



Designation: A1031/A1031M – 25

Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Alloy, Drawing Steel and Structural Steel, Hot-Rolled¹

This standard is issued under the fixed designation A1031/A1031M; 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 reappraisal. A superscript epsilon (ε) indicates an editorial change since the last revision or reappraisal.

1. Scope*

1.1 This specification covers hot-rolled, heavy thickness coils beyond the size limits of Specifications **A506** and **A507**.

1.2 The product is available in three designations: alloy steel, drawing steel, and structural alloy steel.

1.3 Alloy steel is furnished to chemical composition requirements and is intended primarily for general or miscellaneous use where bending and moderate forming is a requirement.

1.4 Drawing steel is produced principally for applications involving severe cold plastic deformation such as deep drawn or severely formed parts.

1.4.1 Drawing steel may be furnished in several conditions, heat treatments, surface finishes, and edges, as specified herein.

1.5 Structural steel is furnished to chemical composition requirements and to specific mechanical property requirements which may include tension tests, hardness tests, or other commonly accepted mechanical tests.

1.5.1 The formability of structural steel decreases with increasing yield strength or hardness. Therefore, product design in relation to the mechanical properties of the grade used must be considered.

1.6 This material is available only in coils described as follows:

Product	Size Limits, Coils Only	
	Width, in. [mm]	Thickness, in. [mm]
Strip	Over 8 to 12, incl	0.230 to 1.000, incl
	[Over 200 to 300]	[Over 6.0 to 25]
Sheet	Over 12	0.230 to 1.000, incl
	[Over 300]	[from 6.0 through 25]

1.7 Sheet and strip in coils of sizes noted in 1.6 are covered by this specification only with the following provisions:

1.7.1 The material is not to be converted into steel plates for structural or pressure vessel use unless tested in complete accordance with the appropriate sections of Specifications

¹ This specification is under the jurisdiction of ASTM Committee **A01** on Steel, Stainless Steel and Related Alloys and is the direct responsibility of Subcommittee **A01.19** on Steel Sheet and Strip.

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A6/A6M (plates provided from coils) or **A20/A20M** (plates produced from coils). A plate produced in this manner is no longer governed by this sheet steel specification and since this material is now plate, the appropriate plate standard must now apply.

1.7.2 The dimensional tolerances of Specification **A635/A635M** are applicable to material produced to this specification.

1.7.3 The material is to be fed directly from coils into a blanking press, drawing or forming operation, tube mill, rolling mill, or sheared or slit into blanks for subsequent drawing or forming.

1.8 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.8.1 Within the text the SI units are shown in brackets.

1.9 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

- A6/A6M** Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling
- A20/A20M** Specification for General Requirements for Steel Plates for Pressure Vessels
- A370** Test Methods and Definitions for Mechanical Testing of Steel Products
- A505** Specification for Steel, Sheet and Strip, Alloy, Hot-Rolled and Cold-Rolled, General Requirements for
- A506** Specification for Alloy and Structural Alloy Steel,

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

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



TABLE 1 Standard Steels Commonly Produced for Alloy Steel Sheet and Strip

Steel Designation No.	Chemical Composition Ranges and Limits, % (Heat Analysis) ^A								
	C	Mn	P	S	Si ^B	Ni	Cr	Mo	V
E3310 ^C	0.08–0.13	0.45–0.60	0.025	0.025	0.15–0.35	3.25–3.75	1.40–1.75	...	...
4012 ^C	0.09–0.14	0.75–1.00	0.025	0.025	0.15–0.35	...	...	0.15–0.25	...
4118	0.18–0.23	0.70–0.90	0.025	0.025	0.15–0.35	...	0.40–0.60	0.08–0.15	...
4130	0.28–0.33	0.40–0.60	0.025	0.025	0.15–0.35	...	0.80–1.10	0.15–0.25	...
4135	0.33–0.38	0.70–0.90	0.025	0.025	0.15–0.35	...	0.80–1.10	0.15–0.25	...
4137	0.35–0.40	0.70–0.90	0.025	0.025	0.15–0.35	...	0.80–1.10	0.15–0.25	...
4140	0.38–0.43	0.75–1.00	0.025	0.025	0.15–0.35	...	0.80–1.10	0.15–0.25	...
4142	0.40–0.45	0.75–1.00	0.025	0.025	0.15–0.35	...	0.80–1.10	0.15–0.25	...
4145	0.43–0.48	0.75–1.00	0.025	0.025	0.15–0.35	...	0.80–1.10	0.15–0.25	...
4147 ^C	0.45–0.50	0.75–1.00	0.025	0.025	0.15–0.35	...	0.80–1.10	0.15–0.25	...
4150	0.48–0.53	0.75–1.00	0.025	0.025	0.15–0.35	...	0.80–1.10	0.15–0.25	...
4320	0.17–0.22	0.45–0.65	0.025	0.025	0.15–0.35	1.65–2.00	0.40–0.60	0.20–0.30	...
4340	0.38–0.43	0.60–0.80	0.025	0.025	0.15–0.35	1.65–2.00	0.70–0.90	0.20–0.30	...
E4340	0.38–0.43	0.65–0.85	0.025	0.025	0.15–0.35	1.65–2.00	0.70–0.90	0.20–0.30	...
4520 ^C	0.18–0.23	0.45–0.65	0.025	0.025	0.15–0.35	...	...	0.45–0.60	...
4615	0.13–0.18	0.45–0.65	0.025	0.025	0.15–0.35	1.65–2.00	...	0.20–0.30	...
4620	0.17–0.22	0.45–0.65	0.025	0.025	0.15–0.35	1.65–2.00	...	0.20–0.30	...
4718	0.16–0.21	0.70–0.90	0.025	0.025	0.15–0.35	0.90–1.20	0.35–0.55	0.30–0.40	...
4815	0.13–0.18	0.40–0.60	0.025	0.025	0.15–0.35	3.25–3.75	...	0.20–0.30	...
4820	0.18–0.23	0.50–0.70	0.025	0.025	0.15–0.35	3.25–3.75	...	0.20–0.30	...
5015	0.12–0.17	0.30–0.50	0.025	0.025	0.15–0.35	...	0.30–0.50	...	...
5046	0.43–0.50	0.75–1.00	0.025	0.025	0.15–0.35	...	0.20–0.35	...	...
5115	0.13–0.18	0.70–0.90	0.025	0.025	0.15–0.35	...	0.70–0.90	...	...
5120	0.17–0.22	0.70–0.90	0.025	0.025	0.15–0.35	...	0.70–0.90	...	...
5130	0.28–0.33	0.70–0.90	0.025	0.025	0.15–0.35	...	0.80–1.10	...	...
5132	0.30–0.35	0.60–0.80	0.025	0.025	0.15–0.35	...	0.75–1.00	...	...
5140	0.38–0.43	0.70–0.90	0.025	0.025	0.15–0.35	...	0.70–0.90	...	...
5150	0.48–0.53	0.70–0.90	0.025	0.025	0.15–0.35	...	0.70–0.90	...	...
5160	0.56–0.64	0.75–1.00	0.025	0.025	0.15–0.35	...	0.70–0.90	...	...
E51100 ^C	0.95–1.10	0.25–0.45	0.025	0.025	0.15–0.35	...	0.90–1.15	...	...
E52100	0.98–1.10	0.25–0.45	0.025	0.025	0.15–0.35	...	1.30–1.60	...	...
6150	0.48–0.53	0.70–0.90	0.025	0.025	0.15–0.35	...	0.80–1.10	...	0.15 min
6158 ^C	0.55–0.62	0.70–1.10	0.025	0.025	0.15–0.35	...	0.90–1.20	...	0.10–0.20
8615	0.13–0.18	0.70–0.90	0.025	0.025	0.15–0.35	0.40–0.70	0.40–0.60	0.15–0.25	...
8617	0.15–0.20	0.70–0.90	0.025	0.025	0.15–0.35	0.40–0.70	0.40–0.60	0.15–0.25	...
8620	0.18–0.23	0.70–0.90	0.035	0.035	0.15–0.35	0.40–0.70	0.40–0.60	0.15–0.25	...
8630	0.28–0.33	0.70–0.90	0.025	0.025	0.15–0.35	0.40–0.70	0.40–0.60	0.15–0.25	...
8640	0.38–0.43	0.75–1.00	0.025	0.025	0.15–0.35	0.40–0.70	0.40–0.60	0.15–0.25	...
8642 ^C	0.40–0.45	0.75–1.00	0.025	0.025	0.15–0.35	0.40–0.70	0.40–0.60	0.15–0.25	...
8645	0.43–0.48	0.75–1.00	0.025	0.025	0.15–0.35	0.40–0.70	0.40–0.60	0.15–0.25	...
8650 ^C	0.48–0.53	0.75–1.00	0.025	0.025	0.15–0.35	0.40–0.70	0.40–0.60	0.15–0.25	...
8655	0.501–0.59	0.75–1.00	0.025	0.025	0.15–0.35	0.40–0.70	0.40–0.60	0.15–0.25	...
8660	0.55–0.65	0.75–1.00	0.025	0.025	0.15–0.35	0.40–0.70	0.40–0.60	0.15–0.25	...
8720	0.18–0.23	0.70–0.90	0.025	0.025	0.15–0.35	0.40–0.70	0.40–0.60	0.20–0.30	...
8735 ^C	0.33–0.38	0.75–1.00	0.025	0.025	0.15–0.35	0.40–0.70	0.40–0.60	0.20–0.30	...
8740 ^C	0.38–0.43	0.75–1.00	0.025	0.025	0.15–0.35	0.40–0.70	0.40–0.60	0.20–0.30	...
9260	0.56–0.64	0.75–1.00	0.025	0.025	1.80–2.20	...	...	...	...
9262 ^C	0.55–0.65	0.75–1.00	0.025	0.025	1.80–2.20	...	0.25–0.40	...	...
E9310 ^C	0.08–0.13	0.45–0.65	0.025	0.025	0.20–0.35	3.30–35.0	1.00–1.40	0.08–0.15	...

^A The chemical ranges and limits shown are subject to product analysis tolerances. See Specification A505.

^B Other silicon ranges are available. Consult the producer.

^C Not an SAE Steel Designation.

Sheet and Strip, Hot-Rolled and Cold-Rolled

A507 Specification for Drawing Alloy Steel, Sheet and Strip, Hot-Rolled and Cold-Rolled

A635/A635M Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Alloy, Carbon, Structural, High-Strength Low-Alloy, and High-Strength Low-Alloy with Improved Formability, General Requirements for

E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

3. General Requirements for Delivery

3.1 Material furnished under this specification shall conform to the applicable requirements of Specification A505, current edition, unless otherwise provided herein.

4. Ordering Information

4.1 Orders for material under this specification shall include the following information, as required, to adequately describe the desired material.