



Designation: ~~A1031/A1031M-10~~ Designation: A1031/A1031M - 12

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 reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

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	Thickness, in. [mm]
Strip	Width, in. [mm] Over 8 to 12, incl [Over 200 to 300]	0.230 to 1.000, incl [Over 6.0 to 25]
Sheet	Over 12 [Over 300]	0.230 to 1.000, incl [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 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.

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, Sheet and Strip, Hot-Rolled and Cold-Rolled

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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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.

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



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

UNSteel Design ^a	SAEation No.	Chemical Composition Ranges and Limits, % (Heat Analysis) ^A								
		C	Mn	P	S	Si ^B	Ni	Cr	Mo	V
---	E3310	0.08-0.13	0.45-0.60	0.025	0.025	0.15-0.30	3.25-3.75	1.40-1.75	...	...
---	E3310 ^C	0.08-0.13	0.45-0.60	0.025	0.025	0.15-0.30	3.25-3.75	1.40-1.75	...	...
G40120	4012	0.09-0.14	0.75-1.00	0.025	0.025	0.15-0.30	...	...	0.15-0.25	...
G40120	4012 ^C	0.09-0.14	0.75-1.00	0.025	0.025	0.15-0.30	...	...	0.15-0.25	...
G41180	4118	0.18-0.23	0.70-0.90	0.025	0.025	0.15-0.30	...	0.40-0.60	0.08-0.15	...
G41300	4130	0.28-0.33	0.40-0.60	0.025	0.025	0.15-0.30	...	0.80-1.10	0.15-0.25	...
G41350	4135	0.33-0.38	0.70-0.90	0.025	0.025	0.15-0.30	...	0.80-1.10	0.15-0.25	...
G41370	4137	0.35-0.40	0.70-0.90	0.025	0.025	0.15-0.30	...	0.80-1.10	0.15-0.25	...
G41400	4140	0.38-0.43	0.75-1.00	0.025	0.025	0.15-0.30	...	0.80-1.10	0.15-0.25	...
G41420	4142	0.40-0.45	0.75-1.00	0.025	0.025	0.15-0.30	...	0.80-1.10	0.15-0.25	...
G41450	4145	0.43-0.48	0.75-1.00	0.025	0.025	0.15-0.30	...	0.80-1.10	0.15-0.25	...
G41470	4147	0.45-0.50	0.75-1.00	0.025	0.025	0.15-0.30	...	0.80-1.10	0.15-0.25	...
G41470	4147 ^C	0.45-0.50	0.75-1.00	0.025	0.025	0.15-0.30	...	0.80-1.10	0.15-0.25	...
G41500	4150	0.48-0.53	0.75-1.00	0.025	0.025	0.15-0.30	...	0.80-1.10	0.15-0.25	...
G43200	4320	0.17-0.22	0.45-0.65	0.025	0.025	0.15-0.30	1.65-2.00	0.40-0.60	0.20-0.30	...
G43400	4340	0.38-0.43	0.60-0.80	0.025	0.025	0.15-0.30	1.65-2.00	0.70-0.90	0.20-0.30	...
G43406	E4340	0.38-0.43	0.65-0.85	0.025	0.025	0.15-0.30	1.65-2.00	0.70-0.90	0.20-0.30	...
G45200	4520	0.18-0.23	0.45-0.65	0.025	0.025	0.15-0.30	...	...	0.45-0.60	...
G45200	4520 ^C	0.18-0.23	0.45-0.65	0.025	0.025	0.15-0.30	...	...	0.45-0.60	...
G46150	4615	0.13-0.18	0.45-0.65	0.025	0.025	0.15-0.30	1.65-2.00	...	0.20-0.30	...
G46200	4620	0.17-0.22	0.45-0.65	0.025	0.025	0.15-0.30	1.65-2.00	...	0.20-0.30	...
G47180	4718	0.16-0.21	0.70-0.90	0.025	0.025	0.15-0.30	0.90-1.20	0.35-0.55	0.30-0.40	...
G48150	4815	0.13-0.18	0.40-0.60	0.025	0.025	0.15-0.30	3.25-3.75	...	0.20-0.30	...
G48200	4820	0.18-0.23	0.50-0.70	0.025	0.025	0.15-0.30	3.25-3.75	...	0.20-0.30	...
G50150	5015	0.12-0.17	0.30-0.50	0.025	0.025	0.15-0.30	...	0.30-0.50	...	...
G50460	5046	0.43-0.50	0.75-1.00	0.025	0.025	0.15-0.30	...	0.20-0.35	...	...
G51150	5115	0.13-0.18	0.70-0.90	0.025	0.025	0.15-0.30	...	0.70-0.90	...	...
G51200	5120	0.17-0.22	0.70-0.90	0.025	0.025	0.15-0.30	...	0.70-0.90	...	...
G51300	5130	0.28-0.33	0.70-0.90	0.025	0.025	0.15-0.30	...	0.80-1.10	...	...
G51300	5130	0.28-0.33	0.70-0.90	0.025	0.025	0.15-0.30	...	0.80-1.10	...	...
G5132	5132	0.30-0.35	0.60-0.90	0.025	0.025	0.15-0.30	...	0.75-1.00	...	...
G5132	5132	0.30-0.35	0.60-0.80	0.025	0.025	0.15-0.30	...	0.75-1.00	...	...
G51400	5140	0.38-0.43	0.70-0.90	0.025	0.025	0.15-0.30	...	0.70-0.90	...	...
G51500	5150	0.48-0.53	0.70-0.90	0.025	0.025	0.15-0.30	...	0.70-0.90	...	...
G51600	5160	0.55-0.65	0.75-1.00	0.025	0.025	0.15-0.30	...	0.70-0.90	...	...
G51600	5160	0.56-0.64	0.75-1.00	0.025	0.025	0.15-0.30	...	0.70-0.90	...	...
G15116	E51100	0.95-1.10	0.25-0.45	0.025	0.025	0.15-0.30	...	0.90-1.15	...	...
G15116	E51100 ^C	0.95-1.10	0.25-0.45	0.025	0.025	0.15-0.30	...	0.90-1.15	...	...
G15216	E52100	0.95-1.10	0.25-0.45	0.025	0.025	0.15-0.30	...	1.30-1.60	...	...
G15216	E52100	0.98-1.10	0.25-0.45	0.025	0.025	0.15-0.30	...	1.30-1.60	...	...
G61500	6150	0.48-0.53	0.70-0.90	0.025	0.025	0.15-0.30	...	0.80-1.10	...	0.15 min
G61500	6150	0.48-0.53	0.70-0.90	0.025	0.025	0.15-0.30	...	0.80-1.10	...	0.15 min
G61580	6158	0.55-0.62	0.70-1.10	0.025	0.025	0.15-0.30	...	0.90-1.20	...	0.10-0.20
G61580	6158 ^C	0.55-0.62	0.70-1.10	0.025	0.025	0.15-0.30	...	0.90-1.20	...	0.10-0.20
G86150	8615	0.13-0.18	0.70-0.90	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86170	8617	0.15-0.20	0.70-0.90	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86170	8617	0.15-0.20	0.70-0.90	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86200	8620	0.18-0.23	0.70-0.90	0.035	0.035	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86300	8630	0.28-0.33	0.70-0.90	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86300	8630	0.28-0.33	0.70-0.90	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86400	8640	0.38-0.43	0.75-1.00	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86400	8640	0.38-0.43	0.75-1.00	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86420	8642	0.40-0.45	0.75-1.00	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86420	8642 ^C	0.40-0.45	0.75-1.00	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86450	8645	0.43-0.48	0.75-1.00	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86500	8650	0.48-0.53	0.75-1.00	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86500	8650 ^C	0.48-0.53	0.75-1.00	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86550	8655	0.50-0.60	0.75-1.00	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86550	8655	0.501-0.59	0.75-1.00	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86600	8660	0.55-0.65	0.75-1.00	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G87200	8720	0.18-0.23	0.70-0.90	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.20-0.30	...
G87350	8735	0.33-0.38	0.75-1.00	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.20-0.30	...
G87350	8735 ^C	0.33-0.38	0.75-1.00	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.20-0.30	...
G87400	8740	0.38-0.43	0.75-1.00	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.20-0.30	...
G87400	8740 ^C	0.38-0.43	0.75-1.00	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.20-0.30	...
G92600	9260	0.55-0.65	0.70-1.00	0.025	0.025	1.80-2.20	...	...	...	...
G92600	9260	0.56-0.64	0.75-1.00	0.025	0.025	1.80-2.20	...	...	...	...
G92620	9262	0.55-0.65	0.75-1.00	0.025	0.025	1.80-2.20	...	0.25-0.40	...	...
G92620	9262 ^C	0.55-0.65	0.75-1.00	0.025	0.025	1.80-2.20	...	0.25-0.40	...	...
---	E9310	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	...
---	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.

 **A1031/A1031M – 12**

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

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