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Underwater Coatings Testing for INEEL Fuel Basin Applications

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Idaho National Engineering and Environmental Laboratory
Bechtel BWXT Idaho, LLC

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DISCLAIMER

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ACRONYMS/ABBREVIATIONS

CFA	Central Facilities Area
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
JSA	Job Safety Analysis
MSDS	Material Safety Data Sheet
MTR	Materials Test Reactor
NBA	North Boulevard Annex
PBF	Power Burst Facility
PPE	Personal Protective Equipment
TAN	Test Area North

Underwater Coatings Testing for INEEL Fuel Basin Applications

1. INTRODUCTION

The Idaho National Engineering and Environmental Laboratory (INEEL) is deactivating several fuel storage basins. Airborne contamination is a concern when the sides of the basins are exposed and allowed to dry during water removal. One way of controlling this airborne contamination is to fix the contamination in place while the pool walls are still submerged. There are many underwater coatings available on the market that are used in marine, naval and other applications. A series of tests were run to determine whether the candidate underwater fixatives are easily applied and adhere well to the substrates (pool wall materials) found in INEEL fuel pools.

The four pools considered included 1) Test Area North (TAN-607) with epoxy painted concrete walls; 2) Idaho Nuclear Technology and Engineering Center (INTEC) (CPP-603) with bare concrete walls; 3) Materials Test Reactor (MTR) Canal with stainless steel lined concrete walls; and 4) Power Burst Facility (PBF-620) with stainless steel lined concrete walls on the bottom and epoxy painted carbon steel lined walls on the upper portions. Therefore, the four materials chosen for testing included bare concrete, epoxy painted concrete, epoxy painted carbon steel, and stainless steel. The typical water temperature of the pools varies from 55^{o}F to 80^{o}F dependent on the pool and the season. These tests were done at room temperature.

2. CANDIDATE COATINGS

Through the use of internet searches, phone calls, and email, thirteen candidate underwater coatings were determined. Originally, EKOR coating (from Eurotech) was going to be tested, however, due to an inability to obtain required information and samples, this test was cancelled. An additional coating (UT-15) was added to the list tested based on a vendor response to a request for proposals for coating the pool walls underwater.

Table 1. Underwater Coatings Evaluated

Product Name	Vendor	Comments
Wet/Dry 700 Epoxy	Progressive Epoxy Polymers, Inc.	www.epoxyproducts.com
Ultra Phix-UW	Ultra Polymers, Inc.	www.ultraploymersinc.com
NMP 1710 Epoxy	National Maintenance Products	Australia
NMP 1720 Epoxy	National Maintenance Products	Australia
Corro-Coat FC 2100 Epoxy	Progressive Epoxy Polymers, Inc.	www.epoxyproducts.com
Alocit 28.15 Epoxy	Alocit Systems	UK/Europe
Carboguard Mastic A-788	Somay Product	
Diver-cote RA 500UW-HV	Chemco International	Scotland
Diver-cote RA 500UW-LV	Chemco International	Scotland
Marine-Flex 570	Edison Coatings Inc.	www.edisoncoatings.com
Euro-vinyl CV02	Euronavy	Portugal
Euro-paste 326	Euronavy	Portugal
Euro-diver 1 323 Epoxy	Euronavy	Portugal
UT-15 Underwater Epoxy	Picco Coatings Co.	Texas

The following criteria were used during this evaluation. The underwater coating must:

- Be easy to apply
- Adhere well to the four surfaces of interest
- Not change or have a negative impact on water chemistry or clarity
- Not be hazardous in final applied form
- Be proven in other underwater applications.

In addition, it is desirable for the coating to have a high pigment or high cross-link density to prevent radiation from penetrating.

3. TEST PROCEDURE

3.1 Test Description

The coatings were applied underwater in a non-radioactive test at the North Boulevard Annex (NBA). Each coating was applied to four different substrates: epoxy-painted concrete; bare concrete; epoxy-painted carbon steel; and stainless steel. The test equipment included clear plastic containers (1.5 feet deep, 2.5 feet long, 1.5 feet wide), brushes, rollers, trowels, stirring sticks, and small containers for mixing up the coatings. Before use, the test containers were washed with soap to remove any manufacturing residue. Personal protective equipment (PPE) consisting of nitrile gloves and safety glasses, as identified by the Industrial Hygienist, were used for all mixing and application of all coatings. Also per the Industrial Hygienist's recommendations, an eyewash was obtained and installed.

A set of four test coupons was used for each of the coatings. The stainless steel and carbon steel test coupons were cut (8" squares) from stock material. The carbon steel plates were then painted with epoxy paint and allowed to cure according to manufacturer's recommendations. Standard concrete bricks (6000 psi concrete – 4" wide X 8" long X 2" deep) were also used and half of these bricks were coated with epoxy paint. Before placing the steel coupons in the water, they were washed to remove any machine oil residue. The metal test coupons were glued with silicone in a vertical orientation to the sides of the clear plastic containers. A separate container was used for each coating to avoid cross-contamination among different fixatives. Concrete test coupons were placed in water to soak for at least 48 hours before the start of testing then transferred to the test container with the metal samples and the test container was filled with water. To avoid excessive rusting of the carbon steel coupons, the test containers were filled with water on the test day. Before and during testing, the water temperature was monitored with a thermocouple since water temperature can have a significant impact on product performance and on epoxy coating pot life (the length of time between mixing and hardening).

Each coating was mixed according to the supplier's instructions. Careful attention was paid to the expected pot life; to ensure that the coating was applied to all four test coupons before hardening. The coating was applied underwater to the vertical surface of each of four test coupons; one of each type of substrate material. The applicator (brush, roller, trowel) was selected based on the supplier's recommendation and discretion of the person completing the application. During application of the fixatives, observations were recorded, including the following:

- Ease of application
- Viscosity (subjective assessment)
- Effectiveness of application method
- Workability
- Applied thickness
- Product control
    - Mixing
    - Pot time
    - Runny, bubbles, lumpy
- Underwater transport of mixed product
    - Impact on water clarity
    - Chunks or drops that float or settle to bottom

- Film on water

- Coverage
- Adhesion

After curing, the samples were analyzed visually for adhesion, surface roughness, cracking, and any other visually notable characteristics. In addition, an attempt to peel the fixative from the test coupon by hand, scratching with a scraper (screwdriver) at about 45 degrees, and striking with a hammer were completed. The results were documented and compared to determine which coatings displayed the best adhesion to the test coupons. This information, combined with the observations taken during application, was analyzed and the three most promising fixatives selected. Still and video photos were taken of test set-up, fixative application, cured fixative, and adhesion testing.

Upon completion of the analysis, the water was disposed of in the floor drain (after straining to remove any chunks of cured coating that could have plugged the drain). The test equipment was disassembled and the test coupons were stored for future reference. The unused fixatives were disposed of or stored in approved locations.

3.2 Safety Documentation

All Material Safety Data Sheets (MSDSs) and product descriptions (Appendix A) were obtained from the suppliers. INEEL form 442.10, "Agent Request Hazard Evaluation" was completed and approved for each product. Through this process, the NBA facility chemical custodian (Craig Robb), the Industrial Hygienist (Saul Chessin), Safety (Doug Ardary), and Environmental (Chris Kent) were all informed of the upcoming use of these chemicals. Once these approvals were in place, free samples of each fixative were requested from the suppliers. The fixatives were shipped to the INEEL Central Facilities Area (CFA) warehouse, and then transported to the NBA for storage and use.

The existing Job Safety Analysis (JSA) for the NBA includes mixing and applying epoxy-type materials. An analysis by the Safety Representative and Chemical Custodian showed that the existing JSA encompassed the planned work, so an additional JSA was not required.

3.3 Quality Level

A form 414.A06 (Appendix B) was completed to determine and document the Quality Level for this work. The testing at the NBA was a Quality Level 4 as it was a simple scoping test.

Procurement verified that suppliers do not need to be on the Qualified Supplier List to obtain free samples for research and development testing. If the products test successfully and procurement is planned, the supplier will need to be evaluated, based on the Quality Level, for approval as a Qualified Supplier.

3.4 INEEL Personnel Contact Information

INEEL Personnel			
Project Specific Title	**Name**	**Phone Number**	**E mail**
Project Manager	Randy Bargelt	(208) 526-9304	rnl@inel.gov
Technical Lead	Julia Tripp	(208) 526-3876	jtri@inel.gov
Project Planning	Ann Marie Phillips	(208) 526-6877	aqs@inel.gov
Test Engineer	Kip Archibald	(208) 526-3187	archke@inel.gov
Test Technician	Craig Robb	(208) 526-5295	car4@inel.gov

4. TEST RESULTS

4.1 Wet/Dry 700

Color and Apparent Viscosity of Coating: Part A was a lumpy white paste. Part B was tan, smooth and slightly runny. After mixing together in a ratio of 1:1 with a wooden stick it was a cream-colored high viscosity paste.

Application Method Used: Both a gloved hand and a trowel were used to apply the mixed coating. It was too thick for brush application.

Pot Life: 80 minutes at 75°F

Applied Thickness: Varied from 1/32 to 1/16 inch.

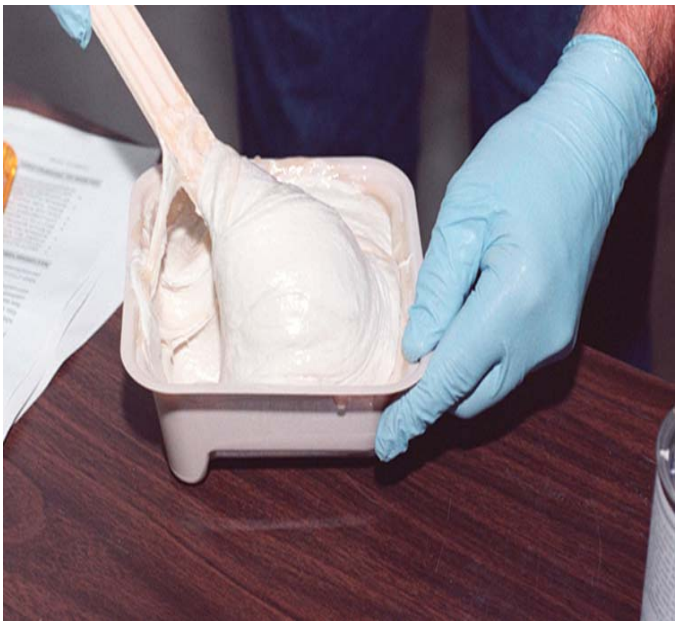
Impact on Water Clarity: During application, water was clear. After 15 minutes of curing, water turned a faint yellow. The excess fixative settled on the bottom of the container. There was no apparent film on the water during or after curing.

Adhesion during Application: Covered the painted brick and painted carbon steel coupons with ease. However, the coating seemed to tear away from the stainless steel and bare concrete surfaces as it was applied. After application, there was no slumping of the coating.

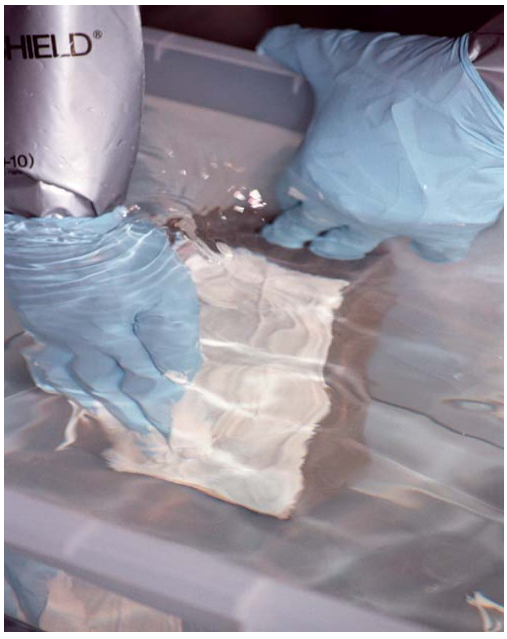
Cure Time and Temperature: A seven-day cure was used (only 2 days required according to manufacturer's information) at about 57°F.

Appearance after Curing: The surface was cream-colored and rough but no cracking was observed. 100% of the surfaces were covered.

Adhesion after Curing: The coating was very well adhered to all surfaces. The material overhanging the edge of the coupon could be broken off (taking the epoxy paint with it on the painted coupons).



Mixing Wet-Dry 700 resulted in thick white paste.



Applying Wet-Dry 700 to brick with gloved hand.

Applying Wet-Dry 700 to stainless steel with trowel.

Overhanging edge of Wet-Dry 700 can be broken off brick.

Scrapping Wet-Dry 700 has no affect.

Overhanging edge of Wet-Dry 700 can be broken off of carbon steel plate taking epoxy paint with it.

4.2 Ultra Phix-UW

Color and Apparent Viscosity of Coating: Both parts of the coating were contained inside a caulking type tube. After application, in a ratio of 2:1 as automatically fed through an in line mixing tube with the caulking gun it was a cream-colored high viscosity paste.

Application Method Used: The vendor provided the caulking gun with a mixing tip was used to squirt the coating out on the coupons surfaces underwater. Then a trowel was used to smooth the coating over the entire surface. This was very time consuming as each squeeze provided just a little coating and the resulting coating was not well mixed (in full scale application it is assumed this would not be an issue).

Pot Life: Since the coating is mixed as it is applied, pot life is not an issue.

Applied Thickness: Varied from 1/32 to 1/16 inch

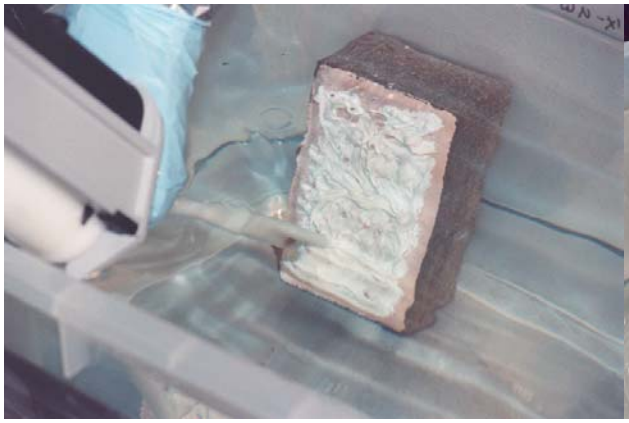
Impact on Water Clarity: During application, water was clear. After 15 minutes of curing, water turned a faint yellow. A small amount of coating floated on the water surface (probably due to the application method). There was no apparent film on the water during or after curing.

Adhesion during Application: Covered the painted brick and painted carbon steel coupons with ease. However, the coating seemed to tear away from the stainless steel and bare concrete surfaces as it was applied. After application there was no slumping of the coating.

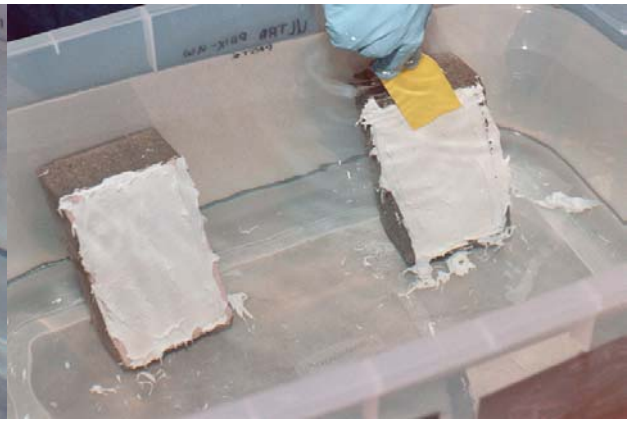
Cure Time and Temperature: A seven-day cure was used (only 3 days required according to manufacturer's information) at about 57°F.

Appearance after Curing: The surface was cream-colored and rough but no cracking was observed. 100% of the surfaces were covered.

Adhesion after Curing: The coating would not peel away from the coupon surfaces but it could be scratched off with a screwdriver held at a 45^{o} angle. The material overhanging the edge of the coupon could be broken off (taking the epoxy paint with it on the painted coupons).



Applying Ultra Phix-UW to the epoxy coated brick with special mixing gun.



Spreading Ultra Phix-UW on brick after application.

Applying Ultra Phix-UW to the stainless steel with special mixing gun.

Overhanging edges of Ultra Phix-UW will break off.

Scrapping Ultra Phix-UW will remove some coating.

4.3 NMP 1710

Color and Apparent Viscosity of Coating: Part A was a white and runny. Part B was grey and a sticky paste. After mixing together in a ratio of 1:1 with a wooden stick, it was a grey-colored medium viscosity paste.

Application Method Used: This material was applied using a plastic trowel.

Pot Life: 45 minutes at 75°F

Applied Thickness: Varied from 1/32 to 1/16 inch

Impact on Water Clarity: Water remained clear at all times. No visible effects.

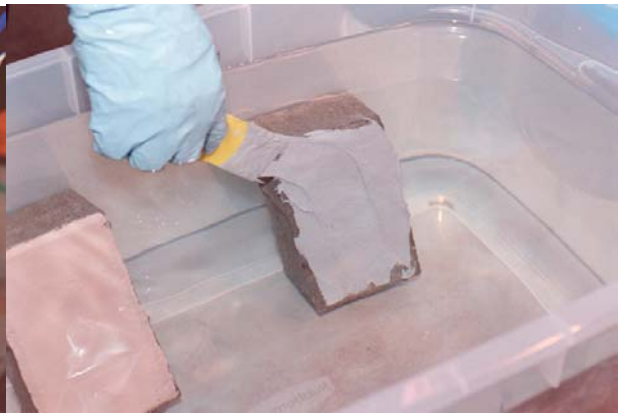
Adhesion during Application: Easily covered all coupon surfaces with no tearing and no slumping.

Cure Time and Temperature: A seven-day cure was used (only 2 days required according to manufacturer's information) at about 57°F.

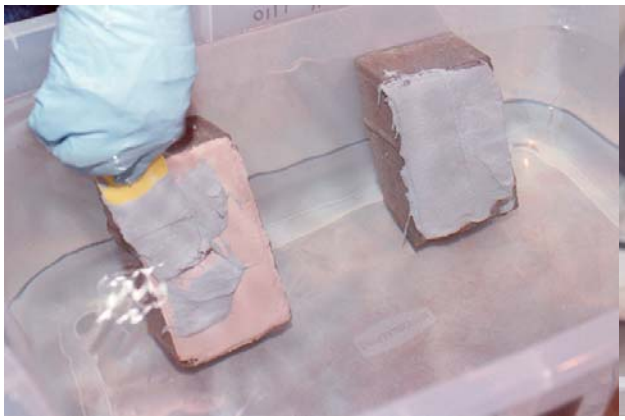
Appearance after Curing: The surface was light grey-colored and semi rough but no cracking was observed. 100% of the surfaces were covered.

Adhesion after Curing: The coating was very well adhered to all surfaces. The material overhanging the edge of the coupon could be broken off.

NMP 1710 was easy to mix.



NMP 1710 was easy to apply.



NMP 1710 application on epoxy coated brick.

A little of the overhanging edge of NMP 1710 could be broken off but coating is well adhered to all surfaces.

4.4 NMP 1720

Color and Apparent Viscosity of Coating: Part A was a white and taffy-like. Part B was tan and paste-like. After mixing together in a ratio of 1:1 with a wooden stick, it was a white-colored high viscosity paste.

Application Method Used: This material was applied using a plastic trowel.

Pot Life: 45 minutes at 75°F

Applied Thickness: Varied from 1/32 to 1/16 inch

Impact on Water Clarity: Water remained clear at all times. No visible effects.

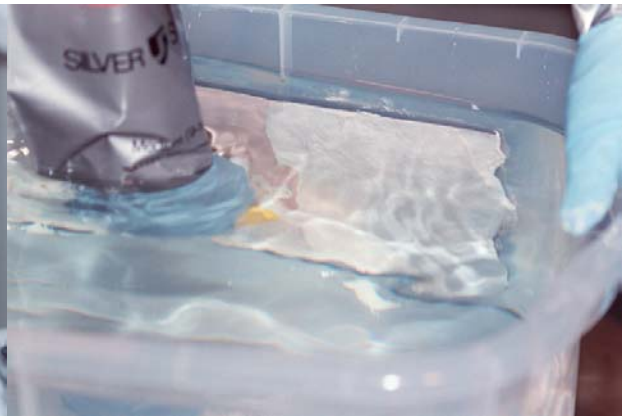
Adhesion during Application: Easily covered all coupon surfaces. Some tearing was observed when applying the coating to the bare concrete coupon. No slumping of the coating was observed.

Cure Time and Temperature: A seven-day cure was used (only 2 days required according to manufacturer's information) at about 59°F.

Appearance after Curing: The surface was white-colored and rough but no cracking was observed. 100% of the surfaces were covered.

Adhesion after Curing: The coating was very well adhered to all surfaces. The material overhanging the edge of the coupon could be broken off.

NMP 1720 was a high-viscosity paste.



NMP 1720 application on epoxy coated carbon steel.

Some tearing occurred when applying NMP 1720 application to bare brick.

A little of the overhanging edge of NMP 1720 could be broken off but coating is well adhered to all surfaces.

NMP 1720 could not be scrapped off the bare brick.

4.5 Corro-Coat FC-2100

Color and Apparent Viscosity of Coating: Part A was a silver paste. Part B was gold with a varnish-like consistency. After mixing together in a ratio of 2:1 with a wooden stick, it was a grey-colored honey-like consistency (low-medium viscosity).

Application Method Used: This material was applied using a paintbrush.

Pot Life: 55-75 minutes at 75°F

Applied Thickness: Varied from 1/32 to 1/16 inch. It was easier to control the thickness and apply an even coating with this coating than with most of the others.

Impact on Water Clarity: Water remained clear at all times. No visible effects.

Adhesion during Application: Easily covered all coupon surfaces with no tearing and no slumping.

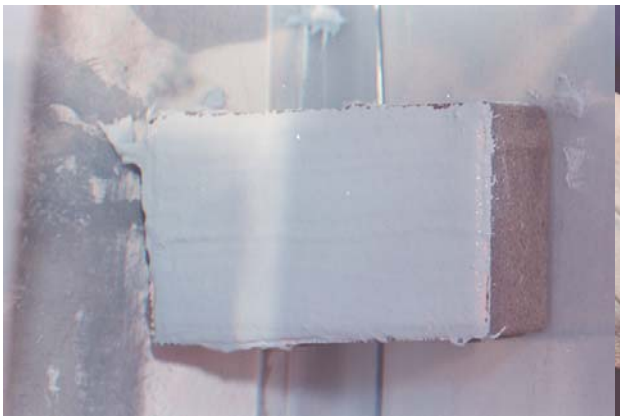
Cure Time and Temperature: A seven-day cure was used (only 8-10 hrs required according to manufacturer's information) at about 56°F.

Appearance after Curing: The surface was grey-colored with a light roughness but no cracking was observed. 100% of the surfaces were covered with a thin coat.

Adhesion after Curing: The coating was very well adhered to all surfaces. The material overhanging the edge of the coupon could be broken off. When scrapping with a screwdriver and applying higher pressure the outer surface of the fixative can be removed. Several weeks after the original adhesion test, some of the coating on the stainless steel coupon had fallen off, but was still tightly adhered to the other coupons (these coupons had been transported around to allow others to observe them).

Corro-Coat FC 2100 was relatively easy to mix.

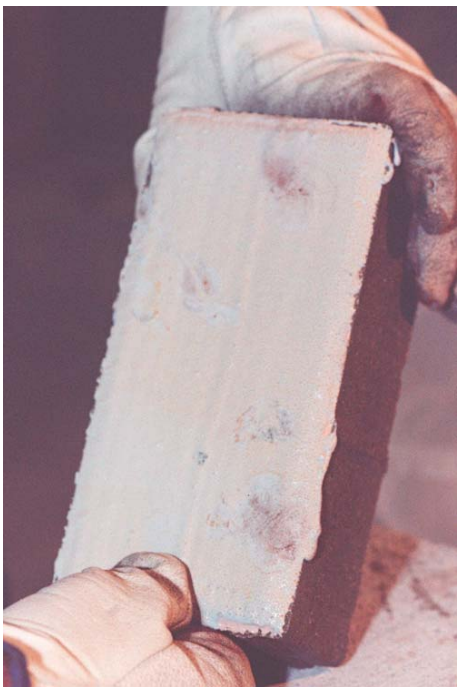
Corro-Coat FC 2100 was applied with a brush.



Corro-Coat FC 2100 applied without tearing or slumping.

The overhanging edge of the cured Corro-Coat FC 2100 could be broken off.

Corro-Coat FC 2100 adhered well to all surfaces during initial adhesion testing but later came off the stainless steel coupon.



4.6 Alocit 28.15

Color and Apparent Viscosity of Coating: Part A was a brown paint-like material. Part B was clear with a consistency of varnish. After mixing together in a ratio of 5:1 with a wooden stick, it was tan-colored with a low-medium viscosity (like latex paint).

Application Method Used: This material was applied using a paintbrush.

Pot Life: 45/60 minutes to one hour at 68°F.

Applied Thickness: Varied from 1/32 to 1/16 inch. It was easier to control the thickness and apply an even coating with this coating than with most of the others.

Impact on Water Clarity: Water remained clear during application. A small amount of floating coating was observed. After curing, a small amount of oil-like film appeared on the water surface.

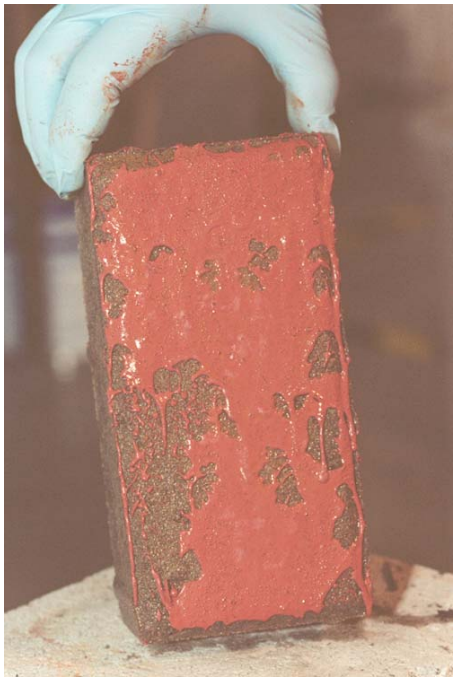
Adhesion during Application: Easily covered all but the unpainted brick. It would tear away from the unpainted brick making it extremely hard to cover. Thirty minutes after the coating had been applied to the unpainted brick only about 60% of the coating remained on the brick with the rest slumping off onto the bottom of the container. After one hour of cure time, some slumping had occurred on all of the different coupons.

Cure Time and Temperature: A seven-day cure was used at about 57°F.

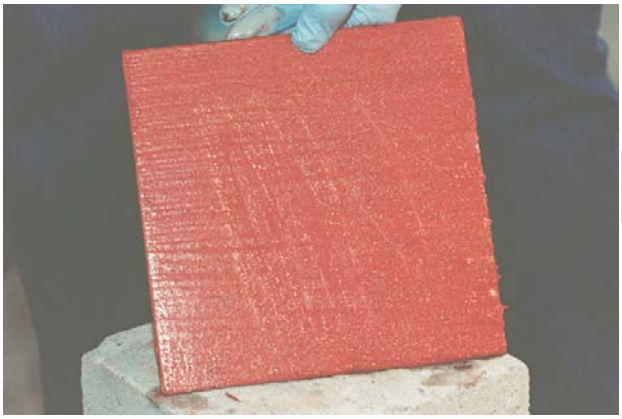
Appearance after Curing: The surface was brown and smooth with no cracking was observed. 100% of the surfaces of the stainless steel, painted carbon steel and painted concrete were covered with a thin coat. Only 60% of the bare concrete was coated.

Adhesion after Curing: The coating was very well adhered to all surfaces. The material overhanging the edge of the coupon could be broken off. When scrapping with a screwdriver and applying pressure greater than 5 psi the outer surface of the fixative can be removed.

Alocit 28.15 mixed easily and covered the metal plates well.



Alocit 28.15 did not adhere well to the bare brick when coating but the coating that did cure on the surface was well adhered..



Alocit 28.15 adhered well to the metal coupons.

4.7 Carboguard Mastic A-788

Color and Apparent Viscosity of Coating: Hard paste that was too difficult to mix by hand (broke two wooden sticks trying to mix).

Application Method Used: Unable to apply due to mixing difficulties and short pot life.

Pot Life: 40 minutes at 75°F for golf ball size amount, 15 minutes for ½ gallon

Applied Thickness: Not applicable

Impact on Water Clarity Not applicable

Adhesion during Application: Not applicable

Cure Time and Temperature: Not applicable

Appearance after Curing: Not applicable

Adhesion after Curing: Not applicable

Carboguard Mastic A-788 was not tested as it was too difficult to mix and had a very short pot life..

4.8 Diver-cote RA 500UW-HV

Color and Apparent Viscosity of Coating: Part A was a clear and runny. Part B was black and lumpy paste. After mixing together in a ratio of 3:1 with a wooden stick, it was a black-colored high-viscosity paste.

Application Method Used: This material was applied using a putty knife to the painted carbon steel and half the stainless steel coupons. Application method was changed to a paintbrush after noting ease of application.

Pot Life: 80 minutes at 68°F

Applied Thickness: Varied from 1/32 to 1/16 inch.

Impact on Water Clarity: Water remained clear with a small amount of floating coating. Some excess coating settled to the bottom of the container. No film on the water when it was first applied but after application complete a small amount of oil-like film appeared on the water surface.

Adhesion during Application: Easily covered the painted brick, stainless steel and painted carbon steel. Did not adhere well to the bare concrete – tearing away from the surface. When smoothing out the coating on all surfaces the coating was stringy (thus the floating and settling coating noted above).

Cure Time and Temperature: A seven-day cure was used (only 3 days required according to manufacturer's information) at about 56°F.

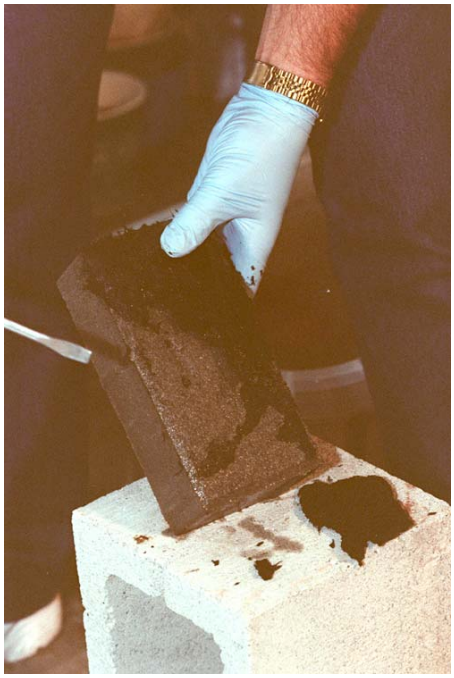
Appearance after Curing: The surface was black and smooth with no cracking observed. 100% of the surfaces were covered with a thin coat.

Adhesion after Curing: The coating was adhered to the epoxy coated brick and epoxy coated carbon steel. The coating on the bare brick and the stainless steel could be peeled off. The material overhanging the edge of the coupons could be broken off and much of the stringy material remained adhered to the coupons. When scrapping with a screwdriver and applying pressure greater than 5 psi the outer surface of the fixative can be removed.

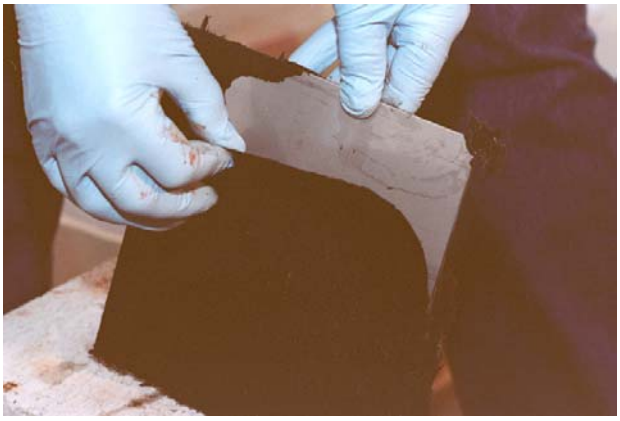
Diver-cote was a high viscosity paste.

Diver-cote was easily applied with a putty knife or a paintbrush.

Diver cote formed “strings” in the water.



Diver-cote peeled off the bare brick after curing.



Diver-cote peeled off the stainless steel after curing.

4.9 Diver-cote RA 500UW-LV

Color and Apparent Viscosity of Coating: Part A was a silver paste. Part B was gold with a varnish like consistency. After mixing together in a ratio of 3:1 with a wooden stick, it was a grey-colored honey-like consistency (low-medium viscosity).

Application Method Used: This material was applied using a paintbrush.

Pot Life: 80 minutes at 68°F

Applied Thickness: Varied from 1/32 to 1/16 inch. It was easier to control the thickness and apply an even coating with this coating than with most of the others.

Impact on Water Clarity: Water remained clear at all times. No visible effects.

Adhesion during Application: Easily covered all coupon surfaces except the unpainted brick where a larger amount of pressure had to be applied to make it adhere. The fixative slumped off all surfaces but on all but the bare brick the slumping still left a coating on the coupon.

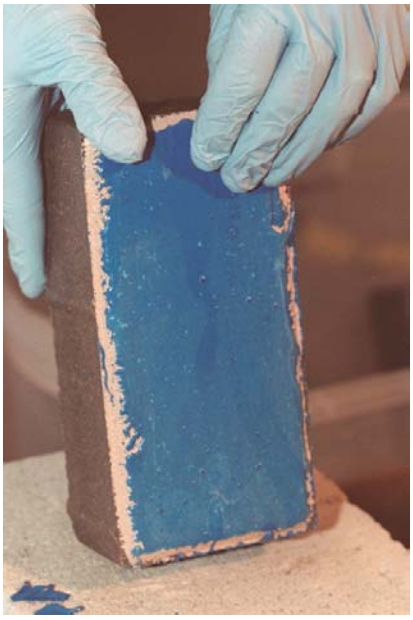
Cure Time and Temperature: A seven-day cure was used (only 3 days required according to manufacturer's information) at about 56°F.

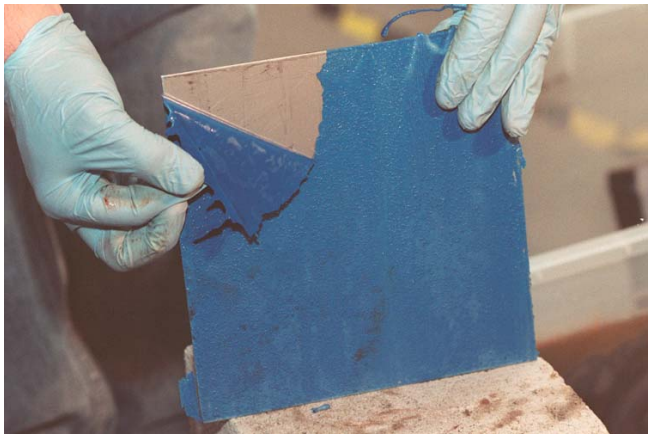
Appearance after Curing: The surface was blue with a light roughness and very porous (popped air bubbles). 100% of the surfaces were covered with a thin coat except for the bare brick which was only about 1/8 covered.

Adhesion after Curing: On the painted carbon steel the coating could not be peeled off but a small amount could be scrapped off with a screwdriver. The coating easily peel away from the surface of the stainless steel and the bare brick. On the painted brick small pieces of coating would peel from the edge but the majority was well adhered.

Diver-cote LV was easy to mix and apply but did not adhere well.

Diver-cote LV slumped off all coupons and almost completely off the bare brick.





Diver-cote LV was adhered to the epoxy coated brick.

Diver-cote LV peeled off the stainless steel after curing.

4.10 Marine-Flex 570

Color and Apparent Viscosity of Coating: Part A was grey with a consistency of latex paint. Part B was yellow-brown with a honey-like consistency. After mixing together in a ratio of 1.5:1 with a wooden stick, it was a grey paint-like consistency (low-medium viscosity).

Application Method Used: This material was applied using a paintbrush.

Pot Life: 20 minutes at 77°F

Applied Thickness: Varied from 1/32 to 1/16 inch.

Impact on Water Clarity: Water remained clear at all times. No visible effects.

Adhesion during Application: Easily covered all coupon surfaces with no tearing and no slumping. However, more pressure was required when applying to the painted brick to get it to adhere.

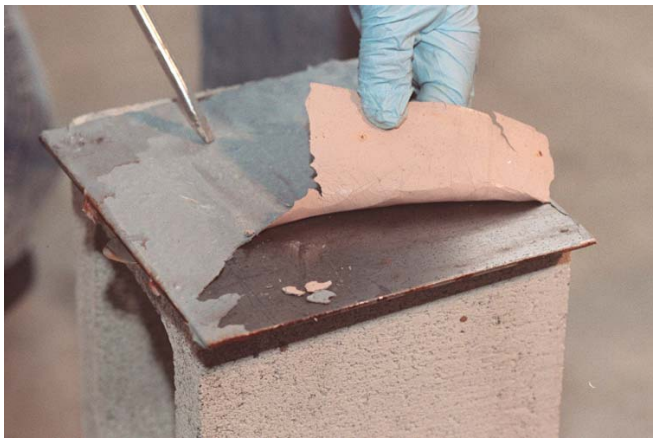
Cure Time and Temperature: A four-day cure was used at about 56°F.

Appearance after Curing: The surface was grey-colored and smooth but no cracking was observed. 100% of the surfaces were covered.

Adhesion after Curing: The coating was not well adhered to any surfaces and was easily peeled or scrapped off. On the epoxy coated carbon steel the epoxy paint peeled off with the coating.

Marine Flex 570 mixed easily and was applied with a paintbrush.

Marine Flex 570 was easily peeled from all surfaces after curing.



4.11 Euro-vinyl CVO2

Color and Apparent Viscosity of Coating: All in one container, stirred with wooden stick to a white medium viscosity paste.

Application Method Used: This material was applied to the painted carbon steel and the stainless steel using a paintbrush and to the painted concrete and bare concrete using a plastic trowel.

Pot Life: NA

Applied Thickness: Varied from 1/32 to 1/16 inch.

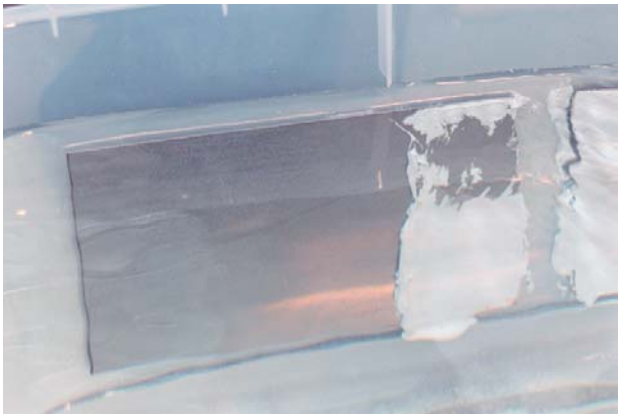
Impact on Water Clarity: Water remained clear with a small amount of floating coating pieces.

Adhesion during Application: Easily covered all coupon surfaces, however some tearing occurred when applying with the paintbrush to the concrete bricks. Therefore, a trowel was used on these bricks with no tearing. More pressure needed to get coating to adhere to the bare brick.

Cure Time and Temperature: A four-day cure was used at about 56°F (only 16 hours required to overcoat at 73°F according to manufacturer's information).

Appearance after Curing: The surface was white with a non-uniform application but no cracking was observed. 100% of the surfaces were covered.

Adhesion after Curing: The coating was not well adhered to any surfaces and was easily peeled or scrapped off, it appeared very glue-like (seemed like uncured).



Euro-vinyl CVO2 applied easily to the stainless steel with a paintbrush.

Euro-vinyl CVO2 was more difficult to apply to the bare brick and a trowel was used to apply more pressure.

Euro-vinyl CVO2 did not adhere well to any surfaces after curing and in some cases did not seem to be fully cured despite adequate lapsed time.

4.12 Euro-paste 326

Color and Apparent Viscosity of Coating: Part A was a white paste. Part B was white with a latex paint-like consistency. After mixing together in a ratio of 5:1 with a wooden stick, it was a white paste (medium viscosity).

Application Method Used: This material was applied using a plastic trowel.

Pot Life: 30 minutes at 73°F.

Applied Thickness: Varied from 1/32 to 1/16 inch.

Impact on Water Clarity: Water remained clear at all times. Some coating pieces floated on the surface of the water.

Adhesion during Application: Easily covered all coupon surfaces with no tearing and no slumping. However, more pressure was required when applying to the unpainted brick to get it to adhere.

Cure Time and Temperature: A four-day cure was used at about 56°F (only 1 day required at 73°F according to manufacturer's information).

Appearance after Curing: The surface was off-white with non-uniform thickness of coating. 100% of the surfaces were covered.

Adhesion after Curing: The coating was very well adhered to the painted carbon steel and the stainless steel. On the stainless steel, when putting a screwdriver under the edge could peel a small amount off. On the painted brick, the entire coating could be peeled off (taking 50% of the paint with it) by pulling on the overhanging edge. However, a screwdriver could not break through the coating surface. On the unpainted brick, the coating easily peeled off the entire brick surface in one big piece.

Euro-paste 326 was easily applied with a trowel.

Euro-paste 326 applied easily to the stainless steel.

Euro-paste 326 adhered well to the stainless steel and painted carbon steel but not to the bricks.

4.13 Euro-diver 1 323

Color and Apparent Viscosity of Coating: Part A was a white paste. Part B was clear with a honey-like consistency. After mixing together in a ratio of 5:1 with a wooden stick, it was a white with a latex paint consistency (low viscosity).

Application Method Used: This material was applied using a paintbrush and a trowel.

Pot Life: 40 minutes at 73°F.

Applied Thickness: Varied from 1/32 to 1/16 inch.

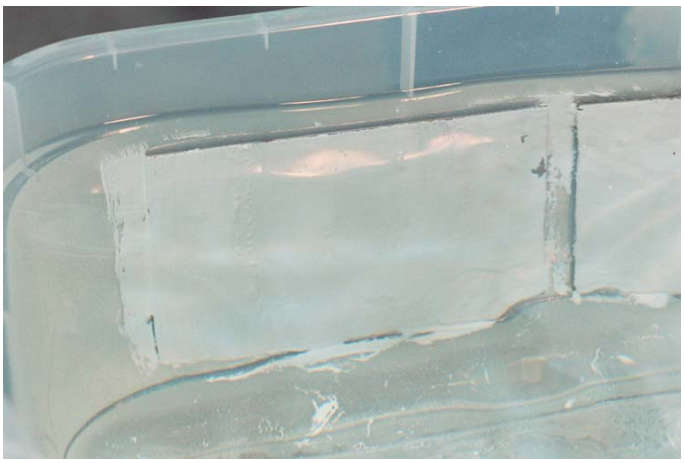
Impact on Water Clarity: Water remained clear at all times. Some coating pieces floated on the water surface.

Adhesion during Application: Easily applied to all metal surfaces (stainless steel and painted carbon steel). However, a large amount of pressure was required when applying to the unpainted brick to get it to adhere. The painted brick was extremely hard to cover. Approximately 10 minutes after applying, the coating began to slump off the unpainted and painted brick.

Cure Time and Temperature: A four-day cure was used at about 56°F (only 1 day required at 73°F according to manufacturer's information).

Appearance after Curing: The surface was off-white colored with an uneven texture. All surfaces were covered except for the unpainted brick, which was only 30%, covered. There was significant rusting of the carbon steel.

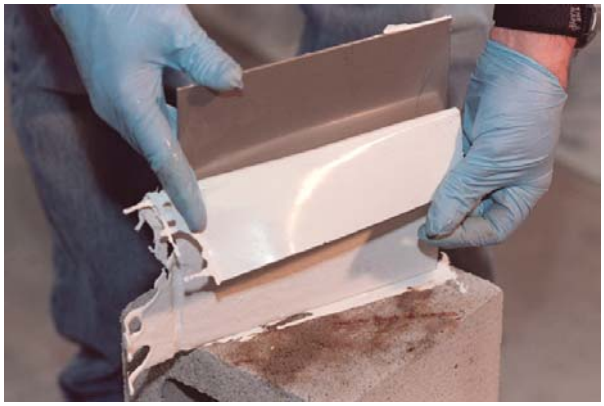
Adhesion after Curing: The coating was easily peeled off the painted carbon steel taking the paint with it. It also peeled easily off of the stainless steel. It was more difficult to remove from the painted brick. The remaining fixative on the unpainted brick peeled off very easily (still had an odor).



Euro-diver 1 323 applied easily to the stainless steel and painted carbon steel with a paintbrush and a trowel.

Euro-diver 1 323 did not stick to the painted and bare bricks well when applying.

Euro-diver 1 323 peeled off of all surfaces after curing.



4.14 UT-15 Underwater Epoxy

Color and Apparent Viscosity of Coating: Part A was a clear syrup. Part B was tan and paint-like. After mixing together in a ratio of 1:1 with a wooden stick, it was off-white with a latex paint consistency (low-medium viscosity).

Application Method Used: This material was applied using a paintbrush.

Pot Life: 65 minutes at 77°F.

Applied Thickness: Varied from 1/32 to 1/16 inch.

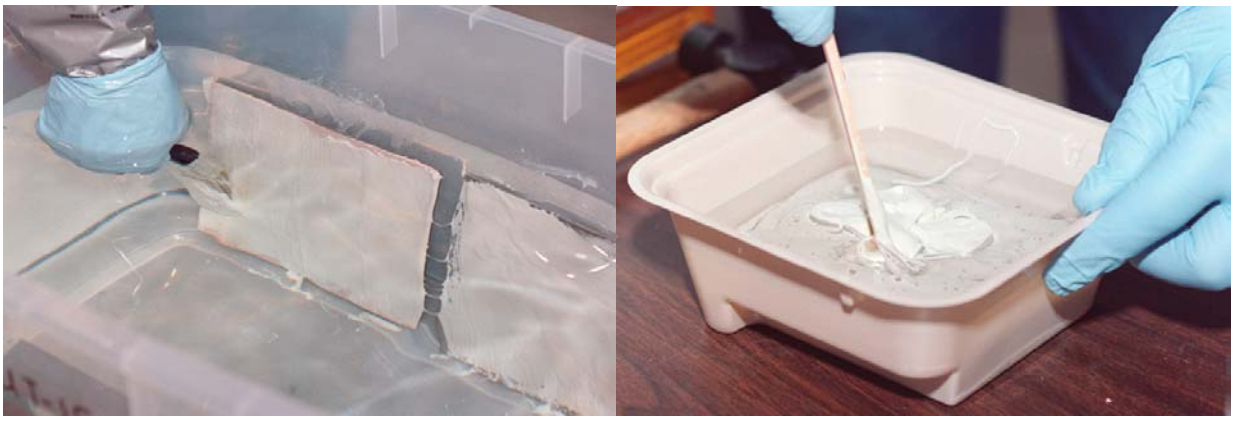
Impact on Water Clarity: Water remained clear during application but turned a yellowish green the day after the coating was applied. A light film appeared on the surface of the water (could be due to incomplete cure of the silicon holding the coupons to the container wall). Analysis of the water found no chemicals of concern.

Adhesion during Application: Very easily covered all coupon surfaces with no tearing and no slumping.

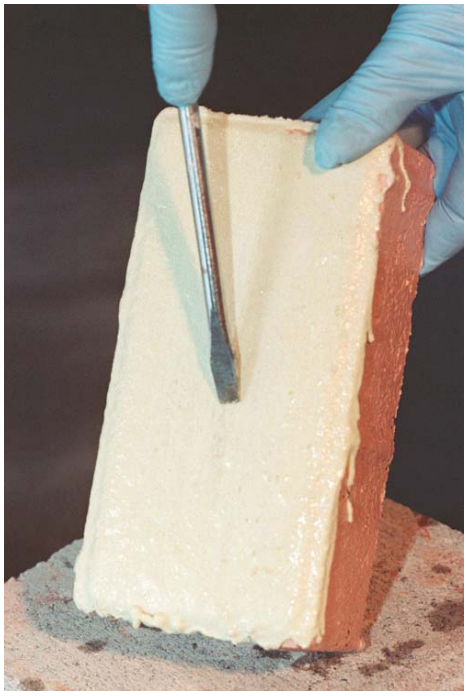
Cure Time and Temperature: A four-day cure was used at about 56-67°F (1.5 days required at 70°F and 4 days required at 33°F according to manufacturer's information).

Appearance after Curing: The surface was pale green-colored, uniform and smooth with no cracking observed. 100% of the surfaces were covered.

Adhesion after Curing: The coating was very well adhered to all surfaces and could not be removed. If there is an overhang of the coating on the edge it could be broken off but did not take it off the coupon surface.



UT-15 applied easily to all surfaces using a paintbrush.



UT-15 adhered well to all surfaces.

5. RECOMMENDATIONS

The three coatings that were the easiest to apply and adhered well were the NMP 1710, Corro-Coat FC 2100 Epoxy, and the UT-15 Underwater Epoxy. However, there is some concern on the Corro-Coat FC 2100 since after several weeks it broke off the stainless steel surface. Many of these coatings require a roughed up surface to adhere well according to manufacturers instructions and this may be why this coating came off.

In several cases, applied coatings bonded well to the epoxy painted surfaces but caused the bond of the epoxy paint to the surface of the coupon to weaken. Some literature suggests that the coating over the epoxy paint actually softens the paint to allow this to happen.

Water samples were analyzed for the UT-15 coating and the Corro-coat FC 2100 coating to determine the presence of any undesirable organic compounds. The samples were analyzed using a carboxen SPME (solid phase micro extraction) technique. The SPME is sensitive to organics in the part per billion and high range. The SPME was adsorbed in the sample for approximately 15 minutes. The SPMEs were then desorbed in the injector of a Shimadzu GCMS. The results for both samples (Appendix C) indicated that there were no hazardous agents present. The compounds that were picked up were not hazardous.

The ratio of surface area to pool volume was calculated for the test coupons (Table 2). This showed that the concentration of any chemicals coming from the coating as it cures should have been higher in the test case than it will be in any of the actual pools.

Table 2. Surface area to pool volume ratios.

	Surface area covered (ft2)	**Volume (gallons)**	**Ratio (gallons/ft2)**
Test	1.33	15.7	11.8
TAN	13,000	750,000	57.7
CPP-603	26,600	1,400,000	52.6
MTR	5,100	118,000	23.1
PBF	2,100	25,000	11.9

Based on these results, use of the UT-15 and the NMP 1710 coatings are recommended for larger scale testing in the actual fuel basins.

Appendix A

MSDS's and Product Information

Appendix B

Quality Assurance Documentation

QUALITY LEVEL AND REQUIREMENTS DETERMINATION

Date Prepared: 11-11-2003

	Revision No.: 0
Activity or Work Package No(s).: A.1.04.00.00.01.01	**Activity or Work Package Title(s):** Planning and Controls Management and Support Underwater Fixative Cold Test at North Boulevard Annex

For R&D work with multiple components, which have different quality levels assigned, attach a list of items by name with their assigned quality levels to this form.

If the work scope is complex and cannot be evaluated on a single form, or if there are activities that multiple quality levels, then a separate form shall be completed for each activity.

Review and Approvals for Quality Level Assignment and Quality Requirement selection:

Quality Level Assigned: 4 Date: 11-13-03

Julia Tripp Quality Level Selection Made By Print/Type Name	Julia Tripp Quality Level Selection Made By Signature	11-13-03 Date
Julia Tripp Principal Investigator, Approval Print/Type Name	Julia Tripp Principal Investigator, Approval Signature	11-13-03 Date
Randall Bargelt Manager Approval Print/Type Name	 Manager Approval Signature	11/13/03 Date
Mona Huffaker Quality Engineer (If Reviewed) Print/Type Name	Mona Huffaker Quality Engineer (If Reviewed) Signature	11/21/03 Date

CONVERSION TABLE

This table shall be used to convert a safety category to an equivalent quality level.

QUALITY LEVEL	SAFETY CATEGORY
1	Safety Class - **SC**
2	Safety Significant - **SS**
3	Low Safety Consequence - **LSC**
4	Consumer Grade - **CG**

Note 1: Quality Level may be applied to each individual item or activity and can vary based on the material or process verification requirements. For example an overall process may be assigned Quality Level 2, while some subcomponents of the process may be considered Quality Level 3 or Quality Level 4.

Note 2: Quality requirements are additives as you go from Quality Level 4 to Quality Level 1.

QUALITY LEVEL AND REQUIREMENTS DETERMINATION

Quality Level	Quality Level 4	Quality Level 3	Quality Level 2	Quality Level 1
Quality Requirements To Be Applied	☒ PI is responsible for the design of the fabrication/assembly of the laboratory prototype using commercial catalog items. MCP-9272 ☐ Approved industry standards will be used in any fabrication to ensure safety of design, MCP-9272 ☒ Documents prototype production/data results in a lab notebook, or Engineering Design File or Project File, MCP-9272 ☐ Statement of Work or Specification for procured items or services to include specific requirements (such as product/service deliverables, milestones, acceptance criteria, data collection and data review requirements and equipment calibration requirements), MCP-9359 for Specification and TEM-101 for Template for Statements of Work ☒ Quality Level 4 (consumer grade) Procurement Requirements, MCP-593, MCP-1185 ☐ Customer requirement as specified ☐ Peer review performed in accordance with MCP-9272 ☐ Work performed to approved procedures and Statement of Work/Specification requirements ☐ Provide documentation of process for calibration of M&TE including tolerances, MCP-2391, MCP-9272, App. B ☐ Design control implemented per MCP-2811 ☐ System Operability Test and Integrated Tests per MCP-3056 ☐ Special processes specified (welding, brazing, NDE, etc.) per MCP-37, if required by governing codes, standards and regulations	☐ Document inspections per MCP-195 and selected test TPR ☐ Special processes specified (welding, brazing, NDE, etc.) per MCP-37 ☐ Quality Level 3 Procurement Requirements specified (vendor qualification, receipt inspections, etc.) MCP-590, MCP-591, MCP-1185 ☐ Documented training/certification of personnel performing special processes and inspections as per MCP-37 ☐ Documents prototype production/data results in a lab notebook, or Engineering Design File or Project File, MCP-2875.	☐ Quality Level 2 Procurement Requirements specified (vendor qualification, receipt inspections, etc.) MCP-590, MCP-591, MCP-1185, MCP-3512, MCP-3513 ☐ Software Control per MCP-3039.	☐ Quality Level 1 Procurement Requirements specified (vendor qualification, receipt inspections, etc.) MCP-590, MCP-591, MCP-1185, MCP-3512, MCP-3513.

Note 1: Quality Level may be applied to each individual item or activity and can vary based on the material or process verification requirements. For example an overall process may be assigned Quality Level 2, while some subcomponents of the process may be considered Quality Level 3 or Quality Level 4.

Note 2: Quality requirements are additives as you go from Quality Level 4 to Quality Level 1.

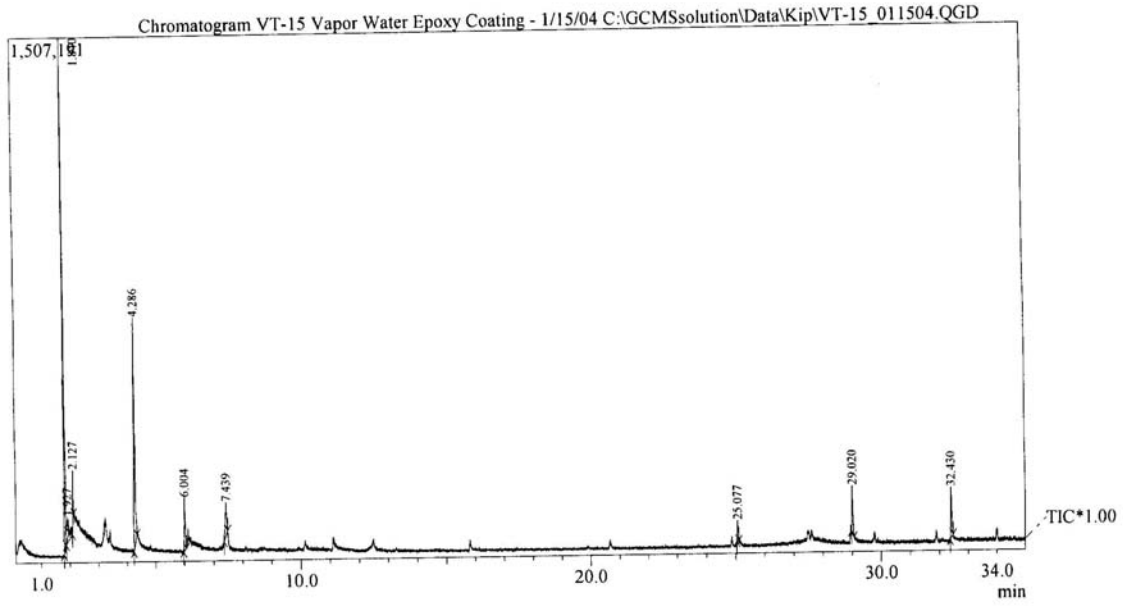
Appendix C

Water Sample Analysis

Sample Information

Analyzed by	: Admin
Analyzed	: 01/19/2004 1:50:14 PM
Sample Type	: Unknown
Level #	: 1
Sample Name	: VT-15 Vapor Water Epoxy Coating - 1/15/04
Sample ID	:
IS Amount	: [1]=1.000
Sample Amount	: 1.000
Dilution Factor	: 1.000
Vial #	: 8
Injection Volume	: 100.000
Data File	: C:\GCMSsolution\Data\Kip\VT-15_011504.QGD
Org Data File	: C:\GCMSsolution\Data\Kip\VT-15_011504.QGD
Method File	: C:\GCMSsolution\Data\Currency\currency_SPME.qgm
Org Method File	: C:\GCMSsolution\Data\Currency\currency_SPME.qgm
Report File	: C:\GCMSsolution\Data\Chris\Chris.qgr
Tuning File	: C:\GCMSsolution\System\Tune1\011904ei.qgt
Modified by	: Admin
Modified	: 01/19/2004 2:25:14 PM

Chromatogram VT-15 Vapor Water Epoxy Coating - 1/15/04 C:\GCMSsolution\Data\Kip\VT-15_011504.QGD



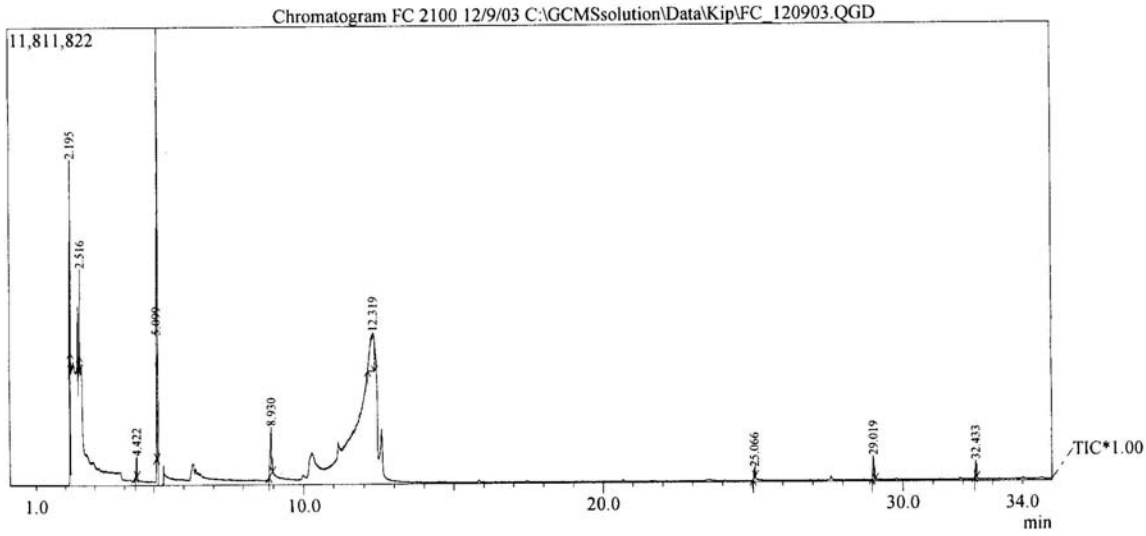
Peak Report TIC

Peak#	R.Time	I.Time	F.Time	Area	Area%	Height	Height%	A/H	Mark	Name
1	1.840	1.802	1.875	2475175	41.76	1470065	50.07	1.68		Carbon dioxide
2	1.927	1.875	1.972	219874	3.71	62404	2.13	3.52	V	Benzeneethanamine, N-methyl-
3	2.127	2.105	2.156	174914	2.95	158133	5.39	1.10		Acetic acid, [(aminocarbonyl)amino]o:
4	4.286	4.244	4.357	1607767	27.13	653598	22.26	2.45		Silane, fluorotrimethyl-
5	6.004	5.969	6.063	368999	6.23	153123	5.22	2.40		Acetic acid, butyl ester
6	7.439	7.366	7.488	330553	5.58	95038	3.24	3.47		1-Methoxy-2-propyl acetate
7	25.077	25.043	25.117	128579	2.17	60260	2.05	2.13		Trisiloxane, 1,1,1,5,5,5-hexamethyl-3,
8	29.020	28.985	29.070	278234	4.69	138403	4.71	2.01		N-(Trifluoroacetyl)-N,O,O',O"-tetrakis
9	32.430	32.379	32.481	343040	5.79	144703	4.93	2.37		N-(Trifluoroacetyl)-N,O,O',O"-tetrakis
				5927135	100.00	2935727	100.00			

Sample Information

Analyzed by	: Admin
Analyzed	: 01/19/2004 2:47:27 PM
Sample Type	: Unknown
Level #	: 1
Sample Name	: FC 2100 12/9/03
Sample ID	:
IS Amount	: [1]=1.000
Sample Amount	: 1.000
Dilution Factor	: 1.000
Vial #	: 8
Injection Volume	: 100.000
Data File	: C:\GCMSsolution\Data\Kip\FC_120903.QGD
Org Data File	: C:\GCMSsolution\Data\Kip\FC_120903.QGD
Method File	: C:\GCMSsolution\Data\Currency\currency_SPME.qgm
Org Method File	: C:\GCMSsolution\Data\Currency\currency_SPME.qgm
Report File	: C:\GCMSsolution\Data\Chris\Chris.qgr
Tuning File	: C:\GCMSsolution\System\Tune1\011904ei.qgt
Modified by	: Admin
Modified	: 01/19/2004 3:22:27 PM

Chromatogram FC 2100 12/9/03 C:\GCMSsolution\Data\Kip\FC_120903.QGD



Peak Report TIC

Peak#	R.Time	I.Time	F.Time	Area	Area%	Height	Height%	A/H	Mark	Name
1	2.195	2.192	2.221	2495281	11.30	5032206	34.35	0.50	MI	(S)-(+)-1-Cyclohexylethylamine
2	2.516	2.510	2.521	704882	3.19	2414968	16.48	0.29	MI	Silane, fluorotrimethyl-
3	4.422	4.383	4.439	874309	3.96	524001	3.58	1.67	MI	Acetic acid
4	5.099	5.080	5.099	2107831	9.55	3168732	21.63	0.67	MI	
5	8.930	8.857	8.978	3577963	16.21	1224220	8.36	2.92	MI	Oxime-, methoxy-phenyl-_
6	12.319	12.143	12.373	9433885	42.73	996281	6.80	9.47	MI	Benzyl Alcohol
7	25.066	25.015	25.094	555812	2.52	255160	1.74	2.18	MI	Trisiloxane, 1,1,1,5,5,5-hexamethyl-3,
8	29.019	28.970	29.078	1366092	6.19	601042	4.10	2.27	MI	Benzeneethanamine, N-[(pentafluorop
9	32.433	32.396	32.470	960525	4.35	433469	2.96	2.22	MI	Benzoic acid, 2,4-bis[(trimethylsilyl)o:
				22076580	100.00	14650079	100.00			

Appendix 1

MSDS's and Product Information

MATERIAL SAFETY DATA SHEET

1. Product Information

Product Name: Wet-Dry 700 Hardener Part B Chemical Family: Amines Product Code: ER160-B

2. Composition/Information on Ingredients

Chemical Name	Percent	Exposure Limits ACGIH TLV-TWA	OSHA PEL
Cyclophatic Amines	45-65	N/E	N/E (Not established)

The specific ingredients of this product are considered a trade Secret.

3. Health Hazards

Eye Contact: Corrosive liquid. Cause severe irritation and may cause burn. **Skin Contact:** Corrosive liquid. Cause irritation and sensitization. Symptoms can be immediate or delayed several hours. **Inhalation:** Can cause respiratory tract irritation. **Ingestion:** Can cause nausea, headache, and gastrointestinal irritation. **Other:** Preexisting skin sensitization may be aggravated by exposure to this product.

4. First Aid Measures

Eyes: Flush eyes thoroughly with water for at least 15 minutes while holding eyelids open. Seek medical attention. **Skin:** Remove contaminated clothing. Wipe excess from skin and wash the affected area thoroughly with soap and water. Wash contaminated clothing thoroughly before reuse. **Inhalation:** Remove to fresh air, and provide oxygen or artificial respiration if needed. Obtain medical attention; symptoms can be delayed up to several hours. **Ingestion:** DO NOT induce vomiting. Give 1-2 cups of water or milk unless the person is drowsy, convulsing, or unconscious. Get medical attention.

5. Fire Fighting Measures

Flash Point: >200°F (PMCC) **Explosive Limits:** Not applicable **Auto-Ignition Temperature:** Not applicable **Hazardous Decomposition Products:** Oxides of nitrogen, carbon monoxide, carbon dioxide and other organic materials **Extinguishing media:** Use carbon dioxide, dry chemical, or appropriate foam.

6. Accidental Release Measures

Ventilate the spill area and evacuate if necessary. Remove all ignition sources. Dike and contain large spills. Flush area with water spray. Clean-up personnel should use adequate protective equipment. .

7. Handling and Storage

Store in a cool; dry place, in closed containers at room temperature. Avoid contact with incompatible materials. Wear protective eyewear, chemical-resistant gloves, and other protective clothing as appropriate.

8. Exposure Control and Personal Protection

Engineering/Ventilation Controls: Effective engineering controls should be used whenever possible to eliminate and/or reduce worker exposure to all respiratory hazards. General ventilation, local ventilation, or isolation may prove adequate to keep airborne concentrations below exposure limits. **Respiratory Protection:** If exposure limits are exceeded and local ventilation is unavailable, a supplied-air respirator or a self-contained breathing apparatus is required. **Skin Protection:** Impervious gloves and protective clothing should be worn as necessary. **Eye Protection:** Chemical splash goggles or safety glasses with side shields should be worn as appropriate.

9. Stability and Reactivity

Chemical Stability: Stable under normal conditions and use. **Conditions and Materials to Avoid:** Reacts with epoxy and strong oxidizing agents. **Hazardous Polymerization:** Will not occur

10. Physical and Chemical Properties

Appearance/Odor: Grey Gel, Slight amine odor **Boiling Point:** Not determined **Vapor Pressure (mm Hg):** <1 @ 25°C **Vapor Density (air=1):** >1 **Specific Gravity:** 1.24-1.29 **Solubility in Water:** Slightly soluble

11. Toxicological Information

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

12. Disposal Considerations

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

13. Transportation and Regulatory Information

DOT/IATA Proper Shipping Name: Non Corrosive, Not Regulated Hazardous Label: NON-CORROSIVE

14. Regulatory Information

TSDCA: The chemical components of this product are included in the TSCA Chemical Substance Inventory, as required. SARA TITLE III: Section 313 - Toxic Chemicals: None Section 311/312 - Hazard Categories: Fire Hazard - No, Reactivity Hazard - No, Sudden Release of Pressure Hazard - No, Immediate (Acute) Health Hazard - Yes, Delayed (Chronic) Health Hazard - No. OSHA Hazard Communication Standard Hazard Classes: Corrosive NFPA Hazards: Health - 2, Flammability - 0, Reactivity - 0 HMIS hazards: Health - 2, Flammability - 0, Reactivity - 0

date of prepn: 9/26/02 Manufactured by: ERC In RI

Distributed by: Progressive Epoxy Polymers - 48 Wildwood Drive - Pittsfield, NH 03263 - Tel: 603-435-7199 - Fax: 603-435-7182

MATERIAL SAFETY DATA SHEET

1. Product Information

Product Name: Wet-Dry 700 A Resin Chemical Family: Epoxy Resin Product Code: ER180-A

2. Composition/Information on Ingredients

Chemical Name	CAS Number	Percent	Exposure Limits ACGIH TLV-TWA	OSHA PEL
Epoxy Resin		100	N/E	N/E (Not established)

Specific ingredients of this product are withheld and considered a trade secret.

3. Health Hazards

Eye Contact: May cause irritation and swelling. **Skin Contact:** May cause irritation and sensitization. Symptoms can be immediate or delayed several hours. **Inhalation:** May cause irritation and temporary or permanent sensitization. **Ingestion:** May cause irritation. **Other:** Preexisting skin sensitization may be aggravated by exposure to this product.

4. First Aid Measures

Eyes: Flush eyes thoroughly with water for at least 15 minutes while holding eyelids open. Seek medical attention. **Skin:** Remove contaminated clothing. Wipe excess from skin and wash the affected area thoroughly with soap and water. Wash contaminated clothing thoroughly before reuse. **Inhalation:** Remove to fresh air, and provide oxygen or artificial respiration if needed. Obtain medical attention; symptoms can be delayed up to several hours. **Ingestion:** DO NOT induce vomiting. Give 1-2 cups of water or milk unless the person is drowsy, convulsing, or unconscious. Get medical attention.

5. Fire Fighting Measures

Flammable Properties: **Flash Point:** >300°F (closed cup) **Explosive Limits:** Not available **Auto-Ignition Temperature:** Not available **Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide, aldehydes, and other organic substances **Extinguishing Media and Fire Fighting Instructions:** When sufficiently large quantities are present, firefighters should be equipped with full bunker gear, including a positive pressure, NIOSH approved, self-contained breathing apparatus. Extreme heat or water contamination may cause closed containers to explode. **Extinguishing Media:** Use carbon dioxide, dry chemical, or appropriate foam

6. Accidental Release Measures

Ventilate the spill area and evacuate if necessary. Remove all ignition sources. Dike and contain large spills. Clean-up personnel should use adequate protective equipment.

7. Handling and Storage

Store in a cool; dry place, in closed containers at room temperature. Avoid contact with incompatible materials. Wear protective eyewear, chemical-resistant gloves, and other protective clothing as appropriate.

8. Exposure Control and Personal Protection

Engineering/Ventilation Controls: Effective engineering controls should be used whenever possible to eliminate and/or reduce worker exposure to all respiratory hazards. General ventilation, local ventilation, or isolation may prove adequate to keep airborne concentrations below exposure limits. **Respiratory Protection:** If exposure limits are exceeded and local ventilation is unavailable, a supplied-air respirator or a self-contained breathing apparatus is required. **Skin Protection:** Impervious gloves and protective clothing should be worn as necessary. **Eye Protection:** Chemical Splash goggles or safety glasses with side shields should be worn as appropriate.

9. Stability and Reactivity

Chemical Stability: Stable under normal conditions and use. **Conditions and Materials to Avoid:** Reacts with amines and strong oxidizing agents. **Hazardous Polymerization:** Will not occur.

10. Physical and Chemical Properties

Appearance/Odor: Thixotropic gel, slight ether odor **Boiling Point:** Not determined **Vapor Pressure (mm Hg):** <1 @ 25°C **Vapor Density (air=1):** >1 **Specific Gravity:** 1.64 **Solubility in Water:** None

11. Toxicological Information

This section provides toxicological information with regard to the pure form of the component indicated. It is suggested that persons trained in its evaluation interpret this information. Epoxy Resins: Acute Oral LD50 (Rat): 11.4 g/kg Acute Dermal LD50 (rabbit): >20 g/kg

12. Disposal Considerations

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

13. Transportation Information and Regulatory Information

DOT/IATA Proper Shipping Name: Not Regulated. **TSCA:** The chemical components of this product are included in the TSCA Chemical Substance Inventory, as required. SARA TITLE III: Section 313 - Toxic Chemicals: None Section 311/312 - Hazard Categories: Fire Hazard: No Reactivity Hazard: No Sudden Release of Pressure Hazard: No Immediate (Acute) Health Hazard: Yes Delayed (Chronic) Health Hazard: No. NFPA Hazards: Health - 2, Flammability - 1, Reactivity - 0 HMIS Hazards: Health - 2, Flammability - 1, Reactivity - 0

date of prepn: 9/26/02 Manufactured by: ERC in RI
Distributed by: Progressive Epoxy Polymers - 48 Wildwood Drive - Pittsfield, NH 03263 - Tel: 603-435-7199 - Fax: 603-435-7182

Wet/Dry 700 Epoxy TECHNICAL DATA

SOLVENT-FREE EPOXY COATING

Protective Coating Sealant Patching	Solvent-Free Easy 1:1 Mixing Ratio Works Underwater Kevlar™ Reinforced

STANDARD PRODUCT DESCRIPTION	Wet/Dry 700 epoxy is a 100% solids, non-regulated, non-hazmat, Kevlar™ reinforced epoxy coating system designed for coating surfaces that may be subjected to constant immersion in water. Wet/Dry 700 will bond to water saturated concrete, and is resistant to sewer gasses, sulfur based chemicals, dilute acids and most caustics.
USES	Marine environments Docks, fiberglass and wood boats Sewers, tunnels, dams, spillways Underground concrete structures Steel and concrete piping
FEATURES	Excellent chemical resistance Convenient 1:1 ratio by volume or 1:0.83 by weight (base/cure) Superior adhesion to cold, damp surfaces Nonhazmat to ship
VISCOSITY	Viscosity at 72°F: Part A: gel Part B: gel Mixed: gel
PHYSICAL PROPERTIES	COMPRESSIVE STRENGTH ..... ASTM D695 — 10,500 psi TENSILE STRENGTH ..... ASTM D638 — 5,200 psi ABRASION RESISTANCE ..... CS-17 WHEEL, 1 kg LOAD ..... ASTM D4060 — 0.20 gm loss WATER ABSORPTION ..... ASTM D570 (2 hour boil) — 0.19 % FLEXURAL STRENGTH ..... ASTM D790 — 4,900 psi SHORE D HARDNESS ..... ASTM D2240 — 88 HEAT DISTORTION TEMPERATURE ..... ASTM D649 — 122° F BOND STRENGTH TO CONCRETE — 100% concrete failure

SOLVENT-FREE COATINGS FOR TOUGH ENVIRONMENTS

Wet/Dry 700 Epoxy TECHNICAL DATA

CURE SCHEDULE	POT LIFE @ 75°F ..... 70 - 80 minutes TACK FREE ..... 6 hours RECOAT ..... 6 to 48 hours
SURFACE PREPARATION	Surface to be topcoated must be clean and free of oils, grease and loose contamination.
APPLICATION	Mix Wet/Dry 700 epoxy base with the Wet/Dry 700 curing agent. Use a mechanical mixer if possible to ensure thorough mixing. The mixing ratio is 1/1 (base/curing agent) by volume or 1/0.83 by weight. Wet/Dry 700 does not require a 'sweat-in' or induction time and the mixed components should be used immediately. Potlife is approximately 70-80 minutes at 75°F, so mix only the amount of epoxy that can be easily applied within that time limit. Apply using a squeegee. Wet/Dry 700 is suitable for horizontal surfaces and vertical surfaces.
NOTES	Unless top-coated with a UV absorber, this epoxy will yellow in sunlight.
TRANSPORT	Nonregulated by USDOT, IATA & IMO.

SAFETY: This is a hazardous material if misused. Read and understand the Material Safety Data Sheet (MSDS) before use.
WARRANTY DISCLAIMER: The technical data given herein has been compiled for your help and guidance and is based upon our experience and knowledge. However, as we have no control over the use to which this information is put, no warranty, express or implied is intended or given except that these goods shall be of merchantable quality and buyer assumes all risk and liability for results obtained by the use of the materials covered in this data sheet, whether used singly or in combination with other products. We assume no responsibility whatsoever for coverage, performance or damages, including injuries resulting from use of this information or of products recommended herein. The sale and use of this product is governed by Progressive Products, Inc.'s Warranty Disclaimer and Return Policy.

Manufactured by:
ERC in RI

Distributed by:
Progressive Epoxy Polymers, Inc.
48 Wildwood Dr.
Pittsfield, NH 03263-3406

Tel: 603-435-7199
Fax: 603-435-7182
www.epoxyproducts.com
info@epoxyproducts.com

This material safety data sheet (MSDS) has been prepared in compliance with the FEDERAL OSHA COMMUNICATION STANDARD 29 CFR 1910. 1200.

ULTRA POLYMERS, INC.
BOX 1376
BONIA, PA 15044

PHONE: (724) 449-2122
24 Hour Emergency Phone (412) 487-5560
Revision Date: March 1, 2000

MATERIAL SAFETY DATA SHEET

SECTION I: IDENTITY INFORMATION
IDENTITY (TRADENAME): ULTRA PHIX UW - PART A
FAMILY/CHEMICAL NAME: EPOXIDE Resin
PRODUCT TYPE: Coating/patching

SECTION II: HAZARDOUS INGREDIENTS
SPECIFIC CHEMICAL NAME: Propietary
CAS #:na
EXPOSURE LIMITS:
OSHA PEL: Not established
ACGIH TLV: Not established
CARCINOGENICITY:
IARC: NO NTP: NO OSHA:NO ACGIH: NO OTHER: NO

SPECIFIC CHEMICAL NAME: Titanium dioxide (TiO_2)
CAS #: 1363-67-1
EXPOSURE LIMITS:
OSHA PEL: 15 mg/m (total dust)
ACGIH/ TLV: 15 mg/m (total dust)Not established
CARCINOGENICITY:
IARC: NO NTP: NO OSHA:NO ACGIH: NO OTHER: NO

SPECIFIC CHEMICAL NAME: Aluminum Oxide
CAS #: 1344-28-1
EXPOSURE LIMITS:
OSHA PEL: 15 mg/m3 (total dust)
ACGIH TLV: Not established
CARCINOGENICITY:
IARC: NO NTP: NO OSHA:NO ACGIH: NO OTHER: NO

SECTION III : PHYSICAL DATA
APPEARANCE AND ODOR: Thick. No odor. **SPECIFIC GRAVITY:** 1.15
SOLUBILITY IN WATER: Insoluble **FREEZING POINT:** N/A
BOILING POINT (760 mm Hg): N/A **% VOLATILE BY VOL.:** N/A
MELTING POINT: Not Applicable **VISCOSITY:** Paste

SECTION IV : FIRE AND EXPLOSION HAZARD DATA
FLASH POINT: >300 F
EXTINGUISHING MEDIA: Water spray, CO_2, dry chemical, foam.
FIRE FIGHTING PROCEDURES - SPECIAL: Firefighters should wear goggles and self-contained breathing apparatus to avoid inhalation of smoke or vapors.
UNUSUAL FIRE AND EXPLOSION HAZARDS: None known.

SECTION V : REACTIVITY DATA
STABILITY: Stable
CONDITIONS TO AVOID: Elevated temperatures.
INCOMPATIBILITY: Strong oxidizing agents.
HAZARDOUS DECOMPOSITION PRODUCTS: Silica will dissolve in Hydrofluoric acid and produce a corrosive gas silicon tetrafluoride.
HAZARDOUS POLYMERIZATION: None known.

SECTION VI : HEALTH HAZARD DATA
PRIMARY ROUTES OF EXPOSURE: Inhalation, ingestion, skin and eye contact.
EYE: May cause slight transient (temporary) eye irritation. Corneal injury is unlikely.
SKIN CONTACT: Prolonged exposure is not likely to cause significant skin irritation. Repeated exposure may cause skin irritation. May caused allergic skin reaction in humans.
SKIN ABSORPTION: A single prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts. The LD50 for skin absorption in rabbits is 20,000 mg/kg.
INGESTION: Single dose oral toxicity is low. The oral LD50 for rats is >5,000 mg/kg. No hazards anticipated from swallowing small amounts incidental to normal handling operations.
INHALATION: Vapors are unlikely due to physical properties.
SYSTEMATIC (OTHER TARGET ORGANS) EFFECTS: Except for skin sensitization, repeated exposures to low molecular weight diglycidyl ether of bisphenol A are not anticipated to cause any significant adverse affects.
CANCER INFORMATION: A poorly characterized sample of low molecular weight diglycidyl ether of bisphenol A has been reported to produce skin cancer in a highly sensitive strain of mice. However, high levels of impurities (including a known animal skin carcinogen) compromise the validity of the findings. Diglycidyl ether of bisphenol A that is representative of current manufacturing processes is not to believed to be a cancer hazard to humans.
TERATOLOGY (BIRTH DEFECTS): Did not cause birth defects or other adverse effects on the fetus when pregnant rabbits were exposed by skin contact, the most likely route of exposure.

EMERGENCY AND FIRST AID PROCEDURES:
EYES: Immediately flush eyes with water for 10 min.
SKIN: Wash with mild soap and water.
INGESTION: If conscious, give large quantities of water.
Induce vomiting.
INHALATION: Remove to fresh air.
OTHER: Remove contaminating clothing.

SECTION VII : SPILL OR LEAK PROCEDURES
SPILL PROCEDURES: Avoid all personal contact. Take up with absorbent material. Use closable containers. Flush area with water.
WASTE DISPOSAL METHODS: Dispose in accordance with federal, state, and local regulations.

SECTION VIII : SPECIAL PROTECTION INFORMATION
VENTILATION: Good general mechanical ventilation and local exhaust.
PROTECTIVE GLOVES: Wear impervious gloves.
EYE PROTECTION: Wear splash-proof chemical goggles.
RESPIRATORY PROTECTION: Use NIOSH approved respirator for organic vapors. IF REQUIRED.
OTHER PROTECTIVE EQUIPMENT: It is preferable to use disposable protective clothing and gloves. Use equipment necessary to prevent skin or eye contact.

SECTION IX : SPECIAL PRECAUTIONS AND PROTECTION
HANDLING, SHIPPING AND STORING PRECAUTIONS:
Avoid contact with skin, eyes, and clothing.
Store above freezing (32 F)
Do not taste. Avoid breathing mists or vapors.
Wash thoroughly after handling.
Keep containers closed when not in use.
Use with adequate ventilation.

SECTION X : REGULATORY INFORMATION
DOT CLASS: Not regulated.
SARA: Health: 1 Fire: 1 Reactivity: 1
RCRA STATUS: Not a hazardous waste.
CERCLA STATUS: Not listed

FOR FURTHER INFORMATION, PLEASE CONTACT LEO A. ANNA
THE INFORMATION AND RECOMMENDATIONS IN THIS DATA SHEET ARE BASED UPON DATA BELIEVED TO BE CORRECT. NO GUARANTEE OR WARRANTY OF ANY KIND IS EXPRESSED OR IMPLIED IS MADE WITH RESPECT TO THE ABOVE INFORMATION.

This material safety data sheet (MSDS) has been prepared in compliance with the FEDERAL OSHA COMMUNICATION STANDARD 29 CFR 1910. 1200.

A POLYMERS, INC.
.OX 1376
GIBSONIA, PA 15044

PHONE: (724) 449-3122
24 Hour Emergency Phone (412) 487-5560
Revision Date: March 1, 2000

MATERIAL SAFETY DATA SHEET

SECTION I: IDENTITY INFORMATION
IDENTITY (TRADENAME): ULTRA PHIX UW - PART B
FAMILY/CHEMICAL NAME: ALIPHATIC POLYAMINES/AMIDO POLYAMINES
PRODUCT TYPE: COATINGS - CONCRETE REPAIR

SECTION II: HAZARDOUS INGREDIENTS
SPECIFIC CHEMICAL NAME: Aliphatic polyamine
CAS #: Not available
EXPOSURE LIMITS:
OSHA PEL: Not established
ACGIH TLV: Not established
CARCINOGENICITY:
IARC: NO NTP: NO OSHA:NO ACGIH: NO OTHER: NO

SPECIFIC CHEMICAL NAME: Amidopolyamine
CAS #: 68410231
EXPOSURE LIMITS:
OSHA PEL: Not established
ACGIH TLV: Not established
CARCINOGENICITY:
IARC: NO NTP: NO OSHA:NO ACGIH: NO OTHER: NO

SECTION III : PHYSICAL DATA
APPEARANCE AND ODOR: Amber liquid **SPECIFIC GRAVITY:** 1.10
SOLUBILITY IN WATER: Slightly **FREEZING POINT:** N/A
BOILING POINT (760 mm Hg): Not available **% VOLATILES BY VOL:** Zero
MELTING POINT: Not applicable **VISCOSITY:** 3,000 - 5,000 cps

SECTION IV : FIRE AND EXPLOSION HAZARD DATA
FLASH POINT: Not available
EXTINGUISHING MEDIA: Water spray, CO2, dry chemical
FIRE FIGHTING PROCEDURES - SPECIAL: Cool exposed containers with water spray. Self-contained breathing apparatus in contained areas.
UNUSUAL FIRE AND EXPLOSION HAZARDS: *None*

SECTION V : REACTIVITY DATA
STABILITY: Stable
CONDITIONS TO AVOID: High temperatures
INCOMPATIBILITY: Strong oxidizing agents
HAZARDOUS DECOMPOSITION PRODUCTS: None known
HAZARDOUS POLYMERIZATION: None known

SECTION VI : HEALTH HAZARD DATA
PRIMARY ROUTES OF EXPOSURE: Inhalation, ingestion, skin and eye contact.
EYE: May cause slight transient (temporary) eye irritation. Corneal injury is unlikely.
SKIN CONTACT: Prolonged exposure is not likely to cause significant skin irritation. Repeated exposure may cause skin irritation. May caused allergic skin reaction in humans.
SKIN ABSORPTION: A single prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts. The LD50 for skin absorption in rabbits is 20,000 mg/kg.

INGESTION: Single dose oral toxicity is low. The oral LD50 for rats is >5,000 mg/kg. No hazards anticipated from swallowing small amounts incidental to normal handling operations.
INHALATION: Vapors are unlikely due to physical properties.
SYSTEMATIC (OTHER TARGET ORGANS) EFFECTS: Except for skin sensitization, repeated exposures to low molecular weight diglycidyl ether of bisphenol A are not anticipated to cause any significant adverse affects.
CANCER INFORMATION: A poorly characterized sample of low molecular weight diglycidyl ether of bisphenol A has been reported to produce skin cancer in a highly sensitive strain of mice. However, high levels of impurities (including a known animal skin carcinogen) compromise the validity of the findings. Diglycidyl ether of bisphenol A that is representative of current manufacturing processes is not to believed to be a cancer hazard to humans.
TERATOLOGY (BIRTH DEFECTS): Did not cause birth defects or other adverse effects on the fetus when pregnant rabbits were exposed by skin contact, the most likely route of exposure.

EMERGENCY AND FIRST AID PROCEDURES:
EYES: Immediately flush eyes with water for 10 min.
SKIN: Wash with mild soap and water.
INGESTION: If conscious, give large quantities of water.
Induce vomiting.
INHALATION: Remove to fresh air.
OTHER: Remove contaminating clothing.

SECTION VII : SPILL OR LEAK PROCEDURES
SPILL PROCEDURES: Avoid all personal contact. Take up with absorbent material. Use closable containers, Flush area with water. For large spills, contain material, take up with absorbent material. Avoid use of water.
WASTE DISPOSAL METHODS: Dispose in accordance with federal, state and local regulations.

SECTION VIII : SPECIAL PROTECTION INFORMATION
VENTILATION: Good general mechanical ventilation and local exhaust.
PROTECTIVE GLOVES: Wear impervious gloves, such as nitrile rubber gloves.
EYE PROTECTION: Wear splash-proof chemical goggles
RESPIRATORY PROTECTION: Use NIOSH approved respirator for organic vapors, IF REQUIRED.
OTHER PROTECTIVE EQUIPMENT: It is suggested that disposable protective gloves and clothing are used. Use equipment necessary to prevent skin or eye contact. Wash before eating , smoking or using the toilet.

SECTION IX : SPECIAL PRECAUTIONS AND PROTECTION
HANDLING, SHIPPING AND STORING PRECAUTIONS: Avoid contact with skin, eyes and clothing. Do not taste. Avoid breathing mists or vapors. Wash thoroughly after handling. Keep containers closed when not in use. Use with adequate ventilation.

SECTION X : REGULATORY INFORMATION
DOT CLASS: Not regulated
OSHA: Corrosive
Reportable Quantities: NA
Shipping Class: Corrosive liquid
SARA: No toxic chemicals subject to reporting requirements.
Health: 2 Fire: 1 Reactivity: 0
RCRA STATUS: Not a hazardous waste
CERCLA STATUS: Not listed

FOR FURTHER INFORMATION, PLEASE CONTACT LEO A. ANNA
THE INFORMATION AND RECOMMENDATIONS IN THIS DATA SHEET ARE BASED UPON DATA BELIEVED TO BE CORRECT. NO GUARANTEE OR WARRANTY OF ANY KIND IS EXPRESSED OR IMPLIED IS MADE WITH RESPECT TO THE ABOVE INFORMATION

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ULTRA POLYMERS, INC.

230 Laurel Avenue - P.O.Box 1376 - Gibsonia - PA - 15044 - Phone: 724 - 449 - 2122 - Fax: 724 - 449 - 1044

NEW PRODUCTS! STELLAR with KEVLAR now available. Ultracoat Underwater for under water mi

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About Ultra Polymers, Inc.

Ultra Polymers, Inc. is the manufacturer and distributor of a superior line of 100% solids high-performance epoxy coatings and liners.

Our coatings are customized to provide high wear resistance, chemical resistance, flexibility, superior adhesion and dimensional stability.

Started in 1976 as the maker of specialized epoxy solutions for a variety of industries, Ultra Polymers, Inc. now offers a full line of coatings. Our coatings are formulated based on experience in commercial and industrial applications.

We offer products that are proven to solve problems. Our coatings are ideal for steel and other metals, concrete, fiberglass, PVC and rubber.

NEW

Ultracoat Underwater

NEW

STELLAR with KEVLAR

Products

- STELLAR with KEVLAR now available for the ultimate in wear resistance!!
- ULTRACOAT UNDERWATER now available for commercial and industrial use. Mix underwater! Apply underwater! Create strong bonds and permanent repairs while completely submerged.
- ULTRACOAT Create a chemical and abrasive resistant barrier for metal, steel, wood and concrete.
- ULTRAGRIP For anti-slip surfaces
- ULTRALINER Superior wear resistance
- ULTRATHANE Flexible epoxy
- ULTRACRETE 4-12 times stronger than concrete
- ULTRAPHIX Superior coating performance in a pre-measured cartridge and easy-to-use applicator.

Services

- APPLICATIONS

Ultracoat Underwater

ULTRACOAT UNDERWATER!! Mix under water! Apply under water!

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ULTRACOAT UNDERWATER

A breakthrough in epoxy coating, ULTRACOAT UNDERWATER lets you apply our superior epoxy coating to surfaces that are completely submerged. Add impact and chemical resistance to damp, wet or even submerged areas in an easy, inexpensive way.

MIX UNDER WATER!

Using cartridges of pre-measured material and a hands-off mixing system, (see the ULTRAPHIX system) ULTRACOAT UNDERWATER is mixed and dispensed right where you want it. NO MESS!

There are some materials that can be applied under water, but they must be mixed in a dry environment first. This limits the time you have to complete repairs and results in expensive wasted material.

APPLY TO WET SURFACES

ULTRACOAT UNDERWATER is specially formulated to adhere directly to wet surfaces without floating away.

Thorough surface preparation yields optimum performance, but surfaces that are corroded or otherwise compromised also can be coated or repaired with excellent results!

SAVE MONEY! SAVE TIME!

Because you only mix exactly the amount you need, when you need it, waste is avoided entirely. It won't cure before you can use it. Unlike most epoxies, small amounts can be used without mixing an entire kit.

ATTENTION DIVERS - it won't ruin your wetsuit!

ULTRACOAT UNDERWATER works in dry environments too! Use it for all your repairs.

Pipes

Boats

Docks

Sump pumps

Gutters

Drains

Pools

Shower rooms

Tanks

Containment areas

More!

MATERIAL SAFETY DATA SHEET

NMP 1710 EPOXY BASE AND CURE
NATIONAL MAINTENANCE PRODUCTS Pty Ltd

Date of Issue: - Feb 03

STATEMENT OF HAZARDOUS NATURE

Considered toxic according to criteria of Worksafe Australia. Not considered hazardous if used as per instructions.
DOES NOT CONTAIN CARCINOGENS

COMPANY DETAILS

Company:	National Maintenance Products Pty Ltd. ACN 097 487 637
Address:	Unit 19, 10 Miltiadis St, Acacia Ridge Qld 4110 PO Box 8149, Woolloongabba, Qld 4102
Phone/Fax:	Ph +61 7 3216 7388: Fax + 61 7 3216 7488
Emergency Telephone No:	+ 61 7 3216 7388

IDENTIFICATION

Product Name:	NMP 1710 (Base and Cure)	UN Number:	None Allocated
Other Names:	NMP 1710	Dangerous Goods Class & Subsidiary Risk:	None Allocated
Manufacturers Product Code:	NMP1710	Hazchem Code:	None Allocated
Pack Size:	8L Pack	Poisons Schedule Number:	None Allocated

PHYSICAL DESCRIPTION/PROPERTIES:

BASE:

Appearance:	Coloured paste with characteristic epoxy odour.		
Packaging:	Packaged in it's own metal or plastic container with press fit lid.		
Boiling Point:	Not applicable.	Flashpoint:	>121°C.
Melting Point:	Not applicable.	Freezing Point:	Not applicable.
Vapour Density:	Not applicable.	Flammability Limits:	Not applicable.
Solubility in Water:	Negligible.	Specific Gravity:	1.34.
Density @ 20°C:	1.36kg/L.	Auto ignition Temp:	Not applicable.

CURE:

Appearance:	White paste with very slight ammoniac odour.		
Packaging:	Packaged in it's own metal or plastic container with press fit lid.		
Boiling Point:	Not applicable.	Flashpoint:	>93°C.
Melting Point:	Not applicable.	Freezing Point:	Not applicable.
Vapour Density:	Not applicable.	Flammability Limits:	Not applicable.
Solubility in Water:	Negligible.	Specific Gravity:	1.69.
Density @ 20°C:	1.69kg/L.	Auto ignition Temp:	Not applicable.

OTHER PROPERTIES:

Curing Time:	Touch dry 4hrs @ 27°C. Hard 14hrs @ 27°C. Variations of temperature up or down will by rule of thumb half or double these times per approx each 10°C variation.
Storage Life:	Minimum 24 months.
Spread Rate:	15sq. m/kit @ 0.5mm.
Pot Life:	Approx 40mins @ 27°C.
Minimum Cure Temperature:	5°C.
Corrosiveness:	Non-Corrosive.
VOC:	0.5% max.

INGREDIENTS:

BASE:

INGREDIENT	CAS NUMBER	PROPORTION %
Epoxy resin liquid polymer	25068-38-6	50 - 75
p-tertbutylphenyl glycidyl ether	31101-60-8	5 - 10
Poly terephthaloylchloride p-phenylenediamine	26125-61-1	2 - 5
Micronised silica	7631-86-9	5 - 10
Products determined not to be hazardous		to 100

CURE:

INGREDIENT	CAS NUMBER	PROPORTION %
Benzyl Alcohol	100-51-6	12 - 24
Products determined not to be hazardous		to 100

HEALTH HAZARD INFORMATION

HEALTH EFFECTS:

BASE:

Skin Irritation – Slight irritant, possible sensitiser
Dot. Corrosivity – Not corrosive.
Oral Toxicity – Unknown – Do not ingest.
Inhalation Toxicity – Unknown, see below.
Eye Irritation – Slight irritant.
Dermal Toxicity – Unknown

Skin and Eye Contact – Slightly irritating, possible sensitiser.
Ingestion – Considered slightly toxic.
Inhalation – Overexposure to mist may cause irritation of respiratory tract. Prolonged or repeated exposure may cause an asthmatic reaction.

First Aid Recommendations:
Skin and Eye Contact – Immediately flush eyes with fresh water holding lids apart for 15 minutes, washing within one minute is essential to achieve maximum effectiveness. Remove from skin using soap and water. Remove contaminated shoes and clothing. Call a physician.
Ingestion – Do not induce vomiting. Prevent aspiration (breathing) liquid into lungs. Get medical attention.
Inhalation – Immediately move to fresh air. If breathing is difficult, give oxygen. Call a physician.

CURE:
Inhalation – Do not inhale the product. May cause irritation to upper respiratory tract upon prolonged or repeated inhalation. (Note: because of low volatility of product and pasty viscosity it is extremely unlikely that excessive exposure to vapours will be experienced at normal temperature under normal circumstances).
Eye and Skin Contact – May cause skin and eye irritation. May cause permanent visual impairment. Wear protective clothing and goggles.
Caution – Pre-existing eye, skin and respiratory disorders may be aggravated by exposure to this product, exercise caution in handling. Remove from skin using liquid soap or detergent – always avoid using solvents to remove skin contamination.

First Aid Recommendations:
Skin and Eye Contact – Immediately flush eyes with fresh water holding lids apart for 15 minutes, washing within one minute is essential to achieve maximum effectiveness. Remove from skin using soap and water. Remove contaminated shoes and clothing. Call a physician. Victims of a major skin contact should remain under medical observation for at least 24 hours due to possible delayed effects.
Ingestion – Danger! Do not take internally. May cause gastrointestinal irritation or ulceration. May cause burns of mouth and throat. Do not induce vomiting. Give a large quantity of milk or water. Do not give fluids to an unconscious person. Call a physician.
Inhalation – Immediately move to fresh air. If symptoms persist, call a physician.

PRECAUTIONS FOR USE

Exposure Standards:	None assigned.
Engineering Controls:	None required during normal use.
Personal Protection:	Mechanical local exhaust at point of contaminant release if conditions warrant. Wear impervious gloves; wear chemical resistant safety goggles if eye contact possible; wear overalls. It is extremely unlikely that harmful concentrations of volatile materials will be released during normal applications by spreaders, trowels, or similar tools in open areas. Wear organic vapour cartridge respirator or fresh air hood if working for extended periods in enclosed spaces with minimal ventilation.

SAFE HANDLING INFORMATION

Storage and Transport:	General good practice required. Store at ambient conditions. Avoid extremes. Transport as non-hazardous.
Spills and Disposal:	
Spills:	Scrape up and place in suitable container for disposal. Wash area with solvent of thinners.
Disposal:	Dispose in industrial disposal. Observe local regulations for chemical waste disposal.
Fire or Explosion Hazard:	Generation of toxic products. Use water spray, foam or dry chemical to fight fire. Not susceptible to explosion.

OTHER INFORMATION

Reactivity:	No known reactivity. Avoid contact with strong acids, bases and oxidising agents.
Ecotoxicity data:	None known.
Toxicological information:	None known.
Stability:	Stable.
Incompatible Materials:	None known.
Hazardous Decomposition:	CO; CO2; unspecified others.
Hazardous Polymerisation:	Will not occur.
Conditions to avoid:	Mixing large volumes of base and cure ... expect a significant exotherm within 20-25 minutes at 25°C.

CONTACT POINT

Technical Services Information Officer: + 61 7 3216 7388
DISCLAIMER: To the best of our knowledge, the information contained herein is accurate. However, National Maintenance Products Pty Ltd. assumes no liability for the accuracy and completeness of the information contained herein. Final determination of suitability of this material is the sole responsibility of the user. All materials present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

NMP 1710
HEAVY DUTY SUPERIOR COATING

Date of Issue:- Feb 03

PRODUCT DATA SHEET

NMP 1710 is a brushable version of our superior NMP 1720. It is a premium performance epoxy, especially formulated to provide superior protection to piers, splash zones, tanks, pits, bunds, walls, floors, pipes, hulls and decks, above or below water. This unique protective coating can be likened to "case hardening" the surface it is protecting, with a tensile strength of 5 times, flexural strength of 3 times, and chip and wear resistance up to 6 times other readily available epoxies, even those which are thick film.

It is formulated on the highest quality, pure epoxy polymers and curing agents. Pigmentation is selected for hardness and durability in order to obtain the best possible properties when cured.
Kevlar™ fibres are also incorporated to enhance the coatings' unique properties. It employs no solvents, is non-hazmat and is so tolerant of wet conditions it makes an excellent anti-corrosive for underwater application to steel, concrete and similar surfaces. Constant immersion in fresh or salt water, sewerage, fuels and oils, hydrocarbons, mineral acids or many other industrial waste products has no detrimental effect on its life span.

NMP 1710 can be applied by brush, spatula or trowel, without the need for a primer. The cured film is hard and glossy with a slight texture resulting from the fibre reinforcement. The solvent-free nature means it is non-corrosive, non-flammable, odourless and is perfectly safe for use in confined spaces, has no shrinkage and is environmentally safe with absolutely no effect on the surrounding plant or marine life.

NMP 1710 is formulated to be "non-regulated", by IATA, IMO, DOT and USDOT for uncomplicated shipment by land, sea or air.

RECOMMENDED USES

- HEAVY DUTY PROTECTIVE COATING FOR STEEL AND CONCRETE
- EXCELLENT CHEMICAL AND IMPACT RESISTANCE FOR TANKS, PITS, BUND WALLS AND FLOORS, SEA WALLS ETC.
- SUPERIOR PHYSICAL STRENGTH UP TO 6 TIMES STRONGER THAN OTHER EPOXIES – FOR SURFACE REINFORCEMENT
- HEAVY-DUTY MAINTENANCE FOR DECKS AND TANKS
- ANTI-CORROSIVE COATING FOR SWEATING PIPES OR UNDER INSULATION TO NEGATE CUI
- IDEAL FOR POWER GENERATION APPLICATIONS – DRAFT TUBES, PENSTOCKS, WATER BOXES, TUBE SHEETS, DAM WALLS ETC.
- REINFORCEMING, RE PAIRING AND PROTECTING CONCRETE AND STEEL TANKS DAMAGED BY EXPOSURE TO CORROSIVE CHEMICAL AND MUNICIPAL WASTE SYTEMS
- ADD CARBOTUNDUM GRIT FOR AN EXTREMELY LONG LIFE NON-SLIP SURFACE FLOORING IN HARSH ENVIRONMENTS

TECHNICAL INFORMATION

VEHICLE TYPE.....	2-pack epoxy/polyamines.
PIGMENTATION.....	Colour/inert/fibrous reinforcing.

COLOURS.....	Grey, white, other on request.
FINISH.....	Glossy with slight texture from the fibre.
CLEANER.....	MEK or lacquer thinner.
MIXING RATIO.....	1:1 v:v
POT SIZE.....	8L.
INDUCTION TIME.....	Not required.
POT LIFE.....	Approx. 40mins @ 25°C.
FLASH POINT.....	Over 100°C.
SOLIDS BY VOLUME.....	100%
SPREAD RATE.....	15 sq. m per kit @ 600 microns.
SURFACE TYPE	Concrete, brick, wood, fibreglass, metal, polystyrene.
DRY TIME	6 hours @ 25°C touch, 15 hours hard. Full: 7 days.
VOC.....	Zero.
LIFE SPAN.....	Very long life, even in adverse conditions.

APPLICATION NOTES

Surface Preparation:

New Concrete - should be left for 28 days (minimum) before coating. Weak surface laitance must be removed by water blasting, acid etching or abrasive sweeping.

Existing Concrete ... coated or bare - sound surfaces should be well cleaned by degreasing, water blasting or grit blasting as appropriate. Small areas can be cleaned by grinder but that is not practical for large areas.

Repair holes or scabbled areas by trowelling in a mix of NMP 1710 and clean fine grain sand at about a 2:1 mix of sand to epoxy. Solvent free - apply over existing well-adhered, clean coatings.

Application:

Mix desired amount well at a 1:1 ratio. Ensure the two components are well mixed to a uniform colour. You do not need to mix the entire product at once. Shelf life of unused product is almost indefinite. Mix well to ensure complete mixing. NMP products do not require an induction time so you can use immediately. Apply by spatula or trowel at about 600 microns.

Underwater- take the mixed product underwater in a bucket. Apply within 30-40mins of mixing by brush, spatula, trowel or hand mitt on difficult shapes such as risers. It is much easier to apply than traditional "splash zone" compositions, and is substantially less messy than lower viscosity underwater "paints".

CHEMICAL RESISTANCE - Resistant to all fuels, oils, skydrol, hydraulic fluid, alkalies, 50% caustic soda, 70% Sulphuric acid.

TRANSPORTATION – Unregulated.

THIS INFORMATION SHOULD BE READ IN CONJUNCTION WITH MATERIAL SAFETY DATA SHEETS.

NATIONAL MAINTENANCE PRODUCTS Pty Ltd

Unit 19, 10 Miltiadis St, Acacia Ridge, Qld 4110, Australia

Ph + 61 7 3216 7388, Fax +61 7 3216 7488

***For Coating Solutions* ...askNMP.com**

MATERIAL SAFETY DATA SHEET

NMP 1720 EPOXY BASE AND CURE

NATIONAL MAINTENANCE PRODUCTS Pty Ltd

Date of Issue: - Feb 03

STATEMENT OF HAZARDOUS NATURE

Considered toxic according to criteria of Worksafe Australia. Not considered hazardous if used as per instructions.
DOES NOT CONTAIN CARCINOGENS

COMPANY DETAILS

Company:	National Maintenance Products Pty Ltd. ACN 097 487 637
Address:	Unit 19, 10 Miltiadis St, Acacia Ridge Qld 4110 PO Box 8149, Woolloongabba, Qld 4102
Phone/Fax:	Ph +61 7 3216 7388: Fax + 61 7 3216 7488
Emergency Telephone No:	+ 61 7 3216 7388

IDENTIFICATION

Product Name:	NMP 1720 (Base and Cure)	UN Number:	None Allocated
Other Names:	NMP 1720	Dangerous Goods Class & Subsidiary Risk:	None Allocated
Manufacturers Product Code:	NMP1720	Hazchem Code:	None Allocated
Pack Size:	8L Pack	Poisons Schedule Number:	None Allocated

PHYSICAL DESCRIPTION/PROPERTIES:

BASE:

Appearance:	Coloured paste with characteristic epoxy odour.		
Packaging:	Packaged in it's own metal or plastic container with press fit lid.		
Boiling Point:	Not applicable.	Flashpoint:	>121°C.
Melting Point:	Not applicable.	Freezing Point:	Not applicable.
Vapour Density:	Not applicable.	Flammability Limits:	Not applicable.
Solubility in Water:	Negligible.	Specific Gravity:	1.34.
Density @ 20°C:	1.4kg/L.	Auto ignition Temp:	Not applicable.

CURE:

Appearance:	Coloured paste with slight ammonia odour.		
Packaging:	Packaged in it's own metal or plastic container with press fit lid.		
Boiling Point:	Not applicable.	Flashpoint:	>121°C.
Melting Point:	Not applicable.	Freezing Point:	Not applicable.
Vapour Density:	Not applicable.	Flammability Limits:	Not applicable.
Solubility in Water:	Negligible.	Specific Gravity:	1.69.
Density @ 20°C:	1.7kg/L.	Auto ignition Temp:	Not applicable.

OTHER PROPERTIES:

Curing Time:	Touch dry 4hrs @ 27°C. Hard 14hrs @ 27°C. Variations of temperature up or down will by rule of thumb half or double these times per approx each 10°C variation.
Storage Life:	Minimum 24 months.
Spread Rate:	11sq. m/kit @ 0.8mm.
Pot Life:	Approx 40mins @ 27°C.
Minimum Cure Temperature:	5°C.
Corrosiveness:	Non-Corrosive.
VOC:	0.5%max.

INGREDIENTS:

BASE:

INGREDIENT	CAS NUMBER	PROPORTION %
Epoxy resin liquid polymer	25068-38-6	50 - 75
p-tertbutylphenyl glycidyl ether	31101-60-8	5 - 10
Poly terephthaloylchloride p-phenylenediamine	26125-61-1	2 - 5
Micronised silica	7631-86-9	5 - 10
Products determined not to be hazardous		to 100

CURE:

INGREDIENT	CAS NUMBER	PROPORTION %
Benzyl Alcohol	100-51-6	12 - 24
Products determined not to be hazardous		to 100

HEALTH HAZARD INFORMATION

HEALTH EFFECTS:

Skin Irritation – Slight irritant, possible sensitiser
Dot. Corrosivity – Not corrosive.
Oral Toxicity – Unknown – Do not ingest.
Inhalation Toxicity – Unknown, see below.
Eye Irritation – Slight irritant.
Dermal Toxicity – Unknown

Skin and Eye Contact – Slightly irritating, possible sensitiser.
Ingestion – Considered slightly toxic.
Inhalation – Overexposure to mist may cause irritation of respiratory tract. Prolonged or repeated exposure may cause an asthmatic reaction.

First Aid Recommendations:
Skin and Eye Contact – Immediately flush eyes with fresh water holding lids apart for 15 minutes, washing within one minute is essential to achieve maximum effectiveness. Remove from skin using soap and water. Remove contaminated shoes and clothing. Call a physician.
Ingestion – Do not induce vomiting. Prevent aspiration (breathing) liquid into lungs. Get medical attention.
Inhalation – Immediately move to fresh air. If breathing is difficult, give oxygen. Call a physician.

CURE:
Inhalation - Overexposure to harmful concentrations of vapour is extremely unlikely in normal brush or roller applications. Inhalation of spray mist might cause irritation of the respiratory tract. Prolonged or repeated exposure may cause an asthmatic reaction in susceptible persons.
Eye and Skin Contact – Danger! Causes severe skin and eye irritation or burns. May cause permanent visual impairment. Not considered toxic by skin absorption but prolonged exposure may cause absorption of harmful amounts. Wear protective clothing and goggles.
Caution – Pre-existing eye, skin and respiratory disorders may be aggravated by exposure to this product, exercise caution in handling. Remove from skin using liquid soap or detergent – always avoid using solvents to remove skin contamination.

First Aid Recommendations:
Skin and Eye Contact – Immediately flush eyes with fresh water holding lids apart for 15 minutes, washing within one minute is essential to achieve maximum effectiveness. Remove from skin using soap and water. Remove contaminated shoes and clothing. Call a physician.
Ingestion – Danger! Do not take internally. May cause gastrointestinal irritation or ulceration. May cause burns of mouth and throat. Do not induce vomiting. Give a large quantity of milk or water. Do not give fluids to an unconscious person. Call a physician.
Inhalation – Immediately move to fresh air. If symptoms persist, call a physician.

PRECAUTIONS FOR USE

Exposure Standards:	None assigned.
Engineering Controls:	None required during normal use.
Personal Protection:	Mechanical local exhaust at point of contaminant release if conditions warrant. Wear impervious gloves; wear chemical. resistant safety goggles if eye contact possible; wear overalls. It is extremely unlikely that harmful concentrations of volatile materials will be released during normal applications by spreaders, trowels, or similar tools in open areas. Wear organic vapour cartridge respirator or fresh air hood if working for extended periods in enclosed spaces with minimal ventilation.

SAFE HANDLING INFORMATION

Storage and Transport:	General good practice required. Store at ambient conditions. Avoid extremes. Transport as non-hazardous.
Spills and Disposal:	
Spills:	Scrape up and place in suitable container for disposal. Wash area with solvent of thinners.
Disposal:	Dispose in industrial disposal. Observe local regulations for chemical waste disposal.
Fire or Explosion Hazard:	Generation of toxic products. Use water spray, foam or dry chemical to fight fire. Not susceptible to explosion.

OTHER INFORMATION

Reactivity:	No known reactivity. Avoid contact with strong acids, bases and oxidising agents.
Ecotoxicity data:	None known.
Toxicological information:	None known.
Stability:	Stable.
Incompatible Materials:	None known.
Hazardous Decomposition:	CO; CO2; unspecified others.
Hazardous Polymerisation:	Will not occur.
Conditions to avoid:	Mixing large volumes of base and cure ... expect a significant exotherm within 20-25 minutes at 25°C.

CONTACT POINT

Technical Services Information Officer: + 61 7 3216 7388

NMP 1720
HEAVY DUTY SUPERIOR COATING

Date of Issue:- Feb 03

PRODUCT DATA SHEET

NMP 1720 is the undisputed leader in premium performance epoxy pastes, especially formulated to provide superior protection to piers, splash zones, tanks, pits, bunds, walls, floors, pipes, hulls and decks, above or below water. This unique protective coating can be likened to "case hardening" the surface it is protecting, with a tensile strength of 5 times, flexural strength of 3 times, and chip and wear resistance up to 6 times other readily available epoxies, even thick film.

It is formulated on the highest quality pure epoxy polymers and curing agents. Pigmentation is selected for hardness and durability in order to obtain the best possible properties when cured. Kevlar™ fibres are also incorporated to enhance the coatings' unique properties. It employs no solvents, is non-hazmat and is so tolerant of wet conditions it makes an excellent anti-corrosive for underwater application to steel, concrete and similar surfaces. Constant immersion in fresh or salt water, sewerage, fuels/oils, hydrocarbons, mineral acids has no detrimental effect.

NMP 1720 can be applied under or above water by spatula or trowel, without the need for a primer. The cured film is hard and glossy with a slight texture resulting from the fibre reinforcement. The solvent-free nature means it is non-corrosive, non-flammable, odourless and is perfectly safe for use in confined spaces, has no shrinkage and is environmentally safe with absolutely no effect on the surrounding plant or marine life. It is approved for use in potable under AS4020(Int).

NMP 1720 is formulated to be "non-regulated", by IATA, IMO, DOT and USDOT for uncomplicated shipment by land, sea or air.

RECOMMENDED USES

- APPROVED FOR USE IN ALL DRINKING MATERIAL TANKS
- HEAVY-DUTY ANTI-CORROSIVE PROTECTIVE COATING FOR STEEL AND CONCRETE
- USE IN SPLASH ZONES – PIERS. WONT WASH OFF BY WAVE ACTION, EVEN DURING CURING
- EXCELLENT CHEMICAL AND IMPACT RESISTANCE FOR SECONDARY CONTAINMENT – TANKS, PITS, BUND WALLSAND FLOORS, SEA WALLS ETC.
- SUPERIOR PHYSICAL STRENGTH UP TO 6 TIMES STRONGER THAN OTHER EPOXIES
- HEAVY-DUTY MAINTENANCE FOR MARINE AND OFF-SHORE PRODUCTS – DECKS, TANKS.
- ANTI-CORROSIVE COATING FOR USE ON SWEATING PIPES OR UNDER INSULATION TO NEGATE CUI IN PETROCHEMICAL APPLICATIONS
- IDEAL FOR POWER GENERATION APPLICATIONS – DRAFT TUBES, PENSTOCKS, WATER BOXES, TUBE SHEETS, DAM WALLS ETC.
- REINFORCING, REPAIRING AND PROTECTING CONCRETE AND STEEL TANKS DAMAGED BY EXPOSURE TO THE CORROSIVE CHEMICAL AND MUNICIPAL WASTE SYSTEMS
- REPAIR AND FAIRING – PATCHING, LEAK SEALING, ROUGH STEEL, CONCRETE REBUILD
- ADHESIVE MORTAR – ADD SAND TO CREATE MORTAR.

TECHNICAL INFORMATION

VEHICLE TYPE.....	2-pack epoxy/polyamines.
PIGMENTATION.....	Colour/inert/fibrous reinforcing.

COLOURS.....	Grey, white, other on request.
FINISH.....	Glossy with slight texture from the fibre.
CLEANER.....	MEK or lacquer thinner.
MIXING RATIO.....	1:1 v:v
POT SIZE.....	8L.
INDUCTION TIME.....	Not required.
POT LIFE.....	Approx 40mins @ 25°C.
FLASH POINT.....	Over 100°C.
SOLIDS BY VOLUME.....	100%
SPREAD RATE.....	11sq. m per kit @ 800 microns.
SURFACE TYPE	Concrete, brick, wood, fibreglass, metal, polystyrene
DRY TIME	6 hours @ 25°C touch, 15 hours hard. Full: 7 days.
VOC.....	Zero.
LIFE SPAN.....	Very long life, even in adverse conditions.

APPLICATION NOTES

Surface Preparation:

New Concrete - should be left for 28 days (minimum) before coating. Weak surface laitance must be removed by water blasting, acid etching or abrasive sweeping.

Existing Concrete ... coated or bare - sound surfaces should be well cleaned by degreasing, water blasting or grit blasting. Small areas cleaned by grinder, but not practical for large areas.

Repair holes or scabbled areas by trowelling in a mix of NMP 1720 and clean fine grain sand at about a 1:1 mix of sand to epoxy. Solvent-free - apply over existing well-adhered, clean coatings.

Metal – High-pressure water/abrasive blasting or grinding. Can be applied over tight rust.

Underwater- Remove marine growth/rust by high-pressure water/abrasive blasting or grinding.

Application:

Mix desired amount well at a 1:1 ratio. Ensure the two components are well mixed to a uniform colour. You do not need to mix the entire product at once. Shelf life of unused product is almost indefinite. Mix well to ensure complete mixing. NMP products do not require an induction time so you can use immediately. Apply by spatula or trowel at about 800 microns.

Underwater - take the mixed product underwater in a bucket. Apply within 30-40mins of mixing by spatula or trowel or hand mitt on difficult shapes such as risers. It is resistant to effects of wave movement during curing. It is much easier to apply than traditional "splash zone" compositions, and is substantially less messy than lower viscosity underwater "paints".

CHEMICAL RESISTANCE - Resistant to all fuels, oils, skydrol, hydraulic fluid, alkalies, 50% caustic soda, 70% Sulphuric acid.

TRANSPORTATION – Unregulated.

THIS INFORMATION SHOULD BE READ IN CONJUNCTION WITH MATERIAL SAFETY DATA SHEETS.

NATIONAL MAINTENANCE PRODUCTS Pty Ltd
Unit 19, 10 Miltiadis St, Acacia Ridge, Qld 4110, Australia
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For Coating Solutions ..... askNMP.com

MATERIAL SAFETY DATA SHEET

1. Product Information

Product Name: Corro Coat FC 2100 A Resin Chemical Family: Epoxy Resin Product Code: ER140-A

2. Composition/Information on Ingredients

Chemical Name	CAS Number	Percent	Exposure Limits ACGIH TLV-TWA	OSHA PEL
Bisphenol-A Epichlorohydrin	25068-38-6	50-90	N/E	N/E (Not established)

Specific ingredients of this product are withheld and considered a trade secret.

3. Health Hazards

Eye Contact: May cause irritation and swelling. **Skin Contact:** May cause irritation and sensitization. Symptoms can be immediate or delayed several hours. **Inhalation:** May cause irritation and temporary or permanent sensitization. **Ingestion:** May cause irritation. **Other:** Preexisting skin sensitization may be aggravated by exposure to this product.

4. First Aid Measures

Eyes: Flush eyes thoroughly with water for at least 15 minutes while holding eyelids open. Seek medical attention. **Skin:** Remove contaminated clothing. Wipe excess from skin and wash the affected area thoroughly with soap and water. Wash contaminated clothing thoroughly before reuse. **Inhalation:** Remove to fresh air, and provide oxygen or artificial respiration if needed. Obtain medical attention; symptoms can be delayed up to several hours. **Ingestion:** DO NOT induce vomiting. Give 1-2 cups of water or milk unless the person is drowsy, convulsing, or unconscious. Get medical attention.

5. Fire Fighting Measures

Flammable Properties: **Flash Point:** >300°F (closed cup) **Explosive Limits:** Not available **Auto-Ignition Temperature:** Not available **Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide, aldehydes, and other organic substances
Extinguishing Media and Fire Fighting Instructions: When sufficiently large quantities are present, firefighters should be equipped with full bunker gear, including a positive pressure, NIOSH approved, self-contained breathing apparatus. Extreme heat or water contamination may cause closed containers to explode. **Extinguishing Media:** Use carbon dioxide, dry chemical, or appropriate foam

6. Accidental Release Measures

Ventilate the spill area and evacuate if necessary. Remove all ignition sources. Dike and contain large spills. Clean-up personnel should use adequate protective equipment.

7. Handling and Storage

Store in a cool; dry place, in closed containers at room temperature. Avoid contact with incompatible materials. Wear protective eyewear, chemical-resistant gloves, and other protective clothing as appropriate.

8. Exposure Control and Personal Protection

Engineering/Ventilation Controls: Effective engineering controls should be used whenever possible to eliminate and/or reduce worker exposure to all respiratory hazards. General ventilation, local ventilation, or isolation may prove adequate to keep airborne concentrations below exposure limits. **Respiratory Protection:** If exposure limits are exceeded and local ventilation is unavailable, a supplied-air respirator or a self-contained breathing apparatus is required. **Skin Protection:** Impervious gloves and protective clothing should be worn as necessary. **Eye Protection:** Chemical Splash goggles or safety glasses with side shields should be worn as appropriate.

9. Stability and Reactivity

Chemical Stability: Stable under normal conditions and use. **Conditions and Materials to Avoid:** Reacts with amines and strong oxidizing agents. **Hazardous Polymerization:** Will not occur.

10. Physical and Chemical Properties

Appearance/Odor: Clear and various colors slight acrylic odor **Boiling Point:** Not determined **Vapor Pressure (mm Hg):** <1 @ 25°C
Vapor Density (air=1): >1 **Specific Gravity:** 1.24 **Solubility in Water:** None

11. Toxicological Information

This section provides toxicological information with regard to the pure form of the component indicated. It is suggested that persons trained in its evaluation interpret this information. Epoxy Resins: Acute Oral LD50 (Rat): 11.4 g/kg Acute Dermal LD50 (rabbit): >20 g/kg

12. Disposal Considerations

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

13. Transportation Information and Regulatory Information

DOT/IATA Proper Shipping Name: Not Regulated. **TSCA:** The chemical components of this product are included in the TSCA Chemical Substance Inventory, as required. SARA TITLE III: Section 313 - Toxic Chemicals: None Section 311/312 - Hazard Categories: Fire Hazard: No Reactivity Hazard: No Sudden Release of Pressure Hazard: No Immediate (Acute) Health Hazard: Yes Delayed (Chronic) Health Hazard: No. NFPA Hazards: Health - 2, Flammability - 1, Reactivity - 0 HMIS Hazards: Health - 2, Flammability - 1, Reactivity - 0

date of prepn: 12/7/98 Manufactured by: ERC in RI
Distributed by: Progressive Epoxy Polymers - 48 Wildwood Drive - Pittsfield, NH 03263 - Tel: 603-435-7199 - Fax 603-435-7182

MATERIAL SAFETY DATA SHEET

1. Product Information

Product Name:Corro Coat FC 2100 Hardener Part B Chemical Family: Cycloaliphatic Amine Product Code: ER140-B

2. Composition/Information on Ingredients

Chemical Name	Percent	Exposure Limits ACGIH TLV-TWA	OSHA PEL
Cycloaliphatic Amines	45-65	N/E	N/E (Not established)

The specific ingredients of this product are considered a trade Secret.

3. Health Hazards

Eye Contact: Corrosive liquid. Cause severe irritation and may cause burn. **Skin Contact:** Corrosive liquid. Cause irritation and sensitization. Symptoms can be immediate or delayed several hours. **Inhalation:** Can cause respiratory tract irritation. **Ingestion:** Can cause nausea, headache, and gastrointestinal irritation. **Other:** Preexisting skin sensitization may be aggravated by exposure to this product.

4. First Aid Measures

Eyes: Flush eyes thoroughly with water for at least 15 minutes while holding eyelids open. Seek medical attention. **Skin:** Remove contaminated clothing. Wipe excess from skin and wash the affected area thoroughly with soap and water. Wash contaminated clothing thoroughly before reuse. **Inhalation:** Remove to fresh air, and provide oxygen or artificial respiration if needed. Obtain medical attention; symptoms can be delayed up to several hours. **Ingestion:** DO NOT induce vomiting. Give 1-2 cups of water or milk unless the person is drowsy, convulsing, or unconscious. Get medical attention.

5. Fire Fighting Measures

Flash Point: >200°F (PMCC) **Explosive Limits:** Not applicable **Auto-Ignition Temperature:** Not applicable **Hazardous Decomposition Products:** Oxides of nitrogen, carbon monoxide, carbon dioxide and other organic materials **Extinguishing media:** Use carbon dioxide, dry chemical, or appropriate foam.

6. Accidental Release Measures

Ventilate the spill area and evacuate if necessary. Remove all ignition sources. Dike and contain large spills. Flush area with water spray. Clean-up personnel should use adequate protective equipment. .

7. Handling and Storage

Store in a cool; dry place, in closed containers at room temperature. Avoid contact with incompatible materials. Wear protective eyewear, chemical-resistant gloves, and other protective clothing as appropriate.

8. Exposure Control and Personal Protection

Engineering/Ventilation Controls: Effective engineering controls should be used whenever possible to eliminate and/or reduce worker exposure to all respiratory hazards. General ventilation, local ventilation, or isolation may prove adequate to keep airborne concentrations below exposure limits. **Respiratory Protection:** If exposure limits are exceeded and local ventilation is unavailable, a supplied-air respirator or a self-contained breathing apparatus is required. **Skin Protection:** Impervious gloves and protective clothing should be worn as necessary. **Eye Protection:** Chemical splash goggles or safety glasses with side shields should be worn as appropriate.

9. Stability and Reactivity

Chemical Stability: Stable under normal conditions and use. **Conditions and Materials to Avoid:** Reacts with epoxy and strong oxidizing agents. **Hazardous Polymerization:** Will not occur

10. Physical and Chemical Properties

Appearance/Odor: Grey Gel, Slight amine odor **Boiling Point:** Not determined **Vapor Pressure (mm Hg):** <1 @ 25°C **Vapor Density (air=1):** >1 **Specific Gravity:** 1.18 **Solubility in Water:** Slightly soluble

11. Toxicological Information

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

12. Disposal Considerations

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

13. Transportation and Regulatory Information

DOT/IATA Proper Shipping Name: Non-Corrosive, Not Regulated Hazardous Label: NON-CORROSIVE

14. Regulatory Information

TSDCA: The chemical components of this product are included in the TSCA Chemical Substance Inventory, as required. SARA TITLE III: Section 313 - Toxic Chemicals: None Section 311/312 - Hazard Categories: Fire Hazard - No, Reactivity Hazard - No, Sudden Releae of Pressure Hazard - No, Immediate (Acute) Health Hazard - Yes, Delayed (Chronic) Health Hazard - No. OSHA Hazard Communication Standard Hazard Classes: Corrosive NFPA Hazards: Health - 2, Flammability - 0, Reactivity - 0 HMIS hazards: Health - 2, Flammability - 0, Reactivity - 0

date of prepn: 12/7/98 Manufactured by: ERC in RI

Distributed by: Progressive Epoxy Polymers - 48 Wildwood Drive - Pittsfield, NH 03263 - Tel: 603-435-7199 - Fax: 603-435-7182

Corro-Coat FC 2100 Epoxy TECHNICAL DATA

SOLVENT-FREE EPOXY COATING SYSTEM

Mix and Match Corro-Coat FC 2100 Bases and Curing Agents

Protective Coating
Marine Barrier Coat
Corrosion Protection
Apply/Cures Underwater

Solvent-Free and Non-Hazardous
Applies and Cures in Water (fresh, salt, brackish)
Excellent Chemical and Abrasion Resistance
Easy 2:1 Mixing Ratio
Feldspar Ceramic and Kevlar™ Reinforced

STANDARD PRODUCT DESCRIPTION	Corro Coat FC 2100 is a 100% solids, next generation, epoxy coating featuring 40% tensile elongation, excellent chemical and abrasion resistance, one coat, no sag, high build glaze finish that will withstand severe abuse. Bonds to concrete (wet and dry), fiberglass, steel and wood surfaces. Novolac version available. Novalac and thicker (nonhazmat) versions available. High temperature (hazmat) version is also available.
USES	Most corrosive environments Marine, chemical, pulp and paper Spillways, piping, pilings, columns Excellent as a finish top coat
FEATURES	Solvent-Free with long pot life Non-Sag at thicknesses up to 30-35 mils High Gloss Convenient 2 to 1 ratio by volume (1:0.37 by weight) Non-blushing and non-water spotting Non-corrosive and Non-hazmat Kevlar™ microfibers reinforce against hairline cracking and chipping Feldspar (ceramic plates/needles) provides extreme abrasive resistance Apply by brush, roller (at the upper limits of roller application) or spreader
VISCOSITY	Viscosity at 72°F: Part A: 25,000 cps Part B: 450 cps Mixed: 1,200 cps
PHYSICAL PROPERTIES	COLOR ..... Light gray, other colors in 15 gallon units COMPRESSIVE STRENGTH ..... ASTM D695 ..... 10,000 psi TENSILE STRENGTH ..... ASTM D638 ..... 4,800 psi ELONGATION AT BREAK ..... 40% ABRASION RESISTANCE ..... CS-17 WHEEL, 1 kg LOAD ..... ASTM D4060 ..... 0.10 gm loss WATER ABSORPTION ..... ASTM D570 ..... 0.10% (2 hour boil) FLEXURAL STRENGTH ..... ASTM D790 ..... 6,600 psi SHORE D HARDNESS ..... ASTM D2240 ..... 91 HEAT DISTORTION ..... ASTM D649 ..... 124° F TEMPERATURE BOND STRENGTH TO: Concrete ..... 100% concrete failure FILM THICKNESS ..... 10-35 mils (average: 100 sq. ft./gallon @ 16 mils)

MULTI-VENDOR EPOXY SOLUTIONS

Corro Coat FC 2100 Epoxy TECHNICAL DATA

CURE SCHEDULE

POT LIFE 50 gram @ 70°F ..... approx. 90+ minutes
FIRM 50 gram @ 70°F ..... 8 - 10 hours

CHEMICAL RESISTANCE

REAGENT ACIDS		RATING	REAGENT ALKALIES		RATING
Acetic	1-5%	2	Ammonium Hydroxide	1-26%	2
Chromic	1-5%	2	Calcium Chloride	All	2
Citric	All	2	Calcium Hypochlorite	1-15%	2
Hydrochloric	All	2	Caustic Soda		2
Lactic	1-10%	2	Caustic Potash		2
Nitric	1-5%	2	Sodium Hydroxide	All	2
Oxalic	1-20%	2	Sodium Sulfide	1-30%	2
Phosphoric	All	2			
Sulfuric	1-75%	2			

2 = intermittent immersion. 8 hours with 8 hours dry time.

SURFACE PREPARATION

Surface to be topcoated must be clean and free of oils, grease and loose contamination.

APPLICATION

Mix Corro Coat FC 2100 epoxy base with the Corro Coat FC 2100 curing agent. Use a mechanical mixer if possible to ensure thorough mixing. The mixing ratio is 2/1 (base/curing agent) by volume or 1/0.37 by weight. Corro Coat FC 2100 does not require a 'sweat-in' or induction time and the mixed components should be used immediately.

Potlife is approximately 55-75 minutes at 75°F, so mix only the amount of epoxy that can be easily applied within that time limit. Apply using a brush, roller (product is at the upper limits of rollability), or squeegee. This product can be thinned for improved rollability or thickened to paste like viscosity.

TEMPERATURE

Corro Coat-FC2100 may be applied in temperatures as low as 45° (7°C) -curing will be slow, however the viscosity of the material will still be workable. Temperature will exert a considerable influence on the rate of curing. In broad terms expect each 10°C, (18°F), rise or fall in temperature to half or double dry times and pot lives.

TRANSPORT

Corro-Coat FC2100 and Novalac version is nonregulated by USDOT, IATA & IMO.
Corro-Coat FC2100 HT (High Temperature) is hazardous for shipping:
UN2735, Packing Group III, Class 8, Corrosive.

Manufactured by:
ERC in RI

Distributed by:
Progressive Epoxy Polymers, Inc.
48 Wildwood Dr.
Pittsfield, NH 03263-3406

Tel: 603-435-7199
Fax: 603-435-7182
www.epoxyproducts.com
info@epoxyproducts.com

SAFETY DATA SHEET:

ALOCIT 28.15 STANDARD

1. IDENTIFICATION OF THE PREPARATION, SUBSTANCE AND COMPANY

Product name: Alocit 28.15 Standard Grade

Alocit Systems Limited, Milltown Street, Radcliffe, Manchester, United Kingdom, M26 1WE.
Tel: +44 (0)1362694916 Fax: +44 (0)1362696360 Email: hq@alocit.co.uk

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical characterization : preparation

Bisphenol A epoxy resin containing reactive diluent

Ingredients	CAS-no.	Hazard Symbols	R-phrases	Concentration
Reaction product: Bisphenol A-(epichlorhydrin); epoxy resin (number average molecular weight <700)				
	25068-38-6	Xi, N	R36/38, R43, R51/53, R68	30-35 %
O-cresyl glycidyl ether	2210-79-9	Xi, N	R38-R43-R51/53	5 - 10%

(See full text of phrases under chapter 15)

3. HAZARDS IDENTIFICATION

Most important hazards: Irritating to eyes and skin. May cause sensitization by skin contact.

4. FIRST AID MEASURES

General Information: In all cases of doubt, or when symptoms persist, seek medical attention. Never give anything by mouth to an unconscious person.

Inhalation: Consult a physician if necessary.

Skin Contact: Wash off with soap and plenty of water. Do not use organic solvents.

Eye contact: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

Ingestion: Drink plenty of water. Do not induce vomiting without medical advice. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Extinguish with carbon dioxide, dry chemical, foam or waterspray

Extinguishing media which must not be used for safety reasons: Do not use water jet

Specific hazards: Do not allow material to contaminate ground water system. Dispose of rinse water in accordance with local and national regulations.

Special protective equipmentfor firefighters: Self-contained breathing apparatus

6. ACCIDENTAL RELEASE MEASURES

Environmental precautions: Do not contaminate surface water. If this does occur, contact authorities immediately.

Methods for cleaning up: Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Dispose of as special waste in compliance with local and national regulations.

7. HANDLING AND STORAGE

Handling: Avoid contact with skin, eyes and clothing.
Keep away from food and drink. Wash hands and face before breaks and immediately after handling the product.

Storage: Keep container tightly closed in a dry and well-ventilated place.
If stored in plastic containers, stack no more than 2 high.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal protection equipment:

- *Respiratory protection:* *Provide adequate ventilation*
- Hand protection: PVC or other plastic material gloves
- Eye protection: Safety glasses with side-shields
- Skin and body protection: Protective suit

9. PHYSICAL AND CHEMICAL PROPERTIES

Odour: Slight

10. STABILITY AND REACTIVITY

Stability: This product is chemically stable and generally compatible with other substances

Materials to avoid: Avoid contact with strong acids and bases and strong oxidizing agents.

11. TOXICOLOGICAL INFORMATION

Acute toxicity: LD50/oral/rat = 5000 mg/kg

Sensitization: Prolonged/repeated contact may cause skin irritation and cause defatting thus rendering the skin more susceptible to damage by other substances.

12. ECOLOGICAL INFORMATION

Degradability: Avoid subsoil penetration. Prevent product from entering drains. Do not contaminate surface water.

Waste code number: in accordance with Federal Law Gazette [BGBI.] II No. 227/1997 (determination regulation) 55903 residual epoxy, not hardened

13. DISPOSAL CONSIDERATIONS

Product: Must be incinerated, when in compliance with local regulations.

Container: Empty containers can be landfilled after thorough cleaning, when in compliance with the Environmental Protection (Duty of Care) Regulations 1991.

14. TRANSPORT INFORMATION

Road Transport

ADR/RID	Information applies to:	product
GGVS	Class:	9
GGVE	Hazard no:	90
	UN no:	3082
	TREM-CARD:	90GM6-III
	Proper shipping name:	Environmentally hazardous substance, liquid, N.O.S.
	Additional information	Bisphenol A-epoxy Resin and 1,2 -cresyl-glycidylether.

Maritime transport

UN 3082
Environmentally hazardous substance, liquid, N.O.S. (Bisphenol A-epoxy Resin mixture)
Class 9
Packing Group III
EMS F-A, S-F.
Marine Pollutant: No

Air transport

UN 3082
Environmentally hazardous substance, liquid, N.O.S. (Bisphenol A-epoxy Resin mixture)
Class 9
Packing Group III

15. REGULATORY INFORMATION

Classification according to EC directives

Contains: BISPHENOL A-EPICHLORHYDRIN) {REACTION PRODUCT}
O-CRESYL GLYCIDYL ETHER

Symbol(s)

Xi - Irritant N - Hazardous to the Environment

Classification: Labelling required
Hazard labels: Xi - Irritant N - Hazardous to the Environment

R36/38	Irritating to eyes and skin.
R43	May cause sensitization by skin contact
R51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment
R68	Possible risk of irreversible effects.
P5	Contains epoxy constituents. See information supplied by the manufacturer
S24/25	Avoid contact with skin and eyes.
S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S36/37	Wear suitable protective clothing and gloves.
S51	Use only in well ventilated areas.
S57	Use appropriate containment to avoid environmental contamination.
S60	This material and/or its container must be disposed of as hazardous waste.
S61	Avoid release to the environment. Refer to special instructions/Safety data sheets

Contains Epoxy Resin

UNNO 3082 Environmentally Hazardous Substance, Liquid, N.O.S.
(Epoxy Resin Mixture (Number average MW <= 700))

N.B. THIS MATERIAL IS NOT HAZARDOUS WHEN MIXED & CURED

16. OTHER INFORMATION

The provision of Safety Data Sheets comes under Regulation 6 of CHIP (CHIP is the recognised abbreviation for the Chemicals (Hazard Information and Packaging (Regulations). This is an addition to the Health and safety at Work Act 1974. Users of products supplied by Alocit Systems Ltd should take appropriate measures to ensure working practices are in accordance with the Control of Substances Hazardous to Health Regulations (COSHH).

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

ALOCIT SYSTEMS
HIGH PERFORMANCE PAINTS AND COATINGS

ALOCIT 28.15 EPOXY COATING FINISH STANDARD GRADE (All temps above water - underwater below 17°C/63°F)

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

USAGE

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

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

TECHNICAL DETAILS

Product Description		Two component/epoxy resin based/pigmented/solvent free
Volume Solids		100%
Mixing Ratio (by weight)		5 parts resin - 1 part hardener
Specific Gravity (mixed)		1.55
Dilution		Do not dilute
Brush/Tool Cleaner		Immediately after use. Acetone
Theoretical Coverage Rate*		@ 400μ/16 mil (Maximum WFT) = 1.35m²/mixed Kg @ 300μ/12 mil (Optimum WFT) = 1.8m²/mixed Kg @ 200μ/8 mil (Minimum WFT) = 2.7m²/mixed Kg 1 US gallon @ 25μ/1 mil = 1600 ft²
Number of Coats		Two coats
Working Life**		@ +20°C/68°F 45/60 minutes
Drying Times		@ +20°C/68°F Touch dry 6-8 hours
Min Practical Cure Temp.***		+5°C/41°F
Resistant to		Water, sea water, oils, petroleum,some solvents, alkalis and a certain range of acids.
Flash Point		Above +200°C/+392°F
Shelf Life		Minimum 1 year in original container
Storage		Moderate room temperature 15-30°C/59-86°F
Colours		White, Black, Grey - others on request - min quantity may apply US FED-STD-595, RAL, BS 36, BS 3800
Pack Size	UK/Europe	3 KG (2.5 kilo resin/0.5 kilo hardener)
	US	1 Quart, 1 Gallon, 5 Gallon (Pack includes both components)

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

ALOCIT INTERNATIONAL - USA - PHONE WARFIELD COMPANY ON 610 328 9440 - UK/EUROPE - PHONE +44 (0)1362 694915

SURFACE PREPARATION

A) NEW STEEL

All millscale to be removed by abrasive blasting, check for rogue peaks and laminations, take remedial action. Remove dust and other contaminations. A blast profile of between 50 and 100μ (2-4 mil) is the aim, based on Swedish Pictorial Standards / IS0-8501-1/SSPC/NACE. We recommend SA2 (SP6, NACE 3) as a minimum, and SA 2.5 (SP10, NACE 2) as the optimum. A secondary choice for surface preparation is mechanical abrading to remove surface contamination before coating application.

B) WEATHERED/EXPOSED/CORRODED STEEL

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

1) Abrasive blasting, dry, in areas of low chemical contamination followed by optional high pressure water blast (15-20,000psi).

2) UHP hydroblasting (30/40,000psi) to remove all previous coatings etc and reveal original profile. Especially suitable for wet environments such as ships tanks, piers, jetties etc. Clean to an agreed standard and check soluble salts level.

3) UHP and High Pressure water blasting may sometimes be employed with added abrasive.

4) Mechanical cleaning (power) i.e. needle gunning, rotary wire brushing etc to remove all contamination/dust etc.

Notes:

1) Stains of rust, paint or mill scale remaining on the surface do not present a problem providing minimum surface profile criteria are met.

2) Alocit product range can be applied to both dry, wet and underwater surfaces, however whilst clean steel in saltwater is acceptable, steel heavily contaminated with salt and/or other chemicals above water is not acceptable. This type of steel requires decontamination, with chemical levels measured before and after.

C) CONCRETE

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

D) NON-FERROUS METALS

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

E) NON METALLIC

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

PRODUCT APPLICATION - Methods

Atmospheric: Brush & Roller
Airless spray - minimum 68:1, Tip size 21-23 thou.

Sweating, damp or underwater: Alocit brushes - use vigorous circular motion.
Alocit K1 underwater pump with round brush - use vigorous circular motion.

Notes:

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

PRODUCT APPLICATION - COATING SYSTEMS

STEEL **Atmospheric and Underwater:**

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

CONCRETE

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

Underwater: 2 coats Alocit 28.15

Notes:

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

PRECAUTIONS

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

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

Never dilute Alocit 28.15 with thinners.

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

IMPORTANT

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

ALL INFORMATION IS GIVEN IN GOOD FAITH BUT WITHOUT WARRANTY

ALOCIT INTERNATIONAL - USA - PHONE WARFIELD COMPANY ON 610 328 9440 - UK/EUROPE - PHONE +44 (0)1362 694915

CARBOLINE CO. MATERIAL SAFETY DATA SHEET PAGE 1 of 3

SECTION I - PRODUCT: A-788 SPLASH ZONE COMPOUND PTB (0969B5NL)
Date: 12/18/01 Replaces 11/18/99
(aka A-788 SPLASH ZONE MASTIC PT B)
CHEMTREC TRANSPORTATION EMERGENCY PHONE NO.: 800-424-9300
PITTSBURGH POISON CONTROL CENTER HEALTH EMERGENCY NO.: 412-681-6669

SECTION II - HAZARDOUS INGREDIENTS EXPOSURE LIMITS

CHEMICAL NAME	(A)	(B)	(C)	(D)	(E)
TALC	14807-96-6	40%	2MG/M3	NE	NE
POLYAMIDE	68082-29-1	35%	NE	NE	NE
SILICA	14808-60-7	30%	0.1MG/M3	NE	NE
TDMAM PHENOL	90-72-2	5%	NE	NE	NE

HAZARDOUS INGREDIENTS	ADDITIONAL DATA	
CHEMICAL NAME	(F)	(G)
TALC	NOT AVAILABLE	NO/NO
POLYAMIDE	>2000 MG/KG ORAL,RAT	NO/NO/1,2
SILICA	NOT AVAILABLE	NO/NO/NR/NO
TDMAM PHENOL	2169 MG/KG ORAL	NO/NO

TABLE (A) CAS NUMBER (B) LESS THAN WT (C) TLV-TWA (D) STEL (E) CEILING (F) TOXICITY DATA (LD50/Route,LC50/Route) (G) SARA 302/SARA 313/ SARA 311-312 CATEGORIES/CERCLA. | NE = not established, NR = not required, NO = no. Color Pigment Mixture may contain Iron Oxides, Titanium Dioxide, Carbon Black, and other particulates not otherwise regulated in varying amounts depending on color of product.

WHMIS CLASSIFICATION: D2A -- D2B
HMIS/NFPA CLASSIFICATION: HEALTH 3, FLAMMABILITY 1, REACTIVITY 1, PERSONAL PROTECTION CODE G, NFPA FIRE FIGHTING PHASE 4

SECTION III - PHYSICAL DATA:

BOILING RANGE: N/A. VAPOR DENSITY: N/A EVAPORATION RATE: N/A VOLATILE BY WEIGHT 0 %. VOLATILE BY VOLUME: 0 %. PRODUCT WT/GAL: 13.7 LBS/U.S.GAL. 1.64 sp gr.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA:

FLAMMABILITY CLASSIFICATION: FLASH POINT: 201 F(93C) (Setaflash) LEL: N/A UEL: N/A
OSHA-COMBUSTIBLE LIQUID/OSHA/CLASS/IIIB, DOT-PAINT, NOT REGULATED, CANADIAN TDGA: NOT REGULATED
EXTINGUISHING MEDIA: Dry Chemical, Foam, Carbon Dioxide, Water Fog.
FIRE AND EXPLOSION HAZARDS: 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

PRODUCT: A-788 SPLASH ZONE COMPOUND PTB (0969B5NL)
Date: 12/18/01 Replaces 11/18/99

hazards exist, workers should be required to use nonferrous tools and to wear conductive and non-sparking shoes.
SPECIAL FIRE FIGHTING PROCEDURES: Evacuate hazard area of unprotected personnel. Use a NIOSH approved self-contained breathing unit and complete body protection. Cool surrounding containers with water in case of fire exposure.

SECTION V - HEALTH HAZARD DATA:

INHALATION: May cause nose and throat irritation. May cause lung irritation. May cause allergic respiratory reaction, effects may be permanent.
CONTACT: May cause eye burns. May be harmful if absorbed through the skin. May cause skin burns. May cause allergic skin reaction.
NOTICE: Contains SILICA which can cause cancer. Risk of cancer depends on duration and level of exposure.
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.
PRIMARY ROUTE(S) OF ENTRY: Inhalation, Dermal, Ingestion.
EMERGENCY FIRST AID PROCEDURES: When exposed always get medical attention.
EYE CONTACT: Flush with water for 15 minutes.
SKIN CONTACT: Wash with soap and water. Remove contaminated clothing and clean before reuse.
INHALATION: Remove to fresh air. Provide oxygen if breathing is difficult. Use artificial respiration if not breathing. Get medical attention.
IF SWALLOWED: DO NOT INDUCE VOMITING!! Always get medical attention.

SECTION VI - REACTIVITY DATA:

STABILITY: This product is stable under normal storage conditions.
HAZARDOUS POLYMERIZATION: Will not occur under normal conditions.
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.
CONDITIONS TO AVOID: Heat, sparks, and open flames.
INCOMPATIBILITY: Avoid contact with strong oxidizing agents.

SECTION VII - SPILL OR LEAK PROCEDURES:

STEPS TO BE TAKEN IN CASE OF SPILL: 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 safe handling and use guidelines in Section VIII. Contain and soak up residual with an absorbent (clay or sand). Take up absorbent material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section II for Sara Title III and CERCLA information.

PRODUCT: A-788 SPLASH ZONE COMPOUND PTB (0969B5NL)
Date: 12/18/01 Replaces 11/18/99

SECTION VIII - SAFE HANDLING AND USE INFORMATION:

RESPIRATORY PROTECTION: Use only with ventilation to keep levels below exposure guidelines. (Section II). User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use.
VENTILATION: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).
SKIN AND EYE PROTECTION: Recommend impervious gloves, clothing and safety glasses with side shields or chemical goggles to avoid skin and eye contact. If material penetrates to skin, change gloves and clothing. Hypersensitive persons should wear gloves or use protective cream.
HYGIENIC PRACTICES: Wash with soap and water before eating, drinking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and pass through hazardous materials. Check shoes carefully after soaking before reuse.
APPLICATION: Use only in accordance with Carboline application instructions, container label and Product Data Sheet.

SECTION IX - SPECIAL PRECAUTIONS:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep away from heat, sparks, open flame, and strong oxidizing agents. Keep containers closed. Store in cool, dry place with adequate ventilation. If pouring or transferring materials, ground all containers and tools.
OTHER PRECAUTIONS: Do not weld, heat, cut or drill on full or empty containers.

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.

Carboline Company 350 Hanley Ind. Ct. St. Louis, MO 63144
PHONE NO. 314-644-1000 FOR INDUSTRIAL USE ONLY

CARBOLINE CO. MATERIAL SAFETY DATA SHEET
PRODUCT: A-788 SPLASH ZONE COMPOUND PTB (0969B5NL)
Date: 12/18/01 Replaces 11/18/99

SPECIFIC STATE REGULATORY INFORMATION

NEW JERSEY
PENNSYLVANIA
Non-Hazardous Materials above 1 Percent:

Name	CAS	Pct
No materials meet this criteria		

CALIFORNIA

WARNING: This product contains a chemical(s) known to the State of California to cause cancer, and birth defects or other reproductive harm.

CARBOLINE CO. MATERIAL SAFETY DATA SHEET PAGE 1 of 3

SECTION I - PRODUCT: A-788 SPLASH ZONE COMPOUND PTA (0969A5NL)
Date: 12/18/01 Replaces 11/18/99
(aka A-788 SPLASH ZONE MASTIC PT A)
CHEMTREC TRANSPORTATION EMERGENCY PHONE NO.: 800-424-9300
PITTSBURGH POISON CONTROL CENTER HEALTH EMERGENCY NO.: 412-681-6669

SECTION II - HAZARDOUS INGREDIENTS EXPOSURE LIMITS

CHEMICAL NAME	(A)	(B)	(C)	(D)	(E)
EPOXY RESIN	25068-38-6	45%	NE	NE	NE
TALC	14807-96-6	35%	2MG/M3	NE	NE
SILICA	14808-60-7	25%	0.1MG/M3	NE	NE
COLOR PIGMENT	MIXTURE	5%	3.5MG/M3	NE	NE

HAZARDOUS INGREDIENTS CHEMICAL NAME	ADDITIONAL DATA (F)	(G)
EPOXY RESIN	11.4G/KG RAT,ORAL >20ML/KG SKIN,SENSITIZER	NO/NO/1,2
TALC	NOT AVAILABLE	NO/NO
SILICA	NOT AVAILABLE	NO/NO/NR/NO
COLOR PIGMENT	NOT AVAILABLE	NO/YES

TABLE (A) CAS NUMBER (B) LESS THAN WT (C) TLV-TWA (D) STEL (E) CEILING (F) TOXICITY DATA (LD50/Route,LC50/Route) (G) SARA 302/SARA 313/ SARA 311-312 CATEGORIES/CERCLA. NE = not established, NR = not required, NO = no. Color Pigment Mixture may contain Iron Oxides, Titanium Dioxide, Carbon Black, and other particulates not otherwise regulated in varying amounts depending on color of product.

WHMIS CLASSIFICATION: D2A -- D2B
HMIS/NFPA CLASSIFICATION: HEALTH 2, FLAMMABILITY 1, REACTIVITY 0,
PERSONAL PROTECTION CODE E, NFPA FIRE FIGHTING PHASE 4

SECTION III - PHYSICAL DATA:

BOILING RANGE: N/A. VAPOR DENSITY: N/A EVAPORATION RATE: N/A VOLATILE BY WEIGHT 0 %. VOLATILE BY VOLUME: 0 %. PRODUCT WT/GAL: 14.8 LBS/U.S.GAL. 1.78 sp gr.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA:

FLAMMABILITY CLASSIFICATION: FLASH POINT: 201 F(93C) (Setaflash) LEL: N/A UEL: N/A
OSHA-COMBUSTIBLE LIQUID/OSHA/CLASS/IIIB, DOT-PAINT, NOT REGULATED, CANADIAN TDGA: NOT REGULATED
EXTINGUISHING MEDIA: Dry Chemical, Foam, Carbon Dioxide, Water Fog.
FIRE AND EXPLOSION HAZARDS: 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 nonferrous tools and to wear conductive and non-sparking shoes.
SPECIAL FIRE FIGHTING PROCEDURES: Evacuate hazard area of unprotected personnel. Use a NIOSH approved self-contained breathing unit and complete body protection. Cool surrounding containers with water in case of fire exposure.

SECTION V - HEALTH HAZARD DATA:

INHALATION: May cause nose and throat irritation.
CONTACT: May cause eye irritation. May cause skin irritation. May cause allergic skin reaction.
NOTICE: Contains SILICA which can cause cancer. Risk of cancer depends on duration and level of exposure.
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.
PRIMARY ROUTE(S) OF ENTRY: Inhalation, Dermal, Ingestion.
EMERGENCY FIRST AID PROCEDURES: When exposed always get medical attention.
EYE CONTACT: Flush with water for 15 minutes.
SKIN CONTACT: Wash with soap and water. Remove contaminated clothing and clean before reuse.
INHALATION: Remove to fresh air. Provide oxygen if breathing is difficult. Use artificial respiration if not breathing. Get medical attention.
IF SWALLOWED: DO NOT INDUCE VOMITING!! Always get medical attention.

SECTION VI - REACTIVITY DATA:

STABILITY: This product is stable under normal storage conditions.
HAZARDOUS POLYMERIZATION: Will not occur under normal conditions.
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.
CONDITIONS TO AVOID: Heat, sparks, and open flames.
INCOMPATIBILITY: Avoid contact with strong oxidizing agents.

SECTION VII - SPILL OR LEAK PROCEDURES:

STEPS TO BE TAKEN IN CASE OF SPILL: 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 safe handling and use guidelines in Section VIII. Contain and soak up residual with an absorbent (clay or sand). Take up absorbent material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section II for Sara Title III and CERCLA information.

PRODUCT: A-788 SPLASH ZONE COMPOUND PTA (0969ASNL)
Date: 12/18/01 Replaces 11/18/99

SECTION VIII - SAFE HANDLING AND USE INFORMATION:

RESPIRATORY PROTECTION: Use only with ventilation to keep levels below exposure guidelines. (Section II). User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use.
VENTILATION: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).
SKIN AND EYE PROTECTION: Recommend impervious gloves, clothing and safety glasses with side shields or chemical goggles to avoid skin and eye contact. If material penetrates to skin, change gloves and clothing. Hypersensitive persons should wear gloves or use protective cream.
HYGIENIC PRACTICES: Wash with soap and water before eating, drinking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and pass through hazardous materials. Check shoes carefully after soaking before reuse.
APPLICATION: Use only in accordance with Carboline application instructions, container label and Product Data Sheet.

SECTION IX - SPECIAL PRECAUTIONS:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep away from heat, sparks, open flame, and strong oxidizing agents. Keep containers closed. Store in cool, dry place with adequate ventilation. If pouring or transferring materials, ground all containers and tools.
OTHER PRECAUTIONS: Do not weld, heat, cut or drill on full or empty containers.

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.

Carboline Company 350 Hanley Ind. Ct. St. Louis, MO 63144
PHONE NO. 314-644-1000 FOR INDUSTRIAL USE ONLY

CARBOLINE CO. MATERIAL SAFETY DATA SHEET
PRODUCT: A-788 SPLASH ZONE COMPOUND PTA (0969ASNL)
Date: 12/18/01 Replaces 11/18/99

SPECIFIC STATE REGULATORY INFORMATION

NEW JERSEY
PENNSYLVANIA
Non-Hazardous Materials above 1 Percent:

Name	CAS	Pct
No materials meet this criteria		

CALIFORNIA

WARNING: This product contains a chemical(s) known to the State of California to cause cancer, and birth defects or other reproductive harm.

product data carboline®

Carboguard® A-78
Splash Zone Mastic

Selection & Specification Data

Generic Type Epoxy Polyamide

Description Solvent-free patching compound used for repairing pits, cracks and voids in steel, concrete, wood and other surfaces. Has the unique ability to be mixed, applied and cured underwater.

Features
- Designed for underwater and other wet applications.
- Can be applied up to 2" in thickness
- Self-priming on most surfaces and over most generic types of coatings
- Rapid cure characteristics
- VOC compliant to current AIM regulations

Color Olive Green

Finish Flat

Primers Self-priming

Topcoats Epoxies, Polyurethanes if required

Dry Film Thickness 1/8"-2" (3,1-50 mm) for most applications
1/4" (6.4 mm) is practical maximum thickness for vertical and overhead applications.

Solids Content By Volume: 99% ± 1%

Theoretical Coverage Rate 1604 mil ft² (24.5 m²/l at 25 microns)
Allow for loss in mixing and application. Field experience has displayed a realistic coverage rate of 8 ft²/gallon (.2 m²/l). This figure accounts for actual losses and the fact that the product is frequently applied at higher dry film thicknesses.

VOC Values As supplied: 0.00 lbs/gal (0 g/l)
These are nominal values.

Dry Temp. Resistance Continuous: 200°F (93°C)
Non-Continuous: 250°F (121°C)

Substrates & Surface Preparation

General

Remove all oil or grease from the surface wi Carboline Surface Cleaner 3 in accordanc with SSPC-SP1.

Remove all dirt, loose paint, spalling concret rotted wood, marine growth and oth contaminants by abrasive blasting or hig pressure water blasting.

Hand or power tool cleaning methods may b used but are of limited benefit and are tim consuming.

Abrasive blasting can be done underwater a the initial air blast will clear a path through th water for the abrasive/air mixture.

When working at the splash zone or in sa water, coat cleaned metal surfaces as soo as possible to minimize new corrosion.

February 2000 replaces November 1999

Carboguard® A-788

lication Equipment

General

Apply by hand, trowel or broad knife. Spread material smoothly onto the surface in a 1/8" to 1/4" (3.1 to 6.4 mm) thick layer using enough pressure to displace water and air bubbles. Smooth out the area by hand. When starting another mix, start spreading at and away from the previous applied film. This will help prevent trapped air bubbles or leaving an area uncoated.

If applying to dry surfaces in dry air, periodically rewet hands or tools with water to keep the product from sticking.

When used as a patch or grout, force the material into the hole or crack and smooth by hand to the thickness needed. For larger patches greater than ¼" (12.7 mm), use a steel or fiberglass plate for added support. Apply A-788 to the substrate, then embed the support plate (cut larger than the hole) and apply A-788 overall.

When applied underwater or when wetted with water during application, the surface of A-788 will form an emulsified lighter green "scum" layer. This layer is normal and facilitates application. The film under the "scum" layer remains undisturbed and will cure properly. The "scum" layer will cure and become part of the finish when A-788 is cured above water; however, this layer will remain soft and uncured when the A-788 is kept underwater during curing.

Mixing & Thinning

Mixing

Mix one Part A to one Part B by volume. Mix by hand "scooping" a quantity of the "A" component from the can and then "scoop" the same quantity of the "B" component from its can. Mix and knead the two components by hand until the yellow and black colors have combined to make a uniform olive green color. Apply this mixture immediately after mixing; no sweat-in time is required. To assist in mixing, keep the gloved hands and the materials wet with water during the mixing process.

Thinning

Not recommended. Use of thinners other than those supplied or recommended by Carboline may adversely affect product performance and void product warranty, whether expressed or implied.

Pot Life

Working times at 70°F (21°C), Below and above water:

Golfball size mix:	40 minutes
Baseball to Softball size mix:	30 minutes
½ gallon mix:	15 minutes

Working times are reduced by one-half at temperatures above 80°F (27°C).

Do not mix more material than can be applied in the working times listed. The material may still appear to be workable after the time limit is exceeded, but it will not properly adhere to the substrate after application and curing.

Cleanup & Safety

Cleanup

Use #2 Thinner or Acetone.

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. Some people may be sensitive to the epoxy resins used in this material, so tight fitting rubber gloves should always be worn during the mixing process. When used for marine applications in splash zone areas, use all necessary precautions to protect the applicators. Wear wet or dry suits if necessary to help preserve body heat and use approved life jackets and safety lines. Avoid working in rough water.

Application Conditions

Condition	Material	Surface	Ambient	Humidity
Normal	65°-75°F (18°-24°C)	60°-80°F (16°-27°C)	60°-80°F (16°-27°C)	30-70%
Minimum	50°F (10°C)	50°F (10°C)	50°F (10°C)	0%
Maximum	100°F (38°C)	110°F (43°C)	100°F (38°C)	100%

Special application techniques may be required above or below normal application conditions. Do not apply or cure in acidic or alkaline water (pH less than 8 or greater than 9) or in solutions containing solvents.

Curing Schedule

Surface Temp. & 50% Relative Humidity	Dry to Touch	Dry to Handle or Topcoat	Maximum Recoat Time
50°F (10°C)	8 Hours	36 Hours	72 Hours
60°F (16°C)	4 Hours	16 Hours	48 Hours
75°F (24°C)	2 Hours	8 Hours	24 Hours
90°F (32°C)	1 Hour	6 Hours	12 Hours

These times are based on a 1/8" (3.1 mm) dry film thickness. Higher film thicknesses or cooler temperatures will require longer cure times. If the maximum recoat times have been exceeded, the surface must be abraded by sweep blasting or sanding to produce a rough surface and to remove the "scum" layer before the application of any further coatings.

Packaging, Handling & Storage

Shipping Weight (Approximate)	½ Gallon Kit 10 lbs (4 kg)	2 Gallon Kit 30 lbs (13 kg)
Flash Point (Setaflash)	Part A: >200°F (93°C) Part B: >200°F (93°C)	
Storage Temperature & Humidity	40°-110°F (4°-43°C) Store indoors. 0-100% Relative Humidity	
Shelf Life	24 months at 75°F (24°C)	

SOMAY PRODUCTS, INC.
4301 N.W. 35th Avenue
Miami, FL 33142-4382
Tel.: (305) 633-6333
Fax: (305) 638-5524
SINCE 1926

February 2000 replaces November 1999

1. IDENTIFICATION OF PREPARATION & OF COMPANY

Product:	Epoxy Resin.
Manufacturer:	Chemco International Ltd East Shawhead Industrial Estate Coatbridge ML5 4XD Scotland
Telephone No:	+44 (0) 1236 606060
Email:	sales@chemcoint.com
Web.Site:	www.chemcoint.com

2. COMPOSITION INFORMATION ON INGREDIENTS

Blend of epoxy resin and reactive diluents.

	Chemicals	Classification	Risk phrases
Resin	Bisphenol A	Xi, N	R36/38-43-51/53
	Bisphenol F	Xi, N	R36/38-43-51/53
	Aliphatic diglycidylether	Xi	R36/38-43

The remaining 30% of the composition is a blend of proprietary, non-hazardous chemicals that are trade secret.

3. HAZARDS IDENTIFICATION

Irritating to eyes and skin.
May cause sensitisation by skin contact.
Toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment.

4. FIRST AID MEASURES

Inhalation:	Remove to fresh air if effects occur. Seek medical attention.
Ingestion:	The decision of whether to induce vomiting or not should be made by an attending physician.
Eyes:	Irrigate with flowing water immediately and continuously for 15 minutes. Consult medical personnel.
Skin:	Immediately flush with flowing water for at least 15 minutes while removing contaminated clothing. Removes residues with soap and water. Seek medical attention if irritation persists.

5. FIRE-FIGHTING MEASURES

Extinguishing media:	Carbon dioxide, dry chemical powder, alcohol foam.
Hazardous combustion products:	Under conditions for incomplete combustion or pyrolysis, phenolics and carbon oxides may evolve. The thermal decomposition products therefore should be treated as potentially hazardous substances and appropriate.
Specific fire or explosion hazards:	Non-flammable product.
Special fire-fighting protection:	Wear positive pressure self-contained breathing apparatus and protective fire fighting clothing (includes fire-fighting helmet, coat, pants, boots and gloves).

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Wear adequate personal protective equipment.
Environmental precautions:	Prevent from entering soil, waterways and groundwater. Flushings and wash waters must be confined and prevented from entering into soil, waterways and ground water. Contain large spills with a dike.
Methods for cleaning up:	Soak up with absorbent material such as sand and collect in suitable, labelled containers. Solvents are not recommended for clean up unless the recommended exposure guidelines and safe handling procedures for the specific solvent is followed. Residual product may be removed using steam or hot soapy water.

7. HANDLING & STORAGE

Handling:	Practice care and caution to avoid skin and eye contact. Avoid breathing vapours of heated material.
Storage:	Store in a cool, dry ventilated storage and in closed containers. Keep away from oxidisers, heat or flames.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls:	Adequate ventilation should be sufficient for most conditions. Local exhaust ventilation may be necessary for some operations.
Exposure controls:	Not established.
Respiratory protection:	Normally not required. If respiratory irritation is experienced, use an approved air purifying respirator. In misty atmospheres, use an approved mist respirator.
Eye protection:	Chemical safety glasses, splash-proof eye goggles with a full face shield. Contact lenses should not be worn.
Skin protection:	Use protective clothing impervious to this material. Selection of specific items will depend on operation. Use impervious gloves when prolonged or frequently contact could occur. Remove contaminated clothing no later than at the end of the work period and launder before reuse.
Hand protection:	Nitrile rubber gloves or butyl rubber gloves, gauntlet type.

9. PHYSICAL & CHEMICAL PROPERTIES

Physical state:	Liquid.
Colour:	Pale yellow.
Odour:	None.
Specific gravity:	1.33 – 1.51g.cm^{-3} @ 25°C
pH:	Not applicable.
Boiling point:	Decomposes prior to boiling.
Flash point:	100°C (DIN 51758)
Water solubility:	> 1% wt (25°C)
Viscosity:	25 – 47 Pa.s @ 25°C

10. STABILITY & REACTIVITY

Chemical stability:	Stable under normal storage conditions.
Materials to avoid:	Acids, amines, bases and oxidising agents.
Conditions to avoid:	Excessive heating over long periods of time degrades the product (causes discoloration).
Hazardous polymerisation:	Will not occur by itself, but masses of more than 0.5kg of product, plus an aliphatic amine will cause irreversible polymerisation with considerable heat build up.

11. TOXICOLOGICAL INFORMATION

Acute toxicity	
Ingestion:	Single dose oral toxicity is low. Small amounts swallowed incidental to normal handling operations are not likely to cause injury.
	Oral LD50 (rats) = > 2,000mg/kg
Skin contact:	Single prolonged exposure is not likely to result in material being absorbed through the skin in harmful amounts.
Inhalation:	At room temperature, exposures to vapours may generate vapour levels sufficient to cause adverse effects.
Irritation:	Skin - Prolonged or repeated exposure may cause slight skin irritation.
	Eyes - May cause eye irritation (temporary corneal injury).
Sensitisation:	Has caused allergic skin reactions in humans.

12. ECOLOGICAL INFORMATION

Mobility and bioaccumulation potential:	Partitioning from water to octanol is not applicable.
Degradation:	Below detectable limits under aerobic conditions.
Aquatic toxicity:	LC50 (fathead minow - pimephales promelas) = 3.1mg/l

13. DISPOSAL CONSIDERATIONS

Product:	Recommended procedure for disposing of waste products is burning under carefully controlled conditions. Burn in adequate incinerator or bury in an approved landfill site.
Contaminated packaging:	Empty container disposed of as hazardous waste unless all remaining product adhering to container wall has been removed. Washings must be disposed of safely in accordance with local regulations.

14. TRANSPORT INFORMATION

Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Bisphenol A - epoxy resin)

Road/rail			
ADR/RID Class:	9	ADR/RID Item No:	11c
Hazard No:	90	Trem Card:	90G01
UN No:	3082		
Sea			
IMDG Class:	9	Packing Group:	III
UN No:	3082		
Air			
IATA/ICAO:	DGR	Class:	9
UN No:	3082	Packing Group:	III
Packing Instruction (Pass & Cargo):	914	Packing Instruction (Cargo):	914

15. REGULATORY INFORMATION

Chemical name:	Contains hexanediol diglycydlether, epoxy resin.
Labelling:	According to Chemical Hazard Information and Packaging for Supply (CHIP) legislation.
Symbols:	(Xi) Irritant (N) Dangerous for the environment.
Risk phrases:	R36/38, Irritating to eyes and skin. R43, May cause sensitisation by skin contact. R51/53, Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Please note that in the final cured film, the product is non-hazardous and does not affect aquatic organisms.
Safety phrases:	S28, After contact with skin, wash immediately with plenty of water. S37/39, Wear suitable gloves and eye/face protection.

16. OTHER INFORMATION

The information contained in this data sheet is based on present state of knowledge and current national legislation. It provides guidance on health, safety and environmental aspects of the product and should not be construed as any guarantee of technical performance or suitability for the particular applications.

Diver - cote™
RA 500UW-HV
Epoxy Resin

1. IDENTIFICATION OF PREPARATION & OF COMPANY

Product:	Epoxy Resin.
Manufacturer:	Chemco International Ltd East Shawhead Industrial Estate Coatbridge ML5 4XD Scotland
Telephone No:	+44 (0) 1236 606060
Email:	sales@chemcoint.com
Web Site:	www.chemcoint.com

2. COMPOSITION INFORMATION ON INGREDIENTS

Blend of epoxy resin and reactive diluents.

	Chemicals	Classification	Risk phrases
Resin	Bisphenol A	Xi, N	R36/38-43-51/53
	Bisphenol F	Xi, N	R36/38-43-51/53
	Aliphatic diglycidylether	Xi	R36/38-43

The remaining 30% of the composition is a blend of proprietary, non-hazardous chemicals that are trade secret.

3. HAZARDS IDENTIFICATION

Irritating to eyes and skin.
May cause sensitisation by skin contact.
Toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment.

4. FIRST AID MEASURES

Inhalation:	Remove to fresh air if effects occur. Seek medical attention.
Ingestion:	The decision of whether to induce vomiting or not should be made by an attending physician.
Eyes:	Irrigate with flowing water immediately and continuously for 15 minutes. Consult medical personnel.
Skin:	Immediately flush with flowing water for at least 15 minutes while removing contaminated clothing. Removes residues with soap and water. Seek medical attention if irritation persists.

5. FIRE-FIGHTING MEASURES

Extinguishing media:	Carbon dioxide, dry chemical powder, alcohol foam.
Hazardous combustion products:	Under conditions for incomplete combustion or pyrolysis, phenolics and carbon oxides may evolve. The thermal decomposition products therefore should be treated as

potentially hazardous substances and appropriate.

Specific fire or explosion hazards:	Non-flammable product.
Special fire-fighting protection:	Wear positive pressure self-contained breathing apparatus and protective fire-fighting clothing (includes fire-fighting helmet, coat, pants, boots and gloves).

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Wear adequate personal protective equipment.
Environmental precautions:	Prevent from entering soil, waterways and groundwater. Flushings and wash waters must be confined and prevented from entering into soil, waterways and ground water. Contain large spills with a dike.
Methods for cleaning up:	Soak up with absorbent material such as sand and collect in suitable, labelled containers. Solvents are not recommended for clean up unless the recommended exposure guidelines and safe handling procedures for the specific solvent is followed. Residual product may be removed using steam or hot soapy water.

7. HANDLING & STORAGE

Handling:	Practice care and caution to avoid skin and eye contact. Avoid breathing vapours of heated material.
Storage:	Store in a cool, dry ventilated storage and in closed containers. Keep away from oxidisers, heat or flames.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls:	Adequate ventilation should be sufficient for most conditions. Local exhaust ventilation may be necessary for some operations.
Exposure controls:	Not established.
Respiratory protection:	Normally not required. If respiratory irritation is experienced, use an approved air purifying respirator. In misty atmospheres, use an approved mist respirator.
Eye protection:	Chemical safety glasses, splash-proof eye goggles with a full face shield. Contact lenses should not be worn.
Skin protection:	Use protective clothing impervious to this material. Selection of specific items will depend on operation. Use impervious gloves when prolonged or frequently contact could occur. Remove contaminated clothing no later than at the end of the work period and launder before reuse.
Hand protection:	Nitrile rubber gloves or butyl rubber gloves, gauntlet type.

9. PHYSICAL & CHEMICAL PROPERTIES

Physical state:	Liquid.
Colour:	Pale yellow.
Odour:	None.

Specific gravity:	1.33 – 1.51g.cm^{-3} @ 25°C
pH:	Not applicable.
Boiling point:	Decomposes prior to boiling.
Flash point:	100°C (DIN 51758)
Water solubility:	> 1% wt (25°C)
Viscosity:	25 – 47 Pa.s @ 25°C

10. STABILITY & REACTIVITY

Chemical stability:	Stable under normal storage conditions.
Materials to avoid:	Acids, amines, bases and oxidising agents.
Conditions to avoid:	Excessive heating over long periods of time degrades the product (causes discoloration).
Hazardous polymerisation:	Will not occur by itself, but masses of more than 0.5kg of product, plus an aliphatic amine will cause irreversible polymerisation with considerable heat build up.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Ingestion:	Single dose oral toxicity is low. Small amounts swallowed incidental to normal handling operations are not likely to cause injury.
Skin contact:	Oral LD50 (rats) = > 2,000mg/kg Single prolonged exposure is not likely to result in material being absorbed through the skin in harmful amounts.
Inhalation:	At room temperature, exposures to vapours may generate vapour levels sufficient to cause adverse effects.
Irritation:	Skin - Prolonged or repeated exposure may cause slight skin irritation. Eyes - May cause eye irritation (temporary corneal injury).
Sensitisation:	Has caused allergic skin reactions in humans.

12. ECOLOGICAL INFORMATION

Mobility and bioaccumulation potential: Partitioning from water to octanol is not applicable.

Degradation:	Below detectable limits under aerobic conditions.
Aquatic toxicity:	LC50 (fathead minow - pimephales promelas) = 3.1mg/l

13. DISPOSAL CONSIDERATIONS

Product:	Recommended procedure for disposing of waste products is burning under carefully controlled conditions. Burn in adequate incinerator or bury in an approved landfill site.
Contaminated packaging:	Empty container disposed of as hazardous waste unless all remaining product adhering to container wall has been removed. Washings must be disposed of safely in accordance with local regulations.

14. TRANSPORT INFORMATION

Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Bisphenol A - epoxy resin)

Road/rail

ADR/RID Class:	9	ADR/RID Item No:	11c
Hazard No:	90	Trem Card:	90G01
UN No:	3082		

Sea

IMDG Class:	9	Packing Group:	III
UN No:	3082		

Air

IATA/ICAO:	DGR	Class:	9
UN No:	3082	Packing Group:	III
Packing Instruction (Pass & Cargo):		914	Packing Instruction (Cargo): 914

15. REGULATORY INFORMATION

Chemical name:	Contains hexanediol diglycydlether, epoxy resin.
Labelling:	According to Chemical Hazard Information and Packaging for Supply (CHIP) legislation.
Symbols:	(Xi) Irritant. (N) Dangerous for the environment.
Risk phrases:	R36/38, Irritating to eyes and skin. R43, May cause sensitisation by skin contact. R51/53, Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. **Please note that in the final cured film, the product is non-hazardous and does not affect aquatic organisms.**
Safety phrases:	S28, After contact with skin, wash immediately with plenty of water. S37/39, Wear suitable gloves and eye/face protection.

16. OTHER INFORMATION

The information contained in this data sheet is based on present state of knowledge and current national legislation. It provides guidance on health, safety and environmental aspects of the product and should not be construed as any guarantee of technical performance or suitability for the particular applications.

Effective Date 01/06/03

Diver - cote™

RA 500UW

Epoxy Solvent-Free System Incorporating *COR-SAN™*

PRODUCT DESCRIPTION & CHARACTERISTICS

Diver-cote™ is recommended for a wide range of applications including the protection of risers, pipes and structures below the splash zone. Repairs holes, leaks, cracks, chips and defects with minimum effort and downtime.
Specifically designed for application underwater or in very wet areas as a protective coating for poorly prepared metal and concrete substrates. Ideal for use on wet and saturated metal and concrete and for hand prepared or hydro-blasted surfaces. Compared to other underwater coating systems, the product offers minimal dispersion during application which in turn:-

- reduces potential contamination of the environment
- helps to keep expensive diving suits and equipment clean
- improves the controllability and accuracy of application as the diver's vision is clearer for a longer period of time.

It will help reduce the risk of M.I.C. (Microbiological Induced Corrosion) and S.R.B. (Sulphate Reducing Bacteria) because it does not contain the food ingredients contained in traditional solvent-borne systems that the bacteria thrive on.
Exhibits long-term resistance to the marine environment.
It is an ideal product for use with other underwater application products such as:-

- Diver-stix™
- Diver-filler™

Material can be supplied in two forms:-

- **Diver-cote™ RA 500UW-LV** as a low viscosity coating for use on submerged or wet surfaces to produce a high gloss finish. Ideal for large areas to give an aesthetically pleasing finish.
- **Diver-cote™ RA 500UW-HV** as a high viscosity coating for use on deep cracks, holes and large defects. Ideal as a repair compound for damaged surfaces.

TECHNICAL FEATURES & BENEFITS

Unique coating system formulated for above and under water applications (by incorporating **COR-SAN™** fibre technology). Ideal for protecting large areas under water. There is less paint film dispersion (a common problem with this type of application) instead, the coating forms a smooth, paint-like finish, enabling very high application rates to be achieved. The system exhibits excellent abrasion resistance and is able to withstand severe physical stresses caused by wave action.

PRODUCT INFORMATION

Typical applications:	Structural steelwork, GRP, splash zone (above and below tide level) tank repairs (internal and external). Ideal for underwater repairs (metal and concrete). Ship repair work, swimming pools and ponds etc. Repair of cracks, including worn, damaged and old concrete.
Colour:	Standard white & blue (other colours available on request).
Volume solids:	100%

Density:	1.21 ± 0.01g/cm³ @ 20°C	
Mix ratio:	Mix part A (resin RA 500UW and part B (hardener HF 500) in proportionate weights as supplied.	
Thinner:	**No thinning agents required.**	
Cleaner:	S11A	
Cure:	10°C	20°C
Pot life:	2 hrs	1 hr 20 mins
Touch dry:	10 hrs	6 hrs
Hard dry:	24 hrs	12 hrs
Full cure:	14 days	3 days

PRODUCT INFORMATION (cont'd)

Recoating interval:	Minimum:	4 – 6 hrs (touch dry).
	Maximum:	unlimited.
Typical thickness range	(RA 500UW-LV):	200 - 400 microns per coat.
Typical thickness range	(RA 500UW-HV):	1.0 - 5.0mm
Theoretical coverage	(RA 500UW-LV):	3.1m²/kg @ 250 microns.
Theoretical coverage	(RA 500UW-HV):	0.67m²/kg @ 1.0mm
		(Allow for application losses, surface irregularities, etc).
Temperature resistance:		Maximum 60°C (immersed).
Method:	Above water:	Airless spray, roller, brush or trowel.
	Below water:	(Power) brush and roller, syringe, trowel, spreading knife, spatula, mitts.
Airless spray application:		Pump (minimum 45:1 ratio) with a fluid twist tip: - RA 500UW-LV (23 - 31 thou.)

SURFACE PREPERATION

Underwater repairs:	Remove all loose contamination by wire brushing or scraping. Remove any scale, dirt, grease with water-proof abrasive paper (wet & dry paper).
Above waterline:	Remove all loose contamination by wire brushing or scraping. For small areas roughen area with mechanical abrader. For larger areas a suitable angular metallic or non-metallic abrasive should be chosen to give a minimum profile of 50 microns. Abrasive blast the surface to ISO 8501-1 SA2½

LIMITATIONS

Pot life:	Vigilant care and attention to pot life is required during application. If gelling has started, do not apply.

SAFETY PRECAUTIONS

It is the policy of CHEMCO INTERNATIONAL (C.I.) to ensure that its products are handled and applied by professionally approved and skilled applicators.
Application shall be carried out in accordance with instructions contained in this data sheet and referenced to C.I. TECHNICAL SPECIFICATION MANUAL.
CHEMCO INTERNATIONAL management are intent on ensuring all work is carried out in accordance with company HEALTH & SAFETY procedures and all materials are handled with due care to COSHH regulations and instructions.

STORAGE

Store in cool, dry conditions (between 2 - 20°C). Keep away from direct heat source and sunlight. When not using the material, always replace the lid on the container.

SHELF LIFE

At least 12 months when stored in sealed containers at temperatures of 20°C or below. At temperatures above, refer to manufacturer for advice.

1. IDENTIFICATION OF PREPARATION & OF COMPANY

Product:	Epoxy Resin.
Manufacturer:	Chemco International Ltd East Shawhead Industrial Estate Coatbridge ML5 4XD Scotland
Telephone No:	+44 (0) 1236 606060
Email:	sales@chemcoint.com
Web Site:	www.chemcoint.com

2. COMPOSITION INFORMATION ON INGREDIENTS

Blend of epoxy resin and reactive diluents.

	Chemicals	Classification	Risk phrases
Resin	Bisphenol A	Xi, N	R36/38-43-51/53
	Bisphenol F	Xi, N	R36/38-43-51/53
	Aliphatic diglycidylether	Xi	R36/38-43

The remaining 30% of the composition is a blend of proprietary, non-hazardous chemicals that are trade secret.

3. HAZARDS IDENTIFICATION

Irritating to eyes and skin.
May cause sensitisation by skin contact.
Toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment.

4. FIRST AID MEASURES

Inhalation:	Remove to fresh air if effects occur. Seek medical attention.
Ingestion:	The decision of whether to induce vomiting or not should be made by an attending physician.
Eyes:	Irrigate with flowing water immediately and continuously for 15 minutes. Consult medical personnel.
Skin:	Immediately flush with flowing water for at least 15 minutes while removing contaminated clothing. Removes residues with soap and water. Seek medical attention if irritation persists.

5. FIRE-FIGHTING MEASURES

Extinguishing media:	Carbon dioxide, dry chemical powder, alcohol foam.
Hazardous combustion products:	Under conditions for incomplete combustion or pyrolysis, phenolics and carbon oxides may evolve. The thermal decomposition products therefore should be treated as potentially hazardous substances and appropriate.
Specific fire or explosion hazards:	Non-flammable product.
Special fire-fighting protection:	Wear positive pressure self-contained breathing apparatus and protective fire fighting clothing (includes fire-fighting helmet, coat, pants, boots and gloves).

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Wear adequate personal protective equipment.
Environmental precautions:	Prevent from entering soil, waterways and groundwater. Flushings and wash waters must be confined and prevented from entering into soil, waterways and ground water. Contain large spills with a dike.
Methods for cleaning up:	Soak up with absorbent material such as sand and collect in suitable, labelled containers. Solvents are not recommended for clean up unless the recommended exposure guidelines and safe handling procedures for the specific solvent is followed. Residual product may be removed using steam or hot soapy water.

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7. HANDLING & STORAGE

Handling:	Practice care and caution to avoid skin and eye contact. Avoid breathing vapours of heated material.
Storage:	Store in a cool, dry ventilated storage and in closed containers. Keep away from oxidisers, heat or flames.

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8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls:	Adequate ventilation should be sufficient for most conditions. Local exhaust ventilation may be necessary for some operations.
Exposure controls:	Not established.
Respiratory protection:	Normally not required. If respiratory irritation is experienced, use an approved air purifying respirator. In misty atmospheres, use an approved mist respirator.
Eye protection:	Chemical safety glasses, splash-proof eye goggles with a full face shield. Contact lenses should not be worn.
Skin protection:	Use protective clothing impervious to this material. Selection of specific items will depend on operation. Use impervious gloves when prolonged or frequently contact could occur. Remove contaminated clothing no later than at the end of the work period and launder before reuse.
Hand protection:	Nitrile rubber gloves or butyl rubber gloves, gauntlet type.

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9. PHYSICAL & CHEMICAL PROPERTIES

Physical state:	Liquid.
Colour:	Pale yellow.
Odour:	None.
Specific gravity:	1.28 – 1.35g.cm^{-3} @ 25°C
pH:	Not applicable.
Boiling point:	Decomposes prior to boiling.
Flash point:	100°C (DIN 51758)
Water solubility:	> 1% wt (25°C)
Viscosity:	14 – 35 Pa.s @ 25°C

10. STABILITY & REACTIVITY

Chemical stability:	Stable under normal storage conditions.
Materials to avoid:	Acids, amines, bases and oxidising agents.
Conditions to avoid:	Excessive heating over long periods of time degrades the product (causes discoloration).
Hazardous polymerisation:	Will not occur by itself, but masses of more than 0.5kg of product, plus an aliphatic amine will cause irreversible polymerisation with considerable heat build up.

11. TOXICOLOGICAL INFORMATION

Acute toxicity	
Ingestion:	Single dose oral toxicity is low. Small amounts swallowed incidental to normal handling operations are not likely to cause injury.
Skin contact:	Oral LD50 (rats) = > 2,000mg/kg Single prolonged exposure is not likely to result in material being absorbed through the skin in harmful amounts.
Inhalation:	At room temperature, exposures to vapours may generate vapour levels sufficient to cause adverse effects.
Irritation:	Skin - Prolonged or repeated exposure may cause slight skin irritation. Eyes - May cause eye irritation (temporary corneal injury).
Sensitisation:	Has caused allergic skin reactions in humans.

12. ECOLOGICAL INFORMATION

Mobility and bioaccumulation potential:	Partitioning from water to octanol is not applicable.
Degradation:	Below detectable limits under aerobic conditions.
Aquatic toxicity:	LC50 (fathead minow - pimephales promelas) = 3.1mg/l

13. DISPOSAL CONSIDERATIONS

Product:	Recommended procedure for disposing of waste products is burning under carefully controlled conditions. Burn in adequate incinerator or bury in an approved landfill site.
Contaminated packaging:	Empty container disposed of as hazardous waste unless all remaining product adhering to container wall has been removed. Washings must be disposed of safely in accordance with local regulations.

14. TRANSPORT INFORMATION

Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Bisphenol A - epoxy resin)

Road/rail			
ADR/RID Class:	9	ADR/RID Item No:	11c
Hazard No:	90	Trem Card:	90G01
UN No:	3082		
Sea			
IMDG Class:	9	Packing Group:	III
UN No:	3082		
Air			
IATA/ICAO:	DGR	Class:	9
UN No:	3082	Packing Group:	III
Packing Instruction (Pass & Cargo):	914	Packing Instruction (Cargo):	914

15. REGULATORY INFORMATION

Chemical name:	Contains hexanediol diglycydlether, epoxy resin.
Labelling:	According to Chemical Hazard Information and Packaging for Supply (CHIP) legislation.
Symbols:	(Xi) Irritant. (N) Dangerous for the environment.
Risk phrases:	R36/38, Irritating to eyes and skin. R43, May cause sensitisation by skin contact. R51/53, Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Please note that in the final cured film, the product is non-hazardous and does not affect aquatic organisms.
Safety phrases:	S28, After contact with skin, wash immediately with plenty of water. S37/39, Wear suitable gloves and eye/face protection.

16. OTHER INFORMATION

The information contained in this data sheet is based on present state of knowledge and current national legislation. It provides guidance on health, safety and environmental aspects of the product and should not be construed as any guarantee of technical performance or suitability for the particular applications.

1. IDENTIFICATION OF PREPARATION & OF COMPANY

Product:	Epoxy Resin.
Manufacturer:	Chemco International Ltd East Shawhead Industrial Estate Coatbridge ML5 4XD Scotland
Telephone No:	+44 (0) 1236 606060
Email:	sales@chemcoint.com
Web Site:	www.chemcoint.com

2. COMPOSITION INFORMATION ON INGREDIENTS

Blend of epoxy resin and reactive diluents.

	Chemicals	Classification	Risk phrases
Resin	Bisphenol A	Xi, N	R36/38-43-51/53
	Bisphenol F	Xi, N	R36/38-43-51/53
	Aliphatic diglycidylether	Xi	R36/38-43

The remaining 30% of the composition is a blend of proprietary, non-hazardous chemicals that are trade secret.

3. HAZARDS IDENTIFICATION

Irritating to eyes and skin.
May cause sensitisation by skin contact.
Toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment.

4. FIRST AID MEASURES

Inhalation:	Remove to fresh air if effects occur. Seek medical attention.
Ingestion:	The decision of whether to induce vomiting or not should be made by an attending physician.
Eyes:	Irrigate with flowing water immediately and continuously for 15 minutes. Consult medical personnel.
Skin:	Immediately flush with flowing water for at least 15 minutes while removing contaminated clothing. Removes residues with soap and water. Seek medical attention if irritation persists.

5. FIRE-FIGHTING MEASURES

Extinguishing media:	Carbon dioxide, dry chemical powder, alcohol foam.
Hazardous combustion products:	Under conditions for incomplete combustion or pyrolysis, phenolics and carbon oxides may evolve. The thermal decomposition products therefore should be treated as

potentially hazardous substances and appropriate.

Specific fire or explosion hazards:	Non-flammable product.
Special fire-fighting protection:	Wear positive pressure self-contained breathing apparatus and protective fire fighting clothing (includes fire-fighting helmet, coat, pants, boots and gloves).

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Wear adequate personal protective equipment.
Environmental precautions:	Prevent from entering soil, waterways and groundwater. Flushings and wash waters must be confined and prevented from entering into soil, waterways and ground water. Contain large spills with a dike.
Methods for cleaning up:	Soak up with absorbent material such as sand and collect in suitable, labelled containers. Solvents are not recommended for clean up unless the recommended exposure guidelines and safe handling procedures for the specific solvent is followed. Residual product may be removed using steam or hot soapy water.

7. HANDLING & STORAGE

Handling:	Practice care and caution to avoid skin and eye contact. Avoid breathing vapours of heated material.
Storage:	Store in a cool, dry ventilated storage and in closed containers. Keep away from oxidisers, heat or flames.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls:	Adequate ventilation should be sufficient for most conditions. Local exhaust ventilation may be necessary for some operations.
Exposure controls:	Not established.
Respiratory protection:	Normally not required. If respiratory irritation is experienced, use an approved air purifying respirator. In misty atmospheres, use an approved mist respirator.
Eye protection:	Chemical safety glasses, splash-proof eye goggles with a full face shield. Contact lenses should not be worn.
Skin protection:	Use protective clothing impervious to this material. Selection of specific items will depend on operation. Use impervious gloves when prolonged or frequently contact could occur. Remove contaminated clothing no later than at the end of the work period and launder before reuse.
Hand protection:	Nitrile rubber gloves or butyl rubber gloves, gauntlet type.

9. PHYSICAL & CHEMICAL PROPERTIES

Physical state:	Liquid.
Colour:	Pale yellow.
Odour:	None.

Specific gravity:	1.28 – 1.35g.cm^{-3} @ 25°C
pH:	Not applicable.
Boiling point:	Decomposes prior to boiling.
Flash point:	100°C (DIN 51758)
Water solubility:	> 1% wt (25°C)
Viscosity:	14 – 35 Pa.s @ 25°C

10. STABILITY & REACTIVITY

Chemical stability:	Stable under normal storage conditions.
Materials to avoid:	Acids, amines, bases and oxidising agents.
Conditions to avoid:	Excessive heating over long periods of time degrades the product (causes discoloration).
Hazardous polymerisation:	Will not occur by itself, but masses of more than 0.5kg of product, plus an aliphatic amine will cause irreversible polymerisation with considerable heat build up.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Ingestion:	Single dose oral toxicity is low. Small amounts swallowed incidental to normal handling operations are not likely to cause injury.
Skin contact:	Oral LD50 (rats) = > 2,000mg/kg Single prolonged exposure is not likely to result in material being absorbed through the skin in harmful amounts.
Inhalation:	At room temperature, exposures to vapours may generate vapour levels sufficient to cause adverse effects.
Irritation:	Skin - Prolonged or repeated exposure may cause slight skin irritation. Eyes - May cause eye irritation (temporary corneal injury).
Sensitisation:	Has caused allergic skin reactions in humans.

12. ECOLOGICAL INFORMATION

Mobility and bioaccumulation potential:	Partitioning from water to octanol is not applicable.
Degradation:	Below detectable limits under aerobic conditions.
Aquatic toxicity:	LC50 (fathead minow – pimephales promelas) = 3.1mg/l

13. DISPOSAL CONSIDERATIONS

Product:	Recommended procedure for disposing of waste products is burning under carefully controlled conditions. Burn in adequate incinerator or bury in an approved landfill site.
Contaminated packaging:	Empty container disposed of as hazardous waste unless all remaining product adhering to container wall

has been removed. Washings must be disposed of safely in accordance with local regulations.

14. TRANSPORT INFORMATION

Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Bisphenol A - epoxy resin)

Road/rail

ADR/RID Class:	9	ADR/RID Item No:	11c
Hazard No:	90	Trem Card:	90G01
UN No:	3082		

Sea

IMDG Class:	9	Packing Group:	III
UN No:	3082		

Air

IATA/ICAO:	DGR	Class:	9
UN No:	3082	Packing Group:	III
Packing Instruction (Pass & Cargo):		914 Packing Instruction (Cargo):	914

15. REGULATORY INFORMATION

Chemical name:	Contains hexanediol diglycydlether, epoxy resin.
Labelling:	According to Chemical Hazard Information and Packaging for Supply (CHIP) legislation.
Symbols:	(Xi) Irritant. (N) Dangerous for the environment.
Risk phrases:	R36/38, Irritating to eyes and skin. R43, May cause sensitisation by skin contact. R51/53, Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. **Please note that in the final cured film, the product is non-hazardous and does not affect aquatic organisms.**
Safety phrases:	S28, After contact with skin, wash immediately with plenty of water. S37/39, Wear suitable gloves and eye/face protection.

16. OTHER INFORMATION

The information contained in this data sheet is based on present state of knowledge and current national legislation. It provides guidance on health, safety and environmental aspects of the product and should not be construed as any guarantee of technical performance or suitability for the particular applications.

MATERIAL SAFETY DATA SHEET

EDISON CHEMICAL SYSTEMS, INC.
25 Grant Street
WATERBURY, CONNECTICUT 06704
(203) 597-9727

SUBMAR-EPOXY 570

HMIS: Health- 3 Fire- 1 Reactivity- 0

Date Issued: 11/18/91 Supersedes: 03/21/91

I. IDENTIFICATION & PHYSICAL DATA

Product Name: SUBMAR-EPOXY 570

Product Class: Modified Aliphatic Amine

Manufacturer's I.D. : 032L050

VOC: Not Applicable

Evaporation Rate: Not Applicable

Percent Volatile by Volume: <1.0

Boiling Range: >432 F

Vapor Density: No data

Weight Per Gallon: 8.1 lbs.

Vapor Pressure at 20 C: <1.0 mm Hg

Solubility in Water: Partially Soluble

Appearance and Odor: Clear light colored viscous liquid with amine odor

II. HAZARDOUS INGREDIENTS

	CAS #	WT. %	OSHA TWA ppm	OSHA STEL ppm	ACGIH TWA ppm	ACGIH STEL ppm
n-Aminoethyl piperazine	000140-31-8	***	---	---	---	---
Nonyl phenol	084852-15-3	***	---	---	---	---

--- Not established

*** The specific chemical identity and/or weight percent is being withheld as a trade secret.

III. FIRE & EXPLOSION DATA

Flashpoint: >200 F Setaflash **LEL:** 0.8 estimated

Extinguishing Media:

Use carbon dioxide or dry chemical for small fires; aqueous foam or water for large fires.

Unusual Fire & Explosion Hazards:

Closed containers may rupture (due to buildup of pressure) when exposed to extreme heat.

Special Fire Fighting Procedures:

Remove all ignition sources. Wear self-contained breathing apparatus and complete personal protective equipment when entering confined areas where potential for exposure to vapors or products of combustion exists.

IV. REACTIVITY DATA

Stability: Stable **Hazardous Polymerization:** Will not occur

Conditions to Avoid:

Excessive heat

Materials to Avoid:

Contamination with strong acids, bases, epoxy resins, or isocyanates can cause polymerization.

Hazardous Decomposition Products:

Fumes produced when heated to decomposition may include: carbon monoxide, carbon dioxide, oxides of nitrogen.

EALTH HAZARD DATA

cts of Overexposure:

g n: No specific information available.
Contains materials that may be slightly toxic.

halation: No specific information available.
Contains materials that could cause headaches, nausea, dizziness, and respiratory irritation if inhaled. Sensitizer - may cause allergic espiratory reaction.

dn Absorption: No specific information available.
Contains materials that may be moderately toxic.

dn Contact:
May cause chemical burn on skin. Sensitizer - may cause allergic skin reaction which can be severe in certain individuals.

'e Contact: No specific information available.
Contains materials that may cause chemical burn in eye — damage irreversible.

ıronic Effects of Overexposure:
lo specific information available.

rgency & First Aid Procedures:

'e Contact:
lush with plenty of water for at least 15 minutes and seek medical attention.

dn Contact:
emove contaminated clothing and wash contact area with soap and water for 15 minutes.

g n:
appreciable quantities are swallowed, seek medical attention.

ıalation:
ı case of exposure to a high concentration of vapor or mist, remove person to fresh air. If breathing has stopped, administer artificial spiration and seek medical attention.

PILL OR LEAK PROCEDURES

s to Be Taken In Case Material is Released or Spilled:

ike spill. Absorb with inert material and collect for disposal. Flush area with water. Prevent washings from entering waterways.
pills or releases to the environment may be reportable to the National Response Center (800-424-8802) and to state and/or local agencies.

te Disposal Method:
ıcinerate or use biological treatment in accordance with federal, state, and local regulations. This material is not defined as a hazardous aste under current RCRA regulations.

PECIAL PROTECTION INFORMATION

ılratory Protection:
Wear a properly fitted NIOSH/MSHA approved respirator whenever exposure to vapor/mist is likely unless levels are below applicable limits.

ilation:
al Exhaust - Recommended when appropriate to control employee exposure.
hanical - Not recommended as the sole means of controlling employee exposure.

ctive Gloves:
or operations where contact can occur, wear impervious gloves (Neoprene).

Protection: Chemical splash goggles.

r Protective Equipment:
r ions where contact can occur, coveralls, apron and rubber foot covering are recommended. A safety shower and eye wash facility ıou s available.

VIII. SPECIAL PRECAUTIONS

Avoid contamination of skin. Remove and thoroughly launder contaminated clothing before reuse. Discard contaminated shoes.

IX. ADDITIONAL R-T-K COMPOSITION INFORMATION

[redacted] information is provided in conjunction with the ingredient information in Section II to meet various regulatory composition requirements.

Component	CAS #	Lists
n-Aminoethyl piperazine	000140-31-8	CN;MA1;NJ2;PA1;

PA1=Pennsylvania Hazardous Substances List PA2= Pennsylvania Special Hazardous Substances List MA1=Massachusetts Hazardous Substances List
MA2=Massachusetts Extraordinary Hazardous Substances List NJ1=New Jersey Workplace Hazardous Substances List NJ2=New Jersey Special Health Hazards List
CN=Canadian Ingredient Disclosure List NL=Not Listed, Concentration Based Disclosure

X. SARA Title III Information

Supplier notification under SARA Title III Section 313 not required for this product.
SARA Section 311 and 312 hazard classification(s) for this product are listed below:
Immediate (acute) health hazard

XI. RCRA Information

Since this product is not sold as a waste, we have not tested it as a waste. Based on our knowledge of the product , its raw materials and processes employed during its manufacture, we believe it is unlikely that this product is a hazardous waste for Federal RCRA purposes. We recommend that you carry out your own tests and evaluations prior to discarding any materials.

XII. CERCLA INFORMATION

Under EPA-CERCLA releases to air, land or water which exceed the reportable quantity must be reported to the National Response Center (800-424-8802).
This product contains no materials with reportable quantities.

XIII. California Proposition 65 Information

This product is not subject to California Proposition 65 notification requirements.

XIV. Transportation Information

D.O.T. Shipping Name: Polyalkylamines, n.o.s. (N-aminoethyl piperazine)
D.O.T. Hazard Class: Corrosive Material **D.O.T. UN/NA Number:** UN 2735
D.O.T. Label(s): Corrosive

XV. Other Information

[redacted]ains p-Nonyl phenol which is TSCA Section 12(b) reportable if exported.

This product complies with all TSCA inventory requirements.

Reason Revised: Revise Section XIV.

MARINE-FLEX 570

Underwater Grade Epoxy Coatings

DESCRIPTION:

Marine-FLEX 570 is a 100% solids, medium viscosity moisture insensitive epoxy coating intenc for heavy marine and wet industrial exposures.

Marine-FLEX 570 **CAN BE APPLIED UNDERWATER**, as well as on wet, damp or dry surface: concrete or steel exposed to air.

PROPERTIES:

Solids Content:	100%
Composition:	Epoxy/Amine
Mix Ratio:	1.5:1
Pot Life (77^0F):	20 min.
Tack-Free Time:	4-10 hrs.
VOC Content:	0

CHEMICAL RESISTANCE:

Sea Water	Distilled Water
Ethanol	Detergent
NaOH	H_2SO_4
HCl	HNO_3

Not recommended for use in contact with strong organic solvents, acetic acid, or Skydrc

APPLICATION:

Marine-FLEX 570 is supplied in preportioned units. Mix the two components thoroughly using s speed paddle mixer, mixing for at least 4 minutes and avoiding incorporation of excess air.

Once blended the two surfaces will not separate or bleed if submerged, and application can be performed in calm, clean water or salt water. Note that pot life is reduced and reaction is accelerated underwater.

Product may also be applied in air, as with other 100% solids epoxy coatings. Submersion is acceptable at any point in the cure regime, but protect from mechanical damages until cured.

Surface Preparation is comparable to other high quality, moisture insensitive epoxy coatings. Surfaces should be clean, sound, free of dirt, oil, grease, coatings or other contaminants which interfere with adhesion. Loose rust and scale should be removed by mechanical means from st surfaces. Abrasive blasting is not required, but will aid in maximizing system durability. Concret surfaces should be free of laitance, loose surface material or other contaminants.

Apply by brush or roller as required to provide a uniform, continuous coating. In hot weather, o vertical surfaces, incorporation of upto 3% fumed silica is acceptable. if required to prevent sag or maintain high film build. Do not apply when air, surface and/or water temperature is below 5C

A second coat may be applied, if desired, at any time after the first coat has cured to a tack-free state. Aged surfaces may be recoated by simply cleaning the existing coating surface and reapplying.

SAFETY AND HANDLING:

Read and observe the safety and handling guidelines as detailed in the Material Safety D sheets supplied with this product. Avoid skin and eye contact.

Marine-FLEX 570 is non-flammable. Store at moderate temperatures, between 50 and 85^0 Keep partially used containers tightly closed.

Shelf life is a minimum of 2 years from date of factory shipment in unopened, properly stored containers.

Used applicators may be disposed of upon curing of the residual coating as non-hazardous waste. Alternatively, clean up solvent is Xylene or ***SYSTEM 100*** Read and observe the Materia Safety Data Sheets for solvents, as supplied by their manufacturers.

FOR COMMERCIAL AND INDUSTRIAL USE ONLY.

For additional information, contact ***EDISON COATINGS, INC***. or your Edison Technical Service Representative.

Edison Coatings, Inc.
3 Northwest Drive, Plainville, CT 06062 USA
Phone: (860) 747-2220 or (800) 697-8055
FAX: (860) 747-2280 or (800) 697-8044
E-Mail: Contact Us

EURO-viny CV02

Material Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE/COMPANY

Product Name: EURO-vinyl CV02
Company Name: EURONAVY-Tintas Marítimas e Industriais S.A.
Address: Estrada Vale de Mulatas, Quinta de S. Francisco, 2914-516 Setúbal Portugal
Phone: 351 265 739440
Fax: 351 265 702711
Emergency Contact: 265 265 739440

2. COMPOSITION/INFORMATION ON INGREDIENTS

Preparation Description: Underwater primer.

HAZARDOUS INGREDIENTS

Ingredient name	CAS number	Concentration	EC Symbol	EC R-phrase
Butyl acetate	123-86-4	18% - 25% (m/m)	-------	R10; R66; R67

3. HAZARDS IDENTIFICATION

Flammable.
Irritating to respiratory system.
May cause skin dryness or cracking.
Vapors inhalation may cause dizziness.

4. FIRST AID MEASURES

EYE CONTACT	: For direct contact: Immediately flush eyes for 15 minutes, occasionally lifting eye-lids. If victim wears contact lenses, remove lenses and continue rinsing. Clean contact before reuse. If irritation or redness persists, seek medical attention.
SKIN CONTACT	: Remove contaminated clothing. Wash affected area with mild soap and water. If irritation or redness develops and persists, seek medical attention.
INGESTION	: Do not induce vomit and get medical attention.
INHALATION	: Remove victim from affected area, if problem persists, get medical attention.

5. FIRE-FIGHTING MEASURES

Extinguishing Media:	Dry chemical powder, carbon dioxide, foam, sand. Do not use water jet.
Fire Fight Procedure: fighters.	The use of self-contained breathing apparatus's recommended for fire
Unusual Fire/Explosion Hazards:	Keep adjacent containers cool by spraying water.

6. ACCIDENTAL RELEASE MEASURES

Personal protection:	Use suitable personal protection equipment. Remove all ignition sources, do not produce sparks. Assure ventilation to affected areas. Avoid contact with skin.
Environmental precautions:	Avoid the contamination of rivers, lakes and sea, absorb or contain with earth, sand or other suitable material. Sweep up and wash area clean with water.

7. HANDLING AND STORAGE

Handling:	Do not breath the vapors, use ventilation, use personal protective equipment. Keep containers closed and use only with adequate ventilation when not in use. Do not use or store near heat, sparks or flame. Use non-sparking tools. Ground and bond all containers when transferring liquid.
Storage:	Keep away from heat and flames. Keep the containers closed in a dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

n-Butyl acetate:
TLV/TWA: 710 mg/m^3
Eyes protection: Safety glasses and available eye bath.
Respiratory protection: Mask or self breathig apparatus for high vapor concentration.
Hand protection: Rubber gloves.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state - Liquid
Flash Point - > 23° C (Abel)
Density – 1.52 g/cm^3.
Solubility in water: Not soluble

10. STABILITY AND REACTIVITY

Stable under normal conditions

11. TOXICOLOGICAL INFORMATION

There are no information about the preparation.

12. ECOLOGICAL INFORMATION

There are no information about the preparation.

13. DISPOSAL CONSIDERATIONS

Depending the extend of the contamination reclaiming or incineration of the product by an officially authorized enterprise.

14. TRANSPORT INFORMATION

UN-No	1263
ADR/RID	
Class	3
Item	31° C
IMO/IMDG	
Class	3.3
IMDG CODE PAGE	3345
ICAO/IATA	
Class	3

15. REGULATORY INFORMATION

EEC R-phrases

R10 – Flammable.
R37 – Irritating to respiratory system.
R66 - May cause skin dryness or cracking.
R67 - Vapors inhalation may cause dizziness.

EEC S-phrases

S23 – Do not breathe vapors.
S24 – Avoid contact with skin.
S25 – Avoid contact with eyes.

16. OTHER INFORMATION

This Material Safety Data Sheet is in compliance with EEC 91/155/EEC directives.

Above informations have been made very carefully based on existing literatures, EURONAVY does not accept any liability whatsoever arising out of the use of this information.

EURO-vinyl CV02

Underwater primer plum

Application guide

SURFACE PREPARATION

EURO-vinyl CV02, is engineered for direct application on poorly prepared surfaces. Gently clean surface with pneumatic rotating machine over entire area to be treated. Remove all lose material, fouling, grease and lose coating. Before application of **EURO-vinyl CV02** you **MUST** gently clean surface if any fouling or debris has settled on surface with rotating disc of **SCOTCH BRITE** or similar materials. **NOTE**: If surface has oil or grease contamination paint will bead and not adhere. Apply soap or degreaser to cleaning pad and clean surface. Contact your local Euronavy agent, for recommendations.

MIXING AND THINNING

EURO-vinyl CV02, is a one pack product. Mix coating to obtain an uniform consistency. The mixing should not take more than 2 to 3 minutes. The use of a speed adjustable power mixer is recommended.

APPLICATION

EURO-vinyl CV02, can be applied, by conventional, brush or roller. A power roller, is recommended for ease and speed. Use contrasting colours for each coat and stripe coating. However a regular solvent resistant brush or roller should be use. Use short bristle brush or medium nap roller working the material into all irregularities. Brush or lap marks may be visible. Be sure that proper film thickness is achieved by working the material. On sharp edges, boltheads, flanges, etc., a second coat would be better to "skips" or holidays. Product may be immersed in water during application on kept topside for power roller application.

Before any overall application is undertaken a small area should be coated and inspected for lifting, wrinkling or softening of the underfilm.

DO NOT THIN THIS PRODUCT

SAFETY

WARNING: Cause eye and skin irritation. The solvents may cause respiratory irritation in sensitive individuals. May cause allergic skin reaction. Avoid breathing the solvents. Do not get in eyes on skin or clothing. ear eye and skin protective equipment. Use appropriate respirator, it is recommended to avoid potential respiratory irritation. Wash skin thoroughly after use and water. Call a physician. Launder clothing before reuse. If not breathing give artificial respiration, preferably mouth-to-mouth, and call physician.
FIRST AID: In case of eye contact immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash skin contact area with soap.

Manufactured by EURONAVY - Tintas Marítimas e Industriais, S.A – www.euronavy.net
Estrada Vale de Mulatas, Quinta de S. Francisco, 2914-516 – Setúbal, Portugal
Tel: +351.265.739440 . Fax: +351.265.70 2711 . E-mail: sales@euronavy.net

EURO-vinyl CV02

Underwater primer plum

GENERAL

EURO-vinyl CV02, is a high performance one pack product, designed for application underwater with conventional tools.

EURO-vinyl CV02, complies with modern environmental regulations, and can be applied, directly over on steel and/or fibre glass surfaces free of grease and loose matter.

FEATURES

EXCELLENT ANTICORROSIVE PROPERTIES

LOW TEMPERATURE APPLICATION.
Can be applied in any temperature water. Application less than 5°C (41°F), requires slightly longer to dry.

EASY UNDERWATER APPLICATION WITH CONVENTIONAL TOOLS.

SINGLE PACK PRODUCT.

EXCELLENT ADHESION ON POORLY TREATED SURFACES.

RECOMMENDED USES

SHIPS, OFFSHORE & MARINE STRUCTURES
Great for protection of water lines areas.

STRUCTURAL STEEL EQUIPMENT
Provides anticorrosive protection for steel structures underwater. Since coating is renewable this protection can be sustained with periodic recoating.

PIPE COATINGS
Provides anticorrosive protection for industrial water intakes lines.

NOT SUITABLE FOR DIRECT APPLICATION ON INTERIOR POTABLE WATER PIPE LINES

Specification Data

Binder Type / Pigment Type	Modified acrylics. - Anticorrosive pigments.
Colors	CV0262 (plum); CV02 00 (white); CV0299 (black).
Finish	Mate.
Mixing ratio	Not applicable.
Specific gravity	1.52 ± 0.09 Kg/dm^3
Solids by Volume	62 % (theoretical).
Flash point (Abel)	>23°C (>73.4°F).
Theoretical covering capacity	4.1 Sq.m/Lt. (167 Sq.ft/US gal.) at 150 microns (6 mils)
Typical film thickness per coat	**Wet**: 242 microns (9.7 mils); - **Dry**: 150 microns (6 mils).
Application method	Brush, Roller.
Thinner	**Material**: none - **Cleaning**: EURO-thinner TH25.
VOC (Volatile Organic Compound)	295 grams/Lt.
Drying time	**Surface dry:** approx. 2 hours (at 23°C (73.4°F) and 50% relative humidity).
Overcoating time	**Min**: 16 hours at 23°C (73,4°F).
Recommended primers	Self.
Ambient temperature	Application below 5°C (41°F) requires slightly longer to dry. In case of any doubt, contact your local Euronavy agent.
Substrate temperature	**Min:** 0°C (32°F) - **Max.**: 50°C (122°F)
Packing	Single pack product, available in 1, 5 Lt.
Storage and Shelf life	The product must be stored in accordance with national regulations. The product should be kept in a cool well ventilated places protected from high temperatures. Containers MUST BE kept tightly closed. Shelf life: 1 year
Approvals	Euronavy Laboratory

Manufactured by EURONAVY - Tintas Maritimas e Industriais, S.A – www.euronavy.net
Estrada Vale de Mulatas, Quinta de S. Francisco, 2914-516 – Setúbal, Portugal
Tel: +351.265.739440 . Fax: +351.265.70 2711 . E-mail: sales@euronavy.net

EURO-paste ES326(Base)

Material Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE/COMPANY

Product Name: EURO-paste ES326(base)
Company Name: EURONAVY
Address: Estrada Vale de Mulatas, Quinta de S. Francisco, 2914-516 Setúbal Portugal
Phone: 351 265 739440
Fax: 351 265 702711
Emergency Contact: 351 265 739440

2. COMPOSITION/INFORMATION ON INGREDIENTS

Preparation Description: 100% Solids Underwater Epoxy Filler.

HAZARDOUS INGREDIENTS

Ingredient name	CAS number	Concentration	EC Symbol	EC R-phrase
Liquid epoxy resin	25068-38-6	38% - 48% (m/m)	Xi	R36/R38; R43
Benzyl alcohol	100-51-6	19% - 24% (m/m)	Xn	R20/R22
Polymer with branched branched ether and urethane groups	not available	20% - 30% (m/m)	Xi	----------

3. HAZARDS IDENTIFICATION

EYES : Causes irritation.

SKIN : Causes irritation.

4. FIRST AID MEASURES

EYE CONTACT	: For direct contact: Immediately flush eyes for 15 minutes, occasionally lifting eye-lids. If victim wears contact lenses, remove lenses and continue rinsing. Clean contact before reuse. If irritation or redness persists, seek medical attention.
SKIN CONTACT	: Remove contaminated clothing. Wash affected area with mild soap and water. If irritation or redness develops and persists, seek medical attention.
INGESTION	: Do not induce vomiting, if victim is conscious and able. Get immediate medical attention.
INHALATION	: No specific measures.

5. FIRE-FIGHTING MEASURES

Extinguishing Media:	Dry chemical powder, carbon dioxide, foam, sand. Do not use water.
Fire Fight Procedure: fighters.	The use of self-contained breathing apparatus's recommended for fire
Unusual Fire/Explosion Hazards:	Keep adjacent containers cool by spraying water.

6. ACCIDENTAL RELEASE MEASURES

Personal protection: Use personal protection equipment.

Environmental precautions: Prevent contamination of soil and water, prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers. If material enters drains, it should be pumped out into an open vessel.

7. HANDLING AND STORAGE

Handling: Avoid contact with skin, eyes and clothing..

Storage: Keep containers tightly closed, in warm and dry conditions.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Not established
Eyes protection: Safety glasses and available eye bath.
Respiratory protection: Not normally required.
Hand protection: Use chemical resistant type gloves.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state - Liquid.
Flash Point - > 100° C (212° F) (Abel)
Density - 1,34 g/cm^3.
Solubility in water: Not soluble

10. STABILITY AND REACTIVITY

Reacts with strong oxidizing agents, polymerizes exothermically with amines, mercaptans and lewis acids at ambient temperature and above.

11. TOXICOLOGICAL INFORMATION

There are no information about the preparation.

12. ECOLOGICAL INFORMATION

There are no information about the preparation.

13. DISPOSAL CONSIDERATIONS

Depending the extend of the contamination reclaiming or incineration of the product by an officially authorized

14. TRANSPORT INFORMATION

Not dangerous according to IMO, ADR/RID and IATA/ICAO

15. REGULATORY INFORMATION

Contains:	Liquid epoxy resin.
EEC Symbol:	Xi - Irritant.
EEC R-phrases:	R36/R38 - Irritating to eyes and skin.
	R43 - May cause sensitization by skin contact..
EEC S-phrases:	S3/7 – Keep container tightly closed in a cool place.
	S9 – Keep container in a well ventilated place.
	S26 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
	S28 - In case of contact with skin, rinse immediately with plenty of water.
	S36/37/39 - Wear suitable protective clothing, gloves and eye/face protection.

16. OTHER INFORMATION

This Material Safety Data Sheet is in compliance with EEC 91/155/EEC directives.

Above informations have been made very carefully based on existing literatures, EURONAVY does not accept any liability whatsoever arising out of the use of this information.

326C01 - Curing agent for ES326

Material Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE/COMPANY

Product Name: 326C01
Company Name: EURONAVY, Tintas Marítimas e Industriais S.A
Address: Estrada Vale de Mulatas, Quinta de S. Francisco, 2914-516 Setúbal Portugal
Phone: 351 265 739440
Fax: 351 265 702711
Emergency Contact: 351 265 739440

2. COMPOSITION/INFORMATION ON INGREDIENTS

Preparation Description: Contains cycloaliphatic polyamine
Curing agent for ES326.

HAZARDOUS INGREDIENTS

Ingredient name	CAS number	Concentration	EC Symbol	EC R-phrase
Isophoronediamine	2855-13-2	40% - 50% (m/m)	C	R21/22; R34; R43
Benzyl alcohol	100-51-6	10% - 15% (m/m)	Xn	R20/22

3. HAZARDS IDENTIFICATION

Harmful in contact with skin and by ingestion.
May cause burns.
May cause sensitization by skin contact.

4. FIRST AID MEASURES

EYE CONTACT : For direct contact: Immediately flush eyes for 15 minutes, occasionally lifting eye-lids. If victim wears contact lenses, remove lenses and continue rinsing. Clean contact lenses before reuse. If irritation or redness persists, seek medical attention.

SKIN CONTACT : Remove contaminated clothing. Wash affected area with plenty of water and soap . If you feel unwell, seek medical attention.

INGESTION : Do not induce vomiting. Show this document where possible..

5. FIRE-FIGHTING MEASURES

Extinguishing Media: Foam, dry chemical or water spray. Do not use water jet.

Special Fire Fight Procedure: The use of self-contained breathing apparatus's recommended for fire fighters. Water may be helpful in keeping adjacent containers cool. Avoid spreading burning liquid with after used for cooling purposes.

6. ACCIDENTAL RELEASE MEASURES

Personal protection: Use suitable personal protection equipment.

Environmental precautions: Avoid the contamination of rivers, lakes and sea, absorb or contain with earth, sand or other suitable material. Sweep up and wash area clean with water.

7. HANDLING AND STORAGE

Handling: Avoid contact with skin and eyes. Provide good ventilation.

Storage: Keep the containers in a cool, dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Eyes protection: Safety glasses and available eye bath.
Hand protection: Use suitable gloves.
Skin protection: Wear boot and industrial overalls, preferably disposable, of the impervious, multilayer type.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state - Liquid
Flash Point - > 100 °C (212° F).
Density - 1,0 g/cm^3.
Solubility in water: Not soluble

10. STABILITY AND REACTIVITY

Reacts with acids.
It decomposes at temperatures above 260° C, it produces ammonia as decomposition product.

11. TOXICOLOGICAL INFORMATION

There are no information about the preparation.

12. ECOLOGICAL INFORMATION

There are no information about the preparation.

13. DISPOSAL CONSIDERATIONS

Depending the extend of the contamination reclaiming or incineration of the product by an officially authorized enterprise.

14. TRANSPORT INFORMATION

UN-No	2735
ADR/RID	
Class	8
Item	53° C
IMO/IMDG	
Class	8
ICAO/IATA	
Class	8

15. REGULATORY INFORMATION

Contains: Isophorone diamine

EEC Symbol: C - Corrosive.

EEC R-phrases: R21/R22 - Harmful by skin contact and ingestion.
R34 - Causes burns
R43 - May cause sensitization by skin contact.

EEC S-phrases: S1/2 – Keep locked up and out of reach of children.
S26 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S36/37/39 - Wear suitable protective clothing, gloves and eye/face protection.
S45 – In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

16. OTHER INFORMATION

This Material Safety Data Sheet is in compliance with EEC 91/155/EEC directives.
Above informations have been made very carefully based on existing literatures, EURONAVY does not accept any liability whatsoever arising out of the use of this information.

EURO-paste ES326

100% solids underwater epoxy filler

GENERAL

EURO-paste ES326, is an excellent 100% solids two components epoxy filler for application underwater with conventional tools.
EURO-paste ES326 is ecologically formulated and designed to be applied on steel, where high impact resistance and thickness are required, such as pitting, welding and anodic zinc areas.

EURO-paste ES326, can be applied directly over poorly treated surfaces

This product does not contain **VOC's**.

FEATURES

- NO HARMFUL SOLVENT VAPOURS.
- Superior impact resistance.
- Good chemical resistance
- Cost savings on surface preparation.
- Excellent anticorrosive properties.
- High film build - up to 5000 microns (200 mils).
- Easy underwater application with conventional tools.
- Compatible with Cathodic protection.

RECOMMENDED USES

SHIPS, OFFSHORE & MARINE STRUCTURES

STRUCTURAL STEEL & EQUIPMENT

PIPES & GREY WATER TANKS

STEEL WATER TANKS, ETC.

Specification Data

Binder Type / Pigment Type	Modified epoxy - Chemical resistant pigments and extenders.	
Colors	White	
Finish	Semi-Gloss	
Mixing ratio	5 (base) to 1 (curing agent) by weight.	4.4 (base) to 1 (curing agent) by volume
Curing agent	326C01.	
Specific gravity (mixture)	1.25± 0.04 Kg/dm^3	
Solids by Volume	100%. (theoretical).	
Pot Life	30 minutes at 23°C (73,4°F), (outside from the water).	
Flash point (Abel)	Base: > 100°C (> 212°F); Curing Agent: > 100°C (> 212°F).	
Theoretical covering capacity	Not applicable.	
Typical film thickness per coat	Not applicable.	
Application method	Spatula.	
Thinner	**Material**: none - **Cleaning**: EURO-thinner TH03.	
VOC (Volatile Organic Compound)	Does not contain. It is a 100% solids epoxy product.	
Drying time	**Surface dry**: approx. 24 hours (underwater application. 23° C aprox.).	
Overcoating time	**Min**: 24 hours at 23°C (73,4°F). **Max.**: 7 days. If maximum overcoat time period exceeded, rough up surface.	
Recommended primers	Self.	
Ambient temperature	**Min:** 5°C (41°F), **Max.**: 50°C (122°F).	
Substrate temperature	**Min:** 5°C (41°F), **Max.**: 50°C (122°F).	
Packing	Two pack product, available in 1 and 5 Kg., packs.	
Storage and Shelf life	The product must be stored in accordance with national regulations. The product should be kept in a cool well ventilated places protected from high temperatures. Containers MUST BE kept tightly closed. Shelf life: 1 year	
Approvals	Euronavy Laboratory.	

Manufactured by EURONAVY - Tintas Marítimas e Industriais, S.A – www.euronavy.net
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Tel: +351.265.739440 . Fax: +351.265.70 2711 . E-mail: sales@euronavy.net

EURO-paste ES326

100% solids underwater epoxy filler

Application guide

SURFACE PREPARATION

EURO-paste ES326, is engineered for direct application on poorly prepared surfaces. Gently clean surface with pneumatic rotating machine over entire area to be treated. Remove all lose material, fouling, grease and lose coating. Before application of **EURO-paste ES326,** you **MUST gently** clean surface if any fouling or debris has settled on surface with rotating disc of **SCOTCH BRITE** or similar materials. **NOTE:** If surface has oil or grease contamination paint will bead and not adhere. Apply soap or degreaser to cleaning pad and clean surface. Contact your local Euronavy agent, for recommendations.

MIXING AND THINNING

EURO-paste ES326, is a two pack 100% epoxy product. , which contains the proper ratio of ingredients. Mix the product to obtain an uniform consistency. The mixing should not take more than 2 to 3 minutes. The use of a speed adjustable power mixer is recommended. The entire contents of each container must be mixed together, as supplied. Stir base first to obtain smooth homogenous condition not longer than 2 minutes. After obtaining a uniform base, add the curing agent slowly to the base under continuous stirring for 3 minutes. The use of a speed adjustable power mixer is recommended. Do not over agitate as this, will accelerate cure and lower life of product.

DO NOT THIN THIS MATERIAL

Higher temperatures will reduce pot life of the mixture. Lower temperatures will increase it.

APPLICATION

EURO-paste ES326, can be applied, by spatula. Care should be taken that proper and uniform film thickness are obtained.

SAFETY

WARNING: Cause eye and skin irritation. Do not get in eyes on skin or clothing.
Be careful handling after mixing product. Use gloves.
FIRST AID: In case of eye contact immediately flush with plenty of water for at least 15 minutes, call a physician.
Wash skin contact areas with soap.

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EURO-diver 1 ES323(Base)

Material Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE/COMPANY

Product Name:	EURO-diver ES323(base)
Company Name:	EURONAVY
Address:	Estrada Vale de Mulatas, Quinta de S. Francisco, 2914-516 Setúbal Portugal
Phone:	351 265 739440
Fax:	351 265 702711
Emergency Contact:	351 265 739440

2. COMPOSITION/INFORMATION ON INGREDIENTS

Preparation Description: 100% Solids Underwater Epoxy Coating.

HAZARDOUS INGREDIENTS

Ingredient name	CAS number	Concentration	EC Symbol	EC R-phrase
Liquid epoxy resin	25068-38-6	30% - 40% (m/m)	Xi	R36/R38; R43
Benzyl alcohol	100-51-6	2% - 5% (m/m)	Xn	R20/R22
Polymer with branched branched ether and urethane groups	not available	20% - 30% (m/m)	Xi	----------
Glycidyl ester of Neodecanoic acid	26761-45-5	5% - 10% (m/m)	Xi	R36/R38; R43

3. HAZARDS IDENTIFICATION

EYES : Causes irritation.

SKIN : Causes irritation.

4. FIRST AID MEASURES

EYE CONTACT	: For direct contact: Immediately flush eyes for 15 minutes, occasionally lifting eye-lids. If victim wears contact lenses, remove lenses and continue rinsing. Clean contact before reuse. If irritation or redness persists, seek medical attention.
SKIN CONTACT	: Remove contaminated clothing. Wash affected area with mild soap and water. If irritation or redness develops and persists, seek medical attention.
INGESTION	: Do not induce vomiting, if victim is conscious and able. Get immediate medical attention.
INHALATION	: No specific measures.

5. FIRE-FIGHTING MEASURES

Extinguishing Media:	Dry chemical powder, carbon dioxide, foam, sand. Do not use water.
Fire Fight Procedure: fighters.	The use of self-contained breathing apparatus's recommended for fire
Unusual Fire/Explosion Hazards:	Keep adjacent containers cool by spraying water.

6. ACCIDENTAL RELEASE MEASURES

Personal protection: Use personal protection equipment.

Environmental precautions: Prevent contamination of soil and water, prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers. If material enters drains, it should be pumped out into an open vessel.

7. HANDLING AND STORAGE

Handling: Avoid contact with skin, eyes and clothing..

Storage: Keep containers tightly closed, in warm and dry conditions.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Not established
Eyes protection: Safety glasses and available eye bath.
Respiratory protection: Not normally required.
Hand protection: Use chemical resistant type gloves.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state - Liquid.
Flash Point - > 200° C - 392 ° F (Abel)
Viscosity - 104 KU (mixture).
Density - 1,3 g/cm^3.
Solubility in water: Not soluble

10. STABILITY AND REACTIVITY

Reacts with strong oxidizing agents, polymerizes exothermically with amines, mercaptans and lewis acids at ambient temperature and above.

11. TOXICOLOGICAL INFORMATION

There are no information about the preparation.

12. ECOLOGICAL INFORMATION

There are no information about the preparation.

13. DISPOSAL CONSIDERATIONS

Depending the extend of the contamination reclaiming or incineration of the product by an officially authorized enterprise.

14. TRANSPORT INFORMATION

Not dangerous according to IMO, ADR/RID and IATA/ICAO

15. REGULATORY INFORMATION

Contains:	Liquid epoxy resin and glycidyl ester of neodecanoic acid
EEC Symbol:	Xi - Irritant.
EEC R-phrases:	R36/R38 - Irritating to eyes and skin. R43 - May cause sensitization by skin contact..
EEC S-phrases:	S24 - Avoid contact with skin. S26 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S28 - After contact with skin, wash immediately with plenty of soap and water. S37/S39 - Wear suitable gloves and eye/face protection.
Contains:	Benzyl Alcohol
EEC Symbol:	Xn - Harmful.
EEC R-phrases:	R20/R22 - Harmfull by inhalation and ingestion.
EEC S-phrases:	S2 - Keep out of reach of children. S26 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

16. OTHER INFORMATION

This Material Safety Data Sheet is in compliance with EEC 91/155/EEC directives.

Above informations have been made very carefully based on existing literatures, EURONAVY does not accept any liability whatsoever arising out of the use of this information..

323C01 - Curing agent for ES323

Material Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE/COMPANY

Product Name: 323C01
Company Name: EURONAVY, Tintas Marítimas e Industriais S.A
Address: Estrada Vale de Mulatas, Quinta de S. Francisco, 2914-516 Setúbal Portugal
Phone: 351 265 739440
Fax: 351 265 702711
Emergency Contact: 351 265 739440

2. COMPOSITION/INFORMATION ON INGREDIENTS

Preparation Description: Contains cycloaliphatic polyamine
Curing agent for ES323.

HAZARDOUS INGREDIENTS

Ingredient name	CAS number	Concentration	EC Symbol	EC R-phrase
Cycloaliphatic polyamine	2855-13-2	40% - 50% (m/m)	C	R21/22; R34; R43
Benzyl alcohol	100-51-6	10% - 15% (m/m)	Xn	R20/22

3. HAZARDS IDENTIFICATION

Harmful in contact with skin and by ingestion.
May cause burns.
May cause sensitization by skin contact.

4. FIRST AID MEASURES

EYE CONTACT	: For direct contact: Immediately flush eyes for 15 minutes, occasionally lifting eye-lids. If victim wears contact lenses, remove lenses and continue rinsing. Clean contact lenses before reuse. If irritation or redness persists, seek medical attention.
SKIN CONTACT	: Remove contaminated clothing. Wash affected area with plenty of water and soap . If you feel unwell, seek medical attention.
INGESTION	: Do not induce vomiting. Show this document where possible..

5. FIRE-FIGHTING MEASURES

Extinguishing Media: Foam, dry chemical or water spray. Do not use water jet.

Special Fire Fight Procedure: The use of self-contained breathing apparatus's recommended for fire fighters. Water may be helpful in keeping adjacent containers cool. Avoid spreading burning liquid with after used for cooling purposes.

6. ACCIDENTAL RELEASE MEASURES

Personal protection: Use suitable personal protection equipment.

Environmental precautions: Avoid the contamination of rivers, lakes and sea, absorb or contain with earth, sand or other suitable material. Sweep up and wash area clean with water.

7. HANDLING AND STORAGE

Handling: Avoid contact with skin and eyes. Provide good ventilation.

Storage: Keep the containers in a cool, dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Eyes protection: Safety glasses and available eye bath.
Hand protection: Use suitable gloves.
Skin protection: Wear boot and industrial overalls, preferably disposable, of the impervious, multilayer type.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state - Liquid
Flash Point - > 100 °C (Abel)
Viscosity - > 140 KU.
Density - 1,0 g/cm^3.
Solubility in water: Not soluble

10. STABILITY AND REACTIVITY

Reacts with acids.
It decomposes at temperatures above 260° C, it produces ammonia as decomposition product.

11. TOXICOLOGICAL INFORMATION

There are no information about the preparation.

12. ECOLOGICAL INFORMATION

There are no information about the preparation.

13. DISPOSAL CONSIDERATIONS

Depending the extend of the contamination reclaiming or incineration of the product by an officially authorized enterprise.

14. TRANSPORT INFORMATION

UN-No 2735

ADR/RID Class	8
	53° C
IMO/IMDG Class	8
ICAO/IATA Class	8

15. REGULATORY INFORMATION

Contains:	Cycloaliphatic polyamine
EEC Symbol:	C - Corrosive.
EEC R-phrases:	R21/R22 - Harmful by skin contact and ingestion.
	R34 - Causes burns
	R43 - May cause sensitization by skin contact.
EEC S-phrases:	S26 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
	S36/37/39 - Wear suitable protective clothing, gloves and eye/face protection.

Contains:	Benzyl Alcohol
EEC Symbol:	Xn - Harmful.
EEC R-phrases:	R20/R22 - Harmfull by inhalation and ingestion.
EEC S-phrases:	S2 - Keep out of reach of children.

S26 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

16. OTHER INFORMATION

This Material Safety Data Sheet is in compliance with EEC 91/155/EEC directives.

Above informations have been made very carefully based on existing literatures, EURONAVY does not accept any liability whatsoever arising out of the use of this information.

EURO-diver 1 ES323

100% solids underwater epoxy coating

GENERAL

EURO-diver 1 ES323, is a 100% solids high performance two pack epoxy product, designed for application underwater with conventional tools.
EURO-diver 1 ES323, complies with modern environmental regulations (does not contain VOC's), and can be applied directly over steel.

Before any overall application is undertaken a small area should be coated and inspected for lifting, wrinkling or softening of the underfilm.

FEATURES

- EXCELLENT ANTICORROSIVE PROPERTIES.
- EASY UNDERWATER APPLICATION WITH CONVENTIONAL TOOLS.
- COMPATIBLE WITH CATHODIC PROTECTION.
- EXCELLENT ADHESION ON POORLY TREATED SURFACES.
- EXCELLENT WATER RESISTANCE

RECOMMENDED USES

SHIPS, OFFSHORE & MARINE STRUCTURES

Great for protection of splash zones.

PIPE COATINGS

Provides anticorrosive protection for industrial water intakes lines.

STEEL WATER TANKS

Specification Data

Binder Type / Pigment Type	Modified epoxy/Amine composite - Chemical resistant pigments.	
Colors	ES323 00 White, or custom request.	
Finish	Mate.	
Mixing ratio	5 (base) to 1 (curing agent) by weight.	4 (base) to 1 (curing agent) by volume
Curing agent	323C01.	
Specific gravity (mixture)	1.30± 0.04 Kg/dm^3	
Solids by Volume	100%. (theoretical).	
Pot Life	40 minutes at 23°C (73,4°F), (outside from the water).	
Flash point (Abel)	Base: > 100°C (> 212°F); Curing Agent: > 100°C (> 212°F).	
Theoretical covering capacity	3,84 Sq.m/Kg. (18,8 Sq.ft/Lb) at 200 microns (8 mils).	
Typical film thickness per coat	**Wet**: 200 microns (8 mils); - **Dry**: 200 microns (8 mils).	
Application method	Brush, Roller. A power roller is recommended for quickest application	
Thinner	**Material**: Not applicable - **Cleaning**: EURO-thinner TH03.	
VOC (Volatile Organic Compound)	Does not contain. It is a 100% solids epoxy product.	
Drying time	**Surface dry:** approx. 24 hours (underwater application, 23° C aprox.).	
Overcoating time	**Min**: 24 hours at 23°C (73,4°F). **Max.**: 7 days. If maximum overcoat time period exceeded, rough up surface.	
Recommended primers	Self.	
Ambient temperature	**Min:** 5°C (41°F), **Max.**: 50°C (122°F).	
Substrate temperature	**Min:** 5°C (41°F), **Max.**: 50°C (122°F).	
Packing	Two pack product, available in 1 and 5 Kg., packs.	
Storage and Shelf life	The product must be stored in accordance with national regulations. The product should be kept in a cool well ventilated places protected from high temperatures. Containers MUST BE kept tightly closed. Shelf life: 1 year	
Approvals	Euronavy Laboratory.	

Manufactured by EURONAVY - Tintas Marítimas e Industriais, S.A – www.euronavy.net
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Tel: +351.265.739440 . Fax: +351.265.70 2711 . E-mail: sales@euronavy.net

EURO-diver 1 ES323

100% solids underwater epoxy coating

Application guide

SURFACE PREPARATION

EURO-diver 1 ES323, is engineered for direct application on poorly prepared surfaces. Gently clean surface with pneumatic rotating machine over entire area to be treated. Remove all lose material, fouling, grease and lose coating. Before application of **EURO-diver 1 ES323,** you **MUST gently** clean surface if any fouling or debris has settled on surface with rotating disc of **SCOTCH BRITE** or similar materials. **NOTE:** If surface has oil or grease contamination paint will bead and not adhere. Apply soap or degreaser to cleaning pad and clean surface. Contact your local Euronavy agent, for recommendations.

MIXING AND THINNING

EURO-diver 1 ES323, is a two pack 100% epoxy product. , which contains the proper ratio of ingredients. Mix the product to obtain an uniform consistency. The mixing should not take more than 2 to 3 minutes. The use of a speed adjustable power mixer is recommended. The entire contents of each container must be mixed together, as supplied. Stir base first to obtain smooth homogenous condition not longer than 2 minutes. After obtaining a uniform base, add the curing agent slowly to the base under continuous stirring for 3 minutes. The use of a speed adjustable power mixer is recommended. Do not over agitate as this, will accelerate cure and lower life of product.
Higher temperatures will reduce pot life of the mixture. Lower temperatures will increase it.

APPLICATION

EURO-diver 1 ES323, can be applied by brush or roller. A power roller, is recommended for ease and speed. Use contrasting colours for each coat and stripe coating. However a regular solvent resistant brush or roller should be use. Use short bristle brush or medium nap roller working the material into all irregularities. Brush or lap marks may be visible. Be sure that proper film thickness is achieved by working the material. On sharp edges, boltheads, flanges, etc., a second coat would be better to "skips" or holidays. Product may be immersed in water during application on kept topside for power roller application.

SAFETY

WARNING: Cause eye and skin irritation. Do not get in eyes on skin or clothing.
Be careful handling after mixing product. Use gloves.
FIRST AID: In case of eye contact immediately flush with plenty of water for at least 15 minutes, call a physician.
Wash skin contact areas with soap.

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Estrada Vale de Mulatas, Quinta de S. Francisco, 2914-516 – Setúbal, Portugal
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MATERIAL SAFETY DATA SHEET
(For Coatings and Related Materials)

DATE: 06/15/98

P I C C O C O A T I N G S C O . I N C .
11601 McKinley
Houston, Texas 77038

Section I -- PRODUCT IDENTIFICATION

Product Class : EPOXY PRODUCTS
Manufacturers Code: UT-15 A
Trade Name : UNDERWATER EPOXY RESIN
Emergency Tel.#:(800) 633-8253
Information # : (281) 447-8877

Section II -- HAZARDOUS INGREDIENTS

Ingredients	CAS #	Percent	TLV
BISPHENOL A/EPICHLOROHYDRIN (EPOXY RESIN)	25068-38-6	100	NE

1. Residual levels of Epichlorohydrin are controlled to 1 PPM maximum.

NE=NOT ESTABLISHED N/A=NOT APPLICABLE

Section III -- PHYSICAL DATA

Boiling Point : >500 deg. F
Weight/Gallon : 9.7#
Vapor Pressure: N/A
Vapor Density : N/A
Evaporation Rate : N/A
% Volatile by Vol. : 0%
Appearance and Odor : THICK CLEAR LIQUID
Solubility in Water : NEGLIGIBLE

Section IV -- FIRE AND EXPLOSION HAZARD DATA

Flammability Classification :OSHA-CLASS III-A Flash Point :>480 Deg. F
LEL: N/A
Extinguishing Media : Use National Fire Protection Association (NFPA) Class B Fire Extinguisher or dry chemical, foam or carbon dioxide. Water fog may also be used.
Unusual Fire and Explosion Hazards: Keep containers tightly closed and away from heat, sparks, electrical equipment and open flame. Closed containers may explode when exposed to extreme heat and resultant pressure build up.

Section V -- HEALTH AND HAZARD DATA

THRESHOLD LIMIT VALUE: N.E.
EFFECTS OF OVER EXPOSURE
Acute: Inhalation- Because of its low volatility, this product is not likely to be an inhalation hazard.
Chronic: Repeated contact may cause dermatitis.
EMERGENCY AND FIRST AID PROCEDURES: Remove patient to fresh air. Flush eyes with clean water for 15 minutes. Wash skin thoroughly and remove saturated clothing. If symptoms persist, seek medical attention.
Ingestion: Keep person warm and quiet. Do not induce vomiting. Call physician immediately.

Section VI -- REACTIVITY DATA

STABILITY: Stable
INCOMPATIBILITY (MATERIALS TO AVOID); Avoid contact with strong oxidizing agents.
HAZARDOUS DECOMPOSITION PRODUCTS: Usual products of combustion - CO, CO2 and possibly acrolein.
HAZARDOUS POLYMERIZATIONS: [ ] MAY OCCUR [X] WILL NOT OCCUR
CONDITIONS TO AVOID: Reaction with some curing agents may produce considerable heat. Run-a-way reactions may char and decompose the resin system, generating unidentified fumes and vapors which may be toxic.

Section VII -- SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Remove sources of ignition and provide ventilation. Large spills may be scooped up with flatblade shovels. Provide personal protection. Small quantities may be picked up with absorbent material. See disposal precautions below.
WASTE DISPOSAL METHOD: Place in closed containers. See other precautions below. Dispose of in accordance with local, state and federal regulations.

Section VIII -- SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: Not ordinarily required.
VENTILATION: Designed and maintained to provide fresh air volume and pattern to prevent vapor concentration in excess of Threshold Limit Value (TLV) or Lower Explosive Limit (LEL).
PROTECTIVE GLOVES: Neoprene rubber gloves.
EYE PROTECTION: Goggles or side shield spectacles.
OTHER PROTECTIVE EQUIPMENT: Eye wash station and safety showers should be available.

Section IX -- SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Store in cool, dry place. Keep away from open flames and high temperatures. Containers, even those that have been emptied, can contain hazardous product residues. Handle in accordance with the hazard potential of curing agent(s) used.

Transport Information: DOT: Resin Compound, Not Regulated

MATERIAL SAFETY DATA SHEET
(For Coatings and Related Materials)

DATE: 10/21/98

P I C C O C O A T I N G S C O . I N C .
11601 McKinley
Houston, Texas 77038

Section I -- PRODUCT IDENTIFICATION

Product Class : EPOXY PRODUCTS
Emergency Tel.#:(800) 633-825
Manufacturers Code: UT-15B
Information # : (281) 447-887
Trade Name : UNDERWATER EPOXY SYSTEM -HARDENER COMPONENT

Section II -- HAZARDOUS INGREDIENTS

Ingredients	CAS #	Percent	TLV	VAP.PRES.
AROMATIC AMINE w/MDA*	101-77-9	33	.01 ppm*	25 mm Hg
DIBUTYL PHTHALATE	84-74-2	19	5 mg/M3	1 mm Hg
DIMETHYLAMINOMETHYL PHENOL	90-72-2	4	NE	
FILLER	1318-94-1	44	NE	

* Skin contact- This product contains trace quantities of Methylene DiAnaline, which is a suspected carcinogen, and is therefore classified as "Extremely Hazardous Substance" under SARA Title III.

NE=NOT ESTABLISHED N/A=NOT APPLICABLE

Section III -- PHYSICAL DATA

Boiling Point : >200 deg. C
Weight/Gallon : 12.1#
Vapor Pressure: see above
Vapor Density : N/A
Evaporation Rate : N/A
% Volatile by Vol. : .8%
Appearance and Odor : THICK WHITE LIQUID
Solubility in Water : SLIGHTLY SOLUBLE

Section IV -- FIRE AND EXPLOSION HAZARD DATA

Flammability Classification :OSHA-CLASS III-A
Flash Point :>250 Deg. C
LEL: N/A

Extinguishing Media : Use National Fire Protection Association (NFPA) Class B Fire Extinguisher or dry chemical, foam or carbon dioxide. Water fog may also be used.

Unusual Fire and Explosion Hazards: Keep containers tightly closed and away from heat, sparks, electrical equipment and open flame. Closed containers may explode when exposed to extreme heat and resultant pressure build up.

Section V -- HEALTH AND HAZARD DATA

THRESHOLD LIMIT VALUE: see Section II

EFFECTS OF OVER EXPOSURE- Human liver toxin. Fever, chills, anorexia, jaundice, eye and respiratory tract irritation. Carcinogenic in laboratory test animals.

EMERGENCY AND FIRST AID PROCEDURES:

SKIN: Wash thoroughly with mild soap and water.

EYES: Immediately flush eyes with water for at least 15 minutes. Call a physician.

INGESTION: If conscious, give large quantities of water. Induce vomiting. Call a physician.

INHALATION: Remove to fresh air. Give oxygen if breathing difficult.

OTHER: Promptly remove contaminated clothing and wash before reuse. Destroy contaminated leather and absorbent shoes.

Section VI -- REACTIVITY DATA

BILITY: Stable
COMPATIBILITY (MATERIALS TO AVOID); Avoid contact with strong oxidizing agents.
HAZARDOUS DECOMPOSITION PRODUCTS: Usual products of combustion - CO, CO2 and possibly acrolein.
HAZARDOUS POLYMERIZATIONS: [ ] MAY OCCUR [x] WILL NOT OCCUR
CONDITIONS TO AVOID: Reaction with some resin bases may produce considerable heat. Run-a-way reactions may char and decompose the resin system, generating unidentified fumes and vapors which may be toxic.

Section VII -- SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Remove sources of ignition and provide ventilation. Large spills may be scooped up with nonsparking tools. Provide respiratory protection if required. Small quantities may be picked up with absorbent material. See disposal precautions below.
WASTE DISPOSAL METHOD: Place in closed containers. See other precautions below. Dispose of in accordance with local, state and federal regulations.

Section VIII -- SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: NIOSH or MSHA approved mask or respirator for organic vapors.
VENTILATION: Designed and maintained to provide fresh air volume and pattern to prevent vapor concentration in excess of Threshold Limit Value (TLV) or Lower Explosive Limit (LEL).
PROTECTIVE GLOVES: Neoprene rubber gloves.
EYE PROTECTION: Goggles or side shield spectacles.
OTHER PROTECTIVE EQUIPMENT: Eye wash station and safety showers should be available.

Section IX -- SPECIAL PRECAUTIONS

WARNING!! Harmful if absorbed through the skin, swallowed or inhaled. May cause irritation and sensitization.
Keep containers tightly closed when not in use. Store away from food, food containers and clothing. Use clean clothing daily. A shower after work is recommended.
Transport Information: DOT: Environmentally Hazardous Substance, Liquid, Corrosive, n.o.s. (Polyaromatic Amine), 9, UN-3082, PG III
PSN: Environmentally Hazardous Substance, Liquid, n.o.s.
IMDG: Class 9 PA 09028 UN-3082 PGP III

NOTE: This product is made exclusively for S.G. Pinney and Associates, Port St. Lucie, Fl.

MANUFACTURERS OF
INDUSTRIAL COATINGS

PICCO COATINGS CO.

TECHNICAL
DATA SHEET

UT-15

7/02/01

UNDERWATER EPOXY COATING

DESCRIPTION:

PICCO COATINGS CO., INC. UT-15 coating is a two component epoxy system designed to be applied in underwater/splash zone environments. It chemically displaces water on the surface being coated, effecting an excellent bond to the substrate.

RECOMMENDED APPLICATIONS:

UT-15 Epoxy Coating is especially suited as a protective coating for use on offshore oil rigs, dock pilings, concrete reservoirs, cooling towers, sewage treatment areas, and processing plant floors. UT-15 not only lowers maintenance costs, but extends the expected service life of equipment and structures. It provides a durable waterproof surface on a variety of materials such as metal, wood, concrete, and fiberglass.

FEATURES:

*100% Solids
*Will not emulsify or float away during application.
*Lowers maintenance costs.
*Easily applied with a paint brush.
*Premeasured kits.
*Excellent resistance to most acids, solvents, caustics, and oils.

PRODUCT CHARACTERISTICS:

COLOR (MIXED):	Off White
VISCOSITY (MIXED):	Heavy Paint
MIXED RATIO:	1 Part Resin to 1 Part Hardener by volume
POT LIFE (AT 77 F):	65 Minutes
REC. STORAGE TEMP:	40-110 deg. F. (store indoors)
SHELF LIFE:	Two years if sealed tightly.
PACKAGING:	1 Gal., 2 Gal., 10 Gal. Kits
YIELD:	140-150 sq. ft./ gal. at 10 mils

CURING TEMP.	TACK FREE	COMPLETE CURE
90 F	4.5 HRS.	18 HRS.
70 F	8.0 HRS.	36 HRS.
33 F	2.0 DAYS	4 DAYS

To recoat, allow coating to become tack free. If coating is allowed to exceed the complete cure period, then mechanically abrade before recoating. Although UT-15 will cure at 33 F, normal recommended water temperature should not fall below 45 F.

PROPERTIES OF CURED SYSTEM:

Compressive Strength (ASTM D-695):24600 psi
Tensile Strength (ASTM D-638): 8950 psi
Tensile Modulus (ASTM D-638): 560000 psi
Impact Resistance (ASTM D-256 Method A):.34 ft.-lb./in.
Shore "D" Hardness (ASTM D-2240):72
Bond Strength to Steel (ASTM D-1002):1830 psi
Bond Strength to Concrete: Greater than tensile strength of concrete.
Heat Deflection Temperature (ASTM D-246):145 F

APPLICATION INSTRUCTIONS:

Surface Preparation:

Abrasive blast or otherwise etch to remove surface laitance and other contaminants. Minimum concrete strength must be 3,000 psi.

Installation Procedures:

1. Mix 1 parts Component A to 1 part Component B of the UT-15 for 2-3 minutes. Trowel apply this material.

2. Allow to cure overnight.

HANDLING AND SAFETY PRECAUTIONS:

This bulletin does not accompany the product when sold. For First Aid instructions and Hazard warnings, refer to Material Safety Data Sheets, which are included with each shipment.

Picco Coatings Co. Inc. strongly recommends you read and fully understand handling and safety precautions prior to installation of materials.

Part A: Liquid Epoxy Resin
Warning! Causes eye and skin irritation. May cause allergic reaction. Harmful if swallowed. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling. Avoid prolonged or repeated contact with skin.

Part B: Liquid Epoxy Hardener
Contains Alkaline Amines. **Danger!** Causes severe eye, and skin burns. May cause allergic skin and respiratory reaction. Harmful if swallowed, inhaled or absorbed through skin. Contains trace quantities of MDA a suspected carcinogen and is therefore listed as "Extremely Hazardous Substance" by OSHA. Do not get in eyes, on skin or clothing. Avoid breathing vapor. Keep container closed. Use only adequate ventilation, wash after handling. Keep away from heat or open flame.