STAINLESS STEEL PIPES

CONTENTS

ABOUT
THE COMPANY

TMK-INOX, LLC was established in 2009 as a professional stainless steel tubes and pipes manufacturer in Russia. The company is a joint venture of PJSC TMK. TMK modernized equipment of Sinarsky Pipe Plant, which has been producing stainless steel pipes since 1973.

TMK-INOX has more than 500 professional employees. The annual output exceeds 5000 tons of seamless stainless steel pipes. In 2013 we launched new facility for production of electric welded stainless steel pipes with slitting machine and 8 production lines. Raw materials for our tubular products are supplied by the top leading domestic and foreign steel manufacturers.

Our Traditional goods are austenitic and ferritic stainless steel pipes with size range 1,6–114 mm for seamless and 8.0–114.3 mm for welded pipes according to international standards ISO, DIN EN, ASTM, ASME, GOST. Currently TMK INOX products are widely applied in nuclear power stations, petroleum, petrochemical, natural gas, shipbuilding, aviation and spacecraft, automotive, pharmaceutical, food, decoration, and others industries.

For a long time TMK-INOX has been a leading supplier of seamless stainless steel pipes for nuclear power plants and thermal power plants in Russia and the CIS.

Corporative system of quality management has passed the ISO 9001:2015 certification by Lloyd's and production certified PED 2014/68/EU authorized by TUV Rheinland.

Moreover, TMK-INOX also has national Federal Environmental, Industrial and Nuclear Supervision Service certificates and licenses as producer products for power plants and nuclear stations.

The Company has made a significant step forward in supplies welded pipes for well-known European automotive brands. Driven by idea of cooperation, using well-testing equipment and providing on site safety policy and best quality control make us valuable company for working with.

For more information on TMK, please visit our web sites at www.tmk-inox.tmk-group.com

PRODUCTION

Main equipment for production cold rolled tubes:

- 9 Cold-rolling mills, OD from 20 till 90 mm, max length of final pipe – 9 m
- 5 Cold-rolling mills, OD from 10 till 133 mm, max length of final pipe – 30 m
  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 m
- 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:

- 8 welding lines with TIG
- Slitting machine up to 4 mm thickness
- Polishing up to 1400 grit

CERTIFICATES


Certificate

Quality-Assurance System for Manufacturer of Materials acc. to Directive 2014/68/EU

Certificate no.: 01 2627 BG/M1-200021.00

Name and address of the manufacturer: LLC "TMK-INOX", 623401, Russia, Sverdlovsk reg., Kamensk Uralsky, Zavodskoy pr. 1

Herewith we certify that the material manufacturer has established and applies a Quality Management System. The system was applied according to the European Directive 2014/68/EU, Annex I, Par. 4.3, with regard to the materials as listed in the scope of approval.

Tested acc. to Directive 2014/68/EU: QA System acc. to EN 764-5, article 4.2 and AD 2000-Merkblatt W0

Scope of application: 2010/250/04

Area of validity: Design and manufacture of seamless cold-worked pipes from stainless steels and alloys, see annex to certificate

Manufacturing plant: LLC "TMK-INOX", 623401, Russia, Sverdlovsk reg., Kamensk Uralsky, Zavodskoy pr. 1

Valid until: 07.12.2020 - 06.12.2023

Zabrze, 07.12.2020

TÜVRheinland® Precisely Right.


Certificate of Approval

This is to certify that the Management System of:

TMK Group

has been approved by Lloyd's Register to the following standards:

ISO 9001:2015

Paul Graf

Area Operations Manager North Europe

for and on behalf of Lloyd's Register Quality Assurance Limited

PARTNERS

The State Atomic Energy Corporation ROSATOM

Gazprom

United Aircraft Corporation

United Shipbuilding Corporation

Rosneft

Surgutneftegaz

Tatneft

Gazpromneft

Taneco

LukOil

Atomenergomash

Machine-Building Plant ZiO-Podolsk

Energomash (Belgorod)-BZEM

Fuel Company of ROSATOM TVEL

Red Kotelschik

Power Machines

Cryogenmash

EuroChem

SibUr

Severstal

MMC Norilsk Nickel

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

Ferritic and Martensitic Steel

TP410	General purpose grade for use in mildly corrosive environments
TP430	Mechanical & structural tubing, Architectural tubing, Heat exchanger tubing, Condensers, Re-heaters, Evaporators.

CHEMICAL COMPOSITION

Chemical Composition

Grade	Tube Standard	C	Si	Mn	P	S	Ni	Cr	Mo	Others
AUSTENITIC STAINLESS STEELS										
TP304	A269, A213, A312	< 0.08	< 0.75	< 2.00	< 0.040	< 0.030	8.00-11.00	18.00-20.00	-	-
TP304L	A269, A213, A312	< 0.035	< 0.75	< 2.00	< 0.040	< 0.030	8.00-13.00	18.00-20.00	-	-
TP304N	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
TP304LN	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
TP304H	A213, A312	0.04-0.10	< 0.75	< 2.00	< 0.040	< 0.030	8.00-11.00	18.00-20.00	-	-
TP316	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	-
TP316L	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	-
TP316N	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
TP316LN	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
TP316Ti	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
TP316H	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	-
TP321	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%
TP321H	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%
TP317	A213, A312	< 0.08	< 0.75	< 2.00	< 0.040	< 0.030	11.00-14.00	18.00-20.00	3.00-4.00	-
TP317L	A213, A312	< 0.035	< 0.75	< 2.00	< 0.040	< 0.030	11.00-15.00	18.00-20.00	3.00-4.00	-
TP310S	A213, A312	< 0.08	< 0.75	< 2.00	< 0.040	< 0.030	19.00-22.00	24.00-26.00	0.75 max	-
TP310H	A213, A312	< 0.10	< 1.0	< 2.00	< 0.040	< 0.030	19.00-22.00	24.00-26.00	-	-
TP347	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%
TP347H	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%
TP904L	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										
TP405	A268	< 0.08	< 0.75	< 1.00	< 0.040	< 0.030	< 0.50	11.50-13.50	-	Al 0.10-0.30
TP410	A268	< 0.15	< 0.75	< 1.00	< 0.040	< 0.030	< 0.50	11.50-13.50	-	-
TP430	A268	< 0.12	< 0.75	< 1.00	< 0.040	< 0.030	< 0.50	16.00-18.00	-	-
TP430Ti	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

GENERAL TUBES AND PIPES

STANDARTS

ASTM A213/ A213M, ASTM A268/A268M, ASTM A269/A269M,
ASTM A312/ A312M, ASTM A511/A511M, ASME A312/A312M
DIN EN 10216-5, DIN EN 10217-7, DIN EN 10357

RANGE OF SIZES

COLD FINISHED	OD 1,6-114,3mm WT 0,2-10mm
WELDED	OD 6-114,3mm WT 0,5-4mm

STEEL GRADES

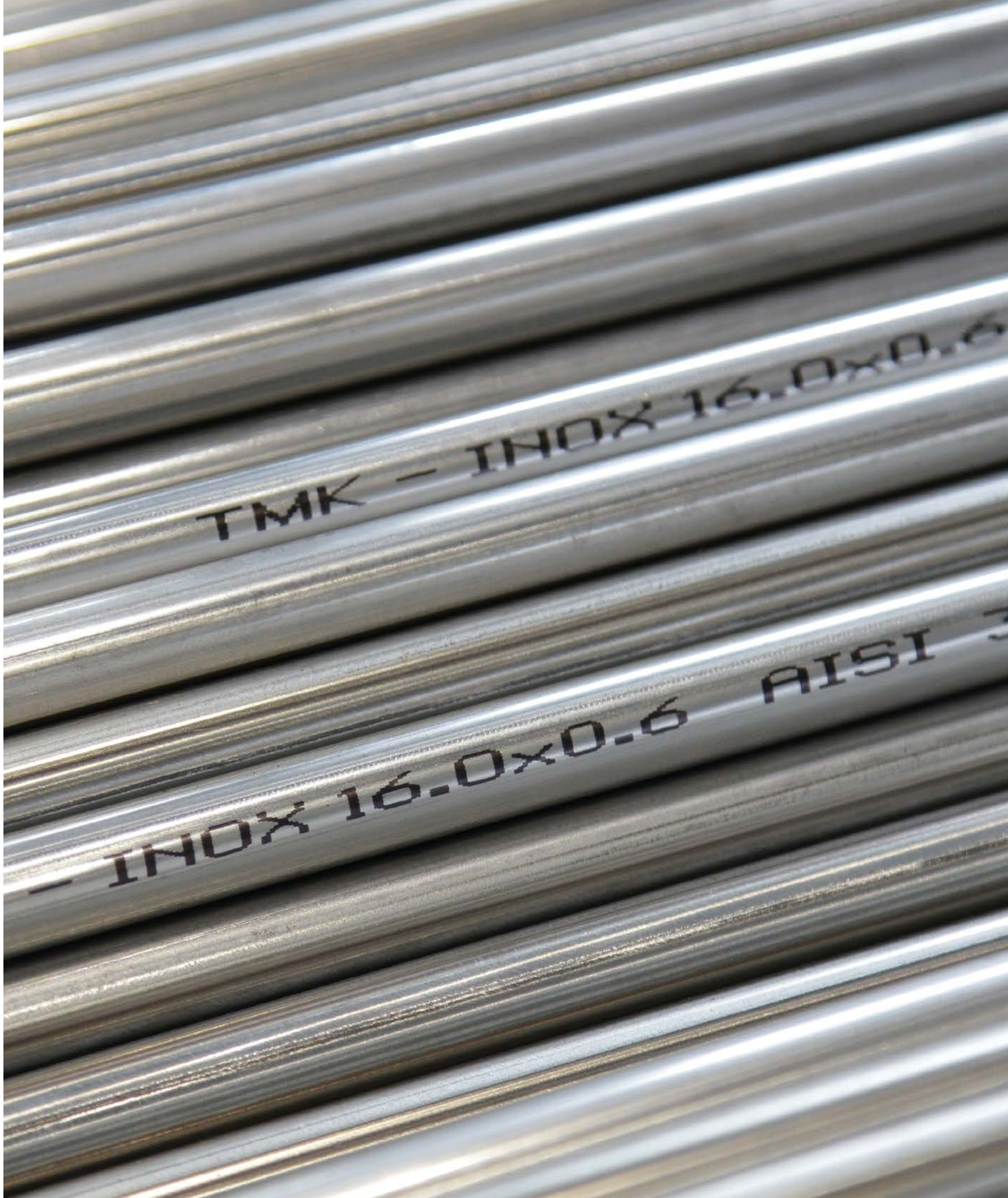
Austenitic

1.4301, 1.4306, 1.4307, 1.4401, 1.4404, 1.4541, 1.4571, 1.4878
TP304, TP304L, TP316, TP316L, TP321, TP321H, TP316Ti

Austenitic/ferritic (duplex)

1.4462, 1.4410*

*production after trial lot



TMK-INOX Products

Range of sizes

Outside diameter	Wall thickness, mm																										
mm	0,5	0,6	0,9	1	1,2	1,5	1,6	1,8	2	2,1	2,3	2,5	2,6	2,9	3	3,2	3,5	3,7	4	4,5	4,7	5	5,4	5,6	6	6,3	7,1	8
4,0																												
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6,0																												
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57,0																												
60,3																												
63,5																												
70,0																												
76,1																												
82,5																												
88,9																												
101,6																												

cold rolled tubes

cold or hot rolled tubes

Welded tubes

STANDARDS

DIN EN 10217-7, DIN EN 10357, ASTM A 268/A268M, ASTM A 554, GOST 11068

STEEL GRADES

1.4541, 1.4301, 1.4306, 1.4307, 1.4401, 1.4571, 1.4404, 1.4462,
AISI 304L, AISI 304, AISI 321, AISI 201, AISI 409, AISI 439, 08-12X18H10T

Outside	Wall thickness, mm																	
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
6,0																			
8,0																			
9,0																			
10,0																			
12,0																			
14,0																			
16,0																			
18,0																			
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101,6																			
108,0																			
114,3																			

HEAT EXCHANGER TUBES

DESCRIPTION

Heat exchanger equipment, pipelines and pipeline components

APPLICATION

- Nuclear Industry
- Chemical Industry
- Petrochemical Industry
- Power Generation

Basic product range of heat exchanger tubing

STANDARDS

ASTM A213/A213M, ASME SA-213/SA-213M, ASTM A269/269M

STEEL GRADES

TP304/304L, TP321/321H, TP316/316L, TP316Ti, other grades upon agreement

Outside diameter		Wall thickness, mm																							
in	mm	0,4	0,5	0,6	0,71	0,89-0,91	1,0	1,2	1,4-1,5	1,6	1,93-1,9	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
	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																								

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%

Mechanical properties

Steel grade	Tensile strength, N/mm², min	Yield strength, N/mm², min	Elongation, %, min
	not less than		
TP304	515	205	35
TP304L	485	170	35
TP316	515	205	35
TP316L	485	170	35
TP321	515	205	35
TP316Ti	515	205	35

Dimensional tolerances (ASTM A1016)

Outside diameter, mm	Wall thickness, mm	Tolerance limits of		
	not less than	outside diameter	wall thickness MW	wall thickness AW
<25.4	0.4-4.5	+0.10 mm, -0.10 mm	+20%, 0%	±10%
25.4-40	1.0-6.0	+0.15 mm, +0.15 mm	+20%, 0%	±10%
42-50.80	1.2-7.0	+0.20 mm, -0.20 mm	+22%, 0%	±11%

STANDARD

EN 10216-5

Steel grades

Steel number	Steel name
1.4301	X5CrNi18-10
1.4306	X2CrNi19-11
1.4541	X6CrNiTi18-10
1.4401	X5CrNiMo17-12-2
1.4404	X2CrNiMo17-12-2
1.4436	X3CrNiMo17-13-3
1.4435	X2CrNiMo18-14-3
1.4571	X6CrNiMoTi17-12-2
1.4462	X2CrNiMoN22-53
1.4410	X2CrNiMoN25-7-4
1.4466	X1CrNiMoN25-22-2

STANDARDS

DIN EN 10216-5

STEEL GRADES

1.4541, 1.4878, 1.4301, 1.4306, 1.4307, 1.4401, 1.4435*, 1.4571, 1.4404, 1.4436*, 1.4462, 1.4507* and other

Outside diameter	Wall thickness, mm																		
mm	0,5	0,6	0,9	1	1,2	1,5	1,6	1,8	2	2,1	2,3	2,5	2,6	2,9	3	3,2	3,5	3,7	4
12,0																			
12,7																			
13,0																			
13,5																			
14,0																			
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17,2																			
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33,7																			
35,0																			
38,0																			
40,0																			
42,0																			
42,4																			
42,2																			
44,5																			
48,3																			
50,0																			
51,0																			

cold rolled tubes

Dimension tolerances

Cold deformed tubes

Maximum deviation for OD		Maximum deviation for WT	
Tolerance Class	Maximum deviation	Tolerance Class	Maximum deviation
D3	±0,75% or ± 0,3mm (what more)	T3	±10% or ± 0,2mm (what more)
D4	±0,5% or ± 0,1mm (what more)	T4	±7,5% or ± 0,15mm (what more)

Length tolerances

Length L, mm	Maximum deviation for L, mm
L ≤ 6000	+5 0
6000< L ≤ 12000	+10 0
L > 12000	+ upon agreement 0

TYPE OF DELIVERY AND SURFACE CONDITION

CFD – cold finished heat treated, descaled, surface metallically clean.
CFA – cold finished heat treated, bright annealed, surface metallically bright.
CFG – cold finished heat treated, ground, surface metallically bright. Degree of roughness shall be agreed upon.

* production after trial lot

Mechanical properties

Steel grade	Tensile strength, N/mm²	Yield strength, 0.2%	Yield strength, 1.0%	Elongation, %
	not less than/range			
1.4301 (XSCrNi18-10)	500-700	195	230	40
1.4306 (X2CrNi19-11)	460-680	180	215	40
1.4541 (XeCrNiTi18-10)	500-730	200	235	35
1.4401 (X5CrNiMo17-12-2)	510-710	205	240	40
1.4571 (XeCrNiMoTi17-12-2)	500-730	210	245	35
1.4404 (X2CrNiMo17-12-2)	490-690	190	225	40
1 4462 (X2CrNiMoN22-5-3)	640-880	450	-	22
1.4878 (X12CrNiTil8-9)	500-750	210	-	40
1.4410 (X2CrNiMoN25-7-4)	800-1000	550	-	20
1.4501 (X2CrNiMoCuWN25-7-4)	800-1000	550	-	20

Dimensional tolerances (ISO 1127)

Tolerance class	Outside diameter tolerances
D3	±0.75% or min ±0.30 mm
D4	±0.50% or min ±0.10 mm

Tolerance class	Wall thickness tolerances
T3	±10.0% or min ±0.20 mm
T4	±7.5% or min ±0.15 mm

Tolerance class	Length L tolerances
L≤6000	+3 mm
6000<L≤12000	+3 mm
L>12000	+3 mm

STANDARDS
ASTM A268/A268M, ASME SA-268/SA-268M

STEEL GRADES
TP410, TP430

Outside diameter		Wall thickness, mm																						
in	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
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																							
7/8	22,23																							
15/16	23,81																							
	25,00																							
1	25,40																							
	26,70																							
	26,9																							
1 1/4	31,75																							
	33,40																							
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 A268/A268M, ASME SA-268/SA-268M

Outside diameter, inch (mm)	Admissible outside diameter tolerance, inch (mm)	Admissible wall thicknes tolerance, %	Length tolerance, inch (mm)		Thin-wall tubes
			more	less	
up to 1/2 (D<12,7)	±0,005 (±0,13)	+0,10mm/-0,10mm	1/8 (3,2)	0	-
"1/2 up to 1 1/2 excl. (12,7 D<38,1)"	±0,005 (±0,13)	+0,15mm/-0,15mm	1/8 (3,2)	0	under 0,065" (1,65mm) nominal
“1 1/2 up to 3 1/2 excl. (38,1 D<88,9)"	±0,010 (±0,25)	+0,20mm/-0,20mm	3/16 (4,8)	0	under 0,095" (2,41mm) nominal

FURNACE TUBES

DESCRIPTION
Tubes and Pipes for Refineries and Petrochemical Industry

STANDARD SPECIFICATIONS
ASTM A213/A213M, ASME SA-213/SA-213M,

ASTM A312/A312M, ASME SA-312/SA-312M, DIN EN 10216-5

STEEL GRADES
TP304H, TP316Ti, TP321H

BASIC SIZE RANGE

ANSI B 36.10M

NPS	O.D. inches	PIPE SCHEDULES									MAX. LENGTH
	mm	10s	40s	60	80	100	120	140	160	XXH	
3	3.50	0.120 29.5	0.216 47.6		0.300 47.6				0.438 43.0	0.600 33.8	ft
	88.90	3.05	5.49 14.5		7.62 14.5				11.13 13.1	15.24 10.3	m

APPLICATION

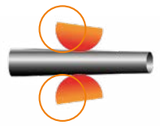
Furnace tubes are the most critical part of the furnaces designed for cracking, evaporation and fired heating, as well as other hyper thermal chemical processes in chemical, refinery and petrochemical industries.

APPROVALS BY END-USERS AND EPC COMPANIES	
Oil & Gas Companies (End-Users)	Engineering Procurement Construction Companies
Saudi Aramco	Linde Technip

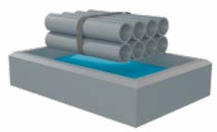
Typical scheme of production of cold deformed pipes

1 Billets stock

2 Cold rolling

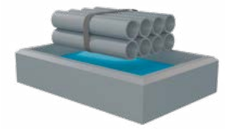


3 Chemical treament



4 Heat treatment

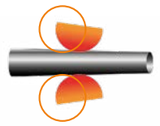
5 Chemical treament



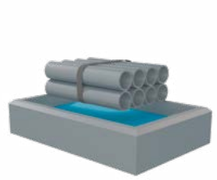
6 Straightening

7 Surface control

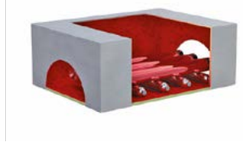
8 Cold rolling



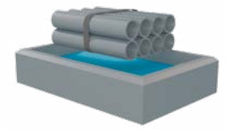
9 Chemical treament



10 Heat treatment

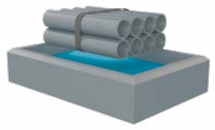


11 Chemical treament



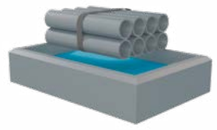
12 Sink drawing

13 Chemical treament



14 Heat treatment

15 Chemical treament



16 Straightening

17 Mechanical tests

18 Surface control

19 NDE

20 Warehouse

NOTES

NOTES

CONTACTS

COMMERCIAL
CONTACTS