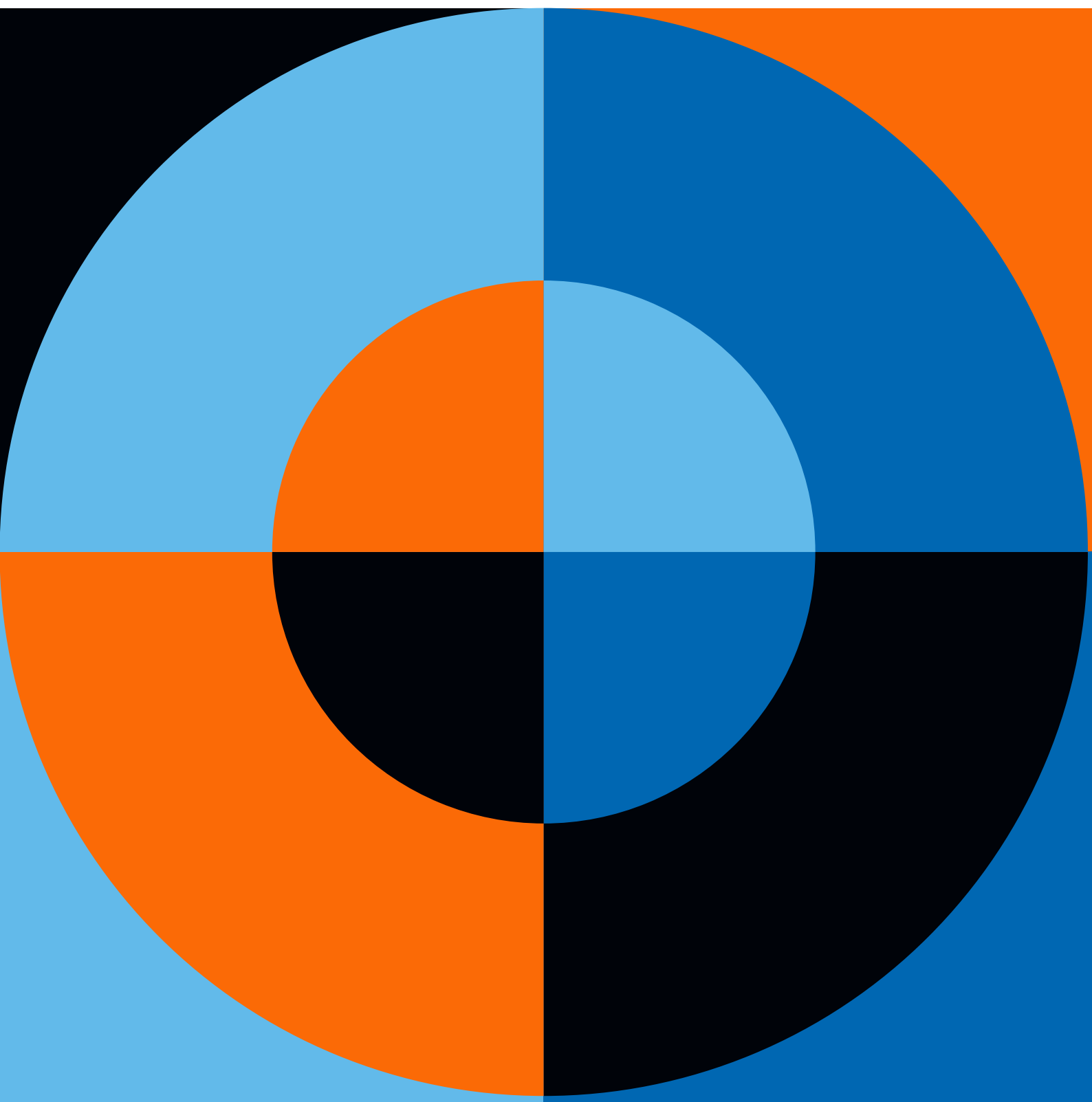




Technical catalog of pipes and tubular products

CATALOG

TMK-GROUP.COM



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OCTG AND LINE PIPES

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CASING

Casing is used to stabilize the wellbore during oil and gas well construction and operation

FEATURES

Casing is joined by threaded connections with couplings or without couplings (integral joint connections).

Threaded connections allow for:

- pipes to be run into wells with complex trajectories, including high dogleg severity sections;
- sufficient strength under all types of loads and the required sealability of pipe connections in a string;
- tools and devices for operations for running inside the string.

Operational control at each stage of casing manufacture ensures compliance with ISO 9001 и API* Spec Q1 as well as high product quality.

Casing finishing lines are equipped with advanced process and control equipment.

Casing produced by TMK plants complies with:

- API* Spec 5CT; API* Spec 5B;
- GOST 632-80; GOST 31446-2017;
- customer-approved technical specifications
- corporate standards.

At customer’s request, protective preservation coating can be applied to the external surface of casing.

Upon agreement between the customer and the manufacturer, Green Well (GW) dope-free coating can be applied to threaded connections.

All pipes are marked with paint and die stamping in line with the applicable technical standards.

Threads of supplied casing, couplings and box and pin ends of integral joint pipes are protected with storage compound and thread protectors. Metal, polymer or composite protectors can be used at customer’s request.

The following types of casing are available:

- standard;
- low-temperature;
- corrosion-resistant.

TMK plants have a unique casing collapse test bench with a maximum hydraulic pressure of 2,000 atmospheres. At customer’s request, the bench can be used to test pipes with diameters from 101.6 mm to 340 mm.

SIZE RANGE

Standards	Pipe size				Grade	Thread	
	Diameter, mm		Wall thickness, mm	Length, m			
	Nominal	Outside					
1	2	3	4	5	6	7	
GOST 632-80 Casing and couplings	114	114.3	5.2; 5.7	8-12.5	D	Short triangular; OTTM; OTTG; extended triangular	
			6.4		D; E; L; M		
			7.4; 8.6; 10.2		D; K; E; L; M; R		
	127	127.0	5.6		D		
			6.4		D; E; L; M		
			7.5; 9.2; 10.2		D; K; E; L; M; R		
	140	139.7	10.7		D; K; E; L; M		
			6.2		D; M		
			7.0		D; K; E; L; M; T		
	146	146.1	7.7; 9.2; 10.5		D; K; E; L; M; R		
			6.5		D; M		
			7.0; 7.7		D; K; E; L; R; T		
	168	168.3	8.5; 9.5; 10.7		D; K; E; L; M		
	178	177.8	7.3; 8.0; 8.9; 10.6; 12.1		D; K; E; L; M; R		
			8.1; 9.2; 10.4; 11.5		D; K; E; L; M; R		
	194	193.7	12.7		D; K; E; L; M; R		
	219	219.1	7.6; 8.3; 9.5; 10.9; 12.7; 15.1		D; K; E; L		
	245	244.5	7.7; 8.9; 10.2; 11.4; 12.05; 12.7; 14.2		D; K; E; L; M; R		
			7.0; 7.9; 8.9; 10.0; 11.1		D; K; E; L; M; R		
	273	273.1	12.0; 13.8; 14.2; 15.9		D; K; E; L; M; R		
324	323.9	8.9; 10.2; 11.4; 12.6; 13.8; 15.1; 16.5	D; K; E; L; M; R				
		8.5	D				
		9.5	D; E; L				
340	339.7	11.0; 12.4; 14.0	D; K; E; L; M; R				
		9.7; 10.9; 12.2; 13.1	D; E; L; M; R				
GOST 31446-2017 Steel casing and tubing for petroleum and natural gas industries. General specifications (effective date: July 01, 2018)		114.30	6.35; 7.37; 8.56	R1; R2; R3	J55; K55; L80 type 1; N80 type Q; N80 type 1; C90; R95; T95; P110; Q125; Q135 L80S; TMK140DW; TMK150 DW; K72	BC; SC; LC; TMK UP CS; TMK UP FMC; TMK UP PF; TMK UP PF ET; TMK UP Simplex; TMK UP CWB; TMK UP CWB II; TMK UP 4; TMK UP Centum; TMK UP Centum ET; TMK UP Momentum FL; TMK UP Momentum; TMK UP Momentum GT; TMK UP GF	
		127.00	6.43; 7.52; 9.19; 10.7; 11.1; 12.7; 12.14			BC; OTTM; OTTG; TMK UP CS; TMK UP FMC; TMK UP PF; TMK UP PF ET; TMK UP CWB; TMK UP CWB II; TMK UP Simplex; TMK UP Momentum; TMK UP Momentum FL; TMK UP Momentum GT; TMK UP CENTUM ET; TMK UP GF	
		139.70	6.98; 7.72; 9.17; 10.54; 12.09; 12.7			BC, OTTM; OTTG; TMK UP CS; TMK UP FMC; TMK UP PF; TMK UP PF ET; TMK UP CWB; TMK UP Centum; TMK UP Centum ET; TMK UP Simplex; TMK UP Momentum; TMK UP Momentum FL; TMK UP Momentum SFL; TMK UP Momentum GT; TMK UP GF	
		146.05	6.5; 7.0; 7.7; 8.5; 9.5; 10.7			BC; SC; LC; TMK UP CS; TMK UP FMC; TMK UP PF; TMK UP Simplex; TMK UP CWB; TMK UP CWB II; TMK UP 4; TMK UP GF	
		168.28	7.32; 8.0; 8.94; 10.59; 12.06			BC; SC; LC; TMK UP CS; TMK UP FMC; TMK UP PF; TMK UP PF ET; TMK UP Simplex; TMK UP CWB; TMK UP CWB II; TMK UP 4; TMK UP Centum; TMK UP Centum ET; TMK UP Momentum FL; TMK UP Momentum SFL; TMK UP Momentum GT; OTTM; OTTG; TMK UP FMC	
		177.80	6.91; 8.0; 8.05; 9.19; 10.36; 11.51; 12.65; 13.72; 15.0; 15.88; 17.45			L80 type 13Cr и C110; K72; J55, K55, L80 type 1, N80 type Q; N80 type 1; C90; R95; T95; P110; Q125; Q135; TM-K140DW; TMK150DW	
	193.68		8.33; 9.52; 10.54; 10.92; 12.0; 12.7; 14.27; 15.11; 15.88; 17.45; 19.05		J55; K55; N80 type Q; N80 type 1; R95; P110; TMK150 DW; K72	LC; SC; OTTM; OTTG; TMK UP FMC; TMK UP PF; TMK UP PF ET; TMK UP CWB; TMK UP CWB II; TMK UP Centum; TMK UP Simplex; TMK UP Momentum FL; TMK UP Momentum SFL; BC; TMK UP GF	
			8.94; 10.16; 11.43; 12.70		N80 type Q; K72; J55; K55; L80 type 1; R95	OTTM; OTTG; BC; TMK UP GF; TMK UP PF; TMK UP PF ET; TMK UP FMC; TMK UP Centum; TMK UP Magna	
	219.08		14.15			OTTM; OTTG; BC; TMK UP GF; TMK UP PF; TMK UP PF ET; TMK UP FMC	
					J55; K55; N80 type Q; N80 type 1; R95; P110; TMK150 DW; K72	LC; SC; OTTM; OTTG; TMK UP FMC; TMK UP PF; TMK UP PF ET; TMK UP CWB; TMK UP CWB II; TMK UP Centum; TMK UP Simplex; TMK UP Momentum; TMK UP Momentum FL, TMK UP Momentum SFL; TMK UP Momentum GT; TMK UP Magna; BC; TMK UP GF	
	244.48		7.92; 8.94; 10.03; 11.05; 11.99; 13.84; 15.11				
	1	2	3		4	5	6

SIZE RANGE (CONTINUED)

Standards	Pipe size				Grade	Thread	
	Diameter, mm		Wall thickness, mm	Length, m			
	Nominal	Outside					
1	2	3	4	5	6	7	
GOST 31446-2017 Steel casing and tubing for petroleum and natural gas industries. General specifications (effective date: July 01, 2018)		273.05	8.89; 10.16; 11.43; 12.57; 13.84; 15.11; 17.07	R1; R2; R3	J55; K55; N80 type Q; N80 type 1; R95; P110; TMK150 DW	LC; SC; OTTM; OTTG; TMK UP FMC; TMK UP PF; TMK UP PF ET; TMK UP CWB; TMK UP CWB II; TMK UP Centum; TMK UP Simplex; TMK UP GF; TMK UP Magna; BC	
		298.45	11.05; 12.42; 13.56; 14.78		J55; K55; L80 type 1; N80 type Q; R95; P110	TMK UP PF; TMK UP PF ET; TMK UP Simplex	
		323.85	8.50		J55; K55; P110	OTTM; BC; TMK UP Simplex; TMK UP CWB; TMK UP Magna; BC	
			9.50; 11.00; 12.40; 14.0		J55; K55; L80 type 1; N80 type Q; R95; P110	OTTM; OTTG; BC; TMK UP FMC; TMK UP PF; TMK UP PF ET; TMK UP Centum; TMK UP Simplex; TMK UP CWB; TMK UP CWB II; TMK UP Magna; TMK UP GF	
		339.72	9.65; 10.92; 12.19; 13.06		J55; K55; N80 type Q; N80 type 1; L80S; R95; P110; TMK140DW; TMK150DW	LC; SC; OTTM; OTTG; TMK UP FMC; TMK UP PF; TMK UP PF ET; TMK UP CWB; TMK UP CWB II; TMK UP Centum; TMK UP Simplex; TMK UP Magna; BC; TMK UP GF	
		346.08	15.88			TMK UP Centum	
		406.4	11.13; 12.57; 16.66			TMK UP Magna	
			14.37			TMK UP Momentum FL	
		425.45	11.00			TMK UP Magna	
		TU 14-157-24-92 Low-temperature casing and couplings				114	114.3
127	127			9.2; 10.7			
140	139.7			9.2; 10.5			
146	146.1			8.5; 9.5; 10.7			
168	168.3			8.9; 10.6; 12.1			
178	177.8			9.2; 10.4; 11.5; 12.7			
194	193.7			9.5; 10.9; 12.7			
219	219.1			8.9; 10.2; 11.4; 12.7; 14.2			
TU 14-157-77-2001 Low-temperature seamless steel casing and couplings with OTTG and OTTM threaded connections		114	114.3	9.5-12.0	D; K; E; L; M	OTTM; OTTG	
		127	127.0				7.5; 9.2; 10.7
		140	139.7				7.0; 7.7; 9.2; 10.5
		146	146.1				7.0; 7.7; 8.5; 9.5; 10.7
		168	168.3				7.3; 8.0; 8.9; 10.6; 12.1
		178	177.8				8.1; 9.2; 10.4; 11.5; 12.7; 13.7
		194	193.7				7.6; 8.3; 9.5; 10.9; 12.7
		219	219.1				7.7; 8.9; 10.2; 11.4; 12.7; 14.2
TU 14-157-93-2007 Seamless steel hydrogen sulfide resistant casing and couplings with high-seala- bility threaded connections TMK UP FMC		140	139.7	9.5-11.8	L80S	TMK UP FMC	
		146	146.1				7.0; 7.7; 8.5; 9.5; 10.7
		168	168.3				8.9; 10.6; 12.1
		178	177.8				9.2; 10.4; 11.5; 12.7; 13.7; 15.0
		219	219.1				8.9; 10.2; 11.4; 12.7; 14.2
TU 14-157-105-2008 Seamless steel casing and couplings with high-seala- bility threaded connections TMK UP PF and TMK UP PF ET		114	114.3	9.5-11.8	Acc. to GOST 632 D; K; E; L; M; R	TMK UP PF TMK UP PF ET	
		127	127.0				7.52; 9.19; 11.10; 12.14; 12.70
		140	139.7				6.98; 7.72; 9.17; 10.54
		168	168.3 (168.28)				7.32; 8.0; 8.94; 10.59; 12.06
		178	177.8				6.91; 8.05; 9.19; 10.36; 11.51; 12.65
TU 14-157-106-2008 Seamless steel casing and couplings with high-seala- bility threaded connections TMK UP PF and TMK UP PF ET		114	114.3	9.5-11.8	J55; K55; N-80Q; L80 type 1; R95; P110	TMK UP PF TMK UP PF ET	
		127	127.0				11.10; 12.14; 12.70
		140	139.7				6.98; 7.72; 9.17; 10.54
		168	168.28				7.32; 8.0; 8.94; 10.59; 12.06
		178	177.8				6.91; 8.05; 9.19; 10.36; 11.51; 12.65
TU 14-159-344-2020 Seamless steel casing and couplings with Premium threaded connections		114	114.30	9.5-12.0	J55; K55; N80 type Q; C90; L80 type 1; R95; P110 in standard and low-temperature design	TMK UP PF; TMK UP FMC	
		127	127.00			7.52; 9.19; 10.7	TMK UP FMC
		140	139.70			6.98; 7.72; 9.17; 10.54	TMK UP FMC
		146	146.05			7.0; 7.7; 8.5; 9.5; 10.7	TMK UP FMC
		168	168.28			7.32; 8.94; 10.59; 12.06	TMK UP FMC
TU 14-159-353-2012 Reduced diameter seamless steel casing and couplings		102	101.60	9.5-12.0	D; E; L; M	OTTM	
TU 14-161-163-2019 Casing with reduced nominal diameter of 102 mm and 110 mm and couplings		102	101.6	9.5-13.0	D; E; L; M	OTTM	
		110	110.0				
1	2	3	4	5	6	7	

SIZE RANGE (CONTINUED)

Standards	Pipe size				Grade	Thread
	Diameter, mm		Wall thickness, mm	Length, m		
	Nominal 2	Outside 3				
1	2	3	4	5	6	7
TU 14-161-175-98 Steel casing and couplings	114	114.3	6.4; 7.4; 8.6	9.5-13.0	D, K, E, L, M	BC
	127	127	6.4; 7.5; 9.2		D, K, E, L, M	
	140	139.7	7.0; 7.7; 9.2; 10.5		D, K, E, L, M	
	146	146.1	7.0		D	
			7.7; 8.5; 9.5; 10.7		D, K, E, L, M	
	168	168.3	7.3; 8.0; 8.9; 10.6		D, K, E, L, M	
TU 14-161-204-2002 Low-temperature steel casing and couplings for gas and gas condensate fields	114	114.3	5.7; 6.4; 7.0; 7.4; 8.6; 10.2	9.5-12.5	D; E; L; M; R	Triangular; extended triangular; OTTM; OTTG; BC; Casing (TMK UP CS)
	127	127.0	6.4; 7.0; 7.5; 9.2; 10.2			
	140	139.7	6.2; 7.0; 7.7; 9.2; 10.5			
	146	146.1	6.5; 7.0; 7.7; 8.5; 9.5; 10.7			
TU 14-162-13-95 Seamless casing with But-tress threaded connections and couplings		168.3	8.0; 8.9; 10.6; 12.1	6.0-12.5	D; E; L; M; R; J55; K55; R95 N80 type Q; L80 type 1; P110	BC
		219.1	8.9; 10.2; 11.4; 12.7; 14.2			
		244.5	7.9; 8.9; 10.0; 11.1; 12.0; 13.8			
		273.05	8.89; 10.16; 11.43; 12.57; 13.84; 15.11			
		323.9	9.5; 11.0; 12.4; 14.0			
		339.7	9.7; 10.9; 12.2; 13.1			
TU 14-162-41-98 Seamless high-sealability 324 mm casing with OTTG threaded connections and couplings	324	323.9	9.5	8.0-12.5	D	OTTG
			11.0; 12.4; 14.0		D; E; L; M	
TU 14-162-171-2019 Seamless steel hot-formed casing for thermally insulated casing strings	245	244.5	7.9; 8.9; 10.0; 11.1; 12.0; 13.8; 15.9	10.0-11.6	D; E	OTTM; OTTG
	324	323.9	8.5; 9.5; 11.0; 12.4; 14.0			
TU 14-3-714-78, TU 14-157-76-2001 Integral plain-end casing with threaded connection OG1M	140	139.7	10.5; 12.7	9.5-12.0	D; E; L; M	OG1M
	168	168.3	10.6; 12.1			
	194	193.7	10.9			
	198	198.0	17.1			
TU 14-3-1575-88 Casing with outside diameter of 351 mm, 377 mm and 426 mm and couplings	426	426	11.0; 12.0	9.5-12.5	D	Triangular
TU 14-3P-174-2021 Seamless steel casing		101.6-508	5.69 - 19.05	7.5-14.63	J55; K55; N80; L80 type 1; C90; R95; T95; P110; C110; Q125; Q135; L80; type 13Cr; C90S	SC; LC; BC; OTTM; OTTG; and other threaded connections by agreement between the customer and the manu-facturer
TU 14-3P-29-2007 Seamless and ERW steel casing and couplings of increased operational reliability with Buttress threaded connections	114	114.3	6.4; 7.4; 8.6; 10.2	9.5-12.5 (number of pipes shorter than 9.5 m) according to GOST 632	D; E; L; M; R Dst; Ds2	BC
	127	127	6.4; 7.5; 9.2; 10.7			
	140	139.7	6.2; 7.0; 7.7; 9.2; 10.5			
	146	146.1	6.5; 7.0; 7.7; 8.5; 9.5; 10.7			
	168	168.3	7.3; 8.0; 8.9; 10.6; 12.1	8.0-12.5		
	178	177.8	6.9; 8.1; 9.2; 10.4; 11.5; 12.7; 13.7; 15.0			
	194	193.7	7.6; 8.3; 9.5; 10.9; 12.7; 15.1			
	219	219.1	7.7; 8.9; 10.2; 11.4; 12.7; 14.2			
	245	244.5	7.9; 8.9; 10.0; 11.1; 12.0; 13.8; 15.9			
	273	273.1	8.9; 10.2; 11.4; 12.6; 13.8; 15.1			
	324	323.9	8.5; 9.5; 11.0; 12.4; 14.0			
	340	339.7	9.7; 10.9; 12.2; 13.1			
TU 14-3P-82-2022 Seamless steel casing and couplings in standard and low-temperature design	114	114.3	5.69; 6.35; 7.0; 7.37; 8.56; 10.2	R2; R3	J55; K55; L80 type 1; N80 type Q; R95; C90; P110; T95; Q125; Q135; N80 type 1, V150, J55-LT, K55-LT, N80 type Q-LT, L80 type Q-LT, R95-LT, P110-LT, Q125 -LT, Q135 -LT, C90-LT	OTTG; OTTM; BC; TMK UP FMC; TMK UP CS; TMK UP CENTUM; TMK UP PF; TMK UP GF
	127	127.0	6.4; 7.0; 7.5; 9.19; 10.7; 11.1; 12.14; 12.7			
	140	139.7	6.2; 6.98; 7.0; 7.72; 9.17; 10.54; 12.09			
	146	146.1	6.5; 7.0; 7.70; 8.50; 9.50; 10.70			
	168	168.3	7.32; 8.0; 8.94; 10.59; 12.06			OTTM; OTTG; BC; TMK UP FMC; TMK UP PF; TMK UP CENTUM; TMK UP GF; TMK UP PF ET
	178	177.8	6.9; 8.05; 9.19; 10.36; 11.51; 12.65; 13.7; 15.0			
	194	193.7	8.33; 9.52; 10.92; 12.70; 14.27; 15.11; 15.88			
	219	219.1	7.7; 8.0; 8.9-14.2			
	245	244.48	7.92; 8.94; 10.03; 11.05; 11.99; 13.84; 15.11			
	251	250.83	15.88			
	273	273.1	8.9-15.1			
	298	298.45	11.05-14.78			
	324	323.9	8.5; 9.5-14.0; 11.0; 12.4			
	340	339.72	9.65; 9.7-13.1			
1	2	3	4	5	6	7

SIZE RANGE (CONTINUED)

Standards	Pipe size				Grade	Thread
	Diameter, mm		Wall thickness, mm	Length, m		
	Nominal	Outside				
1	2	3	4	5	6	7
TU 14-3P-83-2018 Seamless steel hydrogen sulfide resistant casing and couplings	114	114.3	6.35; 7.00; 7.37; 8.56; 10.20	R2; R3	L80S; C90S; T95S; L80S-LT; C90S-LT; T95S-LT	TMK UP FMC; TMK UP Centum; TMK UP GF
	127	127.0	7.00; 7.52; 9.19; 10.7; 11.1; 12.14; 12.7			
	140	139.7	6.98; 7.72; 9.17; 10.54			
	146	146.1	7.00; 7.70; 8.50; 9.50; 10.70			
	168	168.3	7.32; 8.00; 8.94; 10.59; 12.06			
	178	177.8	8.05; 9.19; 10.36; 11.51; 12.65; 13.72; 15.0			
	194	193.68	9.52; 10.92; 12.70; 15.11			
	219	219.08	8.94; 10.16; 11.43; 12.70; 14.15			
	245	244.48	8.94; 10.03; 11.05	7;62-12;7		
251	250.83	15.88				
TU 24.20.12.110-395-00186619-2018 Seamless steel casing and couplings in corrosion resistant and low-temperature design		114.30	6.35; 7.37; 8.56; 10.2	9.5-11.7 R2 (7.62-10.36 m); R3 (10.36-11.70 m)	E; L; N80 type Q; C90; L80 type 1; T95; P110	OTTM; OTTG; BC
		127.00	6.4; 7.5; 9.2; 10.7			
		139.70	6.98; 7.72; 9.17; 10.54			
		146.05	7.0; 7.72; 9.17; 10.54			
		168.28	7.32; 8.30; 8.94; 10.59			
		177.80	8.05; 9.19; 10.36; 11.51			
TU 24.20.12-704-07501107-2021 Seamless steel integral casing with gas-tight threaded connections	127	127.00	7.52; 9.19; 10.36; 11.1; 12.14	R1; R2; R3 length groups	J55; K55; N80 type 1; N80 type Q; L80 type 1; R95; P110; Q125; D; K; E; L; M; J55-LT; K55-LT; N80 type 1-LT; N80 type Q-LT; L80 type 1-LT; R95-LT; P110-LT; Q125-LT; Dkhl; Kkhl; Ekhl; Lkhl; Mklhl	TMK UP MOMENTUM FL
	140	139.70	7.72; 9.17; 10.54; 12.70			
	168	168.28	8.94			
	178	177.8	9.19; 10.36; 11.51; 12.65			
	194	193.68	8.33; 9.52; 10.92; 12.70			
API* Spec 5CT Casing and Tubing		114.30	6.35; 7.37; 8.56	1; 2; 3 length groups	J55; K55; L80 type 1; N80 type 1; N80 type Q; C90; R95; T95; C110; P110; Q125; TMK140 DW; TMK150 DW; L80 type 13Cr	BC; SC; LC; TMK UP CS; TMK UP FMC; TMK UP PF; TMK UP PF ET; TMK UP Simplex; TMK UP CWB; TMK UP CWB II; TMK UP Centum; TMK UP Centum ET; TMK UP Momentum FL; TMK UP Momentum; TMK UP Momentum GT; TMK UP GF
		127.00	6.43; 7.52; 9.19; 11.10; 12.14; 12.70			BC; TMK UP CS; TMK UP FMC; TMK UP PF; TMK UP PF ET; TMK UP CWB; TMK UP CWB II; TMK UP Simplex; TMK UP Momentum FL; TMK UP Momentum GT; TMK UP CENTUM ET; TMK UP GF
		139.70	6.2; 6.98; 7.72; 9.17; 10.54; 12.7			BC; TMK UP CS; TMK UP FMC; TMK UP PF; TMK UP PF ET; TMK UP CWB; TMK UP CWB II; TMK UP Centum; TMK UP Centum ET; TMK UP Momentum FL; TMK UP Momentum SFL; TMK UP Momentum GT; TMK UP CWB II; TMK UP GF
		168.28	7.32; 8.94; 10.59; 12.06			BC; SC; LC; TMK UP CS; TMK UP FMC; TMK UP PF; TMK UP PF ET; TMK UP Simplex; TMK UP CWB; TMK UP CWB II; TMK UP Centum; TMK UP Centum ET; TMK UP Momentum FL; TMK UP Momentum SFL; TMK UP Momentum; TMK UP Momentum GT; TMK UP GF
		177.80	6.91; 8.05; 9.19; 10.36; 11.51; 12.65; 13.72			BC; SC; LC; TMK UP CS; TMK UP FMC; TMK UP PF; TMK UP PF ET; TMK UP Simplex; TMK UP CWB; TMK UP CWB II; TMK UP Centum; TMK UP Centum ET; TMK UP Momentum FL; TMK UP Momentum SFL; TMK UP Momentum; TMK UP Momentum GT; TMK UP GF
		193.68	7.62; 8.33; 9.52; 10.92; 12.70; 14.27; 15.11; 15.88; 17.45; 19.05			BC, plain-end; LC; SC; TMK UP FMC; TMK UP PF; TMK UP PF ET; TMK UP CWB; TMK UP CWB II; TMK UP Centum; TMK UP Simplex; TMK UP Momentum FL; TMK UP Momentum SFL; TMK UP GF
		219.08	7.72; 8.94; 10.16; 11.43; 12.70; 14.15			BC; plain-end; LC; SC; TMK UP FMC; TMK UP PF; TMK UP PF ET; TMK UP Centum; TMK UP Magna; TMK UP GF
		244.48	7.92; 8.94; 10.03; 11.05; 11.99; 13.84; 15.11			LC; SC; BC; plain-end; TMK UP FMC; TMK UP PF; TMK UP PF ET; TMK UP Simplex; TMK UP CWB II; TMK UP Centum; TMK UP Momentum; TMK UP Momentum GT; TMK UP Magna; TMK UP GF
		250.83	15.88; 16.79			H40; J55; K55; M65; L80 type 1; L80 type 13Cr; N80Q; N80; C90; R95; P110; C110; T95; Q125; L80S; TMK140DW; TMK150 DW; L80 type 13Cr
		273.05	8.89; 10.16; 11.43; 12.57; 13.84; 15.11; 17.07			BC; plain-end; LC; SC; TMK UP FMC; TMK UP PF; TMK UP PF ET; TMK UP Simplex; TMK UP CWB; TMK UP CWB II; TMK UP Centum; TMK UP Magna
		298.45	11.05; 12.42; 13.56; 14.78			TMK UP PF; TMK UP PF ET
		339.72	8.38; 9.65; 10.92; 12.19; 13.06			BC; LC; SC; plain-end; TMK UP FMC; TMK UP PF; TMK UP PF ET; TMK UP Simplex; TMK UP CWB; TMK UP CWB II; TMK UP Centum; TMK UP Magna; TMK UP GF
		406.40	14.37			TMK UP Momentum FL
		473.08	11.13; 12.57; 16.66			Plain-end; TMK UP Magna
		508	11.05			TMK UP Magna
			11.13; 12.70; 16.13; 20.62			TMK UP Magna
	1	2	3			4

MECHANICAL PROPERTIES OF CASING

Grade	Tensile strength, σ_{UTS} , MPa, min	Yield strength, σ_y , MPa.	Elongation, δ , %, min
GOST 632-80			
D (mod. A)	655	379-552	14.3
K	687	minimum 490	12.0
E	689	552-758	13.0
L	758	655-862	12.3
M	862	758-965	10.8
R	1,000	930-1,137	9.5
GOST 31446-2017			
J55	517	379-552	-
K55	655	379-552	-
M65	556	448-586	-
L80 type 1	655	552-655	-
N80; N80Q	689	552-758	-
C90	689	621-724	-
R95	758	655-862	-
C110	793	758-828	-
P110	862	758-965	-
Q125	931	862-1,034	-
TMK Spec			
TMK 140	1,034	965-1,103	*
TMK 150	1,103	1,034-1,172	*
API* Spec 5 CT			
J55	517	379-552	*
K55	655	379-552	*
M65	586	448-586	*
L80 type 1	655	552-655	*
N80; N80Q	689	552-758	*
R95	minimum 758	655-862	*
C110	793	758-828	*
P110	862	758-965	*
Q125	931	862-1,034	*

* Calculated as per formula in API* Spec 5 CT.

PIPES FOR WELL WORKOVER. STANDARDS

Standards	Pipe size				Grade	Thread
	Diameter, mm		Wall thickness, mm	Length, m		
	Nominal	Outside				
1	2	3	4	5	6	7
TU 14-157-61-99 Seamless steel integral casing with TMK UP TMK-1 threaded connection	95	95.00	7.00	10-11.3 up to 10% of the batch 9.5-10.0	D; E; L; M	TMK UP TMK-1
	114	114.30	6.88; 8.56			
	120	120.65	6.90; 8.00			
	140	139.70	7.00; 7.70			
	146	146.1	7.00			
TU 14-3P-30-99 Seamless steel integral casing with TMK UP TMK-1 threaded connection	102	101.60	5.74; 6.65	10-11.3 up to 10% of the batch 9.5-10.0	D; E; L; M	TMK UP TMK-1
	114	114.30	6.88; 8.56			
	120	120.65	6.90; 8.00			
	140	139.70	7.00; 7.70			
TU 14-157-99-2005, TU 14-157-61-99 Seamless steel integral casing with TMK UP TMK-1 threaded connection	95	95.0	7.00	10.0-11.3	D; E; L; M; J55; K55; N80 Q; P110; L80 type 1; R95; Q125 type 1	TMK UP TMK-1
	102	101.6	5.74; 6.65			
	114	114.3	6.88; 8.56			
	120	120.65	6.90; 8.00			
	140	139.7	7.00; 7.70			
TU 14-157-126-2017 Seamless steel integral casing with TMK UP TMK-1 threaded connection	102	101.6	5.74; 6.65	10.0-11.3, 10% with the length of 9.5-10.0	J55	TMK UP TMK-1
	114	114.3	6.88; 7.37; 8.56			
	120	120.65	6.90; 8.00			
	140	139.7	7.00; 7.72			
14-3P-29-2007 Seamless and welded steel casing and couplings of increased operational reliability with Buttress thread	114	114.3	6.4; 7.4; 8.6; 10.2	9.5-12.5	D; E; L; M; R	BC
	127	127.0	7.5; 9.2; 10.7			
	140	139.7	7.0; 7.7; 9.2; 10.5			
	146	146.1	7.0; 7.7; 8.5; 9.5; 10.7			
	168.0	168.3	7.3; 8.0; 8.9; 10.6; 12.1			
	178.0	177.8	6.9; 8.1; 9.2; 10.4; 11.5; 12.7; 13.7; 15.0			
	194	193.7	7.6; 8.3; 9.5; 10.9; 12.7; 15.1			
	219	219.1	7.7; 8.9; 10.2; 11.4; 12.7; 14.2			
	245.0	244.5	7.9; 8.9; 10.0; 11.1; 12.0; 13.8; 15.11; 15.9			
	324.0	323.9	8.5; 9.5; 11.0; 12.4; 14.0			
	1	2	3			

MECHANICAL PROPERTIES OF CASING FOR WELL WORKOVER AS PER TU 14-157-61-99

Properties and measuring units	Mechanical properties required for steel grades	
	D	E
Ultimate tensile strength σ_{UTS} , min N/mm ² (kgf/mm ²)	655 (66.8)	689 (70.3)
Yield strength σ_y , N/mm ² (kgf/mm ²), min min	379 (38.7) 552 (56.2)	552 (56.2) 758 (77.3)
Elongation, δ_s , min %	14.3	13.0
Impact strength KCV, min J/cm ² (kgf·m/cm ²)	39.2 (4)	29.0 (3)

THERMALLY INSULATED CASING (THERMOCASES)

Thermally insulated casing (thermocases) are used as conductor pipes in permafrost areas. Thermocases prevent wellbore soil thawing and reduce the permafrost thawing radius near the wellbore to ensure wellhead stability.

FEATURES

Thermally insulated casing consists of two concentric tubes separated by polyurethane foam thermal insulation, end caps and a joint kit. The inner tube protrudes from the outer tube and is equipped with flanges or couplings. The joint area is closed with a metal cover, and the space between the cover and the inner tube is filled with thermal insulation.

Each thermally insulated casing is factory-made (including the metal structure and the thermal insulation layer). Thermal insulation is made of eco-friendly types of pour-in-place polyurethane foams based on ozone-friendly freons as well as Russian or imported freon-free polyurethane foams.

APPLICATIONS

Thermally insulated casing is used to ensure stability of the wellhead zone and to prevent complications resulting from near-wellhead formation sinking, including:

- prevent near-wellhead sinkholes caused by thawing of subsiding, cavernous permafrost (ice layers, vein ice, ice-rich frozen ground, highly subsiding soils) near the surface with depths of no more than 100 m during well construction and operation;
- develop well clusters that need to be located in areas prone to subsidence and prevent the joining of thawed permafrost areas of adjacent wells in the upper part of cryolithosphere during the cluster well operation;
- maintain effective thermal operation modes of gas and oil wells.

Today the production of thermally insulated casing is carried out in accordance with the following standard: TU 25.99.29-035-32256008-2025 Thermally insulated casing for permafrost areas.

SIZE RANGE

Standard	Pipe size		Connection type
	Outer tube diameter (wall thickness), mm	Inner tube diameter (wall thickness), mm	
1	2	3	4
TU 25.99.29-035-32256008-2025 Thermally insulated casing for permafrost areas	530 (8-10)	323.85 (8.5-14.0)	Flanged (Type I) / Threaded (Type II)
	530 (8-10)	339.7 (8.4-15.4)	
	630 (8-10)	426.0 (10.0-12.0)	
	720 (8-15)	508.0 (11.1-16.1)	
	720 (8-15)	530.0 (8.0-15.0)	
1	2	3	4

TUBING

Tubing is used in oil and gas wells to transport fluids inside casing, as well as for workover and for running diagnostic or workover tools into the well.

FEATURES

Tubing is joined by threaded connections with couplings.

Threaded tubing connections allow for:

- pipes to be run into wells with complex trajectories, including high dogleg severity sections;
- sufficient strength under all types of loads and required sealability of pipe connections in the string;
- required wear resistance and maintainability.

Operational control at each stage of tubing manufacture ensures compliance with ISO 9001 and API* Spec Q1 requirements as well as high product quality.

Tubing finishing lines are equipped with advanced process and control equipment. All tubing and couplings undergo nondestructive testing under applicable standards.

Tubing made by TMK complies with the following standards:

- API* Spec 5CT, API* Spec 5B;
- GOST 633-80;
- GOST 31446-2017;
- customer-approved technical specifications.

At customer's request, anti-corrosion coating can be applied to the external surface of tubing.

All tubing is marked with paint and die stamping in line with the applicable technical standards.

Tubing is supplied with thread compound to protect the threaded joints of tubing and couplings, and thread protectors. Metal, polymer and/or combined protective parts can be used at customer's request.

At customer's request, pipes can be supplied in square bundles with reinforced polyethylene frames, tied with steel band. Pipes are supplied in hexagonal bundles with a mass of two to five tons.

The following versions of tubing and their combinations are available:

- high-sealability;
- low-temperature;
- corrosion-resistant;
- with external upset ends;
- with polymeric sealing elements;
- standard;
- with high-sealability Premium thread connections.

SIZE RANGE

Standards	Pipe size				Grade	Connection
	Diameter, mm		Wall thickness, mm	Length, m		
	Nominal	Outside				
1	2	3	4	5	6	7
GOST 633-80 Seamless tubing and couplings	33	33.4	3.5	Modification A: 9.5-10.5	D; K; E	NKT
	48	48.3	4			
	60	60.3	5.0			
	73	73.0	5.5		D; K; E; L; M; R	NKT; NKV; NKM
			7.0			
	89	88.9	6.5		D; K; E; L; M; R	NKV; NKM
			8.0			
	102	101.6	6.5			
114	114.3	7.0	NKT; NKM			
TU 1308-206-00147016-2002 Seamless tubing with external upset ends and couplings for them, hydrogen sulfide and cold-resistant	73	73.0	5.5	9.5-10.5	Es; Ls	NKT; NKV; NKM
	89	88.9	6.5			
	114	114.3	7.0			
TU 1327-371-00186619-2014 Seamless steel tubing and couplings for them with type F threaded connections	73	73.0	5.50; 7.00	9.5-10.5	D; K; E; L; M; R; N80 type Q; R95; L80 type 1	HKF
	89	88.9	6.50			
TU 14-159-340-2016 Seamless steel tubing and couplings for them with gas-tight PREMIUM threaded connections	73	73.02	5.51	9.5-11.5	J55, L80 type 1, N80 type Q, C90, R95, P110	TMK UP PF, TMK UP T100NV
TU 14-161-195-2022 Steel cold-resistant tubing and couplings for them for gas and gas condensate fields	48	48.26	3.68; 4.0	9.5-11	D; E; L; J55; N80; L80; R95 in low-temperature design	NKT
	60	60.32	4.83; 5.0; 6.45			
	73	73.02	5.51; 7.01		D; K; E; L; M; J55; N80; L80; R95; P110 in low-temperature design	NKT; NKV; NKM
	89	88.9	6.45; 7.34; 8.00; 9.52			
	114	114.3	6.88; 7.0			
TU 14-161-232-2008 Plain end tubing and couplings for them with extended threads	73	73.02	5.5	9.5-10.5	D; K; E; L; M; R	NKTU
	89	88.9	6.5		M	
			8.0			
TU 14-3P-189-2023 Seamless steel tubing and couplings with gas-tight threaded connections	60	60.32	4.83; 6.45; 7.49; 8.53	9.5-11.0	C90; C90S; C90 type 1; C110; J55; K72; L80S; L80 type 1; N80 type 1; N80 type Q; P110; R95; T95S; T95 type 1; D; T95	TMK UP PF; TMK UP FMT
	73	73.02	5.51; 7.01; 7.82; 8.64; 9.96; 11.18			
	89	88.9	5.49; 6.45; 7.34; 9.52; 10.92; 12.09; 13.46			
	102	101.6	5.74; 6.65; 8.38; 10.54			
	114	114.3	6.88; 8.56; 9.65; 10.92; 12.70			
TU 24.20.12.120-343-00186619-2018 Seamless steel tubing and couplings for them in the corrosion-resistant and cold-resistant design for gas, gas condensate, and oil field operations	60	60.3	5.0	9.5-10.5	K; E; L	TMK UP T100NV; NKT; NKTV; NKM; NKTU-U
	73	73.0	5.5; 7.0			
	89	88.9	6.5			
	102	101.6	6.5			
	114	114.3	7.0		N80 type Q; L80 type 1; C90; T95; R95	NU; EU; EU-U
60-114	60.32-114.3	4.83-6.88				
TU 39-0147016-97-99 High sealability tubing with external upset ends and NKMV couplings for them	73	73	5.5; 7.0	9.5-10.5	K; E; Ks; Es	NKMV
API* Spec 5CT 10th Edition Tubing. Specifications	60.32	60.32	4.83; 6.45; 7.49; 8.53	R1 7.0 - 7.32 m R2 8.53 - 9.75 m (up to 10.36 m) R3 11.58 - 12.8 m (max. 12.05 m)	J55; L80 type 1; L80 type 13Cr; N80 type Q; C90; P110; T95; R95	TMK UP PF; NU; EU; TMK UP Centum ET
	73.02	73.02	5.51; 7.01; 7.82		J55-P110; L80 type 13Cr; N80 type Q; C90; P110; T95	TMK UP PF; NU; EU; TMK UP Centum ET
	88.9	88.9	5.49; 6.45; 7.34; 9.52; 12.09		J55-P110; L80 type 13Cr J55-L80; N80-P110	TMK UP PF; TMK UP Centum ET; NU; EU; TMK UP Centum; TMK UP FMT; TMK UP Centum ET CHS
	101.6	101.6	5.74; 6.65; 8.38		J55; R95; L80 type 1; L80 type 13Cr; N80 type Q; C90; T95	TMK UP PF; TMK UP Centum ET; NU; EU
	114.3	114.3	6.88; 8.56; 10.92		J55-L80; N80-P110 J55; L80 type 1; L80 type 13Cr; N80 type Q; C90; P110; T95; R95	TMK UP PF; TMK UP Centum; TMK UP Centum ET; NU; EU
1	2	3	4	5	6	7

STANDARDS (CONTINUED)

Standard	Pipe dimensions, pipe grades and end types												
	Outside diameter, D	Wall thickness, S	J55	K72	L80 type 1	N80		C90	T95	R95	P110	Q135	
	mm	mm				type 1	type Q						
	Tubing, end types: P - plain-end, N - for NU connection, U- for EU connection, K - for NKTN connection, H - for NKTU connection, C - for NKM connection, R - for TMK UP PF connection, Q - for TMK UP CENTUM connection, Y – for TMK UP CENTUM ET connection, F - for TMK UP FMT connection; F1- for TMK UP T100NV connection												
GOST 31446-2017 Steel casing and tubing for petroleum and natural gas industries. General specifications (Effective date: July 01, 2018)	33.40	3.38	PNK	-	-	PNK	-	-	-	-	-	-	
	33.40	3.50	PK	PK	-	PK	-	-	-	-	-	-	
	33.40	4.55	PK	-	-	P	-	-	-	-	-	-	
	48.26	3.68	PNK	-	PNK	PNK	PNK	PN	PN	-	-	-	
	48.26	4.00	PK	PK	PK	PK	PK	-	-	-	-	-	
	60.32	4.24	PNK	-	PNK	PNK	PNK	PNK	PNK	-	-	PK	
	60.32	4.83	PNUKHCFR	-	PNUKHCFR	PNK	PNUKHCFR	PNUKHCFR	PNKCFR	PKCRF	PNUHCRF	PK	
	60.32	5.00	PKHC	PKHC	PKHC	PKC	PKHC	PKHC	PKC	PKC	PHC	PK	
	60.32	6.45	-	-	PNUKH	PNK	PNUKH	PNUKH	PNK	PK	PNUKH	PK	
	73.02	5.51	PNUKH-CRF1	PNUKFR	PNUKFF1R	PNK	PNKFF1R	PNUKFF1R	PNUKFR	PNUKFF1R	PNUKFF1R	PKC	
	73.02	7.01	FRK	PNUKFR	PNUKFR	PNK	PNKFR	PNUKFR	PNUKFR	PNUKFR	PNUKFR	PKC	
	73.02	7.82	-	PNUFR	PNUFR	-	PNFR	PNUFR	PNUFR	PNUFR	PNUFR	-	
	88.90	5.49	PNFR	PNFR	PNFR	-	PNFR	PNFR	PNFR	PNFR	PNFR	FR	-
	88.90	6.45	PNUKFR	PNUKFRQ	PNUKFRYQ	PNUKFRYQ	PNK	PNUKFRYQ	PNUKFRYQ	PNUKFRYQ	PNUKFRYQ	PNUKFRYQ	PKCYQ
	88.90	7.34	PNUKHCFR	PNFR	PNUKHCFR	PNKCFR	PNUKHCFR	PNKHCFR	PNKCFR	PNUKFRYQ	PNKHCFRQ	PKC	
	88.90	8.00	PKHC	PNUHC	PNUKHC	PNKC	PNKHC	PNUKHC	PNUKC	PNUKC	PNUKHC	PKC	
	88.90	9.52	PNUKFR	PNUKFR	PNUKHCFR	PNKCFR	PNUKHCFR	PNUKHCFR	PNUKCFR	PNUKCFR	PNUKHCFR	PKC	
	88.90	12.09	-	-	-	-	-	-	R	-	-	-	
	101.60	5.74	PNFR	-	PNFR	PNFR	PNFR	PNFR	PNFR	PNFR	-	-	-
	101.60	6.50	PKHCFR	PKHCFR	PKHCFR	PKCFR	PKHCFR	PKHCFR	PKCFR	PKHCFR	PKHCFR	PRC	
	101.60	6.65	PUKHCFR	-	PUKHCFR	PKCFR	PUKHCFR	PUKHCFR	PKCFR	PKCFR	PKHCFR	PKC	
	101.60	8.38	PNUKHCFR	PNUKHCFR	PNUKHCFR	PNUKHCFR	PNUKHCFR	PNKHCFR	PNUKCFR	PNUKCFR	PNUKHCFR	-	
	101.60	10.54	-	-	PFR	-	-	PFR	PFR	-	PFR	-	
	114.30	6.88	PNUKHC-FRY	-	PNUKHC-FRY	PNKCFRY	PNUKHC-FRYQ	PNUKHC-FRYQ	PNKHC-FRYQ	PKCFRYQ	PKHCFRYQ	PKCFRY	
	114.30	7.00	PKHC	PKHC	PKHC	PKC	PKHC	PKHC	PKC	PKC	PKHC	-	
	114.30	8.56	PNUKHCFR	PNUKHCFR	PNUKHCFR	PNUKHCFR	PNUKHCFR	PNUKHCFR	PNUKHCFR	PNUKHCFR	PNUKHCFR	-	
	114.30	10.92	PNUKHCR	PNUKHCR	PNUKHCR	PNUKHCR	PNUKHCR	PNUKHCR	PNUKHCR	PNUKHCR	PNUKHCR	-	

MECHANICAL PROPERTIES OF TUBING AS PER GOST 633-80

Property	Mechanical properties required for steel grades					
	D (mod. A)	K (NKT)	E	L	M	R
Ultimate tensile strength σ_{UTS} , min MPa (kgf/cm²)	655 (66.8)	687 (70.0)	689 (70.3)	758 (77.3)	823 (83.9)	1,000 (101.9)
Yield strength σ_y ; - min, MPa (kgf/cm²) - max, MPa (kgf/cm²)	379 (38.7) 552 (56.2)	491 (50.0)	552 (56.2) 758 (77.3)	654 (66.8) 862 (87.9)	724 (73.8) 921 (93.9)	930 (94.9) 1,137 (116.0)
Elongation, δ_5 , min %	14.3	12.0	13.0	12.3	11.3	9.5

MECHANICAL PROPERTIES OF TUBING IN THE LOW-TEMPERATURE DESIGN AS PER TU 14-161-195-2001

Property	Mechanical properties required for steel grades					
	D	K (NKT)	E	L	M	R
Ultimate tensile strength σ_{UTS} , min MPa (kgf/cm²)	655 (66.8)	687 (70.0)	689 (70.3)	758 (77.3)	823 (83.9)	1,000 (101.9)
Yield strength σ_y ; - min, MPa (kgf/cm²) - max, MPa (kgf/cm²)	379 (38.7) 552 (56.2)	491 (50.0)	552 (56.2) 758 (77.3)	654 (66.8) 862 (87.9)	724 (73.8) 921 (93.9)	930 (94.9) 1,137 (116.0)
Elongation, δ_5 , min %	14.3	12.0	13.0	12.3	11.3	9.5
Impact strength on Charpy specimens at the temperature of +20°C, min J/cm² (kgf·m/cm²)	Longitudinal KCV		118 (12)	118 (12)	118 (12)	118 (12)
Impact strength on Charpy specimens at the temperature of -60°C, min J/cm² (kgf·m/cm²)	Longitudinal KCV		98 (10)	98 (10)	98 (10)	98 (10)
Shear area fraction at the temperature of -60°C, min %	Longitudinal		70	70	70	70

REQUIREMENTS FOR MECHANICAL PROPERTIES OF TUBING IN THE CORROSION-RESISTANT DESIGN AND LOW-TEMPERATURE DESIGN AS PER TU 14-161-198-2002

Property	Mechanical properties required for steel grades			
	Ds	Ks	Es	Ls
Ultimate tensile strength σ_{UTS} , min MPa (kgf/cm²)	517 (52.8)	647 (66.0)	655 (66.8)	723 (73.9)
Yield strength σ_y : - min, MPa (kgf/cm²) - max, MPa (kgf/cm²)	379 (38.7) 490 (50.0)	490 (50.0) 627 (64.0)	552 (56.2) 686 (77.3)	655 (66.8) 784 (80.0)
Elongation, δ_{ϵ} , min %	20	18	16	15
Hardness, max HRB	95	22 HRC	23 HRC	25 HRC
Impact strength on Charpy specimens at the temperature of -60°C, min J/cm² (kgf-m/cm²)	98 (10)	98 (10)	98 (10)	98 (10)
Shear area fraction at the temperature of -60°C, min %	70	70	70	70

REQUIREMENTS FOR MECHANICAL PROPERTIES OF TUBING AS PER API* SPEC 5CT AND GOST 31446-2017

Grade	Mechanical properties required for steel grades		
	Tensile strength, min, MPa	Yield strength, MPa	
		min	max
H40	414	276	552
J55	517	379	552
K55	655	379	552
K72	687	491	-
N80 type 1	689	552	758
N80 type Q	689	552	758
M65	586	448	586
L80 type 1	655	552	655
L80 type 13Cr	655	552	655
C90	689	621	724
R95 (API*)	724	655	758
R95 (GOST)	758	655	862
T95	724	655	758
P110	862	758	965
Q125	931	862	1,034
Q135	1,000	930	1,137

VACUUM (VIT) AND NON-VACUUM INSULATED TUBING

Vacuum insulated tubing is designed for oil and gas production in permafrost areas to prevent soil thawing and, consequently, failure of the entire well infrastructure, as well as to prevent paraffin and gas hydrate plugging caused by a decrease in produced fluid temperature in the upper part of the well.

Insulated tubing is also used for thermal hydrocarbon recovery, in particular steam-assisted production of heavy (viscous) oil, to increase well flow rate.

FEATURES

Insulated tubing (VIT) consists of two tubes, one (shell) inside the other (bearing tube). The tubes are joined by welding with multiple reflective layers in the sealed space between the tubes where deep vacuum is created to reduce thermal losses.

VIT strings are assembled using threaded couplings, including premium couplings, and bushings made of thermal insulation material.

TMK manufactures low-temperature insulated tubing, as well as insulated tubing made of martensitic 13CrL steels resistant to environments with high CO₂ content (TU 14-161-240-2018 and TU 14-161-243-2019). These products have been successfully field-tested and approved for commercial operation.

APPLICATIONS

Applications of insulated tubing:

- oil and gas field development in the most challenging production environments in permafrost zones, with high-viscosity or waxy hydrocarbons. This type of insulated tubing is used to prevent near-wellbore permafrost thawing and well infrastructure failure, as well as wax and gas hydrate plugs in the upper part of the wellbore;
- for thermal hydrocarbon recovery, in particular steam-assisted production of heavy (viscous) oil, to increase well flow rate. This method requires downhole injection of fluid at a high temperature – up to 350°C;
- light Insulated Tubing, a non-vacuum version of insulated tubing, with reflective insulation between the tubes. Such products are used at oil and gas fields to transport fluids with temperatures up to 180°C.

STANDARDS

Standards	Pipe sizes		Grades	Connection
	OD of outside pipe (wall thickness), mm	OD of inner pipe (wall thickness), mm		
TU 14-161-240-2018 Vacuum insulated tubing and couplings in low-temperature design with gas-tight threaded connections*	168,28 (8,94)	114,3 (6,88)	L80 type 1; J55LT	TMK CS; TMK UP GF; TMK UP FMT; TMK UP PF; TMK UP CENTUM
	114,3 (6,88)	73,02 (5,51)	N80 LT	
	88,9 (6,45)	60,3 (4,83)		
TU 14-161-243-2019 Vacuum insulated tubing and couplings in made of martensitic 13Cr steel and Super 13Cr steel with gas-tight threaded connections*	168,28 (8,94)	114,3 (6,88; 7,37)	L80 type 13Cr; L80 type 13CrL	TMK CS; TMK UP PF; TMK UP GF
TU 14-161-249-2015 Vacuum insulated tubing for field applications, designed to prevent thawing of the permafrost during production and fluid injection**	89/88,9 (6,5)	60/60,3 (5,0)	D; K; E; L; M; R	Thread on plain-end tubing/ Non-upset tubing threads as per GOST 633
TU 14-161-250-2015 Vacuum insulated downhole tubing for oil fields developed by thermal methods***	168.28/168.3 (8.94; 8.9)	114.30/114.3 (6.88; 6.7)	J55 K55 K72 L80 type 1 N80 type Q R95 P110	Non-upset tubing as per GOST 31446; BC as per GOST 34057; Non-upset tubing as per GOST 633; Extended non-upset tubing as per TU 14-161-232; TMK UP CWB; TMK UP PF
	127.00/127.0 (7.52; 7.5)	88.90/88.9 (8.45; 6.5)		
	114.30/114.3 (6.88; 6.7)	88.90/88.9 (6.45; 6.5)		
	114.30/114.3 (6.35; 6.4)	88.90/88.9 (6.45; 6.5)		
	114.30/114.3 (6.88; 6.7)	73.02/73.0 (5.51; 5.5)		
	114.30/114.3 (6.35; 6.4)	73.02/73.0 (5.51; 5.5)		
	101.60/101.6 (6.65; 6.5)	73.02/73.0 (5.51; 5.5)		
	88.90/88.9 (6.45; 6.5)	60.32/60.3 (4.83; 5.0)		
	88.90/88.9 (6.45; 6.5)	48.26/48.3 (4.00; 4.0)		

* Pipe length from 10.0 to 11.7 m
** Pipe length from 8.5 to 10.5 m
*** Pipe length from 6.0 to 11.7 m

DRILL PIPES

Drill pipes with friction welded joints are intended for the construction and workover of exploration and oil and gas production wells, drilling of laterals, deviated and horizontal wells, and various downhole operations.

Pipes are available with internal, external or internal-external upsets, diameters from 50 mm to 139 mm, wall thicknesses from 5.5 mm to 12.7 mm, pipe grades from D to R in accordance with GOST R 50278 and TU or pipe grades from D to S in accordance with GOST 32696, or pipe grades from E to S in accordance with API* Spec 5DP.

FEATURES

Drill pipes are connected by tool joints with special thread. Pipe body ends are upset externally, internally or both internally and externally before the tool joints are welded on.

Drill pipes are seamless pipes made from carbon or alloy steel. The tool joints are welded to the upset ends of the drill pipe body by means of friction welding.

TMK drill pipes and tool joints comply with the applicable specifications.

Drill pipes are protected against atmospheric corrosion by special protective coatings, including colorless varnish.

Tool joint threads are protected by rust-preventive compound and polymeric or metallic protectors.

At customer’s request, pipes can be supplied with hard-faced boxes and/or pins of tool joints, copper-plated tool joint threads, following a break-in procedure consisting of making up / breaking out the connection three times, or cold rolling of thread roots.

At customer’s request, pipes can be supplied in square bundles with cradles and secured with steel strapping.

STANDARDS

Standards*	Pipe sizes		Length, m	Grade	Tool joint	Upset type			
	Nominal outside diameter, mm	Wall thickness, mm							
1	2	3	4	5	6	7			
GOST 32696-2014 Steel drill pipes for the oil and gas industry	60.32	7.11	Range 2 9.14–9.75; Range 3 12.19–12.5	D, E, X, G, S	3, NC, 5 ½ FH, TMK UP TDS, TMK EXD SG	IU; EU			
	73.02	9.19				EU			
	88.90	8.0				IEU; EU			
		9.35							
		11.40							
	101.60	8.38; 9.65	Range 2 8.84–9.75; Range 3 12.19–12.50			IU			
	114.3	8.56				IEU			
		10.92							
	127	9.19							
		12.70							
	139.7	9.17							
	10.54								
GOST R 50278-92 Drill pipes with weld-on tool joints	60.3	7.1	8.0–8.6; 9.0–9.45; 11.9–12.5	D; E; L; M	As per GOST R 50278-92	external upset			
	73.0	9.2		D; E; L; M; R					
	88.9	9.4*; 11.4		R; D; E; L; M					
	101.6	8.4							
	114.3	8.6; 10.9	8.0–8.6; 9.0–9.45; 11.9–12.5			internal upset			
	127.0	9.2; 12.7							
	88.9	9.4; 11.4					8.0–8.6; 9.0–9.45; 11.9–12.5	internal-external upset	
	101.6	8.4							
	114.3	8.6; 10.9							
	127.0	9.2; 12.7							
139.7	9.2; 10.5								
TU 1324-138-00147016-02 Process drill pipes and tool joints	73	5.5	10.0 (–0.8)	D; E	3-95-58	internal-external upset			
				3-95-59					
		6.5		D; E	3-98-59	internal-external upset			
				D; E; L	3-98-57				
		3-105-57							
TU 14-157-107-2009 Drill pipes with TMK UP TDS weld-on tool joints	88.9	9.35	8.0–8.6 11.9–12.5	E; X; G; S; D; E; L; M; R	TMK UP TDS TMK UP TDSA TMK UP TDSM TMK UP TDSAM	IU – with internal upset; EU – with external upset; IEU – with internal-external upset			
	101.6	8.4							
	114.3	8.6; 10.9							
	127.0	9.19; 12.7							
	139.7	9.2; 10.5							
TU 14-161-137-94 Drill pipes with diameters of 60–89 mm and weld-on tool joints	60.3	7	8.0–8.6 9.0–9.45 11.9–12.5	D; E	ZP-77-34	internal upset			
		L		ZP-77-33					
		73		7	D	ZP-86-45	internal-external upset		
				9	D; E; L; M	ZP-105M-45			
	9.19			D; E; L; M	ZP-105M-51	external upset			
					M		ZP-105M-50		
		89		8	D; E	ZP-108M-45	internal upset		
					ZP-105-53	internal-external			
	6.5			D; E; L	ZP-121M-68	external upset			
				D; E	3Π-121M-73				
		TU 14-161-138-94 Drill pipes with diameter of 127 mm (BK-127) with weld-on tool joints of enhanced reliability		127	9.2	8.0–8.6 9.0–9.45 11.9–12.5	D; E	ZP-162-92	internal-external upset
							L	ZP-165-86	
12.7	M		ZP-168-83						
	D; E		ZP-168-83						
	L		ZP-168-76						
TU 14-3P-141-2015 Drill pipes with diameter of 73 mm with BK-73 weld-on tool joints	73	9	8.0–8.6 9.0–9.45 11.9–12.5	D; E; L	ZP-92-34	internal-external upset			
TU 14-161-217-2003 Small diameter lightweight semi-flush drill pipes	73	5.5	8.0–8.4; 9.0–9.45; 11.9–12.5	D; E; L	3-95-62	BN			
TU 14-161-219-2004 Drill pipes with weld-on tool joints (high-torque)	50	5.5	8.0–8.6; 9.0–9.45	D; E; L	ZP-65-25	BV			
	60.3	7.0	8.0–8.6 9.0–9.45 11.9–12.5	D; E	ZP-77-34; ZPR-77-34; ZP-79-34; ZPR-79-34	BV			
	60.3	7.0		L	ZP-77-33; ZPR-77-33; ZP-79-33; ZPR-79-33	BV			
	73	9.19		E; L; M; N; R	ZP-105-51-1; ZPR-105-51-1	BN			
	89	8.0		E; L; M	ZP-105-51-2; ZPR-105-51-2; ZPR-108-51-2	BK			
	89	11.4		D; E; L	ZP-105-51-2; ZPR-105-51-2; ZPR-108-51-2	BV			
	89	11.4		L; M; N	ZP-127-54; ZPR-127-54	BK			
	127	9.19		E; L; M	ZPR-165-89-1; ZP-165-89-1	BK			
	1	2	3	4	5	6	7		

STANDARDS (CONTINUED)

Standards*	Pipe sizes		Length, m	Grade	Tool joint	Upset type
	Nominal outside diameter, mm	Wall thickness, mm				
1	2	3	4	5	6	7
API* 5DP, second edition Drill pipes	60.33	7.11	Range 2 (9.14–9.75) 3 (12.19–12.5)	E; X; G	As per API* Spec 5DP – application of standards to pipe body and/or tool joints of different sizes is possible	IU; EU
	73.03	9.19		E; X; G; S		EU
	88.90	8.0		E; X; G		IEU; EU
		9.35				IEU; EU; IU
		11.40		E; X; G		IEU; EU
	101.60	8.38; 9.65		E; X; G; S		IU
	114.30	8.56; 10.92	8.84–12.9	E; X; G; S		IEU
	127.00	9.19; 12.7	8.84–12.9	E; X; G; S		IEU
	139.70	9.17; 10.54	8.84–12.9	E; X; G; S		IEU
1	2	3	4	5	6	7

TABLE 1 – DRILL PIPE TOOL JOINTS

Tool joint size class	Tool joint thread type	Drill pipe		D, mm	L, mm +/- 12.7	Tool joint weight, kg
		Size class	Grade			
1	2	3	4	5	6	7
ZP-65-25	3-53	BV-50x5.5	D; E; L	65.5	481	9.1
ZP-77-33	3-65	BV-60x7	L	77	511	14
ZPR-77-33	3-65	BV-60x7	L	77	642	17.1
ZP-77-34	3-65	BV-60x7	D; E	77	511	13.9
ZPR-77-34	3-65	BV-60x7	D; E	77	642	17
ZP-86-44	3-73	PN-60x7.11	D; E; L; M	85.7	511.0	14.4
ZP-95-32	3-73	PV-73x9.19	D; E	95.2	511.0	22.7
ZP-86-45	3-73	BK-73x7	D	86	511	16
3-86-48	3-73	60T-86-48	D; E	85.7	403.3	10.15
3P-86-48	3-73	60TR-86-48	D; E	85.7	433.3	12.09
ZP-92-34	3-73	BK-73x9	D; E	92	511	21.7
ZP-95-62	3-81	BN-73x5.5	D; E; L	95	508	14.2
ZP-105-51-1	3-83	BN-73x9.19	E; L; M; N; R	105.5	537	24.8
ZPR-105-51-1	3-83	BN-73x9.19	E; L; M; N; R	105.5	642	30.2
ZP-105-51-2	3-83	BK-89x8	E; L; M	105.5	537	26.1
ZPR-105-51-2	3-83	BK-89x8	E; L; M	105.5	642	31.5
ZP-105-51-2	3-83	BV-89x11.4	D; E; L	105.5	537	26.1
ZPR-105-51-2	3-83	BV-89x11.4	D; E; L	105.5	642	31.5
ZP-105-54	3-86	PN-73x9.19	D; E	104.8	536.4	23.3
ZP-105-51	3-86	PN-73x9.19	L; M	104.8	536.4	24.2
ZP-111-41	3-86	PN-73x9.19	R	111.1	536.4	30.5
ZP-108-44	3-86	PV-89x9.35	D; E	108.0	536.4	29.5
ZP-108-41	3-86	PV-89x11.40	D; E	108.0	536.4	30.3
3-95-58	3-86	73T-95-58	D; E	95.2	403.3	12.47
3-98-57	3-86	73T-98-57	D; E; L	98.4	403.3	12.94
3P-98-57	3-86	73TR-98-57	D; E; L	98.4	433.3	14.08
3-98-59	3-86	73T-98-59	D; E	98.4	403.3	12.51
3P-98-59	3-86	73TR-98-59	D; E	98.4	433.3	13.65
ZP-105M-45	3-86	BK-73x9	D; E; L; M	104.8	536	26.5
ZP-105M-5B	3-86	BN-73x9.19	M	104.8	536	24.2
ZP-105M-51	3-86	BN-73x9.19	D; E; L	104.8	536	24.9
ZP-105-53	3-86	BK-89x8	D; E	105	536	24.4
ZP-105-54	3-86	PN-73x9	D; E	104.8	536	23.3
ZP-105M-54	3-86	BN-76x8.5	D; E	104.8	536	24
3-105-57	3-86	73T-105-57	D; E; L	104.6	403.3	15.52
3P-105-57	3-86	73TR-105-57	D; E; L	104.6	433.3	16.46
ZP-108M-45	3-86	BV-89x8	D; E	108	536	30.5
ZP-121-68	3-102	PN-89x9.35	D; E	120.7	600.0	32.5
ZP-127-65	3-102	PN-89x9.35	L	127.0	600.0	38.9
ZP-127-65	3-102	PN-89x11.40	D; E	127.0	600.0	38.9
ZP-127-62	3-102	PN-89x9.35	M	127.0	600.0	40.4
ZP-127-62	3-102	PN-89x11.40	L	127.0	600.0	40.4
ZP-127-54	3-102	PN-89x9.35	R	127.0	600.0	43.6
ZP-126-54	3-102	PN-89x11.40	M	127.0	600.0	43.6
ZP-121M-68	3-102	BN-89x8	D; E; L	121	600	33.2
ZP-121M-73	3-102	BN-89x6.5	D; E	120.6	587	29.7
3-121-73	3-102	89T-121-73	D; E; L	120.7	403.3	18.37
1	2	3	4	5	6	7

TABLE 1 – DRILL PIPE TOOL JOINTS (CONTINUED)

Tool joint size class	Tool joint thread type	Drill pipe		D, mm	L, mm +/- 12.7	Tool joint weight, kg
		Size class	Grade			
1	2	3	4	5	6	7
ZR-121-73	3-102	89TR-121-73	D; E; L	120.7	433.3	20.1
ZP-127-54	3-102	PN-89x11	M	127	600	43.6
ZP-127-54	3-102	BK-89x11.4	L; M; N	127	600	43.6
ZPR-127-54	3-102	BK-89x11.4	L; M; N	127	650	47.7
ZP-133-71	3-108	PV-102x8.38	D; E	133.4	576.8	39.7
ZP-133-68	3-108	PV-102x8.38	L	133.4	576.4	41.1
ZP-140-62	3-108	PV-102x8.38	M	139.7	576.8	48.6
ZP-140-51	3-108	PV-102x8.38	R	139.7	576.8	52.8
3-133-86	3-108	102T-133-86	D; E; L	133.4	418.3	20.49
ZR-133-86	3-108	102TR-133-86	D; E; L	133.4	448.3	22.41
ZP-152-83	3-122	PN-102x8.38	D; E; L; M	152.4	576.8	53.3
ZP-152-76	3-122	PN-102x8.38	R	152.4	576.8	56.8
ZP-159-83	3-122	PK-114x8.56	D; E	158.8	576.8	59.8
ZP-159-76	3-122	PK-114x8.56	L; M	158.8	576.8	63.3
ZP-159-76	3-122	PK-114x10.92	D; E	158.8	576.8	63.3
ZP-159-70	3-122	PK-114x8.56	R	158.8	576.8	66.4
ZP-159-70	3-122	PK-114x10.92	L	158.8	576.8	66.4
ZP-159-63	3-122	PK-114x10.92	M	158.8	576.8	69.3
ZP-159-57	3-122	PK-114x10.92	R	158.8	576.8	71.9
ZP-162-95-1	3-133	PN-114x8.56	D; E; L; M	161.9	576.8	52.5
ZP-162-92	3-133	PN-114x10.9	D; E	161.9	576.8	54.6
ZP-162-89-1	3-133	PN-114x8.56	R	161.9	576.8	56.4
ZP-162-89-1	3-133	PN-114x10.9	L; M	161.9	576.8	56.4
ZP-168-76	3-133	PN-114x10.9	R	168.3	576.8	69.3
ZP-162-95-2	3-133	PK-127x9.19	D; E	161.9	576.8	53.2
ZP-162-89-2	3-133	PK-127x9.19	L	161.9	576.8	57
ZP-162-89-2	3-133	PK-127x12.70	D; E	161.9	576.8	57
ZP-165-83	3-133	PK-127x9.19	M	165.1	576.8	63.6
ZP-165-76	3-133	PK-127x12.70	L	165.1	576.8	66.9
ZP-168-70	3-133	PK-127x9.19	R	168.3	576.8	72.9
ZP-168-70	3-133	PK-127x12.70	M	168.3	576.8	72.9
ZP-162-92	3-133	BK-127x9.2	D; E	162	577	51.6
ZP-162-95-2	3-133	PK-127x9	D; E	161.9	577	53.2
ZP-165-86	3-133	BK-127x9.2	L	165	577	62.2
ZP-165-89-1	3-133	BK-127x9.19	E; L; M	165	577	59.7
ZPR-165-89-1	3-133	BK-127x9.19	E; L; M	165	672	71.6
ZP-165-89-2	3-133	TBK-127x12.7	D; E; L	165	682	76.1
ZP-165-75	3-133	PN-127x12.7	R	168.3	577	69.3
ZP-168-75	3-133	BK-127x12.7	L	168	577	68.8
ZP-168-83	3-133	BK-127x9.2	M	168	577	65.9
ZP-168-83	3-133	BK-127x12.7	D; E	168	577	65.9
ZP-178-102	3-147	PN-127x9.19	D; E; L; M	177.8	607.2	69.8
ZP-178-102	3-147	PN-127x12.7	D; E	177.8	607.2	69.8
ZP-178-95	3-147	PN-127x12.7	L; M	177.8	607.2	74
ZP-178-102	3-147	PK-140x9.17	D; E	177.8	607.2	69.8
ZP-178-102	3-147	PK-140x10.54	D; E	177.8	607.2	69.8
ZP-178-95	3-147	PK-140x9.17	L	177.8	607.2	74
ZP-184-89	3-147	PK-140x9.17	M	184.1	607.2	84.9
ZP-184-89	3-147	PK-140x10.54	M	184.1	607.2	84.9
ZP-190-76	3-147	PK-140x9.17	R	190.5	618.2	98.9
ZP-190-76	3-147	PK-140x10.54	R	190.5	618.2	98.9
ZP-100-51	3-81Y	BN-73x9.19	E; L; M	100	537	22.2
ZPR-100-51	3-81Y	BN-73x9.19	E; L; M	100	642	27
ZP-178-102	3-147	PN-127x9	D; E; L; M	177.8	687	69.8
ZP-178-102	3-147	PN-127x13	D; E	177.8	687	69.8
1	2	3	4	5	6	7

TABLE 2 – SIZE CLASSES, MAIN DIMENSIONS AND WEIGHTS OF TMK UP TDS TOOL JOINTS

Joint type	Thread type	Tool joint OD, D2, mm	Tool joint ID, d1, mm	Tool joint length, L1, mm*	Tool joint weight, kg
1	2	3	4	5	6
TMK TDS-86-44	3-73	85.7	44.5	511	14.4
TMK TDSA-86-44	NC-26	85.70	44.45	511	14.4
TMK TDSM-86-44	3-73	85.7	44.5	696	20.5
TMK TDSAM-86-44	NC-26	85.70	44.45	696	20.5
TMK TDS-92-34	3-73	92.0	34.0	511	21.0
TMK TDSM-92-34	3-73	92.0	34.0	696	30.2
TMK TDS-95-32	3-73	95.2	31.8	511	22.8
TMK TDSM-95-32	3-73	95.2	31.8	696	32.0
TMK TDS-105-54	3-86	104.8	54.0	536	23.4
TMK TDSA-105-54	NC-31	104.80	53.98	536	23.4
TMK TDSM-105-54	3-86	104.8	54.0	721	33.9
TMK TDSAM-105-54	NC-31	104.80	53.98	721	33.9
TMK TDS-105-51	3-86	104.8	50.8	536	24.3
TMK TDSA-105-51	NC-31	104.80	50.80	536	24.3
TMK TDSM-105-51	3-86	104.8	50.8	721	33.9
TMK TDSAM-105-51	NC-31	104.80	50.80	721	33.9
TMK TDS-108-44	3-86	108.0	44.5	536	29.6
TMK TDSM-108-44	3-86	108.0	44.5	721	40.7
TMK TDS-108-41	3-86	108.0	41.3	536	30.4
TMK TDSM-108-41	3-86	108.0	41.3	721	41.7
TMK TDS-127-65	3-102	127.0	65.1	600	39.1
TMK TDSA-127-65	NC-38	127.00	65.09	600	39.1
TMK TDSM-127-65	3-102	127.0	65.1	785	52.6
TMK TDSAM-127-65	NC-38	127.00	65.09	785	52.6
TMK TDS-127-62	3-102	127.0	61.9	600	40.6
TMK TDSA-127-62	NC-38	127.00	61.91	600	40.6
TMK TDSM-127-62	3-102	127.0	61.9	785	54.7
TMK TDSAM-127-62	NC-38	127.00	61.91	785	54.7
TMK TDS-127-54	3-102	127.0	54.0	600	43.8
TMK TDSA-127-54	NC-38	127.00	53.98	600	43.8
TMK TDSM-127-54	3-102	127.0	54.0	785	58.9
TMK TDSAM-127-54	NC-38	127.00	53.98	785	58.9
TMK TDS-133-68	3-108	133.4	68.3	577	41.9
TMK TDSA-133-68	NC-40	133.40	68.26	577	41.9
TMK TDSM-133-68	3-108	133.4	68.3	762	56.3
TMK TDSAM-133-68	NC-40	133.40	68.26	762	56.3
TMK TDS-140-62	3-108	139.7	61.9	577	48.8
TMK TDSA-140-62	NC-40	139.70	61.91	577	48.8
TMK TDSM-140-62	3-108	139.7	61.9	762	66.7
TMK TDSAM-140-62	NC-40	139.70	61.91	762	66.7
TMK TDS-152-83	3-122	152.4	82.6	577	53.5
TMK TDSA-152-83	NC-46	152.40	82.55	577	53.5
TMK TDSM-152-83	3-122	152.4	82.6	762	72.2
TMK TDSAM-152-83	NC-46	152.40	82.55	762	72.2
TMK TDS-152-76	3-122	152.4	76.2	577	57.0
TMK TDSA-152-76	NC-46	152.40	76.20	577	57.0
TMK TDSM-152-76	3-122	152.4	76.2	762	76.8
TMK TDSAM-152-76	NC-46	152.40	76.20	762	76.8
TMK TDS-159-83	3-122	158.8	82.6	577	60.0
TMK TDSA-159-83	NC-46	158.75	82.55	577	60.0
TMK TDSM-159-83	3-122	158.8	82.6	762	80.9
TMK TDSAM-159-83	NC-46	158.75	82.55	762	80.9
TMK TDS-159-76	3-122	158.8	76.2	577	63.5
TMK TDSA-159-76	NC-46	158.75	76.20	577	63.5
TMK TDSM-159-76	3-122	158.8	76.2	762	85.7
1	2	3	4	5	6

TABLE 2 – SIZE CLASSES, MAIN DIMENSIONS AND WEIGHTS OF TMK UP TDS TOOL JOINTS (CONTINUED)

Joint type	Thread type	Tool joint OD, D2, mm	Tool joint ID, d1, mm	Tool joint length, L1, mm*	Tool joint weight, kg
1	2	3	4	5	6
TMK TDSAM-159-76	NC-46	158.75	76.2	762	85.7
TMK TDS-159-70	3-122	158.8	69.9	577	66.6
TMK TDSA-159-70	NC-46	158.75	69.85	577	66.6
TMK TDSM-159-70	3-122	158.8	69.9	762	89.8
TMK TDSAM-159-70	NC-46	158.75	69.85	762	89.8
TMK TDS-162-95-1	3-133	161.9	95.3	577	52.6
TMK TDSA-168-95-1	NC-50	168.28	95.25	577	58.3
TMK TDSM-162-95-1	3-133	161.9	95.3	762	72.2
TMK TDSAM-168-95-1	NC-50	168.28	95.25	762	80.3
TMK TDS-162-95-2	3-133	161.9	95.3	577	53.3
TMK TDSA-168-95-2	NC-50	168.28	95.25	577	59.0
TMK TDSM-162-95-2	3-133	161.9	95.3	762	72.9
TMK TDSAM-168-95-2	NC-50	168.28	95.25	762	81.0
TMK TDS-162-92	3-133	161.9	92.1	577	54.7
TMK TDSA-168-92	NC-50	168.28	92.08	577	60.4
TMK TDSM-162-92	3-133	161.9	92.1	762	74.9
TMK TDSAM-168-92	NC-50	168.28	92.08	762	83.0
TMK TDS-162-89-1	3-133	161.9	88.9	577	56.6
TMK TDSA-168-89-1	NC-50	168.28	88.9	577	62.3
TMK TDSM-162-89-1	3-133	161.9	88.9	762	77.5
TMK TDSAM-168-89-1	NC-50	168.28	88.9	762	85.6
TMK TDS-162-89-2	3-133	161.9	88.9	577	57.2
TMK TDSA-168-89-2	NC-50	168.28	88.9	577	62.9
TMK TDSM-162-89-2	3-133	161.9	88.9	762	78.1
TMK TDSAM-168-89-2	NC-50	168.28	88.9	762	86.2
TMK TDS-165-83	3-133	165.1	82.6	577	63.8
TMK TDSA-168-83	NC-50	168.28	82.55	577	66.7
TMK TDSM-165-83	3-133	165.1	82.6	762	87.1
TMK TDSAM-168-83	NC-50	168.28	82.55	762	91.2
TMK TDS-165-76	3-133	165.1	76.2	577	67.2
TMK TDSA-168-76-2	NC-50	168.28	76.2	577	70.0
TMK TDSM-165-76	3-133	165.1	76.2	762	91.6
TMK TDSAM-168-76-2	NC-50	168.28	76.2	762	95.7
TMK TDS-168-76	3-133	168.3	76.2	577	69.6
TMK TDSA-168-76-1	NC-50	168.28	76.2	577	69.6
TMK TDSM-168-76	3-133	168.3	76.2	762	95.3
TMK TDSAM-168-76-1	NC-50	168.28	76.2	762	95.3
TMK TDS-178-102	3-147	177.8	101.6	607	70.2
TMK TDSA-178-102	5 1/2FH	177.80	101.6	607	70.2
TMK TDSM-178-102	3-147	177.8	101.6	750	88.8
TMK TDSAM-178-102	5 1/2FH	177.80	101.6	750	88.8
TMK TDS-178-95	3-147	177.8	95.3	607	74.5
TMK TDSA-178-95-1	5 1/2FH	177.80	95.25	607	72.7
TMK TDSA-178-95-2	5 1/2FH	177.80	95.25	607	74.5
TMK TDSM-178-95	3-147	177.8	95.3	750	94.0
TMK TDSAM-178-95-1	5 1/2FH	177.80	95.25	750	92.2
TMK TDSAM-178-95-2	5 1/2FH	177.80	95.25	750	94.0
TMK TDS-184-89	3-147	184.2	88.9	607	85.6
TMK TDSA-184-89-1	5 1/2FH	184.15	88.9	607	84.5
TMK TDSA-184-89-2	5 1/2FH	184.15	88.9	607	85.6
TMK TDSM-184-89	3-147	184.2	88.9	750	108.2
TMK TDSAM-184-89-1	5 1/2FH	184.15	88.9	750	108.2
TMK TDSAM-184-89-2	5 1/2FH	184.15	88.9	750	108.2
1	2	3	4	5	6

* At customer’s request the length can be customized

INTERCHANGEABILITY OF TOOL JOINT THREADS WITH FOREIGN THREADS

Tool joint thread type	Thread pitch, mm	Thread taper	Interchangeable thread according to API* Spec 5DP	Thread profile shape according to GOST	Thread profile shape according to API* Spec 5DP
1	2	3	4	5	6
3-65	6.35	1:6	NC-23	IV	V-0.038R
3-66	5.08	1:4	2 3/8 Reg	I	V-0.040
3-73	6.35	1:6	NC-26	IV	V-0.038R
3-76	5.08	1:4	2 7/8 Reg	I	V-0.040
3-86	6.35	1:6	NC-31	IV	V-0.038R
3-88	5.08	1:4	3 1/2 Reg	I	V-0.040
3-94	6.35	1:6	NC-35	IV	V-0.038R
3-101	5.08	1:4	3 1/2 FH	I	V-0.040
3-102	6.35	1:6	NC-38	IV	V-0.038R
3-108	6.35	1:6	NC-40	IV	V-0.038R
3-117	5.08	1:4	4 1/2 Reg	I	V-0.040
3-118	6.35	1:6	NC-44	IV	V-0.038R
3-121	5.08	1:4	4 1/2 FH	I	V-0.040
3-122	6.35	1:6	NC-46	IV	V-0.038R
3-133	6.35	1:6	NC-50	IV	V-0.038R
3-140	6.35	1:4	5 1/2 Reg	II	V-0.050
3-147	6.35	1:6	5 1/2 FH	III	V-0.050
3-149	6.35	1:4	NC-56	V	V-0.038R
3-152	6.35	1:6	6 5/8 Reg	III	V-0.050
3-161	6.35	1:6	-	III	-
3-163	6.35	1:4	NC-61	V	V-0.038R
3-171	6.35	1:6	6 5/8 FH	III	V-0.050
3-177	6.35	1:4	7 5/8 Reg	II	V-0.050
3-185	6.35	1:4	NC-70	V	V-0.038R
3-189	6.35	1:6	-	III	-
3-201	6.35	1:4	8 5/8 Reg	II	V-0.050
3-203	6.35	1:4	NC-77	V	V-0.038R
1	2	3	4	5	6

DRILL PIPE AND TOOL JOINT GRADE CORRESPONDENCE AS PER GOST 32696, ISO 11961, GOST R 50278 AND GOST 27834

GOST 32696				ISO 11961:2018				GOST R 50278 (for drill pipe bodies) GOST 27834 (for tool joints)			
Drill pipe body grade	Yield strength, σ_y		Ultimate tensile strength σ_{γ} min	Drill pipe body grade	Yield strength, σ_y		Ultimate tensile strength σ_{γ} min	Drill pipe body grade	Yield strength, σ_y		Ultimate tensile strength σ_{γ} min
	min	max			min	max			min	max	
D	379	–	655	–	–	–	–	D	379	–	655
E	517	724	689	E	517	724	689	E	517	724	689
X	655	862	724	X	655	862	724	L	655	862	724
G	724	931	793	G	724	931	793	M	724	930	792
S	931	1,138	1,000	S	931	1,138	1,000	R	930	1,138	999
Tool joints	827	1,138	965	Tool joints	827	1,138	965	Tool joints	832	–	981
High strength tool joints SR25	910	1,138	970								

MECHANICAL PROPERTIES OF DRILL PIPES AS PER API* SPEC 5DP

Grades	Ultimate tensile strength σ_{UTS} , N/mm², min	Yield strength σ_y , N/mm²		Elongation δ_5 , %, min
		min	max	
E	689	517	724	*
X	724	655	862	*
G	793	724	931	*
S	1,000	931	1,138	*

* Calculated by the formula given in API* Spec 5DP.

MECHANICAL PROPERTIES OF DRILL PIPE TOOL JOINTS AS PER GOST 27834–95

Steel grade	Ultimate tensile strength σ_{UTS} N/mm ² (kgf/mm ²), min	Yield strength σ_y , N/mm ² , (kgf/mm ²), min	Elongation δ_5 , %, min	Percentage reduction of area, φ , %, min	Brinell hardness, HB	Impact strength, J/cm ² (kgf·m /cm ²), min	
						KCV	KCU
40HMFA 35HGMA	981 (100)	832 (85)	13	50	300–355	58.9 (6)	88.3 (9)

At customer’s request, drill pipe tool joints can be manufactured with minimum yield strength of 931 N/mm² or higher.

TABLE 3 – SIZE CLASSES, MAIN DIMENSIONS AND WEIGHTS OF TMK UP EXD SG TOOL JOINTS

Joint type	Thread type	Tool joint OD, D2, mm	Tool joint ID, d1, mm	Tool joint length, L1, mm	Tong space length of pin, mm ¹⁾	Tong space length of box, mm ¹⁾	Tool joint weight, kg
1	2	3	4	5	6	7	8
TMK UP EXD SG–80–38	EXD SG 24	79.6	38.1	696	251	318	20.8
TMK UP EXD SG–86–44	EXD SG 26	85.7	44.5	696	251	318	22.4
TMK UP EXD SG–86–42	EXD SG 26	85.7	42.0	696	251	318	23.4
TMK UP EXD SG–102–54	EXD SG 31	101.6	54.0	696	251	318	30.1
TMK UP EXD SG–102–51	EXD SG 31	101.6	50.8	696	251	318	31.6
TMK UP EXD SG–105–54	EXD SG 31	104.8	54.0	696	251	318	32.6
TMK UP EXD SG–105–51	EXD SG 31	104.8	50.8	696	251	318	34.1
TMK UP EXD SG–108–51	EXD SG 31	108.0	50.8	696	251	318	36.7
TMK UP EXD SG–111–51	EXD SG 31	111.1	50.8	696	251	318	39.3
TMK UP EXD SG–105–48	EXD SG 31	104.8	47.6	696	251	318	35.4
TMK UP EXD SG–108–48	EXD SG 31	108.0	47.6	696	251	318	38.0
TMK UP EXD SG–111–48	EXD SG 31	111.1	47.6	696	251	318	40.6
TMK UP EXD SG–111–54	EXD SG 34	111.1	54.0	696	251	318	37.8
TMK UP EXD SG–121–68	EXD SG 38	120.7	68.3	693	248	318	40.3
TMK UP EXD SG–121–65	EXD SG 38	120.7	65.1	693	248	318	42.1
TMK UP EXD SG–121–62	EXD SG 38	120.7	61.9	693	248	318	43.8
TMK UP EXD SG–124–68	EXD SG 38	123.8	68.3	693	248	318	43.1
TMK UP EXD SG–124–65	EXD SG 38	123.8	65.1	693	248	318	44.9
TMK UP EXD SG–124–62	EXD SG 38	123.8	61.9	693	248	318	46.7
TMK UP EXD SG 124–65	EXD SG 39	123.8	65.1	766.3	306.8	332.2	50.6
TMK UP EXD SG–127–65	EXD SG 38	127.0	65.1	693	248	318	48.0
TMK UP EXD SG–127–62	EXD SG 38	127.0	61.9	693	248	318	49.7
TMK UP EXD SG–127–73	EXD SG 39	127.0	73.0	693	248	318	43.4
TMK UP EXD SG–127–71	EXD SG 39	127.0	71.4	693	248	318	44.4
TMK UP EXD SG–127–68	EXD SG 39	127.0	68.3	693	248	318	46.3
TMK UP EXD SG–127–65	EXD SG 39	127.0	65.1	693	248	318	48.2
TMK UP EXD SG–133–76	EXD SG 40	133.4	76.2	677	227	308	47.6
TMK UP EXD SG–133–71	EXD SG 40	133.4	71.4	677	227	308	50.6
TMK UP EXD SG–133–68	EXD SG 40	133.4	68.3	677	227	308	52.4
TMK UP EXD SG–133–65	EXD SG 40	133.4	65.1	677	227	308	54.2
TMK UP EXD SG–140–68	EXD SG 40	139.7	68.3	677	227	308	58.9
TMK UP EXD SG–140–65	EXD SG 40	139.7	65.1	677	227	308	60.7
TMK UP EXD SG–159–83	EXD SG 46	158.8	82.6	677	227	308	71.4
TMK UP EXD SG–159–76	EXD SG 46	158.8	76.2	677	227	308	75.7
TMK UP EXD SG–162–95	EXD SG 50	161.9	95.3	677	227	308	65.8
TMK UP EXD SG–162–92	EXD SG 50	161.9	92.1	677	227	308	69.0
TMK UP EXD SG–162–89	EXD SG 50	161.9	88.9	677	227	308	71.4
TMK UP EXD SG–165–95	EXD SG 50	165.1	95.3	677	227	308	70.3
TMK UP EXD SG–165–92	EXD SG 50	165.1	92.1	677	227	308	72.8
TMK UP EXD SG–165–89	EXD SG 50	165.1	88.9	677	227	308	75.2
TMK UP EXD SG–168–95	EXD SG 50	168.3	95.3	677	227	308	74.2
TMK UP EXD SG–168–92	EXD SG 50	168.3	92.1	677	227	308	76.7
TMK UP EXD SG–168–89	EXD SG 50	168.3	88.9	677	227	308	79.1
TMK UP EXD SG–168–102	EXD SG 54	168.3	101.6	677	227	308	71.0
TMK UP EXD SG–171–102	EXD SG 54	171.5	101.6	677	227	308	75.0
TMK UP EXD SG–178–108	EXD SG 57	177.8	108.0	710	246	322	82.1
TMK UP EXD SG–178–102	EXD SG 57	177.8	101.6	710	246	322	88.0
TMK UP EXD SG–178–95	EXD SG 57	177.8	95.3	710	246	322	93.5
1	2	3	4	5	6	7	8

OIL AND GAS PIPES MADE OF SPECIAL STEELS AND ALLOYS

TMK has developed a wide range of oil and gas line pipes, tubing and casing with special properties for extremely low-temperatures and corrosive environments.

FEATURES

Low-temperature tubing and casing

These pipes are designed for operation in the fields of Siberia and the Far North. The pipe metal has high ductility and impact strength at negative temperatures. Charpy impact test at -60°C with determination of ductile fracture percentage in the test piece is used to evaluate low-temperature performance of pipe metal.

Hydrogen sulfide-resistant tubing and casing (S, SS)

These pipes are intended for fields with hydrogen sulfide in produced fluids. The pipe metal has high sulfide stress cracking resistance, which is confirmed by tests in accordance with NACE TM0177.

The threshold stress intensity factor for pipes during metal testing is selected depending on applicable pipe standards and H₂S partial pressure. S or SS is added to pipe grade designations of hydrogen sulfide resistant pipes in case of supply as per TU.

Carbon dioxide resistant tubing and casing (13CR, 13CRL)

These pipes are intended for fields with carbon dioxide in produced fluids and for CCUS projects. Pipe metal is resistant to local and general CO₂ corrosion. Pipe steel contains 12.0–14.0% of chromium to ensure corrosion resistance. CO₂ resistant pipes can be supplied for standard and low-temperature applications.

TMK-C (110CrNi) tubing and casing

These pipes are designed for use in vertical, horizontal and directional wells with a curvature rate of up to 13.1° per 10 m in high-temperature and highly corrosive environments containing hydrogen sulfide with a partial pressure exceeding 1.5 MPa and carbon dioxide, as well as high chloride content and the presence of free sulfur.

Carbon dioxide resistant oil and gas line pipes (13CR)

These pipes are intended for the construction of pipelines in fields where the extracted and transported product contains carbon dioxide. The pipe metal is resistant to both local and general carbon dioxide corrosion. To ensure corrosion resistance of the pipes, the chromium content in the steel is 12.0–14.0%. The pipes are manufactured to strength class X80 (80 psi). When supplied, oil and gas carbon dioxide resistant line pipes can be equipped with connecting parts and accessories of the same strength class and steel grade.

STANDARDS FOR OCTG MADE OF SPECIAL STEEL GRADES AND ALLOYS

Standards	Pipe dimensions				Steel grade	Type of threaded connection	
	Diameter, mm		Wall nominal, mm	Length, m			
	outside	thickness					
1	2	3	4	5	6	7	
GOST 31446-2017 Steel casing and tubing for petroleum and natural gas industries. General specifications	73	73.02	5.51	9.5-11.5	H40; J55; K55; L80 type 1; N80 type Q; N80 type 1; C90; R95; T95; P110; Q125; Q135; TMK 140 DW; TMK 150 DW; K72	unthreaded; NKT; NKTV; NKM; TMK UP FMT; TMK UP PF	
		73.02	7.01			unthreaded; NKT; NKTV; NKM; TMK UP FMT; TMK UP PF; TMK UP CENTUM ET	
	89	88.90	6.45				TMK UP FMC; TMK UP PF; TMK UP PF ET; TMK UP Centum; TMK UP Centum ET
		88.90	7.34				
	88.90	7.34	6.35; 7.37; 8.56				
TU 14-161-240-2018 Vacuum insulated tubing and couplings in the cold-resistant design with gas-tight threaded connections	114.30	168.28	6.88; 8.94	10.0-11.7	L80 type 1external; J55LT internal	TMK CS; TMK UP GF; TMK UP FMT; TMK UP PF; TMK UP CENTUM	
	73.02	114.30	5.51; 6.88		N80LT		
	60.32	88.9	4.83; 6.45				
TU 14-161-243-2019 Vacuum insulated tubing and couplings made of martensitic 13Cr and super 13Cr steels with gas-tight threaded connections	114.30	168.28	7.37; 8.94 6.88; 8.94	10.0-11.7	L80 type 13Cr; L80 type 13CrL; L80 type 13CrS	TMK CS; TMK UP PF; TMK UP GF	
TU 14-3R-129-2022 Seamless steel casing and couplings made of martensitic 13Cr and super 13Cr steels with gas-tight threaded connections	114	114.3	6.35; 8.56	9.5-13.0	L80 type 13Cr; L80 type 13CrL; R95 type 13Cr; R95 type 13CrL; P110 type 13CrL; P110 type 13Cr	TMK UP FMC; TMK UP PF	
	168	168.3	8.94				
	178	177.8	9.19; 10.36				
	245	244.5	11.05; 11.99				
	273	273.1	11.43				
TU 14-3R-130-2015 Seamless steel tubing and couplings made of martensitic 13Cr steels with gas-tight threaded connections TMK UP FMT and TMK UP PF	73	73.05	5.51; 7.01; 14.0	9.5-12.2	L80 type 13CrL; R95 type 13CrL; P110 type 13CrL	TMK UP FMT; TMK UP PF	
	89	89.9	6.45; 7.34; 16.0; 16.5; 18.0				
	102	101.6	6.65				
	114	114.3	6.88				
TU 14-3R-138-2014 Seamless steel tubing and couplings made of C90SS steel grade in the hydrogen sulfide-resistant design	73	73.02	5.51	9.5-12.2	C90SS	TMK UP PF	
	89	88.9	9.52				
	114	114.3	10.92				
TU 14-3R-139-2014 Seamless tubing and couplings made of a corrosion-resistant alloy with gas-tight threaded connections TMK UP PF	89	88.90	6.45	8.0-12.0	110CrNi	TMK UP PF	
	114	114.30	6.88				
TU 14-3R-146-2025 Seamless casing and couplings made of 110CrNi corrosion-resistant alloy with gas-tight threaded connections	168	168.28	10.59	8.0-12.0	110CrNi	TMK UP PF; TMK UP CENTUM	
TU 24.20.12.110-395-00186619-2018 Seamless steel casing and couplings in the corrosion-resistant and cold-resistant design	114-178	114.3-177.8	6.4-11.5	9.5-11.7 7.62-10.36 10.36-11.7	E, L, N80 type Q, L80 type 1, C90, T95, P110	OTTM; OTTG; BC	
TU 24.20.12.120-343-00186619-2018 Seamless steel tubing and couplings in the corrosion-resistant and cold-resistant design for the operation of gas, gas condensate, and oil fields	60	60.32	5.0	9.5-10.5	K; E; L; N80 type Q; L80 type 1; C90; T95; R95	NKT; NKTV; NKTV-U; NKM; EU; EU-Y; NU	
	73	73.1	5.5-7.0				
	89	88.9	6.5				
	114	114.3	7.0				
TS 62T-70-22	114	114.3	7.37	8.0-12.0	TMK-C 110	TMK UP PF	
	127	127	7.52				
	178	177.8	9.19				
	178	177.8	10.36				
API* Spec 5CT Casing and Tubing. Specifications	60.32	60.32	4.24; 4.83; 6.45;	R1 7.0-7.32 m; R2 8.53-9.75 m (up to 10.36 m); R3 11.58-12.8 m (max 12.05 m)	L80 type 1; L80 type 13Cr; C90; T95; C110	TMK UP PF plain end; threaded non-upset; with external upset; threaded; TMK UP CENTUM ET	
	73.02	73.02	5.51		L80 type 1; L80 type 13Cr; C90; T95; C110	TMK UP FMT; TMK UP PF plain end; threaded non-upset; threaded with external upset; TMK UP CENTUM ET	
			6.45; 7.34		L80 type 1; L80 type 13Cr; C90; T95; C110	TMK UP FMT; TMK UP PF; plain end; threaded non-upset; threaded with external upset; TMK UP CENTUM ET	
			12.09		L80 type 1; L80 type 13Cr; C90; T95; C110	TMK UP FMT; TMK UP PF plain end; threaded non-upset; threaded with external upset; TMK UP CENTUM ET	
	101.6	101.6	5.74; 6.65; 8.38		L80 type 1; L80 type 13Cr; C90; T95; C110	TMK UP FMT; TMK UP PF plain end; threaded non-upset; threaded with external upset; TMK UP CENTUM ET	
			8.56; 10.92		L80 type 1; L80 type 13Cr; C90; T95; C110	TMK UP FMT; TMK UP PF; plain end; threaded non-upset; threaded with external upset; TMK UP CENTUM ET	
	114-273	114.3-273.1	7.37-13.06		L80 type 1; L80 type 13Cr; C90; T95; C110	TMK UP CENTUM; TMK UP FMC; TMK UP PF plain end; threaded non-upset; TMK UP CENTUM ET	
1	2	3	4	5	6	7	

STANDARDS FOR OIL AND GAS LINE PIPES MADE OF SPECIAL STEEL GRADES AND ALLOYS

Standards	Pipe dimensions		Steel grade	Grade (strength class)
	Outside diameter, mm	Wall thickness, mm		
1	2	3	4	5
TU 14-3R-177-2021 Seamless steel oil and gas line pipes made of martensitic steel, grade X80, type 13CR, for the construction of infield pipelines	114.3 *	12.0 *		X80 type 13Cr
TU 14-3R-184-2022 Fittings for infield pipelines, grade X80, type 13CR, for transportation of fluid with increased carbon dioxide content	Flanges, angle joints and tees for pipe 114.3	-		X80 type 13Cr
1	2	3	4	5

* The range of seamless steel oil and gas line pipes is specified for the needs of a specific field; other sizes are available upon request.

MECHANICAL PROPERTIES OF PIPE METAL (TU 14-3R-177)

Property	Value
Ultimate tensile strength σ_{UTS} , N/mm²: - min - max	700 900
Yield strength σ_y , σ_{UTS} , N/mm²: - min - max	552 700
Ratio σ_y/σ_{UTS} , max	0.92
Impact strength, KCV, min J/cm², at testing temperature of -60°C	70
Hardness, HRC (HV10), max	30 (300)
Hardness variation, HRC, max	4

Note:

- The pipe metal is tested for general corrosion resistance in the media containing carbon dioxide. The general corrosion rate does not exceed 0.1 mm/year.
- The pipe metal is tested for local corrosion resistance. After general corrosion resistance testing, the surface of the specimens should not show any local corrosion damage with a mouth cross-section greater than 0.50 mm and/or a depth greater than 0.25 mm.

OIL AND GAS LINE PIPES (SEAMLESS)

Designed for the construction of oil and gas pipelines, gas lift systems, reservoir pressure maintenance systems, and field development. For oil and gas pipelines transporting both conventional and hydrogen sulfide-containing and corrosive media, for gas lift systems, reservoir pressure maintenance systems, and field development, including in the conditions of the Far North.

FEATURES

Oil and gas line pipes are made of TMK’s own metal melted using the EAF process, treated in a ladle furnace and vacuum degassing station and cast in a continuous casting machine. This method produces pure steel complying with requirements for harmful impurities (sulfur, phosphorus and non-ferrous metals) and non-metallic inclusions ensuring high strength, ductility, toughness properties, and corrosion performance of pipes at high pressures, low temperatures, and in corrosive environments.

During pipe production, wall thickness is controlled along the entire length using an automatic ultrasonic thickness gauge, and automated non-destructive testing of the pipes is performed using electromagnetic or ultrasonic methods to detect defects on the outer and inner surfaces.

At customer’s request, oil and gas line pipes can be manufactured for subsequent application of service coatings (internal and/or external) at the customer’s facilities.

In accordance with the requirements of product standards, the pipes undergo tensile testing, flattening testing, impact bending testing (if necessary), and hydrostatic testing.

At customer’s request, the outer surface of the pipe is coated with paint designed for protection against atmospheric corrosion during transportation and storage.

The pipes are supplied in bundles with lifting slings.

At customer’s request, pipes can be supplied with protective end caps.

Oil and gas line pipes can be supplied with fittings and valves of the same grade as required for pipeline installation and connection of the equipment.

STANDARDS

Standards	Pipe dimensions		Steel grade	Pipe grade
	Outside diameter, mm	Wall thickness, mm		
1	2	3	4	5
GOST 30564-98 Seamless hot-worked carbon and alloy steel pipes with special properties	38-426	3.5-32	10; 20; 09G2S; 10G2A; 15KhM; 30KhMA	
TU 1308-195-00147016-01 Seamless hot-worked steel pipes for oil and gas pipelines. corrosion-resistant and cold-resistant. designed for the construction. workover. and reconstruction of underwater crossings	219-426	12.0-16.0	13KhF	
TU 1308-226-00147016-02 Seamless hot-worked steel pipes for oil and gas pipelines made of microalloyed steels with extended service life	57-426	6.0-32.0	13KhFA. 20FA	K52
TU 1308-245-00147016-02 Seamless hot-worked steel pipes for oil and gas pipelines with increased structural strength. designed for use in corrosive environments	245-426	8.0-14.0	20FA; 13KhFA	
TU 1308-269-00147016-2003 Seamless hot-worked pipes for oil and gas pipelines with increased cold resistance and corrosion resistance	168-426	8.0-26.0	20F(V); 06Kh1F	K42; K48
TU 1317-006.1-593377520-2003 Seamless steel pipes for oil and gas pipelines with increased operational reliability	57-426	5.0-25.0	20A; 20FA; 09SFA; 08KhMFChA; 13KhFA; 15KhFA; 15KhMFA; 20KhFA	K48; K50; K52; K54; K56
TU 1317-031-00186654-2011 Seamless hot-worked steel pipes with diameters from 159 to 426 mm for pipelines	159-178	6-16		K36; K42; K48; K52
	245-426	8-20		
TU 1317-204-00147016-01 Seamless cold-resistant oil and gas line pipes with high corrosion resistance	219-426	8.0-20.0	09GSF; 12GF	K48; K50; K52
TU 1317-214-00147016-02 Seamless hot-worked oil and gas line pipes with increased operational reliability	42-426	5.0-26.0	KSI-20F	
TU 1317-233-00147016-02 Seamless hot-worked steel oil and gas line pipes with increased operational reliability	108-426	6.0-32.0	13KhFA	K52; A; V (B)
	114-168	5-14	13KhFA	K52
TU 1319-007-00186654-2010 Seamless hot-worked steel oil and gas line pipes with increased operational reliability with diameters from 89 to 426 mm	89-219	4.0-14.0	13KhFA	K52
TU 1319-1128-00186654-2012 Seamless hot-worked steel oil and gas line pipes of K42 and K48 pipe grade	245-426	8-25		K42; K48
TU 14-156-65-2005 Seamless hot-worked steel pipes for oil pipelines	57-426	4.0-25.0	10; 20; 09G2S; 10G2A	Kh52; Kh60; Kh65
TU 14-156-93-2023 Seamless steel pipes for offshore pipelines	168.3-406.4	7.0-20.5		Kh52; Kh60; Kh65
TU 14-157-37-94 Seamless hot-worked cold-resistant pipes made of steel grade 20	114-273	6.0-18.0	20 select	
TU 14-157-38-94 Seamless hot-worked cold-resistant pipes made of steel grade 09G2S	114-273	6.0-18.0	09G2S	
TU 14-157-50-97 Seamless hot-worked oil and gas line pipes with enhanced performance properties	108-273	6.0-18.0	20 "S" select; 09GSFA	
TU 14-157-54-97 Seamless hot-worked pipes for oil and gas pipelines with increased cold resistance and corrosion resistance	108-273	6.0-18.0	20 "S" select; 09GSFA	
TU 14-157-60-98 Seamless hot-worked hydrogen sulfide-resistant oil and gas line pipes	108-273	6.0-18.0	20 "S" select	
TU 14-158-114-99 Seamless hot-worked pipes for oil and gas pipelines with increased cold resistance and corrosion resistance	273-426	8-14	20FA; 09GSF	
TU 14-158-113-99 Seamless hot-worked pipes for oil and gas pipelines with enhanced cold resistance and corrosion resistance with diameters from 57 to 219 mm	57-219	4.0-14.0	20A	
TU 14-159-1128-2008 Seamless hot-worked cold-resistant steel pipes for gas pipelines. gas lift systems. and gas field development	60-219	4.0-25.0	10; 20; 09G2S	
TU 14-161-147-94 Seamless hot-worked pipes for oil and gas pipelines with hydrogen sulfide resistance and cold resistance	57-168	6.0-14.0	20	
TU 14-161-148-2020 Seamless hot-worked pipes for oil and gas pipelines with enhanced corrosion resistance and cold resistance	57-168	6.0-16.0	20	
TU 14-161-174-97 Seamless hot-worked pipes for oil and gas pipelines with enhanced cold resistance and corrosion resistance	73-168	6.0-16.0	20Ds	
TU 14-161-184-2000 Seamless steel pipes made of steel grade 09G2S	57.0-168.0	6.0-17.0	10; 20; 09G2S	
TU 14-162-14-96 Seamless hot-worked steel pipes for oil and gas pipelines with enhanced corrosion resistance and cold resistance	219-325	8.0-24.0	20A	
TU 14-162-20-97 Seamless hot-worked pipes for oil and gas pipelines with enhanced cold resistance and corrosion resistance	219-325	8.0-25.0	20A; 20UChA; 08KhMChA	
1	2	3	4	5

STANDARDS (CONTINUED)

Standards	Pipe dimensions		Steel grade	Pipe grade
	Outside diameter. mm	Wall thickness. mm		
1	2	3	4	5
TU 14-3-1128-2000 Seamless hot-worked steel pipes for gas pipelines. gas lift systems. and gas field development	57-426	4.0-45.0	10; 20; 09G2S; 10G2A	
TU 14-3-1618-89 Seamless hot-worked pipes for gas pipelines. gas lift systems. and oil and gas field development in northern regions	159-426	6.0-26.0	12GA; 16GA; 13GFA; 09G2S	Categories I. II and III. P - enhanced
	219	7.0-28.0		
TU 14-3-1831-92 Seamless hydrogen sulfide-resistant pipes made of steel grade 12GF-PV	89-159	6.0-14.0	12GF-PV	
TU 14-3-1971-97 Seamless hot-worked oil and gas line pipes with enhanced corrosion resistance and operational reliability made of carbon steel (steel grade 20 and its modifications)	168-426	8.0-26.0	20V	K48
TU 14-3P-25-98 Seamless hot-worked steel pipes with enhanced corrosion resistance	73-168	5.0-15.0	20PL	
TU 14-3P-44-2001 Seamless hot-worked steel pipes for oil and gas pipelines	245-530	8-45	10; 20; 09G2S	
TU 14-3P-77-2004 Seamless hydrogen sulfide-resistant pipes	57-426	4.0-28.0; 33.0	20; 12GF	Categories I and II
TU 14-3P-91-2004 Seamless hot-worked steel pipes for oil and gas pipelines with enhanced resistance to local corrosion and cold resistance	57-426	7.0-28.0	20KT; 13KhFA	K48; K52
TU 14-3P-113-2010 Seamless steel pipes for gas pipelines with operating pressures up to 22.15 MPa inclusive	114-426	7.0-34.8		K48; K52; K54; K56; K60; X52. X56. X60. X65. X70
	114.3	6.7; 7.5; 7.9; 8.9	10GFBA	SMLS 450 FD / X65
	219.1	14.3; 16.0		
TU 14-3P-118-2011 Seamless steel pipes for field pipelines with operating pressures up to 27.5 MPa inclusive	273.1	15.9; 18.3		
TU 14-3P-124-2017 Seamless hydrogen sulfide-resistant steel pipes	57-426	5.0-32.0	20A. 20S. 20FA. 13KhFA	K42-K56
TU 14-3P-125-2017 Seamless steel pipes	57-426	5.0-28.0	20. 20A. 09G2S	K42-K56
TU 14-3P-132-2013 Seamless hydrogen sulfide-resistant steel pipes for oil and gas field pipelines. steel grade X42SS	20-426	3.2-30		X42SS
TU 14-3P-135-2014 Seamless hot-worked steel pipes designed for external and internal anti-corrosion coating	89	4	20; 09G2S	K48; K52
	108-325	7-20		
TU 14-3P-156-2018 Seamless steel pipes for oil and gas pipelines. resistant to local high deformation strain	168.3	12.7		X65Q; X65QO
	219.1	20.62		
TU 14-3P-163 - 2019 Seamless hydrogen sulfide-resistant steel pipes for field and process pipelines	57-426	5.0-28.0		K42-K60
TU 14-3P-164-2019 Seamless steel pipes for field and process pipelines	57-426	5.0-28.0		K42-K60
TU 14-3P-167-2019 Seamless steel pipes for oil and gas pipelines	57-426	4.5-33.0		K42-K60
TU 14-3P-169-2020 Seamless steel pipes for process pipelines with operating wall temperatures up to 400°C inclusive	57.0-426.0	4.5-30	09G2S	K36; K42; K48; K50; K52
TU 14-3P-175-2023 Seamless steel pipes for pipelines with operating pressure up to 32.0 MPa inclusive Notes: 1. Complies with the requirements of TTT-01.02.04-01. version 5.0. Standard technical requirements for the manufacture and supply of equipment. Tubular products. including those with internal and external insulation. 2. If a design solution is available. pipes according to these technical conditions can be used for pipe-lines with an operating pressure of more than 32.0 MPa.	57-426	4-33.0		K42-K60 (ver. 1 и 2) K42-K52 (ver. 3) K48-K60 (ver. 4)
TU 14-3P-173-2021 Seamless cold-resistant steel pipes for oil and gas field pipelines	45-426	4.5-30	20. 20A. 12GB. 20F. 13KhFA. 08KhMFChA. 12KhGBA. 09G2S	L360-L485 (K48-K60)
TU 14-162-150-2015 Seamless steel pipes with enhanced corrosion resistance	168-325	6.0-25.0	13KhFA. 20a. 09GSF	K52-K56 (X56-X60)
TU 14-3P-54-2001 Seamless hot-worked pipes made of steel grade 20YuCh	273-426	8.0-30.0	20UCh	
TU 14-3P-171-2020 Seamless general purpose steel pipes	57.0-426.0	5-28		K34;K38; K42; K46; K48; K50; K52; K56; K60
TU 14-3P-137-2015 Seamless steel pipes for the construction of main and field pipelines	57-426	3.5-31.0		K42-K60 (X42-X70)
TU 14-3P-1128-2007 Seamless hot-worked steel pipes for gas pipelines. gas lift systems. and gas field development	57-426	4.0-30.0	10; 20	K42; K48
			09G2S	
			10G2A	
TU 14-3P-192-2023 Seamless steel pipes for oil and gas pipelines for field development	108.00	5-8	20	in accordance with the mechanical properties of the steel
	114 - 152	6-8		
	159.00	5-8		
	168 - 219	6-8		
1	2	3	4	5

STANDARDS (CONTINUED)

Standards	Pipe dimensions		Steel grade	Pipe grade
	Outside diameter. mm	Wall thickness. mm		
1	2	3	4	5
TU 24.20.13.110-409-00186619-2021 Seamless hot-worked steel pipes	57-219	4.0-20.0	20A. 12GB. 20FA. 13KhFA	L360-L485
TU 24.20.13.110-128-00186654-2019 Seamless hot-worked steel pipes	57-219	3.5-25.0		K42; 48; K50; K52; K54; K56; K60 (grades 1. 2. 3. 4)
	245-426	8-25		
TU 24.20.13.110-369-00186619-2018 Seamless hot-worked steel pipes for oil and gas pipelines with enhanced corrosion resistance	60-426	4.0-16.0	13 KhFA	K52
TU 24.20.13.110-385-00186619-2017 Seamless hot-worked steel pipes	60-219	4.0-16.0	20; 09G2S; 09GF; 09GFB; 20A	K42; K48; K52; K54; K55; K56 (versions U and UKhL)
	245-426	8-18		
TU 14-3R-191-2024 Seamless steel pipes for main and field pipelines	57-426	4.5-30		K42-K60. X42-X70
TU 24.20.13.110-065-00186654-2019 Seamless hot-worked steel pipes	57-426	5-28		255; 345; 355 (Tr-S. versions 0. 20. 40); K42; K46; K48; K50; K52; K55; K56; K60 (Tr-T and Tr-O. versions U and UKhL; Corrosive power class 0.A; 0.B; 1; 2; 3. with material design based on Cr O and X content)
API* Spec 5L- 46 edition Line pipe. Specifications	33.4-406.4	3.4-28.6	L175; L175P; L210-L555	A25; A25P; A; B; X42-X80
	168.3-426	7.0-34.8		
CSA Z 245.1-07 Steel pipe	21.3-168.3	2.77-10.97	20; 12GB; 20F; 14G1F; 14G2F; 08KhMFChA	Gr.241; Gr.290; Gr.359; Gr. 386; Gr. 414; Gr. 448. Categories I. II. and III for standard and aggressive environments
DNV-OS-F101 Standard for offshore applications. Submarine pipeline systems	219-426	7.0-32.0		250-450 F; D
TU 14-3R-192-2023 Seamless steel pipes for oil and gas pipelines for field development	108 - 219	5 - 8	20	in accordance with the mechanical properties of the steel
1	2	3	4	5

MECHANICAL PROPERTIES OF SEAMLESS OIL AND GAS LINE PIPES

Standard	Steel grade	Pipe grade	Ultimate tensile strength. σ_{UTS} . N/mm ²	Yield strength. σ_Y . N/mm ²	σ_{UTS}/σ_Y	Elongation. δ . %	Impact strength. kJ/m ² °C		
			Minimum		Maximum	Minimum	Minimum		
1	2	3	4	5	6	7	8		
TU 14-3-1128-2000; TU 14-3P-1128-2007	09G2S		470-588	265		21	KCV ⁻³⁴ 29.4 KCV ⁻⁴⁰ 29.4 KCV ⁻⁶⁰ 29.4	wall thickness:	
								up to 10 incl.	KCU ⁻⁶⁰ 29.4
								from 10 to 15 incl.	KCU ⁻⁶⁰ 39.2
								over 15	KCU ⁻⁶⁰ 49.0
TU 14-3-1618-89	13GFA	I II III	410 471 539.5	240 290 392.4		23 22 20	KCV ⁻³⁰ 245 KCV ⁻³⁰ 245 KCV ⁻³⁰ 245		
TU 14-3P-77-2004	20 12GF	I II	413-550 413-550	241 290	0.85 0.85	22 24	KCV ⁻²⁰ 2 94 KCV ⁻³⁰ 392	KCV ⁻³⁰ 294 KCV ⁻³⁰ 392	
TU 14-3-1971-97	20V	K48	470	338-451	0.8	25		KCV ⁻⁴⁰ 98	
TU 1308-269-00147016-2003	20F(V) 06KhF	K48 K42 K52	470 412 510	338-451 289-412 385-510	0.8 0.8 0.8	25 25 25	KCV ⁻²⁰ 147 KCV ⁻²⁰ 196 KCV ⁻²⁰ 196	KCV 98 KCV ⁻⁴⁰ 196 KCV ⁻⁴⁰ 147	KCV 49 KCV ⁻⁶⁰ 196 KCV ⁻⁶⁰ 98
TU 1381-159-00147016-01	06Kh1; 06KhF; 09GSF	K42 K48	410 470	245-410 338-451	0.75 0.75	24 24			KCU ⁻⁶⁰ 29-49 KCU ⁻⁶⁰ 29-49
TU 1317-006.1-93377520-2003	20A 20FA 08KhMFChA 13KhFA	K48 K50 K52 K54 K56	470 491 510 530 549	338-451 343-470 372-491 383-510 392-539	25.0 25.0 23.0 23.0 23.0	KCV ⁻⁶⁰ 98			
TU 1317-214-00147016-02	20F	K54	529	382-490	0.80	25	KCV ⁻²⁰ 167		KCV ⁻⁵⁰ 98
TU 1381-204-00147016-01	09GSF	K48 K50	470-588 490-608	314 343	0.85 0.85	25 25			KCU ⁻⁶⁰ 49
	12GF	K50 K52	490-608 510-627	343 372	0.85 0.85	25 25			KCV ⁻⁵⁰ 98
TU 1308-226-00147016-02	13KhFA	K52	500-627	334-470	0.80	25	KCV ⁻²⁰ 147	KCV ⁻⁵⁰ 7 8	
TU 14-157-37-94	20A		412	245		21		KCV ⁻⁴⁰ 29	
TU 14-157-38-94	09G2SA		450	325		21		KCV ⁻⁴⁰ 34	KCU ⁻⁷⁰ 29
TU 14-157-50-97 TU 14-157-54-97	20 S select. 20 UCh		502-598	388-450	0.8	25	KCV ⁻²⁰ 167	KCV ⁻⁴⁰ 147	KCV ⁻⁷⁰ 98
	09GSF		461-559	325-441	0.8	28	KCV ⁻²⁰ 196	KCV ⁻⁴⁰ 167	KCV ⁻⁷⁰ 147
1	2	3	4	5	6	7	8		

MECHANICAL PROPERTIES OF SEAMLESS OIL AND GAS LINE PIPES (CONTINUED)

Standard	Steel grade	Pipe grade	Ultimate tensile strength, σ_{UTS} , N/mm ²	Yield strength, σ_y , N/mm ²	σ_{UTS}/σ_y	Elongation, δ , %	Impact strength, kJ/m ² k		
			Minimum		Maximum	Minimum	Minimum		
1	2	3	4	5	6	7	8		
TU 14-157-60-98	20 S select		470-598	314-451		25	KCV ⁺²⁰ 167	KCV ⁻⁴⁰ 147	KCV ⁻⁷⁰ 98
TU 14-3-1801-92	09G2S	K48	470	314	0.82	22		KCU ⁻⁶⁰ 147	KCV ⁻⁶⁰ 98
		K50	490	343	0.82	22		KCU ⁻⁶⁰ 147	KCV ⁻⁶⁰ 98
TU 14-161-147-94	20		502-598	338-470	0.8	25	KCV ⁺²⁰ 147	KCV ⁻⁴⁰ 98	KCV ⁻⁶⁰ 69
TU 14-161-174-97	20 Ds		502-598	338-470	0.8	25	KCV ⁺²⁰ 196	KCV ⁻⁴⁰ 147	KCV ⁻⁶⁰ 98
TU 14-162-14-96					0.80		longitudinal	transverse	
	20A		502-627	338-470		25	KCV ⁺²⁰ 167 KCV ⁻⁵⁰ 78	KCV ⁺²⁰ 78 KCV ⁻⁵⁰ 29	
TU 1308-245-00147016-02	20FA		502	338-510	0.80	25	KCV ⁺²⁰ 147		KCV ⁻⁶⁰ 98
	13KhFA		502-627	353-470	0.80	25	KCV ⁺²⁰ 196		KCV ⁻⁶⁰ 98
TU 1308-195-00147016-01	13KhF		510	412-539	0.85	23	KCV ⁺²⁰ 2 94	KCV ⁻⁴⁰ 196	KCV ⁻⁶⁰ 70
TU 14-1-5392-2000	20	K42	431	255	-	22	KCU ⁺²⁰ 78		
	10G2		421	265	-	21	KCU ⁺²⁰ 118	KCU ⁻⁴⁰ 25	
	09G2S		460	303	-	21	KCU ⁺²⁰ 60	KCU ⁻⁴⁰ 34	
TU 1317-233-00147016-02	13KhFA	K52	502-686	353-519	0.85	23	KCV ⁺²⁰ 205		KCV ⁻⁶⁰ 127
TU 14-3P-91-2004	20KT 13KhFA							wall thickness	
		K48	470	294		22		5-10	KCU ⁻⁶⁰ 2 9.4
		K52	510	353		20	KCV ⁻⁵⁰ 39.2	10-15	KCU ⁻⁶⁰ 39.2
								15-26	KCU ⁻⁶⁰ 4 9.0
1	2	3	4	5	6	7	8		

SET OF METAL PROPERTIES OF OIL AND GAS LINE PIPES AS PER TU 14-3R-175-2023

Indicator	Indicator value for strength class																											
	K42		K48				K50				K52				K54				K56				K60					
	group 1	group 2	group 1	group 2	group 3	group 4	group 1	group 2	group 3	group 4	group 1	group 2	group 3	group 4	group 1	group 2	group 3	group 4	group 1	group 2	group 3	group 4	group 1	group 2	group 3	group 4		
1	2		3				4				5				6				7				8					
Ultimate tensile strength, σ_{UTS} , N/mm ²	mini-mum 410	410–560	mini-mum 470	470–620	470–618	470–620	mini-mum 491	491–640	485–633	491–640	mini-mum 510	510–660	510–658	510–660	mini-mum 530	530–680		530–680	mini-mum 549			549–700	mini-mum 590	590–740		590–740		
Yield strength, σ_y , N/mm ² , minimum	245		338		290	338	343		345	343	372		355	372	383			383	392			392	412	460		460		
Elongation, δ , min %	16	21	16	21	23	21	16	21	23	21	16	20	21	20	16	20		20	16	20		20	16	20		20		
Ratio σ_y/σ_{UTS} , maximum	0.93	0.9	0.93	0.9	0.85	0.9	0.93	0.9	0.85	0.9	0.93	0.9	0.85	0.9	0.93	0.9		0.9	0.93	0.9		0.9	0.93	0.9		0.9		
Hardness, HV10, maximum	–	250	–	250	220	250	–	250	220	250	–	250	220	250	–	250		250	–	250		250	–	260		260		
Impact strength KCV, J/cm ² , at test temperature of minus 20° C, minimum	34	–														39.2		59	–	39.2		59	–	39.2		59		
Impact strength KCV, J/cm ² , at test temperature of minus 40° C, minimum			39.2	34	39.2	49	59	34	39.2	49	59	34	39.2	49	59	34	–	–	34	–		–	34	–		–		
Impact strength KCU, J/cm ² , at test temperature of minus 60° C, minimum		–	39.2	–	39.2	49	59	–	39.2	49	59	–	39.2	49	59	–	39.2		59	–	39.2		59	–	39.2		59	
Shear area fraction, KCV, at test temperature of minus 40° C, %, minimum		–	–	–	50	–	–	–	50	–	–	–	50	–	–	–		–	–	–		–	–	–		–		
1	2	3				4				5				6				7				8						

Note:

- Pipe metal, group 3, is tested for sulfide stress corrosion cracking (SSC) resistance at a threshold stress σ_{th} of at least 72% of the minimum specified yield strength and for hydrogen-induced cracking resistance (HIC), with crack length ratios (CLR) and crack thickness ratios (CTR) of no more than 6% and 3%, respectively.
- Pipe metal, group 4, is tested for resistance to general corrosion caused by the presence of CO₂. The general corrosion rate is no more than 0.105 mm/year.

SET OF METAL PROPERTIES OF SEAMLESS HOT-WORKED PIPES AS PER TU 24.20.13.110-065-00186654-2019

Indicator	Property value for strength class for Tr-T							
	K42	K46	K48	K50	K52	K55	K56	K60
1	2	3	4	5	6	7	8	9
Ultimate tensile strength. σ_{UTS} . MPa	415-760	435-760	460-760	490-760	520-760	535-760	549-760	570-760
Yield strength. $\sigma_{0.5}$ ¹⁾ MPa	290-4.954	320-5.254	360-530	390-545	415-565	450-600	460-600	485-635
Elongation δ_5 . min %	20			19		18		
Ratio $\sigma_{0.5}/\sigma_y$ max	0.93							
Hardness. max HRC (HV10)	Classes 0.A. 0.B			30 (300)				
	Classes 1. 2. 3 ⁶⁾			22 (250)				
Shear area fraction. KCV. %. at test temperature of minus 20 °C. min ²⁾	Classes 0.A. 0.B5			-				
	Classes 1. 2. 3			50				
Impact strength. KCV. J/cm ² . min ³⁾	Test temperature: minus 20 °C (version U)			34				
	Test temperature: minus 40 °C (version UKhL)			29				
Impact strength. KCU. J/cm ² . min ³⁾	Test temperature: minus 40 °C (version U)			39				
	Test temperature: minus 60 °C (version UKhL)			29				
1	2	3	4	5	6	7	8	9

Note:

- $\sigma_{0.5}$ – yield strength with a full strain tolerance of 0.5%.
- A reduction in the viscous component share to 40% for one specimen is permitted, provided that the average arithmetic value of the specimen test results is not lower than the established standard.
- A reduction in the impact strength values for one specimen by 9.8 J/cm² from the established standard is permitted, provided that the average arithmetic value of the specimen test results is not lower than the minimum impact strength values.
- An increase in the actual yield strength value by no more than 30% is permitted, relative to the difference between the highest and lowest values for a given strength class.
- The proportion of the viscous component is not determined.
- For pipes with a wall thickness greater than 9 mm, the hardness measured along a line 1.5 mm from the outer surface of the pipe must be no more than 275 HV10 or 26 HRC.

SET OF METAL PROPERTIES OF SEAMLESS HOT-WORKED PIPES AS PER TU 24.20.13.110-065-00186654-2019 (CONTINUED)

Property		Property value for strength class for Tr–O							
		K42 2	K46 3	K48 4	K50 5	K52 6	K55 7	K56 8	K60 9
1									
Ultimate tensile strength. σ_{UTS} , MPa		415	435	460	490	510	535	535	570
Yield strength. $\sigma_{0.5}^{(1)}$ MPa		290	320	360	390	415	450	450	485
Elongation δ_5 , min %		20			19		18		
Impact strength. KCU. J/cm ² . min ⁽³⁾	Test temperature: minus 20 °C (version U) ⁽²⁾	–							
	Test temperature: minus 40 °C (version U) ⁽²⁾	–							
Property		Property value for strength class for Tp–S							
		255			345		355		
Ultimate tensile strength. σ_{UTS} , MPa		380			490		490		
Yield strength. $\sigma_y^{(1)}$ MPa		245			345		355		
Elongation δ_5 , min %		22			21		20		
Impact strength. KCU. J/cm ² . min ⁽⁴⁾	Test temperature: minus 40 °C (version 40)	– ³			34				
	Test temperature: minus 20 °C (version 20)	– ³			34				
	Test temperature: 0 °C (version 0)	34			– ³		– ³		
1		2	3	4	5	6	7	8	9

Note:

- $\sigma_{0.5}$ – yield strength with a full strain tolerance of 0.5%.
- The impact strength value is determined based on the actual test results of each batch of pipes.
- Testing is not required.
- A reduction in the impact strength values for one specimen by 9.8 J/cm² from the established standard is permitted, provided that the average arithmetic value of the specimen test results is not lower than the minimum impact strength values.
- When the pipes are produced from continuously cast billets, at least 22% is allowed.

PIPE SIZE RANGE AS PER API* SPEC 5L

Nominal size	Outside diameter		Wall thickness		Weight per unit length		Schedule
	mm	inch	mm	inch	kg/m	lb/ft	
1	2	3	4	5	6	7	8
1	33.4	1.315	3.4	0.133	2.50	1.68	STD
1	33.4	1.315	4.5	0.179	3.24	2.17	XS
1 1/4	42.2	1.660	3.6	0.140	3.39	2.27	STD
1 1/4	42.2	1.660	4.9	0.191	4.47	3.00	XS
1 1/2	48.3	1.900	3.7	0.145	4.05	2.72	STD
1 1/2	48.3	1.900	5.1	0.200	5.40	3.63	XS
2 3/8	60.3	2.375	2.1	0.083	3.02	2.03	STD
2 3/8	60.3	2.375	2.8	0.109	3.93	2.64	STD
2 3/8	60.3	2.375	3.2	0.125	4.47	3.00	STD
2 3/8	60.3	2.375	3.6	0.141	5.00	3.36	STD
2 3/8	60.3	2.375	3.9	0.154	5.43	3.65	STD
2 3/8	60.3	2.375	4.4	0.172	6.03	4.05	STD
2 3/8	60.3	2.375	4.8	0.188	6.54	4.39	STD
2 3/8	60.3	2.375	5.5	0.218	7.48	5.02	STD
2 3/8	60.3	2.375	6.4	0.250	8.45	5.76	STD
2 3/8	60.3	2.375	7.1	0.281	9.36	6.28	STD
2 7/8	73.0	2.875	3.6	0.141	6.13	4.12	STD
2 7/8	73.0	2.875	4.0	0.156	6.75	4.53	STD
2 7/8	73.0	2.875	4.4	0.172	7.40	4.97	STD
2 7/8	73.0	2.875	4.8	0.188	8.04	5.4	STD
2 7/8	73.0	2.875	5.2	0.203	8.62	5.79	STD
2 7/8	73.0	2.875	5.5	0.216	9.13	6.13	STD
2 7/8	73.0	2.875	6.4	0.250	10.44	7.01	STD
2 7/8	73.0	2.875	7.0	0.276	11.41	7.66	STD
3 1/2	88.9	3.500	4.0	0.156	8.29	5.57	STD
3 1/2	88.9	3.500	4.4	0.172	9.10	6.11	STD
3 1/2	88.9	3.500	4.8	0.188	9.90	6.65	STD
3 1/2	88.9	3.500	5.5	0.216	11.29	7.58	STD
3 1/2	88.9	3.500	6.4	0.250	12.93	8.68	STD
3 1/2	88.9	3.500	7.1	0.281	14.38	9.66	STD
3 1/2	88.9	3.500	7.6	0.300	15.26	10.25	STD
4	101.6	4.000	5.7	0.226	13.57	9.11	STD
4	101.6	4.000	6.4	0.250	14.91	10.01	STD
4	101.6	4.000	7.1	0.281	16.62	11.16	STD
4	101.6	4.000	8.1	0.318	18.61	12.50	STD
4 1/2	114.3	4.500	5.2	0.203	13.88	9.32	STD
4 1/2	114.3	4.500	5.6	0.219	14.91	10.01	STD
4 1/2	114.3	4.500	6.0	0.237	16.07	10.79	STD
4 1/2	114.3	4.500	6.4	0.250	16.90	11.35	STD
4 1/2	114.3	4.500	7.1	0.281	18.85	12.66	STD
4 1/2	114.3	4.500	7.9	0.312	20.79	13.96	STD
4 1/2	114.3	4.500	8.6	0.337	22.31	14.98	STD
4 1/2	114.3	4.500	11.1	0.438	28.30	19.00	STD
5 9/16	141.3	5.563	5.6	0.219	18.61	12.50	STD
5 9/16	141.3	5.563	6.6	0.258	21.77	14.62	STD
5 9/16	141.3	5.563	7.1	0.281	23.61	15.85	STD
5 9/16	141.3	5.563	7.9	0.312	26.06	17.50	STD
5 9/16	141.3	5.563	8.7	0.344	28.55	19.17	STD
5 9/16	141.3	5.563	9.5	0.375	30.95	20.78	STD
5 9/16	141.3	5.563	12.7	0.500	40.28	27.04	STD
6 5/8	168.3	6.625	6.4	0.250	25.35	17.02	-
6 5/8	168.3	6.625	7.1	0.280	28.22	18.97	STD
6 5/8	168.3	6.625	7.9	0.312	31.25	21.04	
6 5/8	168.3	6.625	8.7	0.344	34.24	23.08	
6 5/8	168.3	6.625	9.5	0.375	37.20	25.03	
6 5/8	168.3	6.625	11.0	0.432	42.67	28.57	XS
6 5/8	168.3	6.625	12.7	0.500	48.73	32.71	
6 5/8	168.3	6.625	14.3	0.562	54.31	36.39	
6 5/8	168.3	6.625	15.9	0.625	59.76	40.05	
6 5/8	168.3	6.625	18.3	0.750	67.69	45.35	
6 5/8	168.3	6.625	19.1	0.864	70.27	47.06	XXS
6 5/8	168.3	6.625	22.2	0.875	79.98	53.73	
8 5/8	219.1	8.625	7.0	0.277	36.61	24.70	
1	2	3	4	5	6	7	8

PIPE SIZE RANGE AS PER API* SPEC 5L (CONTINUED)

Nominal size	Outside diameter		Wall thickness		Weight per unit length		Schedule
	mm	inch	mm	inch	kg/m	lb/ft	
1	2	3	4	5	6	7	8
8 5/8	219.1	8.625	7.9	0.312	41.14	27.70	
8 5/8	219.1	8.625	8.18	0.322	42.55	28.58	STD
8 5/8	219.1	8.625	8.74	0.344	45.34	30.45	
8 5/8	219.1	8.625	9.53	0.375	49.25	33.07	
8 5/8	219.1	8.625	11.13	0.438	57.08	38.33	
8 5/8	219.1	8.625	12.70	0.500	64.64	43.43	XS
8 5/8	219.1	8.625	14.27	0.562	72.08	48.44	
8 5/8	219.1	8.625	15.88	0.625	79.59	53.45	
8 5/8	219.1	8.625	18.26	0.719	90.44	60.77	
8 5/8	219.1	8.625	19.05	0.750	93.98	63.14	
8 5/8	219.1	8.625	20.62	0.812	100.93	67.82	
8 5/8	219.1	8.625	22.23	0.875	107.93	72.49	XXS
8 5/8	219.1	8.625	25.40	1.000	121.33	81.51	
10 3/4	273.0	10.750	7.80	0.307	51.01	34.27	
10 3/4	273.0	10.750	8.74	0.344	56.96	38.27	
10 3/4	273.0	10.750	9.27	0.365	60.29	40.52	STD
10 3/4	273.0	10.750	11.13	0.438	71.88	48.28	
10 3/4	273.0	10.750	12.70	0.500	81.53	54.79	XS
10 3/4	273.0	10.750	14.27	0.562	91.05	61.21	
10 3/4	273.0	10.750	15.88	0.625	100.69	67.65	
10 3/4	273.0	10.750	18.26	0.719	114.71	77.10	
10 3/4	273.0	10.750	20.62	0.812	128.34	86.26	
10 3/4	273.0	10.750	22.23	0.875	137.48	92.37	
10 3/4	273.0	10.750	23.83	0.938	146.43	98.39	
10 3/4	273.0	10.750	25.40	1.000	155.10	104.23	XXS
12 3/4	323.8	12.750	8.74	0.344	67.31	45.62	
12 3/4	323.8	12.750	9.53	0.375	73.86	49.61	STD
12 3/4	323.8	12.750	10.31	0.406	79.71	53.57	
12 3/4	323.8	12.750	11.13	0.438	85.82	57.65	
12 3/4	323.8	12.750	12.70	0.500	97.44	65.48	XS
12 3/4	323.8	12.750	14.27	0.562	108.93	73.22	
12 3/4	323.8	12.750	15.88	0.625	120.53	81.01	
12 3/4	323.8	12.750	17.48	0.688	132.05	88.71	
12 3/4	323.8	12.750	19.05	0.750	143.17	96.21	
12 3/4	323.8	12.750	20.62	0.812	154.17	103.63	
12 3/4	323.8	12.750	22.23	0.875	165.33	111.08	
12 3/4	323.8	12.750	23.83	0.938	176.29	118.44	
12 3/4	323.8	12.750	25.40	1.000	186.92	125.61	XXS
12 3/4	323.8	12.750	26.97	1.062	197.43	132.69	
14	355.6	14.000	9.53	0.375	81.33	54.62	STD
14	355.6	14.000	10.31	0.406	87.79	59.00	
14	355.6	14.000	11.13	0.438	94.55	63.50	
14	355.6	14.000	11.91	0.469	100.95	67.84	
14	355.6	14.000	12.70	0.500	107.40	72.16	XS
14	355.6	14.000	14.27	0.562	120.12	80.73	
14	355.6	14.000	15.88	0.625	133.04	89.36	
14	355.6	14.000	17.48	0.688	145.76	97.91	
14	355.6	14.000	19.05	0.750	158.11	106.23	
14	355.6	14.000	20.62	0.812	170.34	114.48	
14	355.6	14.000	22.23	0.875	182.76	122.77	
14	355.6	14.000	23.83	0.938	194.98	130.98	
14	355.6	14.000	25.40	1.000	206.84	138.97	
14	355.6	14.000	26.97	1.062	218.58	146.88	
16	406.4	16.000	11.91	0.469	115.87	77.87	
16	406.4	16.000	12.70	0.500	123.31	82.85	XS
16	406.4	16.000	14.27	0.562	138.00	92.75	
16	406.4	16.000	15.88	0.625	152.94	102.72	
16	406.4	16.000	17.48	0.688	167.66	112.62	
16	406.4	16.000	19.05	0.750	181.98	122.27	
16	406.4	16.000	20.62	0.812	196.18	131.84	
16	406.4	16.000	22.23	0.875	210.61	141.48	
16	406.4	16.000	23.83	0.938	224.83	151.03	
16	406.4	16.000	25.40	1.000	238.66	160.35	
16	406.4	16.000	26.97	1.062	252.37	169.59	
1	2	3	4	5	6	7	8

MECHANICAL PROPERTIES OF PIPES

Property	TU 1308-226 -0147016	TU 1317-214 -00147016	TU 14-161-174	TU 14-161-147 TU 14-161-148	TU 14-3P-91		TU 1317-0061-593377520				
	Property value for the steel grade or pipe grade						Property value for the steel grade				
	20F	20F(20FA)	20Ds. 20		K48	K50	K48	K50	K52	K54	K56
Ultimate tensile strength. σ_{UTS} . N/mm ² (kgf/mm ²). min max	512 (52.0) -	539 (55.0) -	502 (51.2) 590 (61.0)	502 (51.2) 590 (61.0)	470 (48.0)	510 (52.0)	470 (47.9)	491 (50.1)	510 (52.0)	530 (54.1)	549 (56.0)
Yield strength. σ_y . N/mm ² (kgf/mm ²). min max	386 (39.3) 512 (52.0)	302 (39.0) 529 (54.0)	338 (34.5) 470 (40.0)	330 (34.5) 470 (40.0)	294 (30.0)	353 (36.0)	338 (34.5) 451 (46.0)	343 (35.0) 470 (48.0)	372 (38.0) 491 (50.1)	383 (39.1) 510 (52.0)	392 (40.0) 539 (55.0)
Ratio σ_y/σ_{UTS} . max	0.85	0.85	0.80	0.80		-	0.80	0.80	0.85	0.85	0.85
Hardness. HRB. max	93.0		92.0	92.0		-	92.0	92.0	92.0	92.0	92.0
Elongation. δ_5 . %. min	25.0	25.0	25.0	25.0	22.0	20.0	25.0	25.0	23.0	23.0	23.0
Impact strength on Charpy and Mesnager specimens. kJ/m ² (kgf/cm ²). min at: KCV-20°C; KCV-40°C; KCV-60°C; KCU-70°C; KCU-60°C. for pipes with wall thickness from 5 to 10 mm incl.. over 10 to 15 mm. over 15 to 26 mm KCV-20° C KCV-50° C	90 (10)	98 (10)	196 (20) 147 (15) 98 (10)	147 (15) 90 (10) - 69 (7)		29.4 (3.0) 39.2 (4.0) 49.0 (5.0) 39.2 (4.0)	98 (10)	98 (10)	98 (10)	98 (10)	98 (10)
Shear area fraction. min % at t° -60 °C at t° -50 °C	70	70	50	-	-		50	50	50	50	50

MECHANICAL PROPERTIES OF PIPES

Property	TU 14-3P-124-2017		TU 14-3P-90	TU 14-3-1128. TU 14-3P-1128			
	Property value for the steel grade or pipe grade			Property value for the steel grade			
	13 KhFA (48)	08KhMFChA (52)	12GB (X42SS)	10	20	10G2A	09G2S
Ultimate tensile strength. σ_{UTS} . N/mm ² (kgf/mm ²). min	412 (42)	510 (52)	412.0 (42.0)	353 (36)	412 (42)	421 (43)	470 (48)
Yield strength σ_y . N/mm ² (kgf/mm ²). min	245 (25)	343 - 510	289.0 - 402.0 (29.5) - (41.0)	216 (22)	245 (25)	265 (27)	265 (27)
Hardness. max HRB HB	-	92	200	-	-	-	-
Elongation. δ_5 . %. min	21	23	28.0	24.0	21.0	21.0	21
Contraction. ψ . %. min	-	-	35.0	-	-	-	-
Ratio σ_y/σ_{UTS} . max	-	0.85	0.85	-	-	-	-
Impact strength. min KCV ⁻⁶⁰ . J/cm ² (kgf/cm ²)	-	98 (10)	-	-	-	-	29.4 (3.0)
Shear area fraction after the KCV impact strength test at the temperature of -60 °C. %. min	-	70	-	-	-	-	-
Impact strength. KCV ⁻⁶⁰ . J/cm ² (kgf/cm ²). min. for longitudinal specimens for transverse specimens	-	-	98 (10) 49 (5)	-	-	29.4 (3.0)	29.4 (3.0)
Impact strength. KCV ⁻⁶⁰ . J/cm ² (kgf/cm ²). min. for longitudinal specimens for transverse specimens Wall thickness up to 10 mm incl. Wall thickness from 11 to 15 mm incl. Wall thickness over 15 mm	-	-	-	29.4 (3.0) 29.4 (3.0) 29.4 (3.0)	29.4 (3.0) - -	-	-
Impact strength. min KCV ⁻⁶⁰ . J/cm ² (kgf/cm ²). Wall thickness up to 10 mm incl. Wall thickness from 11 to 15 mm incl. Wall thickness over 15 mm	29.4 (3)	-	-	-	-	29.4 (3.0) 39.2 (4.0) 49.0 (5.0)	29.4 (3.0) 39.2 (4.0) 49.0 (5.0)
Impact strength. min KCV ⁻⁶⁰ . J/cm ² (kgf/cm ²). Wall thickness up to 10 mm incl. Wall thickness from 11 to 15 mm incl. Wall thickness over 15 mm	-	-	-	29.4 (3.0) 39.2 (4.0) 49.0 (5.0)	29.4 (3.0) 39.2 (4.0) 49.0 (5.0)	-	-
Impact strength. min KCV ⁻⁶⁰ . J/cm ² (kgf/cm ²)	-	-	-	-	-	-	29.4 (3.0)

TENSILE REQUIREMENTS FOR PSL 1 AS PER API* SPEC 5L

Pipe grade	Seamless or welded pipe body		
	Yield strength R _{0.2S} . MPa (psi). minimum	Tensile strength R _m . MPa (psi). minimum	Elongation A _p . %. minimum
L175 or A25	175 (25.400)	310 (45.000)	a
L175P or A25P	175 (25.400)	310 (45.000)	a
L210 or A	210 (30.500)	335 (48.600)	a
L245 or B	245 (35.500)	415 (60.200)	a
L290R or X42R; L290 or X42	290 (42.100)	415 (60.200)	a
L320 or X46	320 (46.400)	435 (63.100)	a
L360 or X52	360 (52.200)	460 (66.700)	a
L390 or X56	390 (56.600)	490 (71.100)	a
L415 or X60	415 (60.200)	520 (75.400)	a
L450 or X65	450 (65.300)	535 (77.600)	a
L485 or X70	485 (70.300)	570 (82.700)	a

TENSILE REQUIREMENTS FOR PSL 2 AS PER API* SPEC 5L

Pipe grade	Seamless and welded pipe body				R _{0.5} ^b / R _m Ratio maximum	Elongation. A _c . %. minimum
	Yield strength R _{0.5} ^b . MPa(psi)		Tensile strength R _m . MPa (psi)			
	minimum	maximum	minimum	maximum		
L245R or BR L245N or BN	245 (35.500)	450 (65.300)	415 (60.200)	760 (110.200)	0.93	a
L290R or X42R L290N or X42N	290 (42.100)	495 (71.800)	415 (60.200)	760 (110.200)	0.93	a
L320N or X46N	320 (46.400)	525 (76.100)	435 (63.100)	760 (110.200)	0.93	a
L360N or X52N L360Q or X52Q	360 (52.200)	530 (76.900)	460 (66.700)	760 (110.200)	0.93	a
L390Q or X56Q	390 (56.600)	545 (79.000)	490 (71.100)	760 (110.200)	0.93	a
L415Q or X60Q	415 (60.200)	565 (81.900)	520 (75.400)	760 (110.200)	0.93	a
L450Q or X65Q	450 (65.300)	600 (87.000)	535 (77.600)	760 (110.200)	0.93	a
L485Q or X70Q	485 (70.300)	635 (92.100)	570 (82.700)	760 (110.200)	0.93	a
L555Q or X80Q	555 (80.500)	705 (102.300)	625 (90.600)	825 (119.700)	0.93	a

Note: a is determined by the formula given in API* Spec 5L.

TENSILE REQUIREMENTS FOR PSL 2 FOR SOUR SERVICE AS PER API* SPEC 5L

Pipe grade	Seamless and welded pipe body					Elongation, A _e %.
	Yield strength R _{0.2} ^a , MPa(psi)		Tensile strength R _m , MPa (psi)		R _{0.2} ^b / R _m Ratio maximum	
	minimum	maximum	minimum	maximum		
L245NS or BNS	245 (35.500)	450 (65.300)	415 (60.200)	760 (110.200)	0.93	a
L290NS or X42NS	290 (42.100)	495 (71.800)	415 (60.200)	760 (110.200)	0.93	a
L360NS or X52NS L360QS or X52QS	360 (52.200)	530 (76.900)	460 (66.700)	760 (110.200)	0.93	a
L390QS or X56QS	390 (56.600)	545 (79.000)	490 (71.100)	760 (110.200)	0.93	a
L415QS or X60QS	415 (60.200)	565 (81.900)	520 (75.400)	760 (110.200)	0.93	a
L450QS or X65QS	450 (65.300)	600 (87.000)	535 (77.600)	760 (110.200)	0.93	a

TENSILE REQUIREMENTS FOR PSL 2 FOR OFFSHORE SERVICE AS PER API* SPEC 5

Pipe grade	Seamless and welded pipe body					
	Yield strength R _{0.2S} ^a , MPa(psi)		Tensile strength R _m , MPa (psi)		R _{0.2S} ^b / R _m Ratio maximum	Elongation, A _p , %. minimum
	minimum	maximum	minimum	maximum		
L245NO or BNO	245 (35.500)	450* (65.300)*	415 (60.200)	760 (110.200)	0.93	a
L290NO or X42NO	290 (42.100)	495 (71.800)	415 (60.200)	760 (110.200)	0.93	a
L360NO or X52NO	360 (52.200)	525 (76.000)	460 (66.700)	760 (110.200)	0.93	a
L390QO or X56QO	390 (56.600)	540 (78.300)	490 (71.100)	760 (110.200)	0.93	a
L415QO or X60QO	415 (60.200)	565 (81.900)	520 (75.400)	760 (110.200)	0.93	a
L450QO or X65QO	450 (65.300)	570 (82.700)	535 (77.600)	760 (110.200)	0.93	a

Note: a is determined by the formula given in API* Spec 5L.

REQUIREMENTS FOR THE CHEMICAL COMPOSITION OF THE HEAT AND THE PRODUCT IN WEIGHT PERCENT FOR PSL 1 AS PER API* 5L

Steel grade (name of steel)	Mass fraction according to heat and product analysis ^c . %							
	C maximum ^b	Mn maximum ^b	P		S maximum	V maximum	Nb maximum	Ti maximum
			minimum	maximum				
L175 or A25	0.21	0.60	—	0.030	0.030	—	—	—
L175P or A25P	0.21	0.60	0.045	0.080	0.030	—	—	—
L210 or A	0.22	0.90	—	0.030	0.030	—	—	—
L245 or B	0.28	1.20	—	0.030	0.030	c. d	c. d	d
L290 or X42	0.28	1.30	—	0.030	0.030	d	d	d
L320 or X46	0.28	1.40	—	0.030	0.030	d	d	d
L360 or X52	0.28	1.40	—	0.030	0.030	d	d	d
L390 or X56	0.28	1.40	—	0.030	0.030	d	d	d
L415 or X60	0.28 ^e	1.40 ^e	—	0.030	0.030	f	f	f
L450 or X65	0.28 ^e	1.40 ^e	—	0.030	0.030	f	f	f
L485 or X70	0.28 ^e	1.40 ^e	—	0.030	0.030	f	f	f
a – Maximum 0.50% for copper. maximum 0.50% for nickel. maximum 0.50% for chromium. and maximum 0.15% for molybdenum. For steel grades or pipes grades up to and including L360/X52. Cu. Cr and Ni should not be added intentionally. b – For each 0.01% of carbon content reduction below its specified maximum content. manganese content can be increased by 0.05% above its specified maximum content to a maximum of 1.65% for grades ≥ L245 or B. but ≤ L360 or X52; a maximum of 1.75% for grades > L360 or X52. but < L485 or X70; and a maximum of 2.00% for L485 or X70. c – Unless otherwise agreed. total niobium and vanadium content should be ≤ 0.06%. d – Total content of niobium. vanadium and titanium should be ≤ 0.15%. e – Unless otherwise agreed. f – Unless otherwise agreed. total niobium. vanadium and titanium content should be ≤ 0.15%.								

REQUIREMENTS FOR THE CHEMICAL COMPOSITION OF THE HEAT AND THE PRODUCT IN WEIGHT PERCENT FOR PSL 2 AS PER API* 5L

Steel grade (name of steel)	Mass fraction according to heat and product analysis. %. maximum									Carbon equivalenta. %. maximum	
	C ^b	Si	Mn ^a	P	S	V	Nb	Ti	Other	CE _{IIW}	CE _{rem}
L245R or BR	0.24	0.40	1.20	0.025	0.015	c	c	0.04	e	0.43	0.25
L290R or X42R	0.24	0.40	1.20	0.025	0.015	0.06	0.05	0.04	e	0.43	0.25
L245N or BN	0.24	0.40	1.20	0.025	0.015	c	c	0.04	e	0.43	0.25
L290N or X42N	0.24	0.40	1.20	0.025	0.015	0.06	0.05	0.04	e	0.43	0.25
L320N or X46N	0.24	0.40	1.40	0.025	0.015	0.07	0.05	0.04	d,e	0.43	0.25
L360N or X52N	0.24	0.45	1.40	0.025	0.015	0.10	0.05	0.04	d,e	0.43	0.25
L360Q or X52Q	0.18	0.45	1.50	0.025	0.05	0.05	0.05	0.04	e	0.43	0.25
L390Q or X56Q	0.18	0.45	1.50	0.025	0.015	0.07	0.05	0.04	d,e	0.43	0.25
L415Q or X60Q	0.18 ^f	0.45 ^f	1.70 ^f	0.025	0.015	g	g	g	h	0.43	0.25
L450Q or X65Q	0.18 ^f	0.45 ^f	1.70 ^f	0.025	0.015	g	g	g	h	0.43	0.25
L485Q or X70Q	0.18 ^f	0.45 ^f	1.80 ^f	0.025	0.015	g	g	g	h	0.43	0.25
L555Q or X80Q	0.18 ^f	0.45 ^f	1.90 ^f	0.025	0.015	g	g	g	ij	As agreed	
a – According to the product analysis results. Maximum carbon equivalent for seamless pipes with t > 20,0 mm (0,787 in.) is subject to agreement. The CEIIW limit value applies if C > 0,12%. The CEPcm limit value applies if the mass fraction of C ≤ 0,12%. b – For each 0,01% of carbon content reduction below its specified maximum content, manganese content can be increased by 0,05% above its specified maximum content to a maximum of 1,65% for grades ≥ L245 or B, but ≤ L360 or X52; a maximum of 1,75% for grades > L360 or X52, but < L485 or X70; a maximum of 2,00% for grades ≥ L485 or X70, but ≤ L555 or X80; and a maximum of 2,20% for grades > L555 or X80. c – Unless otherwise agreed, total niobium and vanadium content should be ≤ 0,06%. d – Total content of niobium, vanadium and titanium should be ≤ 0,15%. e – Unless otherwise agreed, maximum 0,50% for copper, maximum 0,30% for nickel, maximum 0,30% for chromium and maximum 0,15% for molybdenum. f – Unless otherwise agreed. g – Unless otherwise agreed, total niobium, vanadium and titanium content should be ≤ 0,15%. h – Unless otherwise agreed, maximum 0,50% for copper, maximum 0,50% for nickel, maximum 0,50% for chromium, and maximum 0,50% for molybdenum. i – Unless otherwise agreed, maximum 0,50% for copper, maximum 1,00% for nickel, maximum 0,50% for chromium, and maximum 0,50% for molybdenum. j – Maximum 0,004 0% for boron.											

REQUIREMENTS FOR THE CHEMICAL COMPOSITION OF THE HEAT AND THE PRODUCT IN WEIGHT PERCENT FOR PSL 2, SOUR SERVICE, AS PER API* 5L

Steel grade	Mass fraction according to heat and product analysis. %. maximum									Carbon equivalenta. %. maximum	
	C ^b	Si	Mn ^b	P	S	V	Nb	Ti	Other ^{c,d}	CE _{eqV}	CE _{eqNb}
L245NS or BNS	0.14	0.40	1.35	0.020	0.003 ^a	f	f	0.04	g	0.36	0.19 ^h
L290NS or X42NS	0.14	0.40	1.35	0.020	0.003 ^a	0.05	0.05	0.04	—	0.36	0.19 ^h
L360NS or X52NS	0.16	0.45	1.65	0.020	0.003 ^a	0.10	0.05	0.04	g	0.43	0.22 ^h
L360QS or X52QS	0.16	0.45	1.65	0.020	0.003 ^a	0.07	0.05	0.04	g	0.39	0.20 ^h
L390QS or X56QS	0.16	0.45	1.65	0.020	0.003 ^a	0.07	0.05	0.04	g	0.40	0.21 ^h
L415QS or X60QS	0.16	0.45	1.65	0.020	0.003 ^a	0.08	0.05	0.04	g, i, k	0.41	0.22 ^h
L450QS or X65QS	0.16	0.45	1.65	0.020	0.003 ^a	0.09	0.05	0.06	g, i, k	0.42	0.22 ^h
a – According to the product analysis results (see 9.2.4 and 9.2.5). CEIIW limit values apply to carbon mass content > 0,12%, CEPcm limit values apply to carbon mass content ≤ 0,12%. b – For each 0,01% of carbon content reduction below its specified maximum content, manganese content can be increased by 0,05% above its specified maximum content but no more than by 0,20%. c – Total aluminum ≤ 0,060%, nitrogen ≤ 0,012%, AL/N ≥ 2:1 (not applicable to steels deoxidized with titanium or treated with titanium); Cu 0,35% (if agreed, Cu ≤ 0,10%); Ni ≤ 0,30%; Cr ≤ 0,30%; Mo ≤ 0,15%; B ≤ 0,0005%. d – Unless otherwise agreed, in case of welded pipes with Ca intentionally added to steel, Ca/S ≥ 1,5 if S > 0,0015%. For seamless and welded pipes, Ca content ≤ 0,006%. e – Maximum S content may be increased for seamless pipes to ≤ 0,008% and for welded pipes, by agreement, to ≤ 0,006%. In this case, a lower Ca/S ratio can be agreed for welded pipes. f – Unless otherwise agreed, total niobium and vanadium content should be ≤ 0,06%. g – Total content of niobium, vanadium and titanium should be ≤ 0,15%. h – For seamless pipes, this value may be increased by 0,03%. i – Subject to agreement, molybdenum content should be ≤ 0,35%. j – Subject to agreement, chromium content should be ≤ 0,45%. k – Subject to agreement, Cr content should be ≤ 0,45%, Ni ≤ 0,50%.											

REQUIREMENTS FOR THE CHEMICAL COMPOSITION OF THE HEAT AND THE PRODUCT IN WEIGHT PERCENT FOR PSL 2, OFFSHORE SERVICE, AS PER API* 5L

Steel grade	Mass fraction according to heat and product analysis. %. maximum									Carbon equivalenta. %. maximum	
	C ^b	Si	Mn ^b	P	S	V	Nb	Ti	Other ^c	CE _{eqV}	CE _{eqNb}
L245NO or BNO	0.14	0.40	1.35	0.020	0.010	d	d	0.04	e,f	0.36	0.19 ^h
L290NO or X42NO	0.14	0.40	1.35	0.020	0.010	0.05	0.05	0.04	f	0.36	0.19 ^h
L360NO or X52NO	0.16	0.45	1.65	0.020	0.010	0.10	0.05	0.04	e	0.43	0.22 ^h
L390QO or X56QO	0.16	0.45	1.65	0.020	0.010	0.07	0.05	0.04	e,h	0.40	0.21 ^h
L415QO or X60QO	0.16	0.45	1.65	0.020	0.010	0.08	0.05	0.04	e,h	0.41	0.22 ^h
L450QO or X65QO	0.16	0.45	1.65	0.020	0.010	0.09	0.05	0.06	e,h	0.42	0.22 ^h
a – According to the product analysis results (see 9.2.4 and 9.2.5). CEIIW limit values apply to carbon mass content > 0,12%, CEPcm limit values apply to carbon mass content ≤ 0,12%. b – For each 0,01% of carbon content reduction below its specified maximum content, manganese content can be increased by 0,05% above its specified maximum content but no more than by 0,20%. c – Total AL ≤ 0,060%, N ≤ 0,012%, AL/N ≥ 2:1 (does not apply to steels deoxidized with titanium or treated with titanium). d – Unless otherwise agreed, total niobium and vanadium content should be ≤ 0,06%. e – Total content of niobium, vanadium and titanium should be ≤ 0,15%. f – Cu ≤ 0,30%, Ni ≤ 0,30%, Cr ≤ 0,30%, Mo ≤ 0,10%, B ≤ 0,0005%. g – For seamless pipes, this value may be increased by 0,03% to a maximum of 0,25%. h – Cu ≤ 0,50 %, Ni ≤ 0,50%, Cr ≤ 0,50%, Mo ≤ 0,50%, B ≤ 0,0005%.											

PIPES FOR UNDERWATER PIPELINES

These pipes are intended for the construction of underwater crossings and offshore pipelines for the transportation of liquid and gaseous hydrocarbons and other media

FEATURES

Seamless steel pipes for offshore subsea pipelines are manufactured by hot forming (rolling) of steel billets using the technology that provides a fine-grained steel structure, required purity of steel for harmful impurities and non-metallic inclusions. Pipes undergo bulk heat treatment according to the established manufacturing procedures for obtaining final operating characteristics.

By agreement with the Customer, the pipes can be supplied with an external anti-corrosion and internal flow coating, as well as with weighted concrete covering, applied in accordance with additionally agreed technical requirements.

Nominal sizes of underwater pipelines shall be in accordance with requirements in Table 1.

Longitudinal electric-welded steel pipes are manufactured by electric arc welding.

Distinctive features of these products are strict requirements for geometric parameters (outer diameter, wall thickness, ovality, curvature), as well as requirements for the quality of the outer and inner surface of the pipe and pipe integrity.

TABLE 1. STANDARDS

Standards	Pipe dimensions			Steel grade/ category/ pipe grade
	Outside diameter, mm	Wall thickness, mm	Length, m	
1	2	3	4	5
TU 14-156-93-2012 Seamless steel pipes for offshore subsea pipelines	114-426	6.0-26.0	10.5-12.5	Categories PCT36; PCT40; PCT420; PCT500; PCT550 or steel grades X52; X60; X65; X70; X80
TU 14-3P-156-2021 Seamless steel oil and gas line pipes resistant to local elevated deformations	114-355	10.0-25.0	8.0-12.2	X65Q; X65QO
TU 14-3P-176-2021 Seamless steel oil and gas line pipes resistant to local elevated deformations	57-426	4.5-36.0	10.5-12.6	Steel grades K52; K56; K60 and L390; L415; L450; L485; X56; X60; X65; X70
TU 24.20.21-205-57357928-2022 Longitudinal electric-welded steel pipes with outer diameter from 530 mm to 1,220 mm for offshore gas pipelines	530-1220	8.0-14.0	20FA; 13KhFA	245-485 MPa (SMYS)
TU 24.20.21-213-57357928-2022 Longitudinal electric-welded steel pipes for offshore subsea pipelines (PMPC)	530-820	15.0-27.0	10.5-12.35	X60; X65; X70; SAWL 415 IFD; SAWL 450 IFD; SAWL 485 IFD
TU 24.20.21-021-57357928-2022 Longitudinal electric-welded steel pipes for coastal (onshore) and offshore field pipelines	508; 514; 813; 820	27.0; 30.1; 30.2; 32.2; 38.7; 40.8; 45.8; 46.8	6.0-12.6	K60; X65; 450 IFD
TU 24.20.21-039-57357928-2022 Longitudinal electric-welded steel pipes for offshore pipelines	508-1220	8.0-41.0	10.5-12.2	X60; X65; X70; SAWL 415 IFD; SAWL 450 IFD; SAWL 485 IFD
API* Spec 5L Pipes for pipelines (Seamless) Pipes for pipelines (LSAW)	168.3-426 508.0-1422.4	7.1-34.8 7.0-46.0	7.5-12.5 10.0-18.3	B (L245); X42 (L290); X46 (L320); X52 (L360); X56 (L390); X60 (L415); X65 (L450); X70 (L485); X80 (L555)
DNV-ST-F101 Submarine pipeline systems (seamless)	219.0-426.0	7.0-31.0	8.0-12.5	250-450
DNV-OS-F101 Submarine pipeline systems (LSAW)	508-1422	8.0-45.0	10.5-12.5	245-555 (F; D; I)
1	2	3	4	5

PIPES FOR TRUNK PIPELINES

2

Large diameter pipes	43
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LARGE DIAMETER PIPES

Longitudinally electric-welded large diameter steel pipes are designed for the construction of main oil and gas pipelines, including submarine pipelines, field oil pipelines, general-purpose pipelines, thermal power plant pipelines, water supply systems, and metal structure construction

FEATURES

TMK produces both single-seam longitudinally welded pipes (diameter 1,020–1,220 mm) and double-seam longitudinally welded pipes made from two half-cylinders. In addition, TMK has a section that produces double-seam pipes with diameter ranging from 1,520 mm to 2,520 mm for general purposes, building structures, etc.

TMK in its production lines uses all three pipe forming processes used globally to manufacture longitudinally welded large-diameter pipes.

These are three-roll bending (TRB), press forming (UO), and step-by-step forming (JCO).

The TMK’s production lines can produce pipes with lengths of up to 18 m and grades of up to K80 (Russian classification) and up to X100, L690 (ISO and API* classification).

TMK’s plants use the most advanced technologies and highly automated processes to produce state-of-the-art pipe. The process solutions and product quality are continuously improved.

TMK has implemented and utilizes a unique hybrid laser-arc welding technology for longitudinal pipe seams, which is unique to the industry.

STANDARDS

Standards	Pipes dimensions		Steel grade
	Outside diameter, mm	Wall thickness, mm	
1	2	3	4
GOST 10706-76 / GOST 10704-91 Longitudinally electric-welded steel pipes	508-1,420	7-48	St3sp; 20; low-alloy steel
	1,520-2,520	12-35	
GOST 20295-85 Welded steel pipes for main oil and gas pipelines	508-1,420	7.0-48.0	K34; K38; K42; K48; K50; K52; K54; K55; K56; K60
GOST 31447-2012 Welded steel pipes for main gas, oil, and petroleum product pipelines	530-1,420	7.0-48.0	K34; K38; K42; K48; K50; K52; K54; K55; K56; K60
GOST 33228-2015 General-purpose welded steel pipes	508-1,422	7-48	KP235; KP245; KP265; KP245; KP265; KP345; KP355; KP380; KP390; KP410; KP460
	1,520-2,520	12-35	
GOST R 58064-2018 Welded steel pipes for building structures	508-1,420	8.0-48.0	C245 - C440
GOST ISO 3183-2015 Steel pipes for pipelines of the oil and gas industry	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
TU 14-3-1698-2000 Longitudinally electric-welded steel pipes with diameters of 1,020 and 1,220 mm for oil and gas pipelines	1,020-1,220	10-22	17G1S-U, 13GS-U, 12GSB, 13G1S-U, 08GBYU, 09GSF, 10G2FBYU, 12GSB, 12G2SB, 10G2FBYU
TU 14-158-153-05 Longitudinally electric-welded steel pipes with diameters of 1,020 and 1,220 mm for oil and gas pipelines	1,020-1,220	10-22	17G1S-U (K52), 13GS-U (K52), 13G1S-U (K55), 12GSB (K52), 12G2SB (K56), 09GSF (K52), 10G2FBYU (K60)
TU 14-3P-1270-2009 Longitudinally electric-welded steel pipes with diameters of 530, 720, and 820 mm for main oil and gas pipelines	530-820	7.0-15.0	17GS; 17G1S; 17G1S-U; 13GS; 13GSU; 13G1SU; 08GBYU; 09GBYU; 12GSB; 12G2SB; 08GINFBYU; 10G2FBYU; 09GSF; pipe grades K52-K60
TU 24.20.21-001-57357928-2022 Longitudinally electric-welded steel pipes made of K60 steel grade for main gas pipelines with an operating pressure of 11.8 MPa and field gas pipelines with an operating pressure of 12.9 MPa	530-1,420	9.9-37.9	K60
TU 24.20.21-006-57357928-2022 Longitudinally electric-welded steel pipes of K65 pipe grade with a diameter of 1,420 mm for main gas pipelines with an operating pressure of 11.8 MPa	1,420	23.0 27.7 33.4	K65
TU 24.20.21-012-57357928-2022 Longitudinally electric-welded steel pipes for the manufacture of protective casings (jackets) with a diameter of 530-1,420 mm	530-1,420	15.2-32.0	K34; K38; K42; K48; K50; K52; K54; K55
TU 24.20.21-016-57357928-2022 Longitudinally electric-welded steel pipes with diameters ranging from 508 to 1,420 mm for main gas pipelines with an operating 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 24.20.21-018-57357928-2022 Longitudinally electric-welded steel pipes with diameters ranging from 530 to 1,220 mm for pipelines	530-1,220	7.0-35.0	K50; K52; K54; K55; K56; K60
TU 24.20.21-020-57357928-2022 Longitudinally electric-welded steel pipes with diameters from 530 to 1,420 mm, featuring improved weldability and cold resistance for steel building structures	530-1,420	7.0-45.0	K52; K54; K56; K60 X56; X60; X65; X70
TU 24.20.21-027-57357928-2022 Longitudinally electric-welded steel pipes with diameters ranging from 530 to 1,420 mm for main gas pipelines crossing zones of active tectonic faults designed for operating pressures of up to 9.8 MPa inclusive	530-1,420	8.0-40.0	K52; K54; K55; K56; K60 X52; X56; X60; X65; X70
TU 24.20.21-060-57357928-2022 Hydrogen sulfide-resistant longitudinally electric-welded steel pipes designed for the construction and repair of pipelines in Central Asia	530-1,220	8.0-30.0	K48; K50; K52; X42; X46; X52
TU 24.20.21-061-57357928-2022 Longitudinally electric-welded steel pipes designed for the construction of gas gathering networks	530	16.0-26.0	K60
TU 24.20.21-067-57357928-2022 Longitudinally electric-welded steel pipes with diameters ranging from 508 to 1,422 mm for main and field pipelines	508-1,422	8.0-38.0	K52; K55; K56; K60 X56; X60; X65; X70
TU 24.20.21-068-57357928-2022 Longitudinally electric-welded steel pipes for unique building structures	508-1,420	7.0-45.0	C345; C375; C390; C440 K52; K55; K56; K60 X56; X60; X65; X70
TU 24.20.21-074-57357928-2022 Longitudinally electric-welded steel pipes with diameters ranging from 530 to 820 mm for main and field pipelines	530-820	8.0-12.0	K52; K55; K56; K60 X56; X60; X65; X70
TU 24.20.21-076-57357928-2022 Longitudinally electric-welded steel pipes for field pipelines with an operating pressure of up to and 24.0 MPa inclusive	508	22.2 23.8 24.9	X65; SAWL 450 IFD
TU 1381-079-00186654-2016 Longitudinally electric-welded steel pipes made of carbon and low-alloy steel grades for steam and hot water pipelines	530-1,420	8.0-25.0	St3sp; 20; 09G2S; 17GS; 17G1S; 17G1S-U
TU 24.20.21-1573-57357928-2022 Longitudinally electric-welded steel pipes with diameters from 530 to 1,420 mm and wall thicknesses of up to 32 mm for main gas pipelines, oil pipelines, and petroleum product pipelines	530-1,420	8.0-32.0	12G2S; 09G2S; 17GS; 17G1S; 17G1S-U; 13GS; 13GS-U; 08GBYU; 12GSB; 09GSF; 13KhFA; 13G1S-U; 12G2SB; 09GBYU; 09G2FB; 10G2FBYU; 08GINFB (K50; K52; K54; K55; K56; K60 pipe grades)
TU 24.20.21-201-57357928-2022 Longitudinally electric-welded steel pipes of K65 pipe grade with a diameter of 1,420 mm for main gas pipelines with an operating pressure of 11.8 MPa	1,420	23.0 27.7	K65
TU 24.20.21-202-57357928-2022 Longitudinally electric-welded steel pipes with diameters ranging from 530 to 1,420 mm for main and field pipelines with an operating pressure of up to and including 10.0 MPa	530-1,420	8.0-32.0	K52; K54; K55; K56; K60; K65; X56; X60; X65; X70; X80
TU 24.20.21-010-57357928-2023 Longitudinally welded steel pipes for pipelines	508-1,420	7.0-45.0	K42, K48, K50, K52, K54, K56, K60
TU 24.20.21-017-57357928-2024 Longitudinally electric-welded steel pipes with diameters ranging from 508 to 1,422 mm for main and field pipelines	508-1,420	7.0-45.0	K52, K54, K55, K56, K60, K65
1	2	3	4

STANDARDS (CONTINUED)

Standards	Pipes dimensions		Steel grade
	Outside diameter, mm	Wall thickness, mm	
1	2	3	4
TU 24.20.21-099-57357928-2022 Longitudinally electric-welded steel pipes, pipe grade K65, with outer diameter ranging from 508 to 1,420 mm and high deformation capacity for gas pipelines with an operating pressure of up to and 11.8 MPa inclusive, crossing zones of active tectonic faults, permafrost, and zones of increased seismicity; fit for use in areas with weak, heaving, and subsiding soils	508-1,422	8.0-48.0	K65
TU 24.20.21-011-57357928-2023 Longitudinally electric-welded steel pipes, K70 pipe grade, for main gas pipelines with an operating pressure of up to 14.71 MPa inclusive	530, 720, 1,020, 1,220, 1,420	9.9-38.1	K70
TU 24.20.21-203-57357928-2022 Longitudinally electric-welded steel pipes for main gas pipelines with an operating pressure of up to and 9.8 MPa (100 kgf/cm ²) inclusive, designed for operation within zones of active tectonic faults, in areas of increased seismic activity, and in permafrost regions	530-1,420	10-32	K52; K54; K55; K56; K60; X52; X56; X60; X65; X70
TU 24.20.21-204-57357928-2022 Longitudinally electric-welded steel pipes, K60 pipe grade, with diameters of 530-1,420 mm for main gas pipelines with an operating pressure of up to 11.8 MPa	530-1,420	8.0-38.0	K60
TU 24.20.21-205-57357928-2022 Longitudinally electric-welded steel pipes with an outer diameter of 530 to 1,220 mm for subsea gas pipelines	530-1,220	8.0-32.0	245-485 MPa (SMYS)
TU 24.20.21-206-57357928-2022 Longitudinally electric-welded steel pipes with enhanced corrosion resistance and cold resistance for pipelines	530-1,420	8.0-36.0	20A; 20FA 09G2S; 17G1S-U; 09GSF; 13KhFA (K48; K50; K52); K54; K55; K56; K60
TU 24.20.21-207-57357928-2022 Longitudinally electric-welded steel pipes for pipelines	530-1,420	8.0-36.0	K42 -K60 ver. 1;2; K34 - K60 ver. 3
TU 24.20.21-208-57357928-2022 Longitudinally electric-welded steel pipes for oil and gas field pipelines	530-1,020	8.0-32.0	L360-L485; 09GSF; 05KhGB; 13KhFA
TU 24.20.21-209-57357928-2022 Longitudinally electric-welded steel pipes with an outer diameter ranging from 530 to 1,420 mm for the construction and repair of steam and water pipelines	530-1,420	8.0-25.0	3Sp; St20; 09G2S; 17GS; 17G1S; 17G1SU
TU 24.20.21-210-57357928-2022 Electric-welded steel pipes for the manufacture of protective casings (sheaths)	530-1,420	15.2-32.0	K34; K38; K42; K48; K50; K52; K54; K55
TU 24.20.13-213-57357928-2022 Longitudinally electric-welded steel pipes for offshore subsea pipelines (RMRS)	530-820	15.0-27.0	X52; X60; X65; K54; K55; K56 PCT 36W; PCT 40W; PCT 420W
TU 24.20.21-164-57357928-2022 Longitudinally electric-welded steel pipes with diameters from 508 to 1,422 mm	508-1,422	7.5-48.0	L360-L485 09GSF; 05KhGB; 13KhFA
TU 24.20.21-021-57357928-2022 Longitudinally electric-welded steel pipes for onshore (land-based) and subsea production pipelines	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 24.20.21-039-57357928-2022 Longitudinally 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
TU 24.20.21-077-57357928-2022 Longitudinally electric-welded steel pipes with diameters ranging from 508 to 1,422 mm, designed for operation in a wide temperature range from minus 60 °C to plus 400 °C	508-1,422	8.0-40.0	K50; K52; K54; K55; K56; K60 X56; X60; X65; X70
TU 24.20.21-102-57357928-2022 Longitudinally electric-welded steel pipes with enhanced corrosion resistance and reliability for pipelines	530-1,420	7.0-40.0	09GSF; 13KhFA
TU 24.20.21-103-57357928-2022 Cold-resistant longitudinally welded steel pipes for pipelines	530-1,420	7.0-40.0	K48; K50; K52; K54; K55; K56; K60
TU 24.20.21-106-57357928-2022 Longitudinally electric-welded steel pipes for pipelines with an operating pressure of up to 24.0 MPa inclusive	508-812.8	24.9-39.0	K60; X70
TU 24.20.21-108-57357928-2022 Longitudinally electric-welded steel pipes with diameters from 508 to 1,422 mm for main and field pipelines manufactured using laser-hybrid welding	508-1,422	15.0-34.0	K52; K54; K55; K56; K60
TU 24.20.21-110-57357928-2022 Longitudinally electric-welded steel pipes for pipelines	508-1,420	7.0-48.0	K34; K38; K42; K48; K50; K52; K55; K56; K60; 255; 345; 355; steel grades 20; 20A; 09G2S; 17G1S-U; 09GSF; 13KhFA
TU 24.20.21-132-57357928-2022 Longitudinally electric-welded steel pipes with diameters ranging from 508 to 1,422 mm for pipelines	508-1,422	8.0-45.0	K42-K60
TU 24.20.21-200-57357928-2022 Longitudinally electric-welded steel pipes of standard and cold-resistant designs with enhanced operational reliability for main pipelines	530-1,220	8-35	K50, K52, K54, K55, K56, K60
ASTM A671/A671M-20 Standard Specification for Steel Pipes Produced by Fusion Electric Welding, Intended for Use in Ambient and Low-Temperature Environments	508-1,420	7-48	CC60, CC70
API* Spec 5L, 46th edition Specification for Line Pipe	508-1,422	7.1-48.0	B; X42 - X80 or L245 - L555
BS EN 10217-1:2002 Welded steel pipes designed for use under pressure. Part 1. Non-alloy steel pipes with specified properties at room temperature	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	508-1422	8,0-40,0	P275-P460 (N; NH; NL1; NL2)
DNV-OS-F101 Standard for offshore applications. Submarine Pipeline Systems	508-1,422	7.9-45.0	245 – 485 (F; D; I)
ISO 3183-2019 Petroleum and natural gas industries. Steel pipes for pipeline transportation systems	508-1,422	7.0-48.0	B; X42 - X80 or L245 - L555
EN 10219-1:2006 Welded structural hollow sections manufactured by cold forming from non-alloy and fine-grain steels	508-1,420	7-48	S235JRH; S275J0H; S275J2H; S275NH; S275MH; S275NLH; S275MLH; S355NH; S355J0H; S355K2H; S355J2H; S355MH; S355NLH; S355MLH; S420MH; S420MLH; S460NH; S460MH; S460NLH; 460MLH
1	2	3	4

LONGITUDINALLY WELDED LDP SIZE RANGE AS PER GOST AND TU

Outside diameter, mm	Wall thickness, mm												
	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0
530													
630													
720													
820													
1,020													
1,220													
1,420													

Outside diameter, mm	Wall thickness, mm													
	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	33.0
530														
630														
720														
820														
1,020														
1,220														
1,420														

Outside diameter, mm	Wall thickness, mm														
	34.0	35.0	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0	45.0	46.0	47.0	48.0
530															
630															
720															
820															
1,020															
1,220															
1,420															

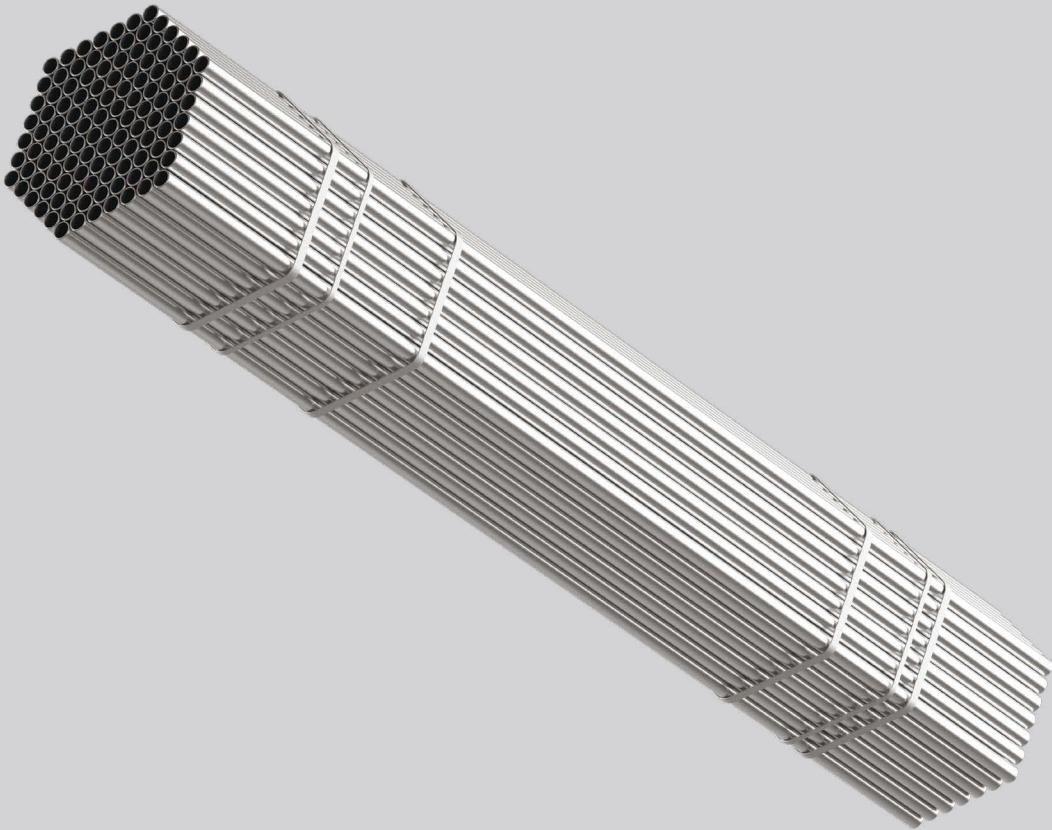
DOUBLE-SEAM LONGITUDINALLY WELDED LDP SIZE RANGE WITH DIAMETERS GREATER THAN 1,420 MM AS PER GOST AND TU

Outside diameter, mm	Wall thickness, mm																			
	12.0	13.0	14.0	15.0	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
1,520																				
1,620																				
1,720																				
2,020																				
2,220																				
2,420																				
2,520																				

INDUSTRIAL PIPES

3

General purpose seamless pipes (hot and cold-formed pipes)	48	Petroleum cracking pipes	70
General purpose welded pipes (pipes for water and gas supply, hollow sections and galvanized pipes)	55	Boiler pipes	72
Precision pipes	61	Pipes for the nuclear industry	77
Stainless steel pipes	63	Special pipes	80



GENERAL PURPOSE SEAMLESS PIPES (HOT AND COLD-FORMED PIPES)

Pipes designed for the manufacture of machine parts and assemblies in the automotive, drilling, oil production, mining, crane, and other mechanical engineering sub-industries. Suitable for oil and gas pipelines transporting both normal and hydrogen sulfide-containing and corrosive media, gas lift systems, reservoir pressure maintenance systems, and field development, including in the Far North.

FEATURES

These pipes are produced by hot, cold or warm rolling on CRM, pilgers CRM or by drawing on drawing mills (with or without a plug). The pipes meet different requirements for dimensions, steel grades, manufacturing tolerances, mechanical properties, and surface quality, depending on the production technique and the requirements of applicable standards.

Random length pipes are manufactured with lengths between 1.5 m and 12.5 m; cut length pipes – between 4.5 m and 9 m. Cut length pipes may be produced with a length of more than 12.5 m by agreement between the parties.

The pipes are made of the following steels: 10, 20, 35, 45, 09G2S (by agreement between the parties, the pipes may be made of other steel grades as per GOST 1050, GOST 4543, GOST 19281, or DIN 17100).

The pipes undergo mandatory tensile testing and, if requested by the customer, hardness testing, bend, flattening, and drift-expanding tests.

It is possible to manufacture pipes of non-standard sizes, pipes with shifted tolerances for geometric dimensions, pipes with increased accuracy in wall thickness (+/- 6%) and in outer diameter (+/- 0.5%), especially thick-walled pipes with a D/S ratio of up to 2.2 and a wall thickness of up to 67 mm.

Isothermal annealing and outside surface machining are available.

SPECIAL CAPABILITIES

- cold-finished pipe diameter range: 0.8 mm–180 mm; wall thickness: 0.16 mm–12.0 mm;
- production of pipes with non-standard dimensions;
- production of pipes with non-standard tolerances;
- outer surface polishing;
- heat treatment of pipes in furnaces with oxidizing or non-oxidizing atmospheres;
- production of capillary tubes;
- non-destructive testing of pipes;
- hydraulic and pneumatic testing of pipes;
- protective coating of pipes.

STANDARDS

Standards	Pipes dimensions		Steel grade
	Outside diameter, mm	Wall thickness, mm	
1	2	3	4
GOST 14162-79 Small-diameter steel tubes (capillary tubes)	0.8–5.0	0.1-1.6	made of corrosion-resistant steels and alloys as per GOST 5632-72; GOST 10994-74
GOST 8645-68/13663-86 Rectangular steel tubes	30x20-150x100*	2.5-10	10; 20; 35; 45; 09G2; 09G2S; 10G2
GOST 8731-74 Seamless hot-formed steel tubes. Technical requirements GOST 8732-78 Seamless hot-formed steel tubes. Size range GOST 32528 Seamless hot-formed steel tubes. Technical specifications	32-550	2.9-90	10-70; 10Kh-45Kh; 18KhGT; 30KhGSA; etc. as agreed 10; 20; 35; 45; 09G2S; 10G2; D; 13KhFA; 30KhGSA; 30KhMA; 40Kh etc. as agreed
GOST 8733-74 Seamless cold-formed and warm-formed steel tubes. Technical requirements GOST 8734-75 Seamless cold-formed steel tubes. Size range GOST 32678-2014 Seamless and welded cold-formed steel tubes for general purposes. Technical specifications	4.0-426	0.4-40	10; 20; 35; 45; 10G2; 20Kh; 40Kh; 30KhGSA; 15KhM and others as agreed
GOST 11017-80 Seamless steel high-pressure tubes*	6-10 (Group A)	int. 1.6-3.0 (Group A)	20
	6-25 (Group B)	int. 2.0-10.0 (Group B)	
GOST 12132-66 Electric-welded and seamless steel tubes for motorcycle and bicycle industries	6-57*	0.8-5.0	10; 20; 15Kh; 35; 45; 30KhGSA; 30KhMA
GOST 19277-2016 Seamless steel tubes for oil and fuel lines. Technical specifications GOST 19277-73 Seamless steel tubes for oil and fuel lines. Technical specifications (reinstated in the Russian Federation for production under the State Defense Order)	5-60*	0.8-3	20A; 30KhGSA; 30KhGSA-VD
GOST 21729-76 Cold-deformed and warm-formed structural tubes made of carbon and alloy steels	4.0-159.0	0.4-12	20A; 45; 38KhA; 30KhGSA; 38Kh2MYuA; 12KhN3A; 12Kh2NVFA (EI-712); 30KhGSA-VD; 30KhGSN2A
GOST 23270-89 Tube blanks for machining. Technical specifications	38-426	3.5-55	10; 20; 35; 45; 20Kh; 40Kh; 30KhGSA and other steel grades
GOST 30563-98 Seamless cold-formed tubes made of carbon and alloy steels with special properties	100-220	2.5-18	10; 20; 10G2A; 15KhM; 30KhMA; 09G2S
GOST 30564-98 Seamless hot-formed tubes made of carbon and alloy steels with special properties	38-426	3.5-55	10; 20; 09G2S and other steel grades
GOST 32528-2013 Seamless hot-formed steel tubes	38-550	3.5-90	10; 20; 35; 45; 20Kh; 40Kh; 30KhGSA; 05G2S and other steel grades
	32-219	2.9-50	10; 20; 35; 45; 09G2S; 10G2; D; 13KhFA; 30KhGSA; 30KhMA; 40Kh etc. as agreed
TU 1301-157-00147016-01 Tube blanks for drill pipe tool joints with increased operational reliability	111-178	int. 47.0-120.0	40KhMFA
TU 1344-370-00186619-2014 Seamless cold-formed steel tubes made of 40Kh steel grade	58	7.5	40Kh
TU 14-00186625-19-96 Hot-formed tube blanks for machining made of high-carbon steel	225 248 250	37.5; 55.0 55.0 42.0; 50.0; 67.5	20; 60; 65; 70; 09G2S
TU 14-156-50-2003 Seamless hot-formed steel tubes made of 20 steel grade, dimensions 198.0 mm x 161 mm ID and 171.0 x 7.0 mm	171; 198	7.0; int. 161.0	20
TU 14-156-114-2018 Seamless hot-formed steel tubes made of 12Kh3GNMFBA, 20Kh3GNMFA or 22Kh3GN2M1FA steel grades	89	9	12Kh3GNMFBA; 20Kh3GNMFA; 22Kh3GN2M1FA
	ID 110	14	
	ID 131	14	
	ID 203	20	
	325	20	
TU 14-157-46-99 Seamless hot-formed coupled and uncoupled plain-end tubes with holes every 1 m along the entire tube length for quick-assembly structures, construction piles and other technical purposes	73-219	7.0-16.0	Pipe grade 2; 4; 6
TU 14-159-126-78 Cold-rolled tubes made of alloy structural fast-machine steel of A15Kh type steel grade	61; 66.5; 69	int. 40; 46; 49	A15Kh
TU 14-159-149-82 Unground structural cold- and warm-formed tubes made of 30KhGSA steel grade	48*	1.5	30KhGSA
TU 14-159-170-87 Seamless cold-formed tubes made of 17GS steel grade	19-25*	2.5-3	17GS
TU 14-159-173-87 Seamless hot-formed tubes made of carbon steel grades for cold conversion. Technical specifications	45-108	3.5-6.5	10; 20; 35; 45
TU 14-159-206-91 High-precision high-pressure seamless cold-formed steel tubes	7.5-8* int. 1.1-2		20A
TU 14-159-241-93 Cold-formed tubes of variable cross-section made of 30KhGSA steel	51*	3.5	30KhGSA
TU 14-159-266-96 High-precision seamless cold-formed tubes made of 30KhMA steel	int. 38*	5.5	30KhMA
TU 14-159-288-2003 Seamless cold-formed steel tubes made of 17G1 steel	19-25*	2.5-3	17G1
TU 14-159-297-2006 Seamless cold-formed tubes made of 10Kh2M-VD steel	16*	2.5-3.5	10Kh2M-VD
TU 14-159-305-2005 ID-calibrated seamless tubes	int. 19.9-39.9*	1.5-1.8	10; 20
1	2	3	4

STANDARDS (CONTINUED)

Standards	Pipes dimensions		Steel grade
	Outside diameter, mm	Wall thickness, mm	
1	2	3	4
TU 14-159-308-2006 Hot-formed seamless steel process tubes made of 20 steel grade designed for the manufacture of parts and structures	171	7.0	20
TU 14-159-314-2010 Hot-formed seamless steel process tubes for the manufacture of smaller-sized tubes	32-219	2.9-45	Group V (10; 20; 35; 45; 10G2; 20Kh; 40Kh; 30KhGSA; 15KhM; 30KhMA); Group B (10; 20; 35; 45; 09G2S; 10G2; 15KhM; 09G2; 15Kh; 20Kh; 15G; 20G; 12KhN3A; 30KhGSA; 38KhS; 30Kh; 40Kh; 20KhN; 40KhN; 30KhMA; 17GS; 32KhA)
TU 14-161-43-2018 Seamless cold-formed steel tubes, dimensions 20.0 x 1.0 mm, made of 35 steel grade	20	1.0	35
TU 14-161-191-2000 Steel water and gas line pipes	10.2-76.1	2.65-4.5	10; 20
TU 14-161-199-2002 Seamless steel tubes made of 30 and 35 steel grades	16. 40. 58	2.0; 3.2; 6.0	30; 35
TU 14-161-200-2002 Seamless cold-formed steel tubes made of 10 steel grade	5-63.5 ht	0.75-4.0 ht	10
	6-70 not ht	1.0-6.0 not ht	
TU 14-161-201-2002 Seamless cold-formed steel tubes	10.3-73.0	1.73-9.53	10; 20; 20Kh; 30
	25.0-68.0 ht	25.0-80.0 ht	
TU 14-161-214-2003 Seamless cold-formed tubes made of 20YuCh steel	25	2.5	20YuCh
TU 14-3-143-73 Steel tubes for tubular rivets	4.0-20.0	0.5-1.5	20A
TU 14-3-170-73 Seamless hot-rolled tubes made of EI 643 (40KhN2SVA) steel grade	63.5-219	5.0-40.0	40KhN2SVA (EI643)
TU 14-3-225-74 Drawn tubes made of iron-nickel alloy	1.5-7.0	0.25-0.3	48NKh (EI 693)
TU 14-3-274-74 Seamless hot-rolled steel tubes	95-168	16.0-42.0	10; 20; 35; 45; 30KhGSA; 30KhMA; 15Kh
TU 14-3-232-74 Cold-formed tubes with internal hexagonal bore	30x22*		40Kh; 40KhU
TU 14-3-289-74 Hot-rolled tubes made of 25Kh2GNTA-VD vacuum-arc remelted steel	152	30	25Kh2GNTA-VD
TU 14-3-316-74 Seamless cold-formed tubes (of non-standard size)	66.3*	10.7	20G
TU 14-3-417-75 Unthreaded cold-formed tubes	33.5*	4.75	Grades: D; K
TU 14-3-463-2005 Hot-rolled and cold-formed tubes made of steels with controlled chemical composition	57-219	2.9-45.0	D; 10G2A; 15GS; 15KhM; 20YuCh; 12Kh1MF; 30KhMA; 30KhGSA; 32G2; 10GN; 38KhNM; 11YuA; 12Kh2NVFA (EI 712); 19KhGN; 40KhN2SVA
	4-180*	0.5-12	D; DB; 32G2S; 10G2A; 15GS; 15KhM; 20YuCh; 12Kh1MF; 30KhMA; 37G2S; 38G2S; 32G2; 38KhNM; 12Kh2NVFA; 19KhGN; 17G1S; 30G2; 20-PV; 37G2F
TU 14-3-473-76 Seamless hot-rolled tubes for cold conversion	146-219	6.0-45.0	10; 20; 35; 45; 20Kh; 40Kh; 30KhGSA; 30KhMA; 12Kh2NVFA (EI-712); 10KhSND; 40KhN2MA-Sh
TU 14-3-533-76 Hot-rolled tubes made of KVK-32 steel grade	76-219	6.0-36.0	32Kh2NVMBR (KVK-32)
TU 14-3-554-76 Seamless cold-formed tubes designed for high-quality fittings	45-73*	5.5-10	38Kh3MFA-Sh
TU 14-3-560-76 High-precision seamless cold-formed tubes	91*	5-8.5	20
TU 14-3-572-77 Hot-rolled tubes made of 12KhN4A-SSh, 18Kh2N4MA-SSh, or 40KhN2MA-SSh steel grades	83-168	12.0-28.0	12Kh2N4A-SSh; 18Kh2N4MA-SSh; 40KhN2MA-SSh
TU 14-3-575-90 Cold-formed tubes made of 20G steel	63-78*	4-21	20G
TU 14-3-588-76 Cold-formed tubes made of 40KhN2MA-Sh steel for tail shafts	int. 36.5*	6-10	40KhN2MA-Sh
TU 14-3-642-77 Extra heavy-wall cold-formed tubes made of 38KhS steel	26* int. 10		38KhS
TU 14-3-747-78 Seamless cold-formed tubes made of 30 steel	16; 40; 58	int. Ø 12;0 33.6; 46.0	30
TU 14-3-748-78 Seamless hot-rolled tubes made of 19KhGN chromium-manganese-nickel steel	84; 87; 89	int. 54.5; 62.0; 54.5	19KhGN
		9.5-18.25	
TU 14-3-749-78 Cold-formed tubes made of 10 steel grade	5.0-63.5 ht	0.8- 3.8 ht	10
	5.0-70.0 not ht	0.75.0-8.7 not ht	
TU 14-3-784-78 Heavy-wall hot-formed tubes	127	32	40Kh; 35KhGSA
TU 14-3-798-79 Seamless hot-formed tubes made of 30KhRA steel	85	18	30KhRA
TU 14-3-858-79 Seamless cold-formed steel tubes (for general purposes)	12-65	2-6	10; 20
1	2	3	4

STANDARDS (CONTINUED)

Standards	Pipes dimensions		Steel grade
	Outside diameter, mm	Wall thickness, mm	
1	2	3	4
TU 14-3-947-80 Seamless cold-formed tubes made of 26Kh2NVMBR (KVK-26) steel	88*	3	26Kh2NVMBR (KVK-26)
TU 14-3-955-80 Seamless cold-formed steel tubes	32*	8.5	30Kh; 35Kh
TU 14-3-956-80 Small-sized carbon steel tubes TU 14-3-966-80 Extra thin-wall seamless cold-formed steel tubes	0.8-4.0 47.4	0.1-1.0 0.6	10 10; 20
TU 14-3-972-80 Cold-formed tubes made of 29NK and 29NK-VI steel grades	1.5-69*	0.25-5.5	29NK; 29NK-VI
TU 14-3-1017-81 Seamless cold-formed steel tubes made of structural steel for aircraft engineering	6.25-14.4	1.65-1.7	20A; 30KhGSA
TU 14-3-1303-84 Seamless cold-formed tubes	25.0-80.0 ht	1.0-9.0 ht	10; 20Kh; 20; 30
	16.0-73.0 not ht	1.0-6.0 not ht	
TU 14-3-1523-88 Seamless hot-formed tubes made of structural steel	89-203	10.0-50.0	OKhM; OKhN1M; OKhN3MFA
TU 14-3-1652-89 Cold-formed tubes made of 20YuCh steel	20-89*	2-12	20YuCh
TU 14-3-1786-91 Seamless steel tubes for boiler plants and pipelines with enhanced performance characteristics	25-60	2.5-4.0	10; 20
TU 14-3-1823-91 Heavy-wall seamless cold-formed tubes made of 12KhN3A steel grade used in tractor-building	41-53*	10.5-12.5	12KhN3A
TU 14-3-1974-99-M Seamless hot-rolled steel tubes for the manufacture of casing couplings	153.7-269.9	13.0-21.7	D
TU 14-3-1978-2001 Regular-precision seamless hot-formed steel tubes for powered mine roof supports	89-245	16.0-48.0	30KhGSA
TU 14-3P-50-2001 Heavy-wall seamless hot-rolled steel tubes	245-550	16-80	10; 20; 35; 45; D; 40Kh; 09G2S and others as agreed
TU 14-3P-51-2001 Heavy-wall seamless hot-rolled steel tubes for mechanical engineering	245-630	16-80	10; 20; 35; 45; D; 40Kh; 09G2S and others as agreed
TU 14-3P-53-2001 Machined seamless steel tubes for steam pipelines	530	15	20
	550	25	
TU 14-3P-54-2001 Seamless hot-formed tubes made of 20YuCh steel grade	273-426	8-30	20YuCh
TU 14-3P-55-2001 Seamless steel tubes for steam boilers and pipelines	10-550	2.0-90	20; 15GS; 20-PV; 15KhM; 12Kh1MF-PV; 12Kh18N12T; 15Kh1M1F; 12Kh1MF; 12Kh2MFSR; 12Kh1MF-Sh; 10Kh9MFB; 10Kh9MFB-Sh; 10Kh9V2MFBR-Sh; 12Kh11V2MF; 08Kh16N9M2; 10Kh13G12BS2N2D2
TU 14-3P-251-2007 Seamless steel tubes for chemical and petrochemical production plants	15-76* 83-194	4.5-14.0* 14-40	20; 20Kh3MVF; 14KhGS; 30KhMA
TU 24.20.13.110-394-00186619-2020 Seamless hot-formed steel tubes made of 12Kh3GNMFBA steel grade	89-145	9-14	12Kh3GNMFBA
TU 24.20.13.140-414-00186619-2022 High-pressure seamless steel tubes for internal combustion engine fuel lines	8 int. 3		18G2AF
TU 14-3P-674-2010 Seamless hot-rolled steel tubes made of 30KhGSA-VD, 30KhGSN2A-VD, 30KhGSN2MA-VD, or 40KhN2SMA-VD (EI643-VD) steel grades	38.2-245	4.0-55.0	30KhGSA-VD; 30KhGSN2A-VD; 30KhGSN2MA-VD; 40KhN2SMA-VD
TU 14-3P-1062-2017 Thin-wall seamless cold-formed steel tubes	23-32	0.8-0.9	35
ASTM A 53/A53M Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless	10.3-508	1.73-50	A; B; C
ASTM A106/A106M Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service	219.1-508	7.8-50.01	A; B; C
ASTM A179/A179M Standard Specification for Seamless Cold-Drawn Low-Carbon Steel Heat-Exchanger and Condenser Tubes	19.05-31.75	2.11-3.05	Low Carbon
ASTM A210/A210M Seamless Medium-Carbon Steel Boiler and Superheater Tubes	57-127	4.0-28.0	A-1; C
	33.4-323.8	1.65-19.05	Group 6
	48.3-168.3	5-22.2	
	219.1	8.18-30.4	Class 6; Class 1; 6
	273.0	7.08-34.9	
	323.8	9.53-33.32	
	355.6	9.53-27.79	
	406.4	9.53; 10.31-28.58	
ASTM A335/335M Standard Specification for Seamless Ferritic Alloy-Steel Pipes for High-Temperature Service	26.7-60.3	3.18-5.54	P-5
ASTM A500/A500M Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes	23.0-76.0	2.0-10.0	A; B; C
1	2	3	4

STANDARDS (CONTINUED)

Standards	Pipes dimensions		Steel grade
	Outside diameter, mm	Wall thickness, mm	
1	2	3	4
ASTM A519/A519M Standard Specification for Seamless Carbon and Alloy Steel Mechanical Tubing	21.3-73	2.77-9.53	1010
DIN EN 10210 (DIN 2448) Hot finished structural hollow sections of non-alloy and fine grain steels (circular)	10.2-108* 33.7-406.4	1.6-12.0 3.2-25.0	S235JRH; S355J2H S275J0H; S275J2H;S355J0H
DIN EN 10210-1/2 Hot finished steel structural hollow sections. Part 1. Technical delivery conditions. Part 2. Tolerances, dimen- sions and sectional properties	33.7-323.9 244.5-508.0	3.2-25 8-50	S355J2H; S235JRH; S275J0H; S275J2H; S355J0H; S355K2H; S355J2H
DIN EN 10216-1 (DIN 1629, DIN 1630) Seamless steel tubes for pressure purposes. Technical delivery conditions. DIN 2448 Seamless Steel Pipes and Tubes. Dimensions, Conventional Masses per Unit Length	32-426 10.2-108* 244.5-508.0	2.9-55.0 1.6-12.0 8-70	St. 37.0; St. 44.0; St. 52.0; St.37.4; St. 44.4; St. 5 2;4
DIN 10216-1:2004 Seamless steel tubes for pressure purposes	10.2-273.0	1.6-25.0	P195TR1; P235TR1; P265TR1; P195TR2; P235TR2; P265TR2
DIN EN 10224 (DIN 2460) Non-alloy steel tubes and fittings for the conveyance of water and other aqueous liquids. Technical delivery conditions	219.1-323.9	8.0-25.0	St 37.4; St 44.4; St 52.4
DIN EN 10255 (DIN 2440) Non-alloy steel tubes suitable for welding and threading. Technical delivery conditions	10.2-76.1	2.0-3.65	St 33.2
DIN EN 10255 (DIN 2441) Non-alloy steel tubes suitable for welding and threading. Technical delivery conditions	10.2-76.1	2.65-4.5	St 33.2; S195T
DIN 17121 Seamless circular steel tubes for structural steelwork	10.2-76.1	1.0-6.3	St 37.2; St 44.2; St 52.3; St 37.3; St 44.3
DIN 17175 Seamless tubes of heat-resistant steels	10-88.9	2-10	St 35.8; St 45.8
DIN 2440/2441 Steel tubes medium-weight suitable for screwing. Steel tubes heavy-weight suitable for screwing	26.9-76.1*	2.65-4.5	St 33
EN 10305-4 Seamless cold drawn tubes for hydraulic and pneumatic power systems	6.0-90.0*	0.5-6.0	E235; E355; C45E
1	2	3	4

* Cold-formed

MECHANICAL PROPERTIES OF SEAMLESS GENERAL PURPOSE PIPES

Standards	Steel grade (pipe grade)	Ultimate tensile strength σ_{UTS} , N/mm ²	Yield strength, σ_y , N/mm ²	Yield strength, δ , %
		minimum		
GOST 8731-74	10	353	216	24
	20	412	245	21
	35	510	294	17
	45	588	323	14
	10G2	421	265	21
	20Kh	431	—	16
	40Kh	657	—	9
	30KhGSA	686	—	11
	15KhM	431	225	21
ASTM A53/A53M	A	330	205	ASTM formula
	B	415	240	ASTM formula

SIZE RANGE OF SEAMLESS GENERAL PURPOSE PIPES

Outside diameter, mm	Wall thickness, mm																					
	0.8	1.0	1.3	1.4	1.5	1.6	1.8	2.0	2.2	2.5	2.8	3	3.5	4	4.5	5	5.5	6	7	8	9	
	Weight per meter length, kg																					
5	0.083	0.099	0.112	0.124	0.129																	
6	0.103	0.123	0.142	0.159	0.166	0.174	0.186															
7	0.122	0.148	0.172	0.193	0.203	0.213	0.231	0.247	0.260	0.277												
8	0.142	0.173	0.201	0.228	0.240	0.253	0.275	0.296	0.31													
9	0.162	0.197	0.231	0.262	0.277	0.292	0.320	0.345	0.369	0.401												
10	0.182	0.222	0.260	0.297	0.314	0.332	0.364	0.395	0.426	0.462	0.497	0.518	0.537	0.561								
11	0.201	0.247	0.290	0.331	0.351	0.371	0.408	0.444	0.477	0.524	0.566	0.592	0.616	0.647								
12	0.221	0.271	0.320	0.366	0.388	0.410	0.453	0.493	0.532	0.586	0.635	0.666	0.694	0.734								
13	0.241	0.296	0.349	0.401	0.425	0.450	0.497	0.543	0.586	0.647	0.704	0.740	0.773	0.820	0.888							
14	0.260	0.321	0.379	0.435	0.462	0.489	0.542	0.592	0.640	0.709	0.773	0.814	0.852	0.906	0.986							
15	0.280	0.345	0.408	0.470	0.499	0.529	0.586	0.641	0.694	0.771	0.842	0.888	0.931	0.993	1.085							
16	0.300	0.370	0.438	0.504	0.536	0.568	0.630	0.691	0.749	0.832	0.911	0.962	1.010	1.079	1.184	1.276	1.356					
17	0.320	0.395	0.468	0.539	0.573	0.608	0.675	0.740	0.803	0.894	0.981	1.036	1.089	1.165	1.282	1.387	1.480					
18	0.339	0.419	0.497	0.573	0.610	0.647	0.719	0.789	0.857	0.956	1.050	1.110	1.168	1.252	1.381	1.498	1.603					
19	0.359	0.444	0.527	0.608	0.647	0.687	0.764	0.838	0.911	1.017	1.119	1.184	1.247	1.338	1.480	1.609	1.726					
20	0.379	0.469	0.556	0.642	0.684	0.726	0.808	0.888	0.966	1.079	1.188	1.258	1.326	1.424	1.578	1.720	1.850	1.967	2.072			
21	0.399	0.493	0.586	0.677	0.721	0.765	0.852	0.937	1.020	1.141	1.257	1.332	1.405	1.511	1.677	1.831	1.973	2.102	2.220			
22	0.418	0.518	0.616	0.711	0.758	0.805	0.897	0.986	1.074	1.202	1.326	1.406	1.484	1.597	1.776	1.942	2.096	2.238	2.368			
23	0.438	0.543	0.645	0.746	0.795	0.844	0.941	1.036	1.129	1.264	1.395	1.480	1.563	1.683	1.874	2.053	2.220	2.374	2.515			
24	0.458	0.567	0.675	0.780	0.832	0.884	0.985	1.085	1.183	1.326	1.464	1.554	1.641	1.769	1.973	2.164	2.343	2.509	2.663			
25	0.477	0.592	0.704	0.815	0.869	0.923	1.030	1.134	1.237	1.387	1.533	1.628	1.720	1.856	2.072	2.275	2.466	2.645	2.811			
26	0.497	0.617	0.734	0.849	0.906	0.963	1.074	1.184	1.291	1.449	1.602	1.702	1.800	1.942	2.170	2.386	2.589	2.781	2.959			
27	0.517	0.641	0.764	0.884	0.943	1.002	1.119	1.233	1.346	1.511	1.671	1.776	1.878	2.208	2.269	2.497	2.713	2.916	3.107			
28												1.85	2.11	2.37	2.61							
32												2.15	2.46	2.76	3.05	3.33						
34	0.655	0.814	0.971	1.126	1.202	1.278	1.429	1.578	1.725	1.942	2.154	2.294	2.430	2.633	2.959	3.274	3.576	3.866	4.143			
35	0.675	0.838	1.000	1.160	1.239	1.318	1.474	1.628	1.780	2.004	2.223	2.367	2.510	2.719	3.058	3.385	3.699	4.001	4.291			
36	0.694	0.863	1.030	1.195	1.276	1.357	1.518	1.677	1.834	2.065	2.293	2.441	2.588	2.805	3.157	3.496	3.822	4.137	4.439			
38												2.59	2.98	3.35	3.72	4.07	4.41	4.74				
40	0.773	0.962	1.148	1.333	1.424	1.515	1.696	1.874	2.051	2.312	2.569	2.737	2.904	3.150	3.551	3.940	4.316	4.680	5.031			
42												2.89	3.32	3.75	4.16	4.56	4.95	5.33	6.04	6.71	7.32	
45												3.11	3.58	4.04	4.49	4.93	5.36	5.77	6.56	7.30	7.99	
48		1.159	1.395	1.609	1.720	1.831	2.051	2.269	2.435	2.805	3.121	3.329	3.535	3.841	4.340	4.827	5.302	5.765	6.215			
50												3.48	4.01	4.54	5.05	5.55	6.04	6.51	7.42	8.29	9.10	
51												3.48	4.01	4.54	5.05	5.55	6.04	6.51	7.42	8.29	9.10	
53				1.712	1.831	1.949	2.184	2.417	2.648	2.990	3.328	3.551	3.772	4.100	4.636	5.160	5.672	6.172	6.659			
53				1.782	1.905	2.028	2.273	2.515	2.756	3.114	3.466	3.699	3.930	4.273	4.834	5.382	5.919	6.443	6.955			
54												3.77	4.36	4.93	5.49	6.04	6.58	7.10	8.11	9.07	9.99	
56				1.885	2.016	2.147	2.406	2.663	2.919	3.298	3.674	3.921	4.167	4.532	5.130	5.715	6.289	6.850	7.398			
57												4.00	4.62	5.23	5.83	6.41	6.99	7.55	8.63	9.67	10.70	
60												4.22	4.88	5.52	6.16	6.78	7.39	7.99	9.15	10.30	11.30	
63												4.44	5.14	5.82	6.49	7.15	7.80	8.43	9.67	10.90	12.00	
65				2.196	2.349	2.502	2.806	3.107	3.407	3.853	4.295	4.587	4.877	5.308	6.017	6.714	7.398	8.070	8.730			
68												4.81	5.57	6.31	7.05	7.77	8.48	9.17	10.50	11.80	13.10	
70												4.96	5.74	6.51	7.27	8.01	8.75	9.47	10.90	12.20	13.50	
73													6.00	6.81	7.60	8.38	9.16	9.91	11.40	12.80	14.20	
76													6.26	7.10	7.93	8.75	9.56	10.40	11.90	13.40	14.90	
83														7.79	8.71	9.62	10.50	11.40	13.10	14.80	16.40	
89														8.38	9.38	10.40	11.30	12.30	14.20	16.00	17.80	
102														9.67	10.82	12.00	13.10	14.20	16.40	18.50	20.60	
108														10.26	11.49	12.70	13.90	15.10	17.40	19.70	22.00	
114																13.40	14.70	16.00	18.50	20.90	23.30	
121																14.30	15.70	17.00	19.70	22.30	24.90	
127																15.00	16.50	17.90	20.70	23.50	26.20	
133																15.80	17.30	18.80	21.80	24.70	27.50	
140																16.60	18.20	19.80	23.00	26.00	29.10	
146																17.40	19.10	20.70	24.00	27.20	30.40	
152																18.10	19.90	21.60	25.00	28.40	31.70	
159																19.00	20.80	22.60	26.20	29.80	33.30	
168																		24.00	27.80	31.60	35.30	
180																			29.87	33.90	38.00	
194																			27.82	32.28	36.70	41.10
203																			29.15	33.84	38.50	43.10
219																			31.50	36.60	41.60	46.60
245																				46.80	52.40	
273																				45.92	52.30	58.60
325																					62.50	75.91
351																						75.91
426																						92.56
450																						
457																						
465																						
480																						
500																						
508																						
530																						
550																						

SIZE RANGE OF SEAMLESS GENERAL PURPOSE PIPES (CONTINUED)

Outside diameter, mm	Wall thickness, mm																						
	10	11	12	14	16	17	18	20	22	25	28	30	32	36	40	45	50	55	60	65	70	75	
	Weight per meter length, kg																						
5																							
6																							
7																							
8																							
9																							
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27																							
28																							
32																							
34																							
35																							
36																							
38	6.91	7.32	7.69																				
40																							
42	7.89	8.41																					
45	8.63	9.22	9.77																				
48																							
50	9.86	10.60	11.20	12.40																			
51																							
53																							
54	10.90	11.70	12.40	13.80	15.00	15.50																	
56																							
57	11.60	12.50	13.30	14.90	16.20	16.80	17.30																
60	12.30	13.30	14.20	15.90	17.40	18.00	18.60	19.70															
63	13.10	14.10	15.10	16.90	18.50	19.30	20.00	21.20															
65																							
68	14.30	15.50	16.60	18.60	20.50	21.40	22.20	23.70															
70	14.80	16.00	17.20	19.30	21.30	22.20	23.10	24.70															
73	15.50	16.80	18.10	20.40	22.50	23.50	24.40	26.10															
76	16.30	17.60	18.90	21.40	23.70	24.70	25.80	27.60															
83	18.00	19.50	21.00	23.80	26.40	27.70	28.90	31.10	33.10														
89	19.50	21.20	22.80	25.90	28.80	30.20	31.50	34.00	36.40														
102	22.70	24.70	26.60	30.40	33.90	35.60	37.30	40.40	43.40	47.50	51.10	53.30											
108	24.20	26.30	28.40	32.50	36.30	38.20	40.00	43.40	46.70	51.20	55.20	57.70											
114	25.70	27.90	30.20	34.50	38.70	40.70	42.60	46.40	49.90	54.90	59.40	62.10											
121	27.40	29.80	32.30	36.90	41.40	43.60	45.70	49.80	53.70	59.20	64.20	67.30	70.20										
127	28.90	31.50	34.00	39.00	43.80	46.10	48.40	52.80	57.00	62.90	68.40	71.80	75.00										
133	30.30	33.10	35.80	41.10	46.20	48.60	51.10	55.70	60.20	66.60	72.50	76.20	79.70	86.10									
140	32.10	35.00	37.90	43.50	48.90	51.60	54.20	59.20	64.00	70.90	77.30	81.80	85.20	92.30									
146	33.50	36.60	39.70	45.60	51.30	54.10	56.80	62.10	67.30	74.60	81.50	85.80	90.00	97.70	104.60								
152	35.00	38.30	41.40	47.60	53.70	56.50	59.50	65.10	70.50	78.30	85.60	90.30	94.70	103.00	110.50								
159	36.70	40.20	43.60	50.10	56.40	59.50	62.60	68.60	74.30	82.60	90.50	95.40	100.20	109.20	117.40								
168	39.00	42.60	46.20	53.20	60.00	63.30	66.60	73.00	79.20	88.20	96.70	102.10	107.30	117.20	126.30	136.50							
180	41.90	45.80	49.70	57.30	64.70	68.30	71.90	78.90	85.70	95.60	105.00	111.00	116.80	127.80	138.10	149.80							
194	45.40	49.60	53.90	62.10	70.20	74.20	78.10	85.80	93.30	104.20	114.90	121.30	127.80	140.30	151.90	165.40	177.60						
203	47.60	52.10	56.50	65.30	73.80	78.00	82.10	90.30	98.20	109.70	120.80	128.00	134.90	148.30	160.80	175.30	188.70	200.74					
219	51.50	56.40	61.30	70.80	80.10	84.70	89.20	98.20	106.90	119.60	131.90	139.80	147.60	162.50	176.60	193.10	208.40	222.45					
245	58.00	63.50	69.00	79.80	90.40	95.60	100.80	111.00	121.00	135.60	149.80	159.10	168.10	185.60	202.20	222.00	240.50						
273	64.90	71.10	77.20	89.40	101.40	107.30	113.20	124.80	136.20	152.90	169.18	179.78											
325	77.70	85.20	92.60	107.40	121.90	129.10	129.10	150.40	164.40	185.00													
351	84.10	92.20	100.30	116.40	132.20	140.00	147.80	163.30	178.50	201.00													
426	102.59	112.58	122.50	142.20	161.80	171.50	181.10	200.20	219.20	323.68	360.45	384.72	408.79		503.09	560.43	616.54						
450					171.25			212.09		262.03		310.74		367.56	404.45	449.46	493.23		577.08	617.15	656.00		
457					174.00			215.54		266.34		315.91		373.75	411.33	457.20	501.83		587.40	628.34	668.04		
465								219.49		271.28		321.83		380.87	419.25	466.10	511.73		599.27	641.20	681.89		
480										280.52		332.93		394.19	436.04	482.75	530.22		621.47	665.25	707.78	749.09	
500										292.86		347.73		411.95	453.77	504.94	554.88						
508										297.77		353.62		419.02	461.63	513.79	567.66		662.86	710.08	756.07	800.83	
530										311.35		369.92		438.58	483.37	538.28	591.88		695.45	745.39	794.10	841.57	
550										323.68		384.72		456.34	503.09	560.43	616.54		725.05	777.45	828.63	878.57	

GENERAL PURPOSE WELDED PIPES (PIPES FOR WATER AND GAS SUPPLY, HOLLOW SECTIONS AND GALVANIZED PIPES)

General purpose welded pipes for water and gas supply and hollow sections are designed for use in the machine building, utility, construction, and other industries.

FEATURES

Welded pipes are manufactured on high-frequency induction pipe welding mills or furnace welding mills, either with or without bulk normalization, local heat treatment of the weld seam and hot stretch-reducing.

Bulk normalization, local heat treatment of the weld seams and hot reduction result in uniform properties of the parent and weld metal, as well as high strength and toughness characteristics.

Pipe welding with oxygen supplied to strip edges improves weld seam quality.

Depending on customer requirements, the pipes are supplied galvanized or ungalvanized on both the internal and external surfaces. Galvanizing is performed by the hot-dip method by immersing the pipe into a molten zinc bath, with zinc coating thickness of not less than 30 μm.

Strength properties are controlled by bend, cold drift-expanding, and flattening testing.

At the customer's request, water and gas line pipes in the size range between 15 mm and 50 mm can be supplied either plain-end, or threaded and coupled, or unthreaded but complete with couplings. At the customer's request, ungalvanized pipes can be coated with anti-corrosion coating.

At the customer's request, all welded pipes can be supplied with caps protecting pipe ends against damage and corrosion.

Pipes can be supplied with the inside flash removed. Welded pipes are delivered in railcar lots or in small batches by road transport.

SPECIAL CAPABILITIES

Wide range of manufactured pipes with diameters from 3.2 mm to 530 mm inclusive.

Available processing capabilities include:

- galvanizing of the outer and inner surfaces of the pipe;
- heat treatment (normalization) of the pipe;
- local heat treatment of the weld seam;
- hydrostatic testing of pipes;
- nondestructive testing of the weld seam and the pipe body;
- application of protective coating on the pipe surface;
- pipe bundling.

STANDARDS

Standards	Dimensions of pipes and sections		Steel grade
	Outside diameter, mm	Wall thickness, mm	
1	2	3	4
GOST 3262-75 Water-supply and gas-supply steel pipes	10.2-165	2.5-11.5	as per GOST 380-2005 and GOST 1050-2013
GOST 5005-82 Steel electrical welded cold-formed tubes for cardan shafts	ins. 45 ins. 46 ins. 55 ins. 66 ins. 82 ins. 94	2.5 2.5 2.0; 2.5 1.6 3.5 4.0	08kp; 08ps; 10; 10ps; 15; 15ps; 20; 20ps
GOST 10704-91 (GOST 10705-80) Electric welded longitudinal steel pipes	16-70	0.8-3.0	08; 08kp; 08ps; 08Yu; 10; 10kp; 10ps; 15; 15kp; 15ps; 20; 20kp; 20ps; St1sp; St1kp; St1ps; St2sp; St2kp; St2ps; St3sp; St3kp; St3ps; St4sp; St4kp; St4ps; 09G2S
GOST 10705-80 Electric-welded steel tubes. Range GOST 10704-91. Range as per GOST 10704-91. For pipelines and various structures	16-530	2-12	08kp; 08ps; 08Yu; 08; 10kp; 10ps; 10; 15kp; 15ps; 15; 20kp; 20ps; 20; St2kp; St2ps; St2sp; St3kp; St3ps; St3sp; St4kp; St4ps; St4sp; 22GYu; 09G2S; 17G1S; 13HFA; 17G1S-U
GOST 10707-80 Steel cold formed electrically welded tubes GOST 32678-2014 Seamless and welded cold-formed steel pipes for general purposes	16-30 32-60	1.0-1.5 1.0-2.5	08; 08kp; 08ps; 10; 10kp; 10ps; 15; 15kp; 15ps; 20; 20kp; 20ps; St1sp; St1kp; St1ps; St2sp; St2kp; St2ps; St3sp; St3kp; St3ps; St4sp; St4kp; St4ps
	6	1.0	08Yu
	6-12	0.7-1.0	
GOST 13663-86 Shaped steel tubes. Technical requirements. Range as per GOST 8639-82. GOST 8645-68	15x15; 20x20; 25x25; 28x25; 30x15; 30x20; 30x30; 35x15; 30x60; 20x40; 40x40; 40x25; 50x20; 50x25; 40x28 50x50; 60x30; 60x40; 60x60; 80x40	1-4	St2; St3; 09G2S 08; 08kp; 08ps; 10ps; 10; 20
GOST 20295-85 (TYPE1) Steel welded pipes for main gas-and-oil pipelines. Specifications	114; 127; 133; 146; 159; 168; 219; 245; 273; 325; 377; 426; 530	3.5-12	K34-K52
GOST 30245-2003 Steel bent closed welded square and rectangular section for building. Specifications	40-60x25-60; 80x40; 150x150; 120x60; 140x60; 100-250x80-200; 80-120x80-120; 120x60; 120x80; 140x60; 140x100; 150x100; 160x80	3-5	St3; 10; 20; 22GYu; 09G2S
	100x100; 120x120; 140x140; 160x160	3.5-6.0	
	140x140; 160x160	4-6	
TU 1373-004-00186619-2016 Electric-welded square and rectangular steel pipes	20x20-60x40	1.0-3.0	08; 08kp; 08ps; 08Yu; 10; 10kp; 10ps; 15; 15kp; 15ps; 20; 20kp; 20ps; St1sp; St1kp; St1ps; St2sp; St2kp; St2ps; St3sp; St3kp; St3ps; 09G2S
TU 14-3-421-75 Electric-welded oval steel pipes	72x20	1.5; 1.8	08; 08ps; 10; 10ps
	72x22		
TU 14-3-1569-88 Cold-formed electric-welded pipes. steel 08kp (for cardan shafts)	ins.38.5-42*	1.5	10; 20
TU 14-157-09-98 Taphole pipes	17.0	2.5	St2ps; 10ps. etc.
TU 14-157-30-2002 Welded steel coupling pipes	26.2; 33.7	4-5	St2ps; 10ps. etc.
TU 14-157-63-99 Longitudinal electric-welded steel pipes. OD 159 mm for pipelines and structures for various purposes	159	5.0-11.0	K34 - K48
TU 14-159-233-2006 (DIN 8905 part 1) Electric-welded steel pipes for compression household refrigerators	Gr. 1: 3.2-8.0	0.5; 0.7	08Yu (RSt 34; 2)
	Gr. 2: 4.76-12.0	0.7; 0.8; 1.0	
TU 14-159-262-2011 Cold-formed electric-welded steel pipes for compression household refrigerators	4.76; 8.0	0.7	08Yu
TU 14-159-322-2007 Cold-formed electric-welded pipes for the automotive industry	40KhVN37	48KhVN43	10; 10ps
TU 14-159-337-2010 Electric-welded cold-formed galvanized steel pipes for the automot-ive industry	Gr.1; 4.76-8.0	0.7	08Yu
	Gr.2; 4.76-12.0	0.7; 0.8	
TU 14-159-339-2009 Formed steel section for mining equipment	33-54	2.0; 2.5; 3.0	09G2S; St3GSP
TU 14-162-169-2018 Longitudinal electric-welded steel pipes for thermally insulated casing strings	325-530	6-12	K48-K52; 09G2S; 17G1S; 17G1S-U
TU 14-162-173-2019 Longitudinal electric-welded steel pipes for field. process pipelines and general purpose	114-530	5-12	K38-K52
TU 24.20.13.130-397-00186619-2018 Electric-welded steel pipes for the manufacture of automotive components TU 24.20.13.130-403-00186619-2019 Electric-welded steel pipes for the manufacture of shock absorber housings	70	2.5	10
1	2	3	4

СТАНДАРТЫ (ПРОДОЛЖЕНИЕ)

Standards	Dimensions of pipes and sections		Steel grade
	Outside diameter, mm	Wall thickness, mm	
1	2	3	4
TU 14-2R-328-97 Electric-welded closed steel bent square and rectangular sections	40x20	1.8-3.0	St1kp; St2kp; St2ps; 10. etc.
	50x25		
	40x40		
	60x30		
	50x50		
	60x40	1.8-4.0	
	80x40		
	60x60		
	80x80	3.5-6.0	
	100x100		
	120x120		
	140x140		
160x160			
TU 14-3R-32-99 Electric-welded pipes for VAZ car parts	16-45	1.0-2.0	08Yu; 08; 08kp; 08ps; 10; 10ps
API* Spec 5CT/ISO11960 Specification for Casing and Tubing	168.28-508	10.3-12	N-80; J-55; K55
API* Spec 5L Specification for Line Pipes	88.9-219.1	3.96-6.35	A25; A; B; X42
DIN 1626 Welded circular unalloyed steel tubes subject to special requirements (DIN EN 10296-1 Welded circular steel tubes for mechanical and general engineering purposes)	12-63.5	0.8-3.2	St 37.0; USt 37.0; St 44.0
DIN EN 10224 Non-alloy steel tubes and fittings for the conveyance of water and other aqueous liquids	21.3-219.1	6-11.5	L235; L275; L355
DIN EN 10255 Non-alloy steel tubes suitable for welding and threading. Technical delivery conditions	21.3-114.3	2.3-4.5	S195T
	17.0-114.3	2.3-4.5	
DIN EN 10296-1 Welded circular steel tubes for mechanical and general engineering purposes	12-63.5	0.8-3.0	RSt 34-2; RSt 37-2; St 44-2; E195; E235; E275; E355
	21.3-219.1	6-11.5	E155; E190; E195; E220; E235; E260; E275; E320; E355; E370
EN 10305-2 Steel tubes for precision applications. Technical delivery conditions. Welded cold drawn tubes	16-30	1.0-1.5	E195; E235; E275; E355
	32-60	1.0-2.5	
1	2	3	4

WELDED PIPES RANGE

Outside diameter, mm	Wall thickness, mm																											
	0.8	1.0	1.2	1.5	1.8	1.9	2.0	2.2	2.3	2.5	2.65	2.8	3.0	3.2	3.5	3.65	3.8	4.0	4.5	5.0	5.5	6.0	7.0	8.0				
	Weight per meter length, kg																											
10		0.222	0.260																									
12		0.271	0.320	0.388																								
16	0.300	0.370	0.438	0.536			0.691																					
18		0.419	0.497	0.610	0.719		0.789																					
19	0.359	0.444	0.527	0.647	0.764		0.838																					
20	0.379	0.469	0.556	0.684	0.808		0.888																					
21,3									1.08	1.16		1.28		1.43														
22	0.418	0.518	0.616	0.758			0.986	1.07																				
25		0.592	0.704	0.869	1.03		1.13			1.39																		
28			0.793	0.980	1.16		1.28	1.40		1.57		1.66																
30		0.715	0.852	1.05	1.25		1.38			1.70	1.79	1.88	2.00	2.11	2.29													
32		0.764	0.911	1.13	1.34		1.48			1.82	1.92	2.02	2.15	2.27	2.46													
33										1.88		2.09	2.22															
33,7										1.92		2.13	2.27															
37		0.838		1.24								2.12																
38			1.09	1.35	1.61		1.78			2.19																		
40			1.15	1.42	1.70		1.87	2.05		2.31		2.57	2.74															
42										2.44	2.57	2.71	2.89	3.06	3.32	3.45	3.58	3.75										
43				1.54								2.73																
45			1.30	1.61	1.92		2.12			2.62																		
48				1.72						2.81	2.96	3.12	3.33	3.54	3.84	3.99	4.14	4.34										
51				1.83	2.18		2.42			2.99			3.55															
57				2.05	2.45		2.71			3.36	3.55	3.74	4.00	4.25	4.62	4.80	4.99	5.23	5.83	6.41								
60				2.16	2.58		2.86			3.55	3.75	3.95	4.22	4.48	4.88	4.88	5.27	5.52	6.16	6.78								

WELDED PIPES RANGE (CONTINUED)

Outside diameter, mm	Wall thickness, mm																											
	0.8	1.0	1.2	1.5	1.8	1.9	2.0	2.2	2.3	2.5	2.65	2.8	3.0	3.2	3.5	3.65	3.8	4.0	4.5	5.0	5.5	6.0	7.0	8.0				
	Weight per meter length, kg																											
63.5				2.29	2.74	2.89	3.03			3.76		4.48		5.18			5.87											
73										4.35		4.85	5.18	5.51	6.00		6.48	6.81										
76				2.76	3.29		3.65	4.00		4.53		5.05	5.40	5.75	6.26	6.51	6.77	7.10	7.93	8.75								
80				2.90	3.47	3.66	3.85	4.22				5.33	5.70															
89							4.29			5.33		5.95	6.36	6.77	7.38	7.68	7.98	8.38	9.38	10.36	11.33	12.28						
89.3																7.38												
90																		8.48										
102							4.93	5.41		6.13		6.85	7.32	7.80	8.50	8.85	9.20	9.67	10.82	11.96	13.09	14.21						
108										6.50		7.26	7.77	8.27	9.02	9.39	9.76	10.26	11.49	12.70	13.90	15.09						
114										6.87		7.68	8.21	8.74	9.54	9.93	10.33	10.85	12.15	13.44	14.72	15.98	18.47					
127												9.18	9.77	10.66	11.10	11.55	12.13	13.60	15.04	16.48	17.90							
133										8.05		8.99	9.62	10.24	11.18	11.64	12.11	12.73	14.26	15.78	17.29	18.79						
146												10.58		12.30				14.01	15.71	17.39	19.06	20.72	24.00	27.23				
152												11.02	11.74	12.82	13.35	13.89	14.60	16.37	18.13	19.87	21.60	25.03	28.41					
152.4											9.79		11.05															
159										9.65		10.79	11.54	12.30	13.42	13.98	14.52	15.29	17.15	18.99	20.82	22.64	26.24	26.24				
168												12.21	13.01					16.18	18.14	20.10	22.04	23.97	27.79	31.57				
177.8																				21.31	23.27	25.2	29.49	33.50				
193.7																				23.27	25.53	27.77	32.23	36.64				
219															18.60		20.17	21.21	23.80	26.39	28.96	31.52	36.60	41.63				

WELDED PIPES RANGE

Outside diameter, mm	Wall thickness, mm									
	5.0	5.5	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0
	Weight per meter length, kg									
244.5	29.53	32.42	35.42	41.00	46.66	52.27				
273	32.05	36.28	39.51	45.92	52.28	58.60	64.86			
325	39.46	43.38	47.20	54.90	62.54	70.14	77.68			
355.6			51.73	60.18	68.58	76.93	85.23			
377			54.90	63.87	72.80	81.68	90.51			
406.4			59.25	68.95	78.60	88.20	97.76	107.72	116.72	
426			62.15	72.33	82.47	92.55	102.59	112.58	122.52	
530			77.54	90.29	102.99	115.64	128.24	140.79	153.30	165.75

RANGE OF WELDED SECTIONS AND RECTANGULAR AND SQUARE PIPES (SHAPED PIPES) AS PER GOST 30245, GOST 8639, GOST 8645, TU 14-2R-328, TS 157-374

Size, mm	Wall thickness, mm																					
	1.0	1.2	1.5	1.8	2.0	2.2	2.5	2.8	3.0	3.2	3.5	3.8	4.0	4.2	4.5	5.0	6.0	7.0	8.0	9.0	10.0	
	Weight per meter length, kg																					
15 x 15	0.426	0.501	0.605																			
20 x 20	0.583	0.689	0.841	0.985	1.08																	
25 x 25	0.740	0.877	1.07	1.27	1.39	1.48	1.68	1.79	1.95													
28 x 25			1.15	1.33	1.49	1.58	1.80		2.09													
30 x 15	0.661	0.783	0.959	1.13	1.23																	
30 x 20	0.740	0.877	1.08	1.27	1.39																	
30 x 30	0.897	1.07	1.31	1.55	1.70																	
35 x 15	0.740	0.877	1.08	1.13	1.39																	
40 x 20	0.897	1.07	1.31	1.55	1.70		2.07															
40 x 25		1.16	1.43	1.69	1.86	2.00	2.27	2.45	2.66	2.81	3.02											
40 x 28			1.50	1.78	1.95	2.13	2.39	2.64	2.80	2.96	3.19											
40 x 40		1.44	1.78	2.12	2.33	2.51	2.85	3.11	3.36	3.49	3.85	4.03	4.30	4.36	4.61							
50 x 20		1.25	1.55	1.83	2.02	2.20	2.47															
50 x 25		1.35	1.67	1.97	2.17	2.37	2.66	2.94	3.13	3.31	3.57											
50 x 30							2.86	3.11	3.36	3.49	3.85	4.03	4.30	4.36	4.61							
50 x 50					2.96	3.24	3.64	3.99	4.31	4.50	4.94	5.22	5.56	5.68	6.02							
60 x 30				2.38	2.62	2.86	3.21	3.55	3.77													
60 x 40			2.02	2.40	2.65	2.89	3.25	3.60	3.83	4.06	4.40	4.72	4.93									
60 x 60					2.96	3.24	3.64	3.99	4.31	4.50	4.94	5.22	5.56	5.68	6.02							
80 x 40				3.29	3.65	4.00	4.53	5.05	5.40	5.75	6.26	6.26	7.10		7.93							
80 x 60					3.59	3.93	4.43	4.87	5.25	5.50	6.04	6.41	6.82									
80 x 80							6.13	6.85	7.32	7.80	8.50	9.20	9.67		10.85							
100 x 100					3.59	3.93	4.43	4.87	5.25	5.50	6.04	6.41	6.82									
120 x 80							5.17	5.75	6.13	6.50	7.14	7.61	8.07	8.32	8.85							

RANGE OF WELDED SECTIONS AND RECTANGULAR AND SQUARE PIPES (SHAPED PIPES) AS PER GOST 30245, GOST 8639, GOST 8645, TU 14-2R-328, TS 157-374 (CONTINUED)

Size, mm	Wall thickness, mm																				
	1.0	1.2	1.5	1.8	2.0	2.2	2.5	2.8	3.0	3.2	3.5	3.8	4.0	4.2	4.5	5.0	6.0	7.0	8.0	9.0	10.0
	Weight per meter length, kg																				
120 x 120									7.07	7.51	8.16	8.80	9.22	9.64	10.26	11.27					
140 x 100									8.96	9.52	10.36	11.19	11.73	12.28	13.08	14.41					
140 x 140													16.76	18.74	20.69	22.62	24.52				
150 x 100									8.01	8.51	9.26	9.99	10.48	10.96	11.67	12.84					
160 x 80									8.96	9.52	10.36	11.19	11.73	12.28	13.08	14.41					
160x 160													19.27	21.56	23.83	26.07	28.29				
180 x 180									10.84	11.53	12.56	13.57	14.25	14.91	15.91	17.55					
200 x 160									8.96	9.52	10.36	11.19	11.73	12.28	13.08	14.41					
200 x 200									10.84	11.53	12.56	13.57	14.25	14.91	15.91	17.55					
250 x 150									11.31	12.03	13.10	14.17	14.87	15.57	16.62	18.33					
240 x 160									10.84	11.53	12.56	13.57	14.25	14.91	15.91	17.55					
350 x 250																		63.08	71.63	80.05	88.36

STANDARD GALVANIZED WELDED PIPES RANGE

Outside diameter, mm	Wall thickness, mm											
	2.0	2.2	2.5	2.8	3.0	3.2	3.5	3.8	4.0	4.5	5.0	6.0
	Weight per meter length, kg											
33			1.94	2.15	2.29							
33.7			1.98	2.19	2.34							
35				2.18								
38	1.83		2.25									
40	1.93		2.38	2.65	2.82							
42			2.51	2.79	2.98							
43				2.81								
45	2.18		2.70									
48			2.89	3.21	3.43	3.65	3.96		4.47			
51	2.49		3.08		3.66							
57	2.79		3.46	3.85	4.11	4.38	4.76		5.39	6.00		
60	2.95		3.66	4.07	4.35	4.61	5.03	5.43	5.69			
63.5	3.12		3.87		4.61		5.34		6.05			
73			4.48	5.00	5.34	5.68	6.18	6.67	7.01			
76	3.76	4.12	4.67	5.20	5.56	5.92	6.45	6.97	7.31	8.17	9.01	
80	3.97	4.35		5.49	5.87							
89	4.42		5.49	6.13	6.55	6.97	7.60	8.22	8.63	9.66	10.67	
90									8.73			
102	5.08	5.57	6.31	7.06	7.54	8.03	8.76	9.48	9.96	11.14	12.32	14.64
108			6.70	7.48	8.00	8.52	9.29	10.05	10.57	11.83	13.08	15.54
114			7.08	7.91	8.46	9.00	9.82	10.64	11.18	12.51	13.84	16.46
127					9.46		10.98		12.49	14.01	15.49	18.44
133			8.29	9.26	9.91	10.55	11.52	12.47	13.11	14.69	16.25	
146					10.90		12.67		14.43	16.18	17.91	21.34
152					11.35	12.09			15.04			22.25
159			9.94	11.11	11.89	12.67	13.82	14.96	15.75	17.66	19.56	23.32

WELDED WATER AND GAS LINE PIPES AS PER GOST 3262-75

Conditional passage	Outside diameter, mm	Wall thickness, mm												
		1.8	2.0	2.2	2.35	2.50	2.8	3.0	3.2	3.5	4.0	4.5	5.0	5.5
		Weight per meter length, kg												
6	10.2	0.37	0.40			0.47								
8	13.5		0.57	0.61			0.74							
10	16.0		0.69											
10	17.0		0.74	0.80			0.98							
15	20.0					1.08								
15	21.3				1.10	1.16	1.28	1.35	1.43					
20	26.0					1.45								
20	26.8				1.42	1.50	1.66	1.76	1.86					
25	32.0						2.02							
25	33.5					1.91	2.12	2.26	2.39	2.59	2.91			
32	41.0						2.64							
32	42.3					2.45	2.73	2.91	3.09	3.35	3.78			
40	47.0							3.26						
40	48.0					2.74	3.05	3.33	3.46	3.84	4.34			

WELDED WATER AND GAS LINE PIPES AS PER GOST 3262-75 (CONTINUED)

Conditional passage	Outside diameter, mm	Wall thickness, mm												
		1.8	2.0	2.2	2.35	2.50	2.8	3.0	3.2	3.5	4.0	4.5	5.0	5.5
		Weight per meter length, kg												
50	59.0							4.14						
50	60.0					3.48	3.88	4.22	4.40	4.88	5.43	6.16		
65	74.0								5.59					
65	75.5								5.71	6.21	7.05	7.88		
80	88.5									7.34	8.34	9.32		
90	101.3									8.44	9.60	10.74		
100	114.0										10.85	12.15	13.44	
125	140.0										13.42	15.04	13.44	18.24
150	165.0										15.88	17.81		21.63

lightweight, ordinary and reinforced.At the customer's request.

MECHANICAL PROPERTIES OF WELDED PIPES AS PER GOST 10705-80

Steel grade	Ultimate tensile strength σ , N/mm ² (kgf/mm ²) for pipes outside diameter D, mm					Yield Strength σ_s , N/mm ² (kgf/mm ²)		Elongation, δ_g , % for pipe outside diameter D, mm					
	8–19	20 to 60 for wall thickness		63–152	159–245			8 –19	20 to 60 for wall thickness		63–152	159–245	
		Greater than 0,06 D	0,06 D or less			Greater than 0,06 D	0,06 D or less		Greater than 0,06 D	0,06 D or less			
08Yu	314 (32)	314 (32)	294 (30)	—	—	174 (18)	—	7	7	16	—	—	—
08PS,08KP	372 (38)	372 (38)	314 (32)	294 (30)	314 (32)	174 (18)	196 (20)	6	6	15	23	15	18
08	372 (38)	372 (38)	314 (32)	294 (30)	314 (32)	186 (19)	196 (20)	6	6	15	23	15	18
10KP,ST2KP	372 (38)	372 (38)	333 (34)	314 (32)	314 (32)	174 (18)	196 (20)	6	6	15	23	15	18
10PS	372 (38)	372 (38)	333 (34)	314 (32)	314 (32)	186 (19)	196 (20)	6	6	15	23	15	18
St2ps	372 (38)	372 (38)	333 (34)	314 (32)	333 (34)	186 (19)	206 (21)	6	6	15	23	15	17
10	372 (38)	372 (38)	333 (34)	314 (32)	314 (32)	196 (20)	196 (20)	6	6	15	23	15	18
St2sp	372 (38)	372 (38)	333 (34)	314 (32)	333 (34)	196 (20)	206 (21)	6	6	15	23	14	17
15	441 (45)	441 (45)	372 (38)	353 (36)	353 (36)	206 (21)	216 (22)	5	5	14	21	14	17
20	441 (45)	441 (45)	372 (38)	353 (36)	353 (36)	216 (22)	216 (22)	5	5	14	21	14	17
St3kp	441 (45)	441 (45)	392 (40)	372 (38)	353 (36)	196 (20)	216 (22)	5	5	13	20	14	17
St3ps	441 (45)	441 (45)	392 (40)	372 (38)	353 (36)	206 (21)	216 (22)	5	5	13	20	14	17
St3sp	441 (45)	441 (45)	392 (40)	372 (38)	353 (36)	216 (22)	216 (22)	5	5	13	20	14	17

MECHANICAL PROPERTIES OF WELDED PIPES AS PER TU 14-162-173-2019

Grade	Base Metal			Weld Metal
	Yield strength σ_y , MPa, not less than	Tensile strength σ_m , MPa, not less than	Elongation, δ_g , %, not less than	
K38	210	335	20	335
K42	290	415	20	415
K46	320	435	20	435
K48	360	460	20	460
K50	390	490	19	490
K52	415	520	19	520

PRECISION PIPES

Pipes for the manufacture of machine parts in the automotive, drilling, oil production, mining, crane, and other industries, including the manufacture of electric submersible pump housings, hydraulic cylinders, shock absorbers, as well as cardan shafts.

FEATURES

Precision steel pipes are manufactured with higher accuracy. Pipes are produced by hot or cold rolling (on cold pilgers), or by drawing (with or without a plug). Pipes meet different requirements for dimensions, steel grades, manufacturing tolerances, mechanical properties, and surface quality, depending on the production technique and the requirements of applicable standards.

Pipes are made of carbon, alloy and stainless steels to Russian and foreign standards as well as to manufacturer's specifications designed to meet the technical requirements of specific customers.

Mandatory tests and examinations are performed in full compliance with applicable standards.

Pipes can be made to customer specifications for dimensions and tolerances, including improved precision of wall thickness (+/-6%) and outside diameter (+/-0.5%), as well as extremely thick-walled pipes with a D/S ratio of up to 2.2 mm and a wall thickness of up to 67 mm. Isothermal annealing and outside surface machining services are available.

The length of non-dimensional pipes is from 1.5 to 12.5 m, the length of metered pipes is from 4.5 to 9 m.

Random length pipes are manufactured with lengths between 1.5 m and 12.5 m; cut length pipes – between 4.5 mm and 9 m. Cut length pipes may be produced with a length of more than 12.5 m by agreement between the parties.

TMK produces high-tech cold-formed pipes made of stainless steels and alloys with controlled nanostructure and improved properties to meet the current and future requirements of various industries. Available equipment can produce pipes with diameters from 1.5 mm to 102 mm, wall thickness from 0.12 mm to 10 mm and length up to 30 m. The plant can produce pipes with a high quality of inner and outer surfaces, including electrochemical polishing.

SPECIAL CAPABILITIES

- cold-formed pipe diameter range: 0.8 mm–426 mm; wall thickness: 0.16 mm–24.0 mm;
- manufacture of pipes with non-standard dimensions and tolerances;
- outer surface grinding;
- pipe heat treatment in furnaces with oxidizing or non-oxidizing atmospheres;
- manufacture of capillary tubes;
- nondestructive testing, hydraulic and pneumatic testing of pipes;
- protective coating of pipes.

STANDARDS

Standards	Pipes dimensions		Steel grade
	Outside diameter, mm	Wall thickness, mm	
1	2	3	4
GOST 9567-75 Precision steel tubes	5.0-80.0 70-203	0.5-10.0 9-50	10; 20; 35; 45; 15XM; 30KhGSA; 10G2, etc.
	5.0-426	0.8-40	10; 20; 35; 45; 10G1; 15X; 20X; 40X; 30KhGSA; 15KhM; 09G2S
TU 14-159-263-2006 (TU 14-159-292-2005) Cold-formed electric-welded precision steel pipes for the automotive industry	16-58	1.0-2.5	10; 10ps; 10kp; 20; 08; 08kp; 08ps; 09G2S
DIN EN 10305-1 Steel tubes for precision applications. Technical delivery conditions. Seamless cold drawn tubes	6.0-110.0	0.5-10.0	E235; E355; C45E
	95-300	7.5-25	
DIN 2391 Seamless precision steel tubes	32-100	2.5-8.0	St 35; St 45; St 52.0; St 52.3
DIN 2393-94 Welded precision steel tubes (cold-formed) (DIN EN 10305-2 Steel tubes for precision applications)	By agreement with the customer		RSt 34-2; RSt 37-2; St 44-2
DIN 2394 As-welded and sized precision steel tubes EN 10305-3 Steel tubes for precision applications. Welded cold sized tubes	12-63.5	0.8-3.0	RSt 34-2; RSt 37-2; St 44-2; E195; E235; E275; E355
DIN 2395, parts 1, 2 Rectangular and square welded precision steel tubes (for general use) EN 10305-5 Steel tubes for precision applications. Technical delivery conditions. Welded cold sized square and rectangular tubes	15x15-60x40	1.0-3.0	RSt 34-2; RSt 37-2; St 44-2; E220
1	2	3	4

STAINLESS STEEL PIPES

Corrosion-resistant pipes are used in the machine building, chemical, oil refining, and food industries.

FEATURES

Hot-formed stainless pipes are produced by extrusion and rolling.

Two extrusion lines with 2,000-tonne and 5,500-tonne extruders have no analogues in Russia and can manufacture pipes with diameters from 38 mm to 273 mm, wall thicknesses from 3.5 mm to 30 mm and lengths from 2 m to 12.5 m, with a high quality of inner and outer surfaces. The mechanical properties of produced pipes are close to those of cold-formed pipes and have improved performance characteristics compared to rolled pipes. The employed production method allows making pipes of steel grades, that are hardly formable, such as 06KhN28MDT, 10KhN28MDT, 10Kh17N13M2T, 15Kh25T, 20-30Kh13, as well as 10Kh23N18 creep resistant steel grades and 08Kh22N6T duplex steel grades.

The continuous rolling mill TPA 159-426 allows the production of pipes with a diameter of 325 mm and a wall thickness of 12.0-16.0 mm.

Hot-formed stainless steel pipes are produced on pilger mills. These mills can produce pipes with a diameter up to 630 mm. Pipes are supplied after machining to ensure high surface quality.

Cold-formed stainless steel and alloy pipes with controlled nanostructure and improved properties are produced on cold-rolling pipe mills (CRM, pilger mill, or by drawing). The available equipment allows for the production of pipes with diameters ranging from 1.6 mm to 426 mm, wall thicknesses from 0.12 mm to 40 mm, and lengths up to 32.5 m.

It is possible to produce pipes with a high quality of inner and outer surfaces, including electrochemical polishing.

Stainless electric-welded pipes are manufactured with a diameter from 6 mm to 1620 mm with wall thicknesses from 0.5 to 50 mm.

Before shipment to the customer, pipes undergo finishing and quality control at the manufacturer's facilities.

RANGE OF ELECTRIC-WELDED STAINLESS STEEL PIPES (CONTINUED)

[illegible]

RANGE OF HOT-FORMED STAINLESS STEEL PIPES

[illegible]

Pipes can be ordered to dimensions not specified in the table.

MECHANICAL PROPERTIES OF SEAMLESS PIPES AS PER GOST 9940-81, GOST 9941-2022

Steel grade	Ultimate tensile strength, MPa	Yield strength, MPa	Elongation at break, %
03Kh18N11	490	196	40
04Kh18N10	490	175	45
08Kh18N10	510	205	43
08Kh18N10T	510	205	43
08Kh18N12T	510	205	43
08Kh18N12B	510	205	43
12Kh18N9	530	215	38
12Kh18N9T	530	215	38
12Kh18N10T	530	235	38
12Kh18N12T	530	235	38
03X17Sh14M3	490	196	40
08Kh17N13M2T	510	196	40
08Kh17N15M3T	510	196	40
10Kh17N13M2T	530	235	37
20Kh23N13	570	235	35
10Kh23N18	530	215	35
20Kh23N18	540	265	35
03Kh22N5AM3	680	450	25
03Kh22N6M2	590	345	25
08Kh22N6T	590	345	18
08Kh21N6M2T	590	345	20
05KhN32T (KhN32T)	470	175	25
06KhN28MDT	540	215	35
304L, 316L	485	170	40

MECHANICAL PROPERTIES OF SEAMLESS PIPES AS PER GOST 9940-81, GOST 9941-2022 (CONTINUED)

Steel grade	Ultimate tensile strength, MPa	Yield strength, MPa	Elongation at break, %
304, 304LN, 304H, 309S, 310S, 316, 316LN, 316H, 316Ti, 317, 321, 321H, 347/321, 321H, 347, 347H	515	205	40
304N, 316N	550	240	30
318	620	450	25
2205	655	450	25
800	520	205	30
904L	490	220	35

MECHANICAL PROPERTIES OF SEAMLESS PIPES AS PER GOST 9940-81, GOST 9941-2022

Steel grade	Ultimate tensile strength, σ_{UTS} , kgf/mm ² (MN/m ²)		Elongation, δ_5 , %		Density, ρ , g/cm ³	
	hot-formed	cold-formed	hot-formed	cold-formed	hot-formed	cold-formed
08Kh13	372 (38)	372 (38)	22	22	7.70	7.70
08Kh17T	372 (38)	372 (38)	17	17	7.70	7.70
12Kh13	392 (40)	392 (40)	21	22	7.70	7.70
12Kh17	441 (45)	441 (45)	17	17	7.70	7.70
15Kh25T	441 (45)	461 (47)	17	17	7.60	7.60
04Kh18Ni10	441 (45)	490 (50)	40	45	7.90	7.90
10Kh23Ni18	491 (50)	529 (54)	37	35	7.95	7.95
08Kh17Ni15MZT	510 (52)	549 (56)	35	35	8.10	8.10
08Kh18Ni10	510 (52)	529 (54)	40	37	7.90	7.90
08Kh18Ni10T	510 (52)	529 (56)	40	37	7.90	7.90
08Kh18Ni10T	510 (52)	549 (56)	38	37	7.90	7.90
08Kh18Ni12B	510 (52)	529 (54)	40	37	7.90	7.90
08Kh18Ni12T	510 (52)	549 (56)	40	37	8.10	7.95
08Kh20Ni14S2	510 (52)	510 (52)	35	35	7.70	7.70
10Kh17Ni13M2T	529 (54)	529 (54)	35	35	8.00	8.00
12Kh18N9	529 (54)	549 (56)	40	37	7.90	7.90
12Kh18Ni10T	529 (54)	549 (56)	40	35	7.90	7.95
12Kh18Ni12T	529 (54)	549 (56)	40	35	7.95	7.90
17Kh18N9	568 (58)	568 (58)	40	35	7.90	7.90
08Kh22Ni6T	588 (60)	588 (60)	24	20	7.70	7.60
08KhN28MDT	490 (50)	490 (50)	30	30	7.96	7.96

PETROLEUM CRACKING PIPES

This type of pipes is used in petroleum cracking and chemical synthesis units.

FEATURES

Cold-formed pipe petroleum cracking pipes are produced from billets supplied from steel mills or from semi-finished hot-extruded pipes.

Hot-formed petroleum cracking pipes are produced from billets supplied from steel mills or from continuous cast billets made by the Company.

Cracking pipe length varies from 4 m to 12.1 m. In agreement with the customer, petroleum cracking pipes can be manufactured with lengths over 12.1 meters.

TMK makes pipes by hot extrusion. Research identified the following advantages of this method over conventional hot rolling*:

- pressure loss per unit of nominal length in a pipeline made from extruded pipes is 40% less than in pipeline made from rolled pipes;
- pipes made by hot extrusion have higher average strength (by 5%–7%) and ductility (by 10%–14%) than rolled pipes, the probability of extruded pipe failure is five times less than in case of rolled pipes.

Hot-formed petroleum cracking pipes are produced in pilger mills from forged billets. These mills are unique in that they can produce extruded pipe with a diameter up to 550 mm.

STANDARDS

Standards	Pipe dimensions		Steel grade	Pipe type
	Outside diameter, mm	Wall thickness, mm		
GOST 550–2020 Seamless steel tubes for petroleum processing and petrochemical industry	10–108	1.5–12.0	09G2C; 10; 10G2; 20; 15Kh5M; 12KhV	cold-formed
	32–168 273–426	2.8–16.0 7.0–18.0	10; 20 10G2; 13Kh9M1	hot-formed
	38–245	4.0–32.0	10; 20; 10G2; 12KhM; 12Kh8; 15Kh5M; 12Kh9M1	hot-formed
TU 14–3R–62–2001 Seamless hot-formed pipes made of 15Kh5M steel for the oil refining industry	273–426	10–36	15Kh5M	hot-formed
	550	25		

RANGE OF COLD-FORMED PETROLEUM CRACKING PIPES

Outside diameter, mm	Wall thickness, mm										
	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5	5.5	6
16	Weight per meter length, kg										
19	0.47	0.65	0.69								
20			0.84								
25			0.89	1.08							
28			1.13	1.39	1.63		2.07	2.28			
32			1.28	1.57					2.84		
38										3.59	3.85
48							4.34	4.83			

* Based on the results of tests conducted by TMK Group.

RANGE OF SEAMLESS HOT-FORMED PETROLEUM CRACKING PIPES

Outside diameter, mm	Wall thickness, mm																										
	2.8	3.0	3.2	3.5	4.0	4.5	5	6	7	8	9	10	11	12	14	15	16	17	18	20	22	23	25	28	30		
32	-	-	-	-	-	-																					
33.7	-	-	-	-	-	-																					
38	-	-	-	-	-	-	-																				
42	-	-	-	-	3.75	4.16	4.56	5.33	6.04	6.71	7.32	7.89	8.41	8.88	9.67												
42.4	-	-	-	-	-																						
45		-	-	-	4.04	4.49	4.93	5.77	6.56	7.30	7.99	8.63	9.22	9.77	10.70												
48.3		-	-	-	4.34	4.83	5.30	6.21	7.08	7.89	8.66	9.37	10.04	10.65	11.74												
50		-	-	-	4.54	5.05	5.55	6.51	7.42	8.29	9.10	9.86	10.58	11.24	12.43	12.95											
54			-	-	4.93	5.49	6.04	7.10	8.11	9.08	9.99	10.85	11.67	12.43	13.81	14.43	14.99	15.51									
57					5.23	5.83	6.41	7.55	8.63	9.67	10.65	11.59	12.48	13.32	14.85	15.54	16.18	16.77	17.31								
60			-	-	5.52	6.16	6.78	7.99	9.15	10.26	11.32	12.33	13.29	14.20	15.88	16.65	17.36	18.03	18.64	19.73							
60.3			-	-	-																						
63.5				-	5.87	6.55	7.21	8.51	9.75	10.95	12.10	13.19	14.24	15.24	17.09	17.94	18.74	19.49	20.20	21.45							
68				-	7.05	7.77	9.17	10.53	11.84	13.09	14.30	15.46	16.57	18.64	19.61	20.52	21.38	22.19	23.67								
70					7.27	8.01	9.47	10.88	12.23	13.54	14.80	16.00	17.16	19.33	20.35	21.31	22.22	23.08	24.66								
73				-	7.60	8.38	9.91	11.39	12.82	14.20	15.54	16.82	18.05	20.37	21.46	22.49	23.18	24.41	26.14								
76				-	7.93	8.75	10.36	11.91	13.42	14.87	16.28	17.63	18.94	21.40	22.57	23.67	24.74	25.75	27.62								
83					8.71	9.62	11.39	13.12	14.80	16.42	18.00	19.53	21.01	23.82	25.16	26.44	27.66	28.85	31.07								
89				-	9.38	10.36	12.28	14.15	15.98	17.76	19.48	21.16	22.79	25.89	27.37	28.80	30.19	31.52	34.03	35.21							
95						11.10	13.17	15.19	17.16	19.09	20.96	22.79	24.56	27.96	29.59	31.17	32.70	34.18	36.99								
102						11.96	14.20	16.40	18.54	20.64	22.69	24.68	26.63	30.38	32.18	33.93	35.64	37.29	40.44	41.95	43.40	47.47	51.10	53.27			
108						12.70	15.09	17.43	19.73	21.97	24.17	26.31	28.41	32.45	34.40	36.30	38.15	39.95	43.40	45.05	46.66	51.17	55.24	57.70			
114						13.44	15.98	18.47	20.91	23.30	25.65	27.94	30.18	34.52	36.62	38.67	40.67	42.61	46.36	48.16	49.91	54.87	59.38	62.14			
121						14.30	17.02	19.68	22.29	24.86	27.37	29.84	32.26	36.94	39.21	41.43	43.60	45.72	49.81	51.79	53.71	59.18	64.21	67.32			
127						15.04	17.90	20.71	23.48	26.19	28.85	31.47	34.03	39.01	41.43	43.80	46.12	48.38	52.77	54.89	56.96	62.88	68.36	71.77			
133						15.78	18.79	21.75	24.66	27.52	30.33	33.09	35.81	41.08	43.65	46.16	48.63	51.05	55.73	58.00	60.22	66.58	72.50	76.20			
140						-	19.83	22.96	26.04	29.07	32.06	34.99	37.88	43.50	46.24	48.93	51.57	54.15	59.18	61.63	64.02	70.90	77.33	81.38			
146						-	20.71	23.99	27.22	30.41	33.54	36.62	39.65	45.57	48.46	51.29	54.08	56.82	62.14	64.73	67.27	74.60	81.48	85.82			
152						-	21.60	25.03	28.41	31.74	35.02	38.25	41.43	47.64	50.68	53.66	56.60	59.48	65.10	67.84	70.53	78.30	85.62	90.26			
159						-	22.64	26.24	29.79	33.29	36.74	40.15	43.50	50.06	53.27	56.42	59.53	62.59	68.55	71.46	74.33	82.61	90.45	95.44			
168									27.79	31.56	35.29	38.96	42.59	46.16	53.17	56.60	59.97	63.31	66.58	72.99	76.13	79.21	88.16	96.67	102.10		
180									29.87	33.93	37.95	41.92	45.84	49.71	57.31	61.04	64.71	68.34	71.91	78.91	82.34	85.72	95.56	104.95	110.98		
194										36.69	41.06	45.37	49.64	53.86	62.14	66.22	70.23	74.21	78.12	85.82	89.59	93.31	104.19	114.62	121.34		
203										38.47	43.06	47.59	52.08	56.52	65.25	69.55	73.78	77.98	82.12	90.26	94.25	98.20	109.74	120.83	127.99		
219									36.60	41.63	46.61	51.54	56/42	61.26	70.77	75.46	80.10	84.69	89.22	98.15	102.54	106.88	119.60	131.88	139.83		
245															79.76	85.08	90.36	95.59	100.76	110.97	116.00	120.98	135.63	149.83	159.07		

MECHANICAL PROPERTIES OF PETROLEUM CRACKING PIPES

Steel Grade	Ultimate tensile strength σ_{UTS} , kgf/mm ² (MN/m ²)	Yield strength σ_y , kgf/mm ² (MN/mm ²)	Elongation δ , %	Percentage reduction of area ψ , %	Impact strength KCU, J/cm ² (kgf/cm ²)	Hardness, HB
	min					max
COLD-FORMED						
10	34 (333)	21 (206)	26	—	—	137
20	42 (412)	25 (245)	23	—	—	156
15Kh5M	40 (392)	22 (216)	22	—	—	170
12Kh8	40 (392)	22 (216)	22	—	—	170
10G2*	43 (421)	27 (265)	21	—	—	197
HOT-FORMED						
10	36 (353)	22 (216)	25	50	78 (8)	137
20	44 (431)	26 (255)	22	50	78 (8)	156
10G2	43 (421)	27 (265)	21	50	118 (12)	197
12KhM	42 (412)	25 (245)	21	45	69 (7)	156
13Kh9M1	392	216	22	50	98	197
	569**	412**	16**	50**	98**	235**
15Kh5	40 (392)	22 (216)	24	50	98 (10)	170
15Kh5M	40 (392)	22 (216)	22	50	118 (12)	170
15Kh5M-U (normalization and tempering)	60 (588)	42 (412)	16	65	98 (10)	235

* For steel grade 10G2, percentage reduction of area is 50%, impact strength is 118 (12) as per GOST 550–2020.

** After normalization and tempering if requested by customer.

BOILER PIPES

Boiler pipes are used in steam boilers and pipelines with high and supercritical steam parameters.

FEATURES

Cold-formed boiler pipes are produced from billets supplied from steel mills or from semi-finished hot-extruded pipes. Pipe length: up to 24 m.

Hot-formed boiler pipes are produced from billets supplied from steel mills or from continuous cast billets.

Hot-formed boiler pipes are manufactured by hot extrusion.

Research identified the following advantages of this method over conventional hot rolling*:

- pipes made by hot extrusion have higher average strength (by 5%–7%) and ductility (by 10%–14%) than rolled pipes, the probability of extruded pipe failure is five times less than in case of rolled pipes.

Hot-formed boiler pipes are produced on pilger mills. These mills are unique in that they can produce pipes with a wall thickness up to 90 mm.

Cold-formed boiler pipes are produced on cold pilgers. These mills can produce pipes with diameters from 90 mm to 426 mm and wall thicknesses from 2 mm to 40 mm. TMK is the only manufacturer of cold-formed pipes with diameters over 120 mm in Russia and other CIS countries.

STANDARDS

Standards	Pipes dimensions		Steel grade
	Outside diameter, mm	Wall thickness, mm	
1	2	3	4
GOST 33229-2015 Pipes for boiler and heat exchange equipment. Specifications. Part 1. Seamless steel pipes for operation under pressure not exceeding 6.4 MPa and at a temperature not exceeding 400 °C	6-168	0.8-16	10; 20; 09G2S; 10G2
	10-180**	2.5-12.0	10; 20; 09G2S; 10G2
GOST R 70731.1-2023 Steel pipes for the manufacture of equipment and pipelines of nuclear power plants. General specifications. Part 1. Seamless steel pipes of unalloyed and alloyed steels. Hot and cold formed	114-610	4.5-28	20, 15KhM, 15Kh1M1F
TU 14-3-190-2004 Seamless steel pipes for boiler plants and pipelines *	5-180**	0.8-12.0	10; 20; 15GS; 20PV; 15KhM; 12Kh1MF-PV; 12Kh1MF; 12X2MFSR
	28-426	2.8-45.0	10; 20; 15GS; 20PV; 15KhM; 12Kh1MF-PV; 12Kh1MF; 15Kh1M1F
TU 14-3-433-75 Seamless steel pipes for high-pressure installations of chemical and petrochemical industries	402	56	14KhGS; 20KhMA; 30KhMA
	426	48	
	465	60	
	530	65	
TU 14-3-796-79 Boiler pipes of corrosion-resistant steel grades	10-60**	2.0-6.0	12Kh18N12T
TU 14-ZR-55-2001 Seamless pipes for steam boilers and pipelines	10-550	2.0-90	20; 15GS; 20-PV; 15KhM; 12Kh1MF-PV; 12Kh18N12T; 15Kh1M1F; 12Kh1MF; 12Kh2MFAD; 12Kh1MF-Sh; 10Kh9MFB; 10Kh9MFB-Sh; 10Kh9V2MFBR-Sh; 12Kh1V2MF; 08Kh16N9M2; 10Kh13G12BS2N2D2
1	2	3	4

STANDARDS (CONTINUED)

Standards	Pipes dimensions		Steel grade
	Outside diameter, mm	Wall thickness, mm	
1	2	3	4
ASTM A53/A53M Standard Specification for Seamless Carbon Steel Pipes for High-Temperature Service ASTM A106/A106M Standard Specification for Pipes, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless ASME SA-53/SA-53M Specification for Pipes, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless ASME SA-106/SA-106M Standard Specification for Seamless Carbon Steel Pipes for High-Temperature Service	168.3-406.4	7.1-34.9	A;B;C Gr A; Gr B; Gr C
	10.3-88.9	1.73-11.13	
	10.3-73.0*	1.73-10.15	
	33.4-219.1	2.90-25.40	
ASTM A106/A106M Standard Specification for Seamless Carbon Steel Pipes for High-Temperature Service	10.3-127	1.73-12.7	A-1; C
	10.3-73.0**	1.73-10.15	Gr A; Gr B; Gr C
	33.4-219.1	2.90-25.40	
	60.3-508	4-50.01	A-1; C
ASTM A192/A192M Standard Specification for Seamless Carbon Steel Boiler Tubes for High-Pressure Service ASME SA-192/SA-192M Seamless Carbon Steel Boiler Tubes for High-Pressure Service. Specifications	19.05-76.2	2.11-5.0	Low Carbon
	19.05*	2.11	
ASTM A335/A335M Seamless Ferritic Alloy-Steel Pipes for High-Temperature Service	26.7-406.4	2.11-25.4	P5; P9; P11; P12; T11; T12; P22; P91, etc..
	219.1	8.18-27.79	
ASTM A 213/A213M Standard Specification for Seamless Ferritic and Austenitic Alloy-Steel Boiler, Superheater, and Heat-Exchanger Tubes Specifications ASME SA-213/SA-213M Standard Specification for Seamless Ferritic and Austenitic Alloy-Steel Boiler, Superheater, and Heat-Exchanger Tubes	26.7-60.3	2.11-5.54	T5
	48-127; 141.3	4-12.7	
	31.75**	6.1-6.6	T22
DIN EN 10216-1 Seamless steel tubes for pressure purposes. Technical delivery conditions. Non-alloy steel tubes with specified room temperature properties	10.2-168.3	1.6-16	R235TR1; R235TR2; 34CrMo4 according to DIN EN 10297-1 (up to 76.1 mm)
	10.2-88.9**	1.8-7.1	R195TR1; R195TR2; P235TR1; P235TR2; R265TR1; R265TR2
	32-219	2.9-45.0	
	38.0-508.0	6-70	R235TR1; R235TR2; 34CrMo4 according to DIN EN 10297-1 (up to 76.1 mm)
DIN EN 10216-2 (DIN 17175) Seamless steel tubes for pressure purposes. Technical delivery conditions. Non-alloy and alloy steel tubes with specified elevated temperature properties	13.5-88.9**	1.8-12.0	P235GH; 16Mo3; 13CrMo4-5; 10CrMo9-10
	21.3-245.9	2.9-55.0	P195GH; P235GH; P265GH; 16MoZ; 13SgMo4-5
DIN EN 10216-3 Seamless steel tubes for pressure purposes. Technical delivery conditions. Alloy fine grain steel tubes	33.7-168.3	2.9-16	P355N; P355NH
	32.0-219.1	2.9-40.0	P355N
1	2	3	4

* Dimensions of boiler pipes to TU 14-3-190-2004 comply with GOST 8732-78 and GOST 8734-75.
** Pipes are manufactured in a cold-formed condition.

MECHANICAL PROPERTIES

Steel grade	Yield strength, σ _{0.2} kgf/mm ² (MN/m ²)			Long-term strength, N/mm ² (kgf/mm ²)										
	at the test temperature, °C			at the test temperature, °C and duration of the test, h										
	250	400	450	450		500		550		600		650		
				10 ⁵ h	2x10 ⁵ h	10 ⁵ h	2x10 ⁵ h	10 ⁵ h	2x10 ⁵ h	10 ⁵ h	2x10 ⁵ h	10 ⁵ h	2x10 ⁵ h	10 ⁵ h
20	196 (20)	137 (14)	127 (13)	78 (8.0)	56 (5.7)	38 (3.9)	—	—	—	—	—	—	—	—
15GS	245 (25)	167 (17)	127 (13)	98 (10.0)	56 (5.7)	—	—	—	—	—	—	—	—	—
15KhM	225 (23)	196 (20)	191 (19.5)	—	—	127 (13.0)	118 (11.5)	51 (5.2)	38 (3.9)	—	—	—	—	—
12Kh1MF	—	216 (22)	206 (21)	—	—	167 (17.0)	135 (13.8)	97 (9.9)	82 (8.4)	55 (5.6)	45 (4.6)	—	—	—
15Kh1M1F	—	235 (24)	225 (23)	—	—	176 (18.0)	147 (15.0)	104 (10.6)	93 (9.5)	63 (6.4)	56 (5.7)	—	—	—
12Kh18N12T	—	—	—	—	—	—	—	147 (15.0)	135 (13.8)	108 (11.0)	90 (9.9)	69 (7.0)	61 (6.2)	29 (3.0)
16MoZ	205 (20.5)	160 (16)	155 (15.5)	245 (24.5)	228 (22.8)	93 (9.3)	75 (7.5)	31 (3.1)	25 (2.5)	—	—	—	—	—
13SgMo41-5	230 (23)	190 (19)	180 (18)	285 (28.5)	260 (26)	137 (13.7)	115 (11.5)	49 (4.9)	39 (3.9)	—	—	—	—	—
St 35.8	160* (16)	110 (11)	105 (10.5)	69 (7)	57 (5.7)	—	—	—	—	—	—	—	—	—
St 45.8	180 (18)	130 (13)	125 (12.5)	69 (7)	57 (5.7)	—	—	—	—	—	—	—	—	—

* Указанные нормы гарантируются.

SIZE RANGE OF SEAMLESS BOILER HIGH ALLOY STEEL PIPES (AS PER TU 14-3R-55-2001)

Outside diameter, mm	Wall thickness, mm																		
	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6	7	8	9	10	11	12	14	15	16	18
Weight per meter length, kg																			
10	0.39	0.46																	
12	0.49	0.59	0.67																
16	0.69	0.83	0.96	1.08	1.18														
20	0.89	1.08	1.26	1.42	1.58	1.72	1.85												
22	0.99	1.20	1.41	1.60	1.78	1.94	2.10												
25	1.13	1.39	1.63	1.86	2.07	2.28	2.47	2.64	2.81										
28	1.28	1.57	1.85	2.11	2.37	2.61	2.84	3.05	3.26										
30	1.38	1.70	2.00	2.29	2.56	2.83	3.08	3.32	3.55										
32	1.48	1.82	2.15	2.46	2.76	3.05	3.33	3.59	3.85	4.32									
36	1.68	2.07	2.44	2.81	3.16	3.50	3.82	4.14	4.44	5.01									
38	1.78	2.19	2.59	2.98	3.35	3.72	4.07	4.41	4.74	5.35									
40		2.31	2.74	3.15	3.55	3.94	4.32	4.68	5.03										
42		2.44	2.89	3.32	3.75	4.16	4.56	4.95	5.33	6.04	6.71								
45		2.62	3.11	3.58	4.04	4.49	4.93	5.36	5.77										
50		2.93	3.48	4.01	4.54	5.05	5.55	6.04	6.51										
57					5.35	5.96	6.56	7.15	7.71	8.81	9.87	10.87	11.82	12.71	13.56	15.17	16.53	17.69	
60					5.65	6.30	6.94	7.56	8.17	9.35	10.47	11.55	12.58	13.55	14.47	16.23	17.74	19.05	20.16
76						8.22	9.07	9.91	10.73	12.33	13.88	15.38	16.83	18.22	19.56				
83						9.03	9.96	10.90	11.8	13.58	15.32	16.99	18.62	20.19	21.71	24.6	25.96		
89						9.72		10.73	11.74	14.66	16.54	18.38	20.16	21.88	23.56	26.75	28.26		
102								12.4	13.57	16.99	19.21	21.37	23.48	25.54	27.55	31.41	33.26	35.05	38.49
108								13.17	14.41	18.06	20.43	22.75	25.02	27.23	29.39	33.56	35.56	37.51	41.26
114								13.93	15.25	19.14	21.66	24.13	26.55	28.92	31.24	35.71	37.86	39.97	44.02
121								14.83	16.24	20.39	23.1	25.75	28.35	30.89	33.39	39.21	40.55	42.83	47.24
133								16.36	17.93	22.54	25.55	28.51	31.42	34.27	37.07	42.51	45.16	47.75	52.77
140									20.55	23.8	26.99	30.12	33.21	36.24	39.22	45.02	47.84	50.62	56
146									22.48	26.02	29.51	32.93	36.3	39.62	42.87	49.21	52.29	55.32	61.19
152									23.44	27.15	30.79	34.38	37.92	41.39	44.81	51.47	54.71	57.89	64.09
159									24.57	28.46	32.3	36.07	39.79	43.46	47.06	54.1	57.53	60.9	67.47
168										29.78	34.23	38.25	42.21	46.11	49.96	57.48	61.15	64.77	71.82
194										34.6		44.53	49.19	53.79	58.33	67.25	71.62	75.93	84.39
219													55.9	61.17	66.39	76.64	81.69	86.67	96.46

Cold-formed pipes for high pressure boilers
Hot-formed pipes for high pressure boilers

PIPES FOR THE NUCLEAR INDUSTRY

Seamless hot-formed and cold-formed pipes are critical components of nuclear power plant equipment. These pipes are used in pipelines, steam generators, condensers, and as fuel element cladding.

FEATURES

Cold-formed stainless steel pipes for the nuclear industry are produced on cold rolling mills (CRM, pilgers CRM or by drawing). The mills can produce pipes with diameters ranging from 4 to 426 mm and wall thicknesses from 0.2 to 40 mm, with lengths of up to 32.5 m. The pipes feature high-quality internal and external surface. Electrochemically polished pipes are one of the options.

Hot-formed stainless steel pipes for the nuclear industry are produced by pressing and rolling. Two press lines with a capacity of 2,000 t and 5,500 t make it possible to produce pipes with diameters ranging from 38 to 273 mm with wall thickness from 3.5 to 30.0 mm and length from 2 to 12.5 m with high-quality internal and external surface.

The mechanical properties of these products are similar to those of cold-formed pipes and offer improved performance compared to rolled pipes. The TPA 159-426 continuous rolling mill produces pipes with diameter of 325 mm and wall thicknesses in the range of 12.0-16.0 mm. Pilger rolling mills produce pipes with diameters of up to 630 mm.

The existing product quality control and traceability system ensures compliance of manufactured products with the following standards:

- GOST 24030;
- GOST 9940;
- GOST 9941;
- GOST R 70731.1;
- GOST R 70731.2;
- TU 14-3R-197;
- TU 14-3R-55-2001;
- TU 1361-023-00212179.

The following types of pipes are available:

- with etched surface;
- with electrochemically polished surface ;
- with ground surface;
- with surface heat treated in a protective atmosphere;
- with combined surface types.

STANDARDS

Standards	Steel grade	Pipes dimensions	
		Outside diameter, mm	Wall thickness, mm
1	2	3	4
GOST 9941-2022 Seamless cold-worked pipes made of corrosion-resistant high-alloy steels. Specifications	08Kh18N10T; 12Kh18N10T; 10Kh17N13M2T; 10Kh23N18; 06Kh28MDT; 08Kh22N6T	5.0	0.2-1.0
		5.0–426.0	0.2-40.0
		6.0–7.0	0.2-1.5
		8.0–9.0	0.2-2.0
		10.0–13.0	0.2-2.5
		14.0–17.0	0.2-3.0
		18.0–19.0	0.2-3.5
		20.0	0.2-4.0
		21.0–24.0	0.3-4.0
		25.0–28.0	0.3-4.5
		30.0–38.0	0.3-5.5
		40.0	0.3-6.0
		42.0	0.3-6.0; 8.0; 9.0
		45.0–50.0	0.3-9.0
		51.0–56.0	0.5-9.0
		57.0–60.0	0.5-10.0
		63.0–73.0	1.8-10.0
		76.0–83.0	2.8-10.0
		85.0	3.2-10.0
		89.0	2.8-10.0
		95.0	2.0–10.0
		100.0; 102.0	1.8–3.0
		114.0	6.0
GOST 10498 Seamless extra thin-walled pipes made of corrosion-resistant steel. Specifications	06Kh18N10T; 08Kh18N10T; 09Kh18N10T	4.0–6.0	0.2-0.5
		from 6.0 to 10	0.12-0.70
		from 10 to 25	0.12-1.0
		from 25 to 75	0.3-1.0
GOST 24030 Seamless corrosion-resistant steel pipes for power plant engineering. Specifications	08Kh18N10T	6.0; 7.0;	1.0-1.5
		8.0; 9.0	1.0-2.0
		10.0–13.0	1.0-2.5
		14.0–17.0	1.0-3.0
		18.0; 19.0	1.0-3.5
		20.0–24.0	1.0-4.0
		25.0–28.0	1.0-4.5
		30.0–36.0	1.0-5.5
		38.0	1.0-6.0
		40.0–45.0	1.2-6.0
		48.0–54.0	1.4-7.5
		56.0; 57.0	1.5-7.5
		60.0–75.0	1.8-7.5
		76.0–83.0	3.0-7.5
GOST R 70731.1-2023 Steel pipes for the manufacture of equipment and pipelines of nuclear power plants. General specifications. Part 1. Seamless steel pipes made of non-alloyed and alloyed steels	20; 15KhM; 15Kh1M1F	17.2–508	2–28
GOST R 70731.2-2023 Steel pipes for the manufacture of equipment and pipelines of nuclear power plants. General specifications. Part 2. Seamless steel pipes made of austenitic steel grades 08Kh18N10T and 08Kh18N10T-Sh. Cold-worked	08Kh18N10T; 08Kh18N10T-Sh	10.2–508	2–28
TU 95.349.2000 Electric-welded longitudinal pipes made of steel grades 08Kh18N10T and 12Kh18N10T for nuclear power plants and thermal power plants	08Kh18N10T; 12Kh18N10T	377-1220	6-14
TU 95.499-00 Electric-welded longitudinal pipes made of grades 20 and 16GS for nuclear power plants and thermal power plants	20 and 16GS		
TU 13 15008 091 002121 79 20121 Seamless hot-pressed pipes made of steel grade 10Kh15N9S3B1-Sh (EP302-Sh)	10Kh15N9S3B1-Sh	57-89	12-16
TU 14-1-5657-2016 Seamless cold-rolled pipes made of steel grade 16Kh12MVSFBR-Sh (EP823-Sh)	16Kh12MVSFBR-Sh	28–40	3-6
TU 14-3P-55-2001 Seamless steel pipes for steam boilers and piping	12Kh18N12T; 10Kh9MFB-Sh; 10Kh9V2MFBR-Sh; 12Kh11V2MF; 08Kh16N9M2; 10Kh13G12BS2N2D2	10-530	2-65
1	2	3	4

SIZE RANGE (CONTINUED)

Standards	Steel grade	Pipes dimensions	
		Outside diameter, mm	Wall thickness, mm
1	2	3	4
TU 14-3-1070-81 Seamless extra thin-walled pipes made of corrosion-resistant austenitic steels	09Kh18N10T; 06Kh18N10T	from 4.0 to 6.0 incl.	0.2-0.5 incl.
		from 6.2 to 10.0 incl.	0.2-0.7 incl.
		from 10.2 to 25.0 incl.	0.2-1.0 incl.
		from 25.2 to 60.0 incl.	0.3-1.0 incl.
TU 14-3-1109-82 Seamless cold- and warm-worked pipes made of corrosion-resistant steel	08Kh18N10T; 08Kh18N12T; 12Kh18N10T; 12Kh18N12T; 10Kh17N13M2T	5.0	0.2-1.0
		6.0; 7.0	0.2-1.5
		8.0; 9.0	0.2-2.0
		10.0–13.0	0.2-2.5
		14.0–17.0	0.2-3.0
		18.0; 19.0	0.2-3.5
		20.0	0.2-4.0
		21.0–24.0	0.3-4.0
		25.0–28.0	0.3-4.5
		30.0–35.0	0.3-5.5
		36.0	0.4-5.5
		38.0–45.0	0.4-6.0
		48.0–50.0	0.4-7.0
		51.0–60.0	0.5-7.0
		63.0–75.0	1.5-7.0
TU 14-161-216-2003 Seamless cold-worked pipes made of 09Kh18N9 steel grade with improved surface quality	09Kh18N9	16-22	1-2.5
TU 14-161-242 Long-length seamless pipes made of corrosion-resistant stainless steels with improved surface quality	03Kh18N13S2AM2VFBR-Sh	18.0	2.5-3.0
TU 1361-023-00212179 Seamless cold-worked and warm-worked pipes made of 08Kh14MF and 08Kh14MF-Sh steel grades	08Kh14MF 08Kh14MF-Sh	6; 7	1.0-1.5
		8; 9	1.0-2.0
		10; 11; 12; 13	1.0-2.5
		14; 15; 16; 17	1.0-3.0
		18; 19	1.0-3.5
		20; 21; 22; 23; 24	1.0-4.0
		25; 27; 28	1.0-4.5
		30; 32; 34; 35; 36	1.0-5.5
		38	1.0-6.0
		40; 42; 45	1.2-6.0
		48; 50; 51; 53; 54	1.4-8.0
		57	1.5-8.5
		60; 63; 65; 68	1.8-9.0
TU 14-3P-197-2001 Seamless pipes made of corrosion-resistant steels with improved surface quality	08Kh18N10T; 08Kh18N10T-U	6.0; 7.0	1.0-1.5
		8.0; 9.0	1.0-2.0
		10.0–13.0	1.0-2.5
		14.0–17.0	1.0-3.0
		18.0; 19.0	1.0-3.5
		20.0–24.0	1.0-4.0
		25.0–28.0	1.0-4.5
		30.0–36.0	1.0-5.5
		38.0	1.0-6.0
		40.0-45.0	1.2-6.0
		42.0–630.0	4.0-28.0
		48.0–54.0	1.4-7.5
		56.0; 57.0	1.5-7.5
		60	5.5
		63	6.5-7.0
		68	2.0
		76	3.0-7.0
		83	3.5
		89	5.0
		114	5.0-7.0
		16	1.5
		95-426	2-40
1	2	3	4

SPECIAL PIPES

Designed for use in various industries: power, chemical, construction, machine building, automotive, food, medical and other industries. These pipes are used to manufacture high-reliability high-pressure pipelines, etc.

FEATURES

These pipes are manufactured by hot rolling with or without mechanical machining, by cold rolling or drawing. The pipes meet different requirements for dimensions, steel grades, manufacturing tolerances, mechanical properties, and surface quality, depending on the production technique and the requirements of applicable standards.

The pipes are made of carbon and alloy steels in accordance with Russian and foreign standards and in accordance with manufacturer’s specifications designed to meet technical requirements of specific customers.

Mandatory testing and quality control are performed in full compliance with product standards and specific customer requirements.

SPECIAL CAPABILITIES

- wide range of pipes (diameters from 1.5 mm to 630 mm, wall thicknesses from 0.25 mm to 70 mm);
- manufacture of capillary pipes of minimal sizes (diameter from 1.5 mm);
- manufacture of pipes with variable cross-section.

TYPES OF ACCEPTANCE

- acceptance by the customer;
- other types of specialized industry acceptance.

STANDARDS

Standards	Pipes dimensions		Steel grade
	Outside diam-eter, mm	Wall thickness, mm	
1	2	3	4
GOST 800-78 Bearing tubes	23.0–81.2*	4.0–12.0	ShKh15; ShKh15-V; ShKh15SG; ShKh15-Sh; ShKh15SG-Sh; 100Cr6; 100CrMnSi6-4; ShKh15SG-V
	53.4–200.0	6.4–29.2	
GOST 1060-83 Cold-formed seamless steel tubes for shipbuilding	17-60	2.0–3.75	10
GOST 24030-80 Corrosion-resistant steel seamless tubes for power engineering industry	6–83	1–7.5	08Kh18 N YuT
TU 14-3-292-74 Semi-finished rectangular pipes for cotton harvesters	120x60*	5.5	20; 35
TU 14-3-335-75 Seamless hot-rolled pipes of ShKh-15 steel grade	83.0–219.0	7.0–42.0	ShKh15; ShKh15-Sh; ShKh15CG; ShKh15CG-Sh
TU 14-3-367-75 Seamless hot-rolled pipes for aircraft equipment	70–219	16–30	12Kh2N4A-VD; 18Kh2N4MA-Sh; 12Kh2N4–VD
TU 14-3-474-76 Seamless cold-drawn pipes for the manufacture of absorption refrigerators	6-63*	0.6-1.3	10; 20
TU 14-3-675-78 Seamless hot-rolled steel pipes for aircraft equipment	38–450	3.5–55.0	10–45; 38KhA; 30KhGSA; 30KhGSN2A; 12KhNZA; 38Kh2 MYuA; 30KhGSNMA
TU 14-3-730-78 Seamless cold-drawn pipes for monopole antenna rods	6-12	1.2	30KhGSA
TU 14-3-772-78 Seamless hot-formed steel pipes	78-121	12.0–21.0	35; 45; 15Kh; 40Kh
TU 14-156-89-2010 Seamless hot-formed high-precision steel pipes for submersible motor and pump housings	92.3–125.0	int. 78-107	33; 35; 35G
TU 14-156-53-2005 Seamless hot-formed pipes of steel grade ShKh4	70.0–171.0	7.1–28.0	ShKh4; ShKh4-V
TU 14-157-53-2000 Square hot-rolled steel pipes for structures and machine parts and for other technical purposes	112x112	19	St. YuA; st. 20A
TU 14-159-161-90 Cold-formed seamless steel pipes for vehicle parts	45*	8.5	35; 45
TU 14-159-195-90 Hot-formed pipes of steel grades 15KhM and 30KhMA for the bushings of chain links of heavy indus-trial tractor tracks	83–92	12.0–23.0	15KhM; 30KhMA
TU 14-3P-579-2007 Thick-walled steel pipes for diesel engines	146–219	18.0–42.0	38Kh2MYuA
TU 14-3P-773-2007 Cold-formed seamless steel pipes	4-83*	0.5-12	10; 20; 30; 35; 45; 15H; 20H; 40H; 30KhGSA
ASTM A 213/A 213M Standard Specification for Seamless Ferritic and Austenitic Alloy-Steel Boiler, Superheater, and Heat-Exchanger Tubes	6.35–168.3	0.4–28	TP304; TP304L; TP316; TP316L; TP316Ti; TP321; TP304H; TP347; TP 347H
DIN EN 10297–1 Seamless circular steel tubes for mechanical and general engineering purposes. Technical delivery conditions. Part 1. Non-alloy and alloy steel tubes	26.9-108*	2.6-11	E235; E275; E355; 34CrNiMo6
	32–219.1	2.9–40.0	
	219.1	17.5	34CrMo4; E355
	244.5	17.5	
	273.1	8–9	
	355.6	7.4–10	
	355.6	12.7	
	406.4	8; 8.3; 11.5	
	244.5–508.0	8–70	
DIN EN 10297-2 (DIN 17456) Seamless circular steel tubes for mechanical and general engineering purposes. Part 1. Technical delivery conditions. Part 2. Stainless steel	6–88.9	0.8–8	X6CrNiTi1810
TU 14-156-117-2022 Seamless hot-formed steel pipes of SP-28 steel grade	245–325	16–20	SP-28 (28Kh3SNM1FA)
TU 14-3P-251-2007 Seamless steel pipes for chemical and petrochemical production units	11–299	2–60	20, 30KhMA; 14KhGS; 18Kh3MV; 20Kh3MVF
ASTM A790/A790M Standard Specification for Seamless and Welded Ferritic and Austenitic Stainless Steel Pipes	15.16	1.23	UNS S32750 (SuperDuplex, 03Kh25N7AM4F)
	17	1.7	
	20	2.3	
	33.4	4.55	
	35	3.6	
	54	5.1; 6.3	
	73	9.53	
TU 14-3-571-77 Seamless cold-worked pipes made of KhN60VT-VD alloy (EI 868-VD)	6–38	0.5–2.0	KhN60VT-VD (EI 868-VD)
TU 14-3-1462-87 Seamless cold-formed extra thin-walled pipes made of a dispersion-hardening alloy KhN50VMTYUB-ID (EP 648-ID)	5.0	0.3	KhN50VMTYUB-ID (EP 648-ID)
GOST 22897-2023 Seamless cold-worked pipes made of titanium-based alloys as per TU 14-3-615-77 Seamless cold-worked pipes made of PT-1M and PT-7M alloys as per TU 14-3-820-79 Seamless cold-worked pipes made of titanium-based alloys as per TU 14-3-843-79 Seamless extra thin-walled pipes made of alloys PT-1M and PT-7M	5.0–50 95-130	1.0–5.5 3.2–6.0	VT1-0; PT-1M; PT-7M
1	2	3	4

* Cold-worked

METAL MICROSTRUCTURE OF BEARING TUBES (AFTER ISOTHERMAL SPHEROIDIZING ANNEALING)

Steel grade	Micropores, points	Microstructure	Remaining carbide network, points	Carbide segregation, points	Micropores, points	Non-metallic inclusions, points	Hardness, HB
			maximum				
ShKh15, ShKh-15V	2.0	fine-grained perlite	3	1.5	2.0	2.5*	207–255 cold-worked pipes 207–187 hot-worked pipes
ShKh15SG	2.0	fine-grained perlite	3	1.5	2.0	2.5	217 - 197

* Acceptable number of points for oxides, sulfides and non-deforming silicates

BEARING TUBE SIZE RANGE

Outside diameter, mm	Wall thickness, mm										
	3.0–6.9	7.0–9.0	9.1–10.0	10.1–11.0	11.1–13.0	13.1–15.0	15.1–17.0	17.1–19.0	19.1–21.0	21.1–23.0	23.1–25.0
20.0–83.0											
56.0–60.0											
60.1–70.0											
70.1–80.0											
80.1–90.0											
90.1–100.0											
100.1–110.0											
110.1–120.0											
120.1–130.0											
130.1–140.0											
140.1–150.0											
150.1–160.0											
160.1–170.0											
170.1–180.0											

Size range subject to agreement

Cold-worked bearing pipes

Hot-worked bearing pipes

Bearing tube size range is limited by the ratio of outside diameter to wall thickness D/S = 4–15.
Minimum ID of hot-rolled bearing tube is 48 mm.
Pipes lengths: from 2.0 m to 5.0 m (hot-rolled) and from 2.5 m to 4.5 m (cold-rolled).

Limit deviations of pipes dimensions:

a) Outside diameter
+0.2 mm for hot-rolled bearing tube
+0.4 mm for 20.0 mm–60 mm cold-rolled bearing tube
+0.5 mm for 60.1 mm–83.0 mm cold-rolled bearing tube

b) Wall thickness
for hot-rolled pipes:

4.0 < D/S ≤ 11	+15%
11.0 < D/S ≤ 12.5	+20%
12.5 < D/S ≤ 15	+25%

for cold-rolled pipes: +12%

c) Curvature
1.0 mm per meter length

PRODUCTS FOR INFRASTRUCTURE PROJECTS

Pipes for pile fields and hydraulic structures (pipe pile)



PIPES FOR PILE FIELDS AND HYDRAULIC STRUCTURES (PIPE PILE)

Piles and welded pipe piles are used in hydraulic engineering, transportation, and industrial and civil construction. They are also used in sheet pile wall construction in permanent and temporary structures erected in all climatic zones.

FEATURES

Piles and welded pipe piles are made from longitudinal electric welded large diameter steel pipes of various steel grades with a wall thickness from 7 mm to 50 mm and diameters ranging from 508 mm to 1,422 mm, 2,020 mm and 2,520 mm. Single-segment piles and welded pipe piles are available in lengths up to 18.3 m. Butt-weld piles and tubular pipe piles can be supplied with lengths up to 24 m. Tubular sheet piles can be manufactured with different types of interlocks depending on the customer requirements.

If required, piles and welded pipe piles can be supplied with reinforcing pads at the top and bottom ends. Anti-corrosion coating can be applied upon request.

PIPES

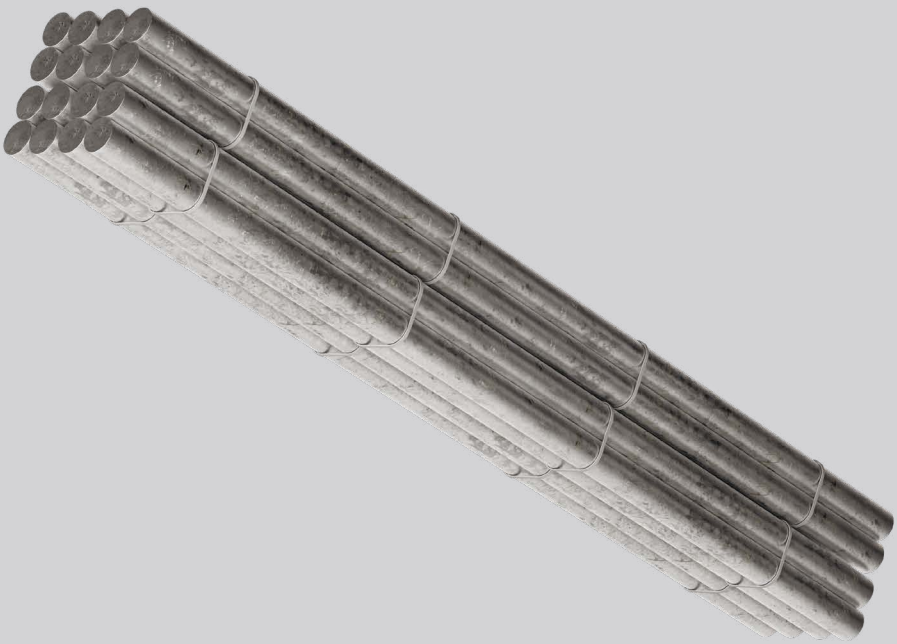
Standards	Pipes dimensions		Steel grade
	Outside diameter, mm	Wall thickness, mm	
1	2	3	4
GOST 10706-76 Electric welded longitudinal steel pipes	508-1,422	7-48	St3; steel 20; 17G1S; 17G1SU; 13GS; 13GSU; 13GS1SU; 08GBYu; 09GBYu; 12GSB; 12GS2SB; 08G1NFB; 10G2FBYu; 09GSF; 13KhFA
GOST 20295-85 Steel welded pipes for main oil and gas pipelines	508-1,422	7-48	K38; K42; K50; K52; K54; K55; K56; K60
GOST 33228-2015 Steel welded pipes for general purposes	508-1,422 1,520; 2,520	7-48 12-35	KP235; KP245; KP265; KP345; KP355; KP380; KP390; KP410; KP460
TU 24.20.21-020-57357928-2022 Longitudinally electric-welded steel pipes with diameters from 530 to 1,420 mm with enhanced weldability and cold resistance for construction metal structures	508-1,422	7-48	K52; K54; K56; K60; X56; X60; X65; X70
TU 14-3P-124-2017 Seamless steel pipes with enhanced corrosion resistance	76-426	6-22	13KhFA; 08KhMChA 20A; 20S; 20FA
	108-168	6.0-28.0	
	168-426	6.5-28.0 7.0-32.0	
EN 10219-1:2006 Cold formed welded structural hollow sections of non-alloy and fine grain steels	508-1,422	7-48	S235JRH; S275J0H; S275J2H; S275NH; S275MH; S275NLH; S275MLH; S355NH; S355J0H; S355K2H; S355J2H; S355MH; S355NLH; S355MLH; S420MH; S420MLH; S460NH; S460MH; S460NLH; 460MLH
Other standards upon customer request	508-1,422	7-48	
	1,520-2,520	12-35	
1	2	3	4

WELDED PIPE PILE

Standards	Pipes dimensions		Steel grade	Shaped steel sections for pipe pile joints
	Outside diameter, mm	Wall thickness, mm		
1	2	3	4	5
GOST R 52664-2010 Welded pipe pile	508-1,422	7-48	Depending on pipe specifications and customer requirements	ZSG1; ZZSG1; SG2; Larsen 4; Larsen 5; GU16-400; ShK-1; UT; FL-510; FL-511; FL-512; AS 500-9;5; AS500-11;0; AS 500-12;0; GR; OB; UG; UE; PB; other interlocks of various shapes available on demand
	2,020; 2,520	20-40		

CONTINUOUS CAST BILLETS

Continuous cast billets. Round billets. Square billets



CONTINUOUS CAST BILLETS. ROUND BILLETS. SQUARE BILLETS

Continuous cast square and round billets of carbon and alloy steels with special properties are used in the production of pipes, long products and special products.

FEATURES

- Steel melting in electric arc furnaces, secondary steelmaking with vacuum degassing (as and when required by applicable standards) and continuous casting on steel continuous casting machines;
- tight tolerances on alloying element content;
- ultrapure steel with low content of harmful impurities (0.005% sulfur maximum and 0.010% phosphorus maximum);
- supply of machined billets;
- technology that produces a fine-grain structure.

SIZE RANGE

Square billets with the following side lengths:*

- 150 (150), 360 (360) mm.

Round billets with the following diameters:*

- 145, 150, 156 (150), 196 (190), 210, 228 (220), 250, 290, 340 (330), 360 (350), 400, 410, 460, 550, 600 mm.

* Dimensions in parentheses are for machined billets.

STANDARDS

Standards	Billet dimensions		
	Cross-section,* mm	Length, m	
1	2	3	4
STO VTZ 53570464-10-2021 Continuous cast billet made in EAF	Cast round bar	156	8.4-11.5
		196	8.0-11.5
		228	6.0-11.5
		260	6.0-11.5
		340	4.0-11.0
		360	4.0-11.0
		410	4.0-8.50
		360	4.0-9.0
	Square	290	3.0-12.0
		360	
STO STZ 22.03-2021 Continuous cast steel billets for the manufacture of hot-worked seamless pipes	Round	150	8.1-12.0
STO TAGMET 00186602-003 Continuous cast round billet for the manufacture of seamless pipes	Round	210	4.5-12.0
		250	3.75-12.0
		300	3.8-12.0
		340	3.8-12.0
		400	3.8-12.0
STO TMK 56601056-008-2006 Continuous cast round steel billet for the manufacture of seamless pipes	Unmachined round	156	5.8-11.3
	Round	150-156 (150-145)	
	Machined round	150, 145	
1	2	3	4

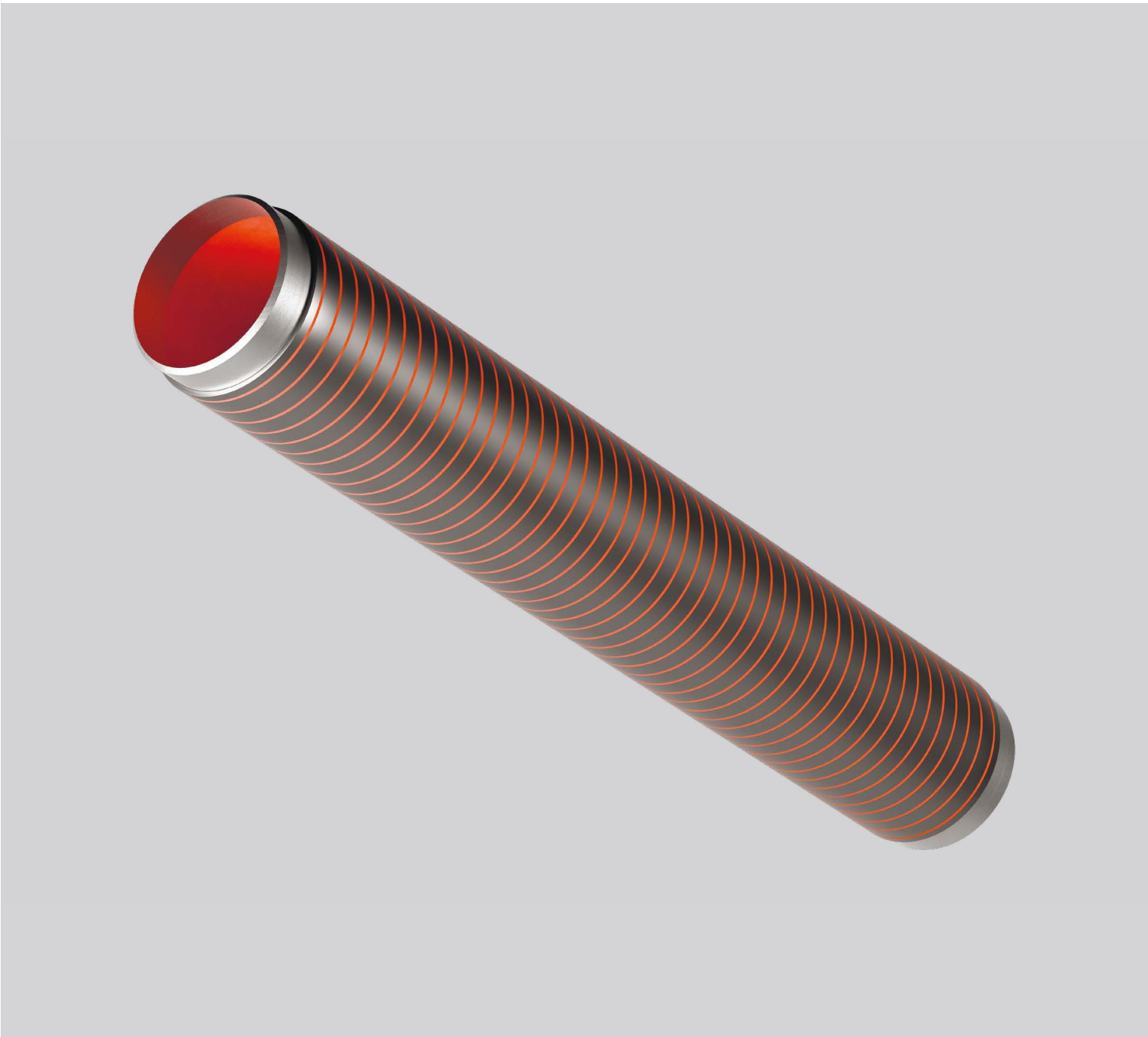
STANDARDS (CONTINUED)

Standards	Billet dimensions		
	Cross-section,* mm	Length, m	
1	2	3	4
TU 14-1-4944-2003 Continuous cast square billets for pipes and long products	Square	240	4.0-8.7
		300	
		360	
TU 14-1-4992-2003 Continuous cast round billets for the manufacture of hot-rolled seamless pipes	Round	156 (145,150)	8.4-11.5
		196 (190)	8.0-11.5
		228 (220)	6.0-11.5
		260	6.0-11.5; 11.8
		340 (330)	4.0-11.0
		360 (350)	4.0-11.0
		410 (400)	4.0-8.5
TU 14-1-5319-2012 Continuous cast billets for boiler pipes	Machined round	145-353	4.0-11.0
	Round after shot blasting	156-410	in accordance with STO VTZ 53570464-10-2021
	Machined round	145-353	
TU 14-1-5614-2011 Continuous cast round billets for the manufacture of boiler pipes	Round	145	4.5-12.0
		150	4.5-12.0
		156	4.5-12.0
		170	4.5-12.0
		180	4.5-12.0
		215	4.5-12.0
		220	4.5-12.0
		460	3.6-12.0
		550	3.6-12.0
		600	3.6-9.5
TU 14-159-324-2016 Continuous cast round billets made of carbon, low-alloy, and alloy steel grades. Technical specifications low-alloy, and alloy steel grades. Technical Specifications TU 14-159-363-2018 Continuous cast round billets for the manufacture of hot-worked pipes with enhanced cold and corrosion resistance. Technical specifications TU 14-159-399-2019 Continuous cast round billets for the manufacture of hot-worked pipes as per TU 24.20.13.110-065-00186654. Technical specifications	Round	CCM 1	9.1-12.4
		145	
		150	
		156	
		170	
		180	
		215	
		220	4.5-12.0
		CCM 2	
		220	
		460	
		550	
		600	
		600	4.05-5.80
TU 14-159-326-2011 Continuous cast square and round billets	Square	150	9.1-12.4
	Round	145	9.1-12.4
		150	
		156	
		170	
		180	
		215	
		220	8.0-12.0
		220	
		460	
		550	
		600	
		600	4.1-10.8
		600	4.1-5.8
1	2	3	4

* Dimensions in parentheses are for machined billets. Steel grades as per GOST 380, 1050, etc.
Billets may be accepted in accordance with OST 14-21-77 and STP 156.02.03-2004 by agreement with the customer.

PIPE COATING

6



PAO TMK PRODUCTION SITES CAN APPLY THE FOLLOWING TYPES OF COATINGS ON THE PIPE:

- | | |
|--|---|
| 1. Weather-protective coating. | 9. External thermal insulation coating based on rigid polyurethane foam with anti-corrosion coating of steel pipe and external protective hydro-insulation layer (polyethylene, zinc, metal-polymeric). |
| 2. External anti-corrosion single-layer epoxy coating (including those with operating temperatures up to 150°C). | 10. External protective coating. |
| 3. External two-layer anti-corrosion epoxy coating. | 11. Internal flow coating. |
| 4. External two-layer anti-corrosion polyethylene coating. | 12. Internal anti-corrosion single-layer coating (including for water pipelines). |
| 5. External three-layer anti-corrosion polyethylene coating (with operating temperatures up to 80°C). | 13. Internal anti-corrosion two-layer coating (including those with operating temperatures up to 120°C). |
| 6. External monolayer anti-corrosion polyethylene coating. | 14. Internal anti-corrosion coating of couplings . |
| 7. External three-layer anti-corrosion polypropylene coating. | |
| 8. External and internal anti-corrosion coatings for pipeline fittings. | |

STANDARDS. INTENDED USE OF EXTERNAL ANTI-CORROSION PIPE COATING

Standard	Intended use of coated pipes
1	2
GOST R 51164-98 Steel main pipelines. General requirements for corrosion protection	For main pipelines transporting natural gas, crude oil, and petroleum products, as well as pipelines for other purposes
GOST 9.602-2016 Underground structures. General requirements for corrosion protection	Corrosion protection of the external surfaces of underground steel structures laid below ground level or within a containment structure: pipelines transporting natural gas (main and distribution gas pipelines), crude oil, petroleum products, and their branch lines; water pipelines; piles, sheet piles, columns, and other load-bearing underground steel structures
GOST 31448-2012 Steel pipes with external protective coatings for main oil and gas pipelines	For the construction and repair of main gas pipelines, oil pipelines, and petroleum product pipelines
TU 14-3R-186-2023 Steel pipes and fittings with protective paint coating on the outer surface	For the construction and reconstruction of field and process pipelines.
TU 14-3R-187-2023 Steel pipes with outer diameter from 57 to 820 mm with protective polyethylene coating on the outer surface	For the construction and reconstruction of field and process pipelines.
TU 24.20.13-018-91076026-2023 Steel pipes with diameters of 57–820 mm with external epoxy coating	For subsequent application of thermal insulation and use in the construction, reconstruction, and repair of main pipelines, product pipelines, field and process pipelines, pumping and compressor stations, and other oil and gas production facilities
TU 24.20.13-020-91076026-2023 Steel pipes with diameters of 57–820 mm with external two-layer and three-layer coating based on extruded polyethylene	For the construction of field and process pipelines, as well as for underground, underwater, and above-ground (in embankments) general-purpose pipelines and their branches; for pipes intended for the manufacture of casings, for crossings over artificial and natural barriers, laid using the directional drilling method
TU 1390-005-32256008-2016 Steel pipes with external anti-corrosion polyethylene coating	For the construction, reconstruction, and major repair of underground and subsea (marine) gas pipelines and their branches, as well as for sections of gas pipelines laid using the directional drilling method
TU 1381-009-00154341-2019 Steel pipes with diameter of 57–720 mm with external anticorrosion coating based on epoxy powder compositions	For the construction, reconstruction, and major repair of pipelines laid underground and above-ground (in embankments), and for protective casings used in the construction of pipeline crossings over natural and artificial barriers, for subsequent application of polyurethane foam thermal insulation with a protective sheath
TU 24.20.13-020-32256008-2020 Steel pipes with diameters of 57...720 mm with external anticorrosion polyethylene coating	For the construction, reconstruction, and major repair of underground and aboveground (in embankments) pipelines and their branches
TU 14-3P-166-2019 Steel pipes and fittings with external protective coating	For the construction and reconstruction of production and process pipelines
TU 24.20.13-008-57357928-2023 Steel pipes with external anticorrosion polyethylene coating for liquid and gas pipeline transportation systems	For the construction, reconstruction, and major repair of pipelines
TU 24.20.13-007-57357928-2023 Steel pipes with external anticorrosion epoxy coating for liquid and gas pipeline transportation systems	For the construction, reconstruction, and major repair of pipelines laid underground and above ground (in embankments), and for protective casings in the construction of pipeline crossings over natural and artificial barriers. Pipes with external anticorrosion epoxy coating may be used for the subsequent application of polyurethane foam thermal insulation with a protective sheath
TU 24.20.13-023-57357928-2024 Steel pipes with external anticorrosion polyethylene coating for gas pipelines	For the construction, reconstruction, and major repair of underground and offshore (subsea) gas pipelines and their branches, as well as sections of gas pipelines laid using the directional drilling method
TU 24.20.13-018-57357928-2025 Pipes with external protective glass-thermoplastic coating	Comprehensive protection of the pipe surface, including external anticorrosion coating against mechanical damage during the construction, reconstruction, repair, and operation of pipelines
TU 24.20.13-030-32256008-2025 Steel pipes with external anti-corrosion polyethylene coating	For the construction, reconstruction, and major repair of underground and subsea (marine) pipelines and their branches, as well as pipeline sections laid using the directional drilling method
TU 24.20.13-220-57357928-2022 Steel pipes with external anticorrosion polyethylene coating for gas pipelines	For the construction, reconstruction, and major repair of underground and offshore (subsea) gas pipelines and their branches, as well as sections of gas pipelines laid using the directional drilling method
TU 24.20.13-226-57357928-2022 Seamless and welded steel pipes with external protective coating based on extruded polyethylene for offshore production and trunk pipelines	For the construction of production and trunk oil and gas pipelines. Protection of pipelines against external corrosion during subsea installation
TU 24.20.13-158-57357928-2022 Steel pipes with external anticorrosion epoxy coating	For the construction, reconstruction, and major repair of pipelines during underground and aboveground (in embankments) installation, and for protective casings in the construction of pipeline crossings over natural and artificial barriers
TU 24.20.13-160-57357928-2022 Steel pipes with external protective polyethylene coating	For the construction, reconstruction, and repair of field pipelines laid underground and above ground (in embankments) at oil, gas, and gas condensate fields
TU 24.20.13-123-57357928-2022 Electric-welded steel pipes with external anticorrosion epoxy coating	For the construction, reconstruction, and major repair of pipelines laid underground and above ground (in embankments), and for protective casings in the construction of pipeline crossings over natural and artificial barriers. Pipes with external anticorrosion epoxy coating may be used for the subsequent application of polyurethane foam thermal insulation with a protective sheath
TU 24.20.13-148-57357928-2022 External two-layer epoxy coating for pipes	For the construction, reconstruction, and major repair of underground main pipeline facilities; sections of main pipelines constructed using directional drilling; underwater crossings; and for protective casings
TU 24.20.13-118-57357928-2022 Steel pipes with external protective polyethylene coating	For the construction, reconstruction, and major repairs of pipelines
TU 1390-001-53570464-2009 Seamless and welded steel pipes with diameters from 102 to 1,220 mm with external protective coating based on extruded polyethylene	For the construction of underground, underwater, and above ground (in embankments) main oil pipelines
TU 24.20.13-003-57357928-2022 Seamless and welded steel pipes with diameters ranging from 219 to 1,420 mm, inclusive, with external three-layer protective coating based on extruded polyethylene	For the construction, reconstruction, and major repairs of underground and subsea main pipeline facilities; for protective casings during the construction of main pipeline crossings over natural and artificial barriers. Coated pipes can be used for bent branches and curved sections produced by cold bending
TU 1390-005-52534308-2015 Steel drill pipes with internal protective coating TMK CDP	For drilling wells at oil and gas fields under various complicating factors
TU 1390-008-91076026-2017 External two-layer and three-layer coating based on extruded polyethylene for steel pipes with diameters ranging from 57 to 820 mm	For the construction, reconstruction, and repair of main, field, and process pipelines
TU 24.20.13-015-91076026-2019 Steel pipes with diameters ranging from 57 to 820 mm with external two-layer and three-layer coating based on extruded polyethylene	For the construction of field and process pipelines, as well as underground, subsea, and above-ground (in embankments) general-purpose pipelines and branches from them, as well as for pipes intended for the manufacture of casings and for crossings over artificial and natural barriers laid using directional drilling methods
1	2

STANDARDS. INTENDED USE OF EXTERNAL ANTI-CORROSION PIPE COATING (CONTINUED)

Standard	Intended use of coated pipes
1	2
TU 1390-009-91076026-2017 External epoxy coating for steel pipes with diameters ranging from 57 to 820 mm	For the construction, reconstruction, and major repairs of main oil and gas pipeline facilities, underground and subsea petroleum product pipelines, field and process pipelines, pumping and compressor stations, and other facilities in the oil and gas industry
TU 24.20.13-031-32256008-2025 Steel pipes with external anti-corrosion epoxy coating	For subsequent application of thermal insulation and use in the construction, reconstruction, and repair of main pipelines, product pipelines, field and process pipelines, pumping and compressor stations, and other facilities of the gas industry. Without thermal insulation, pipes with epoxy coating cannot be used for the construction, reconstruction, and repair of gas industry facilities
TU 24.20.13-016-91076026-2019 Steel pipes with diameters of 57–820 mm with external epoxy coating	For the construction of field and process pipelines for various purposes using underground, subsea, or aboveground installation methods at oil and gas production facilities
TU 24.20.13-223-57357928-2022 Seamless and welded steel pipes with diameters ranging from 114 to 1,420 mm with external protective polyethylene coating	For the construction, reconstruction, and major repairs of underground and subsea main pipeline facilities. For protective casings during the construction of main pipeline crossings over natural and artificial barriers
TU 24.20.13-222-57357928-2022 Electric-welded or seamless steel pipes with external anticorrosion polypropylene coating	For the construction, reconstruction, and major repairs of high-temperature sections of underground gas pipelines and their branch lines, high-temperature process gas pipelines, and marine (subsea) sections of gas pipelines, as well as sections of gas pipelines laid using directional drilling
TU 24.20.13-225-57357928-2022 Steel pipes with diameters ranging from 114 to 1,420 mm with extruded polyethylene-based external coating	For the construction of field and process pipelines, underground, subsea, and above-ground (in embankments) general-purpose pipelines and their branches
TU 1390-012-53570464-2016 Steel pipes with external anticorrosion polyethylene coating for gas pipelines	For the construction, reconstruction, and major repairs of underground and offshore (subsea) gas pipelines and their branches, as well as sections of gas pipelines laid using the directional drilling method
TU 24.20.13-014-57357928-2022 Seamless and welded steel pipes with external anticorrosion polyethylene coating for gas pipelines	For the construction, reconstruction, and major repairs of underground and offshore (subsea) gas pipelines and their branches, as well as sections of gas pipelines laid using the directional drilling method
TU 24.20.13-045-57357928-2022 Steel pipes with external anticorrosion polypropylene coating	For the construction, reconstruction, and major repairs of high-temperature sections of underground gas pipelines and their branches, high-temperature process gas pipelines, and marine (subsea) sections of gas pipelines, as well as sections of gas pipelines laid using directional drilling. Provided that additional protection against solar radiation is provided, these pipes may be used for the above-ground installation of gas pipeline sections
TU 24.20.13-056-57357928-2022 Steel pipes with external anticorrosion single-layer epoxy coating	For subsequent application of polyurethane foam thermal insulation in a protective sheath, and for use in the construction, reconstruction, and repair of main pipelines, product pipelines, field and process pipelines, pumping and compressor stations, and other gas industry facilities
TU 14-3P-103-2009 Seamless and welded steel pipes, including drill pipes, casing, and tubing with diameters ranging from 57 to 820 mm with external and internal coating	For the construction of main and field pipelines, oil pipelines, gas pipelines, gas distribution systems, drinking water and general-purpose water supply systems, product pipelines, and heat supply and wastewater disposal systems
TU 14-3P-144-2016 Steel tubing with diameters ranging from 60 to 114 mm. Protective paint coatings for the internal surface	For the operation and repair of oil and gas wells, and for other applications
TU 14-3P-161-2020 Steel pipes and fittings with diameters ranging from 76 to 720 mm. Thermo-120 protective paint coating for the internal surface	For the construction and reconstruction of field and process pipelines
TU 14-3P-165-2019 Steel pipes and fittings with diameters ranging from 76 to 720 mm. Protective paint coatings for the internal surface	For the construction and reconstruction of field and process pipelines
TU 14-3P-166-2019 Steel pipes and fittings with diameters ranging from 57 to 720 mm. Protective coatings for the external surface	For the construction and reconstruction of field and process pipelines
CAN CSA Z245.21-14 Factory-applied polyethylene coating for steel pipes	For underground or subsea pipelines in oil or gas pipeline systems
DIN 30670-1:2024 Polyethylene coating for steel pipes and fittings. Technical requirements	Protection of steel pipelines laid in the ground or in water
DIN 30678-1-2024 Polypropylene coatings for steel pipes and fittings. Technical requirements and tests	Corrosion protection of steel pipes and fittings intended for the transportation of liquids and gases, laid in the ground or in water
ISO 21809-1-2018 Oil and gas industry. External coating for underground or subsea pipelines used in pipeline transport systems. Part 1. Polyolefin coatings (3-layer PE and 3-layer PP)	For corrosion protection of welded and seamless steel pipes for pipeline transportation systems in the oil and gas industry
1	2

SIZE RANGE

Coated pipes diameter, mm	Length, m	Wall thickness, mm
EXTERNAL COATING		
114-426	8-12.5	6-36
508-1,422	9-18.3	7-45
INTERNAL COATING		
508-1,422	9-18.3	7-42
THERMAL INSULATION OF PIPES		
426-1,420	10.3 - 12.2	7.0 - 22.0
THERMAL INSULATION OF FITTINGS		
426-1,220	10.3 - 12.2	7.0 - 22.0

PROPERTIES OF TWO- AND THREE-LAYER EXTRUDED POLYETHYLENE-BASED COATINGS

Property	Requirement	
	two-layer coating	three-layer coating
1. Appearance	The coating should be continuous with black smooth uniform surface, without visually detectable peeling, bubbles or gaps	
2. Minimum coating thickness, mm	High type according to GOST R 51164-98	
	Up to 273 incl. 2.0	
	From 273 to 530 incl. 2.2	
	From 530 to 720 incl. 2.5	
	Very high type according to GOST 9.602-2016	
	Up to 273 incl. 2.0	
	From 273 to 530 2.2	
	From 530 to 820 2.5	
	Over 820 3.0	
3. Dielectric continuity	Ability to withstand a voltage of no less than 5 kV per 1 mm of coating thickness + 5 kV without breakdown	
4. Minimum contact resistance of coating in a 3% NaCl solution at (20±5)°C, Ohm*m²: – initial – after 100 days in the solution	10 ¹⁰ 10 ⁹	
5. Minimum impact strength, J/mm of coating thickness, at: (50±3)°C (20±5)°C minus (40±3)°C	3 5 6	3 5 6
6. Minimum coating adhesion to steel, N/cm of width, at: (20±5)°C (40±3)°C (60±3)°C	70 50 20	100 70 30
7. Minimum coating adhesion to steel, N/cm of width, after holding for 1,000 h in water at: (20±5)°C (40±3)°C (60±3)°C	50 50 50	- - -
8. Maximum reduction of coating adhesion to steel, % of the initial value, after holding in water for 1,000 h at: (20±5)°C (60±3)°C	-	30 33
9. Maximum peeling area under cathodic polarization, cm2, after 30 days of testing in a 3% NaCl solution at: (20±5)°C (40±3)°C (60±3)°C	5.0 10.0 15.0	4.0 - 10.0
10. Minimum tensile strength of peeled coating, MPa, at: (20±5)°C (60±3)°C	12.0 10.0	12.0 10.0
11. Minimum elongation at break of peeled coating, %, at: (20±5)°C minus (40±3)°C	200 100	350 100
12. Maximum reduction of elongation at break of peeled coating, % of initial value after holding for 1,000 h in air at (110±3)°C	25	25
13. Change in the polyethylene melt flow rate, % from the initial value, after holding for 100 days in air at (110±3)°C	35	35
14 Minimum cracking resistance of coating at (50±3)°C, h	1000	1000
15. Minimum resistance to UV radiation with a flux of 600 kW-h/m at (50±3)°C, h	500	500
16. Minimum fungus resistance, points	2	2
17. Minimum penetration (indentation) resistance, mm, at: (20±5)°C (60±3)°C	0.2 0.3	0.2 0.3
18. Minimum coating resistance to thermal cycling; number of cycles without peeling or cracking of the coating at temperatures: from minus (50±3)°C to plus (20±5)°C from minus (60±3)°C to plus (20±5)°C (for the Far North environments)	10 -	- 10

PROPERTIES OF EXTERNAL MONOLAYER ANTI-CORROSION POLYETHYLENE PIPE COATING

Property	Value for the coating type			
	Normal	Special	Heat-resistant	Special heat-resistant
1. Minimal total coating thickness, mm, for pipes of a diameter: up to 273 mm incl. greater than 273 mm to 530 mm 530 mm–820 mm 820 mm–1,420 mm	2.0 2.2 2.5 3.0	2.5 2.7 3.0 3.5	2.0 2.2 2.5 3.0	2.5 2.7 3.0 3.5
2. Dielectric continuity of coating Absence of breakdown at electrical voltage, kV, minimum	20			
3. Minimum elongation at break of polyethylene coating layer at minus 45°C, %	100			
4. Minimum impact resistance of coating, J/mm, at: minus 45°C 60 °C	7 (5)2 4 (3) 2	8 5	7 4	8 5
5. Minimum coating adhesion, N/cm, at: 25 °C 60 °C 80 °C	200 (120) 2 80 (50) 2 -	250 100 -	250 - 100	250 - 100
6. Minimum coating adhesion at 23°C after holding in water for 1,000 h, N/cm, at: 80 °C 95 °C	100 (70) 2 -	100 -	- 100	- 100
7. Minimum initial contact resistance of coating in a 3% NaCl aqueous solution at 23°C, Ω·m²	1010			
8. Coating resistance under cathodic polarization. Maximum area of peeling after holding for 30 days, cm², at: 60 °C 80 °C	10 -	10 -	- 20	- 20
9. PE coating layer resistance to thermal aging. Minimum elongation at break after holding in air for 100 days, %, at: 110°C 120°C	400 (300) 2 -	400 -	- 400	- 400
10. Coating resistance to thermal cycling, maximum number of cycles, for temperature variation between minus 60°C and plus 23°C	10	10	10	10
11. Degree of cure of primer ΔTg, °C	Within a range of minus 3 ≤ ΔTg ≤ plus 2			
12. Maximum polyethylene coating layer shrinkage at 150°C, %	45			

PROPERTIES OF EXTERNAL THREE-LAYER ANTI-CORROSION POLYPROPYLENE PIPE COATING

Property	Value for the coating type		
	TU 24.20.13-045-57357928-2022	DIN 30678	ISO 21809-1
1. Minimal total coating thickness, mm, for pipes of diameters: up to 273 incl. greater than 273 to 530 incl. greater than 530 to 820 incl. greater than 820	2.0 2.2 2.5 3.0	2.0 2.2 2.5 3.0	Depending on the pipe weight and coating class
2. Minimum dielectric continuity of coating, kV	25	25	10 kV/mm, but no more than 25 kV
3. Minimum coating adhesion, N/cm of width, at testing temperatures of: a) (25±10)°C b) (90±3)°C c) (110±5)°C	250 - 50	250 40 -	250 40 -
4. Minimum impact resistance of coating, J/mm of thickness, at 20°C or 25°C	10	10	10
5. Maximum area of cathodic coating peeling, cm², after 30 days of testing at: a) (20±5)°C b) (60±3)°C c) (80±5)°C	20	7 (28 days) 7 (24 h) 15 (28 days)	7 (28 days) 7 (24 h) 15 (28 days)
6. Coating resistance to thermal cycling; minimum number of cycles without coating peeling or cracking, at temperatures from minus 20°C to plus °C	10	-	-
7. Minimum resistance of coating to indentation (penetration), mm, at test temperatures of: a) (20±5)°C b) (60±3)°C	- -	0.1 -	0.1 0.4 (at maximum temperature)

PROPERTIES OF EXTERNAL EPOXY COATING

Property	Parameters
	Modification type: normal (N)
1. Appearance	Homogeneous, smooth surface without visually detectable gaps, tears, chips, bubbles, or cracks. Separate sags, worn spots, scratches, or traces of repair are allowed
2. Dielectric continuity	Absence of breakdown at 2.5 kV
3. Minimum thickness, mm	0.35
4. Minimum impact resistance at temperatures from minus 40°C to 40°C, J, for pipes diameters: from 57 mm to 273 mm from 325 mm to 530 mm	4.0 6.0
5. Maximum adhesion to steel at 20°C and 80°C, points	1
6. Maximum adhesion to steel after holding in water for 1,000 hours at 20°C and 50°C, points	1
7. Maximum peeling area after holding for 30 days in a 3% NaCl solution at a polarization potential of minus 1.5 V, cm², at: 20 °C 80 °C	5.0 8.0
8. Minimum contact resistance after holding in a 3% NaCl solution at 20°C for 100 days, Ω·m²	10'
9. Minimum elongation at break of free film at 20°C, %	5
10. Maximum indentation (penetration) resistance, mm, at: 20 °C 80 °C	0.2 0.3

STANDARDS. INTENDED USE OF INTERNAL COATING

Standard	Intended use of coating
1	2
TU 24.20.13-221-57357928-2022 Electric-welded steel pipes with internal flow coating for gas pipelines	For the construction, reconstruction, and major repairs of gas pipelines and their branches
TU 24.20.13-005-57357928-2022 Electric-welded steel pipes with an internal flow coating for the construction of main gas pipelines	For the construction, reconstruction, and major repairs of main gas pipelines and their branches, including offshore gas pipelines. The coating is designed to reduce the hydraulic resistance of gas pipelines, as well as to protect the internal surface of the pipes from atmospheric corrosion during transportation, storage, and construction and installation work
TU 1390-017-00186654-2009 Electric-welded steel pipes with diameters ranging from 530 to 1,420 mm, with an internal anticorrosion coating, for the construction of water pipelines	For the construction, reconstruction, and major repair of underground and underwater water pipelines, including those for drinking water, with an operating temperature of up to +60 °C
TU 24.20.13-072-57357928-2022 Electric-welded steel pipes for the oil industry with internal anti-corrosion coating	For the construction, reconstruction, and major repair of oilfield pipelines
TU 24.20.13-112-57357928-2022 Electric-welded steel pipes with internal anti-corrosion coating	For the construction, reconstruction, and repair of field, process, and on-site pipelines
TU 24.20.13-166-57357928-2022 Steel pipes with an internal anti-corrosion coating	For the construction, reconstruction, and repair of field pipelines for underground and aboveground (in embankments) construction in oil, gas, and gas condensate fields
API* 5L2 (RP 5L2)-2015 Recommended Practice for Internal Coating of Line Pipes for Non-corrosive Gas Transmis-sion Service (smooth coating)	For non-corrosive gas transmission. The 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 24.20.13-004-57357928-2023 Electric-welded steel pipes with internal anti-corrosion coating for fluid and gas pipeline transportation systems	For the construction, reconstruction, and repair of field, process, and on-site pipelines
TU 24.20.13-227-573579238-2023 Electric-welded steel pipes with internal anti-corrosion coating for water pipelines	For the construction, reconstruction, and major repair of underground and underwater water pipelines, including those for drinking water
1	2

PROPERTIES OF INTERNAL ANTIFRICTION (FLOW) COATING

Property	Unit of measurement	Parameter
1. Thickness of cured coating	µm	60-150
2. Cross-cut test of coating adhesion	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. 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/cm²	0
7. Coating resistance to changes in gas pressure	-	1 No bubbles or damage after the 10th cycle
8. Coating resistance to changes in hydraulic pressure	-	No bubbles or damage after the 1st cycle
9. Resistance against exposure to salt spray at (25±5)°C for 240 hours	-	Absence of bubbles and peeling
10. Maximum coating roughness (Rz)	µm	15

PROPERTIES OF INTERNAL ANTICORROSION COATING

Property	Value for the coating type							
	TU 1390-017-00186654	TU 24.20.13-072-57357928-2022 (GOST R 58346)	TU 24.20.13-112-57357928-2022	TU 24.20.13-166-57357928-2022	TU 14-3P-165-2019 (oil and gas line pipe)	TU 14-3P-161-2020 (oil and gas line pipe)	TU 14-3P-144-2016 (tubing)	TU 1390-005-52534308-2015 (drill pipe)
1. Minimum coating thickness, µm	400	According to coat-ing manufacturer's recommendations (optional 400)	350	350	According to coating manufacturer's recommendations			
2. Minimum dielectric continuity, V/µm of maximum coating thickness, initial and after exposure to test environments:	5	5	5, absence of break-down	5	5, absence of breakdown			
3. Minimum initial adhesion – X-cut test method, points; – pull-off test method, MPa	4A 5	1 10	1 10	1 10	1 10	1 10	1 16	1 10
4.Adhesion after exposure to test environments – X-cut test method, points; – pull-off test method, MPa, minimum / decrease in % from the initial value, maximum	3A -/50	– 7,0/-	2 – / 30, no corrosion at the place of pull-off		2 -/30%	– -/30%	2 -/40%	2 -/–
5. Maximum abrasion resistance, mg	–	100	100	100	100	100	60	60
6. Bending strength: initial and after exposure to the test environment	–	Discontinuities, cracking or peeling-off are not permitted						
7. Minimum Buchholz hardness	80	94 min	According to manufac-turer's recommendations (optional: 94 hardness units.)	According to manufacturer's recommendations				
8. Maximum resistance to cathodic disbondment (1.5 V/48 h/65 °C), coating peel radius, mm	10	–	–	–	–	–	–	–
9. Minimum direct impact strength, J, initial and after exposure to the test environment	–	–	–	6 / 4	6 / 4	–	5 / 4	6 / 4

THERMAL INSULATION MADE OF POLYURETHANE FOAM

Pipes and connection elements for heating networks and oil and gas pipelines are available with anti-corrosion coatings in thermal insulation made of polyurethane (PU) foam as well as with the following protective sheaths:

Pipes with PU foam insulation can be provided with inserts preventing spread of fire. Pipes and connection elements can be equipped with sensor wires for surveillance systems and tubes for an induction-resistance heating system (IRHS).

- galvanized steel for aboveground and cased underground pipelines;
- steel with polymer coating for underground pipelines.

STANDARDS. INTENDED USE OF THERMAL INSULATION COATING OF PIPES AND PIPELINE COMPONENTS

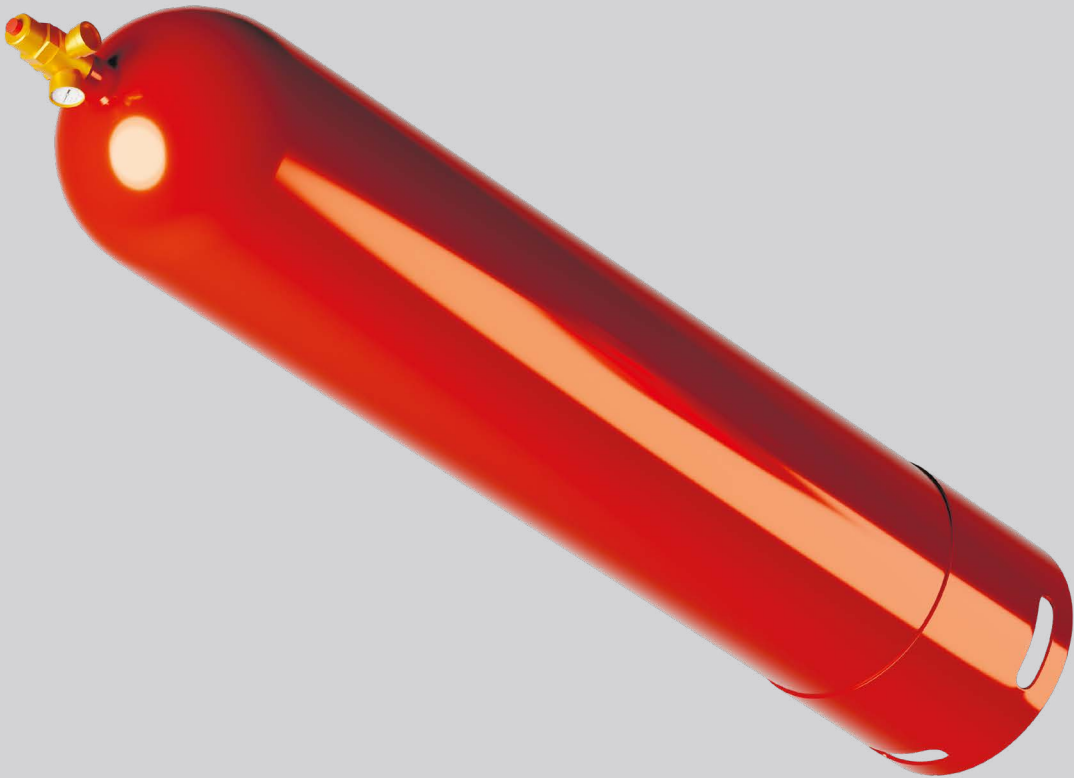
Standard	Intended use of coating
GOST 30732-2020 Steel pipes and shaped products with foamed polyurethane thermal insulation in protective sheath	Pipes and fittings for underground heating networks (uncased, in ducts impassable for people or in crawl space; or, when steel galvanized sheath is provided, 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 according to the design documentation and temperature up to 150°C, with heat supply control range of 150°C to 70°C
TU 23.99.19-062-57357928-2022 Steel pipes and shaped parts with foamed polyurethane thermal insulation in protective sheath (based on GOST 30732)	For underground heating networks (uncased, in ducts impassable for people or in crawl space), for aboveground heating networks, in passable ducts or tunnels, with the following design parameters of heat transfer medium (superheated water): working pressure up to 1.6 MPa and temperature up to 150°C
TU 24.20.13-161-57357928-2022 Steel pipes and fittings with foamed polyurethane thermal insulation in protective sheath	For the construction, reconstruction, and repair of field and process pipelines, general-purpose pipelines, and other oil and gas production facilities
TU 23.99.19-125-57357928-2022 Steel pipes and fittings with foamed polyurethane thermal insulation in protective sheath	For the construction, reconstruction, and repair of field and process pipelines, general-purpose pipelines, and other oil and gas production facilities
TU 23.99.19-055-57357928-2022 Steel pipes and fittings with foamed polyurethane thermal insulation in protective sheath	For the construction, reconstruction, and repair of main pipelines, product pipelines, field and process pipelines, pump and compressor station pipelines, and other gas industry facilities
TU 5768-007-91076026-2015 Steel pipes and fittings with diameters from 57 to 1,020 mm with foamed polyurethane thermal insulation in protective sheath	For the construction and repair of gas pipelines, oil pipelines, oil product pipelines, water pipelines, process and field pipelines, and underground and aboveground heating networks
TU 23.99.19-014-91076026-2019 Steel pipes and fittings with diameters from 57 to 1,020 mm with foamed polyurethane thermal insulation in protective sheath	For the construction and repair of gas pipelines, oil pipelines, oil product pipelines, water pipelines, process and field pipelines, and underground and aboveground heating networks
TU 24.20.13-017-91076026-2023 Steel pipes and fittings with foamed polyurethane thermal insulation in protective sheath for liquid and gas pipeline transportation systems	For the construction of liquid and gas pipeline transportation systems (for field and process pipelines) for a public joint-stock company
TU 24.20.13-019-91076026-2023 Steel pipes and fittings with diameters from 57 to 1,020 mm with foamed polyurethane thermal insulation in protective sheath	For the construction and repair of gas pipelines, oil pipelines, oil product pipelines, water pipelines, process and field pipelines, and underground and aboveground heating networks.
TU 24.20.13-009-57357928-2023 Steel pipes and fittings with foamed polyurethane thermal insulation in protective sheath for liquid and gas pipeline transportation systems	For the construction, reconstruction, and repair of field and process pipelines, general-purpose pipelines, and other oil and gas production facilities
TU 24.20.13-032-32256008-2025 Steel pipes and fittings with foamed polyurethane thermal insulation in protective sheath	For the construction, reconstruction, and repair of main pipelines, product pipelines, field and process pipelines, pump and compressor stations, and other oil and gas industry facilities

PROPERTIES OF THERMAL INSULATION COATING

Property	Value
1. Appearance	Rigid cellular plastic of light yellow to light brown color with uniform fine-cell structure
2. Minimum apparent density, kg/m³	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 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

CYLINDERS

Cylinders



Cylinders are intended for the storage and transportation of various compressed, liquefied and dissolved gases at temperatures from minus 50°C to plus 60°C at a high operating pressure.

FEATURES

Cylinders are made of metal and seamless.

Cylinders are classified by capacity into:

- small capacity, up to 12 liters;
- medium capacity, up to 50 liters;
- large capacity, from 50 liters to 650 liters.

Cylinders are made from seamless pipes of non-alloyed or alloyed (including stainless) steel grades. Small- and medium-capacity cylinders can be made with one or two necks, and with a concave base in line with regulatory requirements.

Small- and medium-capacity cylinders can be supplied with valves, rings, caps, and boots in line with regulatory requirements.

Large-capacity cylinders can be made with one or two necks in line with regulatory requirements. Large-capacity cylinders are supplied without valves.

Cylinders are marked and painted in line with the customer's order and regulatory documentation. Cylinders, other than those listed in the table, can be made to various technical specifications..

Standards number and OKP code	Product name	Capacity, liter	Working pressure, MPa (kgf/cm²)	Diameter, mm	Steel grade
1	2	3	4	5	6
GOST 949-73 OKPD2 25.29.12.110	Small- and medium-capacity steel gas cylinders for Pw ≤ 19.6 MPa (200 kgf cm²). Note: 1. Cylinders with capacities and lengths other than those specified in Table 1 of GOST 949-73, can be manufactured at the customer's request. 2. Cylinders with a concave base can be manufactured by agreement with the customer	0.4; 0.7; 1.0; 1.3; 2.0; 3.0; 4.0; 5.0; 6.0; 7.0; 8.0; 10.0; 12.0	9.8 (100) 14.7 (150) 19.6 (200)	70; 89; 108; 140	Non-alloy steel. 30KhGSA, 34KhGMA
OKPD2 25.29.12.110	Cylinders with a capacity of 2.0 l or less, with a spherical base only	20; 25; 32; 40; 50		219	
GOST 9731-79 OKPD2 25.29.12.120	Steel seamless cylinders of large capacity for gases for Pw ≤ 24.5 MPa (250 kgf/ cm²). Note: 1. Cylinders of modifications 1 and 3 for Pw= 24.5 MPa (250 kgf/cm²) can be made by agreement with the customer	80; 100; 130; 160; 200; 250; 320; 400; 500	9.8 (100) 14.7 (150) 19.6 (200) 24.5 (250)	325; 377; 426; 465	Non-alloy steel
		80; 100; 130; 160; 200; 250; 320; 400; 500	14.7 (150) 19.6 (200) 24.5 (250)	325; 377; 426; 465	38KhA. 40Kh
GOST 12247-80 OKPD2 25.29.12.120	Large seamless steel gas cylinders for operating pressure of 31.4 and 39.2 MPa (320 and 400 kgf/cm²). Note: 1. Cylinders of modifications 1 and 3 can be made by agreement with the customer	80; 100; 130; 160; 200; 250; 320; 400; 500	31.4 (320) 39.2 (400)	325; 377; 426; 465	38KhA. 40Kh
TU 1410-007-29416612-2005	Steel cylinders for inert gas storage in gaseous fire extinguishing systems	20; 40; 50; 60; 80; 100	6.0 (61) 6.5 (68) 14.7 (150) 20.0 (204)	227; 317; 320; 322	34CrMo4
TU 1410-007-29416612-2005	Steel cylinders for the transportation and storage of compressed industrial gases	20; 25; 32; 40; 50 80; 97; 100; 170	14.7 (150) 19.6 (200) 20.0 (204)	219; 229	34CrMo4
TU 1410-007-29416612-2005	Steel cylinders for the on-board storage of compressed natural gas (methane) as motor fuel for vehicles	18,5; 22,5; 23; 33; 34; 37; 39; 44; 50; 52; 53; 62; 65; 66; 70; 76; 77; 80; 86; 92; 100; 108; 114	20.0 (204)	219; 229; 254; 322; 356; 406	34CrMo4
TU 1410-702-0750107-2011	Large-capacity seamless steel gas cylinders for Pw ≤ 24.5 MPa (250 kgf/cm²)	80; 97; 100	24.5 (250)	329	34CrMo4

PROCESS FLOWCHARTS

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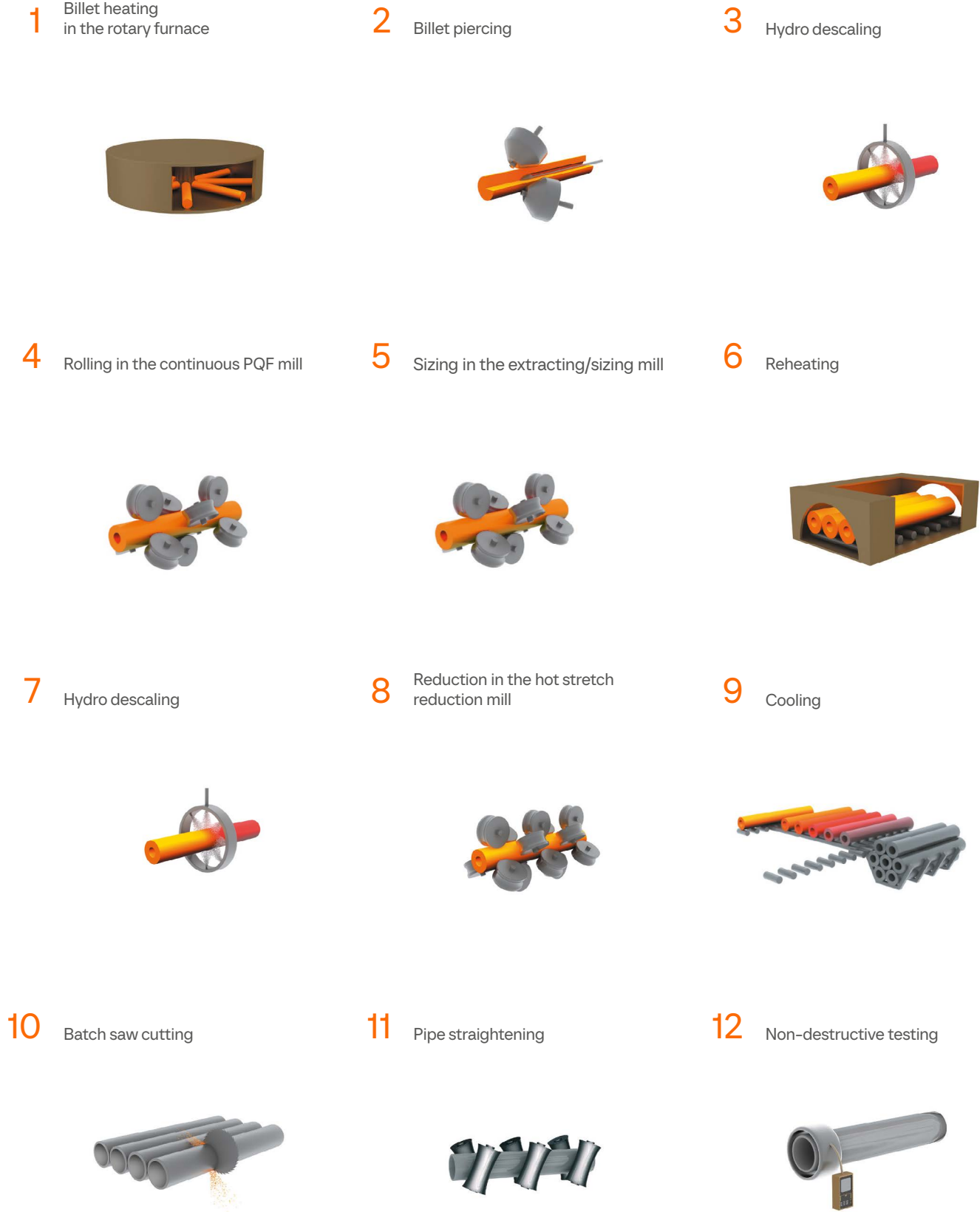
STEEL MELTING AND CASTING



CONTROLLED PARAMETERS:

Scrap weight, chemical composition and dimensions; fractional and chemical composition, moisture content and weight of materials; metal temperature; vacuum level, cooling modes, casting rate; cut quality and length; billet traceability, external surface, geometric dimensions, number of billets, macrostructure, and other.

SEAMLESS PIPES: PIPE ROLLING LINE WITH PQF 10 3/4" CONTINUOUS PIPE ROLLING MILL



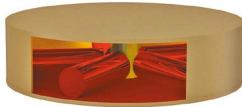
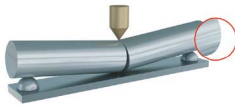
SEAMLESS PIPES: TPA 50-200 AND ASSEL MILL PIPE ROLLING LINE

- 1

Incoming inspection of billets
- 2

Billet breaking, visual inspection
- 3

Billet heating in rotary furnaces

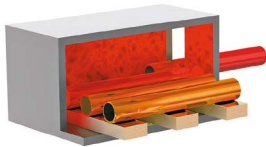


- 7

Mandrel removal
- 8

Pipe heating in the walking beam furnace
- 9a

Final pipe sizing in the three-roll sizing mill



- 12

Pipe straightening on the straightening mill
- 13

Pipe end trimming and edge facing
- 14

Quality control, turning (for bearing tubes)

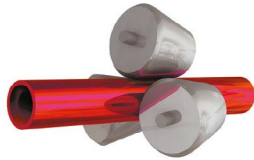
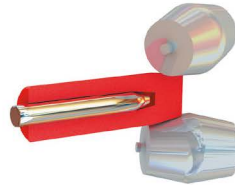


- 4

Billet centering
- 5

Billet piercing
- 6

Rolling of the shell into the pipe on the Assel mill

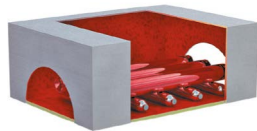
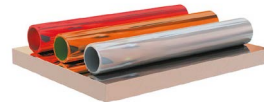


- 9b

Pipe reduction in the 12-stand reducing-sizing mill
- 10

Pipe cooling
- 11

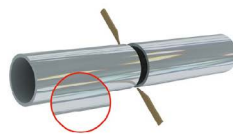
Heat treatment of pipes in pusher furnaces (for bearing tubes and pipes for machinery)



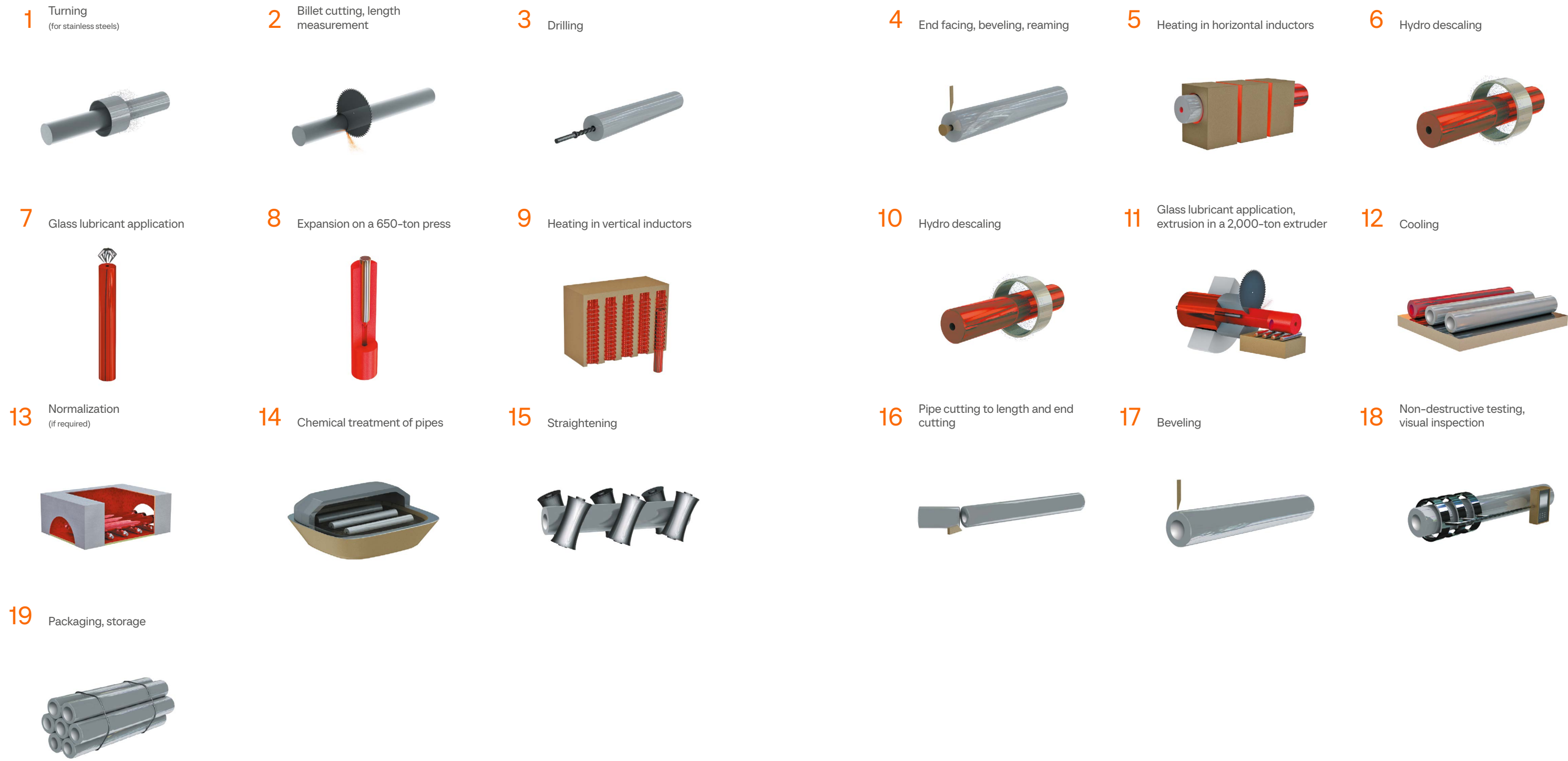
- 15

Pipe cutting to length, quality control
- 16

Packaging, storage



SEAMLESS PIPES MANUFACTURED BY HOT EXTRUSION IN A 2,000-TON LINE

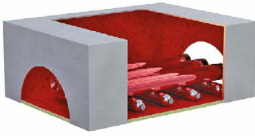


ОБСАДНЫЕ ТРУБЫ

1Heat treatment
(if required)

a) Heating
b) Quenching
c) Tempering
d) Sizing
e) Straightening

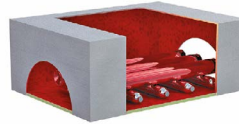
a) Heating



b) Quenching



c) Tempering



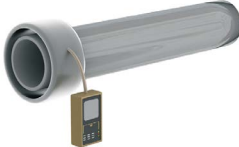
d) Sizing



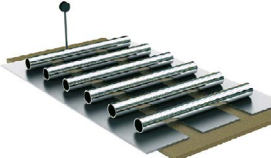
e) Straightening



2Non-destructive testing



3Dimensional inspection, drift test



4Threading and thread inspection



5Coupling make-up



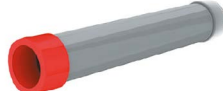
6Hydrostatic testing



7Length measurement, weighing



8Installation of protective parts



9Protective coating, labeling



10Packaging and storage



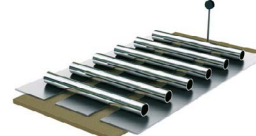
106

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PROCESS FLOWCHART

PREMIUM THREADING

1Dimensional control,
drift test of pipes



2Box end threading and thread
inspection



3Coupling make-up



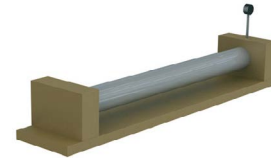
4Hydrostatic testing



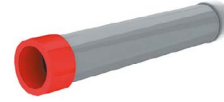
5Pin end threading and thread
inspection



6Length measurement, weighing



7Installation of protective parts



8Protective coating



9Packaging and storage



TMK

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TUBING



MANUFACTURE OF DRILL PIPES WITH WELD-ON TOOL JOINTS

1

Pipe body inspection

2

Induction heating of pipe ends

3

Upsetting of pipe ends

c) Tempering

d) Sizing

5

Magnetic particle inspection of pipe ends

9

Tool joints

a) Delivery
b) Incoming inspection
c) Preparation

10

Friction welding of tool joints to the drill pipe

11

Post-weld heat treatment of the weld zone

15

Pipe inspection, length measurement, weighing

16

Thread protection, pipe painting, labeling

17

Packaging, storage

4

Heat treatment
(if required)

a) Heating
b) Quenching
c) Tempering
d) Sizing

a) Heating

b) Quenching

6

Non-destructive testing of the pipe body

7

Machining of pipe ends for welding

8

Machining of upset parts

12

Finishing of the external and internal surface of the welded joints

13

Welded joint testing

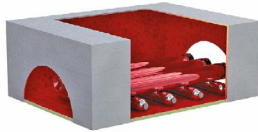
14

Non-destructive testing and magnetic particle inspection of the weld zone

OIL AND GAS LINE PIPES (SEAMLESS)

- 1 Heat treatment
(if required)
- a) Heating
b) Quenching
c) Tempering
d) Sizing
e) Straightening

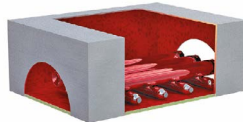
a) Heating



b) Quenching



c) Tempering



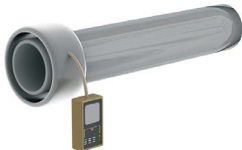
d) Sizing



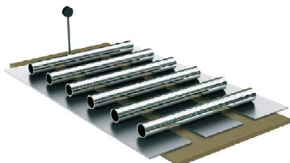
e) Straightening



2 Non-destructive testing



3 Visual and dimensional inspection



4 Edge facing, beveling



5 Hydrostatic testing



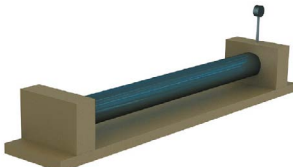
6 Ultrasonic inspection



7 Visual inspection, magnetic particle inspection of pipe end face and bevel



8 Length measurement, weighing



9 Protective coating, labeling



10 Packaging, storage



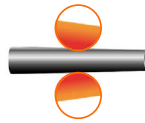
GENERAL PURPOSE COLD-WORKED PIPES

1 Storage of Mother tube for cold rolling

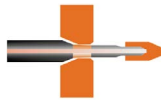


2 Pipe cold-working process
The manufacturing process and the number of passes depend on the mother tube size and on the size and required mechanical properties of finished pipes.

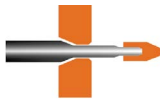
Rolling on cold rolling mill



Drawing on a mandrel



Sink drawing



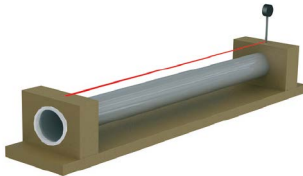
6 Mechanical testing



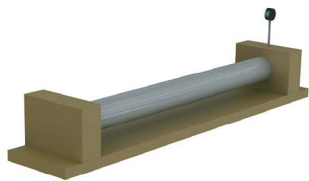
7 Cutting to length



8 Dimensional inspection



12 Length measurement, weighing



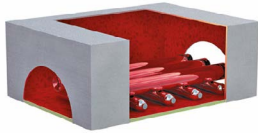
13 Labeling, anti-corrosion protection, packaging. Storage



3 Chemical treatment



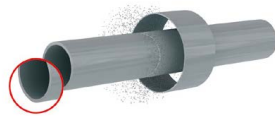
4 Heat treatment



5 Straightening



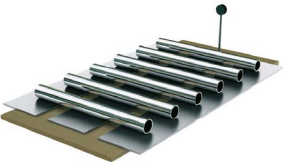
9 Surface inspection



10 Non-destructive testing (if required)



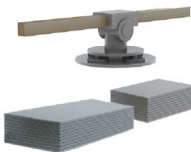
11 Steel grade control



SAWL PIPE PRODUCTION PROCESS (VOLZHISKY)

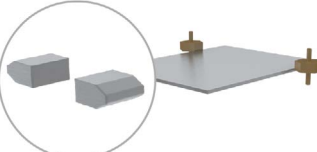
1

Plate handling



2

Milling of longitudinal edges of the plate



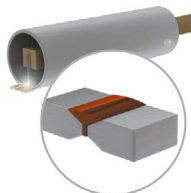
3

3-roll bending



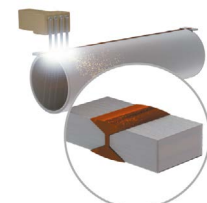
7

Welding of the internal seam



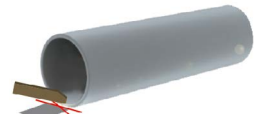
8

Welding of the external seam



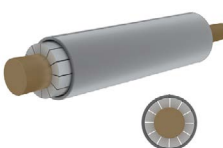
9

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



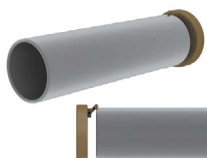
13

Expansion



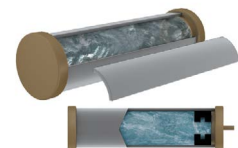
14

Pipe end finishing



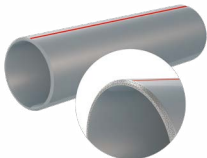
15

Hydrostatic testing



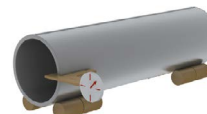
19

Visual and dimensional inspection, magnetic particle inspection



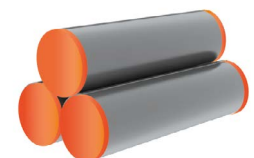
20

Labeling and weighing



21

Packaging, storage



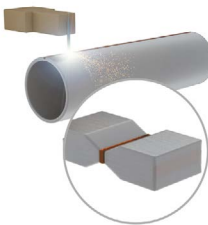
4

Post-bending



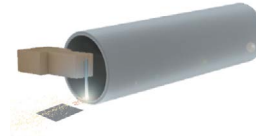
5

Preparation, tack welding



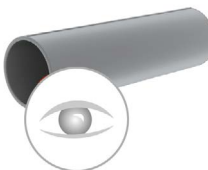
6

Run-off tab welding



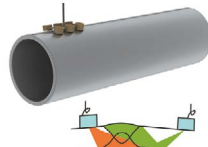
10

Preliminary visual inspection



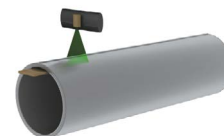
11

Ultrasonic inspection



12

X-ray inspection



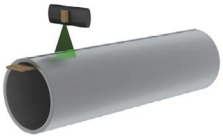
16

Ultrasonic inspection



17

Radiography



18

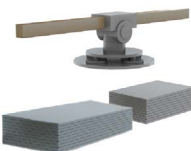
Bevel cutting



PRODUCTION FLOW CHART OF PIPE PRODUCTION 508-1,422 MM PIPE MILL (CHELYABINSK)

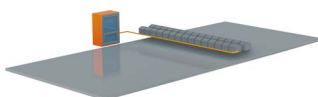
1

Plate handling



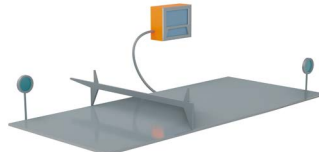
2

Plate ultrasonic inspection



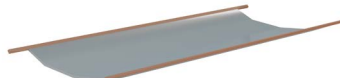
3

Plate geometric parameter control



7

Edge pre-bending



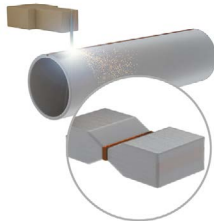
8

Pipe stock step forming



9

Fit-up, technological seam welding



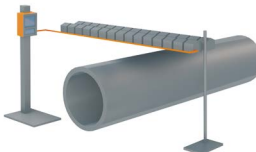
13

Tab cutting-off



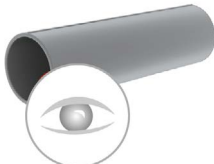
14

Automatic control of pipe stock geometry



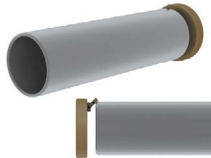
15

Preliminary visual control



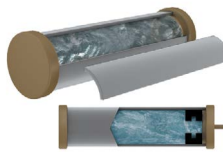
19

Pipe end finishing



20

Hydrostatic testing



21

Ultrasonic inspection



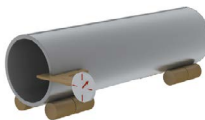
25

Automatic control of finished pipe geometry



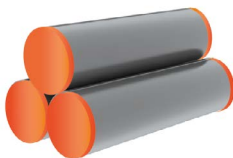
26

Labeling and weighing



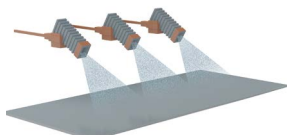
27

Packaging, storage



4

Plate shot blasting



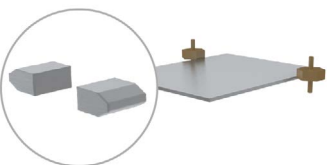
5

Tab welding



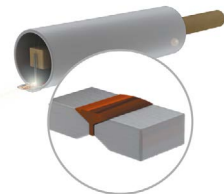
6

Plate longitudinal edge milling



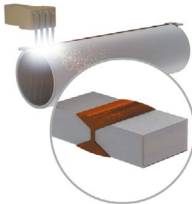
10

Welding of the internal seam



11

Welding of the external seam



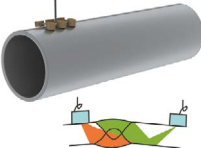
12

External seam slug crust removal



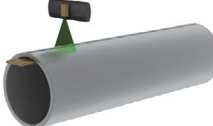
16

Ultrasonic inspection



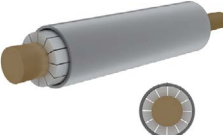
17

X-ray inspection



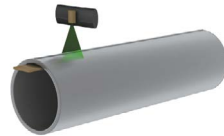
18

Expansion



22

X-ray inspection



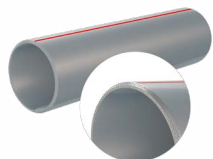
23

Bevel cutting



24

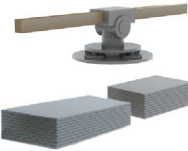
Visual and dimensional inspection, magnetic particle inspection



PRODUCTION FLOW CHART OF PIPE PRODUCTION 530-820 MM PIPE MILL (CHELYABINSK)

1

Plate handling



2

Plate leveling



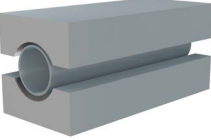
3

Plate cutting



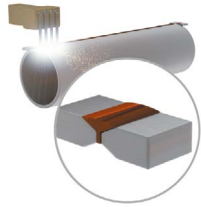
7

Final pipe stock forming



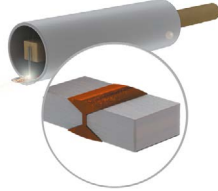
8

Fit-up and welding of the external seam



9

Welding of the internal seam



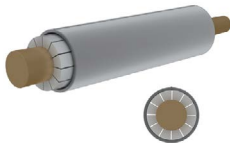
13

Expansion



14

Expansion



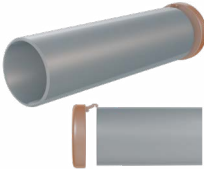
15

Pipe end finishing



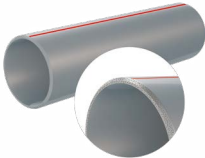
19

Bevel cutting



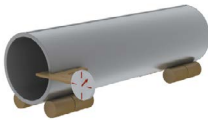
20

Visual and dimensional inspection, magnetic particle inspection



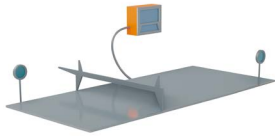
21

Labeling and weighing



4

Plate width measurement



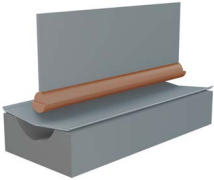
5

Plate edge pre-bending



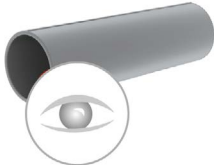
6

Preliminary pipe stock forming



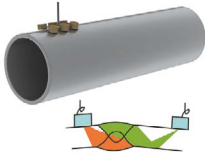
10

Preliminary visual inspection



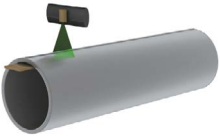
11

Ultrasonic inspection



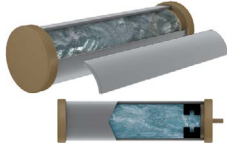
12

X-ray inspection



16

Hydrostatic testing



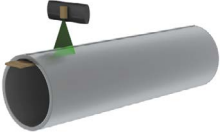
17

Ultrasonic inspection



18

X-ray inspection



22

Packaging, storage



PRODUCTION FLOW CHART OF PIPE PRODUCTION 1,020-1,220 MM PIPE MILL (CHELYABINSK)



ELECTRIC-WELDED SMALL AND MEDIUM DIAMETER PIPES MANUFACTURED ON PIPE ELECTRIC WELDING FACILITY 73-219

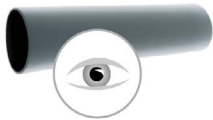


ELECTRIC-WELDED MEDIUM DIAMETER PIPES MANUFACTURED ON PIPE ELECTRIC WELDING FACILITY 168-530 (TMK CPW)

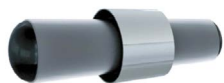


EXTERNAL ANTI-CORROSION COATING

1 Incoming inspection of pipes
(visual)



2 Preheating in a gas furnace



3 Wheel blasting of the exterior surface of pipe with steel grit



4 Purging pipe interior to remove dust



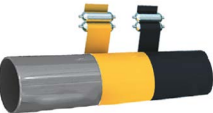
5 Pipe surface preparation quality control
(visual)



6 Heating. Chromating. Subsequent heating before coating



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



7b 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 with a high-voltage flaw detector



10 Coating cut-back



11 Final quality control of coated pipes
(visual)

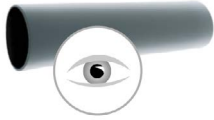


12 Pipe labeling. Installation of protective parts. Pipe storage



INTERNAL ANTI-CORROSION FLOW COATING

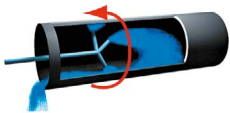
1 Incoming inspection of pipes



2 Pipe heating



3 Degreasing of internal surface of pipe



4 Second heating of pipes



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



6 Internal pipe surface cleaning quality control



7 Cleaning of internal pipe surface in wheel blasting machine No. 2



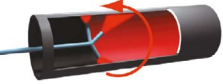
8 Internal surface purge



9 Internal pipe surface preparation quality control



10 Pipe coating
(in a paint booth)



11 Precuring of internal pipe coating



12 Induction heating of pipes



13 Coating curing in a full polymerization chamber



14 Pipe internal flow coating



15 Pipe labeling. Pipe storage with protective canvas caps



SEAMLESS PIPES

Standard	Steel grade (pipe grade)	Mass fraction of elements, %									
		C max	Si	Mn	S	p	cu	Ni	Cr	Al	V
		within the range			max						
GOST 1050-88	10A	0.07-0.14	0.17-0.37	0.35-0.65	0.02	0.02	0.3	0.3	0.25		
GOST 1050-88	20	0.17-0.24	0.17-0.37	0.35-0.65	0.040	0.035	0.25	0.25	0.25	0.050	
GOST 1050-88	20A	0.17-0.24	0.17-0.37	0.35-0.65	0.02	0.02	0.3	0.3	0.25		
TU 14-3P-48-2001	20A	0.17-0.24	0.17-0.35	0.35-0.65	0.02	0.020	-	-	0.25		
TU 14-162-14-96 TU 14-162-20-96	20A	0.17-0.22	0.17-0.37	0.50-0.65	0.015	0.015				0.03 - 0.05	
TU 14-157-37-94	20 select	0.17-0.24	0.17-0.37	0.35-0.65	0.020	0.020	0.30	0.30	0.25		
GOST 8731-74 GOST 1050-88	45	0.42-0.50	0.17-0.37	0.50-0.80	0.020	0.020	0.30	0.30	0.25		
TU 14-3-1971-97	20V	0.17-0.21	0.17-0.37	0.35-0.65	0.008	0.012	0.30	0.30	0.25	0.020-0.500	
TU 1381-214-0147016-02	20F	0.18-0.23	0.2-0.37	0.4-0.65	0.006	0.015	0.3	0.3	0.25	0.02-0.05	0.05-0.09
TU 14-156-37-97	20F (V)	0.17-0.23	0.2-0.33	0.41-0.55	0.008	0.011	0.3	0.3	0.25	0.02-0.05	0.03-0.05
TU 14-157-50-97 TU 14-157-54-97	20 S select 20YuCh	0.22-0.25	0.17-0.30	0.50-0.65	0.015	0.015	0.20	0.20		0.025-0.050	-
TU 14-157-60-98	20 S select	0.22-0.24	0.17-0.30	0.50-0.65	0.020	0.015	0.20	0.20	0.30	0.025-0.050	-
GOST 4543-71	20Kh	0.17-0.23	0.17-0.37	0.50-0.80	max 0.025	max 0.025	0.30	0.30	0.70-1.00		
GOST 4543-71	40Kh	0.36-0.44	0.17-0.37	0.50-0.80	max 0.025	max 0.025	0.30	0.30	0.80-1.10		
GOST 4543-71	30KhPSA	0.28-0.34	0.90-1.2	0.80-1.10	max 0.025	max 0.025	0.30	0.30	0.80-1.10		
GOST 19281	09G2S	0.12	0.50-0.80	1.30-1.70	0.035	0.040	0.30	0.30	0.30		
API* Spec 5L/ISO 3183	(V) (Kh42) (Kh46- Kh80)	0.27 0.29 0.26		1.15 1.25 1.35	0.030 0.030 0.030	0.030 0.030 0.030					
TU 14-3-1128-2000	09G2S	0.12	0.50-0.80	1.30-1.70	0.010	0.025	0.30	0.30	0.30		
TU 14-3-1618-89	13GFA	0.18	0.30	1.20	0.010	0.025					
TU 14-3P-77-2004	20 12GF	0.18-0.22 0.10-0.15	0.35-0.65 0.80-1.00	0.17-0.37 0.17-0.37	0.010 0.008	0.025 0.020				0.015-0.040 0.015-0.040	0.04-0.08
TU 14-3-1972-97 TU 1308-269-00147016-2003 Seamless hot-worked oil and gas line pipes with enhanced cold and corrosion resistance	06Kh1 06KhF	0.06 0.06	0.17-0.37 0.17-0.37	0.35-0.65 0.35-0.65	0.005 0.005	0.010 0.010	0.15-0.25 0.15-0.25	0.30 0.30	0.80-0.95 0.80-0.95	0.020-0.050 0.020-0.050	0.03-0.08 0.03-0.08
TU 1381-159-0147016-01	06Kh1 06KhF 09PSF	0.04-0.08 0.04-0.08 0.07-0.12	0.17-0.37 0.17-0.37 0.5-0.8	0.35-0.65 0.35-0.65 0.5-0.8	0.005 0.005 0.008	0.015 0.015 0.020	0.25 0.25 0.3	0.3 0.3 0.3	0.8-0.95 0.8-0.95 0.3	0.02-0.05 0.02-0.05 0.02-0.05	- 0.06-0.08 0.05-0.09
TU 1381-204-0147016-01	09PSF 12GF	0.07-0.12 0.1-0.15	0.5-0.8 0.17-0.37	0.5-0.8 0.7-0.9	0.01 0.008	0.02 0.02	0.3 0.3	0.3 0.3		0.02-0.05 0.015-0.04	0.04-0.08 0.04-0.08
TU 1308-226-0147016-02	13KhFA	0.11-0.16	0.17-0.37	0.5-0.7	0.01	0.015	0.25	0.3	0.6-0.9	0.03-0.05	0.04-0.06
TU 14-157-38-94 GOST 19281-89	09G2SA	0.12	0.50-0.70	1.30-1.60	0.020	0.020	0.30	0.30	0.30		
TU 14-3P-48-2001	09G2SA	0.12	0.50-0.80	1.30-1.70	0.020	0.020	0.30	0.30	0.30		
TU 1317-006.1 -593377520-2003	20A	0.17-0.24	0.17-0.37	0.35-0.65	0.015	0.017	0.25	0.25	max 0.40	0.02-0.05	max 0.050
	20FA	0.17-0.24	0.17-0.37	0.35-0.75	0.01	0.015	0.30	0.25	0.40	0.02 - 0.05	0.04-0.12
	08KhMF- ChA	0.08-0.13	0.20-0.40	0.45-0.65	0.015	0.015	0.25	0.25	0.5-0.7	0.03 - 0.05	0.04-0.1
	09SFA	0.07-0.13	0.50-0.80	0.50-0.80	0.01	0.015	0.30	0.30	0.30	0.02 - 0.05	0.05-0.12
	13KhFA	0.11-0.17	0.17-0.37	0.40-0.65	0.015	0.015			0.50-0.70	0.02 - 0.05	
TU 14-157-50-97 TU 14-157-54-97	09GSFA	0.08-0.12	0.50-0.70	0.60-0.70	0.015	0.015	0.20	0.20	0.20	0.025-0.050	0.04-0.10
TU 14-157-61-99	32G2A (D)	0.30-0.37	0.20-0.35	1.20-1.45	0.020	0.020	0.30	0.30	0.30		-
GOST 632-80	D	0.40-0.50	0.17-0.37	0.70-1.00	0.045	0.045					
GOST 632-80	32G2A (E)	0.29-0.36	0.20-0.35	1.15-1.45	0.020	0.020	0.30	0.30	0.30		-
GOST 632-80	L	0.28-0.35	0.17-0.37	1.10-1.40	0.035	0.035					0.02-0.06
GOST 632-80	M	0.28-0.35	0.17-0.37	1.10-1.40	0.035	0.035					0.06-0.12
GOST 632-80	R	0.28-0.35	0.17-0.35	1.35-1.55	0.025	0.025					0.07-0.10
TU 14-3P-91-2004	20KT	0.17-0.24	0.17-0.37	0.35-0.80	0.012	0.015					
	13KhFA	0.11-0.17	0.17-0.37	0.40-0.65	0.005	0.008	0.25	0.30	0.50-0.70	0.01-0.05	0.04-0.07

Content of elements not listed in the table:
TU 1381-214-0147016-02 steel 20F: Nitrogen 0.01
TU 1308-226-0147016-02 steel 13KhFA: Nitrogen 0.008

TU 1381-159-0147016-01 steel 09GSF: Nitrogen 0.012
TU 1381-204-0147016-01 steels 09GSF and 12GF: Niobium 0.02-0.06

LARGE DIAMETER PIPES

Standard	Steel grade	Mass fraction of elements, %														
		C	Si	Mn	P	S	Cr	Ni	Cu	Al	V	Ti	Nb	N	Ca	As Sn Sb
		Maximum or within the limits														
TU 13.03-011-00212179-2003	20	0.17-0.24	0.17-0.37	0.35-0.65	0.035	0.04	0.25	0.25	0.25	0.02-0.08						
TU 14-3-1970-97	20	0.17-0.24	0.17-0.37	0.35-0.65	0.025	0.01	0.25	0.25	0.25	0.02-0.06						
TU 14-3-1973-98	20	0.17-0.24	0.17-0.37	0.35-0.65	0.025	0.010				0.02-0.06	0.03-0.06	0.01-0.03				
TU 1381-213-0147016-02	20	0.18-0.23	0.17-0.37	0.35-0.65	0.015	0.01	0.25	0.3	0.3	0.02-0.06	0.04-0.07			0.01		
TU 1381-144-0147016-01 TU 1381-158-0147016-01	20	0.17-0.24	0.17-0.37	0.35-0.65	0.025	0.010	0.25	0.25	0.25	0.02-0.06	0.03-0.06					
TU 14-3-954-2001	17 GS	0.15-0.2	0.4-0.6	1.00-1.40	0.035	0.03	0.3	0.3	0.3							
TU 1104-138100-357-02-96 TU 14-3-954-2001	17GiS	0.15-0.2	0.4-0.6	1.15-1.55	0.035	0.03	0.3	0.3	0.3							
TU 1104-138100-357-02-96 TU 14-3-954-2001	17GiS-U	0.15-0.2	0.4-0.6	1.15-1.55	0.025	0.01	0.3	0.3	0.3							
TU 14-3-1973-98	17GiS	0.15-0.20	0.4-0.6	1.15-1.55	0.020	0.010										
TU 1381-158-0147016-01	09GSF	0.07-0.12	0.5-0.8	0.5-0.8	0.02	0.01	0.3	0.3	0.3	0.02-0.05	0.04-0.08		0.02-0.06	0.012		
TU 1381-144-0147016-01	09GSF	0.07-0.12	0.5-0.8	0.5-0.8	0.020	0.010	0.3	0.3	0.3	0.02-0.05	0.04-0.08		0.02-0.06	0.012		
TU 14-3P-60-2002	10G2FB	0.9-0.12	0.15-0.35	1.55-1.75	0.02	0.006				0.02-0.05	0.01-0.035		0.03-0.05			
TU 14-3-1973-98 TU 14-3-1975-99	10G2FB	0.09-0.12	0.15-0.35	1.55-1.75	0.02	0.006				0.02-0.05	0.09-0.12	0.005-0.02	0.02-0.04			
TU 14-3P-52-2001	06GFBAA	0.04-0.07	0.17-0.37	1.35-1.60	0.005	0.005	0.1	0.04	0.03	0.02-0.04	0.05-0.08	0.02	0.04-0.06	2.0.007	0.005 0.005 0.005	
TU 14-3-1976-99	micro alloyed steels	max 0.15	0.35	1.50	0.02	0.008	0.3	0.3	0.3	max 0.06	max 0.08	max 0.01	max 0.04	0.01	0.006	
TU 14-3-1976-99	low alloyed	0.2	0.6	1.55	0.025	0.01	0.3	0.3	0.3	0.05						
TU 14-3-1977-2000	micro alloyed steels	0.09-0.13	0.15-0.3	1.3-1.55	0.02	0.01	0.3	0.3	0.3	0.025-0.05	0.04-0.08	0.01	0.03-0.05	0.01	0.006	
TU 14-101-794-2010	09G2S	0.12	0.50-0.80	1.30-1.70	0.025	0.020	0.30	0.30	0.30	-	0.10	0.025	0.05	-	-	
TU 14-1-5477-2004	17GiS-U	0.20	0.60	1.55	0.025	0.020	0.30	0.30	0.30	0.06	0.10	-	0.07	0.012	-	
TU 14-1-5477-2004	13GiS-U	0.11-0.15	0.40-0.60	1.25-1.55	0.025	0.007	0.30	0.30	0.30	0.02-0.05	-	0.015-0.035	0.10	0.010	-	
TU 14-1-5477-2004	12G2SB	0.10-0.14	0.25-0.50	1.40-1.80	0.020	0.020	0.30	0.30	0.30	0.01-0.06	0.08	0.005-0.02	0.04-0.07	0.012	-	
TU 14-1-5477-2004	10G2FBU	0.09-0.12	0.15-0.50	1.55-1.75	0.020	0.006	0.30	0.30	0.30	0.02-0.05	0.08-0.12	0.010-0.035	0.02-0.05	0.010	-	
TU 14-101-994-2018	K52, X56 (cat. C)	0.20	0.65	1.70	0.025	0.015	0.30	0.30	0.30	0.020-0.060	0.100	0.030	0.100	0.012	-	
TU 14-101-994-2018	K52, X56 (cat. D)	0.16	0.55	1.70	0.020	0.008	0.30	0.30	0.30	0.020-0.060	0.100	0.030	0.100	0.012	-	
TU 14-101-994-2018	K52, X56 (cat. E)	0.12	0.42	1.70	0.020	0.006	0.30	0.30	0.30	0.020-0.060	0.100	0.030	0.100	0.012	-	
TU 14-101-994-2018	K55 (cat. D)	0.16	0.65	1.70	0.020	0.008	0.30	0.30	0.30	0.020-0.060	0.100	0.030	0.100	0.012	-	
TU 14-101-994-2018	K55 (cat. E)	0.12	0.65	1.70	0.020	0.006	0.30	0.30	0.30	0.020-0.060	0.100	0.030	0.100	0.012	-	
TU 14-101-994-2018	K56, X60, X65 (cat. D)	0.16	0.55	1.80	0.020	0.008	0.30	0.30	0.30	0.020-0.060	0.100	0.030	0.100	0.012	-	
TU 14-101-994-2018	K56, X60, X65 (cat. E)	0.12	0.42	1.80	0.020	0.006	0.30	0.30	0.30	0.020-0.060	0.100	0.030	0.100	0.012	-	
TU 14-101-994-2018	K60, X70 (cat. D)	0.14	0.55	1.90	0.020	0.008	0.30	0.30	0.30	0.020-0.060	0.100	0.030	0.100	0.012	-	
TU 14-101-994-2018	K60, X70 (cat. E)	0.12	0.42	1.90	0.020	0.006	0.30	0.30	0.30	0.020-0.060	0.100	0.030	0.100	0.010	-	
TU 14-101-805-2011	K65	0.05	0.35	1.95	0.015	0.004	0.30	0.15-0.30	0.30	0.020-0.060	0.100	0.01-0.03	0.10	0.008	0.006	
TU 14-101-1278-2022	K70	0.080	0.35	2.00	0.015	0.004	0.40	0.45	0.40	0.060	0.100	0.030	0.100	0.008	-	
TU 14-101-870-2011	Gr.B	0.22	0.45	1.20	0.025	0.015	0.30	0.30	0.50	-	0.05	0.04	0.05	-	-	
TU 14-101-870-2011	X42	0.22	0.45	130	0.025	0.015	0.30	0.30	0.50	-	0.05	0.04	0.05	-	-	
TU 14-101-870-2011	X46	0.22	0.45	1.30	0.025	0.015	0.30	0.30	0.50	-	0.05	0.04	0.05	-	-	
TU 14-101-870-2011	X52	0.22	0.45	1.40	0.025	0.015	0.30	0.30	0.50	-	-	-	-	-	-	
TU 14-101-870-2011	X56	0.22	0.45	1.40	0.025	0.015	0.30	0.30	0.50	-	-	-	-	-	-	
TU 14-101-870-2011	X60	0.12	0.45	1.60	0.025	0.015	0.50	0.50	0.50	-	-	-	-	-	-	
TU 14-101-870-2011	X65	0.12	0.45	1.60	0.025	0.015	0.50	0.50	0.50	-	-	-	-	-	-	
TU 14-101-870-2011	X70	0.12	0.45	1.70	0.025	0.015	0.50	0.50	0.50	-	-	-	-	-	-	
TU 14-101-870-2011	X80	0.12	0.45	1.85	0.025	0.015	0.50	1.00	0.50	-	-	-	-	-	-	

WELDED PIPES AS PER GOST 10704/10706

Standard	Steel grade	Mass fraction of elements, %									
		C	Mn	Si	P	S	Cr	Ni	Cu	As	N
					max						
GOST 380-2005	St1kp	0.06-0.12	0.25-0.50	max 0.05	0.04	0.05	0.3	0.3	0.3	0.1	0.01
	St1Sp	0.06-0.12	0.25-0.50	0.15-0.30	0.04	0.05	0.3	0.3	0.3	0.1	0.01
	St2kp	0.09-0.15	0.25-0.50	max 0.05	0.04	0.05	0.3	0.3	0.3	0.1	0.01
	St2ps	0.09-0.15	0.25-0.50	0.05-0.15	0.04	0.05	0.3	0.3	0.3	0.1	0.01
	St2sp	0.09-0.15	0.25-0.50	0.15-0.30	0.04	0.05	0.3	0.3	0.3	0.1	0.01
	St3kp	0.14-0.22	0.30-0.60	max 0.05	0.04	0.05	0.3	0.3	0.3	0.1	0.01
	St3ps	0.14-0.22	0.40-0.65	0.05-0.15	0.04	0.05	0.3	0.3	0.3	0.1	0.01
	St3sp	0.14-0.22	0.40-0.65	0.15-0.30	0.04	0.05	0.3	0.3	0.3	0.1	0.01
GOST 9045-93	08Yu	max 0.07	max 0.35	max 0.03	max 0.020	max 0.025					
GOST 1050-88	08kp	0.05-0.12	0.25-0.50	max 0.03	0.035	0.04	0.1	0.3	0.3	0.1	0.01
	08ps	0.05-0.11	0.35-0.65	0.05-0.17	0.035	0.04	0.1	0.3	0.3	0.1	0.01
	08	0.05-0.12	0.35-0.65	0.17-0.37	0.035	0.04	0.1	0.3	0.3	0.1	0.01
	10kp	0.07-0.14	0.25-0.50	max 0.07	0.035	0.04	0.15	0.3	0.3	0.1	0.01
	Yups	0.07-0.14	0.35-0.65	0.05-0.17	0.035	0.04	0.15	0.3	0.3	0.1	0.01
	10	0.07-0.14	0.35-0.65	0.17-0.37	0.035	0.04	0.15	0.3	0.3	0.1	0.01
	15	0.12-0.19	0.35-0.65	0.17-0.37	0.035	0.04	0.25	0.3	0.3		
	20	0.17-0.24	0.25-0.50	0.17-0.37	0.035	0.04	0.25	0.3	0.3		
GOST 19281-89	16GS	0.12-0.18	0.9-1.2	0.4-0.7	0.035	0.04	0.3	0.3	0.3		
TU 14-1-2551-76	08G2SF	max 0.12	1.2-1.6	0.4-0.6	0.025	0.01					

BEARING TUBES AS PER GOST 800-78

Steel grade	Mass fraction of elements, %								
	C	Si	Mn	Cr	S	P	Cu	Ni	Ni+Cu
					max				
ShKh-15	0.95-1.05	0.17-0.37	0.20-0.40	1.30-1.65	0.020	0.027	0.25	0.30	0.50
ShKh-15 SG	0.95-1.05	0.40-0.65	0.90-1.20	1.30-1.65	0.020	0.027	0.25	0.30	0.50
ShKh-4	0.95-1.05	0.15-0.30	0.15-0.30	0.35-0.50	0.020	0.027	0.25	0.30	0.50

SEAMLESS PIPES FOR THE OIL REFINING AND PETROCHEMICAL INDUSTRIES (PETROLEUM CRACKING PIPES) AS PER GOST 550-2020

Steel grade	Mass fraction of elements, %										
	C	Si	Mn	Cr	S	P	Ni	Cu	Mo	V	Ti
					max					max	
10	0.07-0.14	0.35-0.65	0.17-0.37	max 0.15	0.040	0.035	0.30	0.30	-	-	-
20	0.17-0.24	0.35-0.65	0.17-0.37	max 0.25	0.025	0.030	0.30	0.30	-	-	-
10G2	0.07-0.15	1.20-1.60	0.17-0.37	max 0.30	0.035	0.035	0.30	0.30	-	-	-
12KhM	0.09-0.16	0.40-0.70	0.17-0.37	0.40-0.70	0.025	0.030	0.30	0.20	0.40-0.60		
15Kh5	max 0.15	max 0.50	max 0.50	4.50-6.00	0.025	0.030	-	-	-	-	-
15Kh5M	max 0.15	0.30-0.50	0.30-0.50	4.50-6.00	0.025	0.030	0.60	0.20	0.45-0.60	0.050	0.030
12Kh8	max 0.12	0.17-0.37	0.3-0.6	7.5-9.0	0.030	0.035	0.40	0.25	-	-	-

SEAMLESS CORROSION-RESISTANT STEEL PIPES (STAINLESS STEEL PIPES)

Steel grade (alloy)	Mass fraction of elements, %														Groups*		
	C	Si	Mn	Cr	Ni	Ti	Al	W	Mo	Nb	V	Fe	S	P	I	II	III
													max				
Steels																	
40Kh9S2	0.35-0.45	2.0-3.0	max 0.8	8.0-10.0	-	-	-	-	-	-	-	Basic metal	0.025	0.025	-	0	0
20Kh13	0.16-0.25	max 0.8	max 0.8	12.0-14.0	-	-	-	-	-	-	-	Basic metal	0.025	0.025	0	-	-
25Kh13N2	0.20-0.30	max 0.5	0.8-1.2	12.0-14.0	1.5-2.0	-	-	-	-	-	-	Basic metal	0.025	0.025	0	-	-
08Kh17T	max 0,08	max 0,8	max 0,8	16,0-18,0	-	5C-0,80	-	-	-	-	-	Basic metal	0,025	0,025	0	0	-
15Kh26T	max 0,15	max 1,0	max 0,8	24,0- 27,0	-	5C-0,90	-	-	-	-	-	Basic metal	0,025	0,025	0	0	-
08Kh17N5M3	0,06-0,10	max 0,8	max 0,8	16,0-17,5	4,5-5,5	-	-	-	3,0-3,5	-	-	Basic metal	0,020	0,020	0	-	-
08Kh17N6T	max 0,08	max 0,8	max 0,8	16,0-18,0	5,5-6,5	-	-	-	6op	max 0,003	-	Basic metal	0,020	0,020	0	-	-
08Kh10N20T2	max 0,08	max 0,8	max 2,0	10,0-12,0	18,0-20,0	1,5-2,5	max 1,0	-	-	-	-	Basic metal	0,030	0,030	0	-	-
09Kh14N16B	0,07-0,12	max 0,6	1,0-2,0	13,0-15,0	14,0-17,0	-	-	-	-	0,9-1,3	-	Basic metal	0,020	0,020	-	0	0
17Kh18N9	0,13-0,21	max 0,8	max 2,0	17,0-19,0	8,0-10,0	-	-	-	-	-	-	Basic metal	0,020	0,020	0	-	-
08Kh18N10T	max 0,08	max 0,8	max 1,5	17,0-19,0	10,0-11,0	5C-0,6	N 0,05	-	-	-	-	Basic metal	0,020	0,020	0	0	-
08Kh18N10	max 0,08	max 0,8	max 2,0	17,0-19,0	9,0-11,0	-	-	-	-	-	-	Basic metal	0,020	0,020	0	0	-

БЕСШОВНЫЕ ТРУБЫ ИЗ КОРРОЗИОННОСТОЙКОЙ СТАЛИ (НЕРЖАВЕЮЩИЕ ТРУБЫ) (ПРОДОЛЖЕНИЕ)

Steel grade (alloy)	Mass fraction of elements, %														Groups*		
	C	Si	Mn	Cr	Ni	Ti	Al	W	Mo	Nb	V	Fe	S	P	I	II	III
													max				
Steels																	
07Kh-15N4M2T-PT	0.05-0.1	max 0.60	0.2-0.7	14.0-16.0	3.5-4.5	0.15-1.35	0.2+Cu 0.2	-	1.5-2.0	-	-	Basic metal	0.02	0.02			
06Kh18N11	max 0.03	max 0.4	max 0.4	17.0-19.0	11.5-13.0	max 0.005	-	-	-	-	1.4-1.7	Basic metal	0.020	0.020	0	-	-
Alloys																	
KhN35VT	max 0.12	max 0.6	1.0-2.0	14.0-16.0	34.0- 38.0	1.1-1.5	-	2.8-3.5	-	-	-	Basic metal	0.020	0.030	-	-	0
20Kh23N18	max 0.20	max 1.0	max 2.0	22.0-25.0	17.0-20.0	-	-	-	-	-	-	Basic metal	0.020	0.035	-	0	0
KhN70Yu	max 1.0	max 0.8	max 0.3	26.0-29.0	Basic metal	-	2.80- 3.50	-	-	-	-	max 1.0	0.012	0.015	-	0	0
Kh70MFV	max 0.02	max 0.10	max 0.5	max 0.3	Basic metal	max 1.5	-	0.10- 0.45	25.0- 27.0	-	1.4-1.7	max 0.8	0.012	0.015	0	-	-
KhN55VMTKYu	0.04-0.10	max 0.5	max 0.5	9.0-12.0	Basic metal	1.4-2.0	3.6-4.5	4.5-6.5	4.0-6.0	-	0.2-0.8	max 5.0	0.010	0.015	-	-	0
KhN65MVU	max 0.02	max 0.10	max 1.0	14.5-16.5	Basic metal	-	-	3.0-4.5	15.0- 17.0	-	-	max 0.5	0.012	0.015	0	-	-

* Groups I – corrosion-resistant, II – heat resistant, III – creep resistant.
Pipes can be made of steel grades not listed in the table within limits set out in GOST 5632-72 (12Kh18N10T, 10Kh7N13M2T, 4S33-VN and others).

SEAMLESS PIPES FOR THE THERMAL POWER INDUSTRY (BOILER PIPES)

Steel grade	Mass fraction of elements, %										
	C	Si	Mn	Cr	Ni	Mo	V	Other			
									max		
TU 14-3P-55-2001											
20	0.17-0.24	0.17-0.37	0.35-0.65	max 0.25	max 0.25	-	-	-	0.30	0.025	0.030
15GS	0.12-0.18	0.70-1.00	0.90-1.30	max 0.30	max 0.30	-	-	-	0.30	0.025	0.035
15KhM	0.10-0.15	0.17-0.37	0.40-0.70	0.80-1.10	max 0.25	0.40-0.55	-	-	0.20	0.025	0.035
12Kh1MF	0.10-0.15	0.17-0.37	0.40-0.70	0.90-1.20	max 0.25	0.25-0.3 5	0.15-0.30	-	0.20	0.025	0.025
15Kh1MF	0.10-0.15	0.17-0.37	0.40-0.70	1.10-1.40	max 0.25	0.90-1.10	0.20-0.35	-	0.25	0.025	0.025
10Kh9MFB-Sh	0.08-0.12	max 0.50	0.30-0.60	8.60-10.00	max 0.70	0.60-0.80	0.10-0.20	Nb 0.1-0.2	0.3	0.015	0.03
12Kh2MFSR	0.08-0.15	0/40-0.70	0.40-0.70	1.60-1.90	max 0.25	0.50-0.70	0.20-0.35	B 0.002-0.005	0.25	0.025	0.025
12Kh11V2MF	0.09-0.14	max 0.50	0.50-0.80	10.0-12.0	max 0.60	0.60-0.90	0.15-0.30	W 1.17-2.20	0.30	0.025	0.025
12Kh18Ni2T	max 0.12	max 0.80	1.00-2.00	17.0-19.0	11.0-13.0	-	-	(C-0.02)x5 max 0.70	0.30	0.020	0.035
10Kh13G12BS2N2D2	0.06-0.10	1.80-2.20	12.00-13.50	11.50-13.00	1.80-2.50	-	-	Nb 0.6-1.0	2.0-2.5	0.020	0.030
DIN 17175, EN 10216-2											
St 3 5.8	0.17	0.10-0.3 5	0.40-0.80	-	-	-	-	-	-	0.04	0.04
St 45.8	0.21	0.10-0.35	0.40-0.80	-	-	-	-	-	-	0.04	0.04
17MP4	0.14-0.20	0.20-0.40	0.90-1.20	0.3	-	-	-	-	-	0.04	0.04
19MP5	0.17-0.22	0.30-0.60	1.00-1.30	0.3	-	-	-	-	-	0.04	0.04
15Mo3	0.12-0.20	0.12-0.3 5	0.40-0.80	-	-	0.25-0.3 5	-	-	-	0.035	0.035
13CrMo44	0.10-0.18	0.10-0.35	0.40-0.70	0.70-1.10	-	0.45-0.65	-	-	-	0.035	0.035
ASTM A106/A106M											
Grade A	0.25	0.10	0.27-0.93	0.40	0.40	0.15	0.08	-	0.40	0.048	0.058
Grade B	0.30	0.10	0.29-1.06	0.40	0.40	0.15	0.08	-	0.40	0.048	0.058
Grade C	0.35	0.10	0.29-1.06	0.40	0.40	0.15	0.08	-	0.40	0.048	0.058

CONTACTS



KEY
CONTACTS



SALES
OFFICE



CONTACTS
OF PLANTS



ONLINE PIPE
STORE



FOR SUPPLIERS



DEALERS

PRODUCT CATALOG, TMK GROUP



CATALOGS

* API* – Effective March 17, 2022, the API Monogram/APIQR Program 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 held API license continuously for over 25 years. They have vast experience in manufacturing pipes in accordance with API standards for the clients worldwide. Since 2003, TMK facilities have produced more than 3 million tons of casing, tubing, drill pipe and line pipe in accordance with API Standards and marked them with the API monogram.

The quality and reliability of TMK’s products are confirmed by many years of supply experience.

Today, despite the restrictions on applying the API monogram, TMK facilities still have the right to declare that their products comply with API standards or specifications, provided that they actually comply with the requirements of the API standard or specification. As previously, the TMK facilities guarantee full compliance with the requirements of API Standards and the quality of supplied products.

In order to provide additional guarantees to our customers, in the summer of 2022 TMK facilities were inspected by AJA Registrars CIS ltd. According to the audit results, it was confirmed that TMK facilities comply with the requirements of API Spec. 5CT, API Spec. 5L, API Spec. 5DP and API Spec. Q1.

During the production of orders, an independent third-party inspection may be invited to ensure that all products are manufactured in strict compliance with API standards and customer specifications. The use of third-party testing laboratories may also be agreed upon.

