Designation: ~~B622 – 10ε1~~ B622 – 15

Standard Specification for Seamless Nickel and Nickel-Cobalt Alloy Pipe and Tube[1]

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 (ε) indicates an editorial change since the last revision or reapproval.

~~ε[1] NOTE—The Si max for R20033 in Table 1 was corrected editorially in March 2014.~~

1. Scope

1.1 This specification[2] 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)*~~R20033)[3] 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 This specification is limited to tubes up to and including 3.5 in. (88.9 mm) outside diameter.

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)~~(SDS) 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:*[4]

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.

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[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 ~~Dec. 15, 2010~~Oct. 1, 2015. Published ~~December 2010~~November 2015. Originally approved in 1977. Last previous edition approved in ~~2006~~2010 as ~~B622 – 06.~~B622 – 10ε1. DOI: ~~10.1520/B0622-10E01.~~10.1520/B0622-15.

[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 Practice E527 and SAE J1086, Practice for Numbering Metals and Alloys (UNS).~~

[3] Designation established in accordance with Practice E527 and SAE J1086, Practice for Numbering Metals and Alloys (UNS).

[4] 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~~standard's Document Summary page on the ASTM website.

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	1.0 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	...	0.50 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	0.80	1.00 max	0.80 max		0.030	0.015		0.50 max		0.50 max				0.006 max				
Low C Ni-Cr-Mo 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	...	...	...									
N06035	remainder [A]	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	...	...	...	...	...	...	...	...
N06058	balance	20.0-23.0	18.5-21.0	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	0.3 max	0.5 max	...	0.015	0.010	...	0.50 max	...	0.1-0.4	...	...	...	...	...	...	...	
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	...									
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	0.030 max	0.75	...	1.00 max	...	0.03	0.03	...											
N06002	remainder [A]	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 max	0.005 max	...	0.25-1.25	0.50-1.25									

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-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		
Ni-Cr-W-Mo Alloys																								
N06230	remainder [A]	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	...	...		
~~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~~	~~0.005~~	~~...~~	~~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~~	~~0.3 max~~	~~0.5 max~~	~~...~~	~~0.015~~	~~0.010~~	~~...~~	~~0.50 max~~	~~...~~	~~0.1-0.4~~	~~...~~	~~...~~	~~...~~	~~...~~	~~...~~	~~...~~	~~...~~	
Low C-Ni-Cr-Mo-Cu Alloy																								
N06200	remainder [A]	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-Mo-Cr Alloy																								
N10362	remainder [A]	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	...	...	...	...	...	...	...	...
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 [A]	...	0.03 max	0.50	...	1.0 max	...	0.03	0.03	...	1.50 max										
Low C-Ni-Cr-Mo-W Alloy																								
N06686	remainder [A]	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 [A]	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~~	~~...~~	~~...~~	~~...~~	~~...~~	~~...~~
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 [A]	18.0-20.0	18.0-20.0	1.0 max	...	0.015 max	0.08	1.0 max	0.5	0.35 max	0.02	0.02	...		...		...	...	...	...	...	1.5-2.2		

[A] See 12.1.

~~†Corrected editorially.~~ †Editorially corrected.