AMERICAN SAFETY TECHNOLOGIES

GUIDE TO SUCCESSFUL PRODUCT APPLICATION

SUMMARY OF TOPICS

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ESSENTIALS OF EPOXY SYSTEMS

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Epoxy resins and hardeners are chemicals. AMERICAN SAFETY TECHNOLOGIES resins and hardeners are generally quite harmless to handle provided certain precautions normally taken when handling chemicals are observed.

1. Uncured materials should not come in contact with food or food utensils.

2. Barrier creams or rubber gloves are advised.

3. Measures should be taken to prevent contact of uncured materials with the skin, since people with particularly sensitive skin may be affected.

4. The skin should be washed thoroughly at the end of each work period using soap and warm water. The use of powerful solvents is to be avoided.

5. Contaminated clothing and rags should be washed before re-use.

6. Any empty containers must be discarded in accordance with local regulations.

By following these few precautions, any chance of adverse affects that may be experienced by the workers will be reduced to a minimum.

THE EPOXY KIT

When working with any epoxy system, it is important to remember that an epoxy system is a balanced system. For complete cross-linking to be achieved, exact proportions of each component must be completely and thoroughly mixed.

Our materials come in kit form consisting of a part A base component epoxy resin and a Part B amine hardener. The proportions are measured to exact weights for each product we produce. It is essential that all of part B material be added to the part A material when mixing a kit. **At no time should a portion of a kit be mixed.** The ratio of the base component and hardener component is very specific. Improper cure will result if the ratio is changed.

Pre-mix the base component. Make sure all settlement is lifted off the bottom of the container and is uniformly dispersed in the material. This may take as much as three minutes depending on the material temperature.

Pour entire contents of hardener can into base material. Mix hardener and base material with a mechanical mixer for approximately 3-5 minutes.

WARNING: Inadequate mixing will result in soft spots in the application.

It is important to remember that the epoxies begin to react (cross-link) as soon as they are mixed. The mixed epoxies therefore have a limited working life or

“Pot Life”. It is essential to know the pot life of the material being used and to plan the job accordingly.

Always match the proper components for the product being used. Never use a part A of one product with part B component from another product.

POT LIFE

When part A resin is combined with part B hardener, a molecular reaction begins. The volume of both materials is considered the mass. The greater the mass, the greater the activity.

The pot life or reactivity of materials is determined in the formulation. The pot life of our materials is established under controlled conditions and should be used as a guideline and should not be considered exact. External factors will change the pot life of the material. For example, over-mixing with a high-speed electric mixer will have a shorter pot life. Cold materials will have longer pot lives than warm material.

Pot life of a material is a factor with which a contractor should be familiar. The working time of a material is much longer when it is on the deck in a puddle than when left in the can. It is important to know the pot life of the material when determining the proper size unit for the job.

When a material reaches the “gel stage” or begins to thicken, it is no longer usable and must be discarded. It is important to remember that the applicator should use the material as soon as they are mixed.

STEEL SURFACE PREPARATION

Products can be applied to any clean, dry surface. All rust, mill scale, paint, dirt, grease, oil, etc. must be completely removed. Recommended methods of cleaning steel surfaces are as follows:

> Grit blasting to SA 2.5 (near white metal) or SSPC-SP10 method of cleaning which results in the best surface for adhesion. A 3-to 4.5-mil anchor tooth profile should be obtained for surfaces abrasively blasted.
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> Where grit blasting is not feasible, power tool cleaning utilizing power sanders fitted with #16 grit aluminum oxide sanding discs produce a sufficiently clean surface provided cleaning and intensively done.

Surface shall be cleaned to a matte finish with at least 95% of the surface area free of all previously existing Visible residue and the remaining 5% containing only randomly dispersed stains of rust, coatings and foreign matter.

If there is oil or grease on the surface, it must be removed prior to cleaning. The preferred method is to scrub with a strong detergent and flush area thoroughly while still wet. An alternative method is to remove the grease or oil with a solvent such as xylene. Solvents are flammable and must be handled with care. It is important that the solvents not be allowed to evaporate during the cleaning process and re-deposit grease or oil on the deck.

It is recommended that MS-7CZ primer be applied on steel surfaces immediately after the surface has been cleaned and before rust or oxidation has a chance to form or surface becomes dirty or contaminated in any way.

It is often said among craftsman that the job can be no better than the preparation for the work to be done. It is difficult to correct a mistake caused by poor workmanship or inadequate preparation once the epoxy is cured.

CONTAMINATION

Contamination is the greatest cause of deck failures and poor results when using epoxy systems. Every precaution should be taken to avoid contamination during an installation.

The most common types of contamination are:

Airborne dust and dirt

Grease, oil and dirt from vehicle and foot traffic

Soap or chemicals used to try and clean the affected area

Water or condensation

Stray steel shot

Any time contamination is suspected, it is advisable to stop work and consult the manufacturers representative for the product being used. The wrong method of correcting contamination will only make the situation worse.

An epoxy system is a balanced system. The chemicals you use to correct contamination may alter the reaction of the epoxies.

The best solution for contamination is to avoid contamination by proper management of the job. Always follow the AMERICAN SAFETY TECHNOLOGIES Technical Data Sheet for the product you are applying.

Steel Preparation Standards

National Association of Corrosion Engineers (NACE)
Steel Structures Painting Council (SSPC)
Swedish Standards (Sa,St)
Ultra High Pressure Water Jetting - NACE / SSPC - WJ-2

National Association of Corrosion Engineers (NACE)
NACE 1 White Metal Blast Cleaning
NACE 2 Near-White Blast Cleaning
NACE 3 Commercial Blast Cleaning
NACE 4 Brush-Off Blast Cleaning

Steel Structures Painting Council (SSPC)
SP-1 Solvent Cleaning
SP-2 Hand Tool Cleaning
SP-3 Power Tool Cleaning
SP-4 Flame Cleaning
SP-5 White Metal Blast Cleaning
SP-6 Commercial Blast Cleaning
SP-7 Brush-Off Blast Cleaning
SP-8 Pickling
SP-9 Weathering Followed By Blast Cleaning
SP-10 Near-White Blast Cleaning
SSPC-SP 11, Power Tool Cleaning to Bare Metal

Swedish Standard (St, Sa)
St 2 Hand Tool Cleaning
St 3 Power Tool Cleaning
Sa 1 Brush-Off Blast Cleaning
Sa 2 Commercial Blast Cleaning
Sa 2 1/2 Near-White Blast Cleaning
Sa 3 White Metal Blast Cleaning

SSPC-SP-1
Solvent Cleaning - Removal of all detrimental foreign matter such as oil, grease, dirt, soil, salts, drawing and cutting compounds, and other contaminants from steel surfaces by the use of solvents, emulsions, cleaning compounds, steam or other similar materials and methods that involve a solvent or cleaning action.

SSPC-SP-2
St 2

Hand Tool Cleaning - Removal of all rust scale, mill scale, loose rust and loose paint to the degree specified by hand wire brushing, hand sanding, hand scraping, hand chipping or other hand impact tools or by a combination of these methods. The substrate should have a faint metallic sheen and be free of oil, grease, dust, soil, salts and other contaminants.

SSPC-SP-3
St 3
Power Tool Cleaning - Removal of all rust scale, mill scale, loose paint, and loose rust to the degree specified by power wire brushes, power impact tools, power grinders, power sanders or by combination of these methods. The substrate should have a pronounced metallic sheen and be free of oil, grease, dirt, soil, salts and other contaminants. Surface should not be buffed or polished smooth.

SSPC-SP-4
Flame Cleaning - Removal of all loose scale, rust and other detrimental foreign matter by passing high temperature, high velocity oxy-acetylene flames over the entire surface, followed by wire brushing. Surface should also be free of oil, grease, dirt, soil, salts and other contaminants.

SSPC-SP-5
Sa 3
NACE 1
White Metal Blast Cleaning - Removal of all mill scale, rust, rust scale, paint or foreign matter by the use of abrasives propelled through nozzles or by centrifugal wheels. A White Metal Blast Cleaned Surface Finish is defined as a surface with a gray-white, uniform metallic color, slightly roughened to form a suitable anchor pattern for coatings. The surface, when viewed without magnification, shall be free of all oil, grease, dirt, visible mill scale, rust, corrosion products, oxides, paint, or any other foreign matter.

SSPC-SP6
Sa 2
NACE 3
Commercial Blast Cleaning - Removal of mill scale, rust, rust scale, paint or foreign matter by the use of abrasives propelled through nozzles or by centrifugal wheels, to the degree specified. A Commercial Blast Cleaned Surface Finish is defined as one from which all oil, grease, dirt, rust scale and foreign matter have been completely removed from the surface and all rust, mill scale and old paint have been completely removed except for slight shadows, streaks, or discolorations caused by rust stain, mill scale oxides or slight, tight residues of paint or coating that may remain; if the surface is pitted, slight residues of rust or paint may by found in the bottom of pits; at least two-thirds of each square inch of surface area shall be free of all visible residues and the remainder shall be

limited to the light discoloration, slight staining or tight residues mentioned above.

SSPC-SP-7
NACE 4
Sa 1
Brush-Off Blast Cleaning - Removal of loose mill scale, loose rust, and loose paint, to the degree hereafter specified, by the impact of abrasives propelled through nozzles or by centrifugal wheels. It is not intended that the surface shall be free of all mill scale, rust, and paint. The remaining mill scale, rust, and paint should be tight and the surface should be sufficiently abraded to provide good adhesion and bonding of paint. A Brush-Off Blast Cleaned Surface Finish is defined as one from which all oil, grease, dirt, rust scale, loose mill scale, loose rust and loose paint or coatings are removed completely but tight mill scale and tightly adhered rust, paint and coatings are permitted to remain provided that all mill scale and rust have been exposed to the abrasive blast pattern sufficiently to expose numerous flecks of the underlying metal fairly uniformly distributed over the entire surface.

SSPC-SP-8
Pickling - Removal of all mill scale, rust and rust scale by chemical reaction, or by electrolysis, or by both. It is intended that the pickled surface shall be completely free of all scale, rust, and foreign matter. Furthermore, the surface shall be free of unreacted or harmful acid, alkali, or smut.

SSPC-SP-9
Weathering Followed By Blast Cleaning - Weathering to remove all or part of the mill scale followed by one of the blast cleaning standards.

SSPC-SP-10
Sa 2-1/2
NACE 2
Near-White Blast Cleaning - Removal of nearly all mill scale, rust, rust scale, paint, or foreign matter by the use of abrasives propelled through nozzles or by centrifugal wheels, to the degree hereafter specified. A Near-White Blast Cleaned Surface Finish is defined as one from which all oil, grease, dirt, mill scale, rust, corrosion products, oxides, paint or other foreign matter have been completely removed from the surface except for very light shadows, very slight streaks or slight discolorations caused by rust stain, mill scale oxides, or light, tight residues of paint or coating that may remain. At least 95 percent of each square inch of surface area shall be free of all visible residues, and the remainder shall be limited to the light discoloration mentioned above.

SSPC-SP 11, Power Tool Cleaning to Bare Metal

Specifies the use of power tools to produce a bare metal surface and to retain or produce a surface profile. This specification is suitable where a roughened, clean, bare metal surface is required, but where abrasive blasting is not feasible or permissible. Once cleaned, the surface will be free of visible oil, grease, dirt, dust, mill scale, rust, paint, oxide, corrosion products, and other foreign matter. Slight residue of rust and paint may be left in the lower portion of pits if the original surface is pitted. Surface shall have a degree of roughness (profile) of no less than 1 mil (25 microns).

Ultra High Pressure Water Jetting - NACE / SSPC - WJ-2
Surface shall be cleaned to a matte finish with at least 95% of the surface area free of all previously existing Visible residue and the remaining 5% containing only randomly dispersed stains of rust, coatings and foreign matter.