Modern Protective Coatings, Inc.
Surface Preparation and Painting Plan Narrative
Dated February 16, 2015

Project Name: **Waterbury**
Project Number: **Vermont Agency of Transportation Project # VT IM 089-2 (43)**
Project Description: **Cleaning and Painting Bridge Ends and Pier Diaphragms**
Competent Person: **Joe Kenney**
Back-up Competent Person: **Scott Roystan and/or Chris Roystan**

Contact Information:

Office:	**(603) 594-3722**	
Joe Kenney	**Cell (603) 455-6393**	**Home (603) 648-2942**
Scott Roystan	**Cell (603) 620-0261**	**Home (603) 881-3018**
Chris Roystan	**Cell (603) 620-0262**	**Home (603) 595-1609**
Resident Engineer, Tom Mancini	**Cell (802) 279-0558**	**Trailer (802) 241-1451**
Agency Hazardous Waste Coordinator, Andy Shively		**(802) 282-2797**
Beck and Bellucci Superintendent, Louie Menard	**(603) 455-0754**	**Trailer (802) 241-1451**

Surface Preparation/Painting Plan

The scope of coatings work for this project primarily deals with small areas in relation to the entire structure. The General Contractor is replacing concrete diaphragms at the piers with new, shop painted steel diaphragms. Our work involves cleaning and priming these areas prior to the installation of the new steel diaphragms and finish painting the connection areas after the new diaphragms are installed.

Existing grease at these connection areas will be scraped and solvent cleaned with mineral spirits in accordance with SSPC-SP1 requirements. Existing grease will be cleaned to a distance of 1 to 1.5 feet beyond the area that will require surface preparation by abrasive blasting.

In accordance with the plan notes, we will abrasive blast clean *all faying surfaces of the existing steel to be connected to new steel and primed with an organic zinc rich primer meeting the Class B slip coefficient value of not less than 0.50 as specified by ASHTO. Containment, surface preparation and painting shall be in accordance with Item 900.645 Special Provision (QC/QA Clean and Paint Existing Steel Structures Bare Steel), Item 900.645 Special Provision (Containment and Disposal of Lead Paint Cleaning Residues),and Item 900.645 Special Provision (Removal of Existing Grease Coating) respectively. The new diaphragms shall be painted prior to delivery to the site. Field painting is only required where new diaphragms connect to existing beams.* The same procedure will be followed for beam ends needing repairs at the discretion of the Resident Engineer once the deck is removed.

We will utilize recyclable steel grit abrasive blasting equipment to prepare the areas of the structure to the specified SSPC-SP6 condition (MSDS is included). This equipment utilizes four blast nozzles and one vacuum recovery system. There are also on-board dust collection and filtration systems that operate in conjunction with the vacuum system to classify the recovered grit and separate clean, re-usable grit from lead waste.

We will spray apply all coatings using adequately sized air-assisted airless paint spray pumps. Based on prior experience and required dry film thickness specifications, we will select the proper tip sizes and pump pressures. Coatings will be "back-brushed" into seams, rivets, nuts, bolts, and any other surface irregularities to ensure adequate coating of all areas that may be inaccessible with a spray gun. These areas will also receive a stripe coat of the intermediate coating in addition to the back-brushed stripe coat of zinc primer.

Coating Material Documentation

Coatings for this project are selected from the NEPCOAT B approved list. The system selected is the Carboline Coatings system, consisting of the Carbozinc 859 organic zinc rich epoxy primer (gray) applied at 3-10 mils DFT, Carboguard 888 epoxy polyamideintermediate coat applied at 3-8 mils DFT, and Carbothane 133 LH aliphatic polyurethane finish coat applied at 3-6 mils DFT. The total system dry film thickness required is 9 to 24 mils.

The NEPCOAT B Qualified Products List is attached. Coatings Data Sheets and MSDS for the Carboline products are attached.

All required certifications shall be submitted in accordance with Subsection 700.02.

Modern Protective Coatings, Inc.
Quality Control Plan Narrative
Dated February 16, 2015

Project Name: **Waterbury**
Project Number: **Vermont Agency of Transportation Project # VT IM 089-2 (43)**
Project Description: **Cleaning and Painting Bridge Ends and Pier Diaphragms**
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Agency Hazardous Waste Coordinator, Andy Shively	**(802) 282-2797**	
Beck and Bellucci Superintendent, Louie Menard	**(603) 455-0754 Trailer (802) 241-1451**	

Quality Control (QC) Program

Modern Protective Coatings Quality Control personnel monitor ambient conditions during surface preparation and coatings application activities performed in the field. Ambient conditions are measured at the start of the work day and monitored about every four hours, or more frequently when weather conditions appear to be changing. The instruments used include a digital psychrometer and a digital surface temperature gauge. We measure and record air temperature, wet bulb temperature, relative humidity, dew-point, and surface temperature.

These are also measured and recorded at various times during the shift when operations change, for example, when surface preparation activities are completed and prior to coatings applications beginning. These conditions are also measured at the end of the work day, or when coatings application activities are completed for the day.

Surfaces to be painted after cleaning are to remain free of moisture and other contaminants. The surface and ambient temperatures shall be a minimum of 40 degrees F and at least 5 degrees F above the dew point. Abrasive blasting outside of these parameters is done at the risk of Modern Protective Coatings as surfaces will be inspected prior to painting to ensure that they have not blushed or show rust bloom prior to priming. Surface cleanliness will meet Project Specification requirements before primer can be applied.

Prior to abrasive blasting the Modern Protective Coatings QC Inspector, Joe Kenney (NACE Level 1 Certification #31416) evaluates the steel to be prepared for visible contaminants. If oil,

grease, or other visible contaminants are found, these areas are solvent cleaned in accordance with SSPC-SP1.

At the start of each blast day, the QC Inspector verifies the suitability of the containment and the ventilation system visually. This is done by observing the tarps to verify that seams are sealed and that negative pressure exists when the Dust Collection system is engaged (ie, tarps are "sucked" inward). Cross draft air flow measurements are made prior to abrasive blasting in each containment using a velometer to verify that it meets designed flow and is at a minimum, 100 feet/min in cross draft, or if applicable, 60 feet/min downdraft.

The quality of the compressed air is also checked at the start of abrasive blast operations. While holding a white, blotter sheet in front, the QC Inspector opens an air valve, down-stream of the air drying equipment, checking the blotter paper for moisture deposits. If moisture is found, the air drying system is inspected and either water is drained off, or additional dessicant material is added until there is no evidence of moisture in the air stream.

During breaks for lunch, etc. the QC Inspector inspects the quality of the abrasive blast, marking out areas requiring additional surface preparation. At the conclusion of the abrasive blast, the Inspector verifies the cleanliness to confirm that it meets the requirements of SSPC-SP10. Surface profile is measured using Testex replica tape and a spring micrometer. The specified range for surface profile is 1.5 to 3.5 mils. Based on historical data using steel grit blast media, we expect this range to be exceeded due to the fact that steel grit is moved through the hose at 150 PSI. We expect to find surface profiles ranging from 3 to 4.5 mils.

Blended steel grit is an acceptable chloride remediation. After blasting, prepared surfaces shall be evaluated for chloride presence using the Chlor*Rid chloride test kits at a frequency of 5 tests per 1,000 square feet completed in a given day, conducted at start-up. If any results of greater than 7 ug/cm2 (SSPC SC2 condition) are detected, the area will be re-blasted and re-tested until results are acceptable. If acceptable results are detected for three consecutive days then the test frequency will be reduced to one test per 1,000 square feet prepared in a given day.

The QC Inspector records batch numbers for the coatings and records the location on the structure where these were applied. Mixing of the field-applied coatings is also witnessed by the QC Inspector. After application of each coat, the QC Inspector checks applied coatings after they are dried, for continuity and coverage and verifies that the dry film thickness meets specification requirements. Dry film thickness measurements are performed and recorded to ensure compliance with specified dry-film thickness requirements.

Prior to the next coat, the QC Inspector verifies the re-coat times and the cleanliness between coats are acceptable. Intermediate and finish coat application will commence under the same application and inspection criteria listed above for the prime coat. Dry film coatings thickness readings are taken using a DeFelsko Positector dry film thickness gauge. All field inspections are documented on the Modern Protective Coatings Daily Painting Inspection Report. All

reports will be reviewed and verified by the Modern Protective Coatings QC Manager, Scott Roystan. Copies of all reports will be provided to the Resident, once coatings dry film thickness readings for the area covered by the report are taken and recorded.

The specified range for the primer application is 3 to 5 mils dry film thickness. We propose close inspection of primer mil readings to ensure that the profile is adequately covered by at least one mil above the surface profile to ensure that there are no problems related to pin-hole corrosion prior to intermediate coat application. A letter from the coatings supplier's representative is attached to address this issue.

The QC Inspector checks applied coatings after they are dried, for continuity and coverage and verifies that the dry film thickness meets specification requirements. Non-conforming areas are re-worked and re-coated, and at a minimum, holidays are touched up. Prior to the next coat, the QC Inspector verifies the re-coat times and the cleanliness between coats are acceptable.

The Quality Control Inspector and/or Supervisor are also looking to identify tendencies in the surface preparation and coatings application which result in substandard performance or non-conformance with the Specifications. In this way training and instruction can be provided to prevent future occurrences thereby improving quality and decreasing the time required to complete the project in accordance with Project Specifications.

SSPC
The Society For Protective Coatings

Modern Protective Coatings, Inc.

of

Hudson, NH

SSPC CERTIFIED CONTRACTOR
SSPC
QP1

has met or exceeded the requirements set forth in the SSPC Painting Contractor Certification Program for

FIELD APPLICATION OF COATINGS COMPLEX STRUCTURES

SSPC-QP1

President, SSPC

March 31, 2015– March 31, 2016

Validation Period

Owners are advised to contact SSPC at 412-281-2331 ext. 2235 or ext. 2209 to verify authenticity of certification.

SSPC
The Society For Protective Coatings

Modern Protective Coatings, Inc.

of

Hudson, NH

has met or exceeded the requirements set forth in the SSPC Painting Contractor Certification Program for

INDUSTRIAL HAZARDOUS PAINT REMOVAL SSPC-QP2

"A"

Category

President, SSPC

March 31, 2015 – March 31, 2016

Validation Period

Owners are advised to contact SSPC at 412-281-2331 ext. 2235 or ext. 2209 to verify authenticity of certification.

SSPC The Society For Protective Coatings

AUTHORIZED IACET PROVIDER

IACET Provider # 1003373
Florida Board of Professional Engineers,
Provider #0004326
New York Board of Professional Engineers
American Board of Industrial Hygiene
Approved Provider #10-193

CERTIFICATE OF COMPLETION

Chris Roystan

Has fulfilled the requirements of
SSPC: The Society for Protective Coatings'

C-5 SUPERVISOR/COMPETENT PERSON REFRESHER TRAINING FOR DELEADING OF INDUSTRIAL STRUCTURES

Course Date(s): 2/20/14

Location: Salisbury, MA

Instructor(s): Lloyd Smith

SSPC President

SSPC Executive Director

And is awarded
.8 Continuing Education Units

SSPC The Society For Protective Coatings

AUTHORIZED IACET PROVIDER

IACET Provider # 1003373
Florida Board of Professional Engineers,
Provider #0004326
New York Board of Professional Engineers
American Board of Industrial Hygiene
Approved Provider #10-193

CERTIFICATE OF COMPLETION

Joseph J. Kenney

Has fulfilled the requirements of
SSPC: The Society for Protective Coatings'

C-5 SUPERVISOR/COMPETENT PERSON REFRESHER TRAINING FOR DELEADING OF INDUSTRIAL STRUCTURES

Course Date(s): 2/20/14

Location: Salisbury, MA

Instructor(s): Lloyd Smith

SSPC President

SSPC Executive Director

And is awarded
.8 Continuing Education Units

www.sspc.org | 40 24th Street 6th Floor Pittsburgh, PA 15222-4656 | P: 412.281.2331 T: 877.281.7772 F: 412.281.9992

NACE INTERNATIONAL

Certificate of Achievement

NACE International Recognizes

Joseph Kenney

NACE Coating Inspector Level 1—Certified

CIP Certification Number 31416

Certification Awarded
January 2011

Executive Director

NACE INTERNATIONAL

315968

Mtg/Effective Date: /5/96, 9/4/96, 1/8/97, 7/22/97, 5/20/98, 3/3/99, 9/22/99, 3/30/00, 11/8/00, 3/28/01, 5/14/01, 11/20/01, 11/29/01, 4/24/02, 2/24/03, 4/17/03, 3/16/04, 2/15/05, 4/19/05 R1, 11/17/05 R1, 10/5/06 R1, 06/21/07, 10/16/08, 4/7/09 R1, 10/7/09 R1, 11/09/10, 01/25/11, 4/5/11 R2, 12/14/11, 4/3/12, 4/3/12 R1, 10/02/12, 10/02/12 R1, 4/16/13, 11/15/13 R1, 04/14/14 R1

NEPCOAT Qualified Products List B

for Protective Coatings for
NEW and 100% BARE EXISTING Steel for Bridges

NTPEP System No.	Coats	3-COAT SYSTEM TESTED AND ACCEPTED	Slip Coef Class	Manuf'r Coating DFT (min/max) mil	micron	VOC Tested g/L	QPL Accepted Dates
NEPCOAT LIST B - ORGANIC Zinc Rich Primer / Epoxy or Urethane Intermediate / Aliphatic Urethane Finish							
SSC(10)-03*		PPG/AMERON					from
	Primer	Amercoat® 68HS Zinc Rich Epoxy Primer	B [1]	3-5	75-125	276	12/14/2011
	Interm	Amercoat® 399 Fast Drying Epoxy		4-8	100-200	177	until mtg.
	Topcoat	Amercoat® 450H Gloss Aliphatic Polyurethane		2-5	50-125	306	fall 2015
	[1] Footnote	3 mils max DFT, 7 days min cure, 3% vol max thin					
SSC(04)-02		CARBOLINE COMPANY					from 11/17/05
SSC(10)-04	Primer	Carbozinc® 859 Organic Zinc Rich Epoxy Primer	B [1]	3-10	75-250	327	until mtg
	Interm	Carboguard® 888 Epoxy Polyamide		3-8	75-200	320	fall 2015
	Topcoat	Carbothane 133 LH Aliphatic Polyurethane		3-6	75-150	311	(passed requalific'n
	[1] Footnote	6 mils max DFT, 4 days min cure, 10% vol max thin					as SSC 10-04)
SSC(10)-05*		WASSER HIGH TECH COATINGS					from
	Primer	MC-Zinc 100	Ø	3-5	75-125	115 es	4/03/12
	Interm	MC-Miomastic 100	no	3-5	75-125	173 es	until mtg.
	Topcoat	MC-Ferrox A 100	report	2-4	50-100	144 es	spring 2016
	Ø Footnote	No data reported.					
SSC(11)-01*		SHERWIN WILLIAMS COMPANY					from
	Primer	Zinc Clad® III HS Organic Zinc Rich Epoxy Primer	A [1]	3-5	75-125	337	10/02/12
	Interm	Steel Spec Epoxy Intermediate		3-8	75-200	293	until mtg.
	Topcoat	Hi-Solids Polyurethane		3-5	75-125	288	fall 2016
	[1] Footnote	3 mils max DFT, 7 days min cure, zero thinner					
(continues)		(List B continues)					

[1] Footnote	Information from the Slip-Coefficient and Creep Resistance Test Certificate is given for use w/ primed bolted connections.
NOTE 1	NEPCOAT- NORTHEAST PROTECTIVE COATINGS COMMITTEE of CT, DE, ME, MA, NH, NJ, NY, PA, RI, VT
2	NTPEP (Nat'l Transport'n Product Evaluat'n Program). See Structural Steel Coating test data at http://data.ntpep.org.
3	Accelerated lab and field testing of coating systems is performed according to AASHTO NTPEP R-31 criteria.
4	Systems are accepted for use on NEW and 100% BARE EXISTING steel for bridges cleaned by abrasive blasting.
5	SSC(yr)-xx systems comply with AASHTO R-31 Evaluation Practice & NEPCOAT Acceptance Criteria.
6	VOC values are lab test results using unthinned samples. NEPCOAT max VOC limit is 420 g/L (3.5 lb/gal). Individual state requirements for VOC limits may differ.
7	Recommended DFT values are listed by manufacturer (see Product Data Sheets.)
8	Any change in coating formulation from that tested will result in removal of the system from the QPL.
9	The full QPL term is seven years starting from the date of acceptance until the next biannual NEPCOAT meeting.
*	Acceptance is CONDITIONAL pending submission within four years of successful 2-year field history. A startup list of five bridges painted with the paint system must be submitted within two years. See Acceptance Criteria. Note that R-31-09 Section 12.1, Requalification Testing, has been discontinued.
es	VOC value adjusted for exempt solvents

NACE INTERNATIONAL

Certificate of Achievement

NACE International Recognizes

Scott D. Roystan

NACE Certified Coating Inspector—Level 3

CERTIFICATION NUMBER *31423*

Certification Awarded

February 2011

Executive Director

dip NACE INTERNATIONAL

289434

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

1. Identification

Product Name: CARBOGUARD 888 PART A
Revision Date: 12/29/2014
Identification Number: 0998A1NL
Supercedes Date: 12/12/2011
Product Use/Class: Epoxy Polyamide - FOR INDUSTRIAL USE ONLY
Manufacturer: Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
800-848-4645
Preparer: Regulatory Department

2. Hazard Identification

EMERGENCY OVERVIEW: WARNING! FLAMMABLE LIQUID AND VAPOR. Keep away from heat and sources of ignition. Harmful if inhaled. Use with adequate ventilation. Vapours may cause drowsiness and dizziness. Keep container closed. Avoid contact with skin, eyes and clothing. Wash thoroughly after handling. Harmful if swallowed. Risk of serious damage to the lungs (by aspiration). This product contains silica which is classified by IARC as a known human carcinogen (Group 1). Crystalline silica is known to cause silicosis. This product may contain Titanium Dioxide, which is listed by IARC as possibly carcinogenic to humans (Group 2B). This listing is based on inadequate evidence of carcinogenicity in humans and sufficient evidence in experimental animals. The classification(s) is/are relevant when exposed to these respirable substances in dust or powder form only, including cured product that is subject to sanding, grinding, cutting, or other surface preparation activities. Irritating to eyes and skin.

EFFECTS OF OVEREXPOSURE - EYE CONTACT: May cause eye irritation.

EFFECTS OF OVEREXPOSURE - SKIN CONTACT: May cause skin irritation. May cause allergic skin reaction. May cause sensitization by skin contact.

EFFECTS OF OVEREXPOSURE - INHALATION: Vapours may be irritating to eyes, nose, throat, and lungs. Harmful if inhaled. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.

EFFECTS OF OVEREXPOSURE - INGESTION: Harmful if swallowed.

EFFECTS OF OVEREXPOSURE - CHRONIC HAZARDS: Repeated and prolonged exposure to solvents may cause brain and nervous system damage.

MEDICAL CONDITIONS PRONE TO AGGRAVATION: Skin disorders. Allergies.

PRIMARY ROUTE(S) OF ENTRY: Eye Contact, Ingestion, Inhalation, Skin Absorption, Skin Contact

3. Composition/Information On Ingredients

Hazardous Ingredients

Chemical Name	CAS-No.	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA PEL-CEILING
TALC	14807-96-6	45.0	N/E	N/E	N/E	N/E
TITANIUM DIOXIDE	13463-67-7	45.0	10 MGM3	N/E	10 MGM3	N/E
EPOXY RESIN	25036-25-3	35.0	N/E	N/E	N/E	N/E
EPOXY RESIN	25068-38-6	20.0	N/E	N/E	N/E	N/E
TOLUENE	108-88-3	10.0	20 PPM	N/E	375 MGM3	N/E
META-XYLENE	108-38-3	5.0	100 PPM	150 PPM	435 MG/M3	N/E
METHYL ISOBUTYL KETONE	108-10-1	5.0	20 PPM	75 PPM	205 MGM3	N/E

CARBON BLACK	1333-86-4	5.0	3.0 MG/M3	N/E	3.5 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	20 PPM	N/E	435 MGM3	N/E
1-METHOXY-2-PROPANOL ACETATE	108-65-6	5.0	N/E	N/E	N/E	N/E
ORTHO-XYLENE	95-47-6	5.0	100 PPM	150 PPM	435 MG/M3	N/E
MICROCRYSTALLINE SILICA	14808-60-7	1.0	0.025 MG/M3 (respirable)	N/E	0.1 MG/M3 (respirable)	N/E

4. First-aid Measures

AFTER EYE CONTACT: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

AFTER SKIN CONTACT: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. If skin irritation persists, call a physician.

AFTER INHALATION: Give oxygen or artificial respiration if needed. Remove person to fresh air. If signs/symptoms continue, get medical attention.

AFTER INGESTION: Do NOT induce vomiting. Never give anything by mouth to an unconscious person. If swallowed, call a poison control centre or doctor immediately.

5. Fire-fighting Measures

Flash Point, °F: 54F (12C) (Setaflash)

Lower Explosive Limit, %: 1.0

Upper Explosive Limit, %: 7.5

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

UNUSUAL FIRE AND EXPLOSION HAZARDS: Flammable liquid. Vapours are heavier than air and may spread along floors. Vapours may form explosive mixtures with air. Vapors may travel to areas away from work site before igniting/flashing back to vapor source. Provide adequate ventilation. Prevent the creation of flammable or explosive concentrations of vapour in air and avoid vapour concentration higher than the occupational exposure limits. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Electrical installations / working materials must comply with the technological safety standards. Wear shoes with conductive soles.

SPECIAL FIREFIGHTING PROCEDURES: In the event of fire, wear self-contained breathing apparatus. Cool containers / tanks with water spray. Flammable.

6. Accidental Release Measures

PERSONAL SAFETY MEASURES/ENVIRONMENTAL MEASURES/METHOD OF CLEANING/CONTAINMENT: Evacuate personnel to safe areas. Remove all sources of ignition. Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13). To avoid ignition of vapours by static electricity discharge, all metal parts of the equipment must be grounded. Wear personal protective equipment. For personal protection see section 8. Ensure adequate ventilation.

7. Handling and Storage

INSTRUCTIONS FOR SAFE HANDLING : Do not breathe vapours or spray mist. Do not get in eyes, on skin, or on clothing. Keep containers dry and tightly closed to avoid moisture absorption and contamination. Use only with adequate ventilation/personal protection. Wash thoroughly after handling. Ensure all equipment is electrically grounded before beginning transfer operations. Do not use sparking tools. Prepare the working solution as given on the label(s) and/or the user instructions.

STORAGE CONDITIONS: Keep container closed when not in use. Store in a dry, well ventilated place away from sources of heat, ignition and direct sunlight.

8. Exposure Controls/Personal Protection

ENGINEERING CONTROLS: Avoid contact with skin, eyes and clothing. Ensure adequate ventilation, especially in confined areas.

RESPIRATORY PROTECTION: Use only with ventilation to keep levels below exposure guidelines reported in this document. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use State or federally approved supplied air respirator. For silica containing coatings in a liquid state, and/or if no exposure limits are established above, air-supplied respirators are generally not required. In order to avoid inhalation of spray-mist and sanding dust, all spraying and sanding must be done wearing adequate respirator.

SKIN PROTECTION: Lightweight protective clothing. Impervious gloves. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough. Request information on glove permeation properties from the glove supplier.

EYE PROTECTION: Safety glasses with side-shields

OTHER PROTECTIVE EQUIPMENT: Ensure that eyewash stations and safety showers are close to the workstation location.

PROTECTION AND HYGIENE MEASURES : Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday. When using, do not eat, drink or smoke.

9. Physical and Chemical Properties

Boiling Range:	176 F (80 C) - 500 F (260 C)	**Vapor Density:**	Heavier than Air
Odor:	Solvent	**Odor Threshold:**	N/D
Appearance:	Viscous Liquid, Various Colors	**Evaporation Rate:**	Slower than Ether
Solubility in Water:	N/D	**Specific Gravity:**	app 1.50
Freeze Point:	N/D	**pH:**	N/D
Physical State:	Liquid	**Vapor Pressure:**	No Information

(See section 16 for abbreviation legend)

10. Stability and Reactivity

CONDITIONS TO AVOID: Heat, flames and sparks.

MATERIALS TO AVOID: Strong oxidizing agents

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon dioxide (CO2), carbon monoxide (CO), oxides of nitrogen (NOx), dense black smoke.

HAZARDOUS POLYMERIZATION: Hazardous polymerisation does not occur.

STABILITY: Stable under normal conditions.

11. Toxicological Information

Chemical Name	CAS-No.	LD50	LC50
TALC	14807-96-6	Not Available	Not Available
TITANIUM DIOXIDE	13463-67-7	25000 mg/m3, oral (rat)	6.82 mg/L, Inh, rat 4H
EPOXY RESIN	25036-25-3	Not Available	Not Available
EPOXY RESIN	25068-38-6	30000 mg/kg, rat, oral	>20 mL/kg skin, sensitizer
TOLUENE	108-88-3	5000 mg/kg rat oral, 14000 mg/kg rabbit dermal	8000 ppm/4 hrs, rat, inhalation
META-XYLENE	108-38-3	Not Available	Not Available
METHYL ISOBUTYL KETONE	108-10-1	2000 mg/kg, oral, rat	5000 ppm / 1 hour, rat
CARBON BLACK	1333-86-4	8000 mg/kg oral, rat	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, 4Hr
1-METHOXY-2-PROPANOL ACETATE	108-65-6	8532 mg/kg, oral (rat)	101 ppm/4 hr, rat, inh
ORTHO-XYLENE	95-47-6	Not Available	Not Available
MICROCRYSTALLINE SILICA	14808-60-7	Not Available	Not Available

12. Ecological Information

ECOLOGICAL INFORMATION: No information available.

13. Disposal Information

DISPOSAL INFORMATION: Dispose of in accordance with local regulations.

14. Transport Information

DOT Proper Shipping Name: Paint
DOT Technical Name: N/A
DOT Hazard Class: 3
DOT UN/NA Number: UN1263
Additional Notes: No Information
Packing Group: II
Hazard Subclass: None
Resp. Guide Page: 128

15. Regulatory Information

U.S. Federal Regulations:

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:

Fire Hazard, Acute 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	CAS-No.
TOLUENE	108-88-3
META-XYLENE	108-38-3
METHYL ISOBUTYL KETONE	108-10-1
PARA-XYLENE	106-42-3
ETHYL BENZENE	100-41-4
ORTHO-XYLENE	95-47-6

Toxic Substances Control Act:

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) components exist in this product.

U.S. State Regulations:

New Jersey Right-to-Know:

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

Chemical Name	CAS-No.

TITANIUM DIOXIDE	1317-80-2

Pennsylvania Right-To-Know:

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

Chemical Name	CAS-No.
TITANIUM DIOXIDE	1317-80-2
IRON OXIDE	1332-37-2
YELLOW IRON OXIDE	51274-00-1
AZO PIGMENT	82199-12-0
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:

Chemical Name	CAS-No.
TITANIUM DIOXIDE	13463-67-7
METHYL ISOBUTYL KETONE	108-10-1
CARBON BLACK	1333-86-4
ETHYL BENZENE	100-41-4
MICROCRYSTALLINE SILICA	14808-60-7
FORMALDEHYDE	50-00-0
BENZENE	71-43-2

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	CAS-No.
TOLUENE	108-88-3
METHYL ISOBUTYL KETONE	108-10-1
BENZENE	71-43-2

International Regulations:

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

16. Other Information

HMIS Ratings:

Health: 2 **Flammability:** 3 **Reactivity:** 0 **Personal Protection:** X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): 330

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

1. Identification

Product Name: CARBOGUARD 888 PART B
Revision Date: 5/15/2013
Identification Number: 0998B1NL
Supercedes Date: 3/28/2011
Product Use/Class: Epoxy Polyamide - FOR INDUSTRIAL USE ONLY
Manufacturer: Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
800-848-4645
Preparer: Regulatory Department

2. Hazard Identification

EMERGENCY OVERVIEW: Contains SILICA which can cause cancer. Risk of Cancer depends on duration and level of exposure. Irritating to eyes and skin. WARNING! - FLAMMABLE LIQUID AND VAPOUR. Keep away from heat and sources of ignition. Harmful if inhaled. Use with adequate ventilation. Vapours may cause drowsiness and dizziness. Keep container closed. Avoid contact with skin, eyes and clothing. Wash thoroughly after handling. Harmful if swallowed. Risk of serious damage to the lungs (by aspiration).

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. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Vapours may be irritating to eyes, nose, throat, and lungs.

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. When sanding or grinding the finished product, there may be potential for crystalline silica to become airborne. Repeated and prolonged exposure to solvents may cause brain and nervous system damage.

MEDICAL CONDITIONS PRONE TO AGGRAVATION: No information available.

PRIMARY ROUTE(S) OF ENTRY: Eye Contact, Ingestion, Inhalation, Skin Absorption, Skin Contact

3. Composition/Information On Ingredients

Hazardous Ingredients

Chemical Name	CAS-No.	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA PEL-CEILING
TALC	14807-96-6	25.0	N/E	N/E	N/E	N/E
ETHYL ALCOHOL	64-17-5	20.0	1000 PPM	1000 PPM	1900 MGM3	N/E
1,2-BENZENEDICARBOXIOLIC ACID, DI-C9-11-BRANCHED AND LINEAR ALKYL ESTERS	68515-43-5	10.0	N/E	N/E	N/E	N/E
TOFA, REACTION PRODUCTS WITH TEPA	68953-36-6	5.0	N/E	N/E	N/E	N/E
TETA, REACTION PRODUCTS WITH PHENOL	32610-77-8	5.0	N/E	N/E	N/E	N/E

ISOPROPANOL	67-63-0	5.0	200 PPM	400 PPM	980 MGM3	N/E
ETHYL BENZENE	100-41-4	1.0	20 PPM	N/E	435 MGM3	N/E
MICROCRYSTALLINE SILICA	14808-60-7	1.0	0.025 MG/M3 (respirable)	N/E	0.1 MG/M3 (respirable)	N/E

4. First-aid Measures

AFTER EYE CONTACT: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

AFTER SKIN CONTACT: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. If skin irritation persists, call a physician.

AFTER INHALATION: Give oxygen or artificial respiration if needed. Remove person to fresh air. If signs/symptoms continue, get medical attention.

AFTER INGESTION: Do NOT induce vomiting. Never give anything by mouth to an unconscious person. If swallowed, call a poison control centre or doctor immediately.

5. Fire-fighting Measures

Flash Point, °F: 56F (13C) (Setaflash)

Lower Explosive Limit, %: 0.9

Upper Explosive Limit, %: 19.0

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

UNUSUAL FIRE AND EXPLOSION HAZARDS: Flammable liquid Vapours are heavier than air and may spread along floors. Vapours may form explosive mixtures with air. Vapors may travel to areas away from work site before igniting/flashing back to vapor source.* Provide adequate ventilation. Prevent the creation of flammable or explosive concentrations of vapour in air and avoid vapour concentration higher than the occupational exposure limits. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Electrical installations / working materials must comply with the technological safety standards. Wear shoes with conductive soles.

SPECIAL FIREFIGHTING PROCEDURES: In the event of fire, wear self-contained breathing apparatus. Cool containers / tanks with water spray. Flammable.

6. Accidental Release Measures

PERSONAL SAFETY MEASURES/ENVIRONMENTAL MEASURES/METHOD OF CLEANING/CONTAINMENT: Do not allow material to contaminate ground water system. Prevent product from entering drains. Remove all sources of ignition. To avoid ignition of vapours by static electricity discharge, all metal parts of the equipment must be grounded. Evacuate personnel to safe areas. Wear personal protective equipment. For personal protection see section 8. Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13).

7. Handling and Storage

INSTRUCTIONS FOR SAFE HANDLING : Do not breathe vapours or spray mist. Do not get in eyes, on skin, or on clothing. Keep containers dry and tightly closed to avoid moisture absorption and contamination. Use only with adequate ventilation/personal protection. Wash thoroughly after handling. Ensure all equipment is electrically grounded before beginning transfer operations. Do not use sparking tools. Prepare the working solution as given on the label(s) and/or the user instructions.

STORAGE CONDITIONS: Keep container closed when not in use. Store in a dry, well ventilated place away from sources of heat, ignition and direct sunlight.

8. Exposure Controls/Personal Protection

ENGINEERING CONTROLS: Avoid contact with skin, eyes and clothing. Ensure adequate ventilation, especially in confined areas.

RESPIRATORY PROTECTION: In order to avoid inhalation of spray-mist and sanding dust, all spraying and sanding must be done wearing adequate respirator. Use only with ventilation to keep levels below exposure guidelines reported in this document. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use State or federally approved supplied air respirator. For silica containing coatings in a liquid state, and/or if no exposure limits are established above, air-supplied respirators are generally not required.

SKIN PROTECTION: Lightweight protective clothing Impervious gloves Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough. Request information on glove permeation properties from the glove supplier.

EYE PROTECTION: Safety glasses with side-shields

OTHER PROTECTIVE EQUIPMENT: Ensure that eyewash stations and safety showers are close to the workstation location.

PROTECTION AND HYGIENE MEASURES : Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday. When using, do not eat, drink or smoke.

9. Physical and Chemical Properties

Boiling Range:	149 F (65 C) - 284F (140 C)	**Vapor Density:**	Heavier than Air
Odor:	Amine	**Odor Threshold:**	N/D
Appearance:	Brown, Viscous Liquid	**Evaporation Rate:**	Slower than Ether
Solubility in Water:	N/D	**Specific Gravity:**	1.52
Freeze Point:	N/D	**pH:**	N/D
Physical State:	Liquid	**Vapor Pressure:**	No Information

(See section 16 for abbreviation legend)

10. Stability and Reactivity

CONDITIONS TO AVOID: Heat, flames and sparks.

MATERIALS TO AVOID: Strong oxidizing agents

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon dioxide (CO2), carbon monoxide (CO), oxides of nitrogen (NOx), dense black smoke.

HAZARDOUS POLYMERIZATION: Hazardous polymerisation does not occur.

STABILITY: Stable under normal conditions.

11. Toxicological Information

Chemical Name	CAS-No.	LD50	LC50
TALC	14807-96-6	Not Available	Not Available
ETHYL ALCOHOL	64-17-5	7060 mg/kg, oral, rat	20000 ppm/10 hrs, rat, inhalation
1,2-BENZENEDICARBOXIOLIC ACID, DI-C9-11-BRANCHED AND LINEAR ALKYL ESTERS	68515-43-5	>5000 MG/KG, ORAL, RAT	NOT AVAILABLE
TOFA, REACTION PRODUCTS WITH TEPA	68953-36-6	4750 mg/kg oral, rat	Not Available
TETA, REACTION PRODUCTS WITH PHENOL	32610-77-8	Not Available	Not Available
ISOPROPANOL	67-63-0	4720 mg/kg rat, oral	22500 ppm/8hrs rat, inhalation
ETHYL BENZENE	100-41-4	3500 mg/kg rat, oral	17.2 mg/L Inh, Rat, 4Hr
MICROCRYSTALLINE SILICA	14808-60-7	Not Available	Not Available

12. Ecological Information

ECOLOGICAL INFORMATION: No information available.

13. Disposal Information

DISPOSAL INFORMATION: Dispose of in accordance with local regulations.

14. Transport Information

DOT Proper Shipping Name:	Paint	**Packing Group:**	II
DOT Technical Name:	N/A	**Hazard Subclass:**	None
DOT Hazard Class:	3	**Resp. Guide Page:**	128
DOT UN/NA Number:	1263		
Additional Notes:	No Information		

15. Regulatory Information

U.S. Federal Regulations:

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:

Fire Hazard, Acute 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	CAS-No.
ISOPROPANOL	67-63-0
ETHYL BENZENE	100-41-4

Toxic Substances Control Act:

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) components exist in this product.

U.S. State Regulations:

New Jersey Right-to-Know:

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

Chemical Name	CAS-No.
CALCIUM METASILICATE	13983-17-0

Pennsylvania Right-To-Know:

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

Chemical Name	CAS-No.
CALCIUM METASILICATE	13983-17-0

CALIFORNIA PROPOSITION 65:

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

Chemical Name	CAS-No.

ETHYL BENZENE	100-41-4
METHYL ISOBUTYL KETONE	108-10-1
MICROCRYSTALLINE SILICA	14808-60-7
BENZENE	71-43-2

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	CAS-No.
METHYL ALCOHOL	67-56-1
TOLUENE	108-88-3
BENZENE	71-43-2

International Regulations:

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 D1 D2A D2B

16. Other Information

HMIS Ratings:

Health: 3 **Flammability:** 3 **Reactivity:** 0 **Personal Protection:** X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): 330

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.

product data carboline®

Carboguard® 888

Selection & Specification Data

Generic Type
Epoxy Polyamide

Description
Low-temperature and rapid curing primer/finish with an extended recoat window. Provides excellent corrosion resistance as a primer, intermediate or finish on steel substrates. Selfpriming on steel, galvanized steel and concrete, 888 offers user-friendly characteristics which facilitate application in a wide range of environmental conditions.

Features
- Low temperature cure characteristics
- Rapid handling for in-shop applications
- One-year recoat window
- Low yellowing compared to other epoxies
- VOC compliant to current AIM regulations
- Meets the requirements of:
- Class "A" slip coefficient and creep testing criteria for use on faying surfaces.

Color
Red (0500); Gray (0700); White (0800); Yellow (0600)

Finish
Satin

Primer
Self-priming. May be applied over organic and inorganic zinc primers, epoxies and others as recommended. A mist coat may be required to minimize bubbling over zinc rich primers.

Dry Film Thickness
3.0 - 5.0 mils (76 - 127 microns) per coat

Do not exceed 10 mils in a single coat.

Solids Content
By Volume 63% +/- 2%

Theoretical Coverage Rate
1011 ft^2 at 1 mil (25 m^2/l at 25 microns)
337 ft^2 at 3 mils (8 m^2/l at 75 microns)
202 ft^2 at 5 mils (5 m^2/l at 125 microns)

Allow for loss in mixing and application.

VOC Values

Thinner 15	19 oz/gal 3.3 lbs./gal 403 g/l
Thinner 225 E	19 oz/gal 2.7 lbs./gal 330 g/l
Thinner 236 E	19 oz/gal 2.7 lbs./gal 330 g/l
Thinner 255 E	19 oz/gal 2.7 lbs./gal 330 g/l
Thinner 33	19 oz/gal 3.3 lbs./gal 403 g/l
As Supplied	2.7 lbs./gal 330 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).

Limitations
Epoxies lose gloss, discolor and eventually chalk in sunlight exposure.

Topcoats
May be coated with Acrylics, Epoxies, or Polyurethanes depending on exposure and need.

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
Surface Profile: 1.5-3.0 mils (38-75 microns)

Galvanized Steel
SSPC-SP7
Consult your Carboline Sales Representative for specific recommendations.

Concrete or CMU
Concrete must be cured 28 days at 75°F (24°C) and 50% relative humidity or equivalent. Laitance, form oils, curing agents and hardeners should be removed by suitable method before coating application.

Performance Data

Test Method	System	Results
ASTM A-490 Slip Coefficient	Blasted Steel 1ct. 888	Meets requirements for Class "A" rating
ASTM B117 Salt Fog	Blasted Steel With organic zinc primer 2 cts. 888	No effect on plane, rust in scribe, less than 1/32 (0.7mm) undercutting at scribe at 7000 hours
ASTM D 1653 Water Vapor Transmission	2cts. 888	WVP of 0.6 perms. Method B - Wet cup; Condition C - R.H. 0% Temperature 73.1°F
ASTM D2247 Humidity Test	Blasted Steel 2cts. 888	No blistering, no rusting; color change less than 2 DE (CieLab units) after 8000 hours
ASTM D4060 Abrasion	Blasted Steel 1ct. 888	138 mg. loss after 1000 cycles, CS17 wheel, 1000 gm. load
ASTM D4213 Scrub Resistance	Blasted Steel 1ct. 888	Erosion Rate: .0039 microliters after 100 cycles w/Abrasive scrub medium
ASTM D4541 Adhesion	Blasted Steel 2cts. 888	1167 psi Elcometer
ASTM D5894 QUV/Prohesion	Blasted Steel 1ct. 888	No rusting, blistering or chalking on plane; rust in scribe; less than 1/8" undercutting at scribe after 1000 hours
Midwest Weathering	Blasted Steel 2 cts. 888	No effect on plane area, except #6 slight chalking after 1 year outdoor exposure at 45° angle.

Test reports and additional data available upon written request.

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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® are registered trademarks of Carboline Company.

Carboguard® 888

Mixing & Thinning

Mixing Power mix separately, then combine and power mix. At material temperatures above 75°F sweat-in the mixed material for 30 minutes. At material temperatures below or at 75°F sweat-in the mixed material for 60 minutes. DO NOT MIX PARTIAL KITS.

Thinning May be thinned up to 19 oz/gal (15%) with Thinner #15 or Thinner #33. Use of thinners other than those supplied or recommended by Carboline may adversely affect product performance and void product warranty, whether expressed or implied.
Carboline Thinner #225E (for colder months), Thinner #236E, and Thinner #255E may also be used to thin this product to minimize VOC and HAP emissions.

Ratio 1:1 Ratio (A to B)

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.

Application Equipment Guidelines

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.

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
**PTFE 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 rerolling. For best results, tie-in within 10 minutes at 75°F (24°C).

Brush Use a medium bristle brush.

Roller Use a 3/8" nap solvent resistant roller.

Application Conditions

Condition	Material	Surface	Ambient	Humidity
Minimum	50 °F (10 °C)	35 °F (2 °C)	35 °F (2 °C)	0%
Maximum	90 °F (32 °C)	135 °F (57 °C)	120 °F (49 °C)	85%

Industry standards are for the substrate temperatures to be 5°F (3°C) 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 Recoat & Topcoat w/ other finishes	Final Cure
35 °F (2 °C)	16 Hours	18 Hours	3 Days
50 °F (10 °C)	9 Hours	8 Hours	2 Days
75 °F (24 °C)	3 Hours	4 Hours	24 Hours
90 °F (32 °C)	90.0 Minutes	2 Hours	12 Hours

These times are based on a 3.0-5.0 mil (75-125 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 blush or haze. Any haze or blush must be removed by water washing before recoating. Maximum recoat time is one year without special surface preparation. "Loose" chalk must be removed in accordance with good painting practice. Specific topcoat products can be used in a much shorter re-coat interval. Consult Carboline for recommendations and test results. If the maximum recoat time has been exceeded, the surface must be abraded by sweep blasting or sanding prior to the application of additional coats. Carboguard 888 applied below 40°F (4°C) may temporarily soften for several hours, after temperatures rise to 60°F (16°C). This is a normal condition and will not effect performance.

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.

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.

Packaging, Handling & Storage

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.

Shipping Weight (Approximate) 2 Gallon Kit - 29 lbs (13 kg)
10 Gallon Kit - 137 lbs (62 kg)

Storage Temperature & Humidity 40° -110°F (4°-43°C)
0-100% Relative Humidity

Flash Point (Setaflash) Part A: 54°F (12°C)
Part B: 56°F (13°C)

Storage Store Indoors.

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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® are registered trademarks of Carboline 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

1. Identification

Product Name: CARBOTHANE 133 LH PART A
Revision Date: 2/10/2015

Identification Number: 8837A1NL
Supercedes Date: 1/25/2012

Product Use/Class: Aliphatic Acrylic-Polyester Polyurethane - FOR INDUSTRIAL USE ONLY

Manufacturer: Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
800-848-4645

Preparer: Regulatory Department

2. Hazard Identification

EMERGENCY OVERVIEW: This product contains silica which is classified by IARC as a known human carcinogen (Group 1). Crystalline silica is known to cause silicosis. This product may contain Titanium Dioxide, which is listed by IARC as possibly carcinogenic to humans (Group 2B). This listing is based on inadequate evidence of carcinogenicity in humans and sufficient evidence in experimental animals. The classification(s) is/are relevant when exposed to these respirable substances in dust or powder form only, including cured product that is subject to sanding, grinding, cutting, or other surface preparation activities. Irritating to eyes and skin. WARNING! FLAMMABLE LIQUID AND VAPOR. Keep away from heat and sources of ignition. Harmful if inhaled. Use with adequate ventilation. Vapours may cause drowsiness and dizziness. Keep container closed. Avoid contact with skin, eyes and clothing. Wash thoroughly after handling. Harmful if swallowed. Risk of serious damage to the lungs (by aspiration).

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. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Vapours may be irritating to eyes, nose, throat, and lungs.

EFFECTS OF OVEREXPOSURE - INGESTION: Harmful if swallowed.

EFFECTS OF OVEREXPOSURE - CHRONIC HAZARDS: Repeated and prolonged exposure to solvents may cause brain and nervous system damage.

MEDICAL CONDITIONS PRONE TO AGGRAVATION: No information available.

PRIMARY ROUTE(S) OF ENTRY: Eye Contact, Ingestion, Inhalation, Skin Absorption, Skin Contact

3. Composition/Information On Ingredients

Hazardous Ingredients

Chemical Name	CAS-No.	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA PEL-CEILING
BARITE	13462-86-7	50.0	0.5 MGM3	N/E	0.5 MGM3	N/E
TITANIUM DIOXIDE	13463-67-7	20.0	10 MGM3	N/E	10 MGM3	N/E
METHYL N-AMYL KETONE	110-43-0	15.0	50 PPM	N/E	465 MG/M3	N/E
MICROCRYSTALLINE SILICA	14808-60-7	15.0	0.025 MG/M3 (respirable)	N/E	0.1 MG/M3 (respirable)	N/E
TOLUENE	108-88-3	5.0	20 PPM	N/E	375 MGM3	N/E
CARBON BLACK	1333-86-4	1.0	3.0 MG/M3	N/E	3.5 MG/M3	N/E

4. First-aid Measures

AFTER EYE CONTACT: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

AFTER SKIN CONTACT: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. If skin irritation persists, call a physician.

AFTER INHALATION: Give oxygen or artificial respiration if needed. Remove person to fresh air. If signs/symptoms continue, get medical attention.

AFTER INGESTION: Do NOT induce vomiting. Never give anything by mouth to an unconscious person. If swallowed, call a poison control centre or doctor immediately.

5. Fire-fighting Measures

Flash Point, °F:	68F (20C)	**Lower Explosive Limit, %:**	1.0
(Setaflash)		**Upper Explosive Limit, %:**	12.7

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

UNUSUAL FIRE AND EXPLOSION HAZARDS: Flammable liquid. Vapours are heavier than air and may spread along floors. Vapours may form explosive mixtures with air. Vapors may travel to areas away from work site before igniting/flashing back to vapor source. Provide adequate ventilation. Prevent the creation of flammable or explosive concentrations of vapour in air and avoid vapour concentration higher than the occupational exposure limits. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Electrical installations / working materials must comply with the technological safety standards. Wear shoes with conductive soles.

SPECIAL FIREFIGHTING PROCEDURES: In the event of fire, wear self-contained breathing apparatus. Cool containers / tanks with water spray. Flammable.

6. Accidental Release Measures

PERSONAL SAFETY MEASURES/ENVIRONMENTAL MEASURES/METHOD OF CLEANING/CONTAINMENT: Ensure adequate ventilation. Evacuate personnel to safe areas. Remove all sources of ignition. Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13). To avoid ignition of vapours by static electricity discharge, all metal parts of the equipment must be grounded. Wear personal protective equipment. For personal protection see section 8.

7. Handling and Storage

INSTRUCTIONS FOR SAFE HANDLING : Do not breathe vapours or spray mist. Do not get in eyes, on skin, or on clothing. Keep containers dry and tightly closed to avoid moisture absorption and contamination. Use only with adequate ventilation/personal protection. Wash thoroughly after handling. Ensure all equipment is electrically grounded before beginning transfer operations. Do not use sparking tools. Prepare the working solution as given on the label(s) and/or the user instructions.

STORAGE CONDITIONS: Keep container closed when not in use. Store in a dry, well ventilated place away from sources of heat, ignition and direct sunlight.

8. Exposure Controls/Personal Protection

ENGINEERING CONTROLS: Avoid contact with skin, eyes and clothing. Ensure adequate ventilation, especially in confined areas.

RESPIRATORY PROTECTION: In order to avoid inhalation of spray-mist and sanding dust, all spraying and sanding must be done wearing adequate respirator. Use only with ventilation to keep levels below exposure guidelines reported in this document. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use State or federally approved supplied air respirator. For silica containing coatings in a liquid state, and/or if no exposure limits are established above, air-supplied respirators are generally not required.

SKIN PROTECTION: Lightweight protective clothing. Impervious gloves. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough. Request information on glove permeation properties from the glove supplier.

EYE PROTECTION: Safety glasses with side-shields

OTHER PROTECTIVE EQUIPMENT: Ensure that eyewash stations and safety showers are close to the workstation location.

PROTECTION AND HYGIENE MEASURES : Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday. When using, do not eat, drink or smoke.

9. Physical and Chemical Properties

Boiling Range:	173 F (78 C) - 300 F (148 C)	**Vapor Density:**	Heavier than Air
Odor:	Solvent	**Odor Threshold:**	N/D
Appearance:	Viscous Liquid, Various Colors	**Evaporation Rate:**	Slower Than Ether
Solubility in Water:	N/D	**Specific Gravity:**	app. 1.80
Freeze Point:	N/D	**pH:**	N/D
Physical State:	Liquid	**Vapor Pressure:**	No Information

(See section 16 for abbreviation legend)

10. Stability and Reactivity

CONDITIONS TO AVOID: Heat, flames and sparks.

MATERIALS TO AVOID: Strong oxidizing agents

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon dioxide (CO2), carbon monoxide (CO), oxides of nitrogen (NOx), dense black smoke.

HAZARDOUS POLYMERIZATION: Hazardous polymerisation does not occur.

STABILITY: Stable under normal conditions.

11. Toxicological Information

Chemical Name	CAS-No.	LD50	LC50
BARITE	13462-86-7	Not Available	Not Available
TITANIUM DIOXIDE	13463-67-7	25000 mg/m3, oral (rat)	6.82 mg/L, Inh, rat 4H
METHYL N-AMYL KETONE	110-43-0	1670 mg/kg rat oral	2000 ppm, 4 hours
MICROCRYSTALLINE SILICA	14808-60-7	Not Available	Not Available
TOLUENE	108-88-3	5000 mg/kg rat oral, 14000 mg/kg rabbit dermal	8000 ppm/4 hrs, rat, inhalation
CARBON BLACK	1333-86-4	8000 mg/kg oral, rat	Not Available

12. Ecological Information

ECOLOGICAL INFORMATION: No information available.

13. Disposal Information

DISPOSAL INFORMATION: Dispose of in accordance with local regulations.

14. Transport 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:	No Information		

15. Regulatory Information

U.S. Federal Regulations:

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:

Fire Hazard, Acute 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	CAS-No.
TOLUENE	108-88-3

Toxic Substances Control Act:

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) components exist in this product.

U.S. State Regulations:

New Jersey Right-to-Know:

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

Chemical Name	CAS-No.
ACRYLIC COPOLYMER	TRADE SECRET

Pennsylvania Right-To-Know:

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

Chemical Name	CAS-No.
ACRYLIC COPOLYMER	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	CAS-No.
TITANIUM DIOXIDE	13463-67-7
MICROCRYSTALLINE SILICA	14808-60-7
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.

Chemical Name	CAS-No.
TOLUENE	108-88-3

International Regulations:

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

16. Other Information

HMIS Ratings:

Health: 1 **Flammability:** 3 **Reactivity:** 0 **Personal Protection:** X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): 324

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

1. Identification

Product Name: URETHANE CONVERTER 8800
Revision Date: 3/27/2014
Identification Number: 8808B1NL
Supercedes Date: 3/28/2011
Product Use/Class: Catalyst for Polyurethane Products - FOR INDUSTRIAL USE ONLY
Manufacturer: Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
800-848-4645
Preparer: Regulatory Department

2. Hazard Identification

EMERGENCY OVERVIEW: Irritating to eyes and skin. WARNING! FLAMMABLE LIQUID AND VAPOR. Keep away from heat and sources of ignition. Harmful if inhaled. Use with adequate ventilation. Vapours may cause drowsiness and dizziness. Keep container closed. Avoid contact with skin, eyes and clothing. Wash thoroughly after handling. Harmful if swallowed. Risk of serious damage to the lungs (by aspiration).

EFFECTS OF OVEREXPOSURE - EYE CONTACT: May cause eye irritation.

EFFECTS OF OVEREXPOSURE - SKIN CONTACT: May cause allergic skin reaction. May cause skin irritation.

EFFECTS OF OVEREXPOSURE - INHALATION: Vapours may be irritating to eyes, nose, throat, and lungs. May cause allergic respiratory reaction. Harmful if inhaled. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.

EFFECTS OF OVEREXPOSURE - INGESTION: Harmful if swallowed.

EFFECTS OF OVEREXPOSURE - CHRONIC HAZARDS: Isocyanates may cause acute irritation and/or sensitisation of the respiratory system leading to tightness of the chest, wheeziness and an asthmatic condition. Repeated and prolonged exposure to solvents may cause brain and nervous system damage.

MEDICAL CONDITIONS PRONE TO AGGRAVATION: Persons allergic to isocyanates, and particularly those suffering from asthma or other respiratory conditions, should not work with isocyanates.

PRIMARY ROUTE(S) OF ENTRY: Eye Contact, Ingestion, Inhalation, Skin Absorption, Skin Contact

3. Composition/Information On Ingredients

Hazardous Ingredients

Chemical Name	CAS-No.	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA PEL-CEILING
HOMOPOLYMER OF HDI	28182-81-2	65.0	N/E	N/E	N/E	N/E
METHYL ETHYL KETONE	78-93-3	35.0	200 PPM	300 PPM	590 MGM3	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
HEXAMETHYLENE DIISOCYANATE	822-06-0	1.0	0.005 PPM	N/E	N/E	N/E

4. First-aid Measures

AFTER EYE CONTACT: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

AFTER SKIN CONTACT: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. If skin irritation persists, call a physician.

AFTER INHALATION: Give oxygen or artificial respiration if needed. Remove person to fresh air. If signs/symptoms continue, get medical attention.

AFTER INGESTION: Do NOT induce vomiting. Never give anything by mouth to an unconscious person. If swallowed, call a poison control centre or doctor immediately.

5. Fire-fighting Measures

Flash Point, °F:	28F (-2C)	**Lower Explosive Limit, %:**	0.9
(Setaflash)		**Upper Explosive Limit, %:**	10.1

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

UNUSUAL FIRE AND EXPLOSION HAZARDS: Humid air and/or water will produce carbon dioxide which will pressurize the container. Flammable liquid. Vapours are heavier than air and may spread along floors. Vapours may form explosive mixtures with air. Vapors may travel to areas away from work site before igniting/flashing back to vapor source. Provide adequate ventilation. Prevent the creation of flammable or explosive concentrations of vapour in air and avoid vapour concentration higher than the occupational exposure limits. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Electrical installations / working materials must comply with the technological safety standards. Wear shoes with conductive soles.

SPECIAL FIREFIGHTING PROCEDURES: In the event of fire, wear self-contained breathing apparatus. Cool containers / tanks with water spray. Flammable.

6. Accidental Release Measures

PERSONAL SAFETY MEASURES/ENVIRONMENTAL MEASURES/METHOD OF CLEANING/CONTAINMENT: Do not allow material to contaminate ground water system. Prevent product from entering drains. Remove all sources of ignition. To avoid ignition of vapours by static electricity discharge, all metal parts of the equipment must be grounded. Evacuate personnel to safe areas. Wear personal protective equipment. For personal protection see section 8. Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13).

7. Handling and Storage

INSTRUCTIONS FOR SAFE HANDLING : Do not get in eyes, on skin, or on clothing. Keep containers dry and tightly closed to avoid moisture absorption and contamination. Use only with adequate ventilation/personal protection. Wash thoroughly after handling. Ensure all equipment is electrically grounded before beginning transfer operations. Do not use sparking tools. Prepare the working solution as given on the label(s) and/or the user instructions. Do not breathe vapours or spray mist.

STORAGE CONDITIONS: Keep container closed when not in use. Store in a dry, well ventilated place away from sources of heat, ignition and direct sunlight.

8. Exposure Controls/Personal Protection

ENGINEERING CONTROLS: Avoid contact with skin, eyes and clothing. Ensure adequate ventilation, especially in confined areas.

RESPIRATORY PROTECTION: In order to avoid inhalation of spray-mist and sanding dust, all spraying and sanding must be done wearing adequate respirator. Use only with ventilation to keep levels below exposure guidelines reported in this document. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use State or federally approved supplied air respirator. For silica containing coatings in a liquid state, and/or if no exposure limits are established above, air-supplied respirators are generally not required.

SKIN PROTECTION: Lightweight protective clothing. Impervious gloves. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough. Request information on glove permeation properties from the glove supplier.

EYE PROTECTION: Safety glasses with side-shields

OTHER PROTECTIVE EQUIPMENT: Ensure that eyewash stations and safety showers are close to the workstation location.

PROTECTION AND HYGIENE MEASURES : Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday. When using, do not eat, drink or smoke.

9. Physical and Chemical Properties

Boiling Range:	262 F (128 C) - 262F (128C)	**Vapor Density:**	Heavier than Air
Odor:	Solvent	**Odor Threshold:**	N/D
Appearance:	Colorless, Mobile Liquid	**Evaporation Rate:**	Slower Than Ether
Solubility in Water:	Reacts	**Specific Gravity:**	1.00
Freeze Point:	N/D	**pH:**	N/D
Physical State:	Liquid	**Vapor Pressure:**	No Information

(See section 16 for abbreviation legend)

10. Stability and Reactivity

CONDITIONS TO AVOID: Heat, flames and sparks. Exposure to moisture.

MATERIALS TO AVOID: Water in the container will lead to increased pressure and risk of explosion. Never allow product to get in contact with water during storage. Strong oxidizing agents

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon dioxide (CO2), carbon monoxide (CO), oxides of nitrogen (NOx), dense black smoke.

HAZARDOUS POLYMERIZATION: Hazardous polymerisation does not occur.

STABILITY: Stable under normal conditions.

11. Toxicological Information

Chemical Name	CAS-No.	LD50	LC50
HOMOPOLYMER OF HDI	28182-81-2	5000 mg/kg, oral, rat	390 mg/m3, inhalation, rat
METHYL ETHYL KETONE	78-93-3	2194 mg/kg rat, oral	34.5 mg/L/ 4 hour rat, inhalation
N-BUTYL ACETATE	123-86-4	10760 mg/kg, rat, oral	23.4 mg/l/4/h (rat)
AROMATIC HYDROCARBON	64742-95-6	4700 mg/kg, oral, rat	3670 ppm/8 hours, rat, inhalation
HEXAMETHYLENE DIISOCYANATE	822-06-0	710 mg/kg, oral rat	23 ppm / 4 hrs

12. Ecological Information

ECOLOGICAL INFORMATION: No information available.

13. Disposal Information

DISPOSAL INFORMATION: Dispose of in accordance with local regulations.

14. Transport Information

DOT Proper Shipping Name:	Flammable Liquid NOS	**Packing Group:**	II
DOT Technical Name:	Methyl Ethyl Ketone, Butyl Acetate	**Hazard Subclass:**	N/A
DOT Hazard Class:	3	**Resp. Guide Page:**	128
DOT UN/NA Number:	1993		
Additional Notes:	No Information		

15. Regulatory Information

U.S. Federal Regulations:

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:

Fire Hazard, Acute 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	CAS-No.
HEXAMETHYLENE DIISOCYANATE	822-06-0

Toxic Substances Control Act:

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) components exist in this product.

U.S. State Regulations:

New Jersey Right-to-Know:

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

No NJ Right-To-Know components exist in this product.

Pennsylvania Right-To-Know:

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

No PA Right-To-Know components exist in this product.

CALIFORNIA PROPOSITION 65:

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

Chemical Name	CAS-No.
ETHYL BENZENE	100-41-4
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.

Chemical Name	CAS-No.
TOLUENE	108-88-3

International Regulations:

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

16. Other Information

HMIS Ratings:

Health: 3 **Flammability:** 3 **Reactivity:** 1 **Personal Protection:** X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): See Part A MSDS

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.

product data carboline®

Carbothane® 133 LH

Selection & Specification Data

Generic Type Aliphatic Acrylic-Polyester Polyurethane

Description High build, low sheen finish that has excellent resistance to corrosion, chemicals and abrasion. Suitable for application over a number of Carboline primers and intermediates, this material provides very good weathering performance in a broad range of colors.

Features
- Exceeds SSPC Paint 36 specification for a Level 3 urethane
- Outstanding performance properties in both mild and aggressive environments
- High build; suitable for many two-coat systems
- Application by spray, brush or roller
- Indefinite recoatability
- VOC compliant to current AIM regulations
- Low HAPs content

Color Refer to Carboline Color Guide.

Finish Satin

Primer Carbozinc, Carboguard and Carbomastic or other primers as specified. Refer to Substrates & Surface Preparation.
Topcoat with Carbothane® Clear Coat when required.

Dry Film Thickness 3.0 - 5.0 mils (76 - 127 microns) per coat

Dry film thickness in excess of 7 mils (175 microns) per coat is not recommended.

Solids Content By Volume 61% +/- 2%

Theoretical Coverage Rate
978 ft^2 at 1 mil (24 m^2/l at 25 microns)
326 ft^2 at 3 mils (8 m^2/l at 75 microns)
196 ft^2 at 5 mils (5 m^2/l at 125 microns)

Allow for loss in mixing and application.

VOC Values Thinner 255 E Thinned 5%: 2.7 lbs/gal (324 g/l)
As Supplied 2.7 lbs./gal (324 g/l)

These are nominal values and may vary slightly with color.

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. Refer to the specific primer's Product Data Sheet for detailed requirements of the specified primer.

Steel SSPC-SP6 with a 1.5-2.5 mil (37.5-62.5 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 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.

Substrates & Surface Preparation

Aluminum SSPC-SPI and prime with appropriate Carboline primer as recommended by your Carboline sales representative.

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. Prime with specific Carboline primers as recommended by your Carboline sales representative.

Mixing & Thinning

Mixing Power mix Part A separately, then combine with Part B and power mix. DO NOT MIX PARTIAL KITS.

Thinning Thinning not normally required. Carboline Thinner 225E, 236E, 243E or 255E may be used to thin this product to minimize HAP and VOC emissions. Thinner 25 may also be used. Consult Carboline Technical Service for guidance.
Use of thinners other than those supplied or recommended by Carboline may adversely affect product performance and void product warranty, whether expressed or implied.

Ratio 4:1 Ratio (A to B)
1.0 Gal. Kit
Part A: 1 gal. can (partial filled)
UC 8800: 1 qt. (partial filled)
5.0 Gal. Kit
Part A: 5 gal. can
UC 8800: 1 qt. (partial filled)

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.

Application Equipment Guidelines

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: .013-.015"
Output PSI: 2100-2300
Filter Size: 60 mesh
*Teflon packings are recommended and available from the pump manufacturer.

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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® are registered trademarks of Carboline Company.

Carbothane® 133 LH

Application Equipment Guidelines

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.

Brush & Roller (General) Multiple coats may be required to obtain desired appearance, recommended dry film thickness and adequate hiding. Avoid excessive rebrushing 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 medium-nap synthetic roller cover with phenolic core.

Application Conditions

Condition	Material	Surface	Ambient	Humidity
Minimum	40 °F (4 °C)	40 °F (4 °C)	40 °F (4 °C)	0%
Maximum	100 °F (38 °C)	110 °F (43 °C)	110 °F (43 °C)	90%

Industry standards are for substrate temperatures to be 5°F (3°C) above the dew point. This product simply requires the substrate temperature to be above the dew point.
Caution: This Product is moisture sensitive in the liquid stage and until cured. Protect from high humidity, dew and direct moisture contact until 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 General
40 °F (4 °C)	24 Hours	24 Hours	28 Days
50 °F (10 °C)	15 Hours	15 Hours	14 Days
75 °F (24 °C)	6 Hours	6 Hours	7 Days
90 °F (32 °C)	3 Hours	3 Hours	4 Days

These times are based on a 3.0-5.0 mil (75-125 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.
***Maximum recoat times are indefinite.** Surface must be clean and dry. As part of good painting practice it is recommended to test for adhesion by wiping the surface with Thinner 25. If the film shows a slight “tack” the surface is suitable for recoating without extensive surface preparation such as abrading.
Carboline Additive 101 can be used to accelerate the film forming process in this product for conditions outside of the parameters of this data sheet. Carboline Additive 101 is added at a rate of 1.0-2.0 oz per mixed gallon or a maximum of 6 oz per mixed five gallons. At this addition rate, Additive 101 will accelerate the cure rate of the urethane product between 25-40% depending on the substrate temperature range and reduce the pot life of the product by approximately 40-50% of that stated on the product data sheet. With the use of Additive 101, this product will continue to cure at temperatures as low as 20°F (-7°C).

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 and use personal protective equipment as directed.

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.

Packaging, Handling & Storage

Shelf Life Part A: Min. 24 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.

Shipping Weight (Approximate) 1 Gallon Kit - 15 lbs (7 kg)
5 Gallon Kit - 70 lbs (32 kg)

Storage Temperature & Humidity 40° -110°F (4°-43°C)
0-90% Relative Humidity

Flash Point (Setaflash) Part A: 68°F (20°C)
Part B: 28°F (-2°C)

Storage Store Indoors.

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

An RPM Company

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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® are registered trademarks of Carboline 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: CARBOZINC 859 PART A

Identification Number: PLMSDS 0486A1NL

Product Use/Class: Organic Zinc-Rich Epoxy - FOR INDUSTRIAL USE ONLY

Revision Date: 05/31/2012

Supercedes : 09/07/2011

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
TOLUENE	108-88-3	25.0	20 PPM	N/E	375 MGM3	NE
EPOXY RESIN	25036-25-3	20.0	N/E	N/E	N/E	N/E
TITANIUM DIOXIDE	13463-67-7	15.0	10 MGM3	N/E	10 MGM3	N/E
EPOXY RESIN	25068-38-6	10.0	NE	NE	NE	NE
METHYL ETHYL KETONE	78-93-3	5.0	200 PPM	300 PPM	590 MGM3	N/E
POLYSTYRENE	9003-53-6	5.0	NE	NE	NE	NE
1,2-BENZENEDICARBOXIOLIC ACID, DI-C9-11-BRANCHED AND LINEAR ALKYL ESTERS	68515-43-5	5.0	N/E	N/E	N/E	N/E
META-XYLENE	108-38-3	5.0	100 PPM	150 PPM	435 MG/M3	N/E
N-BUTANOL	71-36-3	5.0	20 PPM	50 PPM	100 PPM	150 MGM3
1-METHOXY-2-PROPANOL ACETATE	108-65-6	5.0	N/E	N/E	N/E	N/E
CARBON BLACK	1333-86-4	1.0	3.0 MG/M3	N/E	3.5 MG/M3	N/E
ETHYL BENZENE	100-41-4	0.7	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.

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

Effects Of Overexposure - Skin Contact: May be harmful if absorbed through the skin. May cause allergic skin reaction. Direct skin contact may cause irritation. 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: 49F (9C) (Setaflash)

Lower Explosive Limit, %: 0.2
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 aborbent (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 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:	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:**	1.30
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
TOLUENE	108-88-3	5.0 G/KG RAT ORAL, 14G/KG RABBIT DERMAL	8000 PPM/4HRS, RAT, INHALATION
EPOXY RESIN	25036-25-3	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
METHYL ETHYL KETONE	78-93-3	2737MG/KG RAT,ORAL	> 5000 PPM/1 HOUR RAT,INHALATION
POLYSTYRENE	9003-53-6	NOT AVAILABLE	NOT AVAILABLE
1,2-BENZENEDICARBOXIOLIC ACID, DI-C9-11-BRANCHED AND LINEAR ALKYL ESTERS	68515-43-5	>5000 MG/KG, ORAL, RAT	NOT AVAILABLE
META-XYLENE	108-38-3	NOT AVAILABLE	NOT AVAILABLE
N-BUTANOL	71-36-3	2500MG/KG RAT,ORAL	>800PPM/4HRS RAT,INHALATION
1-METHOXY-2-PROPANOL ACETATE	108-65-6	NOT AVAILABLE	NOT AVAILABLE
CARBON BLACK	1333-86-4	NOT AVAILABLE	>8000 MG/KG, ORAL, RAT
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

DOT Technical Name: N/A

DOT Hazard Class: 3

DOT UN/NA Number: UN 1263

Packing Group: II

Hazard Subclass: N/A

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 311and 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	CAS Number

TOLUENE	108-88-3
META-XYLENE	108-38-3
N-BUTANOL	71-36-3
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.

Chemical Name	CAS Number
CERAMIC MICROSPHERES	66402-68-4
NEPHELINE SYENITE	37244-96-5
BLACK IRON OXIDE	1317-61-9

PENNSYLVANIA RIGHT-TO-KNOW

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

Chemical Name	CAS Number
CERAMIC MICROSPHERES	66402-68-4
NEPHELINE SYENITE	37244-96-5
BLACK IRON OXIDE	1317-61-9
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:

Chemical Name	CAS Number
TITANIUM DIOXIDE	13463-67-7
CARBON BLACK	1333-86-4
ETHYL BENZENE	100-41-4
FORMALDEHYDE	50-00-0
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	CAS Number
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): 326

REASON FOR REVISION: Changes made in Section(s) 2 and 11.

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

1. Identification

Product Name: CARBOZINC 859 PRIMER PART B
Revision Date: 4/21/2014

Identification Number: 1037C1NL
Supercedes Date: 3/28/2011

Product Use/Class: Organic Zinc Rich Epoxy - FOR INDUSTRIAL USE ONLY

Manufacturer: Carboline Company
2150 Schuetz Road
St. Louis, MO 63146
800-848-4645

Preparer: Regulatory Department

2. Hazard Identification

EMERGENCY OVERVIEW: Irritating to eyes and skin. WARNING! FLAMMABLE LIQUID AND VAPOR. Keep away from heat and sources of ignition. Harmful if inhaled. Use with adequate ventilation. Vapours may cause drowsiness and dizziness. Keep container closed. Avoid contact with skin, eyes and clothing. Wash thoroughly after handling. Harmful if swallowed. Risk of serious damage to the lungs (by aspiration).

EFFECTS OF OVEREXPOSURE - EYE CONTACT: Causes eye burns.

EFFECTS OF OVEREXPOSURE - SKIN CONTACT: May be harmful if absorbed through skin. Causes skin burns. May cause sensitization by skin contact.

EFFECTS OF OVEREXPOSURE - INHALATION: Harmful if inhaled. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Vapours may be irritating to eyes, nose, throat, and lungs. May cause allergic respiratory reaction.

EFFECTS OF OVEREXPOSURE - INGESTION: Harmful if swallowed.

EFFECTS OF OVEREXPOSURE - CHRONIC HAZARDS: Repeated and prolonged exposure to solvents may cause brain and nervous system damage.

MEDICAL CONDITIONS PRONE TO AGGRAVATION: No information available.

PRIMARY ROUTE(S) OF ENTRY: Eye Contact, Ingestion, Inhalation, Skin Absorption, Skin Contact

3. Composition/Information On Ingredients

Hazardous Ingredients

Chemical Name	CAS-No.	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA PEL-CEILING
TOLUENE	108-88-3	50.0	20 PPM	N/E	375 MGM3	N/E
ISOPROPANOL	67-63-0	25.0	200 PPM	400 PPM	980 MGM3	N/E
1,2-BENZENEDICARBOXIOLIC ACID, DI-C9-11-BRANCHED AND LINEAR ALKYL ESTERS	68515-43-5	10.0	N/E	N/E	N/E	N/E
TRIS-2,4,6-(DIMETHYLAMINOMETHYL) PHENOL	90-72-2	10.0	N/E	N/E	N/E	N/E
AMINE POLYMER	135108-88-2	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
AMINOETHYLPIPERAZINE	140-31-8	5.0	N/E	N/E	N/E	N/E

META-XYLENE	108-38-3	5.0	100 PPM	150 PPM	435 MG/M3	N/E
ETHYL BENZENE	100-41-4	1.0	20 PPM	N/E	435 MGM3	N/E

4. First-aid Measures

AFTER EYE CONTACT: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

AFTER SKIN CONTACT: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. If skin irritation persists, call a physician.

AFTER INHALATION: Give oxygen or artificial respiration if needed. Remove person to fresh air. If signs/symptoms continue, get medical attention.

AFTER INGESTION: Do NOT induce vomiting. Never give anything by mouth to an unconscious person. If swallowed, call a poison control centre or doctor immediately.

5. Fire-fighting Measures

Flash Point, °F: 38F (3C) (Setaflash)

Lower Explosive Limit, %: 1.0

Upper Explosive Limit, %: 12.0

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

UNUSUAL FIRE AND EXPLOSION HAZARDS: Flammable liquid. Vapours are heavier than air and may spread along floors. Vapours may form explosive mixtures with air. Vapors may travel to areas away from work site before igniting/flashing back to vapor source. Provide adequate ventilation. Prevent the creation of flammable or explosive concentrations of vapour in air and avoid vapour concentration higher than the occupational exposure limits. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Electrical installations / working materials must comply with the technological safety standards. Wear shoes with conductive soles.

SPECIAL FIREFIGHTING PROCEDURES: In the event of fire, wear self-contained breathing apparatus. Cool containers / tanks with water spray. Flammable.

6. Accidental Release Measures

PERSONAL SAFETY MEASURES/ENVIRONMENTAL MEASURES/METHOD OF CLEANING/CONTAINMENT: Do not allow material to contaminate ground water system. Prevent product from entering drains. Remove all sources of ignition. To avoid ignition of vapours by static electricity discharge, all metal parts of the equipment must be grounded. Evacuate personnel to safe areas. Wear personal protective equipment. For personal protection see section 8. Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13).

7. Handling and Storage

INSTRUCTIONS FOR SAFE HANDLING : Do not get in eyes, on skin, or on clothing. Keep containers dry and tightly closed to avoid moisture absorption and contamination. Use only with adequate ventilation/personal protection. Wash thoroughly after handling. Ensure all equipment is electrically grounded before beginning transfer operations. Do not use sparking tools. Prepare the working solution as given on the label(s) and/or the user instructions. Do not breathe vapours or spray mist.

STORAGE CONDITIONS: Keep container closed when not in use. Store in a dry, well ventilated place away from sources of heat, ignition and direct sunlight.

8. Exposure Controls/Personal Protection

ENGINEERING CONTROLS: Avoid contact with skin, eyes and clothing. Ensure adequate ventilation, especially in confined areas.

RESPIRATORY PROTECTION: In order to avoid inhalation of spray-mist and sanding dust, all spraying and sanding must be done wearing adequate respirator. Use only with ventilation to keep levels below exposure guidelines reported in this document. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use State or federally approved supplied air respirator. For silica containing coatings in a liquid state, and/or if no exposure limits are established above, air-supplied respirators are generally not required.

SKIN PROTECTION: Lightweight protective clothing. Impervious gloves. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough. Request information on glove permeation properties from the glove supplier.

EYE PROTECTION: Safety glasses with side-shields

OTHER PROTECTIVE EQUIPMENT: Ensure that eyewash stations and safety showers are close to the workstation location.

PROTECTION AND HYGIENE MEASURES : Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday. When using, do not eat, drink or smoke.

9. Physical and Chemical Properties

Boiling Range:	176 F (80 C) - 284 F (140 C)	**Vapor Density:**	Heavier than Air
Odor:	Solvent	**Odor Threshold:**	N/D
Appearance:	Thin, Brown Liquid	**Evaporation Rate:**	Slower Than Ether
Solubility in Water:	N/D	**Specific Gravity:**	0.88
Freeze Point:	N/D	**pH:**	N/D
Physical State:	Liquid	**Vapor Pressure:**	No Information

(See section 16 for abbreviation legend)

10. Stability and Reactivity

CONDITIONS TO AVOID: Heat, flames and sparks.

MATERIALS TO AVOID: Strong oxidizing agents

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon dioxide (CO2), carbon monoxide (CO), oxides of nitrogen (NOx), dense black smoke.

HAZARDOUS POLYMERIZATION: Hazardous polymerisation does not occur.

STABILITY: Stable under normal conditions.

11. Toxicological Information

Chemical Name	CAS-No.	LD50	LC50
TOLUENE	108-88-3	5000 mg/kg rat oral, 14000 mg/kg rabbit dermal	8000 ppm/4 hrs, rat, inhalation
ISOPROPANOL	67-63-0	4720 mg/kg rat, oral	22500 ppm/8hrs rat, inhalation
1,2-BENZENEDICARBOXIOLIC ACID, DI-C9-11-BRANCHED AND LINEAR ALKYL ESTERS	68515-43-5	>5000 MG/KG, ORAL, RAT	Not Available
TRIS-2,4,6- (DIMETHYLAMINOMETHYL) PHENOL	90-72-2	2169 mg/kg oral	Not Available
BENZYL ALCOHOL	100-51-6	1230 mg/kg rat, oral	1000 ppm / 8 hrs rat, inhalation
AMINE POLYMER	135108-88-2	367 mg/kg, oral, rat	Not Available
AMINOETHYLPIPERAZINE	140-31-8	2140 mg/kg, oral, rat	Not Available
META-XYLENE	108-38-3	Not Available	Not Available

ETHYL BENZENE	100-41-4	3500 mg/kg rat, oral	17.2 mg/L Inh, Rat, 4Hr

12. Ecological Information

ECOLOGICAL INFORMATION: No information available.

13. Disposal Information

DISPOSAL INFORMATION: Dispose of in accordance with local regulations.

14. Transport Information

DOT Proper Shipping Name: Paint
DOT Technical Name: N/A
DOT Hazard Class: 3
DOT UN/NA Number: UN 1263
Additional Notes: No Information
Packing Group: II
Hazard Subclass: N/A
Resp. Guide Page: 128

15. Regulatory Information

U.S. Federal Regulations:

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:

Fire Hazard, Acute 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	CAS-No.
TOLUENE	108-88-3
ISOPROPANOL	67-63-0
META-XYLENE	108-38-3
ETHYL BENZENE	100-41-4

Toxic Substances Control Act:

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) components exist in this product.

U.S. State Regulations:

New Jersey Right-to-Know:

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

No NJ Right-To-Know components exist in this product.

Pennsylvania Right-To-Know:

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

No PA Right-To-Know components exist in this product.

CALIFORNIA PROPOSITION 65:

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

Chemical Name	CAS-No.
ETHYL BENZENE	100-41-4
BENZENE	71-43-2

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	CAS-No.
TOLUENE	108-88-3
BENZENE	71-43-2

International Regulations:

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

16. Other Information

HMIS Ratings:

Health: 3 **Flammability:** 3 **Reactivity:** 0 **Personal Protection:** X

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): 326

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: ZINC FILLER TYPE II (fka SPECIAL ZINC FILLER)

Identification Number: PLMSDS 0229B1NL

Product Use/Class: FOR INDUSTRIAL USE ONLY

Revision Date: 11/13/2012

Supercedes : 10/10/2012

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
ZINC (DUST OR FUME)	7440-66-6	100.0	N/E	N/E	N/E	N/E
ZINC OXIDE	1314-13-2	1.0	2 MGM3	10 MGM3	5 MGM3	N/E

Section 3 - Hazards Identification

Emergency Overview: This product has been tested and shown to fall well below the level of gas emission when exposed to water (49CFR Part 173 E, 4) and is, therefore, not a regulated product and is not defined as dangerous when wet. Product is packaged in steel or plastic water tight containers.

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

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

Effects Of Overexposure - Inhalation: Overexposure will be irritating to mucous membranes.

Effects Of Overexposure - Ingestion: May cause gastrointestinal disturbance.

Effects Of Overexposure - Chronic Hazards: Pure Zinc Dust is relatively non-toxic to humans by inhalation. Minor inhalation may irritate respiratory tract causing coughing whereas

larger doses will give zinc shakes or metal fume fever; a benign transient flu-like condition.

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. 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: Flush eyes with water as a precaution.

First Aid - Skin Contact: Wash skin thoroughly 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: Do NOT induce vomiting. Obtain medical attention.

Section 5 - Fire Fighting Measures

Flash Point, F: N/A (N/A)

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

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

Unusual Fire And Explosion Hazards: Bulk Dust in contact with water or damp air evolves hydrogen. The heat produced during this reaction could ignite the hydrogen, an explosive condition could exist if this happens in a confined space. Dry dust forms explosive mixtures with air, if ignited.

Special Firefighting Procedures: Wear self contained breathing apparatus for fire fighting if necessary.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: In the case of dust or aerosol formation use respirator with an approved filter.

Section 7 - Handling And Storage

Handling: Keep containers dry and tightly closed to avoid moisture absorption and contamination. 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 appropriate equipment to keep nuisance dust cloud levels low.

Respiratory Protection: Use the indicated respiratory protection if the occupational exposure limit is exceeded and/or in case of product release (dust). Respirator must be worn if exposed to dust.

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: Handle in accordance with good industrial hygiene and safety practice.

Section 9 - Physical And Chemical Properties

Boiling Range:	N/D - .	**Vapor Density:**	N/A
Odor:	Odorless	**Odor Threshold:**	N/D
Appearance:	Blue - Grey Powder	**Evaporation Rate:**	N/A
Solubility in H2O:	N/D		
Freeze Point:	N/A	**Specific Gravity:**	7.109
Vapor Pressure:	N/A	**PH:**	N/A
Physical State:	Solid		

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Avoid water contact with opened zinc powder containers.

Incompatibility: Strong oxidizing agents

Hazardous Decomposition Products: Under fire conditions, hot zinc dust that is exposed to water could generate Hydrogen gas. When welding, heating or torch cutting surfaces coated with a zinc coating, Zinc Oxide Fume can be produced and could cause "metal fume fever". Use exhaust systems and proper breathing protection to avoid breathing the fumes resulting from these conditions.

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
ZINC (DUST OR FUME)	7440-66-6	NOT AVAILABLE	NOT AVAILABLE
ZINC OXIDE	1314-13-2	NOT AVAILABLE	NOT AVAILABLE

Section 12 - Ecological Information

Ecological Information: Zinc: Zinc in the metallic dust form is insoluble, but its processing or extended exposure in the aquatic and terrestrial environments may lead to the release of zinc in bioavailable forms. Zinc is mobile and can be toxic in the aquatic environment with water hardness, Ph and dissolved organic carbon content being regulating factors. It bioaccumulates in both plants and animals in terrestrial and aquatic systems. Zinc is moderately mobile in soils and is dependent on soil conditions, such as cation exchange capacity, Ph, redox potential, and chemical species present in the soil. Zinc also bioaccumulates in terrestrial plants, vertebrates, and mammals with plant uptake dependent on soil composition.

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: Some international shipments may be classed as UN3077, if ADR/RID Regulations apply.

Section 15 - Regulatory Information

CERCLA - SARA HAZARD CATEGORY

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

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	CAS Number
ZINC (DUST OR FUME)	7440-66-6
ZINC OXIDE	1314-13-2

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.

Chemical Name	CAS Number
IRON	7439-89-6

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: No WHMIS Class Assigned

Section 16 - Other Information

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

VOLATILE ORGANIC COMPOUNDS, GR/LTR MIXED (UNTHINNED): Refer to Part A MSDS

REASON FOR REVISION: Changes made in Section 14

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

product data

carboline®

Carbozinc® 859 Primer

Selection & Specification Data

Generic Type
Organic Zinc-Rich Epoxy

Description
Low VOC organic zinc epoxy steel primer with extremely fast cure-to-topcoat characteristics for in-shop applications and quick turnaround requirements in the field. Carbozinc 859 has less than 3.0 lbs/gallon VOC (thinned) and is used extensively in virtually all industrial markets.

Features
- Meets Class B slip co-efficient and creep testing criteria for use on faying surfaces
- Rapid cure. Dry to recoat in 30 minutes at 75°F (24°C) and 50% relative humidity.
- Low temperature cure down to 35°F (2°C)
- Excellent adhesion
- Protects against undercutting corrosion
- Available in ASTM D520, Type II zinc version
- Field proven primer that applies well by spray methods
- Excellent touch-up primer by brush or roll for small areas.
- VOC compliant to current AIM regulations

Color
Green (0300)

Finish
Flat

Primers
Self Priming

Topcoats
Can be topcoated with Epoxies, Polyurethanes, Acrylics and others as recommended by your Carboline sales representative. Under certain conditions, a mist coat is required to minimize topcoat bubbling.

Dry Film Thickness
3.0-5.0 mils (75-125 microns) Nominal. Dry film thickness. May be applied up 10.0 mils (250 microns) per coat.

Solids Content*
By Volume: 66% ± 2%
*Tested in accordance with ASTM D2697

Zinc Content
By Weight: 81% ± 2% in dry film

Theoretical Coverage Rate
1,059 mil ft^2 (24.0 m^2/l at 25 microns)
353 ft^2 at 3.0 mils (8.0 m^2/l at 75 microns)
Allow for loss in mixing and application

VOC Values
As Supplied: 2.72 lbs./gal (326 g/l)
Thinned:*
13 oz/gal w/ #2: 3.12 lbs./gal (374 g/l)
13 oz/gal w/ #33: 3.15 lbs./gal (378 g/l)
13 oz/gal w/ #236e 2.72 lbs./gal (326 g/l)
13 oz/gal w/ #243e 2.72 lbs./gal (326 g/l)
These are nominal values.
*Use Thinner #76 for projects requiring non-photochemically reactive solvents.

Dry Temp. Resistance
Continuous: 400°F (204°C)
Non-Continuous: 425°F (218°C)

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 minimum with a 1.0-3.0 mil (25-75 micron) nominal surface profile. Carbozinc 859 may be applied over any profile exceeding 1 mil. To achieve specified performance Carbozinc 859 must be applied at thickness to cover the profile by at least 3 mils. Calibrate dry film measurement tools accordingly.
SSPC-SP2 or SP3 for touch-up.

Performance Data

Test Method	System	Results
ASTM D4541 Adhesion	A. Carbozinc 859 B. 859 / Polyurethane C. 859/Epoxy/ Polyurethane	A. 841 psi Pneumatic B. 1,100 min. psi Pneumatic C. 585 psi Elcometer
ASTM D522 Flexibility	A. 859 B. 859 / Polyurethane	A. > 6% B. > 5%
ASTM D2794 Impact	A. 859 B. 859 / polyurethane Gardner Impact Tester,Direct (intrusion), inch-pounds, over 1/8" steel	A. 160 B. 100 min.
ASTM D870 Immersion	A. Carbozinc 859/Epoxy/ Polyurethane Salt Water (5% sodium chloride) at 75°F,30 days B. 859 / Epoxy / Polyurethane Fresh water at 75°F,30 days	A & B had no rusting in the scribe; and no blistering, softening or discoloration with either environment

Test reports and additional data available upon written request.

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. Keep material under mild agitation during application.

Conventional Spray
Agitated 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-.023"
Output PSI: 2000-2200
Filter Size: 60 mesh
*Teflon packings are recommended and available from the pump manufacturer.

Brush/Roller
For small areas and touch-up only. Preferred method for large areas is spray application.

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Carbozinc® 859 Primer

Mixing & Thinning

Mixing Power mix Part A completely. Then slowly sift in the zinc filler under agitation. Power mix Part B separately and add slowly to the mixture. Pour mixture through a 30 mesh screen. DO NOT MIX PARTIAL KITS.
Tip: Sifting zinc through a window screen will aid in mixing process by breaking up or catching dry zinc lumps.

	.80 Gal Kit	4.00 Gal. Kit
Ratio	Part A: .35 gallons	1.77 gallons
	Part B: .20 gallons	1 gallon
	Zinc Filler: 14.6 lbs	73 lbs

Thinning Normally not required but may be thinned up to 13 oz/gal (10%) with Thinner #2 or Thinner #76. In hot or windy conditions, may be thinned up to 13 oz/gal with Thinner #33. Use of thinners other than those supplied by Carboline may adversely affect product performance and void product warranty, whether expressed or implied.

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) and less at higher temperatures. Pot life ends when coating loses body and begins to sag.

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. In addition to ensuring proper ventilation, appropriate respirators must be used by all application personnel.

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°-90°F (16°-32°C)	60°-90°F (16°-32°C)	0-90%
Minimum	40°F (4°C)	35°F (2°C)	35°F (2°C)	0%
Maximum	90°F (32°C)	120°F (49°C)	110°F (43°C)	95%

Industry standards are for the substrate temperatures to be 5°F (3°C) above the dew point. 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
35°F (2°C)	8 Hours	6 Hours
50°F (10°C)	5 Hours	2 Hours
75°F (24°C)	2 Hours	30 Minutes
100°F (32°C)	1 Hour	30 Minutes

These times are based on a 3.0 mil (75 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. **Specific topcoat products can be used in a much shorter re-coat interval. Consult Carboline for recommendations and test results.**
Maximum Recoat: Unlimited. Must have a clean, dry surface for topcoating. “Loose” chalk or salts must be removed in accordance with good painting practice. Consult Carboline Technical Service for specific information.

Packaging, Handling & Storage

Shipping Weight (Approximate)	.80 Gallon Kit 22 lbs (10 kg)	4.00 Gallon Kit 105 lbs (48 kg)
Flash Point (Setaflash)	Part A: 49°F (9°C) Part B: 38°F (3°C) Zinc Filler: NA	
Storage (General)	Store Indoors.	
Storage Temperature & Humidity	40° – 110°F (4° - 43°C). 0-95% Relative Humidity	
Shelf Life	Part A: Min. 36 months at 75°F (24°C) Part B: Min. 24 months at 75°F (24°C) Part C: 24 months at 75°F (24°C)	

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

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MATERIAL SAFETY DATA SHEET

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Revision Date: 12/5/2012 | Replaces Date: 12/9/2009 | Revision Level: **T**
PREPARED BY: Mark Hash | Ervin Industries

SECTION I PRODUCT IDENTIFICATION

Product Name		Chemical Family
AMASTEEL SHOT	**AMABRASIVE**	**FERROUS**
AMASTEEL GRIT	**(SHOT / GRIT MIX)**	

SECTION II COMPOSITION / INGREDIENTS

Chemical Name	CAS Registry No	% Weight	ACGIH - TLV (mg/m^3)	OSHA - PEL (mg/m^3)
Iron - Fe	7439-89-6	>96		
Oxide fume as Fe			5	10
Carbon - C	7440-44-0	<1.2	none estab.	none estab.
Manganese - Mn	7439-96-5	<1.3		
Elemental, Inorganic Compounds as Mn			0.2	5 (ceiling)
Fume as Mn			none estab.	5 (ceiling)
Silicon - Si	7440-21-3	<1.2		
as total dust			10	15
Respirable fraction			none estab.	5
Chromium - Cr	7440-47-3	<0.25		
Elemental, Inorganic Compounds as Cr metal			0.5	1
Cr II compounds - as Cr			none estab.	0.5
Cr III compounds - as Cr			0.5	0.5
Cr VI compounds - water soluble			0.05	5 ug
Cr VI compounds - insoluble			0.01	5 ug
Chromic Acid and Chromates as CrO_3			none estab.	0.1 (ceiling)
Cr VI (hexavalent chromium) in product as shipped		**Not detected**	0.05 & 0.01	5 ug /2.5 action
Copper – Cu	7440-50-8	<0.25		
Fume			0.2	0.1
Dust & mists			1	1
Nickel - Ni	7440-02-0	<0.20		
Elemental metal			1.5	
Insoluble as Ni			0.1	1
Soluble compounds as Ni			0.2	1

SECTION III PHYSICAL DATA

Cast steel shot and grit are non-hazardous as received. Fine metallic dust is generated as the abrasive breaks down from impact and wear during normal use. Since the ferrous content is >96%, dust or fumes will consist mainly of iron or iron oxide. In addition, the fine steel dust created can be a mild explosion hazard (see section V).

Boiling Point - 2850-3150 Degrees C	Melting Point - 1371-1483 Degrees C
Specific Gravity (at 60 Degrees F) >7.6	Vapor Pressure - Not Applicable
% Volatile by Volume - Not Applicable	pH - Not Applicable
Appearance and Odor - Spherical - no odor	Percent Solid by Weight - 100%

SECTION IV REACTIVITY DATA

Stability – Stable Hazardous decomposition products – None Hazardous Polymerization - will not occur
Shot will break down into progressively smaller particles and dust during normal use.

MATERIAL SAFETY DATA SHEET

ERVIN

SECTION V — FIRE AND EXPLOSION HAZARD DATA

Flash Point - Not Applicable	Auto Ignition Temperature (solid iron exposed to Oxygen) -930 degree C
Flammability Limits - Not Applicable	Cast steel shot will not burn or explode

A mild fire or explosion hazard situation may be created from fine metal dust. Fire Extinguishing method for dust created due to use - use Class D extinguishing agents or dry sand to exclude air. Do not use water or other liquids, or foam.

NFPA Hazard Rating: 0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

Health (blue) = 0 Flammability (red) = 0 Reactivity (yellow) = 0 Special (colorless)

SECTION VI — HEALTH HAZARD DATA

Emergency and First Aid Procedure - If inhaled, move out of area into fresh air. Flush eyes with running water, have any remaining particles removed from eyes by a qualified medical person; call 911 for immediate medical assistance.

The end user should have an industrial hygiene evaluation to determine the proper personal protective equipment for each application or blasting operation. Threshold Limit Values - Permissible Exposure Limits - see Section II

Primary Routes of entry - inhalation of dust or dust particles in eyes. Target Organs - Lung for chromium and lung & nasal for Nickel. Metallic Nickel is reasonably anticipated to be a human carcinogen.

Over exposure to dust and fumes may cause mouth, eye, and nose irritation. Prolonged overexposure to manganese dust or fume affects the central nervous system. Prolonged overexposure to iron oxide fume can cause siderosis, or "iron pigmentation" of the lung. It can be seen on a chest x-ray but causes little or no disability.

Fumes generated by welding or flame cutting a surface containing new or used abrasive or the dust created by use of the abrasive may convert a small portion of chromium to hexavalent chromium. IARC reports welding fumes are possibly carcinogenic to humans.

SECTION VII — PERSONAL PROTECTION INFORMATION

Ventilation - General ventilation and local exhaust should be provided to keep the dust levels below the limits shown in Section II.

Respiratory protection – If an industrial hygiene evaluation shows dust exceeds OSHA PEL's indicated in Section II, a NIOSH approved respirator with appropriate filters should be worn as determined by the end user.

Eye protection - Approved safety glasses w/side shields should always be worn. Other protective equipment determined by the end user.

SECTION VIII — SPILL / LEAK PROCEDURES AND WASTE DETERMINATION

Shot spilled or leaked onto floors can create hazardous walking conditions. When cleaning up quantities of dust; if exceeding OSHA permissible exposure limits, an approved respirator with appropriate filters should be used.

Dust from blasting or peening operations always contain contaminants. The dust must be tested to determine if it is hazardous or non-hazardous waste. After such determination, the dust must be disposed of according to appropriate local, State or Federal regulations.

SECTION IX — SPECIAL PRECAUTIONS

Precautions to be taken in handling and storing - Keep dry to reduce rusting. **Observe maximum floor loading limitations**.

SECTION X — TRANSPORTATION

DOT Classification - Not a regulated material Proper Shipping Name - N/A DOT ID # - Not regulated

SECTION XI — REGULATORY

a) CERCLA Hazardous Substance	**_____ yes**	**__X__no**
b) SARA, Title III, Extremely Hazardous Substance	**_____ yes**	**__X__no**
c) Toxic Chemical Release Report	**__X__ yes**	**_____no**

Nickel & Manganese are subject to requirements of Section 313 of the Community Right-to-know Act of 1986 & 40CFR Part 372.

The information presented here has been compiled from sources considered to be reliable and accurate to the best of our knowledge and belief, but is not guaranteed to be so.