TP321 Stainless Tubes (ASTM A312/ ASME SA312)

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ASTM A312 /A312M ASME SA312 Covers seamless, straight-seam welded, and heavily cold worked welded austenitic stainless-steel pipe intended for high-temperature and general corrosive service.

ASTM A312 /A312M ASME SA312 Grades TP304, TP304L, TP304H, TP309S, TP309H, TP310S, TP310H, TP316, TP316L, TP316H, TP317, TP317L, TP321, TP321H, TP347, TP347H, TP348, TP348H...

Standard: ASTM A312/A312M, ASME SA312

Description Name: ASTM A312 seamless stainless tube, ASTM A312 welded seamless stainless tubes, ASTM A312 seamless stainless pipes, ASTM A312 welded seamless stainless pipes, TP304/TP304L/TP304H stainless pipes, TP309S/TP309H stainless pipes, TP310S/TP310H stainless pipes, TP316/TP316L stainless pipes. TP321/TP321H stainless pipe, TP347/TP347H stainless pipe, seamless stainless pipe, welded stainless pipe, seamless stainless tube, welded stainless tube.

Seamless Stainless-Steel Pipe:

Size: OD. 10mm, 15mm
Wall Thickness: 1mm and 1.5mm

Grade	Specification
Stainless 304/304L, 304/304H	ASTM A312/SA312
Stainless 309S	ASTM A312/SA312
Stainless 310S	ASTM A312/SA312
Stainless 316/316L, 316/316H	ASTM A312/SA312
Stainless 317/317L	ASTM A312/SA312
Stainless 321	ASTM A312/SA312
Stainless 347/347H	ASTM A312/SA312

Grade	Specification
Stainless 304/304L, 304/304H	A/SA312
Stainless 316/316L. 316/316H	A/SA312
Stainless 317/317L	A/SA312
Stainless 321	A/SA312
Stainless 347/347H	A/SA312

Shape: Round
Length: Single random length/ Double random length or as customer's actual request

Referenced Documents:

ASTM Referenced Standards
A262 Practices for Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels
A370 Test Methods and Definitions for Mechanical Testing of Steel Products
A941 Terminology Relating to Steel, Stainless Steel, Related Alloys, and Ferroalloys
A999/A999M Specification for General Requirements for Alloy and Stainless Steel Pipe
A1016/A1016M Specification for General Requirements for Ferritic Alloy Steel, Austenitic Alloy Steel, and Stainless Steel Tubes
E112 Test Methods for Determining Average Grain Size
E381 Method of Macroetch Testing Steel Bars, Billets, Blooms, and Forgings
E527 Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS)

Chemical Composition:

Grade	UNS	Composition, %

Grade	Design	C	Mn	P	S	Si	Cr	Ni	Mb	Ti	Nb	N	Cu	Ce	B	Al
TP304	S30400	0.08	2	0.045	0.03	1	18.0–20	8.0–11	. . .	. . .	. . .	. . .	. . .	. . .		
TP304L	S30403	0.035	2	0.045	0.03	1	18.0–20	8.0–13	. . .	. . .	. . .	. . .	. . .	. . .		
TP304H	S30409	0.04–0.1	2	0.045	0.03	1	18.0–20	8.0–11	. . .	. . .	. . .	. . .	. . .	. . .		
TP310S	S31008	0.08	2	0.045	0.03	1	24.0-26	19.0-22	0.8	. . .	. . .	. . .	. . .	. . .		
TP310H	S31009	0.04-0.1	2	0.045	0.03	1	24.0–26	19.0–22	. . .	. . .	. . .	. . .		. . .		
TP310H	S31035	0.04-0.1	0.6	0.025	0.015	0.4	21.5–23.5	23.5–26.5	. . .	. . .	0.40-0.6	0.20-0.3	2.5-3.5	. . .	0.002-0.008	
TP316	S31600	0.08	2	0.045	0.03	1	16.0–18	10.0–14	2.00–3	. . .	. . .	. . .	. . .	. . .		
TP316L	S31603	0.035	2	0.045	0.03	1	16.0–18	10.0–14	2.00–3	. . .	. . .	. . .	. . .	. . .		
TP316H	S31609	0.04–0.1	2	0.045	0.03	1	16.0–18	10.0–14	2.00–3	. . .	. . .	. . .	. . .	. . .		
TP317	S31700	0.08	2	0.045	0.03	1	18.0–20	11.0–15	3.0–4	. . .	. . .	. . .	. . .	. . .		
TP317L	S31703	0.035	2	0.045	0.03	1	18.0–20	11.0–15	3.0–4	. . .	. . .	. . .	. . .	. . .		
TP321	S32100	0.08	2	0.045	0.03	1	17.0–19	9.0–12	. . .	Ti 5 × (C+N) min, 0.70 max	. . .	0.1	. . .	. . .		
TP321H	S32109	0.04–0.1	2	0.045	0.03	1	17.0–19	9.0–12	. . .	4(C+N) min; 0.70 max	. . .	0.1	. . .	. . .		
TP321H	S32654	0.02	2.0-4	0.03	0.005	0.5	24.0–25	21.0–23	7.0-8	. . .	. . .	0.45-0.55	0.30-0.6	. . .		
TP321H	S33228	0.04-0.08	1	0.02	0.015	0.3	26.0–28	31.0–33	. . .	. . .	0.60-1	. . .	. . .	0.05-0.1		0.025
TP321H	S34565	0.03	5.0-7	0.03	0.01	1	23.0–25	16.0–18	4.0-5	. . .	0.1	0.40-0.6	. . .	. . .		
TP347	S34700	0.08	2	0.045	0.03	1	17.0–19	9.0–13	. . .	. . .	See Spec	. . .	. . .	. . .		

TP347H	S34709	0.04–0.1	2	0.045	0.03	1	17.0–19	9.0–13	. . .	. . .	See Spec	. . .	. . .	. . .		
Alloy 20	N08020	0.07	2	0.045	0.035	1	19.0–21	32.0–38	2.0–3	. . .	See Spec	. . .	3.0–4	. . .	. . .	. . .
Alloy 20	N08367	0.03	2	0.04	0.03	1	20.0–22	23.5–25.5	6.0–7	. . .	. . .	0.18–0.25	0.75	. . .	. . .	. . .
Alloy 20	N08028	0.03	2.5	0.03	0.03	1	26.0–28	30.0–34	3.0–4				0.60–1.4			
Alloy 20	N08029	0.02	2	0.025	0.015	0.6	26.0–28	30.0–34	4.0–5				0.6–1.4			

Heat Treatment Requirements

Grade	UNS Designation	Finished	Heating Temperature	Cooling/testing Requirements
TP304H	S30409, S30415	Cold	1900 °F [1040 °C]	See Spec
TP304H	S30409, S30415	Hot	1900 °F [1040 °C]	See Spec
TP310H	S31009		1900 °F [1040 °C]	See Spec
TP310H	S31035		2160—2280 °F [1180—1250 °C]	See Spec
TP316H	S31609	Cold	1900 °F [1040 °C]	See Spec
TP316H	S31610	Hot	1900 °F [1040 °C]	See Spec
TP321H	S32109, S32615	Cold	2000 °F [1100 °C]	See Spec
TP321H	S32109, S32615	Hot	1925 °F [1050 °C]	See Spec
TP321H	S32654		2100 °F [1150 °C]	See Spec
TP321H	S33228		2050—2160 °F [1120—1180 °C]	See Spec
TP321H	S34565		2050—2140 °F [1120—1170 °C]	See Spec
TP347H	S34709	Cold	2000 °F [1100 °C]	See Spec
TP347H	S34709	Hot	1925 °F [1050 °C]	See Spec
Alloy 20	N08020		1700—1850 °F [925—1010 °C]	See Spec
Alloy 20	N08367		2025 °F [1110 °C]	See Spec
Alloy 20	N08028		2000 °F [1100 °C]	See Spec
Alloy 20	N08029		2000 °F [1100 °C]	See Spec

Tensile Requirements

Grade	UNS Designation	Tensile Strength, Min ksi [MPa]	Yield strength, min ksi [MPa]	other
TP304	S30400	75 [515]	30 [205]	
TP304L	S30403	70 [485]	25 [170]	

TP304H	S30409	75 [515]	30 [205]	
TP304H	S30415	87 [600]	42 [290]	
TP310S	S31008	75 [515]	30 [205]	
TP310H	S31009	75 [515]	30 [205]	
TP310H	S31035	95 [655]	45 [310]	
TP316	S31600	75 [515]	30 [205]	
TP316L	S31603	70 [485]	25 [170]	
TP316H	S31609	75 [515]	30 [205]	
TP316H	S31635	75 [515]	30 [205]	
TP317	S31700	75 [515]	30 [205]	
TP317L	S31703	75 [515]	30 [205]	
TP317L	S31725	75 [515]	30 [205]	
TP317L	S31726	80 [550]	35 [240]	
TP317L	S31727	80 [550]	36 [245]	
TP317L	S31730	70 [480]	25 [175]	
TP317L	S32053	93 [640]	43 [295]	
TP321	S32100	75 [515]	30 [205]	welded & seamless
TP321	S32100	75 [515]	30 [205]	t = 0.375 in.
TP321	S32100	70 [480]	25 [170]	t > 0.375 in.
TP321H	S32109	75 [515]	30 [205]	welded & seamless
TP321H	S32109	75 [515]	30 [205]	t = 0.375 in.
TP321H	S32109	70 [480]	25 [170]	t > 0.375 in.
TP321H	S32615	80 [550]	32 [320]	
TP321H	S32654	109 [750]	62 [430]	
TP321H	S33228	73 [500]	27 [185]	
TP321H	S34565	115 [795]	60 [415]	
TP347	S34700	75 [515]	30 [205]	
TP347H	S34709	75 [515]	30 [205]	
Alloy 20	N08020	80 [550]	35 [240]	
Alloy 20	N08028	73 [500]	31 [214]	
Alloy 20	N08029	73 [500]	31 [214]	
Alloy 20	N08367	100 [690]	45 [310]	t = 0.187 in.
Alloy 20	N08367	95 [655]	45 [310]	t > 0.187 in.

Elongation Requirements

Elongation in 2 in., min, %			
	longitudinal	Transverse	Grain size

Longitudinal	Transverse	longitudinal	Transverse	Grain size
35	25	35	25	…
35	25	35	25	…
35	25	35	25	7 or coarser
35	25	35	25	…
35	25	35	25	…
35	25	35	25	6 or coarser
35	25	35	25	7 or coarser
35	25	35	25	…
35	25	35	25	…
35	25	35	25	7 or coarser
35	25	35	25	…
35	25	35	25	…
35	25	35	25	…
35	25	35	25	…
35	25	35	25	…
35	25	35	25	…
35	25	35	25	…
35	25	35	25	…
35	25	35	25	…
35	25	35	25	…
35	25	35	25	…
35	25	35	25	7 or coarser
35	25	35	25	…
35	25	35	25	…
25	…	25	…	3 or finer
35	25	35	25	…
35	25	35	25	…
35	25	35	25	…
35	25	35	25	…
35	25	35	25	7 or coarser
35	25	35	25	…
40	…	40	…	…
40	…	40	…	…
30	…	30	…	…
30	…	30	…	…

Flattening Test

For material heat treated in a continuous furnace flattening tests shall be made on a sufficient number of pipes to constitute 5 % of the lot, but in no case less than 2 lengths of pipe.

Hydrostatic or Nondestructive Testing

Each pipe shall be subjected to the nondestructive electric test or the hydrostatic test.

Markings

Markings will adhere to prescribed specifications in A999/A999M and shall include the NPS or OD and schedule number or average wall thickness, heat number, and NH (when hydrotesting is not performed) and ET (when eddy-current testing is performed) or UT (when ultrasonic testing is performed). The marking shall also include the manufacturer's private identifying mark, the marking requirement of section 12.3 on Hydrostatic or Nondestructive Electric Test, if applicable, and whether seamless (SML), welded (WLD), or heavily cold-worked (HCW). For Grades TP304H, TP316H, TP321H & TP347H, the marking shall also include the heat number and heat-treatment lot identification.

Note:

- Mill test certificates will be issued according to EN10204.3
- All tubes shall be supplied as per applicable ASTM A312 /A312M Specification.

TP321 Inspection

TP321 OD.15MM INSPECTION

TP321 THICKNESS 1.5MM INSPECTION

TP321 OD.10MM INSPECTION

TP321 THICKNESS 1MM INSPECTION

Packing and Marking

- Packed in bundles or ply wooden box wrapped in plastic, and suitably protected for sea-worthily delivery or as requested.

Packing photos:

Read more information of this products

- *ASTM A312 ASME SA312 TP321 Stainless Tubes*

Related products

- **Carbon steel**
- *ASTM A179 / ASME SA179 Seamless tubes*
- *ASTM A192 / ASME SA192 Seamless boiler tubes*
- *ASTM A210 / ASME SA210 GRADE A1 Seamless tubes*

- *ASTM A210 / ASME SA210 GRADE C Seamless tubes*

- **Alloy steel**
- *ASTM A213 T11 T12 T22 Seamless alloy tubes*
- *ASTM A 213/A 213M T2, T5, T5b, T9, T91 Seamless Alloy Steel tubes*
- *ASTM A335 P1, P2, P5, P9 Seamless alloy pipes*
- *ASTM A335 P11, P12, P22, P91 seamless alloy pipes*
- *ASTM A209 ASME SA209 T1 tubes*

- **Stainless steel and Duplex**
- *ASTM A312 ASME SA312 TP321 Stainless Tubes*
- *ASTM A269 Stainless Steel Tubes*
- *ASTM A213 Stainless Steel Tubes*
- *ASTM A249 Stainless Steel Tubes*
- *ASTM A270 Sanitary Stainless Tubing*
- *ASTM A312 Stainless Steel Pipes*
- *ASTM A789 Duplex Stainless Tubing*
- *S31254 Stainless Tubes Approved by Aramco*
- *TP316L Stainless Tubes Approved by Aramco*

- **Copper and Brass**
- *ASTM B111 Copper and Brass Tubes*

Read more information of CTS TUBES main products

- *Seamless carbon steel tubes*
- *Cold drawn precision steel tubes*
- *Seamless alloy steel tubes*
- *Copper alloy seamless tubes*
- *Titanium and titanium alloy tubes*
- *Stainless steel tubes*
- *U bent heat exchanger tubes*
- *Fin tubes*
- *Bearing steel tubes*

About CTS TUBES

CTS TUBES provide a wide range of steel products as Steel Pipes, Seamless Tube and Seamless Pipes, Alloy Pipes, Pipe Fittings, Stainless Steel Pipe, Copper Tube and Titanium Alloy Tube used in the industry, construction etc. We are looking forward to getting in contact by phone or email and we hope that you enjoy our website. More than ten years of profound knowledge turn CTS TUBES to your partner as trading house for tubes, fittings and stainless steel. The name CTS TUBES stands for certified quality, because of that, all products of our wide range consist to demanding norms and the highest standards. CTS TUBES also stands for know-how, effective service, and best solutions for your profit. Our qualified team in our export department in China is always at your disposal and ready to help you. Get in touch if you are interested in our products or cooperation.

Get in Touch

If you are interested in our products or cooperation with us, please contact us now for more detailed information.

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