



Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members¹

This standard is issued under the fixed designation A1003/A1003M; 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 specification covers coated steel sheet used in the manufacture of cold-formed framing members, such as, but not limited to, studs, joists, purlins, girts, and track.

1.2 The steel sheet used for cold-formed framing members includes metallic-coated, painted metallic-coated, or painted nonmetallic-coated.

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

1.4 Unless the order specifies the “M” designation [SI units], the product shall be furnished to inch-pound units.

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

2. Referenced Documents

2.1 ASTM Standards:²

- [A463/A463M](#) Specification for Steel Sheet, Aluminum-Coated, by the Hot-Dip Process
- [A568/A568M](#) Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for
- [A653/A653M](#) Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- [A755/A755M](#) Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-

- [Coating Process for Exterior Exposed Building Products](#)
- [A792/A792M](#) Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
- [A875/A875M](#) Specification for Steel Sheet, Zinc-5 % Aluminum Alloy-Coated by the Hot-Dip Process
- [A879/A879M](#) Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface
- [A902](#) Terminology Relating to Metallic Coated Steel Products
- [A924/A924M](#) Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
- [A941](#) Terminology Relating to Steel, Stainless Steel, Related Alloys, and Ferroalloys
- [A1004/A1004M](#) 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 Members
- [A1046/A1046M](#) Specification for Steel Sheet, Zinc-Aluminum-Magnesium Alloy-Coated by the Hot-Dip Process
- [A1063/A1063M](#) Specification for Steel Sheet, Twin-Roll Cast, Zinc-Coated (Galvanized) by the Hot-Dip Process
- [D714](#) Test Method for Evaluating Degree of Blistering of Paints
- [D1005](#) Test Method for Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers
- [D1654](#) Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
- [D4138](#) Practices for Measurement of Dry Film Thickness of Protective Coating Systems by Destructive, Cross-Sectioning Means
- [D4145](#) Test Method for Coating Flexibility of Prepainted Sheet
- [E29](#) Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

2.2 ISO Standard:

- [ISO 9223](#) Corrosion of Metals and Alloys—Corrosivity of Atmospheres-Classification³

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² 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.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

*A Summary of Changes section appears at the end of this standard

2.3 *AISI Standard:*
Specification for the Design of Cold-Formed Steel Structural Members⁴

3. Terminology

3.1 *Definitions*—See Terminology **A902** for definitions of general terminology relating to metallic-coated steel products, and Terminology **A941** for definitions of general terminology relating to uncoated steel sheet products.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *coating sequence, n*—the unbroken or uninterrupted manufacture of coils of the same coating designation.

3.2.2 *coil coater, n*—the organization that applies paint film coatings to coils of steel sheet on continuous paint lines.

3.2.3 *producer, n*—the organization that produces the steel sheet coil product from which the cold-formed members are fabricated.

3.2.4 *purlins and girts, n*—horizontal structural members that support roof deck or panel covering with loads applied principally by bending.

3.2.5 *resample, n*—additional tests made when the original test results do not satisfy the specification requirements.

3.2.6 *retest, n*—additional test, or tests, made when the original test results do not satisfy the specification requirements and the failure is due to a mechanical condition of the test specimen.

3.2.7 *roll former, n*—the organization that produces the cold-formed members.

3.2.8 *zinc-iron alloy, n*—a dull grey coating with no spangle pattern that is produced on hot-dip zinc-coated steel sheet.

3.2.8.1 *Discussion*—Zinc-iron alloy-coating is normally dull gray in appearance when produced by the manufacture of the coated sheet. Typically, the coating contains between 8 and 12 % iron, which is the result of a diffusion reaction between the steel sheet and the zinc coating during the coating process. In most applications, this product is intended to be painted. The coating offers excellent paint adhesion. When the product is exposed to the environment without a paint coating, there is a tendency for the development of a rust-colored stain on the surface. This is caused by the presence of iron in the coating. This stain may be aesthetically objectionable to some users of cold formed framing members.

3.2.9 *aluminum coating type 1, n*—a coating of aluminum and silicon alloy on steel sheet.

3.2.9.1 *Discussion*—Aluminum-coated steel sheet type 1 provides protection from corrosion primarily through the barrier action of the coating. The aluminum-silicon alloy coating provides galvanic corrosion only in marine environments. Because this coating does not generally provide galvanic protection, rust staining may be evident at area where the base metal is exposed to the environment, such as at punch-outs, cut or sheared edges of members, and at scratches.

3.2.10 *aluminum coating type 2, n*—a coating of commercially pure aluminum on steel sheet.

3.2.10.1 *Discussion*—Aluminum-coated steel sheet type 2 provides protection from corrosion primarily through the barrier action of the coating. The aluminum coating provides galvanic corrosion only in marine environments. Because this coating does not generally provide galvanic protection, rust staining may be evident at areas where the base metal is exposed to the environment such as at punch-outs, cut or sheared edges of members, and at scratches.

3.3 *Suffixes: H, adj*—high ductility.

L, adj—low ductility.

NS, adj—nonstructural.

3.3.1 These designations are associated with aspects of the end uses of the steel products; *H* and *L* are associated with structural or load-bearing applications, and *NS* with nonstructural or nonload-bearing applications.

4. Classification

4.1 The steel sheet is available in the following designations:

4.1.1 Structural Grade 33, 37, 40, 50, 55, 60, 70, and 80 Type H (for example, ST50H), Structural Grade 230, 255, 275, 340, 380, 410, 480, and 550 Type H [for example, ST340H].

4.1.2 Structural Grade 33, 37, 40, 50, 55, 60, 70, and 80 Type L (for example, ST50L), Structural Grade 230, 255, 275, 340, 380, 410, 480, and 550 Type L [for example, ST340L].

4.1.3 Nonstructural Grade 33, 40, 50, 57, 60, 65, 70, and 80 (for example, NS33), Nonstructural Grade 230, 275, 340, 395, 420, 450, 480, 550 [for example, NS230].

NOTE 1—Abbreviated designations are shown in parentheses or brackets.

4.2 Use of Type L steels is limited to purlins and girts (see 3.2.4).

5. Ordering Information

5.1 Steel sheet in coils or cut lengths shall be supplied to either base metal thickness requirements or coated steel thickness requirements, as specified on the purchase order or upon agreement between producer and user. If not specified or no agreement established, base steel thickness requirements shall apply.

5.1.1 Thickness shall be expressed in increments of 0.0001 in. [0.001 mm].

5.1.2 Thickness shall be specified as minimum, nominal thickness is not permitted.

5.1.3 Thickness tolerance is defined in accordance with Specification **A568/A568M** for orders specified with base steel thickness and Specification **A924/A924M** for orders specified with coated steel thickness. For thickness tolerance of thickness expressed in increments of 0.0001 in. [0.001 mm], Practice **E29** rounding rules shall apply.

5.1.4 **Annex A2** provides a correlation between minimum base steel thickness and ordered coated steel thickness, for all approved coating designations. **Table A2.1** shall be used to minimize risk of the base steel thickness falling below the

⁴ Available from American Iron and Steel Institute (AISI), 1140 Connecticut Ave., NW, Suite 705, Washington, DC 20036, <http://www.steel.org>.

ordered coated thickness minus the coating thickness additive for orders and steel produced to the coated steel thickness requirements.

5.1.5 For orders specifying base steel thickness, it is the producer's responsibility to adhere to the minimum base steel thickness regardless of coating thickness or coating designation specified.

5.2 Orders for product to this specification shall include the following information, as necessary to adequately describe the desired product.

5.2.1 ASTM specification number and year of issue (A1003 – __ for inch-pound units and A1003M – __ for SI units),

5.2.2 Name of the material (metallic-coated steel sheet), (painted metallic-coated steel sheet), or (painted nonmetallic-coated steel sheet), and designation (see 4.1). For Structural Grades, if a type is not specified, type H shall be furnished.

5.2.2.1 See Specification **A755/A755M** for additional ordering requirements for the painted-metallic-coated steel sheet.

5.2.3 Type of coating (metallic-coated; zinc, zinc-iron alloy, zinc-aluminum-magnesium alloy, 55 % aluminum-zinc alloy, zinc-5 % aluminum alloy, aluminum-coated Type 1, and aluminum-coated Type 2, electrolytic zinc-coated), (painted-metallic-coated; metallic-coating and nonmetallic-coating type), (painted nonmetallic coated: nonmetallic-coating type).

5.2.3.1 Metallic coating weight [mass] designation (see **Table 1**), (see 9.1).

5.2.3.2 Nonmetallic coating thickness (see 9.2 or 9.3).

5.2.4 Chemically-treated or not chemically-treated (metallic-coated only).

5.2.5 Oiled or not-oiled,

5.2.6 Dimensions (show minimum thickness, width, and flatness requirements and length, if cut lengths).

5.2.7 Coil size requirements (specify maximum outside diameter (OD) acceptable inside diameter (ID), and maximum weight [mass]).

5.2.8 Packaging (specify requirements for banding, paper wrapping and other special packaging requirements).

5.2.9 Certification, if required (heat analysis, metallic coating weight or nonmetallic coating thickness and mechanical properties report).

5.2.10 Special Requirements, if any.

5.2.11 When a composition type is not selected (see **Table 2**) then Class 1 shall be furnished.

NOTE 2—Typical ordering descriptions are as follows:

- Steel sheet, zinc-coated, Structural Grade 50 Type H (ST50H), ASTM A1003, Coating Designation G60, chemically-treated, not oiled, 0.0350 in coated steel thickness, by 48 in. by coil, 24-in. ID, 30 000 lb maximum for steel studs, or

- Steel sheet, zinc-coated, Structural Grade 230 Type L [ST230L], ASTM A1003M, Coating Designation Z180, chemically-treated, not oiled, 1.000 mm base steel thickness, by 920 mm by coil, 600 mm ID, 10 000 kg maximum for purlins.

NOTE 3—Electrolytic zinc-coated steel sheet designations indicate the coating on one surface only; therefore, the coating requirement must be specified for each side of the steel sheet as indicated in **Table 1**. Also, the electrolytic zinc-coated steel sheet is only available in SI values.

6. Materials and Manufacture

6.1 The ordered thickness shall be either the base steel thickness or the coated steel thickness, as specified on the purchase order or upon agreement between producer and user. If not specified and no agreement established, base steel thickness shall apply.

7. Chemical Composition

7.1 Base Metal:

7.1.1 The chemical composition of the steel sheet shall conform to the requirements of **Table 2**, as indicated for the class selected for the steel.

7.1.2 All tests shall be conducted in accordance with the requirements for chemical composition as described in Specification **A924/A924M** for products with metallic coatings and Specification **A568/A568M** for nonmetallic coated products.

7.1.3 An analysis of each heat of steel shall be made by the producer to determine the percentage of elements specified in **Table 2**.

7.1.4 In those cases where the heat analysis is not available a product analysis test shall be performed to determine conformance with the requirements of **Table 2**.

7.1.5 Each of the elements listed in **Table 2** shall be included in the report of heat or product analysis. When the amount of copper, nickel, chromium, or molybdenum is less than 0.02 %, report the analysis as <0.02 % or the actual determined value. When the amount of vanadium, columbium, or titanium is less than 0.008 %, report the analysis as <0.008 % or the actual determined value.

8. Mechanical Properties

8.1 The mechanical properties of the steel sheet shall conform to the requirements shown in **Table 3**.

8.2 Tests for mechanical properties of the “H” and “NS” steel designations shall be conducted in accordance with the tests for mechanical properties described in Specification **A924/A924M** for metallic-coated steel sheet and **A568/A568M** for nonmetallic coated steel sheet.

8.3 Tests for elongation in ½ in. [13 mm] of the “L” steel designations shall be conducted in accordance with the procedure found in the *AISI Cold Formed Design Manual*, “Standard Methods for Determination of Uniform and Local Ductility.”

TABLE 1 Coating Weight [Mass] Requirements (Metallic Coatings)

Product Designation	Coating Designation
Type H and Type L	G60 [Z180] ^A A60 [ZF180] ^B AZ50 [AZM150] ^C GF30 [ZGF90] ^D T1–25 [T1M 75] ^E T2–100 [T2M 300] ^F 30Z/30Z [90G/90G] ^G ZM20 [ZMM60] ^G
Type NS	G40 [Z120] ^A A40 [ZF120] ^B AZ50 [AZM150] ^C GF30 [ZGF90] ^D T1–25 [T1M 75] ^E T2–100 [T2M 300] ^F 20Z/20Z [60G/60G] ^G ZM20 [ZMM60] ^G

^AZinc-coated steel sheet as described in Specifications **A653/A653M**, **A1063/A1063M**.

^BZinc-iron alloy-coated steel sheet as described in Specification **A653/A653M**.

^C55 % aluminum-zinc alloy-coated as described in Specification **A792/A792M**.

^DZinc-5 % aluminum alloy-coated steel sheet as described in Specification **A875/A875M**.

^EAluminum-coated Type 1 and Type 2 steel sheet as described in Specification **A463/A463M**.

^FZinc-coated steel sheet as described in Specification **A879/A879M**.

^GZinc-aluminum-magnesium alloy-coated as described in Specification **A1046/A1046M**.

**TABLE 2 Chemical Composition Heat and Product Analysis,
Max %**

Element	Class 1		Class 2	
	Heat Analysis	Product Analysis	Heat Analysis	Product Analysis
Carbon	0.25	^A	0.25	^A
Manganese	1.15	^A	1.65	^A
Phosphorus	0.20	^A	0.20	^A
Sulfur	0.04	^A	0.04	^A
Copper	0.20 ^B	0.23	0.50 ^C	0.58
Nickel	0.20 ^B	0.23	0.30 ^C	0.35
Chromium	0.15 ^{B,D}	0.19	0.30 ^C	0.35
Molybdenum	0.06 ^B	0.07	0.16 ^C	0.17
Vanadium	0.008 ^E	0.018 ^E	0.20	0.23
Columbium	0.008 ^E	0.018 ^E	0.15	0.17
Titanium	0.008 ^E	0.018 ^E	0.20	0.23

^AProduct analysis tolerances for these elements are found in Table 1 of Specification A924/A924M.

^BThe sum of copper, chromium, nickel, and molybdenum shall not exceed 0.50 %. When one or more of these elements are specified, the sum does not apply. If this occurs, only the individual limits on the remaining elements shall apply.

^CThe sum of copper, chromium, nickel, and molybdenum shall not exceed 1.00 %. When one or more of these elements are specified, the sum does not apply. If this occurs, only the individual limits on the remaining elements shall apply.

^DChromium is permitted, at producer's option, to 0.25 % maximum when the carbon content is less than or equal to 0.05 %. In this case, the limit on the sum of the four elements in footnote ^B does not apply.

^EThe limits for steels whose carbon content is 0.02 % or less are as follows:

Element	Heat Analysis	Product Analysis
Vanadium	0.10	0.11
Columbium	0.045	0.055
Titanium	0.30	0.33

9. Coating Properties

9.1 *Metallic Coating*—The minimum metallic coating weight [mass] requirements shall be as shown in Table 1.

9.1.1 Not all coatings will react the same under a given set of environmental conditions. These minimum coating designations assume normal exposure conditions and construction practices. When more severe exposure conditions are probable, for example, in coastal areas, consideration should be given to specifying heavier coating weight [mass].

9.1.2 Other metallic coatings shall be considered for inclusion to Table 1 provided they satisfy the minimum expected corrosion characteristics as indicated by laboratory testing conducted in accordance with Practice A1004/A1004M.

9.1.3 The minimum expected corrosion characteristics as indicated by laboratory testing for metallic coated sheet steels are as follows:

9.1.3.1 *Corrosion Standard*—No more than 10 % loss of coating from the surface of the laboratory test sample at the end of the prescribed test duration.

9.1.3.2 *Test Duration*—Minimum exposure for Type H and Type L steels is 100 h. Minimum exposure for Type NS steels is 75 h.

NOTE 4—The 10 % standard is intended to be used for laboratory evaluation only and not for assessing rust condition of installed cold formed members.

9.1.4 All tests for coating weight [mass] shall be conducted in accordance with the coating properties of Specifications A463/A463M, A653/A653M, A792/A792M, A875/A875M, A879/A879M, A1046/A1046M, A1063/A1063M.

9.2 *Painted-Metallic Coatings*:

TABLE 3 Mechanical Properties, Base Metal

NOTE 1—All values are minimum requirements in the longitudinal direction.

Designation	Yield Strength, ksi [MPa]	Tensile Strength, ksi [MPa]	Elongation ^A in ½ in. [13 mm]	Elongation in 2 in. [50 mm]
ST80H [ST550H]	80 [550] ^B	90 [620]	C	10 %
ST70H [ST480H]	70 [480] ^B	80 [550]	C	10 %
ST60H [ST410H]	60 [410] ^B	70 [480]	C	10 %
ST55H [ST340H]	55 [380] ^B	70 [480]	C	10 %
ST50H [ST340H]	50 [340] ^B	65 [450]	C	10 %
ST40H [ST275H]	40 [275] ^B	55 [380]	C	10 %
ST37H [ST255H]	37 [255] ^B	52 [360]	C	10 %
ST33H [ST230H]	33 [230] ^B	45 [310]	C	10 %
ST80L [ST550L] ^D	80 [550]		20 % ^E	3 % ^F
ST70L [ST480L] ^D	70 [480]		20 % ^E	3 % ^F
ST60L [ST410L] ^D	60 [410]		20 % ^E	3 % ^F
ST55L [ST380L] ^D	55 [380]		20 % ^E	3 % ^F
ST50L [ST340L] ^D	50 [340]		20 % ^E	3 % ^F
ST40L [ST275L] ^D	40 [275]		20 % ^E	3 % ^F
ST37L [ST255L] ^D	37 [255]		20 % ^E	3 % ^F
ST33L [ST230L] ^D	33 [230]		20 % ^E	3 % ^F
NS 80	80 [550]		... ^G	... ^G
NS 70	70 [480]		... ^G	... ^G
NS 65	65 [450]		... ^G	... ^G
NS 60	60 [410]		... ^G	... ^G
NS 57	57 [395]		... ^G	... ^G
NS 50	50 [340]		... ^G	... ^G
NS 40	40 [275]		... ^G	... ^G
NS 33	33 [230]		... ^G	... ^G

^AThe procedure for determining the local and uniform elongation can be found in the *ASTM Cold Formed Design Manual*, “Standard Methods for Determination of Uniform and Local Ductility.”

^BRatio of tensile strength to yield strength for the Type H steels shall not be less than 1.08.

^CElongation in ½-in. [13-mm] is not required.

^DThe use of Type L steels shall be limited to purlins and girts (see 3.2.4).

^ELocal elongation in a ½-in. [13-mm] gage length across the fracture.

^FUniform elongation outside of the fracture.

^GWhere an ellipsis appears there is no requirement.

9.2.1 Painted-metallic-coated steel sheet shall consist of a metallic-coated substrate and a paint film.

9.2.2 The metallic-coated substrate shall meet the coating weight [mass] requirements of Table 1.

9.2.3 The paint film shall have a minimum thickness of 0.5 mil per side (primer plus topcoat) with a minimum primer thickness of 0.1 mil per side.

9.2.4 The paint film thickness shall be determined according to the requirements of Test Methods D1005 and D4138.

9.2.5 The flexibility and adhesion of the paint film shall be determined according to the requirements of Test Method D4145.

9.2.6 The minimum expected corrosion characteristics as indicated by laboratory testing for painted metallic-coated steel sheet are as follows:

9.2.6.1 *Corrosion Standard*—Mean creepage from a scribe shall satisfy a rating number of 6 (1/16 in. [2 mm] to 1/8 in. [3 mm]) (in accordance with Test Method D1654) and no resistance to blistering shall satisfy the requirement of “no more than a few scattered number 8 blisters” on the surface of the test specimens at the end of the prescribed test duration. See Test Method D714 for a description including photographic standards of the term “few.”

9.2.6.2 *Test Duration*—Minimum exposure of 500 h.

9.2.7 The laboratory procedure for determining conformance to the minimum expected corrosion characteristics is described in Practice A1004/A1004M.

9.3 Nonmetallic Coatings:

9.3.1 Nonmetallic-coated (painted) steel sheet is intended to be used in environments where the rate of corrosion is low. Typically, these environments include very dry atmospheres, such as areas of low rainfall and low humidity, and the interior of buildings that are climate-controlled. The application of painted product shall be restricted to applications defined as Category 1 or 2 of the table found in Annex A1. These categories are described in ISO 9223.

9.3.2 Nonmetallic-coated steel which is painted after roll forming shall have a minimum paint thickness of 1.0 mil on all surfaces including the edges.

9.3.3 The minimum expected corrosion characteristics as indicated by laboratory testing for nonmetallic-coated painted sheet steel are as follows:

9.3.3.1 *Corrosion Standard*—Mean creepage from a scribe shall satisfy a rating number of 6 (1/16 in. [2 mm] to 1/8 in. [3 mm]) (in accordance with Test Method D1654) and resistance to blistering shall satisfy the requirement of “no more than a few scattered number 8 blisters” on the surface of the test specimens at the end of the prescribed test duration. See Test Method D714 for a description including photographic standards of the term “few.”

9.3.3.2 *Test Duration*—Minimum exposure 250 h.

9.3.4 The laboratory procedure for determining conformance to the minimum expected corrosion characteristics is described in Practice A1004/A1004M.

10. Number of Tests

10.1 The producer, coil coater, and rollformer shall be responsible for conducting a sufficient number of tests to certify all of the material to the applicable requirements of this specification.

10.2 *Producer*—Each coating sequence and heat shall be tested by the producer to indicate conformance to the requirements of this specification. At least one test per coating sequence shall be performed to assess coating weight conformance.

10.2.1 Tension Tests:

10.2.1.1 Two tension tests shall be made from each heat of 50 tons [45 000 kg] or greater. When the amount of finished material from a heat is less than 50 tons [45 000 kg], one tension test shall be made. When material rolled from one heat differs 0.020 in. [0.51 mm] or more in thickness, one tension test shall be made from the thickest and thinnest material regardless of the weight represented.

10.2.1.2 Tension test specimens shall be taken at a point immediately adjacent to the material to be qualified.

10.2.1.3 Tension test specimens shall be taken from a location approximately halfway between the center of sheet and the edge of the material as-rolled.

10.2.1.4 Tension test specimens shall be taken with the lengthwise axis of the test specimen parallel to the rolling direction (longitudinal test).

10.3 *Coil Coater:*

10.3.1 The certified test results of the producer shall be used to certify conformance of the substrate to the requirements of this specification.

10.3.2 If certified test results are not available from the producer, the coil coater shall test the product to verify conformance of the substrate to the requirements of this specification.

10.3.2.1 *Type H and Type L Steels*—All coils shall be tested to determine conformance with applicable requirements of this specification. This requirement applies to all coils segments that have been joined to form larger coils.

10.3.2.2 *Type NS Steels*—The number of tests taken to certify the material shall be appropriate to the specific condition and processing history of the material.

10.3.3 The coil coater shall test each coil to ensure conformance with the requirements of the nonmetallic coating(s).

10.4 *Roll Former:*

10.4.1 The certified result of tests for mechanical properties and coating weight from the producer or coil coater, shall be used to certify the conformance of the material used for the manufacture of the cold formed framing members.

10.4.2 If certified test results are not available from the producer or coil coater, and a certified test report is required on the purchase order, the roll former shall test in accordance with the following requirements.

10.4.2.1 *Type H and Type L Steels*—As a minimum, all coils shall be tested in order to determine conformance with the applicable requirements of this specification. This requirement applies to each of the coil segments joined together to form larger coils and after all processing of the flat sheet has taken place. Sufficient testing shall be done to ensure that all of the cold formed framing members associated with a certified report satisfy the applicable requirements.

10.4.2.2 *NS Steels*—The number of tests taken to certify the material shall be appropriate to the specific condition and processing history of the material.

10.4.3 Testing by the roll former for those characteristics that are unchanged by additional processing, such as chemical composition, is not required when certified reports of test are available from the producer or coil coater.

10.4.4 Testing shall be performed by the roll former after all processing, such as cold rolling, has occurred, which alters the mechanical properties of the flat-steel sheet.

11. Retests and Resamples

11.1 *Retests:*

11.1.1 If any test specimen shows defective machining or other flaws, it must be discarded and another specimen substituted.

11.1.2 If the results on an original tensile test are within 2000 psi [14 MPa] of the required yield strength, or within two percentage points of the required elongation, a retest shall be permitted for which one random specimen from the heat or test lot shall be used. If the result on this retest specimen satisfy the specified mechanical requirements, the lot shall be accepted.

11.2 *Resamples:*

11.2.1 If the results of the original tensile test are below the required yield strength or more than two percentage points below the required elongation, resamples shall be permitted providing material represented by the original test specimen is discarded.

11.2.2 Resampling requires two test specimens be taken to qualify the heat or test lot. The first test shall be taken adjacent to the material discarded from the lot and the second from another location within the lot to be qualified. The results of both test shall satisfy the specification requirements.

11.2.3 A maximum of two resamples shall be permitted. If the resampled material does not satisfy the requirements, the coil or coils shall be rejected.

12. Certification

12.1 When required by the purchaser as indicated on the purchase order, a certificate of compliance or a test report, or both, shall be furnished to the purchaser.

12.2 The certificate of compliance shall include a certification that the product has been manufactured and tested in accordance with the requirements of the specification, and that the test results conform to the requirements of that specification.

12.3 The test report shall show the results of all tests required by the specification and the order.

12.4 The documents shall provide information necessary to identify the product represented; for example, the manufacturer's name or brand, ASTM specification, name of the material, product designation, heat number, metallic coating weight, nonmetallic-coating type and thickness, ordered thickness (specifying either base steel or coated steel), width, length, and section, unit identification (coil number, heat number, invoice number, etc.).

12.5 A signature is not required on the test report; however, the document shall identify clearly the organization submitting the report. Notwithstanding the absence of a signature, the organization submitting the report is responsible for the content of the report.

12.6 A material test report, certificate of inspection, or similar document printed from or used in electronic form from an electronic data interchange (EDI) transmission shall be regarded as having the same validity as a counterpart printed in the certifier's facility. The content of the EDI transmitted document must meet the requirements of the invoked ASTM standard and conform to any existing EDI agreement between the purchaser and the supplier. Notwithstanding the absence of a signature, the organization submitting the EDI transmission is responsible for the content of the report.

12.7 The furnishing of a certificate of compliance or test report, or both, shall not restrict the right of the purchaser to sample and test the material furnished.

12.8 When specified in the purchase order or contract, an independent third party shall be used to certify that a producer, coil coater or roll former maintains an adequate quality assurance program.

13. Product Marking

13.1 Coils from the producer and coil coater purchased according to this specification, as a minimum, shall be identified with the producer’s name or brand, ASTM specification, product designation, coating designation, size, unit weight, purchaser’s order number, and unit identification, that is, ticket

number, coil number, etc. legibly shown on a tag attached to each coil or shipping unit.

14. Keywords

14.1 metallic-coated steel sheet; steel framing members—cold-formed; steel products—metallic-coated; steel sheet

ANNEXES

(Mandatory Information)

A1. CATEGORIES OF ATMOSPHERES

Category	Description of Categories ^A
1	Interior climates with climate controlled conditions
2	Properly ventilated interior climates without climate controlled conditions in dry temperature locations [Exceptions — locations (1) with average to high humidity, (2) with substantial air pollution, and/or (3) close to the seacoast.] Exterior climates that are (1) very dry and (2) very warm or dry and very cold.
3	Exterior climates that are dry and warm or cold. Properly ventilated interior climates in (1) dry, warm or cold locations, and (2) temperate locations, both without climate control.
4	All temperate, average humidity exterior climates. Properly ventilated interior climates in humid locations. Unventilated buildings in temperate climates; no climate control.
5	All damp exterior climates. Unventilated buildings in humid climates.

^ASee ISO 9223, First Edition 1992–02–15.

A2. DETERMINATION OF MINIMUM BASE STEEL THICKNESS ASSOCIATED WITH ORDERED COATED STEEL THICKNESS

A2.1 This annex provides information to identify the minimum Base Steel Thickness required to be adhered to by the producer for steel produced to Ordered Coated Steel Thickness.

A2.2 Ordered Coated Steel Thickness applies to Base Steel Thickness plus Coating Thickness.

A2.3 Thickness Tolerance is defined in accordance with Specification **A924/A924M** for the specified Ordered Coated Steel Thickness.

A2.4 Base Steel Thickness shall not be less than the Ordered Coated Steel Thickness minus the Coating Thickness Additive specified in **Table A2.1**, Column 3.

A2.5 **Table A2.1**, Column 3 values can be used as additions to the intended minimum Base Steel Thickness to determine the Ordered Coated Steel Thickness, or as subtractions to the Ordered Coated Steel Thickness to determine the minimum Base Steel Thickness.

TABLE A2.1 Correlation of Base Steel Thickness to Coated Steel Thickness

Coating Designation	Coating Thickness for Minimum Total Coating, Triple Spot Average Requirement. (in. [mm])	Coating Thickness Additive to Base Steel Thickness for Determination of Ordered Coated Steel Thickness. (in. [mm]) ^A
G 30 [Z 90], GF 30 [ZGF 90]	0.0005 [0.013]	0.0008 [0.021]
G 40 [Z 120], A 40 [ZF 120], 60G60G	0.0007 [0.018]	0.0010 [0.026]
G 60 [Z 180], A 60 [ZF 180], 90G90G, T1 25 [T1M 75] G90 [Z 275]	0.0010 [0.026]	0.0013 [0.034]
AZ 50 [AZM 150]	0.0015 [0.038]	0.0018 [0.046]
T2 100 [T2M 300]	0.0016 [0.041]	0.0019 [0.049]
	0.0040 [0.102]	0.0043 [0.110]

Examples for using this table:

- To ensure Base Steel Thickness meets 0.0200 in. [0.508 mm] minimum, the Ordered Coated Steel Thickness for G 60 [Z 180] shall not be less than 0.0213" [0.542 mm] minimum.
- Steel produced with Ordered Coated Steel Thickness of 0.0213 in. [0.5428 mm] minimum for G 60 [Z 180] requires the producer to provide Base Steel Thickness not less than 0.0200 in. [0.508 mm] minimum.

^AThese values include a thickness allowance of 0.0003 in. [0.008 mm] to compensate for coating thickness variability. This thickness allowance is intended to provide a representation of conformance to minimum Base Steel Thickness obtained from measurement of the Coated Steel Thickness.

SUMMARY OF CHANGES

Committee A05 has identified the location of selected changes to this standard since the last issue (A1003/A1003M - 13a) that may impact the use of this standard. (November 1, 2013)

- | | |
|---|---|
| (1) Revised Section 2 to include A1046/A1046M. | (4) Revised Section 9.1.4 to include A463/A463M, A879/A879M, A1046/A1046M and A1063/A1063M. |
| (2) Revised Section 5.2.3 to include zinc-aluminum-magnesium alloy. | |
| (3) Revised Table 1 to include ZM20 [ZMM60] designation and added footnote G. | |

Committee A05 has identified the location of selected changes to this standard since the last issue (A1003/A1003M - 13) that may impact the use of this standard. (May 1, 2013)

- (1) Added 10.2.1.

Committee A05 has identified the location of selected changes to this standard since the last issue (A1003/A1003M - 12) that may impact the use of this standard. (January 1, 2013)

- | | |
|---|--|
| (1) Added reference to Practice E29 in 2.1. | options of 1 in or 3/8 in. from the edge tables. All standard thickness tolerance tables are based on 1 in. from the edge. |
| (2) Added option for steel to be ordered to Coated Steel Thickness in accordance with Specification A924/A924M in 5.1. | (6) Updated examples in Note 2. |
| (3) Added 5.1.1, which was moved from 5.1. | (7) Added reference to ordered base steel thickness or ordered coated steel thickness in 12.4. |
| (4) Added 5.1.2 through 5.1.5. | (8) Added Annex A2. |
| (5) Added requirement for minimum ordered thickness only in 5.2.6; and updated standard thickness tolerance by removing | |

Committee A05 has identified the location of selected changes to this standard since the last issue (A1003/A1003M - 11^{e1}) that may impact the use of this standard. (January 1, 2012)

- (1) Deleted 13.2.

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