



~~Designation: B622-06~~ Designation: B622 - 10

## Standard Specification for Seamless Nickel and Nickel-Cobalt Alloy Pipe and Tube<sup>1</sup>

This standard is issued under the fixed designation B622; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This specification<sup>2</sup> covers seamless pipe and tube of nickel and nickel-cobalt alloys (UNS N10001, UNS N10242, UNS N10665, UNS N12160, UNS N10675, UNS N10276, UNS N06455, UNS N06007, UNS N08320, UNS N06975, UNS N06002, UNS N06985, UNS N06022, UNS N06035, UNS N08135, UNS N06255, UNS N06058, UNS N06059, UNS N06200, UNS N10362, UNS N06030, UNS N08031, UNS R30556, UNS N08535, UNS N06250, UNS N06060, UNS N06230, UNS N06686, UNS N10629, UNS N06210, UNS N10624, and UNS R20033)\* as shown in Table 1.

1.2 Pipe and tube shall be supplied in the solution annealed and descaled condition. When atmosphere control is used, descaling is not necessary.

~~1.3 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.~~

~~1.4 This specification is limited to tubes up to and including 3.5 in. (88.9 mm) outside diameter.~~

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1.4 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.

1.5 *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 Material Safety Data Sheet (MSDS) for this product/material as provided by the manufacturer; to establish appropriate safety and health practices, and determine the applicability of regulatory limitations prior to use.*

### 2. Referenced Documents

2.1 *ASTM Standards:*<sup>3</sup>

B829 [Specification for General Requirements for Nickel and Nickel Alloys Seamless Pipe and Tube](#)

E8 [Test Methods for Tension Testing of Metallic Materials](#)

E527 [Practice for Numbering Metals and Alloys in the Unified Numbering System \(UNS\)](#)

### 3. Terminology

3.1 *Definitions:*

3.1.1 *average diameter, n*—the average of the maximum and minimum outside diameters, or the maximum and minimum inside diameters, as determined at any cross section of the tube.

3.1.2 *pipe, n*—seamless tube conforming to the particular dimensions commercially known as standard pipe sizes (Appendix X2).

3.1.3 *tube, n*—a hollow product of round or any other cross section having a continuous periphery.

### 4. General Requirements

4.1 Material furnished under this specification shall conform to the applicable requirements of Specification B829 unless otherwise provided herein.

<sup>1</sup> 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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<sup>2</sup> For ASME Boiler and Pressure Vessel Code applications see related Specification SB-622 in Section II of that Code.

\* New designation established in accordance with Practice E527 and SAE J1086, Practice for Numbering Metals and Alloys (UNS).

<sup>3</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

## 5. Ordering Information

5.1 It is the responsibility of the purchaser to specify all requirements that are necessary for the material ordered under this specification. Examples of such requirements include, but are not limited to the following:

5.1.1 *Alloy* (Table 1).

5.1.2 *Dimensions*:

5.1.2.1 *Tube*—Outside diameter, minimum or average wall thickness, and length.

5.1.2.2 *Pipe*—Standard pipe size and schedule (Appendix X2).

5.1.3 *Ends*—Plain ends cut and deburred will be furnished.

5.1.4 *Certification*—State if certification or a report of test results is required (Section 15).

5.1.5 *Samples for Check Analysis* —State whether samples for check analysis should be furnished.

5.1.6 *Purchaser Inspection*—If the purchaser wishes to witness tests or inspection of material at the place of manufacture, the purchase order must so state, indicating which tests or inspections are to be witnessed (Section 14).

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[ASTM B622-10](#)

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**TABLE 1 Chemical Requirements**

	Composition Limits, %																								
	Ni	Cr	Mo	Fe	W	C	Si	Co	Mn	V	P	S	Ti	Cu	Cb (Nb) + Ta	Al	Zr	La	N	B	Cb (Nb)	Ta	Ni+Mo	Mg	
Ni-Mo Alloys																									
N10001	remainder	1.0 max	26.0-30.0	4.0-6.0	...	0.05 max	1.0	2.5 max	1.0	0.2-0.4	0.04	0.03	...	...	...	...	0.10 max	...	...	0.006 max	0.20 max	94.0-98.0	...	...	
N10665	remainder	1.0 max	26.0-30.0	2.0 max	...	0.02 max	1.0	1.0 max	1.0	...	0.04	0.03	...	...	...	...	...	...	...	...	...	...	...	...	...
N10675	65.0 min	3.0	27.0-32.0	1.0-3.0	3.0 max	0.01	0.10	3.0 max	3.0	0.20 max	0.030	0.010	0.20 max	0.20 max	0.20 max	0.50 max	0.10 max	...	...	...	0.20 max	...	...	...	
N10629	remainder	0.5-1.5	26.0-30.0	1.0-6.0	...	0.01 max	0.05	2.5 max	1.5 max	...	0.04	0.01	...	0.5 max	...	0.1-0.5	...	...	...	...	...	...	...	...	...
N10624	remainder	6.0-10.0	21.0-25.0	5.0-8.0	...	0.01 max	0.10	1.0 max	1.0	...	0.025	0.01	...	0.5 max	...	...	...	...	...	...	...	...	...	...	...
Ni-Mo-Cr-Fe Alloy																									
N10242	remainder	7.0-9.0	24.0-26.0	2.0 max	...	0.03 max	0.80	1.00 max	0.80	0.030	0.015	0.015	...	0.50 max	...	0.50 max	...	...	...	...	...	...	...	...	...
Low C Ni-Cr-Mo Alloys																									
N10276	remainder	14.5-16.5	15.0-17.0	4.0-7.0	3.0-4.5	0.010 max	0.08	2.5 max	1.0	0.35 max	0.04	0.03	...	...	...	...	...	...	...	...	...	...	...	...	...
N06022	remainder	20.0-22.5	12.5-14.5	2.0-6.0	2.5-3.5	0.015 max	0.08	2.5 max	0.50 max	0.35 max	0.02	0.02	...	...	...	...	...	...	...	...	...	...	...	...	...
N06035	remainder	32.25-34.25	7.60-9.00	2.00 max	0.60 max	0.050 max	0.60	1.00 max	0.50 max	0.20 max	0.030	0.015	...	0.30 max	...	0.40 max	...	...	...	...	...	...	...	...	...
N06455	remainder	14.0-18.0	14.0-17.0	3.0 max	...	0.015 max	0.08	2.0 max	1.0	...	0.04	0.03	0.70 max	...	...	...	...	...	...	...	...	...	...	...	...
Ni-Cr-Fe-Mo-Cu Alloys																									
N06007	remainder	21.0-23.5	5.5-7.5	18.0-21.0	1.0 max	0.05 max	1.0	2.5 max	1.0-2.0	...	0.04	0.03	...	1.5-2.5	1.75-2.5	...	...	...	...	...	...	...	...	...	...
N06975	47.0-52.0	23.0-26.0	5.0-7.0	remainder	...	0.03 max	1.0	...	1.0	...	0.03	0.03	0.70-1.50	0.70-1.20	...	...	...	...	...	...	...	...	...	...	...
N06985	remainder	21.0-23.5	6.0-8.0	18.0-21.0	1.5 max	0.015 max	1.0	5.0 max	1.0	...	0.04	0.03	...	1.5-2.5	0.50 max	...	...	...	...	...	...	...	...	...	...
N06030	remainder	28.0-31.5	4.0-6.0	13.0-17.0	1.5-4.0	0.03 max	0.8	5.0 max	1.5 max	...	0.04	0.02	...	1.0-2.4	0.30-1.50	...	...	...	...	...	...	...	...	...	...
N06255	47.0-52.0	23.0-26.0	6.0-9.0	remainder	3.0 max	0.03 max	1.0	...	1.0	...	0.03	0.03	0.69 max	1.2 max	...	...	...	...	...	...	...	...	...	...	...
N06250	50.0-54.0	20.0-23.0	10.1-12.0	remainder	0.25-1.25	0.020 max	0.09	...	1.00 max	...	0.030	0.005	...	0.25-1.25	...	...	...	...	...	...	...	...	...	...	...
Ni-Fe-Cr-Mo Alloys																									
N08320	25.0-27.0	21.0-23.0	4.0-6.0	remainder	...	0.05 max	1.0	...	2.5 max	...	0.04	0.03	4xC min	...	...	...	...	...	...	...	...	...	...	...	...
N08135	33.0-38.0	20.5-23.5	4.0-5.0	remainder	0.20-0.80	0.030 max	0.75	...	1.00 max	...	0.03	0.03	...	0.70 max	...	...	...	...	...	...	...	...	...	...	...
N06002	remainder	20.5-23.0	8.0-10.0	17.0-20.0	1.0-1.15	0.05-0.15	1.0	0.5-2.5	1.0 max	...	0.04	0.03	...	...	...	...	...	...	...	...	...	...	...	...	...
N06060	54.0-60.0	19.0-22.0	12.0-14.0	remainder	0.25-1.25	0.03 max	0.50	...	1.50 max	...	0.030	0.005	...	0.25-1.25	0.50-1.25	...	...	...	...	...	...	...	...	...	...
Ni-Fe-Cr-Co Alloy																									

**TABLE 1 Continued**

Composition Limits, %

	Ni	Cr	Mo	Fe	W	C	Si max	Co	Mn	V	P max	S max	Ti	Cu	Cb (Nb) +Ta	Al	Zr	La	N	B	Cb (Nb)	Ta	Ni+ Mo	Mg
R30556 Ni-Cr-W-Mo Alloys	19.0-22.5	21.0- 23.0	2.5- 4.0	remainder <sup>r</sup>	2.0- 3.5	0.05- 0.15	0.20- 0.80	16.0- 21.0	0.50- 2.00	...	0.04	0.015	...	...	...	0.10- 0.50	0.001- 0.10	0.005- 0.10	0.10- 0.30	0.02 max	0.30 max	0.3- 1.25	...	...
N06230 Low C-Ni- Cr-Mo	remainder <sup>r</sup>	20.0- 24.0	1.0- 3.0	3.0 max	13.0- 15.0	0.05- 0.15	0.25- 0.75	5.0 max	0.30- 1.00	...	0.03	0.015	...	...	...	0.50 max	...	0.005- 0.050	...	0.015 max	...	...	...	...
N06058	balance	20.0- 23.0	19.0- 21.0	1.5 max	0.3 max	0.010 max	0.10 max	0.3 max	0.50 max	...	0.015	0.010	...	0.50 max	...	0.40 max	...	...	0.02- 0.15	...	...	...	...	...
N06059	balance	22.0- 24.0	15.0- 16.5	1.5 max	...	0.010 max	0.10 max	0.3 max	0.5 max	...	0.015	0.005	...	0.50 max	...	0.1- 0.4	...	...	...	...	...	...	...	...
Low C-Ni- Cr-Mo-Cu Alloy	remainder <sup>r</sup>	22.0- 24.0	15.0- 17.0	3.0 max	...	0.010 max	0.08	2.0 max	0.50 max	...	0.025	0.010	...	1.3- 1.9	...	0.50 max	...	...	...	...	...	...	...	...
Low C-Ni- Fe-Cr- Mo-Cu Alloys	remainder <sup>r</sup>	13.8- 15.6	21.5- 23.0	1.25 max	...	0.010 max	0.08	...	0.60 max	...	0.025	0.010	...	...	...	0.50 max	...	...	...	...	...	...	...	...
N08031	30.0-32.0	26.0- 28.0	6.0- 7.0	balance	...	0.015 max	0.3	...	2.0 max	...	0.020	0.010	...	1.0- 1.4	...	...	...	...	0.15- 0.25	...	...	...	...	...
N08535	29.0-36.5	24.0- 27.0	2.5- 4.0	remainder <sup>r</sup>	...	0.03 max	0.50	...	1.0 max	...	0.03	0.03	...	1.50 max	...	...	...	...	...	...	...	...	...	...
Low C-Ni- Cr-Mo-W Alloy	remainder <sup>r</sup>	19.0- 23.0	15.0- 17.0	5.0 max	3.0- 4.4	0.010 max	0.08	...	0.75 max	...	0.04	0.02	0.02- 0.25	...	...	...	...	...	...	...	...	...	...	...
Ni-Co-Cr-Si Alloy	remainder <sup>r</sup>	26.0- 30.0	1.0 max	3.5 max	1.0 max	0.15 max	2.4- 3.0	27.0- 33.0	1.5 max	...	0.030	0.015	0.20- 0.80	...	...	...	...	...	...	...	1.0 max	...	...	...
N12160	30.0-33.0	31.0- 35.0	0.50- 2.0	balance	...	0.015 max	0.50	...	2.0 max	...	0.02	0.01	...	0.3- 1.20	...	...	...	0.35- 0.60	...	...	...	...	...	...
Cr-Ni-Fe-N Alloy	remainder <sup>r</sup>	18.0- 20.0	18.0- 20.0	1.0 max	...	0.015 max	0.08	1.0 max	0.5 max	0.35 max	0.02	0.02	...	...	...	...	...	...	...	...	...	1.5- 2.2	...	...

<sup>A</sup> See 12.1