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Joint Surface Preparation Standard
NACE No. 5/SSPC-SP 12

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

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Steel Structures Painting Council
40 24th St.
Pittsburgh, Pennsylvania 15222
+1 412/281-2331

NACE International
P.O. Box 218340
Houston, Texas 77218-8340
+1 281/228-6200

Foreword

Since publication of NACE Standard RP0172, “Surface Preparation of Steel and Other Hard Materials by Water Blasting Prior to Coating or Recoating,” surface preparation using water jetting equipment has found acceptance as a viable method. The coatings industry, under the influence of government regulations, is working to find environmentally sensitive and user-friendly methods of surface preparation. The use of a high-energy water stream to strip existing coatings and for surface cleaning has advantages over dry abrasive blasting with respect to worker respiratory exposure and work area air quality. Respiratory requirements for water jetting may be less stringent than for other methods of surface preparation.

Abrasive blasting, one of the most common surface preparation techniques, is sometimes not feasible or desirable because the resultant flying abrasive particles and drifting dust may damage highly sensitive rotary equipment and filters, cause contamination of nearby mechanical equipment and structures, or cause contamination of the environment. Abrasive blasting may also trap contaminants within the topography. This standard describes the surface preparation technique known as water jetting, which provides an alternative method of removing coating systems, including lead-based paint systems. Water jetting is effective in removing (1) deleterious amounts of water-soluble surface contaminants that may not otherwise be removed by dry abrasive blasting alone, specifically in the bottom of pits and craters of severely corroded metallic substrates; (2) surface grease and oil; (3) rust; (4) shot-creting spatter; and (5) existing coatings and linings. Cold working of the topography of the surface does not occur in water jetting. Because water jetting does not provide the primary anchor pattern known to the coatings industry, this standard recommends its use primarily for recoating or relining projects where there is an adequate preexisting profile.

This standard addresses degrees of cleanliness, types of equipment, operating procedures, and safety factors associated with water jetting. Although this standard discusses jetting pressures up to 250 MPa[(1)] (36,000 psi), higher pressures may be used as technology and equipment evolve. High-pressure water jetting has application in a broad spectrum of industry; however, its use as described in this standard is particularly suited to the process industry, power plants, and other industrial plants where the use of high-performance coatings requires extensive surface preparation and/or surface decontamination.

This standard was prepared by NACE/SSPC Joint Task Group D on Surface Preparation by High-Pressure Water Jetting and is issued by NACE International under the auspices of NACE Group Committee T-6 on Protective Coatings and Linings and by the Steel Structures Painting Council. This standard replaces NACE Standard RP0172, “Surface Preparation of Steel and Other Hard Materials by Water Blasting Prior to Coating or Recoating,” and addresses current technology and equipment for high-pressure water cleaning, including water jetting.

[(1)] 1 MPa = 10 bar

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Contents

Section 1: General

1.1 This standard provides requirements for the use of high- and ultrahigh-pressure water jetting to achieve various degrees of surface cleanliness. This standard is limited in scope to the use of water only without the addition of solid particles in the stream.

1.2 Information on water jetting equipment, production rates, procedures, and principles is available in the appendices. Appendices A, B, C, D, E, F, and G do not provide requirements but give additional information on water jetting that will be useful to the owner, user, or contractor.

Section 2: Definitions

2.1 This section provides basic water jetting definitions. Additional definitions relevant to water jetting are contained in "Recommended Practices for the Use of Manually Operated High-Pressure Water Jetting Equipment."[2]

2.1.1 **Water Jetting (WJ)**: Water jetting is the use of standard jetting water at high or ultrahigh pressure to prepare a surface for recoating using pressures above 70 MPa (10,000 psi). Water jetting will not produce an etch or profile of the magnitude currently recognized by the surface preparation industry; rather, it exposes the original abrasive-blasted surface profile.

2.1.2 **Standard Jetting Water**: Standard jetting water is water of sufficient purity and quality that it does not impose additional contaminants on the surface being cleaned and, of critical importance to water jetting operations, does not contain sediments or other impurities that are destructive to the proper functioning of the water jetting equipment being used.

2.1.3 **Low-Pressure Water Cleaning (LP WC)**: LP WC is cleaning performed at pressures less than 34 MPa (5,000 psi).

2.1.4 **High-Pressure Water Cleaning (HP WC)**: HP WC is cleaning performed at pressures from 34 to 70 MPa (5,000 to 10,000 psi).

2.1.5 **High-Pressure Water Jetting (HP WJ)**: HP WJ is cleaning performed at pressures from 70 to 170 MPa (10,000 to 25,000 psi).

2.1.6 **Ultrahigh-Pressure Water Jetting (UHP WJ)**: UHP WJ is cleaning performed at pressures above 170 MPa (25,000 psi).

2.1.7 **Surface Cleanliness (SC)**: Surface cleanliness is the condition of the substrate after water jetting has removed partial or total residues of chloride, soluble ferrous salts, and sulfate contaminants.

Section 3: Surface Cleanliness Conditions

3.1 Table 1 lists four conditions of surface cleanliness in terms of **visible** contaminants. A surface shall be prepared to one of these four visual conditions prior to recoating. As part of the surface preparation, deposits of oil, grease, and foreign matter must be removed by ultrahigh-pressure water jetting, by steam cleaning with detergent, by methods in accordance with SSPC-SP 1[3] or by another method agreed upon by all parties to the contract. NOTE: Direct correlation to existing dry media blasting standards is inaccurate or inappropriate when describing the capabilities of water jetting and the results achieved by water jetting.

3.2 Table 2 lists three surface preparation conditions in terms of **nonvisible** chemical contaminants. In addition to the requirement given in Paragraph 3.1, a surface shall be prepared to one of these three nonvisual conditions prior to recoating, when deemed necessary.

[2] U.S. Water Jet Technology Association, "Recommended Practices for the Use of Manually Operated High-Pressure Water Jetting Equipment" (St. Louis, MO: U.S. Water Jet Technology Association, 1987).
[3] SSPC-SP 1 (latest revision), "Solvent Cleaning" (Pittsburgh, PA: SSPC).