



Standard Specification for Stainless Steel Billets and Bars for Forging¹

This standard is issued under the fixed designation A314; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope*

1.1 This specification covers stainless steel billets and bars intended only for forging.

2. Referenced Documents

2.1 ASTM Standards:²

A484/A484M Specification for General Requirements for
Stainless Steel Bars, Billets, and Forgings

A751 Test Methods, Practices, and Terminology for Chemi-
cal Analysis of Steel Products

E527 Practice for Numbering Metals and Alloys in the
Unified Numbering System (UNS)

2.2 Other Document:

SAE J1086 Recommended Practice for Numbering Metals
and Alloys³

3. Ordering Information

3.1 It is the responsibility of the purchaser to specify all requirements that are necessary for material ordered under this specification. Such requirements may include but are not limited to the following:

- 3.1.1 Quantity (weight or number of pieces),
- 3.1.2 Name of material: type or UNS designation (Table 1),
- 3.1.3 Condition,
- 3.1.4 Cross section (round, round-cornered square, and so forth),
- 3.1.5 Form: bar or forging billet,
- 3.1.6 Applicable dimensions, including size, thickness, width, and length,
- 3.1.7 ASTM designation and date of issue,

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 A01.17 on Flat-Rolled and Wrought Stainless Steel.

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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 Society of Automotive Engineers (SAE), 400 Commonwealth Dr., Warrendale, PA 15096-0001, http://www.sae.org.

3.1.8 Preparation for delivery (see Specification A484/A484M),

3.1.9 Marking (see Specification A484/A484M), and

3.1.10 Exceptions to the specification or special requirements.

3.2 If possible, the intended use of the item should be given on the purchase order especially when the item is ordered for a specific end use or uses.

NOTE 1—A typical ordering description is as follows: 10 000 lb, Type 420, annealed, round-cornered square billets, ASTM A314 dated _____ for valve parts.

4. Manufacture

4.1 *Annealing*—Blooms and billets of the 400 series of stainless steel types which are highly hardenable, such as Types 414, 420, 431, 440A, 440B, and 440C, are commonly annealed prior to shipment and so specified in order to avoid the possibility of thermal cracking. Those grades are not normally furnished in the as-rolled or as-forged condition. Other hardenable grades, such as Types 403, 410, 416, and 416 Se, which may also require annealing, depending on their composition and size, are furnished suitable for cold cutting when so specified on the purchase order.

4.2 *Conditioning*—Material may be conditioned by chipping or grinding to remove injurious surface defects provided the depth of conditioning does not exceed that which will affect the surface condition or dimensions of the article to be forged from the bar or billet.

5. Chemical Composition

5.1 The steel shall conform to the chemical composition prescribed in Table 1 for the respective grades.

5.2 Methods and practices relating to chemical analysis required by this specification shall be in accordance with Test Methods, Practices, and Terminology A751.

6. Dimensions

6.1 Billets and bars shall conform to the shape and dimensions specified by the purchaser within a permissible variation of $\pm 5\%$.

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



TABLE 1 Chemical Requirements

UNS Design- ation ^A	Type Number	Chemical Composition, % ^B									
		Carbon	Man- ganese	Phos- phorus	Sulfur	Silicon	Chromium	Nickel	Molyb- denum	Nitrogen	Other Elements
Austenitic Grades											
S20161	...	0.15	4.00–6.00	0.040	0.040	3.00–4.00	15.00–18.00	4.00–6.00	...	0.08–0.20	...
S20200	202	0.15	7.50–10.00	0.060	0.030	1.00	17.00–19.00	4.00–6.00	...	0.25	...
S20910	XM-19	0.06	4.00–6.00	0.040	0.030	1.00	20.50–23.50	11.50–13.50	1.50–3.00	0.20–0.40	Cb 0.10–0.30 V 0.10–0.30
S21800	...	0.10	7.00–9.00	0.060	0.030	3.50–4.50	16.00–18.00	8.00–9.00	...	0.08–0.18	...
S21900	XM-10	0.08	8.00–10.00	0.060	0.030	1.00	19.00–21.50	5.50–7.50	...	0.15–0.40	...
S21904	XM-11	0.04	8.00–10.00	0.060	0.030	1.00	19.00–21.50	5.50–7.50	...	0.15–0.40	...
S24000	XM-29	0.08	11.50–14.50	0.060	0.030	1.00	17.00–19.00	2.25–3.75	...	0.20–0.40	...
S24100	XM-28	0.15	11.00–14.00	0.060	0.030	1.00	16.50–19.00	0.50–2.25	...	0.20–0.45	...
S28200	...	0.15	17.00–19.00	0.045	0.030	1.00	17.00–19.00	...	0.75–1.25	0.40–0.60	...
S30200	302	0.15	2.00	0.045	0.030	1.00	17.00–19.00	8.00–10.00	...	0.10	...
S30215	302B	0.15	2.00	0.045	0.030	2.00–3.00	17.00–19.00	8.00–10.00	...	...	...
S30300	303	0.15	2.00	0.20	0.15 min	1.00	17.00–19.00	8.00–10.00	...	...	...
S30323	303Se	0.15	2.00	0.20	0.06	1.00	17.00–19.00	8.00–10.00	...	...	Se 0.15 min
S30400	304	0.08	2.00	0.045	0.030	1.00	18.00–20.00	8.00–10.50	...	0.10	...
S30403	304L	0.030	2.00	0.045	0.030	1.00	18.00–20.00	8.00–12.00	...	0.10	...
S30500	305	0.12	2.00	0.045	0.030	1.00	17.00–19.00	10.50–13.00	...	...	...
S30800	308	0.08	2.00	0.045	0.030	1.00	19.00–21.00	10.00–12.00	...	...	...
S30900	309	0.20	2.00	0.045	0.030	1.00	22.00–24.00	12.00–15.00	...	...	...
S30908	309S	0.08	2.00	0.045	0.030	1.00	22.00–24.00	12.00–15.00	...	...	...
S30940	309Cb	0.08	2.00	0.045	0.030	1.00	22.00–24.00	12.00–16.00	...	...	Cb + Ta – 10 × C
S31000	310	0.25	2.00	0.045	0.030	1.50	24.00–26.00	19.00–22.00	...	...	...
S31008	310S	0.08	2.00	0.045	0.030	1.50	24.00–26.00	19.00–22.00	...	...	...
S31266	...	0.030	2.00–4.00	0.035	0.020	1.00	23.0–25.0	21.0–24.0	5.2–6.2	0.35–0.60	Cu 1.00–2.50 W 1.50–2.50
S31400	314	0.25	2.00	0.045	0.030	1.50–3.00	23.00–26.00	19.00–22.00	...	...	...
S31600	316	0.08	2.00	0.045	0.030	1.00	16.00–18.00	10.00–14.00	2.00–3.00	0.10	...
S31603	316L	0.030	2.00	0.045	0.030	1.00	16.00–18.00	10.00–14.00	2.00–3.00	0.10	...
S31635	316Ti	0.08	2.00	0.045	0.030	1.00	16.00–18.00	10.00–14.00	2.00–3.00	...	Ti – 5 × (C+N) min; 0.70
S31640	316Cb	0.08	2.00	0.045	0.030	1.00	16.00–18.00	10.00–14.00	2.00–3.00	...	Cb + Ta – 10 × C min; 1.10
S31700	317	0.08	2.00	0.045	0.030	1.00	18.00–20.00	11.00–15.00	3.00–4.00	0.10	...
S32100	321	0.08	2.00	0.045	0.030	1.00	17.00–19.00	9.00–12.00	...	...	Ti 5 × C min Cb 0.6–1.0
S33228	...	0.04–0.08	1.00	0.020	0.015	0.030	26.00–28.00	31.00–33.00	...	...	Ce 0.05–0.10 Al 0.025
S34700	347	0.08	2.00	0.045	0.030	1.00	17.00–19.00	9.00–13.00	...	...	Cb + Ta 10 × C min
S34800	348	0.08	2.00	0.045	0.030	1.00	17.00–19.00	9.00–13.00	...	...	Cb + Ta 10 × C min; Ta 0.10
S38031	...	0.015	2.0	0.020	0.010	0.3	26.0–28.0	30.0–32.0	6.0–7.0	0.15–0.25	Cu 1.0–1.5
S38926	...	0.020	2.00	0.03	0.01	0.5	19.00–21.00	24.00–26.00	6.0–7.0	0.15–0.25	Cu 0.5–1.5
Austenitic-Ferritic Grades											
S31803	...	0.030	2.00	0.030	0.020	1.00	21.0–23.0	4.5–6.5	2.5–3.5	0.08–0.20	...
S32003	...	0.030	2.00	0.030	0.020	1.00	19.5–22.5	3.0–4.0	1.50–2.00	0.14–0.20	...
S32101	...	0.040	4.00–6.00	0.040	0.030	1.00	21.0–22.0	1.35–1.70	0.10–0.80	0.20–0.25	Cu 0.10–0.80
S32202	...	0.030	2.00	0.040	0.010	1.00	21.50–24.00	1.00–2.80	0.45	0.18–0.26	...
S32205	...	0.030	2.00	0.030	0.020	1.00	22.0–23.0	4.5–6.5	3.0–3.5	0.14–0.20	...
S32304	...	0.030	2.50	0.040	0.030	1.00	21.5–24.5	3.0–5.5	0.05–0.60	0.05–0.20	Cu 0.05–0.60
S32750	...	0.030	1.20	0.035	0.020	0.80	24.0–26.0	6.0–8.0	3.0–5.0	0.24–0.32	Cu 0.50 max
S32760 ^C	...	0.030	1.00	0.030	0.010	1.00	24.00–26.00	6.00–8.00	3.00–4.00	0.20–0.30	Cu 0.50–1.00 W 0.50–1.00
S32950	...	0.030	2.00	0.035	0.010	0.60	26.0–29.0	3.5–5.2	1.00–2.50	0.15–0.35	...
S82441	...	0.030	2.50–4.00	0.035	0.005	0.70	23.0–25.0	3.0–4.5	1.00–2.00	0.20–0.30	Cu 0.10–0.80
Ferritic Grades											
S42900	429	0.12	1.00	0.040	0.030	1.00	14.00–16.00	...	...	...	...
S43000	430	0.12	1.00	0.040	0.030	1.00	16.00–18.00	...	...	...	...
S43020	430F	0.12	1.25	0.06	0.15 min	1.00	16.00–18.00	...	0.60 ^D	...	...
S43023	430F Se	0.12	1.25	0.06	0.06	1.00	16.00–18.00	...	...	...	Se 0.15 min
S44600	446	0.20	1.50	0.040	0.030	1.00	23.00–27.00	...	...	0.25	...
S44625	XM-27 ^E	0.010	0.40	0.020	0.020	0.40	25.00–27.50	0.50	0.75–1.50	0.015	...
Martensitic Grades											
S40300	403	0.15	1.00	0.040	0.030	0.50	11.50–13.00	...	...	...	...
S41000	410	0.15	1.00	0.040	0.030	1.00	11.50–13.50	...	...	...	...
S41400	414	0.15	1.00	0.040	0.030	1.00	11.50–13.50	1.25–2.50	...	...	...
S41425	...	0.05	0.50–1.00	0.020	0.005	0.50	12.0–15.0	4.0–7.0	1.50–2.00	0.06–0.12	Cu 0.30
S41600	416	0.15	1.25	0.06	0.15 min	1.00	12.00–14.00	...	0.60 ^D	...	...
S41623	416Se	0.15	1.25	0.06	0.06	1.00	12.00–14.00	...	...	...	Se 0.15 min
S42000	420	0.15 min	1.00	0.040	0.030	1.00	12.00–14.00	...	...	...	...
S42010	...	0.15–0.30	1.00	0.04	0.03	1.00	13.50–15.00	0.35–0.85	0.40–0.85	...	...
S43100	431	0.20	1.00	0.040	0.030	1.00	15.00–17.00	1.25–2.50	...	...	...

TABLE 1 *Continued*

UNS Designation ^A	Type Number	Chemical Composition, % ^B									
		Carbon	Man-ganese	Phos-phorus	Sulfur	Silicon	Chromium	Nickel	Molybdenum	Nitrogen	Other Elements
S44002	440A	0.60–0.75	1.00	0.040	0.030	1.00	16.00–18.00	...	0.75	...	...
S44003	440B	0.75–0.95	1.00	0.040	0.030	1.00	16.00–18.00	...	0.75	...	...
S44004	440C	0.95–1.20	1.00	0.040	0.030	1.00	16.00–18.00	...	0.75	...	...
S50100	501	0.10 min	1.00	0.040	0.030	1.00	4.00–6.00	...	0.40–0.65	...	...
S50200	502	0.10	1.00	0.040	0.030	1.00	4.00–6.00	...	0.40–0.65	...	...

^A New designation established in accordance with Practice E527 and SAE J1086.

^B Maximum unless otherwise indicated.

^C % Cr + 3.3 × % Mo + 16 × % N ≥ 40.

^D At the option of the manufacturer.

^E Nickel plus copper combined; 0.50 max. Product analysis tolerance over the maximum limit for carbon and nitrogen to be 0.002 %.

7. General Requirements

7.1 In addition to the requirements of this specification, all requirements of the current edition of Specification A484/A484M shall apply. Failure to comply with the general requirements of Specification A484/A484M constitutes non-conformance with this specification.

8. Keywords

8.1 austenitic stainless steel; austenitic-ferritic duplex stainless steel; ferritic stainless steel; martensitic stainless steel; stainless steel bars; stainless steel billets

SUMMARY OF CHANGES

Committee A01 has identified the location of selected changes to this standard since the last issue (A314 – 13a) that may impact the use of this standard. (Approved July 15, 2015.)

(1) UNS S31266 to Table 1.

Committee A01 has identified the location of selected changes to this standard since the last issue (A314–13) that may impact the use of this standard. (Approved Oct. 1, 2013.)

(1) Added UNS S31803, UNS S32003, UNS S32101, UNS S32205, UNS S32304, and UNS S32750 to Table 1. (2) Corrected grades in UNS S32950 and UNS 32202.

Committee A01 has identified the location of selected changes to this standard since the last issue (A314–08) that may impact the use of this standard. (Approved May 1, 2013.)

(1) Added UNS S82441 to Table 1.

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