



Designation: B619/B619M – 17a

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

This standard is issued under the fixed designation B619/B619M; 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 welded pipe of nickel and nickel-cobalt alloys (UNS N10001; UNS N10242; UNS N10665; UNS N12160; UNS N10624; UNS N10629; UNS N10675; UNS N10276; UNS N06455; UNS N06007; UNS N06975; UNS N08320; UNS N06002; UNS N06022; UNS N06035; UNS N06044; UNS N06058; UNS N06059; UNS N06200; UNS N10362; UNS N06985; UNS N06030; UNS R30556; UNS N08031; UNS N08034; UNS N06230; UNS N06686; UNS N06210; and UNS R20033)<sup>3</sup> as shown in [Table 1](#).

1.2 This specification covers pipe in Schedules 5S, 10S, 40S, and 80S through 8-in. nominal pipe size and larger as set forth in ANSI B36.19 (see [Table 2](#)).

1.3 Two classes of pipe are covered as follows:

1.3.1 *Class I*—As welded and solution annealed or welded and sized and solution annealed.

1.3.2 *Class II*—Welded, cold worked, and solution annealed.

1.4 All pipe shall be furnished in the solution annealed and descaled condition. When atmosphere control is used, descaling is not necessary.

1.5 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.6 *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.*

1.7 *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*:<sup>4</sup>

[B775 Specification for General Requirements for Nickel and Nickel Alloy Welded Pipe](#)

[B899 Terminology Relating to Non-ferrous Metals and Alloys](#)

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

2.2 *ANSI Standards*:<sup>5</sup>

[B36.19 Stainless Steel Pipe](#)

[B2.1 Pipe Threads](#)

2.3 *ASME Boiler and Pressure Vessel Code*<sup>6</sup>  
[Section IX Welding and Brazing Qualifications](#)

### 3. Terminology

3.1 For definitions of terms used in this standard refer to Terminology [B899](#).

### 4. General Requirement

4.1 Material furnished under this specification shall conform to the applicable requirements of Specification [B775](#) 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-619 in Section II of that Code.

<sup>3</sup> New designation established in accordance with Practice [E527](#) and SAE J1086, Practice for Numbering Metals and Alloys (UNS).

<sup>4</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.

<sup>5</sup> Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

<sup>6</sup> Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Three Park Ave., New York, NY 10016-5990, <http://www.asme.org>.

\*A Summary of Changes section appears at the end of this standard



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 <sup>A</sup>	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 <sup>A</sup>	1.0 max	26.0- 30.0	2.0 max	...	0.02 max	0.10	1.0 max	1.0 max	0.04	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	0.50 max	0.10 max	...	...	...	0.20 max	0.20 max	94.0- 98.0	...
N10629	remainder <sup>A</sup>	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	0.1- 0.5	...	...	...	...	...	...	...	...
N10624	remainder <sup>A</sup>	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 <sup>A</sup>	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	0.50 max	...	...	...	0.006 max	...	...	...	...
Low C Ni- Cr-Mo Alloys N10276	remainder <sup>A</sup>	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 <sup>A</sup>	20.0- 22.5	12.5- 14.5	2.0-6.0	2.5- 3.5	0.015 max	0.08	2.5 max	0.5 max	0.35 max	0.02	0.02	...	...	...	...	...	...	...	...	...	...	...	...
N06035	remainder <sup>A</sup>	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	0.40 max	...	...	...	...	...	...	...	...
N06044	balance	43.5- 45.3	0.80- 1.20	0.3 max	...	0.02 max	0.20	...	0.07- 0.30	...	0.020	0.020	0.10- 0.30	...	0.30 max	0.30 max	...	...	...	...	...	...	...	...
N06058	balance	20.0- 23.0	18.5- 21.0	1.5 max	0.3 max	0.010 max	0.10	0.3 max	0.50 max	0.015	0.010	...	...	0.50 max	0.40 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	0.1- 0.4	...	...	...	...	...	...	...	...
N06455	remainder <sup>A</sup>	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 <sup>A</sup>	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 max	...	0.03	0.03	0.70- 1.50	0.70- 1.20	...	...	...	...	...	...	...	...	...	...
N06985	remainder <sup>A</sup>	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 <sup>A</sup>	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	...	...	...	...	...	...	...	...	...
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	...	...	...	...	...	...	...	...	...	...	...
Ni-Cr-Mo-Fe Alloy N06002	remainder <sup>A</sup>	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	...	...	...	...	...	...	...	...	...	...	...	...
Ni-Fe-Cr-Co Alloy R30556	19.0-22.5	21.0- 23.0	2.5- 4.0	remainder	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 Alloy N06230	1.0-3.0	20.0-24.0	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-Cu Alloy N06200	15.0-17.0	22.0-24.0	22.0-24.0	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	21.5-23.0	13.8-15.6	13.8-15.6	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 Alloy N08031	6.0-7.0	26.0-28.0	26.0-28.0	balance	...	...	0.015 max	0.3	2.0 max	2.0 max	...	0.020	0.010	...	1.0-1.4	...	...	...	...	0.15-0.25	...	...	...	...	...
N08034	6.0-7.0	26.0-27.0	26.0-27.0	balance	...	...	0.01 max	0.1	1.0-4.0	1.0-4.0	...	0.020	0.010	...	0.5-1.5	...	0.3 max	...	...	0.10-0.25	...	...	...	...	...
Low C-Ni-Cr-Mo-W Alloy N06686	15.0-17.0	19.0-23.0	15.0-17.0	5.0 max	3.0-4.4	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	1.0 max	26.0-30.0	26.0-30.0	3.5 max	1.0 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	0.50-2.0	31.0-35.0	31.0-35.0	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	18.0-20.0	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	...	...

† The composition of the remainder shall be determined arithmetically by difference.