

SSPC: The Society for Protective Coatings

Method for Evaluating Scribe Undercutting on Coated Steel Test Panels Following Corrosion Testing

1. Scope

1.1 This standard allows the user to determine average undercutting values on coated steel test panels scribed in accordance with Section 6 of ASTM D 1654. The standard includes requirements for data collection, analysis, and reporting.

1.2 This standard is applicable for evaluation of most types of protective coatings for use on steel. This standard is not applicable to evaluation of thermal sprayed metals and ceramic coatings, hot-dip and electro-coated metal coatings, and tapes.

2. Referenced Standards

2.1 The latest issue, revision, or amendment of the referenced standards in effect on the date of invitation to bid shall govern, unless otherwise specified.

2.2 If there is a conflict between the requirements of any of the cited reference standards and this standard, the requirements of this standard shall prevail.

2.3 ASTM INTERNATIONAL STANDARDS:¹

D 1654	Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
D 7087	Standard Test Method for An Imaging Technique to Measure Rust Creepage at Scribe on Coated Test Panels Subjected to Corrosive Environments

3. Undercutting Evaluation Procedures

Two procedures for measuring undercutting are allowed by this method. Data analysis and reporting requirements are identical for each procedure.

3.1 PROCEDURE 1: Nondestructive method for interim measurements only. Undercutting is determined by measuring areas of rust creepage or missing, disbonding, or lifted coating along the scribe. Defects at the scribe having the appearance of a “blister” are also considered indicative of undercutting when using this standard. Disregard corrosion products or

rust staining on the surface of the coating when making the measurements.

3.2 PROCEDURE 2: Destructive method for final measurements. This procedure is suitable for evaluating coatings at the completion of testing. This is the default measurement for final measurements unless Procedure 1 is specified. Undercutting is measured after removing the coating along the scribe by scraping or chiseling with a suitable instrument to completely expose the corroded area. Measure exposed areas of corrosion along the scribe. Disregard corrosion products or rust staining on the surface of the coating when making the measurements.

4. Data Collection Procedures

4.1 AVERAGE DISTANCE OF UNDERCUTTING CORROSION: Measure the distance of undercutting corrosion along both the right side and the left side of each scribe, starting from the edge of the scribe. Take nine measurements on each side of each scribe at locations spaced at 10 mm intervals, disregarding the ends of the scribe line, such that a total of 18 data points (nine to the right of the scribe and nine to the left) are obtained for each scribe. Measured values shall be in whole millimeters unless otherwise specified. Measurement may be either direct using a ruled device, or indirect using calipers and a ruler.

4.2 AREA OF UNDERCUTTING CORROSION: Unless otherwise specified, measure the total area of undercutting corrosion along the entire length of each scribe to the nearest whole millimeter. To determine the area manually, overlay each scribe with a transparent grid (ruled in millimeters) and estimate the total area of undercutting corrosion to the nearest square millimeter. Alternatively, use digital imaging in accordance with ASTM D 7087 to directly or indirectly (using a trace of each area) measure the area of undercutting at each scribe.

5. Data Analysis and Reporting

5.1 UNDERCUTTING CORROSION DISTANCE PARAMETER: Data points acquired according to the procedures in Section 4.1 are analyzed. Compute the mean (average), $\bar{X}_d$ and the standard deviation, $2S_d$ of the data. Compute the scribe undercutting distance parameter D , as the mean plus two standard deviations ($D = \bar{X}_d + 2S_d$). Report the number of data points, the value of each data point, mean undercutting distance, standard deviation, and undercutting distance parameter.

¹ ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

5.2 UNDERCUTTING CORROSION AREA PARAMETER: Data points are acquired as described in Section 4.2 and analyzed. Compute the mean (average), $\bar{X}_a$ and the standard deviation, $2S_a$ of the data. Compute the scribe undercutting area parameter A, as the mean plus two standard deviations ($A = \bar{X}_a + 2S_a$). Report the number of data points, the value of each data point, mean undercutting area, standard deviation, and undercutting area parameter.

6. Disclaimer

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

6.2 This standard does not attempt to address problems concerning safety associated with its use. The user of this standard, 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.

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