Designation: ~~B625 – 17~~ B625 – 21

Standard Specification for ~~UNS N08925, UNS N08031, UNS~~Ni-Fe-Cr-Mo-Cu-N Low-Carbon Alloy, Ni-Fe-Cr-Si Alloy, ~~N08034, UNS N08932, UNS N08926, UNS N08354, UNS N08830,~~ Cr-Ni-Fe-N Low-Carbon Alloy, Fe-Ni-Cr-Mo-Cu-N Alloy, and ~~UNS R20033~~Ni-Fe-Cr-Mo-N Alloy Plate, Sheet, and Strip[1]

This standard is issued under the fixed designation B625; 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 ~~alloys UNS N08925, UNS N08031, UNS N08034, UNS N08932, UNS N08926, UNS N08354, UNS N08830, and UNS R20033~~nickel-iron-chromium-molybdenum-copper-nitrogen low-carbon alloy, nickel-iron-chromium-silicon alloy, chromium-nickel-iron-nitrogen low-carbon alloy, iron-nickel-chromium-molybdenum-copper-nitrogen alloy, and nickel-iron-chromium-molybdenum-nitrogen alloy plate, sheet, and strip in the annealed temper.

1.2 ASTM International has adopted definitions whereby some grades, such as UNS N08904, previously in this specification were recognized as stainless steels, because those grades have iron as the largest element by mass percent. Such grades are under the oversight of ASTM Committee A01 and its subcommittees. The products of N08904 previously covered in this specification are now covered by Specifications A240/A240M and A480/A480M.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to become familiar with all hazards including those identified in the appropriate Safety Data Sheet (SDS) for this product/material as provided by the manufacturer, to establish appropriate safety, health, and environmental practices, and determine the applicability of regulatory limitations prior to use.*

1.5 *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]

[1] This specification is under the jurisdiction of ASTM Committee B02 on Nonferrous Metals and Alloys and is the direct responsibility of Subcommittee B02.07 on Refined Nickel and Cobalt and Their Alloys.

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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**

A240/A240M Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
A480/A480M Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip
B906 Specification for General Requirements for Flat-Rolled Nickel and Nickel Alloys Plate, Sheet, and Strip
E527 Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS)

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *plate, n*—material 3⁄16 in. (4.76 mm) and over in thickness and over 10 in. (254 mm) in width.

3.1.2 *sheet, n*—material under 3⁄16 in. (4.76 mm) in thickness and 24 in. (609.6 mm) and over in width. Material under 3⁄16 in. (4.75 mm) in thickness and in all widths with No. 4 finish.

3.1.3 *strip, n*—material under 3⁄16 in. (4.76 mm) in thickness and under 24 in. (609.6 mm) in width.

4. General Requirements

4.1 Material furnished in accordance with this specification shall conform to the applicable requirements of the current edition of Specification B906 unless otherwise provided herein.

5. Ordering Information

5.1 Orders for material under this specification shall include the following information:

5.1.1 Quantity (weight or number of pieces),

5.1.2 Alloy name or UNS number,

TABLE 1 Chemical Requirements[A]

Elements	UNS N08925	UNS N08932	UNS N08354	UNS N08034	UNS N08031	UNS N08926	UNS N08830	UNS R20033
Carbon	0.020	0.020	0.030	0.01	0.015	0.020	0.015	0.015
Manganese	1.00	2.00	1.00	1.0-4.0	2.0	2.00	3.0-6.0	2.0
Phosphorus	0.045	0.025	0.030	0.020	0.020	0.03	0.035	0.02
Sulfur	0.030	0.010	0.010	0.010	0.010	0.01	0.010	0.01
Silicon	0.50	0.40	1.00	0.1	0.3	0.5	1.00	0.50
Nickel	24.00–26.00	24.0–26.0	34.0–36.0	33.5-35.0	30.0–32.0	24.00–26.00	29.0-34.0	30.0–33.0
Chromium	19.00–21.00	24.0–26.0	22.0–24.0	26.0-27.0	26.0–28.0	19.00–21.00	20.0-24.0	31.0–35.0
Molybdenum	6.0–7.0	4.5–6.5	7.0–8.0	6.0-7.0	6.0–7.0	6.0–7.0	4.5-6.5	0.50–2.0
Copper	0.8–1.5	1.0–2.0	...	0.5-1.5	1.0–1.4	0.5–1.5	0.50-2.00	0.30–1.20
Cobalt	...	...	...	...	...	...	0.50-3.5	...
Tungsten	...	...	...	...	...	...	0.20-1.80	...
Nitrogen	0.10–0.20	0.15–0.25	0.17–0.24	0.10-0.25	0.15–0.25	0.15–0.25	0.20-0.55	0.35–0.60
Iron	balance	balance	balance	balance	balance	balance	balance	balance
Aluminum	...	...	...	0.3	...	...	...	...

TABLE 1 Chemical Requirements[A]

Elements	UNS N08925	UNS N08932	UNS N08354	UNS N08034	UNS N08031	UNS N08926	UNS N08830	UNS N08935	UNS R20033
Carbon	0.020	0.020	0.030	0.01	0.015	0.020	0.015	0.030	0.015
Manganese	1.00	2.00	1.00	1.0–4.0	2.0	2.00	3.0-6.0	1.2	2.0
Phosphorus	0.045	0.025	0.030	0.020	0.020	0.03	0.035	0.030	0.02
Sulfur	0.030	0.010	0.010	0.010	0.010	0.01	0.010	0.020	0.01
Silicon	0.50	0.40	1.00	0.1	0.3	0.5	1.00	0.5	0.50
Nickel	24.00–26.00	24.0–26.0	34.0–36.0	33.5–35.0	30.0–32.0	24.00–26.00	29.0–34.0	34.0–36.0	30.0–33.0
Chromium	19.00–21.00	24.0–26.0	22.0–24.0	26.0–27.0	26.0–28.0	19.00–21.00	20.0–24.0	26.0–28.0	31.0–35.0
Molybdenum	6.0–7.0	4.5–6.5	7.0–8.0	6.0–7.0	6.0–7.0	6.0–7.0	4.5–6.5	6.1–7.1	0.50–2.0
Copper	0.8–1.5	1.0–2.0	...	0.5–1.5	1.0–1.4	0.5–1.5	0.50–2.00	0.4	0.30–1.20
Cobalt	...	...	...	...	...	...	0.50–3.5	...	...
Tungsten	...	...	...	...	...	...	0.20–1.80	...	...
Nitrogen	0.10–0.20	0.15–0.25	0.17–0.24	0.10–0.25	0.15–0.25	0.15–0.25	0.20–0.55	0.25–0.36	0.35–0.60
Iron	balance	balance	balance	balance	balance	balance	balance	balance	balance
Aluminum	...	...	...	0.3	...	...	...	...	...

[A] Maximum %, unless range or minimum is indicated.

TABLE 2 Mechanical Property Requirements

Alloy	Form	Tensile Strength, min, ksi (MPa)	Yield Strength (0.2 % offset), min, psi (MPa)	Elongation in 2 in. or 50.8 mm, or 4*D*, min, %
UNS N08925	sheet	87 (600)	43 000 (295)	40
	strip	87 (600)	43 000 (295)	40
	plate	87 (600)	43 000 (295)	40
UNS N08932	plate	87 (600)	44 000 (305)	40
UNS N08031	sheet	94 (650)	40 000 (276)	40
	strip	94 (650)	40 000 (276)	40
	plate	94 (650)	40 000 (276)	40
UNS N08034	sheet	94 (650)	40 000 (280)	40
	strip	94 (650)	40 000 (280)	40
	plate	94 (650)	40 000 (280)	40
UNS N08926	sheet	94 (650)	43 000 (295)	35
	strip	94 (650)	43 000 (295)	35
	plate	94 (650)	43 000 (295)	35
UNS N08354	sheet	93 (640)	43 000 (295)	40
	strip	93 (640)	43 000 (295)	40
	plate	93 (640)	43 000 (295)	40
UNS N08830	sheet	110 (760)	55 000 (380)	40
	strip	110 (760)	55 000 (380)	40
	plate	110 (760)	55 000 (380)	40
UNS N08935	sheet	109 (750)	62 000 (425)	40
	strip	109 (750)	62 000 (425)	40
	plate < 0.25 in. (6.35 mm)	109 (750)	62 000 (425)	40
	plate ≥ 0.25 in. (6.35 mm)	102 (700)	51 000 (350)	40
~~UNS R20033~~	~~sheet~~	~~109 (750)~~	~~55 000 (380)~~	~~40~~
UNS R20033	sheet	109 (750)	55 000 (380)	40
	~~strip~~	~~109 (750)~~	~~55 000 (380)~~	~~40~~
	strip	109 (750)	55 000 (380)	40
	~~plate~~	~~109 (750)~~	~~55 000 (380)~~	~~40~~
	plate	109 (750)	55 000 (380)	40

5.1.3 ~~Form, plate, sheet~~ Form—Plate, sheet, or strip,

5.1.4 Dimensions,

5.1.5 Type edge required, for strip only (see Specification B906),

5.1.6 Finish (see Specification B906)—For sheet with No. 4 finish, specify whether one or both sides are to be polished,

5.1.7 ASTM designation,

5.1.8 Additions to the specification or special requirements,

5.1.9 Certification or test reports—State if certification or test reports are required, and

5.1.10 Source inspection—State if inspection is required.

6. Chemical Composition

6.1 The material shall conform to the composition limits specified in Table 1. One test per lot is required as defined in Specification B906.

6.2 If a product analysis is made by the purchaser, the material shall conform to the product (check) analysis variations in Specification B906.

7. Mechanical Properties and Other Requirements

7.1 *Tensile and Hardness Requirements*—The material shall conform to the mechanical property requirements specified in Table 2. One test per lot is required as defined in Specification B906.