



# Standard Practice for Use of Pictorial Surface Preparation Standards and Guides for Painting Steel Surfaces<sup>1</sup>

This standard is issued under the fixed designation D2200; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

*This standard has been approved for use by agencies of the Department of Defense.*

## 1. Scope

1.1 The visual surface preparation guides and standards consist of a series of color prints available as separate publications. Five different sets of photographs are described in this standard, designated as Method A (ISO/Swedish Standard<sup>2</sup>) and Methods B through E (SSPC Guides and Reference Photographs<sup>3</sup>). The methods differ in the depiction of the initial surface, in the definition and depiction of the cleaning conditions, and in the number of cleaning methods included. Because of these differences, the specifier should state which method to use.

1.2 The colored visual surface preparation guides represent different conditions of hot rolled carbon steel before and after surface preparation. Prior to cleaning, there are four rust grades, A to D, that cover the range from intact mill scale to 100 % rusted and pitted steel. The standards then depict the appearance of the initial conditions after cleaning by one or more methods (for example, dry abrasive blast cleaning) to various degrees of thoroughness. In addition, Method B includes three painted conditions that contain various degrees of deterioration. The Guide<sup>3</sup> depicts these conditions after

various degrees of dry abrasive blast cleaning. Method C includes four rust grades and three painted conditions that contain various degrees of deterioration. The Guide<sup>4</sup> depicts these conditions after various degrees of hand and power tool cleaning. Method D includes two rust grades and four painted conditions that contain various degrees of deterioration. The Guide<sup>5</sup> depicts these conditions after various degrees of water jetting, with three levels of flash rusting. Method E includes two rust grades. The Guide<sup>6</sup> depicts these conditions after various degrees of wet abrasive blast cleaning, with three levels of flash rusting.

## 2. Referenced Documents

### 2.1 Other Documents:

Pictorial Surface Preparation Standards and Guides<sup>2,3,4,5,6</sup>  
Surface Cleanliness Definitions<sup>3,4</sup>

## 3. Terminology

### 3.1 Definitions:

3.1.1 The cleanliness definitions for the Method A visual surface preparation standard appear in the text of the pictorial surface preparation standards publication.<sup>2</sup> The definitions for Methods B, C, D, and E are found in a separate publication.<sup>3,4,5,6</sup>

## 4. Significance and Use

4.1 The appearance of the various degrees of dry and wet abrasive blast cleaning, hand and power tool cleaning and

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.46 on Industrial Protective Coatings.

The pictorial standards described were prepared by the Swedish Corrosion Institute and have been jointly approved by ASTM, The Society For Protective Coatings (SSPC) (VIS 1), and the Swedish Standardizing Commission.

Current edition approved June 1, 2013. Published July 2013. Originally approved in 1966. Last previous edition approved in 2008 as D2200–08. DOI: 10.1520/D2200-13.

<sup>2</sup> The pictorial surface preparation standard Method A is available from The Society for Protective Coatings (SSPC), 40 24th St., 6th Floor, Pittsburgh, PA 15222-4656, <http://www.sspc.org> and Sveriges Standardiseringskommission, Box 3295, Stockholm 3, Sweden.

<sup>3</sup> The Visual Guide for Method B and surface cleanliness definitions are available from The Society for Protective Coatings (SSPC), 40 24th St., 6th Floor, Pittsburgh, PA 15222-4656, <http://www.sspc.org>.

<sup>4</sup> The Visual Guide for Method C and the surface cleanliness definitions are available from The Society for Protective Coatings (SSPC), 40 24th St., 6th Floor, Pittsburgh, PA 15222-4656, <http://www.sspc.org>.

<sup>5</sup> The Visual Guide for Method D and the surface cleanliness definitions are available from The Society for Protective Coatings (SSPC), 40 24th St., 6th Floor, Pittsburgh, PA 15222-4656, <http://www.sspc.org>.

<sup>6</sup> The Visual Guide for Method E and the surface cleanliness definitions are available from The Society for Protective Coatings (SSPC), 40 24th St., 6th Floor, Pittsburgh, PA 15222-4656, <http://www.sspc.org>.

water jetting are influenced by the initial rust grades of the steel being cleaned and/or the type and condition of the coating on the existing steel. The standards and guides aid visually in judging and evaluating the degree of rusting and/or paint deterioration before cleaning and the degree of cleaning of steel surfaces prior to painting.

4.2 Five methods have evolved because of differences in the practice of using visual standards and guides throughout the world, and the method of surface preparation employed. In Europe, the visual standards (Method A) are used as the primary means of assessing the degree of cleaning. In the US, the SSPC written definitions take precedence with the visual guides and reference photographs used as a supplement. The visual guides and reference photographs of Methods B, C, and D conform to the SSPC written definitions. There are no written definitions for Method E.

## 5. Procedure and Interpretation

### Method A — ISO/Swedish Standard (Hand Tool Cleaning, Power Tool Cleaning, Abrasive Blast Cleaning, Flame Cleaning)

5.1 Determine the method of cleaning to be used (for example, hand or power tool cleaning, abrasive blast cleaning, or flame cleaning).

5.2 Determine the initial condition of the steel according to four initial grades (conditions).

- 5.2.1 Condition A: Tightly adhering mill scale.
- 5.2.2 Condition B: Mill scale and rust.
- 5.2.3 Condition C: Rusted.
- 5.2.4 Condition D: Rusted and pitted.

5.3 Following the cleaning operation, compare the prepared surface to the photograph corresponding to the specified degree of thoroughness (St2, St3, F1, Sa1, Sa2, Sa2½, Sa3) for the particular initial condition. Determine whether the prepared surface meets the cleanliness requirements of the contract documents (specification).

5.4 Repeat the procedure for representative areas of structure and record the initial condition, method of cleaning, and degree of thoroughness achieved.

### Method B, SSPC VIS 1 — Guide and Reference Photographs for Steel Surfaces Prepared by Abrasive Blast Cleaning (Dry)

5.5 Determine the degree of blast cleaning specified by the contract documents.

5.6 Determine the initial condition of steel according to the seven initial condition photographs A-D: G<sub>1</sub>, G<sub>2</sub>, G<sub>3</sub>.

- 5.6.1 Condition A: Tightly adhering mill scale.
- 5.6.2 Condition B: Mill scale and rust.
- 5.6.3 Condition C: Rusted with little or no pitting.
- 5.6.4 Condition D: Rusted and pitted.
- 5.6.5 Condition G<sub>1</sub>: Deteriorated coating with extensive pinpoint rusting.
- 5.6.6 Condition G<sub>2</sub>: Deteriorated coating with moderate pitting.

5.6.7 Condition G<sub>3</sub>: Deteriorated coating with severe pitting.

5.7 Following the abrasive blast cleaning operation, compare the prepared surface to the photograph corresponding to the degree of surface cleanliness required by the contract documents (SSPC-SP7, SP14, SP6, SP10, SP5) for the particular initial condition. Determine whether the prepared surface meets the cleanliness requirements.

5.8 Repeat the procedure for all representative areas of structure and record for each area the initial condition and degree of cleanliness achieved.

5.9 When abrasives other than silica sand are used for blast cleaning, consult the photographs in the Appendix A of the SSPC VIS 1 Guide for variations in appearance created by the abrasive type.

5.10 Consult Appendix B of the SSPC VIS 1 Guide for photographs illustrating the effect of variations in surface profile depth, observation angle and lighting on the appearance of prepared surfaces.

NOTE 1—Different steel surfaces show differences in shade, color, tone, pitting, flaking, mill scale, etc. To some extent, these differences between the actual steel surface and the visual guide can be reconciled by preparing a project-specific cleanliness standard.

### Method C, SSPC VIS 3 — Guide and Reference Photographs for Steel Surfaces Prepared by Power and Hand Tool Cleaning

5.11 Determine the degree of hand or power tool cleaning specified by the contract documents.

5.12 Determine the initial condition of previously uncoated or coated steel with photographs A-D or E-G, respectively.

- 5.12.1 Condition A: Tightly adhering mill scale.
- 5.12.2 Condition B: Mill scale and rust.
- 5.12.3 Condition C: Rusted with little or no pitting.
- 5.12.4 Condition D: Rusted and pitted.
- 5.12.5 Condition E: Light colored paint applied to abrasive blast cleaned steel, mostly intact.
- 5.12.6 Condition F: Zinc-rich paint applied to abrasive blast cleaned steel.
- 5.12.7 Condition G: Paint system applied to mill scale, thoroughly weathered, blistered or stained.

5.13 Following the hand or power tool cleaning operation, compare the prepared surface to the photograph corresponding to the degree of cleanliness required by the contract documents (SSPC-SP2, SP3, SP11, SP15) for the particular initial condition. Determine whether the prepared surface meets the cleanliness requirements.

5.14 Repeat the procedure for all representative areas of the structure and record for each area the initial condition, the method of cleaning and the degree of cleanliness achieved.

NOTE 2—Different steel surfaces show differences in shade, color, tone, pitting, flaking, mill scale, etc. To some extent, these differences between the actual steel surface and the visual guide can be reconciled by preparing a project-specific cleanliness standard.

NOTE 3—The type of power tool employed to perform the cleaning can create varying appearances of the prepared surfaces. Visual representations of surfaces prepared using power wire brushes (PWB) and sanding

discs (SD) are depicted in Method C.

NOTE 4—Visual representations of surface profile that has been restored or re-exposed after power tool cleaning to expose bare metal (SP11/R) are depicted for two initial conditions (E and F) in Method C.

### **Method D, SSPC VIS 4/NACE VIS 7 — Guide and Reference Photographs for Steel Surfaces Prepared by Waterjetting**

5.15 Determine the degree of water jetting specified by the contract documents.

5.16 Determine the initial condition of previously uncoated or coated steel with photographs C-D or E-H, respectively.

5.16.1 Condition C: Rusty with little or no pitting.

5.16.2 Condition D: Rusty and pitted.

5.16.3 Condition E: Light colored paint applied to abrasive blast cleaned steel, mostly intact.

5.16.4 Condition F: Zinc-rich paint applied to abrasive blast cleaned steel.

5.16.5 Condition G: Paint system applied to mill scale, thoroughly weathered, blistered or stained.

5.16.6 Condition H: Degraded paint system applied to steel thoroughly weathered, blistered, or stained.

5.17 Following the water jetting operation, compare the prepared surface to the photograph corresponding to the degree of cleanliness required by the contract documents (SP-WJ-1, SP-WJ-2, SP-WJ-3, SP-WJ-4) for the particular initial condition. Determine whether the prepared surface meets the cleanliness requirements immediately after cleaning.

5.18 If flash rusting (rust back) is permitted by the contract documents, assess the level of flash rusting (light, medium, heavy) and determine whether the surface meets the requirements of the contract documents immediately prior to coating.

5.19 Repeat the procedure for all representative areas of the structure and record for each area the initial condition, the method of cleaning, the degree of cleanliness achieved and the level of flash rusting (if permitted).

NOTE 5—Different steel surfaces show differences in shade, color, tone,

pitting, flaking, mill scale, etc. To some extent, these differences between the actual steel surface and the visual guide can be reconciled by preparing a project-specific cleanliness standard.

### **Method E, SSPC VIS 5/NACE VIS 9 — Guide and Reference Photographs for Steel Surfaces Prepared by Wet Abrasive Blast Cleaning**

5.20 Determine the degree of wet abrasive blast cleaning specified by the contract documents.

5.21 Determine the initial condition of previously uncoated steel with photographs C or D.

5.21.1 Condition C: Rusty with little or no pitting.

5.21.2 Condition D: Rusty and pitted.

5.22 Following the wet abrasive blast cleaning operation, compare the prepared surface to the photograph corresponding to the degree of cleanliness required by the contract documents (WAB-6, WAB-10) for the particular initial condition. Determine whether the prepared surface meets the cleanliness requirements immediately after cleaning.

5.23 If flash rusting (rust back) is permitted by the contract documents, assess the level of flash rusting (light, medium, heavy) and determine whether the surface meets the requirements of the contract documents immediately prior to coating.

5.24 Repeat the procedure for all representative areas of the structure and record for each area the initial condition, the method of cleaning, the degree of cleanliness achieved and the level of flash rusting (if permitted).

NOTE 6—Different steel surfaces show differences in shade, color, tone, pitting, flaking, mill scale, etc. To some extent, these differences between the actual steel surface and the visual guide can be reconciled by preparing a project-specific cleanliness standard.

## **6. Keywords**

6.1 abrasive blast cleaning; blast cleaning; flame cleaning; flash rusting; hand tool cleaning; photographic standards for surface preparation; power tool cleaning; surface preparation; surface preparation standards; visual guides; visual standards; water jetting; wet abrasive blast cleaning

*ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.*

*This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.*

*This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org). Permission rights to photocopy the standard may also be secured from the ASTM website (www.astm.org/COPYRIGHT).*