

SURFACE PREPARATION STANDARDS

Your coatings supplier will always designate the degree of surface preparation required for the materials you are using. The basic standards for preparing metal substrates are a joint effort between the Society for Protective Coatings (SSPC) and the National Association of Corrosion Engineers International (NACE).

SSPC-SP1 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-SP2 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-SP3 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-SP5 / NACE 1 White Metal 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-SP6 / NACE 3 Commercial 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-SP7 / NACE 4 Brush-Off 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-SP10 / NACE 2 Near-White 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-SP11 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).

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SSPC-SP12 / 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-SP13 / NACE 6 Surface Preparation of Concrete

Provides requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems.

SSPC-SP14 / NACE 8 Industrial 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.

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WATER JETTING STANDARDS

SSPC-SP12 / 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

Low-Pressure Water Cleaning (LP WC)

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

High-Pressure Water Cleaning (HP WC)

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

High-Pressure Water Jetting (HP WJ)

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

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

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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-SP1 Solvent Cleaning	X	X	X	X	X	X		X	X
SSPC-SP2 Hand Tool Cleaning	X	X							
SSPC-SP3 Power Tool Cleaning	X	X						X	
SSPC-SP11 Power Tool Cleaning to Bare Metal	X								
SSPC-SP7/NACE 4 Brush-Off Blast Cleaning	X	X	X	X	X	X		X	X
SSPC-SP14/NACE 8 Industrial Blast Cleaning	X								
SSPC-SP6/NACE 3 Commercial Blast Cleaning	X								
SSPC-SP10/NACE 2 Near-White Blast Cleaning	X								
SSPC-SP5/NACE 1 White Metal Blast Cleaning	X								
SSPC-SP12/NACE 5 High- and Ultrahigh-Pressure Water Jetting Prior to Recoating	X			X			X	X	X
SSPC-SP13/NACE 6 Surface Preparation of Concrete								X	

Concrete can also be cleaned and prepared using ASTM D 4260 (Acid Etch – Floors), ASTM D 4258 (Solvent Cleaning), ASTM D 3359 (To Check Adhesion), and ASTM D 4259 (To Abrade Concrete).