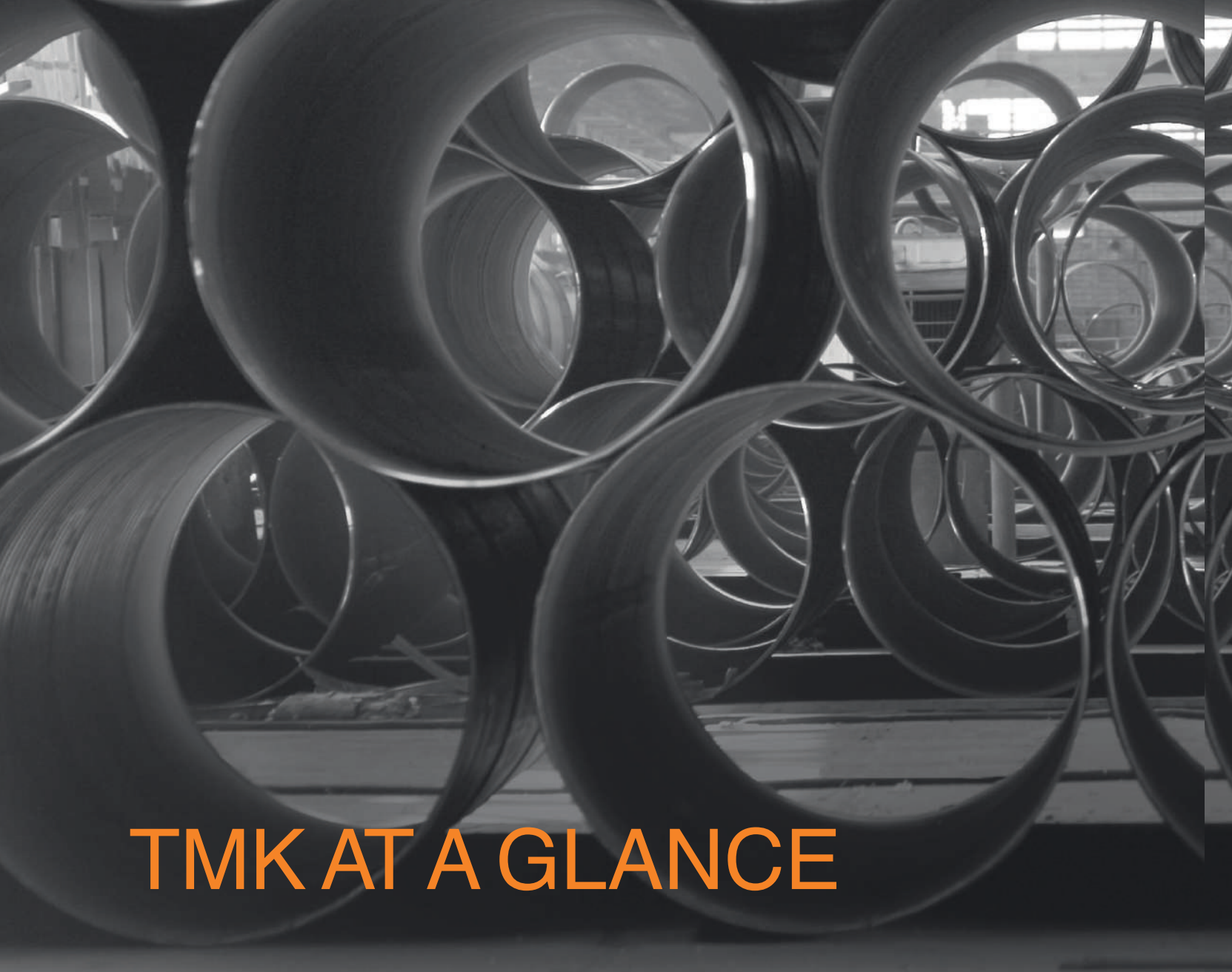




LARGE DIAMETER PIPES

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TMK AT A GLANCE



TMK is a leading supplier of steel piping, piping solutions and supporting services for different sectors of the economy. TMK produces ready-cut piping, including special pipes and other products for the energy, chemical, mechanical engineering, construction and other sectors. The company has wide-ranging expertise in the mechanical engineering sector, provides engineering solutions for power generation and metallurgical facilities and is developing a new line of products for the hydrogen energy sector.

TMK has major production facilities in a number of regions in Russia, including in the Volgograd, Rostov, Sverdlovsk, Smolensk and Chelyabinsk regions, as well as in other countries. It also owns several oil service companies, which together form its subsidiary TMK Neftgazservis. In addition to supplying its products, the company also provides a wide range of services in relation to the selection of piping products and the custom development of new designs, as well as supporting services including warehousing and pipe repair.

TMK is constantly upgrading its scientific and technological skill base and is implementing advanced solutions with the support of an R&D center in Moscow and the Russian Research Institute of the Pipe Industry (RusNITI) in Chelyabinsk. The company is able to provide a full cycle of advanced piping solutions, from the initial concept development to testing and the launch of production.

TMK has an extensive sales network, which allows it to distribute its products to customers in Russia and abroad. The company's shares are listed on the Moscow Stock Exchange.

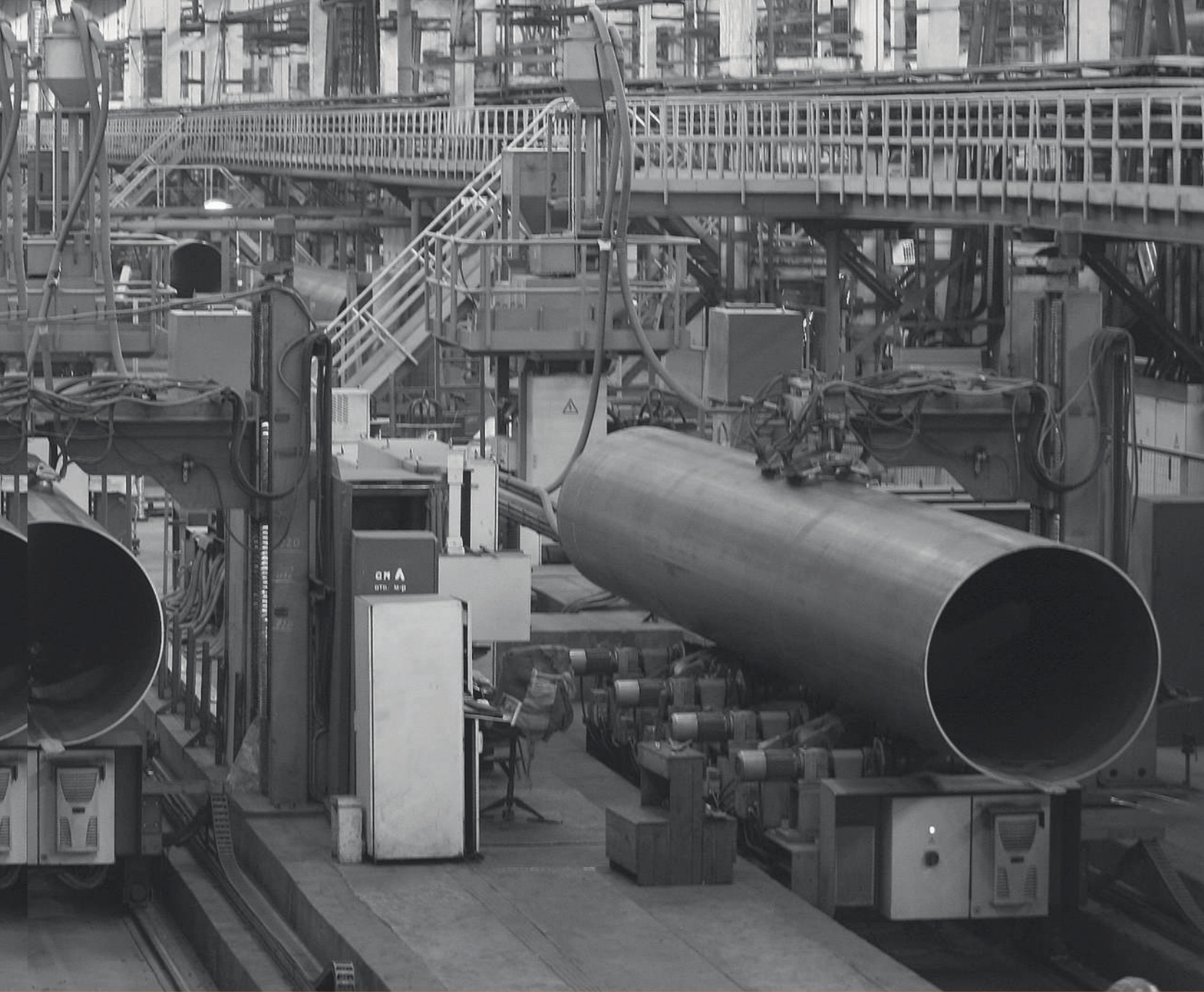


PRODUCTION OF LONGITUDINAL WELDED LDP

TMK produces a wide range of longitudinal welded large diameter pipes compliant with Russian and international standards GOST, TU and API* for oil and gas trunk pipelines.

Large diameter pipes are produced by TMK PS in Chelyabinsk, Volzhsky, and in Seversky Pipe Plant. TMK PS is a successor of CHTPZ and VTZ in large diameter pipe manufacturing, including application of various types of coatings.

TMK PS's electric welding pipe shops Vysota 239 and No. 6 in Chelyabinsk use submerged arc longitudinal welding to produce single and double-seam pipes with diameters from 508 mm to 1,422 mm and wall thicknesses up to 48 mm.



TMK PS's SAWL pipe mill in Volzhsky can produce steel pipes with diameters from 508 mm to 1,422 mm out of steel plate.

STZ has an induction seam welding mill, which can produce pipes with diameters from 219 mm to 530 mm.

Majority of pipelines in Russia are made of TMK pipes. Combining ease of supply to Central Russia, Siberia, the Far East, Kazakhstan, and China with proximity to major plate rolling mills, CHTPZ is optimally positioned to derive multiple synergies.

Volzhsky Pipe Plant's advantageous geography, access to rail and motor transport, and proximity of sea and river routes enable on-time product delivery to its customers.

Seversky Pipe Plant benefits from proximity to the oil and gas provinces of the Khanty-Mansi Autonomous Area, Yamalo-Nenets Autonomous Area and Siberia.



STANDARDS FOR SAWL

At TMK PS (Chelyabinsk), single-seam pipes are produced at the Vysota 239 shop and by Mill 530-820 at Electric-Weld Pipe Shop No. 6. Key customer performance of pipes made at Vysota 239 include consistently high strength and viscoplastic properties of the parent metal and weld seam; improved dimensional properties achieved by JCO forming; and pipe lengths up to 18 meters. The above was made possible by comprehensive deployment of highly automated processes for wheel blasting on both sides of the plate, forming and welding, as pipe dimensional inspection with automatic laser measurements. TMK PS (Chelyabinsk) produces pipes with diameters from 530 mm to 1420 mm and wall thicknesses from 7 mm to 50 mm, using pipe grades up to K55 to Russian standards and pipes with diameters from 508 mm to 1422 mm and wall thicknesses from 7 mm to 50 mm, using pipe grades up to X100 to API*5L or ISO 3183.

Double-seam pipes with diameter from 1,020 mm to 1,220 mm are made from narrow plates, which considerably reduces thickness variation of rolled plates, especially along its longitudinal edges, as well as the variation of mechanical properties along and across the plate. Semi-cylindrical pieces are made in hydraulic presses using conventional process resulting in the optimum distribution of stresses in the piece.

Volzhsy branch of TMK PS has a SAWL pipe mill, capable of producing of longitudinal welded pipes with diameters from 508 mm to 1,420 mm, wall thicknesses from 8 mm to 42 mm and pipe grades up to K65 to Russian standards as well as longitudinal welded LDP with diameters from 508 mm to 1,422 mm, wall thicknesses from 7.9 mm to 42 mm and pipe grades up to X80 to API* Spec 5L.



Three-roll bending followed by submerged arc welding and expanding is the most effective technology to manufacture longitudinal welded large diameter pipes for trunk pipelines.

Quality Policy

As high standards for product quality are essential for winning customer loyalty, TMK is committed to following global best practices in all aspects of its operations.

A Quality Management System certified to ISO 9001:2008 is in place at all TMK plants.

The Company takes a responsible approach to environmental protection and social commitments, and is actively engaged

in addressing environmental problems in the region.

An Environmental Management System in place at its plants is certified to ISO 14001:2004.

Nondestructive testing, including ultrasonic, X-ray and magnetic particle inspections, as well as hydraulic testing are mandatory for all large diameter pipes.

2.1 Standards for SAWL

Standards	Pipes dimensions		Steel and pipes grade
	Outside diameter, mm	Wall thickness, mm	
1	2	3	4
API* 5L Line pipes. Specifications	508–1,422	7.1–48.0	A, B, X42, X46, X52, X56, X60, X65, X70, X80, L245, L290, L320, L360, L390, L415, L450, L485, L555
DNV-OS-F101 Offshore Standard. Submarine Pipeline Systems	508–1,422	8.0–42.0	250-485 F, D, DNV 250-485 FD
DNV-OS-F101-2013 Submarine Pipeline Systems	508–1,422	8.0–45.0	245–555
DIN EN 10217-1:2005 Welded steel tubes for pressure purposes. Part 1: Non-alloy steel tubes with specified room temperature properties	508–1,422	8.0–40.0	P195TR1, P235TR1, P265TR1, P195TR2, P235TR2, P265TR2
DIN EN 10217-3:2019 Welded steel tubes for pressure purposes. Part 3. Electric welded and submerged arc welded alloy fine grain steel tubes with specified room, elevated and low temperature properties	508–1,422	8.0–40.0	P275-P460, (N, NH, NL1, NL2)
ISO 3183:2012 Steel pipes for pipeline transportation systems	508–1,422	7.92–40.0	L290 or X42, L555 or X80
ISO 3183-2019 Petroleum and natural gas industries – Steel pipes for pipeline transportation systems	508–1,422	7.0–48.0	A, B, X42, X46, X52, X56, X60, X65, X70, X80, L245, L290, L320, L360, L390, L415, L450, L485, L555
ÖNORM EN 10219-1:2006 / ÖNORM EN 10219-2:2019 Cold formed welded structural hollow sections of non-alloy and fine grain steels.	508–1,422	7.0–48.0	Non-alloy steels: S235JRH, S275J0H, S275J2H, S355J0H, S355J2H, S355K2H. Fine grain steels: S275MH–S460MLH, S275NH–S460NLH
Casing with OTsK welded connectors	508	15.9	Pipes: X52, X56, X60, X65, X70 Connectors: X80 Locking ring: X100
Casing with a welded pin and an OTsB shoe	508	15.9	Pipes: X52, X56, X60, X65, X70 Connectors: X80 Casing shoe body: X52, X56, X60, X65, X70
Casing crossover with a welded box connector and a pin or box	508	15.9	Pipes: X52, X56, X60, X65, X70 Connectors: X80 Locking ring: X100 Crossover pin or box: X80
GOST ISO 3183-2015 Steel pipes for pipelines of petroleum and natural gas industries	508–1,422	7.0–48.0	A, B, X42, X46, X52, X56, X60, X65, X70, X80, L245, L290, L320, L360, L390, L415, L450, L485, L555
GOST 10704-91 / GOST 10706-76 Electric welded longitudinal steel pipes	508–1,420	7.0–48.0	St2kp (K33), St2ps, St2sp (K34), St3kp (K37), St3ps, St3sp (K38), Low-alloy steels (CE ≤ 0.48), K45
1	2	3	4

Standards	Pipes dimensions		Steel and pipes grade
	Outside diameter, mm	Wall thickness, mm	
1	2	3	4
GOST 20295-85 Steel welded pipes for main gas-and-oil pipelines	508–1,420	7.0–48.0	Carbon and low-alloy steels of grades 3Sp (K34), K38, st20 (K42), K48, K50, K52, K54, K55, K56, K60
GOST 31447-2012 Steel welded pipes for trunk gas pipelines, oil pipelines and oil products pipelines	530–1,420	7.0–48.0	Carbon and low-alloy steels of grades K34, K38, K42, K48, K50, K52, K54, K55, K56, K60
GOST 33228-2015 Steel welded pipes for general purposes	508–1,420	7.0–34.0	KP175–KP460
GOST P 58064-2018 Steel welded pipes for building structure	508–1,420	8.0–48.0	C245–C440
TU 1303-002-08620133-01-TU Electric welded pipes of carbon or low-alloy steel for steam and hot water pipelines	530–1,420	7.0–25.0	St3sp, 20, 09G2S, 16GS, 17GS, 17G1S, 17G1S-U
TU 1381-001-00186654-2012 Longitudinal welded steel pipes of grade K60 for gas trunk pipelines with a working pressure of 11.8 MPa and gathering gas pipelines with a working pressure of 12.9 MPa	530–1,420	9.9–37.9	K60
TU 1381-006-00186654-2010 Longitudinal welded steel pipes of grade K65 with a diameter of 1,420 mm for gas trunk pipelines with a operating pressure of 11.8 MPa	1,420	23.0 27.7 33.4	K65
TU 1381-011-00186654-2013 Low-temperature service, expanded, longitudinal welded steel pipes for the application of anti-corrosion coating and use in oil and gas pipelines	530–1,220	8.0–25.0	09GSF, 13KhFA, Kh56
TU 1381-011-53570464-2012 Electric welded steel pipes for encasements	530–1,420	15.2–32.0	K34, K38, K42, K48, K50, K52, K54, K55
TU 1381-012-00186654-2011 Longitudinal electric-welded steel pipes for encasements with diameters from 530 mm to 1,420 mm	530–1,420	15.2–32.0	K34, K38, K42, K48, K50, K52, K54, K55
TU 1381-016-00186654-2010 Longitudinal welded steel pipes with diameters from 508 mm to 1,420 mm for gas trunk pipelines with a working pressure of up to 9.8 MPa, inclusive	508–1,420	7.0–32.0	K52, K54, K55, K56, K60, X56, X60, X65, X70
TU 1381-018-00186654-2009 Longitudinal electric welded longitudinal steel pipes with diameters from 530 mm to 1,220 mm for pipelines	530–1,220	7.0–35.0	K50, K52, K54, K55, K56, K60
TU 1381-020-00186654-2011 Low-temperature service, longitudinal electric-welded steel pipes with diameters from 530 mm to 1,420 mm with improved weldability for use in steel structures of buildings	530–1,420	7.0–45.0	K52, K54, K56, K60, X56, X60, X65, X70
1	2	3	4

2.1 Standards for SAWL

Standards	Pipes dimensions		Steel and pipes grade
	Outside diameter, mm	Wall thickness, mm	
1	2	3	4
TU 1381-022-00186654-2011 Electric welded steel pipes for subsea pipelines	508–820	8.0–32.0	X52, X60, X65
TU 1381-027-00186654-2013 Longitudinal welded steel pipes with diameters from 530 mm to 1,420 mm for gas trunk pipelines with a working pressure of up to 9.8 MPa, inclusive, crossing active tectonic fault zones	530–1,420	8.0–40.0	K52, K54, K55, K56, K60, X52, X56, X60, X65, X70
TU 1381-029-00186654-2011 Longitudinal electric-welded steel pipes for oil and gas pipelines	508–820	8.0–32.0	K52, K54, K56, K60, X56, X60, X65, X70
TU 1381-042-00186654-2012 Low-temperature service, longitudinal electric-welded steel pipes with diameters from 530 mm to 1,420 mm with improved weldability for use in steel structures of buildings	530–1,420	7.0–48.0	S345, S375, S390, S440
TU 1381-060-00186654-2013 Longitudinal electric-welded steel pipes for hydrogen sulfide service to be used in the construction and repair of pipelines in Central Asia	530–1,220	8.0–30.0	K48, K50, K52, X42, X46, X52
TU 1381-061-00186654-2013 Longitudinal electric-welded steel pipes for gas gathering pipelines of Yamal LNG	530	16.0–26.0	K60
TU 1381-067-00186654-2015 Longitudinal electric-welded steel pipes with diameters from 508 mm to 1,422 mm for trunk and gathering pipelines	508–1,422	8.0–38.0	K52, K55, K54, K56, K60, X56, X60, X65, X70
TU 1381-068-00186654-2016 Longitudinal electric-welded steel pipes for unique building structures	508–1,420	7.0–45.0	S345, S375, S390, S440, K52, K55, K56, K60, X56, X60, X65, X70
TU 1381-074-00186654-2015 Longitudinal electric-welded steel pipes with diameters from 530 mm to 820 mm for trunk and gathering pipelines	530–820	8.0–12.0	K52, K55, K54, K56, K60, X56, X60, X65, X70
TU 1381-076-00186654-2015 Longitudinal electric-welded steel pipes for gathering pipelines with a operating pressure of up to 24.0 MPa, inclusive	508	22.2 23.8 24.9	X65, SAWL 450 IFD
TU 1381-079-00186654-2016 Longitudinal electric-welded steel pipes made of carbon or low-alloy steel for steam and hot water pipelines	530–1,420	8.0–25.0	St3sp, 20, 09G2S, 16GS, 17GS, 17G1S, 17G1S-U
TU 1381-116-00186654-2013 Corrosion resistant, low-temperature service, expanded, longitudinal electric-welded steel pipes for oil and gas pipelines	530–1,220	8.0–25.0	09GSF, 13KhFA, Kh56
TU 1381-1573-00186654-2016 Longitudinal electric-welded steel pipes with diameters from 530 mm to 1,420 mm, wall thicknesses of up to 32 mm for gas, oil and petroleum product trunk pipelines	530–1,420	8.0–32.0	12GS2S, 09GS2S, 17GS, 17GS1S, 17GS1S-U, 13GS, 13GS-U, 08GBYu, 12GSB, 09GSF, 13KhFA, 13GS1S-U, 12GS2SB, 09GBYu, 09G2FB, 10GS2FBYu, 08G1NFB (pipes grades K50, K52, K54, K55, K56, K60)
1	2	3	4

Standards	Pipes dimensions		Steel and pipes grade
	Outside diameter, mm	Wall thickness, mm	
1	2	3	4
TU 14-3-1698-2000 Longitudinal electric-welded steel pipes with diameters of 1,020 mm and 1,220 mm for oil and gas pipelines	1,020–1,220	10.0–22.0	K52, K55, K56, K60
TU 14-156-78-2008 Longitudinal electric-welded steel pipes of grade K65 with diameters from 530 mm to 1,420 mm for gas trunk pipelines with a working pressure of 11.8 MPa	530–1,420	9.9–37.9	K60
TU 14-156-82-2009 Longitudinal welded steel pipes of grade K65 with a diameter of 1,420 mm for gas trunk pipelines with a operating pressure of 11.8 MPa	1,420	23.0; 27.7	K65
TU 14-156-92-2012 Longitudinal electric-welded steel pipes for subsea pipelines	559–711	15.0–25.4	PCT36W, PCT40W, PCT420W (K52, K54, K55, K56, X52, X60, X65)
TU 14-156-98-2013 Longitudinal electric-welded steel pipes of grade K60 for the line sections of gas trunk pipelines and compressor station pipelines with a operating pressure of 11.8 MPa	530–1,220	14.2–33.0	K60
TU 14-156-100-2017 Corrosion resistant, low-temperature service longitudinal electric-welded steel pipes	530–1,220	8.0–30.0	K48, K50, K52, K54, K55, K56, K60
TU 14-156-103-2014 Low-temperature service, electric-welded steel pipes with diameters from 530 mm to 1,420 mm and with improved weldability for use in building structures	530–1,420	8.0–40.0	S345, S375, S390, S440
TU 14-156-104-2014 Longitudinal electric-welded steel pipes for gas trunk pipelines with a operating pressure of up to 9.8 MPa (100 kgf/cm ²), inclusive, operated in active tectonic fault zones, in earthquake-prone areas and in permafrost zones	530–1,420	10.0–36.0	K52, K54, K55, K56, K60, X52, X56, X60, X65, X70
TU 14-156-107-2015 Longitudinal electric-welded steel pipes with diameters from 530 mm to 1,420 mm for trunk and gathering pipelines with a operating pressure of up to 10.0 MPa, inclusive	530–1,420	8.0–32.0	K52, K54, K55, K56, K60, K65, X56, X60, X65, X70, X80
TU 14-156-110-2019 Longitudinal electric-welded steel pipes with outside diameter from 530 mm to 1,420 mm for construction and repair of steam and water pipelines	530–1,420	8.0–25.0	3Sp, st20, 09G2S, 17GS, 17G1S, 17G1SU
TU 14-156-112-2018 Longitudinal electric-welded steel pipes with outside diameter from 530 mm to 1,220 mm for subsea gas pipelines	530–1,220	8.0–32.0	SMYS 245-485
1	2	3	4

2.1 Standards for SAWL

Standards	Pipes dimensions		Steel and pipes grade
	Outside diameter, mm	Wall thickness, mm	
1	2	3	4
TU 14-156-115-2019 Longitudinal electric-welded steel pipes	530–1,420	8.0–36.0	K42–K60 V1, 2, K34–K60 V3
TU 14-158-136-2007 Corrosion resistant, low-temperature service longitudinal welded pipes of 20 and 20 KSKh steel for oil and gas pipelines at Surgutneftegas fields	530–1,220	7.0–22.0	20, 20KSKh
TU 14-158-153-05 (double-seam modification) Longitudinal electric-welded steel pipes with diameters of 1,020 mm and 1,220 mm for oil and gas pipelines	1,020, 1,220	10.0–22.0	17G1S-U, 09GSF, 13GS, 13GSU, 13G1SU, 12GSB, 12GS2SB, 08G1NFBYu, 10GS2FBYu, grades K52–K60
TU 14-3P-03-94 Longitudinal electric-welded steel pipes with diameters from 530 mm to 1,220 mm for gas and oil pipelines	530–1,220	7.0–16.0	K52 (08GBYu), K56 (09GBYu)
TU 14-3P-04-94 Longitudinal electric-welded steel pipes with diameters from 530 mm to 1,220 mm for Arctic gas, oil and petroleum product pipelines	530–1,220	7.0–16.0	K52 (12GSB), K56 (12G2SB)
TU 14-3P-1270-2009 Longitudinal electric-welded steel pipes with a diameter of 530, 720 or 820 mm for gas and oil trunk pipelines	530–820	7.0–15.0	17GS, 17G1S, 17G1S-U, 13GS, 13GSU, 13G1SU, 08GBYu, 09GBYu, 12GSB, 12GS2SB, 08G1NFBYu, 10G2FBYu, 09GSF, grades K52–K60
TU 24.20.13-164-00186654-2021 Longitudinal electric-welded steel pipes with diameters from 508 mm to 1,422 mm for fields	508–1,422	7.5–48.0	L360–L485, 09GSF, 05KhGB, 13KhFA
TU 24.20.21.000-021-00186654-2019 Longitudinal electric-welded steel pipes for onshore and offshore gathering pipelines for the infrastructure	508, 514, 813, 820	27.0, 30.1, 30.2, 32.2, 38.7, 40.8, 45.8, 46.8	K60, X65, 450 I FD
TU 24.20.21.000-039-00186654-2018 Longitudinal electric-welded steel pipes for subsea pipelines	508–1,220	8.0–41.0	X60, X65, X70, SAWL 415 IFD, SAWL 450 IFD, SAWL 485 IFD
1	2	3	4

Standards	Pipes dimensions		Steel and pipes grade
	Outside diameter, mm	Wall thickness, mm	
1	2	3	4
TU 24.20.21.000-077-00186654-2019 Longitudinal electric-welded steel pipes with diameters from 508 mm to 1,422 mm for use in a wide temperature range from - 60 °C to + 400 °C under	508–1,422	8.0–40.0	K50, K52, K54, K55, K56, K60, X56, X60, X65, X70
TU 24.20.21.000-102-00186654-2017 Corrosion-resistant, high-reliability, longitudinal electric-welded steel pipes	530–1,420	7.0–40.0	09GSF, 13KhFA
TU 24.20.21.000-103-00186654-2017 Low-temperature service, longitudinal electric-welded steel pipes	530–1,420	7.0–40.0	K48, K50, K52, K54, K55, K56, K60
TU 24.20.21.000-106-00186654-2018 Longitudinal electric-welded steel pipes for pipelines with a operating pressure of up to 24.0 MPa, inclusive	508–812.8	24.9–39.0	K60, X70
TU 24.20.21.000-108-00186654-2021 Longitudinal welded steel pipes with diameters from 508 mm to 1,422 mm made using laser-hybrid welding for trunk and gathering pipelines	508–1,422	15.0–34.0	K52, K54, K55, K56, K60
TU 24.20.21.000-110-00186654-2019 Longitudinal electric-welded steel pipes	508–1,420	7.0–48.0	K42–K60
TU 24.20.21.000-132-00186654-2019 Longitudinal welded steel pipes with diameters from 508 mm to 1,422 mm for pipelines	508–1,422	8.0–45.0	K42–K60
TU 24.20.22-013-53570464 Large-diameter welded steel casing with diameters from 508 mm to 762 mm with welded TMK UP KATRAN HD connectors	508–762	15.9–25.4; 25.4–38.1	Pipes: X52–X70 Connectors: X80 Locking ring: X100
TU 24.20.22-019-00186654-2018 Large-diameter casing with diameters from 508 mm to 914 mm with LYNX SA2, LYNX HDHT welded connectors	508–914	12.7–38.1	K48–K60, X52–X70
1	2	3	4

2.2 SAWL size ranges as per GOST and TU

Longitudinal welded LDP size range as per API* 5L, ISO 3183:2012 and DNV OS F 101

Outside diameter		Wall thickness, mm																		
MM	inch	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
508	20																			
558.8	22																			
609.6	24																			
660.4	26																			
711.2	28																			
762	30																			
812.8	32																			
863.6	34																			
914.4	36																			
965.2	38																			
1,016	40																			
1,066.8	42																			
1,117.6	44																			
1,168.4	46																			
1,219.2	48																			
1,320.8	52																			
1,422.4	56																			

Longitudinal welded LDP size range as per DIN EN 10217-1-2005 and DIN EN 10217-3-2019

Outside diameter		Wall thickness, mm															
MM	inch	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
508	20																
558.8	22																
609.6	24																
660.4	26																
711.2	28																
762	30																
812.8	32																
863.6	34																
914.4	36																
965.2	38																
1,016	40																
1,066.8	42																
1,219.2	48																
1,422.4	56																

Longitudinal welded LDP size range as per GOST ISO 3183-2015

Outside diameter, mm		Wall thickness, mm																												
		7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30					
508																														
530																														
630																														
720																														
820																														
914																														
1,020																														
1,220																														
1,420																														
1,422																														

Longitudinal welded LDP size range as per GOST 10704-91

Outside diameter, mm	Wall thickness, mm																			
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
508																				
530																				
630																				
720																				
820																				
920																				
1,020																				
1,220																				
1,420																				

Longitudinal welded LDP size range as per GOST 20295-85

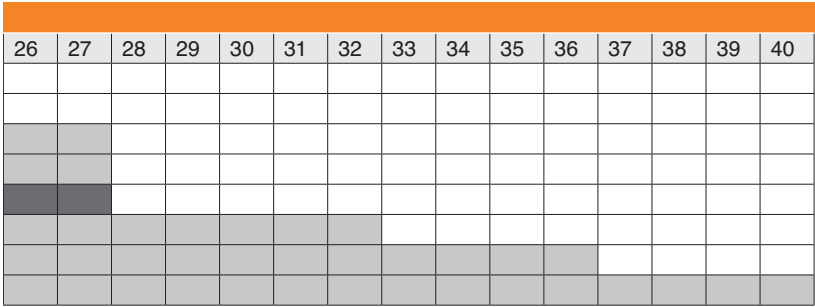
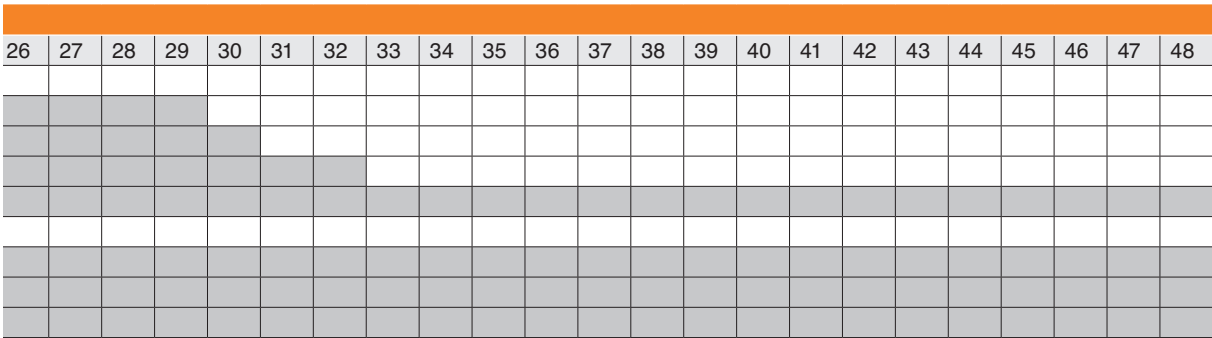
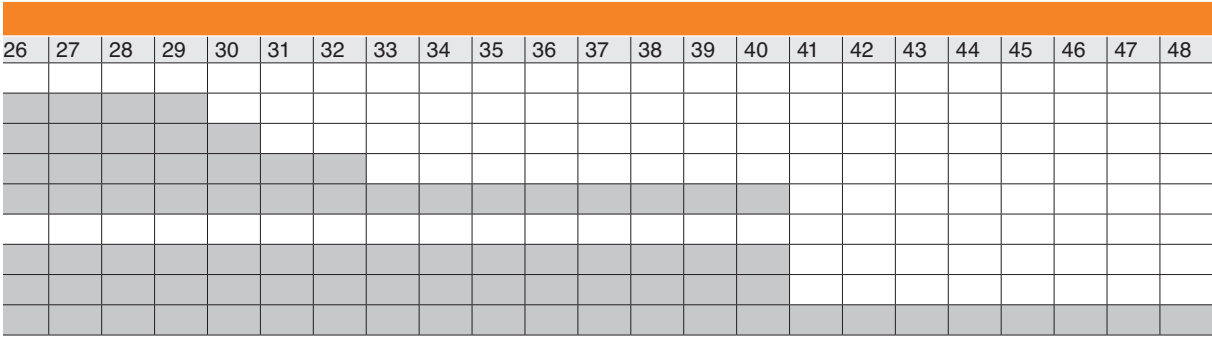
Outside diameter, mm	Wall thickness, mm																			
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
508																				
530																				
630																				
720																				
820																				
920																				
1,020																				
1,220																				
1,420																				

Longitudinal welded LDP size range as per GOST 31447-2012

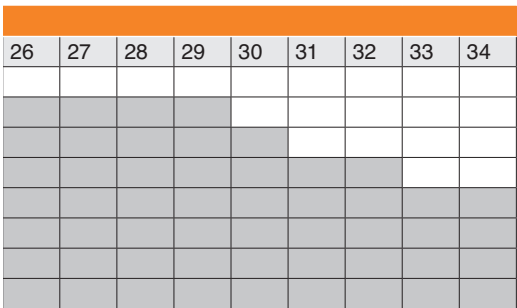
Outside diameter, mm	Wall thickness, mm																			
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
530																				
630																				
720																				
820																				
920																				
1,020																				
1,220																				
1,420																				

Longitudinal welded LDP size range as per GOST 33228-2015

Outside diameter, mm	Wall thickness, mm																			
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
508																				
530																				
630																				
720																				
820																				
1,020																				
1,220																				
1,420																				



- 1. Pipes with OD 530 mm and a wall thickness greater than 12 mm is made by agreement with the manufacturer.
 - 2. Pipes with OD 920 mm is made under a technical agreement.
- To be additionally approved by the manufacturer



Longitudinal welded LDP size range as per GOST R 58064-2018

Outside diameter, mm	Wall thickness, mm																		
	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
508																			
530																			
630																			
720																			
820																			
1,020																			
1,220																			
1,420																			

Longitudinal welded LDP size range as per TU 1303-002-08620133-01-TU

Outside diameter, mm	Wall thickness, mm																		
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
530																			
630																			
720																			
820																			
1,020																			
1,220																			
1,420																			

Longitudinal welded LDP size range as per TU 1381-001-00186654-2012

Outside diameter, mm	Wall thickness, mm																		
	9.9	11.8	12.9	13.4	14.2	15.5	16.1	18.9	19.0	19.3	22.7	26.0	26.4	27.2	27.3	29.9	30.9	31.6	32.0
530																			
720																			
1,020																			
1,220																			
1,420																			

Longitudinal welded LDP size range as per TU 1381-006-00186654-2010

Outside diameter, mm	Wall thickness, mm																		
	23.0								27.7						33.4				
1,420																			

2.2 SAWL size ranges as per GOST and TU

27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48

32.6	33.0	37.9

Longitudinal welded LDP size range as per TU 1381-011-00186654-2013

Outside diameter, mm	Wall thickness, mm																	
	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
530																		
630																		
720																		
820																		
1,020																		
1,220																		

Longitudinal welded LDP size range as per TU 1381-011-53570464-2012

Outside diameter, mm	Wall thickness, mm																	
	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
530																		
630																		
720																		
820																		
1,020																		
1,067																		
1,220																		
1,420																		

Longitudinal welded LDP size range as per TU 1381-012-00186654-2011

Outside diameter, mm	Wall thickness, mm																	
	15.2	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	31.0	32.0
530																		
630																		
720																		
820																		
1,020																		
1,220																		
1,420																		

Longitudinal welded LDP size range as per TU 1381-016-00186654-2010

Outside diameter, mm	Wall thickness, mm																	
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
508																		
530																		
630																		
720																		
813																		
820																		
1,020																		
1,067																		
1,220																		
1,420																		

■ To be additionally approved by the manufacturer.

25	26	27	28	29	30	31	32

Longitudinal welded LDP size range as per TU 1381-018-00186654-2009

Outside diameter, mm	Wall thickness, mm																	
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
530																		
630																		
720																		
820																		
1,020																		
1,067																		
1,220																		

Longitudinal welded LDP size range as per TU 1381-020-00186654-2011

Outside diameter, mm	Wall thickness, mm																	
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
530																		
630																		
720																		
820																		
1,020																		
1,220																		
1,420																		

Longitudinal welded LDP size range as per TU 1381-022-00186654-2011

Outside diameter, mm	Wall thickness, mm																			
	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
508																				
530																				
630																				
720																				
813																				
820																				

Longitudinal welded LDP size range as per TU 1381-027-00186654-2013

Outside diameter, mm	Wall thickness, mm																			
	8	9	10	11	12	13	14	15	15	17	18	19	20	21	22	23	24	25	26	27
508																				
530																				
630																				
720																				
820																				
1,020																				
1,220																				
1,420																				

25	26	27	28	29	30	31	32	33	34	35

25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45

28	29	30	31	32

28	29	30	31	32	33	34	35	36	37	38	39	40

Longitudinal welded LDP size range as per TU 1381-029-00186654-2011

Outside diameter, mm	Wall thickness, mm																			
	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
508																				
530																				
630																				
711																				
720																				
813																				
820																				

Longitudinal welded LDP size range as per TU 1381-042-00186654-2012

Outside diameter, mm	Wall thickness, mm																			
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
530																				
630																				
720																				
820																				
1,020																				
1,220																				
1,420																				

Longitudinal welded LDP size range as per TU 1381-060-00186654-2013

Outside diameter, mm	Wall thickness, mm																		
	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
530																			
630																			
720																			
820																			
1,020																			
1,220																			

Longitudinal welded LDP size range as per TU 1381-061-00186654-2013

Outside diameter, mm	Wall thickness, mm										
	16	17	18	19	20	21	22	23	24	25	26
530											

Longitudinal welded LDP size range as per TU 1381-067-00186654-2015

Outside diameter, mm	Wall thickness, mm																
	8	9	10.2	11	12.2	13	14	15	15.7	17	18	19	20	21	22	23	24
508																	
530																	
630																	
720																	
820																	
1,020																	
1,220																	
1,420																	

28	29	30	31	32

27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48

26	27	28	29	30

26	27	28	29	30	31	32	33	34	35	36	37	38

Longitudinal welded LDP size range as per TU 1381-068-00186654-2016

Outside diameter, mm	Wall thickness, mm																		
	7	8	9	10.2	11	12.2	13	14	15	16	17	18	19	20	21	22	23	24	25
508																			
530																			
630																			
720																			
820																			
1,020																			
1,220																			
1,420																			

Longitudinal welded LDP size range as per TU 1381-074-00186654-2015

Outside diameter, mm	Wall thickness, mm				
	8	9	10	11	12
530					
630					
720					
820					

Longitudinal welded LDP size range as per TU 1381-076-00186654-2015

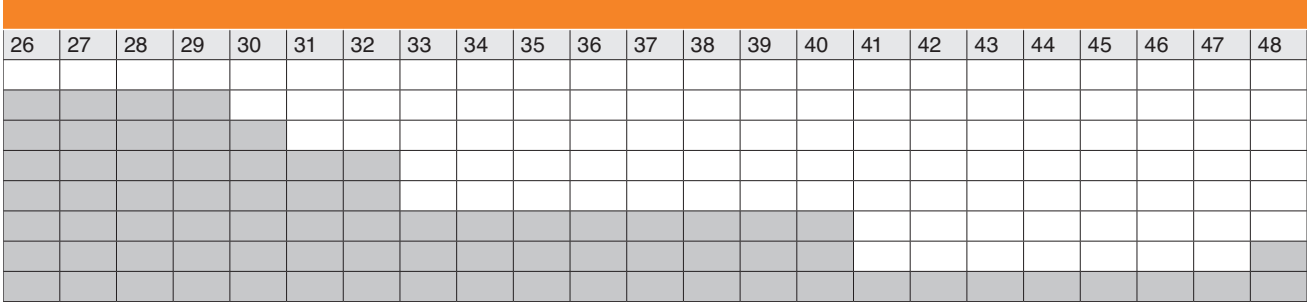
Outside diameter, mm	Wall thickness, mm		
	22,2	23,8	24,9
508			

Longitudinal welded LDP size range as per TU 1381-079-00186654-2016

Outside diameter, mm	Wall thickness, mm																		
	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
530																			
630																			
720																			
820																			
1,020																			
1,220																			
1,420																			

Longitudinal welded LDP size range as per TU 1381-116-00186654-2013

Outside diameter, mm	Wall thickness, mm																		
	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
530																			
630																			
720																			
820																			
1,020																			
1,220																			



26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48

Longitudinal welded LDP size range as per TU 1381-1573-00186654-2016

Outside diameter, mm	Wall thickness, mm																	
	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
530																		
630																		
720																		
820																		
1,020																		
1,220																		
1,420																		

Longitudinal welded LDP size range as per TU 14-156-78-2008¹

Outside diameter, mm	Wall thickness, mm										
	9.9	11.8	14.2								
530											
720				13.4	16.1	19.3					
1,020							18.9	22.7	27.3		
1,220								22.7	27.2	32.6	
1,420									26.4	31.6	37.9

Longitudinal welded LDP size range as per TU 14-156-82-2008

Outside diameter, mm	Wall thickness, mm	
	23	27.7
1,420		

Longitudinal welded LDP size range as per TU 14-156-92-2012

Outside diameter, mm	Wall thickness, mm											
	15	16	17	18	19	20	21	22	23	24	25	26
559												
660												
711												

Longitudinal welded LDP size range as per TU 14-156-98-2013

Outside diameter, mm	Wall thickness, mm															
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
530									14.2							
720													19.3			
1,020																
1,220																

Longitudinal welded LDP size range as per TU 14-156-100-2017

Outside diameter, mm	Wall thickness, mm																		
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
530																			
630																			
720																			
820																			
1,020																			
1,220																			

26	27	28	29	30	31	32

¹Pipe with other wall thicknesses within the range specified for each diameter can be produced at the customer's request.

22	23	24	25	26	27	28	29	30	31	32	33
					27.3						
22.7											33.0

25	26	27	28	29	30

Longitudinal welded LDP size range as per TU 14-156-103-2014

Outside diameter, mm	Wall thickness, mm																		
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
530																			
630																			
720																			
820																			
1,020																			
1,220																			
1,420																			

Longitudinal welded LDP size range as per TU 14-156-104-2014

Outside diameter, mm	Wall thickness, mm																		
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
530																			
630																			
720																			
820																			
1,020																			
1,220																			
1,420																			

Longitudinal welded LDP size range as per TU 14-156-107-2015

Outside diameter, mm	Wall thickness, mm																		
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
530																			
630																			
720																			
820																			
1,020																			
1,220																			
1,420																			

Longitudinal welded LDP size range as per TU 14-156-112-2018

Outside diameter, mm	Wall thickness, mm															
	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
530																
630																
720																
820																
1,020																
1,220																

Longitudinal welded LDP size range as per TU 14-156-115-2019

Outside diameter, mm	Wall thickness, mm																	
	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
530																		
630																		
720																		
820																		
1,020																		
1,220																		
1,420																		

25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

25	26	27	28	29	30	31	32	33	34	35	36

24	25	26	27	28	29	30	31	32

 To be additionally approved by the manufacturer

24	25	26	27	28	29	30	31	32

26	27	28	29	30	31	32	33	34	35	36

Longitudinal welded LDP size range as per TU 14-158-136-2007

Outside diameter, mm	Wall thickness, mm															
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
530																
720																
820																
1,020																
1,220																

Longitudinal welded LDP size range as per TU 14-158-153-05, TU 14-3-1698-2000

Outside diameter, mm	Wall thickness, mm												
	10	11	12	13	14	15	16	17	18	19	20	21	22
1,020													
1,220													

Longitudinal welded LDP size range as per TU 14-3R-03-94 and TU 14-3R-04-94

Outside diameter, mm	Wall thickness, mm										
	7	8	9	10	11	12	13	14	15	16	
530											
720											
820											
1,020											
1,220											

Longitudinal welded LDP size range as per TU 14-3R-1270-2009

Outside diameter, mm	Wall thickness, mm										
	7	7.5	8	8.5	9	10	11	12	13	14	15
530											
630											
720											
820											

Longitudinal welded LDP size range as per TU 24.20.21.000-021-00186654-2019

Outside diameter, mm	Wall thickness, mm							
	27.0	30.1	30.2	32.2	38.7	40.8	45.8	46.8
508								
514								
813								
820								

Longitudinal welded LDP size range as per TU 24.20.21.000-039-00186654-2018

Outside diameter, mm	Wall thickness, mm																	
	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	24.9
508																		
530																		
630																		
720																		
820																		
1,020																		
1,220																		

26	27	28.6	29	30	31	32	33	34	35	36	37	38	39	40	41

2.2 SAWL size ranges as per GOST and TU

Longitudinal welded LDP size range as per TU 24.20.21.000-077-00186654-2019

Outside diameter, mm	Wall thickness, mm																		
	8	8.5	10.2	11	12.2	13	14	15.7	16	17	18	19	20	21	22	23	24	24.9	
508																			
530																			
630																			
720																			
820																			
1,020																			
1,220																			
1,420																			
1,422																			

Longitudinal welded LDP size range as per TU 24.20.21.000-102-00186654-2017 and TU 24.20.21.000-103-00186654-2017

Outside diameter, mm	Wall thickness, mm																	
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
530																		
630																		
720																		
820																		
1,020																		
1,220																		
1,420																		

Longitudinal welded LDP size range as per TU 24.20.21.000-106-00186654-2018

Outside diameter, mm	Wall thickness, mm					
	24.9	25.3	29.3	32.5	39.0	
508						
530						
609.6						
812.8						

Longitudinal welded LDP size range as per TU 24.20.21.000-108-00186654-2021

Outside diameter, mm	Wall thickness, mm																	
	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
508																		
530																		
630																		
720																		
820																		
1,020																		
1,220																		
1,420																		
1,422																		

26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

33	34

2.2 SAWL size ranges as per GOST and TU

Longitudinal welded LDP size range as per TU 24.20.21.000-110-00186654-2019

Outside diameter, mm	Wall thickness, mm																		
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
508																			
530																			
630																			
720																			
820																			
1,020																			
1,220																			
1,420																			

Longitudinal welded LDP size range as per TU 24.20.21.000-132-00186654-2019

Outside diameter, mm	Wall thickness, mm																	
	7	8	8.5	10.2	11	12.2	13	14	15.7	16	17	18	19	20	21	22	23	24
508																		
530																		
630																		
720																		
820																		
1,020																		
1,220																		
1,420																		
1,422																		

Longitudinal welded LDP size range as per TU 24.20.21-164-00186654-2021

Outside diameter, mm	Wall thickness, mm																		
	7.5	8	8.5	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
508																			
530																			
630																			
720																			
820																			
1,020																			
1,220																			
1,420																			
1,422																			

Longitudinal welded LDP size range as per TU 24.20.22-019-00186654-2018

Outside diameter, mm	Wall thickness, mm				
	12.7	15.9	19.1	25.4	38.1
508					
559					
610					
660					
762					
914					

2.2 SAWL size ranges as per GOST and TU

26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48

25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45

26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48

2.3 Weight per unit length (meter) as per API* Spec 5L (ASME B36.10M)

Values are given as per ASME B36.10M

Outside diameter		Wall thickness, mm									
		7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0
MM	inch*	Weight per unit length (meter), kg									
508	20	87.35	99.63	111.86	124.03	136.16	148.24	160.27	172.25	184.18	196.06
530	-	91.18	104.01	116.79	129.51	142.19	154.82	167.40	179.93	192.40	204.83
559	22	96.24	109.79	123.29	136.74	150.14	163.49	176.79	190.04	203.24	216.39
630	-	108.62	123.94	139.20	154.42	169.59	184.71	199.78	214.79	229.76	244.68
660	26	-	129.91	145.93	161.89	177.81	193.67	209.49	225.26	240.97	256.64
711	28	-	140.07	157.36	174.60	191.78	208.92	226.00	243.04	260.02	276.96
720	-	-	141.87	159.38	176.84	194.25	211.61	228.92	246.18	263.39	280.55
762	30	-	150.24	168.79	187.30	205.75	224.16	242.52	260.82	279.08	297.29
813	32	-	-	180.22	200.00	219.73	239.40	259.03	278.61	298.13	317.61
820	-	-	-	181.79	201.74	221.64	241.49	261.30	281.05	300.75	320.40
864	34	-	-	191.66	212.70	233.70	254.65	275.54	296.39	317.19	337.93
914	36	-	-	-	225.16	247.40	269.59	291.73	313.82	335.87	357.86
965	38	-	-	-	237.86	261.37	284.83	308.24	331.61	354.92	378.18
1,020	40	-	-	-	251.56	276.44	301.27	326.05	350.78	375.47	400.10
1,067	42	-	-	-	-	289.32	315.32	341.27	367.17	393.03	418.83
1,118	44	-	-	-	-	303.29	330.56	357.78	384.96	412.08	439.15
1,168	46	-	-	-	-	-	345.50	373.97	402.39	430.76	459.08
1,220	48	-	-	-	-	-	361.05	390.81	420.52	450.19	479.80
1,320	52	-	-	-	-	-	-	-	455.39	487.55	519.65
1,420	56	-	-	-	-	-	-	-	490.26	524.91	559.50

Outside diameter		Wall thickness, mm									
		27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0	36.0
MM	inch*	Weight per unit length (meter), kg									
508	20	-	-	-	-	-	-	-	-	-	-
530	-	338.26	350.09	361.87	-	-	-	-	-	-	-
559	22	357.76	370.31	382.81	-	-	-	-	-	-	-
630	-	405.50	419.83	434.10	448.32	-	-	-	-	-	-
660	26	425.68	440.75	455.77	470.73	-	-	-	-	-	-
711	28	459.98	476.31	492.60	508.84	525.03	541.17	-	-	-	-
720	-	466.03	482.59	499.10	515.57	531.98	548.34	-	-	-	-
762	30	494.27	511.88	529.44	546.95	564.41	581.82	-	-	-	-
813	32	528.57	547.45	566.28	585.06	603.79	622.47	641.10	659.68	678.21	696.69
820	-	533.28	552.33	571.33	590.29	609.19	628.04	646.85	665.60	684.31	702.96
864	34	562.86	583.01	603.11	623.16	643.16	663.11	683.01	702.86	722.66	742.42
914	36	596.49	617.88	639.23	660.52	681.77	702.96	724.11	745.21	766.25	787.25
965	38	630.78	653.45	676.06	698.63	721.15	743.61	766.03	788.39	810.71	832.98
1,020	40	667.77	691.81	715.79	739.73	763.61	787.45	811.23	834.97	858.66	882.29
1,067	42	699.38	724.58	749.74	774.84	799.90	824.91	849.86	874.77	899.63	924.43
1,118	44	733.67	760.15	786.58	812.95	839.28	865.55	891.78	917.96	944.08	970.16
1,168	46	767.30	795.02	822.69	850.31	877.88	905.40	932.88	960.30	987.67	1,014.99
1,220	48	802.27	831.28	860.25	889.17	918.03	946.85	975.62	1,004.33	1,033.00	1,061.62
1,320	52	869.51	901.02	932.48	963.89	995.24	1,026.55	1,057.81	1,089.02	1,120.17	1,151.28
1,420	56	936.76	970.76	1,004.71	1,038.61	1,072.45	1,106.25	1,140.00	1,173.70	1,207.35	1,240.95

Pipes grade: up to X80

The theoretical weight is given for single-seam pipes with a factor of 1.01 to account for weld reinforcement. In case of double-seam pipes, a factor of 1.015 is used.

2.3 Weight per unit length (meter)
as per API* Spec 5L (ASME B36.10M)

17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
207.90	219.68	231.41	243.09	254.72	266.30	277.83	289.32	300.75	-
217.21	229.54	241.82	254.05	266.23	278.36	290.44	302.47	314.45	326.38
229.49	242.54	255.54	268.49	281.39	294.25	307.05	319.80	332.50	345.16
259.55	274.37	289.14	303.86	318.53	333.15	347.72	362.24	376.71	391.13
272.25	287.82	303.34	318.80	334.22	349.59	364.91	380.17	395.39	410.56
293.85	310.68	327.47	344.21	360.90	377.53	394.12	410.66	427.15	443.59
297.66	314.72	331.73	348.69	365.60	382.47	399.28	416.04	432.75	449.41
315.44	333.55	351.61	369.61	387.57	405.48	423.34	441.15	458.90	476.61
337.04	356.41	375.74	395.02	414.25	433.42	452.55	471.63	490.66	509.64
340.00	359.55	379.05	398.51	417.91	437.26	456.56	475.82	495.02	514.17
358.63	379.28	399.88	420.42	440.92	461.37	481.77	502.12	522.42	542.67
379.80	401.69	423.54	445.33	467.07	488.77	510.41	532.00	553.55	575.04
401.39	424.56	447.67	470.73	493.75	516.71	539.63	562.49	585.31	608.07
424.68	449.22	473.70	498.13	522.52	546.85	571.13	595.37	619.55	643.69
444.58	470.29	495.94	521.54	547.10	572.60	598.06	623.46	648.82	674.12
466.18	493.15	520.07	546.95	573.77	600.55	627.27	653.95	680.57	707.15
487.35	515.57	543.74	571.86	599.93	627.95	655.92	683.84	711.71	739.53
509.36	538.88	568.34	597.76	627.12	656.44	685.70	714.92	744.08	773.20
551.71	583.71	615.67	647.57	679.43	711.23	742.99	774.69	806.35	837.96
594.05	628.54	662.99	697.38	731.73	766.03	800.27	834.47	868.62	902.71

37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0	45.0	46.0	47.0	48.0
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
715.12	733.50	751.83	770.11	-	-	-	-	-	-	-	-
721.57	740.12	758.63	777.09	-	-	-	-	-	-	-	-
762.12	781.77	801.37	820.92	-	-	-	-	-	-	-	-
808.19	829.09	849.94	870.73	-	-	-	-	-	-	-	-
855.19	877.36	899.48	921.54	-	-	-	-	-	-	-	-
905.88	929.41	952.90	976.34	-	-	-	-	-	-	-	-
949.19	973.90	998.56	1,023.16	-	-	-	-	-	-	-	-
996.19	1,022.17	1,048.09	1,073.97	-	-	-	-	-	-	-	-
1,042.27	1,069.49	1,096.66	1,123.79	-	-	-	-	-	-	-	-
1,090.19	1,118.70	1,147.17	1,175.59	-	-	-	-	-	-	-	-
1,182.34	1,213.35	1,244.31	1,275.22	-	-	-	-	-	-	-	-
1,274.50	1,308.00	1,341.44	1,374.84	1,408.19	1,441.49	1,474.74	1,507.95	1,541.10	1,574.20	1,607.25	1,640.25

2.4 Weight per unit length (meter) as per API* Spec 5L (ISO 4200)

Values are given as per ISO 4200

Outside diameter, inches	Wall thickness, mm							
	8	8.8	10	11	12.5	14.2	16	17.5
508	98.6	108	123	136	153	173	194	212
559	109	119	135	149	168	191	214	234
610	119	130	146	162	184	209	234	256
660	129	141	160	176	200	226	254	277
711	139	152	173	190	215	244	274	299
762	149	163	185	204	231	262	294	321
813	159	175	198	218	247	280	314	343
864	169	186	211	231	262	298	335	365
914	179	196	223	245	278	315	354	387
1,016	199	219	249	273	309	351	395	431
1,067	209	230	261	286	325	369	415	453
1,118	219	241	273	300	341	387	435	475
1,168	229	252	286	314	356	404	455	497
1,219	239	263	298	328	372	422	475	519
1,321	259	285	323	355	403	458	515	563
1,422	279	307	348	383	435	493	555	605

Pipes grade: up to X80

2.4 Weight per unit length (meter) as per API* Spec 5L (ISO 4200)

20	22.2	25	28	30	32	36	40
241	266	298	331	354	376	419	462
266	294	329	367	391	415	464	512
291	322	361	402	429	455	510	562
316	349	392	436	465	496	554	612
341	377	423	472	504	536	599	662
366	405	454	507	542	576	645	712
391	433	486	542	579	616	690	763
416	461	517	577	617	657	735	813
441	488	548	612	654	696	780	862
491	544	611	682	729	777	870	963
516	572	642	717	767	817	915	1,013
542	600	674	753	805	857	961	1,063
565	627	705	787	842	896	1,005	1,113
591	655	736	822	880	937	1,050	1,163
642	711	799	893	955	1,017	1,141	1,264
692	766	861	963	1,030	1,097	1,231	1,363

2.5 Mechanical properties of steel

Standards	Pipes dimensions		Steel grade, pipes grade	Ultimate tensile strength
	Outside diameter	Wall thickness		MPa
	mm	mm		min
1	2	3	4	5
API* Spec 5L / ISO 3183:2019 Specification for line pipes. Technical requirements	508–1,422	7.9–42.0	X42–X80, A, B (L210, L245, L290– L555)	335–825
DNV-OS-F101 Offshore Standard. Submarine Pipeline Systems	508–1,422	8.0–42.0	245-485 F, FD, FDU	415–570
ISO 3183-2019 / API* 5L Petroleum and natural gas industries – Steel pipes for pipeline transportation systems	508–1,422	7.1–48.0	B, X42–X80, L245–L555	415–655 625–825
ÖNORM EN 10219-1:2006 / ÖNORM EN 10219-2:2019 Cold formed welded structural hollow sections of non-alloy and fine grain steels.	508–1,422	7.0–48.0	Non-alloy steels: S235JRH, S275J0H, S275J2H, S355J0H, S355J2H, S355K2H. Fine grain steels: S275MH–S460MLH, S275NH–S460NLH	Non-alloy steels: 360–510 470–630 Fine-grain: 370–510 540–720
GOST 10704-91, GOST 10706-76 Technical requirements	530–1,420	7.0–48.0	St2kp, St2ps, St2sp, St3kp, St3ps, St3sp, low-alloy steel (CE ≤ 0.48%)	325–440
GOST 20295-85 Steel welded pipes for main gas-and-oil pipelines	530–1,420	7.0–48.0	K34, K38, K42, K48, K50, K52, K54, K55, K56, K60	333–451 588–735
GOST 31447-2012 Steel welded pipes for trunk gas pipelines, oil pipelines and oil products pipelines	530–1,420	7.0–48.0	K34, K38, K42, K48, K50, K52, K54, K55, K56, K60	335–453 590–688
GOST 33228-2015 Steel welded pipes for general purposes	508–1,420	7.0–34.0	KP175–KP460	255–590
GOST P 58064-2018 Steel welded pipes for building structure	508–1,420	8.0–48.0	C245–C440	370 540–700
TU 1381-001-00186654-2012 Longitudinal welded steel pipes of grade K60 for gas trunk pipelines with a working pressure of 11.8 MPa and gathering gas pipelines with a working pressure of 12.9 MPa	530–1,420	9.9–37.9	K60	590–710
TU 1381-006-00186654-2010 Longitudinal welded steel pipes of grade K65 with a diameter of 1,420 mm for gas trunk pipelines with a working pressure of 11.8 MPa	1,420	23.0 27.0 33.4	K65	640–760
TU 1381-012-00186654-2011 Longitudinal electric-welded steel pipes for encasements with diameters from 530 mm to 1,420 mm	530–1,420	15.2–32.0	K34–K55	335–540
TU 1381-016-00186654-2010 Longitudinal electric-welded steel pipes with diameters from 508 mm to 1,420 mm for gas trunk pipelines with a operating pressure of up to 9.8 MPa, inclusive	508–1,420	7.0–32.0	K52–K60 X56–X70	490–598 590–698
TU 1381-018-00186654-2009 Longitudinal electric-welded steel pipes with diameters from 530 mm to 1,220 mm for pipelines	530–1,220	7.0–35.0	K50–K60	490–598 590–688
1	2	3	4	5

Yield strength	Relative elongation	Impact strength KCU	Impact strength KCV	Percentage of ductile fracture	Angle of bend
MPa	%	J/cm ²	J/cm ²	%	°grad.
min					
6	7	8	9	10	11
210–705	per spec.	per spec.	per spec.	per spec.	180
245–485	per spec.	per spec.	per spec.	per spec.	180
245–450 555–705	per spec.	–	per spec.	per spec.	180
Non-alloy steels: 225 355 Fine-grain: 265 460	Non-alloy steels: 24–20 Fine-grain: 24–17	–	Non-alloy steels: 27–40 J (+20°, 0°, –20 °C) Fine-grain: 27–40 J (–20 °C, –50 °C)	–	–
215–265	18–22	29–59 (+20 °C) 15–20 (–20 °C) 24 (–40 °C)			100
206–412 235–412	24–16	29.4 (+40 °C)	29.4 (–5 °C)		180
205–323 460–558	24–20	34.3–49.0 (–40 °C or –60 °C)	24.5–107.8 (–5 °C or –20 °C)	50–85 (–5 °C or –20 °C)	180
175–460	16–9	24.5–78.4 (+20°, –20°, –40°, –60 °C)	–	–	–
235 440	25–20	29–34 (–40 °C or –70 °C)	34–66 (0°, –20°, –40°, –60 °C)	–	–
485–595	20	–	V1: 100–170 (–20 °°); 63 (40 °C) V2: 110 (–19 °C) V3: 90 (–36 °C) V4: 100–225 (–42 °C)	V1: 85 (–20 °C) V2: 85 (–5 °C) V3: 85 (–20 °C) V4: 85 (–42 °C)	180
555–665	18–16	–	250 (–40 °) parent met., 70 (–40 °) weld.joint	85 (–20 °C)	180
205–390	22–17	24.5 (–40 °C or –60 °C)	–	–	–
360 485	20	39.2–58.8 (–60 °C)	39.2–107.8 (–20 °C)	50–85 (–20 °C)	180
345 460	20	49–74 (–60 °C or –40 °C)	49–88 (–20 °C or –5 °C)	60–80 (–20 °C or –5 °C)	120
6	7	8	9	10	11

2.5 Mechanical properties of steel

Standards	Pipes dimensions		Steel grade, pipes grade	Ultimate tensile strength
	Outside diameter	Wall thickness		MPa
	mm	mm		min
1	2	3	4	5
TU 1381-020-00186654-2011 Low-temperature service Longitudinal electric-welded steel pipes with diameters from 530 mm to 1,420 mm with improved weldability for use in steel structures of buildings	530–1,420	7.0–45.0	K52–K60 X56–X70	490–608 590–708
TU 1381-027-00186654-2013 Longitudinal welded steel pipes with diameters from 530 mm to 1,420 mm for gas trunk pipelines with a working pressure of up 9.8 MPa, inclusive, crossing active tectonic fault zones	530–1,420	8.0–40.0	K52, K54, K55, K56, K60, X52, X56, X60, X65, X70	460–570 590–710
TU 1381-042-00186654-2012 Low-temperature service Longitudinal electric-welded steel pipes with diameters from 530 mm to 1,420 mm with improved weldability for use in steel structures of buildings	530–1,420	7.0–48.0	S345, S375, S390, S440	470 590–770
TU 1381-060-00186654-2013 Longitudinal electric-welded steel pipes for hydrogen sulphide service to be used in the construction and repair of pipelines in Central Asia	530–1,220	8.0–30.0	K48, K50, K52, X42, X46, X52	414–532 510–628
TU 1381-061-00186654-2013 Longitudinal electric-welded steel pipes for gas gathering pipelines	530	16.0–26.0	K60	590–730
TU 1381-067-00186654-2015 Longitudinal electric-welded steel pipes with diameters from 508 mm to 1,422 mm for trunk and gathering pipelines	508–1,422	8.0–38.0	K52–K60 X56–X70	490–610 590–710
TU 1381-068-00186654-2016 Longitudinal electric-welded steel pipes for unique building structures	508–1,420	7.0–45.0	S345–S440, K52–K60, X56–X70	470–590 590–710
TU 1381-074-00186654-2015 Longitudinal electric-welded steel pipes with diameters from 530 mm to 820 mm for trunk and gathering pipelines	530–820	8.0–12.0	K52–K60, X56–X70	490–610 590–710
TU 1381-076-00186654-2015 Longitudinal electric-welded steel pipes for gathering pipelines with a working pressure of up to 24.0 MPa, inclusive	508	22.2 23.8 24.9	X65, SAWL 450 IFD	535–655
TU 1381-079-00186654-2016 Longitudinal electric-welded steel pipes of carbon or low-alloy steel for steam and hot water pipelines	530–1,420	8.0–25.0	St3sp, 20, 09G2S, 16GS, 17GS, 17G1S, 17G1S-U	370–480 510–660
TU 1381-1573-00186654-2016 Longitudinal electric-welded steel pipes with diameters from 530 mm to 1,420 mm, wall thicknesses up to 32 mm for gas, oil and petroleum product trunk pipelines	530–1,420	8.0–32.0	12GS2S, 09GS2S, 17GS, 17GS1S, 17GS1S-U, 13GS, 13GS-U, 08GBYu, 12GSB, 09GSF, 13KhFA, 13GS1S-U, 12GS2SB, 09GBYu, 09G2FB, 10GS2FBYu, 08G1NFB (pipes grades K50, K52, K54, K55, K56, K60)	490–608 590–708
1	2	3	4	5

Yield strength	Relative elongation	Impact strength KCU	Impact strength KCV	Percentage of ductile fracture	Angle of bend
MPa	%	J/cm ²	J/cm ²	%	°grad.
min					
6	7	8	9	10	11
360 485	20	–	34 (–40 °C)	–	180
355–455 485–595	21–20	59 (–60 °C)	80–150 (–40 °C)	85 (–20 °C)	180
345 440	18	–	29–34 (–20 °C or –40 °C)	–	180
265 359	20	49 (–60 °C)	49 (–20 °C)	60 (–20 °C)	180
485–605	20	39.2 (–60 °C)	39.2 (–50 °C)	50 (–20 °C)	180
355 485	20–18	50–60 (–60 °C or –40 °C)	cat. C: 60–80 (–5 °C) cat. D: 85–130 (–20°, –30°, –40° C) cat. E: 100–170 (–40 °C)	cat. C: 85 (–5 °C) cat. D: 85 (–20°, –30°, –40° C) cat. E: 85 (–40 °C)	180
345 440	20	–	60–100 (–20°, –40°, –60 °C)	80 (–20 °C)	180
355 485	20–18	50–60 (–60 °C or –40 °C)	cat. C: 60–70 (–5 °C) cat. D: 85–105 (–20°, –30°, –40 °C)	cat. C: 85 (–5 °C) cat. D: 85 (–20°, –30°, –40 °C)	180
450–570	20	–	155 (–32 °C)	85 (–10 °C)	180
235 360	23–20	29–44 (–20 °C or –40 °C)	–	–	120 / 180
340–470 460–600	20	29.4–49.0 (–40 °C or –60 °C)	29.4–49.0 (0°, –5°, –15°, –20°, –40 °C)	50–60 (0°, –5°, –15°, –20 °C)	120 / 180
6	7	8	9	10	11

2.5 Mechanical properties of steel

Standards	Pipes dimensions		Steel grade, pipes grade	Ultimate tensile strength
	Outside diameter	Wall thickness		MPa
	mm	mm		min
1	2	3	4	5
TU 14-156-78-2008 Longitudinal electric-welded steel pipes with diameters from 530 mm to 1,420 mm for gas trunk pipelines with a working pressure of 11.8 MPa	530–1,420	9.9–37.9	K60	590
TU 14-156-82-2009 Longitudinal welded steel pipes of grade K65 with a diameter of 1,420 mm for gas trunk pipelines with a working pressure of 11.8 MPa	1,420	23.0, 27.7	K65	640
TU 14-156-98-2013	530–1,220	14.2–33.0	K60	560–710
TU 14-156-100-2017 Corrosion resistant, low-temperature service longitudinal welded steel pipes for Rosneft pipelines	530–1,220	8.0–30.0	K48, K50, K52, K54, K55, K56, K60	471–710
TU 14-156-104-2014 Longitudinal electric-welded steel pipes for gas trunk pipelines with working pressure up to 9.8 MPa (100 kgf/cm ²) inclusive, operated in active tectonic fault zones, in earthquake-prone areas and in permafrost zones	530–1,420	10.0–36.0	K52, K54, K55, K56, K60, X52, X56, X60, X65, X70	440–710
TU 14-156-107-2015 Longitudinal electric-welded steel pipes with diameters from 530 mm to 1,420 mm for trunk and gathering pipelines with a operating pressure of up to 10.0 MPa, inclusive	530–1,420	8.0–32.0	K52, K54, K55, K56, K60, K65 X56, X60, X65, X70, X80	510–760
TU 14-156-112-2018 Longitudinal electric-welded steel pipes with outside diameter from 530 mm to 1,220 mm for subsea gas pipelines	530–1,220	8.0–32.0	SMYS 245-485 F, D	370–570
TU 14-156-115-2019 Longitudinal electric-welded steel pipes	530–1,420	8.0–36.0	K42–K60, V1, 2	415–760
			K34–K60, V3	310–570
TU 14-158-136-2007 Corrosion resistant, low-temperature service longitudinal welded pipes of 20 and 20 KSKh steel for oil and gas pipelines	530–1,220	7.0–22.0	20, 20KSKh	510–630
TU 14-158-153-05 (double-seam modification) Longitudinal electric-welded steel pipes with diameters of 1,020 mm and 1,220 mm for oil and gas pipelines	1,020, 1,220	10.0–22.0	17G1S-U, 09GSF, 13GS, 13GSU, 13G1SU, 12GSB, 12G2SB, 08G1KhFBYu, 10G2FBYu, grades K52–K60	510–630 590–690
TU 14-3P-1270-2009 Longitudinal electric-welded steel pipes with a diameter of 530, 720 or 820 mm for gas and oil trunk pipelines	530–820	7.0–15.0	17GS, 17G1S, 17G1S-U, 13GS, 13GSU, 13G1SU, 08GBYu, 09GBYu, 12GSB, 12GS2SB, 08G1NFBYu, 10G2FBYu, 09GSF, grades K52–K60	510–628 590–708
1	2	3	4	5

Yield strength	Relative elongation	Impact strength KCU	Impact strength KCV	Percentage of ductile fracture	Angle of bend
MPa	%	J/cm ²	J/cm ²	%	°grad.
min					
6	7	8	9	10	11
485	20	–	100–170 at –20 °C	85 at –20 °C	180
555	18	–	250 at –40 °C	85 at –20 °C	180
485–595	20	–	80–110	85	180
295–460	20	34.3–44.1	39.2	50	180
355–585	20–21	60	100–110	85	180
355–555	18–20, 18–20	40–50	85–130 (K52–K60), 160–250 (K65)	85	180
245–485	18–22		40.0–136.0	85	180
290–635	18–20	45.0 (at –40 °C and –60 °C)	50.0 (at –20 °C)	50	180
175–485	18–20	39.2 (at –20 °C) 24.5 (at –40 °C and –60 °C)	50.0 (at –20 °C)	50	
343	20	39.2 (–60 °C)	39.2 (–20 °C)	50 (–20 °C) in impact test pieces	180
360 480	20	39.2–49.0 (–40°, –60 °C)	29.4–58.8 (0°, –15°, –20 °C)	50–70 (0°, –15°, –20 °C)	180
353 460	20	39.2 (–40°, –60 °C)	39.2 (–5°, –20 °C)	50–70 (0°, –15°, –20 °C)	–
6	7	8	9	10	11

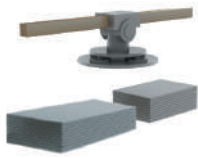
2.5 Mechanical properties of steel

Standards	Pipes dimensions		Steel grade, pipes grade	Ultimate tensile strength
	Outside diameter	Wall thickness		MPa
	mm	mm		min
1	2	3	4	5
TU 24.20.13-164-00186654-2021 Longitudinal electric-welded steel pipes with diameters from 508 mm to 1,422 mm for fields	508–1,422	7.5–48.0	L360–L485, 09GSF, 05KhGB, 13KhFA	460–760 570–760
TU 24.20.21.000-021-00186654-2019 Longitudinal electric-welded steel pipes for onshore and offshore gathering pipelines for the infrastructure	508, 514, 813, 820	27.0, 30.1, 30.2, 32.2, 38.7, 40.8, 45.8, 46.8	K60; X65, 450 I FD	535–655 590–710
TU 24.20.21.000-039-00186654-2018 Longitudinal electric-welded steel pipes for subsea pipelines	508–1,220	8.0–41.0	X60, X65, X70, SAWL 415 IFD, SAWL 450 IFD, SAWL 485 IFD	520 570
TU 24.20.21.000-077-00186654-2019 Longitudinal electric-welded steel pipes with diameters from 508 mm to 1,422 mm for use in a wide temperature range from minus 60 °C to plus 400 °C under the Temperatura brand	508–1,422	8.0–40.0	K50–K60, X56–X70	490–610 590–710
TU 24.20.21.000-102-00186654-2017 Corrosion-resistant, high-reliability Longitudinal electric-welded steel pipes	530–1,420	7.0–40.0	09GSF, 13KhFA	510–630
TU 24.20.21.000-103-00186654-2017 Low-temperature service Longitudinal electric-welded steel pipes	530–1,420	7.0–40.0	K48–K60	471–591 590–710
TU 24.20.21.000-106-00186654-2018 Longitudinal electric-welded steel pipes for pipelines with an operating pressure up to 24.0 MPa, inclusive	508–812.8	24.9–39.0	K60, X70	590–710
TU 24.20.21.000-108-00186654-2021 Longitudinal welded steel pipes with diameters from 508 mm to 1,422 mm made using laser-hybrid welding for trunk and gathering pipelines	508–1,422	15.0–34.0	K52–K60	510–630 590–710
TU 24.20.21.000-110-00186654-2019 Longitudinal electric-welded steel pipes	508–1,420	7.0–48.0	K42–K60	310 570–760
TU 24.20.21.000-132-00186654-2019 Longitudinal electric-welded steel pipes with diameters from 508 mm to 1,422 mm for pipelines	508–1,422	8.0–45.0	K42–K60	410 590
TU 24.20.22-019-00186654-2018 Large-diameter casing pipes with diameters from 508 mm to 914 mm with LYNX SA2, LYNX HDHT welded connectors	508–914	12.7–38.1	K48–K60 X52–X70	460–570 590–710
1	2	3	4	5

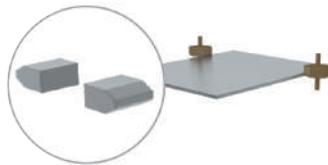
Yield strength	Relative elongation	Impact strength KCU	Impact strength KCV	Percentage of ductile fracture	Angle of bend
MPa	%	J/cm ²	J/cm ²	%	°grad.
min					
6	7	8	9	10	11
360–530 485–635	20	60 (–60°, –70 °C)	50 (–60 °C)	85 (–20 °C) 50 (–60 °C) in impact test pieces	180
450–570	20–18	–	V1: 200 (–40 °C) V2: 155–225 (–25°, –30 °C)	85 (–10 °C)	180
415 485	18	–	42–50 (–20°, –40 °C)	85 (–20 °C)	180
345 485	20–18	60 (–60 °C)	80–180 (–20°, –30°, –40°, –50°, –60 °C)	85 (–20°, –40 °C)	180
353	20	34.3–44.1 (–60 °C)	39.2 (–20 °C)	50 (–20 °C) in impact test pieces	180
334 460	20	34.3–44.1 (–60 °C)	39.2 (–20 °C)	50 (–20 °C) in impact test pieces	180
485–605	20–18	150 (–60 °C)	150 (–40°, –43 °C)	85 (–20°, –24 °C)	180
355 485	20	60 (–60 °C)	85–130 (–20 °C)	85 (–20 °C)	180
175 485–635	20–18	24.5–45.0 (–20° to –60 °C)	59–118 (–20 °C)	50 (–20 °C) in impact test pieces	120 / 180
245 460	20–16	29.4–59.0 (–40 °C)	39.2–59 (–20°, –40 °C)	50 (–20 °C) in impact test pieces	180
355 485	20–18	50–60 (–40°, –60 °C)	cat. C: 60–80 (–5 °C) cat. D: 85–130 (–20°, –30°, –40° C) cat. E: 100–170 (–40 °C)	cat. C: 85 (–5 °C) cat. D: 85 (–20°, –30°, –40° C) cat. E: 85 (–40 °C)	180
6	7	8	9	10	11

2.6 SAWL pipe production process (TMK PS, Volzhsky)

1 Plate handling



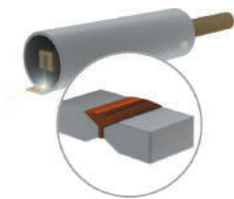
2 Milling of Longitudinal edges of plate



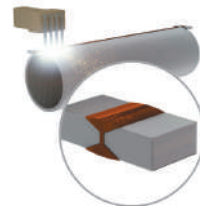
3 Bending



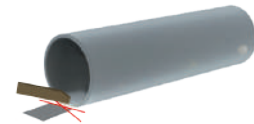
7 Inside welding



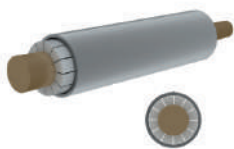
8 Outside welding



9 Removal of weld reinforcement at the ends and run-off tabs



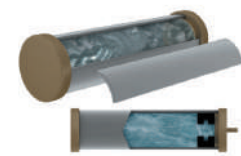
13 Expansion



14 Pipe end finishing



15 Hydrostatic testing



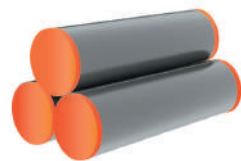
19 Visual inspection, magnetic particle inspection



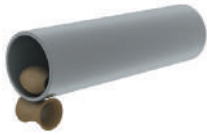
20 Labeling and weighing



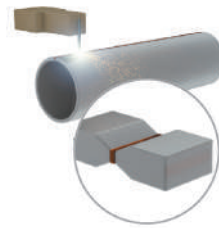
21 Packaging, storage



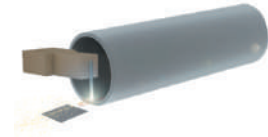
4 Post-bending



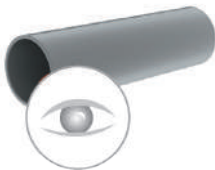
5 Preparation, tack welding



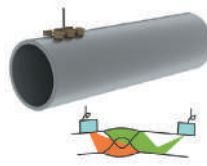
6 Run-off tab welding



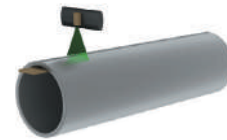
10 Preliminary visual inspection



11 Ultrasonic inspection



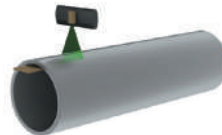
12 X-ray inspection



16 Ultrasonic inspection



17 Radiography

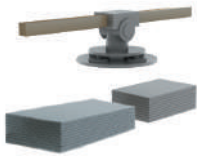


18 Bevel cutting

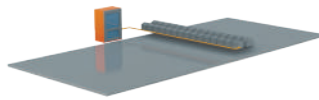


2.7 SAWL pipe production process ("Vyсота 239", TMK PS, Chelyabinsk)

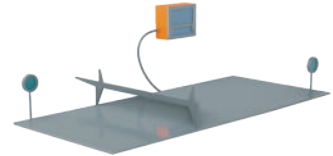
1 Plate handling



2 Plate ultrasonic inspection



3 Plate geometric parameter control



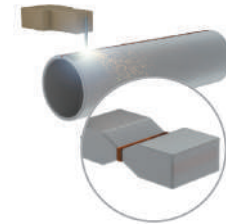
7 Edge pre-bending



8 Pipe stock step forming



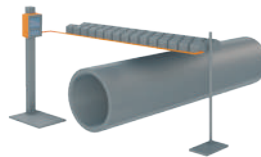
9 Technological seam welding



13 Tab cutting-off



14 Automatic control of pipe stock geometry



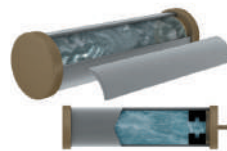
15 Preliminary visual control



19 Pipe end finishing



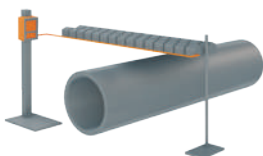
20 Hydrostatic testing



21 Ultrasonic inspection



25 Automatic control of pipe geometry



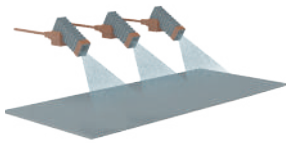
26 Labeling and weighing



27 Packaging, storage



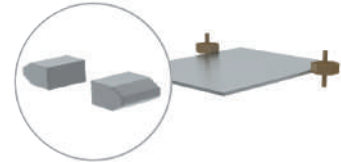
4 Plate shot blasting



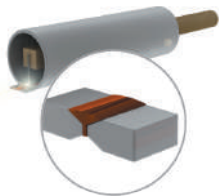
5 Tab welding



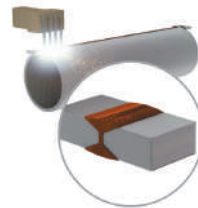
6 Plate longitudinal edge milling



10 Inside welding



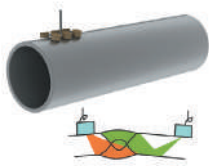
11 Outside welding



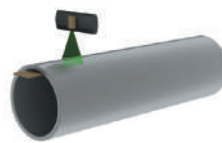
12 Outside seam slug crust removal



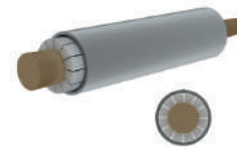
16 Ultrasonic inspection



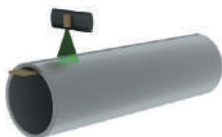
17 X-ray inspection



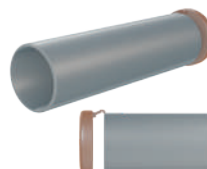
18 Expansion



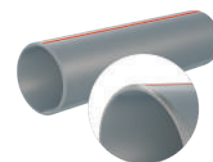
22 X-ray inspection



23 Bevel cutting

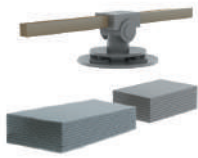


24 Visual inspection, magnetic particle inspection



2.8 SAWL pipe production process at 530-820 mm pipe mill (TMK PS, Chelyabinsk)

1 Plate handling



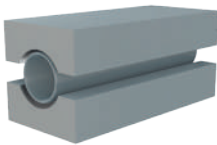
2 Plate smoothing



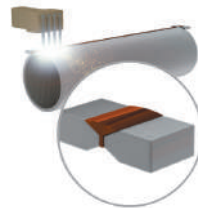
3 Plate cutting



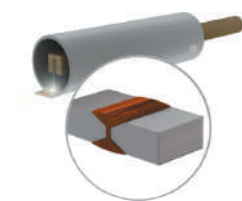
7 Final pipe stock forming



8 Outside welding



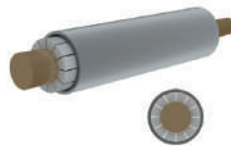
9 Inside welding



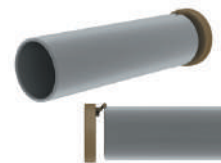
13 Pipe end plasma cutting



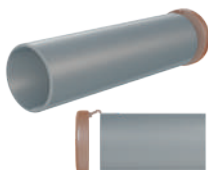
14 Expansion



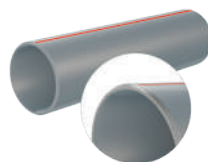
15 Pipe end finishing



19 Bevel cutting



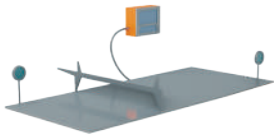
20 Visual inspection, magnetic particle inspection



21 Labeling and weighing



4 Plate width measurement



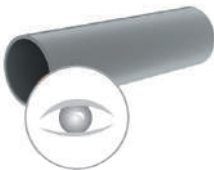
5 Plate edge pre-bending



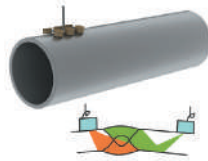
6 Preliminary pipe stock forming



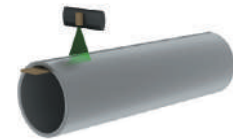
10 Preliminary visual inspection



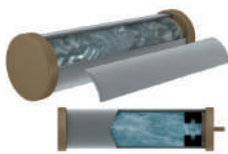
11 Ultrasonic inspection



12 X-ray inspection



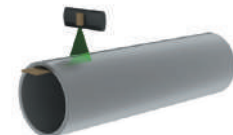
16 Hydrostatic testing



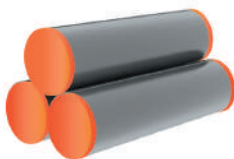
17 Ultrasonic inspection



18 X-ray inspection

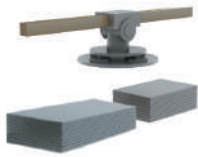


22 Packaging, storage



2.9 SAWL pipe production process at 1020-1220 mm pipe mill (TMK PS, Chelyabinsk)

1 Plate handling



2 Plate smoothing



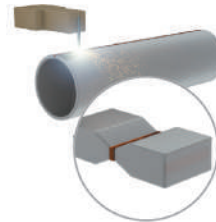
3 Plate cutting



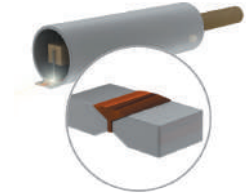
7 Final pipe stock forming



8 Welding of 2 technological seams



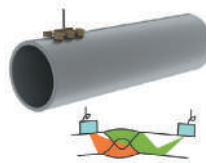
9 Welding of first internal seam



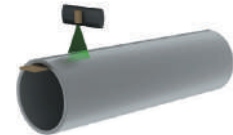
13 Preliminary visual inspection



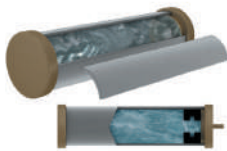
14 Ultrasonic inspection



15 X-ray inspection



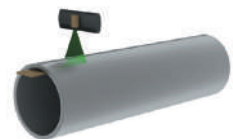
19 Hydrostatic testing



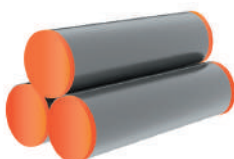
20 Ultrasonic inspection



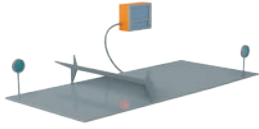
21 X-ray inspection



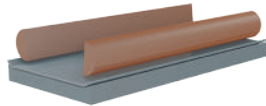
25 Packaging, storage



4 Plate width measurement



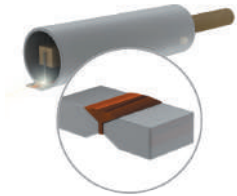
5 Plate edge pre-bending



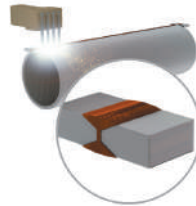
6 Preliminary pipe stock forming



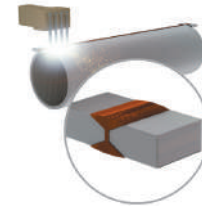
10 Welding of second internal seam



11 Welding of first external seam



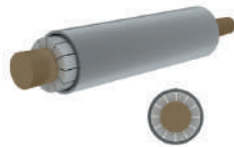
12 Welding of second external seam



16 Pipe end plasma cutting



17 Expansion



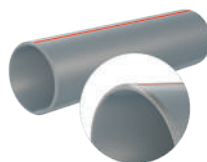
18 Pipe end finishing



22 Bevel cutting



23 Visual inspection, magnetic particle inspection



24 Labeling and weighing





TMK-CPW

TMK-CPW operates at Seversky Pipe Plant in Polevskoy, Sverdlovsk Region. The JV products are intended to meet the needs of oil and gas companies in Russia and the CIS using Longitudinal electric-welded pipes for oil and gas production and transportation, as well as the growing demand of the construction industry.



3.1 TMK-CPW standards

Standards	Pipes dimensions		Pipes grade
	Outside diameter, mm	Wall thickness, mm	
1	2	3	4
API* 5L/ISO 3183-2019 Specification for line pipes. PSL-1	508	6.35–11.91	A, B, X42
DIN EN 10217-1 Welded steel tubes for pressure purposes.	508	6.3–11.0	P235TR1, P265TR1
DIN EN 10219-1 and 10219-2 Cold formed welded structural hollow sections of non-alloy and fine grain steels	508	6.0–12.0	S235JRH, S275J0H, S275J2H S355J0H, S355J2H
GOST 10704/10705 Electrically welded steel tubes	530	7.0–12.0	St.2, St.3, 10, 20, 22GYu, 09G2S, 17G1S, 17G1S-U
GOST 20295-85 Steel welded pipes for main gas-and-oil pipelines. Technical requirements	530	7.0–12.0	K34, K38, K42, K48, K50, K52
TU 14-162-173-2019 LSAW pipes for field, technological and general purpose pipelines for oil and gas fields	530	7.0–12.0	K34, K38, K42, K46, K50, K52
TU 14-162-174-2020 LSAW pipes for oil and gas pipelines	530	7.0–12.0	K42, K46, K50, K52
TU 14-162-180-2022 LSAW pipes for oil and gas fields	530	7.0–12.0	20A, 09G2S, 17G1S-U
1	2	3	4

3.2 Medium diameter welded pipe production process (TMK-CPW)

1 Strip preparation



2 Edge trimming



3 Strip forming



7 Cooling, sizing and straightening of continuous pipes



8 Saw cutting to length



9 Pipe end finishing



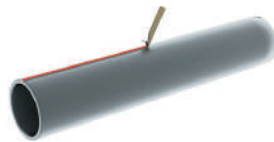
13 Packaging, storage



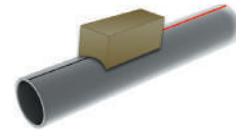
4 High-frequency welding



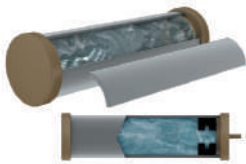
5 External and internal flash removal



6 Heat treatment of weld seam



10 Hydrostatic testing



11 Nondestructive testing of weld seam



12 Visual inspection, dimensional inspection control, labeling of pipes





EXTERNAL PIPE COATING



TMK PS can apply the following types of external anti-corrosion pipe coating (including):

- Two-layer PE coating
- Three-layer PE and PP coating
- Single layer PE coating
- Single and two-layer epoxy coating
- External protective coating

The coatings are applied to the external surface of welded and seamless pipes with diameters from 114 mm to 1,420 mm
Operating temperature of pipes: from $-60\text{ }^{\circ}\text{C}$ to $+80\text{ }^{\circ}\text{C}$
(for PE coating) or from $-20\text{ }^{\circ}\text{C}$ to $+110\text{ }^{\circ}\text{C}$ (for PP coating).

4.1 External anti-corrosion coating standards

Standards	Purpose of coating
1	2
DIN 30670:2012 Polyethylene coatings on steel pipes and fittings – Requirements and testing	Protection of buried or submerged steel pipelines
DIN 30678:2013 Polypropylene coatings on steel pipes and fittings. Requirements and testing	Protection of buried or submerged pipelines at temperatures from minus 20 °C to 110 °C
DIN EN ISO 21809-1:2011 Petroleum and natural gas industries – External coatings for buried or submerged pipelines used in pipeline transportation systems – Part 1: Polyolefin coatings (3-layer PE and 3-layer PP)	Corrosion protection of welded and seamless pipes used in pipeline transportation systems in the oil and gas industry
ISO 21809-1-2018 Petroleum and natural gas industries – External coatings for buried or submerged pipelines used in pipeline transportation systems – Part 1: Polyolefin coatings (3-layer PE and 3-layer PP)	Corrosion protection of welded and seamless steel pipes for transportation systems in the oil and gas industry
GOST 31448-2012 Steel pipes with defensive coverings for main gas and oil pipelines	Construction and repair of trunk gas, oil and petroleum product pipelines
GOST 51164-98 Steel pipes mains. General requirements for corrosion protection	Corrosion protection of external surface of steel trunk pipelines above and below ground
GOST 9.602-2016 Underground constructions. General requirements for corrosion protection	Corrosion protection of the surface of steel structures: pipelines transporting natural gas (trunk or distribution pipelines), crude oil or petroleum products, and branch lines thereof; water pipelines; piles, plate piles, columns, and other load-bearing below-grade steel structures
TU 1390-003-00186654-2008 Seamless and welded steel pipes with diameters from 219 mm to 1,420 mm, inclusive, with an external three-layer extruded polyethylene coating	For the construction, retrofit or major repair of an underground and underwater trunk pipeline. For encasements used in the construction of trunk pipeline crossings through natural and man-made obstacles
TU 1390-008-53570464-2011 Seamless and welded steel pipes with diameters from 114 mm to 1,420 mm, with external protective polyethylene coating	For the construction, retrofit or major repair of an underground and underwater trunk pipeline. For encasements used in the construction of trunk pipeline crossings through natural and man-made obstacles
TU 1390-010-53570464-2012 Electrically welded or seamless steel pipes with external anticorrosion polypropylene coating	For the construction, upgrade and major repair of high-temperature sections of below-ground gas pipelines and branches thereof, high-temperature process gas pipelines, and offshore (subsea) sections of gas pipelines, as well as sections of gas pipelines constructed by directional drilling. Additional protection against solar radiation for sections of gas pipelines laid above ground
TU 1390-014-00186654-2015 Steel pipes with external polyethylene anti-corrosion coating for gas pipelines	For the construction, retrofit and major repair of below-ground and offshore (subsea) gas pipelines, and branches thereof, as well as sections of gas pipelines constructed by directional drilling
TU 1390-012-53570464-2016 Steel pipes with external polyethylene anti-corrosion coating for gas pipelines	For the construction, retrofit and major repair of below-ground and offshore (subsea) gas pipelines, and branches thereof, as well as sections of gas pipelines constructed by directional drilling
TU 1390-015-53570464-2019 Steel pipes with diameters from 114 mm to 1,420 mm with external extruded polyethylene coating	For the construction of gathering and process pipelines, general purpose pipelines laid below-ground, under water or above-ground (in a mound) and branches thereof
TU 14-156-97-2015 Seamless and welded steel pipes with an external protective extruded polyethylene coating for offshore gathering and trunk pipelines	For the construction of gathering and trunk oil and gas pipelines. Underwater pipeline protection against external corrosion
1	2

4.2 Process for external coating application

1 Pipe incoming inspection
(visual)



2 Preheating
in a gas furnace



3 Wheel blasting of pipe external
surface



4 Pipe internal surface purging
to remove dust



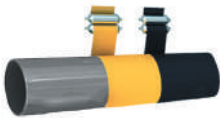
5 Quality control of pipe surface
preparation
(visual)



6 Heating. Chromating.
Subsequent heating before coating



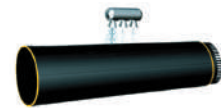
7 a Two-layer PE or PP coating
1) Adhesive application
2) Application of polyethylene
(or propylene)



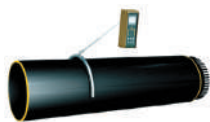
7 b Three-layer PE or PP coating
1) Epoxy primer application
2) Adhesive application
3) Application of polyethylene
(or polypropylene)



8 Water cooling of coated pipes



9 Holiday testing



10 Removal of coating from
pipe ends



11 Final quality control
of coated pipes
(visual)



12 Pipe labeling. Installation
of protective parts. Pipe storage



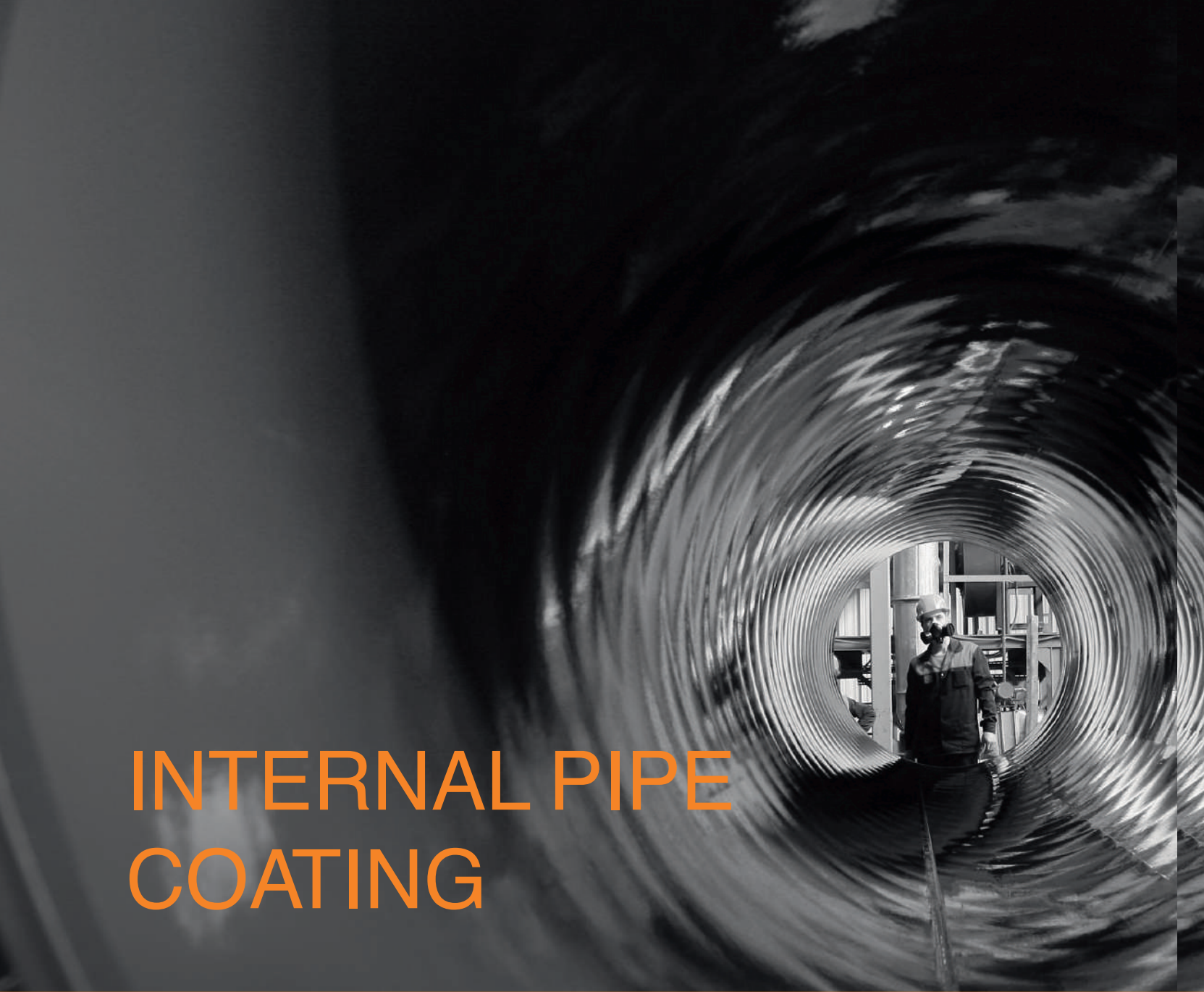


4.3 Anti-corrosion coating properties

Three-layer extruded polyethylene coating

Property	Parameters
1. Minimum thickness, μm	
1 st layer	100–250
2 nd layer	150–400
Total thickness	2,000-4,000 (depending on requirements)
2. Cut-back length, mm	80–180
coating bevel, deg.	20–45
3. Adhesive strength, N/cm width	
at t +20 \pm 5 °C	250
at t +80 \pm 3 °C	100
4. Maximum indentation resistance, mm	
at t +25 \pm 2 °C	0.2
at t +80 \pm 3 °C	0.3
5. Minimum impact strength, J	
at t +23 \pm 2 °C	18
6. Elongation at break, %	
minimum, at t –45 \pm 5 °C	100
7. Cathodic disbonding of coatings, maximum, cm^2	4
8. Degree of cure of epoxy primer	$-2 < \Delta T_g < +3$





INTERNAL PIPE COATING



TMK PS can apply the following types of pipe internal coating:

- Internal flow coating
- Protective

Internal coating can be applied both before and after external coatings.

Internal flow coating is designed to increase throughput as a result of lower loss in transit and to protect the internal surface from atmospheric corrosion during pipe transportation, storage and installation. The coating is applied to pipe with diameters from 530 mm to 1,422 mm.

Allowable ambient temperatures for continuous gas pipeline operation range from $-20\text{ }^{\circ}\text{C}$ to $+80\text{ }^{\circ}\text{C}$.

Protective internal coating is designed to protect the internal surface of pipes used in water pipelines (including drinking water pipelines), agricultural water supply and sewage systems from corrosion.

The coating is applied to pipes with diameters from 530 mm to 1,422 mm. Allowable ambient temperatures for continuous pipeline operation range from $+5\text{ }^{\circ}\text{C}$ to $+60\text{ }^{\circ}\text{C}$.

5.1 Standards. Coating properties

Standards	Purpose of coating
API* 5L2 (RP 5L2)-2015 Recommended Practice for Internal Coating of Line Pipes for Non-corrosive Gas Transmission Service (flow coating)	For non-corrosive gas transmission. Coating is intended for drag reduction in gas pipelines, as well as for the protection of internal surface of pipes against atmospheric corrosion during transportation, storage and installation
GOST 9.602-2016 Underground constructions. General requirements for corrosion protection, incl. as per GOST 31445	Corrosion protection of external surface of underground steel trunk pipelines (including buried offshore pipelines)
TU 1390-004-53570464-2010	For the construction, retrofit and major repair of water pipelines, agricultural water supply pipelines and sewage systems. Corrosion protection of the internal surfaces of pipelines
TU 1390-005-00186654-2014 Electric-welded steel pipes with internal flow coating for the construction of gas trunk pipelines	For the construction, retrofit and major repair of gas trunk pipelines and branches thereof, including offshore gas pipelines. Coating is intended for drag reduction in gas pipelines, as well as for the protection of internal surface of pipes against atmospheric corrosion during transportation, storage and installation
TU 1390-015-53570464-2019 Steel pipes with diameters from 114 mm to 1,420 mm with external extruded polyethylene coating	For the construction of gathering and process pipelines, general purpose pipelines laid below-ground, under water or above-ground (in a mound) and branches thereof
TU 1390-017-00186654-2009 Electric-welded steel pipes with diameters from 530 mm to 1,420 mm with internal anti-corrosion coating for water pipeline construction	For the construction, retrofit and major repair of underground and underwater water pipelines, including for drinking water, with an operating temperature of up to plus 60 °C
TU 14-156-79-2014 Electric-welded steel pipes with internal flow coating for gas trunk pipelines	For the construction, retrofit and major repair of gas pipelines and branches thereof For drag reduction in gas pipelines, as well as for the protection of internal surface of pipes against atmospheric corrosion during transportation, storage and installation
TU 24.20.13-019-53570464-2021 Electric-welded steel pipes with internal flow coating for gas trunk pipelines	For the construction, retrofit and major repair of gas pipelines and branches thereof
TU 24.20.13.190-072-00186654-2020 Electric-welded steel pipes for the oil industry with internal anti-corrosion coating	For the construction, retrofit and major repair of oil gathering pipelines
TU 24.20.13.190-112-00186654-2019 Electric-welded steel pipes with internal anti-corrosion coating	For the construction, retrofit and repair of gathering, process and on-site pipelines
TU 24.20.13-166-00186654-2021 Steel pipes with internal anti-corrosion coating	For the construction, retrofit and repair of below-ground and above-ground (in a mound) gathering pipelines for the oil, gas and gas condensate fields of LLC INK

Coating properties

Internal Flow Coating

Property	Unit of measurement	Norm
1. Thickness of cured coating	µm	60–150
2. Cross-cut test of coating adhesion, maximum	points	1
3. Maximum adhesion of coating after holding for 240 hours in water at (20±5) °C as determined by the cross-cut test	points	2
4. Maximum coating resistance to bending	mm	10
5. Minimum Buchholz hardness	hardness units	94
6. Maximum number of pores in the coating a) uncured b) cured	pores/cm ²	0 1
7. Coating resistance to changes in gas pressure	–	No bubbles or damage after the 10 th cycle
8. Coating resistance to changes in hydraulic pressure	–	No bubbles or damage after the 1 st cycle
9. Resistance against exposure to salt spray at (25±3)°C for 240 hours	–	Absence of bubbles and peeling
10. Maximum coating roughness (Rz)	µm	15

Protective coating

Property	Unit of measurement	Norm
1. Minimum thickness of cured coating	µm	400
2. Determination of adhesion by X-cut test method	points	0 or 1
3. Pull-off test for adhesion, minimum	kgf/cm ²	50
4. Degree of cure of coating	–	No softening or washout
5. Resistance against exposure to 1% solution of NaOH and/or H ₂ SO ₄ at a temperature of (24±3) °C for 30 days	–	No blistering, peeling
6. Resistance against exposure to water at a temperature of (24±5) °C for 30 days	–	No blistering, peeling

5.2 Internal coating application process

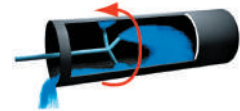
1 Pipe incoming inspection



2 Pipe heating



3 Pipe internal surface degassing



7 Cleaning of pipe internal surface in wheel blasting machine №1



8 Internal surface purging



9 Quality control of pipe internal surface preparation



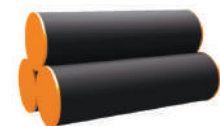
13 Coating curing in a full polymerization chamber



14 Quality control of internal pipe flow coating



15 Pipe labeling. Pipe storage with protective canvas caps



4 Pipe pre-heating prior to blasting



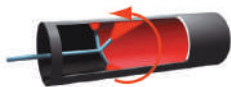
5 Cleaning of pipe internal surface in wheel blasting machine №1



6 Quality control of pipe internal surface



10 Pipe coating
(in a paint booth)



11 Precuring of internal pipe coating



12 Pipe induction heating



THERMAL INSULATION COATING OF PIPES

TMK PS (Chelyabinsk) can apply thermal insulation coating to the following types of pipes:

- Pipes made of galvanized steel for aboveground and cased pipelines
- Pipes made of steel with polymer coating for underground pipelines
- Pipes made of polyethylene for underground and aboveground pipelines

Thermal insulation coating maintains the product temperature to prevent heat loss and negative impact of elevated temperatures on the environment.

Pipes with thermal insulation made of PU foam can be provided with inserts preventing the spread of fire, sensor wires for surveillance

systems and tubes for an induction-resistance heating system.

Allowable ambient temperature for handling thermally insulated products:

- During transportation, storage and operation for pipes made of galvanized steel or steel with polymer coating: -60°C to +60°C, for pipes made of polyethylene: -20°C to +60°C
- During loading and unloading, construction and installation for pipes made of galvanized steel or steel with polymer coating: -50°C to +60°C, for pipes made of polyethylene: -20°C to +60°C

6.1 Standards. Coating properties

Standards	Purpose of coating
GOST 30732-2020 Steel pipes and shaped products with foamed polyurethane thermal insulation in protective sheath	Pipes and fittings for underground heating networks (uncased, in ducts impassable for people or in crawl space; or, when steel galvanized sheath is provided, in service ducts or tunnels) or aboveground heating networks (hereinafter referred to as insulated pipes and fittings) with the following design parameters of heat transfer medium (superheated water): working pressure as per the design documentation and temperature up to 150 °C, with heat supply control range of 150 °C to 70 °C
TU 5768-055-00186654-2013 Steel pipes and connection elements with foamed polyurethane thermal insulation in a protective sheath	For the construction, retrofit and repair of trunk, petroleum-product, gathering and process pipelines, pipelines of pump and compressor stations and other gas industry facilities
TU 23.99.19.111-062-00186654-2018 Steel pipes and shaped products with foamed polyurethane thermal insulation in a protective sheath (as per GOST 30732)	Pipes and fittings for underground heat networks (uncased, in ducts impassable for people or in crawl space), for above-ground heat networks, heat networks in service ducts or in tunnels with the following design parameters of heat transfer medium (superheated water): working pressure of no more than 1.6 MPa and a temperature of no more than 150 °C
TU 24.20.13.190-125-00186654-2019 Steel pipes and connection elements with foamed polyurethane thermal insulation in a protective sheath	For the construction, retrofit and repair of gathering and process pipelines, general purpose pipelines and other oil and gas production facilities
TU 24.20.13-161-00186654-2021 Steel pipes and connection elements with foamed polyurethane thermal insulation in a protective sheath	For the construction, retrofit and repair of gathering and process pipelines, general purpose pipelines and other oil and gas production facilities

Properties of PU foam thermal insulation

Property	Value
1. Appearance	Rigid cellular plastic of light yellow to light brown color with uniform fine-cell structure
2. Minimum apparent density, kg/m ³	60
3. Minimum compressive strength at 10% deformation in radial direction, MPa	0.3
4. Maximum thermal conductivity at (50±3) °C, W/m·K	0.033
5. Maximum water absorption in a 90-minute boiling test, vol%	10
6. Minimum axial shear strength at (23±2) °C, MPa	0.12
7. Minimum tangential shear strength at (23±2) °C, MPa	0.2

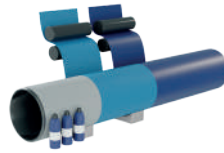
A complete list of tests and testing methods can be found in applicable technical standards.

6.2 Thermal insulation application process

1 Shell manufacturing
(spiral winding machine)



1.1 Anti-corrosion coating
(metal-polymer shell)



2 Preliminary pipe
and shell heating



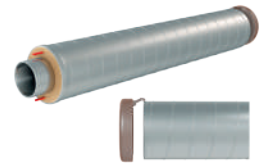
3 Pipe + shell assembly



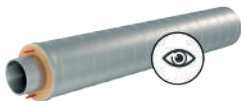
4 Polyurethane foam pouring



5 Thermal insulation
end finishing



6 Visual inspection



7 Labeling



8 Insulated pipe packaging



API* - Effective March 17, 2022, the API Monogram/APIQR Program has ceased offering certification services within the Russian Federation in response to restrictions on financial and business activities imposed by the U.S. and Russian governments. As a result, now all TMK facilities are not authorized to apply the API Monogram on their products.

TMK facilities were holding API license continuously for over 25 years. They have vast experience of manufacturing material in accordance with API standards to the clients worldwide. Since 2003, the TMK facilities have produced more than 3 million metric tons of casing, tubing, drilling and linepipes as per API Standards and marked with the API monogram.

TMK product's quality and reliability are demonstrated by years of supply and service customers.

However, now the TMK facilities are still permitted to state that their products meet or comply with an API standard or specification provided that they do meet the requirements in the API standard or specification. As previously, the TMK facilities guarantee full compliance with the requirements of the API Standards and the quality of supplied products.

To provide additional confidence to our clients, in the summer of 2022 the TMK facilities have been audited by AJA Registrars CIS ltd. and found to be in accordance with requirements API Spec. 5CT, API Spec. 5L, API Spec. 5DP & API Spec. Q1.

During a manufacturing of customer orders a third part inspection can be involved to re-assure that all material is produced in strict accordance with API Standards and customer specifications. A utilization of third part testing laboratories can be provided as well.

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