

ASTM B619 / ASME SB619

Standard Specification for Welded Nickel and Nickel-Cobalt Alloy Pipe

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.

Two classes of pipe are covered as follows:

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

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

A. General Requirement :-

1. Material furnished under this specification shall conform to the applicable requirements of Specification B775 unless otherwise provided herein.

B. Chemical Composition :-

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

Table 1

	Ni	Cr	Mo	Fe	W	C	Si max	Co	Mn	V	P max	S max	Other components
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	0.01max	0.10	3.0 max	3.0 max	0.2 max	0.03	0.01	Ti (0.2 max) Cu (0.2 max) Al (0.5 max) Zr (0.1max) Cb (0.2 max) Ta (0.2 max) Ni+Mo (94.0-98.0)
N10629	remainder ^A	0.5-1.5	26.0-30.0	1.0-6.0	...	0.01max	0.05	2.5 max	1.5 max	...	0.04	0.01	Cu (0.5 max) Al (0.1-0.5)

N10624	remainder ^A	6.0-10.0	21.0-25.0	5.0-8.0	...	0.01max	0.10	1.0 max	1.0 max	...	0.025	0.01	Cu (0.5 max)
Ni-Mo-Cr-Fe Alloys													
N10242	remainder ^A	7.0-9.0	24.0-26.0	2.0 max		0.03 max	0.8	1.0 max	0.8 max		0.03	0.015	Cu (0.5 max) Al (0.5 max) B (0.006 max)
Low C Ni-Cr-Mo Alloys													
N10276	remainder ^A	4.5-16.5	15.0-17.0	4.0-7.0	3.0-4.5	0.010 max	0.08	2.5max	1.0 max	0.35max	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	2.5max	0.5 max	0.35max	0.02	0.02	...
N06035	remainder ^A	32.25-34.25	7.60-9.00	2.00 max	0.60 max	0.050 max	0.06	1.00 max	0.5 max	0.20 max	0.03	0.015	Cu (0.30 max) Al (0.40 max)
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	Ti (0.70 max)
Ni-Cr-Fe- Mo-Cu Alloys													
N06007	remainder ^A	21.0-23.5	5.5-7.5	18.0-21.0	1.0max	0.05max	1.0	2.5max	1.0-2.0	...	0.04	0.03	Cu (1.5-2.5) Cb+Ta (1.75-2.5)
N06975	47.0-52.0	23.0-26.0	5.0-7.0	remainder	...	0.03max	1.0	...	1.0max	...	0.03	0.03	Ti (0.70-1.50) Cu (0.70-1.20)
	remainder ^A	21.0-23.5	6.0-8.0	18.0-21.0	1.5max	0.015max	1.0max	5.0max	1.0max	...	0.04	0.03	Cu (1.5-2.5) Cb+Ta (0.50max)
N06030	remainder ^A	28.0-31.5	4.0-6.0	13.0-17.0	1.5-4.0	0.03max	0.8	5.0max	1.5max	...	0.04	0.02	Cu (1.0-2.4) Cb+Ta (0.30-1.50)
Ni-Fe-Cr-Mo Alloys													
N08320	25.0-27.0	21.0-23.0	4.0-6.0	remainder	...	0.05max	1.0	...	2.5max	...	0.04	0.03	Ti (4xC min)
Ni-Cr-Mo-Fe Alloy													
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	1.0max	...	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	Al (0.10-0.50) Zr (0.001-0.10) La (0.005-0.10) N (0.10-0.30) B (0.02 max) Cb (0.30 max) Ta (0.3-1.25)
Ni-Cr-W-Mo Alloy													

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	Al (0.50max) La (0.005-0.050) B (0.015 max)
Low C-Ni-Cr-Mo Alloy													
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	0.50max	...	0.015	0.010	Cu (0.50max) Al (0.40 max) N (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	0.50max	...	0.015	0.010	Cu (0.50max) Al (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	Cu (1.3-1.9) Al (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	Al (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	...	0.02	0.010	Cu (1.0-1.4) N (0.15-0.25)
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	Ti (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	Ti (0.20-0.80) Cb (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	0.050	...	2.0 max	...	0.02	0.01	Cu (0.3-1.20) N (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	Ta (1.5-2.2)

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

C. Mechanical Properties and Other Requirements :-

1. Tension Test—The tensile properties of the material at room temperature shall conform to those shown in Table 2.

Table 2

Alloy	Tensile Strength, min, ksi (MPa)	Yield Strength (0.2 % Offset), min, ksi (MPa)	Elongation in 2 in. (50.8 mm) or 4D, ^A min, %
Ni-Mo Alloys			
alloy N10001	100 (690)	45 (310)	40
alloy N10665	110 (760)	51 (350)	40
alloy N10675	110 (760)	51 (350)	40
alloy N10629	110 (760)	51 (350)	40
alloy N10624	104 (720)	46 (320)	40
Ni-Mo-Cr-Fe Alloy			
alloy N10242	105 (725)	45 (310)	40
Low C Ni-Cr-Mo Alloys			
alloy N10276	100 (690)	41 (283)	40
alloy N06022	100 (690)	45 (310)	45
alloy N06035	85 (586)	35 (241)	30
alloy N06455	100 (690)	40 (276)	40
Ni-Cr-Fe-Mo-Cu Alloys			
alloy N06007	90 (621)	35 (241)	35
alloy N06975	85 (586)	32 (221)	40
alloy N06985	90 (621)	35 (241)	45
alloy N06030	85 (586)	35 (241)	30
Ni-Fe-Cr-Mo Alloy (N08320)	75 (517)	28 (193)	35
Ni-Cr-Mo-Fe Alloy (N06002)	100 (690)	40 (276)	35
Ni-Fe-Cr-Co Alloy (R30556)	100 (690)	45 (310)	40
Ni-Cr-W-Mo Alloy (N06230) ^B	110 (760)	45 (310)	40
Low C-Ni-Cr-Mo Alloys			
alloy N06058	110 (760)	52 (360)	40
alloy N06059	100 (690)	45 (310)	45
Low C-Ni-Cr-Mo-Cu Alloy (N06200)	100 (690)	45 (310)	45
Low C-Ni-Mo-Cr Alloy (N10362)	105 (725)	45 (310)	40
Ni-Fe-Cr-Mo-Cu Low Carbon Alloy (N08031)	94 (650)	40 (276)	40
Low C Ni-Cr-Mo-W Alloy (N06686)	100 (690)	45 (310)	45
Ni-Co-Cr-Si alloy (N12160)	90 (620)	35 (240)	40
Cr-Ni-Fe-N Low Carbon Alloy (R20033)	109 (750)	55 (380)	40
Low C Ni-Cr-Mo-Ta Alloy (N06210)	100 (690)	45 (310)	45

^A *D refers to the diameter of the tension specimen.*

^B *Solution annealed at a temperature between 2200 to 2275°F (1204 to 1246°C) followed by a water quench or rapidly cooled by other means.*

2. Flattening Test.
3. Transverse Guided Bend Test—
 - i. At the option of the pipe manufacturer, the transverse guided bend test may be substituted in lieu of the flattening test.
 - ii. Guided bend test specimens shall be prepared and tested in accordance with Section IX, Part QW 160 of the ASME Boiler and Pressure Vessel Code and shall be one of the types shown in QW462.2 and QW462.3 of that code.
4. Hydrostatic or Non-destructive Electric Test— Each pipe shall be subjected to either the hydrostatic or the non-destructive electric test at the manufacturer's option.

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