TMK INOX

Stainless steel pipes

Technical Catalog

CONTENTS

ABOUT THE COMPANY

The Company was founded in 2001 and currently operates more than 10 production sites in Russia, Romania, and Kazakhstan. TMK's core business is the production and sales of seamless and welded pipe, including large diameter pipe, pipe with premium connections, combined with an extensive range of heat treatment services, protective coating, premium connections threading, pipe storage and repair.

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 8000 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 2.0–273.0 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.

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.

TMK supply chain lets us deliver tubular products to Russia, Poland, Germany, Italy, Switzerland, China, Singapore, USA, Canada, South Africa, UAE, Kazakhstan, Uzbekistan, Azerbaijan, Turkmenistan and other areas by agents.

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-group.com

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sales@tmk-is.com

TMK's Major Customers

RUSSIAN OIL & GAS COMPANIES

GAZPROM
ROSNEFT
SIBNEFT
TATNEFT
LUKOIL
TRANSNEFTPRODUCT
TRANSNEFT
RUSSNEFT
SURGUTNEFTEGAZ

MAJOR CIS Machine Building and Energy Companies

KRASNY KOTELSHIK
KAMAZ
GAZ
BELENERGOMASH
BELAZ
VAZ
ZIO-PODOLSK
UALAZ
MAZ
PENZAHIMMASH
UAZ
EPK
SIBENERGOMASH

MAJOR INTERNATIONAL INDEPENDENT OIL & GAS COMPANIES

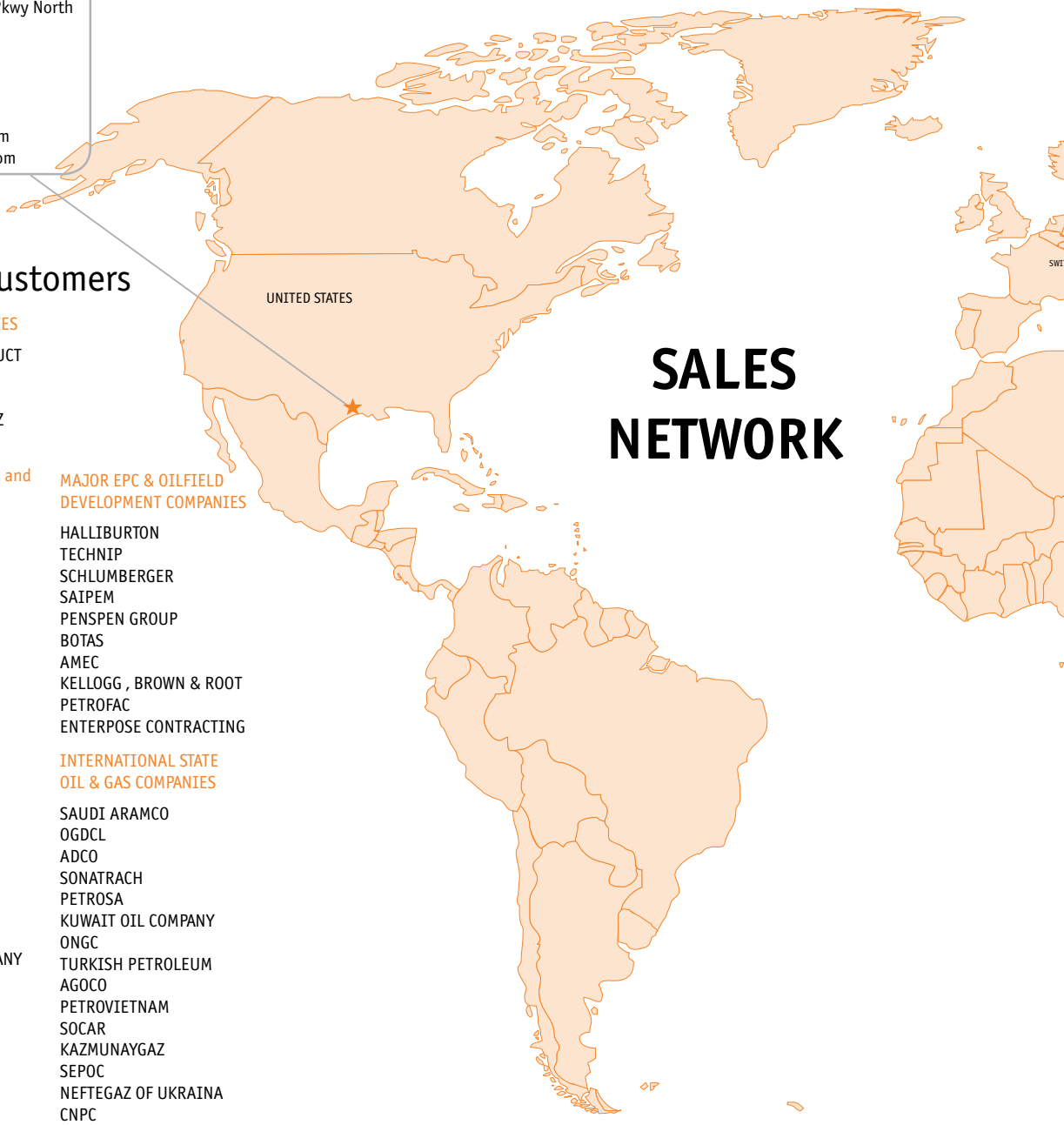
SHELL
TOTAL
EXXONMOBIL
AL-FURAT PETROLEUM COMPANY
ENCANA
PDO
ESHPETCO
WOODSIDE PETROLEUM
REPSOL
PETRO-CANADA
ANADARKO PETROLEUM
MARATHON OIL
CHESAPEAKE
OMV
XTO ENERGY
AMERADA HESS
STATOIL
WINTERSHALL
CHEVRON TEXACO
AGIP
OCCIDENTAL PETROLEUM
MAERSK OIL
BURLINGTON RESOURCES

MAJOR EPC & OILFIELD DEVELOPMENT COMPANIES

HALLIBURTON
TECHNIP
SCHLUMBERGER
SAIPEM
PENSPEN GROUP
BOTAS
AMEC
KELLOGG , BROWN & ROOT
PETROFAC
ENTERPOSE CONTRACTING

INTERNATIONAL STATE OIL & GAS COMPANIES

SAUDI ARAMCO
OGDCL
ADCO
SONATRACH
PETROSA
KUWAIT OIL COMPANY
ONGC
TURKISH PETROLEUM
AGOCO
PETROVIETNAM
SOCAR
KAZMUNAYGAZ
SEPOC
NEFTEGAZ OF UKRAINA
CNPC
GROUPEMENT BERKINE
UZBEKNEFTEGAZ
EGPC
TURKMENNEFTEGAZ
SYRIAN PETROLEUM COMPANY
ORPIC
OMANA GAS CO
DALLEL PERTROLEUM
OOCEP



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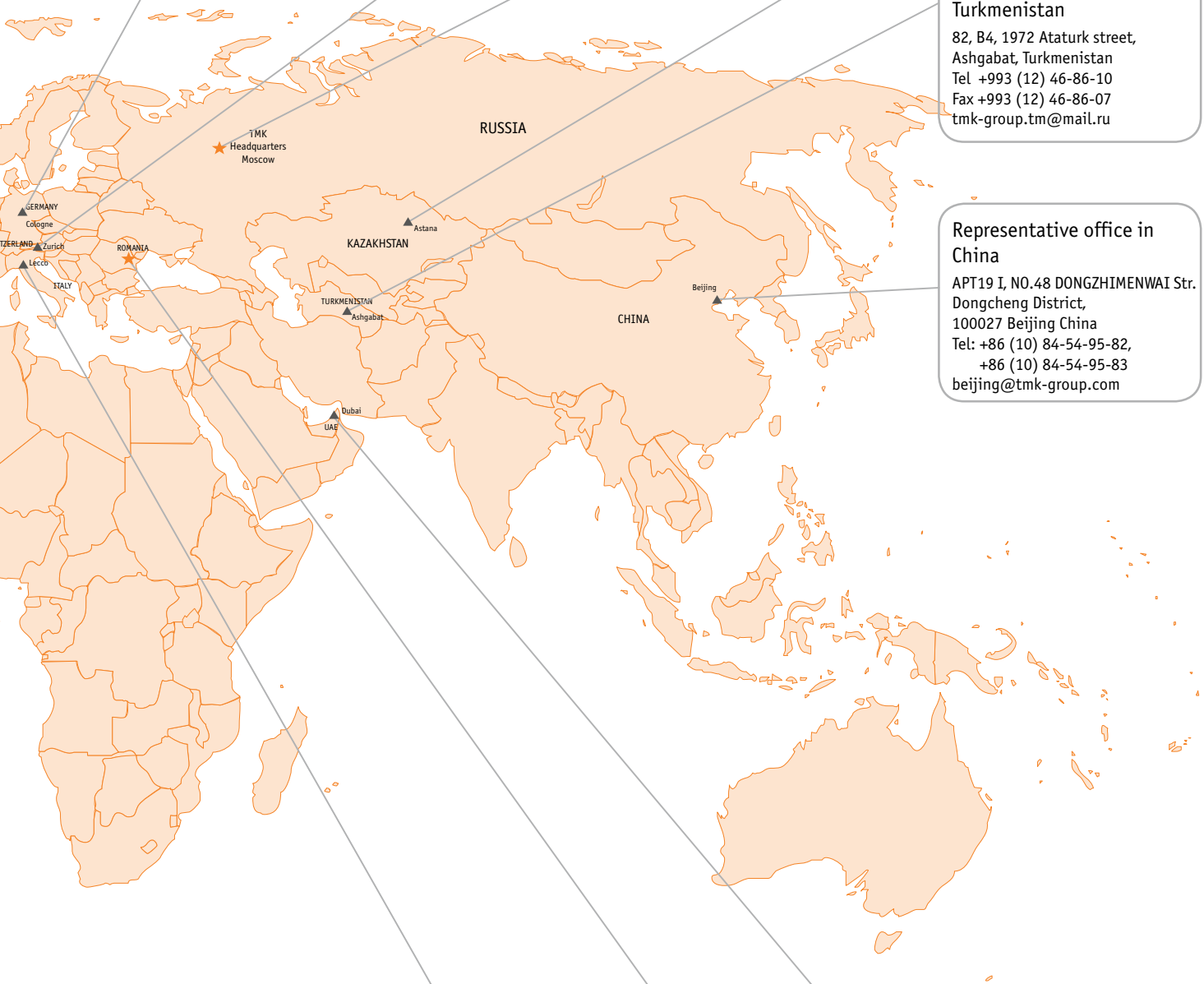
tmk-group.tm@mail.ru



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GSM: +40 372 498263
Fax: +40 249 43-43-30
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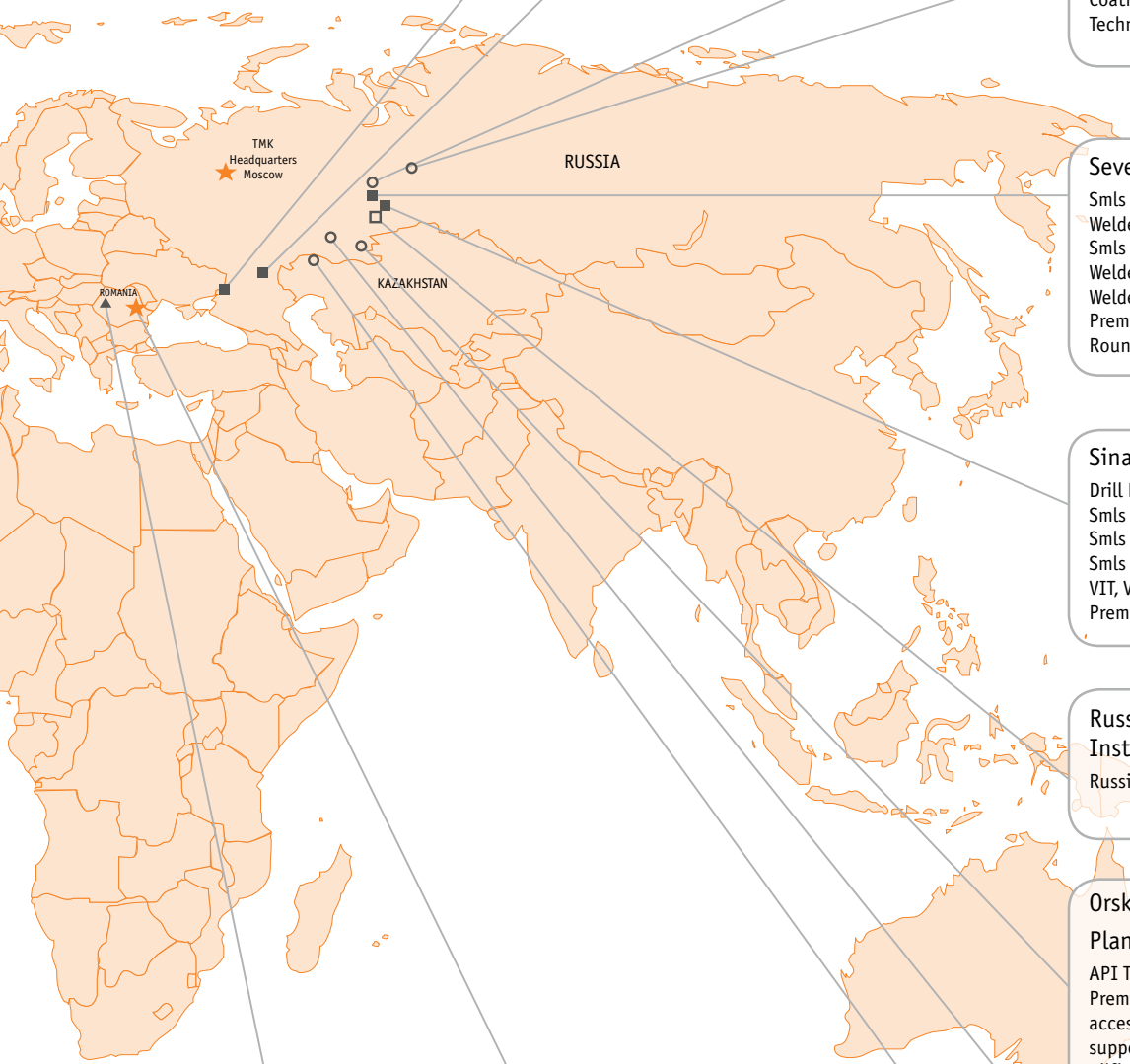
Fax: +971(4) 609-11-40
sales@tmkme.ae

TMK FACILITIES



TAGMET/Smls, ERW/

Drill Pipe 88.9-139.7 mm
Smls OCTG 101.6-219.08 mm
Smls Line Pipe 88.9-273.05 mm
Welded Pipe 13.5-219 mm
Smls Industrial Pipe 89-273 mm
Welded profiles 20x20-160x160 mm
Premium Connections
Round billets 150-400 mm

Volzhsky Pipe Plant /Smls, SAW/

Smls OCTG 168.28-426 mm
Welded LD Pipe 508-1422 mm
Smls Line Pipe 57-426 mm
Smls Industrial Pipe 38-426 mm
Premium Connections
Round billets 145-410 mm

Truboplast

Internal & External Coatings
57-720 mm

TMK NGS-Nizhnevartovsk

Threading 60.3-114.3 mm
Coating 76-720 mm
Technical support & field service

Seversky Tube Works /Smls, ERW/

Smls OCTG 168.28-323,9 mm
Welded LD Pipe 508-530 mm
Smls Line Pipe 168.28-323.9 mm
Welded Pipe 21.3-426 mm
Welded profiles 15x15-350x250 mm
Premium Connections
Round billets 150, 156 mm

Sinarsky Pipe Plant /Smls/

Drill Pipe 60.3-127 mm
Smls OCTG 33.4-168.28 mm
Smls Line Pipe 57-168.28 mm
Smls Industrial Pipe 5-168.28 mm
VIT, VIT Light
Premium Connections

Russian Pipe Industry Institute /RosNITI/

Russia, Yekaterinburg

Orsky Machine Building Plant (OMZ)

API Tool joints
Premium Connections
accessories, fishing tools, tech. support and general oilfield manufacturing

TMK NGS Buzuluk

Threading 33.4-346.08 mm
Technical support & service
Premium Connections

TMK-RESITA

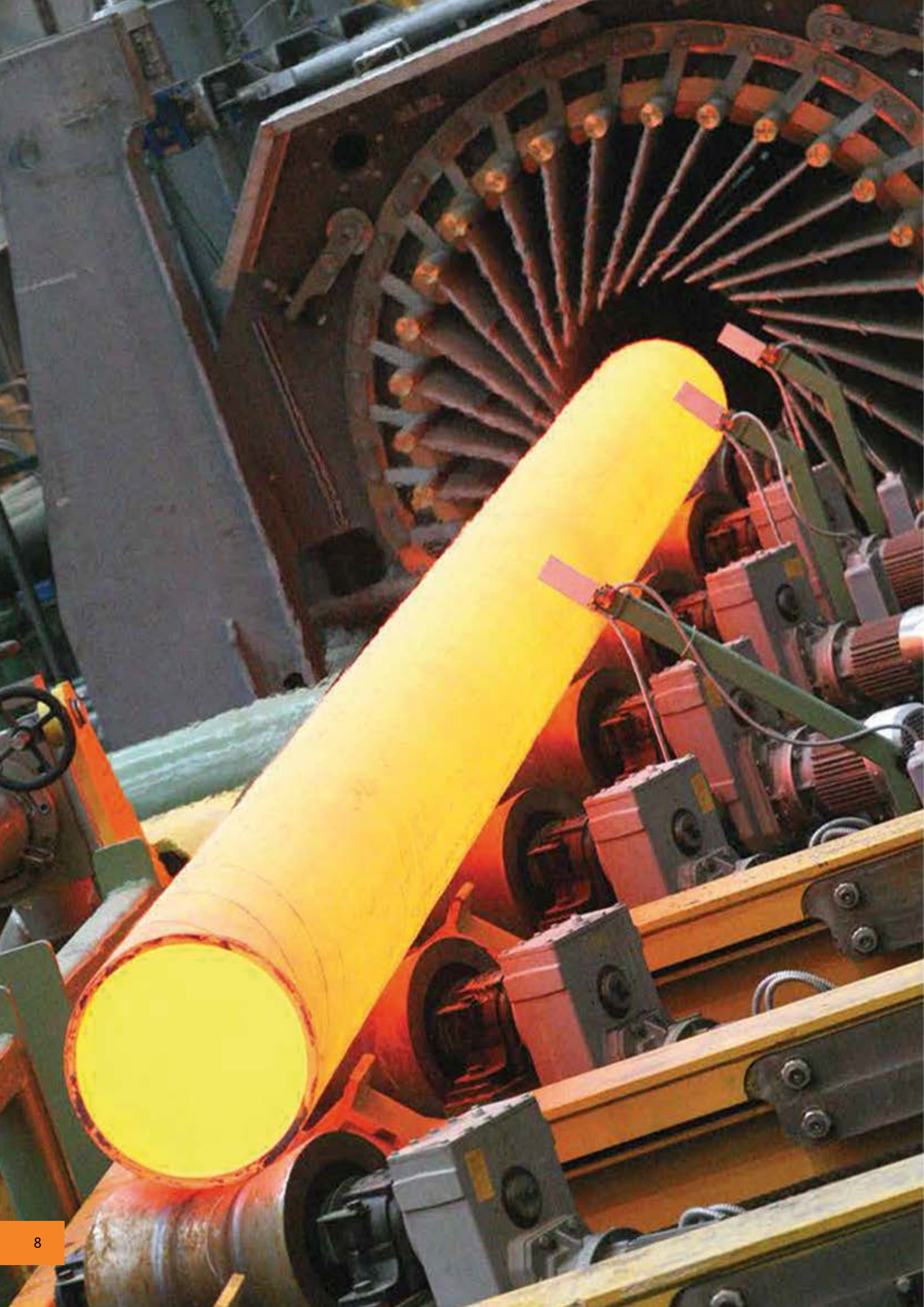
Round billets 177, 220, 280 and 350 mm
Blooms 260 x 340 mm

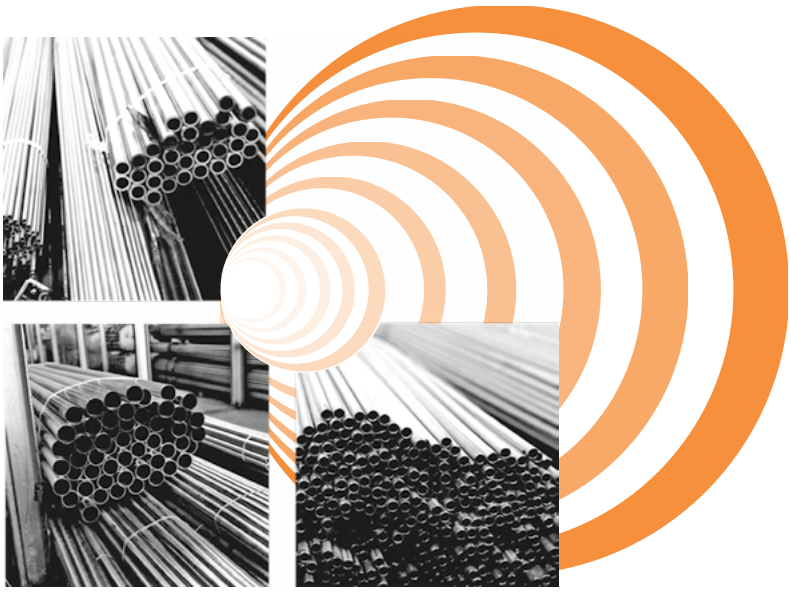
TMK-ARTROM /Smls/

Smls Line pipe 17.1-219.08 mm
Process & PG 15.88 - 219.1mm
Mechanicals 15.88 - 250 mm
Structurals and standard 21.3 - 250 mm

TMK-Kaztrubprom /Smls/

Smls OCTG 60.3-177.8 mm
Premium Connections



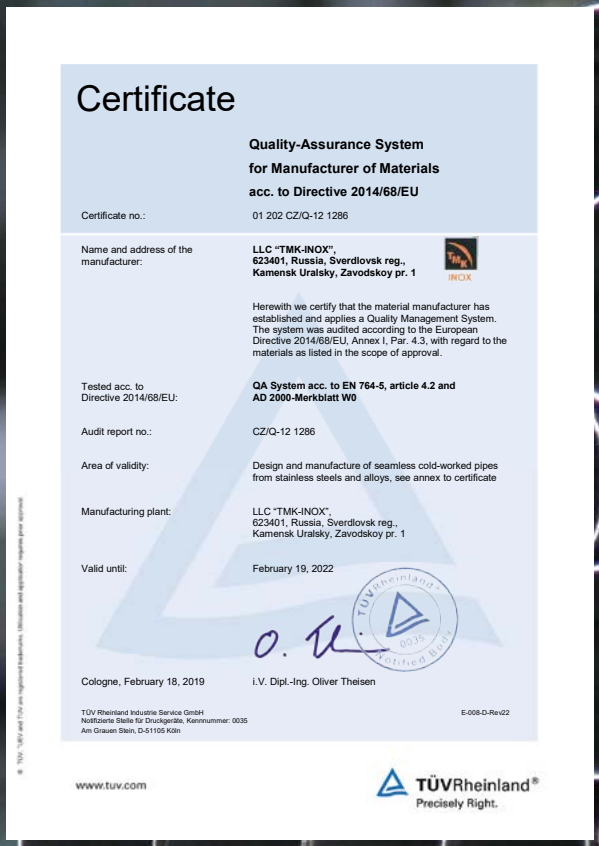


PRODUCTION

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.



Certificate

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

Certificate no.:	01 202 CZ/Q-12 1286
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 audited 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**
Audit report no.:	CZ/Q-12 1286
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:	February 19, 2022

Cologne, February 18, 2019 — i.V. Dipl.-Ing. Oliver Theisen

TÜV Rheinland Industrie Service GmbH
Notifizierte Stelle für Druckgeräte, Kennnummer: 0035
Am Grauen Stein, D-51105 Köln

E-008-D-Rev22

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Precisely Right.

TÜV NORD

CERTIFICATE

Quality-Assurance System for material manufacturer according to directive 2014/68/EU

Certificate no.: 07/202/9190/WZ/0903/17

Name and address of the manufacturer:	**«Volzhsky Pipe Plant» JSC** **7th Avtodoroga str., 6** **404119, Volzhsky, Volgograd region** **Russian Federation**

Herewith we certify that the manufacturer has established and applies a **quality-assurance system related to the material**. This QA System has been subjected to a specific assessment acc. to directive 2014/68/EU, annex I, point 4.3 with regard to the materials mentioned in the scope of approval.

Approved acc. to directive 2014/68/EU:	**QA-System in relation to materials, EN 764-5, section 4.2**
Certification file no.:	**4317076/01**
Audit report file no.:	**9190/WP/0903/17**
Scope of approval: *(product / material)*	**Seamless and welded tubes and pipes** **Ferritic and austenitic material**
Production site:	**«Volzhsky Pipe Plant» JSC** **7th Avtodoroga str., 6** **404119, Volzhsky, Volgograd region** **Russian Federation**
The certificate is valid until:	**May 2020**

Only valid in conjunction with a valid certificate acc. to EN ISO 9001.

Prague, 15.05.2017

Notified Body (0045)
for Pressure Equipment
Mojmír Srnec
TÜV NORD Systems GmbH & Co. KG,
Große Bahnstraße 31, D-22525 Hamburg

Annex: scope of approval

Region. TÜV NORD Czech, s.r.o.
Českomoravská 2420/15
190 00 Praha 9, CZ

Tel. +420 296 587 211
Fax +420 296 587 240
e-mail: tuev-nord@tuev-nord.cz

Member of CEOC

Certificate QA material manufacturer_PED eng_Rev.1/01.17

Lloyd's Register LRQA

CERTIFICATE OF APPROVAL

This is to certify that the Management System of:

TMK Group
40/2A, Pokrovka Street, Moscow, 105062
Russian Federation

has been approved by Lloyd's Register Quality Assurance to the following Quality Management System Standards:

ISO 9001:2015
EN ISO 9001:2015
BS EN ISO 9001:2015

The Management System is applicable to:

Design, manufacture, sales and shipment of steel tube product, including Premium connections, coated and non-coated, tool joints, tubing couplings, accessories, steel gas cylinders. Manufacture, sales and shipment of steel ingots and billets. In-field services of Premium products. After-sales technical services, repair and storage of tubular products. Granting licenses for the right to use intellectual property objects (Premium connections).

This certificate is valid only in association with the certificate schedule bearing the same number on which the locations applicable to this approval are listed.

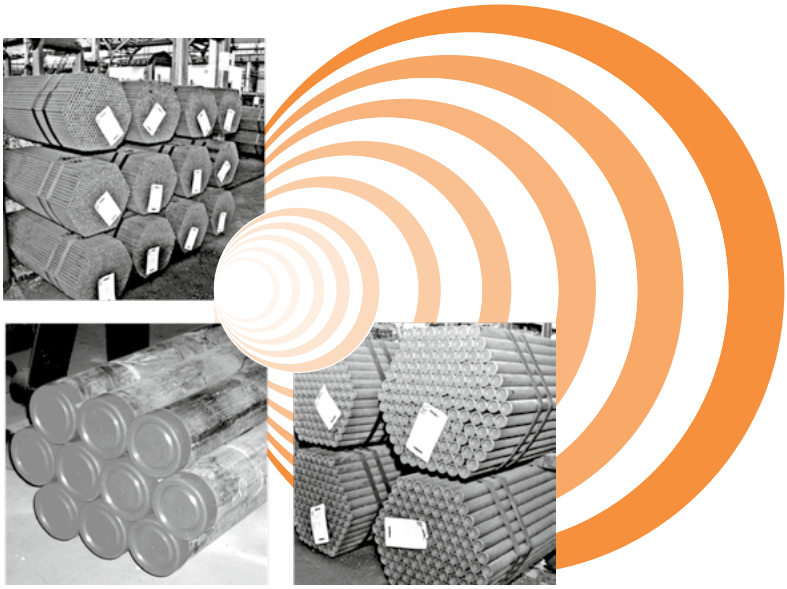
Approval
Certificate No: SPB0006337

Original Approval: 30 December 2008
Current Certificate: 19 December 2017
Certificate Expiry: 18 December 2020

Issued by: Lloyd's Register EMEA Saint-Petersburg for and on behalf of Lloyd's Register Quality Assurance Limited

UKAS
001

40/4, Lit. D, Pulkovskoe shosse, St.Petersburg, 196158, Russia
For and on behalf of 1 Trinity Park, Bickenhill Lane, Birmingham, B37 7ES, United Kingdom



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
TP347HFG	Mainly used for boilers in the termal 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.

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	-	-
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	-	-
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	EN10216-5	< 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


TMK – INOX
TMK – INOX 16.0x0.

GENERAL TUBES AND PIPES

STANDARTS

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

RANGE OF SIZES

HOT FINISHED	OD 42-273mm WT 3,2-34mm
COLD FINISHED	OD 4-114,3mm WT 0,2-10mm
WELDED	OD 6-114,3mm WT 0,5-4mm

STEEL GRADES

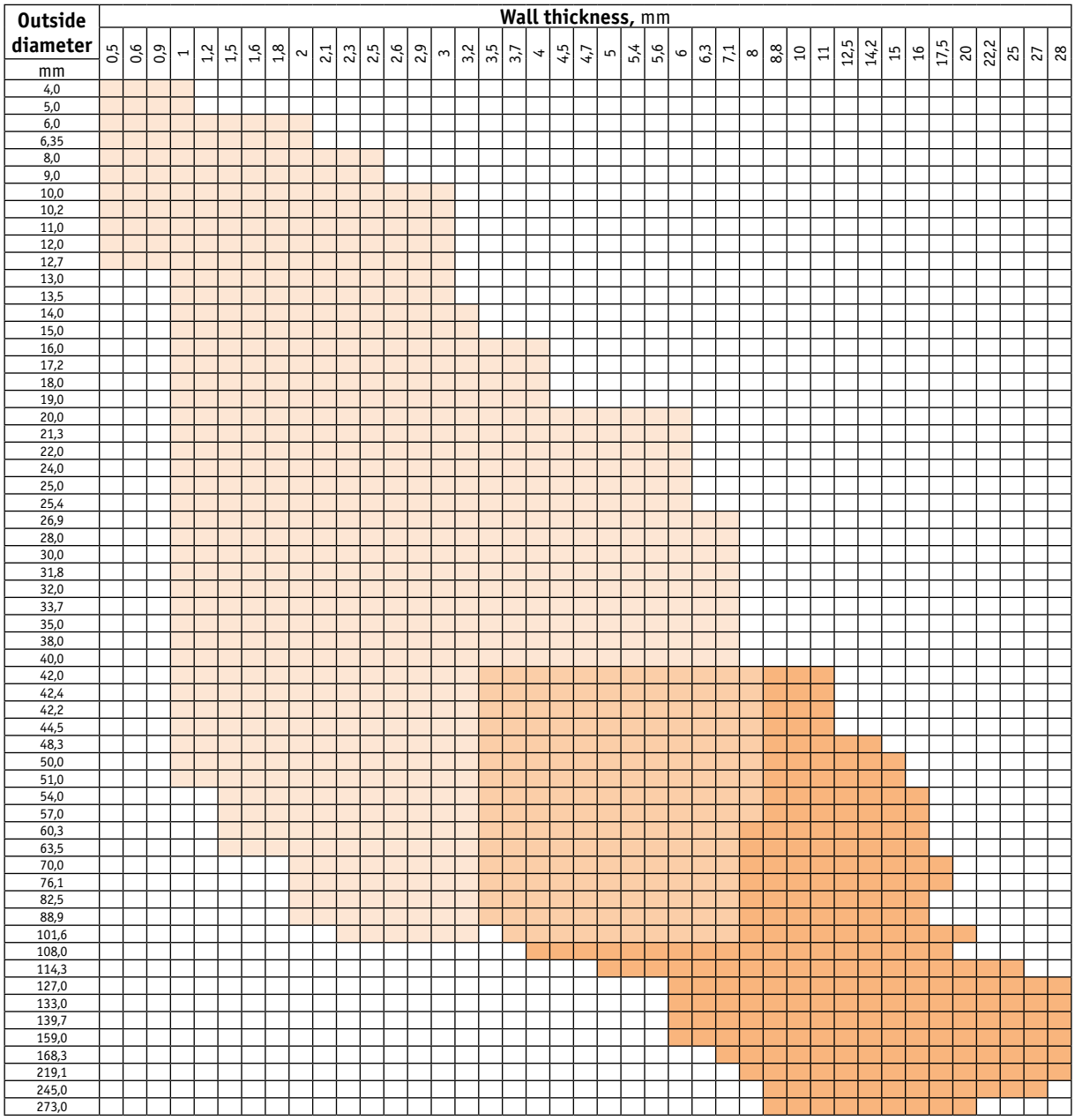
AUSTENITIC
1.4301, 1.4306, 1.4307, 1.4401, 1.4404, 1.4541, 1.4571, 1.4878

AUSTENITIC/FERRITIC (DUPLEX)
1.4462, 1.4410*

*production after trial lot

TMK-INOX Products

Range of sizes



cold rolled tubes

cold or hot rolled tubes

hot rolled tubes

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	**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
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

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%

* production after trial lot

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
TP317	515	205	34
TP317L	515	205	35
TP321	515	205	35
TP316Ti	515	205	35

Dimensional tolerances (ASTM A450, 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	X2CrNi 19 11
1.4541	X6CrNiTi 18 10
1.4401	X5CrNiMo 17 12 2
1.4404	X2CrNiMo 17 12 2
1.4436	X3CrNiMo 17 13 3
1.4435	X2CrNiMo 18 14 3
1.4571	X6CrNiMoTi l7 12 2
1.4462	X2CrNiMoN 22 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																			
15,0																			
16,0																			
17,2																			
18,0																			
19,0																			
20,0																			
21,3																			
22,0																			
24,0																			
25,0																			
25,4																			
26,9																			
28,0																			
30,0																			
31,8																			
32,0																			
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 > 12 000	+ 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/mm*	Yield strength, 0.2%	Yield strength, 1.0%	Elongation, %
	not less than/range			
1.4301 (XSCrNi 1810)	500-700	195	230	40
1.4306 (X2CrNi 1911)	460-680	180	215	40
1.4541 (XeCrNiTi 1810)	500-730	200	235	35
1.4401(X5CrNiMo1712 2)	510-710	205	240	40
1.4571 (XeCrNiMoTi 1712 2)	500-730	210	245	35
l,4404(X2CrNiMo1712 2)	490-690	190	225	40
1 4462 (X2CrNiMoN 22 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, DIN 2462)

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: TP405*, TP410, TP430, TP430Ti*, TP446-1*, TP446-2* 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	1,83-1,9	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 A213/A213M, ASME SA-213/SA-213M

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

* production after trial lot

Standards: ASTM A789/A789M, ASME SA-789/SA-789M

Steel grades: S31803, S32205*, S32750*
Basic product range of heat-exchanger tubing

Outside diameter		Wall thickness											
inch	mm	1.6-1.65	1.83-1.9	2.0-2.03	2.11	2.2-2.3	2.4-2.5	2.6-2.64	2.8	3.0-3.05	3.18-3.2	3.5-3.6	4.0
5/8	15.88												
11/16	17.46												
3/4	19.05												
13/16	20.64												
7/8	22.23												
15/16	23.81												
1	25.40												
1¼	31.75												
1½	38.10												
1¾	44.45												
2	50.80												

Mechanical properties

UNS designation	Tensile strength, N/mm²	Yield strength, min, N/mm²	Elongation in 2" or 50 mm, min, %	Hardness, max	
				Brinnel	Rockwell
S31803	620	450	25	290	30
S32205	655	485	25	290	30
S32750	800	550	15	300	32

Dimensional tolerances

Group	Size, Outside Diameter, in. (mm)	Permissible Variations in Outside Diameter, in. (mm)	Average Wall[D] Permissible Variations in Wall Thickness,[A] %	Minimum Wall[E] Permissible Variations Wall Thickness,[A] %		Permissible Variations in Cut Length, in.[B] [mm]		Thin Walled Tubes[C]
				Over	Under	Over	Under	
1	Up to ½[12.7], excl	±0.005 [0.13]	±15	30	0	⅛ [3]	0	...
2	½ to1½[12.7 to 38.1], excl	±0.005 [0.13]	±10	20	0	⅛ [3]	0	less than 0.065 in. [1.6 mm] specified
3	1½ to 3½ [38.1 to 88.9], excl	±0.010[0.25]	±10	20	0	3/16 [3]	0	less than 0.095 in. [2.4 mm] specified

* production after trial lot

FURNACE TUBES

Description:
Tubes and Pipes for Refineries and Petrochemical Industry

STANDARD SPECIFICATIONS
ASTM / ASME A/SA-213/SA-213M; A/SA-312/SA-312M; EN 10216-5

STEEL GRADES
TP304H; TP310S*, TP316H, TP316Ti, TP317*, TP321H; TP347H; 800H*

BASIC SIZE RANGE
ANSI B 36.10M

NPS	O.D. inches	PIPE SCHEDULES											MAX. LENGTHT
	mm	10s	20	30	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	meters
3-1/2	4.000				0.226 47.6		0.318 47.6					0.636 44.0	ft
	101.60				5.74 14.5		8.08 14.5					16.15 13.4	meters
4	4.500				0.237 47.6	0.281	0.337 47.6		0.438 47.6		0.531 42.0	0.674 35.4	ft
	114.30				6.02 14.5	7.14	8.56 14.5		11.13 14.5		13.49 12.8	17.12 10.8	meters
5	5.563				0.258 47.6		0.375 39.7		0.500 45.9		0.625 39.4	0.750 34.4	ft
	141.30				6.55 14.5		9.53 12.1		12.70 14.0		15.88 12.0	19.05 10.5	meters
6	6.625				0.280 46.9		0.432 40.4		0.562 32.8		0.719 26.9	0.864 23.3	ft
	168.28				7.11 14.3		10.97 12.3		14.27 10.0		18.26 8.2	21.95 7.1	meters
8	8.625				0.322 27.9	0.406 22.3	0.500 19.7	0.594 17.2	0.719 15.1	0.812 13.8	0.906 13.3	0.875 13.3	ft
	219.08				8.18 8.5	10.31 6.8	12.70 6.0	15.09 5.3	18.26 4.6	20.62 4.2	23.01 4.1	22.23 4.1	meters

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

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

* production after trial lot

TMK-C-110 Tubing and Casing Process Flowchart

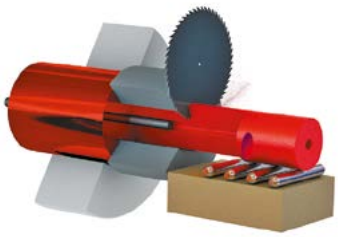
1. Billets cutting

2. Billets drilling

5. Glass lubricant apply

6. Piercing

9. Hot pressing

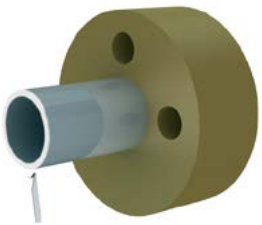


10. Cooling

13. Pipe ends cutting

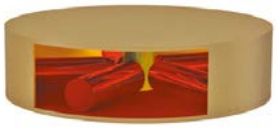
14. NDT

17. Threading and make-up

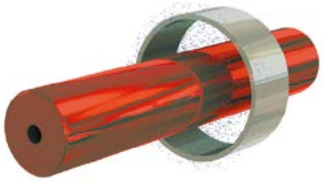


18. Drifting

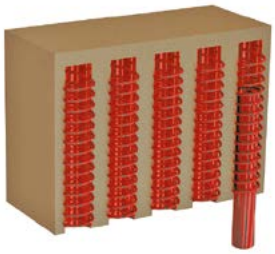
3. Billets heating



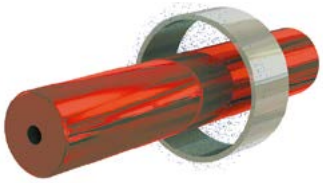
4. Hydrodescaling



7. Intermediate heating



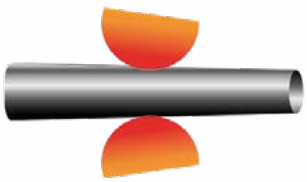
8. Hydrodescaling



11. Glass lubricant removal

12. Pipe sizing

15. Pipe cold rolling



16. NDT

19. Hydrotesting

20. Marking, packing, storage

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