



Designation: A 1004/A 1004M – 99

Standard Practice for Establishing Conformance to the Minimum Expected Corrosion Characteristics of Metallic, Painted-Metallic, and Nonmetallic-Coated Steel Sheet Intended for Use as Cold Formed Framing Members¹

This standard is issued under the fixed designation A 1004/A 1004M; 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 (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers procedures for establishing the acceptability of metallic-coated steel sheet, painted metallic-coated steel sheet and painted nonmetallic-coated steel sheet for use as cold formed framing members.

1.2 This practice shall be used to assess the corrosion resistance of different coatings on steel sheet in a laboratory test. It shall not be used as an application performance standard for the cold formed framing members.

1.3 The practice shall be used to evaluate coatings under consideration for addition to Specification A 1003/A 1003M.

1.4 The values stated in either inch-pound or SI units are to be regarded separately as standard. Within the text, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other.

1.5 The text of this standard references notes and footnotes that provide explanatory material. These notes and footnotes, excluding those in tables and figures, shall not be considered as requirements of the standard.

2. Referenced Documents

2.1 ASTM Standards:

A 902 Terminology Relating to Metallic Coated Steel Products²

A 1003/A 1003M Specification for Steel Sheet, Carbon, Metallic and Non-Metallic Coated for Cold Formed Framing Members²

B 117 Practice for Operating Salt Spray (Fog) Testing Apparatus³

D 714 Test Method for Evaluating Degree of Blistering of Paints⁴

D 1654 Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments⁴

3. Terminology

3.1 For definitions of terms related to metallic-coated steel products, see Terminology A 902.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *red rust, n*—the oxide formed when iron combines chemically with oxygen.

3.2.2 *red rust stains, n*—the discoloration of the surface of a coated steel sheet caused by the bleeding of red rust from adjacent areas.

4. Summary of Practice

4.1 This practice involves exposing flat and formed samples of metallic-coated, painted metallic-coated and painted nonmetallic-coated steel sheet to a controlled saline environment using Practice B 117 and measuring the extent of corrosion after a predetermined time of exposure in the accelerated test.

4.2 The samples exposed to the saline environment are prepared according to Test Method D 1654.

4.3 The maximum acceptable amount of corrosion allowed for each material is described in Specification A 1003/A 1003M.

5. Significance and Use

5.1 This practice is intended solely for the evaluation of metallic-coated, painted metallic-coated, and painted nonmetallic-coated materials used for the manufacture of cold formed framing members.

5.2 Correlation and extrapolation of corrosion performance based on exposure to the test environment provided by Practice B 117 are not always predictable. Correlation and extrapolation should be considered only in cases where appropriate corroborating long-term atmospheric exposures have been conducted.

5.3 This practice assesses whether coated materials not currently in Specification A 1003/A 1003M satisfy the required minimum corrosion characteristics.

¹ This practice is under the jurisdiction of Committee A-5 on Metallic-Coated Iron and Steel Products and is the direct responsibility of Subcommittee A05.11 on Sheet Specifications.

Current edition approved Dec. 10, 1999. Published March 2000.

² Annual Book of ASTM Standards, Vol 01.06.

³ Annual Book of ASTM Standards, Vol 03.02.

⁴ Annual Book of ASTM Standards, Vol 06.01.



6. Procedure

6.1 General Requirements:

6.1.1 Select test panels from routine production material ensuring that the samples are representative of the material. Test panels with the normally applied surface coatings such as chemical treatment or oil, or both.

6.1.2 The size of flat test panels shall be 4 by 12 in. [100 by 300 mm]. Formed panels shall be 4 by 12 in. [100 by 300 mm] or the actual production width, if smaller than the 4-in. [100-mm] width requirement.

6.1.3 Orient test panels in the salt spray cabinet with the 12-in. [300-mm] dimension in the vertical position.

6.2 Metallic-Coated Products:

6.2.1 Use Practice B 117 to evaluate conformance with the minimum expected corrosion characteristics.

6.2.2 Test at least three samples from three different production runs of a candidate product.

6.2.3 Protect the edges of all test panels from exposure to the salt solution.

6.2.4 Metallic-coated materials shall satisfy the minimum corrosion characteristics of G60 [Z180] for the Type H and Type L steels and G40 [Z120] for the Type NS steels.

6.2.5 Test for 100 h for Type H and Type L materials or 75 h for Type NS material.

6.2.6 Loss of coating is indicated by the appearance of red rust in areas devoid of any metallic coating. The products of oxidation combined with the salt solution have a tendency to coat the test sample with a red rust stain. Remove the red rust stain before evaluating the test panel.

NOTE 1—The test criteria for metallic-coated products are listed in Specification A 1003/A 1003M.

6.3 Painted Metallic-Coated:

6.3.1 Use Practice B 117 to establish the minimum expected corrosion characteristics.

6.3.2 Test at least three samples from three different production runs of a candidate product.

6.3.3 The metallic-coated substrate of the painted metallic-coated steel sheet shall satisfy the test requirements described in 6.2

6.3.4 Painted metallic-coated test panels shall have a scribe that penetrates the nonmetallic coating only. The scribe shall be at an angle of 30° to the longest panel (12 in. [300 mm]) dimension.

6.3.5 Protect the edges of all test panels from exposure to the salt solution.

6.3.6 Test for 500 h to establish conformance to the minimum expected corrosion characteristics of the nonmetallic coating.

NOTE 2—The test criteria for painted metallic-coated product are listed in Specification A 1003/A 1003M.

6.3.7 Evaluate the mean creepage in accordance with Test Method D 1654.

6.3.8 Evaluate the blisters in accordance with Test Method D 714.

6.4 Painted Nonmetallic-Coated Products:

6.4.1 Use Practice B 117 to establish the minimum expected corrosion characteristics.

6.4.2 Test at least three samples from three different production lots of a candidate material.

6.4.3 Painted nonmetallic-coated test panels shall have a scribe that penetrates the nonmetallic coating only. The scribe shall be at an angle of 30° to the longest panel (12 in. [300 mm]) dimension.

6.4.4 Protect the edges of all test panels from exposure to the salt solution.

6.4.5 Test for 250 h to establish conformance to requirements.

NOTE 3—The test criteria for painted nonmetallic-coated product are listed in Specification A 1003/A 1003M.

6.4.6 Evaluate the mean creepage in accordance with Test Method D 1654.

6.4.7 Evaluate the blisters in accordance with Test Method D 714.

7. Report

7.1 Subcommittee A05.11 will consider the addition of coating systems not currently referenced in Specification A 1003/A 1003M through the review of results of tests conducted according to this practice.

8. Keywords

8.1 Corrosion; metallic-coated sheet; painted metallic-coated sheet; painted nonmetallic-coated sheet; salt spray; sheet steel