

# TECHNICAL CATALOG 2017



CHELPIPE  
GROUP



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GROUP

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# ABOUT COMPANY

Chelpipe is a Russian steel industry group and one of the nation's largest pipe manufacturers with an aggregate market share of around 20 %. Chelpipe Group unites steel and iron plants and companies: Chelyabinsk Pipe Rolling Plant, Pervouralsk New Pipe Plant, a chain of warehouses selling tubulars in the regions, META scrap metal collection and processing company; transmission pipeline equipment companies COT, ETERNO, MSA (Czech Republic); and an oil service division represented by Rimera.

Chelpipe has capacities for producing welded and seamless pipes of the widest size range and an extensive network of warehouses. The group is an effective and versatile player in the tubular goods market of Russia and CIS nations and specializes in producing tubular goods for all major sectors of the economy: oil and gas, energy, mechanical engineering, and construction industries, agriculture, chemical industry, healthcare, and others.

Major investment projects that are rightfully considered metals industry breakthroughs—the Vysota 239 shop producing large-diameter pipes, the Iron Ozone 32 electric arc furnace facility, and the Finishing Center for Oil Country Tubular Goods—gave rise to White Metallurgy – a new industrial production standard both in Russia and worldwide. It is based on a unique production system and corporate culture. White Metallurgy has now become a competitive advantage of the company. Its principles are not only implemented at new shops but are also consistently expanded to include all production facilities and plants of the group.

Over 70% existing pipelines in Russia and CIS nations were built using pipes made by Chelpipe. Infrastructure projects of recent years implemented with the group's involvement include: the Power of Siberia, South Corridor, Bovanenkovo – Ukhta, Beineu – Bozoi – Shymkent, and Central Asia – China gas pipelines; the Zapolyarye – Purpe, Purpe – Samotlor, and Kuyumba – Tayshet oil pipelines; the V. Filanovsky oil, gas, condensate field; the product pipeline connecting Purovsk Condensate Refinery and Tobolsk-Neftekhim; and the gas gathering network of the Yamal LNG project. In recent years, pipes made by Chelpipe were used in construction of such sports venues as the Olympic Speed Skating Center in Sochi, the Spartak stadium in Moscow and Kazan-Arena stadium in Tatarstan. Football stadiums are under construction in Samara and Saransk as part of preparations for the 2018 FIFA World Cup. Chelpipe Group supplies pipes for major energy projects such as Long Phu 1 Thermal Power Plant (Vietnam), thermal power plants in Kaliningrad and Vietnamese; Rostov, Belarusian, and Tianwan nuclear power plants.

# INTEGRATED QUALITY MANAGEMENT SYSTEM IN PLACEAT CHELYABINSK PIPE ROLLING PLANT

Chelpipe is pursuing a policy aimed at making competitive products that meet the requirements of consumers in the Russian and international markets for tubular goods, with a focus on continual improvement, raising the quality of products, and meeting the growing needs and expectations of our buyers.

Chelpipe has developed and implemented an integrated quality management system compliant with ISO 9001:2008; API Spec Q1, 9th ed. (API Spec 5L 45th ed., API Spec 5CT 9th ed.); PED 97/23/EC; Gazprom Corporate Standard STO 9001-2012; ISO 14001:2004; OHSAS 18001:2007 and covers:

- **design, engineering, manufacture, and delivery of products:**

- seamless hot-rolled pipes compliant with API Specification 5L product specification levels PSL 1 and PSL 2, ASTM, DIN, EN standards for pipelines, including transmission pipelines;
- seamless cold-worked pipes compliant with ASTM, DIN, EN standards for pipelines, including transmission pipelines;
- Welded straight-seam pipes with plain ends produced by submerged arc welding, made to API Specification 5L product specification levels PSL 1 and PSL 2, ASTM, DIN, EN, DNV standards, with outer and inner anti-corrosion coatings, with internal flow coatings, with thermal insulation coatings, and without coatings (including pipes for transmission pipelines);
- casing pipes and tubing with threaded ends and collars compliant with API Specification 5CT;
- connection collars made to API Specification 5CT;
- welding flux compliant with EN standards.

- **environmental protection, occupational safety, industrial safety, and information security.**

The goals and objectives outlined as part of the Integrated Management System are prioritized by company management and staff with a view to ensuring consistently high quality of products, processes, and deliverables.

The Integrated Management System builds upon the quality management system first introduced in 1994 and approved by the American Petroleum Institute (API). For almost two decades now, Chelpipe has been consistently proving through audits its capability to meet customer needs, all the while retaining API licenses to fill orders of critical importance by supplying goods bearing the API monogram. Chelpipe is also licensed to supply goods bearing the CE monogram under European standards. This is confirmed by valid EN certificates. The company's REACH registration attests to the environmental friendliness of its products.

# INTEGRATED QUALITY MANAGEMENT SYSTEM IN PLACE AT PERVOURALSK NEW PIPE PLANT

True to the mission of Chelpipe—“In sharing the ideas of White Metallurgy – a philosophy of transformation, we bring success and prosperity to our clients and society”—Pervouralsk New Pipe Plant management demonstrate their commitment to quality and determination to spearhead the process of continual improvement of the company's operations. The key aspects of Pervouralsk New Pipe Plant operations include increasing the customer focus of the company, developing the White Metallurgy production system, promoting personnel engagement in the process of achieving the company's goals, holding all workers personally accountable for product quality, improving the level of satisfaction with the company's performance with all stakeholders, and developing long-term win-win relations with suppliers and partners.

Based on the environmental management system, Pervouralsk New Pipe Plant management are working to create conditions favoring continual improvement of the environmental situation at operational sites and prevention of environmental pollution.

Certificate No.	Conforms to requirements	Certification system	Certification / licensing authority
<b>Licenses to Make Products Bearing the API Monogram</b>			
No. 5L-0287	API Spec Q1 and API Spec 5L	API	American Petroleum Institute (API, USA)
No. 5CT- 0380	API Spec Q1 and API Spec 5CT		
<b>Quality Management System Certificates</b>			
No. 01 100 1334977	ISO 9001:2008	TUV	TUV Rheinland Cert GmbH (Germany)
<b>Environmental Management System Certificates</b>			
No. 01 104 1334977	ISO 14001:2004	TUV CERT	TUV Rheinland Cert GmbH (Germany)
<b>Certificates of Product Conformity</b>			
No. DGR-0036-QS-W 447/2010/MUC	EU Directive 97/23/EC and AD-2000-Merkblatt W0	TUV CERT	TUV SUD Industrie Service GmbH (Germany)
No. 0036-CPR-M-035-2010	Construction Products Regulation (EU) 305/2011	TUV CERT	TUV SUD Industrie Service GmbH (Germany)

\* Chelpipe can supply pipes made to special (exclusive) customer requirements (technical assignment, technical specifications, etc.) on condition that the customer provides the initial technical requirements for pipes (pipe parameters).

## Primary Certificates and Licenses for Management Systems and Production

Certificate No.	Conforms to requirements	Certification system	Certification / licensing authority
<b>LICENSES TO MAKE PRODUCTS BEARING THE API MONOGRAM</b>			
№5CT- 0288	API Spec Q1 9th ed. and API Spec 5L 45th ed.	API	American Petroleum Institute (API, USA)
No. 5CT-0571	API Spec Q1 9th ed. AND API Spec 5CT 9th ed.	API	
<b>QUALITY MANAGEMENT SYSTEM CERTIFICATES</b>			
QEC27697	ISO 9001:2008	SAI Global	SAI Global (Australia)
14.1214.026	Gazprom Corporate Standard STO 9001-2012	Russian Register certification system	Russian Register Certification Association (St. Petersburg)
<b>ENVIRONMENTAL MANAGEMENT SYSTEM CERTIFICATES</b>			
CEM 21410	ISO 14001:2004	SAI Global	SAI Global (Australia)
<b>OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM CERTIFICATE</b>			
OHS21249	OHSAS 18001:2007	SAI Global	SAI Global (Australia)
<b>CERTIFICATES OF PRODUCT CONFORMITY</b>			
No. 01 202 CZ/Q - 130157	Compliant with EU Directive 97/23/EC (PED 97/23/EC, AD2000/W0 и ASTM/ASME, EN 764-5)  For pipes per EN 10216-1,2,3,5, EN 10297, EN 10305-1, EN 10217-1, EN 3183, ASME SA 213/213M, ASME SA 312/312M, ASTM A213/213M, ASTM A312/312M, ASME/ASTM A-106, ASME/ASTM A-53	TUV CERT	Certification authority TÜV Rheinland  Certificate applies to seamless and Welded pipes.
No. 0035-CPR-A180	Compliant with Regulation (EU) 305/2011 (EN 10210-1:2006, EN 10219-1:2006)	TUV CERT	TUV Rheinland LGA Bautechnik GmbH, Construction Products Certification Department. Certificate applies to seamless and Welded pipes
No. 0035-CPR-C655	Compliant with Regulation (EU) 305/2011: System 2+	TUV CERT	TÜV Rhineland Industries Service GmbH Notified Body for construction products (NB 0035). Certificate applies to flux
PP005557of	Certification of pipe production compliant with DNV-OS-F101 for pipes with a diameter of 1,020 mm and wall thickness of 21.3 mm	DNV	Det Norske VERITAS (Norway) Certificate applies to Welded pipes
PP071620-01	Certification of pipe production compliant with DNV-OS-F101 for pipes with a diameter of 1,153 mm and wall thickness of 34.6 mm (List of Dillinger Hutted, Germany)	DNV	Det Norske VERITAS (Norway) Certificate applies to Welded pipes
PP071620-02	Certification of pipe production compliant with DNV-OS-F101 for pipes with a diameter of 1,153 mm and wall thickness of 34.6 mm (List of MMK, Russia)	DNV	Det Norske VERITAS (Norway) Certificate applies to Welded pipes
PP043827-30	Certification of pipe production compliant with DNV-OS-F101 for pipes with a diameter of 812.4 mm and wall thickness of 39.0 mm (List of MMK, Russia, Salzgitte)	DNV	Det Norske VERITAS (Norway) Certificate applies to Welded pipes
DNVGL-PP144563-SOC-01 revision 01	Certification of pipe production compliant with DNV for pipes with a diameter of 1,153 mm and wall thickness of 41.0 mm	DNV	Det Norske Veritas (Norway) Certificate applies to Welded pipes
DNVGL-PP144563-SOC-01 revision 02	Certification of pipe production compliant with DNV for pipes with a diameter of 1,153 mm and wall thickness of 41.0 mm	DNV	Det Norske Veritas (Norway) Certificate applies to Welded pipes

# PRODUCTION OF SUBMERGED ARC-WELDED LONGITUDINAL (SAWL)

## APPLICATIONS

Submerged Arc-Welded Longitudinal from carbon and low-alloy steel grades are intended for construction of gas and oil transmission pipelines and flowlines in any climatic regions and weather conditions, including in Extreme North areas and at sites with a high seismic rating, in areas of active tectonic faults, subsea portions of pipelines, subsea offshore pipelines, pipelines with high corrosion resistance, pipes for construction applications, pipes for building pipelines intended for various purposes, including water mains, heat mains, low-pressure gas lines, and municipal natural gas and high-pressure liquefied natural gas supply systems.

## HIGHLIGHTS

Chelyabinsk Pipe Rolling Plant has been producing and supplying Submerged Arc-Welded Longitudinal (LDP) since 1956. Its production sites—Vysota 239 LSAW workshop and LSAW workshop No. 6—currently use the submerged arc welding process to manufacture straight-seam (single- and two-seam) pipes 20" - 56" (508-1422 mm) in diameter, with a wall thickness of 0.281"-1.89" (7 - 48 mm) of strength grades Gr.B (L245), X42-X80 (L290-L555) per API 5L classification. The customer may request to have pipes coated with: an outer anti-corrosion coating (epoxy, polyethylene, or polypropylene), internal anti-corrosion coating or flow coating, as well as thermal insulation with polyurethane foam in a protective shell.

**PRODUCERS:** Chelyabinsk Pipe Rolling Plant



## MECHANICAL PROPERTIES OF BASE METAL AND WELDED JOINT OF PIPES (PER PRIMARY REGULATIONS)

Technical Regulation	Steel grade / strength grade	Ultimate breaking strength, MPa, not less than or within the limits of	Yield strength, MPa, not less than or within the limits of	Percent elongation (%), not less than	Impact energy, J (at testing temperature, °C), not less than		Percentage of the ductile component in the fracture section of impact test samples, % (at testing temperature, °C), not less than	Welded joint bend angle, degrees, not less than
					base metal	welded joint metal		
					KCV	KCV		
EN ISO 3183 PSL2	L245 or B	415-655	245-450	Design value	27 - 54 J depending on diameter at 0°C*	27 J at 0°C* (for D<56"); 40 J at 0°C* (for D=56");	'Average for both specimens - not less than 85 at 0°C*	180
	L290 or X42	415-655	290-495					
Specification ANSI/API spec 5L PSL2	L320 or X46	435-655	320-525	Design value	27 - 54 J depending on diameter at 0°C*	27 J at 0°C* (for D<56"); 40 J at 0°C* (for D=56");	'Average for both specimens - not less than 85 at 0°C*	180
	L360 or X52	460-760	360-530					
	L415 or X60	520-760	415-565					
	L450 or X65	535-760	450-600					
	L485 or X70	570-760	485-635					
	L555 or X80	625-825	555-705					
EN 10219-1	S235JRH	360-510	235	24	KV (+20°) not less than 27 J			
	S275J0H	410-560	275	20	KV (0°) not less than 27 J			
					KV (-20°) not less than 27 J			
	S275NH	370-510	275	24	KV (-20°) not less than 40 J			
	S275MH	360-510	275	24	KV (-20°) not less than 40 J			
	S275NLH	370-510	275	24	KV (-50°) not less than 27 J			
	S275MLH	360-510	275	24	KV (-50°) not less than 27 J			
	S355NH	470-630	355	22	KV (-20°) not less than 40 J			
	S355J0H	470-630	355	20	KV (0°) not less than 27 J			
	S355K2H	470-630	355	20	KV (-20°) not less than 27 J			
	S355J2H	470-630	355	20	KV (-20°) not less than 27 J			
	S355MH	450-610	355	22	KV (-20°) not less than 27 J			
	S355NLH	450-510	355	22	KV (-50°) not less than 27 J			
	S355MLH	450-610	355	22	KV (-50°) not less than 27 J			
	S420MH	500-660	420	19	KV (-20°) not less than 27 J			
	S420MLH	500-660	420	19	KV (-50°) not less than 27 J			
	S460NH	540-720	460	17	KV (-20°) not less than 27 J			

	S460MH	530-720	460	17	KV (-20°) not less than 27 J			
	S460NLH	540-720	460	17	KV (-50°) not less than 27 J			
	S460MLH	530-720	460	17	KV (-50°) not less than 27 J			
EN 10217-1	P195TR1	320-440	195	27				
	P195TR2	320-440	195	27	Impact energy, KV at T=0, not less than 40 J			
	P235TR1	360-500	235	25				
	P235TR2	360-500	235	25	Impact energy, KV at T=0, not less than 40			
	P265TR1	410-570	265	21				
	P265TR2	410-570	265	21	Impact energy, KV at T=0, not less than 40 J			

Notes: \* unless agreed otherwise

# PRODUCTION OF SINGLE-SEAM WELDED LARGE-DIAMETER PIPES

**PRODUCERS:** Chelyabinsk Pipe Rolling Plant (LSAW workshop No. 6, Vysota 239 LSAW workshop)

SAWL with a single longitudinal seam are produced using Pipe Electric Welding Machines 530 - 820 and 508 - 1422. Their primary technical features are shown in the table:

	SAWL UOE 530 – 820 MM	SAWL JCO 508 – 1422 MM
Shop	LSAW workshop No. 6	Vysota 239 LSAW workshop
Pipe length	ft. 35 - 40 (10.5 - 12.0 m)	Option I ft. 35 - 40 (10.5 - 12.0 m) Option II ft. 55-61 (16.5 - 18.3 m)
Diameter, mm (inches)	530-820 (20.886-32.283)	508 - 1422 (20 - 56)
Pipe wall thickness, mm (inches)	7-12 (0.281- 0.469)	7-48 (0.281-1.890)
Pipe strength grade	up to X70	up to X80

## HIGHLIGHTS

Plant shops can make cold-resistant pipes and pipes with improved performance characteristics from high-strength steel grades for use in construction of transmission pipelines in any climatic regions, including the Extreme North and offshore.

The characteristics of pipes made in the Vysota 239 LSAW workshop and valued by customers are consistently high strength and ductile properties of base metal and welded joint; improved geometric dimensions achieved using an array of modern pipe forming presses; capability to make

pipes up to 18.3 m long; capability to apply outside and inside coatings.

These characteristics were achieved owing to integrated highly-automated processes: two-sided shot-blasting of the sheet surface, edge crimping and step-by-step forming, and verification of geometric dimensions of pipes using automated laser measuring installations.

All of this forms the technological basis for developing the White Metallurgy ideology and successfully implementing it at Chelpipe Group.

## TABLE OF STANDARDS FOR SINGLE-SEAM SUBMERGED ARC-WELDED LONGITUDINAL

Technical Regulations	Pipe Dimensions		Steel grade / strength grade
	Outside diameter, mm (inches)	Wall thickness, mm (inches)	
EN ISO 3183 Petroleum and natural gas industries - Steel pipe for pipeline transportation systems. General specifications	508-1422	7-48	L245 or B, L290 or X42, L320 or X46, L360 or X52, L390 or X56, L415 or X60, L450 or X65, L485 or X70, L555 or X80
Specification ANSI/API spec 5L	508-1422 (20-56)	7-48 (0.281-1.89)	L245 or B, L290 or X42, L320 or X46, L360 or X52, L390 or X56, L415 or X60, L450 or X65, L485 or X70, L555 or X80
EN 10219-1 Cold formed welded structural sections of non-alloy and fine grain steels	508-1422	7-48	S235JRH, S275J0H, S275J2H, S275NH, S275MH, S275NLH, S275MLH, S355NH, S355J0H, S355K2H, S355J2H, S355MH, S355NLH, S355MLH, S420MH, S420MLH, S460NH, S460MH, S460NLH, 460MLH
EN 10217-1 Welded steel tubes for pressure purposes	508-1422	7-48	P195TR1, P195TR2, P235TR1, P235TR2, P265TR1, P265TR2

\* Technical capabilities are available to manufacture pipes under Standard CSA Z245.1-14, with diameters from 508 to 1422 mm, wall thickness 7-48 mm Grade 241-Grade 550, Cat. I and Cat. II.

## SINGLE-SEAM LDP SIZES

### SIZES OF SINGLE-SEAM SAWL COMPLIANT WITH API 5L

Outside diameter		Theoretical mass of 1 m of pipe with the given wall thickness (reference)																
		mm	7,137	7,925	8,738	9,525	10,31	11,13	11,91	12,7	14,27	15,09	15,88	17,48	19,05	20,62	22,23	
			0,281	0,312	0,344	0,375	0,406	0,438	0,469	0,5	0,562	0,594	0,625	0,688	0,75	0,812	0,875	0,938
mm	(inches)		9/32	5/16	11/32	3/8	13/32	7/16	15/32	1/2	9/16	19/32	5/8	11/16	3/4	13/16	7/8	15/16
508	20	X	88,2	97,7	107,6	117,1	126,5	136,4	145,7	155,1	173,7	183,4	192,7	211,4	229,7	247,8	266,3	284,5
559	22	X	97,1	107,7	118,5	129,0	139,5	150,3	160,6	171,0	191,6	202,3	212,6	233,3	253,6	273,7	294,1	314,4
610	24	X	106,0	117,6	129,5	140,9	152,4	164,3	175,5	186,9	209,5	221,2	232,5	255,2	277,4	299,5	322,0	344,2
660	26	X	115,0	127,5	140,4	152,9	165,3	178,2	190,5	202,8	227,4	240,1	252,4	277,1	301,3	325,3	349,8	374,1
711	28	X		137,4	151,4	164,8	178,2	192,1	205,4	218,8	245,2	259,0	272,3	299,0	325,2	351,2	377,7	403,9
762	30	X		147,4	162,3	176,7	191,1	206,1	220,3	234,7	263,1	277,9	292,2	320,9	349,0	377,0	405,5	433,8
813	32	X		157,3	173,3	188,7	204,0	220,0	235,2	250,6	281,0	296,8	312,1	342,8	372,9	402,8	433,4	463,6
864	34	X			184,2	200,6	216,9	234,0	250,1	266,5	298,9	315,7	332,0	364,7	396,7	428,6	461,2	493,5
914	36	X				212,5	229,9	247,9	265,1	282,4	316,8	334,7	351,9	386,6	420,6	454,5	489,1	523,3
965	38	X					242,8	261,9	280,0	298,3	334,6	353,6	371,8	408,5	444,5	480,3	516,9	553,2
1016	40	X					255,7	275,8	294,9	314,2	352,5	372,5	391,6	430,4	468,3	506,1	544,8	583,0
1067	42	X					268,7	289,8	309,9	330,2	370,5	391,4	411,6	452,4	492,3	532,1	572,7	613,0
1219	48	X							354,5	377,8	423,9	448,0	471,1	517,9	563,7	609,4	656,1	702,3
1422	56	X									495,4	523,5	550,6	605,4	659,1	712,6	767,3	821,6

■ – to be agree separately

PIPELINE TRANSPORT

PRODUCTION OF TWO-SEAM SAWL

24,6	25,4	27,0	28,6	30,2	31,8	32,5	33,3	34,1	34,9	35,7	36,5	38,1	39,7	40,5	44,5	45,2	46,0	48,0
0,969	1	1,062	1,125	1,188	1,25	1,281	1,312	1,343	1,375	1,406	1,438	1,5	1,562	1,594	1,75	1,781	1,812	1,89
94/97	1	1 1/16	1 1/8	1 3/16	1 1/4	1 9/32	1 5/16	112/35	1 3/8	113/32	1 7/16	1 1/2	1 9/16	119/32	1 3/4	125/32	113/16	1 8/9
293,4																		
324,2	334,1	353,7	373,7															
355,0	365,9	387,5	409,5	431,2	452,4													
385,8	397,7	421,3	445,3	469,0	492,2	503,8												
416,7	429,6	455,1	481,1	506,8	532,0	544,6												
447,5	461,4	488,9	516,9	544,6	571,8	585,3												
478,3	493,2	522,6	552,7	582,5	611,5	626,1	640,5	655,0	669,9	684,3	699,3	727,9	756,3	771,1				
509,2	525,0	556,4	588,5	620,3	651,3	666,9	682,2	697,7	713,6	729,0	745,0	775,6	806,0	821,9				
540,0	556,8	590,2	624,3	658,1	691,1	707,6	724,0	740,5	757,3	773,8	790,8	823,3	855,7	872,6				
570,8	588,7	624,0	660,1	695,9	730,8	748,4	765,7	783,2	801,1	818,5	836,6	871,1	905,4	923,3				
601,7	620,5	657,8	695,9	733,7	770,6	789,2	807,4	825,9	844,8	863,3	882,3	918,8	955,1	974,0				
632,6	652,4	691,7	731,9	771,6	810,6	830,1	849,3	868,8	888,8	908,2	928,3	966,7	1005,0	1025,0	1120,9	1139,9		
724,9	747,6	792,8	839,0	884,8	929,6	952,1	974,2	996,7	1019,6	1042,0	1065,2	1109,5	1153,7	1176,7	1287,5	1309,5	1331,2	
848,1	874,8	927,8	982,1	1035,8	1088,5	1115,0	1141,0	1167,4	1194,5	1220,8	1248,1	1300,2	1352,3	1379,4	1510,0	1535,9	1561,5	1626,7

# PRODUCTION OF TWO-SEAM WELDED LARGE-DIAMETER PIPES

**PRODUCERS:** Chelyabinsk Pipe Rolling Plant (LSAW workshop No. 6)

SAWL with two longitudinal seams are produced using Pipe Electric Welding Machine 1020 - 1220. Their primary technical features are shown in the table:

	SAWL UOE 1020 – 1220 MM
Shop	LSAW workshop No. 6
Pipe length	ft. 35 - 39 (10.5 - 11.8 m)
Diameter, mm (inches)	1016-1219 (40-48)
Pipe wall thickness, mm (inches)	10.3 -22.0 (0.406 - 0.875)
Pipe strength grade	up to X70

## HIGHLIGHTS

Two-seam pipes are made from narrow sheets that are rolled with a substantial reduction in variance the thickness over the sheet area and primarily along its longitudinal edges, and also with a substantial reduction in variance of mechanical properties over the sheet area. This ensures greater reliability of pipes in the heat-affected zone.

Semi-cylindrical pipe stock is formed using hydraulic presses using the classical U – O process. The process of forming semi-cylinders in the final forming press ensures the most efficient stress pattern in the pipe stock, which allows

obtaining a theoretically correct shape of the pipe stock to ensure high-quality assembly in the process seam welding machines and, ultimately, a finished pipe with excellent geometric parameters.

All of the above-mentioned two-seam pipe production capabilities in combination with a flexible pricing policy enable Chelpipe to factor in all of the customer's needs.

## TABLE OF STANDARDS FOR TWO-SEAM SUBMERGED ARC-WELDED LONGITUDINAL

Technical Regulations	Pipe Dimensions		Steel grade / strength grade
	Outside diameter, mm (inches)	Wall thickness, mm (inches)	
EN 10217-1 Welded steel tubes for pressure purposes	1016, 1067, 1219	10.3 - 22.2	L245 or B, L290 or X42, L320 or X46, L360 or X52, L390 or X56, L415 or X60, L450 or X65, L485 or X70
Specification ANSI/API spec 5L	1016, 1067, 1219 (40, 42, 48)	10.3 - 22.2 (0.406 - 0.875)	L245 or B, L290 or X42, L320 or X46, L360 or X52, L390 or X56, L415 or X60, L450 or X65, L485 or X70
EN 10219-1 Cold formed welded structural sections of non-alloy and fine grain steels	1016, 1067, 1219	10.3 - 22.2	S235JRH, S275J0H, S275J2H, S275NH, S275MH, S275NLH, S275MLH, S355NH, S355J0H, S355K2H, S355J2H, S355MH, S355NLH, S355MLH, S420MH, S420MLH, S460NH, S460MH, S460NLH, 460MLH

## TWO-SEAM SAWL SIZES

Sizes of two-seam SAWL compliant with API 5L

Outside diameter		Theoretical mass of 1 m of pipe with the given wall thickness (reference)											
		mm	10,3	11,1	11,9	12,7	14,3	15,1	15,9	17,5	19,1	20,6	22,2
			0,406	0,438	0,469	0,500	0,562	0,594	0,625	0,688	0,750	0,812	0,875
mm	(inches)		13/32	7/16	15/32	1/2	9/16	19/32	5/8	11/16	3/4	13/16	7/8
1016,0	40	X	255,7	275,8	294,9	314,2	352,5	372,5	391,6	430,4	468,3	506,1	544,8
1067,0	42	X	268,7	289,8	309,9	330,2	370,5	391,4	411,6	452,4	492,3	532,1	572,7
1219,0	48	X			354,5	377,8	423,9	448,0	471,1	517,9	563,7	609,4	656,1

# TUBING

Tubing serves to recover fluids (oil, gas, water) from pay zones penetrated by wells, inject water, compressed air (or gas) during oil and gas well operation and various routine well interventions or overhauls.

Tubing produced by Pervouralsk New Pipe Plant can be produced in the following configurations (or their combinations):

- standard;
- corrosion-resistant;
- cold-resistant;
- with externally upset ends;
- with color-coding of collars;
- for special applications.

Tubing made by Pervouralsk New Pipe Plant meets the requirements of ISO 9001, API Specification Q1, and API Spec 5B.

At the buyer's option, the outer and/or inner surface of tubing can be protected using any type of coating.

The buyer may request to have collars phosphated or zinc-coated. Threaded connections are made up with the use of a high-quality thread-sealing grease compliant with ISO 13678. Pin ends and free ends of collars are protected using thread-sealing grease (or, if requested by the customer, using preservation grease) and thread protection elements. At the buyer's option, tubing can also be supplied together with metal, polymer, or combination protective elements.

**Pipes are marked according to the requirements of applicable technical regulations in two ways:**

- by applying indelible paint and branding the outer surface;
- using an accompanying tag.

Pipes are packaged according to requirements of standards and technical specifications and the buyer's requirements.

Pipes are supplied in round, hexagonal, or rectangular bundles (as requested by the buyer) that are provided with appropriate below-hook devices or stirrups.

A bundle is tied using a steel strip, wire 6 mm in diameter (or a different diameter), or a plastic strip (depending on the buyer's requirements). At the buyer's option, bundles may also be packed in plastic or wooden pipe cradles.

Chelpipe offers integrated deliveries of tubular goods, including production and supply of adapters (from one type of thread to another and/or from one size/diameter to another) from Chelpipe threaded connections to those of virtually all existing international vendors, as well as union pipes, liners, and other accessories required for makeup and breakout and running of tubing (strings).



## PRODUCTS MADE TO API 5CT

Rows			Outside diameter D, mm	Nominal mass per pipe unit length, (kg/m)		Wall thickness, t, mm	End type						Manufac- turer	
1	2			NU (kg/m)	EU (kg/m)		J55	N80 Type 1	N80 Type Q	R95	L80 Type 1	P110		
	NU	EU												
2-3/8	4,00	-	60,32	5,95	-	4,24	P, N	P, N	N	N	N	-	PNTZ	
	4,60	4,70		6,85	6,99		4,83	P, N, U	P, N	N, U	N, U	N, U		N, U
2-7/8	6,40	6,50	73,02	9,52	9,67	5,51	P, N, U	P, N	N, U	N, U	N, U	N, U		
	7,80	7,90		11,61	11,76		7,01	-	N	N, U	N	N		N, U
	8,60	8,70		12,80	12,95		7,82	-	N	N	N	N		N
3-1/2	7,70	-	88,90	11,46	-	5,49	P, N	P, N	N	N	N	-		
	9,20	9,30		13,69	13,84		6,45	P, N, U	P, N	N, U	N, U	N, U		N, U
	10,20	-		15,18	-		7,34	N	N	N	N	N		-
4-1/2	12,60	12,75	114,30	18,75	-	6,88	N	N	N	N	N	-		

P = plain ends; N = tubing and tube coupling with NU connection type (with nonupset ends);

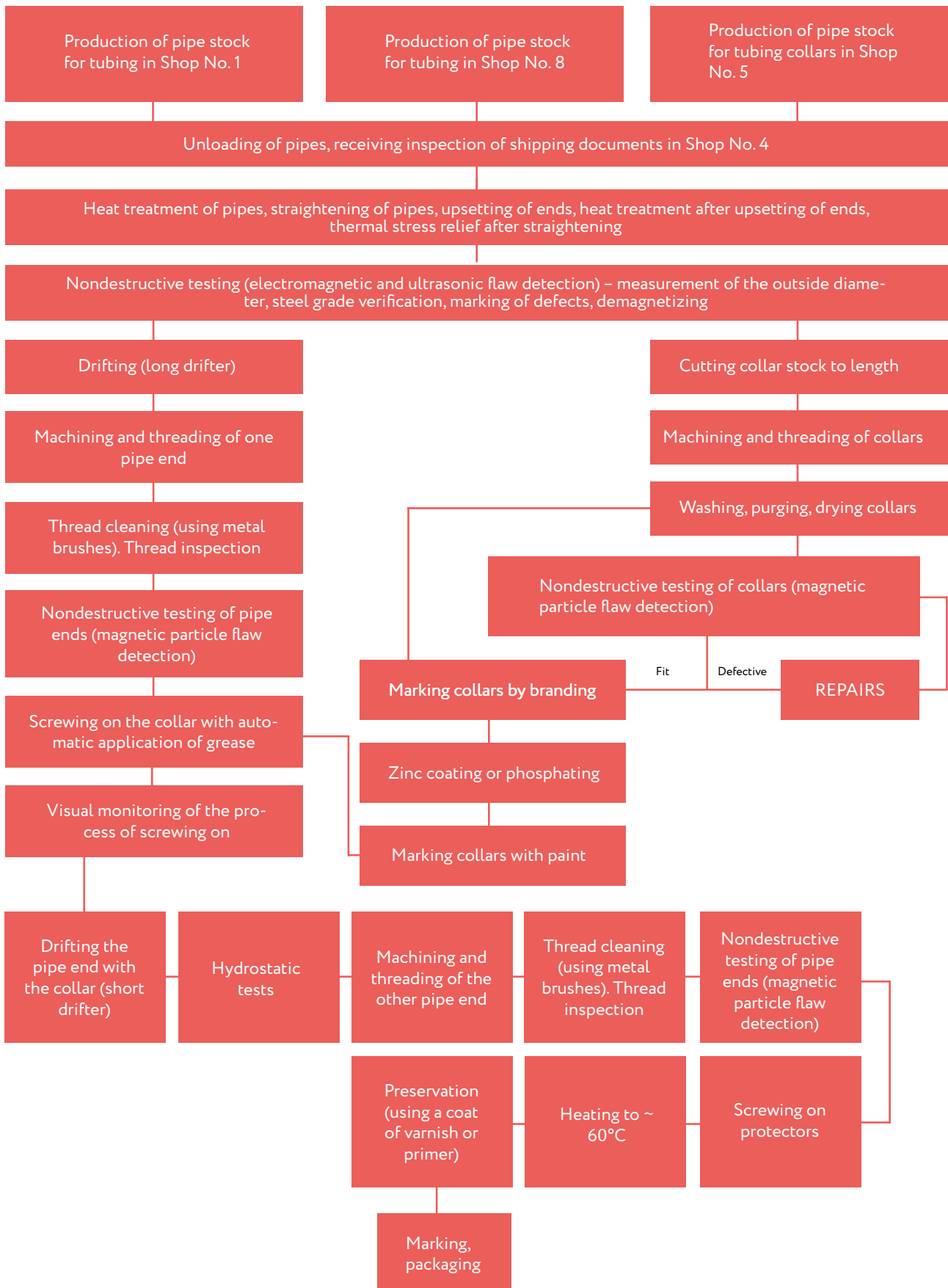
U = tubing and tube coupling with EU connection type (with externally upset ends).

Pipe length R2 = 8.53–10.36 m

## MECHANICAL PROPERTIES OF TUBING

Limits of mechanical properties for strength grades	Ultimate breaking strength, MPa, not less than	Yield strength (MPa)		Percent elonga- tion (%)
		not less than	not more than	
API Spec 5CT				
J55	517	379	552	*
L80 Type 1	655	552	655	*
N80 Type 1	689	552	758	*
N80 Type Q	689	552	758	*
R95	724	656	768	*
P110	862	758	965	*

\* Calculated using the formula specified in API Spec 5CT.



## PIPES CAN BE MADE TO CUSTOMER SPECIFICATIONS, INCLUDING IN THE FOLLOWING SPECIAL CONFIGURATIONS:

### 1. For production or injection of corrosive gas and oil fluids.

Casing pipes, tubing, and rods are exposed to high degrees of corrosion in wells with a high water cut, in which the well-stream contains carbon dioxide and hydrogen sulfide. Under such conditions, the best scenario is to use seamless steel tubing made from economically-alloyed steels with chromium content. Field test results have demonstrated that such steel grades increase the corrosion resistance of tubing and casing pipes in corrosive CO<sub>2</sub> and H<sub>2</sub>S mediums of oil wells by at least 2-3 times.

High corrosivity of wellstream from oil and gas wells imposes heightened requirements for corrosion resistance of pipe metal. Reliable operation of tubing is particularly critical

in oil and gas wells with a high water cut and exposure to hydrogen sulfide and carbon dioxide. This is associated with the risk of corrosive sulfide stress cracking – brittle failure of pipe metal exposed to hydrogen sulfide with water under tensile stress or localized CO<sub>2</sub> corrosion creating corrosion holes along the length of the pipe body. Under such conditions, the best scenario is to use seamless steel tubing made from economically-alloyed steels with chromium content. Field test results have demonstrated that such steel grades increase the corrosion resistance of tubing in corrosive CO<sub>2</sub> and H<sub>2</sub>S mediums of oil wells by at least 2-3 times.

Pervouralsk New Pipe Plant has successfully mastered the production of tubing from economically-alloyed chromium-containing corrosion-resistant steel grades such as 1Cr, 3Cr, and 5Cr based on its proprietary OCTG pipe selection system, taking into account the following primary parameters:

- partial pressure of sour gases – hydrogen sulfide and carbon dioxide;
- operating conditions (method of production, temperature and pressure in the well, water cut, gas-oil ratio, application of reagents and inhibitors, presence of oxygen, asphalt, resin, and paraffin deposits, mechanical impurities, etc.);
- levels of acidity and ion composition of produced water.

#### Corrosion-resistant pipes undergo periodic corrosion tests:

- per NACE TM 0177 (Method "A", Method "C", Method "D");
- total corrosion in CO<sub>2</sub> and/or H<sub>2</sub>S mediums.

Pipes and collars can be made from special-purpose steel grades according to the Pipe Selection System depending on the operating conditions.

### 2. Tubing with the PREMIUM Connections

Chelpipe can supply tubing with Premium connections as an alternative to NEW VAM threaded connections.

Trade names of threaded connections made by Chelpipe:  
ChT-VT

Distinctive features: high-sealing (gas-tight) collar connection of tubing with a metal-to-metal seal, in which sealing is provided by radial and end sealing assemblies. The metal-to-metal seal of the threaded connection in combination with a tapered buttress thread ensures a high seal integrity of the connection and its ultimate joint strength.

In all combinations of ultimate stresses, the values of equivalent stresses in cross-sections of the threaded connection do not exceed the yield strength. The axial tensile strength of the connection is 100% of pipe body. The excess external and internal pressure strength of the connection is 100% of pipe body. The axial compressive strength of the connection is 50% of pipe body. The ultimate compressive axial stress was calculated based on the condition of ultimate yield of the pin end. The threaded connection maintains its gas-tightness under this stress.

# CASING PIPES

Casing pipes are designed for securing borehole walls during drilling, completion, and operation of wells, covering and isolating oil, gas, and water zones and interbeds, and less commonly for drilling, transmitting rotation to the drill bit, transporting liquid and gas, or lifting reservoir fluids (oil, gas, water) to the surface during development.

Casing pipes produced by Chelpipe plants can be produced in the following configurations (or their combinations):

- standard;
- cold-resistance;
- with increased operational reliability;
- high-strength;
- for special applications.

Casing pipes made by Chelpipe plants meet the requirements of ISO 9001, API Specification Q1, API Spec 5CT, and buyer specifications.

At the option of the buyer, the outer and/or inner surface of casing pipes (or collar threads) can be protected by any types of coatings that are applied onto seamless steel casing pipes (onto collar threads).

The buyer may request to have collars phosphated or zinc-coated. Threaded connections are made up with the use of a high-quality thread-sealing grease compliant with ISO 13678. Pin ends and free ends of collars are protected using thread-sealing grease (or, if requested by the customer, using preservation grease) and thread protection elements. At the buyer's option, casing pipes can also be supplied together with metal, polymer, or combination protective elements.

Pipes are marked according to the requirements of applicable technical regulations in two ways:

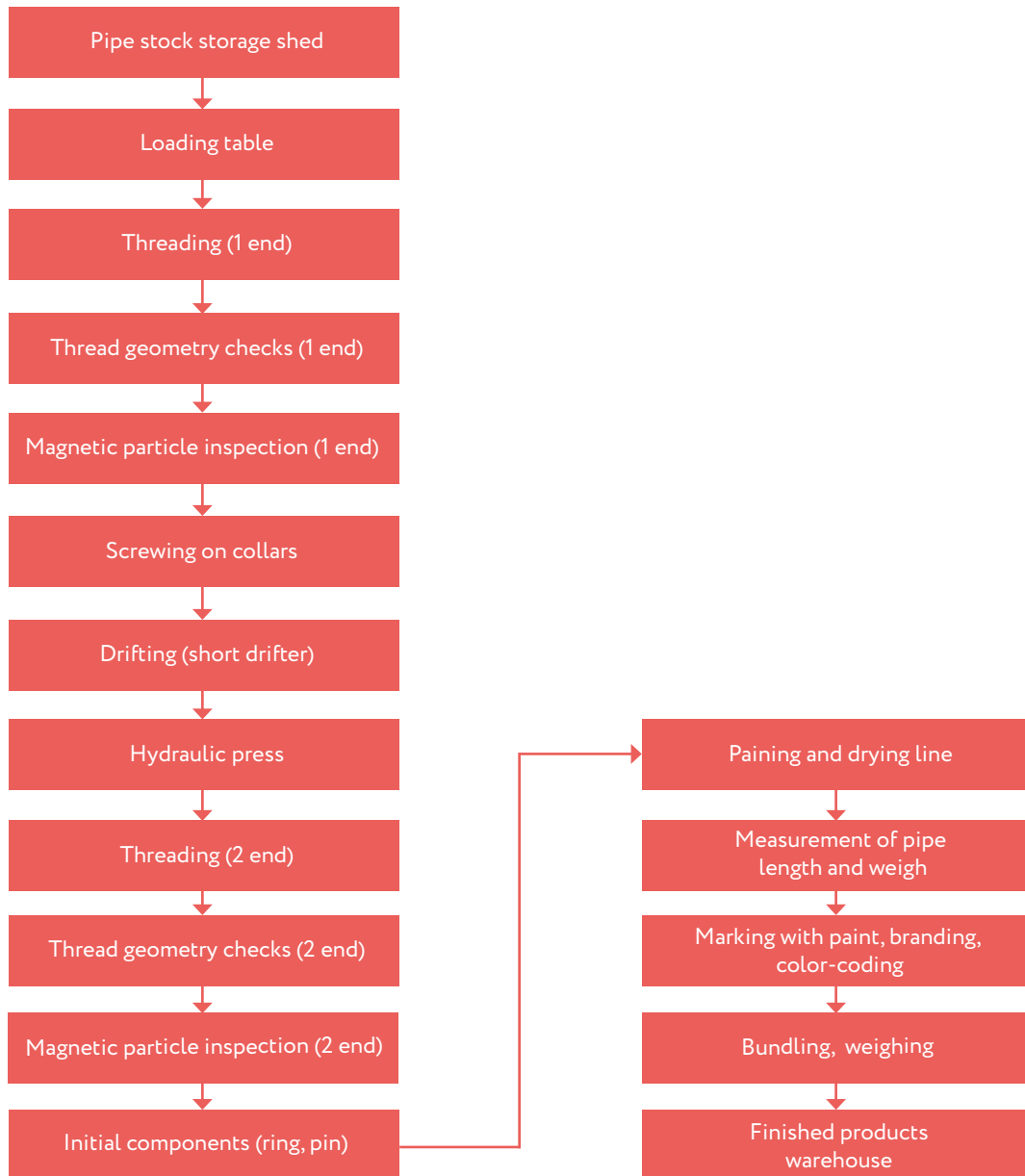
- by applying indelible paint and branding the outer surface;
- using an accompanying tag.

Pipes are packaged according to requirements of standards and technical specifications and the buyer's requirements.

Pipes are supplied in round, hexagonal, or rectangular bundles (as requested by the buyer) that are provided with appropriate below-hook devices or stirrups.

A bundle is tied using a steel strip or wire 6 mm in diameter (or a different diameter) (depending on the buyer's requirements). Chelpipe offers integrated deliveries of tubular goods, including production and supply of adapters (from one type of thread to another and/or from one size/diameter to another) from Chelpipe threaded connections to those of virtually all existing international vendors, as well as union pipes, liners, and other accessories required for makeup and breakout and running of casings (strings).

# APPROXIMATE FLOW CHART OF PRIMARY PROCESS OPERATIONS INVOLVED IN THE PRODUCTION OF SEAMLESS HOT-ROLLED CASING PIPES



## API SPEC 5CT

Rows		Outside Diameter D, mm	Nominal mass per pipe unit length, kg/m	Wall thickness, t, mm	End type						Length range	Manufacturer
1	2				J55, K55	M65	N80 Type Q	R95	L80 Type 1	P110		
4-1/2	9,50	114,30	14,14	5,21	S	S	-	-	-	-	R2	PNTZ
	10,50		15,63	5,69	SB	SB	-	-	-	-	R2	
	11,60		17,26	6,35	SLB	LB	LB	LB	LB	LB	R3	
	13,50		20,09	7,37	-	LB	LB	LB	LB	LB	R3	
	15,10		22,47	8,56	-	-	-	-	-	LB	R3	
5-1/2	14,00	139,70	20,83	6,20	S	S	-	-	-	-	R3	
	15,50		23,07	6,98	SLB	SLB	-	-	-	-	R3	
	17,00		25,30	7,72	SLB	LB	LB	LB	LB	LB	R3	
	20,00		29,76	9,17	-	LB	LB	LB	LB	LB	R3	
	23,00		34,23	10,54	-	LB	LB	LB	LB	LB	R2	
6-5/8	20,00	168,28	29,76	7,32	SLB	SLB	-	-	-	-	R3	
	24,00		35,72	8,94	SLB	LB	LB	LB	LB	LB	R3	
	28,00		41,67	10,59	-	LB	LB	LB	LB	LB	R3	
	32,00		47,62	12,06	-	-	LB	LB	LB	LB	R3	
7	17,00	177,8	25,30	5,87	S	-	-	-	-	-	R3	
	20,00		29,76	6,91	S	S	S	-	-	-	R3	
	23,00		34,23	8,05	-	SLB	LB	LB	LB	-	R3	
	26,00		38,69	9,19	-	SLB	LB	LB	LB	LB	R3	
	29,00		43,16	10,36	-	-	LB	LB	LB	LB	R3	
	32,00		47,62	11,51	-	-	LB	LB	LB	LB	R3	

S = casing and couplings, SC connection type (short rounded thread, 8 threads of screw per inch); L = casing and couplings, LC connection type (long rounded thread, 8 threads of screw per inch); B = casing and couplings, BC connection type (trapezoid thread, 5 threads of screw per inch).

## MECHANICAL PROPERTIES OF CASING PIPES

Limits of mechanical properties for strength grades	Ultimate breaking strength, MPa, not less than	Yield strength (MPa)		Percent elongation (%)
		not less than	not more than	
1	2			
API Spec 5CT				
J55	517	379	552	*
K55	655	379	552	*
M65	586	448	586	*
L80 Type 1	655	552	655	*
N80 Type Q	689	552	758	*
R95	724	655	758	*
P110	862	758	965	*

\* Calculated using the formula specified in API Spec 5CT.

## PIPES CAN BE MADE TO CUSTOMER SPECIFICATIONS, INCLUDING IN THE FOLLOWING SPECIAL CONFIGURATIONS:

### 1. For production or injection of corrosive gas and oil fluids.

Casing pipes, tubing, and rods are exposed to high degrees of corrosion in wells with a high water cut, in which the well-stream contains carbon dioxide and hydrogen sulfide. Under such conditions, the best scenario is to use seamless steel tubing made from economically-alloyed steels with chromium content. Field test results have demonstrated that such steel grades increase the corrosion resistance of tubing and casing pipes in corrosive CO<sub>2</sub> and H<sub>2</sub>S mediums of oil wells by at least 2-3 times.

High corrosivity of wellstream from oil and gas wells imposes heightened requirements for corrosion resistance of pipe metal. Reliable operation of tubing is particularly critical

in oil and gas wells with a high water cut and exposure to hydrogen sulfide and carbon dioxide. This is associated with the risk of corrosive sulfide stress cracking – brittle failure of pipe metal exposed to hydrogen sulfide with water under tensile stress or localized CO<sub>2</sub> corrosion creating corrosion holes along the length of the pipe body. Under such conditions, the best scenario is to use seamless steel tubing made from economically-alloyed steels with chromium content. Field test results have demonstrated that such steel grades increase the corrosion resistance of tubing in corrosive CO<sub>2</sub> and H<sub>2</sub>S mediums of oil wells by at least 2-3 times.

Pervouralsk New Pipe Plant has successfully mastered the production of tubing from economically-alloyed chromium-containing corrosion-resistant steel grades such as 1Cr and 3Cr based on its proprietary OCTG pipe selection system, taking into account the following primary parameters:

- partial pressure of sour gases – hydrogen sulfide and carbon dioxide;
- operating conditions (method of production, temperature and pressure in the well, water cut, gas-oil ratio, application of reagents and inhibitors, presence of oxygen, asphalt, resin, and paraffin deposits, mechanical impurities, etc.);
- levels of acidity and ion composition of produced water.

Corrosion-resistant pipes undergo periodic corrosion tests:

- per NACE TM 0177 (Method "A", Method "C", Method "D");
- total corrosion in CO<sub>2</sub> and/or H<sub>2</sub>S mediums.

Pipes and collars can be made from special-purpose steel grades according to the Pipe Selection System depending on the operating conditions.

### 2. Casing Pipes with the PREMIUM Connections

Chelpipe can supply casing pipes with Premium connections as an alternative to NEW VAM and VAM TOP threaded connections.

Trade names of threaded connections made by Chelpipe: ChT-VC (alternative to NEW VAM connections) and ChT-2C (alternative to VAM TOP connections)

Distinctive features: high-sealing (gas-tight) collar connection of tubing with a metal-to-metal seal, in which sealing is provided by radial and end sealing assemblies. The metal-to-metal seal of the threaded connection in combination with a tapered buttress thread ensures a high seal integrity of the connection and its ultimate joint strength.

In all combinations of ultimate stresses, the values of equivalent stresses in cross-sections of the threaded connection do not exceed the yield strength. The axial tensile strength

of the connection is 100% of pipe body. The excess external and internal pressure strength of the connection is 100% of pipe body. The axial compressive strength of the connection is 50-80% of pipe body. The ultimate compressive axial stress was calculated based on the condition of ultimate yield of the pin end. The threaded connection maintains its gas-tightness under this stress.

Where a high makeup torque is required, Chelpipe can offer ChT-VC modifications with the maximum makeup torque increased by 70%: this modification is sold under the trade name ChT-HT.

The ChT-2C threaded connection is designed for a high maximum makeup torque.

# HOT-ROLLED OIL AND GAS LINE PIPES

They are designed for construction of oil and gas pipelines carrying both regular and H<sub>2</sub>S-containing and corrosive mediums, for use in gaslift systems, field development, including in the Extreme North conditions.

Oil and gas line pipes are made from locally produced metal smelted in an electric arc furnace, treated with synthetic slag in the ladle furnace, and, if necessary, degassed and cast using a continuous casting machine. This method produces pure steel with a low content of harmful impurities (sulfur and phosphorus) and gases, which ensures the high strength,

ductile, and anti-corrosion properties of pipes used under low-temperature conditions of corrosive environments. Corrosion-resistant oil and gas line pipes are subjected to periodic corrosion tests per NACE TM 0177 and NACE TM 0284.

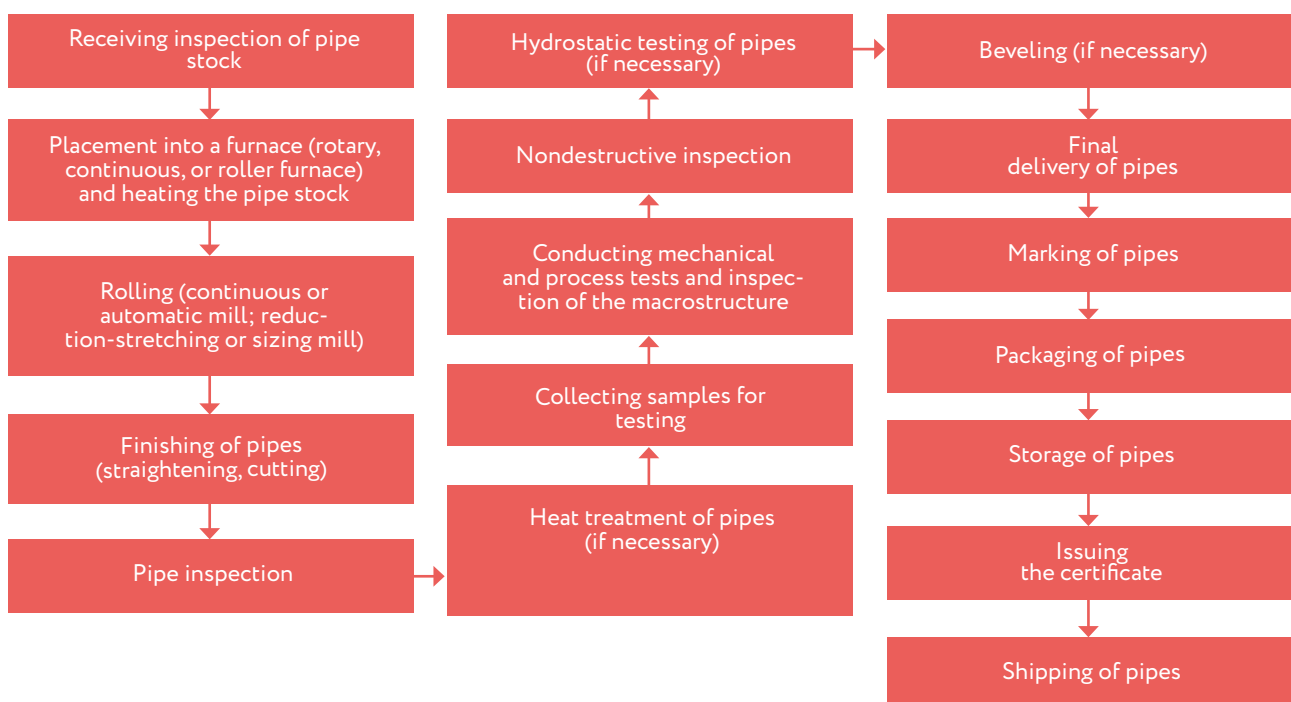
Pipes are subjected to automated nondestructive testing using electromagnetic or ultrasonic techniques to detect flaws on the outer and inner surfaces.

## Mandatory tests required by standards are carried out:

- tensile strength test;
- flare test;
- bending strength test;
- collapsing test;
- impact bending test;
- and hydrostatic tests.

The outer surface of pipes is covered in a preservation primer or an easily removable preservation coating (oiling) to protect them against atmospheric corrosion during shipping and storage. Pipes are supplied in circular or hexagonal bundles fitted with below-the-hook devices. At the buyer's option, pipes can be fitted with caps to protect pipe end faces.

## FLOWCHART OF PRIMARY PROCESS FLOWS DURING PRODUCTION OF SEAMLESS HOT-ROLLED PIPES





# SEAMLESS PIPES

## OIL AND GAS LINE PIPES

### STANDARDS

Title of Technical Regulation	Pipe size, mm (inches)		Steel grade	Site
	Outside diameter	Wall thickness		
1	2	3	4	5
API Spec 5L Specification for Line Pipes. Specifications	60.3 (2.374)-114.3 (4.500) / 114.3 (4.500)-168.3 (6.626)	4.78 (0.188)-11.13 (0.438) / 5.16 (0.203)-14.27 (0.562)	L245-L555 / L245-L450	Pervouralsk New Pipe Plant / Chelyabinsk Pipe Rolling Plant
ASTM A106/A106M Standard specification for seamless carbon steel pipe for high-temperature service	33.4 (1.315)-219.1(8.626) / 245 (9.646)-508 (20)*	2.9 (0.114)-25.4 (1.00)/ 8(0.315)-65 (2.559)*	Gr. A; Gr. B; Gr. C	Pervouralsk New Pipe Plant / Chelyabinsk Pipe Rolling Plant
ASTM A333/A333M Standard specification for seamless and welded steel pipe for low-temperature service	33.4 (1.315)-219.1 (8.626)	2.9 (0.114)-25.4 (1.00)	Grade 6	Pervouralsk New Pipe Plant
ASTM A 53M Standard specifications for pipe, steel black and hot dipped, zinc-coated, welded and seamless.	33.4 (1.315)-219.1(8.626) / 245 (9.646)-508 (20)*	2.9 (0.114)-25.4 (1.00)/ 8(0.315)-65 (2.559)*	Gr. A; Gr. B; Gr. C	Pervouralsk New Pipe Plant, Chelyabinsk Pipe Rolling Plant/ Pervouralsk New Pipe Plant*
ASTM A106/A53	33.4 (1.315)-219.1 (8.626)	2.9 (0.114)-25.4 (1.00)	Gr. B/C	Pervouralsk New Pipe Plant
API Spec 5L/ASTM A106/A53	60.3 (2.374)-114.3 (4.500) / 114.3 (4.500)-168.3 (6.626)	4.78 (0.188)-11.13 (0.438) / 5.16 (0.203)-14.27 (0.562)	L245 /Gr. B	Pervouralsk New Pipe Plant

\* If requirements for geometric dimensions are approved by the buyer

## MECHANICAL PROPERTIES OF SEAMLESS OIL AND GAS LINE PIPES

Regulatory Document	Steel grade (strength grade)	Ultimate breaking strength, $\sigma$ , N/mm <sup>2</sup>	Yield strength, $\tau$ , N/mm <sup>2</sup>	$\tau / \sigma$
		not less than		not more than
1	2	3	4	5
API Spec 5L	PSL 1:			
	L245(B)	415	245	
	L290(X42)	415	290	
	L320(X46)	435	320	
	L360(X52)	460	360	
	L390(X56)	490	390	
	L415(X60)	520	415	
	L450(X65)	535	450	
	L485(X70)	570	485	
	PSL 2:			
	L245R(BR)	415-655	245-450	0,93
	L245N(BN)	415-655	245-450	0,93
	L245Q(BQ)	415-655	245-450	0,93
	L290R(X42R)	415-655	290-495	0,93
	L290N(X42N)	415-655	290-495	0,93
	L290Q(X42Q)	415-655	290-495	0,93
	L320N(X46N)	435-655	320-525	0,93
	L320Q(X46Q)	435-655	320-525	0,93
	L360N(X52N)	460-760	360-530	0,93
	L360Q(X52Q)	460-760	360-530	0,93
	L390N(X56N)	490-760	390-545	0,93
	L390Q(X56Q)	490-760	390-545	0,93
	L415N(X60N)	520-760	415-565	0,93
	L415Q(X60Q)	520-760	415-565	0,93
	L450Q(X65Q)	535-760	450-600	0,93
	L485Q(X70Q)	570-760	485-635	0,93
	L555Q(X80Q)	625-825	555-705	0,93
ASTM A 106/A 106M-14	Grade A	330	205	
	Grade B	415	240	
	Grade C	485	275	
ASTM A333/A333M	Grade 6	415	240	

# HOT-ROLLED PIPES

**PRODUCERS:** Pervouralsk New Pipe Plant / Chelyabinsk Pipe Rolling Plant

## Pipe Applications

They have wide applications in the chemical, petrochemical, mechanical engineering, and construction industries. They are used in the construction of pipelines (for transportation of various substances, supplying water, and wastewater disposal), production of car parts and mechanisms for various applications, parts of steelwork, foundation piles, etc.

## Distinctive Features

1. Wide range of pipe sizes.
2. Production of pipes according to standards developed to account for technical specifications of specific buyers.

## LIST OF TECHNICAL REGULATIONS

Standard	Dimensions (mm)		Steel grades	Site
	Diameter (mm)	Wall (mm)		
DIN EN 10210-1/2 Hot finished structural hollow sections of non-alloy and fine grain steels.	33.7-219.1 / 245 -508*	2.9-40 / 8 -65*	S235JRH; S275JOH; S235J2H; S355JOH; S355J2H	Pervouralsk New Pipe Plant / Chelyabinsk Pipe Rolling Plant*
EN 10297-1 Seamless circular steel tubes for mechanical and general engineering purposes. Technical delivery conditions.	33.7-219.1 / 245 -508*	2.9-40 / 8 -65*	E235, E275, E355	Pervouralsk New Pipe Plant / Chelyabinsk Pipe Rolling Plant*
EN 10216-1 Seamless steel tubes for pressure purposes. Technical delivery conditions.	33.7-219.1 / 245 -508*	2.9-40 / 8 -65*	P235TR1, P235TR2	Pervouralsk New Pipe Plant / Chelyabinsk Pipe Rolling Plant*
DIN 1629 Seamless circular tubes of non-alloy steels with special quality requirements. Technical delivery conditions.	33.7-219.1 / 245 -508*	2.9-40 / 8 -65*	St 37.0, St 44.0, St 52.0	Pervouralsk New Pipe Plant / Chelyabinsk Pipe Rolling Plant*
EN 10255 Non-alloy steel tubes suitable for welding or threading	33.7-219.1	3.2-5.4	S195T	Pervouralsk New Pipe Plant
DIN 2448/1629 / EN 10210-1,2 / EN 10297-1 / EN 10216-1	33.7-219.1	2.9÷40	St 37.0 / S235JRH / E235 / P235TR2; ST 52.0 / S355J2H / E355	Pervouralsk New Pipe Plant

\* If requirements for geometric dimensions are approved by the buyer

## SIZES

Outside diameter, mm (code designation Sch)								
Wall thickness, mm								
114.3 (4)	141.3 (5)	168.3 (6)	273.0 (10)	323.8 (12)	355.6 (14)	406.4 (16)	457.2 (18)	508.0 (20)
5,16	5,56	5,16	8,74	8,38	9,53	9,53	11,91	22,23
5,56	6,55	5,56	9,27	8,74	10,31	10,31	12,70	23,83
6,02	7,14	6,35	11,13	9,53	11,13	11,13	14,27	25,40
6,3	7,92	7,11	12,70	10,31	11,91	11,91	15,88	26,19
7,14	8,74	7,92	14,27	11,13	12,70	12,70	17,48	26,97
7,92	9,53	8,74	15,09	12,70	14,27	14,27	19,05	28,58
8,56	12,70	9,53	15,88	14,27	15,09	15,88	20,62	30,18
11,13		10,97	18,24	15,88	15,88	16,66	22,23	31,75
		12,70	20,62	17,48	17,48	17,48	23,83	32,54
		14,27	21,41	19,05	19,05	19,05	25,40	33,32
		15,88	22,23	20,62	20,62	20,62	26,97	34,93
			23,83	21,44	22,23	21,41	28,58	38,10
			25,40	22,23	23,83	22,23	29,36	44,45
			28,58	23,83	25,40	23,83	30,18	50,01
			31,75	25,40	26,97	25,40	31,75	
				26,97	27,79	26,19	34,93	
				28,58	28,58	26,97	39,67	
				31,75	31,75	28,58	45,24	
				33,32	35,71	30,18		
						30,96		
						31,75		
						36,53		
						40,49		

Note: Pipes of other size can be supplied, provided that such pipes are consistent with all other ASTM requirements.

INDUSTRIAL SEGMENT

HOT-ROLLED PIPES

NPS	Outside diameter		Wall thickness		Mass per unit length		Mass class	Type
	inch	mm	inch	mm	pound/ft	kg/m		
1	2	3	4	5	6	7	8	9
3/8	0.405	10.3	0.068	1.73	0.24	0.37	STD	cold deformed
			0.095	2.41	0.31	0.47	XS	cold deformed
1/4	0.540	13.7	0.088	2.24	0.43	0.63	STD	cold deformed
			0.119	3.02	0.54	0.80	XS	cold deformed
3/16	0.675	17.1	0.091	2.31	0.57	0.84	STD	cold deformed
			0.126	3.20	0.74	1.10	XS	cold deformed
1/2	0.840	21.3	0.109	2.77	0.85	1.27	STD	cold deformed
			0.147	3.73	0.67	1.62	X/S	cold deformed
			0.188	4.78	0.76	1.95	...	cold deformed
3/4	1.050	26.7	0.113	2.87	1.13	1.69	STD	cold deformed
			0.154	3.91	1.48	2.20	X/S	cold deformed
			0.219	5.56	1.95	2.90	...	cold deformed
			0.308	7.82	2.44	3.64	XXS	cold deformed
1	1.315	33.4	0.114	2.90	1.46	2.18	...	cold, hot deformed
			0.133	3.38	1.68	2.50	STD	cold, hot deformed
			0.179	4.55	2.17	3.24	XS	cold deformed
			0.250	6.35	2.85	4.24	...	cold deformed
1 1/4	1.660	42.2	0.140	3.56	2.27	3.39	STD	cold, hot deformed
			0.191	4.85	3.00	4.47	XS	cold, hot deformed
			0.250	6.35	3.77	5.61	...	cold deformed
			0.382	9.70	5.22	7.77	XXS	cold deformed
1 1/2	1.900	48.3	0.145	3.68	2.72	4.05	STD	cold, hot deformed
			0.200	5.08	3.63	5.41	XS	cold, hot deformed
			0.281	7.14	4.86	7.25	...	cold deformed
			0.400	10.15	6.41	9.55	XXS	cold deformed
2	2.375	60.3	0.083	2.11	2.03	3.03	...	cold deformed
			0.109	2.77	2.64	3.93	...	cold deformed
			0.125	3.18	3.01	4.48	...	cold deformed
			0.141	3.58	3.37	5.01	...	cold, hot deformed
			0.154	3.91	3.66	5.44	STD	cold, hot deformed
			0.172	4.37	4.05	6.03	...	cold, hot deformed
			0.188	4.78	4.40	6.54	...	cold, hot deformed
			0.218	5.54	5.03	7.48	XS	cold, hot deformed
			0.250	6.35	5.68	8.45	...	cold, hot deformed
			0.281	7.14	6.29	9.36	...	hot deformed
0.344	8.74	7.47	11.11	...	hot deformed			
0.436	11.07	9.04	13.44	XXS	hot deformed			

NPS	Outside diameter		Wall thickness		Mass per unit length		Mass class	Type
	inch	mm	inch	mm	pound/ft	kg/m		
1	2	3	4	5	6	7	8	9
2 1/4	2.875	73.0	0.083	2.11	2.48	3.69	...	cold deformed
			0.109	2.77	3.22	4.80	...	cold deformed
			0.120	3.05	3.53	5.26	...	cold deformed
			0.125	3.18	3.67	5.48	...	cold deformed
			0.141	3.58	4.12	6.13	...	cold, hot deformed
			0.156	3.96	4.53	6.74	...	cold, hot deformed
			0.172	4.37	4.97	7.40	...	cold, hot deformed
			0.188	4.78	5.40	8.04	...	cold, hot deformed
			0.203	5.16	5.80	8.63	STD	cold, hot deformed
			0.216	5.49	6.14	9.14	...	cold, hot deformed
			0.250	6.35	7.02	10.44	...	cold, hot deformed
			0.276	7.01	7.67	11.41	XS	hot deformed
			0.375	9.53	10.02	14.92	...	hot deformed
			0.552	14.02	13.71	20.39	XXS	hot deformed
3	3.500	88.9	0.141	3.58	5.06	7.53	...	hot deformed
			0.156	3.96	5.58	8.30	...	hot deformed
			0.172	4.37	6.12	9.11	...	hot deformed
			0.188	4.78	6.66	9.92	...	hot deformed
			0.216	5.49	7.58	11.29	STD	hot deformed
			0.250	6.35	8.69	12.93	...	hot deformed
			0.281	7.14	9.67	14.40	...	hot deformed
			0.300	7.62	10.26	15.27	XS	hot deformed
3 1/2	4.000	101.6	0.438	11.13	14.34	21.35	...	hot deformed
			0.600	15.24	18.60	27.68	XXS	hot deformed
			0.156	3.96	6.41	9.54	...	hot deformed
			0.172	4.37	7.04	10.48	...	hot deformed
			0.188	4.78	7.66	11.41	...	hot deformed
			0.226	5.74	9.12	13.57	STD	hot deformed
4	4.500	114.3	0.250	6.35	10.02	14.92	...	hot deformed
			0.281	7.14	11.17	16.63	...	hot deformed
			0.318	8.08	12.52	18.64	XS	hot deformed
			0.188	4.78	8.67	12.91	...	hot deformed
			0.203	5.16	9.32	13.89	...	hot deformed
			0.219	5.56	10.02	14.91	...	hot deformed
			0.237	6.02	10.80	16.08	STD	hot deformed
			0.250	6.35	11.36	16.91	...	hot deformed
			0.281	7.14	12.67	18.87	...	hot deformed
			0.312	7.92	13.97	20.78	...	hot deformed
			0.337	8.56	15.00	22.32	XS	hot deformed
			0.438	11.13	19.02	28.32	...	hot deformed
0.531	13.49	22.53	33.54	...	hot deformed			
0.674	17.12	27.57	41.03	XXS	hot deformed			

NPS	Outside diameter		Wall thickness		Mass per unit length		Mass class	Type
	inch	mm	inch	mm	pound/ft	kg/m		
1	2	3	4	5	6	7	8	9
5	5.563	141,3	0.219	5.56	12.51	18,61	...	hot deformed
			0.258	6,55	14,63	21,77	STD	hot deformed
			0.281	7,14	15,87	23,62	...	hot deformed
			0.312	7,92	17,51	26,05	...	hot deformed
			0.344	8,74	19,19	28,57	...	hot deformed
			0.375	9,53	20,80	30,97	XS	hot deformed
			0.500	12,70	27,06	40,28	...	hot deformed
			0.625	15,88	32,99	49,12	...	hot deformed
			0.750	19,05	38,59	57,43	XXS	hot deformed
6	6.625	168,3	0.250	6.35	17.04	25,36	...	hot deformed
			0.280	7,11	18,99	28,26	STD	hot deformed
			0.312	7,92	21,06	31,33	...	hot deformed
			0.344	8,74	23,10	34,39	...	hot deformed
			0.375	9,53	25,05	37,31	...	hot deformed
			0.432	10,97	28,60	42,56	XS	hot deformed
			0.500	12,70	32,74	48,73	...	hot deformed
			0.562	14,27	36,43	54,21	...	hot deformed
			0.625	15,88	40,09	59,69	...	hot deformed
			0.719	18,26	45,39	67,57	...	hot deformed
			0.750	19,05	47,10	70,12	...	hot deformed
			0.864	21,95	53,21	79,22	XXS	hot deformed
			0.875	22,23	53,78	80,08	...	hot deformed

NPS	Outside diameter		Wall thickness		Mass per unit length		Mass class	Type
	inch	mm	inch	mm	pound/ft	kg/m		
1	2	3	4	5	6	7	8	9
8	8.625	219,1	0.322	8,18	28,58	42,55	STD	hot deformed
			0.344	8,74	30,45	45,34	...	hot deformed
			0.375	9,53	33,07	49,25	...	hot deformed
			0.406	10,31	35,67	53,09	...	hot deformed
			0.438	11,13	38,33	57,08	...	hot deformed
			0.500	12,70	43,43	64,64	XS	hot deformed
			0.562	14,27	48,44	72,08	...	hot deformed
			0.594	15,09	51,00	75,92	...	hot deformed
			0.625	15,88	53,45	79,59	...	hot deformed
			0.719	18,26	60,77	90,44	...	hot deformed
			0.750	19,05	63,14	93,38	...	hot deformed
			0.812	20,62	67,82	100,93	...	hot deformed
			0.875	22,23	72,49	107,93	XXS	hot deformed
			0.906	23,01	74,76	111,27	...	hot deformed
			1.000	25,40	81,51	121,33	...	hot deformed



# COLD-WORKED PIPES

**PRODUCERS:** Pervouralsk New Pipe Plant / Chelyabinsk Pipe Rolling Plant

## PURPOSE

They have wide applications in the chemical, petrochemical, mechanical engineering, and construction industries. They are designed for use in manufacture of parts and mechanisms for various sectors of the mechanical engineering industry (automotive, drilling, petroleum, mining, crane manufacturing, etc.), and are used in construction of utility systems (water mains), in transportation of oil, gas, and chemicals, and as components in furniture manufacture.

## Distinctive Features

1. Extensive range of sizes of pipes, including thin-walled pipes.
2. Capability to produce pipes with a diameter greater than 105 mm.
3. Production of pipes according to standards developed to account for technical specifications of specific buyers.

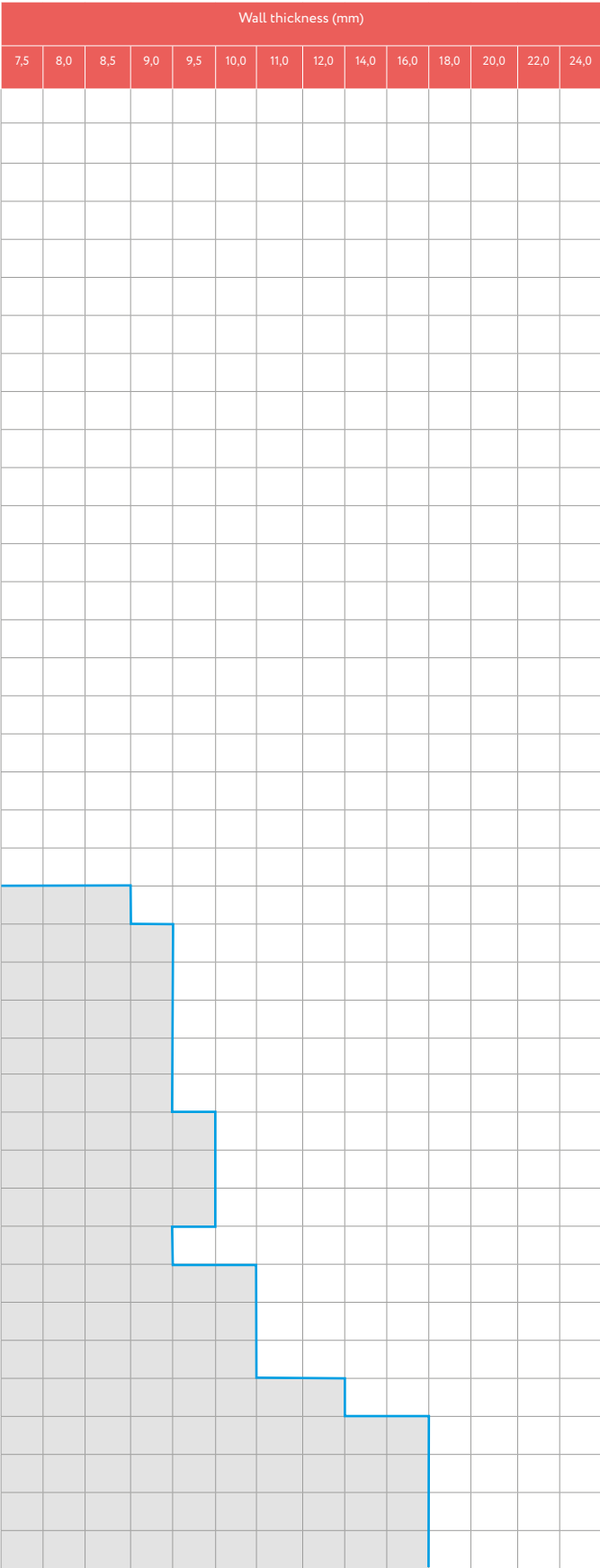


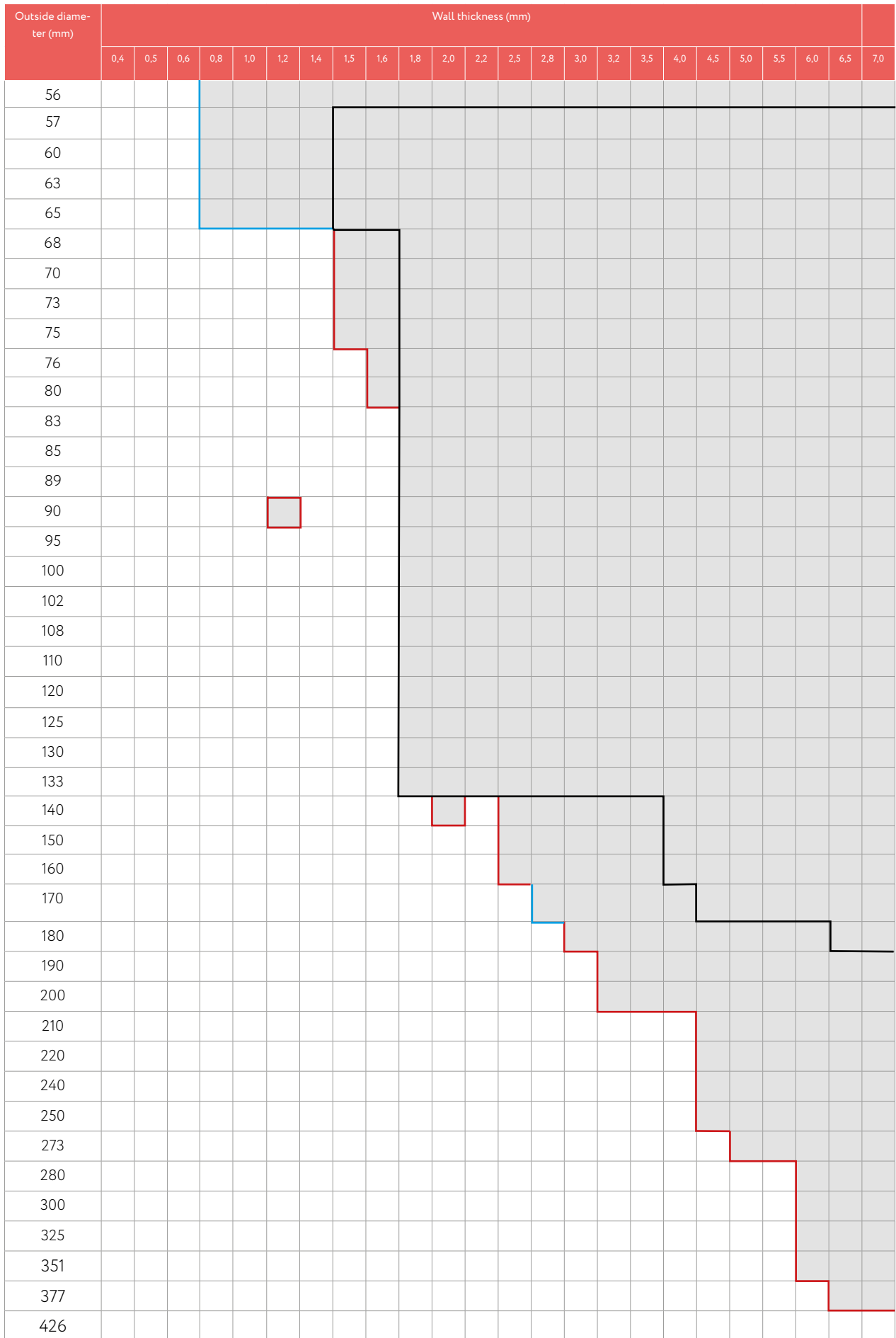
## LIST OF TECHNICAL REGULATIONS

Standard	Dimensions (mm)		Steel grades	Site
	Diameter (mm)	Wall (mm)		
DIN 1629 Seamless circular tubes of non-alloy steels with special quality requirements.	23÷88.9	2.5÷7.1	St 37.0; St 44.0; St 52.0	Pervouralsk New Pipe Plant
DIN 2391 Seamless precision steel tubes.	32÷300	2.5÷28	St 35, St 45 ; St 52.0, St 52.3	Pervouralsk New Pipe Plant / Chelyabinsk Pipe Rolling Plant
EN 10216-1 Seamless steel tubes for pressure purposes. Non-alloy steel tubes with specified room temperature properties.	10.2÷88.9	1.6÷7.1	P195TR; P195TR2; P235TR1; P235TR2; P265TR1; P265TR2; S235JRH; S275J0H; S235J2H; S355J0H, S355J2H	Pervouralsk New Pipe Plant
EN 10305-1 Steel tubes for precision applications. Seamless cold drawn tubes.	32÷300	3÷12.5	E235, E355	Pervouralsk New Pipe Plant / Chelyabinsk Pipe Rolling Plant
EN 10305-4 Seamless cold drawn tubes for hydraulic and pneumatic power systems.	32÷90	3÷5	E235	Pervouralsk New Pipe Plant
EN 10305-1,4/DIN 2391 Seamless precision steel tubes.	6÷65	0.5÷2.5	E235; E355 /St 35; St 45; St 52.0	Pervouralsk New Pipe Plant
DIN 17175 Seamless steel tubes for elevated temperatures. Technical delivery conditions.	25÷88.9	2.3÷12	"St 35.8 (1.0305), St 45.8 (1.0405), 15Mo3 (1.5415), 13CrMo4-4 (1.7335), 10CrMo9-10 (1.7380)"	Pervouralsk New Pipe Plant
ASTM A 53/A53M (general technical requirements per ASTM A 530/A530M) Standard specifications for pipe, steel black and hot dipped, zinc-coated, welded and seamless.	26.7 ÷73 (1.051÷2.875)	2.7 ÷10.15	Gr. A; Gr. B; Gr. C	Pervouralsk New Pipe Plant
DIN 2440/2441 Seam welded steel pipes, medium & heavy series.	26.9÷76.1	2.6÷4.5	St 33	Pervouralsk New Pipe Plant
DIN EN 10255 Non-alloy steel tubes suitable for welding or threading Technical delivery conditions.	26.9÷76.1	2.6÷4.5	S195T	Pervouralsk New Pipe Plant
EN 10255/DIN 2440/DIN 2441 Non-alloy steel tubes suitable for welding or threading Technical delivery conditions.	10.2÷26.9	2÷3.25	S195T/St 33	Pervouralsk New Pipe Plant

# SIZES

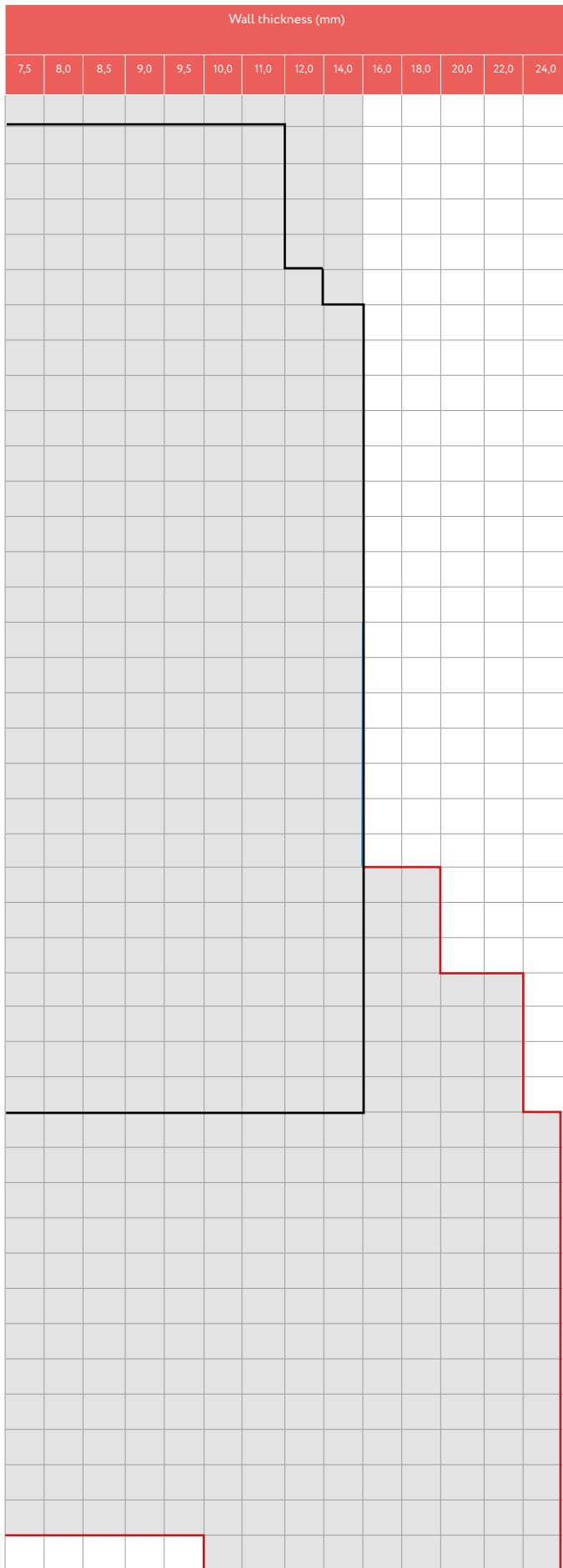
Outside diameter (mm)	Wall thickness (mm)																										
	0,4	0,5	0,6	0,8	1,0	1,2	1,4	1,5	1,6	1,8	2,0	2,2	2,5	2,8	3,0	3,2	3,5	4,0	4,5	5,0	5,5	6,0	6,5	7,0			
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- cold-worked pipes
  - product mix of Pervouralsk New Pipe Plant
  - product mix of Chelyabinsk Pipe Rolling Plant
  - product mix of Pervouralsk New Pipe Plant and Chelyabinsk Pipe Rolling Plant

INDUSTRIAL SEGMENT  
COLD-WORKED PIPES



 - cold-worked pipe production process

# BOILER PIPES

**PRODUCERS:** Pervouralsk New Pipe Plant / Chelyabinsk Pipe Rolling Plant

## Applications

They are used both in energy mechanical engineering and in construction / servicing of generating facilities. They are designed for steam boilers and pipelines with high and extra-critical steam parameters.

## Distinctive Features

1. Manufacture of hot-rolled pipes more than 426 mm in diameter with a wall thickness of more than 60 mm.
2. Manufacture of cold-worked pipes 32÷38 mm in diameter and up to 22 mm in length.
3. Manufacture of cold-worked finned tubes for steam boilers.

## LIST OF TECHNICAL REGULATIONS

Standard	Dimensions (mm)		Steel grades	Site
	Diameter (mm)	Wall (mm)		
EN 10216-2 Seamless steel tubes for pressure purposes. Pipes from non-alloy and alloy steel grades with specified properties at elevated temperatures.	13,5÷88,9	1,8÷12	P235GH; P265GH; 16Mo3; 13CrMo4-5	Pervouralsk New Pipe Plant
ASTM A 106/A106M (general technical requirements per ASTM A 530/A530M) Standard specification for seamless carbon steel pipe for high-temperature service."	33,4-219,1(1,315 - 8,625) / 245÷508* (9,645-20*)	2,9-25,4 (0,114-1) / 8÷65* (0,315 - 2,560)*	Gr. A; Gr. B; Gr. C	Pervouralsk New Pipe Plant, Chelyabinsk Pipe Rolling Plant/ Chelyabinsk Pipe Rolling Plant

\* If requirements for geometric dimensions are approved by the buyer

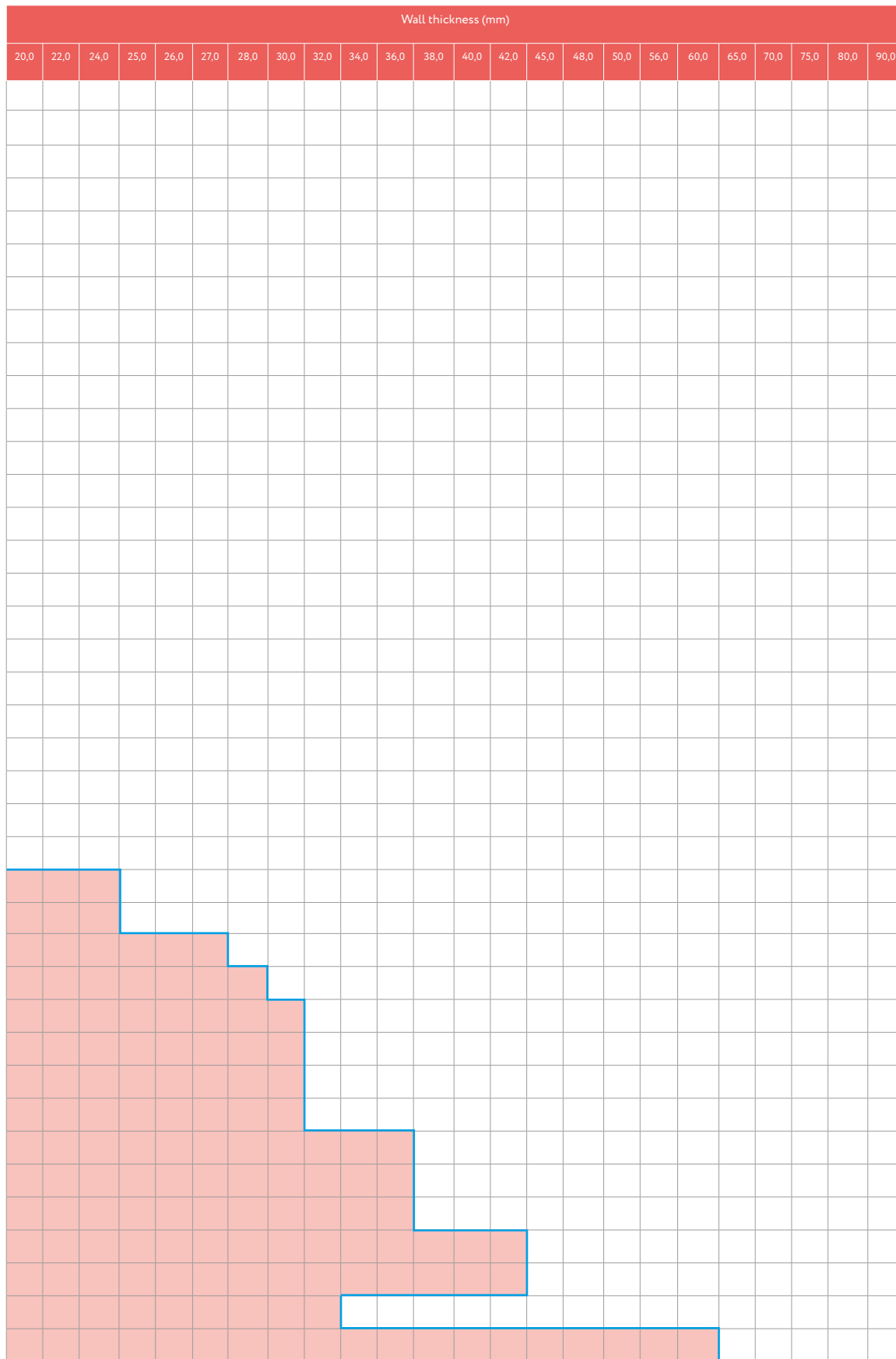
# SIZES

Outside diameter (mm)	Wall thickness (mm)																								
	2,0	2,5	3,0	3,5	4,0	4,5	5,0	5,5	6,0	6,5	7,0	7,5	8,0	9,0	10,0	11,0	12,0	13,0	14,0	15,0	16,0	17,0	18,0	19,0	
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







INDUSTRIAL SEGMENT

BOILER PIPES



Outside diameter (mm)	Wall thickness (mm)																								
	2,0	2,5	3,0	3,5	4,0	4,5	5,0	5,5	6,0	6,5	7,0	7,5	8,0	9,0	10,0	11,0	12,0	13,0	14,0	15,0	16,0	17,0	18,0	19,0	
299																									
325																									
351																									
377																									
426																									
465																									
508																									

-  - cold-worked pipes
-  - product mix of Pervouralsk New Pipe Plant
-  - product mix of Chelyabinsk Pipe Rolling Plant
-  - product mix of Pervouralsk New Pipe Plant and Chelyabinsk Pipe Rolling Plant
-  - cold-worked / hot-worked pipes
-  - hot-rolled pipes

INDUSTRIAL SEGMENT

BOILER PIPES

Wall thickness (mm)																									
20,0	22,0	24,0	25,0	26,0	27,0	28,0	30,0	32,0	34,0	36,0	38,0	40,0	42,0	45,0	48,0	50,0	56,0	60,0	65,0	70,0	75,0	80,0	90,0		

# STAINLESS STEEL PIPES

**PRODUCERS:** Chelyabinsk Pipe Rolling Plant / Pervouralsk New Pipe Plant

## Applications

They have wide applications in the chemical, petrochemical, mechanical engineering, and construction industries. They are designed for use in manufacture of parts and mechanisms for various sectors of the mechanical engineering industry (automotive, drilling, petroleum, mining, crane manufacturing, etc.), and are used in construction of utility systems (water mains), in transportation of oil, gas, and chemicals, and as components in furniture manufacture.

## Distinctive Features

1. Wide range of pipe sizes.
2. Production of capillary pipes of the smallest possible dimensions (starting at  $\varnothing 0.3$  mm).
3. Production of hexagonal pipes.

## Kinds

Chelpipe can make pipes per EN 10216-5 from austenitic steel grades with an outside diameter of 10-76 mm and walls 1.0-7.1 mm thick, taking into account Technical Regulations AD2000/W2/W10 or European Directive PED 93/27/EG. Chelpipe can make pipes per ASTM A 312, ASTM A 213 from austenitic steel grades with an outside diameter of 10-76 mm and walls 1.0-7.1 mm thick, taking into account European Directive PED 93/27/EG. We can make pipes per ASTM A 312 under technical oversight from the Maritime Registry of Shipping.

## LIST OF TECHNICAL REGULATIONS

Standard	Dimensions (mm)		Steel grades	Site
	Diameter (mm)	Wall (mm)		
ASTM A 213 Seamless ferritic and austenitic alloy steel boiler, superheater, and heat exchanger tubes.	10,3 ÷ 73 (0,406-2,875)	1,24 ÷ 7,01 (0,049-0,276)	TP304, TP304L, TP316, TP316L, TP321	Pervouralsk New Pipe Plant
ASTM A 312 Seamless austenitic stainless steel pipes.	10,3 ÷ 88,9 (0,406-3,500)/ 90 ÷ 426 (3,543-16,772)	1,24 ÷ 8,74 (0,049-0,344)/ 1,5 ÷ 40 (0,059-1,575)	TP304, TP304L, TP316, TP316L, TP321	Pervouralsk New Pipe Plant Chelpipe (cold-worked)
EN 10216-5 Stainless steel seamless tubes for pressure purposes.	6,0÷88,9 / 90÷426	1÷8/ 1,5÷40	14301,14306,14541,14571,14401,14404	Pervouralsk New Pipe Plant Chelpipe (cold-worked)
" DIN 17456 General purpose seamless circular stainless steel tubes. Technical delivery conditions. "	6÷76,1	1,0÷8,0	14301,14306,14401,14404,14541,14571	Pervouralsk New Pipe Plant
DIN 17458 Seamless circular austenitic stainless steel tubes subject to special requirements.	6÷76,1	1,0÷8,0	14301,14306,14401,14404,14541,14571	Pervouralsk New Pipe Plant
ASTM B 337/B338 Seamless and welded titanium and titanium alloy condenser and heat exchanger tubes.	10,3 ÷ 48,3 (0,406-1,902)	1.24 ÷ 5.08 (0.049-0.200)	1 (BT1-00), 2 (BT1-0), 3 (BT1-1)	Pervouralsk New Pipe Plant

At the buyer's option, pipes can be produced to meet a combination of standards from several steel grades.

Pipes are supplied without hydrostatic testing. Instead of hydrostatic testing, pipes undergo nondestructive inspection.

# SIZES

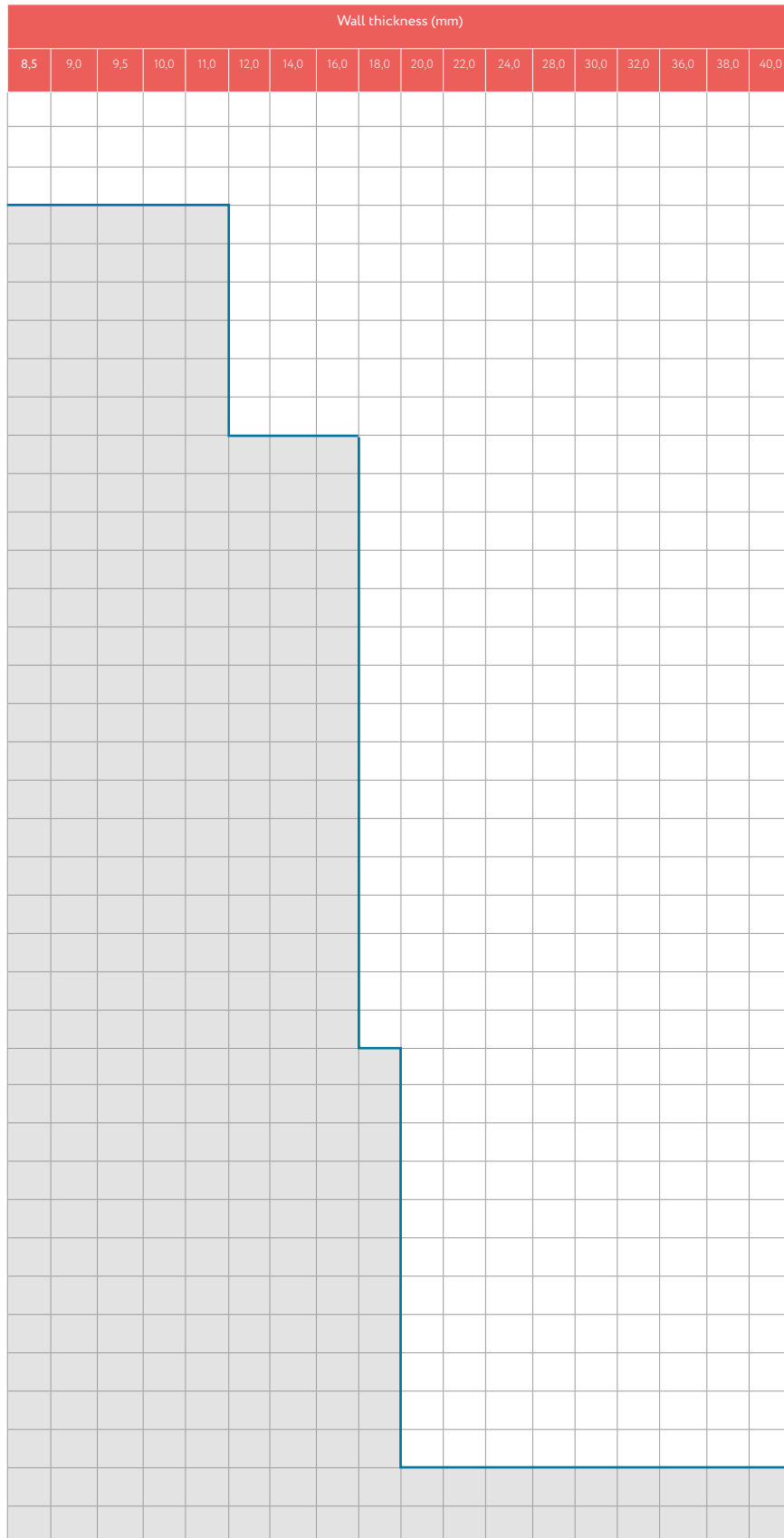
Outside diameter (mm)	Wall thickness (mm)																									
	1,0	1,1	1,2	1,3	1,4	1,5	1,6	1,8	2,0	2,2	2,5	2,8	3,0	3,2	3,5	4,0	4,5	5,0	5,5	6,0	6,5	7,0	7,5	8,0		
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56																										
57																										
60																										

Wall thickness (mm)																	
8,5	9,0	9,5	10,0	11,0	12,0	14,0	16,0	18,0	20,0	22,0	24,0	28,0	30,0	32,0	36,0	38,0	40,0

Outside diameter (mm)	Wall thickness (mm)																								
	1,0	1,1	1,2	1,3	1,4	1,5	1,6	1,8	2,0	2,2	2,5	2,8	3,0	3,2	3,5	4,0	4,5	5,0	5,5		6,0	6,5	7,0	7,5	8,0
63																									
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180																									
190																									
200																									
210																									
220																									
240																									
250																									
273																									
280																									
300																									
325																									
351																									
377																									
426																									

- hot-rolled pipes     
  - cold-worked pipes     
  - cold-worked / hot-rolled pipes





## CHEMICAL COMPOSITION OF STAINLESS STEEL GRADES

Steel grade	Mass fractions of elements (%)									
	C	Mn	Si	Cr	Ti	Ni	P	S	MO	N
	Within the limits or not more than									
TP 304/1.4301	0,07	2,00	1,00	18.0-19.5		8.0-10.5	0,04	0,015		0,11
TP 304L/1.4306	0,03	2,00	1,00	18.0-20.0		10.0-12.0	0,04	0,015		0,11
TP 316/1.4401	0,07	2,00	1,00	16.5-18.0		11.0-13.0	0,04	0,015	2.0-2.5	0,11
TP 316Ti/1.4571	0,08	2,00	0,75	16.5-18.0	5(C+N) - 0.7	10.5-13.5	0,04	0,015	2.0-2.5	0,1
TP 316L/1.4404	0,03	2,00	1,00	16.5-18.0		10.0-13.0	0,04	0,015	2.0-2.5	0,11
TP 321/1.4541	0,08	2,00	1,00	17.0-19.0	5C - 0.7	9.0-12.0	0,04	0,015		0,08

## SIZES OF SEAMLESS HOT-ROLLED PIPES MADE BY DIFFERENT MILLS

Plant	Mill	Size (mm)		
		Diameter	Wall	Length
Pervouralsk New Pipe Plant	Pipe Rolling Mill 140	83÷121	5÷16	3,500÷6,000
	Pipe Rolling Mill 220	121÷159	6÷26	3,500÷7,000
Chelyabinsk Pipe Rolling Plant	Pipe Rolling Mill 8-16" with a pilger unit	245÷530	8÷90	2,500÷11,800

# WELDED SMALL-DIAMETER PIPES

## PRODUCTION OF WELDED SMALL-DIAMETER PIPES

**PRODUCERS:** Pervouralsk New Pipe Plant

### Applications

Transportation of liquids and gases, structural elements of machines, mechanisms, and structures, decorative elements.

### Main applications:

- construction of buildings and structures, industrial facilities
- manufacture of steelwork
- automotive industry, manufacture of car parts
- manufacture of lifts and transporters
- other kinds of mechanical engineering
- furniture industry

### Distinctive Features

Pipes 12 to 76 mm in diameter are produced from carbon steel grades using electric-welding machines using the high-frequency welding method. This technology, in combination with physical pipe inspection methods and hydrostatic testing, ensures the needed pipe strength.

Removal of internal burrs, drawing with and without a mandrel, and rolling on roller mills, and heat treatment in a furnace with a shielding gas allow obtaining high-quality output.

## TABLE OF STANDARDS FOR WELDED SMALL DIAMETER PIPES

Technical Regulations	Pipe Dimensions			Steel grade / strength grade	Specifics. Restrictions
	Outside diameter, mm (inches)	Wall thickness, mm (inches)	Pipe length, m		
DIN EN 10305-2 Steel tubes for precision applications. Technical delivery conditions. Part 2. Welded cold-drawn tubes. - accepted	12-76**	0.8-3.0**	5.5-9.0	RSt 34-2; RSt 37-2; St 44-2. Steel grades E155, E195, E235, E275, E355 – to be agreed separately.	Pipes are produced in the delivery condition: "+"C" – without heat treatment; "+"N" – normalized.
DIN EN 10305-3. Steel tubes for precision applications. Technical delivery conditions. Part 3. Welded cold sized tubes. - accepted	12-76	0.8-3.0	5.5-9.0**	RSt 34-2; RSt 37-2; St 44-2. Steel grades E155, E190, E195, E220, E235, E260, E275, E320, E355 – to be agreed separately.	Pipes are made in the "+CR2" delivery condition – sized during rolling, without heat treatment, brightened. Pipes with diameters of ≤60 mm can be made in the "+N" delivery condition – normalized along the entire length of the pipe.

\* Length of pipes with the preservation coating – up to 7.5 m

\*\* As agreed with the buyer, pipes may be supplied based on specifications of both the outside and inside diameter and wall thickness

## PRODUCT MIX AND THEORETICAL MASS OF WELDED SMALL-DIAMETER PIPES

Outside diameter (mm)		Wall thickness (mm)														
mm	inch	0.8 (0.031)	1 (0.039)	1.2 (0.047)	1.4 (0.055)	1.5 (0.059)	1.6 (0.063)	1.8 (0.071)	2 (0.079)	2.2 (0.087)	2.3 (0.091)	2.5 (0.098)	2.6 (0.102)	2.8 (0.110)	2.9 (0.114)	3 (0.118)
12	0,472	0,221	0,271	0,320		0,388										
16	0,63	0,300	0,37	0,438		0,536										
18	0,709	0,339	0,419	0,497	0,573	0,610		0,719	0,789							
19	0,748	0,359	0,444	0,527	0,608	0,647		0,764	0,838							
20	0,787	0,379	0,469	0,556	0,642	0,684		0,808	0,888							
22	0,866		0,518	0,616	0,711	0,758	0,805	0,897	0,986							
25	0,984		0,592	0,704	0,815	0,869	0,923	1,030	1,134	1,237		1,387				
28	1,102		0,666	0,793	0,918	0,980	1,042	1,163	1,282	1,400		1,572				
30	1,181		0,715	0,852	0,987	1,054	1,121	1,252	1,381	1,508		1,695				
32	1,26		0,765	0,911	1,056	1,128	1,200	1,341	1,480	1,617		1,819				
35	1,378		0,838	1,000	1,160	1,239	1,318	1,474	1,628	1,780	1,855	2,004				2,368
38	1,496		0,912	1,089	1,264	1,350	1,436	1,607	1,776	1,942	2,025	2,189				2,589
40	1,575		0,962	1,148	1,333	1,424	1,515	1,696	1,874	2,051	2,138	2,313				2,737
42	1,654		1,011	1,207	1,402	1,498	1,594	1,785	1,973	2,159	2,252	2,436				2,885
42,4	1,669		1,021	1,219	1,416	1,513	1,610	1,802	1,993	2,181	2,275	2,460				2,915
45	1,772		1,085	1,296	1,505	1,609	1,712	1,918	2,121	2,322	2,422	2,621				3,107
48,3	1,902					1,731	1,843	2,064	2,284	2,501	2,609	2,824	2,930	3,142	3,247	3,351
51	2,008					1,831	1,949	2,184	2,417	2,648	2,762	2,991	3,103	3,328	3,440	3,551
57	2,244					2,053	2,186	2,450	2,713	2,973	3,103	3,361	3,488	3,743	3,869	3,995
60	2,362								2,861	3,136	3,273	3,546	3,680	3,950	4,084	4,217
63,5	2,5								3,033	3,326	3,471	3,761	3,905	4,191	4,334	4,476
76	2,992								3,650	4,004	4,180	4,532	3,488	5,055	5,228	5,401

# THREE-LAYER COATING BASED ON EXTRUDED POLYETHYLENE / POLYPROPYLENE

Factory-applied three-layer coating (epoxy primer, adhesive, polyethylene (or polypropylene)) applied onto pipes using a specially selected system of insulation materials can protect pipelines against corrosion for virtually their entire service life (40-50 years or even longer).

Chelyabinsk Pipe Rolling Plant has been producing pipes with an outer three-layer anti-corrosion coating since 2000.

The plant currently owns three lines for applying the outer coating onto pipes.

## Coating structure:

- primer layer based on epoxy powder paints;
- adhesive layer based on hot-melt polymer compounds;
- outer layer based on extruded temperature- and light-stabilized polyethylene or polypropylene.

The three-layer coating is one of the most effective outer protective coatings for pipelines. The primer layer based on epoxy powder paints ensures increased coating adhesion to steel, resistance to cathodic peeling, and resistance to long-term exposure to water, and is also permeable to cathodic protection currents. The adhesive layer is the intermediate layer in the structure of the three-layer pipe coating. Its function is to bond the outer and inner layers. The outer layer features low moisture and oxygen permeability and acts as a "diffusion barrier", lending a high level of mechanical and impact strength to the coating.

The main advantages of polypropylene coatings over polyethylene coatings include their increased heat resistance, high mechanical strength, resistance to piercing, cutting, and abrasive wear. This type of coating is recommended for use in construction of underwater crossings, in areas where pipelines are laid underground (by directional drilling), in construction of offshore oil and gas pipelines, and also as an anti-corrosion coating for hot pipeline sections. A disadvantage of polypropylene pipe coatings is their low frost resistance.

Pipes onto which thermal insulation and/or ballast coating are to be applied subsequently are additionally covered with a rough layer based on a powder adhesive material, polyethylene, or polypropylene.

To mark Welded pipes made from steel of various strength grades, the outer surface of the coating may be marked using light- and temperature-stabilized polyethylene compositions of various colors. Markings are applied using the transverse extrusion method.

The polyethylene coating is stripped from pipe ends over the length agreed with the customer. At the option of the customer, to provide protection against atmospheric corrosion, uncoated pipe ends may be covered using an easily removable preservation coating.

## LIMITS, PURPOSE

Title of regulatory document	Purpose of coated pipes
<b>THREE-LAYER COATING BASED ON EXTRUDED POLYETHYLENE</b>	
DIN 30670:2012 Polyethylene coatings on steel pipes and fittings. Requirements and testing	For protection of underground or offshore steel pipelines with operating temperatures of minus 40 to plus 80 °C
ISO 21809-1 Petroleum and natural gas industries. Outer coatings for buried or submerged pipelines used in pipeline transportation systems. Part 1: Polyolefin coatings (3-layer PE and 3-layer PP)	For anti-corrosion protection of welded and seamless steel pipes used in pipeline transport systems for oil and natural gas transportation
CAN CSA Z245.21-14 Plant-applied external coatings for steel pipes	For underground or subsea oil and gas pipeline systems
Title of regulatory document	Purpose of coated pipes
DIN 30678-2013 Polypropylene coatings for steel pipes and fittings. Requirements and testing	For construction of underground and subsea pipelines to carry liquids or gases with operating temperatures of minus 20 to plus 110 °C
ISO 21809-1 Petroleum and natural gas industries. Outer coatings for buried or submerged pipelines used in pipeline transportation systems. Part 1: Polyolefin coatings (3-layer PE and 3-layer PP)	For anti-corrosion protection of welded and seamless steel pipes used in pipeline transport systems for oil and natural gas transportation

## SIZES

Diameter of coated pipes (mm)	Length (m)	Wall thickness (mm)
<b>Three-Layer Coating Based on Extruded Polyethylene</b>		
219-426 (seamless)	8.5-12.3	6-16
508-1420 (Welded)	10.0-18.3	7.0-46.0
<b>Three-Layer Coating Based On Extruded Polypropylene</b>		
508-1420 (Welded)	10.0-18.3	8.0-46.0

## PARAMETERS OF THREE-LAYER POLYETHYLENE COATING

## Permissible ambient temperature:

- during transportation, construction, installation, and pipe-laying operations: minus 50 °C to plus 60 °C;
- during storage of coated pipes: minus 60 °C to plus 60 °C;
- during operation: minus 40 °C to plus 80 °C.

Description of Parameter	Parameter Value		
	DIN 30670	ISO 21809-1	"CAN CSA Z245.21-14 (System B.1)"
1. Total coating thickness*, mm, not less than, for pipes with a diameter, mm:			
219 and up to and including 250.	2,0	Depending on pipe weight and coating class: from 1.5 to 4.2 mm	2,0
over 250 and up to and including 500.	2,2		2,2
over 500 and up to and including 800.	2,5		2,5
over 800	3,0		3,0
2. Dielectric strength, not less than			
	10 kV/mm, but not more than 25 kV		10 V/μm, but not more than 15,000 V
3. Coating adhesion at testing temperature:			
a) (25±10) °C;	≥100 N/cm (N), ≥150 N/cm (S)	≥15 N/mm	≥150 N/cm
b) (70±5) °C	≥30 N/cm (S)	-	-
c) (80±5) °C	-	≥3 N/mm	-
4. Impact toughness, J/mm of thickness, at temperature of:			
a) minus (40±2) °C;		#VALUE!	
b) (25±10) °C;		≥7	
5. Peel-off radius during cathodic polarization (mm)			
a) (20±5) °C / 28 days / -1.5 V;	≤7	≤7	≤12
b) (65±3) °C / 24 h / -3.5 V;	-	≤7	≤7
c) at maximum operating temperature / 28 days / -1.5 V	-	≤15	-
6. Ultimate tensile yield strength (MPa):			
	-	-	≥17
7. Elongation at break (%)			
	≥400	≥400	≥300
8. Coating penetration resistance, mm, during temperature tests:			
a) (20±3) °C;	≤0.2	≤0.2	-
b) at maximum temperature	≤0.3 (N, 50 °C), ≤0.4 (S, 70 °C)	≤0.4	-
9. Stability during application (Δ MFR), %			
	≤20	≤20	-
10. Plasticity			
	-	Without cracking	-
11. Testing by immersion in hot water (mm)"			
	-	Average ≤2, maximum ≤3	-
Residual magnetism (mTL)			
	-	0	≤3

\* The table shows the standard coating thickness

\* The complete list of tests depending on the type (class) of coating and diameter of coated pipes is provided in the standard

## PARAMETERS OF THREE-LAYER POLYETHYLENE COATING

### Permissible ambient temperature:

- during transportation, construction, installation, and pipe-laying operations: minus 20 °C to plus 60 °C;
- during storage of coated pipes: minus 20 °C to plus 60 °C;
- during operation: minus 20 °C to plus 110 °C.

Description of Parameter	Parameter Value	
	DIN 30670	ISO 21809-1
1. Total coating thickness*, mm, not less than, for pipes with a diameter, mm:		
219 and up to and including 250.	2,0	Depending on pipe weight and coating class
over 250 and up to and including 500.	2,2	
over 530 and up to and including 820.	2,5	
over 500	2,5	
2. Dielectric strength, not less than	25 kV	10 kV/mm, but not more than 25 kV
3. Coating adhesion at testing temperature:		
a) 23°C;	≥250 N/cm	≥25 N/mm
b) 90 °C or maximum temperature if >90°C	≥40 N/cm	≥4 N/mm
4. Impact toughness, J/mm of thickness, at temperature of 23 °C	≥10	≥10
5. Peel-off radius during cathodic polarization (mm)		
a) 23°C / 28 days / -1.5 V;	≤7	≤7
b) 65°C / 24 h / -3.5 V;	≤7	≤7
c) maximum temperature / 28 days / -1.5 V	≤15 (90 °C)	≤15
6. Elongation at break (%)	≥400	≥400
7. Stability during application (Δ MFR), %	≤20	≤35
8. Coating penetration resistance, mm, during temperature tests:		
a) 23°C;	≤0.1	≤0.1
b) at maximum temperature	≤0,4	≤0.4 (at maximum operating temperature)

\* The complete list of tests depending on the type (class) of coating and diameter of coated pipes is provided in the standard



# EPOXY COATING

The Epoxy coating is designed to reduce the hydraulic resistance of pipelines and also to protect the inner surface of pipes against atmospheric corrosion during shipping, storage, construction and installation operations.

Coated pipes with end caps protects pipe integrity during transportation, loading and unloading, and construction and installation options in the range of minus 45 to plus 60°C, and during storage in the range of minus 60 to plus 60°C.

The delivery package of pipes with an Epoxy coating includes:

- coated pipes;
- a quality certificate that includes data on steel pipes, the outer anti-corrosion coating (if any), and the Epoxy coating;
- polyethylene caps for protecting the faces of pipe ends and the Epoxy coating.

Chelpipe has been making pipes with internal flow coatings or anti-corrosion coatings since 2009. The plant currently owns two lines for applying the Epoxy coating onto pipes.

## LIMITS, PURPOSE

Title of regulatory document	Purpose of coated pipes
<p>API RP 5L2-2002 Recommended practice for internal coating of line pipe for non-corrosive gas transmission service</p>	<p>They are intended for use in construction, retrofitting, and overhauling gas transmission pipelines and their branch lines, including offshore gas pipelines.</p>

## SIZES

Diameter of coated pipes (mm)	Length (m)	Wall thickness (mm)
<p>508-1420 720-1420</p>	<p>10.6-12.2 10.6-18.3</p>	<p>7-45</p>

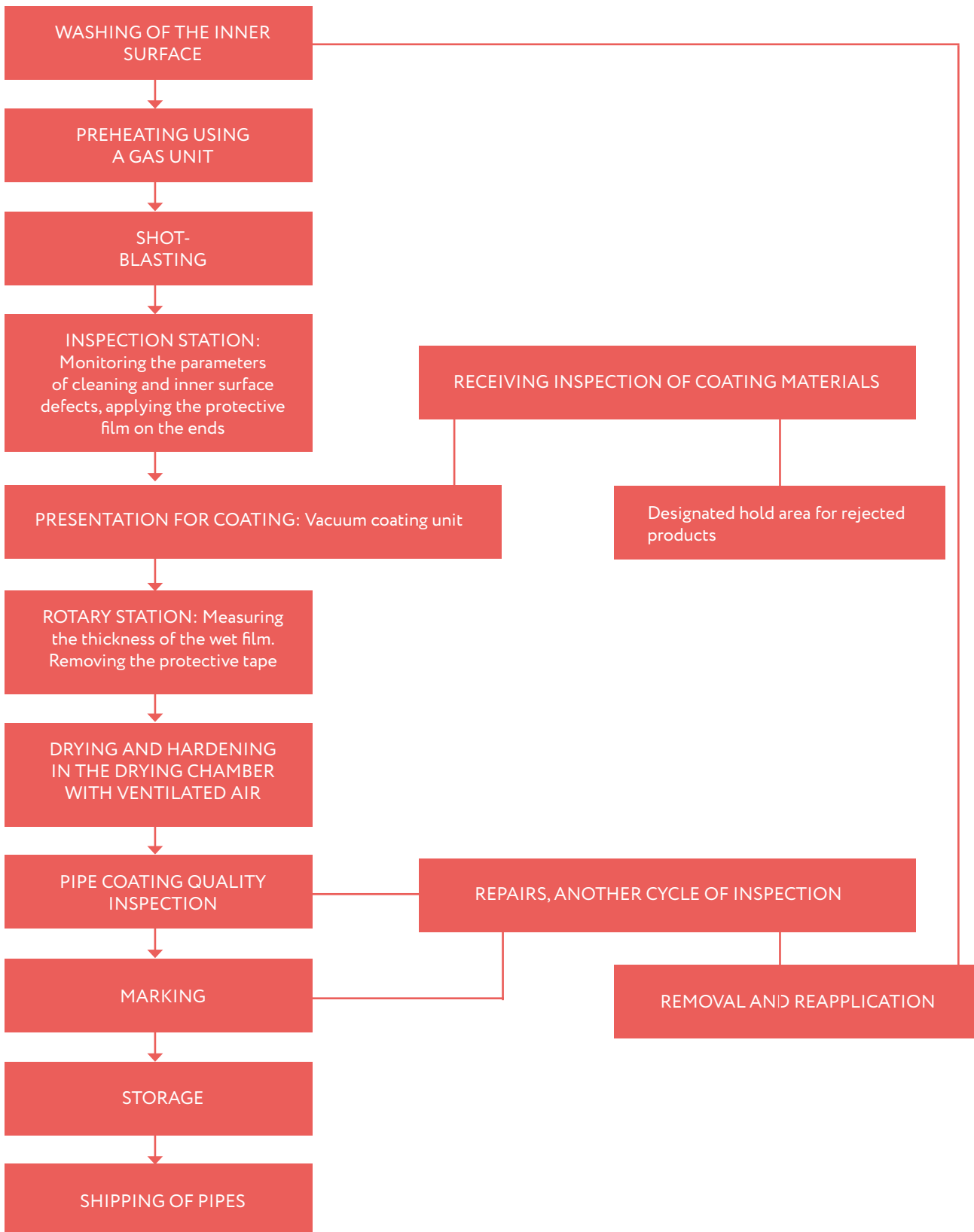
At the buyer's option, a pipe 530 mm in diameter and up to 18.3 m long can be coated.

## EPOXY COATING PARAMETERS

Internal flow coating	
Test*	Acceptance criterion
Coating thickness	"As agreed with the buyer. If thickness is not specified, then not less than 1.5 mil (38 μm) "
Salt spray corrosion resistance at 35°C during 500 hours	"No blistering or peeling at a distance of more than 0.125" (3.2 mm) from the notch"
Immersion in water	No blistering more than 0.25" (6.3 mm) from edges
Mixture of methanol and water, equal volume fractions	No blistering more than 0.25" (6.3 mm) from edges
Film peel-off	Absence of peeling in the form of strips
Bending	In case of the diameter of ≥0.5" (13 mm), the plate should not show signs of flaking, loss of adhesion, or cracking of the surface.
Coating adhesion measured using the cross-cut test (points), not more than	No peeling outside the notches
Buchholz hardness	≥94
Gas blistering	No signs of blistering
Hydraulic blistering	No signs of blistering
Abrasion	≥23 (abrasion coefficient)

\* For the complete list of tests, see API 5L2

# PROCESS FLOWCHART AND EQUIPMENT OF THE EPOXY COATING APPLICATION PROCESS



This reference catalog is not a technical regulatory document. Its purpose is providing general information about tubular goods produced by plants of Chelpipe Group.

Chelpipe shall not be responsible or liable for any losses resulting from damages, emergencies (including environmental emergencies), damage and injuries resulting from the use of information contained in this catalog. Sizes, technical specifications, and standards must be agreed upon with engineering services of Chelpipe. The catalog provides information on tubular goods made by plants of Chelyabinsk Pipe Rolling Plant and Pervouralsk New Pipe Plant.

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