



COATING SURFACE PREPARATION SPECIFICATIONS

INTRODUCTION

This Engineering Letter is intended to be an aid for selecting the proper surface preparation specifications for a given application. It also provides a better understanding of the Steel Structures Painting Council (SSPC) surface preparation specifications, which are the most commonly used. In addition, surface preparation standards published by the National Association of Corrosion Engineers (NACE) are cross-referenced where applicable.

The life of a coating depends as much on surface preparation as on the subsequent coating system. Surface preparation, therefore, requires thorough consideration. The primary functions of surface preparation are:

- To remove surface contaminants and imperfections, such as oil, grease, dust, rust, weld spatter, etc., that will affect the performance of a coating.
- To provide an anchor pattern or surface profile which improves the mechanical bonding of a coating to the prepared surface by increasing the surface area.

Note that all coating systems will fail eventually. However, most premature coating failure can be attributed to inadequate surface preparation or lack of coating adhesion.

SUMMARY OF COMMON SURFACE PREPARATION SPECIFICATIONS

SSPC STANDARD	DESCRIPTION
SP1 - SOLVENT CLEANING	Removal of oil, grease, dirt, soil, salts, and contaminants by cleaning with solvent, vapor, alkali, emulsion, or steam.
SP2 - HAND TOOL CLEANING	Removal of loose rust, loose mill scale, and loose paint by hand chipping, scraping, sanding, and wire brushing.
SP3 - POWER TOOL CLEANING	Removal of loose rust, loose mill scale, and loose paint by power tool chipping, descaling, sanding, wire brushing, and grinding.
SP5 - WHITE-METAL BLAST CLEANING	Removal of all visible rust, mill scale, paint, and foreign matter by blast cleaning. (For very corrosive atmospheres where the high cost of cleaning is warranted).
SP6 - COMMERCIAL BLAST CLEANING	Blast cleaning until at least two-thirds of the surface area is free of all visible residues. (For conditions where thoroughly cleaned surface is required).
SP7 - BRUSH-OFF BLAST CLEANING	Blast cleaning of all except tightly adhering residues of mill scale, rust, and coatings, exposing numerous evenly distributed flecks of underlying metal.
SP10 - NEAR-WHITE BLAST CLEANING	Blast cleaning until at least 95% of the surface area is free of all visible residues. (For high humidity, chemical atmosphere, marine, or other corrosive environments).
SP14 - INDUSTRIAL BLAST CLEANING	An industrial blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dust, and dirt. 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.

SSPC-SP1, “SOLVENT CLEANING”

This specification includes simple solvent wiping, immersion in solvent, solvent spray, vapor degreasing, steam cleaning, emulsion cleaning, chemical paint stripping, and alkaline cleaners. Solvent Cleaning is used primarily to remove oil, grease, dirt, soil, drawing compounds, and other similar organic compounds.

SSPC-SP2, “HAND TOOL CLEANING”

Hand Tool Cleaning is an acceptable method of surface preparation for normal atmospheric exposures, for interiors, and for maintenance painting when using paints with good wetting ability. This specification includes hand chipping, scraping, sanding, and wire brushing. Hand Tool Cleaning is used primarily to remove loose rust, loose mill scale, and loose paint after all oil, grease, and salts are removed as specified in SSPC-SP1, “Solvent Cleaning.”*

SSPC-SP3, “POWER TOOL CLEANING”

Power Tool Cleaning provides a better foundation for the priming paint than Hand Tool Cleaning. This specification includes power tool chipping, descaling, sanding, wire brushing, and grinding. Power Tool Cleaning is used primarily to remove loose rust, loose mill scale, and loose paint after all oil, grease, and salts are removed as specified in SSPC-SP1 - Solvent Cleaning.

SSPC-SP5, “WHITE-METAL BLAST CLEANING”

This blast cleaning method is generally used for exposures in very corrosive atmospheres and for immersion service where the highest degree of cleaning is required and a high surface preparation cost is warranted. Blast cleaning by wheel or nozzle (dry or wet) using sand, grit, or shot to white metal will result in high performance of the paint systems due to the complete removal of all rust, mill scale, and foreign matter or contaminants from the surface. In ordinary atmospheres and general use, White-Metal Blast Cleaning is seldom warranted. Meets requirements of NACE Standard #1.

SSPC-SP6, “COMMERCIAL BLAST CLEANING”

The most common type of blast cleaning should be employed for all general purposes where a high, but not perfect, degree of blast cleaning is required. It will remove all rust, mill scale, and other detrimental matter from at least two-thirds of the surface area. The advantage of Commercial Blast Cleaning lies in the lower cost for satisfactory surface preparation for the majority of cases where blast cleaning is believed to be necessary. If the cleaning done according to this specification is likely to result in a surface unsatisfactory for severe service, then Near-White Blast Cleaning (SSPC-SP10) or White-Metal Blast Cleaning (SSPC-SP5) should be specified. Meets requirements of NACE Standard #3.

SSPC-SP7, “BRUSH-OFF BLAST CLEANING”

This method of blast cleaning should be used when the environment is mild enough to permit tight mill scale, paint, and minor amounts of tight rust and other foreign matter to remain on the surface. The surface resulting from this method of surface preparation should be free of all loose mill scale and loose rust with the small amount of remaining rust serving as an integral part of the surface. Brush-off Blast Cleaning is not intended for very severe surroundings. It is generally intended to supplant Power Tool Cleaning where facilities are available for blast cleaning. Meets requirements of NACE Standard #4.

SSPC-SP10, “NEAR-WHITE BLAST CLEANING”

This type of blast cleaning is generally employed for all general-purpose applications where a high degree of blast cleaning is required to remove all rust, mill scale, and other detrimental matter from at least 95% of the surface area. Exposures include high humidity, chemical atmosphere, marine, or other corrosive environments. Blast cleaning to near-white metal was developed to fill the need for a grade of blast cleaning beyond that of Commercial (SSPC-SP6) but less than White Metal (SSPC-SP5). The advantage of Near - White Blast Cleaning lies in the lower cost for surface preparation that is satisfactory for all but the most severe service conditions. Meets requirements of NACE Standard #2.

SSPC-SP14, “INDUSTRIAL BLAST CLEANING”

This type of industrial blast cleaning is used when the objective is to remove most of the coating, mill scale, and rust, but when the extra effort required to remove every trace of these is determined to be unwarranted.

The industrial blast allows defined mill scale, coating, and rust to remain on less than 10% of the surface and allows defined stains to remain on all surfaces. Meets requirements of NACE Standard #8.

* **nyb**'s standard surface preparation is a high-pressure chemical wash followed by SSPC-SP2 - Hand Tool Cleaning or SSPC-SP3 - Power Tool Cleaning as required.