



Designation: **B626—17 B626 – 17a**

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

This standard is issued under the fixed designation B626; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

### 1. Scope\*

1.1 This specification covers welded tubes made from the nickel and nickel-cobalt alloys (UNS N10001, UNS N10242, UNS N10665, UNS N12160, UNS N10629, UNS N10624, UNS N10675, UNS N10276, UNS N06455, UNS N06007, UNS N06975, UNS N08320, UNS N06985, UNS N06002, UNS N06022, UNS N06030, UNS N06035, UNS N06044, UNS N06058, UNS N06059, UNS N06200, UNS N06617, UNS N10362, UNS N06210, UNS N08031, UNS N08034, UNS R30556, UNS N06230, UNS N06686, and UNS R20033)<sup>2</sup> listed in **Table 1** intended for heat exchanger and condenser tubes and tubes for general corrosive service for heat-resisting applications.

1.2 This specification covers tube  $\frac{1}{8}$  to  $3\frac{1}{2}$  in. (3.2 to 88.9 mm) in outside diameter and 0.015 to 0.148 in. (0.41 to 3.7 mm) inclusive, in wall thickness.

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 ~~health~~ 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:*<sup>3</sup>

**B751 Specification for General Requirements for Nickel and Nickel Alloy Welded Tube**

**E527 Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS)**

### 3. General Requirements

3.1 Material furnished in accordance with this specification shall conform to the applicable requirements of the current edition of Specification **B751** unless otherwise provided herein.

### 4. Classification

4.1 Five classes of tube are covered as follows:

4.1.1 *Class IA*—Welded, sized, solution annealed, and nondestructively tested in accordance with **4.2.1**.

4.1.2 *Class IB*—Welded, sized, and solution annealed.

4.1.3 *Class IIA*—Welded, cold worked, solution annealed, and nondestructively tested in accordance with **4.2.1**.

4.1.4 *Class IIB*—Welded, cold worked, and solution annealed.

4.1.5 *Class III*—Welded, cold worked, solution annealed, and nondestructively tested in accordance with **4.2.2**.

4.2 *Nondestructive Tests:*

<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> New designations 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, 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

**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	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	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	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 max	...	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 max	...	0.030	0.015	...	0.50 max	...	0.50 max	...	...	...	...	0.006 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 max	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	0.5 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	...	...	...	...	...	...	...	...
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	...	...	...	...	...	...	...	...
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	...	...	0.02- 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	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	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	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	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	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	...	...

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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	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	...	...	...	0.50 max	...	0.005- 0.050	...	0.015 max	...	...	...	...
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	...	...	...	...	...	...	...	...
Ni-Cr-Co-Mo Alloys N06617	44.5 min	20.0- 24.0	8.0- 10.0	3.0 max	...	0.05- 0.15	1.0	10.0- 15.0	1.0 max	...	...	0.015	0.6 max	0.5 max	...	0.8- 1.5	...	...	...	0.006	...	...	...	...
Low C-Ni-Mo-Cr Alloy N10362	remainder	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 Alloy 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	...	...	...	...	...
N08034	33.5-35.0	26.0- 27.0	6.0- 7.0	balance	...	0.01 max	0.1	...	1.0- 4.0	...	0.020	0.010	...	0.5- 1.0	...	0.3 max	...	...	0.10- 0.25	...	...	...	...	...
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	0.35 max	0.02	0.02	...	...	...	...	...	...	...	...	...	1.5- 2.2	...	...