



# POLYUREA eBook

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Inside this Booklet You will Learn...

## **FREE GUIDE: Surface Preparation Standards for Polyurea (PUA)**

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## Surface Preparation Standards

VersaFlex Incorporated will always designate the degree of surface preparation required for the coating and lining systems you are using. These basic standards for preparing metal and concrete substrates are a joint effort between SSPC: The Society for Protective Coatings; NACE: the National Association of Corrosion Engineers International; ICRI: International Concrete Repair Institute; and, ISO: International Organization for Standardization.

### **SSPC-SP 1 Solvent Cleaning**

Removal of all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants from steel surfaces with solvent, vapor, cleaning compound, alkali, emulsifying agent, or steam.

### **SSPC-SP 2 / ISO 8501- 1 St 2 Hand Tool Cleaning**

Removes all loose mill scale, loose rust, loose paint, and other loose detrimental foreign matter by hand chipping, scraping, sanding, and wire brushing.

### **SSPC-SP 3 / ISO 8501-1 St 3 Power Tool Cleaning**

Removes all loose mill scale, loose rust, loose paint, and other loose detrimental foreign matter by power wire brushing, power sanding, power grinding, power tool chipping, and power tool descaling.

### **SSPC-SP 5 / NACE 1 / ISO 8501-1 Sa 3 White Metal Blast Cleaning**

### **SSPC-SP 5 (WAB) / NACE WAB-1 White Metal Wet Abrasive Blast Cleaning**

When viewed without magnification, the surface shall be free of all visible oil, grease, dust, dirt, mill scale, rust, coating, oxides, corrosion products and other foreign matter.

### **SSPC-SP 6 / NACE 3 / ISO 8501-1 Sa 2 Commercial Blast Cleaning**

### **SSPC-SP 6 (WAB) / NACE WAB-3 Commercial Wet Abrasive Blast Cleaning**

When viewed without magnification, the surface shall be free of all visible oil, grease, dust, dirt, mill scale, rust, coating, oxides, corrosion products and other foreign matter of at least 66-2/3% of unit area, which shall be a square 3 in. x 3 in. (9 sq. in.). Light shadows, slight streaks, or minor discolorations caused by stains of rust, stains of mill scale, or stains of previously applied coating in less than 33-1/3% of the unit area is acceptable.

### **SSPC-SP 7 / NACE 4 / ISO 8501-1 Sa 1 Brush-Off Blast Cleaning**

### **SSPC-SP 7 (WAB) / NACE WAB-4 Brush-Off Wet Abrasive Blast Cleaning**

When viewed without magnification, the surface shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose coating. Tightly adherent mill scale, rust, and coating may remain on the surface. Mill scale, rust, and coating are considered tightly adherent if they cannot be removed by lifting with a dull putty knife.

### **SSPC-SP 10 / NACE 2 / ISO 8501-1 Sa 2 1/2 Near-White Blast Cleaning**

### **SSPC-SP 10 (WAB) / NACE WAB-2 Near - White Metal Wet Abrasive Blast Cleaning**

When viewed without magnification shall be free of all visible oil, grease, dust, dirt, mill scale, rust, coating, oxides, corrosion products and other foreign matter of at least 95% of each unit area. Staining shall be limited to no more than 5 percent of each unit area, and may consist of light shadows, slight streaks, or minor discolorations caused by stains of rust, stains of mill scale, or stains of previously applied coatings. Unit area shall be approximately 3 in. x 3 in. (9 sq. in.).

### **SSPC-SP 11 Power Tool Cleaning to Bare Metal**

When viewed without magnification, the surface shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portion of pits if the original surface is pitted. The surface profile shall not be less than 1 mil (25 microns).

### **SSPC-SP 12 / NACE 5 Surface Preparation and Cleaning of Steel and Other Hard Materials by High- and Ultra High- Pressure Water Jetting Prior to Recoating**

This standard requires water jetting at high- or ultra high-pressure to prepare a surface for recoating using pressure above 10,000 psi. Water jetting will not produce a profile; rather, it exposes the original abrasive-blasted surface profile. Water jetting shall be performed to meet four conditions: WJ-1, WJ-2, WJ-3, and WJ-4, and a minimum acceptable surface shall have all loose rust, loose mill scale, and loose coatings uniformly removed.

### **SSPC-SP 13 / NACE 6 Surface Preparation of Concrete (EN 1504)**

Provides requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems. Refer also to ICRI Guideline No. 310.2R-2013 and SSPC-Guide 20.

### **SSPC-SP 14 / NACE 8 Industrial Blast Cleaning**

#### **SSPC-SP 14 (WAB) / NACE WAB-8 Industrial Wet Abrasive Blast Cleaning**

Removal of all visible oil, grease, dust and dirt, when viewed without magnification. Traces of tightly adherent mill scale, rust, and coating residues are permitted to remain on 10% of each unit area of the surface if they are evenly distributed. Shadows, streaks, and discoloration caused by stains of rust, stains of mill scale, and stains of previously applied coating may be present on the remainder of the surface.

### **SSPC-SP 15 Commercial Grade Power Tool Cleaning**

This standard covers the requirements for power tool cleaning to provide a commercial grade power tool cleaned steel surface, and to retain or produce a minimum 25 micrometer (1.0 mil) surface profile. This standard permits random staining to remain on a defined percentage of the cleaned surface, where SSPC-SP 11 requires removal of surface staining

### **SSPC-SP 16 Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals**

This standard is intended for brush-off blast cleaning of coated or uncoated metal surfaces other than carbon steel prior to the application of a protective coating system. Surface preparation using this standard is intended to roughen and clean coated and uncoated non-ferrous metal substrates, including, but not limited to, galvanized surfaces, stainless steel, copper, aluminum, and brass. SP 16 requires the cleaned surface to be free of loose contaminants and loose coating as determined by visual inspection. A minimum surface profile of 19 micrometers (0.75 mil) on the bare metal surface is required. Intact coatings are required to be roughened to the degree specified in the project specification.

## WATER JETTING STANDARDS

### SSPC-SP 12 / NACE 5

### Surface Preparation and Cleaning of Steel and Other Hard Materials by High- and Ultra High- Pressure Water Jetting Prior to Recoating

This standard requires water jetting at high- or ultra high-pressure to prepare a surface for recoating using pressure above 10,000 psi. Water jetting will not produce a profile; rather, it exposes the original abrasive-blasted surface profile. The specifier shall use one of the visual surface preparation definitions (WJ-1 to WJ-4) and one of the non- visual surface preparation definitions (SC-1 to SC-3) to specify the degree of visible and non-visible surface matter to be removed.

### Pressure Categorization

**1. Low-Pressure Water Cleaning (LP WC)**

Cleaning performed at pressures less than 34 Mpa (5,000 psi).

**2. High-Pressure Water Cleaning (HP WC)**

Cleaning performed at pressures from 34 to 70 Mpa (5,000 to 10,000 psi).

**3. High-Pressure Water Jetting (HP WJ)**

Cleaning performed at pressures from 70 to 170 Mpa (10,000 to 25,000 psi).

**4. Ultrahigh-Pressure Water Jetting (UHP WJ)**

Cleaning performed at pressures above 170 Mpa (25,000 psi).

### Visual Conditions of Surface Cleanliness

**WJ-1**

Surface shall be free of all previously existing visible rust, coatings, mill scale, and foreign matter and have a matte metal finish.

**WJ-2**

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

**WJ-3**

Surface shall be cleaned to a matte finish with at least two-thirds of the surface area free of all previously existing visible residues (except mill scale), and the remaining one-third containing only randomly dispersed stains of previously existing rust, coatings, and foreign matter.

**WJ-4**

Surface shall have all loose rust, loose mill scale, and loose coatings uniformly removed.

## Non-Visual Conditions of Surface Cleanliness

### SC-1

Surface shall be free of all detectable levels of contaminants as determined using available field test equipment with sensitivity approximating laboratory test equipment. For purposes of this standard, contaminants are water-soluble chlorides, iron-soluble salts, and sulfates

### SC-2

Surface shall have less than 7  $\mu\text{g}/\text{cm}^2$  chloride contaminants, less than 10  $\mu\text{g}/\text{cm}^2$  of soluble ferrous ion levels, and less than 17  $\mu\text{g}/\text{cm}^2$  of sulfate contaminants as verified by field or laboratory analysis using reliable, reproducible test equipment

### SC-3

Surface shall have less than 50  $\mu\text{g}/\text{cm}^2$  chloride and sulfate contaminants as verified by field or laboratory analysis using reliable, reproducible test equipment

**(See Chart on Next Page)**

## SURFACE PREPARATION BY SUBSTRATE

	Iron or Steel	Galvanized	Aluminum	Pre-Finished Metals	Stainless Steel	Non-Ferrous Metals	Plastic – PVC/FRP	Concrete	Previously Painted Surfaces
SSPC-SP 1 Solvent Cleaning	X	X	X	X	X	X		X	X
SSPC-SP 2 Hand Tool Cleaning	X								
SSPC-SP 3 Power Tool Cleaning	X						X	X	
SSPC-SP 11 Power Tool Cleaning to Bare Metal	X								
SSP C-SP 7 / NACE 4 Brush-Off Blast Cleaning	X			X				X	X
SSPC-SP 14 / NACE 8 Industrial Blast Cleaning	X								
SSP C-SP 6 / NACE 3 Commercial Blast Cleaning	X								
SSPC-SP 10 / NACE 2 Near-White Blast Cleaning	X								
SSP C-SP 5 / NACE 1 White Metal Blast Cleaning	X								
SSPC-SP 12 / NACE 5 High- and Ultrahigh-Pressure Water Jetting Prior to Recoating	X			X			X	X	X
SSPC-SP 13 / NACE 6 Surface Preparation of Concrete								X	
SSPC-SP 15 Commercial Grade Power Tool Cleaning	X							X	X
SSPC-SP 16 Brush-Off Blast Cleaning of Non-Ferrous Metals		X	X		X	X			

Concrete can also be cleaned and prepared using ASTM D 4260 (Acid Etch – Floors), ASTM D 4258 (Solvent Cleaning), ASTM D 7234 (To Check Adhesion), and ASTM D 4259 (To Abrade Concrete).