

ASTM B622 / ASME SB622

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

This specification covers seamless pipe and tube of nickel and nickel-cobalt alloys.
This specification is limited to tubes up to and including 3.5 in. (88.9 mm) outside diameter.

A. General Requirements :-

1. Material furnished under this specification shall conform to the applicable requirements of Specification B829 unless otherwise provided herein.

B. Chemical Composition :-

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	0.1	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	0.1	3.0 max	3.0 max	0.20 max	0.03	0.01	Ti [0.20 max], Cu [0.2 max] Al [0.5 max] Zr [0.1 max] 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	...	0.01 max	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	...	0.01 max	0.1	1.0 max	1.0 max	...	0.025	0.01	Cu [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	0.8	1.00 max	0.80 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	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	0.6	1.00 max	0.50 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	1.0 max	0.05 max	1.0	2.5 max	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 ^A	...	0.03 max	1.0	...	1.0 max	...	0.03	0.03	Ti [0.70-1 .50] Cu [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	Cu [1.5-2.5] (Cb +Ta) [0.5 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	Cu [1 .0-2.4] (Cb +Ta) [0.3-1 .5]
N06255	47.0-52.0	23.0-26.0	6.0-9.0	remainder ^A	3.0 max	0.03 max	1	...	1.0 max	...	0.03	0.03	Ti [0.69 max] Cu [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	...	0.03	0.005	Cu [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	Ti [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	0.5	...	1.50 max	...	0.030 max	0.005 max	Cu [0.25-1.25] (Cb +Ta) [0.5-1.25]
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	Al [0.10-0.50] Zr [0.001 -0.10] La [0.005-0.10] N [0.1 0-0.30] B [0.02 max] Cb [0.30 max]

													Ta [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	Al [0.50 max] La [0.005-0.050] B [0.01 5 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	Cu [0.50 max] Al [0.40 max] N [0.02-0.1 5]
N06059	balance	22.0-24.0	15.0-16.5	1.5 max	...	0.010 max	0.1	0.3 max	0.5 max	...	0.015	0.01	Cu [0.50 max] 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	0.01	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	0.01	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	0.01	Cu [1 .0-1 .4] N [0.1 5-0.25]
N08535	29.0-36.5	24.0-27.0	2.5-4.0	remainder ^A	...	0.03 max	0.5	...	1.0 max	...	0.03	0.03	Cu [1 .50 max]
Low C-Ni-Fe-Cr-Mo-Cu Alloys													
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	...	0.03	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	0.05	...	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 element shall be determined by the arithmetic difference.

C. Mechanical Properties :-

The mechanical 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			
UNS N10001	100 (690)	45 (310)	40
UNS N10665	110 (760)	51 (350)	40
UNS N10675	110 (760)	51 (350)	40
UNS N10629	110 (760)	51 (350)	40
UNS N10624	104 (720)	46 (320)	40
Ni-Mo-Cr-Fe			
UNS N10242	105 (725)	45 (310)	40
Low C Ni-Cr-Mo			
UNS N10276	100 (690)	41 (283)	40
UNS N06022	100 (690)	45 (310)	45
UNS N06035	85 (586)	35 (241)	30
UNS N06455	100 (690)	40 (276)	40
Ni-Cr-Fe-Mo-Cu			
UNS N06007	90 (621)	35 (241)	35
UNS N06975	85 (586)	32 (221)	40
UNS N06985	90 (621)	35 (241)	40
UNS N06030	85 (586)	35 (241)	30
UNS N06255	85 (586)	32 (221)	40
UNS N06250	90 (621)	35 (241)	40
Ni-Fe-Cr-Mo			
UNS N08320	75 (517)	28 (193)	35

UNS N08135	73 (503)	31 (214)	40
Ni-Cr-Mo-Fe			
UNS N06002	100 (690)	40 (276)	35
UNS N06060	90 (621)	35 (241)	40
Ni-Fe-Cr-Co-R30556	100 (690)	45 (310)	40
Ni-Cr-W-Mo			
UNS N06230 ^B	110 (760)	45 (310)	40
Low C-Ni-Cr-Mo			
UNS N06058	110 (760)	52 (360)	40
UNS N06059	100 (690)	45 (310)	45
Low C-Ni-Cr-Mo-Cu			
UNS N06200	100 (690)	45 (310)	45
Low C-Ni-Mo-Cr			
UNS N10362	105 (725)	45 (310)	40
Ni-Fe-Cr-Mo-Cu			
low carbon			
UNS N08031	94 (650)	40 (276)	40
UNS N08535	73 (503)	31 (214)	40
Low C Ni-Cr-Mo-W			
UNS N06686	100 (690)	45 (310)	45
Ni-Co-Cr-Si			
UNS N12160	90 (620)	35 (240)	40
low carbon Cr-Ni-Fe-N			
UNS R20033	109 (750)	55 (380)	40
Low carbon Ni-Mo-Cr-Ta			
UNS N06210	100 (690)	45 (310)	45

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

^B Solution annealed at a minimum temperature of 2200°F (1 204°C) followed by a water quench or rapidly cooled by other means.

D. Hydrostatic Test or Non-Destructive Electric Test :-

1. Each pipe or tube shall be tested by the manufacturer by either hydrostatic or a non-destructive electric test in accordance with Specification B829.

E. Weight :-

For calculation of mass or weight, the following densities shall be used:

Alloy	Density	
	lb/in. ³	g/cm ³
Nickel-molybdenum:		
UNS N10001	0.334	9.24
UNS N10242	0.327	9.05
UNS N10665	0.333	9.22
UNS N10675	0.333	9.22
UNS N10629	0.333	9.22
UNS N10624	0.322	8.9
Low carbon nickel-chromium-molybdenum:	0.296	8.18
UNS N10276	0.321	8.87
UNS N06022	0.314	8.69
UNS N06035	0.296	8.18
UNS N06455	0.312	8.64
Nickel-chromium-iron-molybdenum-copper:		
UNS N06007	0.3	8.31
UNS N06975	0.295	8.17
UNS N06985	0.3	8.31
UNS N06030	0.297	8.22
UNS N06255	0.299	8.29
UNS N06250	0.307	8.58
Nickel-iron-chromium-molybdenum:		
UNS N08320	0.291	8.05
UNS N08135	0.292	8.10
Nickel-chromium-molybdenum-iron:		
UNS N06002	0.297	8.23
UNS N06060	0.315	8.71
Nickel-iron-chromium-cobalt:		
UNS R30556	0.297	8.23
Nickel-chromium-tungsten-molybdenum:		
UNS N06230	0.324	8.97
Low carbon nickel-chromium-molybdenum:		
UNS N06058	0.318	8.8

UNS N06059	0.311	8.6
UNS N06200	0.307	8.5
Low carbon-nickel-molybdenum-chromium:		
UNS N10362	0.319	8.83
Low carbon nickel-iron-chromium-molybdenum-copper:		
UNS N08031	0.29	8.1
UNS N08535	0.291	8.07
Low carbon nickel-chromium-molybdenum-tungsten:		
UNS N06686	0.315	8.73
Nickel-cobalt-chromium-silicon:		
UNS N12160	0.292	8.08
Low carbon chromium-nickel-iron-nitrogen:		
UNS R20033	0.29	8.1
Low carbon nickel-molybdenum-chromium-tantalum:		
UNS N06210	0.316	8.76

F. Test Methods :-

1. The chemical composition and mechanical properties of the material as enumerated in this specification shall be determined in accordance with the methods in Specification B829.

Related Keywords

- **astm b622 pdf**
- **astm b622 uns n10276**
- **astm b622 c276**
- **astm b622 material**
- **astm b622 n10276**
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