707-B Executive Blvd. Valley Cottage, NY 10989			Tel: 845.268.0039 Email: aremco@aremco.com www.aremco.com	
Material Description:		Aremco's Corr-Paint™ protective coatings include the most expansive line of high temperature organic- and ceramic-based products available on the market today for applications to 1300 °F.				
	VOCs	HAPs	EPCRA	CERCLA	RCRA	Other Information
Primer Corr-Paint CP5000	<0.1 g/L	Xylene, Methanol, Formaldehyde, Ethyl benzene	Xylene, Formaldehyde, Zinc	Xylene, Methanol, Isobutyl alcohol, Formaldehyde, Butyl acetate, Ethyl benzene, Zinc	Xylene, Methanol, Isobutyl alcohol, Formaldehyde	<ul style="list-style-type: none"> • CP5000 theoretical coverage @ 1 mil = 585 sq ft/gal • CP2020 theoretical coverage @ 1 mil = 1235 sq ft/gal
Intermediate	N/A					
Topcoat Corr-Paint CP2020 (Gray)	336 g/L	4,4'-Diphenyl- methane Diisocyanate (MDI)	N/A	MDI	N/A	
Recommended Surface Prep: Abrasive blast to an SSPC-SP-10, near-white blast. Remove abrasive residue using air pressure – do not clean with organic solvents.						
Other Application Notes: Recommended CP5000 DFT is 1.5 mils and recommended DFT for CP2020 is 3.1 mils.						
Advantages:			Disadvantages:			
<ul style="list-style-type: none"> • Water-based primer with continuous temperature resistance to 1000°F • Topcoat has continuous temperature resistance to 400°F 			<ul style="list-style-type: none"> • Topcoat has high VOCs, isocyanates • Zinc-rich primer 			
Recommended For Testing: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Comments: Topcoat VOC levels are too high so removed from further consideration under this effort.					

Table 5 Carboline Carbozinc 11 WB/Carbotherm 3300/Carbocrylic 3359

Manufacturer: Carboline 2150 Schuetz Road St. Louis, MO 63146							Tel: 314.644.1000 www.carboline.com
Material Description: Carbozinc 11 WB is a water-based inorganic zinc rich primer. Carbotherm 3300 is a ceramic blend insulative composite coating formulated in a high temperature resistant acrylic binder. It inhibits heat transfer into or out of a structure and its insulative properties keeps structures exposed to solar radiation significantly cooler. Carbocrylic 3359 is a high performance finish with excellent corrosion resistance and exterior weathering properties.							
	VOCs	HAPs	EPCRA	CERCLA	RCRA	Other Information	
Primer Carbozinc 11 WB	0 g/L	N/A	Zinc	Zinc	N/A	<ul style="list-style-type: none"> Theoretical Coverage Rate for Carbozinc 11 WB is 321 ft² at 3 mils Theoretical Coverage Rate for Carbotherm 3300 is 70-75 ft² at 20 mils Theoretical Coverage Rate for Carbocrylic 3359 is 288 ft² at 2 mils 	
Intermediate Carbotherm 3300	0 g/L	N/A	N/A	N/A	N/A		
Topcoat Carbocrylic 3359	132 g/L	Dibutyl Phthalate	Dibutyl Phthalate	Dibutyl Phthalate	Dibutyl Phthalate		
Recommended Surface Prep: Surfaces must be clean and dry. Abrasive blast to a minimum SSPC-SP-6 finish with a 1-3 mil blast profile. An angular profile will provide maximum adhesion.							
Other Application Notes: Primer: Conventional spray is preferred; Intermediate: Airless Spray preferred; Topcoat: Pressure pot equipped with dual regulators. Primer DFT = 3-4 mils per coat; Intermediate: each coat = 15-25 mils (number of coats depends on operating temperature and degree of insulation needed); Topcoat DFT = 2-3 mils							
Advantages: <ul style="list-style-type: none"> Low VOCs Low odor Excellent thin-film insulation Corrosion protection 				Disadvantages: <ul style="list-style-type: none"> Zinc-rich primer 			
Recommended For Testing: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Comments: Recommend that this system be included in testing under this effort.						

Table 6 Carboline Carbomastic 15/Carboguard 893/Carbothane 134 MC

Manufacturer: Carboline 2150 Schuetz Road St. Louis, MO 63146							Tel: 314.644.1000 www.carboline.com
Material Description: Carbomastic 15 is a modified aluminum epoxy mastic that is high solids with outstanding performance properties. Carboguard 893 is a high solids corrosion resistant primer and intermediate coat. Carbothane 134 MC is a high gloss finish with exceptional weathering performance characteristics.							
	VOCs	HAPs	EPCRA	CERCLA	RCRA	Other Information	
Primer Carbomastic 15	88 g/L	Toluene, M-xylene, P-xylene, ethylbenzene	Aluminum, Toluene, M-xylene, P-xylene	Toluene, M-xylene, P-xylene, ethylbenzene	Toluene, M-xylene, P-xylene	<ul style="list-style-type: none"> Theoretical coverage rate: Carbomastic 15 = 288 ft² at 5 mils; Carboguard 893 = 412 ft² at 3 mils; Carbothane 134MC = 1123 ft² at 1 mil Intermediate coat adds additional barrier protection since the system is zinc free 	
Intermediate Carboguard 893	195 g/L	Toluene, MEK, M-xylene, ethylbenzene	Toluene, MEK Isopropanol, M-xylene, 1,2,4-trimethyl benzene	Toluene, MEK, M-xylene, ethylbenzene	Toluene, MEK, M-xylene		
Topcoat Carbothane 134 MC	54 g/L	ethylbenzene, Hexamethylene diisocyanate	1,2,4-trimethyl benzene, Hexamethylene diisocyanate	tert-butyl acetate, n-butyl Acetate, ethylbenzene, tert-butyl alcohol, Hexamethylene diisocyanate	N/A		
Recommended Surface Prep: Requires SSPC-SP-6 with a 2-3 mil surface profile for maximum protection.							
Other Application Notes: Recommended DFT for Carbomastic is 7-10 mils, for Carboguard 893 is 4-6 mils, and for Carbothane 134 MC is 2-2.5 mils. Conventional spray application: Pressure pot equipped with dual regulators, 3/8" ID minimum material hose, 0.070" ID fluid tip and appropriate air cap.							
Advantages: <ul style="list-style-type: none"> High solids, low VOC Excellent weatherability Excellent corrosion resistance 				Disadvantages: <ul style="list-style-type: none"> Carbomastic 15 Primer may lose gloss, discolor, and eventually chalk in sunlight exposure 			
Recommended For Testing: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Comments: This system was tested previously by NASA Corrosion Technology Laboratory and did not meet specified requirements so removed from further consideration under this effort.						

Table 7 Carboline Carbomastic 615/Carboguard 893/Carbothane 134 MC

Manufacturer: Carboline 2150 Schuetz Road St. Louis, MO 63146		Tel: 314.644.1000 www.carboline.com				
Material Description: Carbomastic 615 is a high performance epoxy that has excellent resistance to fresh and salt water exposures. Carboguard 893 is a high solids corrosion resistant primer and intermediate coat. Carbothane 134 MC is a high gloss finish with exceptional weathering performance characteristics.						
	VOCs	HAPs	EPCRA	CERCLA	RCRA	Other Information
Primer Carbomastic 615	172 g/L	M-xylene, P-xylene, O-xylene, Ethylbenzene, toluene	M-xylene, P-xylene, O-xylene, n-butanol, toluene	M-xylene, P-xylene, O-xylene, ethylbenzene, n-butanol, toluene	M-xylene, P-xylene, O-xylene, n-butanol, toluene	<ul style="list-style-type: none"> Theoretical coverage rate: Carbomastic 615 = 256 ft² at 5 mils; Carboguard 893 = 412 ft² at 3 mils; Carbothane 134MC = 1123 ft² at 1 mil Intermediate coat adds additional barrier protection since the system is zinc free
Intermediate Carboguard 893	195 g/L	Toluene, MEK, M-xylene, ethylbenzene	Toluene, MEK Isopropanol, M-xylene, 1,2,4-trimethyl benzene	Toluene, MEK, M-xylene, ethylbenzene	Toluene, MEK, M-xylene	
Topcoat Carbothane 134 MC	54 g/L	ethylbenzene, Hexamethylene diisocyanate	1,2,4-trimethyl benzene, Hexamethylene diisocyanate	tert-butyl acetate, n-butyl Acetate, ethylbenzene, tert-butyl alcohol, Hexamethylene diisocyanate	N/A	
Recommended Surface Prep: Requires SSPC-SP-6 with a 2-3 mil surface profile for maximum protection.						
Other Application Notes: Recommended DFT for Carbomastic 615 is 5-10 mils, for Carboguard 893 is 4-6 mils, and for Carbothane 134 MC is 2-2.5 mils. Conventional spray application: Pressure pot equipped with dual regulators, 3/8" ID minimum material hose, 0.070" ID fluid tip and appropriate air cap.						
Advantages: <ul style="list-style-type: none"> High solids, low VOC Excellent weatherability Excellent corrosion resistance Good abrasion resistance 				Disadvantages: <ul style="list-style-type: none"> Carbomastic 15 Primer may lose gloss, discolor, and eventually chalk in sunlight exposure 		
Recommended For Testing: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Comments: Recommend that this system be included in testing under this effort.					

Table 8 Carboline Thermaline 450

Manufacturer: Carboline 2150 Schuetz Road St. Louis, MO 63146							Tel: 314.644.1000 www.carboline.com
Material Description: Thermaline® 450 Novolac is a highly cross-linked, glass flake-filled polymer that offers exceptional barrier protection and resistance to wet/dry cycling at elevated temperatures. Suitable for up to 450°F, it provides excellent resistance to corrosion, abrasion, permeation, and chemical attack.							
	VOCs	HAPs	EPCRA	CERCLA	RCRA	Other Information	
Primer Thermaline 450 Novolac	250 g/L	MEK, M-xylene, P-xylene, O-xylene, ethylbenzene	M-xylene, P-xylene, O-xylene	MEK, M-xylene, P-xylene, O-xylene, ethylbenzene	MEK, M-xylene, P-xylene, O-xylene	<ul style="list-style-type: none"> This coating was tested under joint effort by NASA and Air Force Space Command at Vandenberg Air Force Base. The coating showed excellent corrosion resistance and withstood exposure to one launch, but did not fare well after exposure to second launch 	
Intermediate	N/A						
Topcoat	N/A						
Recommended Surface Prep: Surfaces must be clean and dry. Non-insulated surfaces should be cleaned to SSPC-SP-6 and have a surface profile of 2.0-3.0 mils.							
Other Application Notes:							
Advantages:			Disadvantages:				
<ul style="list-style-type: none"> Temperature resistance up to 450°F High-build single-coat capabilities Excellent resistance to thermal shock Superior abrasion and chemical resistance Ambient temperature cure 			<ul style="list-style-type: none"> Solvent based – VOC content Can only be applied to steel surfaces May lose gloss, discolor, and eventually chalk in sunlight exposure 				
Recommended For Testing: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Comments: This coating is more for Zone 1 applications rather than the Zone 4a applications that are the focus of this effort and was thus removed from further consideration at this time. Recommend that this coating be considered in future efforts that are looking at coatings for Zone 1 applications.						

Table 9 Carboline Thermaline 451

Manufacturer: Carboline 2150 Schuetz Road St. Louis, MO 63146							Tel: 314.644.1000 www.carboline.com
Material Description: Thermaline® 451 Micaceous Iron Oxide Epoxy is a flake-filled cycloaliphatic amine-cured epoxy phenolic novolac. Formulated for use in immersion service in water and hydrocarbons such as fuel oil, diesel fuel, and gasoline. It also provides edge protection and one-coat high-build application properties as well as moderately high temperature resistance.							
	VOCs	HAPs	EPCRA	CERCLA	RCRA	Other Information	
Primer Thermaline 451 Micaceous Iron Oxide Epoxy	203 g/L	MEK, M-xylene, P-xylene, O-zylene, ethylbenzene	M-xylene, P-xylene, O-zylene	MEK, M-xylene, P-xylene, O-zylene, ethylbenzene	MEK, M-xylene, P-xylene, O-xylene	<ul style="list-style-type: none"> This coating was tested under joint effort by NASA and Air Force Space Command at Vandenberg Air Force Base. The coating showed excellent corrosion resistance and withstood exposure to one launch, but did not fare well after exposure to second launch 	
Intermediate	N/A						
Topcoat	N/A						
Recommended Surface Prep: Sandblasting is recommended to remove rust and mill scale. Use commercial blast to SSPC-SP-6 for mild exposures and near white blast SSPC-SP-10 for severe exposures or immersion service.							
Other Application Notes:							
Advantages: <ul style="list-style-type: none"> Extreme chemical resistance Excellent thermal shock resistance Excellent edge protection Excellent abrasion/impact resistance Self-priming 				Disadvantages: <ul style="list-style-type: none"> Solvent based – VOC content 			
Recommended For Testing: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Comments: This coating is more for Zone 1 applications rather than the Zone 4a applications that are the focus of this effort and was thus removed from further consideration at this time. Recommend that this coating be considered in future efforts that are looking at coatings for Zone 1 applications.						

Table 10 Dow Corning DC 3-6077 RTV						
Manufacturer:		Dow Corning Corporation PO Box 994 Midland, MI 48686			Tel: 1-800-248-2481 www.dowcorning.com	
Material Description:		DC 3-6077 RTV Silicone Ablative can be used as an ablative coating, thermal barrier, and as a high temperature pressurization sealant. Its primary use is in the protection of launch structures exposed to direct rocket blast, and is easily removable after charring for recoating.				
	VOCs	HAPs	EPCRA	CERCLA	RCRA	Other Information
Primer						
Intermediate						
Topcoat						
Recommended Surface Prep:						
Other Application Notes:						
Advantages:		<ul style="list-style-type: none"> Withstands temperatures from -55°C to +200°C over extended periods; up to +3300°C for several minutes Low thermal conductivity Flexibility and service at temperature extremes Can be sprayed and trowelled 			Disadvantages:	
Recommended For Testing: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Comments: This coating is more for Zone 1 applications rather than the Zone 4a applications that are the focus of this effort and thus removed from further consideration at this time. Recommend that this coating be considered in future efforts that are looking at coatings for Zone 1 applications.				

Table 11 EonCoat							
Manufacturer: EonCoat, LLC 4000 Airport Drive NW Wilson, NC 27896-8648		Tel: 252.360.3110 Email: info@EonCoat.com www.EonCoat.com					
Material Description:		EonCoat™ ceramic barrier coatings are water-based, two-part spray coatings that form a dense, protective ceramic within minutes. The encapsulating coating both primes and topcoats.					
	VOCs	HAPs	EPCRA	CERCLA	RCRA	Other Information	
Primer Eon Coat	0 g/L	N/A	N/A	Phosphoric Acid	N/A	<ul style="list-style-type: none"> EonCoat ceramics covalently bond to steel; even oxidized steel. Limited exposure testing (40 days) conducted previously at the NASA Kennedy Space Center Corrosion Beach Test Site 	
Intermediate	N/A						
Topcoat	N/A						
Recommended Surface Prep: For iron or steel, a NACE 3 (commercial blast) or 5 (water jetting) cleaning will give plenty of bond strength as long as all old paint is removed.							
Other Application Notes: Apply on surfaces with temperatures from 35-200°F, 0-99% humidity. Apply using plural systems with stainless steel lowers and A/B mixing in spray gun. Can be topcoated with any quality coating, including high gloss.							
Advantages:		<ul style="list-style-type: none"> Water-based—No VOCs, HAPs, odors Excellent corrosion and abrasion resistance Able to withstand pHs of 3 to 11 One coat builds to any thickness Fire retardant (0% flame spread) Flexibility 			Disadvantages:		<ul style="list-style-type: none"> Requires Dual Component Spray equipment Coating has an exothermic reaction that creates a heat rise of 7-40°F Low Gloss coating
Recommended For Testing: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Comments: This alternative requires dual component spray equipment which is not currently used and stakeholders do not wish to purchase new equipment so this alternative was removed from further consideration for testing under this effort.						

Table 12 HALOX SW-111

Manufacturer: Halox 1326 Summer Street Hammond, IN 46320							Tel: 219.933.1560 www.halox.com	
Material Description: HALOX SW-111 is a white non-refractive, corrosion inhibiting pigment used in protective coating systems. It is recommended for use in most water-borne and solvent-borne epoxies and can be formulated into most water reducible resin systems and corrosion resistant caulks and sealants.								
	VOCs	HAPs	EPCRA	CERCLA	RCRA	Other Information		
Primer						<ul style="list-style-type: none"> • Synergistic properties have be found (in the areas of corrosion and humidity resistance) when HALOX SW-111 is used in conjunction with HALOX Zinc Phosphate. 		
Intermediate								
Topcoat								
Recommended Surface Prep:								
Other Application Notes: Recommended loading levels range from 5-10% based on total formula weight.								
Advantages:					Disadvantages:			
Recommended For Testing: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Comments: This is an additive for other commercially available products and thus does not meet the criteria specified and removed from further consideration for testing under this effort.							

Table 13 Heresite CSE 6400						
Manufacturer:		Heresite Protective Coatings, LLC 822 S 14 th Street Manitowoc, WI 54220			Tel: 920.684.6646 Email: sales@heresite.com www.heresite.com	
Material Description:		CSE-6400 epoxy coating is designed for services where flexibility of the coating is critical. Other key attributes of this coating is the excellent abrasion and chemical resistance, high gloss and smooth appearance.				
	VOCs	HAPs	EPCRA	CERCLA	RCRA	Other Information
Primer						• Theoretical coverage = 1572 ft ² /gal/mil
Intermediate						
Topcoat CSE-6400 Series Epoxy	24 g/L					
Recommended Surface Prep:						
Other Application Notes: Recommended DFT = 10 mils						
Advantages:			• Direct-to-Metal coating so no primer is required.		Disadvantages:	
					• Requires heated plural spray component equipment to apply.	
Recommended For Testing: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Comments: Heated plural spray component equipment is not currently used and stakeholders do not wish to purchase new equipment so this alternative was removed from further consideration for testing under this effort.				

Table 14 International Paint Intercure 202

Manufacturer: International Paint 3489 NW 167 th Street Miami, FL 33056 Tel: 305.620.9220 Email: protectivecoatings@akzonobel.com www.international-pc.com						
Material Description: Intercure 202 is a two component epoxy zinc phosphate/micaceous iron oxide primer, formulated on proprietary polymer technology, which provides rapid cure and overcoating even under low temperature conditions.						
	VOCs	HAPs	EPCRA	CERCLA	RCRA	Other Information
Primer	320 g/L					<ul style="list-style-type: none"> Theoretical coverage = 358 ft²/gal
Intermediate						
Topcoat						
Recommended Surface Prep: Abrasive grit blast clean to SSPC-SP-6. A sharp, angular surface profile of 2-3 mils is recommended.						
Other Application Notes: Recommended DFT = 3-4 mils						
Advantages:				Disadvantages:		
Recommended For Testing: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Comments: Product is not available in the U.S. and has high VOC levels so removed from further consideration for testing under this effort.					

Table 15 Polycoat USA						
Manufacturer:		Polycoat USA 14722 Spring Ave Santa Fe Springs, CA 90670		Tel: 562-921-7363 www.polycoatusa.com		
Material Description:		Polyprime 3042 is a two component, 100% solids, liquid applied primer developed for use on carbon steel, non-ferrous metal, fiberglass, PVC pipe, as well as concrete and masonry.				
	VOCs	HAPs	EPCRA	CERCLA	RCRA	Other Information
Primer Polyprime 3042	0 g/L	TBD	TBD	TBD	TBD	<ul style="list-style-type: none"> To be topcoated with Polycoat's plural component spray systems such as Polyeuro 1050H, Polyeuro 5502, Polyeuro MPL or polyaspartic topcoats such as Polycoat-Staingard 6000 or 6072, as well as moisture cured polyurethanes such as Polyglaze 100, Polycoat-Staingard 1110 or Diamondglaze 1000
Intermediate	N/A					
Topcoat TBD	TBD	TBD	TBD	TBD	TBD	
Recommended Surface Prep: Acceptable surface preparation includes SSPC-SP-6 (Commercial Blast) and SSPC-SP-3 (Power Tool/Hand Tool)						
Other Application Notes: Can be applied using an airless sprayer, brush, or phenolic resin core roller; Theoretical coverage = 300 ft ² /gal at recommended DFT of 4-6 mils						
Advantages:				Disadvantages:		
<ul style="list-style-type: none"> 100% solids Low viscosity epoxy coating Surface tolerant primer sealer Provides limited chemical resistance 				<ul style="list-style-type: none"> Not UV stable Difficult to clean up after it has cured 		
Recommended For Testing:	Comments: This product is not considered UV stable and was removed from further consideration for testing under this effort.					
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No						

Table 16 Polyset Ply-Zinc WB 18						
Manufacturer:		Polyset Company Inc. 65 Hudson Ave Mechanicville, NY		Tel: 518.664.6000 www.polyset.com		
Material Description:		Ply-Zinc WB 18 is a waterborne inorganic zinc coating designed to protect structures by providing corrosion resistance and heat resistance up to 700°C. It is a High Ratio Zinc Silicate (HRZS) product that was originally developed by NASA.				
	VOCs	HAPs	EPCRA	CERCLA	RCRA	Other Information
Primer Ply-Zinc WB 18	0 g/L	N/A	Zinc	Zinc	N/A	<ul style="list-style-type: none"> Theoretical coverage for Ply-Zinc WB 18 is 2 mils/330 ft² (topcoated) or 4 mils/165 ft² (no topcoat) Theoretical coverage for Ply-Guard ME is 275 ft² at 4 mil Ply-Zinc WB 18 is currently being tested by Navy Research Lab as a universal primer under polysiloxane coatings and Army Research Lab under CARC
Intermediate	N/A					
Topcoat Ply-Guard ME	158 g/L	Xylene, Ethyl Benzene	Xylene	Xylene, Ethyl Benzene, n-Butyl alcohol	Xylene, n-Butyl alcohol	
Recommended Surface Prep: All surfaces to be coated must be abrasive blasted to a minimum SSPC-SP-6 "Commercial" finish. When used in severe surface environment, or being used as single coat system, SSPC-SP-10 "Near-White" finish is recommended.						
Other Application Notes: While mixing, add Part B to Part A with constant stirring. After mixing, pour product through a 40-mesh screen into a pressure pot or second pail. Continually agitate while applying mixed materials. Recommended DFT is 4 mils with no topcoat and 2 mils if topcoated.						
Advantages:				Disadvantages:		
<ul style="list-style-type: none"> Low VOCs Excellent adhesion to steel Primer has high temperature resistance Primer provides cathodic protection Primer can be used as a non-skid Topcoat has excellent edge retention 				<ul style="list-style-type: none"> Contains zinc silicate and zinc oxide 		
Recommended For Testing:	Comments: Recommend that this system be included in testing under this effort.					
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Table 17 Polyset Ply-Guard ME						
Manufacturer:		Polyset Company Inc. 65 Hudson Ave Mechanicville, NY		Tel: 518.664.6000 www.polyset.com		
Material Description:		Ply-Guard ME is a two component, chemical resistant mastic epoxy coating system designed to perform in a broad range of severe environments such as strong acids/alkalis, and organic solvents. It can be used as a primer and should be used wherever chemical and abrasion resistance and outstanding adhesion are essential.				
	VOCs	HAPs	EPCRA	CERCLA	RCRA	Other Information
Primer Ply-Guard ME	158 g/L	Xylene, Ethyl Benzene	Xylene	Xylene, Ethyl Benzene, n-Butyl alcohol	Xylene, n-Butyl alcohol	<ul style="list-style-type: none"> • Ply-Guard ME can be used as a single coat system, or as a primer for a multi-coat system. • Theoretical coverage: 275 ft² at 4 mil
Intermediate	N/A					
Topcoat	N/A					
Recommended Surface Prep: All surfaces to be coated must be clean, sound, and sandblasted to a SSPC-SP-10 "Near-White" finish immediately before application.						
Other Application Notes: For conventional spray applications, use bottom feed outlet pressures pot with dual regulators; Gun: Binks 7E2, Fluid Tip: 0.015-0.021"; Spray Shape: Round; Atomization Pressure: 30 psi; Fluid Pressure: 25 psi; Recommended DFT = 4-6 mils						
Advantages:				Disadvantages:		
<ul style="list-style-type: none"> • Low VOCs • Fast Dry • Excellent adhesion to steel • Excellent edge retention • No topcoat required but compatible with a variety of urethane, epoxy, or acrylate topcoats 				<ul style="list-style-type: none"> • Contains zinc oxide 		
Recommended For Testing:		Comments: Recommend that this one coat system be included for testing under this effort.				
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						

Table 18 Pratt and Lambert Coatings						
Manufacturer:		PRATT & LAMBERT PAINTS 101 Prospect Avenue N.W. Cleveland, OH 44115			Tel: 216.566.2902 www.paintdocs.com	
Material Description:		Universal Acrylic HP Primer is an advanced technology, self crosslinking acrylic single component, corrosion resistant, water-based primer designed for both new construction and maintenance application. Its moisture resistant properties prevent flash rusting and make it ideal for both new construction and maintenance applications. Acrylic Waterborne DTM is a single component, corrosion resistant waterborne enamel designed for light to moderate duty in industrial and commercial applications.				
	VOCs	HAPs	EPCRA	CERCLA	RCRA	Other Information
Primer Universal HP Acrylic Primer Z6631	96 g/L	N/A	N/A	N/A	N/A	<ul style="list-style-type: none"> • Use one coat of primer with two coats of DTM • Primer Z6631 theoretical spread rate = 156-312 ft²/gal • DTM Z6841 theoretical spread rate = 140-225 ft²/gal
Intermediate	N/A					
Topcoat Acrylic Waterborne DTM Z6841	0 g/L	N/A	N/A	N/A	N/A	
Recommended Surface Prep: Surface must be free of dirt, oil, moisture, grease, and other contaminants. Ferrous Metal should be cleaned according to SSPC SP-2 or SP-3. For optimum protection, blast clean according to SP-6. Galvanizing should be exterior weathered for 6 months prior to painting. Remove chromate pretreatments by abrasive blasting. Do not use hydrocarbon solvents for cleaning.						
Other Application Notes: Apply by airless or conventional spray. Brushing okay for smaller areas. Recommended DFT for Primer Z6631 is 2.0-4.0 mils and for DTM Z6841 it is 2.5-4.0 mils						
Advantages:				Disadvantages:		
<ul style="list-style-type: none"> • Zinc free • Low VOC • Single component, fast drying • Clean up with soap and water 				<ul style="list-style-type: none"> • Designed for light to moderate duty applications • Primer Z6631 color is off-white 		
Recommended For Testing: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Comments: Recommend that this system be included in testing under this effort.					

Table 19 Sherwin-Williams Fast Clad Coating System						
Manufacturer:		The Sherwin-Williams Company 101 Prospect Ave N.W. Cleveland, OH 44115			Tel: 800-474-3794 www.sherwin-williams.com	
Material Description:		The Fast Clad system consists of ultra high solids epoxy amine coatings engineered for immersion service in sea water ballast tanks, fuel/sea water ballast tanks, and petroleum storage tanks. The rapid return to service and high build, edge retentive properties of this coating provide superior protection compared to conventional epoxies.				
	VOCs	HAPs	EPCRA	CERCLA	RCRA	Other Information
Primer Fast Clad Epoxy Primer	<85 g/L	N/A	N/A	N/A	N/A	<ul style="list-style-type: none"> Theoretical coverage of each coating = 1568 ft²/gal at 1 mil
Intermediate	N/A					
Topcoat Fast Clad ER Epoxy	<85 g/L	N/A	N/A	N/A	N/A	
Recommended Surface Prep: Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign materials to ensure adequate adhesion. Minimum recommended surface preparation is SSPC-SP-6 with a 2-3 mil profile; for better performance use SSPC-SP-10.						
Other Application Notes: Plural Component Equipment (Pressure: 4000 psi, Hose: 3/8" ID, Tip: .021-.025", Pump heater setting: 70-80, Material temperature at gun tip: 85-130°F. Brush for stripe and repair only. Recommended DFT for Primer is 4-8 mils and for Epoxy it is 18-22 mils						
Advantages:				Disadvantages:		
<ul style="list-style-type: none"> One coat protection Fast return to service Low VOC Low odor Dry to walk-on within four hours Designed for plural-component application equipment Epoxy has greater than 70% edge build retention 				<ul style="list-style-type: none"> Primer is blue in color Clean up requires MEK or Reducer R7K104 (primer) or R6K10 (Topcoat) Requires dual component spray equipment 		
Recommended For Testing:	Comments: Dual component spray equipment is not currently used and stakeholders do not wish to purchase new equipment so this alternative was removed from further consideration for testing under this effort.					
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No						

Table 20 Shield Products Fluoropolymer Coatings						
Manufacturer: Shield Products Jacksonville, FL 32223		Tel: 904.880.6060 Email: shieldproducts@comcast.com www.shieldproducts.com				
Material Description:		Fluoropolymer coatings are blends of high performance resins and fluoropolymer lubricants. These single coat thin films provide excellent corrosion and chemical resistance. Other benefits include reduced friction, resistance to galling, non-stick, non-wetting, electrical resistance, and abrasion resistance.				
	VOCs	HAPs	EPCRA	CERCLA	RCRA	Other Information
Cleaner/Primer SKU40003	0 g/L	N/A	N/A	Phosphoric Acid	N/A	
Intermediate	N/A					
Topcoat SKU20059VC	0 g/L	N/A	1,2,4-trimethyl benzene	N/A	N/A	
Recommended Surface Prep:						
Other Application Notes: Conventional Spray: Orifice size = 0.055", PSIG = 35-45, Fluid Flow/min = 10-16 oz, Viscosity Zahn #2 = 27-35"; HVLP: Orifice size = 0.055", PSIG = 4-8, Fluid Flow/min = 10-15 oz, Viscosity Zahn #2 = 27-35						
Advantages:				Disadvantages:		
<ul style="list-style-type: none"> • Excellent corrosion and chemical resistance • Single coat thin film • Reduced friction, non-stick, non-wetting • Electrical resistance • Abrasion resistance 				<ul style="list-style-type: none"> • Cost of material 		
Recommended For Testing: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Comments: Recommend that this system be included in testing under this effort.					

Table 21 Tesla NanoCoatings						
Manufacturer: Tesla NanoCoatings Limited 1311 20 th Street SW Massillon, OH 44647		Tel: 330.837.1840				
Material Description:		TESLAN ZN Primer uses fullerene nanotubes, also called buckytubes, in a network of carbon nanotube ropes which strengthens and stiffens the film while building an electron path through the binder system. The mechanical and electrical properties of the nanotubes contribute to the corrosion control properties of the coating.				
	VOCs	HAPs	EPCRA	CERCLA	RCRA	Other Information
Primer TESLAN ZN Primer (Low VOC)	200 g/L	N/A	Zinc, 1,2,4-trimethyl benzene	Zinc	N/A	<ul style="list-style-type: none"> Currently being tested by Army at Ft. Bragg and Ft. Lewis
Intermediate	N/A					
Topcoat TESLAN Low VOC Urethane Topcoat (XUR-12041)	200 g/L	TBD	TBD	Butyl Acetate	TBD	
Recommended Surface Prep: Requires SSPC-SP-10						
Other Application Notes: Standard spray equipment (airless, conventional), Recommended DFT is 3-5 mils						
Advantages: <ul style="list-style-type: none"> Low VOCs Lower amounts of zinc in formula Can be used with or without topcoat 				Disadvantages: <ul style="list-style-type: none"> Contains zinc Solvent-based Cost (approx. \$200/gal) 		
Recommended For Testing: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Comments: Recommend that this system be included in testing under this effort.					

Table 22 TIGER Drylac TIGER SHIELD

Manufacturer: TIGER Drylac U.S.A., Inc. 1261 East Belmont Street Ontario, CA 91761							Tel: 909.930.9100 Email: tiger@tigerdrylac.com www.tigerdrylac.com	
Material Description: TIGER SHIELD is a two coat system comprising a corrosion protective primer as a base coat and an opaque weather resistant TIGER Drylac Powder Coating.								
	VOCs	HAPs	EPCRA	CERCLA	RCRA	Other Information		
Primer	N/A							
Intermediate	N/A							
Topcoat TIGER Drylac®	0 g/L							
Recommended Surface Prep:								
Other Application Notes:								
Advantages:				Disadvantages:				
<ul style="list-style-type: none"> • Zinc free primer available • Very good corrosion protection • Very good mechanical properties • Good chemical resistance • Especially suited for porous substrates • Very good edge coverage • Good intercoat-adhesion 				<ul style="list-style-type: none"> • Powder coating so requires oven cure 				
Recommended For Testing: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Comments: Powder coating that must be cured in an oven so not applicable to our application and thus removed from further consideration for testing under this effort.							

Table 23 Ultimate Linings UL TK 22

Manufacturer: Ultimate Linings 6630 Roxburgh Dr. #175 Houston, TX 77041							Tel: 713.466.0302 www.ultimatelinings.com
Material Description: UL TK 22 is a revolutionary fast set, 100% solids, flexible two component spray elastomer that gives outstanding physical performance against abrasion tear and impact. It is relatively insensitive to moisture and temperature for application in most conditions.							
	VOCs	HAPs	EPCRA	CERCLA	RCRA	Other Information	
Primer							
Intermediate							
Topcoat							
Recommended Surface Prep: Abrasive Blast to SP-10 (Near-white) with a surface profile of 1.2 to 2.2 mils. Remove all oil, grease and weld splatter, and round off any sharp edges. Vacuum all surface to remove dust, etc., prior to application.							
Other Application Notes: Both Part-A and Part-B material should be preconditioned at 75-85°F before application. Recommended surface temperature must be at least 5°F above dew point. Material should be applied using a plural component, heated, high pressure 1:1 spray mixing equipment. Both parts should be sprayed at a min. 2000 psi and at temperatures above 160-170°F. Material should be sprayed in smooth, multidirectional passes to improve uniform thickness and appearance.							
Advantages:				Disadvantages:			
<ul style="list-style-type: none"> • No VOCs and Little to No Odor • Weather Tolerant Curing • Excellent Resistance to Thermal Shock • Flexible, Waterproof, Seamless and Resilient • Unlimited Mil Thickness in One Application • Excellent Bond 				<ul style="list-style-type: none"> • Contains isocyanates 			
Recommended For Testing:	Comments: This product is designed as a protective lining rather than a corrosion resistant coating as needed for this effort so removed from further consideration for testing under this effort.						
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No							

4. SUMMARY

Sixteen (16) coating alternative manufacturers were identified as making potential replacements. These alternatives were identified through literature searches and direct vendor queries. Manufacturers and distributors of the identified alternatives were contacted, and technical, environmental, safety, and occupational health information about the alternatives was gathered.

It was decided in stakeholder technical meetings that the goal of this effort is to identify and qualify environmentally-preferable coatings for addition to the APL in NASA-STD-5008B. Initially, the search for replacement materials or processes included all the identified alternatives to allow for the consideration of all possible new technologies. Of the initially identified alternatives, those selected for testing are:

- One Coat System
 - A&E Group Alocit 28.15 Standard Grade Epoxy Coating Primer/Finish
- Two Coat System
 - Primer: A&E Group Alocit 28.14 Epoxy Coating-Zinc Primer
 - Topcoat: A&E Group Alocit 28.15 Standard Grade Epoxy Coating Primer/Finish
- Three Coat System
 - Primer: Carboline Carbozinc 11 WB
 - Intermediate: Carboline Carbotherm 3300
 - Topcoat: Carboline Carbocrylic 3359
- Three Coat System
 - Primer: Carboline Carbomastic 615
 - Intermediate: Carboline Carboguard 893
 - Topcoat: Carboline Carbothane 134 MC
- Two Coat System
 - Primer: Polyset Ply-Zinc WB 18
 - Topcoat: Polyset Ply-Guard ME
- One Coat System
 - Primer: Polyset Ply-Guard ME
- Two Coat System
 - Primer: P&L Universal HP Acrylic Primer Z6631
 - Topcoat: P&L Acrylic Waterborne DTM Z6841
- Two Coat System
 - Primer: Shield Products SKU40003
 - Topcoat: Shield Products SKU20059VC
- Two Coat System
 - Primer: Tesla TESLAN ZN Primer (Low VOC)
 - Topcoat: TESLAN Low VOC Urethane Topcoat (XUR-12041)

Information, including Material Safety Data Sheets, for the alternatives selected for testing under this project is provided in the Appendix.

APPENDIX

Product Information Material

A-1

A&E Systems, LLC

ALOCIT COATINGS

Our coatings have a long history of problem solving around the world. They are uniquely engineered to adhere on the most challenging substrates, while at the same time maintaining a high level of usability - without sacrificing environmental standards. 100% solids and VOC free, Alocit coatings can be applied using brush, roller or spray (airless or using dual-component pump). High standards of manufacture and quality control, constantly monitoring color consistency and application quality, is at the heart of Alocit's ability to keep on performing, even when the going gets tough.

So...what makes Alocit so great?

You can apply it to the wettest of surfaces

The flange bolts shown below are from an application to constantly sweating pipes running at 3°C in high humidity on an industrial cooling system, under the Petronas Towers in Malaysia.



It can be used on oily surfaces

Oil-soaked bund areas, can be coated with Alocit, preventing escape into the environment. The floor below is in a railroad maintenance tunnel, covered in oil before being coated with Alocit.



It gives fantastic adhesion

Tests on the USS Detroit showed adhesion beyond the ability of the testing equipment they were using (above 1000 p.s.i.)



'Performing flawlessly in severe service'

US NAVY REPORT



It is very hard wearing and long-lasting

The Dutch Navy use Alocit because it stands up so well in its tanks to abrasion. In Germany, on water treatment plants, case histories show more than 30 years constant use in aggressive waste water without deterioration

Use it straight after water-jetting

Independent testing, using coatings on surfaces exclusively prepared using UHP water-jetting, showed Alocit to have nearly twice the adhesion of its nearest rival. NAVSEA PPIs allow Alocit 28.15 to be used without drying surfaces.

Where you can use it ...

On dry or wet surfaces
Steel or concrete
On oily surfaces
In fresh or salty water
Down to 36°F

Why you should use it ...

Hard wearing
Easy to apply
Resists MIC & ALWC
Lasts up to 30 years

What industries are using it ...

On and Offshore
Marine installations
Government & Utilities
Military Organisations



Alocit in action ...



Shell in Texas on sweating pipes

Competitive testing by Shell to find the most suitable coating for cold pipes (2°C), streaming with water in the warm Gulf climate, found Alocit 28.15 to be the most suitable coating for such situations. Following testing, Alocit was given global approval by Shell.



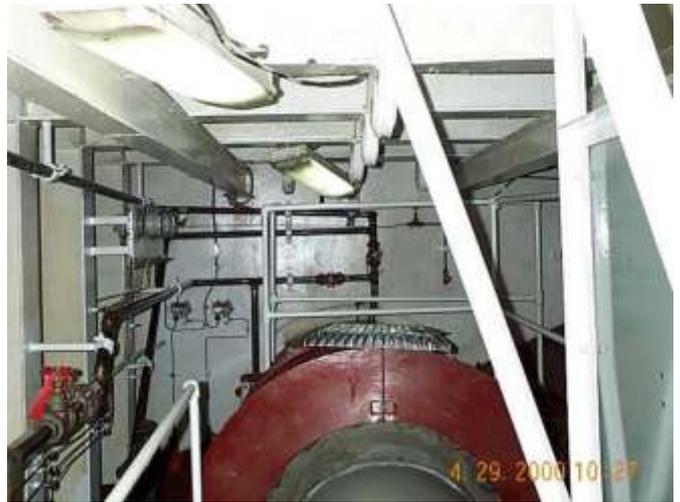
Alabama & New York Harbor on sheet piles

Chosen because Alocit 28.15 adheres so strongly and is surface tolerant, with no need to worry about oil or water contamination. Alocit coatings have been in use by the Port Authority of New York & New Jersey for many years – on tunnels, airports and sheet piles in the harbor.



After water-jetting

Complete refurbishment of large SBM in tropical marine conditions. Water jetting with garnet was used to prepare surfaces - with painters following immediately after. Shell engineers estimated 30% cost saving using Alocit.



USS Detroit

A full-scale Alocit application in the Detroit's port shaft alley bilge was completed in 2000 as part of the NAVSEA approval process. A NAVSEA commissioned inspection by CES in 2001 found the Alocit 28.15 coating to be 'performing flawlessly in severe service'.

US Army Corps of Engineers

Alocit is one of only three coatings listed by USACE as meeting its criteria for application on wet areas – and it's the only one of them that can be applied underwater!

Rapid Transit System in Singapore

Using an Alocit primer, steam-cured concrete casting sections for the MRT tunnel were coated within minutes, without waiting for the concrete to dry instead of waiting for the moisture content of the concrete to fall. Removing the waiting, storage and extra handling brought major cost savings



Product Information

Alocit 28.15 Epoxy Coating Finish

Outstanding adhesion on oily & damp surfaces, under water and in splash zone. Hard-wearing, easily-cleaned two-part epoxy finish for concrete, steel and ironwork. Resistant to light acids, oils, sewage, mechanical wear and chemical attack. Coating can be applied on dry, oily, wet, or even underwater surfaces. High build (200 - 400 microns) per coat.

Alocit 28.14 Epoxy Primer Coating

100% solids, zero VOCs two-pack epoxy primer containing zinc. Outstanding adhesive qualities on both wet and dry surfaces, providing excellent corrosion control. Can be used in conjunction with Alocit 28.15 as a primer to blasted surface. Indispensable where wet or moist or slightly oily conditions exist.

Alocit 28.96 Thixotrope

A thixotropic variant of 28.95 specifically designed for vertical and overhead application - Use as an adhesive on construction materials or filler to repair cracks and holes.

Alocit 28.95 Epoxy Primer

Two-part, clear epoxy primer with a low viscosity for repair of cracked concrete, even if damp or wet. Use on dry or damp surfaces as a bonding agent, sealer, injection sealer or primer for repair and construction. Primer for other Alocit products.

AUSTRALIA: A&E Systems PTY Ltd, 3/20 Clark Court, Bibra Lake, Perth WA 6163
Tel: +61 (0)8 94183688 Fax: +61 (0)8 94183588 Email: aus@ae-sys.com

EUROPE: A&E Systems Ltd, 3 Charles Wood Road, Dereham, NR19 1SX, UK
Tel: +44 (0)1362 694915 Fax: +44 (0)1362 695350 Email: uk@ae-sys.com

MALAYSIA: A&E Systems Sdn Bhd, 26 Jalan Pendaftar U1/54, Seksyen U1, 40150 Shah Alam, Selangor Darul Ehsan, Malaysia. Tel: +60 (0)3-5569 4277
Fax: +60 (0)3-5569 4377 Email: mal@ae-sys.com

USA: A&E Anti-Corrosion Systems LLC,
150 Hilden Rd, Ste 301, Ponte Vedra, FL 32081, USA
Tel: +1 904 819-8985 Fax: +1 904 819-1430
Email: usa@ae-sys.com

ALOCIT SYSTEMS
HIGH PERFORMANCE
PAINTS AND COATINGS

A&E
SYSTEMS
ALOCIT & ENVIROPEEL

www.ae-sys.com



ALOCIT 28 SERIES SPECIFICATION AND GUIDELINES



REVISED 11-05

1 Using Alocit Solvent Free Products

Note: All Alocit materials shown are 100% solids and surface tolerant

Application Conditions	Product
Wet, Dry, Underwater, Oily	28.15 200-400 microns/8-16 mil epoxy primer/finish available in colors*
Wet, Dry, Underwater, Oily	28.14 100-200 microns/4-8 mils zinc rich epoxy
Wet, Dry, Oily	28.95 Low viscosity epoxy primer/sealer
Wet, Dry	28.96 Thixotropic epoxy gel for filling cracks and holes

* STANDARD COLORS: White RAL 9003, Grey RAL 7004, Black RAL 9017
Non Standard Colors to BS/RAL/FED STD 595

ALOCIT 28.15 EPOXY COATING PRIMER/FINISH

STANDARD GRADE (All temps above water - underwater below 17°C/63°F)
TROPICAL GRADE (for underwater application at temperatures above 17°C/63°F)

FEATURES

- Outstanding adhesion, on wet, oily surfaces & underwater
- Surface tolerant
- Environmentally friendly - solvent free and no heavy metals
- Proven corrosion protection, including Accelerated Low Water Corrosion (A.L.W.C.)
- Approved for use by US Navy for Bilges, Freeboards, Sanitary Spaces, Rast Track, Vent Plenums, Ducts, Trunks and Overboard Discharge Piping
- Approved by the US Corps of Engineers for wet area application
- Abrasion resistant
- A protective coating resistant to many alkalis, some acids, oils, sewage, mechanical wear and chemical attack
- High build (200 - 400 microns/8-16 mil) per coat
- DNV B1 rating for Ballast Tanks

USAGE

As a hygienic, easily cleaned finish for concrete, steel, ironwork providing a hard wearing attractive surface.

For preservation of steel structures, industrial floors, cellars, bund areas, laundries, sheet pilings, locks and channels, docks, harbors, oil rigs, oil tanks, ships hulls and bilges, bridges, conduits, caverns, industrial plants for wet or oily surfaces, railway and subway tunnels, underpasses, swimming pools etc. Can also be used as self-priming coat over minimal surface prep.



ALOCIT 28.14 EPOXY COATING-ZINC PRIMER

FEATURES

- Outstanding adhesion on oil contaminated and underwater surfaces
- Environmentally friendly - solvent-free and no heavy metals
- Long term stability
- Especially designed for application onto clean, profiled steel
- Excellent corrosion protection, Accelerated Low Water Corrosion (A.L.W.C.)
- For use in temperate and tropical climates
- Excellent performance in marine environments
- Indispensable in industry where moist, wet or slightly oily conditions exist

USAGE

Two-pack epoxy primer containing zinc. Solvent-free with outstanding adhesion qualities on both wet and dry surfaces providing excellent corrosion control. Should be used as a primer to clean, profiled steel surfaces in conjunction with Alocit 28.15 or other compatible finishing coat.

ALOCIT 28.95 EPOXY PRIMER/ SEALER

FEATURES

- Outstanding adhesion, on damp and oil contaminated surfaces
- A two part, clear epoxy resin, free of solvents, with a very low viscosity
- A sealant with low permeability to moisture
- Fully hardens at temperatures down to 2°C/34°F
- Bonds structural elements of almost any kind firmly
- Bonds new concrete to old concrete
- Usable as a mortar if mixed with quartz or finely crushed stone
- High wear resistance

USAGE

For repair of cracked concrete even if damp or wet, bonding of broken concrete pieces, steel anchors or new concrete to old concrete. Use on dry or damp or oily surfaces as a bonding agent, sealer, injection sealer or primer for repair and construction of highways etc.

- Primer for Alocit and other products, on non metallic substrates
- Adhesive for structural materials Injection sealer and adhesive to improve resistance and restore material strength
- Floor covering with high wear resistance when filled with quartz, or a mortar for repair of damaged concrete.
- Non-hygroscopic bonding agent for insulation material, particularly granular insulation

ALOCIT 28.96 THIXOTROPIC FILLER

FEATURES

- A sealant, which is also usable as a mortar if mixed with small amounts of quartz
- A two component, clear epoxy resin, free of solvents, with the consistency of a gel
- Bonds concrete, artificial and natural stone, wood, metal, bricks, ceramics, fiberglass, plastics, insulation and many other materials firmly and can be applied on dry or damp surfaces.
- Specifically designed for vertical and overhead application
- An adhesive for ceramic, concrete, natural or artificial stone, bricks, insulation
- A mortar to level, fill and repair cracks, small indentations or holes and to bond broken edges

USAGE

For bonding of ceramic tiles on concrete or directly onto existing ceramic tiles; for bonding of broken pieces of concrete, stone, etc; for use in cellars, garages, laundries and vaults, silos, internal sealing of tunnels, conduits, and caverns, repair of swimming pools; for industrial plants, railway and subway tunnels, underpasses and bridges, harbors, locks, dams and channels, for coating of wood and plastic materials. Also used as the base coat on vapor barrier systems for insulation.

2.0 PROJECT EXECUTION

2.1 INITIAL SURVEY

Prior to making a quote or deriving a cost the following details should be ascertained:

- Accessibility to work site and to work area - scaffolding etc
- Substrate type and condition - corrosion degree (If surface preparation is required)
- Type and age of substrate e.g. Round or Sheet Piles
- Zone rating - Hazard / Non Hazardous (Oil & Gas)
- Allowable method of surface preparation - Grit blasting or Water Jetting.
- In situ operation or shut down activity.
- Permit to work, submission of Job Hazard Analysis & Work Procedure.
- Allowable working hours and possibility of extension.
- Equipment certification.
- Personal health check - Drug & Alcohol Test.
- Personal Protection Equipment requirement.
- Client's Quality Control requirement - Wet/Dry Film Thickness etc.
- Client's requirement on job completion documentation.
- Water/Ambient temperature at time of application.

2.2 THEORETICAL COVERAGE RATE M² PER KG / Ft² per Pound

DFT in Microns/Mil	28.14		28.15		28.95	
	M ² /Kg	Ft ² /lb	M ² /Kg	Ft ² /lb	M ² /Kg	Ft ² /lb
1000/40	0.54	2.64	0.60	2.93	0.92	4.49
500/20	1.10	5.27	1.20	5.86	1.84	8.98
250/10	2.20	10.55	2.40	11.72	3.70	17.97

Note: US Gallon (3.7 litres) of material will cover 1600 ft² at 25 microns/1mil
See weight/volume table below

Suggested wastage factor

28.15 10% - 20% depending on profile/underwater application etc
28.14/28.15 - 20% -30% for Airless Spraying. 28.95 - 10% - 20% for absorption

CONVERSION OF ALOCIT PACKING SIZES IN KG TO LITRES & US GALLONS*

with a specific gravity of 1.55 mixed

1.5Kg	= 0.95 Litres	= 1 Quart
3.0Kg	= 1.9 Litres	= 0.5 Gallon
6.0Kg	= 3.7 Litres	= 1 Gallon
30 Kg	= 19.36 Litres	= 5 Gallons

* UK/Standard imperial gallon is 4.5 litres



3.0 WORK PROCEDURE FOR ALOCIT APPLICATION

3.1 SURFACE PREPARATION: STEEL - ABRASIVE BLASTING

Remove all millscale, corrosion deposits, marine growths, chemical compounds etc. Check for rogue peaks and laminations, take remedial action. Remove dust and other contamination. A blast profile of between 50 and 100 μ / 2 - 4 mil is the aim, the basic standards for blast cleaning are the Swedish Pictorial Standards / ISO-8501-1/ SSPC/NACE. We recommend SA 2/SP6/NACE 3 as a minimum, and SA 2.5 /SP10/NACE2 as the optimum.

3.2 SURFACE PREPARATION: STEEL - MECHANICAL

Mechanical cleaning by needle gunning, rotary wire brushing etc. Remove all contamination/dust, flaking paint etc.

3.3 SURFACE PREPARATION: STEEL - HYDROBLASTING

Hydroblasting to remove all previous coatings, corrosion, marine growth etc. High flow rates and high speed rotating heads are recommended. Blast media can also be added for increased effectiveness. Some old steel may not respond to standard cleaning techniques. In such cases ultra-high pressure (UHP) water blasting may be required with additional testing for residual salt levels.

3.4 SURFACE PREPARATION: CONCRETE

The substrate should be free from high levels of laitence, dust, large surface voids etc. Sometimes brush blasting (dry) or hydroblasting are appropriate methods, especially for large areas, large cracks/surface voids should be repaired prior to coating.

3.5 SURFACE PREPARATION: NON-FERROUS METALS

Light surface abrading, remove dust etc. If there are any queries re surface preparation prior to applying the Alocit coating system, please contact our technical dept. for further advice.

3.6 SURFACE PREPARATION: NON-METALLIC

If possible, surface abrading, then remove dust etc. If in doubt, apply a test patch before coating.

3.7 FLASH RUST & CONTAMINATION

Primer coat should be applied as soon as blasting and cleaning is completed with surfaces cleaned to SSPC SP12 2L. All traces of residual dust and abrasive blast medium should be removed prior to primer coat.

NB: For underwater abrasive blasting a larger grade of garnet should be used.

3.8 PRIMER COAT/STRIPE COATING EDGES OF STEEL ABOVE WATER LINE

Primer coat/stripe can be Alocit 28.14 or 28.15.

3.9 APPLICATION: MANUAL ON WET, OILY AND UNDERWATER

Apply Alocit 28.15 by brush using a firm circular motion to spread the coating evenly over the surface. Pay particular attention to pitted areas to ensure that they fully covered by the coating and all edges and valleys of the pits are covered. Apply the coating to achieve specified* dry film thickness per coat.

3.10 APPLICATION: SPRAY ON DRY SURFACE

Apply 28.14 coating in two separate and distinct coats by airless spray using a 68:1 ratio** spray pump.

3.11 OVERCOATING

Alocit 28.14/28.15 should be overcoated before it has reached maximum cure stage. It is good practice to use 2 different colours to distinguish any damage to the coating/substrate, to aid in application and to provide an early warning of damage to the top coat. Curing is temperature dependent. Refer to the technical data sheet for details.

3.12 APPLICATION ON WET, SUBMERGED OR PITTED SUBSTRATES

Apply 28.15 by brush method using circular motion to spread the coating evenly over the surface. Pay particular attention to pitted areas to ensure that they are fully covered. Alocit K1 pump unit can be used for application underwater.

3.13 APPLICATION TO DRY SURFACES (AT LOW WATER)

Apply 28.14/28.15 in two separate and distinct coats by airless spray pump of 68:1 ratio spray pump to achieve specified dry film thickness per coat. Alocit 28.15 should be overcoated with the second coat before it has reached maximum cure stage. Curing is temperature dependent. Refer to technical data sheet for details. Alocit 28.15 can be overcoated underwater. When applying Alocit 28.15 by airless spray above water, blow all excess water off the surface of the preceding coat before commencing application.

3.14 APPLICATION ON CONCRETE

Surfaces should be free from contamination. Apply Alocit 28.95 by brush, roller or airless spray, to achieve specified dry film thickness*. On damp/green concrete apply Alocit 28.15 by brush method using firm circular motion to spread the coating evenly over the surface. Appropriate allowance should be considered for absorption when estimating coating material to be used. Alocit 28.95 should be over coated before it has reached maximum cure stage.

* Applied thickness will be dependent on the surface and service conditions.

** When spraying 28.15 Tropical an Airless Pump Ratio of 74:1 may be needed.



3.5.15 APPLICATION GUIDELINES

- Keep product cool. Do not expose coating material to direct sunlight or heat before mixing or adding hardener. Pot life will be severely shortened if product becomes overheated.
- In damp, wet, oily, submerged or pitted areas a firm circular motion must be used to apply Alocit 28.14/28.15 or 28.95.
- Coverage rates are just a guide line. For further information on specification contact Alocit Technical Department. Refer to Technical Data Sheet.
- Please note Alocit 28.95 is not designed for application underwater.
- Apply 28.14 only to a rust free surface
- When airless spraying ensure surface is dry. Never spray over a wet surface.



AVAILABLE WORLDWIDE ONLY FROM



AUSTRALIA

A & E Systems PTY Limited
3/20 Clark Court, Bibra Lake, Perth WA 6163, Australia
Tel: +61 (0)8 94183688 Fax: +61 (0)8 94183588
Email: aus@ae-sys.com

EUROPE

A & E Systems Limited
3 Charles Wood Road, Dereham, NR19 1SX, England
Tel: +44 (0)1362 694915 Fax: +44 (0)1362 695350
Email: uk@ae-sys.com

MALAYSIA

A & E Systems Sdn Bhd
No 37B, Jalan USJ 21/11, UEP Subang Jaya,
47600 Subang Jaya, Selangor, Malaysia
Tel: +60 (0)3 80246277 Fax: +60 (0)3 80236090
Email: mal@ae-sys.com

USA

A & E Anti-Corrosion Systems LLC
150 Hilden Road, Ste #301, Ponte Vedra, Florida 32081, USA
Tel: +1 904 819-8985 Fax: +1 904 819-1430
Email: usa@ae-sys.com

ALOCIT COATING GUIDELINES

The performance or life of a coating system can be influenced by many factors. The 3 most important factors that need to be considered are:

- The **GENERIC TYPE** of coating (e.g. alkyd, epoxy, PU, etc).
- The **ENVIRONMENT** in which the coating system operates (e.g. temperature and humidity conditions, areas of high abrasion, damp, wet or underwater etc).
- The **CONDITION OF THE SURFACE** prior to painting.

These 3 factors are not independent of one another since, for instance, the environment will limit the range of coatings which are suitable and could also affect the standard and method of surface preparation recommended. When any coating work is being considered it is, therefore, important to consider:

- What lifetime is required from the coating system.
- What the coating system's environment will be
- What surface preparation is possible.

Surface preparation, in particular, needs to be carefully specified since the substrate can contain a wide variety of contaminants such as millscale, oil, grease, rust, soluble salts etc. Optimum performance is only possible if these contaminants are removed and surface preparation guidelines followed. Common surface contaminants and problems which can be encountered are:

Rust Scale

This should always be removed as it is physically unstable and can lead to water retention and salts under the coating.

Millscale

This is found on hot rolled steel as a black layer. Although often apparently tightly adherent to the surface, problems can occur later if it is over-coated, resulting in premature coating failure.

Rust

Loose rust should be removed as substrate should be sound and free from loose material prior to coating.

Old Coatings

Existing coatings must be firmly adherent or removed. Check for compatibility and abrade before application.

Oil/Contaminants

These may reduce the ability of a coating to 'wet out' on to the substrate and can prevent proper adhesion. Alocit coatings can be applied to substrates where residual oil remains (in concrete, for example) but, for best results, a detergent or power wash is required to remove debris/contaminants.

Moisture

Alocit coatings will tolerate damp, wet and underwater surfaces or conditions of high humidity during application. Although otherwise similar, surface profile requirements are greater for wet substrates and surface preparation specifications in the project specification should reflect this. In cases where the surface preparation can not be carried out in accordance with optimum specifications, alternative methods may be possible and the Alocit Technical Department should be contacted for further advice.

N.B. As a rule of thumb for wet substrates, surface profile should be 10% of specified total film thickness

SURFACE PREPARATION STANDARDS

In order to clarify the degree of surface preparation required for steel, various standards exist which set out detailed requirements. Although there is no one standard which is universally accepted, there are similarities between them and a selected correlation of these standards is listed below.

The Swedish Standard

The Swedish Standards institution document: "Surface Preparations Standard for Painting Steel Surfaces" (SISO55900) usually referred to simply as The Swedish Standard, uses pictorial representations of the specified degrees of cleaning.

Other prominent standards used by users of Protective Coatings include:

British Standards Institution
Surface Finish of Blast Cleaned Steel for Painting BS.4232.

SSPC
Steel Structures Painting Council USA: Surface Preparation Specifications SSPC-SP 1-14

NACE
Nace International. NACE No. 1-14

One important feature of the Swedish Standard is that it considers the condition of the steel surface prior to cleaning and defines these as follows:

- A Steel surface completely covered with adherent mill scale and with little or no rust. This condition is typical of steel shortly after rolling.
- B Steel surface where rust has started and millscale has begun to flake. Typically Grade B refers to steel which has been left outside in a fairly corrosive environment for several months.
- C Steel surface with very little visible pitting. Millscale has either rusted away or can be easily scraped off. Typically Grade C refers to steel which has been left unprotected outside for a period of about 12 months in a fairly corrosive environment.
- D Steel Surface where pitting is obviously evident and rusting has resulted in virtually complete removal of mill scale. Typically, Grade D refers to unprotected steel exposed outside for a period of 2-3 years in a fairly corrosive environment.

The above grades are also referred to pictorially in the Swedish Standard. Rust Grade B is illustrated below as a fairly typical substrate from which the grade photo samples in the next section are prepared.



Surface Preparation Standards Compared

Surface Preparation Standards					
System	SSPC Codes	NACE	CDN. Govt.	Swedish	British
Solvent Clean	SSPC.SP1				
Hand Tool Clean	SSPC.SP2		31 GP 401	St. 2 (approx.)	
Power Tool Clean	SSPC.SP3		31 GP 402	St. 3	
Flame Clean (new steel)	SSPC.SP4		31 GP 403		
White Metal Blast	SSPC.SP5	NACE #1	31 GP 404 Type 1	Sa. 3	BS4232 1st Quality
Commercial Blast	SSPC.SP6	NACE #3	31 GP 404 Type 2	Sa. 2	BS4232 3rd Quality
Brush Off Blast	SSPC.SP7	NACE #4	31 GP 404 Type 3	Sa. 1	Light blast to brush-
Pickling	SSPC.SP8				
Weather and Blast	SSPC.SP9				
Near White Blast	SSPC.SP10	NACE #2		Sa. 2 ½	BS4232 2nd Quality
Power Tool Cleaning to Bare	SSPC.SP11				
Non-Ferrous Metals					
Aluminium		Brass, Bronze, Copper, Lead		Galvanized Metal	

Solvent Cleaning SSPC-SP1 Definition:

Solvents such as water, mineral spirits, xylol, toluol etc., are used to remove solvent-soluble foreign matter from the surface of ferrous metals. Rags and solvents must be replenished frequently to avoid spreading the contaminant rather than removing it. Low-pressure (1500 - 4000 psi) high volume (3 - 5 gal/min.) water washing with appropriate cleaning chemicals is a recognized "solvent cleaning" method. All surfaces should be should be cleaned per this specification prior to using hand tools or blast equipment.

Hand Tool Cleaning SSPC-SP2 (SSI-St3) Definition:

A mechanical method of surface preparation involving wire brushing, scraping, chipping and sanding. Not the most desirable method of surface preparation, but can be used for mild exposure conditions. Optimum performances of protective coatings should not be expected when hand tool cleaning is employed.

Power Tool Cleaning SSPC-SP3 (SSI-St3) Definition:

A mechanical method of surface preparation widely used in industry and involving the use of power sanders or wire brushes, power chipping hammers, abrasive grinding wheels, needle guns etc. Although usually more effective than hand tool cleaning, it is not considered adequate for use under severe exposure conditions or for immersion applications.

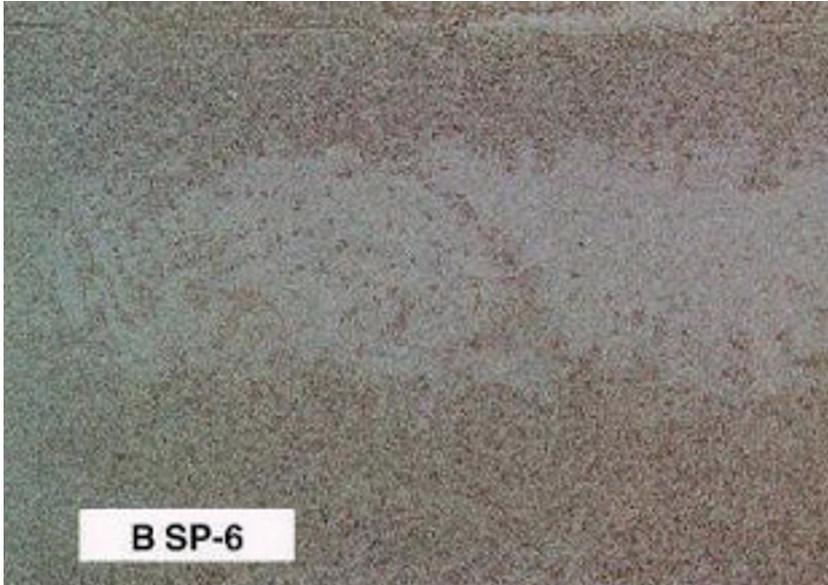
White Metal Blasting SSPC-SP5 (SSI-Sa3), or NACE #1 Definition:

The removal of all visible rust, mill scale, paint and contaminants, leaving the metal uniformly white or gray in appearance. This is the ultimate in blast cleaning. Use where maximum performance of protective coatings is necessary due to exceptionally severe conditions such as constant immersion in water or liquid chemicals.



Commercial Blast SSPC-SP6 (SSI-Sa2), or NACE #3 Definition:

All oil, grease, dirt, rust scale and foreign matter are completely removed from the surface and all rust, mill scale and old paint are completely removed by abrasive blasting except for slight shadows, streaks or discolorations caused by rust stain, mill scale oxides or slight, tight residues of paint or coating that remain. If the surface is pitted, slight residue of rust or paint may be found in the bottom of pits; at least two-thirds of each square inch of surface area shall be free of all visible residues and the remainder shall be limited to the light residues mentioned above.



Brush Off Blast SSPC-SP7 (SSI-Sa1), or NACE #4 Definition:

A method in which all oil, grease, dirt, rust scale, loose mill scale, loose rust and loose paint or coatings are removed completely. Tight mill scale and tightly-adhered rust, paint and coatings are permitted to remain. However all mill scale and rust must have been exposed to the abrasive blast pattern sufficiently to expose numerous flecks of the underlying metal fairly uniformly distributed over the entire surface.



Brush Off Blast SSPC-SP10 (SSI-Sa2 1/2), or NACE #2 Definition:

In this method, all oil, grease, dirt, mill scale, rust, corrosion products, oxides, paint or other foreign matter have been completely removed from the surface by abrasive blasting, except for very light shadows, very slight streaks or slight discolorations caused by rust stain, mill scale oxides or slight, tight residues of paint or coating. At least 95% of each square inch of surface area shall be free of all visible residues, and the remainder shall be limited to the light discolorations mentioned above. From a practical standpoint, this is probably the best quality surface preparation that can be expected to today for existing plant facility maintenance work.



Power Tool Cleaning to Bare Metal SSPC-SP11 Definition:

Utilizing same equipment as Power Tool Cleaning to remove all visible coatings and contaminants to bare metal substrate.

Aluminium:

Remove water-soluble dirt and chemicals with water and detergent; solvent-soluble contaminants with solvent. Rinse, allow to dry, then power or hand abrade to remove the thin film of aluminium oxide. Moderate exposures require only one or two topcoats. Avoid using lead pigmented primers and topcoats. Exposure to corrosive chemicals calls for an epoxy primer followed by an appropriate topcoat for the environment.

Brass, Bronze, Copper, Lead:

Remove contaminants with a combination of water, detergents and solvents (same as aluminium). Allow the metal to dry, then power or hand abrade to remove oxides. Conventional oil and alkyd base primers or finishes may be used.

Galvanized Metal:

Clean same as aluminium and Brass etc, or allow to weather for six months. Caution: Be sure the manufacturer of the galvanized metal has used a paintable "white rust" preventative. Coatings containing oil or alkyd resins must not be used. Specify only primers suitable for use on galvanized metal. In severe Type A environments, or in areas of high humidity or continuous condensation, brush blasting is recommended to assure maximum system adhesion and performance. Newly galvanised surfaces require acid etching prior to application.

STANDARD PROCEDURES & DESCRIPTIONS

Degreasing/ De-oiling

This should be carried out prior to performing other types of preparation if these are called for. Normally, it is accomplished by wiping or washing with proprietary solvents but unless the operator is particularly careful, the end result will be a spreading of the contaminant rather than its complete removal. If this method is to be used successfully, the cleaning solvent should be frequently changed and the cleaning cloth turned and changed regularly.

A more effective method of grease removal is by hot or high pressure washing using suitable detergents applied by a lance or automatic spray washer.

Manual Preparation

This method is generally employed for maintenance painting where grit-blasting is either non-economical or would present difficulties.

Tools: Wire-brushes, scrapers with hardened steel or tungsten carbide blades, emery cloth, glass paper, chipping hammers.

Used for: Loosely adherent millscale, chemical scale, rust, detaching paint films, abrasion of small areas of existing sound surfaces.

Limitations: Strongly bonded materials are not easy to remove by this method. Operator fatigue can lead to inefficient removal of contaminants during the course of the work.

Power Tool Method

These methods are still sometimes referred to as "manual" but are more effective and quicker than hand preparation methods. They are usually chosen for maintenance of larger areas.

Tools: Power wire-brushes, grinders, sanders, needle-guns (non-sparking in hazardous areas).

Used for: Loosely adherent millscale, chemical scale, rust, detaching paint films, abrading existing paint.

Limitations: Strongly bonded materials are not easy to remove by this method. Rotary tools can polish or burnish the surface rather than providing a surface profile, especially on hard surfaces or if tools are worn. Operator fatigue can set in leading to reduced effectiveness .

High Pressure Water Jet Cleaning

Water at a pressure of 5,000-10,000 psi can be used not only to wash down surfaces but also to remove scale, loose paint, etc. and can produce a very high standard of cleanliness if used correctly. The method also removes all traces of corrosive salts. Ultra High Pressure (UHP) Water Jetting, using water pressures at up to 40,000 psi, is a very efficient way of removing all material from a substrate.

NB: Using water only as a cleaning medium does not produce a profile. If there is no pre-existing profile, or insufficient profile following water jetting, then a profile must be produced either by the inclusion of blast media into the water-jetting process or by some other means.

Tools: High pressure or UHP water pumps, water lance and connections, portable water supply, detergents/inhibitors (optional).

Used for: Areas having very heavy rust scale, chemical contamination or other loose contamination.

Limitations: Not particularly suitable for small or confined areas or areas close to electrical equipment. Can cause substrate to re-oxidise or flash rust if surface is cleaned back to bare metal.

Abrasive Blast Cleaning

This is the process of impacting the substrate with an abrasive such as grit, cast-iron shot, copper slag, garnet, or aluminium oxide which is propelled by compressed air. The pressure may be modified according to the type of surface to be cleaned. The process can be extremely effective and often results in a "white" or "near white" metal finish. Lower quality finishes may also be specified depending on the service to which the coating system is to be subjected and the surface tolerance of the coating that is being applied.

Tools: Blast nozzle connected to blast-pot, compressor, abrasive.

Used for: Thorough and efficient preparation of steel, concrete, non ferrous metals.

Limitations: May not be practical for small areas or where extraneous grit could cause problems (e.g. near machinery). However, blasting equipment which removes the abrasive from the surface by vacuum suction is available if a clean method of preparation is required.

NB: Care must be taken to use the appropriate blast media: some soft material may flatten the profile preventing proper adhesion and some areas or environments have restrictions on the type of blasting abrasive you are able to use. Excessive blasting may also cause media entrapment.

Wet Abrasive Blast Cleaning

This differs from dry abrasive blast cleaning, in that water is injected into the cleaning (wet) abrasive stream so that, as well as removing scale, paint and rust, other surface contaminants such as soluble salts are also removed. This ensures that the surface is thoroughly clean and free from corrosion promoting materials. Rust inhibitors can be added to the water to prevent flash rusting which would occur whilst the water is in contact with the freshly cleaned metal surface. These rust inhibitors may not always be compatible with the coating system and should be correctly metered at all times. It is important to check compatibility with Alocit Technical Department before using inhibitors.

NB: Wet abrasive blast cleaning does not give rise to the dust associated with dry abrasive blasting and also eliminates explosion hazards that could occur in blast cleaning in offshore or chemical plants.

Tools: As for dry abrasive blasting plus water reservoir, pump and inhibitors (optional).

Used for: Areas which require a high standard of preparation particularly where the surface is known to be highly contaminated with corrosive salts or where dust cannot be tolerated.

Limitations: Wet abrasive may be more difficult to deal with after blasting than dry abrasive.

Other Methods

There are other methods of surface preparation which are less widely practised. These still have a particular purpose but are not detailed here. The methods include flame cleaning, pickling, etc.

SURFACE PREPARATION OF CONCRETE

New Concrete

Unlike most coatings, which require concrete to cure and dry for at least 25 days before coating, Alocit can be applied to 'green' concrete - although, of course, the concrete must be set properly to provide a firm surface. New concrete also usually has a loosely adherent layer of "laitence" on its surface which should be removed before coating. Other surface contaminants such as curing compound residues should also be removed. Any cracks should be opened out and filled either with a sharp sand/cement mortar (typically 3:1) or a suitable epoxy filler. Cement slurry should not be used.

NB: Oil and grease should be detergent washed to remove loose materials, residual oil in the concrete will not affect adhesion.

Methods for removal of loose material from the surface:

Manual Preparation: Manual rotary wire brushes and grinders to remove "laitence" and surface defects - preparation useful for small areas.

Grit Blasting: Blast clean with a non-metallic grit of relatively coarse mesh size, a recoverable grit blasting unit should be used.

Scarifying or Scrabbling: Scarifying or mechanical flails or reciprocating chisel edged tools are used to remove old coatings or unsound surface layers of concrete. Such methods are generally reserved for "repair areas where mortars are later used to re-profile the surface (unless a high build coating is to be subsequently applied).

Previously coated concrete

The existing coating should first be checked to ensure the coating to be applied is compatible with it. Assuming that this is the case, all loose areas of the existing coating must be removed, for example by rotary grinding to the paint where a strongly bonded edge is encountered. The sound areas of the existing coating should be mechanically etched using a rotary grinder, rotary sander or a sweep abrasive blast.

COATING APPLICATION

The performance of a coating system, as has been discussed can be affected by a number of factors, for instance the environment and the surface preparation which is performed.

Another factor which can be important is the way the coating is applied since various properties, for instance wetting out of the surface, can be influenced by the application method. The choice of application method will depend on a number of factors:

- Alocit recommendations: certain application methods may be unsuitable for a particular project, or a special grade of the product may be required.
- The size of the structure: for example, small items and small diameter pipes are likely to be more suitable for brush application: larger areas could lend themselves to airless spray or pumped brush application.
- The geometry of the surface: large structures may not be suitable for spray application because of their shape or locality .
- The environment around the structure: this could be as simple as the risk of over spray on adjacent structures not being tolerated, the area could be subject to environmental controls or the physical environment may affect application - temperature, humidity, subsea etc.

APPLICATION METHODS

The main methods of application are by Brush, Roller or Airless Spray

Brush Application

Hand brush: this is still the basic method for most maintenance and some new construction painting. The correct brushing action ensures good wetting and flooding of any pitting on a substrate and transport to corners and edges of structures. When applying Alocit using a brush, firm pressure and a circular brushing action will improve wetting out on to the substrate, produce better adhesion and film thickness consistency.

NB: In a multi-coat system film thickness variations will average out but the use of experienced personnel and wet film gauges will also help eliminate inconsistencies.

Pumped brushing: for large areas where spraying or rolling are not possible (e.g. wet substrate) a standard airless spray pump can be used with special brushes and adaptors, to provide a continuous supply to the brush head, making application much faster. Once again, firm pressure and a circular brushing motion produces the best results.

NB: Stripe coating of edges and weld areas is recommended to ensure longevity of the system

Roller Application

Generally used for large dry, flat areas such as walls, steel sheeting etc. when a rapid rate of coverage can be achieved. Use may be limited by the geometry of a structure. Care must be taken to ensure the substrate is thoroughly wetted, keeping the roller full of coating material and monitoring wet film thickness.

NB: Stripe coating of edges and weld areas is recommended to ensure longevity of the system

Airless Spray

This method involves the liquid paint being atomised by pressurising it and forcing it through a small orifice (tip) so that a fan of paint droplets is formed without air being entrained. The paint pressure is raised using a pump which can be powered by compressed air, electricity or petrol. Airless spray systems are available from a wide variety of suppliers but a typical setup used for Alocit would be as follows:

Graco 68.1 airless spray pump fitted with 3/8 inch spray line with 1/4 inch whip end
XTR Graco spray gun with 19-21 thou spray tip

Check with the Alocit technical department for the most appropriate equipment for your project.

NB: In cold climate areas, UK winters, for example, an in-line paint heater block might be required to reduce low-temp viscosity issues.

In high temperature areas, care must be taken to ensure product and equipment are kept as cool as possible. Excessive temperatures will reduce pot life. Store product in cool ventilated areas to avoid heat build up and ensure supply hoses are shaded from direct sunlight as much as possible.

Pump and lines should be flushed regularly with suitable cleaner (Acetone) to ensure no build up of cured material occurs within the pump system.

COVERAGE

Theoretical and Practical Spreading Rates/Loss Factors:

The theoretical spreading rate is a function of volume. As Alocit is supplied in quantities defined by weight not volume, the best way to determine the theoretical coverage at a given film thickness is to consult the technical data sheet for the product. The specific gravity varies between products so, for example, a kilo of 28.95 which has a lower SG than 28.15, will cover a greater area than the equivalent weight of 28.15.

The theoretical spreading rate, however, can only be used as a guide as it takes no account of the various loss factors that can be involved in the application of paint. As a guideline, there are a number of factors to be considered when calculating loss factors and thus the practical spreading rate:

Method of Application and Shape of Structure

These two factors can be significantly involved in affecting the practical spreading and rate. An uncomplicated structure with many flat surfaces should not involve high losses. If this type of structure is coated by brush or roller the loss factor expected would be 5-10% if a competent painter is achieving the minimum thickness specified within reasonable limits. If, however, the structure is more complex and involves lattice work, stiffeners, etc. the losses would increase to about 10-15%. If the structure is to be sprayed then overspray etc. results in a higher loss factor. For simple structures this would be expected to be around 20% but for more complex structures, 60% loss is not uncommon. These figures can be controlled depending on the skill of the applicator. If open lattice work is to be coated it is virtually impossible to estimate loss factors and the best guideline is previous experience.

Blast Profile

Blast cleaning results in a rough surface of peaks and troughs. The size of the peaks (the surface profile) is dependent on the size and shape of the abrasive used for blasting. The paint thickness over the peaks is the most important and so it is generally considered that the paint which does not affect film thickness (i.e. the paint in the troughs) is lost in the profile.

Weather Conditions

If a structure is being coated outside or in a well ventilated, draughty area, the effect of the air movement has to be considered. It is fairly obvious that in windy conditions the loss factors will be higher and often in excess of 20%.

Paint Wastage

During spraying or brush/roller application some wastage always takes place, paint left in the can, paint in the line, occasional tip blockages, materials going past the end of their pot life, brushes dripping, etc. These losses usually lie in the region of 0-10% and can be reduced by good housekeeping.

Alocit products are manufactured and supplied by the A&E Group. Always seek advice from your local technical department before specifying or embarking on a project. Look for your nearest supplier on the A&E Group website at www.ae-sys.com or contact us by email at tech@ae-sys.com.

SAFETY DATA SHEET

ALOCIT H1 HARDENER



1 IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY

PRODUCT NAME: ALOCIT H1 HARDENER
PRODUCT NO: AS33051A
SUPPLIER: A&E SYSTEMS LIMITED, 3 CHARLES WOOD ROAD, DEREHAM, NR19 1SX, UK
Tel: +44 (0)1362 694915 Fax: +44 (0)1362 695350 Email: uk@ae-sys.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

NAME	CAS No.:	EINECS Nr.:	CLASSIFICATION	CONTENT
Trimethylhexamethyldiamine	25620-58-0		C R-22, 34, 43	10-30%
ISOPHORONEDIAMINE	2855-13-2	220-666-8	C R-21/22,34,43,52/53	10-30%
EPOXY RESIN (Number average MW <= 700)	25068-38-6	500-033-5	Xi ,N R-36/38, 43, 51/53	10-30%
OXIRANE, MONO [[C12-14- ALKYL OXY) METHYL] DERIVS	68609-97-2		Xi R-38, 43	1-5%
BENZYL ALCOHOL	100-51-6	202-859-9	Xn R-20/22	10-30%
Salicylic acid	69-72-7		Xn R-22, 36	1-5%

The Full Text for all R-Phrases are Displayed in Section 16

3. HAZARDS IDENTIFICATION

Harmful by inhalation, in contact with skin and if swallowed. Causes burns. May cause sensitisation by skin contact. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

NOTE: All information relates to unmixed hardener - see resin MSDS for further information on product before use. Mixed and cured product is inert, environmental risk from cured product is negligible - see Section 16.

4. FIRST AID MEASURES

INHALATION: Move the exposed person to fresh air at once. Perform artificial respiration if breathing has stopped. Keep the affected person warm and at rest. Get prompt medical attention.

INGESTION: DO NOT INDUCE VOMITING! NEVER MAKE AN UNCONSCIOUS PERSON VOMIT OR DRINK FLUIDS! Remove victim immediately from source of exposure. Promptly get affected personnel to drink large volumes of water to dilute the swallowed chemical. Get medical attention immediately!

SKIN: Remove affected person from source of contamination. Promptly wash contaminated skin with soap or mild detergent and water. Promptly remove clothing if soaked through and wash as above. Do not use organic solvents. Get medical attention if any discomfort continues.

EYES: Promptly wash eyes with plenty of water while lifting the eye lids. Continue to rinse for at least 15 minutes and get medical attention. Get medical attention promptly if symptoms occur after washing.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Carbon dioxide (CO₂). Alcohol resistant foam. Dry chemicals, sand, dolomite etc.

SPECIAL FIRE FIGHTING PROCEDURES: Use special protective clothing. Regular protection may not be safe. Avoid breathing fire vapours. If risk of water pollution occurs, notify appropriate authorities.

UNUSUAL FIRE & EXPLOSION HAZARDS: Fire causes formation of toxic gases. Vapours are heavier than air and may spread near ground to sources of ignition.

HAZARDOUS COMBUSTION PRODUCTS: Fire or high temperatures create: Toxic gases/vapors/fumes of: Carbon dioxide (CO₂). Carbon monoxide (CO).

6. ACCIDENTAL RELEASE MEASURES

SPILL CLEANUP METHODS: Stop leak if possible without risk. Absorb in vermiculite, dry sand or earth and place into containers. Runoff or release to sewer, waterway or ground is forbidden.

7. HANDLING AND STORAGE

USAGE PRECAUTIONS: Avoid spilling, skin and eye contact.

STORAGE PRECAUTIONS: Keep in cool, dry, ventilated storage and closed containers.

STORAGE CRITERIA: Chemical storage.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

INGREDIENT NAME: BENZYL ALCOHOL

CAS NO.: 100-51-6

STD:

LT EXP 8Hrs: No std

ST EXP 15 Min: No std

PROTECTIVE EQUIPMENT:



PROCESS CONDITIONS: Provide eyewash station.

VENTILATION: Provide adequate general and local exhaust ventilation.

PROTECTIVE GLOVES: Protective gloves should be used if there is a risk of direct contact or splash.

EYE PROTECTION: Wear approved safety goggles.

OTHER PROTECTION: AVOID ALL SKIN AND RESPIRATORY CONTACT! Wear appropriate clothing to prevent any possibility of skin contact.

HYGIENIC WORK PRACTICES: Wash at the end of each work shift and before eating, smoking and using the toilet. Wash promptly if skin becomes wet or contaminated. Promptly remove any clothing that becomes contaminated. No eating or drinking while working with this material.

9. PHYSICAL AND CHEMICAL PROPERTIES

ODOUR/TASTE: Amine.

10. STABILITY AND REACTIVITY

STABILITY: Normally stable. Avoid: Contact with acids.

HAZARDOUS DECOMPOSITION PRODUCTS: Toxic gases/vapours/fumes of: Carbon dioxide (CO₂). Carbon monoxide (CO).

11. TOXICOLOGICAL INFORMATION

INHALATION: Vapour may irritate respiratory system or lungs.

INGESTION: Liquid irritates mucous membranes and may cause abdominal pain if swallowed.

SKIN: Irritating to skin. May cause sensitisation by skin contact.

EYES: Irritation of eyes and mucous membranes.

MEDICAL SYPTOMS: Mild intoxication (incl. fatigue, lassitude, irritability, headache, nausea).

12. ECOLOGICAL INFORMATION

ECOLOGICAL INFORMATION: Dangerous for the environment: May cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHODS: Dispose of in accordance with Local Authority requirements.

14. TRANSPORT INFORMATION

LABEL FOR CONVEYANCE:



UN No. ROAD:	2735
UK ROAD TRANSPORT CLASS:	8
UK ROAD PACK GR.:	III
ADR CLASS No.:	8
ADR CLASS:	Class 8: Corrosive substances
ADR PACK GR.	III
HAZARD No. (ADR):	80 Corrosive or slightly corrosive
ADR LABEL No:	8
HAZCHEM CODE:	3X
CEFIC TEC(R) No.:	80GC7-11+111
PROPER SHIPPING NAME I:	AMINES, LIQUID, CORROSIVE, N.O.S OR POLYAMINES, LIQUID, CORROSIVE, N.O.S (ISOPHORONEDIAMINE
RID CLASS No:	8
RID PACK GR.	III
UN No. SEA:	2735
IMDG CLASS:	8
IMDG PACK GR.:	III
EmS No.:	8-05
MFAG TABLE No.:	See Guide
MARINE POLLUTANT:	No.
UN No., AIR:	2735
ICAO CLASS:	8
AIR PACK GR:	III

15. REGULATORY INFORMATION

LABEL FOR SUPPLY:



Harmful



Dangerous for
the environment

RISK PHRASES: R-20/21/22 Harmful by inhalation, in contact with skin and if swallowed
R-34 causes burns
R-43 May cause sensitisation by skin contact.
R-52/53 Harmful to aquatic organisms, may cause long term adverse effects in the aquatic environment.

SAFETY PHRASES: P-5 Contains epoxy constituents. See information supplied by the manufacturer.
S-24/25 Avoid contact with skin and eyes.
S-26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S-27 Take off immediately all contaminated clothing.
S-36/37/39 Wear suitable clothing, gloves and eye/face protection.
S-45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)
S-60 This material and its container must be disposed of as hazardous waste.
S-61 Avoid release to the environment. Refer to special instructions/
Safety Data Sheets.

UK REGULATORY REFERENCES: Chemicals (Hazard Information & Packaging) Regulations 1993.

APPROVED CODE OF PRACTICE: Safety Data Sheets for Substances and Preparations L62. Classification and Labelling of Substances and Preparations Dangerous for Supply.

16. OTHER INFORMATION

RISK-PHRASES (Full Text): R- 21/22 harmful in contact with skin and if swallowed. R-34 Causes burns. R-36/38 Irritating to eyes and skin. R-43 May cause sensitisation by skin contact. R-52/53 harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. R-22 harmful if swallowed. R-38 irritating to skin. R-20/22 Harmful by inhalation and if swallowed. R-36 Irritating to eyes. R-51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Uncured Resin: All risk statements refer to unmixed resin product. Users should also check MSDS for hardener before mixing and be aware that, once resin and hardener are mixed and cured, product is inert.

Cured product: Solidified (cured) epoxy products are inert and relatively harmless, traces of residual components may be left on the surface. Abrading or sanding cured coatings will generate dust or particles that should not be inhaled or ingested, wet surfaces where possible before abrading. Provide ventilation, wear a suitable mask, gloves and cover exposed skin to prevent contact with the dust.

Revision Date: 10/2008 Replaces all versions

All information is based on results gained from experience and tests and is believed to be accurate but is given without acceptance of liability for loss or damage attributable to reliance thereon as conditions of use lie outside our control. Users should always carry out sufficient tests to establish the suitability of any products for their intended applications. No statements shall be incorporated in any contract unless expressly agreed in writing nor construed as recommending the use of any product in conflict of any patent. All goods are supplied subject to A&E Systems Ltd General Conditions of sale.



Alocit Systems products are manufactured and distributed by the A&E Group

AUSTRALIA

A&E Systems PTY Limited, 3/20 Clark Court, Bibra Lake, Perth WA 6163, Australia
Tel: +61 (0)8 94183688 Fax: +61 (0)8 94183588 Email: aus@ae-sys.com

EUROPE

A&E Systems Ltd, 3 Charles Wood Road, Dereham, NR19 1SX, UK
Tel: +44 (0)1362 694915 Fax: +44 (0)1362 695350 Email: uk@ae-sys.com

MALAYSIA

A&E Systems Sdn Bhd, 26 Jalan Pendaftar U1/54, Sekysen U1,
40150 Shah Alam, Selangor Darul Ehsan, Malaysia
Tel : +60 (0)3-5569 4277 Fax : +60 (0)3-5569 4377 Email: mal@ae-sys.com

USA

A&E Systems Anti-Corrosion Systems LLC, 150 Hilden Road, Ste #301, Ponte Vedra, Florida 32081, USA
Tel: +1 904 819-8985 Fax: +1 904 819-1430 Email: usa@ae-sys.com

www.ae-sys.com

TECHNICAL DATA SHEET

ALOCIT 28.14 EPOXY COATING-ZINC PRIMER DARK GREY

- Outstanding adhesion on oil contaminated and underwater surfaces
- Environmentally friendly - solvent-free and no heavy metals
- Long term stability
- Especially designed for application onto clean, profiled steel
- Excellent corrosion protection, including A.L.W.C.
- For use in temperate and tropical climates

USAGE

Two-pack epoxy primer containing zinc. Solvent-free with outstanding adhesion qualities on both wet and dry surfaces providing excellent corrosion control. Should be used as a primer to clean, profiled steel surfaces in conjunction with Alocit 28.15 or other compatible finishing coat.

- Excellent performance in marine environments
- Indispensable in industry where moist, wet or slightly oily conditions exist
- Solvent free

TECHNICAL DETAILS

Product Description	Two component epoxy zinc based solvent free primer
Volume Solids	100%
Mixing Ratio (by weight)	5 parts resin - 1 part hardener
Specific Gravity	Base only 2.2, Mixed 1.82
Dilution	Do not dilute
Brush/Tool Cleaner	Immediately after use. Acetone.
Theoretical Coverage Rate*	@ 200 μ /8 mil (Maximum WFT) - 2.70m ² /mixed KG @ 150 μ /6 mil (Optimum WFT) - 3.60m ² /mixed KG @ 100 μ /4 mil (Minimum WFT) - 5.46m ² /mixed KG 1 US gallon @ 25 μ /1 mil = 1600 ft ²
Number of Coats	One coat
Working Life **	@ 20°C/68°F 45- 60 minutes
Working Life **	@ 27°C/ 81°F 30/45 minutes
Drying Times	@ 20°C/68°F Touch dry 6-8 hours
Drying Times	@ 27°C/81°F Touch dry 3-4 hours
Min Practical Cure Temp.***	+5°C/41°C
Resistant to	Water, sea water, oils, petroleum, many solvents, alkalis and a certain range of acids.
Flash Point	Above +200°C/+392°F
Shelf Life	Unmixed approximately 1 year
Storage	Moderate room temperature 15/30°C
Colour	Dark Grey
Pack Size	UK/Europe 1.2kg (1.0 kg resin/0.2 kg hardener) 3 kg (2.5 kilo resin/0.5 kilo hardener) US 1 Quart, 1 Gallon, 5 Gallon (Pack includes both components)

- Notes
- * Underwater application can result in reduced coverage rates.
 - ** Working life is dependent on unit size, ambient/product temperature, mixing method and time, application speed relative to reduction in vol. of mixed product.
 - *** Curing will take place at lower temperatures but over an extended period.

SURFACE PREPARATION

A) NEW STEEL

All millscale to be removed by abrasive blasting, check for rogue peaks and laminations, take remedial action. Remove dust and other contaminations. A blast profile of between 50 and 100 μ (2-4 mil) is the aim, based on Swedish Pictorial Standards / ISO-8501-1/SSPC/NACE. We recommend SA2 (SP6, NACE 3) as a minimum, and SA 2.5 (SP10, NACE 2) as the optimum. A secondary choice for surface preparation is mechanical abrading to remove surface contamination before coating application.

B) WEATHERED/EXPOSED/CORRODED STEEL

Our basic aim is to remove surface contamination such as corrosion deposits, marine growths, chemical compounds etc., to revealing a clean steel substrate with a surface profile of a minimum 25 microns/1 mil (50 microns/2 mil underwater), various options are:-

- 1) Abrasive blasting, dry, in areas of low chemical contamination followed by optional high pressure water blast (15-20,000psi).
- 2) UHP hydroblasting (30/40,000psi) to remove all previous coatings etc and reveal original profile. Especially suitable for wet environments such as ships tanks, piers, jetties etc. Clean to an agreed standard and check soluble salts level.
- 3) UHP and High Pressure water blasting may sometimes be employed with added abrasive.
- 4) Mechanical cleaning (power) i.e. needle gunning, rotary wire brushing etc to remove all contamination/dust etc.

Notes:

- 1) Stains of rust, paint or mill scale remaining on the surface do not present a problem providing minimum surface profile criteria are met.
- 2) Alocit product range can be applied to both dry, wet and underwater surfaces, however whilst clean steel in saltwater is acceptable, steel heavily contaminated with salt and/or other chemicals above water is not acceptable. This will require decontamination, with chemical levels measured before & after.

PRODUCT APPLICATION - Methods

Atmospheric: Brush & Roller
Airless spray - minimum 63:1, Tip size 19-21 thou.

Underwater: Alocit brushes - use vigorous circular motion.
Alocit K1 underwater pump with round brush - use vigorous circular motion.

Notes:

- 1) Please contact our technical dept for specific details or if in any doubt.
- 2) All equipment should be cleaned immediately after use with acetone.
- 3) Airless spray is not suitable for wet/damp surfaces

PRODUCT APPLICATION - COATING SYSTEMS

Steel: **Atmospheric and Underwater**
Minimum - 1 coat Alocit 28.14 primer. 1 coat Alocit 28.15.
Optimum - 1 coat Alocit 28.14 primer 2 coats Alocit 28.15

Notes:

- 1) Use Alocit 28.15 of a different colour in a multi-coat system.
- 2) Alocit 28.14 zinc primer is specially designed for application onto clean, rust-free profiled steel.

PRECAUTIONS

Mix thoroughly by hand or with a mechanical mixer - avoid aeration of mixed product. Make sure that material is mixed well around the walls and bottom of the can before mixing with hardener.

Always use up the entire can - product cannot be re-used after working life expires.

Always empty the entire amount of hardener into the base to maintain the proper mixing ratio.

Containers are pre-measured and the epoxy containers are oversized to allow adding and mixing of the hardener.

IMPORTANT:

On moist, wet, submerged, or oily surfaces, Alocit 28.14 Primer must be firmly brushed into the surface using circular motions. 1st coat of Alocit 28.15 must be applied as soon as the Alocit 28.14 is touch dry - not later

ALL INFORMATION IS GIVEN IN GOOD FAITH BUT WITHOUT WARRANTY

All information is based on results gained from experience and tests and is believed to be accurate but is given without acceptance of liability for loss or damage attributable to reliance thereon as conditions of use lie outside our control. Users should always carry out sufficient tests to establish the suitability of any products for their intended applications. No statements shall be incorporated in any contract unless expressly agreed in writing nor construed as recommending the use of any product in conflict of any patent. All goods are supplied subject to A&E General Conditions of Sale.



Alocit Systems products are manufactured and distributed by the A&E Group

AUSTRALIA

A&E Systems PTY Limited, 3/20 Clark Court, Bibra Lake, Perth WA 6163, Australia
Tel: +61 (0)8 94183688 Fax: +61 (0)8 94183588 Email: aus@ae-sys.com

EUROPE

A&E Systems Ltd, 3 Charles Wood Road, Dereham, NR19 1SX, UK
Tel: +44 (0)1362 694915 Fax: +44 (0)1362 695350 Email: uk@ae-sys.com

MALAYSIA

A&E Systems Sdn Bhd, 26 Jalan Pendaftar U1/54, Sekyzen U1,
40150 Shah Alam, Selangor Darul Ehsan, Malaysia
Tel : +60 (0)3-5569 4277 Fax : +60 (0)3-5569 4377 Email: mal@ae-sys.com

USA

A&E Systems Anti-Corrosion Systems LLC, 150 Hilden Road, Ste #301, Ponte Vedra, Florida 32081, USA
Tel: +1 904 819-8985 Fax: +1 904 819-1430 Email: usa@ae-sys.com

www.ae-sys.com

SAFETY DATA SHEET

ALOCIT 28.14 ZINC PRIMER DARK GREY



1 IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY

PRODUCT NAME: ALOCIT 28.14 ZINC PRIMER DARK GREY
PRODUCT NO: AS30545B
SUPPLIER: A&E SYSTEMS LIMITED 3 CHARLES WOOD ROAD, DEREHAM, NR19 1SX, UK
Tel: +44 (0)1362 694915 Fax: +44 (0)1362 695350 Email: uk@ae-sys.com
24 HOUR EMERGENCY TELEPHONE NUMBER : + 44 (0)7951 470759

NOTE: All information relates to unmixed resin - see hardener MSDS for further information on product before use.
Mixed and cured product is inert, environmental risk from cured product is negligible - see Section 16.

2 COMPOSITION/INFORMATION ON INGREDIENTS

Name	EC No.	CAS-No.	Content	Classification
ZINC POWDER (PYROPHORIC)	231-175-3	7440-66-6	50-60%	F;R15,R17 N;R50/53
EPOXY RESIN (Number average MW <= 700)	500-033-5	25068-38-6	20-30%	R43 Xi;R36/38 N;R51/53
CRESYL GLYCIDYL ETHER polyamine/fatty acid condensation polymer	247-711-4	26447-14-3	10-20%	Muta3;R68 R43 Xi;R38 N;R51/53 Xi;R38. R43.
1-METHOXY-2-PROPANOL	203-539-1	107-98-2	<1%	R10
CYCLOHEXANONE	203-631-1	108-94-1	<1%	R10 Xn;R20
Bisphenol F - epichlorohydrin resin with Number Average Molecular < 700		28064-14-4	<1%	Xi;R36/38. N;R51/53. R43.
Aliphatic glycidylether		68081-84-5	<1%	Xi;R36/38. N;R51/53. R43.

The Full Text for all R-Phrases are Displayed in Section 16

3 HAZARDS IDENTIFICATION

May cause sensitisation by skin contact. Irritating to eyes and skin. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Possible risk of irreversible effects.
CLASSIFICATION Mut 3;R68. Xi;R36/38. R43. N;R50/53.

4 FIRST-AID MEASURES

INHALATION: Move the exposed person to fresh air at once. Perform artificial respiration if breathing has stopped. When breathing is difficult, properly trained personnel may assist affected person by administering oxygen. Keep the affected person warm and at rest. Get prompt medical attention.

INGESTION: DO NOT INDUCE VOMITING! NEVER MAKE AN UNCONSCIOUS PERSON VOMIT OR DRINK FLUIDS!
Rinse mouth thoroughly. Drink plenty of water. Get medical attention immediately!

SKIN CONTACT: Remove affected person from source of contamination. Promptly wash contaminated skin with soap or mild detergent and water. Promptly remove clothing if soaked through and wash as above. Get medical attention if any discomfort continues.

EYE CONTACT: Promptly wash eyes with plenty of water while lifting the eye lids. Continue to rinse for at least 15 minutes and get medical attention. Get medical attention promptly if symptoms occur after washing.

5 FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA: Water. Foam. Carbon dioxide (CO₂). Dry chemicals, sand, dolomite etc.

SPECIAL FIRE FIGHTING PROCEDURES: Use special protective clothing. Regular protection may not be safe. Avoid breathing fire vapours. If risk of water pollution occurs, notify appropriate authorities.

UNUSUAL FIRE & EXPLOSION HAZARDS: Fire causes formation of toxic gases.

SPECIFIC HAZARDS: Fire or high temperatures create: Toxic gases/vapours/fumes of Carbon dioxide (CO₂). Carbon monoxide (CO).

6 ACCIDENTAL RELEASE MEASURES

SPILL CLEAN UP METHODS: Stop leak if possible without risk. Absorb in vermiculite, dry sand or earth and place into containers. Runoff or release to sewer, waterway or ground is forbidden.

7 HANDLING AND STORAGE

USAGE PRECAUTIONS: Avoid spilling, skin and eye contact.

STORAGE PRECAUTIONS: Store in tightly closed original container in a dry and cool place.

STORAGE CLASS: Chemical storage.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Name	Std	LT - ppm	LT - mg/m ³	ST - ppm	ST - mg/m ³
1-METHOXY-2-PROPANOL	WEL	100 ppm(Sk)	375mg/m ³ (Sk)	150 ppm(Sk)	560 mg/m ³ (Sk)
CYCLOHEXANONE	WEL	10 ppm(Sk)		20 ppm(Sk)	

PROTECTIVE EQUIPMENT



PROCESS CONDITIONS: Provide eyewash station.

ENGINEERING MEASURES: Provide adequate general and local exhaust ventilation.

HAND PROTECTION: Chemical resistant gloves required for prolonged or repeated contact.

EYE PROTECTION: Wear approved safety goggles.

OTHER PROTECTION: AVOID ALL SKIN AND RESPIRATORY CONTACT!

Wear appropriate clothing to prevent any possibility of skin contact.

HYGIENE MEASURES: Wash at the end of each work shift and before eating, smoking and using the toilet. Wash promptly if skin becomes wet or contaminated. Promptly remove any clothing that becomes contaminated. When using do not eat, drink or smoke.

9 PHYSICAL AND CHEMICAL PROPERTIES

ODOUR Characteristic

10 STABILITY AND REACTIVITY

STABILITY: Stable under normal temperature conditions. Avoid: Contact with acids.

HAZARDOUS DECOMPOSITION PRODUCTS: Toxic gases/vapours/fumes of: Carbon dioxide (CO₂). Carbon monoxide (CO).

11 TOXICOLOGICAL INFORMATION

INHALATION: Vapour may irritate respiratory system or lungs.

INGESTION: Liquid irritates mucous membranes and may cause abdominal pain if swallowed.

SKIN CONTACT: Irritating to skin. May cause sensitisation by skin contact.

EYE CONTACT: Irritation of eyes and mucous membranes.

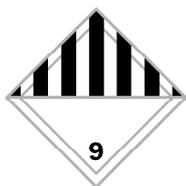
12 ECOLOGICAL INFORMATION

ECOTOXICITY: Unmixed resin is dangerous for the environment: May cause long-term adverse effects in the aquatic environment.

13 DISPOSAL CONSIDERATIONS

DISPOSAL METHODS: Dispose of waste and residues in accordance with local authority requirements.

14 TRANSPORT INFORMATION



UK ROAD CLASS:	9
PROPER SHIPPING:	NAME ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Epoxy Resin Mixture)
UN NO. ROAD:	3082
UK ROAD PACK GR:	III
ADR CLASS NO:	9
ADR CLASS:	Class 9: Miscellaneous dangerous substances and articles
ADR PACK GROUP	III
HAZARD No. (ADR):	90
ADR LABEL NO:	9
HAZCHEM CODE:	2X
CEFIC TEC(R) NO:	90GM6-III
RID CLASS NO:	9
RID PACK GROUP:	III
UN NO. SEA:	3082
IMDG CLASS:	9
IMDG PAGE NO:	9
IMDG PACK GR:	III
EMS:	F-A, S-F
MFAG	See Guide
MARINE POLLUTANT	No.
UN NO. AIR:	3082
AIR CLASS:	9
AIR PACK GR:	III

15 REGULATORY INFORMATION

LABELLING



Harmful



Dangerous for the environment

CONTAINS

EPOXY RESIN (Number average MW \leq 700)
CRESYL GLYCIDYL ETHER

RISK PHRASES:	R43	May cause sensitisation by skin contact.
	R36/38	Irritating to eyes and skin.
	R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
	R68	Possible risk of irreversible effects.

SAFETY PHRASES:	S25	Avoid contact with eyes.
	S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
	S36/37	Wear suitable protective clothing and gloves.
	S57	Use appropriate containment to avoid environmental contamination.
	S60	This material and its container must be disposed of as hazardous waste.
	S61	Avoid release to the environment. Refer to special instructions/safety data sheets.
	P5	Contains epoxy constituents. See information supplied by the manufacturer.

UK REGULATORY REFERENCES: Chemicals (Hazard Information & Packaging) Regulations.

APPROVED CODE OF PRACTICE: Safety Data Sheets for Substances and Preparations. Classification and Labelling of Substances and Preparations Dangerous for Supply.

16 OTHER INFORMATION

RISK PHRASES IN FULL

R10	Flammable.
R15	Contact with water liberates extremely flammable gases.
R17	Spontaneously flammable in air.
R20	Harmful by inhalation.
R36/38	Irritating to eyes and skin.
R38	Irritating to skin.
R43	May cause sensitisation by skin contact.
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R68	Possible risk of irreversible effects.

Uncured Resin: All risk statements refer to unmixed resin product. Users should also check MSDS for hardener before mixing and be aware that, once resin and hardener are mixed and cured, product is inert.

Cured product: Solidified (cured) epoxy products are inert and relatively harmless, traces of residual components may be left on the surface. Abrading or sanding cured coatings will generate dust or particles that should not be inhaled or ingested, wet surfaces where possible before abrading. Provide ventilation, wear a suitable mask, gloves and cover exposed skin to prevent contact with the dust.

Revision Date: 10/2008 Replaces all versions

All information is based on results gained from experience and tests and is believed to be accurate but is given without acceptance of liability for loss or damage attributable to reliance thereon as conditions of use lie outside our control. Users should always carry out sufficient tests to establish the suitability of any products for their intended applications. No statements shall be incorporated in any contract unless expressly agreed in writing nor construed as recommending the use of any product in conflict of any patent. All goods are supplied subject to A&E Systems Ltd General Conditions of sale.

ALL INFORMATION IS GIVEN IN GOOD FAITH BUT WITHOUT WARRANTY



Alocit Systems products are manufactured and distributed by the A&E Group

AUSTRALIA

A&E Systems PTY Limited, 3/20 Clark Court, Bibra Lake, Perth WA 6163, Australia
Tel: +61 (0)8 94183688 Fax: +61 (0)8 94183588 Email: aus@ae-sys.com

EUROPE

A&E Systems Ltd, 3 Charles Wood Road, Dereham, NR19 1SX, UK
Tel: +44 (0)1362 694915 Fax: +44 (0)1362 695350 Email: uk@ae-sys.com

MALAYSIA

A&E Systems Sdn Bhd, 26 Jalan Pendaftar U1/54, Sekyzen U1,
40150 Shah Alam, Selangor Darul Ehsan, Malaysia
Tel : +60 (0)3-5569 4277 Fax : +60 (0)3-5569 4377 Email: mal@ae-sys.com

USA

A&E Systems Anti-Corrosion Systems LLC, 150 Hilden Road, Ste #301, Ponte Vedra, Florida 32081, USA
Tel: +1 904 819-8985 Fax: +1 904 819-1430 Email: usa@ae-sys.com

www.ae-sys.com

TECHNICAL DATA SHEET

ALOCIT 28.15 EPOXY COATING FINISH

STANDARD GRADE (All temps above water - underwater below 17°C/63°F)

- Outstanding adhesion, on oily surfaces & underwater
- Environmentally friendly - solvent free and no heavy metals
- Proven protection against corrosion, including A.L.W.C.
- An inexpensive solution to problem coating needs
- Abrasion resistant

USAGE

As a hygienic, easily cleaned finish for concrete, steel, ironwork providing a hard wearing attractive surface. For preservation of steel structures, industrial floors, cellars, bund areas, laundries, sheet pilings, locks and channels, docks, harbours, oil rigs, oil tanks, ships hulls and bilges, bridges, conduits, caverns, industrial plants for wet or oily surfaces, railway and subway tunnels, underpasses, swimming pools etc. Can also be used as self-priming coat on minimal surface prep.

- A protective coating resistant to many alkalis, some acids, oils, sewage, mechanical wear and chemical attack
- A coating that can be applied on dry, wet, or even on underwater surfaces
- A high build (200 - 400 microns/8-16 mil) per coat

TECHNICAL DETAILS

Product Description	Two component/epoxy resin based/pigmented/solvent free
Volume Solids	100%
Mixing Ratio (by weight)	5 parts resin - 1 part hardener
Specific Gravity	Mixed - 1.55; Base only - 1-75 (+ or - 10% depending on colour)
Dilution	Do not dilute
Brush/Tool Cleaner	Immediately after use. Acetone
Theoretical Coverage Rate*	@ 400µ/16 mil (Maximum WFT) = 1.35m ² /mixed Kg @ 300µ/12 mil (Optimum WFT) = 1.8m ² /mixed Kg @ 200µ/8 mil (Minimum WFT) = 2.7m ² /mixed Kg @ 25µ/1 mil = 1600 ft ²
1 US gallon	
Number of Coats	Two coats
Working Life**	@ +20°C/68°F 45/60 minutes
Drying Times	@ +20°C/68°F Touch dry 6-8 hours
Min Practical Cure Temp.***	+5°C/41°F
Resistant to	Water, sea water, oils, petroleum, some solvents, alkalis and a certain range of acids.
Flash Point	Above +200°C/+392°F
Shelf Life	Minimum 1 year in original container
Storage	Moderate room temperature 15-30°C/59-86°F
Colours	White, Black, Grey - others on request - min quantity may apply US FED-STD-595, RAL, BS 36, BS 3800
Pack Size	UK/Europe 3 KG (2.5 kilo resin/0.5 kilo hardener) US 1 Quart, 1 Gallon, 5 Gallon (Pack includes both components)

- Notes
- * Underwater application can result in reduced coverage rates.
 - ** Working life is dependent on unit size, ambient/product temperature, mixing method and time, application speed relative to reduction in vol. of mixed product.
 - *** Curing will take place at lower temperatures but over an extended period.

SURFACE PREPARATION

A) NEW STEEL

All millscale to be removed by abrasive blasting, check for rogue peaks and laminations, take remedial action. Remove dust and other contaminations. A blast profile of between 50 and 100 μ (2-4 mil) is the aim, based on Swedish Pictorial Standards / ISO-8501-1/SSPC/NACE. We recommend SA2 (SP6, NACE 3) as a minimum, and SA 2.5 (SP10, NACE 2) as the optimum. A secondary choice for surface preparation is mechanical abrading to remove surface contamination before coating application.

B) WEATHERED/EXPOSED/CORRODED STEEL

Our basic aim is to remove surface contamination such as corrosion deposits, marine growths, chemical compounds etc., to revealing a clean steel substrate with a surface profile of a minimum 25 microns/1 mil (50 microns/2 mil underwater), various options are:-

- 1) Abrasive blasting, dry, in areas of low chemical contamination followed by optional high pressure water blast (15-20,000psi).
- 2) UHP hydroblasting (30/40,000psi) to remove all previous coatings etc and reveal original profile. Especially suitable for wet environments such as ships tanks, piers, jetties etc. Clean to an agreed standard and check soluble salts level.
- 3) UHP and High Pressure water blasting may sometimes be employed with added abrasive.
- 4) Mechanical cleaning (power) i.e. needle gunning, rotary wire brushing etc to remove all contamination/dust etc.

Notes:

- 1) Stains of rust, paint or mill scale remaining on the surface do not present a problem providing minimum surface profile criteria are met.
- 2) Alocit product range can be applied to both dry, wet and underwater surfaces, however whilst clean steel in saltwater is acceptable, steel heavily contaminated with salt and/or other chemicals above water is not acceptable. This type of steel requires decontamination, with chemical levels measured before and after.

C) CONCRETE

The substrate should be free from high levels of laitence, dust, oil contamination, large surface voids etc. Sometimes brush blasting (dry) or UHP hydroblasting are appropriate methods, especially for large areas, large cracks/surface voids should be repaired prior to coating.

D) NON-FERROUS METALS

Light surface abrading, remove dust etc. If there are any queries re surface preparation prior to applying the Alocit coating system, please contact our technical dept. for further advice.

E) NON METALLIC

If possible, surface abrading, then remove dust etc if in doubt, apply a test patch before coating.

PRODUCT APPLICATION - Methods

Atmospheric:	Brush & Roller Airless spray - minimum 68:1, Tip size 21-23 thou.
Sweating, damp or underwater:	Alocit brushes - use vigorous circular motion. Alocit K1 underwater pump with round brush - use vigorous circular motion.

Notes:

- 1) Please contact our technical dept for specific details or if any doubt.
- 2) All equipment should be cleaned immediately after use with acetone.
- 3) Airless spray is not suitable for wet/damp surfaces

PRODUCT APPLICATION - COATING SYSTEMS

STEEL **Atmospheric and Underwater:**

Minimum - 1 coat Alocit 28.14 primer plus 1 coat Alocit 28.15.
Optimum - 1 coat Alocit 28.14 primer plus 2 coats Alocit 28.15
OR 2 coats Alocit 28.15

CONCRETE

Atmospheric: 1 coat Alocit 28.95 sealer plus 1 coat Alocit 28.15
OR 1 coat Alocit 28.95 sealer plus 2 coats Alocit 28.15
OR 2 coats Alocit 28.15

Underwater: 2 coats Alocit 28.15

Notes:

- 1) Use Alocit 28.15 of different colours in a multi-coat system.
- 2) Alocit 28.14 zinc primer is specially designed for application onto clean, rust-free profiled steel.
- 3) Alocit 28.95 primer sealer is for application onto wet, oily, concrete etc - not underwater.

PRECAUTIONS

Always use up the entire can. Product cannot be reused after working life expires.

Always empty the entire amount of hardener into the epoxy, because the proper mixing ratio must be maintained. Containers are pre-measured with most epoxy containers oversized to allow adding and mixing of the hardener.

Mix thoroughly by hand or with a mechanical mixer - avoid aeration of mixed product. Make sure that material is mixed well around the walls and the bottom of the can before mixing with hardener.

IMPORTANT

Alocit 28.15 must be brushed onto the surface with circular motions, using pressure on moist, wet, submerged, or oily surfaces. 2nd coat must be applied as soon as the first coat is touch dry - not later.

All information is based on results gained from experience and tests and is believed to be accurate but is given without acceptance of liability for loss or damage attributable to reliance thereon as conditions of use lie outside our control. Users should always carry out sufficient tests to establish the suitability of any products for their intended applications. No statements shall be incorporated in any contract unless expressly agreed in writing nor construed as recommending the use of any product in conflict of any patent. All goods are supplied subject to A&E General Conditions of Sale.



Alocit Systems products are manufactured and distributed by the A&E Group

AUSTRALIA

A&E Systems PTY Limited, 3/20 Clark Court, Bibra Lake, Perth WA 6163, Australia
Tel: +61 (0)8 94183688 Fax: +61 (0)8 94183588 Email: aus@ae-sys.com

EUROPE

A&E Systems Ltd, 3 Charles Wood Road, Dereham, NR19 1SX, UK
Tel: +44 (0)1362 694915 Fax: +44 (0)1362 695350 Email: uk@ae-sys.com

MALAYSIA

A&E Systems Sdn Bhd, 26 Jalan Pendaftar U1/54, Sekyzen U1,
40150 Shah Alam, Selangor Darul Ehsan, Malaysia
Tel : +60 (0)3-5569 4277 Fax : +60 (0)3-5569 4377 Email: mal@ae-sys.com

USA

A&E Systems Anti-Corrosion Systems LLC, 150 Hilden Road, Ste #301, Ponte Vedra, Florida 32081, USA
Tel: +1 904 819-8985 Fax: +1 904 819-1430 Email: usa@ae-sys.com

www.ae-sys.com

SAFETY DATA SHEET

ALOCIT 28.15 STANDARD GREY RAL7004



1 IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY

PRODUCT NAME: ALOCIT 28.15 STANDARD GREY RAL7004
PRODUCT NO: AS32606A
SUPPLIER: A&E SYSTEMS LIMITED, 3 CHARLES WOOD ROAD, DEREHAM, NR19 1SX, UK
Tel: +44 (0)1362 694915 Fax: +44 (0)1362 695350 Email: uk@ae-sys.com

NOTE: All information relates to unmixed resin - see hardener MSDS for further information on product before use.
Mixed and cured product is inert, environmental risk from cured product is negligible - see Section 16.

2. COMPOSITION/INFORMATION ON INGREDIENTS

NAME	CAS No.:	EC No:	CLASSIFICATION	CONTENT
CRESYL GLYCIDYL ETHER	26447-14-3	247-711-4	Xi ,N R-38, R43, R51/53, R68 Muta3	10-20%
EPOXY RESIN (Number average MW <= 700)	25068-38-6	500-033-5	Xi ,N R-36/38, R43, R51/53	30-40%
XYLENE	1330-20-7	215-535-7	R10 Xn; R20/21 Xi; R38	<1%
Polyamine/ fatty acid concentration polymer	120026-50-8		Xi; R38, R43	<1%
1- METHOXY-2- PROPANOL	107-98-2	203-539-1	R10	<1%
Bisphenol F- epichlorohydrin resin with Number Average Molecular <700	28064-14-4		Xi; R36/38, N; R51/53, R43	<1%

The Full Text for all R-Phrases are Displayed in Section 16

3. HAZARDS IDENTIFICATION

May cause sensitisation by skin contact. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. possible risk of irreversible effects. CLASSIFICATION- Mut 3; R68, Xi; R36/38, R43, N; R51/53

4. FIRST AID MEASURES

INHALATION: Move the exposed person to fresh air at once. Perform artificial respiration if breathing has stopped. When breathing is difficult, properly trained personnel may assist affected person by administering oxygen. Keep the affected person warm and at rest. Get prompt medical attention.

INGESTION: DO NOT INDUCE VOMITING! NEVER MAKE AN UNCONSCIOUS PERSON VOMIT OR DRINK FLUIDS! Rinse mouth thoroughly. Drink plenty of water. Get medical attention immediately!

SKIN: Remove affected person from source of contamination. Promptly wash contaminated skin with soap or mild detergent and water. Promptly remove clothing if soaked through and wash as above. Get medical attention if any discomfort continues.

EYES: Promptly wash eyes with plenty of water while lifting the eye lids. Continue to rinse for at least 15 minutes and get medical attention. Get medical attention promptly if symptoms occur after washing.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Water. Foam. Carbon dioxide (CO2). Dry chemicals, sand, dolomite etc.

SPECIAL FIRE FIGHTING PROCEDURES: Use special protective clothing. Regular protection may not be safe. Avoid breathing fire vapours. If risk of water pollution occurs, notify appropriate authorities.

UNUSUAL FIRE & EXPLOSION HAZARDS: Fire causes formation of toxic gases.

HAZARDOUS COMBUSTION PRODUCTS: Fire or high temperatures create: Toxic gases/vapors/fumes of: Carbon dioxide (CO₂). Carbon monoxide (CO).

6. ACCIDENTAL RELEASE MEASURES

SPILL CLEANUP METHODS: Stop leak if possible without risk. Absorb in vermiculite, dry sand or earth and place into containers. Runoff or release to sewer, waterway or ground is forbidden.

7. HANDLING AND STORAGE

USAGE PRECAUTIONS: Avoid spilling, skin and eye contact.

STORAGE PRECAUTIONS: Store in tightly closed original container in a cool, dry well-ventilated place.

STORAGE CRITERIA: Chemical storage.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

NAME	STD	LT-PPM	LT-MG/M3	ST-PPM	ST-MG/M3
XYLENE	WEL	50 ppm (SK)	220 mg/m ³ (SK)	100 ppm (SK)	441 mg/m ³ (SK)
1-METHOXY-2-PROPANOL	WEL	100 ppm (SK)	375 mg/m ³ (SK)	150 ppm (SK)	560 mg/m ³ (SK)

PROTECTIVE EQUIPMENT:



PROCESS CONDITIONS: Provide eyewash station.

VENTILATION: Provide adequate general and local exhaust ventilation.

PROTECTIVE GLOVES: Chemical resistant gloves required for prolonged or repeated contact.

EYE PROTECTION: Wear approved safety goggles.

OTHER PROTECTION: AVOID ALL SKIN AND RESPIRATORY CONTACT! Wear appropriate clothing to prevent any possibility of skin contact.

HYGIENIC WORK PRACTICES: Wash at the end of each work shift and before eating, smoking and using the toilet. Wash promptly if skin becomes wet or contaminated. Promptly remove any clothing that becomes contaminated. When using do not eat, drink or smoke.

9. PHYSICAL AND CHEMICAL PROPERTIES

ODOUR/TASTE: Characteristic.

10. STABILITY AND REACTIVITY

STABILITY: Stable under normal temperature conditions. Avoid: Contact with acids.

HAZARDOUS DECOMPOSITION PRODUCTS: Toxic gases/vapours/fumes of: Carbon dioxide (CO₂). Carbon monoxide (CO).

11. TOXICOLOGICAL INFORMATION

INHALATION: Vapour may irritate respiratory system or lungs.

INGESTION: Liquid irritates mucous membranes and may cause abdominal pain if swallowed.

SKIN: Irritating to skin. May cause sensitisation by skin contact.

EYES: Irritation of eyes and mucous membranes.

12. ECOLOGICAL INFORMATION

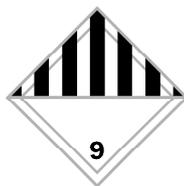
ECOLOGICAL INFORMATION: Dangerous for the environment: May cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHODS: Dispose of in accordance with Local Authority requirements.

14. TRANSPORT INFORMATION

LABEL FOR CONVEYANCE:



UN No. ROAD:	3082
UK ROAD TRANSPORT CLASS:	9
UK ROAD PACK GR.:	III
ADR CLASS No.:	9
ADR CLASS:	Class 9: Miscellaneous dangerous substances and articles.
ADR PACK GR.	III
ADR LABEL No:	9
HAZCHEM CODE:	2X
CEFIC TEC(R) No.:	90GM6-III
PROPER SHIPPING NAME I:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Bisphenol F - epichlorohydrin resin with number average molecular <700)
RID CLASS No:	9
RID PACK GR.	III
UN No. SEA:	3082
IMDG CLASS:	9
IMDG PACK GR.:	III
EmS No.:	F-A, S-F
MFAG TABLE No.:	See Guide
MARINE POLLUTANT:	No.
UN No., AIR:	3082
ICAO CLASS:	9
AIR PACK GR:	III

15. REGULATORY INFORMATION

LABEL FOR SUPPLY:



Harmful



Dangerous for
the environment

CONTAINS: EPOXY RESIN (Number average MW <700) CRESYL GLYCIDYL ETHER

RISK PHRASES: R-36/38 Irritating to eyes and skin.
R-43 May cause sensitisation by skin contact.
R-51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R-68 Possible risk of irreversible effects.

SAFETY P-5 Contains epoxy constituents. See information supplied by the manufacturer.
PHRASES: S-24/25 Avoid contact with skin and eyes.
S-26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S-36/37 Wear suitable protective clothing and gloves.
S-60 This material and its container must be disposed of as hazardous waste.
S-61 Avoid release to the environment. Refer to special instructions/Safety Data Sheets.

UK REGULATORY REFERENCES: Chemicals (Hazard Information & Packaging) Regulations.

APPROVED CODE OF PRACTICE: Safety Data Sheets for Substances and Preparations L62. Classification and Labelling of Substances and Preparations Dangerous for Supply.

16. OTHER INFORMATION

RISK PHRASES (Full Text): R-36/38 Irritating to eyes and skin. R-43 May cause sensitisation by skin contact R-51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. R-38 Irritating to skin. R-68 Possible risk of irreversible effects. R-10 Flammable. R-20/21 Possible risk of irreversible effects.

Uncured Resin: All risk statements refer to unmixed resin product. Users should also check MSDS for hardener before mixing and be aware that, once resin and hardener are mixed and cured, product is inert.

Cured product: Solidified (cured) epoxy products are inert and relatively harmless, traces of residual components may be left on the surface. Abrading or sanding cured coatings will generate dust or particles that should not be inhaled or ingested, wet surfaces where possible before abrading. Provide ventilation, wear a suitable mask, gloves and cover exposed skin to prevent contact with the dust.

Revision Date: 10/2008 Replaces all versions

All information is based on results gained from experience and tests and is believed to be accurate but is given without acceptance of liability for loss or damage attributable to reliance thereon as conditions of use lie outside our control. Users should always carry out sufficient tests to establish the suitability of any products for their intended applications. No statements shall be incorporated in any contract unless expressly agreed in writing nor construed as recommending the use of any product in conflict of any patent. All goods are supplied subject to A&E Systems Ltd General Conditions of sale.

ALL INFORMATION IS GIVEN IN
GOOD FAITH BUT WITHOUT WARRANTY



Alocit Systems products are manufactured and distributed by the A&E Group

AUSTRALIA

A&E Systems PTY Limited, 3/20 Clark Court, Bibra Lake, Perth WA 6163, Australia
Tel: +61 (0)8 94183688 Fax: +61 (0)8 94183588 Email: aus@ae-sys.com

EUROPE

A&E Systems Ltd, 3 Charles Wood Road, Dereham, NR19 1SX, UK
Tel: +44 (0)1362 694915 Fax: +44 (0)1362 695350 Email: uk@ae-sys.com

MALAYSIA

A&E Systems Sdn Bhd, 26 Jalan Pendaftar U1/54, Sekyzen U1,
40150 Shah Alam, Selangor Darul Ehsan, Malaysia
Tel : +60 (0)3-5569 4277 Fax : +60 (0)3-5569 4377 Email: mal@ae-sys.com

USA

A&E Systems Anti-Corrosion Systems LLC, 150 Hilden Road, Ste #301, Ponte Vedra, Florida 32081, USA
Tel: +1 904 819-8985 Fax: +1 904 819-1430 Email: usa@ae-sys.com

www.ae-sys.com

Alocit Safety Data Sheet 28.15 ST Grey RAL7004 Page 4 of 4



A-2

Aremco Products, Inc

Aremco's Corr-Paint™ protective coatings include the most expansive line of high temperature organic- and ceramic-based products available on the market today for applications to 1300 °F.

PRODUCT HIGHLIGHTS

Corr-Paint™ CP20XX Series

These epoxy and urethane based coatings are used for producing corrosion and wear resistant barriers to 500 °F. Typical applications include tanks, pipelines, boilers, precipitators, scrubbers, bag houses, cyclones, hoppers and other process equipment used in the power, pulp and paper, and chemical processing industries.

Urethanes

One-part, oxidation and wear-resistant coatings for applications to 400 °F.

CP2000 Jet Black
CP2010 Aluminum
CP2020 Gray

Epoxies

Two-part, high-build coatings for highly corrosive applications as high as 500 °F.

CP2050-LF Epoxy-phenolic with long glass fibers for strength and reinforcement.
CP2050-FF Epoxy-phenolic with fine glass fibers for smooth, uniform appearance.
CP2050-NF Epoxy-phenolic, un-filled system for aggressive acidic conditions.
CP2060 Novolac-epoxy system with silicon carbide filler.
CP2070 Novolac-epoxy, low viscosity, gray pigmented system.

Corr-Paint™ CP30XX Series

These inorganic-ceramic, aqueous-based coatings provide outstanding resistance to thermal shock, oxidation and chemical corrosion to 1500 °F. Five basic formulations are available:

CP3000 Ceramic filled coating to 1300 °F.
CP3015-AL Aluminum-ceramic filled coating to 1400 °F.
CP3015-BL High emissivity, inorganic black pigmented coating to 1500 °F.
CP3015-IO Micaceous iron oxide filled, inorganic coating to 1400 °F.
CP3015-SS Stainless steel filled, inorganic coating to 1500 °F.

These advanced materials are specially formulated to adhere to steel and refractory products used in boilers, furnaces, rotary calciners, kilns, stacks, and other high temperature structures. Benefits include extended equipment life, lower energy costs, and increased throughput.

Corr-Paint™ CP40XX Series

These silicone-based, heat-resistant coatings are formulated using a state-of-the-art, VOC-compliant, water-dispersible silicone resin. CP40XX Series products adhere to metals, ceramics, refractories, and quartz, and offer outstanding resistance to outdoor weathering, UV light, salt spray, chemical corrosion, thermal cycling, and temperatures to 1100 °F. Standard pigments include:

CP4000 Black*	CP4030 Off-White	CP4060 Red	CP4090 Brown
CP4010 Aluminum*	CP4040 White	CP4070 Blue	CP4095 Orange
CP4020 Gray	CP4050 Green	CP4080 Yellow	

Additional colors are available upon request. *Formulations based on solvent-borne high gloss systems are available. Add -S to part number to order solvent-borne coating. Note: Original formulation for Aremco-Coat™ 567 has been replaced by CP4040-S.

Corr-Paint™ CP5000

CP5000 is a two-part, water-based, inorganic zinc-rich primer which provides superior resistance to salt-fog, immersion, impact and abrasion. This primer system is compatible with all CP-Series products and other organic topcoats. It is used for priming structural steel, marine structures, storage tanks, utility systems, and chemical process equipment and piping.

Corr-Prep™ CPR2000

This is a specially formulated, water-based, zinc phosphate metal etching solution that is non-toxic, non-flammable, non-caustic, and non-corrosive. It etches metal to provide surface profile for superior coating adhesion to aluminum, galvanized, steel, and stainless steel metals. It also helps to improve long-term corrosion protection. Application is simple - just brush or spray liquid on the substrate and rinse off a few minutes later and dry the substrate thoroughly.



Chemical Resistance	2050-XX	2060/2070
Acetic Acid	Good	Excellent
Acetone	Good	Good
Jet Fuel	Excellent	Excellent
Alcohol	Excellent	Excellent
Crude Oil	Excellent	Excellent
Diesel	Excellent	Excellent
Gasoline	Excellent	Excellent
HCl (10%)	Excellent	Excellent
HCl (20%)	Good	Good
Heptane	Excellent	Excellent
Kerosene	Excellent	Excellent
MEK	Good	Good
Methylene Chloride	Not Good	Excellent
HNO ₂ (10%)	Excellent	Excellent
HNO ₃ (20%)	Good	Good
Phosphoric Acid	Good-Excellent	Good-Excellent
Potassium Chloride	Excellent	Excellent
Sodium Hydroxide	Excellent	Excellent
Sulfuric Acid	Good-Excellent	Good-Excellent
Toluene	Good	Excellent
Xylene	Excellent	Excellent

HIGH TEMPERATURE PROTECTIVE COATINGS PROPERTIES

Product Number	CP2000	CP2010	CP2020	CP2050-XX ^①	CP2060 ^①	CP2070	CP3000	CP3015-AL	CP3015-BL	CP3015-IO	CP3015-SS
Type	Urethane	Urethane	Urethane	Epoxy-Phenolic	Novolac-Epoxy	Novolac-Epoxy	Inorganic	Inorganic	Inorganic	Inorganic	Inorganic
Color (cured)	Gloss Black	Aluminum	Gloss Gray	Brown	Gray	Gray	Gray	Aluminum	Black	Iron Oxide Gray	Stainless Steel Gray
Temperature Continuous, °F (°C)	400 (204)	400 (204) ^②	400 (204) ^②	400 (204)	500 (260)	300 (150) ^③	1300 (704)	1400 (760)	1500 (816)	1400 (760)	1500 (816)
Solids by Weight, %	67.0	70.0	72.0	100.0	100.0	100.0	71.0	41.3	51.5	52.0	47.0
Solids by Volume, %	49.0	66.0	77.0	100.0	100.0	100.0	54.2	16.6	21.7	23.9	22.6
WFT, mils (microns) ^③	4.0 (101.6)	4.0 (101.6)	4.0 (101.6)	50+ (1270.0)	50+ (1270.0)	7.0 (177.8)	4.0 (101.6)	6.0 (152.4)	5.0 (127.0)	5.0 (127.0)	5.0 (127.0)
DFT, mils (microns) ^④	2.0 (50.8)	2.6 (67.1)	3.1 (78.7)	50+ (1270.0)	50+ (1270.0)	7.0 (177.8)	2.2 (55.9)	1.0 (25.4)	1.9 (48.3)	1.2 (30.5)	1.1 (28.7)
Theoretical Dry Film Coverage ^⑤ @ 1 mil, ft ² /gal, (m ² /liter)	722 (17.7)	1058 (25.9)	1235 (30.3)	1604 (39.3)	1604 (39.3)	1604 (39.3)	870 (21.3)	266 (6.5)	348 (8.5)	383 (9.4)	363 (8.9)
Primer	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Application Temperature, °F	50-90	50-90	50-90	50-90	50-90	50-90	50-90	50-90	50-90	50-90	50-90
Touch, hrs	4-6	4-6	4-6	6-8	4	5	0.5	1-2	1-2	1-2	1-2
Handling, hrs	6-8	6-8	6-8	12-14	6-8	8	1	2-4	2-4	2-4	2-4
Recoat, (min/max), hrs	3/7	6/12	3/7	4/48	4/8	4/8	0.1/NA	1/4	1/4	1/4	1/4
Min Air Set, hrs ^⑥	.5	1	0.5	2	8	8	.5	1	1	1	1
Cure, °F/hrs	RT/24 or 250/1	RT/24 or 250/1	RT/24 or 250/1	RT/48 or 175/4	RT/48 or 250/6	RT/24	200/3	200/2+500/1 ^⑦	200/2+500/1 ^⑦	200/2+500/1 ^⑦	200/2+500/1 ^⑦
No. Components	1	1	1	2	2	2	1	1	1	1	1
Mix Ratio, by weight	NA	NA	NA	1:1	100:8	100:42 (2:1 by volume)	NA	NA	NA	NA	NA
Mixed Viscosity, cps	200-240	300-600	200-500	Paste	Paste	800-1000	1200-1800	250-450	2800-4500	400-1000	500-1000
Thinner	Hi-Flash Naptha	Hi-Flash Naptha	Hi-Flash Naptha	NR	NR	Xylene	CP3000-T	CP3015-T	CP3015-T	CP3015-T	CP3015-T
Specific Gravity, gms/cc	1.05	1.08	1.08	1.6	1.9	1.1	1.70	1.32	1.58	1.57	1.51
Pot Life, hrs at room temp.	NA	NA	NA	.7	.75 (500 gms)	.35 (200 gms)	NA	NA	NA	NA	NA
Flash Point, °F (°C)	140 (60)	140 (60)	140 (60)	>200 (93)	>200 (93)	>200 (93)	NA	0.0	0.0	NA	NA
VOC's, lbs/gal	2.86	3.00	2.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shelf Life @ RT, Months	12	12	12	12	12	12	6	6	6	6	6
Storage Temperature, °F	40-90	40-90	40-90	40-90	40-90	40-90	40-90	40-90	40-90	40-90	40-90

Reference Notes

Technical Notes for Epoxy Coatings	CP2050-XX	CP2060
Hardness, Shore D	86	90
Lap Shear Strength to Aluminum, psi	2,700	2,300
@ 25 °C	1,800	2,000
@ 100 °C	900	1,200
@ 150 °C	300	900
@ 175 °C	13,400	11,500
Flexural Strength, psi	10,300	12,000
Compressive Strength, psi	3	2
Elongation, %		

- ② CP2010 will begin to discolor at 300 °F.
 ③ Estimated Wet Film Thickness (WFT).
 ④ Recommended Dry Film Thickness (DFT).
 ⑤ Actual coverage will vary depending on material losses during mixing and application.
 ⑥ Where a value is provided for "Min Air Set", it is recommended that the coating set at room temperature for, at minimum, the specified time prior to curing.
- ⑦ Curing is recommended but not absolutely required if the system is raised slowly to a minimum of 500 °F within 24-48 hours of application and not exposed to high moisture or rain during this initial dwell period.
 ⑧ Withstands intermittent service temperatures of 350-400 °F if cured for 2 hours at 185 °F.

Abbreviations

NR - Not Required or Recommended
 NA - Not Applicable
 DFT - Dry Film Thickness
 WFT - Wet Film Thickness
 RT - Room Temperature

Surface Preparation Notes

All surfaces should be free of oil, grease, dirt, corrosives, oxides, paints or other foreign matter. No further preparation is required when coating ceramics, refractories or graphites. Smooth metal surfaces should be further prepared as follows:
CP20XX - Abrasive blast to an SSPC-SP5 profile or etch surface using Aremco's Corr-Prep™ CPR2000. Apply CPR2000 for a maximum of 10-15 minutes, then rinse with warm water and dry rapidly.
CP30XX - Abrasive blast to an SSPC-SP10, near-white blast (.001" profile). Remove abrasive residue using air pressure — do not clean with organic solvents.

Refer to Price List for complete order information. Aremco Products makes no warranty express or implied concerning the use of this product. The user assumes all risk of use or handling whether or not in accordance with directions or suggestions, or used singly or in combination with other products.

HIGH TEMPERATURE PROTECTIVE COATINGS PROPERTIES

Product Number	CP4000	CP4010	CP4020	CP4030	CP4040	CP4050	CP4060	CP4070	CP4080	CP4090	CP4095	CP5000
Type	Silicone	Inorganic										
Color (cured)	Flat Black	Silver-Gray	Medium Gray	Off-White	White	Green	Red	Blue	Yellow	Brown	Orange	Gray
Temperature Continuous, °F (°C)	1100 (593)	1100 (593)	1100 (593)	1100 (593)	1100 (593)	1100 (593)	1100 (593)	1100 (593)	1100 (593)	1100 (593)	1100 (593)	1000 (538)
Solids by Weight, %	40.5	35.5	56.5	50.0	51.0	62.8	56.8	58.0	57.9	52.5	54.5	55.0
Solids by Volume, %	30.3	33.2	38.5	38.9	49.2	37.5	44.1	39.7	45.7	37.7	38.2	36.4
WFT, mils (microns) ^①	5.0 (127.0)	4.0 (101.6)	5.0 (127.0)	5.0 (127.0)	4.0 (101.6)	5.0 (127.0)	4.0 (101.6)	4.0 (101.6)	4.0 (101.6)	5.0 (127.0)	5.0 (127.0)	4.0 (101.6)
DFT, mils (microns) ^②	1.5 (38.1)	1.5 (38.1)	1.9 (48.6)	1.9 (48.6)	2.0 (50.8)	1.9 (48.3)	1.8 (45.7)	1.6 (40.6)	1.8 (45.7)	1.9 (48.3)	1.9 (48.3)	1.5 (38.1)
Theoretical Dry Film Coverage ^③ @ 1 mil, ft ² /gal, (m ² /liter)	486 (11.9)	533 (13.0)	618 (15.1)	624 (15.3)	789 (19.3)	602 (14.7)	707 (17.3)	637 (151.6)	733 (18.0)	605 (14.8)	613 (15.0)	585 (14.4)
Primer ^⑦	CP5000	NR	CP5000	NR								
Application Temperature, °F	50-120	50-120	50-120	50-120	50-120	50-120	50-120	50-120	50-120	50-120	50-120	50-90
Touch, hrs	1	2	1	1	1	1	1	1	1	1	1	.25
Handling, hrs	2	2	2	2	2	2	2	2	2	2	2	1
Recoat, (min/max), hrs	0.5/NA	2.5/NA	0.5/NA	0.1/NA								
Min Air Set, hrs ^④	1	1	1	1	1	1	1	1	1	1	1	24
Cure, °F/hrs ^⑤	450/1	450/1	450/1	450/1	450/1	450/1	450/1	450/1	450/1	450/1	450/1	200/2 ^⑥
No. Components	1	1	1	1	1	1	1	1	1	1	1	2
Mix Ratio, by weight	NA	1:1										
Mixed Viscosity, cps	700-1200	700-1400	1000-2000	700-1200	700-1500	1500-3000	4000-6000	1000-3000	1500-2800	600-1000	600-1000	800-1200
Thinner	Water											
Specific Gravity, gms/cc	1.32	1.16	1.63	1.40	1.41	1.75	1.60	1.63	1.63	1.61	1.56	1.60
Pot Life, hrs at room temp.	NA	24										
Flash Point, °F (°C)	>212 (100)	>212 (100)	>212 (100)	>212 (100)	>212 (100)	>212 (100)	>212 (100)	>212 (100)	>212 (100)	>212 (100)	>212 (100)	NA
VOC's, lbs/gal	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.00
Shelf Life @ RT, Months	6	6	6	6	6	6	6	6	6	6	6	12
Storage Temperature, °F	40-90	40-90	40-90	40-90	40-90	40-90	40-90	40-90	40-90	40-90	40-90	55-95

Reference Notes

- ① Estimated Wet Film Thickness (WFT).
- ② Recommended Dry Film Thickness (DFT).
- ③ Actual coverage will vary depending on material losses during mixing and application.
- ④ Where a value is provided for "Min Air Set", it is recommended that the coating set at room temperature for, at minimum, the specified time prior to curing.
- ⑤ Adequate ventilation is required when curing these products. Outgassing will occur above 300 °F and cease after 750 °F. An additional 30 minutes is required at the highest service temperature if service temperature is below 750 °F.
- ⑥ Curing is recommended but not absolutely required if the system is raised slowly to a minimum of 500 °F within 24-48 hours of application and not exposed to high moisture or rain during this initial dwell period.
- ⑦ Primer is only recommended for exterior applications in which salt fog or moisture are present.

Abbreviations

- NR - Not Required or Recommended
 NA - Not Applicable
 DFT - Dry Film Thickness
 WFT - Wet Film Thickness
 RT - Room Temperature

Surface Preparation Notes

All surfaces should be free of oil, grease, dirt, corrosives, oxides, paints or other foreign matter. No further preparation is required when coating ceramics, refractories or graphites. Smooth metal surfaces should be further prepared as follows:

CP40XX – Abrasive blast to an SSPC-SP6 profile.

CP5000 – Abrasive blast to an SSPC-SP10, near-white blast. Remove abrasive residue using air pressure — do not clean with organic solvents.

Refer to Price List for complete order information.

Aremco Products makes no warranty express or implied concerning the use of this product.

The user assumes all risk of use or handling whether or not in accordance with directions or suggestions, or used singly or in combination with other products.

RELEASED - Printed documents may be obsolete; validate prior to use.

MATERIAL SAFETY DATA SHEET

Product: Corr-Paint CP2020
Revision Date: 2/05/2009

1. MATERIAL IDENTIFICATION

Product Name: Corr-Paint CP2020

Product Description: Liquid, Grey, Aromatic Odor
Product Use: Corrosion Protective Grey Coating

Manufacturer: Aremco Products, Inc.
707-B Executive Blvd.
Valley Cottage, NY 10989

Telephone: 845-268-0039
Emergency Phone: 845-268-0039 or Infotrac (24/7) 800-535-5053

2. COMPOSITION

Ingredient	CAS #	ACGIH TLV (mg/m ³)	OSHA PEL (mg/m ³)
4,4'-Diphenylmethane Diisocyanate (MDI)	101-68-8	.005 ppm	.005 ppm
Polyisocyanate based on MDI	Trade Secret	N/E	N/E
Aromatic Hydrocarbon	64742-95-6	N/E	N/E
Titanium Dioxide	13463-67-7	10	10
Carbon Black	1333-86-4	3.5	3.5

Notes:

- 1) This product is a liquid mixture and all powders are encapsulated.
- 2) Exposure values shown for guidance only. Please follow applicable regulations.

3. HAZARDS IDENTIFICATION

Emergency Overview: Causes irritation to eyes, skin, and respiratory and digestive tracts.

Eye Contact: May cause eye irritation and swelling.

Skin Contact: May cause irritation and sensitization. Symptoms can be immediate or delayed several hours.

Inhalation Acute: Vapors may cause irritation and temporary or permanent sensitization. Exposure well above TLV can lead to bronchitis, bronchial spasm, and pulmonary edema. Chronic exposure may cause lung damage.

Ingestion Acute: May cause irritation to mouth, esophagus, and stomach.

Physical: Spilled material is tacky, slippery, and difficult to remove from skin.

Other: Pre-existing skin sensitization may be aggravated by exposure to this product.

HMIS: Health: 2
Flammability: 2
Reactivity: 1
Personal Protection: H

4. FIRST AID MEASURES

Eye Exposure:

Hold eyelids open and flush with a steady, gentle stream of water for at least 15 minutes. Seek immediate medical attention, preferably with an ophthalmologist. If a physician is not immediately available, eye irrigation should be continued for an additional 15 minutes.

Skin Exposure:

Remove contaminated clothing. Immediately wipe excess material off skin with a dry cloth then wash with plenty of soap and water for at least 5 minutes. After washing, cover affected skin with polyethylene glycol and wash again immediately with soap and water to thoroughly remove the polyethylene glycol and residual isocyanates. Repeat if necessary. Wash contaminated clothing thoroughly before reuse. For severe exposures get under safety shower after removing clothing. Seek medical attention if irritation develops or persists.

Inhalation:

Remove from immediate source of exposure and assure that victim is breathing. If not breathing, administer cardio-pulmonary resuscitation (CPR). If breathing is difficult, administer oxygen if available. Seek medical attention. Symptoms can be delayed several hours.

Ingestion:

If swallowed, do not induce vomiting. If victim is conscious and alert, give 1-2 glasses of milk or water to drink. Do not give anything by mouth to an drowsy, convulsing or unconscious person. Seek medical attention immediately. Do not leave victim unattended. To prevent aspiration of swallowed product, lay victim on side with head lower than waist. Vomiting may occur spontaneously. If vomiting occurs and the victim is conscious, give additional milk or water to further dilute the chemical.

Medical Conditions Possibly Aggravated by Exposure:

Inhalation of product may aggravate existing chronic respiratory problems such as asthma, emphysema or bronchitis. Skin contact may aggravate existing skin disease.

5. FIRE FIGHTING MEASURES

Flash Point:	> 140 °F (closed cup)
Flammable Limits:	Not determined.
Extinguishing Media:	Use carbon dioxide, dry chemical, or appropriate foam.
Special Fire Fighting Procedures:	Firefighters should wear NIOSH/MSHA approved positive pressure breathing apparatus with full face-piece and full chemical resistant protective clothing. Dike area to prevent runoff and contamination of water sources. Dispose of fire control water later. Extreme heat or water contamination may cause closed containers to explode.

6. ACCIDENTAL RELEASE MEASURES

Personal Protection:	Wear chemical goggles, body-covering protective clothing, chemical resistant gloves, and rubber boots. Use NIOSH approved respirator where mist occurs.
Spill Cleanup:	Ventilate the spill area and evacuate if necessary. Remove all ignition sources. Dike and contain large spills. Deactivate the spill with neutralizer (aqueous mixture of 10% concentrated ammonia solution, 2-5% household detergent, and 20% isopropyl alcohol). Allow the neutralized material to stand uncovered for at least 10 minutes before it is placed in open containers to await proper disposal. Add further neutralizer and then allow these containers to stand, loosely covered for 24-48 hours. Dispose in accordance with federal, state and local regulations or permits. Flush area with solvent then water to complete cleanup.

7. HANDLING AND STORAGE

Handling:	Avoid contact with eyes, skin and clothing. Avoid breathing vapors. Keep container closed. Promptly clean residue from closures with cloth and solvent. Promptly clean up spills.
Storage:	Store at room temperature in a dry, well ventilated area, away from combustible material, and away from ignition sources and moisture. Store in clean steel containers. Keep containers closed. Closed containers that are contaminated with water may rupture as carbon dioxide is formed. Avoid contact with incompatible materials.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls:	Normal ventilation for good working conditions should be used. Keep containers closed. Safety shower and eyewash fountain should be within direct access.
Respiratory Protection:	This product is not considered respirable in either the liquid or cured forms. However, if the cured product is polished, ground or chipped during processing, handling or use, powders may be released as airborne respirable particles. In these instances, appropriate personal protection equipment and local ventilation controls must be employed. If exposure limits are exceeded and local ventilation is unavailable, a supplied-air respirator or a self-contained NIOSH-approved vapor respirator is required.
Skin Protection:	Wear body-covering protective clothing and gloves.
Eye Protection:	Wear chemical goggles or face shield.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical and chemical here represent typical properties of this product. Contact Technical Sales for exact specifications.

Appearance:	Liquid
Color:	Grey
Odor:	Aromatic
pH:	N/D
Specific Gravity, g/cc	1.04
Water Solubility:	Reacts with Water
Boiling Point:	308-335 °C @ 760 mm Hg
Vapor Pressure (mm Hg):	N/D
Vapor Density (air=1):	> 4

10. STABILITY AND REACTIVITY

Chemical Stability:	This material is stable under normal conditions of use and storage.
Conditions to Avoid:	Keep away from moisture. Reacts with water, strong bases, amines, alcohols, metal compounds, and surface-active materials.
Hazardous Polymerization:	May occur; contact with moisture may cause polymerization.
Hazardous Decomposition Materials:	Carbon monoxide, carbon dioxide, HCN, and oxides of nitrogen.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity Data:	Not available
Chronic Toxicity Data:	Not available

12. ECOLOGICAL INFORMATION

General: This section provides toxicological information with regard to the pure form of the component indicated. It is suggested that persons trained in its evaluation interpret this information.

MDI (Monomeric & Polymeric):

Acute Toxicity:	Oral LD50 > 15,800 mg/kg (Rat)
	Dermal LD50 > 5,010 but < 7,490 mg/kg (Rabbit)
	Inhalation LC50 4 Hour LC50 for Polymeric MDI ranges from 370-490 mg/m ³

Chronic Toxicity: The effects of irritation to the nasal cavity and lungs in animals exposed to 1.0 and 6.0 mg/m³. No Observable Effect Level (NOEL) was 0.2 mg/m³.

Carcinogenicity: Tumors were observed only in rats exposed to 6.0 mg/m³ concentration.

13. DISPOSAL CONSIDERATIONS

Disposal: Keep out of surface waters, sewers, and waterways entering or leading to surface waters. Notify authorities if any exposure to the environment occurs or is likely to occur. Utilize an appropriate disposal facility, in compliance with federal, state and local environmental control regulations.

14. TRANSPORTATION INFORMATION

Proper Shipping Name:	Coating Solution
DOT UN Number:	1866
Hazard Class:	3
Packing Group:	III
Hazard Label:	Flammable Liquid

15. REGULATORY INFORMATION

U.S. Federal Regulations

CERCLA: No CERCLA reportable quantity has been established for this material.

TSCA: All ingredients of this material are listed on the TSCA inventory.

SARA Title III

Sections 302, 304, 313: Polymeric MDI

Sections 311, 312:

<u>Hazard Classes</u>	<u>Yes/No</u>
Fire Hazard	No
Reactivity Hazard	Yes
Pressure Hazard	No
Immediate Hazard	Yes
Delayed Hazard	Yes

<u>International Inventory</u>	<u>Status</u>
Canada (DSL)	Yes
Europe (EINECS/ELINCS)	Yes
Australia (AICS)	Yes
Japan (MITI)	Yes
South Korea (KECL)	Yes

16. OTHER INFORMATION

NFPA: Health: 2
Flammability: 2
Reactivity: 1

Key Legend Information

ACGIH	American Conference of Governmental Industrial Hygienists
ARD	International Agency for Research on Cancer
CAS	Chemical Abstract Service
CERCLA	Comprehensive Environmental Response, Compensation & Liability Act
DSL	Domestic Substance List
HMIS	Hazardous Materials Identification System
ND	Not Determined
NE	Not Established
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety & Health
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
RTECS	Registry of Toxic Effects of Chemical Substances
SARA	Superfund Amendments & Reauthorization Act
SARA Title III	Emergency Planning & Community Right to Know Act
SARA Section 302	Extremely Hazardous Substances
SARA Section 304	Emergency Release
SARA Section 311	MSDS/List of Chemicals & Hazardous Inventory
SARA Section 312	Emergency & Hazardous Inventory
SARA Section 313	Toxic Chemicals & Release Reporting
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	Time Weighted Average

Disclaimer: The information contained herein is based on data taken from sources believed to be both current and reliable at the time of publication. Aremco Products, Inc. makes no warranty, expressed or implied, as to the accuracy of this MSDS and assumes no liability arising from its use by others. Compliance with all applicable Federal, State and Local laws and regulations remains the responsibility of the user.

MATERIAL SAFETY DATA SHEET

Product: Corr-Paint CP5000-L Liquid Binder
Revision Date: 1/30/2009

1. MATERIAL IDENTIFICATION

Product Name: Corr-Paint CP5000-L Liquid Binder

Product Description: Cloudy Liquid, Solvent Odor
Product Use: High Temperature Binder System

Manufacturer: Aremco Products, Inc.
707-B Executive Blvd.
Valley Cottage, NY 10989

Telephone: 845-268-0039
Emergency Phone: 845-268-0039 or Infotrac (24/7) 800-535-5053

2. COMPOSITION

Ingredient	CAS #	ACGIH TLV (mg/m ³)	OSHA PEL (mg/m ³)
Silicate Solution	1312-76-1	N/E	N/E
Water	7732-18-5	N/A	N/A
Silicone Emulsion Mixture	N/D	N/E	N/E
Xylene (5-10%)	1330-20-7	435	435
Methanol (0.5-0.99%)	67-56-1	325	325
1-Propanol, 2-Methyl- (2-3%)	78-83-1	150	310
Formaldehyde (0.002%)	50-00-0	.6	N/D
Acetic Acid, Butyl Ester (< 0.1%)	123-86-4	N/D	N/D
Benzene, Ethyl (< 3%)	100-41-4	N/D	N/D

3. HAZARDS IDENTIFICATION

Emergency Overview: Cloudy liquid, xylene odor. May cause moderate irritation to eyes, skin, and digestive tract.

Eye Contact: Prolonged and repeated exposure may cause irritation to the eyes.

Skin Contact: No harmful effects have been reported on skin contact.

Inhalation Acute: No harmful effects have been reported upon inhalation.

Ingestion Acute: No harmful effects have been reported upon ingestion.

Primary Routes of Entry: Eyes.

Target Organs: Eyes.

HMIS: Health: 1
Flammability: 1
Reactivity: 0
Personal Protection: G

4. FIRST AID MEASURES

Eye Exposure:
Hold eyelids open and flush with a steady, gentle stream of water for at least 15 minutes. Seek immediate medical attention, preferably with an ophthalmologist. If a physician is not immediately available, eye irrigation should be continued for an additional 15 minutes.

Skin Exposure:
Immediately wipe excess material off skin with a dry cloth then wash with plenty of soap and water for at least 5 minutes. See medical attention if irritation develops or persists. Remove contaminated clothing and shoes and clean thoroughly before re-use.

Inhalation:

Remove from immediate source of exposure and place in fresh air; assure that victim is breathing. If not breathing, administer cardiopulmonary resuscitation (CPR). If breathing is difficult, administer oxygen if available. Seek medical attention.

Ingestion:

Drink large quantities of water and induce vomiting (one tablespoon of salt in one glass of warm water). Do not allow vomit to be inhaled into the lungs. Seek medical attention immediately

Medical Conditions Possibly Aggravated by Exposure:

Inhalation of product may aggravate existing chronic respiratory problems such as asthma, emphysema or bronchitis. Skin contact may aggravate existing skin disease.

5. FIRE FIGHTING MEASURES

Flash Point:	> 200 °F
Flammable Limits:	Not measured.
Extinguishing Media:	Foam, carbon dioxide, dry powder, water spray.
Special Fire Fighting Procedures:	Firefighters should wear NIOSH/MSHA approved positive pressure breathing apparatus with full face-piece and full chemical resistant protective clothing. Dike area to prevent runoff and contamination of water sources. Dispose of fire control water later.
Unusual Fire and Explosion Hazards:	This material can release carbon monoxide, carbon dioxide, and silicon dioxide.

6. ACCIDENTAL RELEASE MEASURES

Personal Protection:	Wear chemical goggles, body-covering protective clothing, chemical resistant gloves, and rubber boots. Use NIOSH approved respirator where mist occurs.
Spill Cleanup:	Ensure adequate ventilation. Take up with absorbent material (e.g., sand). Dispose of absorbed material in accordance with federal, state and local regulations or permits. Flush area with water to complete cleanup.

7. HANDLING AND STORAGE

Handling:	Ensure adequate ventilation. Avoid contact with eyes, skin and clothing. Avoid breathing spray mist. Keep container closed. Promptly clean residue from closures with cloth dampened with water. Promptly clean up spills.
Storage:	Store in an area that is cool, dry, well ventilated, away from combustible material, and away from ignition sources. Keep containers closed. Store in clean plastic or stainless steel containers.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls:	Use with adequate ventilation. Keep containers closed. Safety shower and eyewash fountain should be within direct access.
Respiratory Protection:	If exposure limits are exceeded and local ventilation is unavailable, a supplied-air respirator or a self-contained NIOSH-approved dust and mist respirator is required.
Skin Protection:	Wear body-covering protective clothing and gloves. A protective glove made of fluorinated rubber is recommended.
Eye Protection:	Wear chemical goggles.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical and chemical here represent typical properties of this product. Contact Technical Sales for exact specifications.

Appearance:	Liquid
Color:	Cloudy
Odor:	Xylene
pH:	> 10
Specific Gravity, g/cc	1.2
Water Solubility:	Miscible
Melting Point:	Not measured
Boiling Point:	212 °F
Vapor Pressure:	Not measured
Vapor Density (air=1):	Not available
VOC Content:	< 0.1 lb/gal

10. STABILITY AND REACTIVITY

Chemical Stability: This material is stable under all conditions of use and storage.
Conditions to Avoid: Contact with strong oxidizing agents.
Materials to Avoid: Reacts with oxidizing agents.
Hazardous Decomposition Products: None with proper storage and handling.
Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Note: Due to the composition of the product it cannot be excluded that prolonged and repeated contact will result in irritation of the eyes. Proper use provided, no adverse health effects have been observed or have come to our attention.

12. ECOLOGICAL INFORMATION

Ecotoxicity: Not tested, but should not be allowed to enter soil or waterways.
Environmental Fate: Not tested.

13. DISPOSAL CONSIDERATIONS

Disposal Method: Dispose in accordance with federal, state and local regulations and permits.

14. TRANSPORTATION INFORMATION

DOT UN Status: The material is not a regulated hazardous material for transportation.

15. REGULATORY INFORMATION

U.S. Federal Regulations

CERCLA:	CAS No.	Lbs
	1330-20-0	100
	50-00-0	100
	71-36-3	500
	78-83-1	500

TSCA: All ingredients of this material are listed on the TSCA inventory.

SARA Section 313:	Components	CAS No.	Concentration (%)
	1-Butanol	71-36-3	0-0 (0.0003)
	Methanol	67-56-1	0-0 (0.87)
	Xylenes (o-, m-, p- Isomers)	1330-20-7	0-0 (7.27)
	Formaldehyde	50-00-0	0-0 (0.002)
	Ethylbenzene	100-41-4	0-0 (2.42)

SARA Sections 311, 312	Hazard Classes	Yes/No
	Fire	Yes
	Reactivity	No
	Pressure	No
	Immediate	No
	Delayed	No

International Inventory	Country	Status
	Canada (DSL)	Yes
	Europe (EINECS/ELINCS)	Yes
	Australia (AICS)	Yes
	Japan (MITI)	Yes
	South Korea (KECL)	Yes

16. OTHER INFORMATION

NFPA: Health: 1
Flammability: 1
Reactivity: 0

Key Legend Information

ACGIH	American Conference of Governmental Industrial Hygienists
ARD	International Agency for Research on Cancer
CAS	Chemical Abstract Service
CERCLA	Comprehensive Environmental Response, Compensation & Liability Act
DSL	Domestic Substance List
HMIS	Hazardous Materials Identification System
ND	Not Determined
NE	Not Established
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety & Health
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
RTECS	Registry of Toxic Effects of Chemical Substances
SARA	Superfund Amendments & Reauthorization Act
SARA Title III	Emergency Planning & Community Right to Know Act
SARA Section 302	Extremely Hazardous Substances
SARA Section 304	Emergency Release
SARA Section 311	MSDS/List of Chemicals & Hazardous Inventory
SARA Section 312	Emergency & Hazardous Inventory
SARA Section 313	Toxic Chemicals & Release Reporting
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	Time Weighted Average

Disclaimer: The information contained herein is based on data taken from sources believed to be both current and reliable at the time of publication. Arengo Products, Inc. makes no warranty, expressed or implied, as to the accuracy of this MSDS and assumes no liability arising from its use by others. Compliance with all applicable Federal, State and Local laws and regulations remains the responsibility of the user.

MATERIAL SAFETY DATA SHEET

Product: Corr-Paint CP5000-P Powder
Revision Date: 05/23/2011

1. MATERIAL IDENTIFICATION

Product Name: Corr-Paint CP5000-P Powder
Product Description: Blue-Grey Odorless Powder
Product Use: High Temperature Protective Coating
Manufacturer: Aremco Products, Inc.
707-B Executive Blvd.
Valley Cottage, NY 10989
Telephone: 845-268-0039
Emergency Phone: 845-268-0039 or Infotrac (24/7) 800-535-5053

2. COMPOSITION

Ingredient	CAS #	ACGIH TLV (mg/m ³)	OSHA PEL (mg/m ³)
Zinc Flake (100.0%)	7440-66-6	N/E	N/E

Notes:

1) Exposure values shown for guidance only. Please follow applicable regulations.

3. HAZARDS IDENTIFICATION

Emergency Overview: Grey, odorless powder. Causes irritation to eyes, skin, and digestive tract.
Eye Contact: May cause eye irritation.
Skin Contact: May cause skin irritation.
Inhalation Acute: Mists may cause irritation to upper respiratory track. If user operations generate zinc oxide fume, inhalation of the fume can result in metal fume fever. Characteristics of the signs and symptoms of exposure include unusual metallic taste accompanied by dryness and irritation of the throat, with coughing and labored breathing, feeling of weakness and fatigue, pain in the muscles and joints, and general malaise, Fever then profuse sweating and sometimes convulsions. Recovery is usually complete in 24 to 48 hours. Tolerance to zinc oxide fume can be acquired, however, it is short-lived and usually lost in a couple of days.
Ingestion Acute: May cause irritation to mouth, esophagus, and stomach.
Chronic Hazards: No known chronic hazards. Not listed on NTP, IARC or OSHA as carcinogen.
Physical Hazards: None.

HMIS: Health: 0
Flammability: 1
Reactivity: 1
Personal Protection: F

4. FIRST AID MEASURES

Eye Exposure:

Hold eyelids open and flush with a steady, gentle stream of water for at least 15 minutes. Seek immediate medical attention, preferably with an ophthalmologist. If a physician is not immediately available, eye irrigation should be continued for an additional 15 minutes.

Skin Exposure:

Immediately wipe excess material off skin with a dry cloth then wash with plenty of soap and water for at least 5 minutes. See medical attention if irritation develops or persists. Remove contaminated clothing and shoes and clean thoroughly before re-use.

Inhalation:

Remove from immediate source of exposure and assure that victim is breathing. If not breathing, administer cardio-pulmonary resuscitation (CPR). If breathing is difficult, administer oxygen if available. Seek medical attention.

Ingestion:

If swallowed, do not induce vomiting. If victim is conscious and alert, give 1-2 glasses of water to drink. Do not give anything by mouth to an unconscious person. Seek medical attention immediately. Do not leave victim unattended. To prevent aspiration of swallowed product, lay victim on side with head lower than waist. Vomiting may occur spontaneously. If vomiting occurs and the victim is conscious, give water to further dilute the chemical.

Medical Conditions Possibly Aggravated by Exposure:

Inhalation of product may aggravate existing chronic respiratory problems such as asthma, emphysema or bronchitis. Skin contact may aggravate existing skin disease.

5. FIRE FIGHTING MEASURES

Flash Point:	Not applicable
Flammable Limits:	This material is combustible. Dust explosion is possible if in powder form and mixed with air. In the event of fire, toxic fumes can be released. Avoid contact with water.
Extinguishing Media:	This material is compatible with carbon dioxide, dry sand, metal fire powders; water and foam are considered unsuitable extinguishing media.
Special Fire Fighting Procedures:	Firefighters should wear NIOSH/MSHA approved positive pressure breathing apparatus with full face-piece and full chemical resistant protective clothing. Dike area to prevent runoff and contamination of water sources. Dispose of fire control water later.
Unusual Fire and Explosion Hazards:	This material is non-combustible.

6. ACCIDENTAL RELEASE MEASURES

Personal Protection:	Wear chemical goggles, body-covering protective clothing, chemical resistant gloves, and rubber boots. Use NIOSH approved respirator where mist occurs.
Spill Cleanup:	Collect spills dry or vacuuming with the vacuum exhaust passing through a high efficiency particulate arresting (HEPA) filter if exhaust is discharged into the work place. Residues should be discharged in accordance with federal, state and local regulations.

7. HANDLING AND STORAGE

Handling:	Avoid contact with eyes, skin and clothing. Avoid breathing dust. Keep container closed. Promptly clean residue from closures with cloth dampened with water. Promptly clean up spills.
Storage:	Store in an area that is cool, dry and well ventilated. Keep containers closed. Store in clean plastic or metal containers. Keep away from ignition sources.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls:	Use with adequate ventilation. Keep containers closed. Safety shower and eyewash fountain should be within direct access.
Respiratory Protection:	If exposure limits are exceeded and local ventilation is unavailable, a supplied-air respirator or a self-contained NIOSH-approved dust and mist respirator is required.
Skin Protection:	Wear body-covering protective clothing and gloves.
Eye Protection:	Wear chemical goggles.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical and chemical here represent typical properties of this product. Contact Technical Sales for exact specifications.

Appearance:	Powder
Color:	Blue-Grey
Odor:	Odorless
pH:	Not available
Melting Point/Freezing Point:	420 C
Initial Boiling Point:	907 C
Flash Point:	Not applicable
Evaporation Rate:	Not applicable
Flammability:	Not available
Vapor Pressure:	1 hPa at 487 C
Vapor Density:	Not applicable
Relative Density:	7.14 g/cm ³
Solubility in Water:	Very low, pH-dependent

Auto-ignition Temperature: 480 C
Decomposition Temperature: Not applicable

10. STABILITY AND REACTIVITY

Chemical Stability: This material is stable under normal and dry conditions of use and storage.
Materials to Avoid: Acids, bases (such as sodium hydroxide, potassium hydroxide and calcium hydroxide), oxidizing agents.
Conditions to Avoid: Strong heat.
Possibility of Hazardous Reactions: Violent reactions with oxidizing agents, acids. Hydrogen gas will be released – explosive. Can be charged electrostatically by swirling, pneumatic transport, pouring, etc...
Hazardous Decomposition Products: This material is combustible. Dust explosion is possible if in powder form and mixed with air. In the event of fire, toxic fumes can be released such as zinc oxide fumes.

11. TOXICOLOGICAL INFORMATION

		Value	Unit	Species
Acute Toxicity Data:	LD50 (oral)	>2000	mg/kg bw	rat
	LD50 (dermal)	not available		
	LC50 (inhal)	>5.41	mg/L air (4 h)	rat
Chronic Toxicity Data:		Not available		

12. ECOLOGICAL INFORMATION

	Short Term	Value	Duration	Species
Ecotoxicity (Dissolved Zinc):	EC50 (Invertebrates)	0.15-0.5 mg/l	48 h	Daphnia magna
	EC50 (Algae)	0.150 mg/l	96 h	Selenastrum capricornutum
Persistence & Degradability:		Not applicable		
Bioaccumulative Potential:		Not applicable		
Mobility in Soil:		Not applicable endpoint		
Results of PBT and vPvB Assessment:		Does not apply to inorganic substances		
Other Adverse Effects:		Not known		

13. DISPOSAL CONSIDERATIONS

Disposal Method: Dispose in accordance with federal, state and local regulations and permits.

14. TRANSPORTATION INFORMATION

UN Number: 3077
UN Proper Shipping Name: Environmentally Hazardous Substance, Solid, N.O. S. (Zinc Powder, Stabilized)
Transport Hazard Class: 9
Packing Group: III
Environmental Hazards: IATA: Yes
IMDG: Marine Pollutant

15. REGULATORY INFORMATION

U.S. Federal Regulations

CERCLA: No CERCLA reportable quantity has been established for this material.

TSCA: All ingredients of this material are listed on the TSCA inventory.

SARA Title III

Sections 302, 304, 313: Zinc, CAS No. 7440-66-6

Sections 311, 312:

Hazard Classes	Yes/No
Fire Hazard	No
Reactivity Hazard	Yes
Pressure Hazard	No
Immediate Hazard	Yes
Delayed Hazard	No

International Inventory	Status
Canada (DSL)	Yes
Europe (EINECS/ELINCS)	Yes
Australia (AICS)	Yes
Japan (MITI)	Yes
South Korea (KECL)	Yes

16. OTHER INFORMATION

NFPA:	Health:	1
	Flammability:	0
	Reactivity:	1

Key Legend Information

ACGIH	American Conference of Governmental Industrial Hygienists
ARD	International Agency for Research on Cancer
CAS	Chemical Abstract Service
CERCLA	Comprehensive Environmental Response, Compensation & Liability Act
DSL	Domestic Substance List
HMIS	Hazardous Materials Identification System
ND	Not Determined
NE	Not Established
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety & Health
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
RTECS	Registry of Toxic Effects of Chemical Substances
SARA	Superfund Amendments & Reauthorization Act
SARA Title III	Emergency Planning & Community Right to Know Act
SARA Section 302	Extremely Hazardous Substances
SARA Section 304	Emergency Release
SARA Section 311	MSDS/List of Chemicals & Hazardous Inventory
SARA Section 312	Emergency & Hazardous Inventory
SARA Section 313	Toxic Chemicals & Release Reporting
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	Time Weighted Average

Disclaimer: The information contained herein is based on data taken from sources believed to be both current and reliable at the time of publication. Arengo Products, Inc. makes no warranty, expressed or implied, as to the accuracy of this MSDS and assumes no liability arising from its use by others. Compliance with all applicable Federal, State and Local laws and regulations remains the responsibility of the user.

A-3
Carboline

Selection & Specification Data

Generic Type	Self-curing, water-based inorganic zinc primer.	
Description	Carbozinc 11 WB is a water-based inorganic zinc rich primer that protects steel galvanically, eliminating subfilm corrosion. It meets VOC regulations while providing the proven performance of silicate zinc rich technology. It may be used as a primer under many different types of topcoats.	
Features	<ul style="list-style-type: none"> ▪ Excellent corrosion protection ▪ High zinc loading per square foot ▪ Zero VOC ▪ Good resistance to salting ▪ Fast curing, quick handling ▪ Weldable version available Carboweld 11 WB ▪ Excellent application characteristics (less likely to pump packing or tip plug) ▪ Meets Class B slip coefficient and creep testing criteria for use on faying surfaces. 	
Color	Gray (0700) standard. Green (0300) and Red (0500) available on special order.	
Finish	Matte	
Topcoats	May be topcoated with epoxies, acrylics, silicones, or others as recommended. (Mist coats over the CZ 11 WB may be required to prevent topcoat bubbling.)	
Dry Film Thickness	3.0 - 4.0 mils (75 - 100 microns) per coat Don't exceed 6 mils (150 microns) in a single coat.	
Solids Content By Weight Large Kit (Mixed Material)	Carbozinc 11 WB	79% ± 1%
Zinc content By Weight	Carbozinc 11 WB	83 ± 1% in the dried film
Theoretical Coverage Rate (Per mixed gallon by ASTM D2697)	Carbozinc 11 WB- 962 mil ft ² (321 ft ² /gal at 3 mils; 7.9 m ² /liter @75 microns) Allow for loss in mixing and application.	
VOC Values	As supplied or applied:	0 lbs./gal (0 g/l)
Dry Temp. Resistance	Continuous:	750°F (399°C)
	Non-Continuous:	800°F (427°C)
Limitations	Direct exposure to acids and caustics.	

Substrates & Surface Preparation

General	Remove any oil or grease from the surface to be coated with clean rags soaked in Carboline Thinner #2 or Surface Cleaner #3 (refer to Surface Cleaner #3 instructions) in accordance with SSPC-SP1.
Steel	Abrasive blast to a minimum commercial finish in accordance with SSPC-SP6 with a 1-3 mil (25-75 microns) blast profile. An angular profile will provide maximum adhesion.

Application Equipment

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

General Guidelines:

Spray Application (General)	Remove any oil or grease from the surface to be coated with clean rags soaked in Carboline Thinner #2 or Surface Cleaner #3 (refer to Surface Cleaner #3 instructions) in accordance with SSPC-SP1.
Conventional Spray	Conventional spray is the preferred method of application for Carbozinc 11 WB. Pressure pot equipped with dual regulators, 3/8" I.D. minimum material hose, with a maximum length of 50', 0.070" I.D. fluid tip and appropriate air cap.
Airless Spray	Modified spray guns recommended below will eliminate spray tails when airless is used. Pump Ratio: 30:1 (minimum) GPM Output: 3.0 (minimum) Material Hose: 3/8" I.D. (minimum) Tip Size: 0.017-0.019" Output PSI: 1750-2400 Spray Gun: Graco Model 510 mod B.T. Wiwa Model 500 F (1/2") Filter Size: 60 mesh Teflon packings are recommended and available from the pump manufacturer. Prior to use, flush all equipment with Thinner #21 followed by clean potable water. Keep material under mild agitation during application. If spraying stops for more than 10 minutes, recirculate the material remaining in the spray line. Do not leave mixed primer in the hoses during stoppages.
Brush & Roller (General)	Brush for touch-up only. Avoid excessive rebrushing. Use of a roller is not recommended.

Carbozinc® 11 WB

Mixing & Thinning

Mixing Power mix base, then combine as follows:
Tip: Sifting zinc through a window screen will aid in the mixing process by breaking up or catching dry zinc lumps.

Ratio .94 Gallon Kit 4.7 Gallon Kit
Part A: 0.70 gallon 3.5 gallons
Zinc Filler: 14.6 lbs. 73 lbs.

Thinning Not normally required. In hot or windy conditions it may be necessary to thin with clean, potable water 10-20% to ensure the film has a wet edge during application; or 30% when recoating with itself.

Pot Life 8 hours at 75°F (24°C) and less at higher. Pot life ends when the coating becomes too thick to use.

Cleanup & Safety

Cleanup Use clean, potable water. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

Safety Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions. Hypersensitive persons should wear protective clothing, gloves and use protective cream on face, hands and all exposed areas.

Ventilation When used as a tank lining or in enclosed areas, thorough air circulation must be used during and after application until the coating is cured. While this product has no organic solvents, any ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for any solvents used. User should test and monitor exposure levels to insure all personnel are below guidelines. If not sure or if not able to monitor levels, use MSHA/NIOSH approved respirator.

Caution All electrical equipment and installations should be made and grounded in accordance with the National Electric Code. In areas where explosion hazards exist, workmen should be required to use non-ferrous tools and wear conductive and non-sparking shoes.

Application Conditions

Condition	Material	Surface	Ambient	Humidity
Normal	60-85°F (16°-30°C)	50-95°F (10°C- 35°C)	50-95°F (10°C- 35°C)	40-85%
Minimum	50°F (10°C)	40°F (4°C)	40°F (4°C)	0%
Maximum	95°F (35°C)	140°F (60°C)	110°F (43°C)	90%

This product simply requires the substrate temperature to be above the dew point. Condensation due to substrate temperatures below the dew point can cause flash rusting on prepared steel and interfere with proper adhesion to the substrate. Special application techniques may be required above or below normal application conditions.

January 2008 replaces July 2004

To the best of our knowledge the technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline Company to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance or injuries resulting from use. Liability, if any, is limited to replacement of products. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY, BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Carboline® and Carbozinc®
RELEASED Printed documents may be obsolete; validate prior to use.

Curing Schedule

Surface Temp. & 50% Relative Humidity	Dry to Handle	Dry to Topcoat
75°F (24°C)	30 minutes	18 hours

These times are based on a 3 mil (75 micron) dry film thickness. Higher film thickness, insufficient ventilation, high humidity, or cooler temperatures will require longer cure times and could result in premature failure. Excessive humidity or condensation on the surface during curing can interfere with the cure. Unlike solvent-based inorganic zincs, water-misting the surface will not speed the cure. DO NOT water-mist Carbozinc 11 WB during initial cure cycle.

Any loose salt that appears on the zinc surface as a result of prolonged weathering exposure must be removed prior to the application of additional coatings.

Packaging, Handling & Storage

Shipping Weight (Approximate)	CZ 11 WB	CZ 11 WB
Part A:	<u>.94 Gallon Kit</u>	<u>4.7 Gallon Kit</u>
Zinc Filler:	9 lbs.	42 lbs.
	14.6 lbs.	73 lbs.

Flash Point (Setaflash) None

Storage Temperature & Humidity 40° -100°F (4-43°C)
0-90% Relative Humidity
Store indoors. **Do not allow to freeze.**

Shelf Life:
Carbozinc 11 WB 24 months at 75°F (24°C)
Zinc Filler 24 months at 75°F (24°C)

***Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.**

Special Instructions Concerning Cure, Shipping and Storage

Carbozinc 11 WB is an alkali silicate zinc rich primer. Like all water-based inorganic zinc primers trace amounts of alkalinity may remain within its film after cure. This alkaline residue can be detrimental to coating integrity when water is allowed to puddle on its surface. Use only steel storage, shipping and structural design configurations that prevent the puddling or trapping of water. Trace amounts of alkaline residue may concentrate in a drying puddle and result in high pH values that dissolve the coating film. Thorough rinsing (after full cure) reduces the likelihood or scope of the problem. The use of Carbozinc (WB) Neutralizing Solution helps to mitigate these problems.





Material Safety Data Sheet

CHEMTREC
Transportation
Emergency Phone: 800-424-9300

Pittsburgh Poison Control Center
Health Emergency No.: 412-681-6669

•NOTE: The CHEMTREC
•Transportation Emergency Phone is
•to be used only in the event of
•chemical emergencies involving a
•spill, leak, fire, exposure or accident
•involving chemicals

Section 1 - Chemical Product / Company Information

Product Name: CARBOZINC 11 WB / CARBOWELD 11 WB
Revision Date: 08/03/2011
Identification Number: PLMSDS 0228A1NL
Supercedes : 07/29/2008
Product Use/Class: Water Based Inorganic Zinc Primer - FOR INDUSTRIAL USE ONLY
Preparer: Regulatory, Department
Manufacturer: Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
(800) 848-4645

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA-CEIL
POTASSIUM SILICATE	1312-76-1	20.0	N/E	N/E	N/E	N/E
MICA	12001-26-2	10.0	3 MGM3	N/E	3 MGM3	N/E
ALUMINUM SILICATE	1332-58-7	5.0	2 MGM3	N/E	5 MGM3	NE
LITHIUM POLYSILICATE	12627-14-4	5.0	1MG/M3	NE	NE	NE
COLLOIDAL SILICA	7631-86-9	5.0	N/E	N/E	6 MGM3	N/E

Section 3 - Hazards Identification

Emergency Overview: Use ventilation necessary to keep exposures below recommended exposure limits, if any.

Effects Of Overexposure - Eye Contact: May cause eye irritation.

Effects Of Overexposure - Skin Contact: May cause skin irritation.

Effects Of Overexposure - Inhalation: Use in inadequately ventilated areas may result in irritation headache and nausea.

Effects Of Overexposure - Ingestion: May be harmful if swallowed.

Effects Of Overexposure - Chronic Hazards: Under normal use conditions, this product is not expected to cause adverse health effects.

Primary Route(s) Of Entry: Skin Contact, Skin Absorption, Inhalation, Ingestion, Eye Contact

Medical Conditions Prone to Aggravation by Exposure: If you have a condition that could be aggravated by exposure to dust or organic vapors, see a physician prior to use.

Section 4 - First Aid Measures

First Aid - Eye Contact: If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

First Aid - Skin Contact: Launder clothing before reuse. In case of contact, wash skin immediately with soap and water.

First Aid - Inhalation: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

First Aid - Ingestion: If swallowed do not induce vomiting. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: None
(Setaflash)

Lower Explosive Limit, %: N/A
Upper Explosive Limit, %: N/A

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam, Water Fog

Unusual Fire And Explosion Hazards: None known.

Special Firefighting Procedures: Non-flammable. Cool fire-exposed containers using water spray.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: If a spill or leak occurs, contain the material. It can be allowed to dry or cure and presents no health or fire hazard. The material can then be removed and disposed of as non-hazardous waste. Before drying, the material can be washed or removed using soap and water.

Section 7 - Handling And Storage

Handling: Do not get in eyes, on skin, or on clothing. Keep container tightly closed when not in use. Wear personal protection equipment. Do not breathe vapors. Wash thoroughly after handling. If pouring or transferring materials, ground all containers and tools. Do not weld, heat, cut or drill on full or empty containers. Use only in accordance with Carboline application instructions, container label and Product Data Sheet. Avoid breathing vapors or spray mist.

Storage: Protect from Freezing! Keep container closed when not in use.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).

Respiratory Protection: Use only with ventilation to keep levels below exposure guidelines listed in Section 2. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use. For silica containing coatings in a liquid state, and/or if no exposure limits are established in Section 2 above, supplied air respirators are generally not required.

Skin Protection: Recommend impervious gloves and clothing to avoid skin contact. If material penetrates to skin, change gloves and clothing. The use of protective creams may be beneficial to certain individuals. Protective creams should be applied before exposure.

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Other protective equipment: Eye wash and safety showers should be readily available.

Hygienic Practices: Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and allow hazardous materials to pass through. Check shoes carefully after soaking before reuse. Contaminated clothing should be changed and washed before reuse. Eating, drinking and smoking in immediate work area should be prohibited.

Section 9 - Physical And Chemical Properties

Boiling Range:	212 F (100 C) - 212 F (100 C)	Vapor Density:	Heavier than Air
Odor:	Slight	Odor Threshold:	N/D
Appearance:	Viscous Red, Green or Grey Liquid	Evaporation Rate:	Slower Than Ether
Solubility in H2O:	N/D	Specific Gravity:	1.27
Freeze Point:	32F	PH:	N/D
Vapor Pressure:	N/D		
Physical State:	Liquid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: None

Incompatibility: Avoid contact with strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.

Hazardous Polymerization: Will not occur under normal conditions.

Stability: This product is stable under normal storage conditions.

Section 11 - Toxicological Information

Product LD50: N/D

Product LC50: N/D

Chemical Name	CAS Number	LD50	LC50
POTASSIUM SILICATE	1312-76-1	NOT AVAILABLE	NOT AVAILABLE
MICA	12001-26-2	NOT AVAILABLE	NOT AVAILABLE
ALUMINUM SILICATE	1332-58-7	NOT AVAILABLE	NOT AVAILABLE
LITHIUM POLYSILICATE	12627-14-4	16,540 MG/KG, ORAL RAT	NE
COLLOIDAL SILICA	7631-86-9	NOT AVAILABLE	NOT AVAILABLE

Section 12 - Ecological Information

Ecological Information: No data

Section 13 - Disposal Information

Disposal Information: Dispose of in accordance with State, Local, and Federal Environmental regulations. Responsibility for proper waste disposal is with the owner of the waste.

Section 14 - Transportation Information

DOT Proper Shipping Name:	Not Regulated	Packing Group:	N/A
DOT Technical Name:	N/A	Hazard Subclass:	N/A
DOT Hazard Class:	None	Resp. Guide Page:	N/A
DOT UN/NA Number:	N/A		

Additional Notes: None.

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

No Section 313 Substances exist in this product

TOXIC SUBSTANCES CONTROL ACT

All components of this product are listed on the TSCA inventory.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(B) Substances exist in this product

U.S. STATE REGULATIONS AS FOLLOWS:

NEW JERSEY RIGHT-TO-KNOW

The following materials are non-hazardous, but are among the top five components in this product.

<u>Chemical Name</u>	<u>CAS Number</u>
WATER	7732-18-5
IRON OXIDE	1332-37-2

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

<u>Chemical Name</u>	<u>CAS Number</u>
WATER	7732-18-5
IRON OXIDE	1332-37-2

CALIFORNIA PROPOSITION 65

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

<u>Chemical Name</u>	<u>CAS Number</u>
MICROCRYSTALLINE SILICA	14808-60-7

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

No California Proposition 65 Reproductive Toxins exist

INTERNATIONAL REGULATIONS AS FOLLOWS:

CANADIAN WHMIS

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: D2B

Section 16 - Other Information

HMIS Ratings

Health: 1 **Flammability:** 0 **Reactivity:** 2 **Personal Protection:** X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): 0

REASON FOR REVISION: Changes made in Section(s): 1, 2, and 5

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations

Selection & Specification Data

Generic Type	Waterborne Acrylic																					
Description	Carbotherm 3300 is a ceramic blend insulative composite coating formulated in a high temperature resistant acrylic binder. It is ideally suited as a protective heat barrier to shield personnel from hot surfaces. It also inhibits heat transfer into or out of a structure. Its insulative properties keeps structures exposed to solar radiation, significantly cooler. It can be used to minimize or eliminate "sweating" of pipes or other operating equipment.																					
Features	<ul style="list-style-type: none"> ▪ Excellent thin-film thermal insulation ▪ Unique formula provides superior coverage during application ▪ Protects personnel from hot surfaces ▪ Multi-purpose interior/exterior coating ▪ Insulation provides anti-condensation properties ▪ Easy to use ▪ Zero VOC; low odor ▪ May be applied on hot surfaces 																					
Colors	White only. For custom colors or gloss levels use appropriate topcoat.																					
Primers	Acceptable primers include Carbozinc 11 Series, Carbozinc 859 Series, Thermaline 2977 Series, Carbocrylic 3358 Series, Carboguard 553, Carbomastic 15 Series or others as recommended. See specific data sheet for primer temperature limitations for proper selection.																					
Topcoats	For custom colors or for exterior use, acceptable topcoats include Carbocrylic 3350, Carbocrylic 3359 or 3359 DTM Series.																					
Dry Film Thickness	15-25 mils (375-625 microns) per coat Number of coats depends on the operating temperature and the degree of insulation needed. See below:																					
	<table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: left;"># Cts</th> <th style="text-align: left;">Total DFT</th> <th style="text-align: left;">Substrate Temp</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>20 mils (0.5 mm)</td> <td>Up to 50°C (122°F)</td> </tr> <tr> <td>2</td> <td>40 mils (1.0 mm)</td> <td>50 to 70°C (158°F)</td> </tr> <tr> <td>3</td> <td>60 mils (1.5 mm)</td> <td>70 to 95°C (203°F)</td> </tr> <tr> <td>4</td> <td>80 mils (2.0 mm)</td> <td>95 to 115°C (239°F)</td> </tr> <tr> <td>5</td> <td>100 mils (2.5 mm)</td> <td>115 to 140°C (284°F)</td> </tr> <tr> <td>6</td> <td>120 mils (3.0 mm)</td> <td>140 to 149°C (300°F)</td> </tr> </tbody> </table>	# Cts	Total DFT	Substrate Temp	1	20 mils (0.5 mm)	Up to 50°C (122°F)	2	40 mils (1.0 mm)	50 to 70°C (158°F)	3	60 mils (1.5 mm)	70 to 95°C (203°F)	4	80 mils (2.0 mm)	95 to 115°C (239°F)	5	100 mils (2.5 mm)	115 to 140°C (284°F)	6	120 mils (3.0 mm)	140 to 149°C (300°F)
# Cts	Total DFT	Substrate Temp																				
1	20 mils (0.5 mm)	Up to 50°C (122°F)																				
2	40 mils (1.0 mm)	50 to 70°C (158°F)																				
3	60 mils (1.5 mm)	70 to 95°C (203°F)																				
4	80 mils (2.0 mm)	95 to 115°C (239°F)																				
5	100 mils (2.5 mm)	115 to 140°C (284°F)																				
6	120 mils (3.0 mm)	140 to 149°C (300°F)																				
Solids Content	By Volume: 90% ± 2% * *Tested in accordance with ASTM D2697																					
Theoretical Coverage Rate	70-75 ft ² at 20 mils (1.6-1.8 m ² /l at 500 microns) Allow for loss in mixing and application.																					
VOC Values	<u>As supplied:</u> 0.0 lbs/gal (0 g/l)																					
Normal Operating Temperature Resistance	-60 to 350°F (-51 to 176°C) For temperature exposures outside this range consult Carboline.																					

Substrates & Surface Preparation

General	Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil and all other contaminants that could interfere with adhesion of the coating.
Steel	Prime with appropriate primers as recommended in section on "Primers".
Non-Ferrous Metals	SSPC-SP7 (Brush-Off blast) is recommended for maximum performance.
Limitations	Apply and cure at surface temperatures of 50°F or higher.

Performance Data

Test Method	System	Results
Thermal Conductivity @25°C, (ASTM C177)	Carbotherm 3300 (tested at 0.172")	0.0570 BTU/hr-ft ² -°F (0.0987 W/m ² -K)
R Value	Carbotherm 3300 (tested at 0.172")	0.251 hr-ft ² -°F/BTU
Thermal Transmittance @25°C (ASTM C177)	Carbotherm 3300 (tested at 0.172")	3.98 BTU/hr-ft ² -°F
Emissivity (ASTM E408)	Carbotherm 3300	0.88
Solar Reflectivity (ASTM E903)	Carbotherm 3300	86.2
Flame Spread (ASTM E84)	Carbotherm 3300	Flame Spread: 0 Smoke Development: 0
Cyclic QUV-A /Prohesion (ASTM D5894)	Carbozinc 859/ Carbotherm 3300/ Carbocrylic 3359	2016 hours, No effect; No blisters or rust on plane or scribe
Accelerated Aging, Salt Fog (ASTM B117)	Carbozinc 859/ Carbotherm 3300/ Carbocrylic 3359 DTM	2016 hours, No blisters or rust on the plane (in test); No rust on scribe, Few to medium #2 blisters at scribe
Humidity Cabinet (ASTM D2247)	Carbozinc 859/ Carbotherm 3300/ Carbocrylic 3359 DTM	2016 hours, No effect. No blister or rust on plane or scribe

Application Equipment

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

General Guidelines:

Spray Application (General) Pre-rinse (and lubricate) equipment with undiluted Carboline Surface Cleaner 3 followed by clean potable water before spraying. The following spray equipment has been found suitable and is available from equipment manufacturers.

Conventional Spray Not recommended

Airless Spray Pump Ratio: 30:1 (min.)*
GPM Output: 3.0 (min.)
Material Hose: 3/8" I.D. (min.)
Tip Size: .021-.025***
Output PSI: 1800-2200
Filter Size: Remove filters
*Teflon packings are recommended and available from the pump manufacturer. Use of a surge protector is strongly recommended.
**Use heavy duty reverse-a-clean non-diffuser tips.

Brush & Roller (General) Multiple coats may be required to achieve recommended dry film thickness. Brushing may negatively affect insulative properties; use for touch up of small areas only. Avoid excessive re-brushing. Do not apply by roller.

Brush Use a synthetic bristle brush. Use for touch up of small surface areas only.

Roller Not recommended

Mixing & Thinning

Mixing Separation of coating may occur and is common. Use a drywall compound mixing paddle (in reverse) to incorporate material to a homogeneous consistency resembling a milkshake. Normally this will take several minutes. Avoid contact of mixing blade and edge of plastic buckets to avoid shearing plastic pieces into coating. If other types of blades or high powered mixers are used, avoid high shear or over mixing.

Thinning No thinning is required.

Cleanup & Safety

Cleanup Use clean potable water followed with suitable solvent to dry equipment. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

Safety Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions. Use adequate ventilation and wear gloves or use protective cream on face and hands if hypersensitive. Keep container closed when not in use.

Application Conditions

Condition	Material	Surface	Ambient	Humidity
Minimum	50°F (10°C)	50°F (10°C)	50°F (10°C)	0%
Maximum	100°F (38°C)	300°F (150°C)	110°F (43°C)	95%

Application: It is best to spray apply a light 5-10 mil coat and allow to tack dry prior to full coating. This is especially helpful over hot surfaces which may require 2-4 light passes between 150-300°F (65-150°C).

Do not apply when the surface temperature is less than 5°F (3°C) above the dew point. Do not apply if temperatures are expected to drop below 50°F (10°C) within 24 hours of application. Special application techniques may be required above or below normal application conditions.

Curing Schedule

Surface Temperature & 50% Relative Humidity	Dry to Recoat with Itself
60°F (15°C)	6 hours
75°F (24°C)	3 hours
90°F (32°C)	1.5 hours

These times are based on a 20 mil (500 micron) dry film thickness. Higher film thicknesses, insufficient ventilation, high humidity or cooler temperatures will require longer cure times. The material is typically ready to recoat when it passes a "dry to handle" test (thumb twist test). If a final color coat (see Topcoats) is used; allow 36-48 hours dry time to ensure complete dryness prior to final color coat.

Packaging, Handling & Storage

Shipping Weight (Approximate) 4 Gallons
27lbs (12 kg)

Flash Point (Setaflash) >200°F (93°C)

Storage (General) Store Indoors. **Keep from Freezing**

Storage Temperature & Humidity 40° -100°F (4°-43°C)
0-95% Relative Humidity

Shelf Life 24 months at 75°F (24°C)

***Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.**



2150 Schuetz Rd., St. Louis, MO 63146
PH: 314-644-1000 Toll-Free: 800-848-4645
www.carboline.com

An **RPM** Company

October 2011 replaces August 2011

To the best of our knowledge the technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline Company to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance or injuries resulting from use. Liability, if any, is limited to replacement of products. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY, BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Carboline® and Carboacrylic®
RELEASED Printed documents may be obsolete; validate prior to use.

Carbotherm™ 3300

Frequently Asked Questions

1. Does this product require a primer?

This product does not promote, nor does it prevent corrosion. Our competitors mention the same precautionary statement. Even though the product is often applied at thicknesses of 120+ mils it would be irresponsible to assume this porous film would protect the substrate by itself. Carboline understands corrosion of metals. We would recommend a suitable corrosion resistant primer for the service intended. Even one of the more widely known competitive companies (Mascoat - Delta T) recommends a zinc-rich primer; even though they do not supply one. The following primers are suitable for use under this product; Carbozinc 11 Series, Carbozinc 859 Series, Carbomastic 15 Series, Carbocrylic 3358 Series, Thermaline 2977 (and the soon to be released 2977 VOC), Carboguard 890 and 690.

2. Can it be tinted? Does it need to be topcoated?

The product is available in white only. For interior use, it does not need to be topcoated unless another color is desired or to reduce the amount of dirt pick up. For exterior use, we recommend topcoating with any one of our acrylic finishes (3350, 3359 Series, 3359 DTM Series); Sanitile 555 or Carbothane 134 WB. The topcoat provides a "sealed" surface, custom colors, and gloss preferences depending on what the customer desires. While the film does offer good permeation resistance, these insulative products are somewhat porous by design. They can lose their effectiveness and become poorer insulators if enough water penetrates into the film. There is also a tendency to pick up dirt on the surface. The seal-coat/finish coat prevents this from happening.

3. Can this product be used to control corrosion under insulation?

As mentioned previously, this product does not promote nor does it control corrosion under insulation. We do have some competitors (Envirotrol) that will make this claim arguing that the film thickness and water ingress prevention properties can themselves control corrosion. We believe this logic is flawed and reckless. We believe they are pushing the applications of these products beyond their capabilities. We know what happens to piping/vessels when exposed to wet thermal cycling without a good coating system. Carboline has a number of other more suitable products to recommend specific to that purpose.

4. Why does this product require so many coats to achieve insulation properties?

All these insulative acrylics require multiple coats (typically 20 mils/coat) to achieve the desired insulation effect. These are water-based systems and the water MUST leave the film for these products to work effectively. The thicker they are applied, the longer it takes for the water to leave the film. The thicker the film, the longer the recoat time will be. Carboline seems to have a slight edge over the Mascoat material (20-25 mils versus 15-20 mils per coat). The insulation properties are very similar between products and the recommendations for film thickness

Carbotherm™ 3300

Frequently Asked Questions

versus temperature exposures are much the same. In general, every 20 mil coat will drop the temperature about 30°F (15°C) degrees.

5. **These products are formulated with unique insulative filler packages and proprietary recipes that create a thermal barrier. How do these fillers respond to the mixing and airless spray application? If they are damaged, wouldn't that lower their insulating properties?**

These products are uniquely formulated materials that create an insulating matrix within their film. The unique fillers that form this matrix must be durable to stand up against mixing and spraying. One of the best indicators of this is to compare wet film versus dry film. If the dry film to wet film ratio does not closely match the reported solids content of the material, the film will have lost some of its properties. Carboline has developed a product that overcomes this tendency to “shrink” or collapse and our reported solids content of 90% is the highest of any commercial product.

6. **Some of our competitors will recommend their product up to 350°F (175°C) with some suppliers claiming up to 400°F(204°C). Why can't our product go that high? What happens?**

As these insulative acrylics are exposed to higher and higher temperatures (like many organic-based coatings) they will develop cracks due to excessive internal stresses. We have tested both the Mascoat and TC Ceramic materials at 300°F continuous exposures and they both failed by cracking and delamination. Ours did not.

7. **What other performance features does this product have?**

- Conserves energy; saves money
- Protects personnel; safer work environment
- Tolerates expansion/contraction of substrate
- Low odor; “0” VOC
- Cleans up easily with soap and water
- Greatly reduces solar heat transfer - highly reflective
- Adheres to hot and cold surfaces -80 to 300°F (-65 to 150°C)
- Product can insulate surfaces to 300°F (150°C)
- Quick, easy repairs
- Reduces operating costs
- Keeps surfaces cooler and thus reduces expansion and contraction
- Provides a constant, uninterrupted thermal barrier regardless of the length or size of the job
- Extremely cost effective
- Extremely safe - contains no chlorides, no V.O.C.s, no heavy metals

Carbotherm™ 3300

Frequently Asked Questions

8. What are some of the uses of this unique insulative coating material?

- Hot process piping (protect from workers)
- LP tanks (keep solar radiation from heating up)
- Pressure vessels (keep solar radiation from heating up and increasing pressure)
- Fuel storage tanks (reduces vaporization; and reduces carbon footprint)
- Boiler skins (protect from workers)
- Ductwork (maintain heat)
- Steam generator lines/housings (maintain heat and/or protect workers)
- Engine rooms (sound proofing)
- Mechanical rooms (sound proofing)
- Ceilings (interior space) of uninsulated roof assemblies (keep temperatures cooler in summer and help maintain warm temperatures in winter)
- Condenser boxes/vessels (help prevent condensation/sweating of vessels)

OSHA Requirements

The following excerpts detail the requirements for companies to protect workers from potential high temperature pipes/vessels.

- **29 CFR 1910.261(k)(11): *Steam and hot-water pipes.*** All exposed steam and hot-water pipes within 7 feet of the floor or working platform or within 15 inches measured horizontally from stairways, ramps, or fixed ladders shall be covered with an insulating material, or guarded in such manner as to prevent contact.
- **29 CFR 1910.138(a): *General requirements.*** Employers shall select and require employees to use appropriate hand protection when employees' hands are exposed to hazards such as those from skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes.

Carbotherm® 3300

Carbotherm® 3300 is a high-grade, liquid-applied, insulative coating. It is ideal to shield personnel from hot surfaces by providing insulating properties. It can be used in a variety of applications that will keep structures or vessels cooler from solar exposures and reduce heat transfer into or out of a structure.



PRODUCT FEATURES

- Protects personnel; safer work environment
- Conserves energy; saves money
- Tolerates expansion/contraction of substrate
- Low odor; Low VOC's
- Cleans up easily with soap and water
- Greatly reduces solar heat transfer
- Adheres to hot and cold surfaces -60 to 350°F (-51 to 177°C)
- Product can insulate surfaces to 350°F (177°C)
- Quick, easy repairs
- Reduces operating costs
- Keeps surfaces cooler
- Can easily be applied over complex geometries
- Extremely cost effective compared to other more labor intensive options

○ Extremely safe - contains no chlorides, no VOC's, no heavy metals
RELEASED - Printed documents may be obsolete; validate prior to use.

PRODUCT DETAILS

Carbotherm 3300 is a unique formulation blend of ceramic and special fillers in a heat stable acrylic binder system. It provides a thermal protective barrier to protect workers from hot surfaces while offering insulation properties to either hot or cold surfaces. This product can help minimize solar radiation to structures or vessels and help maintain a cooler operating temperature. It offers insulation value in keeping buildings or storage tanks cooler during the summer; or warmer during the winter by minimizing thermal transfer through its insulative film. It can also be used to reduce or eliminate "sweating" of cold surfaces.

APPLICATIONS

WORKER PROTECTION

HOT PROCESS PIPING
BOILER SKINS
STEAM GENERATOR LINES/HOUSINGS

THERMAL INSULATION

LP TANKS
PRESSURE VESSELS
DUCTWORK (MAINTAIN HEAT)
CEILINGS
FUEL STORAGE TANKS

SWEATING SURFACES

CONDENSER BOXES/VESSELS

SOUND PROOFING

ENGINE ROOMS
MECHANICAL ROOMS



Carbotherm® 3300

QUALITY PRODUCT BACKED BY QUALITY SERVICE

- Carboline Company has over 64 years of solving tough corrosion and fireproofing problems
- Industrial service centers and sales offices located around the world
- 23 worldwide manufacturing locations with a global network of sales and technical support
- Industry leading field service and technical engineering support team
- Certified to ISO 9001

REASONS TO USE CARBOTHERM® 3300

PERFORMANCE FEATURE	ADVANTAGE	BENEFIT
Unique insulative filler package	Reduces heat transfer into or out of substrate	Provides insulation value and worker protection from hot surfaces
High film-build properties	Apply more thickness per coat	Fewer coats needed for higher temperature applications
Paint-like application	Can insulate any complex geometry easily	Less labor required compared to other hand-applied, pipe wrap, casting, or board stock insulation methods
Excellent thermal resistant properties	Greatly reduces solar heat transfer	Energy efficiency

PHYSICAL PROPERTIES

TEST	METHOD	RESULTS
Thermal Conductivity	ASTM C177 (@ 25°C)	0.057 BTU/hr-ft-°F (at 0.172")
Emissivity	ASTM E408	0.88
Solar Reflectivity	ASTM E903	86.2
Thermal Transmittance	ASTM C177 @25°C	3.98 BTU/hr-ft2-°F
Accelerated Ageing	ASTM B117 (System: 859/3300/3359 DTM)	2016 hours; No blisters or rust on the plane; No rust in scribe; Few to medium #2 blisters at scribe
Cyclic QUV-A/Prohesion	ASTM D5894 (System: 859/3300/3359)	2016 hours; No effect
Humidity Cabinet	ASTM D2247 (System: 859/3300/3359 DTM)	2016 hours; No effect
Flame Spread	ASTM E84 (System: 3300)	Flame spread: 0 Smoke development: 0





Material Safety Data Sheet

CHEMTREC
Transportation
Emergency Phone: 800-424-9300

Pittsburgh Poison Control Center
Health Emergency No.: 412-681-6669

•NOTE: The CHEMTREC Transportation Emergency Phone is to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals

Section 1 - Chemical Product / Company Information

Product Name: CARBOTHERM 3300 **Revision Date:** 10/17/2011
Identification Number: PLMSDS 0293S1NL **Supercedes :** 05/20/2011
Product Use/Class: FOR INDUSTRIAL USE ONLY **Preparer:** Regulatory, Department
Manufacturer: Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
(800) 848-4645

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA-CEIL
SODA LIME BOROSILICATE GLASS	65997-17-3	35.0	N/E	N/E	N/E	N/E
TITANIUM DIOXIDE	13463-67-7	5.0	10 MGM3	N/E	10 MGM3	N/E
ACRYLIC RESIN	TRADE SECRET	5.0	N/E	N/E	N/E	N/E

Section 3 - Hazards Identification

Emergency Overview: Use ventilation necessary to keep exposures below recommended exposure limits, if any.

Effects Of Overexposure - Eye Contact: May cause eye irritation.

Effects Of Overexposure - Skin Contact: May cause skin irritation.

Effects Of Overexposure - Inhalation: Use in inadequately ventilated areas may result in irritation headache and nausea.

Effects Of Overexposure - Ingestion: May be harmful if swallowed.

Effects Of Overexposure - Chronic Hazards: Under normal use conditions, this product is not expected to cause adverse health effects.

Primary Route(s) Of Entry: Skin Contact, Ingestion, Eye Contact

Medical Conditions Prone to Aggravation by Exposure: If you have a condition that could be aggravated by exposure to dust or organic vapors, see a physician prior to use.

Section 4 - First Aid Measures

First Aid - Eye Contact: If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

First Aid - Skin Contact: Launder clothing before reuse. In case of contact, wash skin immediately with soap and water.

First Aid - Inhalation: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

First Aid - Ingestion: If swallowed do not induce vomiting. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: >200F (93C)
(Setaflash)

Lower Explosive Limit, %: 2.4
Upper Explosive Limit, %: 17.4

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam, Water Fog

Unusual Fire And Explosion Hazards: None known.

Special Firefighting Procedures: Non-flammable. Cool fire-exposed containers using water spray.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: If a spill or leak occurs, contain the material. It can be allowed to dry or cure and presents no health or fire hazard. The material can then be removed and disposed of as non-hazardous waste. Before drying, the material can be washed or removed using soap and water.

Section 7 - Handling And Storage

Handling: Do not get in eyes, on skin, or on clothing. Keep container tightly closed when not in use. Wear personal protection equipment. Do not breathe vapors. Wash thoroughly after handling. If pouring or transferring materials, ground all containers and tools. Do not weld, heat, cut or drill on full or empty containers. Use only in accordance with Carboline application instructions, container label and Product Data Sheet.

Storage: Protect from Freezing! Keep container closed when not in use.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).

Respiratory Protection: Use only with ventilation to keep levels below exposure guidelines listed in Section 2. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use. For silica containing coatings in a liquid state, and/or if no exposure limits are established in Section 2 above, supplied air respirators are generally not required.

Skin Protection: Recommend impervious gloves and clothing to avoid skin contact. If material penetrates to skin, change gloves and clothing. The use of protective creams may be beneficial to certain individuals. Protective creams should be applied before exposure.

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Other protective equipment: Eye wash and safety showers should be readily available.

Hygienic Practices: Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and allow hazardous materials to pass through. Check shoes carefully after soaking before reuse. Contaminated clothing should be changed and washed before reuse. Eating, drinking and smoking in immediate work area should be prohibited.

Section 9 - Physical And Chemical Properties

Boiling Range:	212 F (100 C) - 538 F (281 C)	Vapor Density:	Lighter than Air
Odor:	Mild	Odor Threshold:	N/D
Appearance:	Viscous Liquid	Evaporation Rate:	Slower Than Ether
Solubility in H2O:	N/D	Specific Gravity:	0.66
Freeze Point:	N/D	PH:	N/D
Vapor Pressure:	N/D		
Physical State:	Liquid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: None

Incompatibility: Avoid contact with strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.

Hazardous Polymerization: Will not occur under normal conditions.

Stability: This product is stable under normal storage conditions.

Section 11 - Toxicological Information

Product LD50: N/D

Product LC50: N/D

Chemical Name	CAS Number	LD50	LC50
SODA LIME BOROSILICATE GLASS	65997-17-3	N/E	N/E
TITANIUM DIOXIDE	13463-67-7	>25 G/KG, ORAL, RAT	>6.82 MG/L 4 HR, RAT
ACRYLIC RESIN	TRADE SECRET	NOT AVAILABLE	NOT AVAILABLE

Section 12 - Ecological Information

Ecological Information: No data

Section 13 - Disposal Information

Disposal Information: Dispose of in accordance with State, Local, and Federal Environmental regulations. Responsibility for proper waste disposal is with the owner of the waste.

Section 14 - Transportation Information

DOT Proper Shipping Name:	Not Regulated	Packing Group:	N/A
DOT Technical Name:	N/A	Hazard Subclass:	N/A
DOT Hazard Class:	None	Resp. Guide Page:	N/A
DOT UN/NA Number:	None		

Additional Notes: None.

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

No Section 313 Substances exist in this product

TOXIC SUBSTANCES CONTROL ACT

All components of this product are listed on the TSCA inventory.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(B) Substances exist in this product

U.S. STATE REGULATIONS AS FOLLOWS:

NEW JERSEY RIGHT-TO-KNOW

The following materials are non-hazardous, but are among the top five components in this product.

<u>Chemical Name</u>	<u>CAS Number</u>
WATER	7732-18-5
ACRYLIC POLYMER	TRADE SECRET

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

<u>Chemical Name</u>	<u>CAS Number</u>
WATER	7732-18-5
ACRYLIC POLYMER	TRADE SECRET

CALIFORNIA PROPOSITION 65

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

<u>Chemical Name</u>	<u>CAS Number</u>
SODA LIME BOROSILICATE GLASS	65997-17-3
TITANIUM DIOXIDE	13463-67-7
ACRYLIC RESIN	TRADE SECRET
MICROCRYSTALLINE SILICA	14808-60-7

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

<u>Chemical Name</u>	<u>CAS Number</u>
ACRYLIC RESIN	TRADE SECRET

INTERNATIONAL REGULATIONS AS FOLLOWS:

CANADIAN WHMIS

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: D2A, D2B

Section 16 - Other Information

HMIS Ratings

Health: 1 **Flammability:** 1 **Reactivity:** 0 **Personal Protection:** X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): 0

REASON FOR REVISION: Changes made in Section(s): 2, 5, 11, and 15

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and

regulations

Selection & Specification Data

Generic Type	Waterborne Acrylic
Description	Versatile high performance finish with excellent corrosion resistance and exterior weathering properties, as well as suitability for interior and mild environments.
Features	<ul style="list-style-type: none"> ▪ Multi-purpose interior/exterior coating ▪ Excellent color and gloss retention ▪ Single component ▪ Outstanding corrosion protection ▪ Low odor, low VOC
Colors	Refer to Carboline Color Guide. Certain colors may require multiple coats to hide.
Finish	Semi-Gloss
Primers	Acrylics, Alkyds, Epoxies, Inorganic and Organic Zincs and others as recommended under <i>Substrates & Surface Preparation</i> . A mist coat may be required to minimize bubbling over Inorganic Zinc primers.
Dry Film Thickness	2.0-3.0 mils (50-75 microns) Do not exceed 3.0 mils in a single coat
Solids Content	By Volume: 36% ± 2%
Theoretical Coverage Rate	577 mil ft ² (14.1 m ² /l at 25 microns) 288 ft ² at 2 mils (7.1 m ² /l at 50 microns) Allow for loss in mixing and application.
VOC Values	<p><u>As supplied:</u> 0.5 lbs/gal (60 g/l) w/6 oz #102: 0.8 lbs/gal (96 g/l) w/12 oz #102: 1.1 lbs/gal (132 g/l) <u>EPA Method 24:</u> 1.1 lbs/gal (132 g/l) (Calculated minus water and exempt solvents) w/6 oz #102: 1.8 lbs/gal (216 g/l) w/12 oz #102: 2.3 lbs/gal (276 g/l) These are nominal values and may vary slightly with color.</p>
Dry Temp. Resistance	Continuous: 235°F (113°C) Non-Continuous: 325°F (163°C) Slight discoloration and loss of gloss is observed above 200°F (93°C).
Limitations	Apply and cure at temperatures of 50°F and above for 24 hours.

Substrates & Surface Preparation

General	Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil and all other contaminants that could interfere with adhesion of the coating.
Steel	SSPC-SP6 with a 1.0-2.0 mil (25-50 micron) surface profile for maximum protection. SSPC-SP2 or SP3 as minimum requirement. Prime with specific Carboline primers as recommended by your Carboline Sales Representative.
Galvanized Steel	SSPC-SP1. Prime with Carbocrylic [®] 120 or others as recommended by your Carboline Sales Representative.
Concrete	Concrete must be cured 28 days at 75°F (24°C) and 50% relative humidity or equivalent. Laitance, form oils, curing agents and hardeners must be removed by suitable method before coating application. Prime with Carbocrylic 120.
CMU	Mortar joints should be thoroughly cured for a minimum of 15 days at 75°F (24°C) and 50% relative humidity or equivalent. Prime with a latex block filler.
Drywall & Plaster	Joint compound and plaster should be fully cured prior to coating application. Prime with Carbocrylic 120.
Wood	Lightly sand with fine sandpaper and remove dust. Prime with Carbocrylic 120.
Previously Painted Surfaces	Lightly sand or abrade to roughen surface and degloss the surface. Existing paint must attain a minimum 3A rating in accordance with ASTM D3359 "X-Scribe" adhesion test. Prime with Carbocrylic 120 or others as recommended by your Carboline Sales Representative.

Performance Data

Test Method	System	Results	Report #
ASTM D3359 Adhesion	Blasted Steel 1 ct. 3358 1 ct. 3359	5A	SR326
ASTM D4541 Adhesion	Stainless Steel 1 ct. 3359	1675 psi (Elcometer)	03305
ASTM D4060 Abrasion	1 ct. Acrylic Pr. 2 cts. 3359	185 mg. loss. 3000 cycles, CS10 Wheel	SR326
ASTM D4213 Scrub Resistance	1 ct. 3359	.0235/.0655 Microliters per 100 cycles Wet/Dry Film Volume	03403
ASTM D3363 Pencil Hardness	1 ct. Acrylic Pr. 2 cts. 3359	5B	08299
ASTM D1653 Water Vapor Transmission	1 ct. 3359	Water Vapor Permeance (WVP) of 3.94 U.S. Perms	02885
ASTM B117 Salt Fog	Blasted Steel 1 ct. IOZ 1 ct. 3359	No blistering, rusting or rust creepage at scribe after 1500 hours	08436
ASTM E84 Flame and Smoke	1 ct. 3358 1 ct. 3359	Flame 10 Smoke 20 Class A	02819

Test reports and additional data available upon written request.

September 2006 replaces April 2003

0263

To the best of our knowledge the technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline Company to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance or injuries resulting from use. Liability, if any, is limited to replacement of products. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY, BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Carboline[®] and Carbocrylic[®]

RELEASED Printed documents may be obsolete; validate prior to use.

Carbocrylic® 3359

Application Equipment

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

General Guidelines:

Spray Application (General) Pre-rinse equipment with undiluted Carboline Surface Cleaner 3 followed by clean potable water before spraying. The following spray equipment has been found suitable and is available from manufacturers such as Binks, DeVilbiss and Graco.

Conventional Spray Pressure pot equipped with dual regulators, ½" I.D. minimum material hose, .086" I.D. fluid tip and appropriate air cap.

Airless Spray Pump Ratio: 30:1 (min.)*
Pump Ratio: 45:1 for two or more guns
GPM Output: 3.0 (min.)
Material Hose: 3/8" I.D. (min.)
Tip Size: .017-.019"
Output PSI: 1800-2100
Filter Size: 60 mesh
*Teflon packings are recommended and available from the pump manufacturer. For ease of application, remove the pickup tube and immerse the lower unit directly into the material.

Brush & Roller (General) Multiple coats may be required to achieve desired appearance, hiding and recommended dry film thickness. Avoid excessive re-brushing or re-rolling.

Brush Use a synthetic bristle brush.

Roller Use a short-nap synthetic roller cover with phenolic core. For rough surfaces, use a 3/8" woven nap synthetic roller.

Mixing & Thinning

Mixing Power mix until uniform in consistency. Avoid excessive air entrapment.

Thinning May be thinned up to 6 oz/gal (5%) with clean, potable water. Areas with cool substrate and warm ambient conditions can experience a surface skinning and separation. Under these conditions, the use of 6-12 oz/gal (5-10%) of Additive 102 assists in the proper film formation at the recommended dry film thickness, without surface skinning. Use of thinners other than those supplied by Carboline may adversely affect product performance and void product warranty, whether expressed or implied.

Cleanup & Safety

Cleanup Use clean potable water followed with suitable solvent to dry equipment. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

Safety Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions. Use adequate ventilation and wear gloves or use protective cream on face and hands if hypersensitive. Keep container closed when not in use.

Application Conditions

Condition	Material	Surface	Ambient	Humidity
Normal	60°-90°F (16°-32°C)	65°-85°F (18°-29°C)	65°-90°F (18°-32°C)	10-80%
Minimum	50°F (10°C)	50°F (10°C)	50°F (10°C)	0%
Maximum	105°F (40°C)	130°F (54°C)	110°F (43°C)	85%

Do not apply when the surface temperature is less than 5°F (3°C) above the dew point. Do not apply if temperatures are expected to drop below 50°F (10°C) within 24 hours of application. Special application techniques may be required above or below normal application conditions.

Curing Schedule

Surface Temp. & 50% Relative Humidity	Dry to Handle	Dry to Topcoat
50°F (10°C)	3 Hours	3 Hours
75°F (24°C)	2 Hours	2 Hours
90°F (32°C)	1 Hour	1 Hour

These times are based on a 2.0-3.0 mil (50-75 micron) dry film thickness. Higher film thicknesses, insufficient ventilation, high humidity or cooler temperatures will require longer cure times.

The acrylic film forming process may require several weeks at 75°F (24°C) with proper ventilation to develop adhesion and water resistance. High humidity, high film thickness, insufficient ventilation or cooler temperatures will lengthen the Dry to Handle and Dry to Topcoat times due to slower water evaporation rate. Waterborne acrylics are sensitive to moisture during early cure and are susceptible to handling damage.

Packaging, Handling & Storage

Shipping Weight (Approximate)	<u>1 Gallon</u>	<u>5 Gallons</u>	<u>50 Gallons</u>
	11 lbs (5 kg)	51 lbs (23 kg)	525 lbs (239 kg)

Flash Point (Setaflash) >200°F (93°C)

Storage (General) Store Indoors. **Keep from Freezing**

Storage Temperature & Humidity 40° -110°F (4°-43°C)
0-95% Relative Humidity

Shelf Life 36 months at 75°F (24°C)

***Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.**



350 Hanley Industrial Court, St. Louis, MO 63144-1599
314/644-1000 314/644-4617 (fax) www.carboline.com

An **RPM** Company

September 2006 replaces April 2003

To the best of our knowledge the technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline Company to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance or injuries resulting from use. Liability, if any, is limited to replacement of products. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Carboline® and Carbocrylic®
RELEASED Printed documents may be obsolete; validate prior to use.



Material Safety Data Sheet

CHEMTREC
Transportation
Emergency Phone: 800-424-9300

Pittsburgh Poison Control Center
Health Emergency No.: 412-681-6669

•NOTE: The CHEMTREC
•Transportation Emergency Phone is
•to be used only in the event of
•chemical emergencies involving a
•spill, leak, fire, exposure or accident
•involving chemicals

Section 1 - Chemical Product / Company Information

Product Name: CARBOCRYLIC 3359 **Revision Date:** 12/29/2011
Identification Number: PLMSDS 0263S1NL **Supercedes :** 01/10/2011
Product Use/Class: Waterborne Acrylic - FOR INDUSTRIAL USE ONLY
Preparer: Regulatory, Department
Manufacturer: Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
(800) 848-4645

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA-CEIL
TITANIUM DIOXIDE	13463-67-7	20.0	10 MGM3	N/E	10 MGM3	N/E
DM GLYCOL ETHER	111-77-3	5.0	NE	NE	NE	NE
GLYCOL ETHER SOLVENT	112-34-5	5.0	NE	N/E	NE	NE
DIBUTYL PHTHALATE	84-74-2	5.0	5 MGM3	N/E	5 MGM3	NE
CARBON BLACK	1333-86-4	5.0	3.0 MG/M3	N/E	3.5 MG/M3	N/E

Section 3 - Hazards Identification

Emergency Overview: Use ventilation necessary to keep exposures below recommended exposure limits, if any.

Effects Of Overexposure - Eye Contact: May cause eye irritation.

Effects Of Overexposure - Skin Contact: May cause skin irritation.

Effects Of Overexposure - Inhalation: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache, or nausea. May cause nose and throat irritation. Use in inadequately ventilated areas may result in irritation headache and nausea.

Effects Of Overexposure - Ingestion: May be harmful if swallowed.

Effects Of Overexposure - Chronic Hazards: Under normal use conditions, this product is not expected to cause adverse health effects. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

Primary Route(s) Of Entry: Skin Contact, Skin Absorption, Inhalation, Ingestion, Eye Contact

Medical Conditions Prone to Aggravation by Exposure: If you have a condition that could be aggravated by exposure to dust or organic vapors, see a physician prior to use.

Section 4 - First Aid Measures

First Aid - Eye Contact: If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

First Aid - Skin Contact: Launder clothing before reuse. In case of contact, wash skin immediately with soap and water.

First Aid - Inhalation: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

First Aid - Ingestion: If swallowed do not induce vomiting. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: 248F (120C)
(Setaflash)

Lower Explosive Limit, %: 0.5
Upper Explosive Limit, %: 24.6

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam, Water Fog

Unusual Fire And Explosion Hazards: This is a water based product, however it does contain small amounts of volatile organic compounds (See Section II). Vapors are heavier than air and will accumulate. Vapors will form explosive concentrations with air. Vapors travel long distances and will flashback.

Special Firefighting Procedures: Evacuate hazard area of unprotected personnel. Use a NIOSH approved self-contained breathing unit and complete body protection. Cool surrounding containers with water in case of fire exposure.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow exposure controls/personal protection guidelines in Section 8. Contain and soak up residual with an absorbent (clay or sand). Take up absorbant material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section 15 for SARA Title III and CERCLA information.

Section 7 - Handling And Storage

Handling: Do not get in eyes, on skin, or on clothing. Keep container tightly closed when not in use. Wear personal protection equipment. Do not breathe vapors. Wash thoroughly after handling. If pouring or transferring materials, ground all containers and tools. Do not weld, heat, cut or drill on full or empty containers. Use only in accordance with Carboline application instructions, container label and Product Data Sheet. Avoid breathing vapors or spray mist.

Storage: Protect from Freezing! Keep away from heat, sparks, open flames and oxidizing agents. Keep containers closed. Store in a cool, dry place with adequate ventilation.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).

Respiratory Protection: Use only with ventilation to keep levels below exposure guidelines listed in Section 2. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use. For silica containing coatings in a liquid state, and/or if no exposure limits are established in Section 2 above, supplied air respirators are generally not required.

Skin Protection: Recommend impervious gloves and clothing to avoid skin contact. If material penetrates to skin, change gloves and clothing. The use of protective creams may be beneficial to certain individuals. Protective creams should be applied before exposure.

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Other protective equipment: Eye wash and safety showers should be readily available.

Hygienic Practices: Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and allow hazardous materials to pass through. Check shoes carefully after soaking before reuse. Contaminated clothing should be changed and washed before reuse. Eating, drinking and smoking in immediate work area should be prohibited.

Section 9 - Physical And Chemical Properties

Boiling Range:	212 F (100 C) - 644 F (340 C)	Vapor Density:	Heavier than Air
Odor:	Ammonia	Odor Threshold:	N/D
Appearance:	Viscous Liquid, Various Colors	Evaporation Rate:	Slower Than Ether
Solubility in H2O:	N/D		
Freeze Point:	N/D	Specific Gravity:	app. 1.16
Vapor Pressure:	N/D	PH:	N/D
Physical State:	Liquid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Heat, sparks and open flames.

Incompatibility: Avoid contact with strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.

Hazardous Polymerization: Will not occur under normal conditions.

Stability: This product is stable under normal storage conditions.

Section 11 - Toxicological Information

Product LD50: N/D

Product LC50: N/D

Chemical Name	CAS Number	LD50	LC50
TITANIUM DIOXIDE	13463-67-7	>25 G/KG, ORAL, RAT	>6.82 MG/L 4 HR, RAT
DM GLYCOL ETHER	111-77-3	>7000 MG/KG, ORAL, RAT	NOT AVAILABLE
GLYCOL ETHER SOLVENT	112-34-5	7292MG/KG,ORAL,RAT 2406MG/KG,ORAL MOUSE	NOT AVAILABLE
DIBUTYL PHTHALATE	84-74-2	8,000 MG/KG, ORAL, RAT	4250 MG/M3
CARBON BLACK	1333-86-4	NOT AVAILABLE	>8000 MG/KG, ORAL, RAT

Section 12 - Ecological Information

Ecological Information: No data

Section 13 - Disposal Information

Disposal Information: Dispose of in accordance with State, Local, and Federal Environmental regulations. Responsibility for proper waste disposal is with the owner of the waste.

Section 14 - Transportation Information

DOT Proper Shipping Name:	Not Regulated	Packing Group:	N/A
DOT Technical Name:	N/A	Hazard Subclass:	N/A
DOT Hazard Class:	None	Resp. Guide Page:	None
DOT UN/NA Number:	None		

Additional Notes: None.

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA)

Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

<u>Chemical Name</u>	<u>CAS Number</u>
GLYCOL ETHER SOLVENT	112-34-5
DIBUTYL PHTHALATE	84-74-2

TOXIC SUBSTANCES CONTROL ACT

All components of this product are listed on the TSCA inventory.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(B) Substances exist in this product

U.S. STATE REGULATIONS AS FOLLOWS:

NEW JERSEY RIGHT-TO-KNOW

The following materials are non-hazardous, but are among the top five components in this product.

<u>Chemical Name</u>	<u>CAS Number</u>
WATER	7732-18-5
ACRYLIC RESIN	TRADE SECRET
ORGANIC PIGMENT	31837-42-0
ORGANIC PIGMENT	5567-15-7

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

<u>Chemical Name</u>	<u>CAS Number</u>
WATER	7732-18-5
ACRYLIC RESIN	TRADE SECRET
ORGANIC PIGMENT	31837-42-0
ORGANIC PIGMENT	5567-15-7
COLOR PIGMENT	36888-99-0
AZO PIGMENT	2786-76-7
AZO PIGMENT	82199-12-0
ORANGE PIGMENT	15793-73-4
IRON OXIDE	1332-37-2
YELLOW IRON OXIDE	51274-00-1
GRAPHITE	7782-42-5
IRON OXIDE	1332-37-2

CALIFORNIA PROPOSITION 65

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

<u>Chemical Name</u>	<u>CAS Number</u>
TITANIUM DIOXIDE	13463-67-7
CARBON BLACK	1333-86-4

MICROCRYSTALLINE SILICA

14808-60-7

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

Chemical Name
DIBUTYL PHTHALATE

CAS Number
84-74-2

INTERNATIONAL REGULATIONS AS FOLLOWS:

CANADIAN WHMIS

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: B3, D2A, D2B

Section 16 - Other Information

HMIS Ratings

Health: 2

Flammability: 1

Reactivity: 1

Personal Protection: X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): 60

REASON FOR REVISION: Changes made in Section(s) 2, 5, 11, and 15.

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations



Material Safety Data Sheet

CHEMTREC
Transportation
Emergency Phone: 800-424-9300

Pittsburgh Poison Control Center
Health Emergency No.: 412-681-6669

•NOTE: The CHEMTREC
•Transportation Emergency Phone is
•to be used only in the event of
•chemical emergencies involving a
•spill, leak, fire, exposure or accident
•involving chemicals

Section 1 - Chemical Product / Company Information

Product Name: CARBOCRYLIC 3359 MIXED METAL OXIDE
Revision Date: 12/29/2011
Identification Number: PLMSDS 0263S1YL
Supercedes : 01/10/2011
Product Use/Class: Waterborne Acrylic - FOR INDUSTRIAL USE ONLY
Preparer: Regulatory, Department
Manufacturer: Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
(800) 848-4645

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA-CEIL
NICKEL ANTIMONY COMPOUND	8007-18-9	20.0	0.5 MGM3	NE	0.5 MGM3	0.5MG/M3
TITANIUM DIOXIDE	13463-67-7	10.0	10 MGM3	N/E	10 MGM3	N/E
DM GLYCOL ETHER	111-77-3	5.0	NE	NE	NE	NE
DIBUTYL PHTHALATE	84-74-2	5.0	5 MGM3	N/E	5 MGM3	NE
GLYCOL ETHER SOLVENT	112-34-5	5.0	NE	N/E	NE	NE

Section 3 - Hazards Identification

Emergency Overview: Use ventilation necessary to keep exposures below recommended exposure limits, if any. This product contains MIXED METAL OXIDE Pigments which are the result of high temperature calcination of the component substances. Due to their unique crystalline structure, the properties of these pigments do not necessarily reflect the properties of the component metals or oxides. Some compounds of the metals used in the manufacturing of these pigments have demonstrated various toxic properties. However, there is no evidence that these pigments have these toxic characteristics. IARC considers Nickel compounds to be carcinogenic to humans (Monograph #49).

Effects Of Overexposure - Eye Contact: May cause eye irritation.

Effects Of Overexposure - Skin Contact: May cause skin irritation.

Effects Of Overexposure - Inhalation: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache, or nausea. May cause nose and throat irritation. Use in inadequately ventilated areas may result in irritation headache and nausea.

Effects Of Overexposure - Ingestion: May be harmful if swallowed.

Effects Of Overexposure - Chronic Hazards: Under normal use conditions, this product is not expected to cause adverse health effects. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

Primary Route(s) Of Entry: Skin Contact, Skin Absorption, Inhalation, Ingestion, Eye Contact

Medical Conditions Prone to Aggravation by Exposure: If you have a condition that could be aggravated by exposure to dust or organic vapors, see a physician prior to use.

Section 4 - First Aid Measures

First Aid - Eye Contact: If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

First Aid - Skin Contact: Launder clothing before reuse. In case of contact, wash skin immediately with soap and water.

First Aid - Inhalation: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

First Aid - Ingestion: If swallowed do not induce vomiting. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: 248F (120C)
(Setaflash)

Lower Explosive Limit, %: 0.5
Upper Explosive Limit, %: 24.6

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam, Water Fog

Unusual Fire And Explosion Hazards: This is a water based product, however it does contain small amounts of volatile organic compounds (See Section II). Vapors are heavier than air and will accumulate. Vapors will form explosive concentrations with air. Vapors travel long distances and will flashback.

Special Firefighting Procedures: Evacuate hazard area of unprotected personnel. Use a NIOSH approved self-contained breathing unit and complete body protection. Cool surrounding containers with water in case of fire exposure.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow exposure

controls/personal protection guidelines in Section 8. Contain and soak up residual with an absorbent (clay or sand). Take up absorbant material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section 15 for SARA Title III and CERCLA information.

Section 7 - Handling And Storage

Handling: Do not get in eyes, on skin, or on clothing. Keep container tightly closed when not in use. Wear personal protection equipment. Do not breathe vapors. Wash thoroughly after handling. If pouring or transferring materials, ground all containers and tools. Do not weld, heat, cut or drill on full or empty containers. Use only in accordance with Carboline application instructions, container label and Product Data Sheet.

Storage: Protect from Freezing! Keep away from heat, sparks, open flames and oxidizing agents. Keep containers closed. Store in a cool, dry place with adequate ventilation.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).

Respiratory Protection: Use only with ventilation to keep levels below exposure guidelines listed in Section 2. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use. For silica containing coatings in a liquid state, and/or if no exposure limits are established in Section 2 above, supplied air respirators are generally not required.

Skin Protection: Recommend impervious gloves and clothing to avoid skin contact. If material penetrates to skin, change gloves and clothing. The use of protective creams may be beneficial to certain individuals. Protective creams should be applied before exposure.

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Other protective equipment: Eye wash and safety showers should be readily available.

Hygienic Practices: Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and allow hazardous materials to pass through. Check shoes carefully after soaking before reuse. Contaminated clothing should be changed and washed before reuse. Eating, drinking and smoking in immediate work area should be prohibited.

Section 9 - Physical And Chemical Properties

Boiling Range:	212 F (100 C) - 644 F (340 C)	Vapor Density:	Heavier than Air
Odor:	Ammonia	Odor Threshold:	N/D
Appearance:	Viscous Liquid, Various Colors	Evaporation Rate:	Slower Than Ether
Solubility in H2O:	N/D		
Freeze Point:	N/D	Specific Gravity:	app. 1.16
Vapor Pressure:	N/D	PH:	N/D
Physical State:	Liquid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Heat, sparks and open flames.

Incompatibility: Avoid contact with strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.

Hazardous Polymerization: Will not occur under normal conditions.

Stability: This product is stable under normal storage conditions.

Section 11 - Toxicological Information

Product LD50: N/D

Product LC50: N/D

Chemical Name	CAS Number	LD50	LC50
NICKEL ANTIMONY COMPOUND	8007-18-9	>10,000MG/KG ORAL RAT	NOT AVAILABLE
TITANIUM DIOXIDE	13463-67-7	>25 G/KG, ORAL, RAT	>6.82 MG/L 4 HR, RAT
DM GLYCOL ETHER	111-77-3	>7000 MG/KG, ORAL, RAT	NOT AVAILABLE
DIBUTYL PHTHALATE	84-74-2	8,000 MG/KG, ORAL, RAT	4250 MG/M3
GLYCOL ETHER SOLVENT	112-34-5	7292MG/KG,ORAL,RAT 2406MG/KG,ORAL MOUSE	NOT AVAILABLE

Section 12 - Ecological Information

Ecological Information: No data

Section 13 - Disposal Information

Disposal Information: Dispose of in accordance with State, Local, and Federal Environmental regulations. Responsibility for proper waste disposal is with the owner of the waste.

Section 14 - Transportation Information

DOT Proper Shipping Name:	Not Regulated	Packing Group:	N/A
DOT Technical Name:	N/A	Hazard Subclass:	N/A
DOT Hazard Class:	None	Resp. Guide Page:	None
DOT UN/NA Number:	None		

Additional Notes: None.

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

<u>Chemical Name</u>	<u>CAS Number</u>
NICKEL ANTIMONY COMPOUND	8007-18-9
DIBUTYL PHTHALATE	84-74-2
GLYCOL ETHER SOLVENT	112-34-5

TOXIC SUBSTANCES CONTROL ACT

All components of this product are listed on the TSCA inventory.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(B) Substances exist in this product

U.S. STATE REGULATIONS AS FOLLOWS:

NEW JERSEY RIGHT-TO-KNOW

The following materials are non-hazardous, but are among the top five components in this product.

<u>Chemical Name</u>	<u>CAS Number</u>
WATER	7732-18-5
ACRYLIC RESIN	TRADE SECRET
AZO PIGMENT	82199-12-0

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

<u>Chemical Name</u>	<u>CAS Number</u>
WATER	7732-18-5
ACRYLIC RESIN	TRADE SECRET
AZO PIGMENT	82199-12-0
ORGANIC PIGMENT	31837-42-0

CALIFORNIA PROPOSITION 65

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

<u>Chemical Name</u>	<u>CAS Number</u>
NICKEL ANTIMONY COMPOUND	8007-18-9
TITANIUM DIOXIDE	13463-67-7
CARBON BLACK	1333-86-4

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

Chemical Name
DIBUTYL PHTHALATE

CAS Number
84-74-2

INTERNATIONAL REGULATIONS AS FOLLOWS:

CANADIAN WHMIS

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: B3, D2A, D2B

Section 16 - Other Information

HMIS Ratings

Health: 2

Flammability: 1

Reactivity: 1

Personal Protection: X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): 60

REASON FOR REVISION: Changes made in Section(s) 5, 11, and 15.

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations

Selection & Specification Data

Generic Type	Modified aluminum epoxy mastic
Description	Aluminum-pigmented, low-stress, high-solids mastic with outstanding performance properties and proven field history. Carbomastic 15 was the pioneer mastic coating in a number of industrial markets and today still provides unmatched levels of barrier protection and corrosion resistance over existing finishes and rusted or SSPC-SP2 or SP3-cleaned steel.
Features	<ul style="list-style-type: none"> ▪ Excellent performance over minimal surface preparation of steel substrates ▪ Suitable as a topcoat for most tightly adhered existing coatings ▪ Excellent choice for field touch-up of zinc-rich primers and galvanized steel ▪ Unique formulation with aluminum <i>flakes</i> provides exceptional barrier protection ▪ May be applied at 35°F (2°C) when CM 15 FC's part B is utilized. ▪ Suitable for use under insulation on hot surfaces operating up to 300°F(150°C) ▪ VOC compliant to current AIM regulations
Color	CM 15: Aluminum (C901); Red (M500)* CM 15 FC: Aluminum (C901); Red (M500)* Color variations within a batch and from batch-to-batch may occur due to the metallic pigments and variations in application techniques and conditions. Neither product is color matched, nor will they match each other. (15 FC may have a greenish appearance.) *Red (M500) is available for use as a contrasting primer in multiple coat applications, but should always be topcoated.
Primers	Self-priming. May be applied over most tightly adhering coatings as well as inorganic zinc primers. A mist coat may be required to minimize bubbling over inorganic zinc primers.
Topcoats	Acrylics, Alkyds, Epoxies, Polyurethanes
Dry Film Thickness	3.0 mils (75 microns) over existing coatings and 5.0 mils (125 microns) minimum on rusted steel. 7.0-10.0 mils (175-250 microns) in one or two coats for severe exposures. Do not exceed 10.0 mils (250 microns) in a single coat.
Solids Content	By Volume: 90% ± 2%
Theoretical Coverage Rate	1444 mil ft ² (36.0 m ² /l at 25 microns) 288 ft ² at 5 mils (7.2 m ² /l at 125 microns) Allow for loss in mixing and application
VOC Values	As supplied: (CM15) 0.7 lbs/gal (88 g/l)
CM 15 & CM 15 FC	(CM15FC) 0.8 lbs/gal (97 g/l)
	Thinned: (values are for CM15)
	32 oz/gal w/ #76: 1.9 lbs/gal (231 g/l)
	32 oz/gal w/ #10: 2.0 lbs/gal (242 g/l)
	These are nominal values.
HAPS Values	As supplied: (CM15) 0.70 lbs/solid gal

Temperature Resistance

Under Insulation: 300°F (150°C)
 Discoloration is observed above 180°F (82°C) but does not affect performance.

Substrates & Surface Preparation

General

Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil and all other contaminants that could interfere with adhesion of the coating.

Steel

Immersion: SSPC-SP10 with a 2.0-3.0 mil (50-75 micron) surface profile.

Non-Immersion: SSPC-SP6 with a 2.0-3.0 mil (50-75 micron) surface profile for maximum protection. SSPC-SP2, SP3, SP7, or SP12 are also acceptable methods

Galvanized Steel

For optimum performance sweep blast cleaning is recommended. Consult your Carboline Sales Representative for specific recommendations.

Previously Painted Surfaces

Lightly sand or abrade to roughen and degloss the surface. Existing paint must attain a minimum 3A rating in accordance with ASTM D3359 "X-Scribe" adhesion test.

Performance Data

Test Method	System	Results
ASTM D522 Flexibility	Blasted steel 1 ct. CM15	A) Conical - crack 0.38", actual elongation 48.57% B) Cylindrical- no cracking observed
ASTM D4060 Taber Abrasion	1 ct. CM15	89.8 mg per 3000 cycles CS 17 wheel, 1000 gm load,
ASTM G14 Impact Resistance	A) Blasted steel 1 ct. CM15 B) Rusted steel 1 ct. CM15	Area damaged: A) 1/4 inch (0.25") B) 1/4 - 9/16 inch (0.44")
ASTM B117 Salt Spray	Rusted steel 1 ct. CM 15	No blistering, rusting, or softening No rust creep from scribe
ASTM D1735 Water Fog	Rusted steel 1 ct. CM 15	No blistering or softening No creep from scribe

Test reports and additional data available upon written request.

Carbomastic® 15 & 15 FC

Application Equipment

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

Spray Application (General) The following spray equipment has been found suitable and is available from manufacturers such as Binks, DeVilbiss and Graco.

Conventional Spray Pressure pot equipped with dual regulators, 3/8" I.D. minimum material hose, .086" I.D. fluid tip and appropriate air cap.

Airless Spray

Pump Ratio:	30:1 (min.)*
GPM Output:	3.0 (min.)
Material Hose:	3/8" I.D. (min.)
Tip Size:	.019-.025"
Output PSI:	1900-2100
Filter Size:	60 mesh

*Teflon packings are recommended and available from the pump manufacturer.

Brush & Roller Multiple coats may be required to obtain desired appearance, recommended dry film thickness and adequate hiding. Avoid excessive re-brushing or re-rolling. Use clean natural bristle brush or medium nap phenolic core roller. Work coating into all irregularities.

Plural Component May be applied by plural component spray equipment. Contact Carboline Technical Service for specific recommendations.

Mixing & Thinning

Mixing Power mix separately, then combine and power mix. DO NOT MIX PARTIAL KITS. (Note: Carbomastic 15 FC uses the same Part A as Carbomastic 15)

Ratio 1:1 Ratio (A to B)

Thinning May be thinned up to 32 oz/gal (25%) with Thinner #10. Substitute Thinner #72 when non-photochemically reactive thinners are required. To extend pot life, may be thinned up to 32 oz/gal (25%) with Thinner #72. Use of thinners other than those supplied by Carboline may adversely affect product performance and void product warranty, whether expressed or implied.

Pot Life 2 Hours at 75°F (24°C) unthinned
CM 15 1 Hour at 90°F (32°C) unthinned

Pot life ends when coating becomes too viscous to use.

Pot Life Approximately 30 minutes at 75°F (24°C) unthinned.
CM 15 FC When thinned 12%, pot life will be 45 minutes at 75°F.
Pot life ends when coating becomes too viscous to use.

Cleanup & Safety

Cleanup Use Thinner #2 or Acetone. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

Safety Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions. Hypersensitive persons should wear protective clothing, gloves and use protective cream on face, hands and all exposed areas.

Ventilation When used as a tank lining or in enclosed areas, thorough air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. In addition to ensuring proper ventilation, appropriate respirators must be used by all application personnel.

Caution This product contains flammable solvents. Keep away from sparks and open flames. All electrical equipment and installations should be made and grounded in accordance with the National Electric Code. In areas where explosion hazards exist, workmen should be required to use non-ferrous tools and wear conductive and non-sparking shoes.

December 2010 replaces October 2010

Application Conditions

CM 15

Condition	Material	Surface	Ambient	Humidity
Min/Max	50-90°F (10-32°C)	50-130°F (10-54°C)	50-100°F (10-38°C)	0-95%

CM 15 FC

Condition	Material	Surface	Ambient	Humidity
Min/Max	50-75°F (10-24°C)	35-130°F (2-54°C)	35-100°F (2-38°C)	0-95%

This product simply requires the substrate temperature to be above the dew point. Condensation due to substrate temperatures below the dew point can cause flash rusting on prepared steel and interfere with proper adhesion to the substrate. Special application techniques may be required above or below normal application conditions.

Curing Schedule

CM 15

Surface Temp. & 50% Relative Humidity	Dry to Recoat / Topcoat	Final Cure for Immersion Service
50°F (10°C)	5 Days	15 Days
60°F (16°C)	3 Days	10 Days
75°F (24°C)	24 Hours	5 Days
90°F (32°C)	18 Hours	3 Days

Dry to Touch is 5 hours at 75°F (24°C). Maximum recoat/topcoat times are 30 days for epoxies and 90 days for polyurethanes at 75°F (24°C).

CM 15 FC

Surface Temp. & 50% Relative Humidity	Dry to Recoat / Topcoat
35°F (2°C)	32 Hours
50°F (10°C)	25 Hours
60°F (16°C)	18 Hours
75°F (24°C)	5 Hours

Dry to Touch is 3.5 hours at 75°F (24°C). Maximum recoat/topcoat times are 30 days for epoxies and 90 days for polyurethanes at 75°F (24°C).

These times are based on a 5.0-7.0 mil (125-175 micron) dry film thickness. Higher film thickness, insufficient ventilation or cooler temperatures will require longer cure times and could result in solvent entrapment and premature failure. Excessive humidity or condensation on the surface during curing can interfere with the cure, can cause discoloration and may result in a surface haze. Any haze or blush must be removed by water washing before recoating. If the maximum recoat time is exceeded, the surface must be abraded by sweep blasting prior to the application of additional coats. Note: This product contains conductive pigments and cannot be holiday tested.

Packaging, Handling & Storage

Shipping Weight (Approximate)	2 Gallon Kit 25 lbs (11 kg)	10 Gallon Kit 124 lbs (56 kg)
--------------------------------------	---------------------------------------	-----------------------------------------

Flash Point (Setaflash)

CM 15	Part A: >200°F (93°C)
CM 15	Part B: 76°F (24°C)
CM 15 FC	Part B: 45°F (7°C)

Storage (General) Store Indoors.

Storage Temperature & Humidity 45° - 110°F (7-43°C)
0-90% Relative Humidity

Shelf Life: CM15 Part A & B: Min. 36 months at 75°F (24°C)
CM 15 FC Part A & B: Min. 36 months at 75°F (24°C)

***Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.**


Coatings - Linings - Fireproofing

2150 Schuetz Rd., St. Louis, MO 63146
PH: 314-644-1000 Toll-Free: 800-848-4645
www.carboline.com

An  Company

To the best of our knowledge the technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline Company to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance or injuries resulting from use. Liability, if any, is limited to replacement of products. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Carboline® and Carbomastic®
RELEASED Printed documents may be obsolete; validate prior to use.



Material Safety Data Sheet

CHEMTREC
Transportation
Emergency Phone: 800-424-9300

Pittsburgh Poison Control Center
Health Emergency No.: 412-681-6669

•NOTE: The CHEMTREC
•Transportation Emergency Phone is
•to be used only in the event of
•chemical emergencies involving a
•spill, leak, fire, exposure or accident
•involving chemicals

Section 1 - Chemical Product / Company Information

Product Name: CARBOMASTIC 15 PART A **Revision Date:** 10/26/2011
Identification Number: PLMSDS 0185A1NL **Supercedes :** 09/20/2011
Product Use/Class: Epoxy Mastic - FOR INDUSTRIAL USE ONLY
Preparer: Regulatory, Department
Manufacturer: Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
(800) 848-4645

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA-CEIL
EPOXY RESIN	25068-38-6	55.0	NE	NE	NE	NE
ALUMINUM (DUST OR FUME)	7429-90-5	20.0	10 MG/M3 (metal dust)	N/E	15 MG/M3 (total dust)	N/E
TRIPHENYL PHOSPHITE	101-02-0	15.0	NE	N/E	NE	NE
CARBON BLACK	1333-86-4	0.3	3.0 MG/M3	N/E	3.5 MG/M3	N/E

Section 3 - Hazards Identification

Emergency Overview: Warning! May cause allergic skin reactions. May cause irritation.

Effects Of Overexposure - Eye Contact: May cause eye irritation.

Effects Of Overexposure - Skin Contact: May cause skin sensitization. Direct skin contact may cause irritation. May cause allergic skin reaction.

Effects Of Overexposure - Inhalation: May cause nose and throat irritation.

Effects Of Overexposure - Ingestion: May be harmful if swallowed.

Effects Of Overexposure - Chronic Hazards: No Information.

Primary Route(s) Of Entry: Skin Contact, Inhalation

Medical Conditions Prone to Aggravation by Exposure: If sensitized to amines, epoxies, or other chemicals do not use. See a physician if a medical condition exists.

Section 4 - First Aid Measures

First Aid - Eye Contact: If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

First Aid - Skin Contact: In case of contact, wash skin immediately with soap and water.

First Aid - Inhalation: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

First Aid - Ingestion: If swallowed do not induce vomiting. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: 201 F (93 C)
(Setaflash)

Lower Explosive Limit, %: Not Applicable
Upper Explosive Limit, %: Not Applicable

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam, Water Fog

Unusual Fire And Explosion Hazards: This product contains less than 1% volatile components. The amount of vapors that could accumulate are minimal. However, vapors are heavier than air and could travel long distances, ignite, and flashback. Eliminate all ignition sources. Keep away from sparks, open flames, and heat sources. All electrical equipment and installations should be made and grounded in accordance with the National Electrical Code. In areas where explosion hazards exist, workers should be required to use nonferrous tools and to wear conductive and non-sparking shoes.

Special Firefighting Procedures: Evacuate hazard area of unprotected personnel. Use a NIOSH approved self-contained breathing unit and complete body protection. Cool surrounding containers with water in case of fire exposure.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow exposure controls/personal protection guidelines in Section 8. Contain and soak up residual with an absorbent (clay or sand). Take up absorbant material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section 15 for SARA Title III and CERCLA information.

Section 7 - Handling And Storage

Handling: Do not get in eyes, on skin, or on clothing. Keep container tightly closed when not in use. Wear personal protection equipment. Do not breathe vapors. Wash thoroughly after handling. If pouring or transferring materials, ground all containers and tools. Do not weld, heat, cut or drill on full or empty containers. Use only in accordance with Carboline application

instructions, container label and Product Data Sheet. Avoid breathing vapors or spray mist.

Storage: Keep away from heat, sparks, open flames and oxidizing agents. Keep containers closed. Store in a cool, dry place with adequate ventilation.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).

Respiratory Protection: Use only with ventilation to keep levels below exposure guidelines listed in Section 2. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use. For silica containing coatings in a liquid state, and/or if no exposure limits are established in Section 2 above, supplied air respirators are generally not required.

Skin Protection: Recommend impervious gloves and clothing to avoid skin contact. If material penetrates to skin, change gloves and clothing. The use of protective creams may be beneficial to certain individuals. Protective creams should be applied before exposure.

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Other protective equipment: Eye wash and safety showers should be readily available.

Hygienic Practices: Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and allow hazardous materials to pass through. Check shoes carefully after soaking before reuse.

Section 9 - Physical And Chemical Properties

Boiling Range:	Not Determined - .	Vapor Density:	Heavier than Air
Odor:	Epoxy	Odor Threshold:	N/D
Appearance:	Viscous Liquid, Aluminum, Red or Green in color	Evaporation Rate:	Slower than Ether
Solubility in H2O:	Not Determined		
Freeze Point:	N/A	Specific Gravity:	1.24
Vapor Pressure:	Not Determined	PH:	Not Determined
Physical State:	Liquid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Heat, sparks and open flames.

Incompatibility: Avoid contact with strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.

Hazardous Polymerization: Will not occur under normal conditions.

Stability: This product is stable under normal storage conditions.

Section 11 - Toxicological Information

Product LD50: N/D

Product LC50: N/D

Chemical Name	CAS Number	LD50	LC50
EPOXY RESIN	25068-38-6	11.4G/KG RAT,ORAL	>20ML/KG SKIN,SENSITIZER
ALUMINUM (DUST OR FUME)	7429-90-5	NOT AVAILABLE	NOT AVAILABLE
TRIPHENYL PHOSPHITE	101-02-0	1.6 G/KG ORAL, RAT	>6700 MG/M 3 HR, RAT
CARBON BLACK	1333-86-4	NOT AVAILABLE	>8000 MG/KG, ORAL, RAT

Section 12 - Ecological Information

Ecological Information: No data

Section 13 - Disposal Information

Disposal Information: Dispose of in accordance with State, Local, and Federal Environmental regulations. Responsibility for proper waste disposal is with the owner of the waste.

Section 14 - Transportation Information

DOT Proper Shipping Name:	Paint, Not Regulated	Packing Group:	N/A
DOT Technical Name:	N/A	Hazard Subclass:	N/A
DOT Hazard Class:	None	Resp. Guide Page:	N/A
DOT UN/NA Number:	None		

Additional Notes: None.

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

Chemical Name
ALUMINUM (DUST OR FUME)

CAS Number
7429-90-5

TOXIC SUBSTANCES CONTROL ACT

All components of this product are listed on the TSCA inventory.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(B) Substances exist in this product

U.S. STATE REGULATIONS AS FOLLOWS:

NEW JERSEY RIGHT-TO-KNOW

The following materials are non-hazardous, but are among the top five components in this product.

Chemical Name
POLYSTYRENE
YELLOW IRON OXIDE

CAS Number
9003-53-6
51274-00-1

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

Chemical Name
POLYSTYRENE
YELLOW IRON OXIDE
IRON OXIDE

CAS Number
9003-53-6
51274-00-1
1332-37-2

CALIFORNIA PROPOSITION 65

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

Chemical Name
CARBON BLACK

CAS Number
1333-86-4

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

No California Proposition 65 Reproductive Toxins exist

INTERNATIONAL REGULATIONS AS FOLLOWS:

CANADIAN WHMIS

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: D2B

Section 16 - Other Information

HMIS Ratings

Health: 2 Flammability: 1 Reactivity: 1 Personal Protection: X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): 88

REASON FOR REVISION: Changes made in Section(s): 2, 11, and 15

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations



Material Safety Data Sheet

**CHEMTREC
Transportation
Emergency Phone: 800-424-9300**

**Pittsburgh Poison Control
Center
Health Emergency No.:
412-681-6669**

•NOTE: The CHEMTREC
•Transportation Emergency Phone is to
•be used only in the event of chemical
•emergencies involving a spill, leak, fire,
•exposure or accident involving
•chemicals

Section 1 - Chemical Product / Company Information

Product Name: CARBOMASTIC 15 PART B **Revision Date:** 01/19/2012
Identification Number: PLMSDS 0185B1NL **Supercedes :** 09/20/2011
Product Use/Class: Epoxy Mastic - FOR INDUSTRIAL USE ONLY
Preparer: Regulatory, Department
Manufacturer: Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
(800) 848-4645

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STE	OSHA PEL-TWA	OSHA-CEIL
MICROCRYSTALLINE SILICA	14808-60-7	45.0	0.025 MG/M3 (respirable)	N/E	0.1 MG/M3 (respirable)	N/E
MICA	12001-26-2	15.0	3 MGM3	N/E	3 MGM3	N/E
AMINE COMPOUND	TRADE SECRET	10.0	N/E	N/E	N/E	N/E
BENZYL ALCOHOL	100-51-6	10.0	N/E	N/E	N/E	N/E
ISOPHORONEDIAMINE	2855-13-2	5.0	N/E	N/E	N/E	N/E
TOLUENE	108-88-3	5.0	20 PPM	N/E	375 MGM3	NE
META-XYLENE	108-38-3	5.0	100 PPM	150 PPM	435 MG/M3	N/E
1-METHOXY-2-PROPANOL ACETATE	108-65-6	5.0	N/E	N/E	N/E	N/E
PARA-XYLENE	106-42-3	5.0	100 PPM	150 PPM	435 MGM3	N/E
ETHYL BENZENE	100-41-4	5.0	20 PPM	N/E	435 MGM3	N/E

Section 3 - Hazards Identification

Emergency Overview: Warning! Flammable. Harmful if inhaled. Causes eye and skin irritation. Aspiration may cause lung damage. May cause dizziness and drowsiness. Keep away from heat, sparks, flame. Avoid breathing vapor. Avoid contact with eyes, skin and clothing. Do not swallow. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling. Contains SILICA which can cause cancer. Risk of Cancer depends on duration and level of exposure. Skin and eye irritant.

Effects Of Overexposure - Eye Contact: May cause eye burns.

Effects Of Overexposure - Skin Contact: May cause skin burns. May be harmful if absorbed through the skin.

Effects Of Overexposure - Inhalation: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache, or nausea. May cause nose and throat irritation. May cause lung

irritation. May cause allergic respiratory reaction, effects may be permanent.

Effects Of Overexposure - Ingestion: Harmful if swallowed.

Effects Of Overexposure - Chronic Hazards: Crystalline silica is known to cause silicosis. Crystalline silica (Quartz) is classified as a known human carcinogen (Group 1) by IARC. Exposure is by route of inhalation. If material is in a liquid matrix it is unlikely to be inhaled. However, when sanding or grinding the finished product, there may be potential for crystalline silica to become airborne. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

Primary Route(s) Of Entry: Skin Contact, Skin Absorption, Inhalation

Medical Conditions Prone to Aggravation by Exposure: If sensitized to amines, epoxies, or other chemicals do not use. See a physician if a medical condition exists. If you have a condition that could be aggravated by exposure to dust or organic vapors, see a physician prior to use.

Section 4 - First Aid Measures

First Aid - Eye Contact: If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

First Aid - Skin Contact: In case of contact, immediately flush skin with plenty of water while removing contaminated clothing and shoes. Launder clothing before reuse. If rash or irritation develops, consult a physician.

First Aid - Inhalation: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

First Aid - Ingestion: If swallowed do not induce vomiting. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: 76 F (24 C)
(Setaflash)

Lower Explosive Limit, %: 1.0%
Upper Explosive Limit, %: 13.1%

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam, Water Fog

Unusual Fire And Explosion Hazards: Flammable Liquid. Vapors are heavier than air and will accumulate. Vapors will form explosive concentrations with air. Vapors travel long distances and will flashback. Use mechanical ventilation when necessary to keep percent vapor below the "Lower Explosion Level" (LEL). Eliminate all ignition sources. Keep away from sparks, open flames and heat sources. All electric equipment and installations should be made and grounded in accordance with the National Electrical Code. In areas where explosion hazards exist, workers should be required to use non-ferrous tools and to wear conductive and non-sparking shoes.

Special Firefighting Procedures: Evacuate hazard area of unprotected personnel. Use a NIOSH approved self-contained breathing unit and complete body protection. Cool surrounding containers with water in case of fire exposure. Flammable. Cool fire-exposed containers using water spray.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow exposure controls/personal protection guidelines in Section 8. Contain and soak up residual with an absorbent (clay or sand). Take up absorbant material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section 15 for SARA Title III and CERCLA information.

Section 7 - Handling And Storage

Handling: Do not get in eyes, on skin, or on clothing. Keep container tightly closed when not in use. Wear personal protection equipment. Do not breathe vapors. Wash thoroughly after handling. If pouring or transferring materials, ground all containers and tools. Do not weld, heat, cut or drill on full or empty containers. Use only in accordance with Carboline application instructions, container label and Product Data Sheet. Avoid breathing vapors or spray mist.

Storage: Keep away from heat, sparks, open flames and oxidizing agents. Keep containers closed. Store in a cool, dry place with adequate ventilation.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).

Respiratory Protection: Use only with ventilation to keep levels below exposure guidelines listed in Section 2. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use. For silica containing coatings in a liquid state, and/or if no exposure limits are established in Section 2 above, supplied air respirators are generally not required.

Skin Protection: Recommend impervious gloves and clothing to avoid skin contact. If material penetrates to skin, change gloves and clothing. The use of protective creams may be beneficial to certain individuals. Protective creams should be applied before exposure.

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Other protective equipment: Eye wash and safety showers should be readily available.

Hygienic Practices: Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and allow hazardous materials to pass through. Check shoes carefully after soaking before reuse.

Section 9 - Physical And Chemical Properties

Boiling Range:	232F (111C) - 300F (148C)	Vapor Density:	Heavier than Air
Odor:	Epoxy	Odor Threshold:	N/D
Appearance:	Viscous Liquid	Evaporation Rate:	Slower than Ether
Solubility in H2O:	Not Determined		
Freeze Point:	N/A	Specific Gravity:	1.56
Vapor Pressure:	Not Determined	PH:	Not Determined
Physical State:	Liquid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Heat, sparks and open flames.

Incompatibility: Keep away from strong oxidizing agents, heat and open flames.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding,

cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.

Hazardous Polymerization: Will not occur under normal conditions.

Stability: This product is stable under normal storage conditions.

Section 11 - Toxicological Information

Product LD50: N/D

Product LC50: N/D

Chemical Name	CAS Number	LD50	LC50
MICROCRYSTALLINE SILICA	14808-60-7	NOT AVAILABLE	NOT AVAILABLE
MICA	12001-26-2	NOT AVAILABLE	NOT AVAILABLE
AMINE COMPOUND	TRADE SECRET	NOT AVAILABLE	NOT AVAILABLE
BENZYL ALCOHOL	100-51-6	1230MG/KG RAT,ORAL	1000PPM/8HRS RAT,INHALATION
ISOPHORONEDIAMINE	2855-13-2	>0.5 G/KG ORAL	NOT AVAILABLE
TOLUENE	108-88-3	5.0 G/KG RAT ORAL, 14G/KG RABBIT DERMAL	8000 PPM/4HRS, RAT, INHALATION
META-XYLENE	108-38-3	NOT AVAILABLE	NOT AVAILABLE
1-METHOXY-2-PROPANOL ACETATE	108-65-6	NOT AVAILABLE	NOT AVAILABLE
PARA-XYLENE	106-42-3	NOT AVAILABLE	NOT AVAILABLE
ETHYL BENZENE	100-41-4	3500 MG/KG RAT,ORAL	17.2 mg/L Inh, Rat 4h

Section 12 - Ecological Information

Ecological Information: No data

Section 13 - Disposal Information

Disposal Information: Dispose of in accordance with State, Local, and Federal Environmental regulations. Responsibility for proper waste disposal is with the owner of the waste.

Section 14 - Transportation Information

DOT Proper Shipping Name:	Paint	Packing Group:	III
DOT Technical Name:	N/A	Hazard Subclass:	N/A
DOT Hazard Class:	3	Resp. Guide Page:	128
DOT UN/NA Number:	UN 1263		

Additional Notes: None.

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD, FIRE HAZARD

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

<u>Chemical Name</u>	<u>CAS Number</u>
TOLUENE	108-88-3
META-XYLENE	108-38-3
PARA-XYLENE	106-42-3
ETHYL BENZENE	100-41-4

TOXIC SUBSTANCES CONTROL ACT

All components of this product are listed on the TSCA inventory.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(B) Substances exist in this product

U.S. STATE REGULATIONS AS FOLLOWS:

NEW JERSEY RIGHT-TO-KNOW

The following materials are non-hazardous, but are among the top five components in this product.

<u>Chemical Name</u>	<u>CAS Number</u>
HYDROCARBON RESIN	TRADE SECRET

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

<u>Chemical Name</u>	<u>CAS Number</u>
HYDROCARBON RESIN	TRADE SECRET

CALIFORNIA PROPOSITION 65

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

<u>Chemical Name</u>	<u>CAS Number</u>
MICROCRYSTALLINE SILICA	14808-60-7
ETHYL BENZENE	100-41-4

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

<u>Chemical Name</u>	<u>CAS Number</u>
TOLUENE	108-88-3

INTERNATIONAL REGULATIONS AS FOLLOWS:

CANADIAN WHMIS

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: B2 D2A D2B

Section 16 - Other Information

HMIS Ratings

Health: 2

Flammability: 3

Reactivity: 0

Personal Protection: X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): 88

REASON FOR REVISION: Changes made in Section(s): 2, 3, 11, and 15

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations

Selection & Specification Data

Generic Type	Phenalkamine epoxy
Description	High performance epoxy that has excellent resistance to fresh and salt water exposures. This coating exhibits outstanding moisture and surface tolerance during application, low temperature cure capability, and very fast cure response for quick return to service. It contains an inert flake reinforcement (micaceous iron oxide) to enhance film strength and performance.
Features	<ul style="list-style-type: none"> ▪ High solids, low VOC ▪ Low temperature cure ▪ Excellent wetting properties ▪ Excellent surface tolerance ▪ Excellent moisture tolerance (application) ▪ Fast cure response ▪ Suitable for immersion service in fresh or salt water after 60 minute cure @75°F
Gloss	Semi-gloss
Color	Standard: Tan (0200) and Grey (0700). Red (0500) and Black (C900) are special order.
Primers	Self-Priming
Topcoats	Acrylics, Alkyds, Epoxies, Polyurethanes
Dry Film Thickness	For most applications: 5-10 mils (125-250 microns)
Solids Content	Theoretical solids of mixed material by volume: 80 +/- 2%
Theoretical Coverage Rates	1283 mil ft ² (32 m ² /l at 25 microns) 256 sq. ft. at 5 mils (6.4 sq. m/l @ 125 microns) NOTE: Material losses during mixing and applications will vary and must be taken into consideration when estimating job requirements.
Dry Temp. Resistance	Continuous: 200°F (93°C) Non-Continuous: 250°F (121°C)
Wet Temp. Resistance	Immersion temperature resistance depends upon exposure. Consult Carboline Technical Service for specific information.
VOC Values (calculated)	As supplied: 1.44 lbs/gal (172 g/l) mixed Thinned: 16* oz/gal w/ #2: 2.07 lbs/gal (248 g/l) These are nominal values and may vary with color.
HAPS Values	As supplied: 1.63 lbs/solid gal
Limitations	Epoxies lose gloss, discolor and eventually chalk in sunlight exposure. Discoloration is more pronounced with Carbomastic 615.

Substrates & Surface Preparation

General	Remove any oil or grease from surface to be coated with clean rags soaked in Carboline Thinner #2, or toluol. Concrete Do not apply coating unless concrete has cured at least 28 days @ 70°F (21°C) and 50% RH or equivalent.
Substrates	Steel: <u>Immersion:</u> SSPC-SP10 with a 2.0-3.0 mil (50-75 micron) surface profile. <u>Non-Immersion:</u> SSPC-SP6 with a 2.0-3.0 mil (50-75 micron) surface profile for maximum protection. SSPC-SP2, SP3, SP7, or SP12 are also acceptable methods Concrete: Normally clean and dry. Remove all loose, unsound concrete. This product can tolerate damp concrete (green appearance but not visibly wet). Consult Carboline Technical Service for more specific recommendations.

Ordering Information

Prices may be obtained from Carboline Sales Representative or Main Office. Terms – Net 30 days.

	<u>1 Gal. Kit</u>	<u>5 Gal. Kit</u>
Shipping Weight	15.8 lbs.	79 lbs.

Application Equipment

Listed below are the general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

Spray Application	Hold gun 12-14 inches from the surface and at a right angle to the surface.																						
Airless Spray	<table border="0"> <tr> <td>Pump Ratio:</td> <td>30:1 (min.)</td> </tr> <tr> <td>Volume Output:</td> <td>9.5 l/min min. (2.5gpm min.)</td> </tr> <tr> <td>Material Hose:</td> <td>9.5mm min. (3/8" I.D. min.)</td> </tr> <tr> <td>Tip Size:</td> <td>0.43-0.53mm (0.017-0.021")</td> </tr> <tr> <td>Output</td> <td>140-175kg/cm²</td> </tr> <tr> <td>Pressure:</td> <td>(2000-2500 psi)</td> </tr> </table> <p>Use a 1/2" minimum I.D. material hose The following spray equipment has been found suitable and is available from manufacturers such as Binks, DeVilbiss and Graco.</p> <table border="0"> <tr> <td><u>Mfr. & Gun</u></td> <td><u>Pump*</u></td> </tr> <tr> <td>Use either model below:</td> <td>Huskie</td> </tr> <tr> <td>Graco 207-300</td> <td>(DeVilbiss)</td> </tr> <tr> <td>Binks Model 520</td> <td>Bulldog 45:1</td> </tr> <tr> <td></td> <td>Jupiter 8D</td> </tr> </table> <p>*Teflon packings are recommended and available from pump manufacturer.</p>	Pump Ratio:	30:1 (min.)	Volume Output:	9.5 l/min min. (2.5gpm min.)	Material Hose:	9.5mm min. (3/8" I.D. min.)	Tip Size:	0.43-0.53mm (0.017-0.021")	Output	140-175kg/cm ²	Pressure:	(2000-2500 psi)	<u>Mfr. & Gun</u>	<u>Pump*</u>	Use either model below:	Huskie	Graco 207-300	(DeVilbiss)	Binks Model 520	Bulldog 45:1		Jupiter 8D
Pump Ratio:	30:1 (min.)																						
Volume Output:	9.5 l/min min. (2.5gpm min.)																						
Material Hose:	9.5mm min. (3/8" I.D. min.)																						
Tip Size:	0.43-0.53mm (0.017-0.021")																						
Output	140-175kg/cm ²																						
Pressure:	(2000-2500 psi)																						
<u>Mfr. & Gun</u>	<u>Pump*</u>																						
Use either model below:	Huskie																						
Graco 207-300	(DeVilbiss)																						
Binks Model 520	Bulldog 45:1																						
	Jupiter 8D																						

Carbomastic® 615

Conventional Spray Pressure pot equipped with dual regulators, 3/8" I.D. minimum material hose, .070" I.D. fluid tip and appropriate air cap.

Brush or Roller Not recommended for tank lining applications except when striping welds. For non-immersion applications over damp surfaces, brush and roller is the preferred method. Multiple coats may be required to obtain desired appearance, recommended dry film thickness and adequate hiding. Avoid excessive re-brushing or re-rolling. For best results, tie-in within 10 minutes at 75°F (24°C). Thin up to 11% by volume per gallon with Carboline #2. Use a short-nap synthetic roller cover with phenolic core

Mixing & Thinning

Mixing Mix separately, then combine and mix in the following proportions:

	<u>1 Gal. Kit</u>	<u>5 Gal. Kit</u>
Part A	.8 gallon	4 gallon
Part B	.2 gallon	1 gallon

Thin up to 12% by volume with Carboline Thinner #2.

Pot Life 1½ hours at 75°F (24°C) and less at higher temperatures. Pot life ends when coating becomes too viscous to use.

Cleanup & Safety

Cleanup Use Thinner #2 or Acetone. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

Safety Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions. Hypersensitive persons should wear protective clothing, gloves and use protective cream on face, hands and all exposed areas.

Ventilation When used as a tank lining or in enclosed areas, thorough air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. User should test and monitor exposure levels to insure all personnel are below guidelines. If not sure or if not able to monitor levels, use MSHA/NIOSH approved supplied air respirator.

Caution This product contains flammable solvents. Keep away from sparks and open flames. All electrical equipment and installations should be made and grounded in accordance with the National Electric Code. In areas where explosion hazards exist, workmen should be required to use non-ferrous tools and wear conductive and non-sparking shoes.

Application Conditions

<u>Condition</u>	<u>Material</u>	<u>Substrate</u>	<u>Ambient</u>	<u>RH</u>
Optimum	60°F– 75°F (16°C–24°C)	60°F-75°F (16°C-24°C)	60°F-75°F (16°C-24°C)	30-70%
Minimum	45°F (7°C)	20°F (-7°C)	20°F (-7°C)	0%
Maximum	90°F (32°C)	120°F (50°C)	100°F (35°C)	95%

Industry standards are for substrate temperatures to be above the dew point. For immersion conditions it is recommended to follow this procedure. For non-immersion conditions Carbomastic 615 can tolerate damp substrates. See Brush or Roller above. Special thinning and application techniques may be required above or below normal conditions. Do not apply to substrates with ice or ice crystal formation. Dehumidify or raise the temperature to eliminate ice on the substrate.

Curing Schedule

<u>Surface Temperature @ 50% RH</u>	<u>Dry to topcoat minimum</u>	<u>Minimum cure for water immersion</u>	<u>Maximum recoat time</u>
20°F (-7°C)	72 hours	7 days	90 days
35°F (2°C)	17 hours	48 hours	60 days
60°F (14°C)	8 hours	3 hours	30 days
75°F (24°C)	2 hours	1 hour	15 days
90°F (32°F)	1.5 hours	1 hour	7 days

These times above are based on a 5.0-10.0 mil (125-250 micron) dry film thickness per coat. Higher film thickness, insufficient ventilation or cooler temperatures will require longer cure times and could result in solvent entrapment and premature failure. Excessive humidity or condensation on the surface during curing can interfere with the cure, can cause discoloration and may result in a surface haze. Any haze or blush must be removed by water washing before recoating. If the maximum recoat times have been exceeded, the surface must be abraded by sweep blasting or sanding prior to the application of additional coats. For force curing, contact Carboline Technical Service for specific requirements.

Packaging, Handling & Storage

Flash Point (Setaflash)	Part A: 110°F (43°C) Part B: 90°F (32°C) Mixed: 103°F (39°C) Thinner 2 23°F (-5°C)
Storage (General)	Store Indoors. KEEP DRY
Storage Temperature & Humidity	40 -100°F (4°C-38°C) 0-95% Relative Humidity
Shelf Life	Part A: 24 months at 76°F (24°C) Part B: 24 months at 76°F (24°C)

***Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.**



2150 Schuetz Rd., St. Louis, MO 63146
PH: 314-644-1000 Toll-Free: 800-848-4645
www.carboline.com

An **RPM** Company

January 2011 N

To the best of our knowledge the Technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline Company to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance or injuries resulting from use. Liability, if any, is limited to replacement of products. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY, BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Carboline® and

RELEASED - Printed documents may be obsolete; validate prior to use.



Material Safety Data Sheet

**CHEMTREC Transportation
Emergency Phone: 800-424-
9300**

**Pittsburgh Poison Control
Center
Health Emergency No.: 412-
681-6669**

•NOTE: The CHEMTREC Transportation
•Emergency Phone is to be used only in the
•event of chemical emergencies involving a
•spill, leak, fire, exposure or accident
•involving chemicals

Section 1 - Chemical Product / Company Information

Product Name: CARBOMASTIC 615 PART A **Revision Date:** 01/19/2011
Identification Number: PLMSDS 1049A1NL **Supersedes :** 01/19/2011
Product Use/Class: FOR INDUSTRIAL USE ONLY
Preparer: Regulatory, Department

Manufacturer: Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
(800) 848-4645

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA-CEIL
BARITE	13462-86-7	25.0	0.5 MGM3	N/E	0.5 MGM3	N/E
EPOXY RESIN	25068-38-6	15.0	NE	NE	NE	NE
TALC	14807-96-6	15.0	N/E	N/E	N/E	N/E
TITANIUM DIOXIDE	13463-67-7	10.0	10 MGM3	N/E	10 MGM3	N/E
META-XYLENE	108-38-3	5.0	434 Mg/M3	651 Mg/M3	434 Mg/M3	N/E
PARA-XYLENE	106-42-3	5.0	100 PPM	150 PPM	435 MGM3	N/E
ETHYL BENZENE	100-41-4	5.0	100 PPM	125 PPM	435 MGM3	N/E
ORTHO-XYLENE	95-47-6	5.0	434 Mg/M3	651 Mg/M3	434 Mg/M3	N/E

Section 3 - Hazards Identification

Emergency Overview: Warning! Flammable. Harmful if inhaled. Causes eye and skin irritation. Aspiration may cause lung damage. May cause dizziness and drowsiness. Keep away from heat, sparks, flame. Avoid breathing vapor. Avoid contact with eyes, skin and clothing. Do not swallow. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling.

Effects Of Overexposure - Eye Contact: May cause eye irritation.

Effects Of Overexposure - Skin Contact: Direct skin contact may cause irritation. May cause allergic skin reaction. May cause skin sensitization.

Effects Of Overexposure - Inhalation: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache, or nausea. May cause nose and throat irritation.

Effects Of Overexposure - Ingestion: Harmful if swallowed.

Effects Of Overexposure - Chronic Hazards: Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

Primary Route(s) Of Entry: Skin Contact, Skin Absorption, Inhalation, Ingestion, Eye Contact

Medical Conditions Prone to Aggravation by Exposure: If sensitized to amines, epoxies, or other chemicals do not use. See a physician if a medical condition exists. If you have a condition that could be aggravated by exposure to dust or organic vapors, see a physician prior to use.

Section 4 - First Aid Measures

First Aid - Eye Contact: If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

First Aid - Skin Contact: In case of contact, immediately flush skin with plenty of water while removing contaminated clothing and shoes. Launder clothing before reuse. If rash or irritation develops, consult a physician.

First Aid - Inhalation: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

First Aid - Ingestion: If swallowed do not induce vomiting. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: 110F (43C)
(Setaflash)

Lower Explosive Limit, %: 0.9
Upper Explosive Limit, %: 10.9

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam, Water Fog

Unusual Fire And Explosion Hazards: Flammable Liquid. Vapors are heavier than air and will accumulate. Vapors will form explosive concentrations with air. Vapors travel long distances and will flashback. Use mechanical ventilation when necessary to keep percent vapor below the "Lower Explosion Level" (LEL). Eliminate all ignition sources. Keep away from sparks, open flames and heat sources. All electric equipment and installations should be made and grounded in accordance with the National Electrical Code. In areas where explosion hazards exist, workers should be required to use non-ferrous tools and to wear conductive and non-sparking shoes.

Special Firefighting Procedures: Flammable. Cool fire-exposed containers using water spray.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow exposure controls/personal protection guidelines in Section 8. Contain and soak up residual with an absorbent (clay or sand). Take up absorbant material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section 15 for SARA Title III and CERCLA information.

Section 7 - Handling And Storage

Handling: Avoid breathing vapors or spray mist. Do not get in eyes, on skin, or on clothing. Keep container

tightly closed when not in use. Wear personal protection equipment. Do not breathe vapors. Wash thoroughly after handling. If pouring or transferring materials, ground all containers and tools. Do not weld, heat, cut or drill on full or empty containers. Use only in accordance with Carboline application instructions, container label and Product Data Sheet.

Storage: Keep away from heat, sparks, open flames and oxidizing agents. Keep containers closed. Store in a cool, dry place with adequate ventilation.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).

Respiratory Protection: Use only with ventilation to keep levels below exposure guidelines listed in Section 2. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use. For silica containing coatings in a liquid state, and/or if no exposure limits are established in Section 2 above, supplied air respirators are generally not required.

Skin Protection: Recommend impervious gloves and clothing to avoid skin contact. If material penetrates to skin, change gloves and clothing. The use of protective creams may be beneficial to certain individuals. Protective creams should be applied before exposure.

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Other protective equipment: Eye wash and safety showers should be readily available.

Hygienic Practices: Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and allow hazardous materials to pass through. Check shoes carefully after soaking before reuse.

Section 9 - Physical And Chemical Properties

Boiling Range:	176 F (80 C) - 334 F (168 C)	Vapor Density:	Heavier than Air
Odor:	Epoxy	Odor Threshold:	N/D
Appearance:	Viscous Liquid, Various Colors	Evaporation Rate:	Slower Than Ether
Solubility in H2O:	N/D		
Freeze Point:	N/D	Specific Gravity:	app. 2.0
Vapor Pressure:	N/D	PH:	N/D
Physical State:	Liquid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Heat, sparks and open flames.

Incompatibility: Keep away from strong oxidizing agents, heat and open flames.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.

Hazardous Polymerization: Will not occur under normal conditions.

Stability: This product is stable under normal storage conditions.

Section 11 - Toxicological Information

Product LD50: N/D

Product LC50: N/D

Chemical Name	CAS Number	LD50	LC50
BARITE	13462-86-7	NOT AVAILABLE	NOT AVAILABLE
EPOXY RESIN	25068-38-6	11.4G/KG RAT,ORAL	>20ML/KG SKIN,SENSITIZER
TALC	14807-96-6	NOT AVAILABLE	NOT AVAILABLE
TITANIUM DIOXIDE	13463-67-7	>25 G/KG, ORAL, RAT	>6.82 MG/L 4 HR, RAT
META-XYLENE	108-38-3	NOT AVAILABLE	NOT AVAILABLE
PARA-XYLENE	106-42-3	NOT AVAILABLE	NOT AVAILABLE
ETHYL BENZENE	100-41-4	3500 MG/KG RAT,ORAL	NOT AVAILABLE
ORTHO-XYLENE	95-47-6	NOT AVAILABLE	NOT AVAILABLE

Section 12 - Ecological Information

Ecological Information: No data

Section 13 - Disposal Information

Disposal Information: Dispose of in accordance with State, Local, and Federal Environmental regulations. Responsibility for proper waste disposal is with the owner of the waste.

Section 14 - Transportation Information

DOT Proper Shipping Name:	Paint	Packing Group:	III
DOT Technical Name:	N/A	Hazard Subclass:	N/A
DOT Hazard Class:	3	Resp. Guide	128
DOT UN/NA Number:	UN 1263	Page:	

Additional Notes: None.

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD, FIRE HAZARD

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

<u>Chemical Name</u>	<u>CAS Number</u>
META-XYLENE	108-38-3
PARA-XYLENE	106-42-3
ETHYL BENZENE	100-41-4
ORTHO-XYLENE	95-47-6

TOXIC SUBSTANCES CONTROL ACT

All components of this product are listed on the TSCA inventory.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

<u>Chemical Name</u>	<u>CAS Number</u>
PARA-XYLENE	106-42-3

U.S. STATE REGULATIONS AS FOLLOWS:

NEW JERSEY RIGHT-TO-KNOW

The following materials are non-hazardous, but are among the top five components in this product.

<u>Chemical Name</u>	<u>CAS Number</u>
MICACEOUS IRON OXIDE	1317-60-8

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

<u>Chemical Name</u>	<u>CAS Number</u>
MICACEOUS IRON OXIDE	1317-60-8
HYDROCARBON RESIN	TRADE SECRET
POLYSTYRENE	9003-53-6

CALIFORNIA PROPOSITION 65

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

<u>Chemical Name</u>	<u>CAS Number</u>
ETHYL BENZENE	100-41-4
CARBON BLACK	1333-86-4
CUMENE	98-82-8
MICROCRYSTALLINE SILICA	14808-60-7

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

<u>Chemical Name</u>	<u>CAS Number</u>
TOLUENE	108-88-3

INTERNATIONAL REGULATIONS AS FOLLOWS:

CANADIAN WHMIS

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: B2 D2A D2B

Section 16 - Other Information

HMIS Ratings

Health: 2

Flammability: 2

Reactivity: 1

Personal Protection: X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): 172

REASON FOR REVISION: New Product

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations



Material Safety Data Sheet

**CHEMTREC Transportation
Emergency Phone: 800-424-9300**

**Pittsburgh Poison Control
Center
Health Emergency No.: 412-681-6669**

•NOTE: The CHEMTREC Transportation
•Emergency Phone is to be used only in the
•event of chemical emergencies involving a
•spill, leak, fire, exposure or accident
•involving chemicals

Section 1 - Chemical Product / Company Information

Product Name: CARBOMASTIC 615 PART B **Revision Date:** 02/23/2011
Identification Number: PLMSDS 1049B1NL **Supersedes :** 02/23/2011
Product Use/Class: FOR INDUSTRIAL USE ONLY
Preparer: Regulatory, Department
Manufacturer: Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
(800) 848-4645

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA-CEIL
ALKYL PHENOL POLYAMINE	TRADE SECRET	50.0	NE	NE	NE	NE
META-XYLENE	108-38-3	15.0	434 Mg/M3	651 Mg/M3	434 Mg/M3	N/E
N-BUTANOL	71-36-3	10.0	20 PPM	50 PPM	100 PPM	150 MGM3
TRIS-2,4,6- (DIMETHYLAMINOMETHYL) PHENOL	90-72-2	5.0	NE	N/E	NE	NE
PARA-XYLENE	106-42-3	5.0	100 PPM	150 PPM	435 MGM3	N/E
ETHYL BENZENE	100-41-4	5.0	100 PPM	125 PPM	435 MGM3	N/E
ORTHO-XYLENE	95-47-6	5.0	434 Mg/M3	651 Mg/M3	434 Mg/M3	N/E
TOLUENE	108-88-3	0.2	20 PPM	N/E	375 MGM3	NE

Section 3 - Hazards Identification

Emergency Overview: Warning! Flammable. Harmful if inhaled. Causes eye and skin irritation. Aspiration may cause lung damage. May cause dizziness and drowsiness. Keep away from heat, sparks, flame. Avoid breathing vapor. Avoid contact with eyes, skin and clothing. Do not swallow. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling.

Effects Of Overexposure - Eye Contact: Can cause eye burns.

Effects Of Overexposure - Skin Contact: May be harmful if absorbed through the skin. May cause allergic skin reaction. Can cause skin burns.

Effects Of Overexposure - Inhalation: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache, or nausea. May cause nose and throat irritation. May cause lung irritation. May cause allergic respiratory reaction, effects may be permanent.

Effects Of Overexposure - Ingestion: Harmful if swallowed.

Effects Of Overexposure - Chronic Hazards: Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

Primary Route(s) Of Entry: Skin Contact, Skin Absorption, Inhalation, Ingestion, Eye Contact

Medical Conditions Prone to Aggravation by Exposure: If sensitized to amines, epoxies, or other chemicals do not use. See a physician if a medical condition exists. If you have a condition that could be aggravated by exposure to dust or organic vapors, see a physician prior to use.

Section 4 - First Aid Measures

First Aid - Eye Contact: If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

First Aid - Skin Contact: In case of contact, immediately flush skin with plenty of water while removing contaminated clothing and shoes. Launder clothing before reuse. If rash or irritation develops, consult a physician.

First Aid - Inhalation: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

First Aid - Ingestion: If swallowed do not induce vomiting. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: 90F (30C)
(Setaflash)

Lower Explosive Limit, %: 1.0
Upper Explosive Limit, %: 11.2

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam, Water Fog

Unusual Fire And Explosion Hazards: Flammable Liquid. Vapors are heavier than air and will accumulate. Vapors will form explosive concentrations with air. Vapors travel long distances and will flashback. Use mechanical ventilation when necessary to keep percent vapor below the "Lower Explosion Level" (LEL). Eliminate all ignition sources. Keep away from sparks, open flames and heat sources. All electric equipment and installations should be made and grounded in accordance with the National Electrical Code. In areas where explosion hazards exist, workers should be required to use non-ferrous tools and to wear conductive and non-sparking shoes.

Special Firefighting Procedures: Flammable. Cool fire-exposed containers using water spray.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow exposure controls/personal protection guidelines in Section 8. Contain and soak up residual with an absorbent (clay or sand). Take up absorbant material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section 15 for SARA Title III and CERCLA information.

Section 7 - Handling And Storage

Handling: Do not get in eyes, on skin, or on clothing. Keep container tightly closed when not in use. Wear personal protection equipment. Do not breathe vapors. Wash thoroughly after handling. If pouring or transferring materials, ground all containers and tools. Do not weld, heat, cut or drill on full or empty containers. Use only in accordance with Carboline application instructions, container label and Product Data Sheet.

Storage: Keep away from heat, sparks, open flames and oxidizing agents. Keep containers closed. Store in a cool, dry place with adequate ventilation.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).

Respiratory Protection: Use only with ventilation to keep levels below exposure guidelines listed in Section 2. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use. For silica containing coatings in a liquid state, and/or if no exposure limits are established in Section 2 above, supplied air respirators are generally not required.

Skin Protection: Recommend impervious gloves and clothing to avoid skin contact. If material penetrates to skin, change gloves and clothing. The use of protective creams may be beneficial to certain individuals. Protective creams should be applied before exposure.

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Other protective equipment: Eye wash and safety showers should be readily available.

Hygienic Practices: Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and allow hazardous materials to pass through. Check shoes carefully after soaking before reuse.

Section 9 - Physical And Chemical Properties

Boiling Range:	150 F (66 C) - 404 F (207 C)	Vapor Density:	Heavier than Air
Odor:	Slight Amine	Odor Threshold:	N/D
Appearance:	Clear to Amber Liquid	Evaporation Rate:	Slower Than Ether
Solubility in H2O:	N/D		
Freeze Point:	N/D	Specific Gravity:	0.98
Vapor Pressure:	N/D	PH:	N/D
Physical State:	Liquid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Heat, sparks and open flames.

Incompatibility: Keep away from strong oxidizing agents, heat and open flames.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.

Hazardous Polymerization: Will not occur under normal conditions.

Stability: This product is stable under normal storage conditions.

Section 11 - Toxicological Information

Product LD50: N/D

Product LC50: N/D

Chemical Name	CAS Number	LD50	LC50
ALKYL PHENOL POLYAMINE	TRADE SECRET	NOT AVAILABLE	NOT AVAILABLE
META-XYLENE	108-38-3	NOT AVAILABLE	NOT AVAILABLE
N-BUTANOL	71-36-3	2500MG/KG RAT,ORAL	>800PPM/4HRS RAT,INHALATION
TRIS-2,4,6-(DIMETHYLAMINOMETHYL)PHENOL	90-72-2	2169 MG/KG ORAL	NOT AVAILABLE
PARA-XYLENE	106-42-3	NOT AVAILABLE	NOT AVAILABLE
ETHYL BENZENE	100-41-4	3500 MG/KG RAT,ORAL	NOT AVAILABLE
ORTHO-XYLENE	95-47-6	NOT AVAILABLE	NOT AVAILABLE
TOLUENE	108-88-3	5.0 G/KG RAT ORAL, 14G/KG RABBIT DERMAL	8000 PPM/4HRS, RAT, INHALATION

Section 12 - Ecological Information

Ecological Information: No data

Section 13 - Disposal Information

Disposal Information: Dispose of in accordance with State, Local, and Federal Environmental regulations. Responsibility for proper waste disposal is with the owner of the waste.

Section 14 - Transportation Information

DOT Proper Shipping Name: Paint
DOT Technical Name: N/A
DOT Hazard Class: 3
DOT UN/NA Number: UN 1263

Packing Group: III
Hazard Subclass:N/A
Resp. Guide 128
Page:

Additional Notes: None.

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD, FIRE HAZARD

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

<u>Chemical Name</u>	<u>CAS Number</u>
META-XYLENE	108-38-3
N-BUTANOL	71-36-3
PARA-XYLENE	106-42-3
ETHYL BENZENE	100-41-4
ORTHO-XYLENE	95-47-6
TOLUENE	108-88-3

TOXIC SUBSTANCES CONTROL ACT

All components of this product are listed on the TSCA inventory.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

<u>Chemical Name</u>	<u>CAS Number</u>
PARA-XYLENE	106-42-3

U.S. STATE REGULATIONS AS FOLLOWS:

NEW JERSEY RIGHT-TO-KNOW

The following materials are non-hazardous, but are among the top five components in this product.

<u>Chemical Name</u>	<u>CAS Number</u>
POLYAMINE	TRADE SECRET

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

<u>Chemical Name</u>	<u>CAS Number</u>
POLYAMINE	TRADE SECRET

CALIFORNIA PROPOSITION 65

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

<u>Chemical Name</u>	<u>CAS Number</u>
ETHYL BENZENE	100-41-4

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

<u>Chemical Name</u>	<u>CAS Number</u>
TOLUENE	108-88-3

INTERNATIONAL REGULATIONS AS FOLLOWS:

CANADIAN WHMIS

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: B2 D2A D2B

Section 16 - Other Information

HMS Ratings**Health: 3****Flammability: 3****Reactivity: 0****Personal Protection: X****VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): 172****REASON FOR REVISION:** New Product**Legend:** N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations

Selection & Specification Data

Generic Type	Cycloaliphatic Amine Epoxy
Description	High solids corrosion resistant primer and intermediate. Used either as a primer or an intermediate coat over steel and inorganic zinc primers. Can be topcoated with a broad variety of high performance finish coats.
Features	<ul style="list-style-type: none"> ▪ Excellent corrosion protection ▪ Excellent film build and edge protection ▪ Used as a primer or an intermediate coating ▪ Good abrasion resistance ▪ Cures down to 40°F ▪ VOC compliant to current AIM regulations
Color	Red (0500); Gray (0700); White (0800); Yellow (0600)
Finish	Eggshell
Primers	Self-priming. May be applied over organic and inorganic zinc rich primers. A mist coat may be required to minimize bubbling over zinc rich primers.
Topcoats	Acrylics, Alkyds, Epoxies, Polyurethanes
Dry Film Thickness	3.0 mils (75 microns) for mild environments and as an intermediate coat over inorganic zincs. 4.0-6.0 mils (100-150 microns) for more severe environments. Do not exceed 10.0 mils (250 microns) in a single coat. Excessive film thickness over inorganic zincs may increase damage during shipping or erection.
Solids Content	By Volume: 77% ± 2%
Theoretical Coverage Rate	1235 mil ft ² (30.8 m ² /l at 25 microns) 412 ft ² at 3 mils (10.3 m ² /l at 75 microns) Allow for loss in mixing and application
VOC Values	As supplied: 1.6 lbs/gal (195 g/l) Thinned:* 16 oz/gal w/ #2: 2.2 lbs/gal (261 g/l) 32 oz/gal w/ #33: 2.7 lbs/gal (329 g/l) 33 oz/gal w/ #230 2.8 lbs/gal (337 g/l) These are nominal values and may vary slightly with color. *Maximum thinning for 250 g/l restricted areas is 12 oz/gal with Thinner #2, and 11 oz/gal with Thinner #33 or #230. Use Thinner #76 where non-photochemically reactive solvents are required (up to 11 oz/gal).
Dry Temp. Resistance	Continuous: 200°F (93°C) Non-Continuous: 250°F (121°C) Discoloration and loss of gloss is observed above 200°F (93°C).
Limitations	Not recommended for immersion service

Substrates & Surface Preparation

General	Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil and all other contaminants that could interfere with adhesion of the coating.
Steel	SSPC-SP6 with a 1.0-2.0 mil (25-50 micron) surface profile.
Galvanized Steel	Prime with specific Carboline primers as recommended by your Carboline Sales Representative. Refer to the specific primer's Product Data Sheet for substrate preparation requirements.
Concrete	Concrete must be cured 28 days at 75°F (24°C) and 50% relative humidity or equivalent. Prepare surfaces in accordance with ASTM D42582 Surface Cleaning of Concrete and ASTM D4259 Abrading Concrete. Voids in concrete may require surfacing.

Performance Data

Test Method	System	Results	Report #
ASTM D4060 Abrasion	Blasted Steel 1 ct. 893	88 mg. loss after 1000 cycles, CS17 wheel, 1000 gm. load	L401-28
ASTM B117 Salt Fog	Blasted Steel 1 ct. IOZ 1 ct. 893	No blistering, rusting and no creepage at scribe after 4000 hrs	03120
ASTM D1735 Water Fog	Blasted Steel 1 ct. IOZ 1 ct. 893	No blistering, softening or rusting after 5000 hours	02514,5
ASTM D2583 Hardness	Blasted Steel 1 ct. 893	73, Barcol Test, 1 week cure, 5 mils DFT	L401-28
ASTM G26 Weatherometer	Blasted Steel 1 ct. IOZ 1 ct. 893	No blistering, softening or rusting after 4000 hours	03120

Test reports and additional data available upon written request.

October 2009 replaces April 2009

0998

To the best of our knowledge the technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline Company to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance or injuries resulting from use. Liability, if any, is limited to replacement of products. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY, BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Carboline[®] and Carboguard[®]

RELEASED Printed documents may be obsolete; validate prior to use.

Application Equipment

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

Spray Application (General) This is a high solids coating and may require adjustments in spray techniques. Wet film thickness is easily and quickly achieved. The following spray equipment has been found suitable and is available from manufacturers such as Binks, DeVilbiss and Graco.

Conventional Spray Pressure pot equipped with dual regulators, 3/8" I.D. minimum material hose, .070" I.D. fluid tip and appropriate air cap.

Airless Spray Pump Ratio: 30:1 (min.)
GPM Output: 3.0 (min.)
Material Hose: 3/8" I.D. (min.)
Tip Size: .017-.021"
Output PSI: 2100-2300
Filter Size: 60 mesh
Teflon packings are recommended and available from the pump manufacturer.

Brush & Roller (General) Multiple coats may be required to obtain desired appearance, recommended dry film thickness and adequate hiding. Avoid excessive re-brushing or re-rolling. For best results, tie-in within 10 minutes at 75°F (24°C).

Brush Use a medium bristle brush.

Roller Use a short-nap synthetic roller cover with phenolic core.

Mixing & Thinning

Mixing Power mix separately, then combine and power mix. DO NOT MIX PARTIAL KITS. A 30-minute "sweat-in" time is highly recommended for applications below 50°F and will improve cure response.

Ratio 1:1 Ratio (A to B)

Thinning* Spray: Up to 16 oz/gal (12%) w/ #2 or up to 33 oz of #230
Brush: Up to 32 oz/gal (25%) w/ #33
Roller: Up to 32 oz/gal (25%) w/ #33
Mist coating: Thin up to 32 oz/gal with Thinner #2 or #33 in VOC restricted (2.8lb/gal) areas. May thin up to 48 oz/gal where VOC restricted levels are at 3.5 lb/gal for mist coat only. If necessary, use Thinner 230 to slow down the evaporation rate (hot, dry, or windy conditions)
Use of thinners other than those supplied or recommended by Carboline may adversely affect product performance and void product warranty, whether expressed or implied.
*See VOC values for thinning limits.

Carboline Thinner #236E may also be used to thin this product to minimize HAP and VOC emissions. Consult Carboline Technical Service for guidance.

Pot Life 4 Hours at 75°F (24°C)
Pot life ends when coating loses body and begins to sag. Pot life times will be less at higher temperatures. Thinning rates above 16 oz/gal will shorten the working time to 2 hours.

Cleanup & Safety

Cleanup Use Thinner #2 or Acetone. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

Safety Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions. Hypersensitive persons should wear protective clothing, gloves and use protective cream on face, hands and all exposed areas.

Ventilation When used in enclosed areas and product is thinned, thorough air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. User should test and monitor exposure levels to insure all personnel are below guidelines. If not sure or if not able to monitor levels, Use MSHA/NIOSH approved supplied air respirator.

October 2009 replaces April 2009

To the best of our knowledge the technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline Company to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance or injuries resulting from use. Liability, if any, is limited to replacement of products. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Carboline® and Carboguard®

Cleanup & Safety Cont.

Caution This product contains flammable solvents. Keep away from sparks and open flames. All electrical equipment and installations should be made and grounded in accordance with the National Electric Code. In areas where explosion hazards exist, workmen should be required to use non-ferrous tools and wear conductive and non-sparking shoes.

Application Conditions

Condition	Material	Surface	Ambient	Humidity
Normal	60°-85°F (16°-29°C)	60°-85°F (16°-29°C)	60°-90°F (16°-32°C)	0-80%
Minimum	40°F (4°C)	40°F (4°C)	40°F (4°C)	0%
Maximum	90°F (32°C)	135°F (57°C)	110°F (43°C)	90%

This product simply requires the substrate temperature to be above the dew point. Condensation due to substrate temperatures below the dew point can cause flash rusting on prepared steel and interfere with proper adhesion to the substrate. Special application techniques may be required above or below normal application conditions.

Curing Schedule

Surface Temp. & 50% Relative Humidity	Dry to Touch	Dry to Handle	Dry to Topcoat
40°F (4°C)	6 Hours	24 Hours	72 Hours
50°F (10°C)	5 Hours	16 Hours	24 Hours
60°F (16°C)	4 Hours	12 Hours	16 Hours
75°F (24°C)	3 Hours	6 Hours	8 Hours
90°F (32°C)	2 Hours	3 Hours	4 Hours

Surface Temp. & 50% Relative Humidity	Maximum Recoat Time w/ Epoxies	Maximum Recoat Time w/ Polyurethanes	Maximum Recoat Time w/ Acrylics
40°F (4°C)	30 Days	90 Days	14 Days
50°F (10°C)	30 Days	90 Days	14 Days
75°F (24°C)	30 Days	90 Days	14 Days
90°F (32°C)	15 Days	30 Days	14 Days

These times are based on a 4.0 mil (100 micron) dry film thickness. Higher film thickness, insufficient ventilation or cooler temperatures will require longer cure times and could result in solvent entrapment and premature failure. Excessive humidity or condensation on the surface during curing can interfere with the cure, can cause discoloration and may result in a surface haze. Any haze or blush must be removed by water washing before recoating. During high humidity conditions, it is recommended that the application be done while temperatures are increasing. If the maximum recoat time is exceeded, the surface must be abraded by sweep blasting or sanding before the application of additional coats. When cured below 50°F, a slight softening is typically observed as the temperature rises above 50°F and is considered normal.

Packaging, Handling & Storage

Shipping Weight (Approximate)	<u>2 Gallon Kit</u> 29 lbs (13 kg)	<u>10 Gallon Kit</u> 143 lbs (65 kg)
Flash Point (Setflash)	Carboguard 893 Part A: 61°F (16°C) Carboguard 893 Part B: 59°F (15°C)	
Storage Temperature & Humidity	40° - 110°F (4°-43°C) Store indoors. 0-90% Relative Humidity	
Shelf Life	Part A: Min. 36 months at 75°F (24°C) Part B: Min. 24 months at 75°F (24°C)	

*Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.



350 Hanley Industrial Court, St. Louis, MO 63144-1599
314/644-1000 314/644-4617 (fax) www.carboline.com

An **RPM** Company



Material Safety Data Sheet

CHEMTREC
Transportation
Emergency Phone: 800-424-9300

Pittsburgh Poison Control Center
Health Emergency No.:
412-681-6669

•NOTE: The CHEMTREC
•Transportation Emergency Phone is to be
•used only in the event of chemical
•emergencies involving a spill, leak, fire,
•exposure or accident involving chemicals

Section 1 - Chemical Product / Company Information

Product Name: CARBOGUARD 893 PART A **Revision Date:** 12/06/2011
Identification Number: PLMSDS 0988A1NL **Supercedes :** 03/28/2011
Product Use/Class: Cycloaliphatic Amine Epoxy - FOR INDUSTRIAL USE ONLY
Preparer: Regulatory, Department
Manufacturer: Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
(800) 848-4645

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA-CEIL
MICROCRYSTALLINE SILICA	14808-60-7	55.0	0.025 MG/M3 (respirable)	N/E	0.1 MG/M3 (respirable)	N/E
TITANIUM DIOXIDE	13463-67-7	25.0	10 MGM3	N/E	10 MGM3	N/E
EPOXY RESIN	25068-38-6	20.0	NE	NE	NE	NE
EPOXY RESIN	25036-25-3	10.0	N/E	N/E	N/E	N/E
1,2-BENZENEDICARBOXYLIC ACID, DI-C9-11-BRANCHED AND LINEAR ALKYL ESTERS	68515-43-5	10.0	N/E	N/E	N/E	N/E
TOLUENE	108-88-3	5.0	20 PPM	N/E	375 MGM3	NE
CARBON BLACK	1333-86-4	5.0	3.0 MG/M3	N/E	3.5 MG/M3	N/E
METHYL ETHYL KETONE	78-93-3	5.0	200 PPM	300 PPM	590 MGM3	N/E
ISOPROPANOL	67-63-0	5.0	200 PPM	400 PPM	980 MGM3	N/E
META-XYLENE	108-38-3	5.0	100 PPM	150 PPM	435 MG/M3	N/E
1-METHOXY-2-PROPANOL ACETATE	108-65-6	5.0	N/E	N/E	N/E	N/E
ETHYL BENZENE	100-41-4	0.6	20 PPM	N/E	435 MGM3	N/E

Section 3 - Hazards Identification

Emergency Overview: Warning! Flammable. Harmful if inhaled. Causes eye and skin irritation. Aspiration may cause lung damage. May cause dizziness and drowsiness. Keep away from heat, sparks, flame. Avoid breathing vapor. Avoid contact with eyes, skin and clothing. Do not swallow. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling. Contains SILICA which can cause cancer. Risk of Cancer depends on duration and level of exposure.

Effects Of Overexposure - Eye Contact: May cause eye irritation.

Effects Of Overexposure - Skin Contact: May cause skin sensitization. Direct skin contact may cause irritation. May cause allergic skin reaction.

Effects Of Overexposure - Inhalation: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache, or nausea. May cause nose and throat irritation.

Effects Of Overexposure - Ingestion: Harmful if swallowed.

Effects Of Overexposure - Chronic Hazards: Crystalline silica is known to cause silicosis. Crystalline silica (Quartz) is classified as a known human carcinogen (Group 1) by IARC. Exposure is by route of inhalation. If material is in a liquid matrix it is unlikely to be inhaled. However, when sanding or grinding the finished product, there may be potential for crystalline silica to become airborne. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

Primary Route(s) Of Entry: Skin Contact, Skin Absorption, Inhalation, Ingestion, Eye Contact

Medical Conditions Prone to Aggravation by Exposure: If sensitized to amines, epoxies, or other chemicals do not use. See a physician if a medical condition exists. If you have a condition that could be aggravated by exposure to dust or organic vapors, see a physician prior to use.

Section 4 - First Aid Measures

First Aid - Eye Contact: If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

First Aid - Skin Contact: In case of contact, immediately flush skin with plenty of water while removing contaminated clothing and shoes. Launder clothing before reuse. If rash or irritation develops, consult a physician.

First Aid - Inhalation: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

First Aid - Ingestion: If swallowed do not induce vomiting. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: 61F (16C)
(Setaflash)

Lower Explosive Limit, %: 0.2
Upper Explosive Limit, %: 12.0

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam, Water Fog

Unusual Fire And Explosion Hazards: Flammable Liquid. Vapors are heavier than air and will accumulate. Vapors will form explosive concentrations with air. Vapors travel long distances and will flashback. Use mechanical ventilation when necessary to keep percent vapor below the "Lower Explosion Level" (LEL). Eliminate all ignition sources. Keep away from sparks, open flames and heat sources. All electric equipment and installations should be made and grounded in accordance with the National Electrical Code. In areas where explosion hazards exist, workers should be required to use non-ferrous tools and to wear conductive and non-sparking shoes.

Special Firefighting Procedures: Flammable. Cool fire-exposed containers using water spray.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow exposure controls/personal protection guidelines in Section 8. Contain and soak up residual with an absorbent (clay or sand). Take up absorbant material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section 15 for SARA Title III and CERCLA information.

Section 7 - Handling And Storage

Handling: Do not get in eyes, on skin, or on clothing. Keep container tightly closed when not in use. Wear personal protection equipment. Do not breathe vapors. Wash thoroughly after handling. If pouring or transferring materials, ground all containers and tools. Do not weld, heat, cut or drill on full or empty containers. Use only in accordance with Carboline application instructions, container label and Product Data Sheet. Avoid breathing vapors or spray mist.

Storage: Keep away from heat, sparks, open flames and oxidizing agents. Keep containers closed. Store in a cool, dry place with adequate ventilation.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).

Respiratory Protection: Use only with ventilation to keep levels below exposure guidelines listed in Section 2. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved organic vapor respirator. Follow all current OSHA requirements for respirator use.

Skin Protection: Recommend impervious gloves and clothing to avoid skin contact. If material penetrates to skin, change gloves and clothing. The use of protective creams may be beneficial to certain individuals. Protective creams should be applied before exposure.

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Other protective equipment: Eye wash and safety showers should be readily available.

Hygienic Practices: Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and allow hazardous materials to pass through. Check shoes carefully after soaking before reuse.

Section 9 - Physical And Chemical Properties

Boiling Range:	175 F (79 C) - 465 F (241 C)	Vapor Density:	Heavier than Air
Odor:	Epoxy	Odor Threshold:	N/D
Appearance:	Viscous Liquid, Various colors	Evaporation Rate:	Slower than Ether
Solubility in H2O:	N/D		
Freeze Point:	N/D	Specific Gravity:	app 1.56
Vapor Pressure:	N/D	PH:	N/D
Physical State:	Liquid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Heat, sparks and open flames.

Incompatibility: Keep away from strong oxidizing agents, heat and open flames.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.

Hazardous Polymerization: Will not occur under normal conditions.

Stability: This product is stable under normal storage conditions.

Section 11 - Toxicological Information

Product LD50: N/D

Product LC50: N/D

Chemical Name	CAS Number	LD50	LC50
MICROCRYSTALLINE SILICA	14808-60-7	NOT AVAILABLE	NOT AVAILABLE
TITANIUM DIOXIDE	13463-67-7	>25 G/KG, ORAL, RAT	>6.82 MG/L 4 HR, RAT
EPOXY RESIN	25068-38-6	11.4G/KG RAT,ORAL	>20ML/KG SKIN,SENSITIZER
EPOXY RESIN	25036-25-3	NOT AVAILABLE	NOT AVAILABLE
1,2-BENZENEDICARBOXYLIC ACID, DI-C9-11-BRANCHED AND LINEAR ALKYL ESTERS	68515-43-5	>5000 MG/KG, ORAL, RAT	NOT AVAILABLE
TOLUENE	108-88-3	5.0 G/KG RAT ORAL, 14G/KG RABBIT DERMAL	8000 PPM/4HRS, RAT, INHALATION
CARBON BLACK	1333-86-4	NOT AVAILABLE	>8000 MG/KG, ORAL, RAT
METHYL ETHYL KETONE	78-93-3	2737MG/KG RAT,ORAL	> 5000 PPM/1 HOUR RAT,INHALATION
ISOPROPANOL	67-63-0	4720MG/KG RAT,ORAL	22500 PPM/8HRS RAT,INHALATION
META-XYLENE	108-38-3	NOT AVAILABLE	NOT AVAILABLE
1-METHOXY-2-PROPANOL ACETATE	108-65-6	NOT AVAILABLE	NOT AVAILABLE
ETHYL BENZENE	100-41-4	3500 MG/KG RAT,ORAL	17.2 mg/L Inh, Rat 4h

Section 12 - Ecological Information

Ecological Information: No data

Section 13 - Disposal Information

Disposal Information: Dispose of in accordance with State, Local, and Federal Environmental regulations. Responsibility for proper waste disposal is with the owner of the waste.

Section 14 - Transportation Information

DOT Proper Shipping Name:	Paint	Packing Group:	II
DOT Technical Name:	N/A	Hazard Subclass:	N/A
DOT Hazard Class:	3	Resp. Guide	128
DOT UN/NA Number:	1263	Page:	

Additional Notes: None.

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD, FIRE HAZARD

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

<u>Chemical Name</u>	<u>CAS Number</u>
TOLUENE	108-88-3
META-XYLENE	108-38-3
ETHYL BENZENE	100-41-4

TOXIC SUBSTANCES CONTROL ACT

All components of this product are listed on the TSCA inventory.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(B) Substances exist in this product

U.S. STATE REGULATIONS AS FOLLOWS:

NEW JERSEY RIGHT-TO-KNOW

The following materials are non-hazardous, but are among the top five components in this product.

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

<u>Chemical Name</u>	<u>CAS Number</u>
IRON OXIDE	1332-37-2
YELLOW IRON OXIDE	51274-00-1

CALIFORNIA PROPOSITION 65

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

<u>Chemical Name</u>	<u>CAS Number</u>
MICROCRYSTALLINE SILICA	14808-60-7
TITANIUM DIOXIDE	13463-67-7
CARBON BLACK	1333-86-4
ETHYL BENZENE	100-41-4

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

<u>Chemical Name</u>	<u>CAS Number</u>
TOLUENE	108-88-3

INTERNATIONAL REGULATIONS AS FOLLOWS:

CANADIAN WHMIS

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: B2 D2A D2B

Section 16 - Other Information

HMIS Ratings

Health: 2

Flammability: 3

Reactivity: 0

Personal Protection: X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): 195

REASON FOR REVISION: Changes made in Section(s) 2, 5, 9, 11, and 15.

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations



Material Safety Data Sheet

**CHEMTREC Transportation
Emergency Phone: 800-424-
9300**

**Pittsburgh Poison Control
Center
Health Emergency No.: 412-
681-6669**

•NOTE: The CHEMTREC Transportation
•Emergency Phone is to be used only in the
•event of chemical emergencies involving a
•spill, leak, fire, exposure or accident
•involving chemicals

Section 1 - Chemical Product / Company Information

Product Name: CARBOGUARD 893 PART B
Identification Number: PLMSDS 0988B1NL
Product Use/Class: Cycloaliphatic Amine Epoxy - FOR INDUSTRIAL USE ONLY
Revision Date: 03/28/2011
Supersedes : 09/18/2008
Preparer: Regulatory, Department
Manufacturer: Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
(800) 848-4645

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA-CEIL
MICROCRYSTALLINE SILICA	14808-60-7	65.0	0.025 MG/M3 (respirable)	N/E	0.1 MG/M3 (respirable)	N/E
TOLUENE	108-88-3	10.0	20 PPM	N/E	375 MGM3	NE
ISOPROPANOL	67-63-0	5.0	200 PPM	400 PPM	980 MGM3	N/E
BENZYL ALCOHOL	100-51-6	5.0	N/E	N/E	N/E	N/E
POLYOXYPROPYLENEDIAMINE	9046-10-0	5.0	N/E	N/E	N/E	N/E
CYCLOALIPHATIC AMINE	TRADE SECRET	5.0	NE	N/E	NE	NE
CYCLOALIPHATIC AMINE	TRADE SECRET	5.0	NE	N/E	NE	NE
DIAMINOCYCLOHEXANE	694-83-7	5.0	N/E	N/E	N/E	N/E
AROMATIC HYDROCARBON	64742-95-6	5.0	N/E	N/E	N/E	N/E
1,2,4 TRIMETHYLBENZENE	95-63-6	5.0	25 PPM	N/E	125 MGM3	N/E

Section 3 - Hazards Identification

Emergency Overview: Warning! Flammable. Harmful if inhaled. Causes eye and skin irritation. Aspiration may cause lung damage. May cause dizziness and drowsiness. Keep away from heat, sparks, flame. Avoid breathing vapor. Avoid contact with eyes, skin and clothing. Do not swallow. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling. Contains SILICA which can cause cancer. Risk of Cancer depends on duration and level of exposure. Skin and eye irritant.

Effects Of Overexposure - Eye Contact: Can cause eye burns.

Effects Of Overexposure - Skin Contact: May be harmful if absorbed through the skin. Can cause skin burns.

Effects Of Overexposure - Inhalation: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache, or nausea. May cause nose and throat irritation. May cause lung irritation. May cause

allergic respiratory reaction, effects may be permanent.

Effects Of Overexposure - Ingestion: Harmful if swallowed.

Effects Of Overexposure - Chronic Hazards: Crystalline silica is known to cause silicosis. Crystalline silica (Quartz) is classified as a known human carcinogen (Group 1) by IARC. Exposure is by route of inhalation. If material is in a liquid matrix it is unlikely to be inhaled. However, when sanding or grinding the finished product, there may be potential for crystalline silica to become airborne. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

Primary Route(s) Of Entry: Skin Contact, Skin Absorption, Inhalation, Ingestion, Eye Contact

Medical Conditions Prone to Aggravation by Exposure: If sensitized to amines, epoxies, or other chemicals do not use. See a physician if a medical condition exists. If you have a condition that could be aggravated by exposure to dust or organic vapors, see a physician prior to use.

Section 4 - First Aid Measures

First Aid - Eye Contact: If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

First Aid - Skin Contact: In case of contact, immediately flush skin with plenty of water while removing contaminated clothing and shoes. Launder clothing before reuse. If rash or irritation develops, consult a physician.

First Aid - Inhalation: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

First Aid - Ingestion: If swallowed do not induce vomiting. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: 59F (15C)
(Setaflash)

Lower Explosive Limit, %: 0.5
Upper Explosive Limit, %: 12.0

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam, Water Fog

Unusual Fire And Explosion Hazards: Flammable Liquid. Vapors are heavier than air and will accumulate. Vapors will form explosive concentrations with air. Vapors travel long distances and will flashback. Use mechanical ventilation when necessary to keep percent vapor below the "Lower Explosion Level" (LEL). Eliminate all ignition sources. Keep away from sparks, open flames and heat sources. All electric equipment and installations should be made and grounded in accordance with the National Electrical Code. In areas where explosion hazards exist, workers should be required to use non-ferrous tools and to wear conductive and non-sparking shoes.

Special Firefighting Procedures: Evacuate hazard area of unprotected personnel. Use a NIOSH approved self-contained breathing unit and complete body protection. Cool surrounding containers with water in case of fire exposure. Flammable. Cool fire-exposed containers using water spray.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate

personal protection clothing and equipment. Follow exposure controls/personal protection guidelines in Section 8. Contain and soak up residual with an absorbent (clay or sand). Take up absorbant material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section 15 for SARA Title III and CERCLA information.

Section 7 - Handling And Storage

Handling: Do not get in eyes, on skin, or on clothing. Keep container tightly closed when not in use. Wear personal protection equipment. Do not breathe vapors. Wash thoroughly after handling. If pouring or transferring materials, ground all containers and tools. Do not weld, heat, cut or drill on full or empty containers. Use only in accordance with Carboline application instructions, container label and Product Data Sheet. Avoid breathing vapors or spray mist.

Storage: Keep away from heat, sparks, open flames and oxidizing agents. Keep containers closed. Store in a cool, dry place with adequate ventilation.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).

Respiratory Protection: Use only with ventilation to keep levels below exposure guidelines listed in Section 2. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved organic vapor respirator. Follow all current OSHA requirements for respirator use.

Skin Protection: Recommend impervious gloves and clothing to avoid skin contact. If material penetrates to skin, change gloves and clothing. The use of protective creams may be beneficial to certain individuals. Protective creams should be applied before exposure.

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Other protective equipment: Eye wash and safety showers should be readily available.

Hygienic Practices: Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and allow hazardous materials to pass through. Check shoes carefully after soaking before reuse.

Section 9 - Physical And Chemical Properties

Boiling Range:	176 F (80 C) - 530 F (277 C)	Vapor Density:	Heavier than Air
Odor:	Solvent	Odor Threshold:	N/D
Appearance:	Viscous, amber liquid	Evaporation Rate:	Slower than Ether
Solubility in H2O:	N/D		
Freeze Point:	N/D	Specific Gravity:	1.52
Vapor Pressure:	N/D	PH:	N/D
Physical State:	Liquid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Heat, sparks and open flames.

Incompatibility: Keep away from strong oxidizing agents, heat and open flames.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.

Hazardous Polymerization: Will not occur under normal conditions.

Stability: This product is stable under normal storage conditions.

Section 11 - Toxicological Information

Product LD50: N/D

Product LC50: N/D

Chemical Name	CAS Number	LD50	LC50
MICROCRYSTALLINE SILICA	14808-60-7	NOT AVAILABLE	NOT AVAILABLE
TOLUENE	108-88-3	5.0 G/KG RAT ORAL, 14G/KG RABBIT DERMAL	8000 PPM/4HRS, RAT, INHALATION
ISOPROPANOL	67-63-0	4720MG/KG RAT,ORAL	22500 PPM/8HRS RAT,INHALATION
BENZYL ALCOHOL	100-51-6	1230MG/KG RAT,ORAL	1000PPM/8HRS RAT,INHALATION
POLYOXYPROPYLENEDIAMINE	9046-10-0	.48 G/KG, ORAL, RAT	NOT AVAILABLE
CYCLOALIPHATIC AMINE	TRADE SECRET	1230 MG/KG ORAL RAT,2000 MG/KG DERMAL	NOT AVAILABLE
CYCLOALIPHATIC AMINE	TRADE SECRET	1230 MG/KG ORAL RAT,2000 MG/KG DERMAL	NOT AVAILABLE
DIAMINOCYCLOHEXANE	694-83-7	1752 MG/KG,RAT,ORAL	NOT AVAILABLE
AROMATIC HYDROCARBON	64742-95-6	4700 MG/KG, ORAL, RAT	3670 PPM/8 HOURS, RAT, INHALATION
1,2,4 TRIMETHYLBENZENE	95-63-6	5 GM/KG, ORAL, RAT	18 GM/M3/4HOURS

Section 12 - Ecological Information

Ecological Information: No data

Section 13 - Disposal Information

Disposal Information: Dispose of in accordance with State, Local, and Federal Environmental regulations. Responsibility for proper waste disposal is with the owner of the waste.

Section 14 - Transportation Information

DOT Proper Shipping Name:	Paint	Packing Group:	II
DOT Technical Name:	N/A	Hazard Subclass:	N/A
DOT Hazard Class:	3	Resp. Guide	128
		Page:	
DOT UN/NA Number:	1263		

Additional Notes: None.

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and

312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD, FIRE HAZARD

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

<u>Chemical Name</u>	<u>CAS Number</u>
TOLUENE	108-88-3
1,2,4 TRIMETHYLBENZENE	95-63-6

TOXIC SUBSTANCES CONTROL ACT

All components of this product are listed on the TSCA inventory.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(B) Substances exist in this product

U.S. STATE REGULATIONS AS FOLLOWS:

NEW JERSEY RIGHT-TO-KNOW

The following materials are non-hazardous, but are among the top five components in this product.

<u>Chemical Name</u>	<u>CAS Number</u>
HYDROCARBON RESIN	68855-24-3
POLYSTYRENE	9003-53-6

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

<u>Chemical Name</u>	<u>CAS Number</u>
HYDROCARBON RESIN	68855-24-3
POLYSTYRENE	9003-53-6

CALIFORNIA PROPOSITION 65

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

<u>Chemical Name</u>	<u>CAS Number</u>
MICROCRYSTALLINE SILICA	14808-60-7
CUMENE	98-82-8
ETHYL BENZENE	100-41-4
FORMALDEHYDE	50-00-0

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

<u>Chemical Name</u>	<u>CAS Number</u>
TOLUENE	108-88-3

INTERNATIONAL REGULATIONS AS FOLLOWS:

CANADIAN WHMIS

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: B2 D2A D2B

Section 16 - Other Information

HMIS Ratings

Health: 2

Flammability: 3

Reactivity: 0

Personal Protection: X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): 195

REASON FOR REVISION: Changes made in Section(s): 1, 2, 5, 8, 9, 11, and 15

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations

Selection & Specification Data

Generic Type	Aliphatic Acrylic Polyurethane
Description	High gloss finish with exceptional weathering performance characteristics. Used extensively in virtually all industrial markets, 134 MC provides a smooth, durable finish that has superior resistance to corrosion, abrasion and chemical exposure.
Features	<ul style="list-style-type: none"> ▪ High solids, low VOC content ▪ Excellent weatherability ▪ Exceeds SSPC Paint 36 specification for a Level 3 urethane ▪ Excellent flow characteristics allow for application by spray or roller ▪ Superior impact and abrasion resistance ▪ VOC compliant to 100 g/l VOC regulations
Color *	Refer to Carboline Color Guide. Certain colors, particularly in non-lead safety oranges, reds and yellows may require multiple coats for adequate hiding. Check color suitability before use.
Finish	Gloss
Primers	Refer to <i>Substrates & Surface Preparation</i>
Topcoats	Carbothane® Clear Coat when required
Dry Film Thickness	2.0-2.5 mils (50-62 microns)
Solids Content	By Volume: 70% ± 2%
Theoretical Coverage Rate	1123 mil ft ² (27.5 m ² /l at 25 microns) Allow for loss in mixing and application
VOC Values	As supplied: 0.45 lbs./gal (54 g/l) Thinned: 15 oz/gal w/ #236E: 0.45 lbs./gal (54 g/l) 6 oz/gal w/ #214: 0.80 lbs./gal (96 g/l) 6 oz/gal w/ #215: 0.83 lbs./gal (99 g/l) These are nominal values and may vary slightly with color.
Dry Temp. Resistance	Continuous: 200°F (93°C) Non-Continuous: 250°F (121°C) Discoloration and loss of gloss is observed above 200°F (93°C).

* The alignment of aluminum flakes in aluminum-filled finishes is very dependent on application conditions and techniques. Care must be taken to keep conditions as constant as possible to reduce variations in final appearance. It is also advisable to work from a single batch of material since variations can occur from batch to batch. For more information consult Carboline Technical Service Department.

Substrates & Surface Preparation

General	Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil and all other contaminants that could interfere with adhesion of the coating. For all surfaces prime with specific Carboline primers as recommended by your Carboline sales representative. Refer to the specific primer's Product Data Sheet for detailed requirements of the specified primer.
Previously Painted Surfaces	Lightly sand or abrade to roughen and degloss the surface. Existing paint must attain a minimum 3B rating in accordance with ASTM D3359 "X-Scribe" adhesion test.

Performance Data

The following data applies to both Carbothane 134 HG and 134 MC

Test Method	System	Results	Report #
ASTM D4541 Adhesion	Blasted Steel 1 ct. Epoxy 1 ct. 134 HG	2562 psi (Pneumatic)	09360
ASTM D3359 Adhesion	Blasted Steel 1 ct. Epoxy 1 ct. 134 HG	5A	09360
ASTM D4060 Abrasion	Blasted Steel 1 ct. 134 HG	70 mg. loss after 1000 cycles, CS17 wheel, 1000 gm. load	09360
ASTM G26 Weatherometer	Blasted Steel 1 ct. Epoxy 1 ct. 134 HG	No blistering, rusting or cracking; gloss retention of 85%; color change of 1 McAdam unit after 2000 hours.	09360
ASTM G53 ASTM D4587 Accelerated Weathering	Blasted Steel 1 ct. Org. Zinc 1 ct. Epoxy 1 ct. 134 HG	No rusting, blistering or loss of adhesion; less than 5% gloss loss after 3000 hours	03390
ASTM B117 Salt Fog	Blasted Steel 1 ct. Org. Zinc 1 ct. Epoxy 1 ct. 134 HG	No rusting, blistering, loss of bond or any measurable creepage from the scribe after 3000 hours.	03390
ASTM D3363 Hardness	Blasted Steel 1 ct. Epoxy 1 ct. 134 HG	H	09360
ASTM D2794 Impact Resistance	Blasted Steel 1 ct. 134 HG	155 inch-pounds; no visible cracking. Gardner Impact Tester	03259
ASTM D870 Immersion Resistance	Blasted Steel 1 ct. Org. Zinc 1 ct. Epoxy 1 ct. 134 HG	No rusting in the scribe; no blistering, softening or discoloration after either 30 days of freshwater immersion or 30 days of salt water immersion at 75°F.	03390

Test reports and additional data available upon written request.

Carbothane® 134 MC

Application Equipment

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modification to these guidelines to achieve the desired results.

General Guidelines:

Spray Application (General) This is a high solids coating and may require adjustments in spray techniques. Wet film thickness is easily and quickly achieved. The following spray equipment has been found suitable and is available from manufacturers such as Binks, DeVilbiss and Graco.

Conventional Spray Pressure pot equipped with dual regulators, 3/8" I.D. minimum material hose, .070" I.D. fluid tip and appropriate air cap.

Airless Spray Pump Ratio: 30:1 (min.)*
GPM Output: 3.0 (min.)
Material Hose: 3/8" I.D. (min.)
Tip Size: .015-.017"
Output PSI: 2100-2400
Filter Size: 60 mesh
*Teflon packings are recommended and available from the pump manufacturer.

Brush & Roller (General) Multiple coats may be required to obtain desired appearance, recommended dry film thickness and adequate hiding. Avoid excessive re-brushing or re-rolling. For best results, tie-in within 10 minutes at 75°F (24°C).

Brush Recommended for touch-up only. Use a medium, natural bristle brush.

Roller Use a short-nap mohair roller cover with phenolic core.

Mixing & Thinning

Mixing Power mix Part A separately, then combine and power mix. DO NOT MIX PARTIAL KITS.

Ratio (By Volume) 4:1 Ratio (A to B)

Thinning Spray/Brush: Up to 15 oz/gal (12%) w/ #236E
Up to 6 oz/gal (5%) w/ #214.
Roller: Up to 6 oz/gal (5%) w/#215
Use of thinners other than those supplied or recommended by Carboline may adversely affect product performance and void product warranty, whether expressed or implied.

Pot Life 4 Hours at 75°F (24°C) and less at higher temperatures. Pot life ends when coating becomes too viscous to use. MOISTURE CONTAMINATION WILL SHORTEN POT LIFE AND CAUSE GELLATION.

Cleanup & Safety

Cleanup Use Thinner #2 or Acetone. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

Safety Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions. Hypersensitive persons should wear protective clothing, gloves and use protective cream on face, hands and all exposed areas.

Ventilation When used in enclosed areas, thorough air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. User should test and monitor exposure levels to insure all personnel are below guidelines. If not sure or if not able to monitor levels, use MSHA / NIOSH approved respirator.

Caution This product contains flammable solvents. Keep away from sparks and open flames. All electrical equipment and installations should be made and grounded in accordance with the National Electric Code. In areas where explosion hazards exist, workmen should be required to use non-ferrous tools and wear conductive and non-sparking shoes.

July 2007 N

To the best of our knowledge the technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline Company to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance or injuries resulting from use. Liability, if any, is limited to replacement of products. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Carboline® and Carbothane®
RELEASED Printed documents may be obsolete; validate prior to use.

Application Conditions

Condition	Material	Surface	Ambient	Humidity
Normal	60°-85°F (16°-29°C)	65°-85°F (18°-29°C)	65°-85°F (18°-29°C)	40-60%
Minimum	50°F (10°C)	35°F (2°C)	35°F (2°C)	10%
Maximum	100°F (38°C)	120°F (49°C)	95°F (35°C)	80%

Industry standards are for substrate temperatures to be above 5°F (3°C) the dew point.

Caution: This Product is moisture sensitive in the liquid stage and until fully cured. Protect from high humidity, dew and direct moisture contact until fully cured. Application and/or curing in humidities above maximum, or exposure to moisture from rain or dew may result in a loss of gloss and/or microbubbling of the product.

Curing Schedule

Surface Temp. & 50% Relative Humidity	Dry to Handle	Dry to Recoat	Final Cure
35°F (2°C)	36 Hours	36 Hours	14 Days
50°F (10°C)	16 Hours	16 Hours	10 Days
75°F (24°C)	8 Hours	8 Hours	7 Days
90°F (32°C)	4 Hours	4 Hours	5 Days

These times are based on a 2.0 mil (50 micron) dry film thickness. Higher film thickness, insufficient ventilation or cooler temperatures will require longer cure times and could result in solvent entrapment and premature failure.

Caution: This product is moisture sensitive in the liquid stage and until fully cured. Protect from high humidity, dew and direct moisture contact until fully cured. Application and/or curing in humidities above maximum, or exposure to moisture from rain or dew may result in a loss of gloss and/or microbubbling of the product.

Packaging, Handling & Storage

Shipping Weight (Approximate) 1 Gallon Kit 13 lbs (6kg) 5 Gallon Kit 65 lbs (27kg)

Flash Point (Setaflash) Part A: 68° F (20° C)
Urethane Converter 811 Part B: 106° F (41° C)

Storage (General) Store Indoors.

Storage Temperature & Humidity 40° -110°F (4°-43°C)
0-80% Relative Humidity

Shelf Life Part A: Min. 36 months at 75°F (24°C)
Part B: Min. 24 months at 75°F (24°C)

***Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.**



350 Hanley Industrial Court, St. Louis, MO 63144-1599
314/644-1000 314/644-4617 (fax) www.carboline.com

An **RPM** Company



Material Safety Data Sheet

CHEMTREC
Transportation
Emergency Phone: 800-424-9300

Pittsburgh Poison Control Center
Health Emergency No.: 412-681-6669

•NOTE: The CHEMTREC
•Transportation Emergency Phone is to
•be used only in the event of chemical
•emergencies involving a spill, leak, fire,
•exposure or accident involving
•chemicals

Section 1 - Chemical Product / Company Information

Product Name: CARBOTHANE 134 MC PART A **Revision Date:** 10/14/2011
Identification Number: PLMSDS 0870A1NL **Supersedes :** 01/25/2008
Product Use/Class: FOR INDUSTRIAL USE ONLY **Preparer:** Regulatory, Department
Manufacturer: Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
(800) 848-4645

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA-CEIL
TITANIUM DIOXIDE	13463-67-7	35.0	10 MGM3	N/E	10 MGM3	N/E
MICROCRYSTALLINE SILICA	14808-60-7	25.0	0.025 MG/M3 (respirable)	N/E	0.1 MG/M3 (respirable)	N/E
PARACHLOROBENZO TRIFLUORIDE	98-56-6	20.0	N/E	N/E	N/E	N/E
TERT-BUTYL ACETATE	540-88-5	10.0	200 PPM	N/E	950 MGM3	N/E
ALIPHATIC DIOL	TRADE SECRET	5.0	25 PPM	N/E	25 PPM	N/E
N-BUTYL ACETATE	123-86-4	5.0	150 PPM	200 PPM	710 MG/M3	N/E
ETHYL BENZENE	100-41-4	0.3	20 PPM	N/E	435 MGM3	N/E
TERT BUTYL ALCOHOL	75-65-0	0.1	100 PPM	N/E	300 MGM3	N/E

Section 3 - Hazards Identification

Emergency Overview: Warning! Flammable. Harmful if inhaled. Causes eye and skin irritation. Aspiration may cause lung damage. May cause dizziness and drowsiness. Keep away from heat, sparks, flame. Avoid breathing vapor. Avoid contact with eyes, skin and clothing. Do not swallow. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling. Contains SILICA which can cause cancer. Risk of Cancer depends on duration and level of exposure.

Effects Of Overexposure - Eye Contact: May cause eye irritation.

Effects Of Overexposure - Skin Contact: Direct skin contact may cause irritation.

Effects Of Overexposure - Inhalation: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache, or nausea. May cause nose and throat irritation.

Effects Of Overexposure - Ingestion: Harmful if swallowed.

Effects Of Overexposure - Chronic Hazards: Crystalline silica is known to cause silicosis. Crystalline silica (Quartz) is classified as a known human carcinogen (Group 1) by IARC. Exposure is by route of inhalation. If material is in a liquid matrix it is unlikely to be inhaled. However, when sanding or grinding the finished product, there may be potential for crystalline silica to become airborne. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

Primary Route(s) Of Entry: Skin Contact, Skin Absorption, Inhalation, Ingestion, Eye Contact

Medical Conditions Prone to Aggravation by Exposure: If you have a condition that could be aggravated by exposure to dust or organic vapors, see a physician prior to use.

Section 4 - First Aid Measures

First Aid - Eye Contact: If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

First Aid - Skin Contact: In case of contact, immediately flush skin with plenty of water while removing contaminated clothing and shoes. Launder clothing before reuse. If rash or irritation develops, consult a physician.

First Aid - Inhalation: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

First Aid - Ingestion: If swallowed do not induce vomiting. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: 68F (20C)
(Setaflash)

Lower Explosive Limit, %: 0.6
Upper Explosive Limit, %: 36.0

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam, Water Fog

Unusual Fire And Explosion Hazards: Flammable Liquid. Vapors are heavier than air and will accumulate. Vapors will form explosive concentrations with air. Vapors travel long distances and will flashback. Use mechanical ventilation when necessary to keep percent vapor below the "Lower Explosion Level" (LEL). Eliminate all ignition sources. Keep away from sparks, open flames and heat sources. All electric equipment and installations should be made and grounded in accordance with the National Electrical Code. In areas where explosion hazards exist, workers should be required to use non-ferrous tools and to wear conductive and non-sparking shoes.

Special Firefighting Procedures: Flammable. Cool fire-exposed containers using water spray.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow exposure controls/personal protection guidelines in Section 8. Contain and soak up residual with an absorbent (clay or sand). Take up absorbant material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section 15 for SARA Title III and CERCLA information.

Section 7 - Handling And Storage

Handling: Do not get in eyes, on skin, or on clothing. Keep container tightly closed when not in use. Wear personal protection equipment. Do not breathe vapors. Wash thoroughly after handling. If pouring or transferring materials, ground all containers and tools. Do not weld, heat, cut or drill on full or empty containers. Use only in accordance with Carboline application instructions, container label and Product Data Sheet. Avoid breathing vapors or spray mist.

Storage: Keep away from heat, sparks, open flames and oxidizing agents. Keep containers closed. Store in a cool, dry place with adequate ventilation.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).

Respiratory Protection: Use only with ventilation to keep levels below exposure guidelines listed in Section 2. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use. For silica containing coatings in a liquid state, and/or if no exposure limits are established in Section 2 above, supplied air respirators are generally not required.

Skin Protection: Recommend impervious gloves and clothing to avoid skin contact. If material penetrates to skin, change gloves and clothing. The use of protective creams may be beneficial to certain individuals. Protective creams should be applied before exposure.

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Other protective equipment: Eye wash and safety showers should be readily available.

Hygienic Practices: Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and allow hazardous materials to pass through. Check shoes carefully after soaking before reuse.

Section 9 - Physical And Chemical Properties

Boiling Range:	147 F (64 C) - 401 F (205 C)	Vapor Density:	Heavier than Air
Odor:	Solvent	Odor Threshold:	N/D
Appearance:	Viscous Liquid, Various Colors	Evaporation Rate:	Slower Than Ether
Solubility in H2O:	N/D	Specific Gravity:	app. 1.41
Freeze Point:	N/D	PH:	N/D
Vapor Pressure:	N/D		
Physical State:	Liquid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Heat, sparks and open flames.

Incompatibility: Keep away from strong oxidizing agents, heat and open flames.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous.

Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.

Hazardous Polymerization: Will not occur under normal conditions.

Stability: This product is stable under normal storage conditions.

Section 11 - Toxicological Information

Product LD50: N/D

Product LC50: N/D

Chemical Name	CAS Number	LD50	LC50
TITANIUM DIOXIDE	13463-67-7	>25 G/KG, ORAL, RAT	>6.82 MG/L 4 HR, RAT
MICROCRYSTALLINE SILICA	14808-60-7	NOT AVAILABLE	NOT AVAILABLE
PARACHLOROBENZO TRIFLUORIDE	98-56-6	>2.7 G/KG, RABBIT	4479 PPM
TERT-BUTYL ACETATE	540-88-5	>3160 MG/KG, ORAL, RAT	>4000 PPM/6 HOURS, RAT INHALATION
ALIPHATIC DIOL	TRADE SECRET	NOT AVAILABLE	NOT AVAILABLE
N-BUTYL ACETATE	123-86-4	7.4 G/KG RABBIT ORAL	>1800 PPM/6H INHALATION
ETHYL BENZENE	100-41-4	3500 MG/KG RAT,ORAL	17.2 mg/L Inh, Rat 4h
TERT BUTYL ALCOHOL	75-65-0	NOT AVAILABLE	NOT AVAILABLE

Section 12 - Ecological Information

Ecological Information: No data

Section 13 - Disposal Information

Disposal Information: Dispose of in accordance with State, Local, and Federal Environmental regulations. Responsibility for proper waste disposal is with the owner of the waste.

Section 14 - Transportation Information

DOT Proper Shipping Name:	Paint	Packing Group:	II
DOT Technical Name:	N/A	Hazard Subclass:	N/A
DOT Hazard Class:	3	Resp. Guide Page:	128
DOT UN/NA Number:	UN 1263		

Additional Notes: None.

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD, FIRE HAZARD

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

Chemical Name
ETHYL BENZENE
TERT BUTYL ALCOHOL

CAS Number
100-41-4
75-65-0

TOXIC SUBSTANCES CONTROL ACT

All components of this product are listed on the TSCA inventory.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(B) Substances exist in this product

U.S. STATE REGULATIONS AS FOLLOWS:

NEW JERSEY RIGHT-TO-KNOW

The following materials are non-hazardous, but are among the top five components in this product.

Chemical Name
ACRYLIC COPOLYMER
POLYMER NON HAZARDOUS

CAS Number
TRADE SECRET
TRADE SECRET

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

Chemical Name
ACRYLIC COPOLYMER
POLYMER NON HAZARDOUS

CAS Number
TRADE SECRET
TRADE SECRET

CALIFORNIA PROPOSITION 65

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

Chemical Name
TITANIUM DIOXIDE
MICROCRYSTALLINE SILICA
ETHYL BENZENE
CARBON BLACK

CAS Number
13463-67-7
14808-60-7
100-41-4
1333-86-4

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

No California Proposition 65 Reproductive Toxins exist

INTERNATIONAL REGULATIONS AS FOLLOWS:

CANADIAN WHMIS

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: B2, D2A, D2B

Section 16 - Other Information

HMIS Ratings

Health: 2

Flammability: 3

Reactivity: 1

Personal Protection: X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): 54

REASON FOR REVISION: Changes made in Section(s) 1, 2, 3, 5, 11, and 15.

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations



Material Safety Data Sheet

CHEMTREC
Transportation
Emergency Phone: 800-424-9300

Pittsburgh Poison Control Center
Health Emergency No.: 412-681-6669

•NOTE: The CHEMTREC
•Transportation Emergency Phone is to
•be used only in the event of chemical
•emergencies involving a spill, leak, fire,
•exposure or accident involving
•chemicals

Section 1 - Chemical Product / Company Information

Product Name: CARBOTHANE 134 MC PART A
MIXED METAL OXIDE
Revision Date: 10/14/2011
Identification Number: PLMSDS 0870A1YL
Supercedes : 10/07/2010
Product Use/Class: FOR INDUSTRIAL USE ONLY
Preparer: Regulatory, Department
Manufacturer: Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
(800) 848-4645

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA-CEIL
NICKEL ANTIMONY COMPOUND	8007-18-9	30.0	0.5 MGM3	NE	0.5 MGM3	0.5MG/M3
PARACHLORO BENZO TRIFLUORIDE	98-56-6	20.0	N/E	N/E	N/E	N/E
MICROCRYSTALLINE SILICA	14808-60-7	20.0	0.025 MG/M3 (respirable)	N/E	0.1 MG/M3 (respirable)	N/E
COBALT COMPOUND	1345-16-0	15.0	0.02 MGM3	NE	.05 MG/M3	NE
TERT-BUTYL ACETATE	540-88-5	10.0	200 PPM	N/E	950 MGM3	N/E
CHROME ANTIMONY COMPOUND	68186-90-3	5.0	0.5 MG/M3	N/E	0.5 MG/M3	N/E
TITANIUM DIOXIDE	13463-67-7	5.0	10 MGM3	N/E	10 MGM3	N/E
ALIPHATIC DIOL	TRADE SECRET	5.0	25 PPM	N/E	25 PPM	N/E
N-BUTYL ACETATE	123-86-4	5.0	150 PPM	200 PPM	710 MG/M3	N/E
ETHYL BENZENE	100-41-4	0.3	20 PPM	N/E	435 MGM3	N/E
TERT BUTYL ALCOHOL	75-65-0	0.1	100 PPM	N/E	300 MGM3	N/E

Section 3 - Hazards Identification

Emergency Overview: Warning! Flammable. Harmful if inhaled. Causes eye and skin irritation. Aspiration may cause lung damage. May cause dizziness and drowsiness. Keep away from heat, sparks, flame. Avoid breathing vapor. Avoid contact with eyes, skin and clothing. Do not swallow. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling. Contains SILICA which can cause cancer. Risk of Cancer depends on duration and level of exposure. This product contains MIXED METAL OXIDE Pigments which are the result of high temperature calcination of the component substances. Due to their unique crystalline structure, the properties of these pigments do not necessarily reflect the properties of the component metals or oxides. Some compounds of the metals used in the manufacturing of these pigments have demonstrated various toxic properties. However, there is no evidence that these pigments have these toxic

characteristics. IARC has classified Cobalt and Cobalt compounds as possibly carcinogenic to humans. (Class 2B, Monograph #52). IARC considers Nickel compounds to be carcinogenic to humans (Monograph #49).

Effects Of Overexposure - Eye Contact: May cause eye irritation.

Effects Of Overexposure - Skin Contact: Direct skin contact may cause irritation.

Effects Of Overexposure - Inhalation: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache, or nausea. May cause nose and throat irritation.

Effects Of Overexposure - Ingestion: Harmful if swallowed.

Effects Of Overexposure - Chronic Hazards: Crystalline silica is known to cause silicosis. Crystalline silica (Quartz) is classified as a known human carcinogen (Group 1) by IARC. Exposure is by route of inhalation. If material is in a liquid matrix it is unlikely to be inhaled. However, when sanding or grinding the finished product, there may be potential for crystalline silica to become airborne. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

Primary Route(s) Of Entry: Skin Contact, Skin Absorption, Inhalation, Ingestion, Eye Contact

Medical Conditions Prone to Aggravation by Exposure: If you have a condition that could be aggravated by exposure to dust or organic vapors, see a physician prior to use.

Section 4 - First Aid Measures

First Aid - Eye Contact: If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

First Aid - Skin Contact: In case of contact, immediately flush skin with plenty of water while removing contaminated clothing and shoes. Launder clothing before reuse. If rash or irritation develops, consult a physician.

First Aid - Inhalation: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

First Aid - Ingestion: If swallowed do not induce vomiting. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: 68F (20C)
(Setaflash)

Lower Explosive Limit, %: 0.6
Upper Explosive Limit, %: 36.0

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam, Water Fog

Unusual Fire And Explosion Hazards: Flammable Liquid. Vapors are heavier than air and will accumulate. Vapors will form explosive concentrations with air. Vapors travel long distances and will flashback. Use mechanical ventilation when necessary to keep percent vapor below the "Lower Explosion Level" (LEL). Eliminate all ignition sources. Keep away from sparks, open flames and heat sources. All electric equipment and installations should be made and grounded in accordance with the National Electrical Code. In areas where explosion hazards exist, workers should be required to use non-ferrous tools and to wear conductive and non-sparking shoes.

Special Firefighting Procedures: Flammable. Cool fire-exposed containers using water spray.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow exposure controls/personal protection guidelines in Section 8. Contain and soak up residual with an absorbent (clay or sand). Take up absorbant material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section 15 for SARA Title III and CERCLA information.

Section 7 - Handling And Storage

Handling: Do not get in eyes, on skin, or on clothing. Keep container tightly closed when not in use. Wear personal protection equipment. Do not breathe vapors. Wash thoroughly after handling. If pouring or transferring materials, ground all containers and tools. Do not weld, heat, cut or drill on full or empty containers. Use only in accordance with Carboline application instructions, container label and Product Data Sheet. Avoid breathing vapors or spray mist.

Storage: Keep away from heat, sparks, open flames and oxidizing agents. Keep containers closed. Store in a cool, dry place with adequate ventilation.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).

Respiratory Protection: Use only with ventilation to keep levels below exposure guidelines listed in Section 2. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use. For silica containing coatings in a liquid state, and/or if no exposure limits are established in Section 2 above, supplied air respirators are generally not required.

Skin Protection: Recommend impervious gloves and clothing to avoid skin contact. If material penetrates to skin, change gloves and clothing. The use of protective creams may be beneficial to certain individuals. Protective creams should be applied before exposure.

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Other protective equipment: Eye wash and safety showers should be readily available.

Hygienic Practices: Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and allow hazardous materials to pass through. Check shoes carefully after soaking before reuse.

Section 9 - Physical And Chemical Properties

Boiling Range:	147 F (64 C) - 401 F (205 C)	Vapor Density:	Heavier than Air
Odor:	Solvent	Odor Threshold:	N/D
Appearance:	Viscous Liquid, Various Colors	Evaporation Rate:	Slower Than Ether
Solubility in H2O:	N/D		
Freeze Point:	N/D	Specific Gravity:	app. 1.41
Vapor Pressure:	N/D	PH:	N/D

Physical State: Liquid

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Heat, sparks and open flames.

Incompatibility: Keep away from strong oxidizing agents, heat and open flames.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.

Hazardous Polymerization: Will not occur under normal conditions.

Stability: This product is stable under normal storage conditions.

Section 11 - Toxicological Information

Product LD50: N/D

Product LC50: N/D

Chemical Name	CAS Number	LD50	LC50
NICKEL ANTIMONY COMPOUND	8007-18-9	>10,000MG/KG ORAL RAT	NOT AVAILABLE
PARACHLOROBENZO TRIFLUORIDE	98-56-6	>2.7 G/KG, RABBIT	4479 PPM
MICROCRYSTALLINE SILICA	14808-60-7	NOT AVAILABLE	NOT AVAILABLE
COBALT COMPOUND	1345-16-0	NOT AVAILABLE	NOT AVAILABLE
TERT-BUTYL ACETATE	540-88-5	>3160 MG/KG, ORAL, RAT	>4000 PPM/6 HOURS, RAT INHALATION
CHROME ANTIMONY COMPOUND	68186-90-3	>10000 MG/KG, ORAL, RAT	NOT AVAILABLE
TITANIUM DIOXIDE	13463-67-7	>25 G/KG, ORAL, RAT	>6.82 MG/L 4 HR, RAT
ALIPHATIC DIOL	TRADE SECRET	NOT AVAILABLE	NOT AVAILABLE
N-BUTYL ACETATE	123-86-4	7.4 G/KG RABBIT ORAL	>1800 PPM/6H INHALATION
ETHYL BENZENE	100-41-4	3500 MG/KG RAT, ORAL	17.2 mg/L Inh, Rat 4h
TERT BUTYL ALCOHOL	75-65-0	NOT AVAILABLE	NOT AVAILABLE

Section 12 - Ecological Information

Ecological Information: No data

Section 13 - Disposal Information

Disposal Information: Dispose of in accordance with State, Local, and Federal Environmental regulations. Responsibility for proper waste disposal is with the owner of the waste.

Section 14 - Transportation Information

DOT Proper Shipping Name: Paint

Packing Group: II

DOT Technical Name: N/A

Hazard Subclass: N/A

DOT Hazard Class: 3

Resp. Guide Page: 128

DOT UN/NA Number: UN 1263

Additional Notes: None.

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD, FIRE HAZARD

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

<u>Chemical Name</u>	<u>CAS Number</u>
NICKEL ANTIMONY COMPOUND	8007-18-9
COBALT COMPOUND	1345-16-0
CHROME ANTIMONY COMPOUND	68186-90-3
ETHYL BENZENE	100-41-4
TERT BUTYL ALCOHOL	75-65-0

TOXIC SUBSTANCES CONTROL ACT

All components of this product are listed on the TSCA inventory.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(B) Substances exist in this product

U.S. STATE REGULATIONS AS FOLLOWS:

NEW JERSEY RIGHT-TO-KNOW

The following materials are non-hazardous, but are among the top five components in this product.

<u>Chemical Name</u>	<u>CAS Number</u>
ACRYLIC COPOLYMER	TRADE SECRET

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

<u>Chemical Name</u>	<u>CAS Number</u>
ACRYLIC COPOLYMER	TRADE SECRET
POLYMER NON HAZARDOUS	TRADE SECRET
AZO PIGMENT	2786-76-7

CALIFORNIA PROPOSITION 65

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

<u>Chemical Name</u>	<u>CAS Number</u>
NICKEL ANTIMONY COMPOUND	8007-18-9
MICROCRYSTALLINE SILICA	14808-60-7
TITANIUM DIOXIDE	13463-67-7
ETHYL BENZENE	100-41-4
CARBON BLACK	1333-86-4

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

No California Proposition 65 Reproductive Toxins exist

INTERNATIONAL REGULATIONS AS FOLLOWS:

CANADIAN WHMIS

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: B2 D2A D2B

Section 16 - Other Information

HMIS Ratings

Health: 2 Flammability: 3 Reactivity: 1 Personal Protection: X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): 54

REASON FOR REVISION: Changes made in Section(s) 2, 11, and 15.

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations



Material Safety Data Sheet

**CHEMTREC Transportation
Emergency Phone: 800-424-9300**

**Pittsburgh Poison Control
Center
Health Emergency No.: 412-681-6669**

•NOTE: The CHEMTREC Transportation
•Emergency Phone is to be used only in the
•event of chemical emergencies involving a
•spill, leak, fire, exposure or accident
•involving chemicals

Section 1 - Chemical Product / Company Information

Product Name: URETHANE CONVERTER 811 **Revision Date:** 03/28/2011
Identification Number: PLMSDS 0856B1NL **Supercedes :** 09/01/2010
Product Use/Class: Catalyst for Polyurethane Products -
FOR INDUSTRIAL USE ONLY **Preparer:** Regulatory, Department
Manufacturer: Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
(800) 848-4645

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA-CEIL
HOMOPOLYMER OF HDI	28182-81-2	90.0	N/E	N/E	N/E	N/E
N-BUTYL ACETATE	123-86-4	5.0	150 PPM	200 PPM	710 MG/M3	N/E
AROMATIC HYDROCARBON	64742-95-6	5.0	N/E	N/E	N/E	N/E
1,2,4 TRIMETHYLBENZENE	95-63-6	5.0	25 PPM	N/E	125 MGM3	N/E
HEXAMETHYLENE DIISOCYANATE	822-06-0	0.3	0.005 PPM	N/E	N/E	N/E

Section 3 - Hazards Identification

Emergency Overview: COMBUSTIBLE liquid and vapor. Reacts violently with common materials including water, alcohols, bases and amines. Harmful if inhaled. Eye, skin and respiratory tract irritant. Possible sensitizer.

Effects Of Overexposure - Eye Contact: May cause eye irritation.

Effects Of Overexposure - Skin Contact: Irritant. May produce symptoms similar to those from inhalation. Can cause dryness, loss of natural oils, allergic reaction.

Effects Of Overexposure - Inhalation: Harmful if inhaled. May cause hoarseness, upper respiratory tract irritation, intoxication, headache, confusion, coma, liver damage, kidney damage.

Effects Of Overexposure - Ingestion: Harmful if ingested. May produce symptoms similar to those from inhalation. Can cause nausea, abdominal cramps.

Effects Of Overexposure - Chronic Hazards: Prolonged contact may cause liver damage, kidney damage, chronic damage to intestines, central nervous system damage, dizziness, weakness, headache, nausea. Repeated, prolonged contact may cause intestinal disturbances. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

Primary Route(s) Of Entry: Skin Contact, Skin Absorption, Ingestion, Eye Contact

Medical Conditions Prone to Aggravation by Exposure: If sensitized to isocyanates or other chemicals, do not use. See a physician if a medical condition exists. If you have a condition that could be aggravated by exposure to dust or organic vapors, see a physician prior to use.

Section 4 - First Aid Measures

First Aid - Eye Contact: If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

First Aid - Skin Contact: In case of contact, immediately wash with plenty of soap and water for at least 15 minutes. Seek medical attention. Remove contaminated clothing and shoes. Clean contaminated clothing and shoes before re-use.

First Aid - Inhalation: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

First Aid - Ingestion: If swallowed do not induce vomiting. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: 127F (53C)
(Setaflash)

Lower Explosive Limit, %: 0.9
Upper Explosive Limit, %: 10.4

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam

Unusual Fire And Explosion Hazards: Combustible Liquid. Vapors are heavier than air and will accumulate. Vapors will form explosive concentrations with air. Vapors travel long distances and will flashback. Use mechanical ventilation when necessary to keep percent vapor below the "Lower Explosion Level" (LEL). Eliminate all ignition sources. Keep away from sparks, open flames and heat sources. All electric equipment and installations should be made and grounded in accordance with the National Electrical Code. In areas where explosion hazards exist, workers should be required to use non-ferrous tools and to wear conductive and non-sparking shoes.

Special Firefighting Procedures: Combustible. Cool fire-exposed containers using water spray. Firefighters should wear NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing. Cool tightly closed containers exposed to fire with water.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow exposure controls/personal protection guidelines in Section 8. Contain and soak up residual with an absorbent (clay or sand). Take up absorbant material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section 15 for SARA Title III and CERCLA information.

Section 7 - Handling And Storage

Handling: Do not get in eyes, on skin, or on clothing. Keep container tightly closed when not in use. Wear personal protection equipment. Do not breathe vapors. Wash thoroughly after handling. If pouring or transferring materials, ground all containers and tools. Do not weld, heat, cut or drill on full or empty containers. Use only in accordance with Carboline application instructions, container label and Product Data Sheet.

Storage: Keep away from heat, sparks, open flames and oxidizing agents. Keep containers closed. Store in a cool, dry place with adequate ventilation.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).

Respiratory Protection: Use only with ventilation to keep levels below exposure guidelines listed in Section 2. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not in a confined space, and not able to monitor, use MSHA/NIOSH approved organic vapor respirator. Follow all current OSHA requirements for respirator use.

Skin Protection: Recommend impervious gloves and clothing to avoid skin contact. If material penetrates to skin, change gloves and clothing. The use of protective creams may be beneficial to certain individuals. Protective creams should be applied before exposure.

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Other protective equipment: Eye wash and safety showers should be readily available.

Hygienic Practices: Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and allow hazardous materials to pass through. Check shoes carefully after soaking before reuse.

Section 9 - Physical And Chemical Properties

Boiling Range:	262 F (128 C) - 262F (128C)	Vapor Density:	Heavier than Air
Odor:	Slight Odor	Odor Threshold:	N/D
Appearance:	Colorless, Mobil Liquid	Evaporation Rate:	Slower Than Ether
Solubility in H2O:	Reacts		
Freeze Point:	N/D	Specific Gravity:	1.12
Vapor Pressure:	N/D	PH:	N/D
Physical State:	Liquid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Heat, sparks and open flames.

Incompatibility: Keep away from strong oxidizing agents, heat and open flames.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, and unidentified organic

compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.

Hazardous Polymerization: Will not occur under normal conditions.

Stability: This product is stable under normal storage conditions.

Section 11 - Toxicological Information

Product LD50: N/D

Product LC50: N/D

Chemical Name	CAS Number	LD50	LC50
HOMOPOLYMER OF HDI	28182-81-2	>5000 MG/KG, ORAL, RAT	3124 MG/KG
N-BUTYL ACETATE	123-86-4	7.4 G/KG RABBIT ORAL	>1800 PPM/6H INHALATION
AROMATIC HYDROCARBON	64742-95-6	4700 MG/KG, ORAL, RAT	3670 PPM/8 HOURS, RAT, INHALATION
1,2,4 TRIMETHYLBENZENE	95-63-6	5 GM/KG, ORAL, RAT	18 GM/M3/4HOURS
HEXAMETHYLENE DIISOCYANATE	822-06-0	710 MG/KG, ORAL RAT	23 PPM / 4 HRS

Section 12 - Ecological Information

Ecological Information: No data

Section 13 - Disposal Information

Disposal Information: Dispose of in accordance with State, Local, and Federal Environmental regulations. Responsibility for proper waste disposal is with the owner of the waste.

Section 14 - Transportation Information

DOT Proper Shipping Name:	Paint	Packing Group:	III
DOT Technical Name:	N/A	Hazard Subclass:	N/A
DOT Hazard Class:	3	Resp. Guide	128
		Page:	
DOT UN/NA Number:	UN 1263		

Additional Notes: None.

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD, FIRE HAZARD

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

Chemical Name
1,2,4 TRIMETHYLBENZENE
HEXAMETHYLENE DIISOCYANATE

CAS Number
95-63-6
822-06-0

TOXIC SUBSTANCES CONTROL ACT

All components of this product are listed on the TSCA inventory.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(B) Substances exist in this product

U.S. STATE REGULATIONS AS FOLLOWS:

NEW JERSEY RIGHT-TO-KNOW

The following materials are non-hazardous, but are among the top five components in this product.

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

CALIFORNIA PROPOSITION 65

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

Chemical Name
CUMENE
ETHYL BENZENE

CAS Number
98-82-8
100-41-4

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

Chemical Name
TOLUENE

CAS Number
108-88-3

INTERNATIONAL REGULATIONS AS FOLLOWS:

CANADIAN WHMIS

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: B3 D2A D2B

Section 16 - Other Information

HMIS Ratings

Health: 2

Flammability: 3

Reactivity: 1

Personal Protection: X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): Refer to Part A MSDS

REASON FOR REVISION: New Product

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations

Selection & Specification Data

Generic Type	Amine-Cured Novolac Epoxy
Description	Highly cross-linked, glass flake-filled polymer that offers exceptional barrier protection and resistance to wet/dry cycling at elevated temperatures. Suitable for insulated and non-insulated pipes, stacks and equipment operating up to 450°F (232°C). This coating provides excellent resistance to corrosion, abrasion and permeation, and its novolac-modification resists severe chemical attack.
Features	<ul style="list-style-type: none"> ▪ Temperature resistance up to 450°F (232°C) ▪ High-build single-coat capabilities ▪ Excellent resistance to thermal shock ▪ Superior abrasion and chemical resistance through internal reinforcement ▪ Ambient-temperature cure ▪ VOC compliant to current AIM regulations
Color	Red (0500); Gray (5742)
Finish	Eggshell
Primers	Self-priming. May be applied over epoxies and phenolics.
Topcoats	Epoxies, Polyurethanes
Dry Film Thickness	8.0-10.0 mils (200-250 microns) Do not exceed 15 mils (375 microns) per coat.
Solids Content	By Volume: 70% ± 2%
Theoretical Coverage Rate	1117 mil ft ² (27.9 m ² /l at 25 microns) Allow for loss in mixing and application
VOC Values	As supplied: 2.08 lbs/gal (250 g/l) Thinned: 13 oz/gal w/ #213: 2.58 lbs/gal (308 g/l) 13 oz/gal w/#2 2.54 lbs/gal (305 g/l) These are nominal values.
Dry Temp. Resistance	Continuous: 425°F (218°C) Non-Continuous: 450°F (232°C) Discoloration and loss of gloss may be observed above 200°F (93°C).
Limitations	Epoxies lose gloss, discolor and eventually chalk in sunlight exposure.

Substrates & Surface Preparation

General	Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil and all other contaminants that could interfere with adhesion of the coating.	
Steel	<u>Non-Insulated:</u>	SSPC-SP6
	<u>Insulated:</u>	SSPC-SP10
	<u>Surface Profile:</u>	2.0-3.0 mils (50-75 microns)

Performance Data

Test Method	System	Results
ASTM D3359 Adhesion	Blasted Steel 2 cts. 450	4A
ASTM D4060 Abrasion	Blasted Steel 2 cts. 450	171 mg loss after 1000 cycles; CS17 wheel, 1000 gram load
ASTM D2794 Impact	Blasted Steel 1 ct. 450	.375 in. from damaged area. 100-in./lbs
Heat Cycling Test	Blasted Steel 1 ct. 450	No cracking, blistering or delamination of film after 425°F for 1 hr/ambient/ -10°F for 24 hrs/ambient/ 425°F for 24 hrs/ambient/ -10°F for 24 hrs/ambient/ 425°F for 200 hr/ambient
Modified NACE Std. TM-01-74B Immersion	Blasted Steel 2 cts. 450	No effect to coating film except discoloration after 6 month exposure, Deionized water
Chemical Resistance	Blasted Steel 1 ct. 450	Resistant to fumes of commons acids, alkalis, solvents and hydrocarbon compounds. Resistant to splash and spillage of alkalis, solvents and hydrocarbons. Acid contact may cause discoloration of coating.

Thermaline® 450 Novolac

Application Equipment

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

General Guidelines:

Spray Application (General) The following spray equipment has been found suitable and is available from manufacturers such as Binks, DeVilbiss and Graco.

Conventional Spray Pressure pot equipped with dual regulators, ½" I.D. minimum material hose, .110" I.D. fluid tip and appropriate air cap.

Airless Spray Pump Ratio: 45:1 (min.)*
GPM Output: 3.0 (min.)
Material Hose: ½" I.D. (min.)
Tip Size: .035-.041"
Output PSI: 2200-2500
*Teflon packings are recommended and available from the pump manufacturer.

Brush For striping of welds and touch-up of small areas only. Use a medium natural bristle brush and avoid rebrushing.

Roller Not recommended.

Mixing & Thinning

Mixing Power mix separately, then combine and power mix. DO NOT MIX PARTIAL KITS.

Ratio 4:1 Ratio (A to B)

Thinning May be thinned up to 13 oz/gal (10%) with Thinner #213. For application on horizontal surfaces, may be thinned up to 13 oz/gal (10%) with Thinner #2. Agitate Thinner #213 before use. Thinner #213 will have a thick viscous appearance which is normal. Use of thinners other than those supplied by Carboline may adversely affect product performance and void product warranty, whether expressed or implied.

Pot Life 3 Hours at 75°F (24°C). Pot life ends when coating loses body and begins to sag. Pot life times will be less at higher temperatures.

Cleanup & Safety

Cleanup Use Thinner #2 or Acetone. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

Safety Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions. Hypersensitive persons should wear protective clothing, gloves and use protective cream on face, hands and all exposed areas.

Ventilation When used in enclosed areas, thorough air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. User should test and monitor exposure levels to insure all personnel are below guidelines. If not sure or if not able to monitor levels, use MSHA/NIOSH approved supplied air respirator.

Caution This product contains flammable solvents. Keep away from sparks and open flames. All electrical equipment and installations should be made and grounded in accordance with the National Electric Code. In areas where explosion hazards exist, workmen should be required to use non-ferrous tools and wear conductive and non-sparking shoes.

Application Conditions

Condition	Material	Surface	Ambient	Humidity
Normal	65°-85°F (18°-29°C)	65°-85°F (18°-29°C)	65°-85°F (18°-29°C)	30-60%
Minimum	55°F (13°C)	50°F (10°C)	50°F (10°C)	0%
Maximum	90°F (32°C)	110°F (43°C)	100°F (38°C)	90%

This product simply requires the substrate temperature to be above the dew point. Condensation due to substrate temperatures below the dew point can cause flash rusting on prepared steel and interfere with proper adhesion to the substrate. Special application techniques may be required above or below normal application conditions.

Curing Schedule

Surface Temp. & 50% Relative Humidity	Dry to Handle	Dry to Topcoat w/ Other Finishes	Final Cure
50°F (10°C)	18 Hours	48 Hours	21 Days
60°F (16°C)	12 Hours	32 Hours	14 Days
75°F (24°C)	6 Hours	16 Hours	7 Days
90°F (32°C)	3 Hours	8 Hours	4 Days

These times are based on a 10.0 mil (250 micron) dry film thickness. Higher film thickness, insufficient ventilation or cooler temperatures will require longer cure times and could result in solvent entrapment and premature failure. Excessive humidity or condensation on the surface during curing can interfere with the cure, can cause discoloration and may result in a surface haze. Any haze or blush must be removed by water washing before recoating. During high humidity conditions, it is recommended that the application be done while temperatures are increasing. If the final cure time is exceeded, the surface must be abraded by sweep blasting prior to the application of additional coats.

Packaging, Handling & Storage

Shipping Weight (Approximate) 1 Gallon Kit 12 lbs (6 kg) 5 Gallon Kit 58 lbs (26 kg)

Flash Point (Setaflash) Part A: 53°F (12°C)
Part B: >200°F (93°C)

Storage (General) Store Indoors.

Storage Temperature & Humidity 40° - 110°F (4°-43°C)
0-90% Relative Humidity

Shelf Life Part A & B: Min. 36 months at 75°F (24°C)

***Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.**



2150 Schuetz Rd., St. Louis, MO 63146
PH: 314-644-1000 Toll-Free: 800-848-4645
www.carboline.com

An **RPM** Company

February 2011 replaces June 2010

To the best of our knowledge the technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline Company to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance or injuries resulting from use. Liability, if any, is limited to replacement of products. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Carboline® and Thermaline®
RELEASED Printed documents may be obsolete; validate prior to use.



Material Safety Data Sheet

CHEMTREC
Transportation
Emergency Phone: 800-424-9300

Pittsburgh Poison Control Center
Health Emergency No.:
412-681-6669

•NOTE: The CHEMTREC
•Transportation Emergency Phone is to
•be used only in the event of chemical
•emergencies involving a spill, leak, fire,
•exposure or accident involving
•chemicals

Section 1 - Chemical Product / Company Information

Product Name: THERMALINE 450 NOVOLAC PART A **Revision Date:** 07/19/2011

Identification Number: PLMSDS 1039A1NL **Supersedes :** 06/24/2008

Product Use/Class: Amine Cured Novolac Epoxy - FOR INDUSTRIAL USE ONLY

Preparer: Regulatory, Department

Manufacturer: Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
(800) 848-4645

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA-CEIL
EPOXY PHENOL NOVOLAC RESIN	28064-14-4	40.0	N/E	N/E	N/E	N/E
METHYL ETHYL KETONE	78-93-3	15.0	200 PPM	300 PPM	590 MGM3	N/E
META-XYLENE	108-38-3	10.0	100 PPM	150 PPM	435 MG/M3	N/E
TITANIUM DIOXIDE	13463-67-7	5.0	10 MGM3	N/E	10 MGM3	N/E
PARA-XYLENE	106-42-3	5.0	100 PPM	150 PPM	435 MGM3	N/E
ETHYL BENZENE	100-41-4	5.0	20 PPM	N/E	435 MGM3	N/E
CARBON BLACK	1333-86-4	5.0	3.0 MG/M3	N/E	3.5 MG/M3	N/E
ORTHO-XYLENE	95-47-6	5.0	100 PPM	150 PPM	435 MG/M3	N/E

Section 3 - Hazards Identification

Emergency Overview: Warning! Flammable. Harmful if inhaled. Causes eye and skin irritation. Aspiration may cause lung damage. May cause dizziness and drowsiness. Keep away from heat, sparks, flame. Avoid breathing vapor. Avoid contact with eyes, skin and clothing. Do not swallow. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling.

Effects Of Overexposure - Eye Contact: May cause eye irritation.

Effects Of Overexposure - Skin Contact: May cause skin sensitization. Direct skin contact may cause irritation. May cause allergic skin reaction.

Effects Of Overexposure - Inhalation: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache, or nausea. May cause nose and throat irritation.

Effects Of Overexposure - Ingestion: Harmful if swallowed.

Effects Of Overexposure - Chronic Hazards: Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

Primary Route(s) Of Entry: Skin Contact, Skin Absorption, Inhalation, Ingestion, Eye Contact

Medical Conditions Prone to Aggravation by Exposure: If sensitized to amines, epoxies, or other chemicals do not use. See a physician if a medical condition exists. If you have a condition that could be aggravated by exposure to dust or organic vapors, see a physician prior to use.

Section 4 - First Aid Measures

First Aid - Eye Contact: If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

First Aid - Skin Contact: In case of contact, immediately flush skin with plenty of water while removing contaminated clothing and shoes. Launder clothing before reuse. If rash or irritation develops, consult a physician.

First Aid - Inhalation: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

First Aid - Ingestion: If swallowed do not induce vomiting. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: 53 F (11 C)
(Setaflash)

Lower Explosive Limit, %: 1.0
Upper Explosive Limit, %: 36.0

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam, Water Fog

Unusual Fire And Explosion Hazards: Flammable Liquid. Vapors are heavier than air and will accumulate. Vapors will form explosive concentrations with air. Vapors travel long distances and will flashback. Use mechanical ventilation when necessary to keep percent vapor below the "Lower Explosion Level" (LEL). Eliminate all ignition sources. Keep away from sparks, open flames and heat sources. All electric equipment and installations should be made and grounded in accordance with the National Electrical Code. In areas where explosion hazards exist, workers should be required to use non-ferrous tools and to wear conductive and non-sparking shoes.

Special Firefighting Procedures: Flammable. Cool fire-exposed containers using water spray.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow exposure controls/personal protection guidelines in Section 8. Contain and soak up residual with an absorbent (clay or sand). Take up absorbant material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section 15 for SARA Title III and CERCLA information.

Section 7 - Handling And Storage

Handling: Do not get in eyes, on skin, or on clothing. Keep container tightly closed when not in use. Wear personal protection equipment. Do not breathe vapors. Wash thoroughly after handling. If pouring or transferring materials, ground all containers and tools. Do not weld, heat, cut or drill on full or empty containers. Use only in accordance with Carboline application instructions, container label and Product Data Sheet. Avoid breathing vapors or spray mist.

Storage: Keep away from heat, sparks, open flames and oxidizing agents. Keep containers closed. Store in a cool, dry place with adequate ventilation.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).

Respiratory Protection: Use only with ventilation to keep levels below exposure guidelines listed in Section 2. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use. For silica containing coatings in a liquid state, and/or if no exposure limits are established in Section 2 above, supplied air respirators are generally not required.

Skin Protection: Recommend impervious gloves and clothing to avoid skin contact. If material penetrates to skin, change gloves and clothing. The use of protective creams may be beneficial to certain individuals. Protective creams should be applied before exposure.

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Other protective equipment: Eye wash and safety showers should be readily available.

Hygienic Practices: Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and allow hazardous materials to pass through. Check shoes carefully after soaking before reuse.

Section 9 - Physical And Chemical Properties

Boiling Range:	149 F (65 C) - 400 F (204 C)	Vapor Density:	Heavier than Air
Odor:	Epoxy	Odor Threshold:	N/D
Appearance:	Viscous Liquid, Various Colors	Evaporation Rate:	Slower Than Ether
Solubility in H2O:	N/D		
Freeze Point:	N/D	Specific Gravity:	app. 1.34
Vapor Pressure:	N/D	PH:	N/D
Physical State:	Liquid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Heat, sparks and open flames.

Incompatibility: Keep away from strong oxidizing agents, heat and open flames.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.

Hazardous Polymerization: Will not occur under normal conditions.

Stability: This product is stable under normal storage conditions.

Section 11 - Toxicological Information

Product LD50: N/D

Product LC50: N/D

Chemical Name	CAS Number	LD50	LC50
EPOXY PHENOL NOVOLAC RESIN	28064-14-4	>5,000 MG/KG. ORAL, RAT	>1.7 MG/L (AEROSOL) 4 HR
METHYL ETHYL KETONE	78-93-3	2737MG/KG RAT,ORAL	> 5000 PPM/1 HOUR RAT,INHALATION
META-XYLENE	108-38-3	NOT AVAILABLE	NOT AVAILABLE
TITANIUM DIOXIDE	13463-67-7	>25 G/KG, ORAL, RAT	>6.82 MG/L 4 HR, RAT
PARA-XYLENE	106-42-3	NOT AVAILABLE	NOT AVAILABLE
ETHYL BENZENE	100-41-4	3500 MG/KG RAT,ORAL	NOT AVAILABLE
CARBON BLACK	1333-86-4	NOT AVAILABLE	>8000 MG/KG, ORAL, RAT
ORTHO-XYLENE	95-47-6	NOT AVAILABLE	NOT AVAILABLE

Section 12 - Ecological Information

Ecological Information: No data

Section 13 - Disposal Information

Disposal Information: Dispose of in accordance with State, Local, and Federal Environmental regulations. Responsibility for proper waste disposal is with the owner of the waste.

Section 14 - Transportation Information

DOT Proper Shipping Name:	Paint	Packing Group:	II
DOT Technical Name:	N/A	Hazard Class:	N/A
DOT Hazard Class:	3	Subclass:	
DOT UN/NA Number:	Un 1263	Resp. Guide Page:	128

Additional Notes: None.

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD, FIRE HAZARD

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

<u>Chemical Name</u>	<u>CAS Number</u>
META-XYLENE	108-38-3
PARA-XYLENE	106-42-3
ETHYL BENZENE	100-41-4
ORTHO-XYLENE	95-47-6

TOXIC SUBSTANCES CONTROL ACT

All components of this product are listed on the TSCA inventory.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(B) Substances exist in this product

U.S. STATE REGULATIONS AS FOLLOWS:

NEW JERSEY RIGHT-TO-KNOW

The following materials are non-hazardous, but are among the top five components in this product.

<u>Chemical Name</u>	<u>CAS Number</u>
----------------------	-------------------

GLASSFLAKE
IRON OXIDE

65997-17-3
1332-37-2

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

Chemical Name
GLASSFLAKE
IRON OXIDE

CAS Number
65997-17-3
1332-37-2

CALIFORNIA PROPOSITION 65

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

Chemical Name
ETHYL BENZENE
CARBON BLACK
MICROCRYSTALLINE SILICA

CAS Number
100-41-4
1333-86-4
14808-60-7

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

Chemical Name
TOLUENE

CAS Number
108-88-3

INTERNATIONAL REGULATIONS AS FOLLOWS:

CANADIAN WHMIS

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: B2 D2A D2B

Section 16 - Other Information

HMIS Ratings

Health: 2

Flammability: 3

Reactivity: 0

Personal Protection: X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): 240

REASON FOR REVISION: Changes made in Section(s): 1, 2, 3, 11, and 15

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations



Material Safety Data Sheet

CHEMTREC
Transportation
Emergency Phone: 800-424-9300

Pittsburgh Poison Control Center
Health Emergency No.:
412-681-6669

•NOTE: The CHEMTREC
•Transportation Emergency Phone is to
•be used only in the event of chemical
•emergencies involving a spill, leak, fire,
•exposure or accident involving
•chemicals

Section 1 - Chemical Product / Company Information

Product Name: THERMALINE 450 NOVOLAC PART B
Revision Date: 07/19/2011
Identification Number: PLMSDS 1039B1NL
Supercedes : 07/08/2008
Product Use/Class: FOR INDUSTRIAL USE ONLY
Preparer: Regulatory, Department
Manufacturer: Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
(800) 848-4645

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA-CEIL
CYCLOALIPHATIC AMINE	TRADE SECRET	70.0	N/E	N/E	N/E	N/E
FURFURYL ALCOHOL	98-00-0	40.0	10 PPM	15 PPM	40 MGM3	N/E

Section 3 - Hazards Identification

Emergency Overview: Toxic by Inhalation. Corrosive. Severe eye irritant. Severe skin irritant. May cause sensitization by skin contact. Toxic in contact with skin.

Effects Of Overexposure - Eye Contact: Causes eye burns. May cause blindness. Severe eye irritation

Effects Of Overexposure - Skin Contact: Toxic in contact with skin. Causes skin burns.

Effects Of Overexposure - Inhalation: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache, or nausea. Toxic by inhalation. Can cause severe eye, skin and respiratory tract burns.

Effects Of Overexposure - Ingestion: If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach. May be fatal if swallowed. Toxic if swallowed.

Effects Of Overexposure - Chronic Hazards: This product contains no listed carcinogens according to IARC, ACGIH, NTP and/or OSHA in concentrations of 0.1 percent or greater. Prolonged contact may result in chemical burns and permanent damage. Repeated or prolonged contact causes sensitization, asthma and eczemas. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

Primary Route(s) Of Entry: Skin Contact, Inhalation, Eye Contact

Medical Conditions Prone to Aggravation by Exposure: Asthma. Eye disease. Skin disorders and allergies. If sensitized to amines, epoxies, or other chemicals do not use. See a physician if a medical condition exists.

Section 4 - First Aid Measures

First Aid - Eye Contact: Hold eyelids apart, initiate and maintain gentle and continuous irrigation until the patient receives medical care. If medical care is not promptly available, continue to irrigate for one hour.

First Aid - Skin Contact: Immediately remove contaminated clothing, and any extraneous chemical, if possible to do so without delay. Initiate and maintain gentle and continuous irrigation until the patient receives medical care. If medical care is not promptly available, continue to irrigate for one hour. Cover wound with sterile dressing. Take off contaminated clothing and shoes immediately. NOTE TO PHYSICIANS: Application of corticosteroid cream has been effective in treating skin irritation.

First Aid - Inhalation: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

First Aid - Ingestion: If a person vomits when lying on his back, place him in the recovery position. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Prevent aspiration of vomit. Turn victims head to the side. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: 203F (95C)
(Setaflash)

Lower Explosive Limit, %: 1.8
Upper Explosive Limit, %: 16.3

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam

Unusual Fire And Explosion Hazards: May generate ammonia gas. May generate toxic nitrogen oxide gases. Use of water may result in the formation of very toxic aqueous solutions. Do not allow run-off from fire-fighting to enter drains or water courses. Incomplete combustion may form carbon monoxide. Downward personnel must be evacuated. Burning produces obnoxious and toxic fumes.

Special Firefighting Procedures: Avoid contact with the skin. A face shield should be worn. Use personal protective equipment. Wear Self-contained breathing apparatus for fire fighting if necessary. Evacuate hazard area of unprotected personnel. Use a NIOSH approved self-contained breathing unit and complete body protection. Cool surrounding containers with water in case of fire exposure.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow exposure controls/personal protection guidelines in Section 8. Contain and soak up residual with an absorbent (clay or sand). Take up absorbant material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section 15 for SARA Title III and CERCLA information.

Section 7 - Handling And Storage

Handling: Avoid contact with skin and eyes. Use only in well ventilated areas. Avoid breathing vapors and/or aerosols. Adhere to work practice rules established by government regulations. Avoid contact with eyes. Use personal protective equipment. When using, do not eat, drink, or smoke.

Storage: Keep away from heat, sparks, open flames and oxidizing agents. Keep containers closed. Store in a cool, dry place with adequate ventilation.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).

Respiratory Protection: Use only with ventilation to keep levels below exposure guidelines listed in Section 2. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use. For silica containing coatings in a liquid state, and/or if no exposure limits are established in Section 2 above, supplied air respirators are generally not required.

Skin Protection: Recommend impervious gloves and clothing to avoid skin contact. If material penetrates to skin, change gloves and clothing. The use of protective creams may be beneficial to certain individuals. Protective creams should be applied before exposure. Chemical-resistant gloves and chemical goggles, face-shield and synthetic apron or coveralls should be used to prevent contact with eyes, skin or clothing.

Eye Protection: Use full face shield with goggles underneath. Chemical resistant goggles must be worn.

Other protective equipment: Eye wash and safety showers should be readily available.

Hygienic Practices: Wash with soap and water before eating, drinking, smoking, applying

cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and allow hazardous materials to pass through. Check shoes carefully after soaking before reuse.

Section 9 - Physical And Chemical Properties

Boiling Range:	324F (162C). - .	Vapor Density:	Heavier than Air
Odor:	Fishy	Odor Threshold:	N/D
Appearance:	Amber Liquid	Evaporation Rate:	Slower Than Ether
Solubility in H2O:	Insoluble		
Freeze Point:	N/D	Specific Gravity:	1.09
Vapor Pressure:	1.50 mmHg at 21C	PH:	Alkaline
Physical State:	Liquid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Avoid contact with the following materials: Oxidizing agents, Peroxides, Sodium Hypochlorite, Organic acids, Mineral Acids, Reactive metals, and metals reactive with hydroxyl compounds. Heat, sparks and open flames.

Incompatibility: Avoid contact with strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.

Hazardous Polymerization: Will not occur under normal conditions.

Stability: This product is stable under normal storage conditions.

Section 11 - Toxicological Information

Product LD50: N/D

Product LC50: N/D

Chemical Name	CAS Number	LD50	LC50
CYCLOALIPHATIC AMINE	TRADE SECRET	>2000 MG/KG, ORAL, RAT	NOT AVAILABLE
FURFURYL ALCOHOL	98-00-0	NOT AVAILABLE	NOT AVAILABLE

Section 12 - Ecological Information

Ecological Information: ECOTOXICITY EFFECTS:

Aquatic Toxicity: No data is available on the product itself.

Toxicity to fish - Components

Cycloaliphatic Amine LC50: (96 h) 46 - 100 mg/L Species: Golden orfe (Leuciscus idus).

Toxicity to daphnia - Components
Cycloaliphatic Amine: EC50 (48 h) : 6.84 mg/L Species: Daphnia magna

Toxicity to Algae - Components
Cycloaliphatic Amine EC50 (72 h) : 140 - 200 mg/l Species: Algae

PERSISTANCE AND DEGRADABILITY

Mobility : No data available

Bioaccumulation:: No data available on the product itself

Section 13 - Disposal Information

Disposal Information: Dispose of in accordance with State, Local, and Federal Environmental regulations. Responsibility for proper waste disposal is with the owner of the waste.

Section 14 - Transportation Information

DOT Proper Shipping Name:	Corrosive Liquid, Toxic, n.o.s.	Packing Group:	III
DOT Technical Name:	Cycloaliphatic Amine, Furfuryl Alcohol	Hazard Subclass:	6.1
DOT Hazard Class:	8	Resp. Guide Page:	154
DOT UN/NA Number:	UN 2922		

Additional Notes: None.

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

No Section 313 Substances exist in this product

TOXIC SUBSTANCES CONTROL ACT

All components of this product are listed on the TSCA inventory.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(B) Substances exist in this product

U.S. STATE REGULATIONS AS FOLLOWS:

NEW JERSEY RIGHT-TO-KNOW

The following materials are non-hazardous, but are among the top five components in this product.

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

CALIFORNIA PROPOSITION 65

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

No California Proposition 65 Carcinogens exist

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

No California Proposition 65 Reproductive Toxins exist

INTERNATIONAL REGULATIONS AS FOLLOWS:

CANADIAN WHMIS

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: D1A, D2A, D2B, E

Section 16 - Other Information

HMIS Ratings

Health: 3

Flammability: 1

Reactivity: 0

Personal Protection: X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): 240

REASON FOR REVISION: Changes made in Section 1

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations

Selection & Specification Data

Generic Type	Cycloaliphatic (MIO) Amine Epoxy
Description	Thermaline 451 is a (MIO) flake filled cycloaliphatic amine cured epoxy phenolic novolac. This product has been formulated for use in immersion service in water and hydrocarbons such as fuel oil, diesel fuel, and gasoline. It may also be used under thermal insulation at elevated temperatures. Thermaline 451 has been modified with micaceous iron oxide (MIO) to provide excellent edge protection, one coat high build application properties, high temperature resistance and reinforced film properties. This product is self priming and resistant to 425°F- 450°F.
Features	<ul style="list-style-type: none"> ▪ Extreme chemical resistance ▪ Excellent thermal shock resistance ▪ Excellent internal film reinforcement ▪ Excellent edge protection ▪ Excellent abrasion/impact resistance
Color	Grey only
Finish	Semi Gloss
Primers	This product may be applied directly to steel and concrete surfaces.
Topcoats	Normally not required
Dry Film Thickness	7.0-9.0 dry mils (Do not apply over 9.0 mils for service above 300°F)
Solids Content	By Volume: 76 ± 2% mixed
Theoretical Coverage Rate	152 ft ² @8 mils dft.
VOC Values	As supplied: 1.69 lbs/gal (203 g/l)
Dry Temp. Resistance	425°F (constant), 450°F (intermittent)
Recommended Spread Rate	125-160 ft ² /gal (10.0-13.0 wet mils)

Substrates & Surface Preparation

General	All surfaces must be thoroughly cleaned to remove dirt, grease, mill scale, loose rust, and any other contaminants that can reduce adhesion via SSPC-SP1 solvent cleaning before proceeding with recommended surface preparation.
Metal	For maintenance work hand tool clean per SSPC-SP2, Sandblasting is recommended to remove rust and mill scale. Use commercial blast to SSPC-SP6 for mild exposures and near white blast SSPC-SP10 for severe exposures or immersion service.
Concrete or Concrete Block	Prep to SSPC-SP13, masonry surfaces must cure for at least 30 days at 70°F before painting. Remove loose or excess mortar, efflorescence, laitance and concrete form release compounds. Etch or abrasive blast slick or glazed, or powdery concrete.
Previously Painted Surfaces	If the paint is glossy, sand to dull the surface. Apply test areas, allow to cure and test for adhesion and compatibility with existing coatings. Scrape loose, scaly or peeling paint and sand the edges smooth. Remove rust and scale from ferrous metal. IF mildew is present, remove completely by sterilizing the surface with mildew remover and detergent. Rinse well and allow to dry before painting.

Special Information:

Do not apply if material, substrate or ambient temperature is below 50°F or above 120°F. Old coatings should be tested for lifting before applying Thermaline 451. If substrate temperatures are above 100°F for more than 72 hours, pretreatment may be required before an addition coat of Thermaline 451 is applied. When recoating beyond 1 month, additional surface preparation may be required. Spread rates are based on volume solids and do not take in to account loss factors, porosity or roughness of the surface being coated, application tools, techniques or any other variables. Relative humidity 85% maximum.

Application Equipment

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

General Guidelines:

Conventional Spray Binks Model 95 spray gun or equal, reduce coating as needed up to 10% by volume if allowable. Fluid nozzle 66, air nozzle 66PR, 65-80 psi atomizing air pressure, 15-25 psi fluid pressure.

Airless Spray Apply using a 45:1 pump at 3600 psi minimum.

Material Hose: 3/8 – 1/2" x 100; max
Tip Size: .019-.021"
High Pressure Filter: 30 mesh

Brush Apply using a natural bristle brush.

Roller Roll using a 3/8" Phenolic core cover. Keep roller wet. Roll in one direction, rewet, then cross roll.

Mixing & Thinning

Mixing Thoroughly stir each component. Pour component B into component A (mixing ratio by volume: 4 parts component A, to 1 part component B). Mix well with a drill type mechanical mixer. No induction time is necessary. Do not mix more than can be applied within the specified pot life at the given temperature; allow additional time to clean lines and equipment.

Thinning Thin up to 10% by volume with Thinner 2. Thin only if allowed by local air quality and air pollution regulations.

Pot Life 2 hours @75°F

Cleanup & Safety

Cleanup Clean up all tools and equipment promptly with Thinner 2. Flush out all spray tips, fluid lines and pressure pots immediately after use.

Safety Read and follow all caution statements on this product data sheet and on the MSDS for this product. Employ normal workmanlike safety precautions. Use adequate ventilation and wear gloves or use protective cream on face and hands if hypersensitive. Keep container closed when not in use.

Curing Schedule

Surface Temp. & 50% Relative Humidity	Set to Touch	Set to Handle	Set to Recoat	Dry Hard
50°F (10°C)	5.5 hours	18 hours	48 hours min, 1 month max	20 days
75°F (24°C)	3 hours	7 hours	18 hours, 1 month max	7 days
100°F (38°C)	1 hour	2 hours	5.5 hours, 1 month max	3 days

Dry times are calculated with a 12.0 mil wet film @ 50% relative humidity. Expect longer dry times in periods of higher humidity or lower temperatures or when applying thicker films. If the maximum recoat window is exceeded the film must be mechanically abraded before recoating.

Packaging, Handling & Storage

Shipping Weight (Approximate) **5 Gal Kit**
77 lbs (35 kg)

Flash Point (Setaflash) Part A: 89°F
Part B: >200°F

Storage (General) Store in protected, dry area.

Storage Temperature & Humidity 40-110°F; 0-90% RH

Shelf Life Part A: 24 months @75°F
Part B: 24 months @75°F

***Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.**



350 Hanley Industrial Court, St. Louis, MO 63144-1599
314/644-1000 314/644-4617 (fax) www.carboline.com

An **RPM** Company

July 2007 N



Material Safety Data Sheet

**CHEMTREC Transportation
Emergency Phone: 800-424-9300**

**Pittsburgh Poison Control
Center
Health Emergency No.: 412-681-6669**

•NOTE: The CHEMTREC Transportation
•Emergency Phone is to be used only in the
•event of chemical emergencies involving a
•spill, leak, fire, exposure or accident
•involving chemicals

Section 1 - Chemical Product / Company Information

Product Name: THERMALINE 451 PART A **Revision Date:** 08/31/2010
Identification Number: PLMSDS 132FA1NL **Supercedes :** 08/15/2007
Product Use/Class: Amine-Cured Novolac Epoxy - FOR INDUSTRIAL USE ONLY
Preparer: Regulatory, Department
Manufacturer: Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
(800) 848-4645

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA-CEIL
EPOXY PHENOL NOVOLAC RESIN	28064-14-4	30.0	N/E	N/E	N/E	N/E
METHYL ETHYL KETONE	78-93-3	5.0	200 PPM	300 PPM	590 MGM3	N/E
TITANIUM DIOXIDE	13463-67-7	5.0	10 MGM3	N/E	10 MGM3	N/E
META-XYLENE	108-38-3	5.0	434 Mg/M3	651 Mg/M3	434 Mg/M3	N/E
PARA-XYLENE	106-42-3	5.0	100 PPM	150 PPM	435 MGM3	N/E
ETHYL BENZENE	100-41-4	5.0	100 PPM	125 PPM	435 MGM3	N/E
ORTHO-XYLENE	95-47-6	5.0	434 Mg/M3	651 Mg/M3	434 Mg/M3	N/E

Section 3 - Hazards Identification

Emergency Overview: Warning! Flammable. Harmful if inhaled. Causes eye and skin irritation. Aspiration may cause lung damage. May cause dizziness and drowsiness. Keep away from heat, sparks, flame. Avoid breathing vapor. Avoid contact with eyes, skin and clothing. Do not swallow. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling.

Effects Of Overexposure - Eye Contact: May cause eye irritation.

Effects Of Overexposure - Skin Contact: Direct skin contact may cause irritation. May cause allergic skin reaction.

Effects Of Overexposure - Inhalation: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache, or nausea. May cause nose and throat irritation.

Effects Of Overexposure - Ingestion: Harmful if swallowed.

Effects Of Overexposure - Chronic Hazards: Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

Primary Route(s) Of Entry: Skin Contact, Inhalation, Ingestion, Eye Contact

Medical Conditions Prone to Aggravation by Exposure: If sensitized to amines, epoxies, or other chemicals do not use. See a physician if a medical condition exists. If you have a condition that could be

aggravated by exposure to dust or organic vapors, see a physician prior to use.

Section 4 - First Aid Measures

First Aid - Eye Contact: If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

First Aid - Skin Contact: In case of contact, immediately flush skin with plenty of water while removing contaminated clothing and shoes. Launder clothing before reuse. If rash or irritation develops, consult a physician.

First Aid - Inhalation: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

First Aid - Ingestion: If swallowed do not induce vomiting. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: 89F (31C)
(Setaflash)

Lower Explosive Limit, %: 0.5
Upper Explosive Limit, %: 10.1

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam, Water Fog

Unusual Fire And Explosion Hazards: Flammable Liquid. Vapors are heavier than air and will accumulate. Vapors will form explosive concentrations with air. Vapors travel long distances and will flashback. Use mechanical ventilation when necessary to keep percent vapor below the "Lower Explosion Level" (LEL). Eliminate all ignition sources. Keep away from sparks, open flames and heat sources. All electric equipment and installations should be made and grounded in accordance with the National Electrical Code. In areas where explosion hazards exist, workers should be required to use non-ferrous tools and to wear conductive and non-sparking shoes.

Special Firefighting Procedures: Flammable. Cool fire-exposed containers using water spray.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow exposure controls/personal protection guidelines in Section 8. Contain and soak up residual with an absorbent (clay or sand). Take up absorbent material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section 15 for SARA Title III and CERCLA information.

Section 7 - Handling And Storage

Handling: Do not get in eyes, on skin, or on clothing. Keep container tightly closed when not in use. Wear personal protection equipment. Do not breathe vapors. Wash thoroughly after handling. If pouring or transferring materials, ground all containers and tools. Do not weld, heat, cut or drill on full or empty containers. Use only in accordance with Carboline application instructions, container label and Product Data Sheet.

Storage: Keep away from heat, sparks, open flames and oxidizing agents. Keep containers closed. Store in a cool, dry place with adequate ventilation.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).

Respiratory Protection: Use only with ventilation to keep levels below exposure guidelines listed in Section 2. User should test and monitor exposure levels to ensure all personnel are below guidelines. If

not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use. For silica containing coatings in a liquid state, and/or if no exposure limits are established in Section 2 above, supplied air respirators are generally not required.

Skin Protection: Recommend impervious gloves and clothing to avoid skin contact. If material penetrates to skin, change gloves and clothing. The use of protective creams may be beneficial to certain individuals. Protective creams should be applied before exposure.

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Other protective equipment: Eye wash and safety showers should be readily available.

Hygienic Practices: Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and allow hazardous materials to pass through. Check shoes carefully after soaking before reuse.

Section 9 - Physical And Chemical Properties

Boiling Range:	175 F (79 C) - 400 F (204 C)	Vapor Density:	Heavier than Air
Odor:	Epoxy	Odor Threshold:	N/D
Appearance:	Viscous Grey Liquid	Evaporation Rate:	Slower Than Ether
Solubility in H2O:	N/D		
Freeze Point:	N/D	Specific Gravity:	1.96
Vapor Pressure:	N/D	PH:	N/D
Physical State:	Liquid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Heat, sparks and open flames.

Incompatibility: Keep away from strong oxidizing agents, heat and open flames.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.

Hazardous Polymerization: Will not occur under normal conditions.

Stability: This product is stable under normal storage conditions.

Section 11 - Toxicological Information

Product LD50: N/D

Product LC50: N/D

Chemical Name	CAS Number	LD50	LC50
EPOXY PHENOL NOVOLAC RESIN	28064-14-4	>5,000 MG/KG. ORAL, RAT	>1.7 MG/L (AEROSOL) 4 HR
METHYL ETHYL KETONE	78-93-3	2737MG/KG RAT,ORAL	> 5000 PPM/1 HOUR RAT, INHALATION
TITANIUM DIOXIDE	13463-67-7	>25 G/KG, ORAL, RAT	>6.82 MG/L 4 HR, RAT
META-XYLENE	108-38-3	NOT AVAILABLE	NOT AVAILABLE
PARA-XYLENE	106-42-3	NOT AVAILABLE	NOT AVAILABLE
ETHYL BENZENE	100-41-4	3500 MG/KG RAT,ORAL	NOT AVAILABLE
ORTHO-XYLENE	95-47-6	NOT AVAILABLE	NOT AVAILABLE

Section 12 - Ecological Information

Ecological Information: No data

Section 13 - Disposal Information

Disposal Information: Dispose of in accordance with State, Local, and Federal Environmental regulations. Responsibility for proper waste disposal is with the owner of the waste.

Section 14 - Transportation Information

DOT Proper Shipping Name:	Paint	Packing Group:	III
DOT Technical Name:	N/A	Hazard Subclass:	N/A
DOT Hazard Class:	3	Resp. Guide Page:	128
DOT UN/NA Number:	UN 1263		

Additional Notes: None.

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD, FIRE HAZARD

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

<u>Chemical Name</u>	<u>CAS Number</u>
META-XYLENE	108-38-3
PARA-XYLENE	106-42-3
ETHYL BENZENE	100-41-4
ORTHO-XYLENE	95-47-6

TOXIC SUBSTANCES CONTROL ACT

All components of this product are listed on the TSCA inventory.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

<u>Chemical Name</u>	<u>CAS Number</u>
PARA-XYLENE	106-42-3

U.S. STATE REGULATIONS AS FOLLOWS:

NEW JERSEY RIGHT-TO-KNOW

The following materials are non-hazardous, but are among the top five components in this product.

<u>Chemical Name</u>	<u>CAS Number</u>
MICACEOUS IRON OXIDE	1317-60-8

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

<u>Chemical Name</u>	<u>CAS Number</u>
MICACEOUS IRON OXIDE	1317-60-8

CALIFORNIA PROPOSITION 65

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

<u>Chemical Name</u>	<u>CAS Number</u>
ETHYL BENZENE	100-41-4
MICROCRYSTALLINE SILICA	14808-60-7
CUMENE	98-82-8

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

<u>Chemical Name</u>	<u>CAS Number</u>
TOLUENE	108-88-3

INTERNATIONAL REGULATIONS AS FOLLOWS:

CANADIAN WHMIS

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: B2 D2A D2B

Section 16 - Other Information

HMIS Ratings

Health: 2 Flammability: 3 Reactivity: 0 Personal Protection: X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): 203

REASON FOR REVISION: Changes made in Section(s) 1, 2, 3, 5, 8, 11, and 15.

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations



Material Safety Data Sheet

CHEMTREC
Transportation
Emergency Phone: 800-424-9300

Pittsburgh Poison Control Center
Health Emergency No.:
412-681-6669

NOTE: The CHEMTREC Transportation Emergency Phone is to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals

Section 1 - Chemical Product / Company Information

Product Name: THERMALINE 451 PART B **Revision Date:** 07/19/2011

Identification Number: PLMSDS 132FB1NL **Supercedes :** 07/10/2008

Product Use/Class: Amine Cured Novolac Epoxy - FOR INDUSTRIAL USE ONLY

Preparer: Regulatory, Department

Manufacturer: Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
(800) 848-4645

Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA-CEIL
DIAMINOCYCLOHEXANE	694-83-7	60.0	N/E	N/E	N/E	N/E
BENZYL ALCOHOL	100-51-6	40.0	N/E	N/E	N/E	N/E

Section 3 - Hazards Identification

Emergency Overview: Contains a material which can cause nervous system effects. Moderate respiratory irritant. Moderate skin irritant. Irritating to eyes. May cause sensitization by skin contact.

Effects Of Overexposure - Eye Contact: May cause eye burns. Product vapor in low concentrations can cause lacrimation, conjunctivitis and corneal edema when absorbed into the tissue of the eye from the atmosphere. Corneal edema can cause the perception of "blue haze" or "fog" around lights, although this is a temporary effect and has no known residual effect. Causes eye irritation.

Effects Of Overexposure - Skin Contact: May cause skin burns. May be harmful if absorbed through the skin.

Effects Of Overexposure - Inhalation: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache, or nausea. Harmful if inhaled and may cause delayed lung

injury. May cause central nervous system effects, such as headache, nausea, dizziness, confusion, breathing difficulties. Severe cases of overexposure can result in respiratory failure. May cause nose, throat and lung irritation. Inhalation of vapors and/or aerosols in high concentration may cause irritation of the respiratory system.

Effects Of Overexposure - Ingestion: May be harmful if swallowed. May cause central nervous system effects, such as headache, nausea, vomiting, abdominal pain, dizziness, confusion, breathing difficulties. Severe cases of overexposure can result in respiratory failure.

Effects Of Overexposure - Chronic Hazards: This product contains no listed carcinogens according to IARC, ACGIH, NTP and/or OSHA in concentrations of 0.1 percent or greater. Muscular dysfunction. Repeated or prolonged contact causes sensitization, asthma and eczemas. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

Primary Route(s) Of Entry: Skin Contact, Skin Absorption, Inhalation, Ingestion, Eye Contact

Medical Conditions Prone to Aggravation by Exposure: If sensitized to amines, epoxies, or other chemicals do not use. See a physician if a medical condition exists.

Section 4 - First Aid Measures

First Aid - Eye Contact: If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

First Aid - Skin Contact: In case of contact, wash skin immediately with soap and water.

First Aid - Inhalation: If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

First Aid - Ingestion: If swallowed do not induce vomiting. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: 201F (93C)
(Setaflash)

Lower Explosive Limit, %: N/A

Upper Explosive Limit, %: N/A

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam, Water Fog

Unusual Fire And Explosion Hazards: May generate ammonia gas. May generate toxic nitrogen oxide gases. Use of water may result in the formation of very toxic aqueous solutions. Do not allow run-off from fire-fighting to enter drains or water courses. Incomplete combustion may form carbon monoxide. Downward personnel must be evacuated. Burning produces obnoxious and toxic fumes.

Special Firefighting Procedures: Evacuate hazard area of unprotected personnel. Use a NIOSH approved self-contained breathing unit and complete body protection. Cool surrounding containers with water in case of fire exposure.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: Use self-contained breathing apparatus and chemically protective clothing. Wear suitable protective clothing, gloves and eye/face protection. Evacuate personnel to safe areas.

Section 7 - Handling And Storage

Handling: Do not get in eyes, on skin, or on clothing. Keep container tightly closed when not in use. Wear personal protection equipment. Do not breathe vapors. Wash thoroughly after handling. If pouring or transferring materials, ground all containers and tools. Do not weld, heat, cut or drill on full or empty containers. Use only in accordance with Carboline application instructions, container label and Product Data Sheet.

Storage: Keep away from heat, sparks, open flames and oxidizing agents. Keep containers closed. Store in a cool, dry place with adequate ventilation.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).

Respiratory Protection: Use only with ventilation to keep levels below exposure guidelines listed in Section 2. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use. For silica containing coatings in a liquid state, and/or if no exposure limits are established in Section 2 above, supplied air respirators are generally not required.

Skin Protection: Recommend impervious gloves and clothing to avoid skin contact. If material penetrates to skin, change gloves and clothing. The use of protective creams may be beneficial to certain individuals. Protective creams should be applied before exposure.

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Other protective equipment: Eye wash and safety showers should be readily available.

Hygienic Practices: Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and allow hazardous materials to pass through. Check shoes carefully after soaking before reuse.

Section 9 - Physical And Chemical Properties

Boiling Range:	401F (205C) - 401F (205C)	Vapor Density:	Heavier than Air
Odor:	Strong Amine	Odor Threshold:	N/D
Appearance:	Viscous Amber Liquid	Evaporation Rate:	Slower Than Ether
Solubility in H2O:	Slightly Soluble		
Freeze Point:	N/D	Specific Gravity:	1.04
Vapor Pressure:	N/D	PH:	N/D
Physical State:	Liquid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Avoid contact with the following materials: Oxidizing agents, Peroxides, Sodium Hypochlorite, Organic acids, Mineral Acids, Reactive metals, and metals reactive with hydroxyl compounds.

Incompatibility: Avoid contact with strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.

Hazardous Polymerization: Will not occur under normal conditions.

Stability: This product is stable under normal storage conditions.

Section 11 - Toxicological Information

Product LD50: 4400 MG/KG, ORAL, RAT

Product LC50: N/D

<u>Chemical Name</u>	<u>CAS Number</u>	<u>LD50</u>	<u>LC50</u>
DIAMINOCYCLOHEXANE	694-83-7	1752 MG/KG,RAT,ORAL	NOT AVAILABLE
BENZYL ALCOHOL	100-51-6	1230MG/KG RAT,ORAL	1000PPM/8HRS RAT,INHALATION

Section 12 - Ecological Information

Ecological Information: No data

Section 13 - Disposal Information

Disposal Information: Dispose of in accordance with State, Local, and Federal Environmental regulations. Responsibility for proper waste disposal is with the owner of the waste.

Section 14 - Transportation Information

DOT Proper Shipping Name:	Not Regulated	Packing Group:	N/A
DOT Technical Name:	N/A	Hazard Subclass:	N/A
DOT Hazard Class:	None	Resp. Guide Page:	N/A
DOT UN/NA Number:	None		

Additional Notes: None.

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD

SARA SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

No Section 313 Substances exist in this product

TOXIC SUBSTANCES CONTROL ACT

All components of this product are listed on the TSCA inventory.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(B) Substances exist in this product

U.S. STATE REGULATIONS AS FOLLOWS:

NEW JERSEY RIGHT-TO-KNOW

The following materials are non-hazardous, but are among the top five components in this product.

Chemical Name
TRADE SECRET

CAS Number
TRADE SECRET

PENNSYLVANIA RIGHT-TO-KNOW

The following non-hazardous ingredients are present in the product at greater than 3%.

Chemical Name
TRADE SECRET

CAS Number
TRADE SECRET

CALIFORNIA PROPOSITION 65

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

No California Proposition 65 Carcinogens exist

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

No California Proposition 65 Reproductive Toxins exist

INTERNATIONAL REGULATIONS AS FOLLOWS:

CANADIAN WHMIS

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: D2A D2B

Section 16 - Other Information

HMIS Ratings

Health: 2

Flammability: 1

Reactivity: 0

Personal Protection: X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): Refer to Part A MSDS

REASON FOR REVISION: Changes made in Section 1

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations

A-4

Dow Corning Corporation



DOW CORNING® 3-6077 RTV Silicone ablative

FEATURES

- Withstands temperatures from -55°C to +200°C over extended periods, and up to +3300°C for several minutes
- Moderately tough char characteristics
- Surface easily cleaned and re-coated
- Low thermal conductivity
- Good dielectrical properties
- Flexibility and service at temperature extremes
- Can be sprayed and trowelled
- Two part room temperature cure

Two part, non-slumping silicone elastomer

APPLICATIONS

- Can be used as an ablative coating, a thermal barrier and as a high temperature pressurisation sealant. Its primary use is in the protection of launch structures exposed to direct rocket blast, and is easily removable after charring, for recoating. It can also be used for rocket liner applications.
- Developed for the aerospace industry.

TYPICAL PROPERTIES

Specification writers: These values are not intended for use in preparing specifications. Please contact your local Dow Corning sales representative prior to writing specifications on this product.

CTM*	ASTM*	Property	Unit	Value
As supplied				
		Consistency		Viscous liquid
		Colour - base/catalyst		White/Blue
0050	D1084	Viscosity at 25°C (base)	mPa.s	1,900,000
		Mixing ratio by weight		10:1
Catalysed, Mixed 10:1 by weight (Base/Catalyst)				
0022	D722	Relative density at 25°C		1.58
		Cure time at 25°C	hours	24
Physical properties, cured 7 days at room temperature				
0137A	D412	Tensile strength	MPa	4.2
0137A	D412	Elongation at break	%	50
0099	D2240	Durometer hardness, Shore A		73
		Deep section cure - 25mm thickness		Yes
		Thermal conductivity	W/(m.K)	0.29
		Specific heat at 25°C	kJ/kg.K	1.04
Ablation, Oxy-acetylene torch, 45 watts/cm²				
		Penetration rate	mm/s	0.035
		Char retention		Fair

* CTM: Corporate Test Method, copies of CTMs are available on request.
ASTM: American Society for Testing and Materials.

HOW TO USE

Substrate preparation

DOW CORNING 3-6077 RTV Silicone Ablative adheres well to most materials. Typical materials include glass, cured silicone rubber, cork, phenolic, polyester, epoxy, silicone resin laminates, and most metals including stainless steel,

titanium and aluminium. It does not adhere well to polyethylene, certain plastics or organic materials including rubber, which bleed or exude plasticisers.

Substantially stronger and more uniform bonds are obtained by preparing surfaces with DOW CORNING® 1200 Primer. For

best results, the following steps should be followed on all surfaces:

1. Clean the surface with a chlorinated solvent (see Handling Precautions) and a slightly abrasive pad or a coarse lint-free cloth.
2. Rinse cleaned surface with acetone or methyl ethyl ketone.
3. Apply a thin coat of primer by dipping, brushing or spraying.
4. Allow the primer to dry for at least 1 hour, according to relative humidity.
5. Silicone rubber surfaces should not normally be primed, but only roughened slightly with abrasive paper and rinsed with acetone. In thin sections, a primer may be needed.

Mixing

DOW CORNING 3-6077 RTV Silicone Ablative is added in a ratio of 1 part of catalyst, by weight, to 10 parts of base material. The catalyst may be dispersed by 2 to 5 minutes of hand mixing or approximately 25 cycles of a mechanical mixer, such as the Semco® Pressure Mixer, model S-1350 or S-1378.

How to apply

After catalyst addition, DOW CORNING 3-6077 RTV Silicone Ablative may be applied with a spatula or loaded into cartridges and applied from a pressure gun. The applied material may be reworked to any configuration. Masking tape may be used to obtain neat fillets or to control excess. The tape should be removed before a surface skin forms. Uncured excess may be removed with xylene, toluene or similar aromatic solvents.

Working and cure time

At normal room temperature, approximately 25°C, DOW CORNING 3-6077 RTV Silicone Ablative remains workable for 2-3 hours after the catalyst addition with full cure in 24 hours. Working time may be extended by mixing, handling and applying the mixture at low temperatures.

HANDLING PRECAUTIONS

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED.

BEFORE HANDLING, READ PRODUCT AND SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE SAFETY DATA SHEET IS AVAILABLE FROM YOUR LOCAL DOW CORNING SALES REPRESENTATIVE.

USABLE LIFE AND STORAGE

When stored at or below 32°C in the original unopened containers DOW CORNING 3-6077 RTV Silicone Ablative has a usable life of 12 months from the date of production.

PACKAGING

DOW CORNING 3-6077 RTV Silicone Ablative is available in 5kg kits.

LIMITATIONS

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

HEALTH AND ENVIRONMENTAL INFORMATION

To support customers in their product safety needs, Dow Corning has an extensive Product Stewardship organization and a team of Health, Environment and Regulatory Affairs specialists available in each area.

For further information, please consult your local Dow Corning representative.

WARRANTY INFORMATION - PLEASE READ CAREFULLY

The information contained herein is offered in good faith and is believed to be accurate. However, because conditions and methods of use of our products are beyond our control, this information should not be used in substitution for customer's tests to ensure that Dow Corning's products are safe, effective, and fully satisfactory for the intended end use. Dow Corning's sole warranty is that

the product will meet the Dow Corning sales specifications in effect at the time of shipment. Your exclusive remedy for breach of such warranty is limited to refund of purchase price or replacement of any product shown to be other than as warranted. Dow Corning specifically disclaims any other express or implied warranty of fitness for a particular purpose or merchantability. Unless Dow Corning provides you with a specific, duly signed endorsement of fitness for use, Dow Corning disclaims liability for any incidental or consequential damages. Suggestions of use shall not be taken as inducements to infringe any patent.

DOW CORNING(R) 3-6077 RTV SILICONE ABLATIVE KIT (BASE information is below)**1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY**

Dow Corning Corporation
South Saginaw Road
Midland, Michigan 48686

24 Hour Emergency Telephone: (989) 496-5900

Customer Service: (989) 496-6000

Product Disposal Information: (989) 496-6315

CHEMTREC: (800) 424-9300

MSDS No.: 01596551

Revision Date: 2007/10/30

Generic Description: Silicone elastomer

Physical Form: Paste

Color: White

Odor: Odorless

NFPA Profile: Health 2 Flammability 1 Instability/Reactivity 0

Note: NFPA = National Fire Protection Association

2. HAZARDS IDENTIFICATION**POTENTIAL HEALTH EFFECTS**Acute Effects

Eye: Direct contact may cause mild irritation.

Skin: May cause mild irritation.

Inhalation: Vapor and/or mist irritating to the respiratory tract.

Oral: Low ingestion hazard in normal use.

Prolonged/Repeated Exposure Effects

Skin: Repeated or prolonged exposure may irritate seriously.

Inhalation: Overexposure by inhalation may injure the following organ(s):

Oral: No known applicable information.

Signs and Symptoms of Overexposure

No known applicable information.

Medical Conditions Aggravated by Exposure

No known applicable information.

DOW CORNING(R) 3-6077 RTV SILICONE ABLATIVE KIT (BASE information is below)

The above listed potential effects of overexposure are based on actual data, results of studies performed upon similar compositions, component data and/or expert review of the product. Please refer to Section 11 for the detailed toxicology information.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
682-01-9	1.0 - 5.0	Tetrapropyl orthosilicate
12182-56-8	1.0 - 5.0	Staurolite

The above components are hazardous as defined in 29 CFR 1910.1200.

4. FIRST AID MEASURES

Eye:	Immediately flush with water for 15 minutes.
Skin:	Remove from skin and wash thoroughly with soap and water or waterless cleanser. Get medical attention if irritation or other ill effects develop or persist.
Inhalation:	Remove to fresh air. Get immediate medical attention.
Oral:	No first aid should be needed.
Notes to Physician:	Treat according to person's condition and specifics of exposure.

5. FIRE FIGHTING MEASURES

Flash Point:	Not applicable.
Autoignition Temperature:	Not determined.
Flammability Limits in Air:	Not determined.
Extinguishing Media:	On large fires use dry chemical, foam or water spray. On small fires use carbon dioxide (CO ₂), dry chemical or water spray. Water can be used to cool fire exposed containers.
Fire Fighting Measures:	Self-contained breathing apparatus and protective clothing should be worn in fighting large fires involving chemicals. Determine the need to evacuate or isolate the area according to your local emergency plan. Use water spray to keep fire exposed containers cool.
Unusual Fire Hazards:	None.

DOW CORNING(R) 3-6077 RTV SILICONE ABLATIVE KIT (BASE information is below)**6. ACCIDENTAL RELEASE MEASURES**

Containment/Clean up: Observe all personal protection equipment recommendations described in Sections 5 and 8. Wipe up or scrape up and contain for salvage or disposal. Clean area as appropriate since spilled materials, even in small quantities, may present a slip hazard. Final cleaning may require use of steam, solvents or detergents. Dispose of saturated absorbant or cleaning materials appropriately, since spontaneous heating may occur. Local, state and federal laws and regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which federal, state and local laws and regulations are applicable. Sections 13 and 15 of this MSDS provide information regarding certain federal and state requirements.

Note: See section 8 for Personal Protective Equipment for Spills. Call (989) 496-5900, if additional information is required.

7. HANDLING AND STORAGE

Use with adequate ventilation. Traces of benzene (carcinogen) may form if heated in air above 300 F (149 C). Provide ventilation to control vapor exposure within inhalation guidelines when handling at elevated temperatures. Review the OSHA benzene regulation for detailed information on safe handling requirements. Product evolves n-propyl alcohol when exposed to water or humid air. Provide ventilation during use to control n-propyl alcohol within exposure guidelines or use respiratory protection. Avoid eye contact. Avoid skin contact. Do not breathe vapor, mist, dust, or fumes. Keep container closed.

Use reasonable care and store away from oxidizing materials. Keep container closed and store away from water or moisture.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION**Component Exposure Limits**

<u>CAS Number</u>	<u>Component Name</u>	<u>Exposure Limits</u>
682-01-9	Tetrapropyl orthosilicate	See n-propyl alcohol comments.

n-Propyl alcohol is formed upon contact with water or humid air. Provide adequate ventilation to control exposures within guidelines of OSHA PEL (final rule): TWA 200 ppm, STEL 250 ppm. ACGIH TLV: TWA 100 ppm.

Engineering Controls

Local Ventilation: Recommended.
General Ventilation: Recommended.

Personal Protective Equipment for Routine Handling

DOW CORNING CORPORATION
Material Safety Data Sheet

Page: 4 of 9

Version: 2.0

Revision Date: 2007/10/30

DOW CORNING(R) 3-6077 RTV SILICONE ABLATIVE KIT (BASE information is below)

Eyes:	Use proper protection - safety glasses as a minimum.
Skin:	Wash at mealtime and end of shift. If skin contact occurs, change contaminated clothing as soon as possible and thoroughly flush affected areas with cool water. Chemical protective gloves are recommended.
Suitable Gloves:	Avoid skin contact by implementing good industrial hygiene practices and procedures. Select and use gloves and/or protective clothing to further minimize the potential for skin contact. Consult with your glove and/or personnel protective equipment manufacturer for selection of appropriate compatible materials.
Inhalation:	Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines. IH personnel can assist in judging the adequacy of existing engineering controls.
Suitable Respirator:	General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators.

Personal Protective Equipment for Spills

Eyes:	Use full face respirator.
Skin:	Wash at mealtime and end of shift. If skin contact occurs, change contaminated clothing as soon as possible and thoroughly flush affected areas with cool water. Chemical protective gloves are recommended.
Inhalation/Suitable Respirator:	Respiratory protection recommended. Follow OSHA Respirator Regulations (29 CFR 1910.134) and use NIOSH/MHSA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.
Precautionary Measures:	Avoid eye contact. Avoid skin contact. Do not breathe vapor, mist, dust, or fumes. Keep container closed. Use reasonable care.

DOW CORNING(R) 3-6077 RTV SILICONE ABLATIVE KIT (BASE information is below)

Comments: Traces of benzene (carcinogen) may form if heated in air above 300 F (149 C). Provide ventilation to control vapor exposure within inhalation guidelines when handling at elevated temperatures. Review the OSHA benzene regulation for detailed information on safe handling requirements. Product evolves n-propyl alcohol when exposed to water or humid air. Provide ventilation during use to control n-propyl alcohol within exposure guidelines or use respiratory protection.

When heated to temperatures above 180 degrees C in the presence of air, product can form formaldehyde vapors. Formaldehyde is a potential cancer hazard, a known skin and respiratory sensitizer, and an irritant to the eyes, nose, throat, skin, and digestive system. Safe handling conditions may be maintained by keeping vapor concentrations within the OSHA Permissible Exposure Limit for formaldehyde.

Note: These precautions are for room temperature handling. Use at elevated temperature or aerosol/spray applications may require added precautions.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical Form: Paste
 Color: White
 Odor: Odorless
 Specific Gravity @ 25°C: 1.5
 Viscosity: 1500000 cSt

Freezing/Melting Point: Not determined.
 Boiling Point: Not determined.
 Vapor Pressure @ 25°C: Not determined.
 Vapor Density: Not determined.
 Solubility in Water: 0 g/l
 pH: Not determined.
 Volatile Content: 1 %
 Flash Point: Not applicable.
 Autoignition Temperature: Not determined.
 Flammability Limits in Air: Not determined.

Note: The above information is not intended for use in preparing product specifications. Contact Dow Corning before writing specifications.

10. STABILITY AND REACTIVITY

Chemical Stability: Stable.

Hazardous Polymerization: Hazardous polymerization will not occur.

Conditions to Avoid: None.

DOW CORNING(R) 3-6077 RTV SILICONE ABLATIVE KIT (BASE information is below)

Materials to Avoid: Oxidizing material can cause a reaction. Water, moisture, or humid air can cause hazardous vapors to form as described in Section 8.

Hazardous Decomposition Products

Thermal breakdown of this product during fire or very high heat conditions may evolve the following decomposition products: Carbon oxides and traces of incompletely burned carbon compounds. Silicon dioxide. Formaldehyde. Metal oxides. Quartz.

11. TOXICOLOGICAL INFORMATION

Special Hazard Information on Components

No known applicable information.

12. ECOLOGICAL INFORMATION

Environmental Fate and Distribution

Complete information is not yet available.

Environmental Effects

Complete information is not yet available.

Fate and Effects in Waste Water Treatment Plants

Complete information is not yet available.

Ecotoxicity Classification Criteria

Hazard Parameters (LC50 or EC50)	High	Medium	Low
Acute Aquatic Toxicity (mg/L)	<=1	>1 and <=100	>100
Acute Terrestrial Toxicity	<=100	>100 and <= 2000	>2000

This table is adapted from "Environmental Toxicology and Risk Assessment", ASTM STP 1179, p.34, 1993.

This table can be used to classify the ecotoxicity of this product when ecotoxicity data is listed above. Please read the other information presented in the section concerning the overall ecological safety of this material.

13. DISPOSAL CONSIDERATIONS

RCRA Hazard Class (40 CFR 261)

When a decision is made to discard this material, as received, is it classified as a hazardous waste? No

DOW CORNING(R) 3-6077 RTV SILICONE ABLATIVE KIT (BASE information is below)

State or local laws may impose additional regulatory requirements regarding disposal. Call (989) 496-6315, if additional information is required.

14. TRANSPORT INFORMATION**DOT Road Shipment Information (49 CFR 172.101)**

Not subject to DOT.

Ocean Shipment (IMDG)

Not subject to IMDG code.

Air Shipment (IATA)

Not subject to IATA regulations.

Call Dow Corning Transportation, (989) 496-8577, if additional information is required.

15. REGULATORY INFORMATION

Contents of this MSDS comply with the OSHA Hazard Communication Standard 29 CFR 1910.1200.

TSCA Status: All chemical substances in this material are included on or exempted from listing on the TSCA Inventory of Chemical Substances.

EPA SARA Title III Chemical Listings**Section 302 Extremely Hazardous Substances (40 CFR 355):**

None.

Section 304 CERCLA Hazardous Substances (40 CFR 302):

None.

Section 311/312 Hazard Class (40 CFR 370):

Acute: Yes
Chronic: Yes
Fire: No
Pressure: No
Reactive: No

Section 313 Toxic Chemicals (40 CFR 372):

None present or none present in regulated quantities.

Note: Chemicals are listed under the 313 Toxic Chemicals section only if they meet or exceed a reporting threshold.

DOW CORNING(R) 3-6077 RTV SILICONE ABLATIVE KIT (BASE information is below)**Supplemental State Compliance Information****California**

Warning: This product contains the following chemical(s) listed by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) as being known to cause cancer, birth defects or other reproductive harm.

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>	
108-88-3	<0.1	Toluene	Developmental toxin.

Massachusetts

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
7631-86-9	1.0 - 5.0	Silica, amorphous

New Jersey

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
70131-67-8	30.0 - 60.0	Dimethyl siloxane, hydroxy-terminated
14940-68-2	15.0 - 40.0	Zircon
68855-54-9	15.0 - 40.0	Diatomaceous earth, flux calcined
14464-46-1	10.0 - 30.0	Cristobalite
65997-17-3	7.0 - 13.0	Glass
7631-86-9	1.0 - 5.0	Silica, amorphous
14808-60-7	<1.0	Quartz

Pennsylvania

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
70131-67-8	30.0 - 60.0	Dimethyl siloxane, hydroxy-terminated

DOW CORNING(R) 3-6077 RTV SILICONE ABLATIVE KIT (BASE information is below)

14940-68-2	15.0 - 40.0	Zircon
68855-54-9	15.0 - 40.0	Diatomaceous earth, flux calcined
14464-46-1	10.0 - 30.0	Cristobalite
65997-17-3	7.0 - 13.0	Glass
7631-86-9	1.0 - 5.0	Silica, amorphous

16. OTHER INFORMATION

Prepared by: Dow Corning Corporation

These data are offered in good faith as typical values and not as product specifications. No warranty, either expressed or implied, is hereby made. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable. However, each user should review these recommendations in the specific context of the intended use and determine whether they are appropriate.

(R) indicates Registered Trademark

DOW CORNING(R) 3-6077 RTV SILICONE ABLATIVE - CURING AGENT (CURING AGENT information is below)**1. PRODUCT AND COMPANY IDENTIFICATION**

Dow Corning Corporation
South Saginaw Road
Midland, Michigan 48686

24 Hour Emergency Telephone: (989) 496-5900

Customer Service: (989) 496-6000

Product Disposal Information: (989) 496-6315

CHEMTREC: (800) 424-9300

MSDS No.: 02696258

Revision Date: 2009/10/20

Generic Description: Silicone
Physical Form: Paste
Color: Blue
Odor: Odorless

NFPA Profile: Health 2 Flammability 1 Instability/Reactivity 0

Note: NFPA = National Fire Protection Association

2. HAZARDS IDENTIFICATION**POTENTIAL HEALTH EFFECTS****Acute Effects**

Eye: Direct contact may cause severe irritation.

Skin: May cause moderate irritation.

Inhalation: Irritates respiratory passages very slightly.

Oral: May cause irritation to the mouth, throat and stomach. Harmful by ingestion.

Prolonged/Repeated Exposure Effects

Skin: Overexposure may injure internally if absorbed.

Inhalation: Prolonged or repeated exposure by inhalation may injure internally.

Oral: No known applicable information.

Other Health Effects

This product contains a chemical(s) that has the following effect(s):

Reproductive Toxicity
Developmental Toxicity

See Section 11 for specific details.

DOW CORNING(R) 3-6077 RTV SILICONE ABLATIVE - CURING AGENT (CURING AGENT information is below)**Signs and Symptoms of Overexposure**

No known applicable information.

Medical Conditions Aggravated by Exposure

No known applicable information.

The above listed potential effects of overexposure are based on actual data, results of studies performed upon similar compositions, component data and/or expert review of the product. Please refer to Section 11 for the detailed toxicology information.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
1067-33-0	3.0 - 7.0	Dibutyltin diacetate

The above components are hazardous as defined in 29 CFR 1910.1200.

4. FIRST AID MEASURES

Eye:	Immediately flush with water for 15 minutes. Get medical attention.
Skin:	Remove from skin and immediately flush with water for 15 minutes. Get medical attention if irritation or ill effects develop or persist.
Inhalation:	Remove to fresh air. Get medical attention if ill effects persist.
Oral:	Get medical attention.
Notes to Physician:	Treat according to person's condition and specifics of exposure.

5. FIRE FIGHTING MEASURES

Flash Point:	Not applicable.
Autoignition Temperature:	Not determined.
Flammability Limits in Air:	Not determined.
Extinguishing Media:	On large fires use dry chemical, foam or water spray. On small fires use carbon dioxide (CO ₂), dry chemical or water spray. Water can be used to cool fire exposed containers.

DOW CORNING CORPORATION

Material Safety Data Sheet

Page: 3 of 9

Version: 3.0

Revision Date: 2009/10/20

DOW CORNING(R) 3-6077 RTV SILICONE ABLATIVE - CURING AGENT (CURING AGENT information is below)

Fire Fighting Measures: Self-contained breathing apparatus and protective clothing should be worn in fighting large fires involving chemicals. Determine the need to evacuate or isolate the area according to your local emergency plan. Use water spray to keep fire exposed containers cool.

Unusual Fire Hazards: None.

6. ACCIDENTAL RELEASE MEASURES

Containment/Clean up: Observe all personal protection equipment recommendations described in Sections 5 and 8. Wipe up or scrape up and contain for salvage or disposal. Clean area as appropriate since spilled materials, even in small quantities, may present a slip hazard. Final cleaning may require use of steam, solvents or detergents. Dispose of saturated absorbant or cleaning materials appropriately, since spontaneous heating may occur. Local, state and federal laws and regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which federal, state and local laws and regulations are applicable. Sections 13 and 15 of this MSDS provide information regarding certain federal and state requirements.

Note: See section 8 for Personal Protective Equipment for Spills. Call (989) 496-5900, if additional information is required.

7. HANDLING AND STORAGE

Use with adequate ventilation. Product evolves acetic acid (HOAc) when exposed to water or humid air. Provide ventilation during use to control HOAc within exposure guidelines or use respiratory protection. Product evolves n-butyl alcohol when exposed to water or humid air. Provide ventilation during use to control n-butyl alcohol within exposure guidelines or use respiratory protection. Avoid eye contact. Avoid skin contact. Avoid breathing vapor, mist, dust, or fumes. Keep container closed. Do not take internally.

Use reasonable care and store away from oxidizing materials. Keep container closed and store away from water or moisture.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Component Exposure Limits

<u>CAS Number</u>	<u>Component Name</u>	<u>Exposure Limits</u>
1067-33-0	Dibutyltin diacetate	Observe organic tin compounds limits. OSHA PEL and ACGIH TLV-skin: TWA 0.1 mg/m ³ ; ACGIH STEL 0.2 mg/m ³ . See acetic acid and n-butyl alcohol comments.

Acetic acid is formed upon contact with water or humid air. Provide adequate ventilation to control exposures within

DOW CORNING(R) 3-6077 RTV SILICONE ABLATIVE - CURING AGENT (CURING AGENT information is below)

guidelines of OSHA PEL: TWA 10 ppm and ACGIH TLV: TWA 10 ppm, STEL 15 ppm. n-Butyl alcohol is formed on contact with water or humid air. Provide adequate ventilation to control exposures within guidelines of OSHA PEL (final rule): TWA 100 ppm and ACGIH TLV: 20 ppm.

Engineering Controls

Local Ventilation: Recommended.
General Ventilation: Recommended.

Personal Protective Equipment for Routine Handling

Eyes: Use chemical worker's goggles.

Skin: Wash at mealtime and end of shift. Contaminated clothing and shoes should be removed as soon as practical and thoroughly cleaned before reuse. Chemical protective gloves are recommended.

Suitable Gloves: Avoid skin contact by implementing good industrial hygiene practices and procedures. Select and use gloves and/or protective clothing to further minimize the potential for skin contact. Consult with your glove and/or personnel protective equipment manufacturer for selection of appropriate compatible materials.

Inhalation: Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines. IH personnel can assist in judging the adequacy of existing engineering controls.

Suitable Respirator: General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators.

Personal Protective Equipment for Spills

Eyes: Use full face respirator.

Skin: Wash at mealtime and end of shift. Contaminated clothing and shoes should be removed as soon as practical and thoroughly cleaned before reuse. Chemical protective gloves are recommended.

Inhalation/Suitable Respirator: Respiratory protection recommended. Follow OSHA Respirator Regulations (29 CFR 1910.134) and use NIOSH/MHSA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.

DOW CORNING(R) 3-6077 RTV SILICONE ABLATIVE - CURING AGENT (CURING AGENT information is below)

Precautionary Measures: Avoid eye contact. Avoid skin contact. Avoid breathing vapor, mist, dust, or fumes. Keep container closed. Do not take internally. Use reasonable care.

Comments: Product evolves acetic acid (HOAc) when exposed to water or humid air. Provide ventilation during use to control HOAc within exposure guidelines or use respiratory protection. Product evolves n-butyl alcohol when exposed to water or humid air. Provide ventilation during use to control n-butyl alcohol within exposure guidelines or use respiratory protection.

When heated to temperatures above 180 degrees C in the presence of air, product can form formaldehyde vapors. Formaldehyde is a potential cancer hazard, a known skin and respiratory sensitizer, and an irritant to the eyes, nose, throat, skin, and digestive system. Safe handling conditions may be maintained by keeping vapor concentrations within the OSHA Permissible Exposure Limit for formaldehyde.

Note: These precautions are for room temperature handling. Use at elevated temperature or aerosol/spray applications may require added precautions.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical Form: Paste
 Color: Blue
 Odor: Odorless
 Specific Gravity @ 25°C: 1.0
 Viscosity: Not determined.
 Freezing/Melting Point: Not determined.
 Boiling Point: Not determined.
 Vapor Pressure @ 25°C: Not determined.
 Vapor Density: Not determined.
 Solubility in Water: Not determined.
 pH: Not determined.
 Volatile Content: Not determined.
 Flash Point: Not applicable.
 Autoignition Temperature: Not determined.
 Flammability Limits in Air: Not determined.

Note: The above information is not intended for use in preparing product specifications. Contact Dow Corning before writing specifications.

10. STABILITY AND REACTIVITY

Chemical Stability: Stable.
 Hazardous Polymerization: Hazardous polymerization will not occur.
 Conditions to Avoid: None.

DOW CORNING(R) 3-6077 RTV SILICONE ABLATIVE - CURING AGENT (CURING AGENT information is below)

Materials to Avoid: Oxidizing material can cause a reaction. Water, moisture, or humid air can cause hazardous vapors to form as described in Section 8.

Hazardous Decomposition Products

Thermal breakdown of this product during fire or very high heat conditions may evolve the following decomposition products: Carbon oxides and traces of incompletely burned carbon compounds. Silicon dioxide. Nitrogen oxides. Metal oxides. Quartz. Formaldehyde.

11. TOXICOLOGICAL INFORMATION**Special Hazard Information on Components****Developmental Toxicity**

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>	
1067-33-0	3.0 - 7.0	Dibutyltin diacetate	Evidence of teratogenicity (birth defects) in laboratory animals.

Reproductive Toxicity

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>	
1067-33-0	3.0 - 7.0	Dibutyltin diacetate	Evidence of reproductive effects in laboratory animals.

12. ECOLOGICAL INFORMATION**Environmental Fate and Distribution**

Complete information is not yet available.

Environmental Effects

Complete information is not yet available.

Fate and Effects in Waste Water Treatment Plants

Complete information is not yet available.

Ecotoxicity Classification Criteria

Hazard Parameters (LC50 or EC50)	High	Medium	Low
Acute Aquatic Toxicity (mg/L)	<=1	>1 and <=100	>100

DOW CORNING(R) 3-6077 RTV SILICONE ABLATIVE - CURING AGENT (CURING AGENT information is below)

Acute Terrestrial Toxicity	<=100	>100 and <= 2000	>2000
This table is adapted from "Environmental Toxicology and Risk Assessment", ASTM STP 1179, p.34, 1993.			
This table can be used to classify the ecotoxicity of this product when ecotoxicity data is listed above. Please read the other information presented in the section concerning the overall ecological safety of this material.			

13. DISPOSAL CONSIDERATIONS**RCRA Hazard Class (40 CFR 261)**

When a decision is made to discard this material, as received, is it classified as a hazardous waste? No

State or local laws may impose additional regulatory requirements regarding disposal. Call (989) 496-6315, if additional information is required.

14. TRANSPORT INFORMATION**DOT Road Shipment Information (49 CFR 172.101)**

Not subject to DOT.

Ocean Shipment (IMDG)

Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

Hazard Technical Name: Dibutyltin Diacetate

Hazard Class: 9

UN/NA Number: UN 3077

Packing Group: III

Hazard Label(s): miscellaneous

Marine Pollutant: Dibutyltin Diacetate

Air Shipment (IATA)

Not subject to IATA regulations.

Call Dow Corning Transportation, (989) 496-8577, if additional information is required.

15. REGULATORY INFORMATION

Contents of this MSDS comply with the OSHA Hazard Communication Standard 29 CFR 1910.1200.

DOW CORNING(R) 3-6077 RTV SILICONE ABLATIVE - CURING AGENT (CURING AGENT information is below)

TSCA Status: All chemical substances in this material are included on or exempted from listing on the TSCA Inventory of Chemical Substances.

EPA SARA Title III Chemical Listings**Section 302 Extremely Hazardous Substances (40 CFR 355):**

None.

Section 304 CERCLA Hazardous Substances (40 CFR 302):

None.

Section 311/312 Hazard Class (40 CFR 370):

Acute: Yes
Chronic: Yes
Fire: No
Pressure: No
Reactive: No

Section 313 Toxic Chemicals (40 CFR 372):

None present or none present in regulated quantities.

Note: Chemicals are listed under the 313 Toxic Chemicals section only if they meet or exceed a reporting threshold.

Supplemental State Compliance Information**California**

Warning: This product contains the following chemical(s) listed by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) as being known to cause cancer, birth defects or other reproductive harm.

None known.

Massachusetts

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
1067-33-0	3.0 - 7.0	Dibutyltin diacetate

New Jersey

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
14808-60-7	> 60.0	Quartz

DOW CORNING(R) 3-6077 RTV SILICONE ABLATIVE - CURING AGENT (CURING AGENT information is below)

63148-62-9 30.0 - 60.0 Polydimethylsiloxane

1067-33-0 3.0 - 7.0 Dibutyltin diacetate

Pennsylvania

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
14808-60-7	> 60.0	Quartz
63148-62-9	30.0 - 60.0	Polydimethylsiloxane
1067-33-0	3.0 - 7.0	Dibutyltin diacetate

16. OTHER INFORMATION

Prepared by: Dow Corning Corporation

These data are offered in good faith as typical values and not as product specifications. No warranty, either expressed or implied, is hereby made. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable. However, each user should review these recommendations in the specific context of the intended use and determine whether they are appropriate.

(R) indicates Registered Trademark

A-5

EonCoat, LLC

EonCoat™ Flexible Ceramic Coatings



An Introduction to EonCoat Coatings

Executive Summary	2
Chemically Bonded Phosphate Ceramics	3
Ductile (Flexible) Ceramics	4
Covalent Bonding	5
5x+ More Corrosion Resistance	6
Extreme Performance	7
Comparisons to Other Coatings	8
Exclusive Protection	9
Exclusive Finishes	10
Cost Comparisons	11
No Need for VOCs	12
EonCoat Application	13
Product Information/Specifications	14-15
FAQs	Back Cover





BACKGROUND



Executive Summary for EonCoat™ Ceramic Barrier Coatings

- What are they?** EonCoat™ ceramic barrier coatings are water-based, two-part spray coatings that form a dense, protective ceramic within minutes. The encapsulating coating both primes and topcoats.
- Why use it?** 5x more corrosion resistant, with excellent abrasion resistance, able to withstand pHs of 3 to 11, these fire retardant (0% flame spread) coatings allow one-coat builds to any thickness.
- How applied?** For iron or steel, a NACE 3 (commercial blast) or 5 (waterjetting) cleaning will give plenty of bond strength as long as all old paint is removed. EonCoat ceramics covalently bond to steel, even oxidized steel. Apply on surfaces with temperatures from 35° to 200°F/2° to 93°C, 0% to 99% humidity. Apply using plural systems with stainless steel lowers and A/B mixing in spray gun. Finishes: semi-gloss, pastel, or sand plaster texture. Standard color: white. Colored sands available for sand plaster texture. Can be topcoated with any quality coating, including high gloss.
- Where used?** Hundreds of high-performance industrial, OEM, and architectural applications. Performance includes 0% flame-spread fire retardant, waterproofing, abrasion protection, and steam/high pressure wash-down protection. Extraordinary architectural flexibility including spray-applied “tile” and textured finishes like high-end stucco and sand-plaster.
- When?** Available now.

Developed by U.S. D.O.E. to Encapsulate Nuclear Wastes

During the 1990s, Argonne National Laboratory/University of Chicago developed a chemically bonded phosphate ceramic to be a long-term (thousands of years) binder for radioactive and hazardous wastes. The material had mostly nuclear plant and military applications until serial-entrepreneur Tony Collins read Dr. Arun Wagh’s book, “Chemically Bonded Phosphate Ceramics.” Collins contracted with Argonne National Laboratory, directing the research towards commercial applications while purchasing its commercial technology rights. The ongoing research led to the creation of EonCoat coatings, as well as Ductile Ceramics composites and cements.

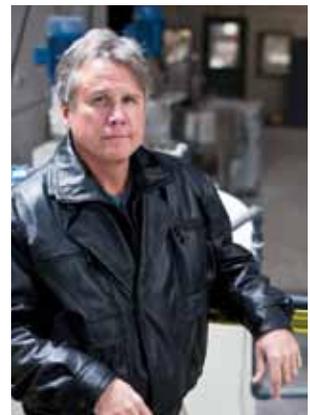


Exclusively from EonCoat, LLC



EonCoat coatings are manufactured by EonCoat, LLC, in their state-of-the-art, 100,000 ft² / 3900 m² R&D and production facility in Wilson, North Carolina, close to The Research Triangle.

In 1986, Tony Collins founded and ran Turbine Generator Maintenance, Inc. (TGM) a leading independent service provider for gas and steam turbines. In 2007, when he sold TGM to a private equity firm, it had customers in 47 states and 15 countries. Collins is now CEO of EonCoat, LLC, concentrating his time on the commercial applications of the Ceramicrete technology. From his power plants days, Collins knows firsthand the challenges of protecting critical equipment from corrosion, chemical attacks, abrasion, and extreme temperatures.





What are EonCoat Coatings?

Simply put, EonCoat coatings are a new type of spray-on, non-fired, protective ceramic.

Technically known as “chemically bonded phosphate ceramics” (CBPCs), these coatings have unprecedented corrosion protection, durability, and application flexibility.

A dual-component spray gun mixes Part A (acid phosphate) with Part B (base minerals and metal oxides, in a water slurry) causing an exothermic (heat-producing) reaction that includes the oxides on the top layer of the substrate. The metal oxides in the coating become alloyed with the metal substrate. This 2-micron thick layer becomes a complex of stable (inert) oxides, unable to further react to oxygen and moisture.

Additional passes of the spray gun build ceramic layers on top of this inert, alloyed layer. You can build a protective ceramic coating to any desired thickness desired with multiple passes.

EonCoat coatings are both a primer and topcoat. Their ceramic surfaces are strong, extremely abrasion resistant, and nearly insoluble. For example, they can withstand immersion in aggressive solvents, like MEK, acetone and xylene. Grit blasting is needed to remove EonCoat coatings.

Put another way: the coated substrate is completely stabilized, then encapsulated under ceramic. It would be difficult to imagine a more corrosion resistant process.

- **5x More Corrosion Resistant**
- **Excellent Abrasion Resistance**
- **Cycled Tested up to 1250°F / 660°C**
- **1-Hour Return to Service**
- **No VOCs, No HAPs, No Odors**
- **0% Flame Spread**
- **Build to Any Thickness**

What EonCoat Coatings are NOT

EonCoat coatings are not simply pre-fired ceramic beads mixed into a paint. The EonCoat exothermic reaction is akin to a “micro-firing,” that creates ceramics on-the-spot (in situ). EonCoat ceramics cure in 10 minutes, but continue to gain strength for years, similar to the chemical hardening process of natural stone.

EonCoat coatings are not based on the decades-old technology of so-called “rust converters”: phosphoric or oxalic and tannic acids used to convert iron oxides to iron tannate.

EonCoat coatings have no VOCs, no HAPs* and no odors. They have no flash point and a zero flame spread rating. They have no pot life and no hazardous disposal issues.

In short, EonCoat technology is unlike any existing coating technology — in its chemistry, practical application, and performance. It’s therefore understandable that it takes some time for coating professionals to grasp the practical significance of EonCoat coatings.



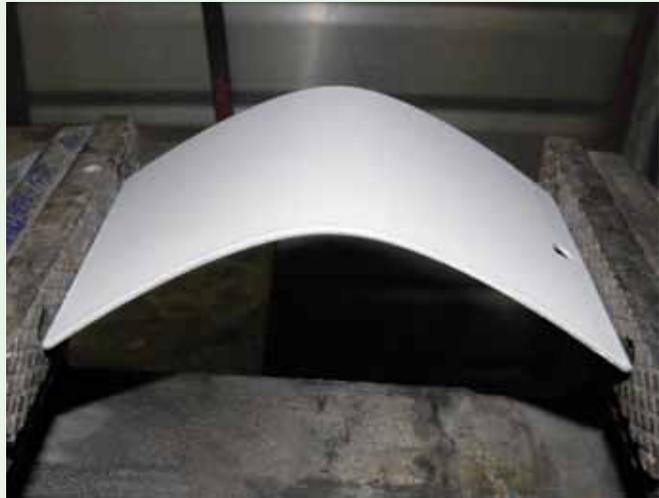
DUCTILE CERAMICS



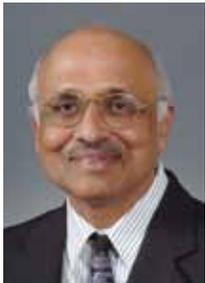
7%+ Ceramic Flexibility

Ordinary, fired ceramics are inflexible; they flex less than 1%. Steel flexes 7% to 38% before it fails. But steel only flexes 1% before it permanently deforms.

Independent tests done by Dwight Weldon of Weldon Labs (author of the book “Failure Analysis of Paints and Coatings”) show that EonCoat High Temperature flexes 7% before failing, while the standard EonCoat coating flexes 19% prior to failure. EonCoat ceramics have many times the flexibility (or ductility) needed to handle the typical movements of steel — including flexing, expansion, and contraction — found in bridges, storage tanks, exteriors of steam pipes, concrete structures, and so on.



Although we don't recommend it, your coated metals could be bent 19% before permanently damaging (cracking) the EonCoat coating.



Dr. Arun Wagh, lead developer of the technologies underlying EonCoat ceramics and consultant to EonCoat, LLC.



Meet the creative spark beyond EonCoat R&D: Lead Scientist Sameer Patel. Sameer is the lead developer of formulations that are easy to handle and spray. He's the “go-to” guy for designing experiments, conducting QA, documenting R&D and modifying products. As our high-end support “guru,” Sameer is eager to make EonCoat ceramics work for your applications.



How EonCoat Ceramics Flex

EonCoat ceramics have fibers and fillers with an acicular structure to create toughness and additional ductility (flexibility). This isn't possible with traditional ceramics because fibers cannot withstand their firing. But the EonCoat exothermic reaction creates a heat rise of only 7° to 40°F (4° to 22°C), so a wide range of materials can be used for performance enhancement. EonCoat coatings also have very good impact resistance: 22 inch lbs (standard) and 25 inch lbs (Hi-Temp). Both can take a significant blow without showing damage.

Super Strong Coating Bonds

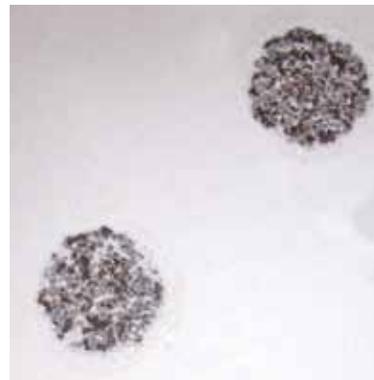
Traditional polymer coatings — such as oil-base paints, latexes, and acrylics — mechanically bond to surfaces. They need extensive surface prep (for example, NACE 1 or “white metal”) to create rust-free “hills and valleys” for their polymers to mechanically grip onto. To visualize this, imagine a tarp (the film created by traditional coatings), bound to a clean, coarse surface.

By contrast, EonCoat coatings chemically bond to substrates. The Part A (acid) and B (base) react with each other, plus the surface’s oxides, so the EonCoat coating becomes part of the surface.

The EonCoat reaction creates covalent bonds, so there’s a sharing of electrons between atoms. Additional layers of EonCoat spray are also chemically bonded to each other, further promoting bonding strength and chemical resistance.



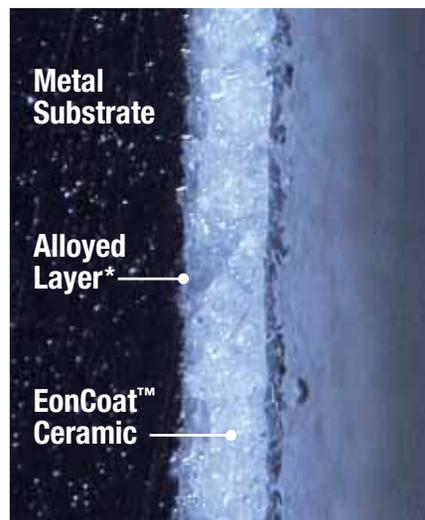
Metal plate coated with EonCoat ceramic.



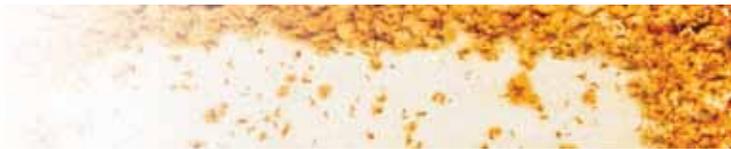
Pull-off tests show that surface prep matters very little to pull-off strength. Using NACE 1, 2, 3 or 5 preparation, the ceramic itself separates at an average of 520 psi for EonCoat standard and 620 psi for EonCoat High-Temperature, but the ionic bond between the coating and steel does not fail in any case.

Pull-Off (Adhesion) Test Results

Formulation	Substrate Prep (metal)	Avg. psi / bar
EonCoat™ Standard	NACE 3 or 5	520 / 35
EonCoat™ High-Temp	NACE 3 or 5	620 / 42



*2-micron layer is not visible at this level of magnification (50x).

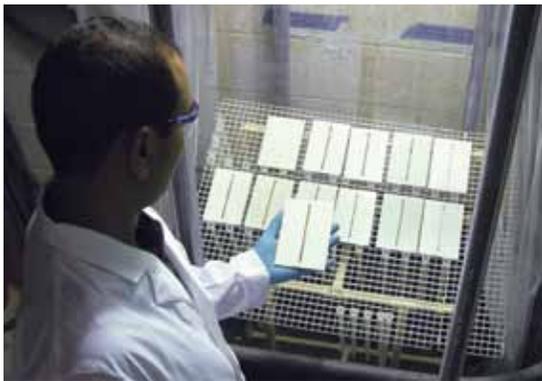


5x+ More Corrosion Resistant Than Leading Corrosion Paints



The NASA Corrosion Test: Coated samples are scribed, then exposed to 12 hours of salt spray, followed by 12 hours of sunlight (or UV light equivalent). Every other high-performance coating we tested failed dramatically in 45 days or less: see the sample on the right side of each photo. The EonCoat™ sample is on the left side. Except for the rust on its scribe (gouge) line, the EonCoat™ sample looks the same as day one, even after several months.

To comprehend the extreme corrosion protection provided by EonCoat coatings, it might be helpful to think of them as ceramic mineral structures. These mineral structures have tight, covalent, yet flexible bonds that are part of the newly alloyed substrate.



Contrast that image with traditional coatings' film structure, which lays on top of the substrate like a tarp. In the NASA corrosion tests (see photos), moisture migrates under the film on both sides of the test scribe line, as well as under all four uncoated edges. Moisture and heat are trapped by the film, creating a "greenhouse effect," promoting corrosion and coating blistering and/or bubbling.

On the EonCoat sample, corrosion doesn't spread beyond the test scribe line — that is, to either side of the scribe — because the substrate's surface oxides have been converted into an inert layer incapable of supporting the corrosion (oxidation) process.



No flash point,
no ignition danger.

Performance Highlights



ASTM D4060 Taber Abrasion Tests:
 Left photo, a premium enamel coating after 375 cycles.
 Middle and right photos: EonCoat standard coating after 1000 cycles.

Factor	EonCoat Performance	Comments
Corrosion Protection	Unprecedented NASA Corrosion Test results	Shown to be at least 5x more corrosion resistant than any other corrosion coating.
Pressure Washing	4500 psi / 310 bar	Easily withstands pressure washing systems.
Steam Cleaning	380°F / 193°C	Easily withstands steam cleaning systems.
Taber Abrasion Wear Cycle per Mil (WCM)	EonCoat standard: 1000 cycles. EonCoat High Temp: 1100 cycles.	Most paints: 75 cycles. Typical epoxies: 125 to 250 cycles.
Pencil Hardness	EonCoat standard: 8-9H EonCoat High Temp: 9H++	A hard, abrasion-resistant coating that is, nonetheless, flexible.
Return to Service time	Tack-free in 3 minutes; cures in 10 minutes; 1-hour return to service (all @77°F / 25°C, 50% RH)	Unmatched Return to Service time for extreme performance coatings.
High Build	Each pass is 3 to 6 mils thick (75 to 150 microns). Build to any thickness in one application by doing multiple passes of spray gun.	Unique to EonCoat ceramics.
No VOCs No HAPs No Odors	Water-based Parts A & B are separate until sprayed, eliminating the need for solvents.	Other VOC-free coatings are considered “compromises” by most coating professionals.
Cost Savings	25% to 50% cost savings: 1) Requires only NACE 3 or 5 (iron or steel) or NACE 6 (concrete or masonry) surface prep, and 2) High Build: build to any thickness in one application using multiple passes.	Unique to EonCoat ceramics.
Flash Point	No flash point	Unusual for extreme-performance coatings.
Chemical Resistance	Withstands pH 3 to 11	Rare among coatings.
UV Resistance	Exclusive UV resistance since EonCoat coatings are inorganic minerals. (Quantitative tests underway.)	Unprecedented UV resistance.
Breathability	Currently undergoing vapor transmission testing.	EonCoat coatings can be used as waterproofing — converting entire rooms to washdown areas.
Scrubability	Use any chemical cleaner or solvent, no matter how harsh, with rags, brushes, soft scrubbing pads, pressure or steam cleaners.	Harsh chemicals degrade typical polymer coatings.



COMPARISONS TO OTHER COATINGS



“Too Good To Be True”

Because we use an acid/base chemistry that is fundamentally different from existing coatings, we’re used to hearing some skepticism.

This makes sense: the history of coatings has

been filled with small, incremental improvements to the basic formulas that have been around for decades.

To grasp the gap between traditional and EonCoat coatings, the following comparisons might be helpful:

Factor	Epoxies	EonCoat™ Coatings
Pot Life	Limited working time if mixed prior to application.	No pot life: Parts A & B only mix in spray gun
Finishes	Gloss	Semi-Gloss, Pastel, or Sand Plaster
Odors	Can be extreme, with prolonged off-gassing	No odors
Cure Time	Typically 24+ hours	10 minutes

Factor	Urethanes	EonCoat™ Coatings
UV Protection	Good	Unprecedented
Flexibility	Excellent	Good
Resistance to sea water	Excellent	Outstanding
Acid Resistance	Good	Excellent
Abrasion Resistance	Good	Excellent
Adhesion to Steel	Excellent	Excellent
Adhesion to Concrete (cured)*	Excellent	Excellent
Sanding between coats	Sanding may be necessary.	N/A. All layers applied at once via multiple passes of sprayer.
Flash Point	Can vary greatly.	No flash point.
Humidity Limitations	Limited humidity range during application.	Can be applied at 0% to 99% humidity. Substrate can be damp.

*EonCoat testing underway to determine application to concrete prior to concrete’s standard cure time of 28 days.

Factor	Acrylics	EonCoat™ Coatings
Priming	Primer required, or two coats of a “self-priming” coating.	Are primer and topcoat in one. Can be built to any thickness via multiple passes in same application.
Weathering	Can crack or split	No cracking due to weathering; cracks only when substrate is bent more than 7% (EonCoat High Temp) or 19% (EonCoat standard).

Factor	Alkyds (oil-based)	EonCoat™ Coatings
VOCs	Very high VOCs	No VOCs
Odors	Strong solvent odor	No odor
Sagging	Sags if applied too thick; avoid sagging by doing multiple coats.	Doesn’t sag or run regardless of thickness. Achieve any thickness in one application with multiple passes of spray gun.
Disposal	Considered hazardous waste by most communities.	Simple: mix A & B to produce inert, ceramic rock.

For CUI: Protects At 1250°F / 660°C

Ordinary polymer paints have organic materials that quickly degrade at high temperatures, unable to withstand 300+°F / 150+°C. EonCoat materials use inorganic minerals, so the ceramic is indifferent to high temperatures. EonCoat High-Temperature (HT) ceramic has gone through hundreds of cycles of 1250°F / 660°C without signs of degrading or cracking. When used as a thermal (insulation) barrier, much higher temperatures are practical. Above 1250°F / 660°C bond strength stays high and the coating is stable, but minor expansion cracks can occur since steel and the ceramic have small differences in thermal expansion coefficients.



EonCoat ceramics are an excellent choice for protecting steam lines and high temperature equipment, including CUI (Corrosion Under Insulation).



Ordinary paint quickly burns, giving off toxic gases.



EonCoat™ coatings have 0% flame spread. They can't burn. Period.

**See the
video at
EonCoat.com**

An Occupant-Friendly Fire Retardant with 0% Flame Spread

By legal definition, a “fire retardant” coating is only required to slow the flame spread by 50% as the flame moves across a substrate. So the coated substrate still burns — just 50% slower than if the substrate didn't have the fire retardant coating. By contrast, EonCoat™ ceramic has a flame spread rating of 0%. It will not burn. Period. Substrates will only burn when a fire gets hot enough to self-ignite whatever is behind the ceramic.

Common flame retardants are made with halogenated compounds, mainly chlorine and bromine-based. During a fire, these retardants decompose to create a cloud that reduces oxygen around the treated item. Unfortunately, these halogenated gases are inhaled by people near the fire, and they are suspected endocrine-disruptors, causing potential neurological damage, cancer, and birth defects. By comparison, EonCoat ceramic is inert and stable, with no Volatile Organic Compounds (VOCs), Hazardous Air Pollutants (HAPs), and no odors. EonCoat coatings consist of food grade acid phosphate (found in sodas) and magnesium oxide (one of the world's most plentiful metal oxides, with no known hazards).

There is no off-gassing, either during or after application or when exposed to flames, making EonCoat ceramics possibly the safest fire retardant ever. Use EonCoat ceramics to coat walls, ceilings, equipment, cargo holds — wherever you need 0% flame spread.



Coat Any Surface to Withstand Harsh Cleaners, Pressure/Steam Washing

From floors, to walls, to exteriors, EonCoat ceramics will encapsulate porous substrates, providing the ultimate in waterproofing resilience, on both new construction and renovations.

But EonCoat ceramics go way beyond waterproofing. They also protect against high-pressure power washing and steam cleaning. Able to comfortably withstand water pressure of 4500 psi/310 bar and steam at 380°F+/193°C+, EonCoat ceramics let you quickly convert interior spaces into sanitize-ready, wash-down areas. Entire floors can be converted in a day into wash-down spaces for food preparation. (NSF approval pending.)

Create Spray-On Sand Plaster or “Tile” Finishes

Because you can build EonCoat ceramics to virtually any thickness, your painters can quickly correct surface defects, like a rough drywall job.

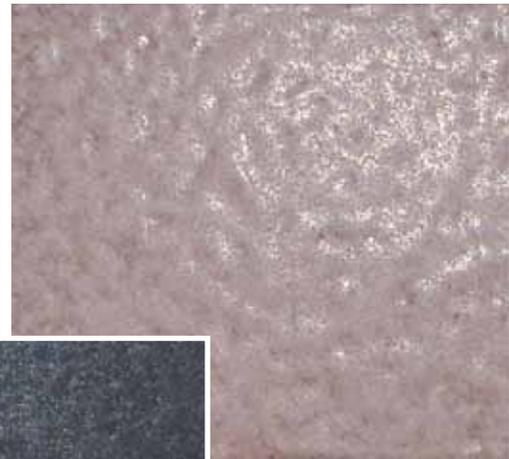
And you can also readily blend EonCoat ceramics with dozens of additives to create countless custom finishes, including high-end sand-plaster or stucco. You can even build a ceramic tile surface similar to hand-set tiles.



Before: EonCoat coating is on the top half of panel, a leading, high-performance enamel is on the bottom half.



After: After 10-minute immersion in xylene solvent: the bottom half is virtually bare metal, while the EonCoat ceramic is fine — and will be fine indefinitely.



Textured Finish

High-Temperature Finish



Sand Plaster Textured Finish



COST COMPARISONS

Factors	Industry Average for Corrosion Coatings	EonCoat™ Standard Coating
Total cost applied per sq. ft.	\$2.58	\$1.43
Return to Service avg. (20,000 sq. ft.)	4 days	1 day
Service Life	10 years	20 years
COST BREAKDOWN		
Labor:		
Prep - Labor dollars to prep per sq. ft.	\$1.25 NACE 1, 2	\$0.70 NACE 3 or 5, Commercial or water blast
Labor dollars to spray per coat / per sq. ft.	\$0.31	\$0.31
Total number of coats	3 (1 prime, 2 topcoats)	1 (no primer needed)
Spray - Labor cost to spray per sq. ft.	\$0.94	\$0.31
Material:		
Total material cost per sq. ft.	\$0.83	\$0.42
Recommended number of topcoats	2	1
Initial cost per gallon of topcoat	\$80	\$105
Coverage per gallon in sq. ft.	300 @ 2 mil DFT	250 @ 5-6mil DFT*
Number of prime coats	1	No primer needed
Initial cost per gallon of primer	\$60	No primer needed
Primer coverage per gallon in sq. ft.	200 @ 2 mil DFT	No primer needed

***Note:** EonCoat WFT virtually equals its DFT, even though its volume solids is 78%. How is this possible?

The remaining 22% is water. Most of the H₂O molecules are utilized by the chemically bonded phosphate ceramic. In other words, the water becomes bound to the acid phosphates, minerals, and metal oxides to form the final ceramic coating. A small percentage of the water is lost either during the atomization process of spraying or it is “boiled off” in the reaction.

We say the EonCoat WFT virtually equals DFT because if you take a paint thickness meter to an EonCoat coated item one minute after spraying, its thickness is going to be the same 5 hours or 5 years later.



EXTREME PERFORMANCE, NO VOCs

If You Didn't Need VOCs, Would You Use Them?

Coating professionals often equate very high VOC content with high coating performance. That makes sense...to a point.

VOCs keep coating components (binders, pigments, additives) separate so they won't react until the VOCs evaporate. If your components very strongly "want" to react with one another, they'll probably form a strong bond...but, you'll need lots of VOCs to keep them separate until the coating is applied.

We eliminated need for VOCs by using a dual-component sprayer and inorganic components (that is, no carbon compounds). The EonCoat reaction starts the moment the components — acid phosphates, inorganic minerals, and water — mix in the spray gun.

The spray gun is mixing an acid (pH 3 to 5, equivalent to strawberry juice) with a base (pH 9 to 11, equivalent to Milk of Magnesia). The differential of seven pH levels causes a strong reaction. The reaction is so significant, it produces its own heat rise (7°F to 40°F / 4°C to 22°C), drying tack free within 3 minutes, and curing in 10 minutes. The resulting EonCoat ceramic exceeds virtually all performance benchmarks for VOC-laden industrial coatings.

Wouldn't you like to forget about keeping up with ever-changing VOC regulations...once and for all? With EonCoat coatings, you can.



Are "Extreme Performance VOC-Free Coatings" an Oxymoron?

EonCoat, LLC has tested many other manufacturers' low or "no" VOC coatings and we found their performance to be substandard. So, we completely understand your skepticism of VOC-free coatings.

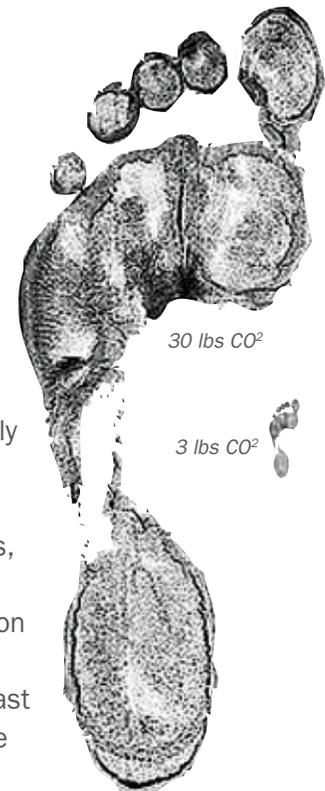
Since "the proof is in the pudding," we'd be happy to send you coated test samples or even 100 gallons of EonCoat coatings for free for your own tests and evaluations.



100 Gallons Free
No Obligation
Apply now: EonCoat.com

LEED-Compliant, With 1/10th the Carbon Footprint

Being VOC-free automatically makes EonCoat coatings LEED Compliant. And, compared to average paints, EonCoat coatings also use 1/10th the amount of carbon during their manufacture. Finally, EonCoat ceramics last several orders of magnitude longer than other coatings, making their overall carbon footprint exceedingly small.



An Overview of EonCoat Application

Fast Surface Prep

EonCoat coatings do not require a primer (unless used on plastic substrates), nor do they require sanding prep. For iron and steel, our coatings only need a NACE 3 (commercial blast) or NACE 5 (waterjetting) level of preparation. EonCoat ceramics are perfect for waterjetting prep; the resulting “flash rust” provides an ideal layer of oxides for the EonCoat alloyed reaction. For concrete or masonry, NACE 6 is sufficient.



Recommended Coating Thickness

The thickness of EonCoat coating is a function of your required abrasion resistance, chemical resistance, and flame/heat barrier needs.

The corrosion barrier — the area of alloyed steel — is about 2 microns thick. A typical pass of your gun applies between 3 to 6 mils (75 to 150 microns), depending on how you set up your sprayer. Wet Film Thickness (WFT) is virtually the same as Dry Film Thickness (DFT); see bottom of page 11 for an explanation.

So, for some applications, it's sufficient to apply 5 mils (125 microns). Given the hardness of EonCoat coatings (pencil hardness 8-9H, or 9H++ for High-Temp), you might end up specifying a thinner coat than previously used. Applications where abrasion is a major environmental factor — like desert pipelines with frequent sandstorms — might warrant 40 mils (1 mm).

**Watch Our
“How To” Videos
at EonCoat.com**

Monitoring The Application

As with any coating, there are a number of steps to proper application. One additional step is the regular measurement of the exothermic reaction. Using a laser thermometer gun, you do test measurements of the applied coating to confirm a temperature rise of at least 7°F / 4°C compared to uncoated substrate.



Overspray & Disposal

EonCoat overspray dries in seconds. So material that didn't reach the substrate will generally dry up before floating elsewhere. It can be readily swept up, if not already captured by your painters' tarps.

To dispose, just mix equal amounts of EonCoat Parts A and B to get an inert ceramic that can be disposed on anyplace you might put any other rock.



EonCoat Specifications

Product Description



Water-borne, two-part, ceramic barrier coatings: standard and High-Temperature formulations. Outstanding, long-term, ductile (flexible) ceramic protection against corrosion, abrasion, chemical attacks, flame, heat, steam, and UV. Primer and topcoat in one.

Product Characteristics

Finishes:	Semi-Gloss, Pastel, or Sand Plaster Texture
Color:	Off-White is standard. Colored sands available for sand plaster texture.
Primer:	Only required on plastic substrates; call for info.
Topcoats:	None needed. Can be topcoated with virtually any quality topcoat, including high-gloss.
Volume Solids:	78%
Weight Solids:	78%
VOCs (EPA Method 24):	0 g/L; 0 lb/gal
Mix Ratio:	1:1 by volume

Recommended Spreading Rate per Each Pass of Sprayer

(can be built to any thickness in one application using multiple passes)

	Minimum	Maximum
Wet mils (microns)	3.0 (75)	6.0 (150)
Dry mils (microns)	3.0 (75)	6.0 (150)

WFT virtually equals DFT: see page 11 for explanation.

~Coverage:

5-6 mils thick	250 sq. ft. per gal
130-150 microns thick	6.1 m ² per liter

Drying Schedule (any thickness)

Tack free	3 minutes
To cure	10 minutes
Return to Service	1 hour
Flash Point:	n/a (no flash point)
Reducer/Clean Up:	Do not reduce. Clean up with water and brushes.
Dry Fall:	Yes

Recommended Uses

Can be used on virtually any prepared surfaces; contact us for prep information for plastic or resin substrates.

- Corrosion protection
- Chemical attack protection (from pH 3 to pH 11)
- Abrasion resistance
- Fire retardant with 0% flame spread
- High Temperature formula: 1250°F (660°C) service, CUI
- Extreme UV protection

Not recommended for: High Gloss applications



Performance Characteristics

Substrate: Steel
Surface Preparation: SSPC-SP 6 / NACE 3
 or SSPC-SP 12 / NACE 5

Test Name	Test Method	Results
Abrasion Resistant (aka Wear Index, mg loss per 1000 cycles)	ASTM D4060 CS10 wheel, 1000 cycles, 1 kg load	EonCoat standard: 180 mg loss EonCoat High Temp: 110 mg loss
Adhesion	ASTM D4541	EonCoat standard: 520 psi EonCoat High Temp: 620 psi
Direct Impact Resistance	ASTM D2794	EonCoat standard: 22 inch lbs EonCoat High-Temp: 25 inch lbs
Dry Heat Resistance (EonCoat High-Temp)	ASTM D2485	1250°F 660°C
Pencil Hardness	ASTM D3363	EonCoat standard: 8-9H EonCoat High Temp: 9H++

Surface Preparation

Surface must be clean and in sound condition. Remove all previous coatings, oil, dust, grease, dirt, loose rust, and foreign material. Surfaces can be damp prior to application.

Minimum recommended surface preparation:

Iron & Steel: SSPC-SP 6 / NACE 3
 or SSPC-SP 12 / NACE 5

Concrete & Masonry: SSPC-SP 13 / NACE 6

Tinting

Base is Off-White. Other base colors available soon. Contact us.

Application Conditions

Temperatures, Ambient: 35°F to 110°F
 (2°C to 43°C)

Temperatures, Surface: 35°F to 200°F
 (2°C to 93°C)

Humidity: 0% to 99%;
 damp surfaces OK

Application Equipment

Contact EonCoat, LLC for detailed instructions.

PPE for handling/applying

Respiratory Protection: nuisance dust mask.

Eye Protection: safety glasses.

Protective Gloves: not required.

Protective Clothes: as needed.

Ventilation: minimum 10 air-changes per hour.

Clean-up: equipment can be cleaned with water and brushes.

Packaging & Storage

Container: 5 gallon / 18.9 liter pails

Net Contents: approx. 65 lbs per 5 gallon pail /
 29 kg per 18.9 liter pail

Shelf Life: 12 months, unopened

Storage Temperature: part B should not be stored below 33°F / 0.6°C. If the material freezes it can be remixed but it requires aggressive agitation to do so.





FAQs about EonCoat™ Ceramic Barrier Coatings

Q: What EonCoat guarantee or warranty do you make?

A: "If our coating is applied by an EonCoat Certified Contractor and the coating fails within 5 years, we will fix the coating or replace it at our cost." Period. (Our anticipated EonCoat design life is well beyond 5 years.)

Q: How do I know EonCoat, LLC will be in business 5 or 10 years from now?

A: EonCoat LLC is well-funded, with solid technology, good systems/processes, and talented people. We have not needed outside funding, so we're not at the mercy of capital markets. We encourage you to visit our 100,000 ft² R&D and production facilities in Wilson, NC, near Research Triangle and to correspond with our technical staff: 252-360-3110.

Q: Why haven't we seen this technology before?

A: Research began in the late 1980s. In 1994 R&D Magazine recognized Ceramicrete™ technology as one of the best 100 inventions of the year. There are now 23 Ceramicrete patents.



Q: If Ceramicrete technologies are so high-performing, why aren't they licensed by the big companies?

A: CH2MHill has a Ceramicrete license for radioactive waste disposal and five other companies have licenses for very specific, limited applications, such as cement road patch. The bulk of the commercial Ceramicrete licenses are owned by Latitude 18, Inc.

Q: What long-term studies do you have on the effectiveness of EonCoat coatings?

A: DOE-funded studies show that the formula is suitable for encapsulating radioactive waste — its original application — for at least hundreds of years.

Q: Lab studies are one thing — what field testing on EonCoat coatings have you done?

A: The point of good lab testing is to simulate actual field conditions. We have Argonne National Laboratory samples that are 15+ years old. And where possible, we use EonCoat coatings on our own facilities.

Q: Where SHOULDN'T I use EonCoat coatings?

A: Plastic and resin substrates require either a primer or grit blasting to create a rough surface for mechanical bonding. Continual exposure to acids below pH 3 and alkalis above pH 11 are not recommended. Parts should be formed (rolled, stamped, shaped) prior to EonCoat application.

Q: Are EonCoat coatings for immersion service?

A: EonCoat ceramics should be suitable for immersion. Long term testing is now underway to evaluate immersion performance.

Q: Can you encapsulate lead or asbestos?

A: Theoretically, yes, although they haven't been tested for such uses.

Q: Are they NSF listed? What about for USDA inspected facilities? Or cleanrooms?

A: EonCoat coatings should be NSF approved shortly. Certification tests are underway.

Q: Are they electrically conductive? Static resistant?

A: They are not electrically conductive. They are static resistant and extremely appropriate for data centers with their zero flame spread.

Q: Even our best painters sometimes miss a tiny spot, which later leads to coating failure. Are EonCoat coatings different in this regard?

A: Yes. All the substrate around the missed spot is converted into an inert layer of stable oxides, unable to support corrosion. Over time, the missed spot would corrode but moisture would not be able to spread underneath the surrounding coating since it has become a tightly (covalently) bonded part of the fully-stabilized substrate.

Q: What is the ballpark contractor price per sq. ft of material...applied?

A: About \$1.50 per sq. ft. applied at 5-6 mils.

Q: How do I buy EonCoat coatings?

A: EonCoat coatings are sold directly by EonCoat, LLC.

Q: Are EonCoat coatings available internationally?

A: Yes. They're available in all PCT (Patent Cooperation Treaty) countries.

Q: Do you have an EonCoat distributor near me?

A: EonCoat coatings can only be applied by EonCoat Certified Contractors and original equipment manufacturers.

Q: What's the EonCoat Certification process?

A: 2-day training at our facility or ours. You learn the plural spray machine and how to recognize proper EonCoat reactions. We want you to be successful.



100 Gallons Free
No Obligation
 Apply now: EonCoat.com



EonCoat, LLC
4000 Airport Drive NW
Wilson, NC 27896-8648 USA

Tel: 252-360-3110 | Fax: 252-360-3109
www.EonCoat.com | info@EonCoat.com

© 2011 EonCoat, LLC. EonCoat™ and its logo are trademarks. All other trademarks are sole property of their respective owners. Industrial V1 1M 2011-02
Printed on FSC (Forest Stewardship Council) certified paper. Please recycle.



Product Data

Part A Acid
Part B Base

Product Characteristics

Finish: Low Gloss/Matte
 Color: Tint base/oxide earth tones
 Volume Solids: 91% ± 3%
 Weight Solids: 70% ± 2%
 VOC (EPA Method 24): 0 g/L
 Mix Ratio: 1:1
 Cleanup: Water before combining

Product Description

EonCoat is a Zero VOC, Zero HAP, environmentally friendly, spray (plurally) applied “self-firing” true ceramic coating which offers the industry's longest lasting corrosion protection for both steel & concrete. Coated areas, parts and equipment can be returned to service in as little as an hour. This coating is “fundamentally different” than any other paint or coating developed in the past 100 years.

Recommended Coverage per pass:

	Maximum	Minimum
Wet Mills (micron)	6 mils	3 mils
Dry Mills (micron)	6 mils	3 mils
~Coverage		
225 - ft ² /gal	@ 5 mils	(6.1 m ² /L)
Recommended maximum field use DFT	36 mils	
Note: Brush or roll application is not possible due to Zero Pot Life when A & B are mixed.		

Performance Characteristics

Substrate: C R Mild Steel

Surface Preparation: SSPC SP5/NACE 1

Abrasion	ASTM D 4060 CS 10 wheel 1000 cycles, 1kg load	W C M 695
Adhesion	ASTM D4541	450 psi
Chemical Resistance	ASTM D1308 6 hour exposure	No effect
Flexibility	ASTM D522	Passes (steel) 19%
Pencil Hardness	ASTM D3363	>6 H (steel)
Direct Impact Resistance	ASTM D2794	18 in/lbs (steel)
Water Vapor Transmission	ASTM E96	2.5 perm-inch

Drying Schedule @14 Mil wet (350 microns):

@40° F to 110° F (4.4°-43.3° C)

To Touch: 3 minutes
 To Handle: 5 minute
 To Recoat: Minimum: Immediate
 Maximum: Unlimited
 Top Coat: 1 hour per 5 mils
 Full Cure: 24 hours
 (Note: Full cure is temperature, humidity and film thickness dependent,)
 Pot Life: Part A/B **cannot be mixed until spraying**
 Sweat-in-time: None required
 Shelf Life: Part A: 8 months, unopened
 Part B: 8 months, unopened

Store at room temperature-constant variations in Temperature result in increased crystal size and

Difficulty spraying: 70°- 75°

Flash Point: NONE - Reducer: Do not use any!

RELEASED. Printed documents may be obsolete; validate prior to use.



Product Data

Part A Acid
Part B Base

Surface Preparation

Application Conditions

Surface must be clean and free of standing water and loose debris, particles, or poorly adhered paint, mill scale or other remaining finishes. Before blast remove all oil, grease and dust to insure proper adhesion.

Refer to chart of standards for surface preparation information

Minimum surface prep for:

Galvanized Steel:	SSPC-SP5/NACE 1
Iron & steel:	SSPC-SP7/NACE 4
Previously painted steel	SSPC-SP10/NACE 2
Concrete:	SSPC-SP14/NACE 8
Drywall (new or painted):	Primer recommended

Surface Preparation Standards

Condition of Surface

White metal blast:	New/mill scale	SSPC-SP5 /NACE 1
Near white metal:	New/unused w/ rust over mill scale	SSPC-SP10/NACE 2
Commercial blast:	in-service/previously coated	SSPC-SP6 /NACE 3
Brush-off blast:	Uniform layer of rust/oxide	SSPC-SP7 /NACE 4
High pressure water jet:	Previously painted/ loose rust & debris	SSPC-SP12/NACE 5
Concrete:	All	SSPC-SP13/NACE 6
Industrial blast cleaning:	Used/in-service/ previously coated	SSPC-SP14/NACE 8

Temperature:

Air and surface: 40°F (1.7°C) to 110°F (43.33°C)

DO NOT APPLY OVER ICE

Material: 40°F (1.7°C) minimum

110°F (43.33°C) Maximum

Relative humidity: up to 95%

Ordering information

Packaging:

Part A: 4.8 Gal (18.1 L) in 5 Gallon pail

Part B: 4.8 Gal (18.1 L) in 5 Gallon pail

Weight:

Part A: 13.8 lb/Gal 1.63 Kg/L

Part B: 12.1 lb/Gal 1.45 Kg/L

2 pail minimum= 1 Part A/1 Part B

Safety Precautions

Refer to MSDS before use

Published technical data and instructions are subject to change without notice. Contact EonCoat (252)360-3110 for additional data and information.

Warranty: EonCoat, LLC warrants our product to be free of manufacturing defects in accord with EonCoat quality control procedures. When/if applied by an "EonCoat certified contractor" the coating fails within 5 years of documented Application, EonCoat, LLC will fix/correct or replace the coating (applied) at our cost, labor and material. No other Warranty or guarantee of any kind, implied or expressed is made by EonCoat, LLC.

RELEASED - Printed documents may be obsolete; validate prior to use.



Product Data

Part A Acid
Part B Base

Selection & Specification Data

Generic Type	“ Self-firing” water-based inorganic ceramic coating.
Description	EonCoat is a water-based inorganic ceramic coating that offers corrosion resistance to steel by means of an alloyed layer at the surface of @ 20 microns. All thickness above is added abrasion resistance. It may be used as a pre-construction primer or primer under any desirable top coat. It may also be used as the only coat and still achieve superior results.
Features	<ul style="list-style-type: none"> Un-paralleled corrosion protection High abrasion resistance Strong resistance to most chemicals and acids. Good impact strength ZERO VOC / HAP'S Works best over existing rust Lower level of prep required No detrimental effects of surface salts/chlorides on substrate Unlimited re-coat window <p><u>formulations with broader limits are available for specific applications.</u></p>
Color	<ul style="list-style-type: none"> White base-standard. Grey base-high abrasion
Finish	Matte/Pastel
Topcoats	May be top coated with any conventional paint.
Dry film Thickness	2.0-10 mils (50-250 microns) per coat do not exceed 10 mils per pass.
Solids content	91%
Coverage	225 ft ² @ 5 mils
VOC Values	As supplied or applied: 0 lbs./per gal
Limitations	Temperature exposure of 160F maximum

Application Equipment

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve desired results.

General guidelines

For spray application:

Prepare surface according to previous guideline chart in accordance with SSPC/NACE. Plural airless spray with ½” minimum material hose, with a maximum length of 250’. Gun is to be plural (Probler P2 recommended) with 01 mix chamber and 00 or 01 primary tip w/ 2530 fan tip applied for optimum results. For finer pattern use 3840 or 3640 Fan tip. Please consult your EonCoat representative for Assistance in choosing the proper tip for the project. Alternate for repair or small area spray: HSS dual cartridge dispenser with static mix tip w/air atomization cap. Use 15 – 30 psi atomization air adjusted to desired result.

Conventional spray

Not possible due to rate of reaction when mixing A/B together.

Brush & Roller

Also not possible due to rate of reaction.

Concrete surfaces:

Surface must be clean and free of sealers/curing compounds or previously applied coating. Dirt, dust, oils, or any other contaminants must be removed to insure proper contact with surface. Cracks and expansion joints should be caulked with cementitious material. Cracks should be prepared in dovetail fashion. (▲) If spraying in direct sunlight, monitor surface temperature and be sure not to exceed 120^o F (49^oC). Do not spray over ice or standing or puddle water. Thickness build will be determined by line pressure and ambient conditions, so operator must use discretion as to finish desired. It is recommended to chamfer all edges and inside corners which are greater than 45^o. Surface should be Profiled to insure proper adhesion. Do not apply to Smooth trowel finish. Acid etch or blast profile.



MATERIAL SAFETY DATA SHEET

DATE OF PREPARATION
September 15, 2010

SECTION 1 – PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER

PRODUCT NAME

Eon Coat Paint component **Part A**

MANUFACTURER'S NAME

EonCoat, LLC.
4000 Airport Drive
Wilson, NC 27896
Phone 1-252-360-3110

Telephone Numbers and Websites

Product Information	(252) 360-3110 www.eoncoat.com
Regulatory Information	(252) 360-3110 www.eoncoat.com
Transportation Emergency *	(800) 424-9300
* for chemical emergency ONLY (spill, leak, fire, exposure, or accident)	

SECTION 2 – COMPOSITION/INFORMATION ON INGREDIENTS

CAS number	Hazardous Ingredients	Units	Vapor Pressure
7664-38-2	Phosphoric Acid	OSHA PEL 1mg/m ³ Respirable Fraction	

SECTION 3 – HAZARDS IDENTIFICATION

Routes of Exposure

INHALATION of spray mist
EYE or SKIN contact with the product, or spray mist

Effects of Over Exposure

EYES: Irritation
SKIN: Prolonged or repeated exposure may cause irritation.
INHALATION: Irritation of the upper respiratory system.

Signs and Symptoms of Overexposure

Redness and itching or burning sensation may indicate eye or excessive skin exposure.

Medical Conditions Aggravated by Exposure

None generally recognized

HMIS Codes

Health	1
Flammability	0
Reactivity	0

SECTION 4 – FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.

SKIN: Wash affected area thoroughly with soap and water.

INHALATION: If affected, remove from exposure.

Ingestion: Do not induce vomiting. Get medical attention.

SECTION 5 – FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	FLAMMABILITY CLASSIFICATION
N/A	N/A	N/A	None

EXTINGUISHING MEDIA

This material is neither flammable nor fuel for flame. Use media such as Carbon Dioxide, Dry Chemicals for primary fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS

None

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used. Water spray may be used.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE OF MATERIAL IS SPILLED OR RELEASED

Sweep or vacuum up and place in an appropriate container. Clean up residual material by washing area with water and detergent.

Spilled solid material should be neutralized before final disposal. Soda ash or sodium bicarbonate may be used to neutralize. When discarded or spilled, this product is neither a hazardous waste as defined in current federal regulations 40 CFR, Part 261 (RCRA) nor toxic pollutant as currently defined by the federal EPA per section 307 of the clean water act.

Disposal information: Dispose of in a landfill in accordance with local, state, and federal regulations.

SECTION 7 – HANDLING AND STORAGE

STORAGE CATEGORY

Not Applicable

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

SECTION 8 – EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE

Use with adequate ventilation.

Avoid contact with skin and eyes. Avoid breathing spray mist.

Wash hand after using.

This coating may contain materials classified as nuisance particulates, which may be only present during sanding or abrading of dried film/coating.

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in section 2 in maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure can not be controlled below applicable limits by ventilation, wear a properly fitted respirator approved by NIOSH/MSHA for protection. When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES

Required for long or repeated contact. Any type of chemical resistance gloves can be used.

EYE PROTECTION

Wear safety spectacles with imperforated sideshields.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance/Odor	Viscous suspension/ No odor	
Product Weight	14 lb/ gallons	1500 g/ l
Specific Gravity	1.7	
Boiling Point	Not available	
Melting Point	Not available	
Volatile Volume	~30%	
Evaporation Rate	Slower than ether	
Vapor Density	N/A	
Solubility in Water	N/A	
pH	3 - 5	
Volatile Organic Compounds (VOCs)	0 g/ l	Less water
	0 g/ l	Emitted VOC

SECTION 10 – STABILITY AND REACTIVITY

Stability	Stable
Conditions to Avoid	None known
Incompatibility	None known
Decomposition product	By fire: Oxides of phosphate and potassium

SECTION 11 – TOXICOLOGICAL INFORMATION

This product does not contain any substances that are considered by OSHA, NTP, IARC or ACGIH to be “probable” or “suspected” human carcinogens.

Ingestion of large quantities of this material may cause an osmotic catharsis resulting in diarrhea and probable abdominal cramps.

SECTION 12 – ECOLOGICAL INFORMATION

No data available

SECTION 13 – DISPOSAL CONSIDERATIONS**Waste Disposal Methods**

Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. For additional information refer section 6.

SECTION 14 – TRANSPORTATION INFORMATION**US Ground (DOT), Canada (TDG), IMO**

Not regulated for transportation

SECTION 15 – REGULATORY INFORMATION

SARA 313 (40 CFR 372.65 C) SUPPLIER NOTIFICATION

No ingredient in this product is subject to SARA 313 (40 CFR 372.65C) supplier notification

TSCA Certification

All chemicals in this product are listed, or are exempt from listing, on the TSCA inventory

SECTION 16 – OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers/other commercially available additives to the product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.



MATERIAL SAFETY DATA SHEET

DATE OF PREPARATION
September 15, 2010

SECTION 1 – PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER

PRODUCT NAME

Eon Coat Paint component **Part B**

MANUFACTURER'S NAME

EonCoat, LLC.
4000 Airport Drive
Wilson, NC 27896
Phone 1-252-360-3110

Telephone Numbers and Websites

Product Information	(252) 360-3110 www.eoncoat.com
Regulatory Information	(252) 360-3110 www.eoncoat.com
Transportation Emergency *	(800) 424-9300
* for chemical emergency ONLY (spill, leak, fire, exposure, or accident)	

SECTION 2 – COMPOSITION/INFORMATION ON INGREDIENTS

CAS number	Hazardous Ingredients	Units	Vapor Pressure
01309-42-8	Magnesium Hydroxide	OSHA PEL 15 mg/m ³ Total Dust OSHA PEL 10 mg/m ³ Respirable Fraction	

SECTION 3 – HAZARDS IDENTIFICATION

Routes of Exposure

INHALATION of spray mist
EYE or SKIN contact with the product, or spray mist

Effects of Over Exposure

EYES: Irritation
SKIN: Prolonged or repeated exposure may cause irritation.
INHALATION: Irritation of the upper respiratory system.

Signs and Symptoms of Overexposure

Redness and itching or burning sensation may indicate eye or excessive skin exposure.

Medical Conditions Aggravated by Exposure

None generally recognized

HMIS Codes

Health	1
Flammability	0
Reactivity	0

SECTION 4 – FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.

SKIN: Wash affected area thoroughly with soap and water.

INHALATION: If affected, remove from exposure.

Ingestion: Do not induce vomiting. Get medical attention.

SECTION 5 – FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	FLAMMABILITY CLASSIFICATION
N/A	N/A	N/A	None

EXTINGUISHING MEDIA

This material is neither flammable nor fuel for flame. Use media such as Carbon Dioxide, Dry Chemicals for primary fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS

None

SPECIAL FIRE FIGHTING PROCEDURES

None. Water spray may be used.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE OF MATERIAL IS SPILLED OR RELEASED

Sweep or vacuum up and place in an appropriate container. Clean up residual material by washing area with water and detergent.

Spilled solid material should be neutralized before final disposal. When discarded or spilled, this product is neither a hazardous waste as defined in current federal regulations 40 CFR, Part 261 (RCRA) nor toxic pollutant as currently defined by the federal EPA per section 307 of the clean water act.

Disposal information: Dispose of in a landfill in accordance with local, state, and federal regulations.

SECTION 7 – HANDLING AND STORAGE

STORAGE CATEGORY

Not Applicable

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

SECTION 8 – EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE

Use with adequate ventilation.

Avoid contact with skin and eyes. Avoid breathing spray mist.

Wash hand after using.

This coating may contain materials classified as nuisance particulates, which may be only present during sanding or abrading of dried film/coating.

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in section 2 in maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure can not be controlled below applicable limits by ventilation, wear a properly fitted respirator approved by NIOSH/MSHA for protection. When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES

Required for long or repeated contact. Any type of chemical resistance gloves can be used.

EYE PROTECTION

Wear safety spectacles with imperforated sideshields.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance/Odor	Suspension (Slurry)/ No odor	
Product Weight	12 lbs/ gallons	1500 g/ l
Specific Gravity	1.5	
Boiling Point	N/A	
Melting Point	N/A	
Volatile Volume	~40%	
Evaporation Rate	Slower than ether	
Vapor Density	N/A	
Solubility in Water	N/A	
pH	9-11	
Volatile Organic Compounds (VOCs)	0 g/ l	Less water
	0 g/ l	Emitted VOC

SECTION 10 – STABILITY AND REACTIVITY

Stability	Stable
Conditions to Avoid	None known
Incompatibility	None known
Decomposition product	By fire: Oxide of Magnesium

SECTION 11 – TOXICOLOGICAL INFORMATION

This product does not contain any substances that are considered by OSHA, NTP, IARC or ACGIH to be “probable” or “suspected” human carcinogens.

Ingestion of large quantities of this material may cause an osmotic catharsis resulting in diarrhea and probable abdominal crams.

SECTION 12 – ECOLOGICAL INFORMATION

No data available

SECTION 13 – DISPOSAL CONSIDERATIONS**Waste Disposal Methods**

Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. For additional information refer section 6.

SECTION 14 – TRANSPORTATION INFORMATION

US Ground (DOT), Canada (TDG), IMO

Not regulated for transportation

SECTION 15 – REGULATORY INFORMATION

SARA 313 (40 CFR 372.65 C) SUPPLIER NOTIFICATION

No ingredient in this product is subject to SARA 313 (40 CFR 372.65C) supplier notification

TSCA Certification

All chemicals in this product are listed, or are exempt from listing, on the TSCA inventory

SECTION 16 – OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers/other commercially available additives to the product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

A-6

Halox



SW-111

Zinc Free Corrosion Inhibitor

Technical Data

Chemical Description:

Strontium Phosphosilicate

Product Description:

HALOX[®] SW-111 is a white, nonrefractive, corrosion inhibiting pigment used in protective coating systems. HALOX[®] SW-111 is recommended for use in most water-borne and solvent-borne epoxies. HALOX[®] SW-111 can be formulated into most water reducible resin systems and corrosion resistant caulks and sealants.

Application:

Recommended loading levels range from 5-10% based on total formula weight. Synergistic properties have been found [in the areas of corrosion and humidity resistance] when HALOX[®] SW-111 is used in combination with HALOX[®] Zinc Phosphate [1:1 ratio] in some water-borne systems.

Specific Data:

pH (10% solution by wt)	7.9
Oil Absorption (lbs/100 lbs)	45.1
Density (g/ml)	2.8
Mean Particle Size (microns)	5.9
Hegman Grind	5.0
% Moisture	0.8
% Solubility in water	0.03

These are typical values and do not represent product specifications.



A Division of Hammond Group, Inc.
1326 Summer Street
Hammond, IN 46320 USA
tel: 219-933-1560
fax: 219-933-1570
e-mail: techservice@halox.com

Revised: 09/06/07

Our Quality System is ISO 9001:2000 Certified

The information contained within is believed to be reliable, but is presented without warranties, express or implied, including, but not limited to, any implied warranty of merchantability or fitness for a particular purpose. User is responsible for determining whether the HALOX product is fit for a particular purpose and suitable for user's method of application.



1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURED BY: HALOX
1326 Summer Street
Hammond, IN 46320-2240

PRODUCT NAME: HALOX® SW-111

Phone: 219-933-1560 (US Central) M-F 8:00 am - 5:00 pm

Emergency Phone: 219-845-0031

Chemtrec: 1-800-424-9300

Product Use: Corrosion inhibiting pigment, commonly used in the production of protective coating systems.

2. COMPOSITION/INFORMATION ON INGREDIENTS

There are no hazardous ingredients as defined by 29 CFR 1910.1200.

HMIS

HEALTH:	1
FLAMMABILITY:	0
REACTIVITY:	0
PERSONAL PROTECTION:	*

* Recommended personal protective measures are identified in Section 8.0 of this document.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

This material is a white, odorless powder.

This material is not flammable. However, if involved in a fire, may emit toxic fumes.

Excessive airborne concentrations may obscure vision and present an inhalation and ingestion hazard.

Spill materials and associated run-off should not be allowed to reach waterways.

POTENTIAL ACUTE HEALTH EFFECTS:

EYE CONTACT:

May cause moderate to severe irritation, inflammation of the mucous membranes, and tearing of the eyes.

SKIN CONTACT:

May cause irritation to skin through mechanical abrasion or physically irritating deposition.

INGESTION:

May cause irritation of gastrointestinal tract, nausea, and vomiting.

INHALATION:

May cause irritation to the upper respiratory tract, difficulty in breathing, nasal discharge, chest pain, wheezing and coughing.

Routes of Exposure: Inhalation, ingestion, skin and eye contact.

Date of Last Revision: June 12, 2008

POTENTIAL CHRONIC HEALTH EFFECTS:

Chronic exposures are considered negligible.

Medical conditions aggravated by exposure: Any pre-existing lung or pulmonary condition.

4. FIRST AID MEASURES**INHALATION:**

Remove victim to fresh air. Restore breathing if necessary (AR, CPR). Seek medical attention if symptoms develop or persist.

INGESTION:

If victim is alert, wash out mouth with water. Seek medical attention if symptoms develop or persist.

EYES:

Do not let victim rub eyes. Flush eyes well with water for at least 15 minutes. If irritation persists, seek medical attention.

SKIN:

Wash exposed area with soap and water. If irritation persists, seek medical attention.

5. FIRE FIGHTING MEASURES

FLASH POINT (° F) Not applicable.

OSHA FLAMMABILITY CLASSIFICATION: Not Applicable.

EXTINGUISHING MEDIA: This material is not flammable and will not react with commercially available extinguishing media. Use appropriate media for surrounding fire.

SPECIAL FIREFIGHTING PROCEDURES: Firefighters should wear a positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing.

AUTOIGNITION TEMP (° F) Unknown

UNUSUAL FIRE AND EXPLOSION HAZARDS: None.

6. ACCIDENTAL RELEASE MEASURES**ACTION TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:**

Always wear recommended personal protective equipment. Limit foot and vehicular traffic to minimize mechanical agitation and dispersion. The spill should first be contained and the area should be cleaned by wet-sweeping or vacuum cleaning (HEPA filter). Notify In-plant Spill Response Coordinator or appropriate party to determine any additional requirements pertaining to spill response.

CONTAINMENT TECHNIQUES: This is a solid material and will not travel far from the spill location unless mechanically agitated. Therefore, no specific containment techniques are recommended outside of restricting access to the spill location.

SPILL RESPONSE EQUIPMENT:

- Vacuum, equipped with HEPA filter
- Dustpan, shovel or scoop
- Broom, wet mop
- Bags, drums or sacks for collection

SPILL RESPONSE PERSONAL PROTECTIVE EQUIPMENT:

- Rubber or leather gloves
- Cotton overalls
- Chemical/safety impact goggles
- If airborne concentrations cannot be controlled below the required or recommended exposure limits, respiratory equipment, as per Section 8.0, may be required.

7. HANDLING AND STORAGE

HANDLING:

Always wear recommended personal protective equipment. Avoid dust generation.

STORAGE:

Store in a cool, dry, well-ventilated area away from sources of ignition. Keep containers tightly closed when not in use. Use care when handling and storing containers to prevent damage.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: General mechanical ventilation is acceptable, as long as concentrations are maintained below required/recommended limits. Where acceptable concentrations cannot be maintained by general mechanical ventilation, local exhaust ventilation is recommended.

RESPIRATORY PROTECTION EQUIPMENT: NIOSH/MSHA approved respiratory protection is recommended for use in airborne concentrations exceeding exposure limits identified in section 2. Where no required/recommended exposure limits exist, personal protection measures should be incorporated when potential airborne concentrations may exceed 10 mg/m³ total dust and 3 mg/m³ respirable dust (particulate containing no asbestos and <1% crystalline silica).

PROTECTIVE GLOVES: Rubber or leather gloves and cotton coveralls are recommended to prevent direct skin contact.

EYE AND FACE PROTECTION: Wear safety glasses or goggles to protect against exposure.

OTHER PROTECTIVE EQUIPMENT: An emergency eye wash is recommended in the work area and should, at a minimum, meet the requirements under ANSI Z.358.1 for location, design, and operation.

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Range/Point	None established
Freezing Point	None established
Melting Point	1540 °C (2804 °F)
Vapor Pressure	Not applicable
Vapor Density (AIR=1)	Not applicable
Physical State	Powder
Color	White
Percent Moisture	0.8
Solubility in Water	0.03%
% Volatile by Weight	Not applicable

Evaporation Rate (Butyl Acetate=1)	Not applicable
Density	2.8 g/ml
pH*	7.9
Mean Particle Size (µm)	5.9

*at 10% slurry by weight in water.

10. STABILITY AND REACTIVITY

STABILITY: Stable.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS THERMAL DECOMPOSITION/COMBUSTION PRODUCTS: After prolonged contact with water, this substance will revert to its associated salts.

INCOMPATIBILITY (MATERIALS TO AVOID): This product will solubilize in acid, ammonia hydroxide, or prolonged contact with water.

CONDITIONS TO AVOID: Incompatible materials, excess heat.

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: This product contains wollastonite. Wollastonite is listed by IARC as a Group 3 carcinogen. Therefore, there is inadequate evidence of its carcinogenicity in humans and inadequate or limited evidence in experimental animals.

ACUTE ORAL LD50 (mg/kg): 2,770 (RABBIT)

ACUTE INHALATION LC50: No data at this time.

ACUTE DERMAL LD50 (mg/kg): No data at this time.

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: No data at this time

CHEMICAL FATE INFORMATION: No data at this time.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Re-blend spilled, unused, off-specification materials with other materials, where possible, in support of waste minimization. Where this is not possible, dispose of material according to Federal (country-specific), state, and local requirements.

EMPTY CONTAINERS: This product may be shipped in paper or nylon bags, steel drums, plastic or steel pails, or intermediate bulk containers. All residual material should be emptied and the containers recycled where possible. Where recycling is not possible, all containers should be disposed of in accordance with Federal (country-specific), state, and local requirements.

14. TRANSPORT INFORMATION

DOT SHIPPING NAME: Not Regulated

AIR FREIGHT TRANSPORTATION: Not Regulated

OCEAN TRANSPORTATION: Not Regulated

15. REGULATORY INFORMATION

TSCA STATUS:

All components of this product are on the US TSCA Inventory.

CALIFORNIA PROPOSITION 65:

This product is not known to contain any chemicals known to the state of California to cause cancer or birth defects. However, we do not conduct routine analysis for all listed materials.

SARA 302 EXTREMELY HAZARDOUS SUBSTANCES LIST:

This product does not contain greater than 1.0% of any chemical substance on the SARA Extremely Hazardous Substance List.

SARA (311, 312) HAZARD CLASS:

None

SARA SECTION 313 TOXIC CHEMICALS:

None

CANADIAN INVENTORY:

All components are on the Domestic Substance List (DSL).

EINECS REGULATIONS:

All components are on the European Inventory of Existing Commercial Chemical Substances (EINECS).

16. OTHER INFORMATION

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES:

The information in this document is believed to be correct as of the date issued. However, no warranty of merchantability, fitness for any particular purpose, or any other warranty is expressed or is to be implied regarding the accuracy or completeness of this information, the results to be obtained from the use of this information or the product, the safety of this product, or the hazards related to its use. This information and product are furnished on the condition that the person receiving them shall make his own determination as to the suitability of the product for his particular purpose and on the condition that he assume the risk of his use thereof.

17. LABEL INFORMATION

SIGNAL WORD: NOTICE

TARGET ORGANS: May cause eye, skin, or respiratory irritation.

EYES: Do not let victim rub eyes. Flush eyes well with water for at least 15 minutes. If irritation persists, seek medical attention.

SKIN: Wash exposed area with soap and water. If irritation persists, seek medical attention.

- INGESTION:** If victim is alert, wash out mouth with water. Seek medical attention if symptoms develop or persist.
- INHALATION:** Remove victim to fresh air. Restore breathing if necessary (AR, CPR). Seek medical attention if symptoms develop or persist.
- HANDLING:** Always wear recommended personal protective equipment. Avoid contact with skin, eyes and clothing.
- STORAGE:** Store in a cool, dry, well-ventilated area away from sources of ignition. Keep containers tightly closed when not in use. Use care when handling and storing containers to prevent damage.
- IN CASE OF SPILL:** Collect and dispose in accordance with federal, state and local regulations.
- EXTINGUISHING MEDIA:** This material is not flammable and will not react with commercially available extinguishing media. Use appropriate media for surrounding fire.
- CALIFORNIA PROPOSITION 65:** This product is not known to contain any chemicals known to the state of California to cause cancer or birth defects. However, we do not conduct routine analysis for all listed materials.

A-7

Heresite Protective Coatings, LLC



CSE-6400 Series

Two component epoxy amine industrial coating

CSE-6400 series of epoxy coating is designed for services where flexibility of the coating is critical. Other key attributes of this coating is the excellent abrasion and chemical resistance. Along with the high gloss and the smooth surface makes this coating applicable for use in storage equipment such as hopper cars and bins.

Flexibility: CSE-6400 series passes a 1/8 in mandrel bend test.

Abrasion Resistance: 70 mg weight loss per 1000 cycles using a CS17 wheel and 1000 gm weight.

Colors: Standard color is gray, other colors are available upon request.

VOC (mixed): 0.2 #/gal (24 g/L) no exempt solvents or water.

Solids by volume: 98%

Theoretical Coverage: 1,572 ft²/gal/mil

Dry Film Thickness: 10 mils (254 microns)

Primer: Normally not required. This coating is designed to be direct to metal. Use of a primer without direction of the company voids any warranty.

To the best of our knowledge the information herein is true and accurate at the time of issuance and are subject to change without prior notice. No guarantee of accuracy is given or implied. We guarantee our products conform to strict quality control. We assume no responsibility for coverage, performance or injuries resulting from use. Liability, if any, is limited to replacement of products. Prices are subject to change without prior. **NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY THE SELLER, EXPRESS OR IMPLIED, STATUTORY, BY OPERATION OR LAW, INCLUDING MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE.**

HERESITE PROTECTIVE COATINGS, LLC. , 822 south 14th Street, Manitowoc, WI 54220. 1-800-558-7747: e-mail: sales@heresite.com



Heresite CSE-6400X Epoxy

Generic Type: two component, cross linked amine cured epoxy

Recommended Usage: Heresite CSE-6400 is a flexible, abrasion resistant, impact resistant, high gloss solvent free epoxy, designed as a one coat lining for hopper cars and other demanding tank applications

Product Features:

- One coat direct to metal
- Meets FDA requirements of 21CFR 175.300
- Excellent release properties, high gloss
- Impact Resistant
- Quick dry to workable and fast full cure
- Excellent Chemical Resistance
- Excellent Abrasion resistance
- Odorless

Physical Data:

Primers: self-priming

Solids by volume: 99% ± 1%

VOC Value: 0.1 LBS/gallon (method 24)

Dry Film Thickness: 8-12 mils, one coat application

Gloss: 80-90 @ 60°

Flexibility: Passes 1/8 inch Mandrel Bend test (ASTM D 522) @ 12 mils dry film thickness

Direct Impact resistance: 100 lbs. at 12 mils

Reverse Impact resistance: 40 lbs. at 12 mils

Dry to handle at room temperature: 10 to 12 hours @ 12 mils dry film thickness

Dry to handle heated:

1.5 hours @ 120°F

45 minutes @ 180°F

Full Cure at room temperature: 7 days passes MEK 100 rub test after 7 days

Full cure heating schedule:

Full cure = 4 hours @ 120°F after 1 hour flash off

Full cure = for 1 hour @ 180°F after 1 hour flash off

Theoretical Coverage: 1300 square feet per gallon per 1 mil

Mix ratio:

1:

1 (A to B) no thinning required

Application: By airless heated plural component spray equipment

A-8

International Paint

Safety Data Sheet**EPA233 INTERCURE 202 BUFF PART A****Version No. 2 Date Last Revised 29/11/11**

Conforms to the requirements of Regulation (EC) No.1907/2006 (REACH), Annex II and Regulation (EC) No.1272/2008

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1. Product identifier** INTERCURE 202 BUFF PART A

Product Code EPA233

Registration Number

1.2. Relevant identified uses of the substance or mixture and uses advised against

Intended use See Technical Data Sheet.

Application Method See Technical Data Sheet.

1.3. Details of the supplier of the safety data sheet**Manufacturer** International Paint Ltd.
Stoneygate Lane
Felling Gateshead
Tyne and Wear
NE10 0JY UK**Telephone No.** +44 (0)191 469 6111**Fax No.** +44 (0)191 438 3711**1.4. Emergency telephone number****Manufacturer** +44 (0)191 469 6111 24hr**Official Advisory Body Telephone No.:**
Advice for Doctors and Hospitals

+44 (0)844 892 0111

Email sdsfellinguk@akzonobel.com**SECTION 2: Hazards identification****2.1. Classification of the substance or mixture****Mixture NOT yet classified according to Regulation (EC) No. 1272/2008****Classification according to 67/548/EEC or 1999/45/EC.**Xi Irritant.
N Dangerous for the environment.R10 Flammable.
R36/38 Irritating to eyes and skin.
R43 May cause sensitisation by skin contact.
R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

2.2. Label elements

According to 1999/45/EC



Irritant



Dangerous for the environment

Contains: Epoxy resin (MW 700 - 1000), Epoxy resin (av.mol.wt.<700), Epoxy novolac resin,
R10 Flammable.
R36/38 Irritating to eyes and skin.
R43 May cause sensitisation by skin contact.
R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

S23 Do not breathe vapour/spray.
S24 Avoid contact with skin.
S37 Wear suitable gloves.
S51 Use only in well-ventilated areas.

P. Phrases;

Contains epoxy constituents. See information supplied by the manufacturer.

2.3. Other hazards

This product contains no PBT/vPvB chemicals.

SECTION 3: Composition/information on ingredients

If the product contains substances that present a health hazard within the meaning of the Dangerous Substances Directive 67/548/EC, or have occupational exposure limits detailed in EH40, these substances are listed below.

Ingredient/Chemical Designations	Weight %	67/548/EEC Classification	EC No. 1272/2008 Classification	Notes
Zinc phosphate CAS Number: 0007779-90-0 EC No. 231-944-3 Index No.: 030-011-00-6 REACH Reg. No.: 01-2119485044-40-xxxx	25 - < 50	N;R50-53	Aquatic Acute 1;H400 Aquatic Chronic 1;H410	[1]
Epoxy resin (av.mol.wt.<700) CAS Number: 0025068-38-6 EC No. 500-033-5 Index No.: 603-074-00-8 REACH Reg. No.: 01-2119456619-26-xxxx	2.5 - < 10	R43 Xi;R36/38 N;R51-53	Eye Irrit. 2;H319 Skin Irrit. 2;H315 Skin Sens. 1;H317 Aquatic Chronic 2;H411	[1]
Xylene CAS Number: 0001330-20-7 EC No. 215-535-7 Index No.: 601-022-00-9 REACH Reg. No.:	2.5 - < 10	R10 Xn;R20/21 Xi;R38	Flam. Liq. 3;H226 Acute Tox. 4;H332 Acute Tox. 4;H312 Skin Irrit. 2;H315	C [1][2]
1-methoxypropan-2-ol CAS Number: 0000107-98-2 EC No. 203-539-1 Index No.: 603-064-00-3 REACH Reg. No.: 01-2119457435-35-xxxx	2.5 - < 10	R10 R67	Flam. Liq. 3;H226 STOT SE 3;H336	[1][2]
Epoxy novolac resin CAS Number: 0028064-14-4	2.5 - < 10	Xi;R36/38 Xi;R43 N;R51/53	Skin Irrit. 2;H315 Eye Irrit. 2;H319	[1]

RELEASED - Printed documents may be obsolete; validate prior to use.

EC No. 500-108-2 Index No.: REACH Reg. No.:			Skin Sens. 1;H317 Aquatic Chronic 2;H411	
Epoxy resin (MW 700 - 1000) CAS Number: 0025036-25-3 EC No. Index No.: REACH Reg. No.:	2.5 - < 10	Xi;R36/38 R43	Eye Irrit. 2;H319 Skin Irrit. 2;H315, Skin Sens. 1;H317	[1]
Butan-1-ol CAS Number: 0000071-36-3 EC No. 200-751-6 Index No.: 603-004-00-6 REACH Reg. No.: 01-2119484630-38-xxxx	2.5 - < 10	R10 Xn;R22 Xi;R37/38-41 R67	Flam. Liq. 3;H226 Acute Tox. 4;H302 STOT SE 3;H335 Skin Irrit. 2;H315 Eye Dam. 1;H318 STOT SE 3;H336	[1][2]
Ethylbenzene CAS Number: 0000100-41-4 EC No. 202-849-4 Index No.: 601-023-00-4 REACH Reg. No.:	1 - < 2.5	F;R11 Xn;R20	Flam. Liq. 2;H225 Acute Tox. 4;H332	[1][2]
Solvent naphtha (petroleum), light aromatic CAS Number: 0064742-95-6 EC No. 265-199-0 Index No.: 649-356-00-4 REACH Reg. No.:	0 - < 1	Xn;R65	Asp. Tox. 1;H304	H; P [1]

[1] Substance classified with a health or environmental hazard.

[2] Substance with a workplace exposure limit.

[3] PBT-substance or vPvB-substance.

*The full texts of the phrases are shown in Section 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

General

In all cases of doubt, or when symptoms persist, seek medical attention.

Never give anything by mouth to an unconscious person.

Inhalation

Remove to fresh air, keep patient warm and at rest. If breathing is irregular or stopped, give artificial respiration. If unconscious place in the recovery position and obtain immediate medical attention. Give nothing by mouth.

Skin

Remove contaminated clothing. Wash skin thoroughly with soap and water or use a recognised skin cleanser. Do NOT use solvents or thinners.

Eye

Irrigate copiously with clean fresh water for at least 10 minutes, holding the eyelids apart and seek medical attention.

Ingestion

If accidentally swallowed obtain immediate medical attention. Keep at rest. Do NOT induce vomiting.

4.2. Most important symptoms and effects, both acute and delayed

No data available

4.3. Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Fire-fighting measures

5.1. Extinguishing media

Recommended extinguishing media; alcohol resistant foam, CO². powder, water spray.

Do not use; water jet.

5.2. Special hazards arising from the substance or mixture

Fire will produce dense black smoke. Decomposition products may include the following materials: carbon monoxide, carbon dioxide, smoke, oxides of nitrogen.

Avoid exposure and use breathing apparatus as appropriate.

5.3. Advice for fire-fighters

Cool closed containers exposed to fire by spraying them with water. Do not allow run off water and contaminants from fire fighting to enter drains or water courses.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Remove sources of ignition, do not turn lights or unprotected electrical equipment on or off. In case of a major spill or spillage in a confined space evacuate the area and check that solvent vapour levels are below the Lower Explosive Limit before re-entering.

6.2. Environmental precautions

Do not allow spills to enter drains or watercourses.

6.3. Methods and material for containment and cleaning up

Ventilate the area and avoid breathing vapours. Take the personal protective measures listed in section 8.

Contain and absorb spillage with non-combustible materials e.g. sand, earth, vermiculite. Place in closed containers outside buildings and dispose of according to the Waste Regulations. (See section 13).

Clean, preferably with a detergent. Do not use solvents.

Do not allow spills to enter drains or watercourses.

If drains, sewers, streams or lakes are contaminated, inform the local water company immediately. In the case of contamination of rivers, streams or lakes the Environmental Protection Agency should also be informed.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Handling

This coating contains solvents. Solvent vapours are heavier than air and may spread along floors. Vapours may form explosive mixtures with air. Areas of storage, preparation and application should be ventilated to prevent the creation of flammable or explosive concentrations of vapour in air and avoid vapour concentrations higher than the occupational exposure limits.

In Storage

Handle containers carefully to prevent damage and spillage.

Naked flames and smoking should not be permitted in storage areas. It is recommended that fork lift trucks and electrical equipment are protected to the appropriate standard.

7.2. Conditions for safe storage, including any incompatibilities

Keep away from the following materials: oxidising agents, strong alkalis, strong acids.

Avoid skin and eye contact. Avoid inhalation of vapours and spray mists. Observe label precautions. Use personal protection as shown in section 8.

Smoking, eating and drinking should be prohibited in all preparation and application areas.

Never use pressure to empty a container; containers are not pressure vessels.

Store in a well ventilated, dry place away from sources of heat and direct sunlight.

Store on concrete or other impervious floor, preferably with bunding to contain any spillage. Do not stack more than 3 pallets high.

Keep container tightly closed. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Keep in the original container or one of the same material.

Prevent unauthorised access.

Activities such as sanding, burning off etc. of paint films may generate dust and/or fumes hazardous to the skin and lungs. Sanding dust may contain levels of unreacted hazardous materials which may cause irritation and sensitization; these are highest in the first 24/48 hours after application. Work in well ventilated areas. Use local exhaust ventilation and personal skin and respiratory protective equipment as appropriate.

7.3. Specific end use(s)

There are no exposure scenarios, see details in section 1.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

The following workplace exposure limits have been established by the Health and Safety Executive as published in EH40.

Material	Short term (15 min. ave)		Long term (8hr TWA)		Comments
	ppm	mg/m ³	ppm	mg/m ³	
1-methoxypropan-2-ol	150	560	100	375	+
Butan-1-ol	50	154	-	-	+
Ethylbenzene	125	552	100	441	+
Xylene	100	441	50	220	+

For Key to entries in 'Comments' column see Section 16

DNEL/PNEC values

No Data Available

8.2. Exposure controls

Provide adequate ventilation. Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction. If these are not sufficient to maintain concentrations of particulates and any vapour below occupational exposure limits suitable respiratory protection must be worn.

Eye/face protection

Wear safety eyewear, e.g. safety spectacles, goggles or visors to protect against the splash of liquids. Eyewear should meet the requirements of standard EN 166.

Skin protection

For prolonged or repeated contact use protective gloves. Barrier creams may help to protect the exposed areas of skin, they should however not be applied once exposure has occurred. Skin should be washed after contact.

Use chemical resistant gloves classified under Standard EN 374: Protective gloves against chemicals and micro-organisms. Recommended gloves: Viton® or Nitrile

Breakthrough Time: 480 min

RELEASED - Printed documents may be obsolete; validate prior to use.

When prolonged or frequently repeated contact may occur, a glove with a protection class of 6 (breakthrough time greater than 480 minutes according to EN 374) is recommended. When only brief contact is expected, a glove with a protection class of 2 or higher (breakthrough time greater than 30 minutes according to EN 374) is recommended.

NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

The user must check that the final choice of type of glove selected for handling this product is the most appropriate and takes into account the particular conditions of use, as included in the user's risk assessment.

Other

Overalls which cover the body, arms and legs should be worn. Skin should not be exposed. Barrier creams may help to protect areas which are difficult to cover such as the face and neck. They should however not be applied once exposure has occurred. Petroleum jelly based types such as Vaseline should not be used. All parts of the body should be washed after contact.

Respiratory protection

If workers are exposed to concentrations above the exposure limit they must use the appropriate, certified respirators. For maximum protection when spraying this product it is recommended that a multi layer combination type filter, such as ABEK1, is used. In confined spaces use compressed air or fresh air respiratory equipment.

Thermal hazards

No Data Available

SECTION 9: Physical and chemical properties

Appearance	Light Coloured Liquid
Odour	Smell of Solvent
Odour threshold	Not Measured
pH	Not Measured
Melting point / freezing point (°C)	Not Measured
Initial boiling point and boiling range (°C)	100
Flash point (°C)	23
Evaporation rate (Ether = 1)	Not Measured
Flammability (solid, gas)	Not Applicable
Upper/lower flammability or explosive limits	Lower Explosive Limit: Not Measured Upper Explosive Limit: Not Measured
Vapour pressure (Pa)	Not Measured
Vapour density	Heavier than air.
Relative density	1.91
Solubility(ies)	Immiscible
Partition coefficient n-octanol/water (Log Kow)	Not Measured
Auto-ignition temperature (°C)	Not Measured
Decomposition temperature (°C)	Not Measured
Viscosity (cSt)	Not Measured

9.2. Other information

SECTION 10: Stability and reactivity

10.1. Reactivity

No data available

10.2. Chemical stability

Stable under recommended storage and handling conditions (see section 7). When exposed to high temperatures may produce hazardous decomposition products such as carbon monoxide, carbon dioxide, oxides of nitrogen and smoke.

Keep away from oxidising agents, strongly alkaline and strongly acid materials in order to avoid possible exothermic reactions.

10.3. Possibility of hazardous reactions

May react exothermically with: oxidising agents, strong alkalis, strong acids.

10.4. Conditions to avoid

Stable under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

Keep away from the following materials: oxidising agents, strong alkalis, strong acids.

10.6. Hazardous decomposition products

Fire will produce dense black smoke. Decomposition products may include the following materials: carbon monoxide, carbon dioxide, smoke, oxides of nitrogen.

Avoid exposure and use breathing apparatus as appropriate.

SECTION 11: Toxicological information

Acute toxicity

Exposure to solvent vapour concentrations from the component solvents in excess of the stated occupational exposure limits may result in adverse health effects such as mucous membrane and respiratory system irritation and adverse effects on the kidneys, liver and central nervous system. Symptoms include headache, nausea, dizziness, fatigue, muscular weakness, drowsiness and in extreme cases, loss of consciousness.

Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin resulting in dryness, irritation and possible non-allergic contact dermatitis. Solvents may also be absorbed through the skin. Splashes of liquid in the eyes may cause irritation and soreness with possible reversible damage.

Based on the properties of the epoxy constituents and considering toxicological data on similar preparations this preparation may be an irritant and a skin and respiratory sensitiser. Low molecular weight epoxy constituents are irritating to eyes, mucous membranes and skin. Repeated skin contact may lead to irritation and sensitisation, possibly with cross-sensitisation to other epoxies. Skin contact with the preparation and exposure to spray mist and vapour should be avoided.

Ingredient	Oral LD50, mg/kg	Skin LD50, mg/kg	Inhalation Vapour LD50, mg/L/4hr	Inhalation Dust/Mist LD50, mg/L/4hr
1-methoxypropan-2-ol - (107-98-2)	5,000.00, Rat	13,000.00, Rabbit	Not Available	Not Available
Butan-1-ol - (71-36-3)	2,292.00, Rat	3,430.00, Rabbit	Not Available	Not Available
Epoxy novolac resin - (28064-14-4)	2,000.00, Rat	Not Available	Not Available	Not Available
Epoxy resin (av.mol.wt.<700) - (25068-38-6)	2,000.00, Rat	2,000.00, Rabbit	Not Available	Not Available
Epoxy resin (MW 700 - 1000) - (25036-25-3)	Not Available	Not Available	Not Available	Not Available
Ethylbenzene - (100-41-4)	3,500.00, Rat	15,433.00, Rabbit	17.20, Rat	Not Available

Solvent naphtha (petroleum), light aromatic - (64742-95-6)	6,800.00, Rat	3,400.00, Rabbit	Not Available	Not Available
Xylene - (1330-20-7)	4,299.00, Rat	1,548.00, Rabbit	20.00, Rat	Not Available
Zinc phosphate - (7779-90-0)	5,000.00, Rat	Not Available	Not Available	Not Available

SECTION 12: Ecological information

12.1. Toxicity

The preparation has been assessed following the conventional method of the Dangerous Preparations Directive 1999/45/EC and is classified for eco-toxicological properties accordingly. See Sections 2 and 3 for details.

There are no data available on the product itself.

The product should not be allowed to enter drains or water courses.

Aquatic Ecotoxicity

Ingredient	96 hr LC50 fish, mg/l	48 hr EC50 crustacea, mg/l	ErC50 algae, mg/l
Zinc phosphate - (7779-90-0)	0.09, Oncorhynchus mykiss	0.04, Daphnia magna	0.136 (72 hr), Selenastrum capricornutum
Epoxy resin (av.mol.wt.<700) - (25068-38-6)	3.10, Pimephales promelas	1.40, Daphnia magna	Not Available
Xylene - (1330-20-7)	3.30, Oncorhynchus mykiss	8.50, Palaemonetes pugio	100.00 (72 hr), Chlorococcales
1-methoxypropan-2-ol - (107-98-2)	1,000.00, Oncorhynchus mykiss	500.00, Daphnia magna	1,000.00 (96 hr), Selenastrum capricornutum
Epoxy novolac resin - (28064-14-4)	9.00, Oncorhynchus mykiss	9.00, Daphnia magna	Not Available
Epoxy resin (MW 700 - 1000) - (25036-25-3)	Not Available	Not Available	Not Available
Butan-1-ol - (71-36-3)	1,376.00, Pimephales promelas	1,328.00, Daphnia magna	500.00 (96 hr), Scenedesmus subspicatus
Ethylbenzene - (100-41-4)	4.20, Oncorhynchus mykiss	2.93, Daphnia magna	3.60 (96 hr), Pseudokirchneriella subcapitata
Solvent naphtha (petroleum), light aromatic - (64742-95-6)	9.22, Oncorhynchus mykiss	6.14, Daphnia magna	19.00 (72 hr), Selenastrum capricornutum

12.2. Persistence and degradability

There is no data available on the preparation itself.

12.3. Bioaccumulative potential

Not Measured

12.4. Mobility in soil

No data available

12.5. Results of PBT and vPvB assessment

This product contains no PBT/vPvB chemicals.

12.6. Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Do not allow into drains or water courses. Wastes and emptied containers should be disposed of in accordance with regulations made under the Control of Pollution Act and the Environmental Protection Act.

Using information provided in this data sheet advice should be obtained from the Waste Regulation Authority, whether the special waste regulations apply.

The European Waste Catalogue Classification of this product, when disposed of as waste is 08 01 11 Waste paint and varnish containing organic solvents or other dangerous substances. If mixed with other wastes this code may no longer apply and the appropriate code should be assigned. For further information contact your local waste authority.

SECTION 14: Transport information

14.1. UN number 1263

14.2. UN proper shipping name PAINT

14.3. Transport hazard class(es)

ADR/RID/ADN UN1263 Paint, 3, III

IMDG class/div 3 **Sub Class** -
Segregation Group No segregation group appropriate

EmS F-E,S-E

ICAO/IATA Air class 3 **Sub Class** -

14.4. Packing group III

14.5. Environmental hazards

ADR/RID/ADN Environmentally Hazardous: Yes

IMDG Marine Pollutant: Yes (Zinc phosphate)

14.6. Special precautions for user

No further information

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not Applicable

SECTION 15: Regulatory information

EU Legislation

REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.

REGULATION (EC) No 1907/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC

National Legislation

UKSI 2009 No. 716 CHEMICALS (HAZARD INFORMATION AND PACKAGING FOR SUPPLY)

SECTION 16: Other information

IMPORTANT NOTE: the information contained in this data sheet (as may be amended from time to time) is not intended to be exhaustive and is presented in good faith and believed to be correct as of the date on which it is prepared. It is the user's responsibility to verify that this data sheet is current prior to using the product to which it relates.

Persons using the information must make their own determinations as to the suitability of the relevant product for their purposes prior to use. Where those purposes are other than as specifically recommended in this safety data sheet, then the user uses the product at their own risk.

MANUFACTURER'S DISCLAIMER: the conditions, methods and factors affecting the handling, storage, application, use and disposal of the product are not under the control and knowledge of the manufacturer. Therefore the manufacturer does not assume responsibility for any adverse events which may occur in the handling, storage, application, use, misuse or disposal of the product and, so far as permitted by applicable law, the manufacturer expressly disclaims liability for any and all loss, damages and/or expenses arising out of or in any way connected to the storage, handling, use or disposal of the product. Safe handling, storage, use and disposal are the responsibility of the users. Users must comply with all applicable health and safety laws.

Unless we have agreed to the contrary, all products are supplied by us subject to our standard terms and conditions of business, which include limitations of liability. Please make sure to refer to these and / or the relevant agreement which you have with AkzoNobel (or its affiliate, as the case may be).

© AkzoNobel

The information in this Health & Safety Data Sheet is required pursuant to EC Regulation 1907(2006) and the Chemicals (Hazard Information & Packaging for Supply) Regulations 2009.

Key to 'Comments' column in Section 8.

- (+) There is a risk of absorption through unbroken skin.
- (C) Capable of causing cancer and/or heritable genetic damage.
- (R) Suppliers recommended limit.
- (S) Capable of causing occupational asthma.

The full text of the R, H & EUH phrases appearing in section 3 is:

- H225 Highly flammable liquid and vapour.
- H226 Flammable liquid and vapour.
- H302 Harmful if swallowed.
- H304 May be fatal if swallowed and enters airways.
- H312 Harmful in contact with skin.
- H315 Causes skin irritation.
- H317 May cause an allergic skin reaction.
- H318 Causes serious eye damage.
- H319 Causes serious eye irritation.
- H332 Harmful if inhaled.
- H335 May cause respiratory irritation.
- H336 May cause drowsiness and dizziness.
- H400 Very toxic to aquatic life.
- H410 Very toxic to aquatic life with long lasting effects.
- H411 Toxic to aquatic life with long lasting effects.
- R10 Flammable.

R11 Highly flammable.

R20 Harmful by inhalation.

R20/21 Harmful by inhalation and in contact with skin.

R22 Harmful if swallowed.

R36/38 Irritating to eyes and skin.

R37/38 Irritating to respiratory system and skin.

R38 Irritating to skin.

R41 Risk of serious damage to eyes.

R43 May cause sensitisation by skin contact.

R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R65 Harmful: may cause lung damage if swallowed.

R67 Vapours may cause drowsiness and dizziness.

The following sections have changed since the previous revision.

SECTION 11: Toxicological information

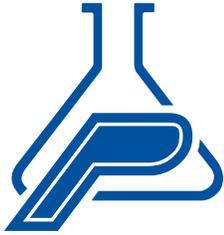
End of document



Your attention is drawn to the disclaimer on the Product Data Sheet which with this Safety Data Sheet and the package labelling comprise an integral information system about this product. Copies of the Product Data Sheet are available from International Paint on request or from our Internet sites : www.yachtpaint.com , www.international-marine.com, www.international-pc.com

A-9

Polycoat USA



**POLYCOAT
PRODUCTS**
A Division of American Polymers Corp.

POLYPRIME 3042

*Polyamine Epoxy
Primer / Sealer*

Technical Data Sheet

DESCRIPTION

Polyprime 3042 is a two component, 100% solids, liquid applied primer. This primer has been developed for use on carbon steel, non-ferrous metal, fiberglass, PVC pipe, as well as concrete and masonry.

FEATURES

- ❖ 100% Solids
- ❖ Low Viscosity Epoxy Coating
- ❖ Surface Tolerant Primer Sealer
- ❖ Provides Limited Chemical Resistance
- ❖ Versatile Application: Spray, Roll or Brush

TYPICAL USES

- ❖ Mining and Milling Industry
- ❖ Pulp and Paper Industry
- ❖ Steel Structures and Bridges
- ❖ Food Processing Facilities
- ❖ Concrete Floors and Decks
- ❖ Power Generating Plants
- ❖ Water and Wastewater Treatment Plants
- ❖ Chemical and Pharmaceutical Industries
- ❖ Petrochemical Plants
- ❖ Storage Tanks
- ❖ Industrial Flooring

TYPICAL APPLICATIONS

To be used as a primer over Carbon Steel, Galvanized Steel, Aluminum, Existing Coating, and Concrete. It is to be top-coated with Polycoat's plural component spray systems such as Polyeuro® 1050H, Polyeuro® 5502, Polyeuro® MPL or polyaspartic topcoats such as Polycoat-Staingard 6000 or 6072, as well as with moisture cured polyurethane systems, such as Polyglaze 100, Polycoat-Staingard 1110, or Diamondglaze 1000.

COLORS

Part-A: Grey, Part-B: Clear

PACKAGING

3 gallon kit: One 3.5 gallon pail, net fill 2 gallons (7.57 liters) of Part-A and One 1 gallon (3.78 liter) can of Part-B

15 gallon kit: Two 5 gallon (18.9 liter) pails of Part-A and One 5 gallon (18.9 liter) pail of Part-B.

MIXING

The volume mixing ratio is 2 parts Part-A to 1 part Part-B.

Polyprime 3042 Part-A and Part-B should be thoroughly mixed individually prior to combining to ensure a homogeneous material. Polyprime 3042 must always be mixed with two parts Part-A and one part Part-B (Part-A: Part-B = 2:1). The combined components should be thoroughly mixed using a mechanical mixer at slow speed.

Polyprime 3042 may be diluted with either PM Acetate or MEK within the regional air pollution regulations. Clean all application equipment with xylene, MEK or other appropriate solvents. Power stir product until uniform color appears,

TECHNICAL DATA (Based on draw down film)

Coverage Rate	1 gal/300 sq. ft. 0.14 l/m ²
Pot Life at 75°F (24°C), 50% R.H.	20-30 min.
Dry Film Thickness per Coat	5 ± 1 mils 127 ± 25 microns
Hardness, ASTM D-2240	70 ± 5 Shore D
Specific Gravity,	
Part-A	1.09
Part-B	1.07
Total Solids by Weight, ASTM D-2369	100%
Total Solids by Volume, ASTM D-2697	100%
Viscosity at 75°F (24°C),	
Part-A & B combined	600 ± 50 cps
Volatile Organic Compounds,	
ASTM D-2369-81	0 lbs/gal 0 gm/liter
Sag Resistance at 75°F (24°C)	5 - 6 mil 127 -152 microns

approximately 5 minutes.

Polyprime 3042 is very sensitive to heat and moisture. Higher temperature and/or high humidity will accelerate the cure time. Use caution in batch sizes and thickness of application. Low temperature and/or low humidity extends the cure time and the use of accelerators may be necessary.

APPLICATION DATA

Apply over prepared or suitably prepared carbon steel, galvanized steel, concrete or aluminum.

Surface Preparation Method:

- Carbon Steel: SSSP-SP-2, 3, 6 or SP-12 (WJ-3).
- Aluminum: Alondine®, Alumiprep® or light abrasive blast.
- Galvanized Steel: Galvaprep or light abrasive blast.
- Concrete: SSSP-SP-7 Brush-Off Blast.

SURFACE PREPARATION

In general, coating performance is directly proportional to surface preparation. All surfaces must be free of oil, grease, dirt and other contaminants.

Carbon Steel: Use SSSP Guidelines for surface preparation acceptable systems include SP-6 (Commercial Blast), SP-3 (Power Tool/Hand Tool).

Aluminum: Remove oil, grease, dirt and other contaminants with neutral detergent and treat with Alondine® 1200 or equal. Light abrasive blasting is also acceptable.

Galvanized Steel: Remove all contaminants such as oil, grease, dirt or residues with a neutral detergent and treat with Galvaprep®. Light abrasive blasting is also acceptable.

Existing Coatings: Use SSSP guidelines for re-coating methods, recommended systems are SP-7 Abrasive blast or SP-3

Power Tool cleaning. Pressurized water at 2000 psi may also be used in conjunction with abrasive blasting or Power tool cleaning. Apply a test patch to check adhesion before topcoating.

Concrete: Pressure wash (2000-3000 psi) with clean fresh water in conjunction with biodegradable cleanser if necessary to remove all contaminants. Surface shall be dry and free of all oils, wax or any loose sealers or coatings. Use SSSP guidelines for abrading the surface such as SP-7 Brush-off blast cleaning.

See Specification Guide for further detail.

APPLICATION

Polyprime 3042 should be applied at the rate of 1 gallon (mixture of Part-A & Part-B)/300 sq. ft. (0.14 liters/m²). Coverage rate will depend on surface roughness and porosity. It can be applied using an airless sprayer, brush, or phenolic resin core roller.

Application temperature for Polyprime 3042 should be between 60-95°F (15-35°C). Do not apply product unless temperature is at least 5° F (3°C) above the dew point. Re-coat schedule is 2-36 hours dependent upon environment. See Specification Guide for re-coating guidelines and additional information.

Airless Spray: Use Graco 28:1 pump or higher, Binks "Airless" spray gun with Reversa-Clean 0.017-0.019 spray tips with a 1" fluid line, adjust pump pressure to the lowest possible setting that provides proper atomization. Equipment of equal performance is acceptable.

Conventional Spray: Variations of conventional production spray equipment such as pressure pot, air assisted airless or high volume, low pressure systems as supplied by Binks, Graco, Nordson, Devilbiss or equal may be used. See Specification Guide for additional information.

Brush: Use mohair or natural bristle brush with feather edge.

Roller: Use phenolic core, short nap sheepskin or equal natural roller covers.

EQUIPMENT CLEANUP

Equipment should be cleaned with an environmentally safe solvent, as permitted under local regulations, immediately after use.

STORAGE

Polyprime 3042 has a shelf life of one (1) year from date of manufacture in original, factory-sealed containers when stored indoors at a temperature between 60-95°F (15-35°C).

LIMITATIONS

Polyprime 3042 should be coated within 36 hours after it has become tack free.

Not UV stable.

Surfaces must be dry, clean and free of foreign matter.

Containers that have been opened must be used as soon as possible.

Polyprime 3042 is difficult to clean up after it has cured.

Mix no more material than can be used within ____ minutes.

WARNING

This product contains Epoxy Resin and Curatives.

Please read all information in the general guidelines, product data sheets, guide specifications and material safety data sheets (MSDS) before applying material. Published technical data and instructions are subject to change without notice. Contact your local Polycoat Products representative or visit our website for current technical data and instructions.

LIMITED WARRANTY

Polycoat Products warrants its products to be free of manufacturing defects and that they will meet Polycoat Products current published physical properties. Polycoat Products warrants that its products, when properly installed by a state licensed waterproofing contractor according to Polycoat Products guide specifications and product data sheets over a sound, properly prepared substrate, will not allow water migration for a period of one (1) year. Seller's and manufacturer's sole responsibility shall be to replace that portion of the product of this manufacturer which proves to be defective. There are no other warranties by Polycoat Products of any nature whatsoever expressed or implied, including any warranty of merchantability or fitness for a particular purpose in connection with this product. Polycoat Products shall not be liable for damages of any sort, including remote or consequential damages resulting from any claimed breach of any warranty whether expressed or implied. Polycoat Products shall not be responsible for use of this product in a manner that infringes on any patent held by others. In addition, no warranty or guarantee is being issued with respect to appearance, color, fading, chalking, staining, shrinkage, peeling, normal wear and tear or improper application by the applicator. Damage caused by abuse, neglect and lack of proper maintenance, acts of nature and/or physical movement of the substrate or structural defects are also excluded from the limited warranty. Polycoat Products reserves the right to conduct performance tests on any material claimed to be defective prior to any repairs by owner, general contractor, or applicator.

DISCLAIMER

All guidelines, recommendations, statements, and technical data contained herein are based on information and tests we believe to be reliable and correct, but accuracy and completeness of said tests are not guaranteed and are not to be construed as a warranty, either expressed or implied. It is the user's responsibility to satisfy himself, by his own information and test, to determine suitability of the product for his own intended use, application and job situation and user assumes all risk and liability resulting from his use of the product. We do not suggest or guarantee that any hazard listed herein are the only ones which may exist. Neither seller nor manufacturer shall be liable to the buyer or any third person for any injury, loss or damage directly or indirectly resulting from use of, or inability to use, the product. Recommendations or statements, whether in writing or oral, other than those contained herein shall not be binding upon the manufacturer, unless in writing and signed by a corporate officer of the manufacturer. Technical and application information is provided for the purpose of establishing a general profile of the material and proper application procedures. Test performance results were obtained in a controlled environment and Polycoat Products makes no claim that these tests or any other tests, accurately represent all environments.

A-10

Polysat Company Inc.



Polymer Systems
for Performance

65 Hudson Ave. Mechanicville, New York 518-664-6000

The Polyset Company is headquartered out of Mechanicville NY, at this time we are performing a market opportunity analysis on a very specific product called High Ratio Zinc Silicate (HRZS). This product will be marketed as Ply-Zinc WB 18. This is Water Based, High Ratio Inorganic Zinc (HRZS) product. Polyset Company is the original manufacturer of this HRZS since the mid 1980's when it was made commercially available under the NASA patent. The Polyset Silicate (liquid Binder) has been used by every successful paint manufacturer requiring QPL- 24648 Approval, marketed under different manufacturers brand for sale and use of HRZS for DoD programs. I personally have been involved with this product since 1989 while working at Oldenburg Group Inc. on various Army and Navy systems and have been utilized as a consultant over the years on this product, speaking to HRZS specifically , it's use, how it offers superior Cathodic corrosion protection in the most extreme environments known to man, Used as a single coat system or complemented with a topcoat our Ply Zinc WB 18 offers benefits superior and unlike any other typical cathodic or barrier system used in any marine environment when it comes to complete corrosion prevention.

This product offers, superior cathodic and barrier corrosion protection when applied reducing Total Cost of Ownership (TCO) for the products lifecycle from cradle to grave. This product offers complete corrosion protection with a single 4≥ mil. Coating and does not require a topcoat, but can be easily top coated if required, and is self-healing when damaged. This product was developed by NASA in the early 1980's and has been used exclusively on all causeway systems for the Army and Navy since then. This product is used not only in Marine environments which is what it was originally designed for by NASA, but also in road construction, bridges, oil refineries, offshore oil platforms, pipelines, underground mining equipment, and railway systems, Paper processing, and nuclear industry. Polyset's Ply-Zinc WB 18 offers cathodic corrosion protection in basically the worst environments known to propagate severe corrosion and once applied will never undercut, or show loss of millage.

Please feel free to contact me anytime to discuss any possible areas you may see fit for our HRZS product Ply Zinc WB 18. It would be our pleasure here at Polyset to work with your as a critical supply chain partner for services, support, and advanced high performance coating products.

Respectfully yours,

Earl W Ramlow – Iron Mountain, Mi.
Product Manager – HRZS Systems
Polyset Company www.poyset.com
Skype: Earl Ramlow

Ply-Zinc WB 18

TECHNICAL BULLETIN

10/2010

Ply-Zinc WB 18 is a state-of-the art High Ratio, Zinc Silicate, steel primer designed to protect our most treasured structures. Originally developed by NASA to shelter gantries from corrosive ocean spray, this material has been installed successfully on the Golden Gate Bridge, Statue of Liberty, and the Panama Canal, amongst many other high-performance maritime applications. **Ply-Zinc WB 18** provides corrosion resistance and heat resistance up to 750°F.

Key Features

- Zero VOC
- Air-dry, Forced cure possible
- Passes hot-seawater erosion test (MIL-P-23236)
- Passes over 7000 hrs salt fog without deterioration (ASTM B-117)
- Excellent adhesion to steel
- High Temperature resistance (750°F)
- Cathodic protection of steel, even in damaged areas
- No top-coat required, but if desired, compatible with a wide variety of urethane, epoxy or acrylate top-coats.

Uses

Superb corrosion-resistant primer for severe environments, such as:

- Marine applications (ships, off-shore rigs, dry-docks, etc.)
- UIL® Certified drinking water systems
- Bridges (New & Existing)
- Pipelines
- Pre-construction
- Antennae

Surface Prep

All surfaces to be coated **Ply-Zinc WB 18** must be abrasive blasted to a minimum SSPC-SP-10 "Near-White" finish with a minimum 2 mil profile.

**For application instructions & equipment,
please consult Polysset.**

Shelf Life: 1 year in original unopened containers.

Storage: Store between 60-95°F.

Limited Warranty: Polysset Company Inc. makes no warranty, expressed or implied, including any warranty of merchantability of fitness for a particular purpose. The sole remedy of Purchaser for any claim concerning this product, including, but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is the replacement of product or refund of the purchase price, at the discretion of Polysset Company Inc. Any claims concerning this product shall be submitted in writing within one year of the delivery date of this product to Purchaser and any claims not presented within that period are waived by Purchaser. IN NO EVENT SHALL POLYSET COMPANY INC. BE LIABLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDES LOSS OF PROFITS) OR PUNITIVE DAMAGES.

Mixing

While mixing, add Part B (Metallic zinc powder) to Part A (Silicate) with constant stirring. **Do not add Part A to Part B.** After mixing, pour the product through a 40-mesh screen into a pressure pot or second pail. Continually agitate while applying mixed materials.

Specifications

All readings taken at 25°C, unless noted

Part A

Viscosity (cP): 20-40 (ASTM D-2196)

Density (lbs/gal): 9.8-10.0

Appearance: Clear Liquid

Part B: Pure (>98%), fine metallic zinc powder
(ASTM D-520, Type III)

Mix Ratio:

By Weight: 1:2.55 (**Part A: Part B**)

By Volume: 2.33:1 (**Part A: Part B**)

Mixed Properties:

Viscosity (cP): 120 ± 20

Color: Bluish-Gray

Density: 25.0 ± 0.2 lbs/gal

3.00 ± 0.1 kg/L

Solids in mixed soln(%): 80 ± 2 (*by weight*)

40 ± 2 (*by volume*)

Zinc in dry film(%): 91 ± 2 (*by weight*)

77 ± 2 (*by volume*)

Recommended DFT/ 2 mils/330 ft²(*top-coated*)

Theoretical Coverage: 4 mils/165 ft²(*no top-coat*)

Pot-life (60-80°F): 8 hr minimum

Drying Time:

Set to touch: 15-30 min

Initial Cure: 2-3 hr

FOR PROFESSIONAL USE ONLY

Protective gloves, clothes, and splash resistant glasses recommended. Direct contact with skin should be avoided as it may cause skin irritation. Fatal if taken internally. Keep from open flame.

Polysset Company, Inc.
65 Hudson Avenue
P.O. Box 111
Mechanicville, NY 12118
(518) 664-6000
(518) 664-6001 Fax

Revision Date: Dec. 6, 2011

MATERIAL SAFETY DATA SHEET

SECTION I - IDENTIFICATION

TRADE NAME: Ply-Zinc WB - Part A (Binder)

MANUFACTURER CODE I.D.: 400200 (Bulk); 400202 (7.7 Lb. Pail); 400203 (40 Lb. Pail); 400204 (550 Lb. Drum);
400205 (2600 Lb. Tote); 400230 (3300 Lb. Tote); 400231 (27.5 Lb. Pail); 400232 (37.4
Lb. Pail); 400233 (50 Lb. Pail); 400234 (7 Lb. Can); 400260 (4 Gal. Unit of A&B)

SECTION II - HAZARDOUS INGREDIENTS

POTASSIUM SILICATE 30% MAXIMUM
CAS # 1312-76-1 (*Exposure limits not established*)

SECTION III - HEALTH INFORMATION

EFFECTS OF SHORT TERM EXPOSURE

SWALLOWING

May cause vomiting and diarrhea.

INHALATION

Spray mist may damage respiration tract.

EYE

May cause irritation

SKIN

May cause irritation

EFFECTS OF REPEATED EXPOSURE

None currently known.

SECTION IV - FIRST AID AND EMERGENCY PROCEDURES

IF SWALLOWED

Do not induce vomiting. Immediately dilute two glasses of water or activated charcoal slurry (prepared from 50 gm of activated charcoal in 400 ml H₂O). Call a physician. Never give anything to an unconscious person.

IF INHALED

Remove to fresh air. Symptoms resulting from inhalation overexposure usually disappear within 24 hours.

CONTACT

Immediately flush eyes with plenty of water for at least 15 minutes. Consult physician for medical attention.
Flush skin with water. Remove clothing.

SECTION V - PHYSICAL DATA

BOILING RANGE	213°F	% VOLATILE BY VOLUME	89
VAPOR DENSITY	Heavier than air.		
EVAPORATION RATE	Slower than diethyl ether.	VOC	.00 lb/gal less water and NPRS*
SPECIFIC GRAVITY	1.19 - 1.22	VOC	.00 lb/gal gal solids
pH	11.0 - 12.0		
FORM	Liquid		

*Negligibly Photochemically Reactive Materials

SECTION VI - FIRE AND EXPLOSION DATA

NFPA FLAMMABILITY CLASSIFICATION	Not a flammable liquid
FLASHPOINT	N/A
EXTINGUISHING MEDIA	Will not burn
UNUSUAL FIRE AND EXPLOSION HAZARDS	None known
SPECIAL FIRE FIGHTING PROCEDURES	None known

SECTION VII - REACTIVITY DATA

STABILITY

Normally stable

Conditions to Avoid

Flammable hydrogen gas may be produced on prolonged contact with metals such as aluminum, tin, lead and zinc.

INCOMPATIBILITY (MATERIALS TO AVOID)

Gels when mixed with acid.

HAZARDOUS DECOMPOSITION PRODUCTS

None

HAZARDOUS POLYMERIZATION

None known

SECTION VIII - ENVIRONMENTAL INFORMATION

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

Small quantities - (less than 100 gallons) mop up and flush to sewer with plenty of water.

Large quantities - isolate, dike and place material in container for disposal.

WASTE DISPOSAL

Neutralize with dilute acid and landfill solids according to federal, state and local regulations. Flush neutral liquid to sewer with plenty of water.

RCRA CLASSIFICATION

As produced, this product is not waste. If discarded as is, it is not classified a hazardous waste under RCRA.

ENVIRONMENTAL HAZARDS

None known.

SECTION IX - PERSONAL PROTECTION INFORMATION

RESPIRATORY PROTECTION

Use NIOSH/MSHA approved mist respirator while spraying.

VENTILATION

Ventilate area while spraying.

HAND PROTECTION

Protective gloves recommended to prevent skin irritation in hypersensitive individuals.

EYE PROTECTION

Chemical goggles to face shield.

OTHER PROTECTIVE EQUIPMENT

None

SECTION X - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Prevent from freezing. Keep containers covered. Do not store above 120°F.

OTHER PRECAUTIONS

Do not take internally. Close container after use. Keep away from children.

SECTION XI - OTHER INFORMATION

US DOT INFORMATION

Hazard Class: Not regulated.

Description Number: 45890

Harmonized Code: 2839.20.000

Proper Shipping Name: Potassium Silicate

Polyset Company, Inc. makes no warranty of any kind, express or implied, concerning the use of the product either singly or in combination with other substances. User assumes all risks incident to its use. To the best of our knowledge, the information contained herein is accurate. However, Polyset Company, Inc. does not assume any liability whatsoever for the accuracy or completeness of the information contained within.

Material Safety Data Sheet

FOR INDUSTRIAL USE ONLY

1. Product and company identification

Product Name	Ply-Zinc WB – Part B (Zinc Dust)
Internal Code	400900 (Bulk); 400902 (14.6 Lb. Can); 400903 (100 Lb. Pail); 400930 (72 Lb. Pail); 400931 (17.85 Lb. Can); 400260 (4 Gal. Unit of A&B)
Product Type	Zinc Dust (ASTM D520 Type III)
Product Use	Metallic Zinc for water-based zinc-rich primer
Manufacturer/Supplier	Polyset Company, Inc. P.O. Box 111 65 Hudson Avenue Mechanicville, NY 12118 U.S.A. info@polyset.com
Revision Date	06-DEC-2011
Telephone	For 24-Hour Emergency Response Information Call ChemTel: (800) 255-3924 (U.S./Canada) +01-813-248-0585 (International) ChemTel Contract Number: MIS0003508 For Other Product or Technical Information Call Polyset Company, Inc.: (518) 664-6000

2. Hazards identification

Product Form	Powder
OSHA/HCS status	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Emergency Overview	WARNING! HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT. MAY FORM COMBUSTIBLE DUST CONCENTRATIONS IN AIR. WATER REACTIVE.
<u>Potential acute health effects</u>	
Inhalation	Minor inhalation may irritate respiratory tract causing coughing whereas larger doses may give zinc shakes or metal fume fever (a transient flu-like condition). Inhalation of zinc oxide fume from fire or welding on zinc-coated surfaces may cause zinc shakes, metal fume fever, stomach cramps and/or diarrhea.
Ingestion	Extremely large oral dosages may produce gastrointestinal disturbances, due both to mechanical effects and the possibility of reaction with gastric juice to produce zinc chloride. Pain, stomach cramps and nausea could occur in aggravated cases.
Skin	May cause skin dryness and/or irritation.

Eyes May produce mechanical irritation of the eyes.

Potential chronic health effects

Chronic effects None known.

Carcinogenicity This product does not contain any chemicals classified as a carcinogen by NTP or IARC. This product is not regulated as a carcinogen by OSHA.

Developmental effects None known

Fertility effects None known.

Target organs Respiratory & gastrointestinal tracts.

Over-exposure signs/symptoms

Inhalation Coughing, shakes, fever, stomach cramps and/or diarrhea.

Ingestion Stomach pain, stomach cramps and/or nausea.

Skin Skin dryness &/or irritation

Eyes Irritation or gritty feeling in the eyes.

Medical conditions aggravated by over-exposure Pre-existing skin disorders or pre-existing impaired respiratory function.

See section 11 for more detailed information on health effects and symptoms.

3. Composition/Information on ingredients

<u>Ingredient name</u>	<u>CAS number</u>	<u>WT %</u>
Zinc (metallic zinc)	7440-66-6	≥ 96.0%
Zinc Oxide	1314-13-2	2 – 4%
Iron		≤ 0.002%
Lead		≤ 0.002%
Cadmium		≤ 0.001%
Copper		≤ 0.001%

4. First aid measures

Eye contact Flush eyes and under eyelids with warm, gently running water for at least 15 minutes. If irritation persists, consult a physician.

Skin contact Wash with soap and water. Seek medical attention if irritation persists.

Inhalation Remove exposed person to fresh air immediately. Seek medical attention immediately.

Ingestion If victim is conscious, rinse mouth with water and give 2 to 3 cups of water or milk to (never give any liquids by mouth to an unconscious victim). Do not induce vomiting. Get medical attention immediately.

Notes to physician Treat symptomatically.

5. Fire-fighting measures

Flammability properties of the product **Flash Point:** Not Applicable
Flash Point Method Used: Not Applicable
Flammable Limits in Air (Lower - % by volume): Not Determined
Flammable Limits in Air (Upper - % by volume): Not Determined

Extinguishing media

Suitable	Blanket with Class D dry powder type extinguisher or smoother with dry sand.
Not suitable	DO NOT USE WATER.
Special exposure hazards	Do not disturb until fully extinguished.
Hazardous combustion products	Contact with acids and alkali hydroxides results in the generation of potentially explosive hydrogen gas.
Unusual Fire and Explosion Hazards	Sealed, fire-exposed containers may build up dangerous pressure, potentially resulting in explosive rupture. Keep nuisance dust cloud formation to a minimum. Do not expose product to water. If contact with water should occur, do not seal containers, as explosive buildup of hydrogen gas may occur.
Special protective equipment for fire-fighters	Fire-fighters should wear appropriate protective equipment including proper respiratory protection.

6. Accidental release measures

Personal precautions	No action shall be taken involving any personal risk or without suitable training. Put on appropriate personal protective equipment (see section 8).
Environmental precautions	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
Spill Response	Restrict access to clean up personnel only. Sweep up and keep nuisance dust cloud formation to a minimum. Transfer wet zinc dust to an open container in a well-ventilated area until dry. Transfer dry zinc dust into dry containers. Store in a dry area. Avoid getting product wet.

7. Handling and storage

Handling	Keep product dry. Avoid spillage. Keep nuisance dust cloud formation to a minimum. Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Avoid breathing vapor or dust. Avoid contact with eyes, skin, and clothing. Avoid tasting or swallowing. Keep container closed when not in use. Use with adequate ventilation. Wash thoroughly after handling.
Storage	Keep in the original container or an approved alternative made from a compatible material, kept product dry and keep container tightly closed when not in use. Store at room temperature away from direct sunlight. Store in accordance with all local and government regulations.

8. Exposure controls/personal protection

CAS Number	Chemical Identity	Exposure Limits				
		ACGIH		OSHA		NIOSH
		TWA	STEL	PEL	STEL	
7440-66-6	Zinc (Metallic Zinc)	N.E.	N.E.	N.E.	N.E.	N.E.
1314-13-2	Zinc Oxide (Total Dust):	N.E.	N.E.	15 mg/m ³	N.E.	5 mg/m ³ TWA; 15 mg/m ³ Ceiling
	Zinc Oxide (Respirable Fraction):	2 mg/m ³	10 mg/m ³	5 mg/m ³	N.E.	N.E.
	Zinc Oxide (Fume):	2 mg/m ³	10 mg/m ³	5 mg/m ³	N.E.	5 mg/m ³ TWA; 10 mg/m ³ STEL

Recommended monitoring procedures

If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures

Keep nuisance dust cloud formation to a minimum. If mechanical ventilation is required, use adequate, properly designed ventilation systems. The use of explosion-proof ventilation systems may be required. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Hygiene measures

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated clothing should be fully decontaminated before reusing. Ensure that eyewash stations and safety showers are located in the work area.

Respiratory

Use a properly fitted, air-purifying respirator complying with an approved standard (such as NIOSH) if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Eyes

Safety glasses with side-shields or chemical splash goggles are recommended.

Skin

Impervious gloves should be used. Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

9. Physical and chemical properties

Form	Solid powder
Color	Blue-gray
pH	Not applicable
Boiling point	906°C (1663°F)
Freezing Point	419°C (786°F)
Specific gravity	7.11
Vapor pressure	Not applicable
Odor threshold	None (odorless)
Solubility in water	Reacts with water
Evaporation rate	Not applicable
Vapor density	Not applicable

10. Stability and reactivity

Stability	The product is stable when stored under dry conditions at ambient temperatures.
Conditions to avoid	Heat, open flames, ignition sources. Avoid contact with water or moist, humid air (may evolve highly flammable hydrogen gas).
Materials to avoid	Reactive or incompatible with the following materials: Sulfur, strong oxidizing agents, alkaline hydroxides.
Other hazards	May form explosive mixture if dispersed in air as a fine powder and ignited.
Hazardous decomposition products	Heat generates zinc oxide fume. Contact with acids or alkaline hydroxides may generate hydrogen gas, which is flammable. Reactivity with water is similar but very slow. Under normal conditions, zinc dust is stable.

11. Toxicological information

Acute toxicity

Zinc Dust (CAS # 7440-66-6)	LD50 Oral	Rat	> 2000 mg/kg
		Mouse	7950 mg/kg
	LD50 Dermal	Rat	> 2000 mg/kg
	LC50 Inhalation	Other than mammals	> 23 g/m ³
	TDL _o Inhalation	Rat	25 mg/kg

Carcinogenicity Classification

Ingredient name

Zinc Dust (CAS # 7440-66-6)	IARC	Not listed
	NTP	Not listed
	OSHA	Not regulated as a carcinogen
	EU	Not classified

12. Ecological information

Environmental effects

Species:	Effective concentration:	Rating:
Daphnia magna	68 µg/l/48 h	LC50
Crustacean (Penaeus chinensis)	645 - 1000 µg/l 48 h	LC50
Fish (Pimephales promelas)	0.238 mg/l/96 h	LC50
Fish (Oncorhynchus mykiss)	0.24 mg/l/96 h	LC50
Fish (Oncorhynchus tshawytscha)	500 µg/l/96 h	NOEC
Fish (Oncorhynchus tshawytscha)	280 µg/l/96 h	NOEC

Other adverse effects

Very toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment. If material enters waters, sewers or vegetation inform responsible authorities.

13. Disposal considerations

Waste disposal	The generation of waste should be avoided or minimized wherever possible. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of
-----------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

14. Transport information

The data provided in this section is for information only and may not be specific to each package size or mode of transport. Apply the appropriate regulations to properly classify your shipment for transportation.

International transport regulations

Regulatory information	UN/NA number	Proper shipping name	Classes/*PG	Reportable Quantity (RQ)
CFR	--	Not Regulated for Transportation**	--	1000 Lbs.
TDG	--	Not Regulated for Transportation**	--	1000 Lbs.
IMO/IMDG	--	Not Regulated for Transportation**	--	1000 Lbs.
IATA (Cargo)	--	Not Regulated for Transportation**	--	1000 Lbs.

*PG : Packing group

**Note: Zinc Dust packaged in a single container of 1,000 lbs. or greater must be labeled as follows: RQ (Reportable Quantity), Environmentally Hazardous Substance, Solid, N.O.S., UN3077, 9, PG III

15. Regulatory information

US regulations

HCS Classification When used for its intended purpose, this material is classified as hazardous in accordance with OSHA 29CFR 1910.1200 (Hazard Communication)

U.S. Federal regulations

SARA Title III, Section 311/312 Classification
Reactive hazard

SARA Title III, Section 313 - Supplier Notification

This product contains the following toxic chemical(s) subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986, and Subpart C-Supplier Notification Requirement of 40 CFR Part 372.

Zinc Compounds (Chemical Category N982): ≥ 99%

SARA Section 302 Extremely Hazardous Substances

None

State regulations

Massachusetts RTK Substances

Zinc Dust (CAS # 7440-66-6)

New Jersey RTK Hazardous Substances

Zinc Dust (CAS # 7440-66-6)

Pennsylvania RTK Hazardous Substances

Zinc Dust (CAS # 7440-66-6)

California Prop. 65: WARNING: This product may contain the following chemical(s) known to the State of California to cause cancer:

Lead (trace impurity)
Cadmium (trace impurity)

California Prop. 65: WARNING: This product may contains the following chemical(s) known to the State of California to be a reproductive toxin:

Lead (trace impurity)
Cadmium (trace impurity)

Canada

WHMIS (Canada) Not applicable.

International regulations
Chemical inventories

Canada inventory - All components are listed or exempted
United States inventory (TSCA 8b) All components are listed or exempted.

16. Other information

Hazardous Material Information System III (U.S.A.)	Health: 1 Flammability: 1 Physical hazards: 1 Personal Protection: X
-----------------------------------------------------------	-------------------------------------------------------------------------------

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. HMIS® ratings are to be used with a fully implemented HMIS® program.

Prepared by	Polyset Company, Inc.
Date of issue	December 6, 2011
Date of printing	December 6, 2011

Notice to reader

The information provided herein was believed by Polyset Company, Inc. ("Polyset") to be accurate at the time of preparation or prepared from sources believed to be reliable, but it is the responsibility of the user to investigate and understand other pertinent sources of information, to comply with all laws and procedures applicable to the safe handling and use of the product and to determine the suitability of the product for its intended use. All products supplied by Polyset are subject to Polyset's terms and conditions of sale. POLYSET MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY POLYSET, except that the product shall conform to Polyset's specifications. Nothing contained herein constitutes an offer for the sale of any product.

Ply-Guard ME

Ply-Guard ME is two component, chemical resistant mastic epoxy coating system designed to perform exceptionally well in a broad range of severe environments such as strong acids/alkalis, and organic solvents. It can be used as a primer, and should be used wherever chemical and abrasion resistance and outstanding adhesion are essential. Ply-Guard ME is designed for use on properly prepared concrete and metal surfaces in refineries, offshore platforms, chemical plants, food & beverage plants and pulp & paper mills.

Key Features

- Low VOC
- Fast Dry
- Excellent adhesion to steel
- Excellent edge Retention

Uses

Superb coating for severe environments, such as:

- Marine applications (ships, off-shore rigs, dry-docks)
- Bridges (New & Existing)
- Pipelines

Can be used alone or as a intermediate tie coat in high ratio zinc systems.

Surface Prep

Remove oils, greases, loose dirt and particles, weak sections, curing compounds, and existing coatings, prior to application of **Ply-Guard ME**. Steel surfaces must be clean, sound and sandblasted to near white metal SSPC-10 finish immediately before the application of **Ply-Guard ME**. After sandblasting, surface should be rinsed and vacuumed prior to application. New concrete should be cured to 80% of design strength.

Mixing

Stir individual components prior to mixing together. Mix only what may be applied during the pot life (max 4 hrs). Mix according to specified mixing ratio. Allow 15 minutes to activate **Ply-Guard ME** before application.

Application Recommendations:

For conventional spray applications, use bottom feed outlet pressure pot with dual regulators.

Gun: Binks 7E2; Fluid Tip—0.015–0.021”;

Spray Shape—Round;

Atomization Pressure—30 psi; Fluid Pressure—25 psi

Limited Warranty: Polysset Company Inc. makes no warranty, expressed or implied, including any warranty of merchantability of fitness for a particular purpose. The sole remedy of Purchaser for any claim concerning this product, including, but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is the replacement of product or refund of the purchase price, at the discretion of Polysset Company Inc. Any claims concerning this product shall be submitted in writing within one year of the delivery date of this product to Purchaser and any claims not presented within that period are waived by Purchaser. IN NO EVENT SHALL POLYSET COMPANY INC. BE LIABLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDES LOSS OF PROFITS) OR PUNITIVE DAMAGES.

Physical Data

Appearance @ 25°C			
	Part "A"	Part "B"	Mixed
Color	Gray	Dk. Amber	Gray
VOC	1.10 lbs/gal	2.21lbs/gal	1.32 lbs/gal
Flash pt (°C)	30	29	35

Ratio & Cure			
Mix Ratio	4 parts "A"	1 parts "B"	By Volume
Initial Set	2-3 hr @ 25°C	Initial Cure	5-6 hr @ 25°C
Recoat Time	6 hr @ 25°C	Final Cure	24hrs @ 25°C

Cured Properties	
Finish	Satin Gloss
Temp. Resistance	100—125°C
Recommended DFT	4—6 mil (0.10—0.15 mm)
Theo. Coverage	275 ft ² /gal (@ 4 mil DFT)

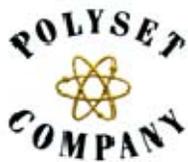
Packaging: 5-gallon kit (78 lbs shipping wt)

Shelf Life: 18 monthsr in original unopened containers.

Storage: Store between 40-95°F.

FOR PROFESSIONAL USE ONLY

Protective gloves, clothes, and splash resistant glasses recommended. Direct contact with skin should be avoided as it may cause skin irritation. Fatal if taken internally. Keep from open flame.



Material Safety Data Sheet

FOR INDUSTRIAL USE ONLY

1. Product and company identification

Product Name	PLY-GUARD ME – PART A
Internal Code	269610, 269623
Product Type	Epoxy Resin
Product Use	Chemically Resistant Mastic Epoxy Coating for Severe Environments
Manufacturer/Supplier	Polyset Company, Inc. P.O. Box 111 65 Hudson Avenue Mechanicville, NY 12118 U.S.A. info@polyset.com
Revision Date	9-JUN-2011
Telephone	For 24-Hour Emergency Response Information Call ChemTel: (800) 255-3924 (U.S./Canada) +01-813-248-0585 (International) ChemTel Contract Number: MIS0003508 For Other Product or Technical Information Call Polyset Company, Inc.: (518) 664-6000

2. Hazards identification

Product Form	Viscous liquid.
OSHA/HCS status	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Emergency Overview	WARNING! FLAMMABLE LIQUID. HARMFUL IF INHALED. AVOID BREATHING VAPORS. CAUSES EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. MAY CAUSE RESPIRATORY TRACT IRRITATION. ASPIRATION MAY CAUSE LUNG DAMAGE. MAY CAUSE DIZZINESS AND DROWSINESS. KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAMES. AVOID CONTACT WITH EYES, SKIN AND CLOTHING. DO NOT SWALLOW

Potential acute health effects

Inhalation	May cause respiratory tract irritation. May cause tightness in the chest, Central Nervous System (CNS) excitation (giddiness, liveliness, light-headed feeling), followed by CNS depression (dizziness, drowsiness, weakness, fatigue, nausea, headache, unconsciousness) and other CNS effects.
Ingestion	Harmful if swallowed. If this product gets into the lungs during swallowing or vomiting, lung inflammation and/or lung injury may occur.

Skin Irritating to skin. May cause allergic skin sensitization by skin contact. Prolonged or repeated contact may result in redness, burning, drying and cracking of the skin.

Eyes May cause eye irritation. Vapor or liquid contact may cause stinging, tearing, redness and blurred vision. Liquid contact may cause additional mechanical irritation if trapped under the eyelids due to the non-skid (gritty) components that are a part of this product.

Potential chronic health effects

Chronic effects Overexposure may have effects on kidney, liver, and nervous system.

Carcinogenicity This product contains ethylbenzene which is classified as a carcinogen by IARC (2B, possibly carcinogenic to humans)

Developmental effects No known significant effects or critical hazards.

Fertility effects Exposure to organic solvents during pregnancy may cause an increased risk of birth defects.

Target organs Central nervous system (CNS), eyes, skin, respiratory system, gastrointestinal (GI) tract, blood, liver, kidneys.

Over-exposure signs/symptoms

Inhalation May affect the brain and central nervous system. May cause dizziness, drowsiness, weakness, fatigue, nausea, or headache.

Ingestion May be harmful if swallowed.

Skin Adverse symptoms may include irritation, redness, drying and cracking. May cause allergic skin reaction.

Eyes Adverse symptoms may include the following: pain or irritation, watering, redness, blurred vision.

Medical conditions aggravated by over-exposure Pre-existing skin disorders or skin sensitization may be aggravated by exposure to this product. Cardiac arrhythmia leading to death may also occur in sensitive individuals.

See section 11 for more detailed information on health effects and symptoms.

3. Composition/Information on ingredients

<u>Ingredient name</u>	<u>CAS number</u>	<u>WT %</u>
Talc (Hydrous Magnesium Silicate)	14807-96-6	3 – 5
Bisphenol A Epoxy Resin	67924-34-9	12 – 20
Xylene	1330-20-7	< 4
Solvent Naptha (Petroleum), Light Aromatic	64742-95-6	< 7
Methyl n-Propyl Ketone	107-87-9	< 4
1,2,4-Trimethylbenzene	95-63-6	< 2
Ethylbenzene	100-41-4	0.9
Zinc Oxide	1314-13-2	0.3

4. First aid measures

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention.

Skin contact Flush contaminated skin with plenty of water. Remove contaminated

clothing and shoes. Wash contaminated clothing thoroughly with water while removing it, or wear gloves to prevent further skin contact. Continue to rinse skin for at least 10 minutes. Wash contaminated clothing before reuse. Get medical attention if rash or irritation develops or if exposed person begins to feel unwell.

Inhalation Move exposed person to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Ingestion Wash out mouth with water. Remove dentures if any. Move exposed person to fresh air. Keep person warm and at rest. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get immediate medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Notes to physician No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

Flammability properties of the product **Flash Point:** 80°F (26.6 °C)
Flash Point Method Used: Closed Cup
Flammable Limits in Air (Lower - % by volume): 0.9% (Xylene)
Flammable Limits in Air (Upper - % by volume): 6.6% (Xylene)

Extinguishing media

Suitable Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

Not suitable Straight streams of water on pools of flaming material.

Special exposure hazards Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Hazardous combustion products Decomposition products may include the following materials: carbon monoxide, carbon dioxide, various hydrocarbons.

Unusual Fire and Explosion Hazards Sealed, fire-exposed containers may build up dangerous pressure, potentially resulting in explosive rupture. Vapors are flammable and heavier than air. Vapors may travel across the ground and reach remote ignition sources causing a flashback fire danger.

Special protective equipment for fire-fighters Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

Personal precautions	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).
Environmental precautions	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
Spill Response	Remove all sources of ignition. Stop leak if without risk. Approach release from upwind. Provide explosion proof ventilation. Move containers from spill area. Take up spilled material on absorbent material. Shovel with non-sparking tools into closable container for disposal. Prevent entry into sewers, water courses, basements or confined areas. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product.

7. Handling and storage

Handling	Warning! Flammable liquid. Keep away from heat, sparks, and flame. Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Causes irritation if inhaled and can cause skin irritation, eye irritation, and allergic skin reaction. May be harmful if inhaled or if swallowed. Avoid breathing vapor or mist. Avoid contact with eyes, skin, and clothing. Avoid tasting or swallowing. Keep container closed when not in use. Use with adequate ventilation. Wash thoroughly after handling.
Storage	Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container. Do not cut or weld container. Keep away from heat, sparks and open flame. Ground and bond metal containers for liquid transfer to avoid static sparks. Store in tightly closed containers in cool, well-ventilated area. Keep containers closed to prevent moisture absorption and contamination. Store in accordance with all local and government regulations.

8. Exposure controls/personal protection

CAS Number	Chemical Identity	Exposure Limits				Other
		ACGIH		OSHA		
		TWA	STEL	PEL	STEL	
1330-20-7	Xylene	100 ppm	150 ppm	100 ppm	150 ppm	N.E.
107-87-9	Methyl n-Propyl Ketone	200 ppm	250 ppm	200 ppm	250 ppm	N.E.
95-63-6	1,2,4-Trimethylbenzene	25 ppm	N.E.	25 ppm	N.E.	N.E.
100-41-4	Ethylbenzene	100 ppm	125 ppm	100 ppm	N.E.	N.E.

Recommended monitoring procedures	If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.
Engineering measures	Use only with adequate ventilation (use only explosion-proof ventilation systems). If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
Hygiene measures	Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are located in the work area.
Respiratory	Use a properly fitted, air-purifying or air-supplied respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
Eyes	Safety glasses with side-shields or chemical splash goggles are recommended.
Skin	Impervious gloves should be used. Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

9. Physical and chemical properties

Form	Medium viscosity liquid
Color	Gray
pH	Not determined
Boiling point	Not determined
Freezing Point	Not determined
Specific gravity	1.85
Vapor pressure	Not determined
Odor threshold	Aromatic solvent
Solubility in water	Negligible
Evaporation rate	0.9 for Xylene (Butyl Acetate = 1)
Vapor density	3.6 for Xylene (Air = 1)

10. Stability and reactivity

Stability	The product is stable. Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions to avoid	Heats, sparks, and open flames.
Materials to avoid	Reactive or incompatible with the following materials: oxidizing materials, strong acids, strong alkalis.
Other hazards	Reacts with epoxy curing agents. Heat may be generated.
Hazardous decomposition products	Decomposition products may include the following materials: carbon monoxide, carbon dioxide, and various hydrocarbons.

11. Toxicological information

Acute toxicity

Xylene (CAS # 1330-20-7)	LD50 Oral	Rat	4,300 mg/kg
	LD50 Dermal	Rat	> 1,700 mg/kg
	LC50 Inhalation	Rat	500 ppm
Solvent Naptha (CAS # 64742-95-6)	LD50 Oral		> 3,000 mg/kg
	LD50 Dermal		>3160 mg/kg
1,2,4-Trimethylbenzene (CAS # 95-63-6)	LD50 Oral	Rat	5 gm/kg
	LC50 Inhalation	Rat	18 gm/m3 over 4 hours
Ethylbenzene (CAS # 100-41-4)	LD50 Oral	Rat	3,500 mg/kg
	LD50 Dermal	Rabbit	17,800 uL/kg

Carcinogenicity Classification

Ingredient name

Ethylbenzene (CAS # 100-41-4)	IARC	Group 2B (Possibly carcinogenic to humans)
	NTP	Not listed
	OSHA	Not regulated as a carcinogen
	EU	Not classified

12. Ecological information

Environmental effects

No known significant effects or critical hazards.

Other adverse effects

No known significant effects or critical hazards.

13. Disposal considerations

Waste disposal

The generation of waste should be avoided or minimized wherever possible. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

14. Transport information

The data provided in this section is for information only and may not be specific to each package size or mode of transport. Apply the appropriate regulations to properly classify your shipment for transportation.

International transport regulations

Regulatory information	UN/NA number	Proper shipping name	Classes/*PG	Reportable Quantity (RQ)
CFR	UN1263	Paint	Class 3, PG III	5000 Lbs.
TDG	UN1263	Paint	Class 3, PG III	5000 Lbs.
IMO/MDG	UN1263	Paint	Class 3, PG III	5000 Lbs.
IATA (Cargo)	UN1263	Paint	Class 3, PG III	5000 Lbs.

*PG : Packing group

15. Regulatory information

US regulations

HCS Classification

When used for its intended purpose, this material is classified as hazardous in accordance with OSHA 29CFR 1910.1200.

U.S. Federal regulations

SARA Title III, Section 311/312 Classification

Immediate (Acute) health hazard
Delayed (Chronic) health hazard
Fire hazard

SARA Title III, Section 313 - Supplier Notification

This product contains the following toxic chemical(s) subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986, and Subpart C-Supplier Notification Requirement of 40 CFR Part 372.

Xylene (CAS # 1330-20-7): < 3%
1,2,4-Trimethylbenzene (CAS # 95-63-6): < 2%
Zinc Compounds (Category N982): 1.1%
Ethylbenzene (CAS # 100-41-4): < 1%

SARA Section 302 Extremely Hazardous Substances

None required.

State regulations

Massachusetts RTK Substances

Calcium Silicate (CAS # 13983-17-0)
Barium Sulfate (CAS # 7727-43-7)
Titanium Dioxide (CAS # 13463-67-7)
Carbon Black (CAS # 1333-86-4)

New Jersey RTK Hazardous Substances

Calcium Silicate (CAS # 13983-17-0)
Barium Sulfate (CAS # 7727-43-7)
Titanium Dioxide (CAS # 13463-67-7)
Carbon Black (CAS # 1333-86-4)

Pennsylvania RTK Hazardous Substances

Calcium Silicate (CAS # 13983-17-0)
Barium Sulfate (CAS # 7727-43-7)
Titanium Dioxide (CAS # 13463-67-7)
Carbon Black (CAS # 1333-86-4)

California Prop. 65: WARNING: This product contains a chemical known to the State of California to cause cancer:

Benzene
Carbon Black
Epichlorohydrin

California Prop. 65: WARNING: This product contains a chemical known to the State of California to be a reproductive toxin:

Epichlorohydrin

Canada

WHMIS (Canada)

Class B2: Flammable liquid.
Class D2B: Material causing other toxic effects.

International regulations

Chemical inventories

Australia inventory (AICS) - Not determined
Canada inventory - All components are listed or exempted.
Japan inventory - Not determined.
China inventory (IECSC) - Not determined.
Korea inventory - Not determined.
New Zealand Inventory (NZIoC) - Not determined.
Philippines inventory (PICCS) - Not determined.
United States inventory (TSCA 8b) - All components are listed or exempted.

16. Other information

Hazardous Material Information System III (U.S.A.)	Health: 2 Flammability: 3 Physical hazards: 0 Personal Protection: X
-------------------------------------------------------------------	-------------------------------------------------------------------------------

Caution: HMIS[®] ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. HMIS[®] ratings are to be used with a fully implemented HMIS[®] program.

Prepared by	Polyset Company, Inc.
Date of issue	9-JUN-2011
Date of printing	9-JUN-2011

Notice to reader

The information provided herein was believed by Polyset Company, Inc. ("Polyset") to be accurate at the time of preparation or prepared from sources believed to be reliable, but it is the responsibility of the user to investigate and understand other pertinent sources of information, to comply with all laws and procedures applicable to the safe handling and use of the product and to determine the suitability of the product for its intended use. All products supplied by Polyset are subject to Polyset's terms and conditions of sale. POLYSET MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY POLYSET, except that the product shall conform to Polyset's specifications. Nothing contained herein constitutes an offer for the sale of any product.



Material Safety Data Sheet

FOR INDUSTRIAL USE ONLY

1. Product and company identification

Product Name	PLY-GUARD ME – PART B
Internal Code	269620, 269622
Product Type	Modified Polyamide Epoxy Curing Agent
Product Use	Chemically Resistant Mastic Epoxy Coating for Severe Environments
Manufacturer/Supplier	Polyset Company, Inc. P.O. Box 111 65 Hudson Avenue Mechanicville, NY 12118 U.S.A. info@polyset.com
Revision Date	9-JUN-2011
Telephone	For 24-Hour Emergency Response Information Call ChemTel: (800) 255-3924 (U.S./Canada) +01-813-248-0585 (International) ChemTel Contract Number: MIS0003508 For Other Product or Technical Information Call Polyset Company, Inc.: (518) 664-6000

2. Hazards identification

Product Form	Clear, amber liquid.
OSHA/HCS status	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Emergency Overview	WARNING! FLAMMABLE LIQUID. HARMFUL IF INHALED. AVOID BREATHING VAPORS. CAUSES EYE AND SKIN IRRITATION AND/OR BURNS. MAY CAUSE ALLERGIC SKIN REACTION. MAY CAUSE RESPIRATORY TRACT IRRITATION. ASPIRATION MAY CAUSE LUNG DAMAGE. MAY CAUSE DIZZINESS AND DROWSINESS. KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAMES. AVOID CONTACT WITH EYES, SKIN AND CLOTHING. DO NOT SWALLOW

Potential acute health effects

Inhalation	May cause respiratory tract irritation. May cause tightness in the chest, Central Nervous System (CNS) excitation (giddiness, liveliness, light-headed feeling), followed by CNS depression (dizziness, drowsiness, weakness, fatigue, nausea, headache, unconsciousness) and other CNS effects.
Ingestion	Harmful if swallowed. Ingestion may cause burns of the upper digestive and respiratory tracts. If this product gets into the lungs during swallowing or vomiting, lung inflammation and/or lung injury may occur.

Skin Causes skin burns. May be absorbed through the skin in harmful amounts. May cause severe skin irritation. May cause sensitization by skin contact. Prolonged or repeated contact may result in redness, burning, drying and cracking of the skin.

Eyes Causes severe eye irritation. May cause permanent eye injury. May cause blindness. Causes eye burns. Vapor or liquid contact may cause stinging, tearing, redness and blurred vision.

Potential chronic health effects

Chronic effects Overexposure may have effects on kidney, liver, and nervous system.

Carcinogenicity This product contains ethylbenzene which is classified as a carcinogen by IARC (2B, possibly carcinogenic to humans).

Developmental effects No known significant effects or critical hazards.

Fertility effects Exposure to organic solvents during pregnancy may cause an increased risk of birth defects.

Target organs Central nervous system (CNS), kidneys, liver, lungs, blood, eyes, skin.

Over-exposure signs/symptoms

Inhalation May affect the brain and central nervous system. May cause dizziness, drowsiness, weakness, fatigue, nausea, or headache.

Ingestion May cause intestinal burns. May be harmful if swallowed.

Skin Adverse symptoms may include burning, irritation, redness, drying and cracking. May cause allergic skin reaction.

Eyes Adverse symptoms may include the following: burning, pain or irritation, watering, redness, blurred vision, blindness.

Medical conditions aggravated by over-exposure Pre-existing skin disorders or skin sensitization to epoxies, amines, or organic solvents may be aggravated by exposure to this product. Cardiac arrhythmia leading to death may also occur in sensitive individuals.

See section 11 for more detailed information on health effects and symptoms.

3. Composition/Information on ingredients

<u>Ingredient name</u>	<u>CAS number</u>	<u>WT %</u>
Modified Polyamide Polymer	Trade Secret	45 - 55
Benzyl Alcohol	100-51-6	15 - 20
Xylene	1330-20-7	15 - 18
Butanol	71-36-3	10 - 12
Triethylenetetramine	112-24-3	< 5
Ethylbenzene	100-41-4	< 4

4. First aid measures

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention.

Skin contact Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water while removing it, or wear gloves to prevent further skin contact. Continue to rinse skin for at least 10 minutes. Wash contaminated clothing before reuse. Get medical attention if rash or irritation develops or if exposed person begins to feel unwell.

Inhalation	Move exposed person to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
Ingestion	Wash out mouth with water. Remove dentures if any. Move exposed person to fresh air. Keep person warm and at rest. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get immediate medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
Notes to physician	No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

Flammability properties of the product	Flash Point: 85°F (29.4 °C) Flash Point Method Used: Closed Cup Flammable Limits in Air (Lower - % by volume): 0.9% (Xylene) Flammable Limits in Air (Upper - % by volume): 6.6% (Xylene)
<u>Extinguishing media</u>	
Suitable	Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.
Not suitable	Straight streams of water on pools of flaming material.
Special exposure hazards	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Hazardous combustion products	Decomposition products may include the following materials: carbon monoxide, carbon dioxide, various hydrocarbons.
Unusual Fire and Explosion Hazards	Sealed, fire-exposed containers may build up dangerous pressure, potentially resulting in explosive rupture. Vapors are flammable and heavier than air. Vapors may travel across the ground and reach remote ignition sources causing a flashback fire danger.
Special protective equipment for fire-fighters	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

Personal precautions	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and
-----------------------------	-------------------------------------------------------------------------------------------------------------------------------------

unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

Environmental precautions

Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Spill Response

Remove all sources of ignition. Stop leak if without risk. Approach release from upwind. Provide explosion proof ventilation. Move containers from spill area. Take up spilled material on absorbent material. Shovel with non-sparking tools into closable container for disposal. Prevent entry into sewers, water courses, basements or confined areas. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product.

7. Handling and storage

Handling

Warning! Flammable liquid. Keep away from heat, sparks, and flame. Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Causes irritation if inhaled and can cause skin & eye irritation or burns and allergic skin reaction. May be harmful if inhaled or if swallowed. Avoid breathing vapor or mist. Avoid contact with eyes, skin, and clothing. Avoid tasting or swallowing. Keep container closed when not in use. Use with adequate ventilation. Wash thoroughly after handling.

Storage

Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container. Do not cut or weld container. Keep away from heat, sparks and open flame. Ground and bond metal containers for liquid transfer to avoid static sparks. Store in tightly closed containers in cool, well-ventilated area. Keep containers closed to prevent moisture absorption and contamination. Store in accordance with all local and government regulations.

8. Exposure controls/personal protection

CAS Number	Chemical Identity	Exposure Limits				Other
		ACGIH		OSHA		
		TWA	STEL	PEL	STEL	
100-51-6	Benzyl Alcohol	N.E.	N.E.	N.E.	N.E.	10 ppm (AIHA-WEEL)
1330-20-7	Xylene	100 ppm	150 ppm	100 ppm	150 ppm	N.E.
71-36-3	n-Butanol	20 ppm	N.E.	100 ppm	N.E.	Ceiling: 30 ppm TWA: 15 ppm (Canada – B.C. OEL)
112-24-3	Triethylenetetramine	N.E.	N.E.	N.E.	N.E.	6 mg/m ³ – skin (AIHA-WEEL) 3 mg/m ³ (Ontario OEL)
100-41-4	Ethylbenzene	100 ppm	125 ppm	100 ppm	N.E.	N.E.

Recommended monitoring procedures	If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.
Engineering measures	Use only with adequate ventilation (use only explosion-proof ventilation systems). If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
Hygiene measures	Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are located in the work area.
Respiratory	Use a properly fitted, air-purifying or air-supplied respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
Eyes	Safety glasses with side-shields or chemical splash goggles are recommended.
Skin	Impervious gloves should be used. Butyl Rubber gloves are recommended. Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

9. Physical and chemical properties

Form	Clear liquid
Color	Amber
pH	Not determined
Boiling point	117.7°C / 243.9°F (for Butanol)
Freezing Point	-15°C / -5°F (for Benzyl Alcohol)
Specific gravity	0.96
Vapor pressure	Not determined
Odor threshold	Aromatic solvent
Solubility in water	Negligible
Evaporation rate	< 1 (Butyl Acetate = 1)
Vapor density	3.4 (Air = 1)

10. Stability and reactivity

Stability	The product is stable. Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions to avoid	Heats, sparks, and open flames.
Materials to avoid	Strong oxidizing agents. Acids. Bases. Iron. Aluminum. Zinc. Alcohols. Aldehydes. Halogenated compounds. Ketones. Copper. Copper alloys.
Other hazards	Reacts with epoxy curing agents. Heat may be generated.
Hazardous decomposition products	Decomposition products may include the following materials: carbon monoxide, carbon dioxide, nitrogen oxides, and various hydrocarbons.

11. Toxicological information

Acute toxicity

Benzyl Alcohol (CAS # 100-51-6)	LD50 Oral	Rat	1,230 mg/kg
	LD50 Dermal	Rabbit	2,000 mg/kg
	LC50 Inhalation	Rat	8.9 mg/L over four hours
Xylene (CAS # 1330-20-7)	LD50 Oral	Rat	4,300 mg/kg
	LD50 Dermal	Rat	> 1,700 mg/kg
	LC50 Inhalation	Rat	500 ppm
Butanol, normal (CAS # 71-36-3)	LD50 Oral	Rat	790 mg/kg
	LD50 Dermal	Rabbit	3,400 mg/kg
Triethylenetetramine (CAS # 112-24-3)	LD50 Oral	Rat	2,500 mg/kg
	LD50 Dermal	Rabbit	550 mg/kg
Ethylbenzene (CAS # 100-41-4)	LD50 Oral	Rat	3,500 mg/kg
	LD50 Dermal	Rabbit	17,800 uL/kg

Carcinogenicity Classification

Ingredient name

Ethylbenzene (CAS # 100-41-4)

IARC	Group 2B (Possibly carcinogenic to humans)
NTP	Not listed
OSHA	Not regulated as a carcinogen
EU	Not classified

12. Ecological information

Environmental effects

Moderately toxic to aquatic organisms.

Benzyl Alcohol

Bioconcentration factor (BCF)	~ 0.31
Freshwater Algae	EC50 (96h) 640 mg/l (algae)
Toxicity to Aquatic Invertebrates	EC50 (48h) 360 ppm (Daphnia magna)
Freshwater Fish	LC50 (96h) 460 mg/l (Pimephales promelas)

Triethylenetetramine

Freshwater Algae	EC50 (96h) 3.7 mg/l (Pseudokirchneriella subcapitata)
Toxicity to Aquatic Invertebrates	LC50 (48h) 12 mg/l (Daphnia magna)
Freshwater Fish	LC50 (96h) 330 mg/l (Pimephales promelas)

Other adverse effects

No known significant effects or critical hazards.

13. Disposal considerations

Waste disposal

The generation of waste should be avoided or minimized wherever possible. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

14. Transport information

The data provided in this section is for information only and may not be specific to each package size or mode of transport. Apply the appropriate regulations to properly classify your shipment for transportation.

International transport regulations

Regulatory information	UN/NA number	Proper shipping name	Classes/*PG	Reportable Quantity (RQ)
CFR	UN1263	Paint	Class 3, PG III	5000 Lbs.
TDG	UN1263	Paint	Class 3, PG III	5000 Lbs.
IMO/IMDG	UN1263	Paint	Class 3, PG III	5000 Lbs.
IATA (Cargo)	UN1263	Paint	Class 3, PG III	5000 Lbs.

*PG : Packing group

15. Regulatory information

US regulations

HCS Classification When used for its intended purpose, this material is classified as hazardous in accordance with OSHA 29CFR 1910.1200.

U.S. Federal regulations

SARA Title III, Section 311/312 Classification

Immediate (Acute) health hazard
Delayed (Chronic) health hazard
Fire hazard

SARA Title III, Section 313 - Supplier Notification

This product contains the following toxic chemical(s) subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986, and Subpart C-Supplier Notification Requirement of 40 CFR Part 372.

Xylene (CAS # 1330-20-7): 17%
Butanol, Normal (CAS # 71-36-3): 11%
Ethylbenzene (CAS # 100-41-4): < 4%

SARA Section 302 Extremely Hazardous Substances

None required.

State regulations

Massachusetts RTK Substances

Modified Polyamide Polymer (CAS # is a Trade Secret)

New Jersey RTK Hazardous Substances

Modified Polyamide Polymer (CAS # is a Trade Secret)

Pennsylvania RTK Hazardous Substances

Modified Polyamide Polymer (CAS # is a Trade Secret)

California Prop. 65: WARNING: This product contains a chemical known to the State of California to cause cancer:

Benzene

Canada

WHMIS (Canada)

Class B2: Flammable liquid.
Class D2B: Material causing other toxic effects.

International regulations

Chemical inventories

Australia inventory (AICS) - Not determined
Canada inventory - All components are listed or exempted.
Japan inventory - Not determined.
China inventory (IECSC) - Not determined.
Korea inventory - Not determined.
New Zealand Inventory (NZIoC) - Not determined.
Philippines inventory (PICCS) - Not determined.
United States inventory (TSCA 8b) - All components are listed or exempted.

16. Other information

Hazardous Material Information System III (U.S.A.)	Health: 2 Flammability: 3 Physical hazards: 1 Personal Protection: X
-------------------------------------------------------------------	-------------------------------------------------------------------------------

Caution: HMIS[®] ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. HMIS[®] ratings are to be used with a fully implemented HMIS[®] program.

Prepared by	Polyset Company, Inc.
Date of issue	9-JUN-2011
Date of printing	9-JUN-2011

Notice to reader

The information provided herein was believed by Polyset Company, Inc. ("Polyset") to be accurate at the time of preparation or prepared from sources believed to be reliable, but it is the responsibility of the user to investigate and understand other pertinent sources of information, to comply with all laws and procedures applicable to the safe handling and use of the product and to determine the suitability of the product for its intended use. All products supplied by Polyset are subject to Polyset's terms and conditions of sale. POLYSET MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY POLYSET, except that the product shall conform to Polyset's specifications. Nothing contained herein constitutes an offer for the sale of any product.

A-11

Pratt and Lambert Paints

PRODUCT INFORMATION



PRATT & LAMBERT®

INDUSTRIAL
high performance maintenance coatings

Universal HP Acrylic Primer Z6631

Universal Acrylic HP Primer is a single component, fast drying, rust inhibitive acrylic primer designed for both new construction and maintenance applications.

- Single component
- Interior and exterior use
- Rust inhibitive
- VOC compliant
- Early moisture resistance
- Fast dry
- Low temperature application
- Use under water-based or solvent-based high performance topcoats
- Suitable for use in USDA inspected facilities

RECOMMENDED USES:

Use this product on properly prepared surfaces of steel, iron, aluminum, galvanized metal, and previously painted surfaces.

RECOMMENDED SYSTEMS:

Steel, Aluminum, Galvanized Metal, Previously Painted (Waterborne Topcoat)

1 coat Pratt & Lambert® Universal HP Acrylic Primer
1-2 coats Pratt & Lambert® Acrylic Waterborne DTM
or Pratt & Lambert® Acrylic PreCat Epoxy
or Pratt & Lambert® Acrylic Waterborne Epoxy
or Pratt & Lambert® Acrylic Urethane Gloss

Steel, Aluminum, Galvanized Metal, Previously Painted (Solvent Based Topcoat)

1 coat Pratt & Lambert® Universal HP Acrylic Primer
1-2 coats Pratt & Lambert® Industrial Alkyd Enamel
or Pratt & Lambert® High Build Mastic Epoxy
or Pratt & Lambert® PalGard® Polyamide Epoxy

TECHNICAL DATA

Vehicle:	Acrylic
Finish:	Low sheen
Color:	Off-white
Flash Point:	>200°F, Seta Flash
Volume Solids:	39 ± 2%
Weight Solids:	53 ± 2%
Weight/Gallon:	10.8 lb
VOC (EPA Method #24):	Unreduced <100 g/L; <0.83 lb/gal
Recommended Film Thickness:	5.0 - 10.0 mils wet 2.0 - 4.0 mils dry
Spread Rate:	156-312 sq. ft. per gallon
Shelf Life:	36 months, unopened
Application:	Apply by airless spray, conventional spray, brush or roller

Note: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

Drying Time (@ 6 mils wet, 50% R.H.):

	40°F	77°F	120°F
To Touch:	2 hrs	40 min	20 min
Tack Free:	8 hrs	2 hrs	1 hr
To Recoat:	16 hrs	4 hrs	2 hrs
To Cure:	45 days	30 days	14 days

Note: Drying times are temperature, humidity and film thickness dependant.

Reduction:	Water
Clean-up:	Soap and Water
Tinting:	Do not tint
Sizes:	1 gallon, 5 gallons

FOR INDUSTRIAL USE ONLY

As of 04/01/11 Complies with	
OTC	Yes
SCAQMD	Yes
CARB	Yes
MPI Spec #	

Technical Information Line:
1-800-BUY-PRAT (1-800-289-7728)
www.prattandlambert.com

SURFACE PREPARATION:

WARNING! Removal of old paint by sanding, scraping or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup. For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority.

Surface must be clean, dry and in sound condition. Remove all oil, dust, grease, dirt, loose rust and other foreign materials to ensure adequate adhesion.

Do not use hydrocarbon solvents for cleaning.

Iron & Steel – Minimum surface preparation is Hand Tool Clean SSPC-SP2. Remove all oil and grease from surface per SSPC-SP1. For better performance, use Commercial Blast Cleaning per SSPC-SP6. Primer recommended for best performance.

Aluminum – Remove all oil, grease, dirt, oxide and other foreign material per SSPC-SP1.

Galvanizing – Surface should be exterior weathered for 6 months prior to painting. Solvent Clean per SSPC-SP1. When weathering is not possible, or the surface has been treated with chromates or silicates, first Solvent Clean per SSPC-SP1 and apply a test patch. Allow paint to dry at least one week before testing adhesion. If adhesion is poor, brush blasting per SSPC-SP7 is necessary to remove these treatments. Rusty galvanizing requires a minimum of Hand Tool Cleaning per SSPC-SP2. Prime cleaned area the same day with Pratt & Lambert® Universal HP Acrylic Primer.

Previously Painted Surfaces – If in sound condition, clean surface of all foreign material. Smooth, hard or glossy coatings and surfaces should be dulled by abrading the surface. Apply a test area, allowing paint to dry one week before testing adhesion. If adhesion is poor, additional abrasion of the surface and/or removal of the previous coating may be necessary. Retest surface for adhesion. If paint is peeling or badly weathered, clean surface to sound substrate and treat as a new surface as above.

CLEAN UP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

Z6631 Universal HP Acrylic Primer

APPLICATION

Temperature (air, surface and material):

40°F minimum, 120°F maximum

At least 5°F above dew point

Relative humidity: 85% maximum

Reducer/Clean-up: Water

Airless Spray:

Pressure..... 2000 psi

Hose..... 1/4" ID

Tip..... .015" - .019"

Filter..... 60 mesh

Reduction..... Not recommended

Conventional Spray:

Gun..... Binks 95 (or similar)

Fluid Nozzle..... 66

Air Nozzle..... 63PBB

Atomization Pressure 60 psi

Fluid Pressure..... 25 psi

Reduction..... As needed up to 5%
by volume

Brush:

Brush..... Nylon/polyester

Reduction..... Not recommended

Roller:

Cover..... 3/8" Woven

Reduction..... As needed up to 5%
by volume

PHYSICAL TEST DATA

System Tested:

Substrate: Steel

Surface Preparation: SSPC-SP10

Finish: 1 coat Universal HP Acrylic Primer and 1 coat
Acrylic Waterborne DTM

Adhesion:

Method: ASTM D4541

Result: 500 psi

Corrosion Weathering

Method: ASTM D5894, 3360 hrs, 10 cycles

Result: Passes

Direct Impact Resistance:

Method: ASTM D2794

Result: >140 in. lbs

Dry Heat Resistance:

Method: ASTM D2485

Result: 200°F

Flexibility:

Method: ASTM D522, 180° bend, 1/4" mandrel

Result: Passes

Moisture Condensation Resistance:

Method: ASTM D4585, 1250 hours, 100°F

Result: Passes

Pencil Hardness:

Method: ASTM D3363

Result: H

Salt Fog Resistance:

Method: ASTM B117, 1250 hours

Result: Passes

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of Pratt & Lambert Paints. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Pratt & Lambert dealer or representative to obtain the most recent Product Data Sheet.

RELEASED - Printed documents may be obsolete; validate prior to use.

MATERIAL SAFETY DATA SHEET

Z6631
28 00

DATE OF PREPARATION
Aug 24, 2011

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER

Z6631

PRODUCT NAME

Universal HP Acrylic, White

MANUFACTURER'S NAME

PRATT & LAMBERT PAINTS
101 Prospect Avenue N.W.
Cleveland, OH 44115

Telephone Numbers and Websites

Regulatory Information	(216) 566-2902 www.paintdocs.com
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
*for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units	Vapor Pressure
3	29911-28-2	1-(2-Butoxymethylethoxy)-propanol		
		ACGIH TLV	Not Available	0.06 mm
		OSHA PEL	Not Available	
13	471-34-1	Calcium Carbonate		
		ACGIH TLV	10 mg/m3 as Dust	
		OSHA PEL	10 mg/m3 Total Dust	
		OSHA PEL	5 mg/m3 Respirable Fraction	
10	13463-67-7	Titanium Dioxide		
		ACGIH TLV	10 mg/m3 as Dust	
		OSHA PEL	10 mg/m3 Total Dust	
		OSHA PEL	5 mg/m3 Respirable Fraction	

SECTION 3 — HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE

INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.

EFFECTS OF OVEREXPOSURE

EYES: Irritation.

SKIN: Prolonged or repeated exposure may cause irritation.

INHALATION: Irritation of the upper respiratory system.

In a confined area vapors in high concentration may cause headache, nausea or dizziness.

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

None generally recognized.

CANCER INFORMATION

For complete discussion of toxicology data refer to Section 11.

HMIS Codes

Health	1*
Flammability	0
Reactivity	0

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.

SKIN: Wash affected area thoroughly with soap and water.
Remove contaminated clothing and launder before re-use.

INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.

INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	FLAMMABILITY CLASSIFICATION
Not Applicable	N.A.	N.A.	Not Applicable

EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Alcohol Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Closed containers may explode (due to the build-up of pressure) when exposed to extreme heat.

During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used.

Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate the area.

Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY

Not Applicable

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally.

Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation.

Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.

Wash hands after using.

This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m³ (total dust), 3 mg/m³ (respirable fraction), OSHA PEL 15 mg/m³ (total dust), 5 mg/m³ (respirable fraction).

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits.

Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.

When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES

Wear gloves which are recommended by glove supplier for protection against materials in Section 2.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	10.23 lb/gal	1225 g/l
SPECIFIC GRAVITY	1.23	
BOILING POINT	212 - 449 °F	100 - 231 °C
MELTING POINT	Not Available	
VOLATILE VOLUME	63%	
EVAPORATION RATE	Slower than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	N.A.	
pH	8.7	
VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)		
0.80 lb/gal	96 g/l	Less Water and Federally Exempt Solvents
0.32 lb/gal	39 g/l	Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY**STABILITY — Stable
CONDITIONS TO AVOID**

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION**CHRONIC HEALTH HAZARDS**

IARC's Monograph No. 93 reports there is sufficient evidence of carcinogenicity in experimental rats exposed to titanium dioxide but inadequate evidence for carcinogenicity in humans and has assigned a Group 2B rating. In addition, the IARC summary concludes, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium is bound to other materials, such as paint."

TOXICOLOGY DATA

CAS No.	Ingredient Name			
29911-28-2	1-(2-Butoxymethylethoxy)-propanol	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
471-34-1	Calcium Carbonate	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
13463-67-7	Titanium Dioxide	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION**ECOTOXICOLOGICAL INFORMATION**

No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS**WASTE DISPOSAL METHOD**

Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)

Not Regulated for Transportation.

Canada (TDG)

Not Regulated for Transportation.

IMO

Not Regulated for Transportation.

IATA/ICAO

Not Regulated for Transportation.

SECTION 15 — REGULATORY INFORMATION**SARA 313 (40 CFR 372.65C) SUPPLIER NOTIFICATION**

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
	Zinc Compound	1	0.8

CALIFORNIA PROPOSITION 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION

All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

PRODUCT INFORMATION



PRATT & LAMBERT®

INDUSTRIAL
high performance maintenance coatings

Acrylic Waterborne DTM

Z6600 Series - Satin

Z6700 Series - Semi-Gloss

Z6800 Series - Gloss

Acrylic Waterborne DTM is an interior/exterior, single component, corrosion-resistant waterborne enamel designed for light to moderate duty industrial and commercial applications. Use for new construction or maintenance work.

- Zero VOC, Low Odor
- Early Moisture Resistance
- Flash Rust / Early Rust Resistant
- Corrosion Resistant
- Chemical Resistant
- Fast Dry
- Single Component
- Use Directly on Prepared Metal and Masonry Surfaces
- Interior/Exterior Use
- Suitable for use in USDA inspected facilities

RECOMMENDED USES:

Use this product on properly prepared surfaces of steel, iron, aluminum, galvanized metal, concrete block, masonry, wood, drywall, pre-finished siding and previously painted surfaces.

RECOMMENDED SYSTEMS:

Steel – with primer

1 coat Pratt & Lambert® Universal HP Acrylic Primer

2 coats Pratt & Lambert® Acrylic Waterborne DTM

Steel - unprimed

2 coats Pratt & Lambert® Acrylic Waterborne DTM – White/Base 1 or custom tints from White/Base 1 only. Deeper colors require a primer.

(Note that application over unprimed bare steel may cause pinpoint rusting)

Aluminum, Galvanized Steel

2 coats Pratt & Lambert® Acrylic Waterborne DTM

Pre-Finished Siding (Baked-on Finishes):

1 coat Pratt & Lambert® Acrylic Waterborne Bonding Primer

2 coats Pratt & Lambert® Acrylic Waterborne DTM

Concrete, Masonry

2 coats Pratt & Lambert® Acrylic Waterborne DTM

Concrete Block

1 coat Pratt & Lambert® Acrylic Block Filler

2 coats Pratt & Lambert® Acrylic Waterborne DTM

Wood

1 coat Pratt & Lambert® Multi-Purpose Waterborne Primer

2 coats Pratt & Lambert® Acrylic Waterborne DTM

Drywall, Wallboard

1 coat Pratt & Lambert® Zero VOC Latex Primer

2 coats Pratt & Lambert® Acrylic Waterborne DTM

Previously Painted Surfaces

2 coats Pratt & Lambert® Acrylic Waterborne DTM

TECHNICAL DATA

Vehicle:	Acrylic
Finish:	Satin, Semi-Gloss, Gloss
Flash Point:	499°F, Seta Flash
Volume Solids:	35 ± 2%
Weight Solids:	44 ± 2%
Weight/Gallon:	9.51 ± 2%
VOC (EPA Method #24):	Unreduced 0 g/L, trace
Recommended Film Thickness:	6.0 - 12.0 mils wet 2.5 - 4.0 mils dry
Spread Rate:	140-225 sq. ft. per gallon
Shelf Life:	36 months
Application:	Apply by airless or conventional spray, brush or roller

Note: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

Drying Time (@ 7 mils wet, 50% R.H.):

	50°F	77°F	120°F
To Touch:	1 hr	30 min	5 min
Tack Free:	8 hrs	5 hrs	15 min
To Recoat:	8 hrs	5 hrs	15 min
To Cure:	30 days	30 days	30 days

Note: Drying times are temperature, humidity and film thickness dependant.

Reduction:	Water
Clean-up:	Soap and Water
Tinting:	Pratt & Lambert Colorants or Universal Colorants
Sizes:	1 gallon, 5 gallons

FOR INDUSTRIAL USE ONLY

As of 04/01/11 Complies with	
OTC	Yes
SCAQMD	Yes
CARB	Yes
MPI Spec #	

Technical Information Line:
1-800-BUY-PRAT (1-800-289-7728)
www.prattandlambert.com

SURFACE PREPARATION:

WARNING! Removal of old paint by sanding, scraping or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup. For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority.

Surface must be clean, dry and in sound condition. Remove all oil, dust, grease, dirt, loose rust and other foreign materials to ensure adequate adhesion.

Safety colors, and colors tinted from Base 2/Deep and Base 3/Neutral require a prime coat for maximum durability, adhesion and corrosion protection.

Do not use hydrocarbon solvents for cleaning.

Iron & Steel – Minimum surface preparation is Hand Tool Clean SSPC-SP2. Remove all oil and grease from surface per SSPC-SP1. For better performance, use Commercial Blast Cleaning per SSPC-SP6. Primer recommended for best performance.

Aluminum – Remove all oil, grease, dirt, oxide and other foreign material per SSPC-SP1.

Galvanizing – Surface should be exterior weathered for 6 months prior to painting. Remove all oil and grease per SSPC-SP1. Rusty galvanizing requires a minimum of Hand Tool Cleaning per SSPC-SP2. Prime cleaned area the same day with Pratt & Lambert® Universal HP Acrylic Primer.

Concrete and Masonry – For surface preparation, refer to NACE 6/SSPC-SP13 or ICRI 03732, CSP 1-3. Surface should be thoroughly clean and dry. Surface temperatures must be at least 55°F before filling. If required for a smoother finish, use Pratt & Lambert® Acrylic Block Filler. Filler must be thoroughly dry before topcoating per label instructions. Weathered masonry and soft or porous cement board must be brush blasted or power tool cleaned to remove loosely adhering contamination and to get a hard, firm surface. Apply one coat Pratt & Lambert® Masonry Surface Conditioner, following label instructions.

Wood – Surface must be clean, dry and sound. Prime with recommended primer. No painting should be done immediately after a rain or during foggy weather. Knots and pitch streaks must be scraped, sanded and spot primed before a full coat of primer is applied. All nail holes or small openings must be properly caulked.

Pre-Finished Siding – Remove oil, grease, dirt, oxides and other contaminants from the surface by cleaning per SSPC-SP1 or water blasting per NACE Standard RP-01-72. Always check for compatibility of the previously painted surface with the new coating by applying a test patch of 2-3 square feet. Allow to dry thoroughly for 1 week before checking adhesion. Prime with Pratt & Lambert® Acrylic Waterborne Bonding Primer.

Previously Painted Surfaces – If in sound condition, clean surface of all foreign material. Smooth, hard or glossy coatings and surfaces should be dulled by abrading the surface. Apply a test area, allowing paint to dry one week before testing adhesion. If adhesion is poor, additional abrasion of the surface and/or removal of the previous coating may be necessary. Retest surface for adhesion. If paint is peeling or badly weathered, clean surface to sound substrate and treat as a new surface as above.

CLEAN UP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

Series Z6600, Z6700, Z6800 Acrylic Waterborne DTM

APPLICATION

Temperature (air, surface and material):

50°F minimum, 120°F maximum

At least 5°F above dew point

Relative humidity: 85% maximum

Reducer/Clean-up: Water

Airless Spray:

Pressure..... 1500 psi

Hose..... 1/4" ID

Tip..... .017" - .021"

Filter..... 60 mesh

Reduction..... Not recommended

Conventional Spray:

Gun..... Binks 95 (or equivalent)

Fluid Nozzle..... 66

Air Nozzle..... 63PBB

Atomization Pressure 50 psi

Fluid Pressure..... 15-20 psi

Reduction..... As needed up to 12.5%
by volume

Brush:

Brush..... Nylon/polyester

Reduction..... Not recommended

Roller:

Cover..... 3/8" Woven

Reduction..... Not recommended

PHYSICAL TEST DATA

System Tested:

Substrate: Steel

Surface Preparation: SSPC-SP10

Finish: 2 coats Acrylic WB DTM

Adhesion:

Method: ASTM D4541

Result: 1386 psi

Corrosion Weathering (over HP Acrylic WB Primer):

Method: ASTM D5894, 1500 hrs, 5 cycles

Result: Rating 10, per ASTM D714 for blistering; Rating 9 per ASTM D1654 for corrosion

Direct Impact Resistance:

Method: ASTM D2794

Result: >160 in. lb.

Dry Heat Resistance:

Method: ASTM D2485

Result: 250°F

Flexibility:

Method: ASTM D522, 180° bend, 1/8" mandrel

Result: Passes

Humidity Resistance (over HP Acrylic WB Primer):

Method: ASTM D4585, 1500 hours

Result: Rating 10 per ASTM D714 for blistering; Rating 10 per ASTM D1654 for corrosion

Pencil Hardness:

Method: ASTM D3363

Result: 2B

Salt Fog Resistance (over HP Acrylic WB Primer):

Method: ASTM B117, 1500 hours

Result: Rating 10 per ASTM D714 for blistering; Rating 9 per ASTM D1654 for corrosion

Thermal Cycling:

Method: ASTM D2246, 5 cycles

Result: Passes

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of Pratt & Lambert Paints. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Pratt & Lambert dealer or representative to obtain the most recent Product Data Sheet.

RELEASED - Printed documents may be obsolete; validate prior to use.

MATERIAL SAFETY DATA SHEET

Z6841
08 00

DATE OF PREPARATION
May 19, 2011

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER

Z6841

PRODUCT NAME

Acrylic Waterborne DTM Gloss, White/Base 1

MANUFACTURER'S NAME

PRATT & LAMBERT PAINTS
101 Prospect Avenue N.W.
Cleveland, OH 44115

Telephone Numbers and Websites

Regulatory Information	(216) 566-2902 www.paintdocs.com
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
*for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units	Vapor Pressure
13	13463-67-7	Titanium Dioxide		
		ACGIH TLV	10 mg/m3 as Dust	
		OSHA PEL	10 mg/m3 Total Dust	
		OSHA PEL	5 mg/m3 Respirable Fraction	

SECTION 3 — HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE

INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.

EFFECTS OF OVEREXPOSURE

EYES: Irritation.
SKIN: Prolonged or repeated exposure may cause irritation.
INHALATION: Irritation of the upper respiratory system.

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

None generally recognized.

CANCER INFORMATION

For complete discussion of toxicology data refer to Section 11.

HMIS Codes

Health	2*
Flammability	0
Reactivity	0

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.
SKIN: Wash affected area thoroughly with soap and water.
INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT Not Applicable **LEL** N.A. **UEL** N.A. **FLAMMABILITY CLASSIFICATION** Not Applicable

EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Alcohol Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Closed containers may explode (due to the build-up of pressure) when exposed to extreme heat.

During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used.

Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate the area.

Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY

Not Applicable

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally.

Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation.

Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.

Wash hands after using.

This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m³ (total dust), 3 mg/m³ (respirable fraction), OSHA PEL 15 mg/m³ (total dust), 5 mg/m³ (respirable fraction).

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits.

Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.

When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES

Required for long or repeated contact.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	9.48 lb/gal	1135 g/l
SPECIFIC GRAVITY	1.14	
BOILING POINT	212 - 213 °F	100 - 100 °C
MELTING POINT	Not Available	
VOLATILE VOLUME	64%	
EVAPORATION RATE	Slower than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	N.A.	
pH	9.0	
VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)		
0.00 lb/gal	0 g/l	Less Water and Federally Exempt Solvents
0.00 lb/gal	0 g/l	Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable

CONDITIONS TO AVOID

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION**CHRONIC HEALTH HAZARDS**

IARC's Monograph No. 93 reports there is sufficient evidence of carcinogenicity in experimental rats exposed to titanium dioxide but inadequate evidence for carcinogenicity in humans and has assigned a Group 2B rating. In addition, the IARC summary concludes, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium is bound to other materials, such as paint."

TOXICOLOGY DATA

CAS No.	Ingredient Name			
13463-67-7	Titanium Dioxide	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION**ECOTOXICOLOGICAL INFORMATION**

No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS**WASTE DISPOSAL METHOD**

Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)

Not Regulated for Transportation.

Canada (TDG)

Not Regulated for Transportation.

IMO

Not Regulated for Transportation.

IATA/ICAO

Not Regulated for Transportation.

SECTION 15 — REGULATORY INFORMATION**SARA 313 (40 CFR 372.65C) SUPPLIER NOTIFICATION**

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
---------	-------------------	---------	-----------

No ingredients in this product are subject to SARA 313 (40 CFR 372.65C) Supplier Notification.

CALIFORNIA PROPOSITION 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION

All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

A-12

Sherwin-Williams



Protective & Marine Coatings

FAST CLAD® EPOXY PRIMER WITH OPTI-CHECK OAP TECHNOLOGY

PART A
PART B

B62L245
B62V245

BLUE OAP
HARDENER

Revised 8/11

PRODUCT INFORMATION

9.52

PRODUCT DESCRIPTION

Fast Clad Epoxy Primer is an, ultra high solids epoxy amine coating engineered for immersion service in sea water ballast tanks, fuel/sea water ballast tanks, and petroleum storage tanks. The rapid return to service properties of this coating provide superior value compared to conventional epoxies.

- Fast return to service
- Low VOC
- Dry to walk-on within four hours
- Designed for plural-component application equipment
- Low Temperature application and cure capabilities to 35°F (See Application Conditions)
- Low odor

PRODUCT CHARACTERISTICS

Finish:	Gloss
Color:	Blue
Volume Solids:	98%, ± 2%, mixed
Weight Solids:	98%, ± 2%, mixed
VOC (EPA method #24):	<85 g/L; 0.71 lb/gal, mixed
Mix Ratio:	1:1 by volume

Recommended Spreading Rate per coat:

	Minimum	Maximum
Wet mils (microns)	4.0 (100)	8.0 (200)
Dry mils (microns)	4.0 (100)	8.0 (200)
~Coverage sq ft/gal (m²/L)	200 (4.9)	400 (9.8)
Theoretical coverage sq ft/gal (m²/L) @ 1 mil / 25 microns dft	1568 (38.4)	

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

Drying Schedule @ 8.0 mils wet (200 microns):

	@ 40°F/4.5°C	@ 77°F/25°C 50% RH	@ 100°F/38°C
To touch:	6 hours	1 hour	35 minutes
To handle:	8-12 hours	3 hours	55 minutes
To recoat:			
minimum:	6 hours	1 hour	35 minutes
maximum:	14 days	14 days	14 days
Foot traffic:	8-12 hours	3 hours	1 hour
Cure to service:	36 hours	24 hours	12 hours
Pot Life:	7 minutes		
Sweat-in-Time:	None required		

Shelf Life:	24 months, unopened Store indoors at 40°F (4.5°C) to 100°F (38°C)
Flash Point:	230°F (110°C), PMCC, mixed
Reducer:	Not recommended
Clean Up:	MEK (R6K10) or Reducer R7K104

RECOMMENDED USES

For use over prepared steel or masonry surfaces in industrial and marine exposures such as:

- Ballast tank interiors and oil storage tank interiors
- Fuel storage tanks and external pipeline coating
- Primary or Secondary containment
- Acceptable for use with cathodic protection systems
- Where rapid return to service properties are required
- Meets performance requirements of MIL-PRF-23236
- Blue OAP contains, fluorescent pigment

PERFORMANCE CHARACTERISTICS

Substrate*: Steel

Surface Preparation*: SSPC-SP10

System Tested*:

1 ct. Fast Clad Epoxy Primer @ 6.0 mils (150 microns) dft

1 ct. Fast Clad ER Epoxy @ 18.0-22.0 mils (450-550 microns) dft

*unless otherwise noted below

Test Name	Test Method	Results
Abrasion Resistance	ASTM D4060, CS17 wheel, 1000 cycles, 1 kg load	22.4 mg loss
Adhesion	ASTM D4541, Patti	3,238 psi avg
Cathodic Disbondment	ASTM G8	Passes, <10mm ²
Corrosion Weathering	ASTM D5894, 15 cycles, 5000 hours	Rating 10 per ASTM D610 for Rusting (field); Rating 10 per ASTM D714 for Blistering (field)
Direct Impact Resistance*	ASTM D2794	68 in lb, Passes
Dry Heat Resistance	ASTM D2485	250°F (121°C)
Flexibility	ASTM D522, 1" mandrel	Passes
Moisture Condensation Resistance	ASTM D4585, 5000 hours, 100°F (38°C)	Rating 10 per ASTM D610 for Rusting (field); Rating 10 per ASTM D714 for Blistering (field)
Pencil Hardness	ASTM D3363	H
Salt Fog Resistance	ASTM B117, 5000 hours	Rating 10 per ASTM D610 for Rusting (field); Rating 10 per ASTM D714 for Blistering (field)

*Report No. IM54.1352-08; Fast Clad Epoxy Primer, Fast Clad ER Epoxy

Refer to respective topcoat for immersion service performance.

Epoxy coatings may darken or yellow after application and curing.

Note: Brush and roll application recommended for stripe coating and repair only.



Protective & Marine Coatings

FAST CLAD® EPOXY PRIMER WITH OPTI-CHECK OAP TECHNOLOGY

PART A B62L245
PART B B62V245

BLUE OAP
HARDENER

PRODUCT INFORMATION

9.52

RECOMMENDED SYSTEMS

	Dry Film Thickness / ct.	
	Mils	(Microns)
Steel, immersion:		
1 ct. Fast Clad Epoxy Primer	4.0 -8.0**	(100-200)
1 ct. Fast Clad ER Epoxy	18.0-22.0	(450-550)
Steel, immersion:		
2 cts. Fast Clad ER Epoxy	9.0 – 11.0	(225-275)
Concrete, immersion:		
1 ct. Corobond 100 Epoxy Primer/Sealer; apply primer to achieve uniform hiding, appearance, and complete wetting of the concrete surface, approximately 4-6 mils (100-150 microns) dft. Coating will be partially absorbed into the concrete. Roll out any puddles.		
2 cts. Fast Clad ER Epoxy	9.0 – 11.0	(225-275)

** When using an OAP Fluorescent pigment system, use Fast Clad Epoxy Primer with a non-OAP containing topcoat color.

The systems listed above are representative of the product's use, other systems may be appropriate.

SURFACE PREPARATION

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Refer to product Application Bulletin for detailed surface preparation information.

Minimum recommended surface preparation:

Iron & Steel:		
Atmospheric:	SSPC-SP6/NACE 3, 2 mil (50 micron) profile or SSPC-SP12/NACE No. 5, WJ-3/SC-2	
Immersion:	SSPC-SP10/NACE2, 2-3 mil (50-75 micron) profile or SSPC-SP12/NACE No. 5, WJ-2/SC-2	
Concrete & Masonry:		
Atmospheric:	SSPC-SP13/NACE 6, or ICRI No. 310.2, CSP2-3	
Immersion:	SSPC-SP13/NACE 6-4.3.1 or 4.3.2, or ICRI No. 310.2 CSP2-3	

Surface Preparation Standards

Condition of Surface	ISO 8501-1 BS7079:A1	Swedish Std. SIS055900	SSPC	NACE
White Metal	Sa 3	Sa 3	SP 5	1
Near White Metal	Sa 2.5	Sa 2.5	SP 10	2
Commercial Blast	Sa 2	Sa 2	SP 6	3
Brush-Off Blast	Sa 1	Sa 1	SP 7	4
Hand Tool Cleaning	C St 2	C St 2	SP 2	-
Pitted & Rusty	D St 2	D St 2	SP 2	-
Rusty	C St 3	C St 3	SP 3	-
Power Tool Cleaning	Pitted & Rusty	D St 3	SP 3	-

TINTING

Do not tint

APPLICATION CONDITIONS

Temperature:
Air & surface: 40°F (4.5°C) minimum, 110°F (43°C) maximum

*For application at 35°F (1.7°C) to 40°F (4.5°C), specific guidelines are required:

- Air & Surface temperature conditions must be expected to remain stable or improve for a period of four hours.
- Environmental controls (dehumidification, heating, forced-air ventilation) are recommended to maintain acceptable application conditions.
- Final cure must be confirmed in accordance with ASTM D5402, "Assessing the Solvent Resistance of Organic Coatings Using Solvent Rubs". Test shall consist of 50 double rubs with MEK. Test shall confirm no loss of DFT, and no coating residue on rubbing cloth.

The material should be 85°F-130°F/29°C-54°C (vary as needed) at the mixing block for optimal atomization based on tip size and pump pressure.. **Do not heat above 140°F/60°C.**

Relative humidity: 85% maximum

Refer to product Application Bulletin for detailed application information.

ORDERING INFORMATION

Packaging:	
Part A:	5 gallon (18.9L) container
Part B:	5 gallon (18.9L) container
Weight:	11.96, ± 0.3 lb/gal ; 1.43 Kg/L, mixed

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

DISCLAIMER

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Information and Application Bulletin.

WARRANTY

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.



**Protective
&
Marine
Coatings**

**FAST CLAD® EPOXY PRIMER
WITH OPTI-CHECK OAP TECHNOLOGY**

**PART A
PART B**

**B62L245
B62V245**

**BLUE OAP
HARDENER**

Revised 8/11

APPLICATION BULLETIN

9.52

SURFACE PREPARATIONS

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Iron & Steel (atmospheric service)

Minimum surface preparation is Commercial Blast Cleaning per SSPC-SP6/NACE 3 or SSPC-SP12/NACE No. 5. For surfaces prepared by SSPC SP6/NACE 3, first remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. For better performance, use Near White Metal Blast Cleaning per SSPC-SP10/NACE 2. Blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2-3 mils / 50-75 microns). For surfaces prepared by SSPC-SP12/NACE No. 5, all surfaces shall be cleaned in accordance with WJ-3/SC2. Pre-existing profile should be approximately 2 mils (50 microns). Prime any bare steel the same day as it is cleaned or before flash rusting occurs.

Iron & Steel (immersion service)

Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. Minimum surface preparation is Near White Metal Blast Cleaning per SSPC-SP10/NACE 2, or SSPC-SP12/NACE No. 5. For SSPC-SP10/NACE 2, blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2-3 mils / 50-75 microns). For SSPC-SP12/NACE No.5, all surfaces to be coated shall be cleaned in accordance with WJ-2/SC2 standards. Pre-existing profile should be approximately 2 mils (50 microns). Remove all weld spatter. Prime any bare steel the same day as it is cleaned or before flash rusting occurs.

Concrete and Masonry

For surface preparation, refer to SSPC-SP13/NACE 6, or ICRI No. 310.2, CSP 2-3. Surfaces should be thoroughly clean and dry. Concrete and mortar must be cured at least 28 days @ 75°F (24°C). Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement and hardeners. Fill bug holes, air pockets and other voids with Steel-Seam FT910. Primer required.

Follow the standard methods listed below when applicable:

- ASTM D4258 Standard Practice for Cleaning Concrete.
- ASTM D4259 Standard Practice for Abrading Concrete.
- ASTM D4260 Standard Practice for Etching Concrete.
- ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete.
- SSPC-SP 13/Nace 6 Surface Preparation of Concrete.
- ICRI No. 310.2 Concrete Surface Preparation.

Concrete, Immersion Service:

For surface preparation, refer to SSPC-SP13/NACE 6, Section 4.3.1 or 1.3.2 or ICRI No. 310.2, CSP 2-3.

Surface Preparation Standards

Condition of Surface	ISO 8501-1 BS7079:A1	Swedish Std. SIS055900	SSPC	NACE
White Metal	Sa 3	Sa 3	SP 5	1
Near White Metal	Sa 2.5	Sa 2.5	SP 10	2
Commercial Blast	Sa 2	Sa 2	SP 6	3
Brush-Off Blast	Sa 1	Sa 1	SP 7	4
Hand Tool Cleaning	C St 2	C St 2	SP 2	-
Pitted & Rusted	D St 2	D St 2	SP 2	-
Rusted	C St 3	C St 3	SP 3	-
Power Tool Cleaning	Pitted & Rusted D St 3	D St 3	SP 3	-

APPLICATION CONDITIONS

Temperature:

Air & surface: 40°F (4.5°C) minimum, 110°F (43°C) maximum

*For application at 35°F (1.7°C) to 40°F (4.5°C), specific guidelines are required:

- Air & Surface temperature conditions must be expected to remain stable or improve for a period of four hours.
- Environmental controls (dehumidification, heating, forced-air ventilation) are recommended to maintain acceptable application conditions.
- Final cure must be confirmed in accordance with ASTM D5402, "Assessing the Solvent Resistance of Organic Coatings Using Solvent Rubs". Test shall consist of 50 double rubs with MEK. Test shall confirm no loss of DFT, and no coating residue on rubbing cloth.

The material should be 85°F-130°F/29°C-54°C (vary as needed) at the mixing block for optimal atomization based on tip size and pump pressure.. **Do not heat above 140°F/60°C.**

Relative humidity: 85% maximum

APPLICATION EQUIPMENT

The following is a guide. Changes in pressures and tip sizes may be needed for proper spray characteristics. Always purge spray equipment before use with listed reducer. Any reduction must be compliant with existing VOC regulations and compatible with the existing environmental and application conditions.

ReductionNot recommended

Clean UpMEK (R6K10) or R7K104

Plural Component Equipment

Pump.....WIWA DURO-MIX 1:1 or Graco Extreme Mix

Pressure.....4000 psi

Hose.....3/8" ID

Tip0.021" - .025"

Pump heater setting.....70 - 80

Material temperature at

gun tip 85°F-130°F/29°C-54°C (vary as needed)

BrushFor stripe coating and repair only

Brush.....Nylon/Polyester or Natural Bristle

RollerFor stripe coating and repair only

Cover3/8" woven with solvent resistant core

If specific application equipment is not listed above, equivalent equipment may be substituted.



**Protective
&
Marine
Coatings**

**FAST CLAD® EPOXY PRIMER
WITH OPTI-CHECK OAP TECHNOLOGY**

PART A **B62L245** **BLUE OAP**
PART B **B62V245** **HARDENER**

APPLICATION BULLETIN

9.52

APPLICATION PROCEDURES

Surface preparation must be completed as indicated.

Mixing Instructions: Mix contents of each component thoroughly using low speed power agitation. Make certain no pigment remains on the bottom or the sides of the can. Then combine one part by volume of Part A with one part by volume of Part B. Thoroughly agitate the mixture with power agitation.

To ensure that no unmixed material remains on the sides or bottom of the cans after mixing, visually observe the container by pouring the material into a separate container.

Apply paint at the recommended film thickness and spreading rate as indicated below:

Recommended Spreading Rate per coat:

	Minimum	Maximum
Wet mils (microns)	4.0 (100)	8.0 (200)
Dry mils (microns)	4.0 (100)	8.0 (200)
~Coverage sq ft/gal (m²/L)	200 (4.9)	400 (9.8)
Theoretical coverage sq ft/gal (m²/L) @ 1 mil / 25 microns dft	1568 (38.4)	

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

Drying Schedule @ 8.0 mils wet (200 microns):

	@ 40°F/4.5°C	@ 77°F/25°C 50% RH	@ 100°F/38°C
To touch:	6 hours	1 hour	35 minutes
To handle:	8-12 hours	3 hours	55 minutes
To recoat:			
minimum:	6 hours	1 hour	35 minutes
maximum:	14 days	14 days	14 days
Foot traffic:	8-12 hours	3 hours	1 hour
Cure to service:	36 hours	24 hours	12 hours
Pot Life:		7 minutes	
Sweat-in-Time:		None required	

Application of coating above maximum or below minimum recommended spreading rate may adversely affect coating performance.

CLEAN UP INSTRUCTIONS

Clean spills and spatters immediately with MEK, R6K10. Clean tools immediately after use with MEK, R6K10. Follow manufacturer's safety recommendations when using any solvent.

DISCLAIMER

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Information and Application Bulletin.

PERFORMANCE TIPS

**Repair of Pitted Tank Bottoms
Extensive, deep pitting:**

Options:

Option 1 ..Apply a full wet coat, by spray application, of Fast Clad Epoxy Primer. Follow with rubber squeegee to work material into and fill the pitted areas. After recommended drying time, apply a full coat of Fast Clad ER at recommended film thickness.

Option 2 ..Apply Dura-Plate UHS Clear Laminant Resin with 1½ oz fiberglass mat over the pitted areas. After recommended drying time, apply a full coat of Fast Clad ER at recommended film thickness.

Option 3 ..Weld new steel plates, or use puddle welds, as required to repair pitted areas. Coat areas as recommended.

Shallow pitting, isolated areas:

Options:

Option 1 ..Same as number 1 above.

Option 2 ..Apply Steel Seam FT910 as required to fill the pitted areas. Coat areas as recommended.

When using spray application, use a 50% overlap with each pass of the gun to avoid holidays, bare areas, and pinholes. If necessary, cross-coat spray at a right angle.

Spreading rates are calculated on volume solids and do not include an application loss factor due to surface profile, roughness or porosity of the surface, skill and technique of the applicator, method of application, various surface irregularities, material lost during mixing, spillage, overthinning, climatic conditions, and excessive film build.

No reduction of material is recommended as this can affect film build, appearance, and adhesion.

Stripe coat all crevices, welds, and sharp angles to prevent early failure in these areas.

Do not mix previously catalyzed material with new.

Do not apply the material beyond recommended pot life.

Remove and solvent clean housing tip every 20-30 minutes.

For Immersion Service: (if required) Holiday test in accordance with ASTM D5162 for steel, or ASTM D4787 for concrete.

When using an OAP fluorescent pigment system, use the Fast Clad Epoxy Primer, with a non-OAP containing Fast Clad ER topcoat color.

Guidance on techniques and required equipment to inspect a coating system incorporating Opti-Check OAP Technology can be found in SSPC-TU 11.

Refer to Product Information sheet for additional performance characteristics and properties.

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

WARRANTY

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

MATERIAL SAFETY DATA SHEET

B62L245
06 00

DATE OF PREPARATION
Jan 20, 2012

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER

B62L245

PRODUCT NAME

FAST CLAD® Epoxy Primer (Part A), Blue OAP

MANUFACTURER'S NAME

THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, OH 44115

Telephone Numbers and Websites

Product Information	(800) 524-5979 www.sherwin-williams.com
Regulatory Information	(216) 566-2902 www.paintdocs.com
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300

*for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units	Vapor Pressure
8	100-51-6	Phenylmethanol ACGIH TLV OSHA PEL	Not Available Not Available	0.15 mm
10	98-54-4	Paratertiarybutylphenol ACGIH TLV OSHA PEL	Not Available Not Available	
1	25154-52-3	Nonylphenol ACGIH TLV OSHA PEL	Not Available Not Available	
8	25620-58-0	Trimethyl-1,6-hexanediamine ACGIH TLV OSHA PEL	Not Available Not Available	
7	1477-55-0	1,3-Benzenedimethanamine ACGIH TLV OSHA PEL	0.1 ppm (Skin) CEILING 0.1 ppm (Skin) CEILING	
21	13463-67-7	Titanium Dioxide ACGIH TLV OSHA PEL OSHA PEL	10 mg/m3 as Dust 10 mg/m3 Total Dust 5 mg/m3 Respirable Fraction	

SECTION 3 — HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE

INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.

EFFECTS OF OVEREXPOSURE

EYES: Causes burns.

SKIN: Causes burns.

INHALATION: Causes burns of the upper respiratory system.

In a confined area vapors in high concentration may cause headache, nausea or dizziness.

Prolonged overexposure to hazardous ingredients in Section 2 may cause adverse chronic effects to the following organs or systems:

- the nervous system

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Redness and itching or burning sensation may indicate eye or excessive skin exposure.

HMIS Codes

Health	3*
Flammability	1
Reactivity	1

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

May cause allergic skin reaction in susceptible persons or skin sensitization.

CANCER INFORMATION

For complete discussion of toxicology data refer to Section 11.

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention **IMMEDIATELY**.

SKIN: Wash affected area thoroughly with soap and water.
If irritation persists or occurs later, get medical attention.
Remove contaminated clothing and launder before re-use.

INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.

INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	FLAMMABILITY CLASSIFICATION
> 200 °F PMCC	N.A.	N.A.	Not Applicable

EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Closed containers may explode (due to the build-up of pressure) when exposed to extreme heat.

During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used.

Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES**STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED**

Remove all sources of ignition. Ventilate the area.

Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE**STORAGE CATEGORY**

DOL Storage Class IIIB

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally.

Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION**PRECAUTIONS TO BE TAKEN IN USE**

Use only with adequate ventilation.

Do not get in eyes, or on skin or clothing. Do not breathe vapor or spray mist.

Wash hands after using.

This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m³ (total dust), 3 mg/m³ (respirable fraction), OSHA PEL 15 mg/m³ (total dust), 5 mg/m³ (respirable fraction).

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits.

Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.

When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES

To prevent skin contact, wear gloves which are recommended by glove supplier for protection against materials in Section 2.

EYE PROTECTION

To prevent eye contact, wear safety spectacles with unperforated sideshields.

OTHER PROTECTIVE EQUIPMENT

Use barrier cream on exposed skin.

OTHER PRECAUTIONS

This product must be mixed with other components before use. Before opening the packages, READ AND FOLLOW WARNING LABELS ON ALL COMPONENTS.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	14.34 lb/gal	1718 g/l
SPECIFIC GRAVITY	1.73	
BOILING POINT	396 - 405 °F	202 - 207 °C
MELTING POINT	Not Available	
VOLATILE VOLUME	14%	
EVAPORATION RATE	Slower than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	N.A.	
VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)		
1.26 lb/gal	150 g/l	Less Water and Federally Exempt Solvents
1.26 lb/gal	150 g/l	Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY**STABILITY — Stable****CONDITIONS TO AVOID**

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION**CHRONIC HEALTH HAZARDS**

IARC's Monograph No. 93 reports there is sufficient evidence of carcinogenicity in experimental rats exposed to titanium dioxide but inadequate evidence for carcinogenicity in humans and has assigned a Group 2B rating. In addition, the IARC summary concludes, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium is bound to other materials, such as paint."

TOXICOLOGY DATA

CAS No.	Ingredient Name			
100-51-6	Phenylmethanol	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
98-54-4	Paratertiarybutylphenol	LC50 RAT	4HR	Not Available
		LD50 RAT		1200 mg/kg
25154-52-3	Nonylphenol	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
25620-58-0	Trimethyl-1,6-hexanediamine	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
1477-55-0	1,3-Benzenedimethanamine	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
13463-67-7	Titanium Dioxide	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION**ECOTOXICOLOGICAL INFORMATION**

No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS**WASTE DISPOSAL METHOD**

Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.

Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)

1 Liter (1.1 Quarts) and Less may be Classed as CONSUMER COMMODITY, ORM-D

Larger Containers are Regulated as:

UN3066, PAINT, 8, PG II, (ERG#153)

Bulk Containers may be Shipped as:

UN3066, PAINT, 8, PG II, (ERG#153)

Canada (TDG)

UN3066, PAINT, CLASS 8, PG II, (ERG#153)

IMO

1 Liter (1.1 Quarts) and Less may be Shipped as Limited Quantity.

UN3066, PAINT, CLASS 8, PG II, EmS F-A, S-B, ADR (E)

IATA/ICAO

UN3066, PAINT, 8, PG II

SECTION 15 — REGULATORY INFORMATION

SARA 313 (40 CFR 372.65C) SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
---------	-------------------	---------	-----------

No ingredients in this product are subject to SARA 313 (40 CFR 372.65C) Supplier Notification.

CALIFORNIA PROPOSITION 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION

All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

MATERIAL SAFETY DATA SHEET

B62V245
05 00

DATE OF PREPARATION
Jul 7, 2011

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER

B62V245

PRODUCT NAME

FAST CLAD® Epoxy Primer Hardener (Part B)

MANUFACTURER'S NAME

THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, OH 44115

Telephone Numbers and Websites

Product Information	www.sherwin-williams.com
Regulatory Information	(216) 566-2902 www.paintdocs.com
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300

*for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units	Vapor Pressure
15	68609-96-1	Alkyl Glycidyl Ether		
		ACGIH TLV	Not Available	
		OSHA PEL	Not Available	
83	25068-38-6	Epoxy Polymer		
		ACGIH TLV	Not Available	
		OSHA PEL	Not Available	
1	67762-90-7	Hydrophobic Amorphous Silica		
		ACGIH TLV	10 mg/m ³ as Dust	
		OSHA PEL	6 mg/m ³ as Dust	

SECTION 3 — HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE

INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.

EFFECTS OF OVEREXPOSURE

EYES: Irritation.
SKIN: Prolonged or repeated exposure may cause irritation.
INHALATION: Irritation of the upper respiratory system.

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

May cause allergic skin reaction in susceptible persons or skin sensitization.

CANCER INFORMATION

For complete discussion of toxicology data refer to Section 11.

HMIS Codes

Health	2*
Flammability	1
Reactivity	0

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.

SKIN: Wash affected area thoroughly with soap and water.
If irritation persists or occurs later, get medical attention.
Remove contaminated clothing and launder before re-use.

INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.

INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	FLAMMABILITY CLASSIFICATION
> 200 °F PMCC	N.A.	N.A.	Not Applicable

EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Closed containers may explode (due to the build-up of pressure) when exposed to extreme heat.

During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used.

Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate the area.

Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY

DOL Storage Class IIIB

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally.

Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation.

Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.

Wash hands after using.

This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m³ (total dust), 3 mg/m³ (respirable fraction), OSHA PEL 15 mg/m³ (total dust), 5 mg/m³ (respirable fraction).

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits.

Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.

When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES

Wear gloves which are recommended by glove supplier for protection against materials in Section 2.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

OTHER PROTECTIVE EQUIPMENT

Use of barrier cream on exposed skin is recommended.

OTHER PRECAUTIONS

This product must be mixed with other components before use. Before opening the packages, READ AND FOLLOW WARNING LABELS ON ALL COMPONENTS.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	9.61 lb/gal	1151 g/l
SPECIFIC GRAVITY	1.16	
BOILING POINT	Not Applicable	
MELTING POINT	Not Available	
VOLATILE VOLUME	0%	
EVAPORATION RATE	N.A.	
VAPOR DENSITY	N.A.	
SOLUBILITY IN WATER	N.A.	
VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)		

0.02 lb/gal 2 g/l Less Water and Federally Exempt Solvents
 0.02 lb/gal 2 g/l Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable

CONDITIONS TO AVOID

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS

No ingredient in this product is an IARC, NTP or OSHA listed carcinogen.

TOXICOLOGY DATA

CAS No.	Ingredient Name			
68609-96-1	Alkyl Glycidyl Ether	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
25068-38-6	Epoxy Polymer	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
67762-90-7	Hydrophobic Amorphous Silica	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD

Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)

Not Regulated for Transportation.

Canada (TDG)

Not Regulated for Transportation.

IMO

Not Regulated for Transportation.

IATA/ICAO

Not Regulated for Transportation.

SECTION 15 — REGULATORY INFORMATION

SARA 313 (40 CFR 372.65C) SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
---------	-------------------	---------	-----------

No ingredients in this product are subject to SARA 313 (40 CFR 372.65C) Supplier Notification.

CALIFORNIA PROPOSITION 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION

All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.



Protective & Marine Coatings

FAST CLAD® ER EPOXY WITH OPTI-CHECK OAP TECHNOLOGY

PART A
PART A
PART B
PART B

B62W230
B62L230
B62V230
B62AV230

WHITE BASE
BLUE OAP
CLEAR HARDENER
GRAY HARDENER

Revised 1/12

PRODUCT INFORMATION

9.50

PRODUCT DESCRIPTION

Fast Clad ER Epoxy is an edge retentive, ultra high solids epoxy amine coating engineered for immersion service in sea water ballast tanks, fuel/sea water ballast tanks, and petroleum storage tanks. The rapid return to service and high build, edge retentive properties of this coating provide superior protection compared to conventional epoxies.

- One coat protection
- Low VOC
- Dry to walk-on within four hours
- Designed for plural-component application equipment
- Greater than 70% edge build retention
- Low Temperature application and cure capabilities to 35°F (See Application Conditions)
- Fast return to service
- Low odor

PRODUCT CHARACTERISTICS

Finish:	Gloss
Color:	White-Base, Blue OAP
Volume Solids:	98%, ± 2%, mixed
Weight Solids:	98%, ± 2%, mixed
VOC (EPA method #24):	<85 g/L; 0.71 lb/gal, mixed
Mix Ratio:	1:1 by volume

Recommended Spreading Rate per coat:

	Minimum	Maximum
Wet mils (microns)	18.0 (450)	22.0 (550)
Dry mils (microns)	18.0 (450)	22.0 (550)
~Coverage sq ft/gal (m²/L)	73 (1.8)	89 (2.2)

*Can be applied up to 60.0 mils (1500 microns) dft if required.

Theoretical coverage sq ft/gal (m²/L) @ 1 mil / 25 microns dft **1568** (38.4)

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

Drying Schedule @ 20.0 mils (500 microns):

	@ 40°F/4.5°C	@ 77°F/25°C 50% RH	@ 100°F/38°C
To touch:	6 hours	1 hour	35 minutes
To handle:	8-12 hours	3 hours	55 minutes
To recoat:			
minimum:	6 hours	1 hour	35 minutes
maximum:	14 days	14 days	14 days
Foot traffic:	8-12 hours	3 hours	1 hour
Cure to service:	36 hours	24 hours	12 hours
Pot Life:		7 minutes	
Sweat-in-Time:		None required	

Shelf Life:	24 months Store indoors at 40°F (4.5°C) to 100°F (38°C)
Flash Point:	230°F (110°C), PMCC, mixed
Reducer:	Not recommended
Clean Up:	MEK (R6K10) or Reducer R7K104

RECOMMENDED USES

For use over prepared steel or masonry surfaces in industrial and marine exposures such as:

- Ballast tank interiors and oil storage tank interiors
- Fuel storage tanks and external pipeline coating
- Primary or Secondary containment
- Acceptable for use with cathodic protection systems
- Where rapid return to service and edge protection film build properties are required
- Meets MIL-PRF-23236 Type VII, Class 5, 7, 5/18, 7/18, 13/18, Grade C requirements for single and multi-coat seawater, fuel, and CHT tanks
- Blue OAP contains fluorescent pigment
- Wind tower gearbox lining and transformer lining up to 284°F (140°C)

PERFORMANCE CHARACTERISTICS

Substrate*: Steel

Surface Preparation*: SSPC-SP10

System Tested*:

1 ct. Fast Clad ER Epoxy @ 18.0-22.0 mils (450-550 microns) dft
*unless otherwise noted below

Test Name	Test Method	Results
Abrasion Resistance	ASTM D4060, CS17 wheel, 1000 cycles, 1 kg load	22.4 mg loss
Adhesion	ASTM D4541	870 psi
Cathodic Disbondment	ASTM G8	Passes 30 days @ 1.5 volts (Cu/CuSO ₄), <10 mm disbondment radius
Corrosion Weathering	ASTM D5894, 4 cycles, 1134 hours	Rating 10 per ASTM D610 for Rusting (field); Rating 10 per ASTM D714 for Blistering (field)
Direct Impact Resistance	ASTM D2794	15 in-lb
Dry Heat Resistance	ASTM D2485	250°F (121°C)
Flexibility	ASTM D522	7/16" (24-hour cure)
Immersion Elevated Temperature*		Passes 6 months at 204°F (96°C) in gearbox oil
Moisture Condensation Resistance	ASTM D4585, 100°F (38°C), 2000 hours	Rating 10 per ASTM D610 for Rusting (field); Rating 10 per ASTM D714 for Blistering (field)
Pencil Hardness	ASTM D3363	H

*Report No. IM54.1382-09

Immersion (ambient temperature) for the following:

- Ballast tank mix Recommended
- Crude oil Recommended
- Fresh water Recommended
- Gasoline Recommended
- Sea water..... Recommended
- Reformulated gasoline Recommended
- Kerosene Recommended

Epoxy coatings may darken or yellow after application and curing.



Protective & Marine Coatings

FAST CLAD® ER EPOXY WITH OPTI-CHECK OAP TECHNOLOGY

PART A
PART A
PART B
PART B

B62W230
B62L230
B62V230
B62AV230

WHITE BASE
BLUE OAP
CLEAR HARDENER
GRAY HARDENER

PRODUCT INFORMATION

9.50

RECOMMENDED SYSTEMS

	Dry Film Thickness / ct.	
	Mils	(Microns)
Steel, immersion:		
1 ct. Fast Clad ER Epoxy	18.0 -22.0	(450-550)
Steel, immersion:		
1 ct. Fast Clad Epoxy Primer	4.0 -8.0**	(100-200)
1 ct. Fast Clad ER Epoxy	18.0-22.0	(450-550)
Steel, immersion:		
2 cts. Fast Clad ER Epoxy	9.0-11.0	(225-275)
Concrete, immersion:		
1 ct. Corobond 100 Epoxy Primer/Sealer; apply primer to achieve uniform hiding, appearance, and complete wetting of the concrete surface, approximately 4-6 . Coating will be partially absorbed into the concrete. Roll out any puddles.		
2 cts. Fast Clad ER Epoxy	9.0 – 11.0	(225-275)

**When using B62L245 Primer containing the OAP fluorescent pigment, make sure a non-containing OAP fluorescent pigment topcoat is used.

The systems listed above are representative of the product's use, other systems may be appropriate.

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

DISCLAIMER

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Information and Application Bulletin.

WARRANTY

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

SURFACE PREPARATION

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Refer to product Application Bulletin for detailed surface preparation information.

Minimum recommended surface preparation:

Iron & Steel:

Atmospheric:

SSPC-SP6/NACE 3, 2 mil

(50 micron) profile or

SSPC-SP12/NACE No. 5, WJ-3/SC-2

Immersion:

SSPC-SP10/NACE2, 2-3 mil

(50-75 micron) profile or

SSPC- SP12/NACE No. 5,

WJ-2/SC-2

Concrete & Masonry:

Atmospheric:

SSPC-SP13/NACE 6, or ICRI

No. 310.2, CSP2-3

Immersion:

SSPC-SP13/NACE 6-4.3.1 or 4.3.2,

or ICRI No. 310.2, CSP2-3

Surface Preparation Standards

Condition of Surface	ISO 8501-1 BS7079:A1	Swedish Std. SIS055900	SSPC	NACE
White Metal	Sa 3	Sa 3	SP 5	1
Near White Metal	Sa 2.5	Sa 2.5	SP 10	2
Commercial Blast	Sa 2	Sa 2	SP 6	3
Brush-Off Blast	Sa 1	Sa 1	SP 7	4
Hand Tool Cleaning	Rusted C St 2	C St 2	SP 2	-
Pitted & Rusted	D St 2	D St 2	SP 2	-
Rusted	C St 3	C St 3	SP 3	-
Power Tool Cleaning	Pitted & Rusted D St 3	D St 3	SP 3	-

TINTING

Do not tint part A. 5 gallons (18.9L) of clear hardener part B may be tinted with up to 2.75 ounces of Maxitoner Colorant Phthalo Green or Black only.

APPLICATION CONDITIONS

Temperature:

Air & surface: 40°F (4.5°C) minimum*, 110°F (43°C) maximum

*For application at 35°F (1.7°C) to 40°F (4.5°C), specific guidelines are required:

- Air & Surface temperature conditions must be expected to remain stable or improve for a period of four hours.
- Environmental controls (dehumidification, heating, forced-air ventilation) are recommended to maintain acceptable application conditions.
- Final cure must be confirmed in accordance with ASTM D5402, "Assessing the Solvent Resistance of Organic Coatings Using Solvent Rubs". Test shall consist of 50 double rubs with MEK. Test shall confirm no loss of DFT, and no coating residue on rubbing cloth.

The material should be 85°F-130°F/29°C-54°C (vary as needed) at the mixing block for optimal atomization based on tip size and pump pressure.. **Do not heat above 140°F/60°C.**

Relative humidity: 85% maximum

Refer to product Application Bulletin for detailed application information.

ORDERING INFORMATION

Packaging:

Part A: 5 gallon (18.9L) container

Part B: 5 gallon (18.9L) container

Weight:

11.71, ± 0.3 lb/gal ; 1.4 Kg/L, mixed



Protective & Marine Coatings

FAST CLAD® ER EPOXY WITH OPTI-CHECK OAP TECHNOLOGY

PART A
PART A
PART B
PART B

B62W230
B62L230
B62V230
B62AV230

WHITE BASE
BLUE OAP
CLEAR HARDENER
GRAY HARDENER

Revised 1/12

APPLICATION BULLETIN

9.50

SURFACE PREPARATIONS

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Iron & Steel (atmospheric service)

Minimum surface preparation is Commercial Blast Cleaning per SSPC-SP6/NACE 3 or SSPC-SP12/NACE No. 5. For surfaces prepared by SSPC SP6/NACE 3, first remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. For better performance, use Near White Metal Blast Cleaning per SSPC-SP10/NACE 2. Blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2-3 mils / 50-75 microns). For surfaces prepared by SSPC-SP12/NACE No. 5, all surfaces shall be cleaned in accordance with WJ-3/SC2. Pre-existing profile should be approximately 2 mils (50 microns). Prime any bare steel the same day as it is cleaned or before flash rusting occurs.

Iron & Steel (immersion service)

Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. Minimum surface preparation is Near White Metal Blast Cleaning per SSPC-SP10/NACE 2, or SSPC-SP12/NACE No. 5. For SSPC-SP10/NACE 2, blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2-3 mils / 50-75 microns). For SSPC-SP12/NACE No.5, all surfaces to be coated shall be cleaned in accordance with WJ-2/SC2 standards. Pre-existing profile should be approximately 2 mils (50 microns). Remove all weld spatter. Prime any bare steel the same day as it is cleaned or before flash rusting occurs.

Concrete and Masonry

For surface preparation, refer to SSPC-SP13/NACE 6, or ICRI No. 310.2, CSP 2-3. Surfaces should be thoroughly clean and dry. Concrete and mortar must be cured at least 28 days @ 75°F (24°C). Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement and hardeners. Fill bug holes, air pockets and other voids with Steel-Seam FT910. Primer required.

Follow the standard methods listed below when applicable:

ASTM D4258 Standard Practice for Cleaning Concrete.
ASTM D4259 Standard Practice for Abrading Concrete.
ASTM D4260 Standard Practice for Etching Concrete.
ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete.
SSPC-SP 13/Nace 6 Surface Preparation of Concrete.
ICRI No. 310.2 Concrete Surface Preparation.

Concrete, Immersion Service:

For surface preparation, refer to SSPC-SP13/NACE 6, Section 4.3.1 or 1.3.2 or ICRI No. 310.2, CSP 2-3.

Surface Preparation Standards

Condition of Surface	ISO 8501-1 BS7079:A1	Swedish Std. SIS055900	SSPC	NACE
White Metal	Sa 3	Sa 3	SP 5	1
Near White Metal	Sa 2.5	Sa 2.5	SP 10	2
Commercial Blast	Sa 2	Sa 2	SP 6	3
Brush-Off Blast	Sa 1	Sa 1	SP 7	4
Hand Tool Cleaning	OC St 2	OC St 2	SP 8	-
Pitted & Rusted	OC St 2	OC St 2	SP 8	-
Rusted	OC St 2	OC St 2	SP 8	-
Power Tool Cleaning	D St 3	D St 3	SP 3	-
Pitted & Rusted	D St 3	D St 3	SP 3	-

APPLICATION CONDITIONS

Temperature:
Air & surface: 40°F (4.5°C) minimum*, 110°F (43°C) maximum

*For application at 35°F (1.7°C) to 40°F (4.5°C), specific guidelines are required:

- Air & Surface temperature conditions must be expected to remain stable or improve for a period of four hours.
- Environmental controls (dehumidication, heating, forced-air ventilation) are recommended to maintain acceptable application conditions.
- Final cure must be confirmed in accordance with ASTM D5402, "Assessing the Solvent Resistance of Organic Coatings Using Solvent Rubs". Test shall consist of 50 double rubs with MEK. Test shall confirm no loss of DFT, and no coating residue on rubbing cloth.

The material should be 85°F-130°F/29°C-54°C (vary as needed) at the mixing block for optimal atomization based on tip size and pump pressure.. **Do not heat above 140°F/60°C.**

Relative humidity: 85% maximum

APPLICATION EQUIPMENT

The following is a guide. Changes in pressures and tip sizes may be needed for proper spray characteristics. Always purge spray equipment before use with listed reducer. Any reduction must be compliant with existing VOC regulations and compatible with the existing environmental and application conditions.

ReductionNot recommended

Clean UpMEK (R6K10) or R7K104

Plural Component Equipment

Pump.....WIWA DURO-MIX 1:1 or
Graco Extreme Mix

Pressure.....4000 psi

Hose.....3/8" ID

Tip0.021" - .025"

Pump heater setting.....70 - 80

Material temperature at

gun tip85°F-130°F (29°C-54°C)
(vary as needed)

BrushFor stripe coating and repair only

Brush.....Nylon/Polyester or Natural Bristle

RollerFor stripe coating and repair only

Cover3/8" woven with solvent resistant core

If specific application equipment is not listed above, equivalent equipment may be substituted.



Protective & Marine Coatings

FAST CLAD® ER EPOXY WITH OPTI-CHECK OAP TECHNOLOGY

PART A B62W230
PART A B62L230
PART B B62V230
PART B B62AV230

WHITE BASE
BLUE OAP
CLEAR HARDENER
GRAY HARDENER

APPLICATION BULLETIN

9.50

APPLICATION PROCEDURES

Surface preparation must be completed as indicated.

Mixing Instructions: Mix contents of each component thoroughly using low speed power agitation. Make certain no pigment remains on the bottom or the sides of the can. Then combine one part by volume of Part A with one part by volume of Part B. Thoroughly agitate the mixture with power agitation.

To ensure that no unmixed material remains on the sides or bottom of the cans after mixing, visually observe the container by pouring the material into a separate container.

Apply paint at the recommended film thickness and spreading rate as indicated below:

Recommended Spreading Rate per coat:

	Minimum	Maximum
Wet mils (microns)	18.0 (450)	22.0 (550)
Dry mils (microns)	18.0 (450)	22.0 (550)
~Coverage sq ft/gal (m ² /L)	73 (1.8)	89 (2.2)
*Can be applied up to 60.0 mils (1500 microns) dft if required.		
Theoretical coverage sq ft/gal (m ² /L) @ 1 mil / 25 microns dft	1568 (38.4)	

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

Drying Schedule @ 20.0 mils (500 microns):

	@ 40°F/4.5°C	@ 77°F/25°C 50% RH	@ 100°F/38°C
To touch:	6 hours	1 hour	35 minutes
To handle:	8-12 hours	3 hours	55 minutes
To recoat:			
minimum:	6 hours	1 hour	35 minutes
maximum:	14 days	14 days	14 days
Foot traffic:	8-12 hours	3 hours	1 hour
Cure to service:	36 hours	24 hours	12 hours
Pot Life:		7 minutes	
Sweat-in-Time:		None required	

Application of coating above maximum or below minimum recommended spreading rate may adversely affect coating performance.

CLEAN UP INSTRUCTIONS

Clean spills and spatters immediately with MEK, R6K10. Clean tools immediately after use with MEK, R6K10. Follow manufacturer's safety recommendations when using any solvent.

DISCLAIMER

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Information and Application Bulletin.

PERFORMANCE TIPS

Repair of Pitted Tank Bottoms

Extensive, deep pitting:

Options:

Option 1 ..Apply a full wet coat, by spray application, of Fast Clad Epoxy Primer. Follow with rubber squeegee to work material into and fill the pitted areas. After recommended drying time, apply a full coat of Fast Clad ER at recommended film thickness.

Option 2 ..Apply Dura-Plate UHS Clear Laminant Resin with 1½ oz fiberglass mat over the pitted areas. After recommended drying time, apply a full coat of Fast Clad ER at recommended film thickness.

Option 3 ..Weld new steel plates, or use puddle welds, as required to repair pitted areas. Coat areas as recommended.

Shallow pitting, isolated areas:

Options:

Option 1 ..Same as number 1 above.

Option 2 ..Apply Steel Seam FT910 as required to fill the pitted areas. Coat areas as recommended.

When using spray application, use a 50% overlap with each pass of the gun to avoid holidays, bare areas, and pinholes. If necessary, cross-coat spray at a right angle.

Spreading rates are calculated on volume solids and do not include an application loss factor due to surface profile, roughness or porosity of the surface, skill and technique of the applicator, method of application, various surface irregularities, material lost during mixing, spillage, overthinning, climatic conditions, and excessive film build.

No reduction of material is recommended as this can affect film build, appearance, and adhesion.

Stripe coat all crevices, welds, and sharp angles to prevent early failure in these areas.

Do not mix previously catalyzed material with new.

Do not apply the material beyond recommended pot life.

Remove and solvent clean tip housing every 20-30 minutes.

For Immersion Service: (if required) Holiday test in accordance with ASTM D5162 for steel, or ASTM D4787 for concrete.

When using an OAP fluorescent pigment system, use the Fast Clad Epoxy Primer, with a non-OAP containing Fast Clad ER topcoat color.

Guidance on techniques and required equipment to inspect a coating system incorporating Opti-Check OAP Technology can be found in SSPC-TU 11.

Refer to Product Information sheet for additional performance characteristics and properties.

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

WARRANTY

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

MATERIAL SAFETY DATA SHEET

B62W230
12 00

DATE OF PREPARATION
Jul 7, 2011

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER

B62W230

PRODUCT NAME

FAST-CLAD® ER Epoxy (Part A), White

MANUFACTURER'S NAME

THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, OH 44115

Telephone Numbers and Websites

Product Information	www.sherwin-williams.com
Regulatory Information	(216) 566-2902 www.paintdocs.com
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300

*for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units	Vapor Pressure
9	100-51-6	Phenylmethanol	ACGIH TLV OSHA PEL	Not Available Not Available
				0.15 mm
11	98-54-4	Paratertiarybutylphenol	ACGIH TLV OSHA PEL	Not Available Not Available
1	25154-52-3	Nonylphenol	ACGIH TLV OSHA PEL	Not Available Not Available
8	25620-58-0	Trimethyl-1,6-hexanediamine	ACGIH TLV OSHA PEL	Not Available Not Available
8	1477-55-0	1,3-Benzenedimethanamine	ACGIH TLV OSHA PEL	0.1 ppm (Skin) CEILING 0.1 ppm (Skin) CEILING
8	13463-67-7	Titanium Dioxide	ACGIH TLV OSHA PEL OSHA PEL	10 mg/m3 as Dust 10 mg/m3 Total Dust 5 mg/m3 Respirable Fraction

SECTION 3 — HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE

INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.

EFFECTS OF OVEREXPOSURE

EYES: Causes burns.

SKIN: Causes burns.

INHALATION: Causes burns of the upper respiratory system.

In a confined area vapors in high concentration may cause headache, nausea or dizziness.

Prolonged overexposure to hazardous ingredients in Section 2 may cause adverse chronic effects to the following organs or systems:

- the nervous system

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

May cause allergic skin reaction in susceptible persons or skin sensitization.

HMIS Codes

Health	3*
Flammability	1
Reactivity	1

CANCER INFORMATION

For complete discussion of toxicology data refer to Section 11.

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention **IMMEDIATELY**.

SKIN: Wash affected area thoroughly with soap and water.
If irritation persists or occurs later, get medical attention.
Remove contaminated clothing and launder before re-use.

INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.

INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	FLAMMABILITY CLASSIFICATION
> 200 °F PMCC	N.A.	N.A.	Not Applicable

EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Closed containers may explode (due to the build-up of pressure) when exposed to extreme heat.

During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used.

Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES**STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED**

Remove all sources of ignition. Ventilate the area.

Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE**STORAGE CATEGORY**

DOL Storage Class IIIB

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION**PRECAUTIONS TO BE TAKEN IN USE**

Use only with adequate ventilation.

Do not get in eyes, or on skin or clothing. Do not breathe vapor or spray mist.

Wash hands after using.

This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m³ (total dust), 3 mg/m³ (respirable fraction), OSHA PEL 15 mg/m³ (total dust), 5 mg/m³ (respirable fraction).

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits.

Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.

When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES

To prevent skin contact, wear gloves which are recommended by glove supplier for protection against materials in Section 2.

EYE PROTECTION

To prevent eye contact, wear safety spectacles with unperforated sideshields.

OTHER PROTECTIVE EQUIPMENT

Use barrier cream on exposed skin.

OTHER PRECAUTIONS

This product must be mixed with other components before use. Before opening the packages, READ AND FOLLOW WARNING LABELS ON ALL COMPONENTS.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	13.59 lb/gal	1628 g/l
SPECIFIC GRAVITY	1.64	
BOILING POINT	396 - 405 °F	202 - 207 °C
MELTING POINT	Not Available	
VOLATILE VOLUME	14%	
EVAPORATION RATE	Slower than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	N.A.	
VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)		
1.22 lb/gal	147 g/l	Less Water and Federally Exempt Solvents
1.22 lb/gal	147 g/l	Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable

CONDITIONS TO AVOID

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION**CHRONIC HEALTH HAZARDS**

IARC's Monograph No. 93 reports there is sufficient evidence of carcinogenicity in experimental rats exposed to titanium dioxide but inadequate evidence for carcinogenicity in humans and has assigned a Group 2B rating. In addition, the IARC summary concludes, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium is bound to other materials, such as paint."

TOXICOLOGY DATA

CAS No.	Ingredient Name			
100-51-6	Phenylmethanol	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
98-54-4	Paratertiarybutylphenol	LC50 RAT	4HR	Not Available
		LD50 RAT		1200 mg/kg
25154-52-3	Nonylphenol	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
25620-58-0	Trimethyl-1,6-hexanediamine	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
1477-55-0	1,3-Benzenedimethanamine	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
13463-67-7	Titanium Dioxide	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION**ECOTOXICOLOGICAL INFORMATION**

No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS**WASTE DISPOSAL METHOD**

Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)

1 Liter (1.1 Quarts) and Less may be Classed as CONSUMER COMMODITY, ORM-D

Larger Containers are Regulated as:

UN3267, CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S. (MODIFIED CYCLOALIPHATIC POLYAMINES), 8, PG II, (ERG#153)

Bulk Containers may be Shipped as:

UN3267, CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S. (MODIFIED CYCLOALIPHATIC POLYAMINES), 8, PG II, (ERG#153)

Canada (TDG)

UN3267, CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S. (MODIFIED CYCLOALIPHATIC POLYAMINES), CLASS 8, PG II, (ERG#153)

IMO

1 Liter (1.1 Quarts) and Less may be Shipped as Limited Quantity.

UN3267, CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S. (MODIFIED CYCLOALIPHATIC POLYAMINES), CLASS 8, PG II, EmS F-A, S-B, ADR (E)

IATA/ICAO

UN3267, CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S. (MODIFIED CYCLOALIPHATIC POLYAMINES), 8, PG II

SECTION 15 — REGULATORY INFORMATION

SARA 313 (40 CFR 372.65C) SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
---------	-------------------	---------	-----------

No ingredients in this product are subject to SARA 313 (40 CFR 372.65C) Supplier Notification.

CALIFORNIA PROPOSITION 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION

All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

MATERIAL SAFETY DATA SHEET

B62V230
10 00

DATE OF PREPARATION
Jul 7, 2011

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER

B62V230

PRODUCT NAME

FAST-CLAD® ER Epoxy (Part B), Hardener

MANUFACTURER'S NAME

THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, OH 44115

Telephone Numbers and Websites

Product Information	www.sherwin-williams.com
Regulatory Information	(216) 566-2902 www.paintdocs.com
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300

*for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units	Vapor Pressure
15	68609-96-1	Alkyl Glycidyl Ether		
		ACGIH TLV	Not Available	
		OSHA PEL	Not Available	
82	25068-38-6	Epoxy Polymer		
		ACGIH TLV	Not Available	
		OSHA PEL	Not Available	
0.8	14808-60-7	Quartz		
		ACGIH TLV	0.025 mg/m3 as Resp. Dust	
		OSHA PEL	0.1 mg/m3 as Resp. Dust	
2	67762-90-7	Hydrophobic Amorphous Silica		
		ACGIH TLV	10 mg/m3 as Dust	
		OSHA PEL	6 mg/m3 as Dust	

SECTION 3 — HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE

INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.

EFFECTS OF OVEREXPOSURE

EYES: Irritation.

SKIN: Prolonged or repeated exposure may cause irritation.

INHALATION: Irritation of the upper respiratory system.

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

May cause allergic skin reaction in susceptible persons or skin sensitization.

CANCER INFORMATION

For complete discussion of toxicology data refer to Section 11.

HMIS Codes

Health	2*
Flammability	1
Reactivity	0

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.

SKIN: Wash affected area thoroughly with soap and water.
If irritation persists or occurs later, get medical attention.
Remove contaminated clothing and laundry before re-use.

INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.

INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	FLAMMABILITY CLASSIFICATION
> 200 °F PMCC	N.A.	N.A.	Not Applicable

EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Closed containers may explode (due to the build-up of pressure) when exposed to extreme heat.

During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used.

Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate the area.

Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY

DOL Storage Class IIIB

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally.
Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation.

Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.

Wash hands after using.

This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m³ (total dust), 3 mg/m³ (respirable fraction), OSHA PEL 15 mg/m³ (total dust), 5 mg/m³ (respirable fraction).

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits.

Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.

When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES

Wear gloves which are recommended by glove supplier for protection against materials in Section 2.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

OTHER PROTECTIVE EQUIPMENT

Use of barrier cream on exposed skin is recommended.

OTHER PRECAUTIONS

This product must be mixed with other components before use. Before opening the packages, READ AND FOLLOW WARNING LABELS ON ALL COMPONENTS.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	9.68 lb/gal	1159 g/l
SPECIFIC GRAVITY	1.16	
BOILING POINT	Not Applicable	
MELTING POINT	Not Available	
VOLATILE VOLUME	0%	
EVAPORATION RATE	N.A.	
VAPOR DENSITY	N.A.	
SOLUBILITY IN WATER	N.A.	
VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)		
	0.01 lb/gal	1 g/l
	0.01 lb/gal	1 g/l
	Less Water and Federally Exempt Solvents	
	Emitted VOC	

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable

CONDITIONS TO AVOID

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION**CHRONIC HEALTH HAZARDS**

Crystalline Silica (Quartz, Cristobalite) is listed by IARC and NTP. Long term exposure to high levels of silica dust, which can occur only when sanding or abrading the dry film, may cause lung damage (silicosis) and possibly cancer.

TOXICOLOGY DATA

CAS No.	Ingredient Name			
68609-96-1	Alkyl Glycidyl Ether	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
25068-38-6	Epoxy Polymer	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
14808-60-7	Quartz	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
67762-90-7	Hydrophobic Amorphous Silica	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION**ECOTOXICOLOGICAL INFORMATION**

No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS**WASTE DISPOSAL METHOD**

Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)

Not Regulated for Transportation.

Canada (TDG)

Not Regulated for Transportation.

IMO

Not Regulated for Transportation.

IATA/ICAO

Not Regulated for Transportation.

SECTION 15 — REGULATORY INFORMATION

SARA 313 (40 CFR 372.65C) SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
---------	-------------------	---------	-----------

No ingredients in this product are subject to SARA 313 (40 CFR 372.65C) Supplier Notification.

CALIFORNIA PROPOSITION 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION

All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

A-13

Shield Products

Superior Shield excellent for Metals

Shield Products has solved problems in many industries and applications. Due to its unique benefits **Superior Shield** has been applied to various types and grades of metals. The water works industry takes advantage of the superior corrosion resistance properties by coating T-head bolts for underground service. Stainless steel fasteners, used in many different industries, are coated for lubricity and anti-galling. These metals are commonly used by turn around groups, operations and maintenance departments and contractors at many chemical plants, refineries and offshore platforms. The coatings chemical resistance and easy on/easy off characteristics are perfect for these environments. A few specific applications where problems have been solved by using this coating process are.

If it's metal, you can coat it and get years of protection!

Oxygen Service	Monochlorobenzene (MCB)	Anhydrous HCL
Phosgene Gas Lines	Formaldehyde	Water Lines Insulated
Boiler Rooms	Aniline	Piping (Non-Insulated)
Gas Meters	Steam	Piping
Copper/Brass	Steel w/wo Primer	Stainless Steel
Fuel tanks-In and out		

Technical Data:

Use Temperatures:
-100° to 500°F

Adhesion:
5B (ASTM D3359-95)

Corrosion Resistance:
Salt Spray (ASTM B117) Test to 4,000 hrs

Dielectric Strength:
500 Volts per mil

Pencil Hardness:
8H (ASTM D3363-92A)

Elonggation:
50%

Kinetic Friction Coefficient:
0.06 - 0.08

Tensile Strength:
4,000 psi

Thickness:
Nominal 0.001" (1 mil)

Operating Pressure:
Up to 100,000 psi

Impact:
160 Inch Lbs (ASTM D2794-93)

Kestemich Test:
Nuts not frozen after 30+ cycles (DIN 50018)

Coverage: 500-650 sq ft

Corrosion Resistance:

D1308	Muratic Acid 31% HCL	24 Hours	No Effect
D1308	Sulfuric Acid 93% H2SO4	24 Hours	No Effect
D1308	Caustic Soda 100% NaOH	24 Hours	No Effect
D1308	Methyl Ethyl Keytone (MEK)	24 Hours	No Effect

D1308

Salt Fog

1000 Hours

No Effect

Super Shield - A Coating Process for the Future!

Shield Products has perfected the Fluoropolymer fastener coating process. Surface preparation of the fastener prior to coating is a very important step. Use the latest industry accepted methods to thoroughly clean all contaminants from the fasteners. Manufacturing oils, rust and scale are removed to ensure the highest quality coating.

FLUOROPOLYMER coatings are extremely durable and not easily removed during normal usage. During assembly of fasteners in the field, the coating can sometimes be damaged. With most other coatings, this results in exposed bare metal that quickly begins to show corrosion and causes the coating to fail. Our coating ensures superior corrosion resistance, does not chip and continues to provide protection even under water and the harshest conditions

**For further information and personal contact please call
(904) -880 6060-e-mail shieldproducts@comcast.net
Shield Products Jacksonville, Fl.**

Paint Gun Technical Information

APPLICATION

Spray Type	Orifice Size	Atomizing Pressure (PSIG)	Fluid Flow per Minute	Viscosity Zahn #2
Conventional	0.055"	35 - 45	10oz - 16oz	27" - 35"
High Volume Low Pressure	0.055"	4- 8	10oz - 15oz	27" - 35"
Electrostatic	0.055" [265 Air Panel (Devilbiss Ransberg) Voltage 48 KV]	30 - 40	8oz - 10oz	30" - 35"
Turbodisk (90 KV)	6" Conical Disk 20,000 RPM/8" Uni Disk 12,000 RPM	N/A	18oz - 20oz	30" - 40"
Aerobell	2.24"	18 - 20	4oz - 6oz	30" - 40"
Airless	0.011" - 0.015"	1500 - 2000	18oz - 20oz	30" - 40"
Plural Component (A/A)	0.011" - 0.015" (608 Aircap)	1000 - 1500	14oz - 18oz	10-20% Reduction Dependant on Pump Pressure

For further information and personal contact please call
 (904) -880 6060-e-mail shieldproducts@comcast.net
 Shield Products Jacksonville, Fl.

S
P

MATERIAL SAFETY DATA SHEET
SHIELD METAL PREP
SHIELD PRODUCTS

JACKSONVILLE, FL 32207

SHIELD METAL CLEANER SKU40003

DESCRIPTION: SHIELD METAL PREP IS A RUST REMOVER AND METAL PREP FOR USE ON FERROUS METALS. WHEN APPLIED SHIELD METAL CLEANER PENETRATES AND DISSOLVES RUST CONVERTING IRON OXIDE (RUST) TO IRON PHOSPHATE GIVING EXCELLENT PAINT ADHESION. SHIELD METAL PREP IS ALSO VALUABLE FOR ETCHING ALUMINUM AND GALVANIZED SURFACES PRIOR TO PAINTING.

TO USE SHIELD METAL PREP REMOVE DIRT, OIL AND GREASE. REMOVE LOOSE RUST WITH WIRE BRUSH. APPLY USING BRUSH OR LOW PRESSURE SPRAYER, ALLOW TO DRY COMPLETELY. RINSING IS NOT NECESSARY OR RECOMMENDED ON BARE METAL **TRANSPORTATION:**.

TYPICAL PROPERTIES:

SPECIFIC GRAVITY 1.20
APPEARANCE GREEN LIQUID

BOILING POINT		212 DEGREES F.
ASH POINT		NONE DEGREES F.

WATER SOLUBILITY 100.00%

SAFETY DATA:

CHEMICAL RESISTANT GLOVES, EYE PROTECTION OR FACE SHIELD , CHEMICAL APRON AND BOOTS IF NECESSARY TO PREVENT CONTACT AND RESPIRATORY PROTECTION IF NECESSARY TO PREVENT BREATHING MIST.

TRANSPORTATION:

DOT SHIPPING NAME: CORROSIVE LIQUID NOS, (PHOSPHORIC ACID), 8,UN1760,PGIII

DOT HAZARD CLASS: CORROSIVE

CONSULT MATERIAL SAFETY DATA SHEET FOR FURTHER INFORMATION.

PRODUCT NUMBER:	P0010B	DATE PREPARED :	5/10/93
CAS NUMBER :	N/A	REVISED DATE :	3/9/07
CHEMICAL NAME :	N/A	PRINT DATE :	1/25/11

CHEMICAL FAMILY :	ACID / DETERGENT BLEND		
-------------------	------------------------	--	--

D.O.T. SHIPPING NAME : CORROSIVE LIQUID NOS, (PHOSPHORIC ACID), 8,UN1760,PGIII

LABEL REQUIRED : CORROSIVE

SECTION II-HAZARDOUS INGREDIENTS							
CHEMICAL NAME : CAS NUMBER :	PHOSPHORIC ACID					SARA	
	7664-38-2	TLV	% BY WT	312	313	372	CERCLA
		1 MG/M3	TWA 25%	N	Y	N/A	5000
			TWA	STEL		CEILING	
	PPM	MG/M3	PPM	MG/M3	PPM	MG/M3	

1
1
1
3
3

TLV STANDARDS PER CFR-29 1920.100 Z-1, Z-2, OR Z-3

SARA						
HAP	% BY WT	312	313	372	CERCLA	
TWA		STEL		CEILING		
PPM	MG/M3	PPM	MG/M3	PPM	MG/M3	
OSHA						
NIOSH						
ACGIH						

SARA						
HAP	% BY WT	312	313	372	CERCLA	
TWA		STEL		CEILING		
PPM	MG/M3	PPM	MG/M3	PPM	MG/M3	
OSHA						
NIOSH						
ACGIH						

SECTION III - PHYSICAL CHARACTERISTICS INITIAL BOILING POINT : 212 DEGREES F

FREEZING POINT : N/A

SPECIFIC GRAVITY : 1.20

VAPOR DENSITY : >1 AIR = 1

VAPOR PRESSURE : N/A % @ DEGREES

SOLUBILITY IN WATER : 100%

PERCENT VOLATILE BY VOLUME : 64% COMPLETE

EVAPORATION RATE : <1 (N-BUTYL ACETATE = 1)

APPEARANCE AND ODOR : GREEN LIQUID PUNGENT ODOR

SECTION IV : FIRE AND EXPLOSION DATA

FLASH POINT : NONE DEGREES F. FLAMMABILITY LIMITS: N/A

EXTINGUISHING MEDIA: N/A

SPECIAL FIRE FIGHTING PROCEDURES:

SELF CONTAINED BREATHING APPARATUS

UNUSUAL FIRE AND EXPLOSION HAZARDS:

CORROSIVE MATERIAL

SECTION V: HEALTH AND FIRST AID DATA		

EFFECTS OF OVEREXPOSURE:

- X MAY CAUSE EYE IRRITATION
- X MAY CAUSE SKIN IRRITATION
- X MAY CAUSE RESPIRATORY TRACT IRRITATION
- X MAY BE HARMFUL OR FATAL IF SWALLOWED

TLV N / A ESTABLISHED?

NOTES:

FIRST AID:	
EYE CONTACT : SKIN CONTACT :	FLUSH WITH WATER FOR 15 MINUTES, RAISING THE EYELID TO INSURE THOROUGH WASHING. SEEK MEDICAL ATTENTION IF IRRITATION PERSISTS. RINSE WITH FRESH WATER. CONTACT A PHYSICIAN IF IRRITATION PERSISTS.
INGESTION :	DRINK LARGE QUANTITIES OF WATER OR MILK. DO NOT INDUCE VOMITING. SEEK MEDICAL ATTENTION.
INHALATION :	REMOVE TO FRESH AIR. SEEK MEDICAL ATTENTION IF IRRITATION OR SHORTNESS OF BREATH DEVELOPS.

SECTION VI- REACTIVITY DATA

STABILITY : PRODUCT IS STABLE UNDER NORMAL CONDITIONS

CONDITIONS TO AVOID: CONTACT WITH STRONG ALKALIS AND OXIDIZERS.

HAZARDOUS DECOMPOSITION PRODUCTS:
OXIDES OF CARBON WITH COMBUSTION

HAZARDOUS POLYMERIZATION:
WILL NOT OCCUR UNDER NORMAL CONDITIONS

SECTION VII- SPILL OR LEAK PROCEDURE

STEPS TO BE TAKEN IN CASE OF SPILL OR LEAK :

DIKE OR OTHERWISE CONTAIN LARGE SPILLS. SMALL SPILLS MAY BE CONTROLLED USING COMMON FLOOR ABSORBENT. TRANSFER REFUSE TO APPROPRIATE HOLDING CONTAINERS FOR DISPOSAL. FLUSH AREA WITH WATER.

WASTE DISPOSAL METHODS : CONSULT LOCAL, STATE AND FEDERAL REGULATIONS

SECTION VIII- SPECIAL PROTECTION DATA

THE FOLLOWING PROTECTION IS RECOMMENDED WHEN USING THIS PRODUCT

- | | |
|---|--------------------------------------------------------------------|
| 1 | CHEMICAL RESISTANT SAFETY GLASSES OR FACE SHIELD |
| 2 | CHEMICAL RESISTANT GLOVES |
| 3 | RESPIRATORY PROTECTION IF NECESSARY TO PREVENT BREATHING MIST |
| 4 | CHEMICAL RESISTANT BOOTS AND APRON IF NECESSARY TO PREVENT CONTACT |
| 5 | |

PRECAUTIONS TO BE TAKEN WHEN HANDLING AND STORING :

STORE IN A COOL DRY AREA IN TIGHTLY CLOSED CONTAINERS. OPEN SLOWLY TO RELEASE PRESSURE.

SECTION X- SPECIAL HAZARD DESIGNATIONS

HEALTH	3
FLAMMABILITY	0
REACTIVITY	0
SPECIAL NOTICE	N/A

SARA HAZARD CATEGORIES :

FIRE	NO
REACTIVITY	NO
SUDDEN RELEASE OF PRESSURE	NO
ACUTE HEALTH	YES
CHRONIC HEALTH	NO

DEFINITIONS

ACC— ACCEPTABLE CEILING CONCENTRATION

ACGIH— AMERICAN CONFERENCE OF GOVERNMENTAL HYGIENISTS

AMP— ACCEPTABLE MAXIMUM PEAK ABOVE THE ACCEPTABLE CEILING CONCENTRATION FOR AN 8 **CAS**— CHEMICAL ABSTRACT SERVICE

CL— CEILING LIMIT (MAXIMUM EXPOSURE AT ANY GIVE TIME)

DOT— DEPARTMENT OF TRANSPORTATION

M3— CUBIC METER

MG— MILLIGRAM

N/A— NOT APPLICABLE

N/L— NOT LISTED

N/EST— NOT ESTABLISHED

NIOSH— NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

OSHA— OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

PEL— PERMISSIBLE EXPOSURE LIMITS **PPM**— PARTS PER MILLION

SKIN— DESIGNATES SKIN RATHER THAN AIR LIMIT

STEL— SHORT TERM EXPOSURE LIMITS (15 MINUTES/8 HR DAY)

TLV— THRESHOLD LIMIT VALUES

TWA— TIME WEIGHTED AVERAGES (AVERAGES EXPOSURE / 8 HR DAY)

UG— MICROGRAM (1 MILLIONTH OF A GRAM) **HAP**— HAZARDOUS AIR

POLLUTANTS LIST **X**— HAZARDOUS AIR POLLUTANT

O— ORGANIC HAZARDOUS AIR POLLUTANT **V**— VOLATILE HAZARDOUS

NFPA— NATIONAL FIRE PROTECTION ASSOCIATION HAZARDOUS

N— NONE

THE DATA CONTAINED HEREIN IS FURNISHED GRATUITOUSLY AND INDEPENDENT OF ANY SALE OF PRODUCT. IT IS SUPPLIED ONLY FOR YOUR INVESTIGATION AND POSSIBLE DEPENDENT VERIFICATION. SHIELD PRODUCTS MAKES NO REPRESENTATION AS TO THE ACCURACY OF THE DATA CONTAINED HEREIN AND EXPRESSLY DISCLAIMS LIABILITY FOR LOSS, DAMAGE, OR EXPENSE ARISING OUT OF THE HANDLING, STORING, USE OR

RELEASED - Printed documents may be obsolete; validate prior to use.

DISPOSAL OF THE PRODUCTS HEREIN REFERRED TO.

MATERIAL SAFETY DATA SHEET



SHIELD PRODUCTS

Technical data sheet
 SKU20059-VC
 VOC Compliant
Fluoropolymer Coating

Fluoropolymer coatings are blends of high performance resins and Fluoropolymer lubricants.

These single coat thin films provide excellent corrosion and chemical resistance. Other benefits of Fluoropolymer coatings include reduced friction, resistance to galling, non stick, non wetting, electrical resistance and abrasion resistance. Fluoropolymer coatings are also applied to fasteners and various OEM components to provide a longer life before replacement.

SKU 20059VC Coating Statistics	
Elongation (ASTM D1457)	50%
Impact Strength (ASTM D256)	13 ft - LBI in
Hardness (ASTM D2240)	8-Pencil Hardness
Abrasion Resistance (Tabor)	> 15 mg
Coefficient of Friction (ASTM D1894)	.15 -.35 static.
Dielectric Strength (ASTM D149)	1400 volts per mil
Use Temperature	- 100-F to 500°F max
Melting Point	n/a
Thermal Conductivity	n/a
Chemical Resistance (ASTM D543)	good
Salt Spray Resistance (ASTM B117)	4000 hour
Water Absorption (ASTM D570)	<.03%
Thickness	.0008" -.002"

Use Temperatures: 40°F - 500°F

Corrosion Resistance:

Salt Spray (ASTM B 117) ... 4,000 hrs

Pencil Hardness: 8-H (ASTM D3363-92A-

Kinetic Friction Coefficient: 0.06-0.08

Thickness: nominal 0.001 " (1 mil)

Impact: 160 in lb (ASTM D2794-93)

Adhesion:

5B (ASTM D3359-95)

Dielectric Strength: 1400 volts per mil

Elongation: 50%

Tensile strength: 4000 Psi

Operating Pressure: to 100,000 psi

Flame spread Test: O-Flame spread

Chemical Resistance- TEST

D1308	Muriatic Acid 3 1 % HCL	24 Hours No Effect
D1308	Sulfuric Acid 93% H2SO4	24 hour No Effect
D1308	Caustic Soda 100% NaOH	24 Hour No Effect
D1308	Methel Ethyl Ketone-MEK –	24Hour NoEffect

Film Properties of Super Shield 20059VCF

Varnish properties

N.V.(wt%)	60	40	50	60	66
Specific Gravity	1.12	1.06	1.08	1.05	1.16
Solvent	Xylene	Cyclohexanone	Acetone	Solvesso	PCBTF

Film propertiesTest Method

Gloss (20° / 60°)				ISO2813	70/90
Pencil Hardness				ASTMD3 363	7H-8H
Adhesion (Cross-cut Tape Test)				ASTMD3359	Excellent
Soil Resistance (Marking Pen)					No trace
Solvent Resistance (Xylene Rubbing)					More than 200 times
Impact resistance (Diameter 12.7mm)				ASIM D2794	Intrusion 0.5kg > 0.5m Extrusion 0.5kg > 0.5m
Flexibility (T bending)				ASTMD4145	3T (paint fracture) >
Flexibility (Cupping Test)				ISO 1520	7mm (Cracking)
Water Resistance (Water Immersion Method)				IS02812	No change
Adhesion (Wet/Dry)				ASTMD3359	5B/5B-4B
Blistering				ASIMD714	No blistering
				ISO4628	
	1 0% HCl				No change
	10% H2SO4				No change
Chemical Resistance	5% CH2 COOH			Room temperature for 10 days	No change
	1 0% NaOH				No change
	1 0% NH3				No change
	Benzene				No change
	MEK				No change
Solvent Resistance	Acetone				No change
	Acetate			for 10 days	No change
					No change

REGISTERED CHEMTREC-1 800 424 9300
SECTION 1 - CHEMICAL, PRODUCT, AND COMPANY INFORMATION PRODUCT

CODE/IDENTITY: SKU-20059VC

PRODUCT TRADE NAME: Superior shield

REVISION DATE: 08/29/05 (000) 0874

CUSTOMER PART #/NAME: Not applicable

CHEMICAL FAMILY: Fluoropolymer

EMERGENCY MEDICAL/SPILL INFO: (904-880-6959 (U.S.))

TECHNICAL INFORMATION: 1-904-880-6060

PRODUCT SAFETY/MSDS INFORMATION: 11674 Gran Crique Ct No,
Jacksonville, Fl 32223

DATE OF LAST MSDS PREPARATION: 06/04/05

PRIMARY HAZARD WARNING

Harmful if swallowed. This product contains a material which can cause skin burns. This product contains a material which may cause eye damage. Vapor and/or spray mist may be harmful if inhaled. Vapor irritates eyes, nose, and throat.

THIS MATERIAL SAFETY DATA SHEET HAS BEEN PREPARED IN ACCORDANCE WITH THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200), THE SUPPLIER NOTIFICATION REQUIREMENTS OF SARA TITLE III, SECTION 313, AND OTHER APPLICABLE RIGHT-TO-KNOW REGULATIONS.

TRANSPORTATION OF DANGEROUS GOODS

PROPER SHIPPING NAME: SUPERIOR SHIELD

Paint TECHNICAL NAME: None

HAZARD CLASS: 3

SUBSIDIARY CLASS: None

UN NUMBER: UN1263 PACKING GROUP: III

MARINE POLLUTANT: NA

VOC COMPLIANT: BASED ON FEDERAL STANDARDS.

USA-RQ, Not DOT Regulated: 4-CHLOROBENZOTRIFLUORIDE

VOC -2.00

USA-RQ, SUBSTANCE THRESHOLD SHIP WEIGHT:

CANADA SCHEDULE XIII, 9.2:

CANADA SCHEDULE XIII, 9.2 THRESHOLD SHIP WEIGHT: 402 LB

USA Shipments Only - RQ Threshold Ship Weight: This is the total weight of this product that must be shipped to exceed the RQ quantity. Canada Shipments Only - Canada Schedule XIII Threshold Ship Weight: This is the total weight of this product that must be shipped to exceed the Canadian Schedule XIII Regulated Limit quantity.

**SECTION 2 -
COMPOSITION/INFORMATION ON INGREDIENTS
Ref HAZARDOUS INGREDIENTS PERCENT CAS NUMBER**

01 1-METHOXY-2-PROPYL ACETATE	10- <20	108-65-6
02 AROMATIC NAPHTHA	10- <20	64742-95-6
03 SILICA	1 - <5	7631-86-9
04 DODECYLPYRROLIDINEDIONE	1 - <5	79720-19-7
05 1,2,4-TRIMETHYL BENZENE	5 - <10	95-63-6

* Carcinogens: O=OSHA;A=ACGIH=NTP; I=IARC

SARA TITLE III & CERCLA CLASSIFICATIONS- SARA 311/312

REF

	SARA 102 RQ (LBS)	SARA 302 TPQ (LBS)	SARA 313 AC	CH	FL	PR	RE
01	NOT ESTAB	NOT ESTAB	N	--	--	N	--
02	NOT ESTAB	NOT ESTAB	N	N	N	N	N
03	NOT ESTAB	NOT ESTAB	N	Y	N	N	N
04	NOT ESTAB	NOT ESTAB	N	N	N	N	N
05	NOT ESTAB	NOT ESTAB	N	Y	N	N	N
06	NOT ESTAB	NOT ESTAB	Y	Y	N	N	N

SARA 311/312 CATEGORIES FOR THIS PRODUCT: ACUTE= Y, CHRONIC=N,FLAMMABILITY= Y, PRESSURE= N, REACTIVITY= N
OCCUPATIONAL EXPOSURE LIMITS HAVE BEEN ESTABLISHED FOR THE FOLLOWING

ACGIH		U.S. OSHA	
TLV-TWA	TLV-STEL	PEL-TWA	PEL-STEL
NOT ESTAB	NOT ESTAB	NOT ESTAB	NOT ESTAB
IPEL-TWA:	100 ppm	IPEL-STEL:	NOT ESTAB
NOT ESTAB	NOT ESTAB	NOT ESTAB	NOT ESTAB
100 ppm	150 ppm	100 ppm	150 ppm
NOT ESTAB	NOT ESTAB	NOT ESTAB	NOT ESTAB
NOT ESTAB	NOT ESTAB	NOT ESTAB	NOT ESTAB
10 mg/m3	NOT ESTAB	6 mg/m3	NOT ESTAB
NOT ESTAB	NOT ESTAB	NOT ESTAB	NOT ESTAB
NOT ESTAB	NOT ESTAB	NOT ESTAB	NOT ESTAB

MATERIALS: REF

01 01 01 02 03 03 04 05 06

[C- Ceiling Limit; S- Potential Skin Absorption; R- Respirable Dust] REF ACGIH TLV - BASIS - CRITICAL EFFECT(S)

01	NOT	ESTAB.	01
ESTAB	NOT		02
irritation	03		NOT
ESTAB.	03		NOT
ESTAB.	04		NOT
ESTAB.	05		NOT
ESTAB.	06		NOT

SECTION 3 - HAZARDS

[ACGIH TLV BASIS - CRITICAL EFFECT(S): CNS-CENTRAL NERVOUS SYSTEM; CVS-CARDIOVASCULAR SYSTEM; CWP-COAL WORKER' S PNEUMOCONIOSIS; GI-GASTRO INTESTINAL] [NOT ESTAB.= NOT ESTABLISHED = NOT APPLICABLE] [NOT ESTAB.= NOT ESTABLISHED = NOT APPLICABLE] PRODUCT STATUS RELATIVE TO THE U.S. EPA TOXIC SUBSTANCES CONTROL ACT All chemical substances in this product are listed on the U.S. TSCA Inventory or are other exempt from TSCA Inventory reporting requirements.

IDENTIFICATION EFFECTS OF OVEREXPOSURE FROM:

GENERAL

After adequate first aid, no further treatment is required unless symptoms reappear.

SKIN: Remove contaminated clothing as needed. Wash skin thoroughly with mild soap and water. Flush with luke warm water for 15 minutes. If sticky, use waterless cleaner first. Seek medical attention if ill effect or irritation develops.

INHALATION: If overcome by exposure remove victim to fresh air immediately. Give oxygen or artificial respiration as needed. Call a physician.

INGESTION: Harmful if swallowed.

EYE: Thoroughly flush the eyes with large amounts of clean low pressure water for at least 15 minutes., occasionally lifting the upper and lower eye lids. If irritation persists seek medical attention.

CHRONIC OVEREXPOSURE: Avoid long-term and repeated contact.

SIGNS AND SYMPTOMS OF OVEREXPOSURE: Eye watering, headaches, nausea, dizziness, and loss of coordination are indications that solvent levels are too high. Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal. Redness, itching, burning sensation and visual disturbances may indicate excessive eye contact. Dryness, itching, cracking, burning, redness, and swelling are conditions associated with excessive skin contact.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Not applicable.

Note to Physician

Treat symptomatically. Treatment of over exposure should be directed at the control of symptoms and the clinical condition of the patient.

SECTION 4 - FIRST AID MEASURES

IMPORTANT FIRST AID INFORMATION: If ingestion, irritation, any type of overexposure or symptoms of overexposure occur during or persists after use of this product, contact a **PHYSICIAN** immediately; have Material Safety Data Sheet information available.

INGESTION: Gently wipe or rinse the inside of the mouth with water. Sips of water may be given if person is fully conscious. Never give anything by mouth to an unconscious or convulsing person. Do Not induce vomiting. Contact physician right away as further treatment may be necessary.

EYE CONTACT: Remove contact lens and pour a gentle stream of warm water through the affected eye for at least 15 minutes. Contact physician right away as further treatment may be necessary.

SKIN CONTACT: Run a gentle stream of water over the affected area for 15 minutes. A mild soap may be used if available. Contact a physician right away as further treatment may be necessary.

INHALATION: Remove from area to fresh air. If symptomatic, contact a physician for treatment information.

SECTION 5 - FIRE FIGHTING MEASURES

FLASHPOINT: 135 F Degrees

FLAMMABLE LIMITS: Lower explosion limit (LEL) : 1.1

Upper explosion limit (UEL): Not available

EXTINGUISHING MEDIA: Use National Fire Protection Association (NFPA) Class B extinguishers (carbon dioxide, dry chemical, or universal aqueous film forming foam) designed to extinguish NFPA Class IC flammable liquid fires.

SPECIAL FIRE FIGHTING PROCEDURES: Water spray may be ineffective. Water spray may be used to cool closed containers to prevent pressure build-up and possible auto ignition or explosion when exposed to extreme heat. If water is used, fog nozzles are preferable. Fire-fighters should wear self-contained breathing apparatus and full protective clothing.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Provide maximum ventilation. Only personnel equipped with proper respiratory, skin, and eye protection should be permitted in the area. Remove all sources of ignition. Take up spilled material with sand, vermiculite, or other noncombustible absorbent material and place in clean, empty containers for disposal. Only the spilled material and the absorbant should be placed in this container.

WASTE DISPOSAL METHOD: Waste material must be disposed of in accordance with federal, state, provincial, and local environmental control regulations. Empty containers should be recycled or disposed of through an approved waste management facility.

SECTION 7 - HANDLING AND STORAGE

HANDLING AND STORAGE PRECAUTIONS: Do not store above 120 degrees F. (48 degrees C.). Store large quantities in buildings designed and protected for storage of NFPA Class IC flammable liquids.

OTHER PRECAUTIONS: Vapors may collect in low areas. If this material is part of a multiple component system, read the Material Safety Data Sheet (s) for the other component or components before blending as the resulting mixture may have the hazards of all of its parts. Containers should be grounded when pouring. Avoid free fall of liquids in excess of a few inches.

SECTION 8 - EXPOSURE CONTROLS AND PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT FOR:

EYE PROTECTION: Wear chemical-type splash goggles or full face shield when possibility exists for eye contact due to splashing or spraying liquid, airborne particles, or vapors.

SKIN PROTECTION: Wear protective clothing sufficient to cover exposed skin surfaces. For applications where skin contact is likely and impermeable clothing is necessary, select clothing constructed of: neoprene rubber or nitril rubber. No specific permeation/degradation testing have been done on protective clothing for this product. Recommendations for skin protection are based on infrequent contact with this product. For frequent contact or total immersion, contact a manufacturer of protective clothing for appropriate chemical impervious equipment.

RESPIRATORY PROTECTION: Overexposure to vapors may be prevented by ensuring proper ventilation controls, vapor exhaust or fresh air entry. A NIOSH- approved air purifying respirator with the appropriate chemical cartridges or a positive-pressure, air-supplied respirator may also reduce exposure. Read the respirator manufacturer's instructions and literature carefully to determine the type of airborne contaminants against which the respirator is effective, its limitations, and how it is to be properly fitted and used.

OTHER EQUIPMENT: Clean contaminated clothing and shoes.

VENTILATION REQUIREMENTS: Provide general dilution or local exhaust ventilation in volume and pattern to keep the concentration of ingredients listed in Section 2 below the lowest suggested exposure limits, the LEL below the stated limit, and to remove decomposition products during welding or flame cutting.

RELEASED - Printed documents may be obsolete; validate prior to use.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES [FORMULA VALUES, NOT SALES SPECIFICATIONS]

BOILING RANGE: 239- 379Degrees

F SOLUBILITY IN WATER: 3.6 %

VAPOR PRESSURE: 4.1 mmHg

WEIGHT/GALLON (LBS): 9.14 U.S.)

VAPOR DENSITY: Heavier than air

pH: Not determined%

VOLATILE/VOLUME: 68.860 %

SOLIDS BY WEIGHT: 60.34 VOC

2.00

SPECIFIC GRAVITY: .962 EVAPORATION

RATE (BUOAC=100) : 44

ODOR/APPEARANCE: Viscous liquid with an odor characteristic of the solvents listed in Section 2.

SECTION 10 - STABILITY AND REACTIVITY

This product is normally stable and will not undergo hazardous reactions.

INCOMPATIBILITY (MATERIALS AND CONDITIONS TO AVOID): Avoid contact with strong alkalis, strong mineral acids, or strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS: May produce the following hazardous decomposition products when exposed to extreme heat: carbon monoxide ; carbon dioxide ; lower molecular weight polymer fractions; Extreme heat includes, but is not limited to, flame cutting, brazing, and welding.Hazardous Materials Identification System (HMIS) and National Fire Protection Association

NFPA) Ratings:

HMIS Rating		NFPA Rating	
HEALTH	1	HEALTH	1
FLAMMABILITY	2	FLAMMABILITY	2
REACTIVITY	0	INSTABILITY	0

Rating System: 0=Minimal, 1=Slight, 2=Moderate, 3=Serious, 4=Severe, * =Chronic Effects.

Safe handling of this product requires that all of the information on the MSDS be evaluated for specific work environments and conditions of use.

THIS IS THE END OF THE MSDS FOR: SKU 20059VC
Shield Products
4849-1 Dawin Road

A-14

Tesla NanoCoatings Limited



Tesla NanoCoatings Limited

Material Safety Data Sheet

MSDS Name: TESLAN™ ZN Primer (Low VOC)
Part A
MSDS Number: GM-2
MSDS Date: November 21, 2011

SECTION I - PRODUCT AND COMPANY INFORMATION

Product Name: TESLAN™ Primer Part A (Low VOC)
CAS Number: Mixture
Hazard Rating: Health: 1 Fire: 2 Reactivity: 1 PPI:

Company Identification: Tesla NanoCoatings Limited
1311 20th Street SW
Massillon, OH 44647

Contact: Todd Hawkins
Telephone: (330) 417-3550
Emergency Phone (24 Hour): (330)-417-3550

Product Class: Paint
Trade Name:
Product Code:
DOT Hazard Class:
UN Number:
Shipping Name: SWNT /Zinc Epoxy Primer Coat
Technical Name:

Additional Information

SECTION II - INGREDIENT AND HAZARD INFORMATION

Ingredient Name	CAS Number	Percent	TSCA
ZINC METAL	7440-66-6	10-30	Y
AROMATIC PETROL. DISTILL.	64742-95-6	0-10	Y
HMIS Health: 0 Fire: 2 Reactivity: 0		PPI:	
\$ 1,2,4 TRIMETHYLBENZENE	95-63-6	0-8	Y
HMIS Health: 0 Fire: 2 Reactivity: 0		PPI:	

***ALL ingredients in this product are listed in the T.S.C.A. Inventory

ADDITIONAL INFORMATION

SECTION 313 SUPPLIER NOTIFICATION: THIS PRODUCT MAY CONTAIN TOXIC CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF THE EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW ACT OF 1986 AND 40 CFR 372 (NOTED BY THE \$ SYMBOL)

CAUTION: This product may become a dust nuisance when removed by sanding, abrading or sandblasting. Dust masks should be worn during these operations.
NE = not established NA = not available NR = not regulated

ALL COMPONENTS OF THIS MIXTURE ARE LISTED ON THE TSCA INVENTORY.



MSDS Name: TESLAN™ ZN Primer (Low VOC)
Part A
MSDS Number: GM-2
MSDS Date: November 21, 2011

SECTION III - PHYSICAL DATA

Form: Liquid
Appearance/Color: Gray
Odor: Mild
Solubility (in water): N
pH Value: 0
Boiling Range: 300°F (148.89°C)
Vapor Pressure (mmHg): 0 @ 0°F (-17.78°C)
Melting Point: 0°F (-17.78°C)
Evaporation Rate: 0.15 times slower than n-Butyl Acetate
Vapor Density:
Partition Coefficient:
% Volatile Weight: 8.3%
% Volatile Volume: 10%
Specific Gravity: 1.18656
VOC: < 100 g/l
Molecular Weight:
Heavy Elements (ppm): 0

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flammability Class: II
Flash Range: 130°F (54.44°C)
Setaflash
Explosive Range: 1%
7%

EXTINGUISHING MEDIA:

Carbon Dioxide---Dry Chemical---Foam---Water Fog
Use water for cooling material stored in vicinity of fire.

SPECIAL FIREFIGHTING PROCEDURES:

Use self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode. Wear protective clothing.

UNUSUAL FIRE & EXPLOSION HAZARDS:

Vapors are heavier than air and may travel along the ground to an ignition source some distance from material handling point. Ignition sources include pilot lights, smoking, heaters, electric motors, sparks from electrical switches and static discharges.

CAUTION: Never use cutting torch on empty containers! Residual solvent vapor in empty container may explode.

SECTION V - HEALTH HAZARD DATA

Route	Species	Exposure and Dose
-------	---------	-------------------

PERMISSIBLE EXPOSURE LEVEL:

Refer to Section II



Tesla NanoCoatings Limited

Material Safety Data Sheet

MSDS Name: TESLAN™ ZN Primer (Low VOC)
Part A
MSDS Number: GM-2
MSDS Date: November 21, 2011

EFFECTS OF OVEREXPOSURE:

EYES: Can cause redness, irritation, swelling and blurred vision.

SKIN: Prolonged or repeated contact can cause moderate irritation, defatting, dermatitis.

BREATHING: Excessive inhalation of vapors and/or spray mist can cause respiratory irritation, dizziness, weakness, fatigue nausea, headache, unconsciousness and even asphyxiation.

SWALLOWING: Can cause gastrointestinal irritation, nausea, vomiting and diarrhea; aspiration of material into the lungs can cause chemical pneumonitis which can be fatal.

FIRST AID:

EYES: Flush with large amounts of water for 15 minutes. Lift eyelids occasionally, get prompt medical attention.

SKIN: Wash thoroughly with soap and water, remove contaminated clothing promptly; wash clothing before reuse. Consult a physician if irritation persists.

SWALLOWING: DO NOT induce vomiting! Keep person warm, quiet and get medical attention. Aspiration of material into the lungs due to vomiting can cause chemical pneumonitis which can be fatal. Drink 1-2 glasses of water to dilute.

INHALATION: Move affected person to fresh air. If breathing is difficult, administer oxygen. If breathing has stopped, give artificial respiration. Keep person warm, quiet, and get medical attention. Consult a physician.

SECTION VI - REACTIVITY DATA

Stability: This product is stable

Hazardous Polymerization: Hazardous polymerization will not occur

INCOMPATIBILITY :

Avoid contact with strong oxidizers (e.g. nitric acid)

CONDITIONS TO AVOID:

Keep away from heat and open flame.

HAZARDOUS DECOMPOSITION PRODUCTS:

May form carbon monoxide and dioxide, various hydrocarbons, etc.

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED SMALL SPILL:

Absorb liquid with rags, floor absorbent, vermiculite or other absorbent material and transfer to hood.

LARGE SPILL: Eliminate all ignition sources---dike area of spill to prevent spreading---ventilate area if indoors---pump liquid into salvage tank---remaining liquid may be taken up with sand, floor absorbent or other absorbent material and shoveled into containers---prevent run-off to sewers and bodies of water--notify proper authorities as required by local, state and federal regulations.

WASTE DISPOSAL METHOD:

Dispose of in accordance with federal, state and local regulations.



Tesla NanoCoatings Limited

Material Safety Data Sheet

MSDS Name: TESLAN™ ZN Primer (Low VOC)
Part A
MSDS Number: GM-2
MSDS Date: November 21, 2011

SECTION VIII - SPECIAL PROTECTION INFORMATION

Occupational Exposure Limits

ACGIH TLV	ACGIH TLV-C	ACGIH STEL	OSHA STEL	OSHA PEL
ZINC METAL 10mg/m ³	N/est	N/est	N/est	N/est
AROMATIC PETROL. DISTILL. N/est	N/est	N/est	N/est	N/est
\$ 1,2,4 TRIMETHYLBENZENE 25.00ppm	N/est	N/est	N/est	N/est

RESPIRATORY PROTECTION:

If workplace exposure limits are exceeded for any component (see Section II for hazardous components and exposure limits) a NIOSH/OSHA approved respirator for components listed is recommended.

VENTILATION:

Sufficient ventilation in volume and pattern, should be provided to keep air contamination below current applicable OSHA permissible exposure limit or ACGIH TLV limit.

PROTECTIVE GLOVES:

Wear resistant gloves such as: nitrile rubber

EYE PROTECTION:

Chemical splash goggles in compliance with OSHA regulations are advised; however, OSHA regulations also permit other types of safety glasses. (Consult your safety equipment supplier)

OTHER PROTECTIVE EQUIPMENT:

Appropriate impervious clothing is recommended if prolonged or repeated contact is likely.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:

Do not drop containers. Avoid heat, sparks, and open flame. Store large quantities only in buildings designed to comply with OSHA 1910.106. Never use pressure to empty. Avoid breathing sanding dust. Do not handle until the manufacturers safety precautions have been read and understood.

OTHER PRECAUTIONS:

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances.

DO NOT TAKE INTERNALLY. AVOID PROLONGED INHALATION AND BODY CONTACT.

SECTION X - ADDITIONAL REGULATORY INFORMATION

SARA TITLE III SECTION 313:

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and of 40 CFR 372:

**Tesla NanoCoatings Limited****Material Safety Data Sheet**

MSDS Name: TESLAN™ ZN Primer (Low VOC)
Part A
MSDS Number: GM-2
MSDS Date: November 21, 2011

Ingredient Name	CAS Number	Percent
\$ 1,2,4 TRIMETHYLBENZENE	95-63-6	0-8%

PROP 65 (CARCINOGEN):

WARNING: This product contains a chemical known to the state of California to cause cancer.

Ingredient Name	CAS Number	Percent
\$ Lead Compound	1314-41-6	0.01

PROP 65 (TERATOGEN):

WARNING: This product contains a chemical known to the state of California to cause birth defects or other reproductive harm.

Ingredient Name	CAS Number	Percent
\$ Toluene	108-88-3	0.01

PROP 65 (BOTH CARCINOGEN AND TERATOGEN) :



Tesla NanoCoatings Limited

Material Safety Data Sheet

MSDS Name: TESLAN™ ZN Primer (Low VOC)
Part B
MSDS Number: GM-2-B
MSDS Date: November 21, 2011

SECTION I - PRODUCT AND COMPANY INFORMATION

Product Name: TESLAN™ ZN Primer Part B
CAS Number: Mixture
Hazard Rating: Health: 2 Fire: 1 Reactivity: 1 PPI:

Company Identification: Tesla NanoCoatings Limited
1311 20th Street SW
Massillon, OH 44647

Contact: Todd Hawkins
Telephone: (330) 417-3550
Emergency Phone (24 Hour): (330)-417-3550

Product Class: Paint
Trade Name:
Product Code:
DOT Hazard Class:
UN Number:
Shipping Name: SWNT / Zinc Epoxy Primer Coat
Technical Name:

Additional Information

SECTION II - INGREDIENT AND HAZARD INFORMATION

Ingredient Name	CAS Number	Percent	TSCA
AROMATIC PETROL. DISTILL. HMIS Health: 0 Fire: 2 Reactivity: 0	64742-95-6	0-10 PPI:	Y
MINERAL SPIRITS RULE 66 HMIS Health: 0 Fire: 2 Reactivity: 0	8052-41-3	0-10 PPI:	Y
\$ 1,2,4 TRIMETHYLBENZENE HMIS Health: 0 Fire: 2 Reactivity: 0	95-63-6	0-8 PPI:	Y

***ALL ingredients in this product are listed in the T.S.C.A. Inventory

ADDITIONAL INFORMATION

SECTION 313 SUPPLIER NOTIFICATION: THIS PRODUCT MAY CONTAIN TOXIC CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF THE EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW ACT OF 1986 AND 40 CFR 372 (NOTED BY THE \$ SYMBOL)

CAUTION: This product may become a dust nuisance when removed by sanding, abrading or sandblasting. Dust masks should be worn during these operations.
NE = not established NA = not available NR = not regulated



Tesla NanoCoatings Limited

Material Safety Data Sheet

MSDS Name: TESLAN™ ZN Primer (Low VOC)
Part B
MSDS Number: GM-2-B
MSDS Date: November 21, 2011

ALL COMPONENTS OF THIS MIXTURE ARE LISTED ON THE TSCA INVENTORY.

SECTION III - PHYSICAL DATA

Form:	Liquid
Appearance/Color:	Amber
Odor:	Amine
Solubility (in water):	N
pH Value:	0
Boiling Range:	300°F (148.89°C)
Vapor Pressure (mmHg):	0 @ 0.°F (-17.78°C)
Melting Point:	0.°F (-17.78°C)
Evaporation Rate:	0.2 times slower than n-Butyl Acetate
Vapor Density:	Heavier than air
Partition Coefficient:	
% Volatile Weight:	3.7%
% Volatile Volume:	10%
Specific Gravity:	2.575
VOC:	< 100 g/l
Molecular Weight:	
Heavy Elements (ppm):	0

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flammability Class:	II
Flash Range:	130°F (54.44°C) Setaflash
Explosive Range:	1% 7%

EXTINGUISHING MEDIA:

Carbon Dioxide---Dry Chemical---Foam---Water Fog
Use water for cooling material stored in vicinity of fire.

SPECIAL FIREFIGHTING PROCEDURES:

Use self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode. Wear protective clothing.

UNUSUAL FIRE & EXPLOSION HAZARDS:

Vapors are heavier than air and may travel along the ground to an ignition source some distance from material handling point. Ignition sources include pilot lights, smoking, heaters, electric motors, sparks from electrical switches and static discharges.

CAUTION: Never use cutting torch on empty containers! Residual solvent vapor in empty container may explode.

SECTION V - HEALTH HAZARD DATA

Route	Species	Exposure and Dose
-------	---------	-------------------



Tesla NanoCoatings Limited

Material Safety Data Sheet

MSDS Name: TESLAN™ ZN Primer (Low VOC)
Part B
MSDS Number: GM-2-B
MSDS Date: November 21, 2011

PERMISSIBLE EXPOSURE LEVEL:

Refer to Section II

EFFECTS OF OVEREXPOSURE:

EYES: Can cause redness, irritation, swelling and blurred vision.

SKIN: Prolonged or repeated contact can cause moderate irritation, defatting, dermatitis.

BREATHING: Excessive inhalation of vapors and/or spray mist can cause respiratory irritation, dizziness, weakness, fatigue nausea, headache, unconsciousness and even asphyxiation.

SWALLOWING: Can cause gastrointestinal irritation, nausea, vomiting and diarrhea; aspiration of material into the lungs can cause chemical pneumonitis which can be fatal.

FIRST AID:

EYES: Flush with large amounts of water for 15 minutes. Lift eyelids occasionally, get prompt medical attention.

SKIN: Wash thoroughly with soap and water, remove contaminated clothing promptly; wash clothing before reuse. Consult a physician if irritation persists.

SWALLOWING: DO NOT induce vomiting! Keep person warm, quiet and get medical attention. Aspiration of material into the lungs due to vomiting can cause chemical pneumonitis which can be fatal. Drink 1-2 glasses of water to dilute.

INHALATION: Move affected person to fresh air. If breathing is difficult, administer oxygen. If breathing has stopped, give artificial respiration. Keep person warm, quiet, and get medical attention. Consult a physician.

SECTION VI - REACTIVITY DATA

Stability: This product is stable

Hazardous Polymerization: Hazardous polymerization will not occur

INCOMPATIBILITY :

Avoid contact with strong oxidizers (e.g. nitric acid)

CONDITIONS TO AVOID:

Keep away from heat and open flame.

HAZARDOUS DECOMPOSITION PRODUCTS:

May form carbon monoxide and dioxide, various hydrocarbons, etc.

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED SMALL SPILL:

Absorb liquid with rags, floor absorbent, vermiculite or other absorbent material and transfer to hood.

LARGE SPILL: Eliminate all ignition sources---dike area of spill to prevent spreading---ventilate area if indoors---pump liquid into salvage tank---remaining liquid may be taken up with sand, floor absorbent or other absorbent material and shoveled into containers---prevent run-off to sewers and bodies of water--notify proper authorities as required by local, state and federal regulations.

WASTE DISPOSAL METHOD:

Dispose of in accordance with federal, state and local regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

Occupational Exposure Limits



Tesla NanoCoatings Limited

Material Safety Data Sheet

MSDS Name: TESLAN™ ZN Primer (Low VOC)
Part B
MSDS Number: GM-2-B
MSDS Date: November 21, 2011

ACGIH TLV	ACGIH TLV-C	ACGIH STEL	OSHA STEL	OSHA PEL
AROMATIC PETROL. DISTILL. N/est	N/est	N/est	N/est	N/est
MINERAL SPIRITS RULE 66 N/est	N/est	N/est	N/est	100.00ppm
\$ 1,2,4 TRIMETHYLBENZENE 25.00ppm	N/est	N/est	N/est	N/est

RESPIRATORY PROTECTION:

If workplace exposure limits are exceeded for any component (see Section II for hazardous components and exposure limits) a NIOSH/OSHA approved respirator for components listed is recommended.

VENTILATION:

Sufficient ventilation in volume and pattern, should be provided to keep air contamination below current applicable OSHA permissible exposure limit or ACGIH TLV limit.

PROTECTIVE GLOVES:

Wear resistant gloves such as: nitrile rubber

EYE PROTECTION:

Chemical splash goggles in compliance with OSHA regulations are advised; however, OSHA regulations also permit other types of safety glasses. (Consult your safety equipment supplier)

OTHER PROTECTIVE EQUIPMENT:

Appropriate impervious clothing is recommended if prolonged or repeated contact is likely.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:

Do not drop containers. Avoid heat, sparks, and open flame. Store large quantities only in buildings designed to comply with OSHA 1910.106. Never use pressure to empty. Avoid breathing sanding dust. Do not handle until the manufacturers safety precautions have been read and understood.

OTHER PRECAUTIONS:

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances.

DO NOT TAKE INTERNALLY. AVOID PROLONGED INHALATION AND BODY CONTACT.

SECTION X - ADDITIONAL REGULATORY INFORMATION

SARA TITLE III SECTION 313:

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and of 40 CFR 372:

Ingredient Name	CAS Number	Percent
\$ 1,2,4 TRIMETHYLBENZENE	95-63-6	0-6

PROP 65 (CARCINOGEN):



Tesla NanoCoatings Limited

Material Safety Data Sheet

MSDS Name: TESLAN™ ZN Primer (Low VOC)
Part B
MSDS Number: GM-2-B
MSDS Date: November 21, 2011

PROP 65 (TERATOGEN):

WARNING: This product contains a chemical known to the state of California to cause birth defects or other reproductive harm.

Ingredient Name	CAS Number	Percent
\$ Toluene	108-88-3	0.01

PROP 65 (BOTH CARCINOGEN AND TERATOGEN) :



Tesla NanoCoatings Limited

Material Safety Data Sheet

MSDS Name: TESLAN™ ZN Primer (Low VOC)
Part A
MSDS Number: GM-2
MSDS Date: November 21, 2011

SECTION I - PRODUCT AND COMPANY INFORMATION

Product Name: TESLAN™ Primer Part A (Low VOC)
CAS Number: Mixture
Hazard Rating: Health: 1 Fire: 2 Reactivity: 1 PPI:

Company Identification: Tesla NanoCoatings Limited
1311 20th Street SW
Massillon, OH 44647

Contact: Todd Hawkins
Telephone: (330) 417-3550
Emergency Phone (24 Hour): (330)-417-3550

Product Class: Paint
Trade Name:
Product Code:
DOT Hazard Class:
UN Number:
Shipping Name: SWNT /Zinc Epoxy Primer Coat
Technical Name:

Additional Information

SECTION II - INGREDIENT AND HAZARD INFORMATION

Ingredient Name	CAS Number	Percent	TSCA
ZINC METAL	7440-66-6	10-30	Y
AROMATIC PETROL. DISTILL.	64742-95-6	0-10	Y
HMIS Health: 0 Fire: 2 Reactivity: 0		PPI:	
\$ 1,2,4 TRIMETHYLBENZENE	95-63-6	0-8	Y
HMIS Health: 0 Fire: 2 Reactivity: 0		PPI:	

***ALL ingredients in this product are listed in the T.S.C.A. Inventory

ADDITIONAL INFORMATION

SECTION 313 SUPPLIER NOTIFICATION: THIS PRODUCT MAY CONTAIN TOXIC CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF THE EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW ACT OF 1986 AND 40 CFR 372 (NOTED BY THE \$ SYMBOL)

CAUTION: This product may become a dust nuisance when removed by sanding, abrading or sandblasting. Dust masks should be worn during these operations.
NE = not established NA = not available NR = not regulated

ALL COMPONENTS OF THIS MIXTURE ARE LISTED ON THE TSCA INVENTORY.



MSDS Name: TESLAN™ ZN Primer (Low VOC)
Part A
MSDS Number: GM-2
MSDS Date: November 21, 2011

SECTION III - PHYSICAL DATA

Form: Liquid
Appearance/Color: Gray
Odor: Mild
Solubility (in water): N
pH Value: 0
Boiling Range: 300°F (148.89°C)
Vapor Pressure (mmHg): 0 @ 0°F (-17.78°C)
Melting Point: 0°F (-17.78°C)
Evaporation Rate: 0.15 times slower than n-Butyl Acetate
Vapor Density:
Partition Coefficient:
% Volatile Weight: 8.3%
% Volatile Volume: 10%
Specific Gravity: 1.18656
VOC: < 100 g/l
Molecular Weight:
Heavy Elements (ppm): 0

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flammability Class: II
Flash Range: 130°F (54.44°C)
Setaflash
Explosive Range: 1%
7%

EXTINGUISHING MEDIA:

Carbon Dioxide---Dry Chemical---Foam---Water Fog
Use water for cooling material stored in vicinity of fire.

SPECIAL FIREFIGHTING PROCEDURES:

Use self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode. Wear protective clothing.

UNUSUAL FIRE & EXPLOSION HAZARDS:

Vapors are heavier than air and may travel along the ground to an ignition source some distance from material handling point. Ignition sources include pilot lights, smoking, heaters, electric motors, sparks from electrical switches and static discharges.

CAUTION: Never use cutting torch on empty containers! Residual solvent vapor in empty container may explode.

SECTION V - HEALTH HAZARD DATA

Route	Species	Exposure and Dose
-------	---------	-------------------

PERMISSIBLE EXPOSURE LEVEL:

Refer to Section II



Tesla NanoCoatings Limited

Material Safety Data Sheet

MSDS Name: TESLAN™ ZN Primer (Low VOC)
Part A
MSDS Number: GM-2
MSDS Date: November 21, 2011

EFFECTS OF OVEREXPOSURE:

EYES: Can cause redness, irritation, swelling and blurred vision.

SKIN: Prolonged or repeated contact can cause moderate irritation, defatting, dermatitis.

BREATHING: Excessive inhalation of vapors and/or spray mist can cause respiratory irritation, dizziness, weakness, fatigue nausea, headache, unconsciousness and even asphyxiation.

SWALLOWING: Can cause gastrointestinal irritation, nausea, vomiting and diarrhea; aspiration of material into the lungs can cause chemical pneumonitis which can be fatal.

FIRST AID:

EYES: Flush with large amounts of water for 15 minutes. Lift eyelids occasionally, get prompt medical attention.

SKIN: Wash thoroughly with soap and water, remove contaminated clothing promptly; wash clothing before reuse. Consult a physician if irritation persists.

SWALLOWING: DO NOT induce vomiting! Keep person warm, quiet and get medical attention. Aspiration of material into the lungs due to vomiting can cause chemical pneumonitis which can be fatal. Drink 1-2 glasses of water to dilute.

INHALATION: Move affected person to fresh air. If breathing is difficult, administer oxygen. If breathing has stopped, give artificial respiration. Keep person warm, quiet, and get medical attention. Consult a physician.

SECTION VI - REACTIVITY DATA

Stability: This product is stable

Hazardous Polymerization: Hazardous polymerization will not occur

INCOMPATIBILITY :

Avoid contact with strong oxidizers (e.g. nitric acid)

CONDITIONS TO AVOID:

Keep away from heat and open flame.

HAZARDOUS DECOMPOSITION PRODUCTS:

May form carbon monoxide and dioxide, various hydrocarbons, etc.

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED SMALL SPILL:

Absorb liquid with rags, floor absorbent, vermiculite or other absorbent material and transfer to hood.

LARGE SPILL: Eliminate all ignition sources---dike area of spill to prevent spreading---ventilate area if indoors---pump liquid into salvage tank---remaining liquid may be taken up with sand, floor absorbent or other absorbent material and shoveled into containers---prevent run-off to sewers and bodies of water--notify proper authorities as required by local, state and federal regulations.

WASTE DISPOSAL METHOD:

Dispose of in accordance with federal, state and local regulations.



Tesla NanoCoatings Limited

Material Safety Data Sheet

MSDS Name: TESLAN™ ZN Primer (Low VOC)
Part A
MSDS Number: GM-2
MSDS Date: November 21, 2011

SECTION VIII - SPECIAL PROTECTION INFORMATION

Occupational Exposure Limits

ACGIH TLV	ACGIH TLV-C	ACGIH STEL	OSHA STEL	OSHA PEL
ZINC METAL 10mg/m ³	N/est	N/est	N/est	N/est
AROMATIC PETROL. DISTILL. N/est	N/est	N/est	N/est	N/est
\$ 1,2,4 TRIMETHYLBENZENE 25.00ppm	N/est	N/est	N/est	N/est

RESPIRATORY PROTECTION:

If workplace exposure limits are exceeded for any component (see Section II for hazardous components and exposure limits) a NIOSH/OSHA approved respirator for components listed is recommended.

VENTILATION:

Sufficient ventilation in volume and pattern, should be provided to keep air contamination below current applicable OSHA permissible exposure limit or ACGIH TLV limit.

PROTECTIVE GLOVES:

Wear resistant gloves such as: nitrile rubber

EYE PROTECTION:

Chemical splash goggles in compliance with OSHA regulations are advised; however, OSHA regulations also permit other types of safety glasses. (Consult your safety equipment supplier)

OTHER PROTECTIVE EQUIPMENT:

Appropriate impervious clothing is recommended if prolonged or repeated contact is likely.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:

Do not drop containers. Avoid heat, sparks, and open flame. Store large quantities only in buildings designed to comply with OSHA 1910.106. Never use pressure to empty. Avoid breathing sanding dust. Do not handle until the manufacturers safety precautions have been read and understood.

OTHER PRECAUTIONS:

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances.

DO NOT TAKE INTERNALLY. AVOID PROLONGED INHALATION AND BODY CONTACT.

SECTION X - ADDITIONAL REGULATORY INFORMATION

SARA TITLE III SECTION 313:

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and of 40 CFR 372:

**Tesla NanoCoatings Limited****Material Safety Data Sheet**

MSDS Name: TESLAN™ ZN Primer (Low VOC)
Part A
MSDS Number: GM-2
MSDS Date: November 21, 2011

Ingredient Name	CAS Number	Percent
\$ 1,2,4 TRIMETHYLBENZENE	95-63-6	0-8%

PROP 65 (CARCINOGEN):

WARNING: This product contains a chemical known to the state of California to cause cancer.

Ingredient Name	CAS Number	Percent
\$ Lead Compound	1314-41-6	0.01

PROP 65 (TERATOGEN):

WARNING: This product contains a chemical known to the state of California to cause birth defects or other reproductive harm.

Ingredient Name	CAS Number	Percent
\$ Toluene	108-88-3	0.01

PROP 65 (BOTH CARCINOGEN AND TERATOGEN) :



Tesla NanoCoatings Limited

Material Safety Data Sheet

MSDS Name: TESLAN™ ZN Primer (Low VOC)
Part B
MSDS Number: GM-2-B
MSDS Date: November 21, 2011

SECTION I - PRODUCT AND COMPANY INFORMATION

Product Name: TESLAN™ ZN Primer Part B
CAS Number: Mixture
Hazard Rating: Health: 2 Fire: 1 Reactivity: 1 PPI:

Company Identification: Tesla NanoCoatings Limited
1311 20th Street SW
Massillon, OH 44647

Contact: Todd Hawkins
Telephone: (330) 417-3550
Emergency Phone (24 Hour): (330)-417-3550

Product Class: Paint
Trade Name:
Product Code:
DOT Hazard Class:
UN Number:
Shipping Name: SWNT / Zinc Epoxy Primer Coat
Technical Name:

Additional Information

SECTION II - INGREDIENT AND HAZARD INFORMATION

Ingredient Name	CAS Number	Percent	TSCA
AROMATIC PETROL. DISTILL. HMIS Health: 0 Fire: 2 Reactivity: 0	64742-95-6	0-10 PPI:	Y
MINERAL SPIRITS RULE 66 HMIS Health: 0 Fire: 2 Reactivity: 0	8052-41-3	0-10 PPI:	Y
\$ 1,2,4 TRIMETHYLBENZENE HMIS Health: 0 Fire: 2 Reactivity: 0	95-63-6	0-8 PPI:	Y

***ALL ingredients in this product are listed in the T.S.C.A. Inventory

ADDITIONAL INFORMATION

SECTION 313 SUPPLIER NOTIFICATION: THIS PRODUCT MAY CONTAIN TOXIC CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF THE EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW ACT OF 1986 AND 40 CFR 372 (NOTED BY THE \$ SYMBOL)

CAUTION: This product may become a dust nuisance when removed by sanding, abrading or sandblasting. Dust masks should be worn during these operations.
NE = not established NA = not available NR = not regulated



Tesla NanoCoatings Limited

Material Safety Data Sheet

MSDS Name: TESLAN™ ZN Primer (Low VOC)
Part B
MSDS Number: GM-2-B
MSDS Date: November 21, 2011

ALL COMPONENTS OF THIS MIXTURE ARE LISTED ON THE TSCA INVENTORY.

SECTION III - PHYSICAL DATA

Form:	Liquid
Appearance/Color:	Amber
Odor:	Amine
Solubility (in water):	N
pH Value:	0
Boiling Range:	300°F (148.89°C)
Vapor Pressure (mmHg):	0 @ 0°F (-17.78°C)
Melting Point:	0°F (-17.78°C)
Evaporation Rate:	0.2 times slower than n-Butyl Acetate
Vapor Density:	Heavier than air
Partition Coefficient:	
% Volatile Weight:	3.7%
% Volatile Volume:	10%
Specific Gravity:	2.575
VOC:	< 100 g/l
Molecular Weight:	
Heavy Elements (ppm):	0

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flammability Class:	II
Flash Range:	130°F (54.44°C) Setaflash
Explosive Range:	1% 7%

EXTINGUISHING MEDIA:

Carbon Dioxide---Dry Chemical---Foam---Water Fog
Use water for cooling material stored in vicinity of fire.

SPECIAL FIREFIGHTING PROCEDURES:

Use self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode. Wear protective clothing.

UNUSUAL FIRE & EXPLOSION HAZARDS:

Vapors are heavier than air and may travel along the ground to an ignition source some distance from material handling point. Ignition sources include pilot lights, smoking, heaters, electric motors, sparks from electrical switches and static discharges.

CAUTION: Never use cutting torch on empty containers! Residual solvent vapor in empty container may explode.

SECTION V - HEALTH HAZARD DATA

Route	Species	Exposure and Dose
-------	---------	-------------------



Tesla NanoCoatings Limited

Material Safety Data Sheet

MSDS Name: TESLAN™ ZN Primer (Low VOC)
Part B
MSDS Number: GM-2-B
MSDS Date: November 21, 2011

PERMISSIBLE EXPOSURE LEVEL:

Refer to Section II

EFFECTS OF OVEREXPOSURE:

EYES: Can cause redness, irritation, swelling and blurred vision.

SKIN: Prolonged or repeated contact can cause moderate irritation, defatting, dermatitis.

BREATHING: Excessive inhalation of vapors and/or spray mist can cause respiratory irritation, dizziness, weakness, fatigue nausea, headache, unconsciousness and even asphyxiation.

SWALLOWING: Can cause gastrointestinal irritation, nausea, vomiting and diarrhea; aspiration of material into the lungs can cause chemical pneumonitis which can be fatal.

FIRST AID:

EYES: Flush with large amounts of water for 15 minutes. Lift eyelids occasionally, get prompt medical attention.

SKIN: Wash thoroughly with soap and water, remove contaminated clothing promptly; wash clothing before reuse. Consult a physician if irritation persists.

SWALLOWING: DO NOT induce vomiting! Keep person warm, quiet and get medical attention. Aspiration of material into the lungs due to vomiting can cause chemical pneumonitis which can be fatal. Drink 1-2 glasses of water to dilute.

INHALATION: Move affected person to fresh air. If breathing is difficult, administer oxygen. If breathing has stopped, give artificial respiration. Keep person warm, quiet, and get medical attention. Consult a physician.

SECTION VI - REACTIVITY DATA

Stability: This product is stable

Hazardous Polymerization: Hazardous polymerization will not occur

INCOMPATIBILITY :

Avoid contact with strong oxidizers (e.g. nitric acid)

CONDITIONS TO AVOID:

Keep away from heat and open flame.

HAZARDOUS DECOMPOSITION PRODUCTS:

May form carbon monoxide and dioxide, various hydrocarbons, etc.

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED SMALL SPILL:

Absorb liquid with rags, floor absorbent, vermiculite or other absorbent material and transfer to hood.

LARGE SPILL: Eliminate all ignition sources---dike area of spill to prevent spreading---ventilate area if indoors---pump liquid into salvage tank---remaining liquid may be taken up with sand, floor absorbent or other absorbent material and shoveled into containers---prevent run-off to sewers and bodies of water--notify proper authorities as required by local, state and federal regulations.

WASTE DISPOSAL METHOD:

Dispose of in accordance with federal, state and local regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

Occupational Exposure Limits



Tesla NanoCoatings Limited

Material Safety Data Sheet

MSDS Name: TESLAN™ ZN Primer (Low VOC)
 Part B
 MSDS Number: GM-2-B
 MSDS Date: November 21, 2011

ACGIH TLV	ACGIH TLV-C	ACGIH STEL	OSHA STEL	OSHA PEL
AROMATIC PETROL. DISTILL. N/est	N/est	N/est	N/est	N/est
MINERAL SPIRITS RULE 66 N/est	N/est	N/est	N/est	100.00ppm
\$ 1,2,4 TRIMETHYLBENZENE 25.00ppm	N/est	N/est	N/est	N/est

RESPIRATORY PROTECTION:

If workplace exposure limits are exceeded for any component (see Section II for hazardous components and exposure limits) a NIOSH/OSHA approved respirator for components listed is recommended.

VENTILATION:

Sufficient ventilation in volume and pattern, should be provided to keep air contamination below current applicable OSHA permissible exposure limit or ACGIH TLV limit.

PROTECTIVE GLOVES:

Wear resistant gloves such as: nitrile rubber

EYE PROTECTION:

Chemical splash goggles in compliance with OSHA regulations are advised; however, OSHA regulations also permit other types of safety glasses. (Consult your safety equipment supplier)

OTHER PROTECTIVE EQUIPMENT:

Appropriate impervious clothing is recommended if prolonged or repeated contact is likely.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:

Do not drop containers. Avoid heat, sparks, and open flame. Store large quantities only in buildings designed to comply with OSHA 1910.106. Never use pressure to empty. Avoid breathing sanding dust. Do not handle until the manufacturers safety precautions have been read and understood.

OTHER PRECAUTIONS:

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances.

DO NOT TAKE INTERNALLY. AVOID PROLONGED INHALATION AND BODY CONTACT.

SECTION X - ADDITIONAL REGULATORY INFORMATION

SARA TITLE III SECTION 313:

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and of 40 CFR 372:

Ingredient Name	CAS Number	Percent
\$ 1,2,4 TRIMETHYLBENZENE	95-63-6	0-6

PROP 65 (CARCINOGEN):



Tesla NanoCoatings Limited

Material Safety Data Sheet

MSDS Name: TESLAN™ ZN Primer (Low VOC)
Part B
MSDS Number: GM-2-B
MSDS Date: November 21, 2011

PROP 65 (TERATOGEN):

WARNING: This product contains a chemical known to the state of California to cause birth defects or other reproductive harm.

Ingredient Name	CAS Number	Percent
\$ Toluene	108-88-3	0.01

PROP 65 (BOTH CARCINOGEN AND TERATOGEN) :

A-15

TIGER Drylac U.S.A., Inc.



Zinc free OGF primer
09/73841

An outgassing-forgiving (zinc free) primer as part of a two coat TIGER SHIELD system for a superior corrosion protection of forged, cast, hot galvanized and porous substrates.
Based on Epoxy/Polyester

TIGER Drylac® U.S.A., Inc.
1-800-243-8148

WEST COAST (HQ)
1261 East Belmont St.
Ontario, CA 91761
phone 909 930 9100
fax 909 930 9111
customerservicewest@tigerdrylac.com
www.tigerdrylac.com

MIDWEST
3855 Swenson Ave.
St. Charles, IL 60174
phone 630 513 9999
fax 630 513 9998
customerservicemw@tigerdrylac.com

EAST COAST
1100 Commons Blvd.
Reading, PA 19605
phone 610 926 8148
fax 610 926 8149
customerserviceeast@tigerdrylac.com

SOUTHEAST
3400 Town Point Drive NW Ste. 140
Kennesaw, GA 30144
phone 770 218 2490
fax 770 218 2495
customerserviceeast@tigerdrylac.com

SOUTH
339 Exchange Drive
Arlington, TX 76011
phone 817 227 7995
fax 817 227 1931
customerservicesouth@tigerdrylac.com

Typical applications

- Heavy corrosion protection
- Steel/Aluminum constructions
- Agricultural machinery
- Industrial equipment
- Fixtures
- Fences
- Bike mounts

Features

- ▶ Zinc free primer
- ▶ Especially suited for porous substrates
- ▶ Good intercoat-adhesion
- ▶ Very Good Corrosion Protection
- ▶ Very Good Mechanical Properties
- ▶ Good Chemical Resistance
- ▶ Good Storage Stability
- ▶ Very Good Edge Coverage

Finish | Colours

- ▶ Smooth flow – glossy surface, approx. 75 ± 5*
- ▶ Grey

TIGER SHIELD®

TIGER SHIELD® is a two coat system comprising a corrosion protective primer, TIGER Drylac® 69/70000 Dryprotector® or TIGER Dryzinc® 69/90350 or OGF primer 09/73841 as a base coat and an opaque weather resistant TIGER Drylac® Powder Coating.

Standard Packaging

55 [lb] boxes and 5.0 [lb] Minipack
25 [kg] cartons and 2,5 [kg] Minipack

Specific Gravity (ASTM D792)

approx. 1.60 depending on pigmentation

Theoretical Coverage

at specific gravity 1.5 and film thickness of 2.5 [mils] / 60 [µm]:
51.5 [sq ft/lb] / 11.1 [m²/kg]
(also please refer to data sheets # 4001 & 4002 in the latest edition)

Storage Stability

6 months at no more than 77 °[F] / 25 °[C]

*Gloss level acc. to ASTM 523 / 60° angle.



Pretreatment (alternatives)

The following two methods of pre-treatment have been tested: Prerequisite for inclusion in the TIGER SHIELD processing is the quality of the steel substrate defined as an alloy-treated steel, class ST 37, ST 52 or any other equally suited steel that can be coated (stainless steel alloys, any derivatives thereof are explicitly excluded for use within a TIGER SHIELD application). The following means of pre-treatment and metal preparation respectively have been tested in accordance with the requirements as set forth in EN ISO 12944 and have been approved.

I.) Zinc Phosphating

Conversion coating weight shall be a minimum of $2,5 \pm 1,0$ [g/m²].

II.) Blasting

The raw steel surface needs to be blasted using sharp and edged mineral or cast iron pellets. The tolerances for a blasted steel surface thereby need to correspond to the comparison specimen standard G 201 (lower tolerance segment 2, upper tolerance segment 3 = medium grade) and to the surface preparation class of minimum Sa 2.5 acc. to ISO 8503-1 and ISO 8503-2 with the surface depth between a minimum of R_z 50 – 70 µm and a maximum of R_{max} 100 µm acc. to ISO 8501 and a peak amount Pc10 µm of 20 measured with perthometer (Mahr). Blasting must ensure, that a minimum of 95 [%] of the total area to be blasted is reached.

To avoid any corrosion, the powder coating has to take place immediately after the blasting stage.

Processing

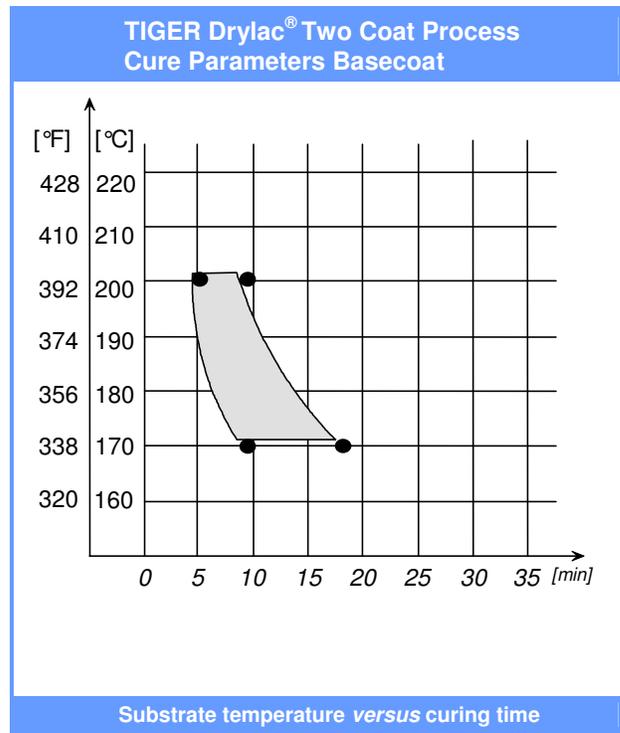
Corona

Tribo

For Tribo / Airstatic Powders please confirm before ordering. Suitability of metallic effects for tribo processing must be verified prior to application. Please consult with the appropriate data sheets in the latest edition.

Since not all powder coatings are suitable for recycling / reclaim, please verify before ordering.

Cure parameters (substrate temperature)



Please observe cure parameters closely since mechanical properties will develop before full cross-linking.

Two Coat Process

If used as a two coat TIGER SHIELD system, best intercoat-adhesion is achieved when pre-gelling the primer at 392°F / 200°C for 5-6 [min] prior to applying a topcoat of a TIGER Drylac® powder coating, which then is to be cured applying the curing parameters as given in the relevant product data sheet for that top coat.

Please note

To avoid eventual oxidation no more than 12 hours must elapse between the application of TIGER primer 09/73841 and the spraying of any TIGER Drylac® topcoat.

When pre-gelling and the subsequent cure are done in a directly fired gas oven inter-coat adhesion between the primer and the topcoat may suffer due to a variation in the gas supply.



Film thickness

A minimum film thickness of 3.2 [mils] / 80 [µm] each needs to be applied per layer. The system requires the primer to be applied at 3.5 - 4.5 [mils] / 80 - 100 [µm] and the weather resistant topcoat to be sprayed at a film thickness of 3.5 - 4.5 [mils] / 80 - 100 [µm]. It is required that the total film thickness of both, the primer and the top coat amount to entire film build up to 6.4 [mils] / 160 [µm]. In order to achieve sufficient opacity it may become necessary to apply organic pigmented topcoats at a higher film thickness. Please observe, that non-pigmented topcoats, such as clear coats or transparent effects are not suited for a TIGER SHIELD® application.

Please note

Post-bending properties of any part must be verified prior to application. Minor cracks in the coated surface may lead to corrosion.

Joint sealants and any other auxiliary products, such as glazing aids, gliding waxes, drilling and cutting lubricants, which come in contact with the coated surface must be ph-neutral and free of substances which may damage the finish. Prior to coating a suitability test at the applicator is therefore highly recommended.

Any post mechanical processing of already coated parts, such as sawing, drilling, milling, cutting and bending will result in damage of the coated surface and will subsequently weaken the corrosion protection.

Read and understand the Material Safety Datasheet (MSDS) before using.

Test results

Checked on a 3,0 [mm] in gauge zinc phosphated, steel panel, two coat TIGER SHIELD system with a total film thickness of max. 6.4 [mils] / 160 [µm] and a topcoat in a smooth glossy finish. Cure conditions according to the cure curves.

Test result	Test method	OGF primer 09/73841 + TIGER Drylac® Series 38
Film thickness		6.4 – 7.2 [mils] 160 - 180 [µm]
Cross cut tape test	<i>ASTM D3359 Method B</i>	B5
Humidity resistance 1,000 [h]	<i>ASTM D2247</i>	Max. undercutting 1 [mm] No blistering
Salt spray resistance 3,000 [h]	<i>ASTM B117</i>	Max. undercutting 1 [mm] No blistering
Porosity of Paint films	<i>ASTM D3258</i>	non-porous

* Humidity Test with SO₂ addition of 0.2 [l]



Drylac® Zinc free OGF primer

Cleaning recommendations: Please refer to our data sheet in the latest edition.

Chemical resistance

The required chemical resistance of a powder coating depends among other things on its formulation. Chemical resistance requirements therefore must be considered according to processing conditions and final use of the finished product. This is best already established during the product specification process. Agreement between all parties involved must be reached about the requirements for such chemical resistance as well as the test method, which may be performed in accordance with PCI test method #8 "Solvent Cure Test". Furthermore, the test duration and concentration of the test media need to be agreed upon.

As a part of our product information program our product data sheets are periodically updated. Therefore, please check our website for the latest edition. Our verbal and written recommendations for the use of our products are based upon experience and in accordance with present technological standards. These are given in order to support the buyer or user. They are non-committal and do not create any additional commitments to the purchase agreement. They do not release the buyer from verifying the suitability of our products for the intended application.

This product data sheet substitutes any and all previous product data sheet and notes for customers published on this subject matter.



Member of the Powder Coating Institute

TIGER Drylac® U.S.A., Inc.

1261 East Belmont Street

Ontario, CA 91761

Phone 909 930 9100

Fax 909 930 9111

tiger@tigerdrylac.com

www.tigerdrylac.com

A-16

Ultimate Linings



Ultimate Linings

UL TK 22 *High Abrasion Resistance Spray Elastomer Coating*

DESCRIPTION

UL TK 22 (High Abrasion Resistance) is a revolutionary fast set, 100% solids, flexible two component spray elastomer that gives outstanding physical performance against abrasion tear and impact. It is designed to give exceptional values including tensile, high tear and impact resistance in severe demanding applications against abrasion and corrosion. It may be applied in single or multiple applications without appreciable sagging and is relatively insensitive to moisture and temperature allowing application in most temperatures. Its extremely fast gel time makes it suitable for applications down to -20°F.

FEATURES

Exceptional Abrasion Resistance / Exceptional Hydrolytic Stability / High Tear and Impact Resistance
Excellent Impact Dampening / Excellent Thermal Stability / Zero VOC (100% Solids) / Low Temperature Flexibility / Good Chemical Resistance / Coats Carbon or Mild Steel Metals without Primer.

TYPICAL USES

With its durable characteristics, UL II HAR is intended to use as a protective lining and coating on interior of concrete, masonry and metal structures in various facilities like: Dredging / Petrol Refineries / Cargo Containers / Mining Operations / Landfill Containment / Marine Environments / Secondary Containment Water and Waste Water Treatment / Industrial and Manufacturing Facilities.

COLORS

Clear/Neutral. Custom colors are available upon request. Color Packs, when used, must be added to Part-B. Due to its aromatic composition, **UL TK 22** will tend to yellow or darken in color and will become flat after exposure to UV light.

PACKAGING

10 gallon kit: 5 gallons Part-A (Isocyanate side) and 5 gallons Part-B (Resin side). 100 gallon kit: 50 gallons Part-A (Isocyanate side) and 50 gallons Part-B (Resin side).

COVERAGE

UL TK 22 may be applied at any rate to achieve desired thickness. Theoretical coverage for 1 mil thickness is one gallon per 1600 sq. ft.

SURFACE PREPARATION

In general, coating performance and adhesion are directly proportional to surface preparation. Most failures in the performance of surface coatings can be attributed to poor surface preparation. Polyurea coatings rely on the structural strength of the substrate to which they are applied. All surfaces must be free of dust, dirt, oil, grease, rust, corrosion and other contaminants. When coating substrates previously used, it is important to consider the possibility of substrate absorption, which may affect the adhesion of the coating system, regardless of the surface preparation. Ultimate Linings recognizes the potential for unique substrates from one project to another.

Carbon Steel:

A. Exterior coating: Abrasive Blast to SSSP, SP-10 (Near-white) with a surface profile of 1.2 - 2.2 mils. B. Internal Lining: Abrasive Blast to SSSP-SP-5 (White metal) with a surface profile of 2.2 -3 .2 mils. Vacuum all surfaces to remove dust, etc., prior to application.

New and Old Concrete:

Refer to SSPC-SP13/NACE 6, or ICRI 03732: CSP 3-5. New concrete must be cured for 28 days prior to product application. Surface must be clean, dry, sound and offer sufficient profile for product adhesion. Remove all dust, dirt, oil, form release agents, curing compounds, salts, efflorescence, laitance and other foreign matter by shot blasting and/or suitable chemical means, in accordance with local chemical regulations. Rinse thoroughly, to achieve a pH between 8.0 and 11.0. Allow to dry completely. If old concrete has a surface that has deteriorated to an unacceptably rough surface, UL BC 371 or a mixture of UL PB 32 and sand should be used as a repair agent for cracks, spalls, bug holes and voids. Upon full cure of the repair agent, prime the entire surface intended for coating.

6630 Roxburgh Dr. #175 * Houston, TX 77041 * 281-598-5030 * Fax 713-937-0052
www.ultimatelinings.com

Concrete Surface Preparation Reference:

AS D4258 - Standard practice for cleaning concrete

AS D4259 - Standard practice for abrading concrete

AS D4260 - Standard practice for etching concrete

AS F1869 - Standard test method for measuring moisture vapor emission rate of concrete ICRI 03732 - Concrete surface preparation

Wood:

All wood should be clean, dry and free of any knots, splinters, oil, grease or other contaminants. Splintered or rough areas should be sanded. Knots should be repaired using **UL BC 371** with sand. Upon full cure of the repair agent, prime the entire surface intended for coating.

Steel (Aospheric and Immersion Exposure):

Remove all oil, grease, weld spatters and round off any sharp edges from surface. Minimum surface preparation is Near White Metal Blast Cleaning per SSPC-SP10/NACE 2. Optimum surface profile is 2-3 mils. Prime and shoot **UL TK 22** on to any bare metal the same day as it is cleaned to minimize any potential flash rusting.

Aluminum:

Aluminum should be blasted with aluminum oxide or sand, and not with steel or metal grit. Excessive blasting may result in a warped or deformed surface. After blasting, wash aluminum with a commercially available aluminum cleaner. Allow to dry, then prime.

Brass and Copper:

Brass and copper should be blasted with sand, and not with steel or metal grit. Remove all dust and grease prior to applying primer.

Galvanized Surfaces:

Clean and degrease any contaminated surfaces before priming. Do not blast galvanized surfaces with an abrasive grit. An adhesion test is recommended prior to starting the project.

Fiberglass Reinforced Plastic:

The gel coat should be lightly blasted or sanded with 80 grit sandpaper and cleaned.

Plastic Foams:

Enhanced adhesion is obtained when the foam is mechanically abraded. When coating polystyrene, do not use a solvent-based primer.

Textiles, Canvas, Fabrics:

Adhesion to most fabrics, geothermal membranes and textiles does not require a primer.

Stainless Steel:

Stainless steel may be grit blasted and degreased before priming. Some stainless steel alloys are so inert that it is not possible to achieve a satisfactory bond. An adhesion test is recommended prior to starting the project.

New and Old Cast Iron:

Blast with a steel grit and degrease before priming. Old cast iron is difficult to prepare for a satisfactory bond. It can absorb oil and water soluble contaminants that will keep returning to the surface after the coating system has been applied and affect the coating system adhesion. An adhesion test is recommended prior to starting the project.

All Other Surfaces:

An adhesion test is recommended prior to starting the project.

MIXING

UL TK 22 may not be diluted under any circumstances. Thoroughly mix **UL TK 22** Part-B (Resin side) with air driven power equipment until a homogeneous mixture and color is obtained.

6630 Roxburgh Dr. #175 * Houston, TX 77041 * 281-598-5030 * Fax 713-937-0052
www.ultimatelinings.com

APPLICATION

Both Part-A and Part-B material should be preconditioned at 75-85°F before application. Recommended surface temperature must be at least 5°F above the dew point. **UL TK 22** should be applied using a plural component, heated, high pressure 1:1 spray mixing equipment like Graco's Reactor, Glass Craft or other equivalent machine may be used. Both Part-A and Part-B materials should be sprayed at a minimum of 2000 psi and at temperatures above 160-170°F. Adequate pressure and temperature should be maintained at all times. **UL TK 22** should be sprayed in smooth, multidirectional passes to improve uniform thickness and appearance.

EQUIPMENT CLEAN UP

Equipment should be cleaned with an environmentally safe, urethane- grade solvent (alcohol free) as permitted under local regulations immediately after use.

STORAGE

UL TK 22 has a shelf life of one (1) year from date of manufacture, in factory-sealed containers. Part-A and Part-B drums are recommended to be stored above 60°F. Avoid freezing temperatures Store drums on wooden pallets, avoid direct contact with the ground. If stored for a long period of time, rotate drums regularly.

LIMITATIONS

Do not open until ready to use.

Both Part-A and Part-B containers must be fitted with a desiccant device during use.

WARNING

This product contains Isocyanates and Curative Material.

TECHNICAL DATA

Abrasion Resistance

ASTM-D4060, 1 kg wt 1000 cycles:

H-18 Wheel Weight Loss 39 mg

CS17 Wheel Weight Loss 0.8 mg

Tear ASTM D-624 350 ± 25 pli

Elongation ASTM D-300 275% ± 50%

Tensile ASTM D-412 3200 ± 300 psi

Hardness ASTM D-2240 42 ± 3 D

Pot Life @ 160°F 2 - 4 secs

Tack Free Time @ 75°F 20 - 40 secs

Recoat Time @ 75°F < 1 hour

Viscosity @ 150-160°F (66.5-71°C), Brookfield:

Part-A 200 ± 50 cps

Part-B 200 ± 50 cps

Density Side A & B Combined 9.28 lbs/gal

Flash Point > 200°F

Service Temperature -40°F to 250°F

Water Vapor Permeability, ASTM E-96 1.340 perm-inch

VOC Content 0 gm/lit

Recommended Applied Thickness > 2 mm

Return to Service:

Foot Traffic 2 - 4 hours

Full Service 10 - 24 hours

Water Absorption, ASTM D471

(maximum 23°C, 24 hours) < 0.5 %

Crack Bridging, ASTM C836

(-25°C, 1.6mm crack, 25 cycles) Pass

Impact Resistance @ 25°C (ASTM G14) > 200 lbs

Pull-Off Strength (minimum), ASTM D4541:

Inter-Coat Adhesion Excellent (within recoat time)

Concrete (Shot blasted profile), substrate failure occurred > 500 psi

Concrete (Primed), substrate failure occurred > 500 psi

Steel (90 um blast profile) > 900 psi

Lineal Shrinkage 1 - 2%

Flexibility (1/8" (3mm) Mendrel Bend Test), ASTM D1737 Pass Resistance to Weathering, ASTM G-

23 (Type QUV Weatherometer-2000 hrs exposure) No cracking, blistering. Color change,

gloss reduction & chalking are noted. (*These physical properties from sample sprayed with Graco

Foam Cat 200 @ 2000 psi minimum, with Gusmer GX7-400 mechanical purge gun @ 150-160°F.

Different machine and parameter will change these properties. User should perform their own

independent testing as properties are approximate.)

6630 Roxburgh Dr. #175 * Houston, TX 77041 * 281-598-5030 * Fax 713-937-0052

www.ultimatelinings.com

Please read all information in the general guidelines, product data sheets, guide specifications and material safety data sheets (MSDS) before applying material. Published technical data and instructions are subject to change without notice. Contact your local Ultimate Linings Products representative or visit our website for recently updated instructions and data.

Limited Warranty

Ultimate Linings Products warrants its products to be free from manufacturing defects and that they will meet Ultimate Linings Products current published physical properties. Ultimate Linings Products warrants that its products, when properly installed by a state licensed waterproofing contractor according to Ultimate Linings Products guide specifications and product data sheets over a sound, properly prepared substrate, will not allow water migration for a period of one (1) year. Sellers and manufacturers sole responsibility shall be to replace that portion of the product of this manufacturer which proves to be defective. There are no other warranties by Ultimate Linings Products of any nature whatsoever expressed or implied, including any warranty of merchantability of fitness for particular purpose in connection with this product. Ultimate Linings Products shall not be liable for damages of any sort, including remote or consequential damages resulting from any claimed breach of any warranty whether expressed or implied. Ultimate Linings Products shall not be responsible for use of this product in a manner of infringe on any patent held by others. In addition, no warranty or guarantee is being issued with respect to appearance, color, fading, chalking, staining, shrinkage, peeling, normal wear and tear or improper application by the applicator. Damage caused by abuse, neglect and lack of proper maintenance, acts of nature and/or physical movement of the substrate or structural defects are also excluded from the limited warranty. Ultimate Linings Products reserves the right to conduct performance tests on any material claimed to be defective prior to any repairs by owner, general contractor, or applicator.

DISCLAIMER

All guidelines, recommendations, statements, and technical data contained herein are based on information and tests we believe to be reliable and correct, but accuracy and completeness of said tests are not guaranteed and are not to be construed as a warranty, either expressed or implied. It is the user's responsibility to satisfy himself, by his product for his own intended use, application and job situation on the user assumes all risk and liability resulting from his use of the product. We do not suggest or guarantee that any hazards listed herein are the only ones, which may exist. Neither seller nor manufacturer shall be liable to the buyer or any third person for any injury, loss or damage directly or indirectly resulting from use of, or inability to use the product. Recommendations or statements, whether in writing or oral, other than those contained herein shall not be binding upon the manufacturer, unless in writing and signed by a corporate officer of the manufacturer. Technical and application information is provided for establishing a general profile of the material and proper application procedures. Test performance results were obtained in a controlled environment and Ultimate Linings Products makes no claim that these tests or any other tests accurately represent all environments.

6630 Roxburgh Dr. #175 * Houston, TX 77041 * 281-598-5030 * Fax 713-937-0052
www.ultimatelinings.com

RELEASED - Printed documents may be obsolete; validate prior to use.