



Item No. 21156

Joint Surface Preparation Standard

Waterjet Cleaning of Metals—Thorough Cleaning (WJ-3)

This NACE International/SSPC: The Society for Protective Coatings joint surface preparation standard represents a consensus of those individual members who have reviewed this document, its scope, and provisions. Its acceptance does not in any respect preclude anyone, whether he or she has adopted the standard or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not in conformance with this standard practice. Nothing contained in this NACE/SSPC standard is to be construed as granting any right, by implication or otherwise, to manufacture, sell, or use in connection with any method, apparatus, or product covered by letters patent, or as indemnifying or protecting anyone against liability for infringement of letters patent. This standard represents minimum requirements and should in no way be interpreted as a restriction on the use of better procedures or materials not discussed herein. Neither is this standard intended to apply in all cases relating to the subject. Unpredictable circumstances may negate the usefulness of this standard in specific instances. NACE and SSPC assume no responsibility for the interpretation or use of this standard by other parties, and accept responsibility for only those official NACE or SSPC interpretations issued by NACE or SSPC in accordance with their governing procedures and policies, which preclude the issuance of interpretations by individual volunteers.

Users of this NACE/SSPC standard are responsible for reviewing appropriate health, safety, and regulatory documents and for determining their applicability in relation to this standard prior to its use. This NACE/SSPC standard may not necessarily address all potential health and safety problems or environmental hazards associated with the use of materials, equipment, and/or operations detailed or referred to within this standard. Users of this NACE/SSPC standard also are responsible for establishing appropriate health, safety, and environmental protection practices, in consultation with appropriate regulatory authorities if necessary, to achieve compliance with any existing applicable regulatory requirements prior to the use of this standard.

CAUTIONARY NOTICE: NACE/SSPC joint surface preparation standards are subject to periodic review, and may be revised or withdrawn at any time in accordance with NACE/SSPC technical committee procedures. NACE and SSPC require that action be taken to reaffirm, revise, or withdraw this standard no later than five years from the date of initial publication and subsequently from the date of each reaffirmation or revision. The user is cautioned to obtain the latest edition. Purchasers of NACE/SSPC standards may receive current information on all standards and other NACE/SSPC joint publications by contacting the organizations at the addresses below:

ISBN 1-57590-250-8
©2012, NACE and SSPC

NACE International
1440 South Creek Drive
Houston, Texas 77084-4906
+1 281-228-6200

The Society for Protective Coatings
40 24th Street, 6th Floor
Pittsburgh, PA 15222-2331
+1 412-281-2331

Approved: 2012-03-10
Printed by NACE International

This is a preview of "NACE WJ-3/SSPC-SP WJ...". [Click here to purchase the full version from the ANSI store.](#)

Foreword

This NACE/SSPC joint standard defines the Thorough Cleaning (WJ-3) degree of surface cleanliness of coated or uncoated metallic substrates achieved by the use of waterjet cleaning prior to the application of a protective coating or lining. Waterjet cleaning is the use of pressurized surface preparation water for removing coatings and other materials, including hazardous materials, from a substrate to achieve a defined degree of surface cleanliness. Waterjet cleaning includes various methods such as low-pressure water cleaning (LP WC), high-pressure water cleaning (HP WC), high-pressure waterjetting (HP WJ), and ultrahigh-pressure waterjetting (UHP WJ).

The four degrees of surface cleanliness achieved by waterjet cleaning, which are addressed in separate standards, are as follows:

Degree of Surface Cleanliness	Designation
Cleaning to Bare Substrate	WJ-1
Very Thorough Cleaning	WJ-2
Thorough Cleaning	WJ-3
Light Cleaning	WJ-4

Thorough Cleaning (WJ-3) provides a greater degree of surface cleanliness than Light Cleaning (WJ-4), but a lesser degree of cleaning than Very Thorough Cleaning (WJ-2).

Waterjet cleaning to achieve the Thorough Cleaning (WJ-3) degree of surface cleanliness is used when the objective is to remove much of the rust and other corrosion products, coating, and mill scale, and leave tightly adherent thin films, but when the extra effort required to remove almost all of these materials is determined to be unwarranted. Discoloration of the surface may be present.

Waterjet cleaning does not provide the primary anchor pattern on the metallic substrate known as "surface profile." The coatings industry uses waterjet cleaning primarily for recoating or relining projects in which there is an adequate pre-existing surface profile. The degrees of surface cleanliness cited above to be achieved by waterjet cleaning methods are not intended to require that a surface profile be present or defined prior to coating application.

Waterjet cleaning reduces and may completely remove water-soluble surface contaminants, notably those contaminants found at the bottom of pits on the surface of corroded metallic substrates. Waterjet cleaning also helps remove oil, grease, rust and other corrosion products, and other foreign matter (for example, shotcrete spatter) from the surface, and is used when it is a more feasible method of surface preparation than, for example, abrasive blast cleaning, power or hand tool cleaning, or chemical stripping. Waterjet cleaning may be used when the application of high-performance coatings requires extensive surface preparation, surface decontamination, or both.

This standard is intended for use by coating or lining specifiers, applicators, inspectors, or others who have responsibility to define a standard degree of surface cleanliness to be achieved by waterjet cleaning methods.

NACE WJ-3/SSPC-SP WJ 3

This standard was prepared by NACE/SSPC Joint Task Group (TG) 277, "Surface Preparation of Metals to WJ-3 (Thorough Cleaning) by High-Pressure Waterjetting." TG 277 is administered by Specific Technology Group (STG) 04, "Coatings and Linings, Protective—Surface Preparation," and is sponsored by STG 02, "Coatings and Linings, Protective—Atmospheric," and STG 03, "Coatings and Linings, Protective—Immersion and Buried Service." This standard is issued by NACE under the auspices of STG 04, and by SSPC Group Committee C.2 on Surface Preparation. This standard is one of a set of four standards on degrees of surface cleanliness to be achieved by waterjet cleaning that are intended to replace NACE No. 5/SSPC-SP 12,¹ which includes all four degrees of surface cleanliness.

In NACE/SSPC standards, the terms *shall*, *must*, *should*, and *may* are used in accordance with Paragraph 2.2.1.8 of the Agreement between NACE International and SSPC: The Society for Protective Coatings. The terms *shall* and *must* are used to state mandatory requirements. The term *should* is used to state something considered good and is recommended but is not mandatory. The term *may* is used to state something considered optional.

NACE/SSPC

Joint Surface Preparation Standard

Waterjet Cleaning of Metals—Thorough Cleaning (WJ-3)

Contents

1. General	1
2. Definitions	1
3. Additional Technical Considerations	2
4. Associated Documents	2
5. Procedures Before Waterjet Cleaning	3
6. Waterjet Cleaning Methods	3
7. Procedures Following Waterjet Cleaning and Immediately Prior to Coating	4
References	4
Appendix A: Explanatory Notes (Nonmandatory)	5
Appendix B: Methods of Assessing the Degree of Flash Rust (Nonmandatory)	8
Appendix C: Waterjet Cleaning Equipment and Operating Parameters (Nonmandatory)	9
TABLE B1: Assessment of Degree of Flash Rust—Tape Pull Test	9

Section 1: General

1.1 This standard defines the Thorough Cleaning (WJ-3) degree of surface cleanliness of uncoated or coated metallic substrates by use of waterjet cleaning. The defined degree of cleanliness shall be achieved prior to the application of a specified protective coating or lining system. These requirements include the end condition of the surface and materials and procedures necessary to achieve and verify the end condition, as determined by visual inspection. This standard also may be used in situations in which the degree of surface cleanliness is required, but protective coatings or linings are not immediately applied. (Paragraphs A1 and A2 of Appendix A provide additional information.) Waterjet cleaning does not establish but may reveal an existing surface profile on a metallic substrate. If the existing surface profile is not acceptable for subsequent coating application, alternative surface preparation methods to create the required surface profile must be considered. (Paragraph A3 of Appendix A provides additional information.)

1.1.1 Thorough Cleaning (WJ-3) is essentially equivalent to the International Organization for Standardization (ISO)⁽¹⁾ 8501-4² degree of cleanliness Wa 2, thorough cleaning. ISO 8501-4 notes the use of various common terms for methods of waterjet cleaning: water jetting, water blast cleaning, hydrojetting, aquajetting, hydroblasting, aquablasting, and "cleaning by directing a jet of pressurized water onto the surface to be cleaned."

1.1.2 Within the hierarchy of degrees of surface cleanliness achieved by waterjet cleaning, Thorough Cleaning (WJ-3) is intended to be similar to the degree of surface cleanliness of NACE No. 3/SSPC-SP 6,³ except that tightly adherent material, rather than only stains, is permitted to remain on the surface; and to the degree of surface cleanliness of NACE No. 8/SSPC-SP 14,⁴ Industrial Blast Cleaning, which allows tightly adherent material to remain on the surface.

1.2 Although carbon steel is the metallic substrate most frequently cleaned in the field using waterjetting technology, waterjet cleaning may be used on metallic substrates other than carbon steel, including other ferrous substrates such as alloy steels, stainless steels, ductile iron, and cast irons, nonferrous substrates such as aluminum, and copper alloys such as bronze. For convenience, the written definitions of the degrees of surface cleanliness of the metallic substrate use the general term "rust and other corrosion products." The term "rust" is intended to apply to carbon steel substrates and the term "other corrosion products" (such as surface oxides) is intended to apply to metallic substrates other than carbon steel that are being waterjet cleaned. "Flash rust" is an oxidation product that forms as a wetted carbon steel substrate dries. The visual guides and comparators referenced for cleanliness and flash rust only illustrate carbon steel substrates.

1.3 This standard does not address surface preparation of concrete. Information on surface preparation of concrete can be found in NACE No. 6/SSPC-SP 13.⁵

1.4 This standard is limited to requirements for visible surface contaminants. Information on nonvisible contamination can be found in Paragraph A8 of Appendix A.

Section 2: Definitions

2.1 Thorough Cleaning (WJ-3): A metal surface after Thorough Cleaning, when viewed without magnification, shall have a matte (dull, mottled) finish and shall be free of all visible oil, grease, dirt, rust, and other corrosion products except for randomly dispersed stains of rust and other corrosion products, tightly adherent thin coatings, and other tightly adherent foreign matter. The staining or tightly adherent matter shall be limited to no more than 33 percent of each unit area of surface and may consist of randomly dispersed stains of rust and other corrosion products or previously applied coating, tightly adherent thin coatings, and other tightly adherent foreign matter.

2.1.1 A unit area of surface is an area approximately 5,800 mm² [9.0 in²] (i.e., a square 76 mm x 76 mm [3.0 in x 3.0 in]).

2.1.2 Coatings, mill scale, and foreign matter are considered tightly adherent if they cannot be removed by lifting with a dull putty knife. (Paragraphs A4 and A5 of Appendix A provide additional information.)

2.1.3 The gray to brown-black discoloration remaining on corroded and pitted carbon steel that cannot be removed by further waterjet cleaning is not considered part of the percentage staining.

⁽¹⁾ International Organization for Standardization (ISO), 1 ch. de la Voie-Creuse, Case postale 56, CH-1211 Geneva 20, Switzerland.