

Created by  
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## Technical Information

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Revision Date  
21-Nov-11

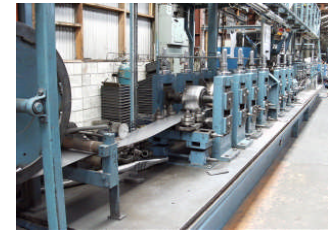
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### NZTM-Q12A - Austenitic Stainless Steel (Round) Tube specification

#### General Information

- Specification Scope** : This specification applies to general tube and food / milk processing industry (FQ).
- Equivalent standards** : **AS1528.1** - Food / Milk Processing Industry and **ASTM A554** - General & Architectural Application.
- Available sizes** : Tube sizes range from 7.94 mm to 152.4 mm outside diameter. Refer **NZTM-Q08B** for available Tubes sizes
- Grades of Material** : **304, 316, 316L** Stainless Steel.
- Manufacture** : Automatic tig welding with no addition of filler metal.
- Heat treatment** : Tube is not post weld heat treated except for Standards ASTM A269 & A249 where tube is annealed.



#### Material Tests

##### Chemical Composition (Coil)

Unless specifically requested otherwise chemical tests are from coil manufactured to ASTM A240 / A480

Grades	C max	Mn max	P max	S max	Si max	Cr	Ni	N max	Mo
TP 304	0.07	2.00	0.045	0.03	0.75	17.5-- 19.5	8 -- 10.5	0.10	--
TP 304L	0.03	2.00	0.045	0.03	0.75	17.5-- 19.5	8 -- 12	0.10	--
TP 316	0.08	2.00	0.045	0.03	0.75	16 -- 18	10 -- 14	0.10	2 -- 3
TP 316L	0.03	2.00	0.045	0.03	0.75	16 -- 18	10 -- 14	0.10	2 -- 3

##### Mechanical Tests

Except tube made to ASTM A249 and specifically requested otherwise Yield stress , Tensile tests & Hardness tests are from coil manufactured to ASTM A240 / 480.

<b>Yield Stress (Coil)</b>	TP 304 & TP 316	205 MPa min
	TP 316L & TP304L	170 MPa min
<b>Tensile Stress (Coil)</b>	TP 304 & TP 316	515 MPa min
	TP 316L & TP 304L	485 MPa min
<b>Elongation (Coil)</b>	40% Minimum (50mm test piece)	
<b>Hardness tests (Coil)</b>	TP 304 & TP 316	92 HRB / 202 HB30 max
	TP 316L & TP 304L	95 HRB / 217 HB30 max

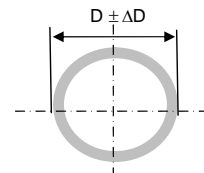
C - Carbon  
Mn - Manganese  
P - Phosphorous  
S - Sulphur  
Si - Silicon  
Cr - Chromium  
Ni - Nichol  
N - Nitrogen  
Mo - Molybdenum

##### Tube Weld Integrity Tests

- Reverse Bend Test** : Flatten to 2 times material thickness.
- Flare / Cone Test** : Minimum 1.2 tube diameter (60 deg included angle).
- Flange Test** : Minimum 1.2 tube diameter.
- Eddy Current Test** : Tubes with diameters greater than (>) 14.7 are on-line eddy-current tested.  
Tubes with diameters less than & equal to ( $\leq$ ) 14.7 are off-line eddy-current tested.

##### Tube Dimensional Tolerances

Outside diameter (OD)	O/D (D)	Tolerance ( $\Delta$ D)
	O/D $\leq$ 31.8 mm	+ 0.13 mm
	31.8 < O/D $\leq$ 76.2 mm	+ 0.25 mm
	O/D = 101.6 mm	$\pm$ 0.38 mm
	O/D = 152.4 mm	$\pm$ 0.76 mm



- Ovality** : Difference between maximum and minimum diameters at any one cross section to be within max & min sizes as above.
- Thickness tolerance** :  $\pm$ 10% of nominal tube thickness
- Weld Bead** : Weld bead of tube without cold work controlled to 110% of wall thickness
- Straightness** : Maximum of 1.0 mm / metre
- Length tolerance** : Standard length 6 metres -0/+35 mm  
Cut to exact length jobs, by agreement (+/- 1 mm)

##### Finish

- End finish** : Sizes to 152.4 chamfered both ends.
- Finish internal** : Tubes with diameter greater than or equal to ( $\geq$ ) 38.1 & 31.8 are internally cold worked (Internal weld beaded to tube surface).  
Tubes with diameter less than (<) 38.1 are in as welded condition and internal weld height is controlled to a minimum height.
- Finish external** : Available as follows:  
1) **As welded** condition (external weld bead removed).  
May have forming, straightening & weld polish cross hatch marking.  
2) **Standard Polished** equivalent to **320 Grit** - typical Ra = 0.25 to 0.5  $\mu$ m  
Minor form marks may be visible.  
3) **Ultrabrite (mirror) Polished** - Ra value = 0.05 mm.  
Refer **NZTM-Q21** for Polished tube finish in details.

##### Documentation & Packaging

- Packaging** : Polished Tube is individually plastic sleeved in a bundle with corrugated steel protection.
- Traceability** : SAP controlled batch traceability from raw material to finished tube.  
For traceability purpose the tube is either **inkjet** marked or attached with label identifying sizes , batch & trace numbers.
- Test certificate** : Raw material test certificates are available on request.  
Certificate of Test of Finished Tube is provided for the tube dispatched.

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