

SSPC: The Society for Protective Coatings

GUIDE TO SSPC-VIS 1

Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning

1. Scope

This guide describes the use of reference photographs depicting the appearance of both previously unpainted and previously painted and partially rusted hot-rolled carbon steel prior to and after abrasive blast cleaning. These photographs are intended to be used to supplement the written SSPC/NACE International blast cleaning surface preparation standards. The written standards are the primary means to determine conformance with blast cleaning requirements. The photographs shall not be used as a substitute for the written standards (see Note 7.1).

2. Description

The reference photographs consist of a series of 1:1 (actual size) color photographs that represent various conditions of unpainted and painted steel surfaces prior to and after surface preparation by abrasive blast cleaning. The photographs were taken under controlled studio lighting designed to show the maximum detail possible.

3. Referenced Standards

3.1 SSPC AND NACE INTERNATIONAL JOINT STANDARDS:

SP 5/NACE No. 1	White Metal Blast Cleaning
SP 6/NACE No. 3	Commercial Blast Cleaning
SP 7/NACE No. 4	Brush-Off Blast Cleaning
SP 10/NACE No. 2	Near-White Blast Cleaning
SP 14/NACE No. 8	Industrial Blast Cleaning

4. Conditions Depicted

4.1 These reference photographs illustrate five initial rust conditions before surface preparation, covering the range from intact mill scale to rusted and pitted steel, as well as previously painted steel.¹ The rust conditions are:

Condition A:	Steel surface completely covered with adherent mill scale; little or no rust visible
Condition B:	Steel surface covered with both mill scale and rust

Condition C:	Steel surface completely covered with rust; little or no pitting visible
Condition D:	Steel surface completely covered with rust; pitting visible
Condition G:	Coating system applied over mill scale bearing steel; system thoroughly weathered, thoroughly blistered, or thoroughly stained
Condition G₁	In this series of photographs, extensive pinpoint rusting is present.
Condition G₂	In this series of photographs, moderate pitting is present
Condition G₃	In this series of photographs, severe pitting is present.

4.2 These reference photographs illustrate surfaces prepared by abrasive blast cleaning using silica sand with the exception of those in Appendix A (see Section 4.3).

The various degrees of cleaning represented are:

SSPC-SP 7/NACE No. 4	Brush-Off Blast Cleaning
SSPC-SP 14/NACE No. 8	Industrial Blast Cleaning
SSPC-SP 6/NACE No. 3	Commercial Blast Cleaning
SSPC-SP 10/NACE No. 2	Near-White Blast Cleaning
SSPC-SP 5/NACE No. 1	White Metal Blast Cleaning

4.3 Appendix A: Photographs illustrative of some variations in color, texture, and general appearance that can result from the choice of abrasive are provided in Appendix A (also see Note 7.2). These photographs represent Condition A (adherent mill scale) surfaces blast cleaned to SSPC-SP 5/NACE No. 1 (white metal) by mineral, slag, and metallic abrasives. The variations in appearance are depicted only for white metal; however, these same variations should be considered when assessing steel prepared to other degrees of cleaning.

4.4 Appendix B: These photographs illustrate how variations in surface profile, view angle, and lighting can affect the appearance of G₁ and G₃ surfaces blast cleaned to SSPC-SP 5/NACE No. 1.

4.4.1 Profile Variations: The photographs labeled "P" show G₁ SP 5 and G₃ SP 5 surfaces with a profile height of 4

¹ Conditions E and F are described and illustrated in SSPC-VIS 4/NACE VIS 7.

mils (100 μm). For comparison, a single photo of the same surface condition with a profile height of 1 mil (25 μm) is also shown. The lighting conditions were the same as those used in the G_1 and G_3 series.

4.4.2 Angle of View: The photographs labeled “H”, “L” and “D” show variations in appearance of the 4-mil (25 μm) G_1 SP 5 P and G_3 SP 5 P specimens caused by differences in the angle at which the surface is viewed. Photographs labeled “H” were taken at a high (i.e., nearly perpendicular) camera angle. Photographs labeled “L” were taken at a lower (more acute) camera angle.

4.4.3 Diffusion of Light: The photographs labeled “D” were taken using diffused lighting, as may occur on a completely overcast day. Due to the diffused light, no strong shadows appear on the surface, regardless of the angle of view. However, these photographs show that diffused light may result in an overall color cast to the surface.

5. Procedure

5.1 Select the photograph of the condition (A, B, C, D, G_1 , G_2 or G_3) that most closely represents the appearance of the steel to be cleaned. The steel to be cleaned may contain more than one initial condition.

5.2 Determine the degree of cleaning that is specified (SSPC-SP 7, SP 14, SP 6, SP 10, or SP 5).

5.3 Use Table 1 to determine which photograph depicts the finished surface. For example, if the initial condition is “C” and SSPC-SP 6 (commercial blast cleaning) is specified, use photograph C SP 6 (also see Note 7.3).

5.4 Compare the prepared surface with the photograph selected in Section 5.3 to evaluate the degree of cleaning.

5.5 These reference photographs shall be used only in conjunction with the written SSPC/NACE International surface preparation standards, as the reference photographs are based upon appearance only and do not address other factors necessary for compliance with the written specification. Steel surfaces show variations in texture, shade, color, tone, pitting, flaking, mill scale, etc., which should be considered when making a comparison with the reference photographs.

6. Disclaimer

6.1 While every precaution is taken to ensure that all information furnished in SSPC guides and standards is as accurate, complete, and useful as possible, SSPC cannot assume any responsibility nor incur any obligation resulting from the use of any materials or methods specified therein, or of the guides or standards themselves.

6.2 This guide does not attempt to address problems concerning safety associated with its use. The user of this specification, as well as the user of all products or practices described herein, is responsible for instituting appropriate health and safety practices and for ensuring compliance with all governmental regulations.

7. Notes

7.1 This edition of SSPC-VIS 1 contains all of the photographs contained in the 1989 edition. The written surface preparation standards, such as SSPC-SP 5, are joint standards of SSPC and NACE International and are identified as such in Section 3.3. This revised edition also contains photographs of previously painted steel that has been abrasive blast cleaned.

7.2 The photographs of nonmetallic abrasives in Appendix A illustrate the range of appearance produced by nonmetallic abrasives as a class. Among the abrasives included in this class are silica sand, olivine sand, garnet, flint shot, copper slag, coal slag, and nickel slag. The abrasive used for each photograph is not specifically identified because noticeable variations in appearance were observed among the abrasives within a given generic class (e.g., copper slag).

A similar set of photographs illustrates the range of appearance produced by metallic abrasives as a class, which includes steel shot, steel grit, and combinations and modifications of these two abrasive media.

7.3 In addition to the photographs prepared from previously painted steel shown in the Condition G series, the photographs in the Conditions A through D series prepared from unpainted steel are often found to be representative of the appearance of blast cleaned steel that was previously painted.

TABLE 1
INITIAL CONDITIONS

Degree of Cleaning	Condition A 100% Mill Scale	Condition B Mill Scale and Rust	Condition C 100% Rust	Condition D 100% Rust with Pits	Condition G ₁ Weathered Coating System Over Mill Scale with Extensive Pinpoint Rusting	Condition G ₂ Weathered Coating System Over Mill Scale with Moderate Pitting	Condition G ₃ Weathered Coating System Over Mill Scale with Severe Pitting
Brush-Off Blast Cleaning (SSPC-SP 7)	See Footnote 1	B SP 7	C SP 7	D SP 7	G ₁ SP 7	G ₂ SP 7	G ₃ SP 7
Industrial Blast Cleaning (SSPC-SP 14)	See Footnote 2	See Footnote 2	See Footnote 2	See Footnote 2	G ₁ SP 14	G ₂ SP 14	G ₃ SP 14
Commercial Blast Cleaning (SSPC-SP 6)	See Footnote 3	B SP 6	C SP 6	D SP 6	G ₁ SP 6	G ₂ SP 6	G ₃ SP 6
Near-White Blast Cleaning (SSPC-SP 10)	A SP 10	B SP 10	C SP 10	D SP 10	G ₁ SP 10	G ₂ SP 10	G ₃ SP 10
White Metal Blast Cleaning (SSPC-SP 5)	A SP 5	B SP 5	C SP 5	D SP 5	G ₁ SP 5 G ₁ SP 5 P ⁵ G ₁ SP 5 H G ₁ SP 5 L G ₁ SP 5 D	G ₂ SP 5	G ₃ SP 5 G ₃ SP 5 P ⁵ G ₃ SP 5 H G ₃ SP 5 L G ₃ SP 5 D

¹No photograph provided. The initial condition has only tightly adherent mill scale, which, according to the SSPC-SP 7 definition, is not removed by brush-off blast cleaning.

²SSPC-SP 14 can be achieved from these conditions, but photographs are not available.

³No photograph provided. The effort required to remove mill scale on Condition A steel typically results in less staining than the maximum 33% allowed by SP 6, approaching the photograph provided for A SP 10.

⁴The photographs contained in Appendix A depict the appearance of previously unpainted steel surfaces after blast cleaning to white metal with alternate abrasives (see Note 7.2).

•Alternate nonmetallic abrasives A SP 5 N1, A SP 5 N2, A SP 5 N3

•Alternate metallic abrasives: A SP 5 M1, A SP 5 M2, A SP 5 M3.

⁵The photographs contained in Appendix B illustrate the effect of variations in profile height (P), viewing angle (H, L), and diffusion of light (D) on the appearance of a pitted surface and a nonpitted surface.

