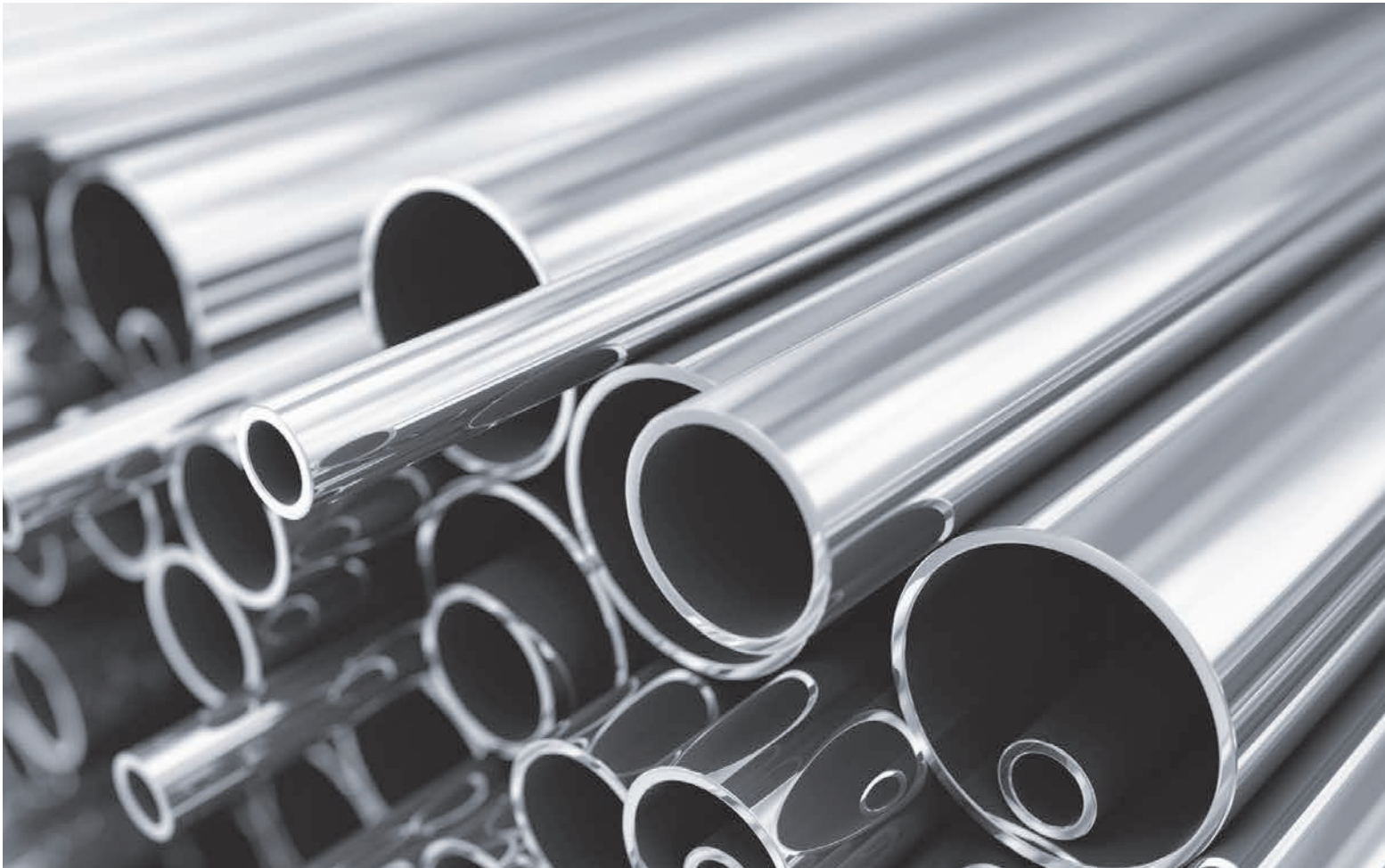


VENUSTM
PIPES AND TUBES

#RedefiningEndurance



Manufacturer & Exporter of Stainless Steel Welded & Seamless Pipes | Tubes | U - Tubes

*An ISO 9001:2015, 14001:2015 and BS OHSAS 18001:2007, PED 2014/68/EU
& ADW / AD 2000 - Merkblatt WO certified company*



ABOUT

Our association with stainless steel products is more than 15 years old now. Employing our vast experience as a successful trading company, we have ventured into manufacturing of stainless steel tubular products.

We at Venus, ensure the finest products for our customers with nine production lines including pilgers, tube-mills with plasma welders, draw benches, annealing furnaces and many more ancillary machinery. Superior quality and production is achieved by implementing benchmark technologies in manufacturing processes and setting up fully-equipped in-house quality control lab conferring to international standards.

With highly dedicated and young team, we aim to become the forerunner of the tubular solutions industry when it comes to products, quality, standards, material range, pricing and most importantly customer satisfaction. The production facility is spread across 11 acres' area based in Kutch region of Kutch, India, which houses two major sea ports, enabling us with easy logistics.



Manufacturer & Exporter of Stainless Steel Welded & Seamless Pipes | Tubes | U - Tubes
An ISO 9001:2015, 14001:2015 and BS OHSAS 18001:2007, PED 2014/68/EU
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VISION

- Making ourselves as first reference and preference in stainless steel pipes and tubes manufacturer.
- To be a leading manufacturer and provider for demanding and challenging applications for stainless steel pipes and tubes.



MISSION

- To provide quality and flawless service for dealing with customer / supplier and distributors
- For transparency and high quality delivery, establishing integrated system with the help of IT.



CORE VALUES

- We are working with the highest ethical standards in all aspects of our activities.
- Innovation, quality and service are most important for us and our business.
- Priority to establish and maintain positive long-term relationship with our business partners.



PRODUCTS

Stainless Steel High Precision & Heat Exchanger Tubes

Outside Diameter Range	6 mm to 101.60 mm
Wall Thickness Range	0.70 mm to 8.0mm
Length	As per Requirement. Maximum up to 24 Meter long.
U- Tubes	As per Customer's Drawing, Developed length up to 36 Meter.
Grades	304/L/H/LN, 316/L/H/LN/Ti, 309, 310/L/H/S, 317/L/H, 321/H, 347/H, 405, 409/L, 410, 430/Ti, 436, 439, 1.4301, 1.4306, 1.4571, 1.4541, 1.4401, 1.4404 UNS S31500, UNS S31803, UNS S2205, UNS S32750, UNS S32760
Specification	Seamless – ASTM A-213, A-268, A-269, A-270, A-789, EN 10216-5 Welded – ASTM A-249, A-268, A-269, A-270, A-554, A-688, A-789, A-803, EN-10217-7
Supply Condition	Solution-annealed, pickled and passivated Bright Annealed
Application	Heat Exchangers • Pressure Vessels • Chemical & Fertilizer • Marine Equipments • Refinery & Petrochemical • Process Industry • Dairy / Pharmaceutical Industry • Nuclear Power Generation • Automotive • Aerospace

Contact sales for more available grades

*Specifications as per ASTM, ASME, DIN, JIS (JAPAN), EN, NF(ANOR) also available

Stainless Steel Hydraulic & Instrumentation Tubes

Outside Diameter Range	6 mm to 76 mm
Wall Thickness Range	0.50 mm to 8.0mm
Length	As per Requirement. Maximum up to 24 Meter long.
Grades	304/L/H/LN, 316/L/H/LN/Ti, 309, 310/L/H/S, 317/L/H, 321/H, 347/H, 405, 409/L, 410, 430/Ti, 436, 439, 1.4301, 1.4306, 1.4571, 1.4541, 1.4401, 1.4404 UNS S31500, UNS S31803, UNS S2205, UNS S32750, UNS S32760
Specification	ASTM A-213, A-269, A-789, EN 10216-5
Supply Condition	Solution-annealed, pickled and passivated, Bright Annealed
Application	Nuclear & Thermal Power generation • Oil & Gas • Process Industries • Chemical & Fertilizer • Nuclear Power • Food & Beverage Processing • Automotive • Aerospace • Medical & Pharmaceutical

Stainless Steel Seamless Pipes

Outside Diameter Range	1/8" NB to 12" NB
Wall Thickness Range	SCH 5S to SCH XXS
Length	As per Requirement. Maximum up to 24 Meter long.
Grades	304/L/H/LN, 316/L/H/LN/Ti, 309, 310/L/H/S, 317/L/H, 321/H, 347/H, UNS S31500, UNS S31803, UNS S2205, UNS S32750, UNS S32760
Specification	ASTM A-312, A-790
Supply Condition	Solution-Annealed, pickled and passivated. Can be supplied in other conditions on requirement.
Application	Onshore and Offshore Oil and Gas Production, Exploration and Transport (OCTG – Oil Country Tubular Goods) • Chemical & Petrochemical • Energy & Power Generation • Mechanical & Plant Engineering • Marine Equipment's • Pulp & Paper • Pharmaceutical Industry

Contact sales for more available grades

*Specifications as per ASTM, ASME, DIN, JIS (JAPAN), EN, NF(ANOR) also available

Stainless Steel Welded Pipes

Outside Diameter Range	1/8" NB to 12" NB
Wall Thickness Range	SCH 5S to SCH 80S
Length	As per Requirement. Maximum up to 24 Meter long.
Grades	304/L/H/LN, 316/L/H/LN/Ti, 309, 310/L/H/S, 317/L/H, 321/H, 347/H, UNS S31500, UNS S31803, UNS S2205, UNS S32750, UNS S32760
Specification	ASTM A-312, A-554, A-778, A-790
Supply Condition	Solution-Annealed, pickled and passivated. Can be supplied in other conditions on requirement.
Application	Chemical & Petrochemical • Gas Industry • Power Generation • Mechanical & Plant Engineering • Marine Equipment's • Pulp & Paper • Pharmaceutical Industry

Stainless Steel Box Pipes

Square	15×15 mm to 100×100 mm
Rectangular	15×30 mm to 100×50 mm
Wall Thickness Range	1.0 mm to 6.0 mm
Length	As per Requirement. Maximum up to 12 Meter long .
Grades	As per Requirement.
Specification	As per Requirement.
Supply Condition	Annealed, pickled and passivated. Can be supplied polished condition on requirement.



APPLICATIONS

- Heat Exchangers
- Pharmaceuticals
- Aerospace
- Refineries
- Oil & Gas
- Automobiles
- Power Plant
- Chemicals
- Food Processing





QUALITY CONTROL
Inspection & Testing Facilities

Non-Destructive Testing

1	Eddy Current Test	Performed by Level-I, II personnel at Technofour Make Eddy Current System to detect surface and sub-surface flaws.
2	Liquid Penetration Test	Carried out by DPT kit to detest surface flaws.
3	Visual & Dimensional Inspection	Tubular are checked for imperfection and dimensional conformity by Digital Vernier Caliper, Micrometer, Ultra-sonic Thickness Gauge, Measuring Tape of valid calibration.
4	Hydro Testing	Performed by qualified personnel to detect leak-tightness of Tubular at calculated pressure at Hydro-Tester Bench equipped with Pressure Gauge of Valid Calibration
5	Pneumatic Test	Air under water test to check the leak-tightness of tubing
6	Positive Material Identification	Carried out for sorting by XRF Analyzer.

Destructive Testing

1	Tensile Testing (Proof Load, UTS & % Elongation)	40 M.T. Universal Testing Machine integrated with Software to check Tensile Strength, Yield strength (including 0.2%, 1.0% Proof Test), Percentage of Elongation.
2	Chemical Testing- Product analysis	Full chemical composition is analyzed with high-precision Optical Emission Spectrometer.
3	Rockwell Hardness Testing	Hardness Test is performed in HRC/HRB Scale at Rockwell Hardness Machine with pre-calibrated with Master Block
4	Flattening/Reverse Flattening Test	Flattening testing performed to reveal the compression strength of the tube.
5	Guided Bend/Reverse Bend Test	Bend testing is performed to evaluate the Ductility and Soundness of weld, to evaluate the effectiveness of Heat Treating Process
6	Flaring/Flange Test	The flaring and Flange test serves to establish the forming behavior of tubes or pipes which is expanded to a specific degree.
7	Micro/Macro Examination	Micro- Structure is analyzed for Grain-Size, Phase-balance, phase precipitation, morphology, inclusions , defects etc. at various magnification (20X,50X,100X,400X,1000X) by advanced micro-scope integrated with Image Analyzer Software
8	Inter Granular Corrosion test- IGC Practice A, E & C (ASTMA-262), Practice W,X, Y,Z (ASTM A-763) , Method A, C (ASTM A-923)	Carried out with well-equipped kit to detect susceptibility to inter-granular attack for various Austenitic, Ferritic and Duplex Stainless Steel.

List of Measuring and Monitoring Equipments

Sr. No	Equipment/ Instrument Name/ Description	Range	No. of Equipments	Make
01	Optical Emission Spectrometer	Assorted	01	Bruker
02	PMI Machine	Assorted	01	Niton
03	Offline Eddy Current System	Up To 4" Dia.	01	Technofour
04	Universal Testing Machine	0-400 KN	01	FSA
05	Rockwell cum Superficial Hardness Testing Machine	0-100 HRB /0-100 HRC	01	Meta-Test
06	Metallurgical Microscope with Image Analyzer Software	1000 X Magnification	01	Metalab
07	Surface Roughness Tester	360 μ m	01	Mitutoyo
08	DC Power Supply	0-10 Volt	01	Metalab
09	Electronic Hot Plate	0-110 °C	02	Metalab
10	Electronic Weighing Balance	0-200 Gms.	01	Wensar
11	Muffle Furnace	0-1200 °C	01	Venus
12	pH Meter	0-14	02	Hanna
13	Temp. cum TSDS Meter	0-9990 ppm /0-80°C	02	HM Digital
14	IGC Testing Kit	Assorted	02	Borosil
15	Pressure Gauge	Varied Range	30	Waree, Baumer, Excel
16	Flat Micrometer	Varied Range	07	Mitutoyo
17	Tube Micrometer	Varied Range	02	Mitutoyo
18	Digital Vernier Caliper	Varied Range	04	Mitutoyo
19	Ball Micrometer	Varied Range	05	Mitutoyo
20	Analog Ampere Meter	0-100 Amp.	01	Risabh
21	Analog VoltMeter	0-15 kV	01	Risabh
22	Digital VoltMeter	0-440 V	06	d-Pro, Nippon
23	RPM Meter	0-3000 Rpm	03	Aptus
24	Digital Volt Meter	0-600 V	05	Miller
25	Digital Ampere Meter	0-600 A	05	Miller
26	Digital Multimeter	0-440 VAC /0-24VDC	01	Meco
27	Clamp Meter	0-1000 A	01	Kusum Meco

GRADE COMPARISON



TYPE OF MATERIAL	USA AISI	France AFNOR	Germany DIN 17006	Germany W.N. 17007	Italy UNI	Japan JIS	Russia GOST	Spain UNE	Sweden SIS	UK BSI	European Union EURONORM	
AUSTENITIC GRADES	201	--	--	--	--	SUS 201	---	---	---	----	---	
	301	Z 12 CN 17-07	X 12 CrNi 17 7	1.4310	X 12 CrNi 1707	SUS 301	---	X 12 CrNi 17-07	23 31	301S21	X 12 CrNi 17 7	
	302	Z 10 CN 18-09	X 5 CrNi 18 7	1.4319	X 10 CrNi 1809	SUS 302	12KH18N9	X 10 CrNi 18-09	23 31	302S25	X 10 CrNi 18 9	
	303	Z 10 CNF 18-09	X 10 CrNiS 18 9	1.4305	X 10 CrNiS 1809	SUS 303		X 10 CrNiS 18-09	23 46	303S21	X 10 CrNiS 18 9	
	304	Z 6 CN 18-09	X 5 CrNi 18 10	1.4301	X 5 CrNi 1810	SUS 304	08KH18N10	X 6 CrNi 19-10	23 32	304S15	X 6 CrNi 18 10	
			X 5 CrNi 18 12	1.4303			06KH18N11			304S16		
	304 N	--	--	--	X 5 CrNiN 1810	SUS 304N1	---	---	---	---	---	
	304 H	--	--	--	X 8 CrNi 1910	SUS F 304H	---	X 6 CrNi 19-10	---	---	---	
	304 L	Z 2 CN 18-10	X 2 CrNi 18 11	1.4306	X 2 CrNi 1911	SUS 304L	03KH18N11	X 2 CrNi 19-10	23 52	304S11	X 3 CrNi 18 10	
	304LN	Z 2 CN 18-10-AZ	X 2 CrNiN 18 10	1.4311	X 2 CrNiN 1811	SUS 304LN	---	---	23 71	---	---	
	305	Z 8 CN 18-12			X 8 CrNi 1812	SUS 305	---	X 8 CrNi 18-12	23 33	305S19	X 8 CrNi 18 12	
	309	Z 15 CN 24-13	X 15 CrNiS 20 12	1.4828	X 16 CrNi 2314	SUH 309	---	---	---	309S24	X 15 CrNi 23 13	
	309 S	--	--	--	X 6 CrNi 2314	SUS 309S	20KH23N18	---	---	---	---	X 6 CrNi 22 13
	310	--	X 12 CrNi 25 21	1.4845	X 22 CrNi 2520	SUH 310	10KH23N18	---	---	310S24	---	---
	310 S	Z 12 CN 25-20	X 12 CrNi 25 20	1.4842	X 5 CrNi 2520	SUS 310S	20KH25N20S2	---	23 61	---	---	X 6 CrNi 25 20
	314	Z 12 CNS 25-20	X 15 CrNiS 25 20	1.4841	X 16 CrNiS 2520	---	---	---	---	---	---	X 15 CrNiS 25 20
316	Z 6 CND 17-11	X 5 CrNiMo 17 12 2	1.4401	X 5 CrNiMo 1712	SUS 316	---	X 6 CrNiMo 17-12-03	23 47	316S31	---	X 6 CrNiMo 17 12 2	
316 H	--	--	--	X 8 CrNiMo 1713	---	03KH17N14M2	X 6 CrNiMo 17-12-03	---	---	---	---	
316 L	Z 2 CND 17-12	X 2 CrNiMo 17 13 2	1.4404	X 2 CrNiMo 1712	SUS 316L	---	X 2 CrNiMo 17-12-03	23 48	316S11	---	X 3 CrNiMo 17 12 2	
316 L	Z 2 CND 17-13	X 2 CrNiMo 18 14 3	1.4435	X 2 CrNiMo 1713	---	---	X 2 CrNiMo 17-12-03	23 53	316S13	---	X 3 CrNiMo 17 13 3	
316LN	Z 2 CND 17-12-AZ	X 2 CrNiMoN 17 12 2	1.4406	X 2 CrNiMoN 1712	SUS 316LN	03KH16N15M3	---	---	---	---	---	

TYPE OF MATERIAL	USA AISI	France AFNOR	Germany DIN 17006	Germany W.N. 17007	Italy UNI	Japan JIS	Russia GOST	Spain UNE	Sweden SIS	UK BSI	European Union EURONORM	
AUSTENITIC GRADES	316Ti	Z6 CNDT 17-12	X 6 CrNiMoTi 17 12 2	1.4571	X 6 CrNiMoTi 1712	--	08KH17N13M2T	X 6 CrNiMoTi 17-12-03	23 50	320S31	X 6 CrNiMoTi 17 12 2	
	317	--	--	--	X 5 CrNiMo 1815	SUS 317	--	--	23 66	317S16	--	
	317 L	Z 2 CND 19-15	X 2 CrNiMo 18 16 4	1.4438	X 2 CrNiMo 1815	SUS 317L	--	--	23 67	317S12	X 3 CrNiMo 18 16 4	
	330	Z 12NCS 35-16	X 12 NiCrSi 36 16	1.4864	--	SUH 330	08KH18N10T	--	--	--	--	
	321	Z 6 CNT 18-10	X 6 CrNiTi 18 10 X 12 CrNiTi 18 9	1.4541 1.4878	X 6 CrNiTi 1811	SUS 321	12KH18N10T	X 6 CrNiTi 18-11	23 37	321S31	X 6 CrNiTi 18 10	
	321 H	--	--	--	X 8 CrNiTi 1811	SUS 321H	08KH18N12B	X 7 CrNiTi 18-11	--	321S20	--	
	329	--	X 8 CrNiMo 27 5	1.4460	--	SUS 329J1	--	--	23 24	--	--	
	347	Z 6 CnNb 18-10	X 6 CrNiNb 18 10	1.4550	X 6 CrNiNb 1811	SUS 347	--	X 6 CrNiNb 18-11	23 38	347S31	X 6 CrNiNb 18 10	
	347 H	--	--	--	X 8 CrNiNb 1811	SUS F 347H	--	X 7 CrNiNb 18-11	--	--	--	
	DUPLEX & SUPER DUPLEX GRADES	UNS31803	--	X 2 CrNiMoN 22 5	1.4462	--	--	--	--	--	--	--
UNS32760		Z 3 CND 25-06Az	X 3 CrNiMoN 25 7	1.4501	--	--	12Kh13	--	--	--	--	
MARTENSITIC AND FERRITIC GRADES	403	Z 12 C 13	X 6 Cr 13 X 10 Cr 13 X 15 Cr 13	1.4000 1.4006 1.4024	X 12 Cr 13	SUS 403	--	X 6 Cr 13	23 02	403S17	X 10 Cr 13 X 12 Cr 13	
	405	Z 6 CA 13	X 6 CrAl 13	1.4002	X 6 CrAl 13	SUS 405	--	X 6 CrAl 13	--	405S17	X 6 CrAl 13	
	409	Z 6 CT 12	X 6 CrTi 12	1.4512	X 6 CrTi 12	SUH 409	--	--	--	409S19	X 5 CrTi 12	
	410	Z 10 C 13	X 6 Cr 13	1.4000	X 12 Cr 13	SUS 410	08Kh13	X 12 Cr 13	23 02	410S21	X 12 Cr 13	
		Z 12 C 13	X 10 Cr 13 X 15 Cr 13	1.4006 1.4024	--	--	--	--	--	--	--	--
	410 S	Z 6 C 13	X 6 Cr 13	1.4000	X 6 Cr 13	SUS 410S	--	--	23 01	403S17	X 6 Cr 13	



CHEMICAL COMPOSITION OF STAINLESS STEEL

ASTM GRADE	UNS GRADE	DIN EN GRADE	STEEL NAME	JIS GARDE	C	Mn	P	S
TP 304	S30400	1.4301	X2CrNi18-20		0.080	2.00	0.045	0.030
					0.070	2.00	0.040	0.015
TP 304L	S30403	1.4307	X2CrNi18-9	SUS304TB	0.080	2.00	0.040	0.030
					0.035	2.00	0.045	0.030
TP 304H	S30409	1.4948	X6CrNi18-10	SUS304LTB	0.030	2.00	0.040	0.015
					0.030	2.00	0.040	0.030
TP 310S	S31008	1.4845	X8CrNi25-21	SUS310HTB	0.04-0.10	2.00	0.045	0.030
					0.04-0.08	2.00	0.035	0.015
TP 310H	S31009	1.4335	X1CrNi25-21	SUS310STB	0.04-0.10	2.00	0.040	0.030
					0.080	2.00	0.045	0.030
TP 316	S31500	1.4401	X5CrNiMo17-12-2	SUS316TB	0.100	2.00	0.045	0.015
					0.080	2.00	0.040	0.030
TP 316L	S31603	1.4404	X2CrNiMo17-12-2	SUS316LTB	0.080	2.00	0.040	0.030
					0.035	2.00	0.045	0.030
TP 316H	S31609	1.4918	X6CrNiMo17-13-2	SUS316HTB	0.030	2.00	0.040	0.015
					0.030	2.00	0.040	0.030
TP 316 Ti	S31635	1.4571	X6CrNiMoTi17-12-2	SUS316TiTB	0.04-0.10	2.00	0.045	0.030
					0.04-0.08	2.00	0.035	0.015
TP 321	S32100	1.4541	X6CrNiTi18-10	SUS321TB	0.04-0.10	2.00	0.030	0.030
					0.080	2.00	0.045	0.030
TP 321H	S32109	1.4941	X5CrNiTiB18-10	SUS321HTB	0.080	2.00	0.040	0.015
					0.080	2.00	0.040	0.030
TP 347	S34700	1.455	X5CrNiNb18-10	SUS347TB	0.04-0.10	2.00	0.045	0.030
					0.04-0.08	2.00	0.035	0.015
TP 347H	S34709	1.4912	X7CrNiNb18-10	SUS347HTB	0.080	2.00	0.040	0.015
					0.080	2.00	0.040	0.030
TP 405	S40500	1.4002	X6CrAl13		0.04-0.10	2.00	0.030	0.030
					0.04-0.10	2.00	0.040	0.015
TP 410	S41000	1.4006	X12Cr13		0.080	1.00	0.040	0.015
					0.150	1.00	0.040	0.030
TP 430	S43000	1.4016	X6Cr17		0.018-0.15	1.50	0.040	0.015
					0.120	1.00	0.040	0.030
2205	UNS S31803 UNS S32205	1.4452	X2CrNiMoN22-5-3		0.080	1.00	0.040	0.015
					0.030	2.00	0.030	0.020
2507	UNS S32750 UNS S32760	1.441	X2CrNiMoN25-7-4		0.030	2.00	0.035	0.015
					0.030	1.20	0.030	0.020
		1.4501	X2CrNiMoCuWN25-7-4		0.030	1.00	0.030	0.010
					0.030	1.00	0.035	0.015

	Si	Cr	Ni	Mo	N	Nb	Ti	Cu	Al	W	B
	1.00	18.0-20.0	8.00-11.0								
	1.00	17.0-19.5	8.00-10.5		0.10Max						
	1.00	18.0-20.0	8.00-11.0								
	1.00	18.0-20.0	8.00-12.0								
	1.00	17.5-19.5	8.00-10.0		0.10 Max						
	1.00	18.0-20.0	9.00-13.0								
	1.00	18.0-20.0	8.00-11.0								
	1.00	17.0-19.0	8.00-11.0								
	0.75	18.0-20.0	8.00-11.0								
	1.00	24.0-26.0	19.00-22.0								
	1.50	24.0-26.0	19.00-22.0		0.11 Max.						
	1.50	24.0-26.0	19.00-22.0								
	1.00	24.0-26.0	19.00-22.0								
	0.25	24.0-26.0	20.00-22.0	0.20 Max.							
	1.00	16.0-18.0	11.00-14.0	2.00-3.0							
	1.00	16.5-18.5	10.00-13.0	2.00-2.5	0.10 Max						
	1.00	16.0-18.0	10.00-14.0	2.00-3.0							
	1.00	16.0-18.0	10.00-14.0	2.00-3.0							
	1.00	16.5-18.5	11.00-13.0	2.00-2.5	0.10 Max						
	1.00	16.0-18.0	12.00-16.0	2.00-3.0							
	1.00	16.0-18.0	11.00-14.0	2.00-3.0							
	0.75	16.0-18.0	12.00-14.0	2.00-2.5							
	0.75	16.0-18.0	11.00-14.0	2.00-3.0							
	0.75	16.0-18.0	10.00-14.0	2.00-3.0	0.10 Max.						
	1.00	16.5-18.5	10.50-13.5	2.00-2.5			5(C+N)-0.70				
	1.00	16.0-18.0	10.00-14.0	2.00-3.0			5XC TO 0.70				
	1.00	17.0-19.0	9.00-12.0				5XC Min.				
	1.00	17.0-19.0	9.00-12.0				5(C+N)-0.70				
	1.00	17.0-19.0	9.00-12.0				5XC TO 0.70				
	1.00	17.0-19.0	9.00-13.0				5XC Min.				
	1.00	17.0-19.0	9.00-12.0				5(C+N)-0.70				
	1.00	17.0-19.0	9.00-12.0				5XC - 0.80				
	0.75	17.0-20.0	9.00-13.0				4XC - 0.60				
	1.00	17.0-20.0	9.00-13.0			10XC-1.10					0.0015 - 0.00050
	1.00	17.0-19.0	9.00-12.0			10XC - 1.0					
	1.00	17.0-19.0	9.00-13.0			10XC Min.					
	1.00	17.0-19.0	9.00-13.0			5XC-1.10					
	1.00	17.0-19.0	9.00-12.0		0.10 Max.	10XC - 1.2					
	1.00	17.0-19.0	9.00-13.0			8XC-1.00					
	1.00	11.5-14.5	0.50(MAX)						0.10-0.30		
	1.00	12.0-14.0							0.10-0.30		
	1.00	11.5-13.5									
	1.00	11.5-13.5	0.75								
	1.00	16.0-18.0									
	1.00	16.0-18.0									
	1.00	21.0-23.0	4.50-6.50	2.50-3.5	0.08-0.20						
	1.00	22.0-23.0	4.50-6.50	3.00-3.5	0.14-0.20						
	1.00	21.0-23.0	4.50-6.50	2.50-3.5	0.10-0.22						
	0.90	24.0-26.0	6.00-8.0	3.00-5.0	0.24-0.30			0.50 Max.			
	1.00	24.0-26.0	6.00-8.0	3.00-4.5	0.24-0.35						
	1.00	24.0-26.0	6.00-8.0	3.00-4.0	0.20-0.30			0.50-0.10		0.50-1.00	
	1.00	24.0-26.0	6.00-8.0	3.00-4.0	0.20-0.30				0.50-1.00		



TUBE SIZE CHART

Outside	in mm	6.35	12.7	19.05	25.4	31.75	38.1	44.45	50.8	57.15	63.5	69.85	76.2	82.55	88.9	95.25	101.6	
Diameter	in inch	1/4	1/2	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	
Wall Thickness																		
Gauge	mm	inch																
22 SWG 22 BWG	0.711 0.711	0.028 0.028	0.099 0.099	0.21 0.21	0.322 0.322	0.433 0.433	0.544 0.544	0.656 0.656	0.767 0.767	0.878 0.878	0.99 0.99	1.101 1.101						
21 SWG 21 BWG	0.813 0.813	0.032 0.032	0.111 0.111	0.238 0.238	0.366 0.366	0.493 0.493	0.62 0.62	0.748 0.748	0.875 0.875	1.002 1.002	1.13 1.13	1.257 1.257						
20 SWG 20 BWG	0.914 0.889	0.036 0.035	0.123 0.12	0.266 0.259	0.409 0.398	0.552 0.537	0.695 0.677	0.838 0.816	0.981 0.955	1.124 1.094	1.268 1.233	1.411 1.373	1.554 1.512					
19 SWG 19 BWG	1.016 1.067	0.04 0.042	0.134 0.139	0.293 0.306	0.452 0.473	0.611 0.64	0.77 0.807	0.929 0.974	1.088 1.142	1.247 1.309	1.406 1.476	1.566 1.643	1.725 1.81					
18 SWG 18 BWG	1.219 1.245	0.048 0.049	0.154 0.157	0.345 0.352	0.536 0.547	0.727 0.742	0.918 0.937	1.109 1.132	1.3 1.327	1.491 1.522	1.681 1.716	1.872 1.911	2.063 2.106	2.254 2.301	2.445 2.496	2.636 2.691	2.827 2.886	
17 SWG 17 BWG	1.422 1.473	0.056 0.058	0.173 0.179	0.396 0.414	0.618 0.649	0.841 0.884	1.064 1.118	1.286 1.353	1.509 1.588	1.732 1.823	1.954 2.057	2.177 2.292	2.4 2.527	2.622 2.762	2.845 2.996	3.068 3.176	3.29 3.466	
16 SWG 16 BWG	1.626 1.651	0.064 0.065	0.189 0.191	0.444 0.45	0.699 0.708	0.953 0.967	1.208 1.226	1.463 1.484	1.717 1.743	1.972 2.001	2.226 2.26	2.481 2.518	2.736 2.777	2.99 3.035	3.245 3.294	3.5 3.552	3.754 3.811	4.009 4.07
15 SWG 15 BWG	1.829 1.829	0.072 0.072	0.204 0.204	0.49 0.49	0.777 0.777	1.063 1.063	1.35 1.35	1.636 1.636	1.922 1.922	2.209 2.209	2.495 2.495	2.782 2.782	3.068 3.068	3.355 3.355	3.641 3.641	3.927 3.927	4.214 4.214	4.5 4.5
14 SWG 14 BWG	2.032 2.108	0.08 0.083	0.216 0.221	0.535 0.551	0.853 0.881	1.171 1.211	1.489 1.541	1.807 1.871	2.126 2.201	2.444 2.531	2.762 2.861	3.08 3.192	3.399 3.522	3.717 3.852	4.035 4.182	4.353 4.512	4.671 4.842	4.99 5.172
13 SWG 13 BWG	2.337 2.413	0.092 0.095		6.493 0.612	0.963 0.99	1.329 1.368	1.695 1.746	2.061 2.124	2.427 2.502	2.793 2.879	3.159 3.257	3.525 3.635	3.891 4.013	4.257 4.391	4.623 4.769	4.989 5.147	5.355 5.525	5.721 5.902
12 SWG 12 BWG	2.642 2.769	0.104 0.109		0.655 0.678	1.069 1.112	1.483 1.545	1.897 1.979	2.31 2.413	2.724 2.846	3.138 3.28	3.552 3.714	3.965 4.147	4.379 4.581	4.793 5.014	5.206 5.448	5.62 5.882	6.034 6.315	6.448 6.749
11 SWG 11 BWG	2.946 3.048	0.116 0.12		0.709 0.726	1.17 1.203	1.631 1.68	2.093 2.157	2.554 2.635	3.015 3.112	3.477 3.589	3.938 4.067	4.399 4.544	4.861 5.021	5.322 5.499	5.783 5.976	6.245 6.453	6.706 6.931	7.167 7.408
10 SWG 10 BWG	3.251 3.404	0.128 0.134		0.758 0.78	1.267 1.313	1.776 1.847	2.285 2.38	2.794 2.913	3.303 3.446	3.812 3.979	4.321 4.512	4.83 5.045	5.34 5.578	5.849 6.111	6.358 6.644	6.867 7.177	7.376 7.71	7.885 8.243
9 SWG 9 BWG	3.658 3.759	0.144 0.148		0.816 0.829	1.389 1.418	1.961 2.006	2.534 2.595	3.107 3.183	3.68 3.772	4.253 4.361	4.826 4.949	5.398 5.538	5.971 6.127	6.544 6.715	7.117 7.304	7.69 7.893	8.263 8.481	8.836 9.07
8 SWG 8 BWG	4.064 4.191	0.16 0.165		0.866 0.879	1.502 1.536	2.138 2.192	2.775 2.848	3.411 3.505	4.048 4.161	4.684 4.817	5.321 5.474	5.957 6.13	6.593 6.786	7.23 7.443	7.866 8.099	8.503 8.755	9.139 9.412	9.775 10.068
7 SWG 7 BWG	4.470 4.572	0.176 0.18			1.607 1.632	2.307 2.348	3.007 3.064	3.707 3.78	4.407 4.496	5.107 5.212	5.807 5.928	6.507 6.644	7.207 7.36	7.907 8.076	8.607 8.792	9.307 9.508	10.007 10.224	10.707 10.94
6 SWG 6 BWG	4.877 5.156	0.192 0.202			1.705 1.767	2.468 2.574	3.232 3.382	3.996 4.189	4.76 4.996	5.523 5.804	6.287 6.611	7.051 7.419	7.815 8.226	8.578 9.034	9.342 9.841	10.106 10.648	10.87 11.456	11.633 12.263
5 SWG 5 BWG	5.385 5.588	0.212 0.22			1.815 1.855	2.658 2.73	3.501 3.605	4.345 4.48	5.188 5.356	6.031 6.231	6.875 7.106	7.718 7.981	8.561 8.856	9.404 9.731	10.248 10.606	11.091 11.481	11.934 12.356	12.778 13.231
4 SWG 4 BWG	5.893 6.045	0.232 0.238			1.912 1.939	2.835 2.885	3.758 3.832	4.681 4.779	5.603 5.725	6.526 6.672	7.449 7.619	8.372 8.565	9.295 9.512	10.218 10.459	11.141 11.405	12.063 12.352	12.986 13.299	13.909 14.245
3 SWG 3 BWG	6.401 6.579	0.252 0.259			1.997 2.023	2.999 3.054	4.002 4.084	5.004 5.114	6.006 6.144	7.009 7.175	8.011 8.205	9.014 9.235	10.016 10.266	11.018 11.296	12.021 12.326	13.023 13.356	14.026 14.387	15.028 15.417
2 SWG 2 BWG	7.010 7.214	0.276 0.284				3.179 3.235	4.277 4.365	5.375 5.495	6.473 6.625	7.57 7.754	8.668 8.884	9.766 10.014	10.864 11.143	11.961 12.273	13.059 13.403	14.157 14.533	15.255 15.662	16.352 16.792
1 SWG 1 BWG	7.620 7.620	0.3 0.3				3.341 3.341	4.535 4.535	5.728 5.728	6.921 6.921	8.114 8.114	9.308 9.308	10.501 10.501	11.694 11.694	12.888 12.888	14.081 14.081	15.274 15.274	16.467 16.467	17.661 17.661
0 SWG 0 BWG	8.229 8.636	0.324 0.34				3.485 3.57	4.773 4.923	6.062 6.275	7.351 7.628	8.639 8.98	9.928 10.332	11.217 11.685	12.505 13.037	13.794 14.39	15.083 15.742	16.371 17.094	17.66 18.447	18.949 19.799

SPECIFICATIONS

ASTM Specification stainless Steel Pipes

A312/A312M	Specification for Seamless and Welded Austenitic Stainless Steel Pipe
A333 /A333M	Specification for Seamless and Welded Steel Pipe for Low-Temperature Service
A358/A358M	Specification for Electric-Fusion-Welded Austenitic Chromium-Nickel Alloy Steel Pipe for High-Temperature Service
A530/A530M	Specification for General Requirements for Specialized Carbon and Alloy Steel Pipe
A790/A790M	Specification for Seamless and Welded Ferritic/Austenitic Stainless Steel Pipe
A928/A928M	Specification for Ferritic/Austenitic (Duplex) Stainless Steel Pipe Electric Fusion Welded with Addition of Filler Metal
A999M	Specification for General Requirements for Alloy and Stainless Steel Pipe

ASTM Specification Stainless Steel Tubes

A213/A213M	Specification for Seamless Ferritic and Austenitic Alloy-Steel Boiler, Super heater, and Heat-Exchanger Tubes
A249/A249M	Specification for Welded Austenitic Steel Boiler, Superheater, Heat-Exchanger, and Condenser Tubes
A268/A268M	Specification for Seamless and Welded Ferritic and Martensitic Stainless Steel Tubing for General Service
A269	Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
A270	Specification for Seamless and Welded Austenitic Stainless Steel Sanitary Tubing
A334/A334M	Specification for Seamless and Welded Carbon and Alloy-Steel Tubes for Low-Temperature Service
A450/A450M	Specification for General Requirements for Carbon, Ferritic Alloy, and Austenitic Alloy Steel Tubes
A688/A688M	Specification for Welded Austenitic Stainless Steel Feed water Heater Tubes
A778 - A778	Specification for Welded, Un annealed Austenitic Stainless Steel Tubular Products
A789/A789M	Specification for Seamless and Welded Ferritic/Austenitic Stainless Steel Tubing for General Service
A 1016	Standard Specification for General Requirements for Ferritic Alloy Steel, Austenitic Alloy Steel, and Stainless Steel Tubes

ASTM Specification Mechanical Tubing

A511	Specification for Seamless Stainless Steel Mechanical Tubing
A554	Specification for Welded Stainless Steel Mechanical Tubing

EN Standards

DIN EN 10216-5	Seamless steel tubes for pressure purposes
DIN EN 10217-7	Welded steel tubes for pressure purposes
DIN EN 10297-2	Seamless Steel tubes for Mechanical and General engineering purpose
DIN EN 10305-1	Steel tubes for precision application

German Standards

DIN 11850	Stainless Steel Tubes for Food and Chemical Industries
DIN 17455	General purpose welded circular stainless steel tubes.
DIN 17456	General purpose Seamless circular stainless steel tubes.
DIN 17457	Welded Circular austenitic stainless tubes subject to special requirement
DIN 17458	Seamless Circular austenitic stainless tubes subject to special requirement
DIN 28180	Seamless Steel tubes for Heat Exchanger
DIN 11850	Welded Tubes and Pipes for food, beverages, chemical & pharmaceuticals industry

Russian Standards

GOST 9941	Seamless and Warm-Deformed Tubes made from corrosion-resistant steel
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TOLERANCE CHART

	ALLOWABLE OUTSIDE DIAMETER TOLERANCE IN mm	ALLOWABLE WALL THICKNESS TOLERANCES
ASTM A-270/A1016 (Seamless and Welded Austenitic and Ferritic/ Austenitic Stainless Steel Sanitary Tubing)		
OUTSIDE DIAMETER (mm)		
[25] and under	+0.13, -0.13	+12.5%, -12.5%
Over [25] to 2 [50]	+0.20, -0.20	+12.5%, -12.5%
Over [50] to 3 [75]	+0.25, -0.25	+12.5%, -12.5%
Over 3 [75] to 4 [100]	+0.38, -0.38	+12.5%, -12.5%
[100] to 5.1/2 [140], excl.	+0.38, -0.38	+12.5%, -12.5%
[140] to 8 [200], excl.	+0.75, -0.75	+12.5%, -12.5%
8 [200] to 12 [300]	+1.25, -1.25	+12.5%, -12.5%
ASTM A-249/A1016 (Welded, Austenitic Steel Boiler, Superheater, Heat-Exchanger and Condenser Tubes)		
Under 1 [25]	+0.1, -0.11	+10.0%, -10.0%
1 to 1.1/2 [25 to 40], incl	+0.15, -0.15	+10.0%, -10.0%
Over 1.1/2 to 2 [40 to 50], excl	+0.2, -0.20	+10.0%, -10.0%
2 to 2.1/2 [50 to 65], excl	+0.25, -0.25	+10.0%, -10.0%
2.1/2 to 3 [65 to 75], excl	+0.30, -0.30	+10.0%, -10.0%
3 to 4 [75 to 100], incl	+0.38, -0.38	+10.0%, -10.0%
Over 4 to 7.1/2 [100 to 200], incl	+0.38, -0.64	+10.0%, -10.0%
Over 7.1/2 to 9 [200 to 225], incl	+0.38, -1.14	+10.0%, -10.0%
ASTM A-312/A999 (Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes)		
1/8-1.1/2, incl	+0.40, -0.40	--
Over 1.1/2 to 4, incl	+0.80, -0.80	--
Over 4 to 8, incl	+1.60, -0.80	--
Over 8 to 18, incl	+2.40, -0.80	--
Over 18 to 26, incl	+3.20, -0.80	--
Over 26 to 34, incl	+4.0, -0.80	--
Over 34 to 48, incl	+4.80, -0.80	--
"1/8 to 2.1/2 incl., all t/D ratios"	--	+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%	--	+15.0, -12.5%
"20 and larger, welded, all t/D ratios"	--	+17.5, -12.5%
20 and larger, seamless, t/D up to 5 % incl.	--	+22.5, -12.5%
"20 and larger, seamless, t/D > 5 %"	--	+15.0, -12.5%
ASTM A-269 /A 1016 (Seamless and Welded Austenitic Stainless Steel Tubing for General Service)		
Up to 1/2 [13]	+0.13, -0.13	+15.0%, -15.0%
"1/2 to 1.1/2 [13 to 38], excl"	+0.13, -0.13	+10.0%, -10.0%
"1.1/2 to 3.1/2 [38 to 89], excl"	+0.25, -0.25	+10.0%, -10.0%
"3.1/2 to 5.1/2 [89 to 140], excl"	+0.38, -0.38	+10.0%, -10.0%
"5.1/2 to 8 [140 to 203], excl"	+0.76, -0.76	+10.0%, -10.0%
"8 to 12 [203 to 305], excl"	+1.01, -1.01	+10.0%, -10.0%
"12 to 14 [305 to 356], excl"	+1.26, -1.26	+10.0%, -10.0%
ASTM A-213/A1016 (Seamless Ferritic and Austenitic Alloy-Steel Boiler, Superheater, and Heat-Exchanger Tubes)		
Under 1 [25]	+0.10, -0.11	+20%, -0.0%
1 to 1.1/2 [25 to 40], incl	+0.15, -0.15	+20%, -0.0%
Over 1.1/2 to 2 [40 to 50], excl	+0.20, -0.20	+22%, -0.0%
2 to 2.1/2 [50 to 65], excl	+0.25, -0.25	+22%, -0.0%
2.1/2 to 3 [65 to 75], excl	+0.30, -0.30	+22%, -0.0%
3 to 4 [75 to 100], incl	+0.38, -0.38	+22%, -0.0%
Over 4 to 7.1/2 [100 to 200], incl	+0.38, -0.64	+22%, -0.0%
Over 7.1/2 to 9 [200 to 225], incl	+0.38, -1.14	+22%, -0.0%
<i>Permissible variations from the specified average wall thickness shall be ±10 % of the specified average wall thickness for cold formed tubes</i>		
ASTM A-268/A1016 (Seamless and Welded Ferritic and Martensitic Stainless Steel Tubing for General Service)		
Up to 1/2 [12.7], excl	+0.13,-0.13	+15.0%, -15.0%
1/2 to 1.1/2 [12.7 to 38.1], excl	+0.13,-0.13	+10.0%, -10.0%
1.1/2 to 3.1/2 [38.1 to 88.9], excl	+0.25,-0.25	+10.0%, -10.0%
"3.1/2 to 5.1/2 [88.9 to 139.7], excl"	+0.38,-0.38	+10.0%, -10.0%
"5.1/2 to 8 [139.7 to 203.2], incl"	+0.76,-0.38	+10.0%, -10.0%



DIN STANDARD- For Welded tube, DIN 17457: the tolerances on OD and wall thickness is given in DIN 2463 or EN 10217-7 (See below table)

OUTSIDE DIAMETER D (mm)	Tolerance on Outside Diameter D		Tolerances on Wall Thickness T	
	Tolerance Class	Permissible Deviation		
D ≤ 168.30	D3	+ 0.75 % or + 0.3 mm Whichever is greater	T3	+ 10 % or + 0.2 mm Whichever is greater
	D4	+ 0.5 % or + 0.1 mm Whichever is greater		
D > 168.30	D2	+ 1.0 %		

DIN STANDARD- For Seamless tube, DIN 17456/17458: the tolerances on OD and wall thickness is given in EN 1127(See below table)

Tolerance Class	Tolerance on Outside Diameter D	Tolerance Class	Tolerances on Wall Thickness T
D1	+ 1.5 % with + 0.75mm min.	T1	+ 15 % with + 0.6 mm min.
D2	+ 1.0 % with + 0.50mm min.	T2	+ 12.5 % with + 0.4 mm min.
D3	+ 0.75 % with + 0.3mm min.	T3	+ 10 % with + 0.2 mm min.
D4	+ 0.5 % with + 0.10mm min.	T4	+ 7.5 % with + 0.15 mm min.

 Certificates



TUV – PED



ISO 9001-2015, 14001-2015
BS OHSAS 18001-2007



TUV – AD 2000 Merkblatt W0



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