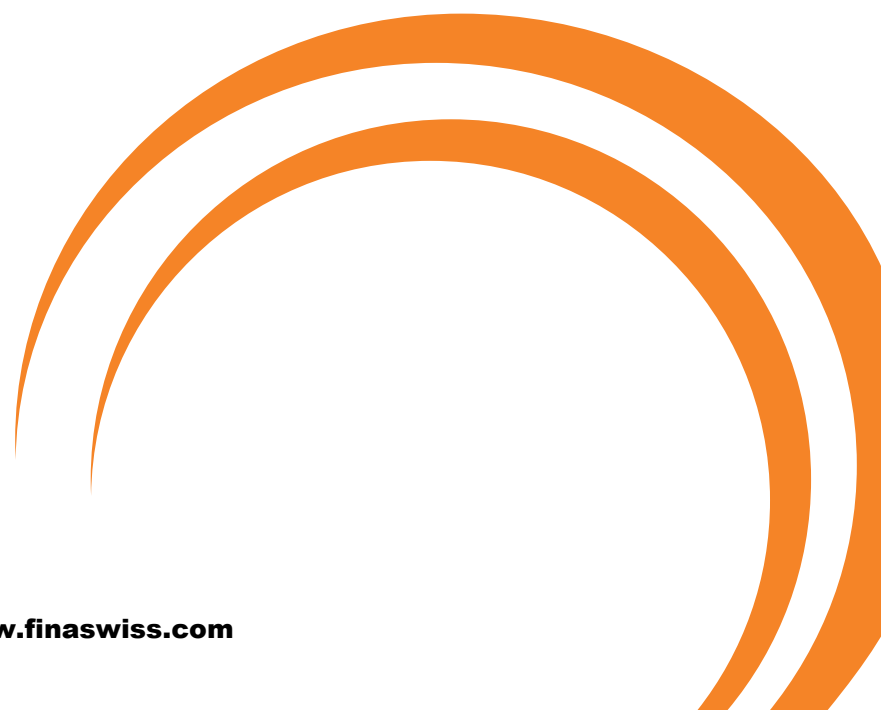
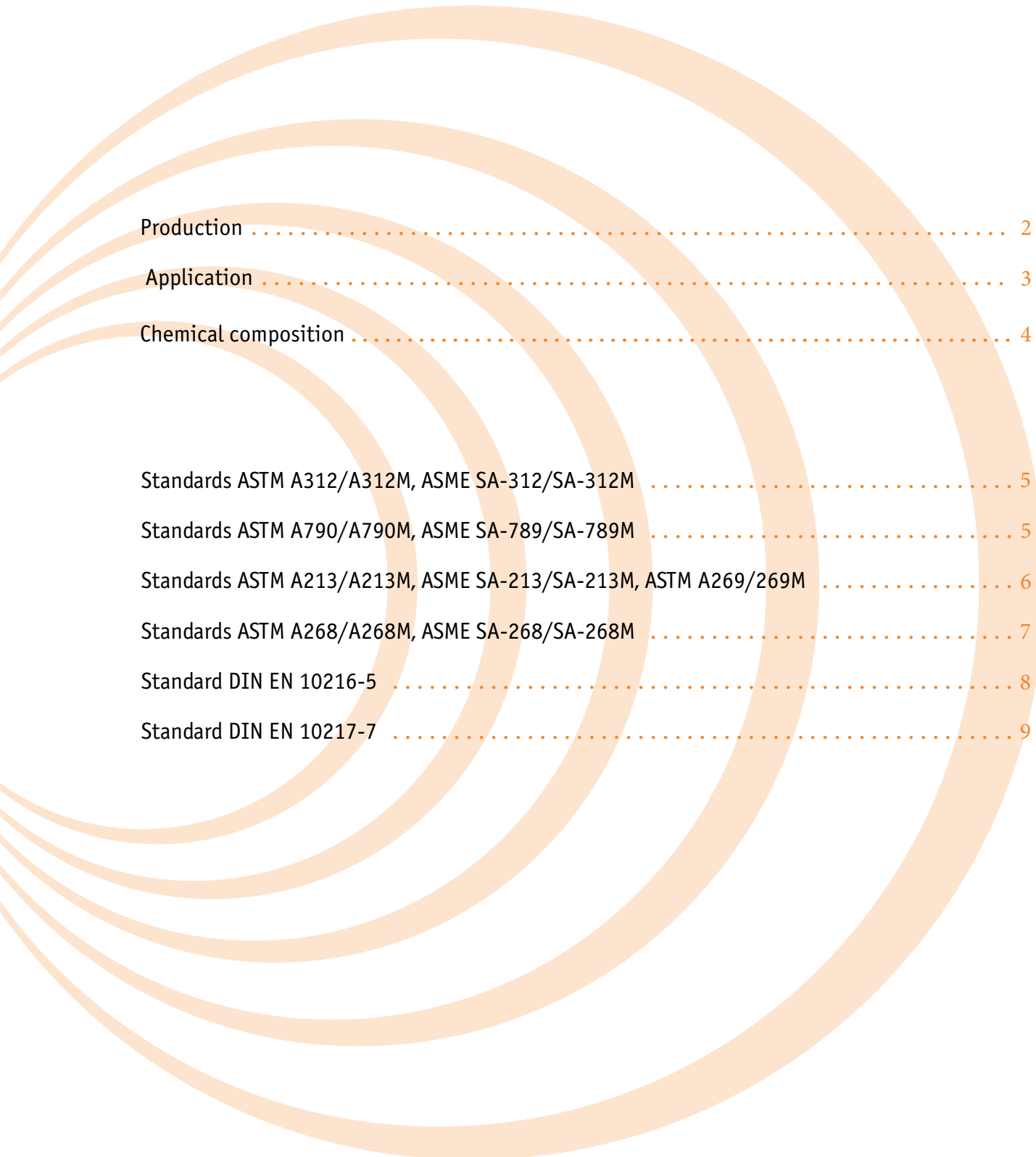


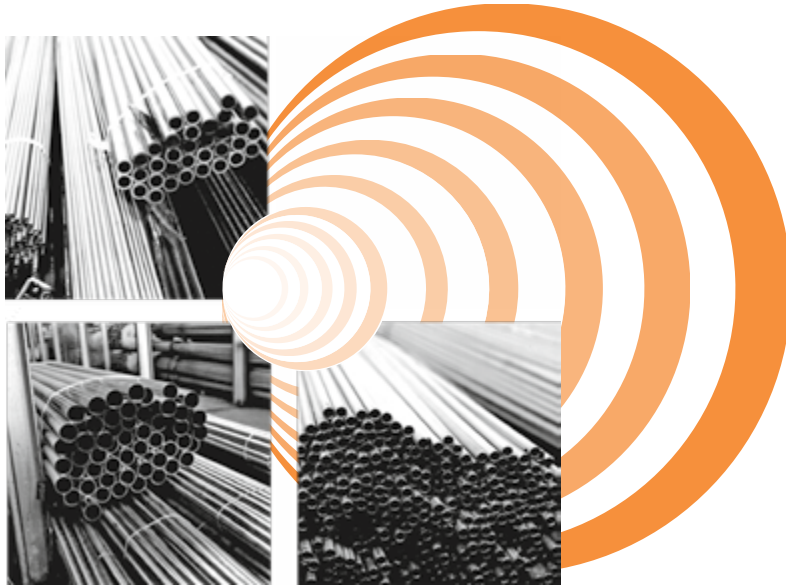


Stainless steel pipes
Technical Catalog





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Standards ASTM A312/A312M, ASME SA-312/SA-312M	5
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Production

Main equipment for production hot rolled tubes:

- . Pressing line with horizontal press with power 2000 tons (manufacturer – Clesim, France) for production tubes from 42 mm to 114 mm
- . Pressing line with horizontal press with power 5500 tons (manufacturer – Mannesmann-Demag, Germany) for production tubes from 114 mm to 273 mm
- . Chemical treatment line
- . Roller-hearth furnace for heat treatment
- . Ultra-sonic and eddy-current nondestructive testing equipment
- . equipment for testing on tensile strength, yield, elongation, hardness, impact hardness, corrosion resistance, beveling machine

Main equipment for production cold rolled tubes:

- . 9 Cold-rolling mills, OD from 20 till 90 mm, max length of final pipe – 9 meters
- . 5 Cold-rolling mills, OD from 10 till 133 mm, max length of final pipe – 30 meters
The mill is of the new type; they use the conical and curved mandrels with liquid lubricant
- . 4 drawing benches for the small dimensions
- . 2 new system of the chemical preparation, max length – 25 meters
- . Furnace for bright annealed, vacuum furnaces
- . Equipment for electro chemical polishing surface
- . High-production grinding-machine
- . 9 system for Ultra-Sonic and Eddy-Current control, max length 31 m
- . equipment for testing on tensile strength, yield, elongation, hardness, impact hardness, corrosion resistance

Main equipment for production welded tubes:

- . 10 welding lines with TIG, Laser and TIG+Plasma welding.
- . Slitting machine up to 4 mm thickness.
- . Polishing up to 1400 grit.
- . 3 bright anneal furnaces.

Application range of stainless steel tubes

Austenitic steel

TP304	General-purpose stainless steel with good corrosion resistance for most applications. Used for: Bar rails, Boat railings, Canopy supports, Chemical processing equipment, Chemical tubing, Column covers, Duct works, Feed-water tubes, Food preparation equipment, Food processing equipment, Heat exchanger tubes, Hypodermic needles, Ladders, Mechanical & structural components, Pharmaceutical processing equipment, Piping systems, Railings (architectural), Traffic barriers, Water pipes.
TP304H	Higher carbon content than 304L, for increased strength, particularly at elevated temperatures.
TP304L	Chemical plant and food processing equipment, where freedom from sensitization is required in plate thicknesses
TP316/316L	Used where higher corrosion resistance is required. Boat railings, Canopy supports, Chemical tubing, Column covers, Duct works, Feed-water tubes, Food preparation equipment, Food processing equipment, Heat exchanger tubes, Hypodermic needles, Ladders, Mechanical & structural components, Pharmaceutical processing equipment, Piping systems, Railings, Street (urban) furniture, Textile tubing, Traffic barriers, Water pipes.
TP316H	Similar oxidation resistance to TP 316. Main areas of application: Heat exchangers, furnaces, chemical and petrochemical plant.
TP321	Heat exchanger tubing, Chemical processing tubing, Pressure tank tubing. Suitable for heat resisting applications to 800°C.
TP321H	This is the high carbon version of TP 321 which ensures greater creep resistance. Behaves much the same as TP 321 in oxidation resistance. Main applications: Heat exchangers, furnaces, boilers in chemical and petrochemical plant.
TP316Ti	A titanium stabilized version of 316 used where good resistance to intergranular corrosion and high temperature strength is required.
TP317	Chemical processing tubing, Dyeing equipment, Ink manufacturing equipment, Pulp & paper manufacturing equipment
1.4828	It is high-temperature steel for service at temperatures of up to 950-1000°C in dry air.
1.4841	It is high-temperature steel with wide application in chemical & petrochemical industries, mechanical engineering. Also widely used in furnace
TP347HFG	Mainly used for boilers in the thermal power plant, reheaters and superheaters

Super-Austenitic steel

TP904L	High resistance to general corrosion in e.g. sulphuric and acetic acids, crevice corrosion, stress corrosion cracking, pitting in chloride bearing solutions.
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Ferritic and Martensitic Steel

TP405	Used for applications where hardening upon cooling from high temperatures must be avoided. Has excellent long-time stability up to 1200°F.
TP410	General purpose grade for use in mildly corrosive environments
TP430	Mechanical & structural tubing, Architectural tubing, Heat exchanger tubing, Condensers, Re-heaters, Evaporators.

Duplex

S31803	Typically used in heat exchangers, gas scrubbers, fans, chemical tanks, flowlines, marine and refinery applications.
S32750	Used in oil & gas, chemical process, power industries. At that heat-exchangers are main application
S31254	With high levels of chromium, molybdenum, and nitrogen is especially suited for high-chloride environments such as brackish water, seawater and other high-chloride process streams.

Chemical Composition

Grade	Tube Standard	C	Si	Mn	P	S	Ni	Cr	Mo	Others
Austenitic stainless steels										
TP 304	A269, A213, A312	≤ 0.08	≤ 0.75	≤ 2.00	≤ 0.040	≤ 0.030	8.00-11.00	18.00-20.00	-	-
TP 304L	A269, A213, A312	≤ 0.035	≤ 0.75	≤ 2.00	≤ 0.040	≤ 0.030	8.00-13.00	18.00-20.00	-	-
TP 304N	A213, A312	≤ 0.08	≤ 0.75	≤ 2.00	≤ 0.040	≤ 0.030	8.00-11.00	18.00-20.00	-	N 0.10-0.16
TP 304LN	A269, A213, A312	≤ 0.035	≤ 0.75	≤ 2.00	≤ 0.040	≤ 0.030	8.00-11.00	18.00-20.00	-	N 0.10-0.16
TP 304H	A213, A312	0.04-0.10	≤ 0.75	≤ 2.00	≤ 0.040	≤ 0.030	8.00-11.00	18.00-20.00	-	-
TP 316	A269, A213, A312	≤ 0.08	≤ 0.75	≤ 2.00	≤ 0.040	≤ 0.030	11.00-14.00	16.00-18.00	2.00-3.00	-
TP 316L	A269, A213, A312	≤ 0.035	≤ 0.75	≤ 2.00	≤ 0.040	≤ 0.030	10.00-15.00	16.00-18.00	2.00-3.00	-
TP 316N	A213, A312	≤ 0.08	≤ 0.75	≤ 2.00	≤ 0.040	≤ 0.030	11.00-14.00	16.00-18.00	2.00-3.00	N 0.10-0.16
TP 316 LN	A269, A213, A312	≤ 0.035	≤ 0.75	≤ 2.00	≤ 0.040	≤ 0.030	11.00-14.00	16.00-18.00	2.00-3.00	N 0.10-0.16
TP 316Ti	A213, A312	≤ 0.08	≤ 0.75	≤ 2.00	≤ 0.040	≤ 0.030	10.00-14.00	16.00-18.00	2.00-3.00	Ti 5(C+N)-0.70
TP 316H	A213, A312	0.04-0.10	≤ 0.75	≤ 2.00	≤ 0.040	≤ 0.030	11.00-14.00	16.00-18.00	2.00-3.00	-
TP 321	A269, A213, A312	≤ 0.08	≤ 0.75	≤ 2.00	≤ 0.040	≤ 0.030	9.00-13.00	17.00-20.00	-	Ti > 5xC, max 0.60%
TP 321H	A213, A312	0.04-0.10	≤ 0.75	≤ 2.00	≤ 0.040	≤ 0.030	9.00-13.00	17.00-20.00	-	Ti > 5xC, max 0.60%
TP 317	A213, A312	≤ 0.08	≤ 0.75	≤ 2.00	≤ 0.040	≤ 0.030	11.00-14.00	18.00-20.00	3.00-4.00	-
TP 317L	A213, A312	≤ 0.035	≤ 0.75	≤ 2.00	≤ 0.040	≤ 0.030	11.00-15.00	18.00-20.00	3.00-4.00	-
TP 310S	A213, A312	≤ 0.08	≤ 0.75	≤ 2.00	≤ 0.040	≤ 0.030	19.00-22.00	24.00-26.00	0.75 max	-
TP 310H	A213, A312	≤ 0.10	≤ 1.0	≤ 2.00	≤ 0.040	≤ 0.030	19.00-22.00	24.00-26.00	-	-
TP 347	A269, A213, A312	≤ 0.08	≤ 0.75	≤ 2.00	≤ 0.040	≤ 0.030	9.00-13.00	17.00-20.00	...	Co + Ta > 10xC, max 1.00%
TP 347H	A213, A312	0.04-0.10	≤ 0.75	≤ 2.00	≤ 0.040	≤ 0.030	9.00-13.00	17.00-20.00	-	Co + Ta > 8xC, max 1.00%
TP 904L	A269, A312	≤ 0.02	≤ 1.0	≤ 2.00	≤ 0.040	≤ 0.030	23.00-28.00	19.00-23.00	4.00-5.00	N 0.10, Cu 1.0-2.0
1.4301	EN 10216-5	≤ 0.07	≤ 1.00	≤ 2.00	≤ 0.040	≤ 0.030	8.0-10.5	17.0-19.5	-	0.11
1.4306	EN 10216-5	≤ 0.03	≤ 1.00	≤ 2.00	≤ 0.040	≤ 0.030	10.0-12.0	18.0-20.0	-	0.11
1.4307	EN 10216-5	≤ 0.03	≤ 1.00	≤ 2.00	≤ 0.040	≤ 0.030	8.0-10.0	17.5-19.5	-	0.11
1.4311	EN 10216-5	≤ 0.03	≤ 1.00	≤ 2.00	≤ 0.040	≤ 0.030	8.5-11.5	17.0-19.5	-	0.12-0.22
1.4401	EN 10216-5	≤ 0.07	≤ 1.00	≤ 2.00	≤ 0.040	≤ 0.030	10.0-13.0	16.5-18.5	2.0-2.5	0.11
1.4404	EN 10216-5	≤ 0.03	≤ 1.00	≤ 2.00	≤ 0.040	≤ 0.030	10.0-13.0	16.5-18.5	2.0-2.5	0.11
1.4435	EN 10216-5	≤ 0.03	≤ 1.00	≤ 2.00	≤ 0.040	≤ 0.030	12.5-15.0	17.0-19.0	2.5-3.0	-
1.4429	EN 10216-5	≤ 0.03	≤ 1.00	≤ 2.00	≤ 0.040	≤ 0.015	11.0-14.0	16.5-18.5	2.5-3.0	0.12-0.22
1.4436	EN 10216-5	≤ 0.05	≤ 1.00	≤ 2.00	≤ 0.040	≤ 0.030	10.5-13.0	16.5-18.5	2.5-3.0	-
1.4541	EN 10216-5	≤ 0.08	≤ 1.00	≤ 2.00	≤ 0.040	≤ 0.015	9.0-12.0	17.0-19.0	-	5*C-0.70
1.4571	EN 10216-5	≤ 0.08	≤ 1.00	≤ 2.00	≤ 0.040	≤ 0.030	10.5-13.5	16.5-18.5	2.0-2.5	5*C-0.70
1.4828	SEW 470	≤ 0.20	1.5-2.5	≤ 2.00	≤ 0.045	≤ 0.030	11.0-13.0	19.0-21.0	-	-
1.4845	SEW 470	≤ 0.15	≤ 0.75	≤ 2.00	≤ 0.045	≤ 0.030	19.0-22.0	24.0-26.0	-	-
1.4878	SEW 470	≤ 0.12	≤ 1.00	≤ 2.00	≤ 0.045	≤ 0.030	9.0-12.0	17.0-19.0	-	4*C-0.80
Ferritic stainless steel										
TP 405	A268	≤ 0.08	≤ 0.75	≤ 1.00	≤ 0.040	≤ 0.030	≤ 0.50	11.50-13.50	-	Al 0.10-0.30
TP 410	A268	≤ 0.15	≤ 0.75	≤ 1.00	≤ 0.040	≤ 0.030	≤ 0.50	11.50-13.50	-	-
TP 430	A268	≤ 0.12	≤ 0.75	≤ 1.00	≤ 0.040	≤ 0.030	≤ 0.50	16.00-18.00	-	-
TP 430Ti	A268	≤ 0.10	≤ 1.00	≤ 1.00	≤ 0.040	≤ 0.030	≤ 0.75	16.00-19.50	-	Ti 5xC min; 0.75 max
1.4002	EN 10297-2	≤ 0.08	≤ 1.0	≤ 1.00	≤ 0.040	≤ 0.030	-	12.0-14.0	-	Al 0.10-0.30
1.4006	EN 10297-2	0.08-0.15	≤ 1.0	≤ 1.50	≤ 0.040	≤ 0.030	≤ 0.75	11.5-13.5	-	-
1.4016	EN 10297-2	≤ 0.08	≤ 1.0	≤ 1.00	≤ 0.040	≤ 0.030	-	16.0-18.0	-	Al 0.10-0.30
1.4510	EN 10297-2	≤ 0.05	≤ 1.0	≤ 1.00	≤ 0.040	≤ 0.030	-	16.0-18.0	-	(4(C+N)+0.15) - 0.80
Duplex stainless steel										
S31803	A790	≤ 0.03	≤ 1.0	≤ 2.00	≤ 0.030	≤ 0.020	4.50-6.50	21.0-23.0	2.50-3.50	N 0.08-0.20
S32205	A790	≤ 0.03	≤ 1.0	≤ 2.00	≤ 0.030	≤ 0.020	4.50-6.50	22.00-23.00	3.00-3.50	N 0.14-0.20
1.4462	10216-5	≤ 0.03	≤ 1.0	≤ 2.00	≤ 0.035	≤ 0.020	4.50-6.50	21.0-23.0	2.50-3.50	-
Superduplex stainless steel										
S32750	A790	≤ 0.03	≤ 1.0	≤ 2.00	≤ 0.030	≤ 0.020	4.50-6.50	21.0-23.0	2.50-3.50	N 0.08-0.20
S32760	A790	≤ 0.03	≤ 1.0	≤ 2.00	≤ 0.030	≤ 0.020	4.50-6.50	22.00-23.00	3.00-3.50	N 0.14-0.20

Seamless tubes

Standards: ASTM A312/A312M, ASME SA-312/SA-312M

Steel grades: TP304/304L/304H, TP321/321H, TP316/316L, TP316Ti, TP347/347H, TP310S*, other grades on agreement

Outside diameter			Wall thickness													
			SCH 5S		SCH 10S		SCH 40S		SCH 80S		SCH 120		SCH 160		SCH XXS	
NPS	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
1/8	0,405	10,3			0,049	1,24	0,068	1,73	0,095	2,41						
1/4	0,540	13,72			0,065	1,65	0,088	2,24	0,119	3,02						
3/8	0,675	17,15			0,065	1,65	0,091	2,31	0,126	3,20						
1/2	0,840	21,34	0,065	1,65	0,083	2,11	0,109	2,77	0,147	3,73			0,188	4,78		
3/4	1,050	26,67	0,065	1,65	0,083	2,11	0,113	2,87	0,154	3,91			0,219	5,56		
1	1,315	33,4	0,065	1,65	0,109	2,77	0,133	3,38	0,179	4,55			0,250	6,35	0,358	9,09
1 1/4	1,660	42,2	0,065	1,65	0,109	2,77	0,140	3,56	0,191	4,85			0,250	6,35	0,382	9,7
1 1/2	1,900	48,3	0,065	1,65	0,109	2,77	0,145	3,68	0,200	5,08			0,281	7,14	0,400	10,2
2	2,375	60,3	0,065	1,65	0,109	2,77	0,154	3,91	0,218	5,54			0,344	8,74	0,436	11,1
2 1/2	2,875	73,0	0,083	2,11	0,120	3,05	0,203	5,16	0,276	7,01			0,375	9,53	0,552	14
3	3,5	88,9	0,083	2,11	0,120	3,05	0,216	5,49	0,3	7,62			0,438	11,1	0,6	15,2
3 1/2	4	101,6			0,120	3,05	0,226	5,74	0,318	8,08			0,5	12,7	0,636	16,2
4	4,5	114,3			0,120	3,05	0,237	6,02	0,337	8,56	0,38	11,1	0,531	13,5	0,674	17,1
5	5,563	141,3					0,258	6,55	0,375	9,52	0,5	12,7	0,625	15,9	0,75	19,1
6	6,625	168,3					0,28	7,11	0,432	10,97	0,562	14,3	0,719	18,3	0,864	22
8	8,625	219,1					0,322	8,18	0,5	12,7	0,719	18,3	0,906	21	0,875	22,2
10	10,75	273,0					0,365	9,27	0,5	12,7						

Permissible Variations in Outside Diameter

NPS Designator	Over		Under	
	inch	mm	inch	mm
1/8 – 1 , incl	0,015	0,4	0,031	0,8
Over 1 to 4, incl	0,031	0,8	0,031	0,8
Over 4 to 8, incl	0,062	1,6	0,031	0,8
Over 8 to 18, incl	0,093	2,4	0,031	0,8

Permitted Variations in Wall Thickness

NPS Designator	Over, %	Under, %
1/8 to 2 .	20,0	12,5
3 to 18 incl., t/D up to 5% incl.	22,5	12,5
3 to 18 incl., t/D > 5% incl.	15,0	12,5

Standards: ASTM A790/A790M; ASME SA-790/SA-790M, ASTM A789/A789M, ASME SA-789/SA-789M

Steel grades: S31803, S32205*, S32750*, S32760* other grades upon agreement

Outside diameter			Wall thickness															
			SCH 5S		SCH 10S		SCH 30S		SCH 40S		SCH 80S		SCH 120		SCH 160		SCH XXS	
NPS	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm		
1/8	0,405	10,29			0,049	1,24	0,057	1,45	0,068	1,73	0,095	2,41						
1/4	0,54	13,72			0,065	1,65	0,073	1,85	0,088	2,24	0,119	3,02						
3/8	0,675	17,15			0,065	1,65	0,073	1,85	0,091	2,31	0,126	3,20						
1/2	0,84	21,34	0,065	1,65	0,083	2,11	0,095	2,41	0,109	2,77	0,147	3,73						
3/4	1,05	26,67	0,065	1,65	0,083	2,11	0,095	2,41	0,113	2,87	0,154	3,91						
1	1,315	33,4	0,065	1,65	0,109	2,77	0,114	2,90	0,133	3,38	0,179	4,55						
1 1/4	1,660	42,2	0,065	1,65	0,109	2,77	0,117	2,97	0,140	3,56	0,191	4,85			0,250	6,35	0,382	9,7
1 1/2	1,900	48,3	0,065	1,65	0,109	2,77	0,125	3,18	0,145	3,68	0,200	5,08			0,281	7,14	0,400	10,15
2	2,375	60,3	0,065	1,65	0,109	2,77	0,125	3,18	0,154	3,91	0,218	5,54			0,344	8,74	0,436	11,07
2 1/2	2,875	73,0	0,083	2,11	0,120	3,05	0,188	4,78	0,203	5,16	0,276	7,01			0,375	9,53	0,552	14,02
3	3,5	88,9	0,083	2,11	0,120	3,05	0,188	4,78	0,216	5,49	0,3	7,62			0,438	11,13	0,6	15,24
3 1/2	4	101,6			0,120	3,05	0,188	4,78	0,226	5,74	0,318	8,08			0,5	12,7	0,636	16,15
4	4,5	114,3							0,237	6,02	0,337	8,56	0,38	11,13	0,531	13,49	0,674	17,12
5	5,563	141,3							0,258	6,55	0,375	9,52	0,5	12,7	0,625	15,88	0,75	19,05
6	6,625	168,3							0,28	7,11	0,432	10,97	0,562	14,27	0,719	18,26	0,864	21,95
8	8,625	219,1									0,5	12,7	0,719	18,26	0,906	21,01	0,875	22,23
10	10,75	273,0									0,50	12,7						

COLD

HOT

COLD&HOT

* production after trial lot

Standards: ASTM A213/A213M, ASME SA-213/SA-213M, ASTM A269/269M
Steel grades: TP304/304L/304H, TP321/321H, TP316/316L, TP316Ti, TP347/347H, TP310S*, other grades upon agreement

Outside diameter		Wall thickness, mm																							
		0,4	0,5	0,6	0,71	0,89-0,91	1,0	1,2	1,4-1,5	1,6	1,83-1,9	2,0-2,03	2,11	2,2-2,3	2,4-2,5	2,6-2,64	2,7-2,77-2,88	3,0-3,05	3,18-3,2	3,5-3,6	4	4,4-4,5	5	5,5	6
in	mm																								
	4,00																								
	6,00																								
1/4	6,35																								
	7,00																								
5/16	7,94																								
	8,00																								
	9,00																								
3/8	9,53																								
	10,00																								
	10,2																								
7/16	11,11																								
	12,00																								
1/2	12,7																								
	13,00																								
	13,50																								
9/16	14,0-14,3																								
	15,0																								
5/8	15,88																								
	16,00																								
11/16	17,2-17,5																								
	18,00																								
3/4	19,0-19,05																								
	20,00																								
13/16	20,6-21,34																								
	22,00																								
7/8	22,23																								
15/16	23,81																								
	25,00																								
1	25,40																								
	26,70																								
	26,9																								
	28,00																								
	30,00																								
1 1/4	31,75																								
	32,00																								
	33,40																								
	33,70																								
	35,00																								
	36,00																								
1 1/2	38,10																								
	40,00																								
	42,0-42,4																								
1 3/4	44,45																								
	48,0-48,3																								
2	50,8																								
	54																								
	57																								
2 3/8	60,3-60,33																								
2 1/2	63,5																								
2 3/4	69,85																								
3	76,1-76,2																								

Dimensional tolerances for ASTM A213/A213M, ASME SA-213/SA-213M

Outside diameter, mm	Wall thickness, mm	Tolerance limits of		
		OD, mm	MW WT, %	AW WT, %
< 25,4	0,4-4,5	+0,10mm/-0,10mm	+20%/-0%	+10%/-10%
25,4-38,10	1,0-6,0	+0,15mm/-0,15mm	+20%/-0%	+10%/-10%
38,2-50,80	1,2-7,0	+0,20mm/-0,20mm	+22%/-0%	+10%/-10%
50,90-63,50	1,8-8,0	+0,25mm/-0,25mm	+22%/-0%	+10%/-10%
63,60-76,20	2,0-8,5	+0,30mm/-0,30mm	+22%/-0%	+10%/-10%

* production after trial lot

Welded tubes

Standards: DIN EN 10217-7, EN 10296, ASTM A 554, GOST 11068

Steel grades: 1.4541, 1.4878, 1.4301, 1.4306, 1.4307, 1.4401, 1.4435*, 1.4571, 1.4404, 1.4436*, 1.4462, 1.4512*, 1.4510*, 1.4509*, AISI 310S* and other

Outside mm	Wall thickness, mm																			
	0,5	0,6	0,8	1	1,2	1,5	1,6	1,8	2	2,1	2,3	2,5	2,6	2,9	3	3,2	3,6	3,7	4	
8,0																				
9,0																				
10,0																				
12,0																				
14,0																				
16,0																				
18,0																				
20,0																				
21,3																				
22,0																				
25,0																				
26,9																				
28,0																				
29,0																				
30,0																				
32,0																				
33,0																				
33,7																				
35,0																				
38,0																				
40,0																				
41,0																				
42,4																				
43,0																				
45,0																				
48,3																				
50,8																				
51,0																				
52,0																				
53,0																				
57,0																				
60,3																				
63,5																				
70,0																				
76,1																				
85,0																				
88,9																				
101,6																				
108,0																				
114,3																				

* production after trial lot