Designation: A 314 – 97 (Reapproved 2002)

An American National Standard

Standard Specification for Stainless Steel Billets and Bars for Forging[1]

This standard is issued under the fixed designation A 314; 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 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:*

A 484/A 484M Specification for General Requirements for Stainless Steel Bars, Billets and Forgings[2]

A 751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products[3]

E 527 Practice for Numbering Metals and Alloys (UNS)[4]

2.2 *Other Document:*

SAE J1086 Recommended Practice for Numbering Metals and Alloys[5]

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, etc.),

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,

3.1.8 Preparation for delivery (see Specification A 484/A 484M),

3.1.9 Marking (see Specification A 484/A 484M), 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 A 314 dated ——— for valve parts.

4. Manufacture

4.1 *Annealing*

4.1.1 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*

4.2.1 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 A 751.

6. Dimensions

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

7. General Requirements

7.1 In addition to the requirements of this specification, all requirements of the current edition of Specification A 484/A 484M shall apply. Failure to comply with the general requirements of Specification A 484/A 484M constitutes nonconformance with this specification.

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[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 Stainless Steel Products.

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[2] *Annual Book of ASTM Standards*, Vol 01.05.

[3] *Annual Book of ASTM Standards*, Vol 01.03.

[4] *Annual Book of ASTM Standards*, Vol 01.01.

[5] Available from Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096.

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8. Keywords

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

TABLE 1 Chemical Requirements

UNS Designation[A]	Type Number	Chemical Composition, %[B]									
		Carbon	Manganese,	Phosphorus,	Sulfur,	Silicon,	Chromium	Nickel	Molybdenum	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. . .	. . .	. . .	
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	. . .	. . .	. . .
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
S33228	. . .	0.04–0.08	1.00	0.020	0.015	0.030	26.00–28.00	31.00–33.00	. . .	. . .	Cb 0.6–1.0 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					
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	. . .	0.03	2.00	0.035	0.010	0.60	26.00–29.00	3.50–5.20	1.00–2.50	0.15–0.35	. . .
						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	. . .

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TABLE 1 *Continued*

UNS Designation[A]	Type Number	Chemical Composition, %[B]									
		Carbon	Manganese,	Phosphorus,	Sulfur,	Silicon,	Chromium	Nickel	Molybdenum	Nitrogen	Other Elements
						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	. . .	. . .	. . .
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 E 527 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 %.

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