



Designation: B 622 – 00

Standard Specification for Seamless Nickel and Nickel-Cobalt Alloy Pipe and Tube¹

This standard is issued under the fixed designation B 622; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This specification² 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 N08135, UNS N06255, UNS N06058, UNS N06059, UNS N06200, 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.

2. Referenced Documents

2.1 ASTM Standards:

B 880 Specification for General Requirements for Chemical Check Analysis Limits for Nickel, Nickel Alloys and Cobalt Alloys³

E 8 Test Methods for Tension Testing of Metallic Materials⁴

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications⁵

E 55 Practice for Sampling Wrought Nonferrous Metals and Alloys for Determination of Chemical Composition⁶

E 1473 Test Methods for Chemical Analysis of Nickel, Cobalt, and High-Temperature Alloys⁷

3. Terminology

3.1 Definitions:

3.1.1 *average diameter*—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*—seamless tube conforming to the particular dimensions commercially known as standard pipe sizes (Appendix X2).

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

4. Ordering Information

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

4.1.1 *Alloy* (Table 1).

4.1.2 *Dimensions*:

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

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

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

4.1.4 *Certification*—State if certification or a report of test results is required (Section 16).

4.1.5 *Samples for Check Analysis*—State whether samples for check analysis should be furnished (10.2.2).

4.1.6 *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).

5. Chemical Composition

5.1 The material shall conform to the composition limits specified in Table 1.

5.2 If a product (check) analysis is made by the purchaser, the material shall conform to the requirements specified in Table 1 subject to the permissible tolerances per B 880.

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.

Current edition approved May 10, 2000. Published June 2000. Originally published as B 622 – 77. Last previous edition B 622 – 99a.

² 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 ASTM E 527 and SAE J1086, Practice for Numbering Metals and Alloys (UNS).

³ *Annual Book of ASTM Standards*, Vol 02.04.

⁴ *Annual Book of ASTM Standards*, Vol 03.01.

⁵ *Annual Book of ASTM Standards*, Vol 14.02.

⁶ *Annual Book of ASTM Standards*, Vol 03.05.

⁷ *Annual Book of ASTM Standards*, Vol 03.06.

TABLE 1 Chemical Requirements

	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	
Ni-Mo Alloys																									
N10001	remainder ^A	1.0 max	26.0-30.0	4.0-6.0	...	0.05 max	1.0	2.5 max	1.0 max	0.2-0.4	0.04	0.03	...	...	...	...	...	...	...	...	...	...	...	...	...
N10665	remainder ^A	1.0 max	26.0-30.0	2.0 max	...	0.02 max	0.10	max	1.0 max	...	0.04	0.03	...	...	...	...	...	...	...	...	...	...	...	...	...
N10675	65.0 min	1.0-3.0	27.0-32.0	1.0-3.0	3.0 max	0.01 max	0.10	3.0 max	3.0 max	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	0.20 max	94.0-98.0		
N10629	remainder ^A	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 ^A	6.0-10.0	21.0-25.0	5.0-8.0	...	0.01 max	0.10	1.0 max	1.0 max	...	0.025	0.01	...	0.5 max	...	...	...	...	...	...	...	...	...	...	...
Ni-Mo-Cr-Fe Alloy																									
N10242	remainder ^A	7.0-9.0	24.0-26.0	2.0 max	0.03 max	0.03 max	0.80	1.00 max	0.80 max	0.030	0.015	0.015	...	0.50 max	0.006 max	0.50 max	...	...	...	...	...	...	...	...	...
Low C Ni-Mo-Cr Alloys																									
N10276	remainder ^A	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 max	0.35 max	0.04	0.03	...	...	...	...	...	...	...	...	...	...	...	...	...
N06022	remainder ^A	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	...	...	...	...	...	...	...	...	...	...	...	...	...
N06455	remainder ^A	14.0-18.0	14.0-17.0	3.0 max	...	0.015 max	0.08	2.0 max	1.0 max	...	0.04	0.03	0.70 max	...	...	...	...	...	...	...	...	...	...	...	...
Ni-Cr-Fe-Mo-Cu Alloys																									
N06007	remainder ^A	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 ^A	...	0.03 max	1.0	...	1.0 max	...	0.03	0.03	0.70-1.50	0.70-1.20	...	...	...	...	...	...	...	...	...	...	...
N06985	remainder ^A	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 max	...	0.04	0.03	...	1.5-2.5	0.50 max	...	...	...	...	...	...	...	...	...	...
N06030	remainder ^A	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 ^A	3.0 max	0.03 max	1.0	...	1.0 max	...	0.03	0.03	0.69 max	1.2 max	1.50	...	...	...	...	...	...	...	...	...	...
N06250	50.0-54.0	20.0-23.0	10.1-12.0	remainder ^A	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 ^A	...	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 ^A	0.20-0.80	0.03 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	0.20-1.0	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 ^A	0.25-1.25	0.03 max	0.50	...	1.50 max	...	0.030	0.005 max	...	0.25-1.25	0.50-1.25	...	...	...	...	...	...	...	...	...	...
Ni-Fe-Cr-Co Alloy																									
R30556	19.0-22.5	21.0-23.0	2.5-4.0	remainder ^A	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	...	...	...

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	
Ni-Cr-W-Mo Alloys																									
N06230	remainder	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	...	...	...	0.20-0.50	...	0.005-0.050	...	0.015 max	...	...	...	...
Low C-Ni-Cr-Mo																									
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																									
N06200	remainder	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																									
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	...	0.03 max	0.50	...	1.0 max	...	0.03	0.03	...	1.50 max	...	...	...	...	...	...	...	...	...	...
Low C-Ni-Cr-Mo-W Alloy																									
N06686	remainder	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																									
N12160	remainder	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	...	...	...
Cr-Ni-Fe-N Alloy																									
R20033	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	...	...	...	...	...
Low C-Ni-Mo-Cr-Ta Alloy																									
N06210	remainder	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	...	...

^ASee 13.1.1