

Not For Production Use (For Reference Only)

ASTM A778-01

Specification for Welded Unannealed Austenitic Stainless Steel Tubular Products
(Reapproved 1995)

ASTM Chemical Requirements

Elements	304L	316L	321
	S30403	S31603	S32100
(C) Carbon, max	0.030	0.030	0.08
(Mn) Manganese, max	2.00	2.00	2.00
(P) Phosphorus, max	0.045	0.045	0.045
(S) Sulfur, max	0.030	0.030	0.030
(Si) Silicon	1.00	1.00	1.00
(Ni) Nickel	8.00-13.00	10.00-14.00	9.00-12.00
(Cr) Chromium	18.00-20.00	16.00-18.00	17.00-19.00
(Mo) Molybdenum	N/A	2.00	N/A
(Ti) Titanium	N/A	N/A	5xC - 0.070
(N) Nitrogen	0.10	0.10	N/A

ASTM Tensile Requirements

Grade	Tensile Strength	Yield Strength	Elong. In 2"
	min, ksi (Mpa)	min, ksi (Mpa)	min, %
304L	70 (485)	25 (170)	40
316L	70 (485)	25 (170)	40
321	75 (515)	30 (205)	40

Mechanical Testing Test

Test	ASTM	United
Flare	Not Required	Required
Flatten	Required	Required
Reverse Bend	Not Required	Required
Eddy Current	Not Required	Required
Transverse Tension	Required	Required

Laboratory Testing

Test	ASTM	United
Passivation test per MIL-STD 753B	Not Required	Required

Product Marking

- Each length will have man. Name or brand, specified size, heat number, spec. number, grade and "HT-O" to indicate no heat treatment. For small diameter tubes and pieces under 3', the information will be placed on a tag securely fixed to the bundle.

Dimensional Requirements

Size	Outside Diameter		Squareness		Length**		Straightness		Weld Height		Wall	
	ASTM	United	ASTM	United	ASTM	United	ASTM	United	ASTM	United	ASTM	United
1/2"	-1/32 +1/64	+/- .006	N/A	.015	-0 + 1/4	-0 + 1/4	0.25"/10'	.030/36"	N/A	.002/.012	+/- 12.5%	+/- 12.5%
3/4"	-1/32 +1/64	+/- .008	N/A	.015	-0 + 1/4	-0 + 1/4	0.25"/10'	.030/36"	N/A	.002/.012	+/- 12.5%	+/- 12.5%
1"	-1/32 +1/64	+/- .008	N/A	.020	-0 + 1/4	-0 + 1/4	0.25"/10'	.030/36"	N/A	.002/.012	+/- 12.5%	+/- 12.5%
1-1/4"	-1/32 +1/64	+/- .010	N/A	.025	-0 + 1/4	-0 + 1/4	0.25"/10'	.030/36"	N/A	.002/.012	+/- 12.5%	+/- 12.5%
1-1/2"	-1/32 +1/64	+/- .010	N/A	.030	-0 + 1/4	-0 + 1/4	0.25"/10'	.030/36"	N/A	.002/.012	+/- 12.5%	+/- 12.5%
2"	+/- 1/32	+/- .012	N/A	.040	-0 + 1/4	-0 + 1/4	0.25"/10'	.030/36"	N/A	.002/.012	+/- 12.5%	+/- 12.5%
2-1/2"	+/- 1/32	+/- .012	N/A	.045	-0 + 1/4	-0 + 1/4	0.25"/10'	.030/36"	N/A	.002/.015	+/- 12.5%	+/- 12.5%
3"	+/- 1/32	+/- .015	N/A	.045	-0 + 1/4	-0 + 1/4	0.25"/10'	.030/36"	N/A	.002/.015	+/- 12.5%	+/- 12.5%
3-1/2"	+/- 1/32	+/- .015	N/A	.045	-0 + 1/4	-0 + 1/4	0.25"/10'	.030/36"	N/A	.002/.015	+/- 12.5%	+/- 12.5%
4"	+/- 1/32	+/- .015	N/A	.045	-0 + 1/4	-0 + 1/4	0.25"/10'	.030/36"	N/A	.002/.015	+/- 12.5%	+/- 12.5%