

American National Standard

*Test Procedure and Acceptance Criteria for —
Prime Painted Steel Surfaces
for Steel Doors and Frames*



SPONSOR
Steel Door Institute
Approved November 30, 1998



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Revision and Redesignation of
ANSI 224.1-1990

American National Standard

Test Procedure and Acceptance Criteria for
Prime Painted Steel Surfaces
for Steel Doors and Frames

Secretariat

Steel Door Institute

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American National Standards Institute, Inc.

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Foreword (This Foreword is not part of American National Standard A250.10-1998)

The material contained in this document has been developed under the auspices of the Technical Committee of the Steel Door Institute.

The original standard was issued on July 28, 1980 and was last revised in 1990. The current edition is a revision of the 1990 document with the contents being updated to reflect changes and advances that have taken place in the steel door and frame industry since that time.

Suggestions for improvement gained in the use of this standard will be welcome. They should be sent to the Steel Door Institute, 30200 Detroit Road, Cleveland, Ohio 44145-1967.

The organizations that have approved this standard are as follows:

American Institute of Architects
American Iron and Steel Institute
Builders Hardware Manufacturers' Association
Canadian Steel Door Manufacturers' Association
Door and Hardware Institute
Factory Mutual Research Corporation
General Services Administration
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Intertek Testing Services
Manufactured Housing Institute
National Association of Home Builders
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The Accredited Standards Committee A250 TC-1 developed this standard and had the following personnel at the time of approval:

Robert M. Berhinig, Chairman
 J. Jeffery Wherry, Managing Director

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American National Standard

Test Procedure and Acceptance Criteria for — Prime Painted Steel Surfaces for Steel Doors and Frames

1 Scope

These methods prescribe the procedures to be followed in the selection of material, chemical preparation, painting, testing, and evaluation of prime painted steel surfaces for steel doors and frames.

2 Material

2.1 The test specimen shall be the exact type and gauge of steel used in the manufacturing of the product. It shall be 4" x 10" with a ¼" hole at the center of the 4" width, ½" in from the end. When a specimen greater than 10" in length is used for the coating process, the bottom 10" of the specimen shall be used for all subsequent testing.

Permanent identification marks shall be added to the specimen as required for control purposes.

2.2 The specimen(s) shall be hung using a method representative of that used in production.

2.3 The specimen(s) shall be cleaned, pre-treated and painted in accordance with the manufacturer's normal production method and procedure. All coating weights used on test specimens shall be documented and representative of the individual manufacturer's normal production material.

2.4 At the end of the paint cycle, the specimen(s) shall be removed from the paint system with careful handling. The painted surface of the specimen shall not be handled or come in contact with other objects to prevent disruption of the painted surface.

2.5 All specimens shall be aged a minimum of 72 hours prior to testing.

3 Testing

3.1 Salt spray test

a) Apparatus — The apparatus used for salt spray testing shall be of such design as to conform to ASTM B117-03, "Standard Practice for Operating Salt Spray (Fog) Apparatus."

b) Test performance — Salt spray testing shall be conducted as specified in ASTM B117-03, "Standard Practice for Operating Salt Spray (Fog) Apparatus" for a test period of 120 continuous hours. The test specimen(s) shall be scribed with an "X" per ASTM D1654-92(2000) "Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments," sections 4.1 and 5.1.

3.2 Condensation testing (humidity)

a) Apparatus — The apparatus used for condensation (humidity) testing shall be of such design as to conform to ASTM D4585-99, "Standard Practice for Testing Water Resistance of Coatings Using Controlled Condensation."

b) Test performance — Condensation (humidity) testing shall be conducted as specified in ASTM D4585-99, "Standard Practice for Testing Water Resistance of Coatings Using Controlled Condensation," for a test period of 240 continuous hours. Exposure temperatures shall be maintained at a minimum of 100° Fahrenheit. Actual test temperature shall be noted in the report.

3.3 Impact test

The paint shall be tested per ASTM D2794-93 (1999)e1 "Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)," with 20 inch pounds

of direct impact using a Gardner Impact Tester with 1/2" diameter ball or punch at room temperature of 70° – 75° Fahrenheit. After impact is made, apply 3/4" wide #600 Scotch cellophane tape firmly to the impact area and pull off sharply.

3.4 Film adhesion test

The coating film adhesion shall be tested in accordance with method "B" of ASTM D3359-02, "Standard Test Methods for Measuring Adhesion by Tape Test." A total of (11) parallel cuts are made with a sharp instrument, 1 mm apart in both a vertical and horizontal direction forming a grid. One inch wide pressure-sensitive tape is then firmly applied to the scribed surface and rapidly removed.

4 Acceptance criteria

4.1 Salt spray resistance

The paint film on the unscored surface of the test specimen shall have a rust grade of no less than 6 as defined in ASTM D610-01, "Standard Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces." Table 1 and the depictions shown on page 5 illustrate the scale used to evaluate the rust grades. The paint film at the scored line shall not be undercut by rust more than 1/8" each side, when tested in accordance with paragraph 3.1.

4.2 Condensation resistance

The paint film may have any quantity of #8 blisters but, shall have no more than a few #6 blisters as illustrated in ASTM D714-02, "Standard Test Method for Evaluating Degree of Blistering of Paints," when tested in accordance with paragraph 3.2. Visual representations of the various degrees of blistering are shown on pages 6 and 7.

4.3 Impact test

No paint film removal shall occur other than at an area 1/8" in diameter at the center of the impact area, when tested in accordance with paragraph 3.3.

4.4 Film adhesion

There shall be no adhesion loss less than a grade 3B as defined in ASTM D3359-02. This grade represents a film removal of between 5 and 15%. Table 2 on page 8 illustrates the various classifications for adhesion loss.

5 Report

5.1 The report shall cover the date the test was performed and the issue date of the report.

5.2 Identification of the specimen tested, source of supply, manufacturer, model or series number, or both, and any other pertinent information.

5.3 A detailed description of the specimen or specimens tested shall include the type of prime paint, the method of paint application, the procedure used to cure it, and the dry film thickness.

5.4 A statement that the test or tests were conducted in accordance with the methods and procedures as specified herein. If deviations from these methods and procedures were made, they shall be described in the report.

5.5 When the test is made to check the conformance of the unit specimen to test requirements of a particular specification, the identification or description of the specification shall be included in the report.

6 General

6.1 Testing laboratory

All tests shall be conducted and/or certified by a nationally recognized, independent testing laboratory.

6.2 Certification

Reference may be made to this specification. When reference is made, the following statement shall be used: Prime finish has been tested in conformance with ANSI Standard A250.10-1998.

Table 1 – Rust grades

Rust Grade	Maximum % of rusted area
10	00.01
9	00.03
8	00.10
7	00.30
6	01.00
5	03.00
4	10.00
3	16.67
2	33.33
1	50.00
0	100.00

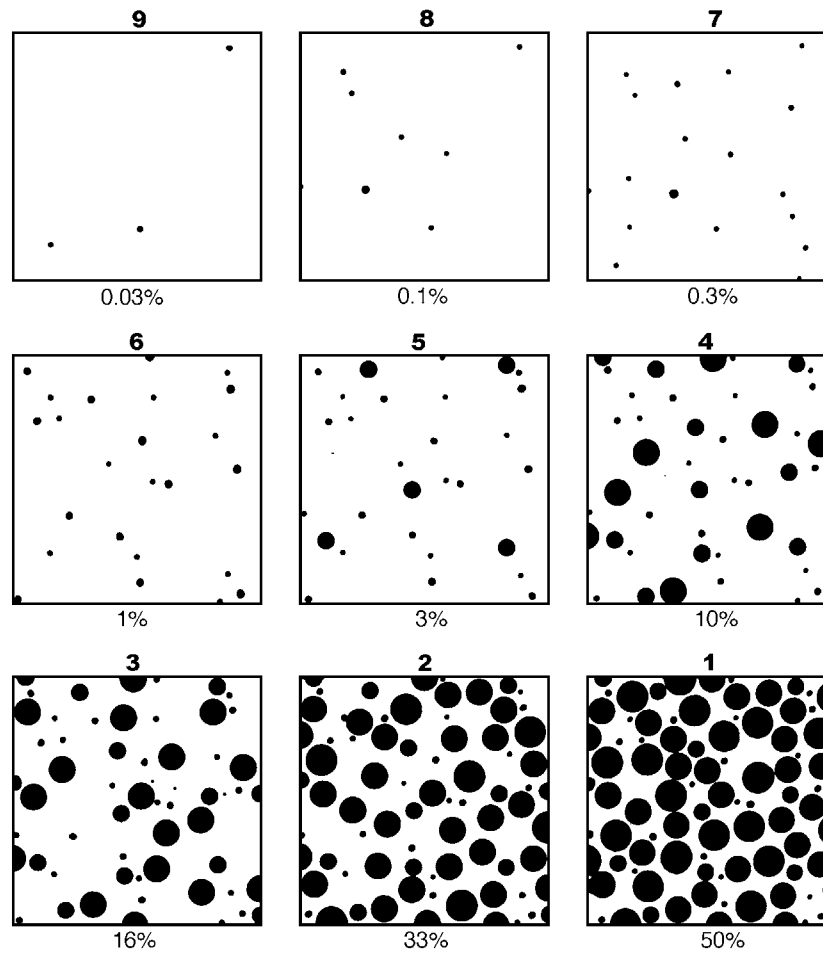
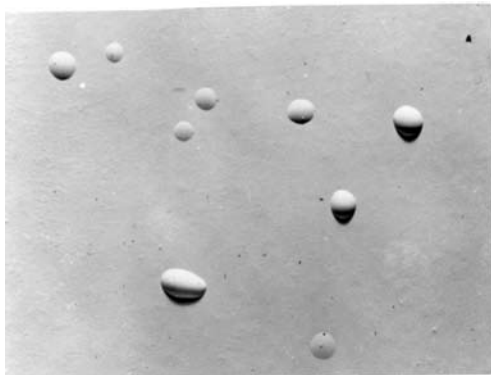
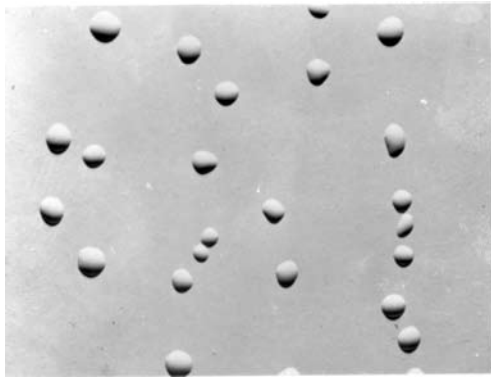


Figure 1 – Visual reference for percentage of rust

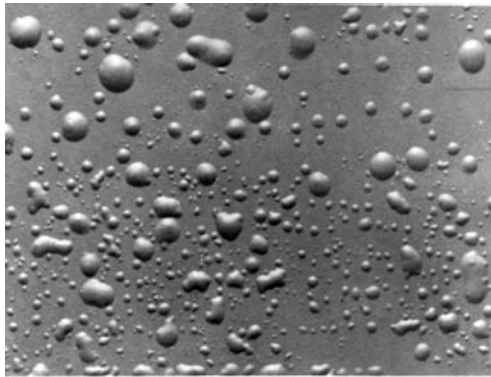
Visual examples illustrating degrees of blistering



FEW



MEDIUM

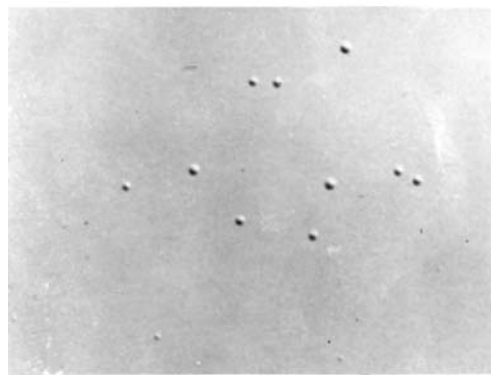


MEDIUM DENSE

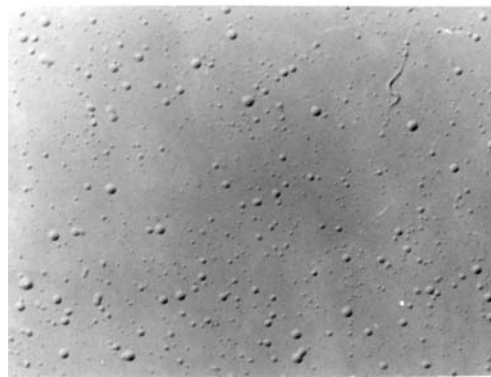


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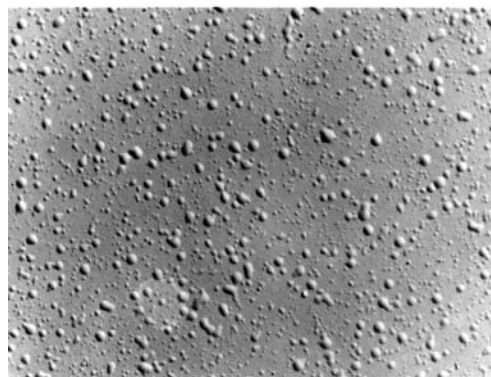
Figure 2 – Blister size #2



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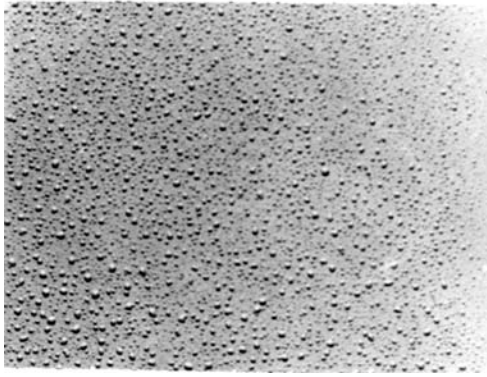
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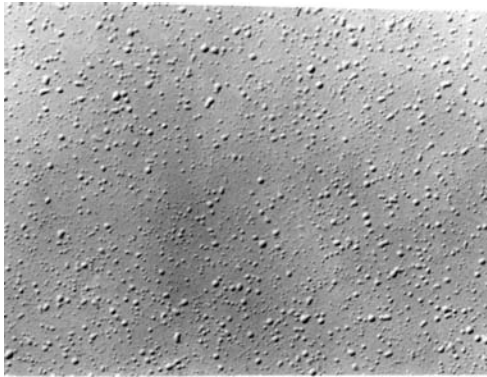
DENSE

Figure 3 – Blister size #4

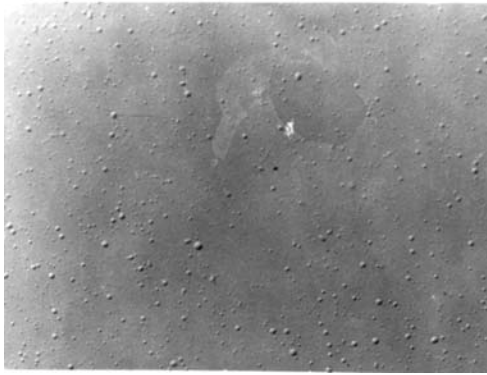
Visual examples illustrating degrees of blistering



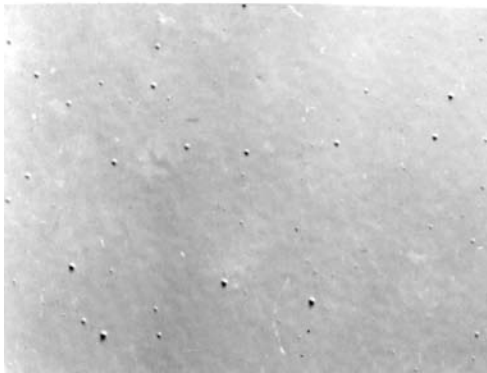
DENSE



MEDIUM DENSE

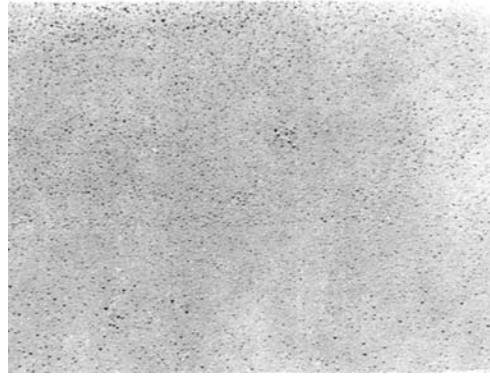


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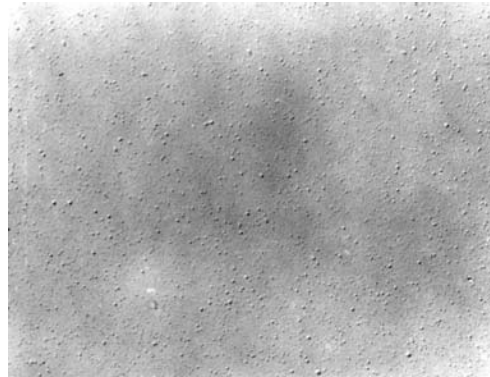


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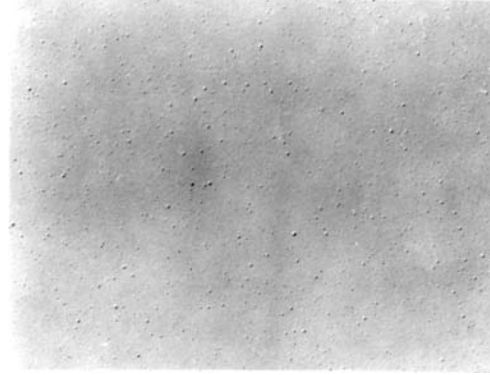
Figure 4 – Blister size #6



DENSE



MEDIUM DENSE



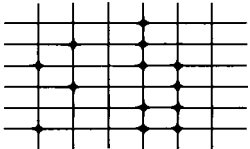
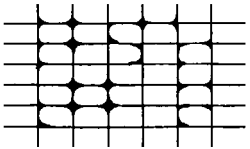
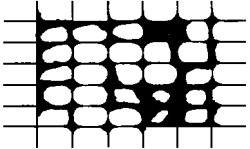
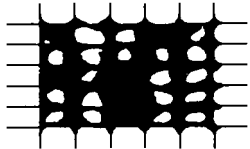
MEDIUM



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Figure 5 – Blister size #8

Table 2 – Classification of adhesive test results

Classification	Surface of cross-cut areas from which listing has occurred. (Example for six parallel cuts.)	Rate of adhesion
5B	None	The edges of the cuts are completely smooth; none of the squares or the lattice are detached.
4B		Small flakes of coating are detached at intersections; less than 5% of the area is affected.
3B		Small flakes of coating are detached along edges and at intersections of cuts. The area affected is 5 to 15% of the lattice.
2B		The coating has flaked along the edges and at parts of the squares. The affected area is 15 to 35% of the lattice.
1B		The coating has flaked along the edges of cuts in large ribbons and entire squares have detached. The area affected is 35 to 65% of the lattice.
0B	Flaking and detachment in excess of 65%.	

AVAILABLE PUBLICATIONS

Specifications

- ANSI/SDI A250.6** Recommended Practice for Hardware Reinforcings on Standard Steel Doors and Frames
- ANSI/SDI A250.8** SDI 100 Recommended Specifications for Standard Steel Doors & Frames
- SDI-108** Recommended Selection & Usage Guide for Standard Steel Doors
- SDI-109** Hardware for Standard Steel Doors & Frames
- SDI-118** Basic Fire Door Requirements
- SDI-128** Guidelines for Acoustical Performance of Standard Steel Doors & Frames
- SDI-129** Hinge & Strike Spacing

Test Procedures

- ANSI/SDI A250.3** Test Procedure & Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors & Frames
- ANSI/SDI A250.4** Test Procedure & Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frame Anchors & Hardware Reinforcings
- ANSI/SDI A250.10** Test Procedure & Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors & Frames
- ANSI/SDI A250.13** Testing and Rating of Severe Windstorm Resistant Components for Swinging Door Assemblies
- SDI-113** Standard Practice for Determining the Steady State Thermal Transmittance of Steel Door & Frame Assemblies
- SDI-131** Accelerated Physical Endurance Test Procedure for Steel Doors, Frames and Frame Anchors

Construction Details

- ANSI/SDI A250.11** Recommended Erection Instructions for Steel Frames
- SDI-110** Standard Steel Doors & Frames for Modular Masonry Construction
- SDI-111** Recommended Details for Standard Details Steel Doors, Frames, Accessories and Related Components
- SDI-122** Installation & Troubleshooting Guide for Standard Steel Doors & Frames
- SDI** Drywall Slip-On Frames

Miscellaneous Documents

- ANSI/SDI A250.7** Nomenclature for Standard Steel Doors & Steel Frames
- SDI-106** Recommended Standard Door Type Nomenclature
- SDI-112** Zinc-Coated (Galvanized/Galvannealed) Standard Steel Doors & Frames
- SDI-117** Manufacturing Tolerances for Standard Steel Doors & Frames
- SDI-124** Maintenance of Standard Steel Doors & Frames
- SDI-127** Industry Alert Series (A-L)
- SDI-130** Electrified Hinge Preparations
- SDI** What is The SDI?

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STEEL DOOR INSTITUTE

30200 DETROIT ROAD • CLEVELAND, OHIO 44145

440.899.0010 • FAX 440.892.1404

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