

**GUIDE SPECIFICATIONS:**

The following guide is for general use. Each project should be reviewed for site specific and project related considerations.

**NACE**

NACE RP0178: Visual Comparator – Surface Finishing of Welds (Complements NACE Standard RP0178).

NACE 5 / SSPC-SP12: Surface Preparation and Cleaning of Steel and Other Hard Materials by High- and Ultrahigh-Pressure Water Jetting Prior to Recoating.

**SSPC**

SSPC-TU-4: Field Methods for Retrieval and Analysis of Soluble Salts on Substrates.

SSPC-SP1 Solvent Cleaning: - to remove detrimental foreign matter such as oil, grease, soil, drawing and cutting compounds, and other surface contaminants.

SSPC-SP2 Hand Tool Cleaning - to remove loose mill scale, loose rust, and loose paint by hand brushing, hand sanding, hand scraping, hand chipping, or with other hand impact tools.

SSPC-SP3 Power Tool Cleaning – to remove loose mill scale, loose rust, and loose paint with power wire brushes, power impact tools, power grinders, power sanders, or by a combination of these methods.

SSPC-SP5 / NACE 1 White Metal Blast Cleaning: when viewed without magnification, the surface shall be free of all visible oil, grease, dirt, rust, mill scale, paint, oxides, corrosion products, and other foreign matter.

**International Concrete Repair Institute (ICRI)**

Guideline # 03732 – Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.

**SURFACE PREPARATION METHODS:**

Method used to prepare the surface will depend on many different factors, such as:

**Substrate Conditions:**

- New vs. Existing
- Chemical Contamination:
- Water Saturation:
- Mechanical Soundness:
- Visual Appearance

**Customer Requirements:**

- Noise:
- Vibration:
- Dust
- Water:
- Downtime:

**Material Requirements:**

Surface Preparation Requirements:

Curing Requirements:

Environmental Requirements:

Application Conditions: (i.e. Generation of the following)

Dust

Slurries:

Waste:

Water:

**SURFACE PREPARATION:**

Overall goal, whether a new or existing substrate, is to provide a clean, sound, dry, geometrically smooth and profiled surface, in order to ensure maximum adhesion and minimum film distortion.

**NEW SUBSTRATES:**

All substrates shall be visually inspected prior to, and following the preparing of the surface. A visual inspection will highlight such things as surface imperfections, etc, that may require additional attention.

For immersion service all substrates shall be prepared to achieve an anchor pattern of 1 – 2.5 mils.

Concrete: provided the concrete is fully cured.

Brush blast to remove all latent material.

Finish to a minimum ICRI CSP 3 using FluoroGrip FS-400 Epoxy, Concrete Filler–Sealer as per manufacturer’s recommendations

If required, apply FluoroGrip CP-300 conductive epoxy primer as per manufacturer’s recommendations.

Fiberglass: provided the resin system is fully cured.

Clean entire surface of all visible oil, grease, dirt, rust, mill scale, oxides, corrosion products, un-bonded coatings/linings, other foreign matter.

Metallic:

Clean entire surface of all visible oil, grease, dirt, rust, mill scale, oxides, corrosion products, un-bonded coatings/linings, other foreign matter.

Prepare surface to NACE RP0178.

Abrasive blast to SSPC-SP5 / NACE #1 to achieve a 1 – 2.5 mil anchor pattern.

New & Existing Coatings: (i.e. splash/spill protection)

Clean entire surface of all visible oil, grease, dirt, rust, mill scale, oxides, corrosion products, un-bonded coatings/linings, other foreign matter.

**EXISTING SUBSTRATES:**

All substrates shall be visually inspected prior to, and following the preparation of the surface. A visual inspection will highlight such things as surface imperfections, etc., that may require additional attention.

For immersion service all substrates shall be prepared to achieve an anchor pattern of 1 – 2.5 mils.

The majority of coatings/linings need not be removed (elastomeric materials being one exception) as long as they are mechanically sound and clean (i.e. galvanizing, baked phenolics, etc.).

### Concrete:

Remove all deteriorated concrete using a suitable method as outlined in ICRI Guide 03732.  
Check the surface for soluble salts. Surface must be cleaned to an SC-3 as defined by NACE No. 5 / SSPC-SP 12.  
Finish the surface to ICRI CSP using FluoroGrip FS400 as per mfg. recommendations.  
Apply FluoroGrip CP300 as per mfg. recommendations.

### Fiberglass:

Clean entire surface of all visible oil, grease, dirt, rust, mill scale, oxides, corrosion products, un-bonded coatings/linings, other foreign matter.  
Check the surface for soluble salts. Surface must be cleaned to an SC-3 as defined by NACE No. 5 / SSPC-SP 12.  
Depending on degree of fiber bloom present, surface may need to be resin coated.

### Metallic:

Clean entire surface of all visible oil, grease, dirt, rust, mill scale, oxides, corrosion products, un-bonded coatings/linings, other foreign matter.  
Check the surface for soluble salts. Surface must be cleaned to an SC-3 as defined by NACE No. 5 / SSPC-SP 12.  
All pitted and corroded areas shall be filled and blended to ensure a smooth surface for maximum lining adhesion.  
Prepare surface to NACE RP0178.

### **SEAMING:**

Currently there are three ways to ensure a sound joint. They are as follows:

Overlap: Is typically used in non-aggressive environments where the adhesive is unaffected by the corrodent (i.e. water, ozone, certain food stuffs). The environments typically include corrosive atmospheres, splash & spill and secondary containment conditions or mild immersion services.

Overlap w/Elastomeric Sealant: Used when the corrodent must be isolated from the adhesive. The environments typically include corrosive atmospheres, splash & spill and secondary containment conditions or mild immersion services.

Welded: Used for maximum protection of the substrate and adhesive. Welding process is broken down into two types depending on film thickness:

- <30 mils: ITI's new, state of the art, patented, Infra Red welding.
- >30 mils: Conventional hot air methods.

### **MATERIALS:**

All materials, technical specifications, and procedures shall be supplied by ITI (i.e. ITI's Engineering Binder). Substitutes may be made following written approval from ITI.

Abrasive blasting on metallic surfaces shall only be done with new, uncontaminated steel grit or oxides like Black Beauty®. Silica sand shall not be used.

Abrasive blasting on fiberglass can be done with new, uncontaminated media, such as corncob or walnut shells. It is advisable not to use anything more aggressive like the media used for metallics.

**APPLICATION:**

In order to minimize seams and thus the amount of welds, and maximize the ease of application, mental layout prior to applying the lining is important. Things to consider for layout are: accessibility, vertical and horizontal surfaces, nozzles, manways, location of any internals, surface geometries, length of individual pieces, diameters, etc.

In general it is best to layout the longest piece of film first. Begin by cutting to length the first piece. Layout and tape in place the first piece. Begin by removing a small section of the release liner (approximately 3" back from the end), and apply the film to the surface. Remove the release liner in increments of 4"-6" at a time. Using either a rubber roller or dry film squeegee, press the film onto the surface. Take the second section of film and lay it out butting up against (or overlapping a minimum of 1") the first piece: again tape this section into place (holding the film in place with tape prevents the film from wondering during application). Apply the entire second piece. Continue applying sections of film until the entire surface is coated. Be sure to solvent wipe all areas of film that will be overlapped to ensure adequate adhesion.

In the case of an above ground storage tank, it is recommended to coat the sidewalls first followed by the floor. It is also recommended to start from the floor and work up the sidewall; this will produce a shingle effect. This will minimize wear and tear on the floor.

Once the entire surface is coated, begin applying the cap strips that will be used to weld the butt joints. Solvent clean all area to be welded using isopropyl alcohol. Weld all cap strips according to the manufacturers specifications.

All terminations shall be encapsulated with either SB-100 (a minimum of two coats shall be applied to minimize potential leak paths) or SB-200 fluoroelastomer sealer.

**CURING:**

A minimum of 24 hours at ambient temperature is recommended prior to placing the lining into service.

**INSPECTION:**

Visual: A visual inspection shall be performed to ensure a sound application. Things to look for during the inspection are:

1. Air Entrapment: Must be minimized to ensure a sound bond. Large air pockets can sometimes be worked out, or a needle can be used to expel the air, followed by applying pressure to the film. A patch must then be applied that covers the hole made by the needle by at least 1/2" on all sides.
2. Welded Butt Joints: In order to ensure a sound homogenous weld, the film shall be butted as tightly as possible. However, in reality this may prove to be difficult due to curvatures and surface irregularities. A maximum gap between two adjacent pieces of film shall not exceed 1/4".
3. Edges: To ensure adequate bonding at the edges (i.e. sharp corners yield very little adhesive) it is best to cut all corners to at least a 1/2" radius.
4. Proper Overlap: In general, the minimum overlap for a non-welded system shall be 1". This specified overlap helps when working with both wide and long sections of film, as well as when working both vertical and overhead surfaces.

Discontinuity Test: To confirm a holiday free application, both high and low voltage tests can be performed to ensure a sound application, as per the manufacturers specifications and ASTM D5162 and NACE RP0188-90.