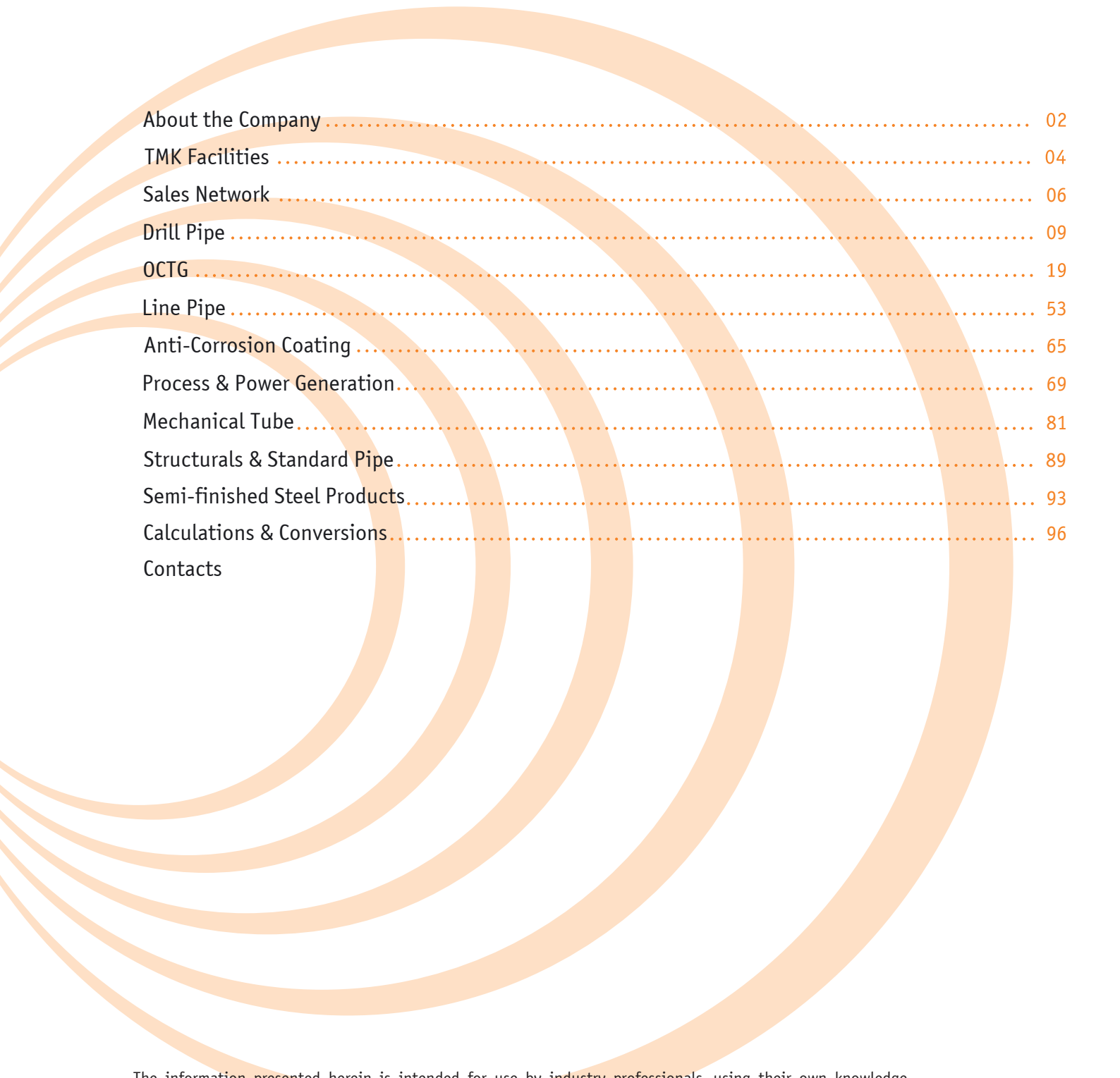




Tube & Pipe
Technical Catalog

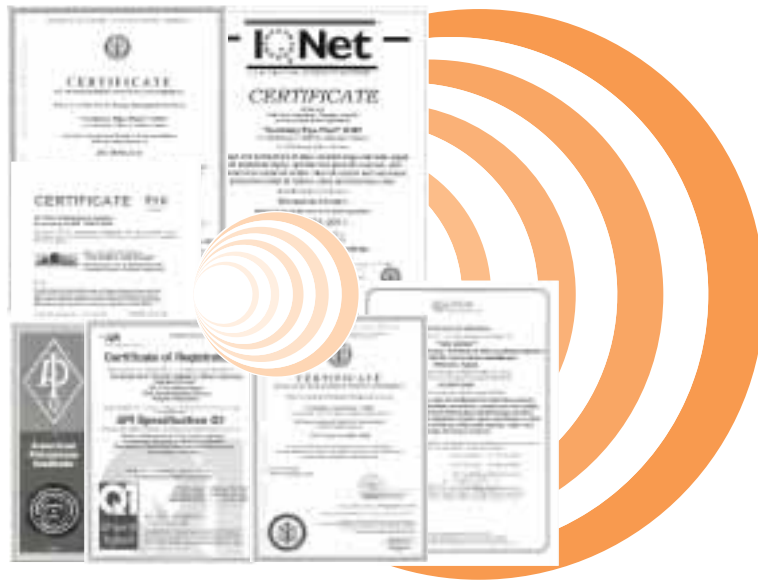




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The information presented herein is intended for use by industry professionals, using their own knowledge, experience and expertise. Although we have endeavored to provide accurate information and calculations, such information may be subject to change or correction, and OAO TMK and its affiliates take no responsibility for the reliance on or use of any information contained herein.

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TMK is a leading global supplier of tubular products for the oil and gas sector. TMK integrates 28 operations located in Russia, the USA, Canada, Romania, Oman, UAE and Kazakhstan, as well as two R&D centers in Russia and the USA.

TMK's Russian Division operates four of the leading pipe manufacturers in Russia – Volzhsky Pipe Plant, Seversky Tube Works, Sinarsky Pipe Plant and Taganrog Metallurgical Works, as well as four oilfield services companies – Orsky Machine Building Plant, Truboplast (Ekaterinburg), TMK NGS-Nizhneartovsk (Nizhneartovsk, the Khanty-Mansiysk Autonomous District) and TMK NGS-Buzuluk. TMK-Kazrubprom, specializing in casing and tubing production, is also part of TMK's Russian Division.

The European Division is comprised by production facilities located in Romania: TMK-Artrom and TMK-Resita.

TMK's American Division includes twelve production assets in the USA and Canada consolidated into TMK IPSCO. These assets produce seamless and welded pipes for the oil and gas sector (Ambridge PA, Camanche IA, Geneva NE, Wilder KY, Blytheville AR), finished pipes and premium threaded connections (Catoosa OK, Odessa TX, Houston TX, Baytown TX, Brookfield OH, Edmonton (Canada), while Koppel RA is a steelmaking facility. TMK plants produce almost the entire range of tubular goods used in the oil and gas sector, chemical and petrochemical industries, energy and machine-building, construction and municipal housing, shipbuilding, aviation, aerospace and rocket engineering, and agriculture.

The range of products manufactured by the operations of TMK Group includes: oil country tubular goods – OCTG – (seamless and welded), line pipes (seamless and welded), industrial pipes (seamless and welded), and large-diameter welded line pipes. TMK pipes are manufactured from carbon, low-alloyed, stainless and heat-resistant steels, titanium and nickel alloys and bimetals.

Products of TMK Group are produced according to international, regional, interstate, national and industry standards such as: ISO, API, ASTM, DIN EN, GOST, GOST R as well as with account of individual requirements of the customer. Compliance of TMK's Quality and Product Management System is confirmed by such recognized certification bodies as Lloyd's Register, TUV, API, IQNet, BVQI, etc. TMK's Corporate Quality Management System, implemented at all operations of the Group meets the requirements of ISO 9001:2008 international standard and is certified by an independent certification body Lloyd's Register Quality Assurance («LR EMEA»), UK.

TMK's broad market presence is ensured by its extensive global sales network. Sales are made through TMK Trade House as well as a number of other distributors. Today TMK and TMK Trade House operate in the USA, Canada, Switzerland, Germany, Italy, China, Singapore, UAE, Oman, South Africa, Kazakhstan, Uzbekistan, Turkmenistan and Azerbaijan.

TMK has a diversified sales network and supplies its products to over 80 countries. TMK's main export markets are Europe, the Middle East, North Africa, South and Southeast Asia and the CIS.

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



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SALES NETWORK

TMK's Major Customers

RUSSIAN OIL & GAS COMPANIES

SIBNEFT TRANSNEFTPRODUCT
 TATNEFT TRANSNEFT
 LUKOIL RUSSNEFT
 ROSNEFT GAZPROM
 SURGUTNEFTEGAZ

MAJOR CIS Machine Building and Energy Companies

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

MAJOR INTERNATIONAL INDEPENDENT OIL & GAS COMPANIES

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

MAJOR EPC & OILFIELD DEVELOPMENT COMPANIES

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

INTERNATIONAL STATE OIL & GAS COMPANIES

NATIONAL IRANIAN OIL COMPANY
 OGDCL
 ADCO
 SONATRACH
 PETROSA
 KUWAIT OIL COMPANY
 ONGC
 TURKISH PETROLEUM
 AGOCO
 PETROVIETNAM
 SOCAR
 KAZMUNAYGAZ
 SEPOC
 NEFTEGAZ OF UKRAINA
 CNPC
 SAUDI ARAMCO
 GROUPEMENT BERKINE
 UZBEKNEFTEGAZ
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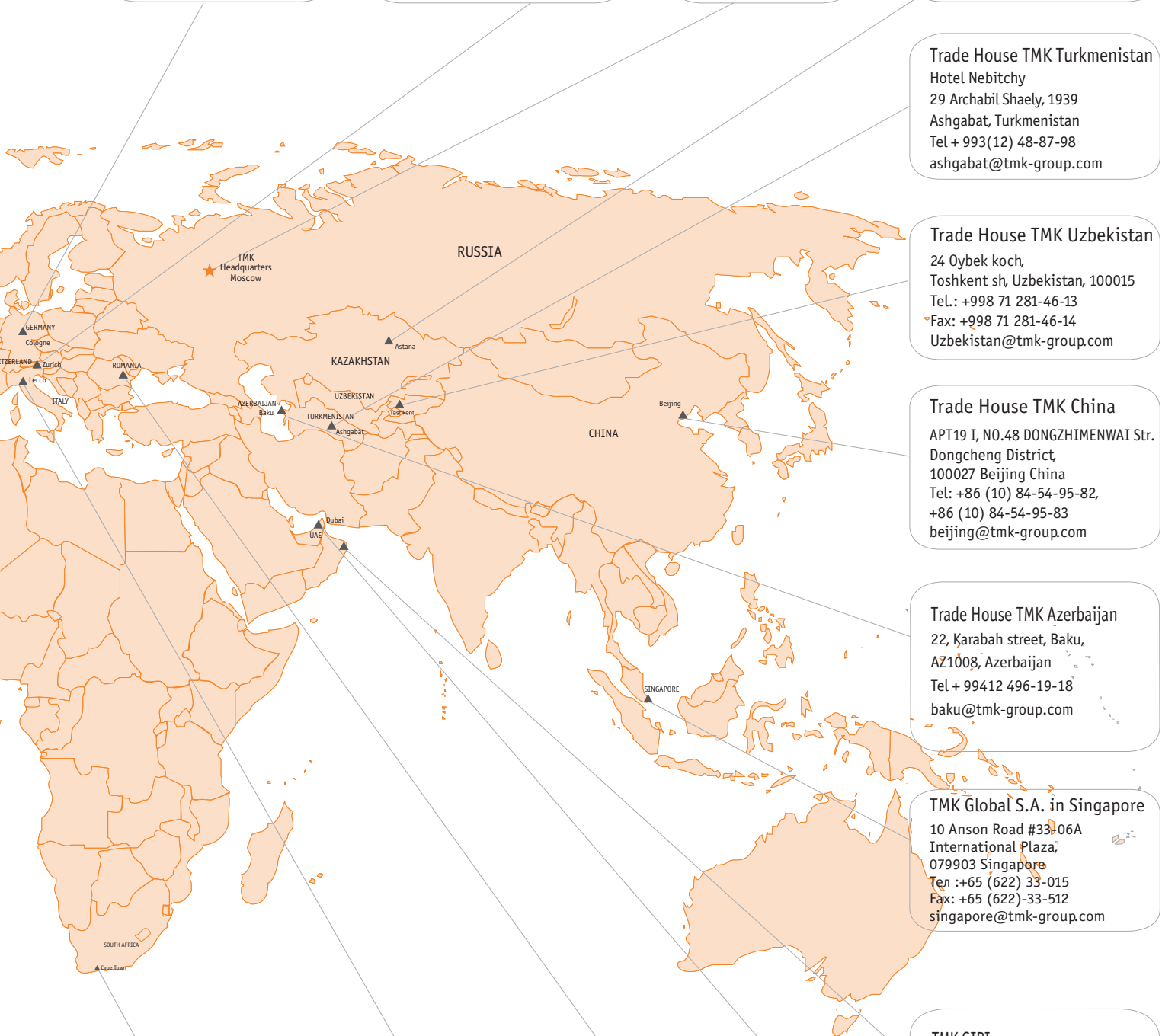
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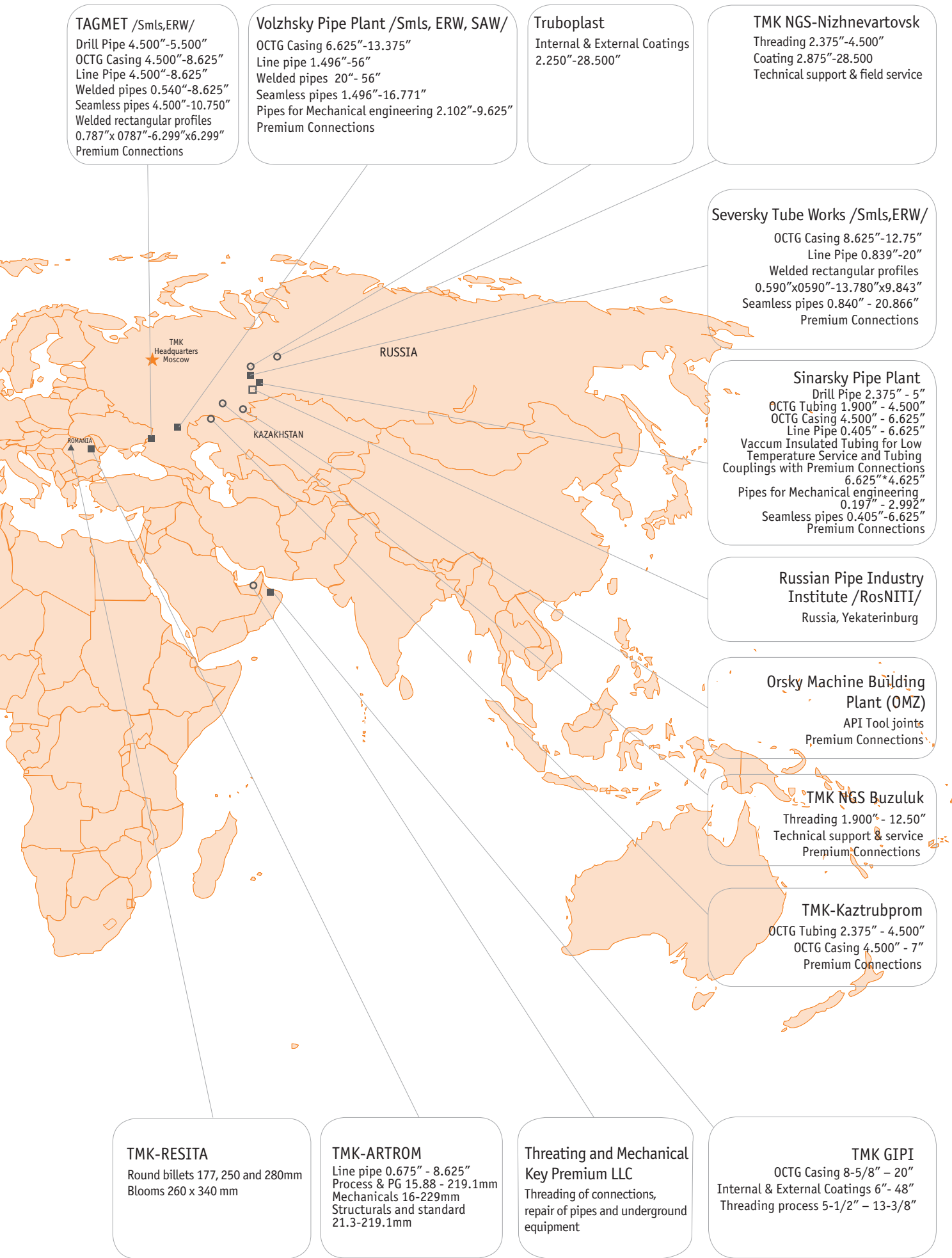
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Drill Pipe

TMK provides high quality drill pipe for the oil and gas industry. Drill pipe is produced at the Sinarsky plant (Russia), TAGMET (Russia) and green tube is manufactured at Ambridge (US). Weld-on tool joints are produced and delivered by OMZ (Russia), which is part of TMK Oilfield Services, certified by API Spec 7-1, API Spec 7-2. Pipe sizes range from 2 3/8 up to 5 1/2 inches and can be produced in grades E75, X95, G105 and S135. Ambridge drill pipe can be produced as green tube for further finishing.

During production, all pipe undergoes required heat treatment and NDT inspection. TMK drill pipe can be produced to lengths both in Range 2 and Range 3. To prevent corrosion, each pipe is covered with a protective coating. Drill pipe connections are coated with an anti-corrosion thread compound and API composite thread protectors are applied. Delivery is carried out in strict accordance to API loading and transportation standards.

Drill Pipe Producers

Plant Location	Products	OD	WT	Grades
Sinarsky Pipe Plant /Russia/	Drill Pipe	2 3/8 - 4	0.280" - 0.449"	E75, X95, G105, S135
TAGMET /Russia/	Drill Pipe	4 1/2 - 5 1/2	0.337" - 0.500"	E75, X95, G105, S135
Ambridge /US/	Green Tube	2 3/8 - 5 1/2	0.362" - 0.474"	E75, X95, G105, S135

Drill Pipe Dimensional Range and Performance Properties

Pipe Figures										
Plant	Nominal Size	Nominal Weight	Wall thickness	Inside Diameter	Grade	Upset	Tensile Yield	Torsional Yield	Internal Pressure	Collapse
	in	lb/ft	in	in			lb	ft-lb	psi	psi
	mm	kg/m	mm	mm			kN	Nm	bar	bar
3	2 3/8 60,3	6.65 9,34	0.280 7,11	1.815 46,13	E75	EU	138 214 615	6 250 8 474	15 474 1 067	15 599 1 075
		6.65 9,34	0.280 7,11	1.815 46,13	X95	EU	175 072 779	7 917 10 734	19 600 1 351	19 759 1 362
		6.65 9,34	0.280 7,11	1.815 46,13	G105	EU	193 500 861	8 751 11 864	21 663 1 493	21 839 1 505
3,A	2 7/8 73,0	10.4 15,49	0.362 9,19	2.151 54,64	E75	EU	214 344 953	11 554 15 665	16 526 1 139	16 509 1 138
		10.4 15,49	0.362 9,19	2.151 54,64	X95	EU	271 503 1208	14 635 19 842	20 933 1 443	20 911 1 441
		10.4 15,49	0.362 9,19	2.151 54,64	G105	EU	300 082 1335	16 176 21 932	23 137 1 595	23 112 1 593
		10.4 15,49	0.362 9,19	2.151 54,64	S135	EU	385 820 1716	20 798 28 198	29 747 2 051	29 716 2 048
3,A	3 1/2 88,9	13.3 19,81	0.368 9,35	2.764 70,20	E75	EU	271 569 1208	18 551 25 152	13 800 951	14 113 973
		13.3 19,81	0.368 9,35	2.764 70,20	X95	EU	343 988 1530	23 498 31860	17 480 1 205	17 877 1 232
		13.3 19,81	0.368 9,35	2.764 70,20	G105	EU	380 197 1691	25 972 35213	19 320 1 332	19 758 1 362
		13.3 19,81	0.368 9,35	2.764 70,20	S135	EU	488 825 2174	33 392 45 273	24 840 1 712	25 404 1 751
		15.5 23,09	0.449 11,4	2.602 66,10	E75	EU	322 775 1436	21 086 28 589	16 838 1 160	16 774 1 156
		15.5 23,09	0.449 11,4	2.602 66,10	X95	EU	408 848 1819	26 708 36 211	21 328 1 470	21 247 1 465
		15.5 23,09	0.449 11,4	2.602 66,10	G105	EU	451 885 2010	29 520 40 023	23 573 1 625	23 484 1 619
		15.5 23,09	0.449 11,4	2.602 66,10	S135	EU	580 995 2585	37 954 51 459	30 308 2 090	30 194 2 081
3	4 101,6	14.0 20,85	0.330 8,38	3.340 84,84	E75	IU	258 359 1269	23 288 31574	10 828 746	11 354 782
		14.0 20,85	0.330 8,38	3.340 84,84	X95	IU	361 454 1608	29 498 39 994	13 716 945	14 382 992
		14.0 20,85	0.330 8,38	3.340 84,84	G105	IU	399 502 1777	32 603 44 204	15 159 1 045	15 896 1 096

Plant designation: 3 – Sinarsky/Rus/; 4 – TAGMET/Rus/; A – Ambridge/US/

Tool Joint Figures							Assembly		
Connection	Outside Diameter	Inside Diameter	Tong Length Pin	Tong Length Box	Tensile Yield	Torsional Yield	Aprox. Weight	Torsional Ratio, pin to pipe	Make-up torque
	in	in	in	in	lb	ft-lb			ft-lb
	mm	mm	mm	mm	kN	Nm	Nm		
NC26	3 3/8 85,725	1 3/4 27,15	7 177,8	8 203,2	313 681 1 395	6 875 9 321	6.99 10,41	1.10	4 125 5 593
NC26	3 3/8 85,725	1 3/4 27,15	7 177,8	8 203,2	313 681 1 395	6 875 9 321	7.11 10,59	0.87	4 125 5 593
NC26	3 3/8 85,725	1 3/4 27,15	7 177,8	8 203,2	313 681 1 395	6 875 9 321	7.11 10,59	0.79	4 125 5 593
NC31	4 1/8 104,8	2 1/8 53,98	7 177,8	9 228,6	447 130 1 989	11 790 15 985	10.87 16,19	1.02	7 122 9 656
NC31	4 1/8 104,8	2 50,80	7 177,8	9 228,6	495 726 2 205	13 158 17 839	11.09 16,52	0.90	7 918 10 735
NC31	4 1/8 104,8	2 50,80	7 177,8	9 228,6	495 726 2 205	13 158 17 839	11.09 16,52	0.81	7 918 10 735
NC31	4 3/8 111,1	1 5/8 41,28	7 177,8	9 228,6	623 844 2 775	16 809 22 790	11.55 17,20	0.81	10 167 13 785
NC38	4 3/4 120,7	2 11/16 68,26	8 203,2	10 1/2 266,7	587 308 2 613	18 071 24 500	13.93 20,75	0.97	10 864 14 730
NC38	5 127,0	2 9/16 65,09	8 203,2	10 1/2 266,7	649 158 2 888	20 095 27 245	14.62 21,78	0.86	12 196 16 536
NC38	5 127,0	2 7/16 61,91	8 203,2	10 1/2 266,7	708 063 3 150	22 035 29 875	14.71 21,91	0.85	13 328 18 070
NC38	5 127,0	2 1/8 53,98	8 203,2	10 1/2 266,7	842 440 3 748	26 503 35 933	14.92 22,22	0.79	15 909 21 570
NC38	5 127,0	2 9/16 65,09	8 203,2	10 1/2 266,7	649 158 2 888	20 095 27 245	16.54 24,64	0.95	12 196 16 536
NC38	5 127,0	2 7/16 61,91	8 203,2	10 1/2 266,7	708 063 3 150	22 035 29 875	16.82 25,05	0.86	13 328 18 070
NC38	5 127,0	2 1/8 53,98	8 203,2	10 1/2 266,7	842 440 3 748	26 503 35 933	17.03 25,37	0.90	15 909 21 570
NC40	5 1/2 139,7	2 1/4 57,15	7 177,8	10 254,0	979 996 4 360	32 693 44 325	17.57 26,17	0.86	19 766 26 799
NC40	5 1/4 133,4	2 13/16 71,44	7 177,8	10 254,0	711 611 3 166	23 279 31 562	15.04 22,40	1.00	17 092 19 106
NC40	5 1/4 133,4	2 11/16 68,26	7 177,8	10 254,0	776 406 3 454	25 531 34 615	15.34 22,85	0.87	15 404 20 885
NC40	5 1/2 139,7	2 7/16 61,91	7 177,8	10 254,0	897 161 3 991	29 764 40 354	15.91 23,70	0.91	18 068 24 497

Drill Pipe Dimensional Range and Performance Properties

Pipe Figures										
Plant	Nominal Size	Nominal Weight	Wall thickness	Inside Diameter	Grade	Upset	Tensile Yield	Torsional Yield	Internal Pressure	Collapse
	in	lb/ft	in	in			lb	ft-lb	psi	psi
	mm	kg/m	mm	mm			kN	Nm	bar	bar
4	4 1/2 114,3	16.6 24,73	0.337 8,56	3.826 97,18	E75	IEU	330 558 1 470	30 807 41 774	9 829 678	10 392 717
		16.6 24,73	0.337 8,56	3.826 97,18	X95	IEU	418 707 1 863	39 022 52 914	12 450 859	12 765 880
		16.6 24,73	0.337 8,56	3.826 97,18	G105	IEU	462 781 2 059	43 130 58 484	13 761 949	13 825 953
		16.6 24,73	0.337 8,56	3.826 97,18	S135	IEU	595 004 2 647	55 453 75 194	17 693 1 220	16 773 1157
		20.00 29,79	0.430 10,92	3.64 92,46	E75	IEU	412 358 1 834	36 901 50 038	12 542 865	12 964 894
		20.00 29,79	0.430 10,92	3.64 92,46	X95	IEU	522 320 2 323	46 741 63 381	15 886 1 096	16 421 1132
		20.00 29,79	0.430 10,92	3.64 92,46	G105	IEU	577 301 2 568	51 661 70 052	17 558 1 211	18 149 1252
		20.00 29,79	0.430 10,92	3.64 92,46	S135	IEU	742 244 3 302	66 421 90 067	2 2575 1 557	23 335 1609
4	5 127,0	19.50 29,05	0.362 9,19	4.276 108,62	E75	IEU	395 595 1 760	41 167 55 822	9 503 655	9 962 687
		19.50 29,05	0.362 9,19	4.276 108,62	E75	IEU	395 595 1 760	41 167 55 822	9 503 655	9 962 687
		19.50 29,05	0.362 9,19	4.276 108,62	X95	IEU	501 087 2 229	52 144 70 707	12 037 830	12 026 829
		19.50 29,05	0.362 9,19	4.276 108,62	X95	IEU	501 087 2 229	52 144 70 707	12 037 830	12 026 829
		19.50 29,05	0.362 9,19	4.276 108,62	G105	IEU	553 833 2 464	57 633 78 150	13 304 918	12 999 896
		19.50 29,05	0.362 9,19	4.276 108,62	G105	IEU	553 833 2 464	57 633 78 150	13 304 918	12 999 896
		19.50 29,05	0.362 9,19	4.276 108,62	S135	IEU	712 070 3 168	74 100 100 480	17 105 1180	15 672 1 081
		19.50 29,05	0.362 9,19	4.276 108,62	S135	IEU	712 070 3 168	74 100 100 480	17 105 1180	15 672 1 081
		25.60 38,13	0.50 12,70	4.000 101,60	E75	IEU	530 144 2 358	52 257 70 860	13 125 905	13 500 931
		25.60 38,13	0.50 12,70	4.000 101,60	E75	IEU	530 144 2 358	52 257 70 860	13 125 905	13500 931

Plant designation: 3 – Sinarsky; 4 – TAGMET;

Tool Joint Figures							Assembly		
Connection	Outside Diameter	Inside Diameter	Tong Length Pin	Tong Length Box	Tensile Yield	Torsional Yield	Aprox. Weight	Torsional Ratio, pin to pipe	Make-up torque
	in	in	in	in	lb	ft-lb	lb/ft		ft-lb
	mm	mm	mm	mm	kN	Nm	kg/m		Nm
NC 46	6 1/4 158,8	3 1/4 82,55	7 177,8	10 254,0	901 164 4 009	33 228 45 057	18.37 27,35	1.09	20.396 27 657
NC 46	6 1/4 158,8	3 76,20	7 177,8	10 254,0	1 048 426 4 664	38 998 52 881	18.79 27,98	1.01	20.396 27 657
NC 46	6 1/4 158,8	3 76,20	7 177,8	10 254,0	1 048 426 4 664	38 998 52 881	18.79 27,98	0.91	23.795 32 266
NC 46	6 1/4 158,8	2 3/4 69,85	7 177,8	10 254,0	1 183 908 5 266	44 359 60 151	19.00 28,29	0.81	26.923 36 508
NC 46	6 1/4 158,75	3 76,20	7 177,8	10 254,0	1 048 426 4 664	38 998 52 881	22.09 32,89	1.07	23.795 32 266
NC 46	6 1/4 158,75	2 3/4 69,85	7 177,8	10 254,0	1 183 908 5 266	44 359 60 151	22.67 33,76	0.96	26.923 36 508
NC 46	6 1/4 158,75	2 1/2 63,50	7 177,8	10 254,0	1 307 608 5 817	49 297 66 847	22.86 34,03	0.96	29.778 40 379
NC 46	6 1/4 158,75	2 1/4 57,15	7 177,8	10 254,0	1 419 527 6 315	53 800 79 953	23.03 34,29	0.81	
NC 50	6 5/8 168,28	3 3/4 95,25	7 177,8	10 254,0	939 095 4 177	37 269 50 537	20.85 31,05	0.92	22.836 30 966
51/2 FH	7 177,8	3 3/4 95,25	8 203,2	10 254,0	1 448 407 6 443	62 903 85 296	22.28 33,17	1.53	
NC 50	6 5/8 168,28	3 1/2 88,90	7 177,8	10 254,0	1 109 920 4 937	44 456 60 282	21.45 31,94	0.86	27.076 36 715
51/2 FH	7 177,8	3 3/4 95,25	8 203,2	10 254,0	1 448 407 6 443	62 903 85 296	22.62 33,68	1.21	
NC 50	6 5/8 168,28	3 1/4 82,55	7 177,8	10 254,0	1 268 963 5 645	51 217 69 450	21.93 32,65	0.89	31.025 42 070
51/2 FH	7 177,8	3 3/4 95,25	8 203,2	10 254,0	1 448 407 6 443	62 903 85 296	22.62 33,68	1.09	
NC 50	6 5/8 168,28	2 3/4 69,85	7 177,8	10 254,0	1 551 706 6 903	63 393 85 961	22.61 33,67	0.86	38.044 51 588
51/2 FH	7 1/4 184,15	3 1/2 88,90	8 203,2	10 254,0	1 619 231 7 203	72 213 97 921	23.48 34,96	0.98	43.490 58 972
NC 50	6 5/8 168,28	3 1/2 88,90	7 177,8	10 254,0	1 109 920 4 937	44 156 59 876	26.85 39,98	0.86	27.076 36 715
51/2 FH	7 177,8	3 1/2 88,90	8 203,2	10 254,0	1 619 231 7 203	62 903 85 296	28.27 42,09	1.21	37.742 51 178

Drill Pipe Dimensional Range and Performance Properties

Pipe Figures																		
Plant	Nominal Size	Nominal Weight	Wall thickness	Inside Diameter	Grade	Upset	Tensile Yield	Torsional Yield	Internal Pressure	Collapse								
	in	lb/ft	in	in			lb	ft-lb	psi	psi								
	mm	kg/m	mm	mm			kN	Nm	bar	bar								
4	5 127,0	25.60 38,13	0.50 12,70	4.000 101,60	X95	IEU	671 515 2 987	66 192 89 756	16 625 1 147	17 100 1179								
		25.60 38,13	0.50 12,70	4.000 101,60			X95	IEU	671 515 2 987	66 192 89 756	16 625 1 147	17 100 1179						
		25.60 38,13	0.50 12,70	4.000 101,60					G105	IEU	742 201 3 302	73 159 99 204	18 375 1 267	18 900 1303				
		25.60 38,13	0.50 12,70	4.000 101,60							G105	IEU	742 201 3 302	73 159 99 204	18 375 1 267	18 900 1303		
		25.60 38,13	0.50 12,70	4.000 101,60					S135	IEU			954 259 4 245	94 062 127 548	23 625 1 629	24 300 1676		
4	5 1/2 139,7	21.90 32,62	0.361 9,17	4.778 121,36	E75	IEU	437 116 1 944	50 710 68 763			8 615 594	8 413 580						
		21.90 32,62	0.361 9,17	4.778 121,36			X95	IEU	553 681 2 463	64 233 87 100	10 912 753	10 019 691						
		21.90 32,62	0.361 9,17	4.778 121,36					G105	IEU	611 963 2 722	70 994 96 258	12 061 832	10 753 742				
		21.90 32,62	0.361 9,17	4.778 121,36							S135	IEU	786 809 3 500	91 278 123 773	15 507 1 069	12 679 874		
		24.70 36,79	0.415 10,54	4.670 118,62					E75	IEU			497 222 2 212	56 574 76 714	9 903 683	10 464 722		
		24.70 36,79	0.415 10,54	4.670 118,62							X95	IEU	629 814 2 802	71 660 97 171	12 544 865	12 933 892		
		24.70 36,79	0.415 10,54	4.670 118,62									G105	IEU	696 111 3 097	79 204 107 401	13 865 956	14 013 966
		24.70 36,79	0.415 10,54	4.670 118,62											S135	IEU	894 999 3 981	101 833 138 086
24.70 36,79	0.415 10,54	4.670 118,62	S135	IEU	894 999 3 981	101 833 138 086	17 826 1229	17 023 1 174										
24.70 36,79	0.415 10,54	4.670 118,62			S135	IEU	894 999 3 981	101 833 138 086									17 826 1229	17 023 1 174

Plant designation: 3 – Sinarsky; 4 – TAGMET;

Tool Joint Figures							Assembly		
Connection	Outside Diameter	Inside Diameter	Tong Length Pin	Tong Length Box	Tensile Yield	Torsional Yield	Aprox. Weight	Torsional Ratio, pin to pipe	Make-up torque
	in	in	in	in	lb	ft-lb			ft-lb
	mm	mm	mm	mm	kN	Nm	kg/m		Nm
NC 50	6 5/8 168,28	3 76,20	7 177,8	10 254,0	1 416 225 6 300	57 534 78 016	27.87 41,50	0.86	34.680 47026
51/2 FH	7 177,8	3 1/2 88,90	8 203,2	10 254,0	1 619 231 7 203	62 903 85 296	28.59 42,57	0.95	37.742 51178
NC 50	6 5/8 168,28	2 3/4 69,85	7 177,8	10 254,0	1 619 231 7 203	63 393 85 961	28.32 42,17	0.87	38.044 51588
51/2 FH	7 1/4 184,15	3 1/2 88,90	8 203,2	10 254,0	1 551 706 6 903	72 213 97 921	29.16 43,42	0.99	43.490 58972
51/2 FH	7 1/4 184,15	3 1/4 82,55	8 203,2	10 254,0	1 778 274 7 910	78 716 106 739	29.43 43,82	0.83	47.230 64044
51/2 FH	7 177,8	4 101,60	8 203,2	10 254,0	1 265 802 5 631	55 687 75 512	23.77 35,39	1.11	33.560 45507
51/2 FH	7 177,8	3 3/4 95,25	8 203,2	10 254,0	1 448 407 6 443	62 903 85 296	24.53 36,53	0.98	37.742 51178
51/2 FH	7 1/4 184,15	3 1/2 88,9	8 203,2	10 254,0	1 619 231 7 203	72 213 97 921	25.38 37,79	1.02	43.490 58972
51/2 FH	7 1/2 190,50	3 76,20	8 203,2	10 254,0	1 925 536 8 566	86 765 117 653	26.50 39,46	0.96	52.302 70922
51/2 FH	7 177,8	4 101,60	8 203,2	10 254,0	1 265 802 5 631	55 687 75 512	26.33 39,21	0.99	33.560 45507
51/2 FH	7 1/4 184,15	3 1/2 88,9	8 203,2	10 254,0	1 619 231 7 203	72 213 97 921	27.85 41,47	1.01	43.490 58972
51/2 FH	7 1/4 184,15	3 1/2 88,9	8 203,2	10 254,0	1 619 231 7 203	72 213 97 921	27.85 41,47	0.92	43.490 58972
51/2 FH	7 1/2 190,50	3 76,20	8 203,2	10 254,0	1 925 536 8 566	86 765 117 653	27.77 41,35	0.86	52.302 70922

Drill Pipe Flowchart

1. Inspection table



2. Heating



5. Heat treatment of pipe



6. Quenching. Water cooling



9. Ultrasonic NDT of pipe and MPI of pipe end



10. Pipe ready for welding



12. Heating and heat treatment of weld area



13. Finish machining of weld area



16. Inspection, weighing, marking, stamping



17. Finished drillpipe



3. Upsetting



4. Magnetic particle inspection (MPI) of pipe end



7. Tempering



8. Straightening



- a. Tool-joint delivery from Manufacturer
- b. Tool-joint depreservation
- c. Incoming inspection of tool-joint



11. Friction welding of tool-joint to drill pipe



14. Seam test for bending



15. Flaw detecting of weld point

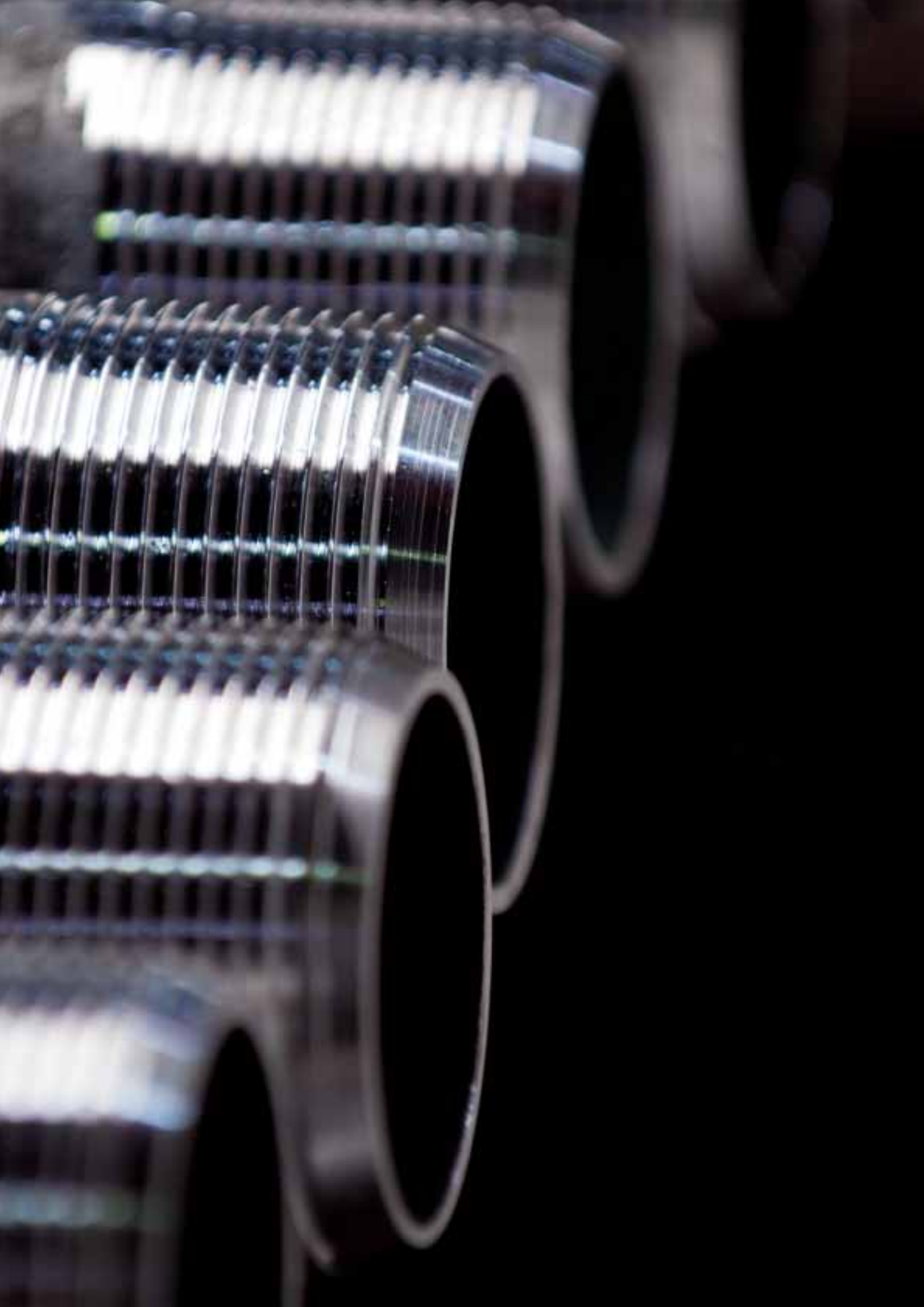


18. Paint pipe body and protection of treading



19. Storage







OCTG

TMK provides a wide range of high quality casing and tubing as well as related services for the oil and gas industry. Casing and tubing is available in carbon and alloy grades produced by seamless and ERW methods at Russian and US facilities according to API Spec 5CT.

We utilize the latest technologies throughout our steel and pipe production and finishing processes. All OCTG casing and tubing undergoes ultrasonic and electromagnetic NDT inspection per API Spec 5CT. Pipe ends and couplings are tested using luminescent magnetic fluid. Tensile, flattening and hydrostatic tests are carried out according to specifications and/or upon customer request. Outside pipe surfaces are covered with black lacquer. Threads are covered with compound and protectors.

To operate in the most challenging environments and conditions, we offer TMK and ULTRA premium connections. For more information and performance properties, please refer to our Premium Connections catalog.

Tubing Producers

Plant Location	OD	WT	Grades	Method
Sinarsky Tube Works /Russia/	2 3/8 - 4 1/2	0.179" - 0.375"	J55, K55, L80 type1, N80 type 1, N80Q C90, C95, P110	Seamless
Kaztrubprom /Kazakhstan/	2 3/8 - 4 1/2	0.190" - 0.415"	K55, L80, N80, C95, P110	Seamless
Ambridge /US/	2 3/8 - 4 1/2	0.190" - 0.476"	J55, L80, N80, P110	Seamless
Blytheville /US/	2 3/8 - 4 1/2	0.190" - 0.271"	J55, L80, N80Q, P110	ERW

Casing Producers

Plant Location	OD	WT	Grades	Method
Volzhsy Pipe Plant /Russia/	7 - 13 3/8	0.352" - 0.595"	J55, K55, M65, L80, N80 type1, N80Q, C90, C95, T95, P110, Q125	Seamless
Seversky Tube Works /Russia/	8 5/8 - 10 3/4	0.352" - 0.595"	J55, K55, L80, N80Q, C95, P110	Seamless
Seversky Tube Works /Russia/	6 5/8 - 20	0.231" - 0.500"	H40, J55, K55	ERW
Sinarsky Pipe Plant /Russia/	4 1/2 - 6 5/8	0.250" - 0.500"	J55, K55, L80 type 1, N80 type1, N80Q, C90, C95, P110, Q125	Seamless
TAGMET /Russia/	4 1/2 - 8 5/8	0.288" - 0.500"	H40, J55, K55, L80 type 1, N80Q, C95, P110	Seamless
Kaztrubprom/Kazakhstan/	4 1/2 - 6 5/8	0.250" - 0.495"	K55, N80, L80, C95, P110	Seamless
Ambridge /US/	4 1/2 - 5 1/2	0.205" - 0.500"	J55, L80, N80, P110, Q125	Seamless
Blytheville /US/	4 1/2	0.205" - 0.290"	I65, J55, I80, N80, I100, HCL80, HCP110	ERW
Camanche/US/	4 1/2 - 8 5/8	0.225" - 0.408"	H40, J55, I65, N80, I80, I100, HCL80, HCP110	ERW
Wilder /US/	4 1/2 - 16	0.205" - 0.545"	J55, N80, HCL80, HCP110	ERW
TMK GIPI/Oman*	8-5/8-20"	0/264"-0/635"	J55, H40, K55, N80-1	ERW

* Threading process 5-1/2"-13-3/8" BTC, LTC

Tubing Dimensional Range and Performance Properties 2 3/8 - 2 7/8

Method	Plant	Size O.D.	Weight lb/ft		Grade	Dimensions, in					Performance Properties					
			Threaded & Coupled			Wall Thickness	Inside Diameter	Drift Diameter	Coupling Outside Diameter		Special Clearance	Collapse, psi	Burst, psi			
			Non-Upset	Upset					Non-Upset	Upset Regular			Internal Yield Pressure			
													Plain-end & Non-Upset	Upset Regular	Special Clearance	Integral Joint
S	3	2 3/8	4.00		J55	0.167	2.041	1.947	2.875			7190	6770			
S	3			L80	9980							9840				
S	3			N80	9980							9840				
S	3			C90	10940							11070				
S, ERW	3, A, B	2 3/8	4.60	4.70	J55	0.19	1.995	1.901	2.875	3.063	2.910	8100	7700	7700	7700	
S, ERW	3, A, B				L80							11780	11200	11200	11200	
S, ERW	3, A, B				N80							11780	11200	11200	11200	
S	3				C90							13250	12600	12600	12600	
					T95							13980	13300	13300	13300	
S, ERW	3, A, B				P110							16130	15400	15400	15400	
S, ERW	3, A, B	2 3/8	5.80	5.95	L80	0.254	1.867	1.773	2.875	3.063	2.910	15280	14970	14860	11440	
S, ERW	3, A, B				N80							15280	14970	14860	11440	
S	3				C90							17190	16840	16720	12870	
					T95							18150	17780	17650	13580	
S, ERW	3, A, B				P110							21010	20590	20430	15730	
S	A	2 3/8	6.60		L80	0.295	1.785	1.691				17410	17390			
				C90	19580							19560				
				T95	20670							20650				
		2 3/8	7.35	7.45	C90	0.336	1.703	1.609		3.063	2.910	21860	22280	16720		
					T95							23080	23520	17650		
S, ERW	3, A, B	2 7/8	6.40	6.50	J55	0.217	2.441	2.347	3.500	3.668	3.460	7680	7260	7260	7260	
S, ERW	3, A, B				L80							11170	10570	10570	10570	
S, ERW	3, A, B				N80							11170	10570	10570	10570	
S	3				C90							12380	11890	11890	11890	
					T95							12940	12550	12550	12550	
S, ERW	3, A, B				P110							14550	14530	14530	14530	
S	3, A	2 7/8	7.80	7.90	L80	0.276	2.323	2.229	3.500	3.668	3.460	13890	13440	13440		
S	3, A				N80							13890	13440	13440		
S	3				C90							15620	15120	15120		
					T95							16490	15960	15960		
S	3, A				P110							19090	18480	18480		
S	3, A	2 7/8	8.60	8.70	L80	0.308	2.259	2.165	3.500	3.668	3.460	15300	15000	14940		
S	3, A				N80							15300	15000	14940		
S	3				C90							17220	16870	16810		
					T95							18170	17810	17740		
S	3, A				P110							21040	20260	20540		
S	A				2 7/8							9.35	9.45	L80	0.340	2.195
		C90	18770	18630												
		T95	19810	19660												

Method: S - seamless; ERW - electric resistance welded

Plant designation:

Russia: 1 - Volzhsky/Smls; 2 - Seversky/Smls; 2w - Seversky/ERW; 3 - Sinarsky/Smls; 4 - TAGMET/Smls/;

The USA: A - Ambridge/Smls; B - Blytheville/ERW; C - Camanche/ERW; W - Wilder/ERW/

Performance Properties					Recommended Make-up - Thread Tubing					
Tension, lb					Torque, ft x lbs					
Pipe Body Yield Strength	Joint Yield Strength				Non-Upset			Upset		
	Threaded and Coupled				Optimum	Minimum	Maximum	Optimum	Minimum	Maximum
	Non-Upset	Upset	Special Clearance	Integral Joint						
63700	41400				610	460	760			
92600	60200				830	620	1040			
92600	60200				830	620	1040			
71700	49400	71700	71700		730	550	910	1290	970	1610
104300	71800	104300	104300		990	740	1240	1760	1320	2200
104300	71800	104300	104300		1020	770	1280	1800	1350	2250
117400	80800	117400	117400		1080	810	1350	1920	1440	2400
123900	85300	123900	123900							
143400	98800	143400	143400		1340	1010	1680	2380	1790	2980
135400	102900	135400	135400		1420	1070	1780	2190	1640	2740
135400	102900	135400	135400		1460	1100	1830	2240	1680	2800
152300	115700	152300	152300		1550	1160	1940	2390	1790	2990
160700	122200	160700	160700							
186100	141500	186100	186100		1930	1450	2410	2960	2220	3700
154200										
173500										
183200										
193700										
204400										
99700	72500	99700	99700		1050	790	1310	1650	1240	2060
145000	105400	145000	145000		1430	1070	1790	2250	1690	2810
145000	105400	145000	145000		1470	1100	1840	2300	1730	2880
163100	118600	163100	163100		1570	1180	1960	2460	1850	3080
172100	125200	172100	172100							
199300	145000	199300	199300		1940	1460	2430	3050	2290	3810
180300	140700	180300	180300		1910	1430	2390	2710	2030	3390
180300	140700	180300	180300		1960	1470	2450	2770	2080	3460
202900	158300	202900	202900		2090	1570	2610	2970	2230	3710
214100	167100	214100	214100							
247900	193500	247900	247900		2590	1940	3240	3670	2750	4590
198700	159200	198700	193100		2160	1620	2700	2950	2210	3690
198700	159200	198700	193100		2210	1660	2760	3020	2270	3780
223600	179100	223600	217300		2370	1780	2960	3230	2420	4040
236000	189100	236000	229400							
273200	218900	273200	265600		2920	2190	3650	3990	2990	4990
216600		216600	193100							
243700		243700	217300							
257300		257300	229400							

Tubing Dimensional Range and Performance Properties 2 7/8 - 4

Method	Plant	Size O.D.	Weight lb/ft		Grade	Dimensions, in					Performance Properties							
			Threaded & Coupled			Wall Thickness	Inside Diameter	Drift Diameter	Coupling Outside Diameter		Special Clearance	Collapse, psi	Burst, psi					
			Non-Upset	Upset					Non-Upset	Upset Regular			Internal Yield Pressure					
													Plain-end & Non-Upset	Upset Regular	Special Clearance	Integral Joint		
		2 7/8	10.50		L80	0.392	2.091	1.997			18840	19090						
					C90									21200	21470			
					T95									22370	22670			
		2 7/8	11.50		L80	0.440	1.995	1.901			20740	21430						
					C90									23330	24100			
					T95									24630	25440			
S, ERW	3, A, B	3 1/2	7.70		J55	0.216	3.068	2.943	4.250		5970	5940						
S, ERW	3, A, B				L80										7870	8640		
S, ERW	3, A, B				N80										7870	8640		
S	3				C90										8540	9720		
S, ERW	3, A, B	3 1/2	9.20	9.30	J55	0.254	2.992	2.867	4.250	4.500	4.180	7400	6990	6990	6990			
S, ERW	3, A, B				L80							10540	10160	10160	10160			
S, ERW	3, A, B				N80							10540	10160	10160	10160			
S	3				C90							11570	11430	11430	11430			
					T95							12080	12070	12070	12070			
S, ERW	3, A, B				P110							13530	13970	13970	13970			
S	3, A	3 1/2	10.20		J55	0.289	2.922	2.797	4.250		8330	7950						
S	3, A				L80										12120	11560		
S	3, A				N80										12120	11560		
S	3				C90										13640	13010		
					T95										14390	13730		
S	3, A	3 1/2	12.70	12.95	L80	0.375	2.750	2.625	4.250	4.500	4.180	15310	15000	15000				
S	3, A				N80							15310	15000	15000				
S	3				C90							17220	16880	16880				
					T95							18180	17810	17810				
S	3, A				P110							21050	20630	20630				
S	A	3 1/2	14.30		L80	0.430	2.640	2.515			17240	17200						
					C90									19400	19350			
					T95									20480	20430			
S	A	3 1/2	15.50		L80	0.476	2.548	2.423			18800	19040						
					C90									21150	21420			
					T95									22330	22610			
		3 1/2	17.00		L80	0.530	2.440	2.315			20560	21200						
					C90									23130	23850			
					T95									24410	25170			
S	3, A	4	9.50		J55	0.226	3.548	3.423	4.750		5110	5440						
S	3, A				L80										6590	7910		
S	3, A				N80										6590	7910		
S	3				C90										7080	8900		

Method: S - seamless; ERW - electric resistance welded

Plant designation:

Russia: 1 - Volzhsky/Smls; 2 - Seversky/Smls; 2w - Seversky/ERW; 3 - Sinarsky/Smls; 4 - TAGMET/Smls/;

The USA: A - Ambridge/Smls; B - Blytheville/ERW; C - Camanche/ERW; W - Wilder/ERW/

Performance Properties					Recommended Make-up - Thread Tubing					
Tension, lb					Torque, ft x lbs					
Pipe Body Yield Strength	Joint Yield Strength				Non-Upset			Upset		
	Threaded and Coupled				Optimum	Minimum	Maximum	Optimum	Minimum	Maximum
	Non-Upset	Upset	Special Clearance	Integral Joint						
244600										
275200										
290500										
269300										
302900										
319800										
122500	89400				1210	910	1510			
178200	130000				1660	1250	2080			
178200	130000				1700	1280	2130			
	146400				1820	1360	2270			
142500	109200	142500	142500		1480	1110	1850	2280	1710	2850
207200	158900	207200	207200		2030	1520	2540	3030	2270	3790
207200	158900	207200	207200		2070	1550	2590	3200	2400	4000
233100	178700	233100	233100		2220	1670	2780	3430	2570	4290
246000	188700	246000	246000							
284900	218500	284900	284900		2740	2060	3430	4240	3180	5300
160300	127200				1720	1290	2150			
233200	185000				2360	1770	2950			
232000	185000				2410	1810	3010			
262400	208100				2590	1940	3240			
276900	219600									
294600	246200	294600			3140	2360	3930	4200	3150	5250
294600	246200	294600			3210	2410	4010	4290	3220	5360
331400	277000	331400			3440	2580	4300	4610	3460	5760
349800	292400	349800								
405000	338600	405000			4250	3190	5310	5690	4270	7110
331800										
373200										
394000										
361800										
407000										
429600										
395600										
445100										
469800										
147400	99000				1220	920	1530			
214400	144000				1680	1260	2100			
214400	144000				1720	1290	2150			
	162000				1870	1410	2340			

Tubing Dimensional Range and Performance Properties 4 - 4 1/2

Method	Plant	Size O.D.	Weight lb/ft		Grade	Dimensions, in					Performance Properties							
			Threaded & Coupled			Wall Thickness	Inside Diameter	Drift Diameter	Coupling Outside Diameter		Special Clearance	Collapse, psi	Burst, psi					
			Non-Upset	Upset					Non-Upset	Upset Regular			Internal Yield Pressure					
													Plain-end & Non-Upset	Upset Regular	Special Clearance	Integral Joint		
S	3, A	4	11.00		J55	0.262	3.476	3.351	5.000		6590	6300	6300					
S	3, A				L80											8800	9170	9170
S	3, A				N80											8800	9170	9170
S	3				C90											9590	10320	10320
					T95											9980	10890	10890
S	3, A	4	13.20		L80	0.330	3.340	3.215			12110	11550						
S	3				C90						13620	12990						
					T95						14380	13720						
		4	16.10		L80	0.415	3.170	3.045			14880	14530						
					C90						16740	16340						
					T95						17670	17250						
		4	18.90		L80	0.500	3.000	2.875			17500	17500						
					C90						19690	19690						
					T95						20780	20780						
		4	22.20		L80	0.610	2.780	2.655			20680	21350						
					C90						23260	24020						
					T95						24560	25350						
S	3, A, B	4 1/2	12.60	12.75	J55	0.271	3.958	3.833	5.200	5.563	5730	5800	5800					
S, ERW	3, A, B				L80						7500	8430	8430					
S, ERW	3, A, B				N80						7500	8430	8430					
S	3				C90						8120	9490	9490					
					T95						8410	10010	10010					
S	3, A	4 1/2	15.20		L80	0.337	3.826	3.701			11080	10480						
S	3				C90						12220	11800						
					T95						12760	12450						
		4 1/2	17.00		L80	0.380	3.740	3.615			12370	11820						
					C90						13920	13300						
					T95						14690	14040						
S	A	4 1/2	18.90		L80	0.430	3.640	3.515			13830	13380						
					C90						15560	15050						
					T95						16420	15890						
S	A	4 1/2	21.50		L80	0.500	3.500	3.375			15800	15560						
					C90						17780	17500						
					T95						18770	18470						
		4 1/2	23.70		L80	0.560	3.380	3.255			17430	17420						
					C90						19610	19600						
					T95						20700	20690						
		4 1/2	26.00		L80	0.630	3.240	3.115			19260	19600						
					C90						21670	22050						
					T95						22880	23280						

Method: S - seamless; ERW - electric resistance welded

Plant designation:

Russia: 1 – Volzhsky/Smls; 2 – Seversky/Smls; 2w – Seversky/ERW; 3 – Sinarsky/Smls; 4 – TAGMET/Smls/;

The USA: A – Ambridge/Smls; B – Blytheville/ERW; C – Camanche/ERW; W – Wilder/ERW/

Performance Properties					Recommended Make-up - Thread Tubing					
Tension, lb					Torque, ft x lbs					
Pipe Body Yield Strength	Joint Yield Strength				Non-Upset			Upset		
	Threaded and Coupled				Optimum	Minimum	Maximum	Optimum	Minimum	Maximum
	Non-Upset	Upset	Special Clearance	Integral Joint						
169200		169200						2560	1920	3200
246200		246200						3530	2650	4410
246200		246200						3600	2700	4500
276900		276900						3870	2900	4840
292300		292300								
304400										
342500										
361500										
373900										
420700										
444000										
439800										
494800										
522300										
519800										
584700										
617200										
198000	143500	198000			1740	1310	2180	2860	2150	3580
288000	208700	288000			2400	1800	3000	3940	2960	4930
288000	208700	288000			2440	1830	3050	4020	3020	5030
324000	234800	324000			2630	1970	3290	4330	3250	5410
342000	247900	342000								
352600										
396600										
418700										
393400										
442600										
467200										
439800										
494800										
522300										
502600										
565500										
596900										
554600										
623900										
658500										
612800										
689400										
727700										

Casing Dimensional Range and Performance Properties 4 1/2

Method	Plant	Size O.D.	Wall Thickness	Weight-T&C	Grade	Dimensions				Performance Properties			
				Weight Plain End		Inside Diameter	Drift diameter	Outside Diameter of Coupling	Collapse Pressure	Burst Pressure, psi			
			in	lb/ft		in	in	in	psi	Minimum Internal Yield Pressure			
									Plain End, psi	Round Thread		Buttress Thread, psi	
							Short, psi	Long, psi					
S, ERW	A,B,C,W	4 1/2	0.205	9.50 9.41	H40	4.090	3.965	5.000	2760	3190	3190		
					J55				3310	4380	4380		
					K55				3310	4380	4380		
					I65*				3600	5180	5180		
					M65				3600	5180	5180		
S, ERW	A,B,C,W	4 1/2	0.224	10.50 10.24	J55	4.052	3.927	5.000	4010	4790	4790		4790
					K55				4010	4790	4790		4790
					I65*				4430	5660	5660		5660
					M65				4430	5660	5660		5660
S, ERW	3,A,B,C,W	4 1/2	0.250	11.60 11.36	J55	4.000	3.875	5.000	4960	5350	5350	5350	5350
S	3				K55				4960	5350	5350	5350	5350
ERW	B,W				I65*				5560	6320		6320	6320
					M65				5560	6320		6320	6320
ERW	B,C,W				I80*				6350	7780		7780	7780
S, ERW	3,A,B,C,W				L80				6350	7780		7780	7780
S, ERW	3,A,B,C,W				N80				6350	7780		7780	7780
S	3				C90				6820	8750		8750	8750
S	3,A				C95				7030	9240		9240	9240
					T95				7030	9240		9240	9240
ERW	B,C				I100*				7220	9720		9720	9720
S, ERW	3,A,B,C,W				P110				7580	10690		10690	10690
S, ERW	A,B,C				HC-P110*				8650	10690		10690	10690
ERW	B,C,W				4 1/2				0.290	13.50 13.05	M65	3.920	3.795
		I80*	8540	9020			9020	9020					
		L80	8540	9020			9020	9020					
		N80	8540	9020			9020	9020					
		C95	9660	10710			10710	10710					
		P110	10690	12410			12410	12410					
		HC-P110*	11600	12410			12410	12410					
S, ERW	3,4,A	P110	14340	14420		14420	13460						
ERW	C	4 1/2	0.337	15.10 15.00	HC-P110*	3.826	3.701	5.000	15830	14420		14420	13460
					Q125				15830	16380		16380	15300

Method: S - seamless; ERW - electric resistance welded

Plant designation:

Russia: 1 - Volzhsky/Smls/; 2 - Seversky/Smls/; 2w - Seversky /ERW/; 3 - Sinarsky/Smls/; 4 - TAGMET/Smls/;

The USA: A - Ambridge /Smls/; B - Blytheville/ERW/; C - Camanche/ERW/; W - Wilder/ERW/

* Indicates TMK IPSCO proprietary grades

Performance Properties				Recommended Make-up Torque 8-Round - Thread Casing					
Tension, 1000 lbs				Torque, ft-lbs					
Pipe Body	Joint Strength			Short Thread			Long Thread		
Yield Strength	Round Thread		Buttress Thread	Optimum	Minimum	Maximum	Optimum	Minimum	Maximum
	Short	Long							
111	77			770	580	960			
152	101			1010	760	1260			
152	112			1120	840	1400			
180	113			1130	850	1410			
180	118			1180	890	1480			
165	132		203	1320	990	1650			
165	146		249	1460	1100	1830			
196	144		208	1470	1100	1840			
196	154		231	1540	1160	1930			
184	154	162	225	1540	1160	1930	1620	1220	2030
184	170	180	277	1700	1280	2130	1800	1350	2250
217		167	231				1790	1340	2240
217		188	256				1880	1410	2350
267		201	278				2190	1640	2740
267		212	291				2230	1670	2790
267		223	304				2280	1710	2850
300		223	309				2450	1840	3060
317		234	325				2580	1940	3230
317		234	325				2580	1940	3230
334		245	341				2710	2030	3390
367		279	385				3020	2270	3780
367		279	385				3020	2270	3780
249		228	295				2280	1710	2850
307		243	319				2650	1990	3310
307		257	334				2710	2030	3390
307		270	349				2760	2070	3450
364		284	374				3130	2350	3910
422		338	443				3660	2750	4580
422		338	443				3660	2750	4580
485		406	509				4400	3300	5500
485		406	509				4400	3300	5500
551		438	554				4910	3680	6140

Casing Dimensional Range and Performance Properties 5

Method	Plant	Size O.D.	Wall Thickness	Weight T&C	Grade	Dimensions				Performance Properties				
				Weight Plain End		Inside diameter	Drift diameter	Outside Diameter of Coupling	Collapse Pressure	Burst Pressure. psi				
			in	lb/ft		in	in	in	psi	Minimum Internal Yield Pressure				
										Plain End. psi	Round Thread		Buttress Thread. psi	
								Short. psi	Long. psi					
S,ERW	A,W	5	0.220	11.50	J55	4.560	4.435	5.563	3060	4240	4240			
				11.24	K55				3060	4240	4240			
					M65				3290	5010	5010			
S,ERW	3,A,W	5	0.253	13.00	J55	4.494	4.369	5.563	4140	4870	4870	4870	4870	
				12.84	K55				4140	4870	4870	4870	4870	
					M65				4590	5760	5760	5760	5760	
S,ERW	3,4,A,W	5	0.296	15.00	J55	4.408	4.283	5.563	5560	5700	5700	5700	5700	
					14.88				K55	5560	5700	5700	5700	5700
									M65	6280	6730		6730	6730
S,ERW	3,4,A,W	5	0.296	15.00	L80	4.408	4.283	5.563	7250	8290		8290	8290	
					14.88				N80	7250	8290		8290	8290
									C90	7830	9320		9320	9320
S	3,4,A	5	0.296	15.00	C95	4.408	4.283	5.563	8110	9840		9840	9840	
					14.88				T95	8110	9840		9840	9840
									P110	8850	11400		11400	11400
S,ERW	3,4,A,W	5	0.362	18.00	M65	4.276	4.151	5.563	8730	8240		8240	8240	
					17.95				L80	10500	10140		10140	9910
									N80	10500	10140		10140	9910
S	3,4,A	5	0.362	18.00	C90	4.276	4.151	5.563	11520	11400		11400	11150	
					17.95				C95	12030	12040		12040	11770
									T95	12030	12040		12040	11770
S	3,4,A	5	0.362	18.00	P110	4.276	4.151	5.563	13470	13940		13940	13620	
					17.95				Q125	14820	15840		15840	15840
S	4,A	5	0.437	21.40	M65	4.126	4.001	5.563	10370	9940		9940	9910	
					21.32				L80	12760	12240		10810	9910
									N80	12760	12240		10810	9910
S	4,A	5	0.437	21.40	C90	4.126	4.001	5.563	14360	13770		12170	11150	
					21.32				C95	15150	14530		12840	11770
									T95	15160	14530		12840	11770
S	4,A	5	0.437	21.40	P110	4.126	4.001	5.563	17550	16820		14870	13620	
					21.32				Q125	19940	19120		16900	15480
S	4,A	5	0.478	23.20	L80	4.044	3.919	5.563	13830	13380		10810	9910	
					23.11				N80	13830	13380		10810	9910
									C90	15560	15060		12170	11150
S	4,A	5	0.478	23.20	C95	4.044	3.919	5.563	16430	15890		12840	11770	
					23.11				T95	16430	15890		12840	11770
									P110	19020	18400		14870	13620
S	4,A	5	0.500	24.10	Q125	4.044	3.919	5.563	21620	20910		16900	15480	
					24.05									
S	4,A	5	0.500	24.10	L80	4	3.875	5.563	14400	14000		10810	9910	
					24.05				N80	14400	14000		10810	9910
									C90	16200	15750		12170	11150
S	4,A	5	0.500	24.10	C95	4	3.875	5.563	17100	16630		12840	11770	
					24.05				T95	17100	16630		12840	11770
									P110	19800	19250		14870	13620
S	4,A	5	0.500	24.10	Q125	4	3.875	5.563	22500	21880		16900	15480	
					24.05									

Method: S - seamless; ERW - electric resistance welded

Plant designation:

Russia: 1 – Volzhsky/Smls/; 2 – Seversky/Smls/; 2w – Seversky /ERW/; 3 – Sinarsky/Smls/; 4 – TAGMET/Smls/;

The USA: A – Ambridge /Smls/; B – Blytheville/ERW/; C – Camanche/ERW/; W- Wilder/ERW/

Performance Properties				Recommended Make-up Torque 8-Round - Thread Casing					
Tension. 1000 lbs				Torque. ft-lbs					
Pipe Body	Joint Strength			Short Thread			Long Thread		
Yield Strength	Round Thread		Buttress Thread	Optimum	Minimum	Maximum	Optimum	Minimum	Maximum
	Short	Long							
182	133			1330	1000	1660			
182	147			1470	1100	1840			
215	155			1550	1160	1940			
208	169	182	252	1690	1270	2110	1820	1370	2280
208	186	201	309	1860	1400	2330	2010	1510	2510
245	196	212	288	1960	1470	2450	2120	1590	2650
241	207	223	293	2070	1550	2590	2230	1670	2790
241	228	246	359	2280	1710	2850	2460	1850	3080
284		259	334				2590	1940	3240
350		295	379				3080	2310	3850
350		311	396				3140	2360	3930
394		311	404				3380	2540	4230
416		326	424				3560	2670	4450
416		326	424				3560	2670	4450
481		388	503				4170	3130	5210
343		331	402				3310	2480	4140
422		376	457				3930	2950	4910
422		396	477				4000	3000	5000
475		396	487				4310	3230	5390
501		416	512				4550	3410	5690
501		416	512				4550	3410	5690
580		495	606				5310	3980	6640
659		535	661				5930	4450	7410
407		409	478				4090	3070	5110
501		466	510				4860	3650	6080
501		490	536				4950	3710	6190
564		490	536				5340	4010	6680
595		515	563				5620	4220	7030
595		515	563				5620	4220	7030
689		613	671				6580	4940	8230
783		662	724				7340	5510	9180
543		513	510				5350	4010	6690
543		540	536				5450	4090	6810
611		540	536				5880	4410	7350
645		567	563				6200	4650	7750
645		567	563				6200	4650	7750
747		675	671				7250	5440	9060
849		729	724				8090	6070	10110
565		538	510				5610	4210	7010
565		567	536				5720	4290	7150
636		567	536				6170	4630	7710
672		595	563				6500	4880	8130
672		595	563				6500	4880	8130
778		708	671				7600	5700	9500
884		765	724				8490	6370	10610

Casing Dimensional Range and Performance Properties 5 1/2

Method	Plant	Size O.D.	Wall Thickness	Weight T&C	Grade	Dimensions				Performance Properties			
				Weight Plain End		Inside Diameter	Drift diameter	Outside Diameter of Coupling	Collapse Pressure	Burst Pressure, psi			
			in	lb/ft		in	in	in	psi	Minimum Internal Yield Pressure			
										Plain End, psi	Round Thread		Buttress Thread, psi
										Short, psi	Long, psi		
ERW	C	5 1/2	0.244	14.00	H40	5.012	4.887	6.050	2620	3110	3110		
S,ERW	3,A,C,W				J55				3120	4270	4270		
S	3				K55				3120	4270	4270		
					M65				3360	5050	5050		
S,ERW	3,A,C,W	5 1/2	0.275	15.50	J55	4.950	4.825	6.050	4040	4810	4810	4810	4810
S	3				K55				4040	4810	4810	4810	4810
ERW	W				I65*				4470	5690	5690	5690	5690
					M65				4470	5690	5690	5690	5690
ERW	C,W				I80*				4990	7000	7000	7000	7000
S,ERW	3,4,A,C,W	5 1/2	0.304	17.00	J55	4.892	4.767	6.050	4910	5320	5320	5320	5320
S	3,4				K55				4910	5320	5320	5320	5320
ERW	W				I65*				5510	6290		6290	6290
					M65				5510	6290		6290	6290
ERW	C,W				I80*				6290	7740		7740	7740
S,ERW	3,4,A,C,W				L80				6290	7740		7740	7740
S,ERW	3,4,A,C,W				N80				6290	7740		7740	7740
S	3				C90				6740	8710		8710	8710
					C95				6940	9190		9190	9190
					T95				6940	9190		9190	9190
ERW	C				I100*				7140	9670		9670	9670
S	3,4,A				P110				7480	10640		10640	10640
ERW	C,W				HC-P110*				8580	10640		10640	10640
		I65*	7540	7470		7470	7470						
		M65	7540	7470		7470	7470						
S	3,4,A	L80	8830	9190		9190	8990						
S	3,4,A	N80	8830	9190		9190	8990						
S	3	C90	9630	10340		10340	10120						
S	3,4,A	C95	10020	10910		10910	10680						
		T95	10020	10910		10910	10680						
S	3,4,A	P110*	11100	12640		12640	12360						
		HC-P110*	12080	12640		12640	12360						
		M65	9070	8580		8580	8580						
S	3,4,A	L80	11160	10560		9880	8990						
S	3,4,A	N80	11160	10560		9880	8990						
S	3	C90	12380	11880		11100	10120						
S	3,4,A	C95	12930	12540		11730	10680						
		T95	12930	12540		11730	10680						
S	3,4	P110	14540	14530		13580	12360						
S	3,A	Q125	16060	16510		15430	14050						
		C90	4.500	4.375		14880	14320						
		T95				15700	15100						
		C90	4.376	4.251		16510	16090						
		T95				17430	16990						
		C90	4.250	4.125		18130	17900						
		T95				19140	18890						

Method: S - seamless; ERW - electric resistance welded

Plant designation:

Russia: 1 – Volzhsky/Smls/; 2 – Seversky/Smls/; 2w – Seversky /ERW/; 3 – Sinarsky/Smls/; 4 – TAGMET/Smls/;

The USA: A – Ambridge /Smls/; B – Blytheville/ERW/; C – Camanche/ERW/; W- Wilder/ERW/

* Indicates TMK IPSCO proprietary grades

Performance Properties				Recommended Make-up Torque 8-Round - Thread Casing					
Tension, 1000 lbs				Torque, ft-lbs					
Pipe Body	Joint Strength			Short Thread			Long Thread		
Yield Strength	Round Thread		Buttress Thread	Optimum	Minimum	Maximum	Optimum	Minimum	Maximum
	Short	Long							
161	130			1300	980	1630			
222	172			1720	1290	2150			
222	189			1890	1420	2360			
262	200			2000	1500	2500			
248	202	217	300	2020	1520	2530	2170	1630	2710
248	222	239	366	2220	1670	2780	2390	1790	2990
293	225	235	309	2250	1690	2810	2420	1820	3030
293	235	253	342	2350	1760	2940	2530	1900	3160
361	274	282	373	2740	2060	3430	2950	2210	3690
273	229	247	329	2290	1720	2860	2470	1850	3090
273	252	272	402	2520	1890	3150	2720	2040	3400
323		267	340				2750	2060	3440
323		287	376				2870	2150	3590
397		320	410				3350	2510	4190
397		338	428				3410	2560	4260
397		348	446				3480	2610	4350
447		356	456				3750	2810	4690
471		374	480				3960	2970	4950
471		374	480				3960	2970	4950
496		392	503				4160	3120	5200
546		445	568				4620	3470	5780
546		445	568				4620	3470	5780
379		329	399				3380	2540	4230
379		353	442				3530	2650	4410
466		416	503				4200	3150	5250
466		428	524				4280	3210	5350
525		438	536				4620	3470	5780
554		460	563				4870	3650	6090
554		460	563				4870	3650	6090
641		548	667				5690	4270	7110
641		548	667				5960	4270	7110
431		415	503				4150	3110	5190
530		489	551				4930	3700	6160
530		502	580				5020	3770	6280
597		514	580				5430	4070	6790
630		540	609				5720	4290	7150
630		540	609				5720	4290	7150
729		643	725				6680	5010	8350
829		694	783				7470	5600	9340
707									
746									
785									
828									
861									
909									

Casing Dimensional Range and Performance Properties 5 1/2 - 7

Method	Plant	Size O.D.	Wall Thickness	Weight T&C	Grade	Dimensions				Performance Properties				
				Weight Plain End		Inside Diameter	Drift diameter	Outside Diameter of Coupling	Collapse Pressure	Burst Pressure, psi				
			in	lb/ft		in	in	in	psi	Minimum Internal Yield Pressure				
										Plain End, psi	Round Thread		Buttress Thread, psi	
										Short, psi	Long, psi			
		5 1/2	0.687	35.30 35.35	C90 T95	4.126	4.001		19680 20770	19670 20770				
		5 1/2	0.750	38.00 38.08	C90 T95	4.000	3.875		21200 22380	21480 22670				
		5 1/2	0.812	40.50 40.69	C90 T95	3.876	3.751		22650 23910	23250 24540				
		5 1/2	0.875	43.10 43.26	C90 T95	3.750	3.625		24080 25420	25060 26450				
S,ERW	4,2w	6 5/8	0.288	20.00 19.51	H40	6.049	5.924	7.390	2520	3040	3040			
S,ERW	3,4,1,2w, C,W				J55				2970	4180	4180	4180	4180	
S,ERW	3,4,1,2w				K55				2970	4180	4180	4180	4180	
S	1				M65				3190	4940	4940	4940	4940	
S	3,4,1	6 5/8	0.352	24.00 23.60	J55	5.921	5.796	7.390	4560	5110	5110	5110	5110	
S	3,4,1				K55				4560	5110	5110	5110	5110	
S	1				M65				5080	6040		6040	6040	
S	3,4,1				L80				5760	7440		7440	7440	
S	3,4,1				N80				5760	7440		7440	7440	
S	3,1				C90				6140	8370		8370	8370	
S	3,4,1				C95				6310	8830		8830	8830	
S	1				T95				6310	8830		8830	8830	
S	3,4,1				P110				6730	10230		10230	10230	
S	1				M65				7010	7160		7160	7160	
S	3,4,1	L80	8170	8810		8810	8810							
S	3,4,1	N80	8170	8810		8810	8810							
S	3,1	C90	8880	9910		9910	9910							
S	3,4,1	C95	9220	10460		10460	10460							
S	1	T95	9220	10460		10460	10460							
S	3,4,1	P110	10160	12120		12120	12120							
S	3,4,1	L80	10320	10040		10040	9820							
S	3,4,1	N80	10320	10040		10040	9820							
S	3,1	C90	11330	11290		11290	11050							
S	3,4,1	C95	11820	11920		11920	11660							
S	1	T95	11820	11920		11920	11660							
S	3,4,1	P110	13220	13800		13800	13500							
S	3,1	Q125	14540	15680		15680	15340							
S,ERW	2w,C,W	7	0.231	17.00	H40	6.538	6.413	7.656	1420	2310	2310			
ERW	2w,C,W	7	0.272	20.00 19.56	H40	6.456	6.331	7.656	1970	2720	2720			
ERW	2w,C,W				J55				2270	3740	3740			
ERW	2w				K55				2270	3740	3740			
ERW	C,W				I65*				2480	4420	4420	4420	4420	
ERW					M65				2480	4420	4420			

Method: S - seamless; ERW - electric resistance welded

Plant designation:

Russia: 1 - Volzhsky/Smls; 2 - Seversky/Smls; 2w - Seversky /ERW; 3 - Sinarsky/Smls; 4 - TAGMET/Smls/;

The USA: A - Ambridge /Smls; B - Blytheville/ERW; C - Camanche/ERW; W - Wilder/ERW/

* Indicates TMK IPSCO proprietary grades

Performance Properties				Recommended Make-up Torque 8-Round - Thread Casing					
Tension, 1000 lbs				Torque, ft-lbs					
Pipe Body	Joint Strength			Short Thread			Long Thread		
Yield Strength	Round Thread		Buttress Thread	Optimum	Minimum	Maximum	Optimum	Minimum	Maximum
	Short	Long							
935									
987									
1007									
1063									
1076									
1136									
1144									
1208									
229	184			1840	1380	2300			
315	245	266	374	2450	1840	3060	2660	2000	3330
315	267	290	453	2670	2000	3340	2900	2180	3630
373	285	309	428	2850	2140	3560	3090	2320	3860
382	314	340	453	3140	2360	3930	3400	2550	4250
382	342	372	548	3420	2570	4280	3720	2790	4650
451		396	518				3960	2970	4950
555		473	592				4730	3550	5910
555		481	615				4810	3610	6010
624		520	633				5210	3910	6510
659		546	665				5490	4120	6860
659		546	665				5490	4120	6860
763		641	786				6410	4810	8010
529		483	607				4830	3620	6040
651		576	693				5760	4320	7200
651		586	721				5860	4400	7330
732		633	742				6350	4760	7940
773		665	780				6690	5020	8360
773		665	780				6690	5020	8360
895		781	922				7810	5860	9760
734		666	783				6660	5000	8330
734		678	814				6780	5090	8480
826		732	837				7340	5510	9180
872		769	880				7740	5810	9680
872		769	880				7740	5810	9680
1010		904	1040				9040	6780	11300
1147		989	1138				10110	7580	12640
196	122			1220	920	1530			
230	176			1760	1320	2200			
316	234			2340	1760	2930			
316	254			2540	1910	3180			
374	262	288	388	2620	1970	3280	2880	2160	3600
374	273			2730	2050	3410			

Casing Dimensional Range and Performance Properties 7

Method	Plant	Size O.D.	Wall Thickness	Weight T&C	Grade	Dimensions				Performance Properties								
				Weight Plain End		Inside Diameter	Drift diameter	Outside Diameter of Coupling	Collapse Pressure	Burst Pressure, psi								
			in	lb/ft		in	in	in	psi	Minimum Internal Yield Pressure								
										Plain End, psi	Round Thread		Buttress Thread, psi					
										Short, psi	Long, psi							
S,ERW	4,1,2w,C,W	7	0.317	23.00	J55	6.366	6.241	7.656	3270	4360	4360	4360	4360					
S,ERW	4,1,2w				K55									3270	4360	4360	4360	
S	1				I65*									3540	5150		5150	5150
ERW	C,W				M65									3540	5150		5150	5150
S,ERW	4,1,W				I80*									3830	6340		6340	6340
S,ERW	4,1,W				L80									3830	6340		6340	6340
S	1				N80									3830	6340		6340	6340
S	4,1				C90									4030	7130		7130	7130
S	1				C95									4140	7530		7530	7530
S	1				T95									4140	7530		7530	7530
S,ERW	4,1,W	7	0.362	26.00	J55	6.276	6.151	7.656	4330	4980	4980	4980	4980					
S	4,1				K55									4330	4980	4980	4980	
					I65*									4810	5880		5880	5880
S	1				M65									4810	5880		5880	5880
ERW	C,W				I80*									5410	7240		7240	7240
S,ERW	4,1,C,W				L80									5410	7240		7240	7240
S,ERW	4,1,C,W				N80									5410	7240		7240	7240
					HC-L80*									7000	7240		7240	7240
S	1				C90									5740	8150		8150	8150
S	4,1				C95									5890	8600		8600	8600
S	1				T95									5890	8600		8600	8600
S,ERW	4,1, C,W				P110									6230	9960		9960	9960
ERW	C,W				HC-P110*									7800	9960		9960	9960
					I65*									6100	6630		6630	6630
S	1	M65	6100	6630		6630	6630											
S,ERW	4,1,C,W	L80	7030	8160		8160	8160											
S,ERW	4,1,C,W	N80	7030	8160		8160	8160											
		HC-L80*	7720	8160		8160	8160											
S	1	C90	7580	9180		9180	9180											
S	4,1	C95	7840	9690		9690	9690											
S	1	T95	7840	9690		9690	9690											
S,ERW	4,1,C,W	P110	8530	11220		11220	11220											
ERW	C,W	HC-P110*	9200	11220		11220	11220											
S	1	M65	7360	7360		7360	7360											
S,ERW	4,1,W	L80	8600	9060		9060	8460											
S,ERW	4,1,W	N80	8600	9060		9060	8460											
S	1	C90	9380	10190		10190	9520											
S	4,1	C95	9740	10760		10760	10050											
S	1	T95	9740	10760		10760	10050											
S,ERW	4,1,W	P110	10780	12460		12460	11640											

Method: S - seamless; ERW - electric resistance welded

Plant designation:

Russia: 1 - Volzhsky/Smls/; 2 - Seversky/Smls/; 2w - Seversky /ERW/; 3 - Sinarsky/Smls/; 4 - TAGMET/Smls/;

The USA: A - Ambridge /Smls/; B - Blytheville/ERW/; C - Camanche/ERW/; W - Wilder/ERW/

* Indicates TMK IPSCO proprietary grades

Performance Properties				Recommended Make-up Torque 8-Round - Thread Casing					
Tension, 1000 lbs				Torque, ft-lbs					
Pipe Body	Joint Strength			Short Thread			Long Thread		
Yield Strength	Round Thread		Buttress Thread	Optimum	Minimum	Maximum	Optimum	Minimum	Maximum
	Short	Long							
366	284	313	432	2840	2130	3550	3130	2350	3910
366	309	341	522	3090	2320	3860	3410	2560	4260
433		350	450				3500	2630	4380
433		364	494				3640	2730	4550
532		428	543				4280	3210	5350
532		435	565				4350	3260	5440
532		442	588				4420	3320	5530
599		479	605				4790	3590	5990
632		505	636				5050	3790	6310
632		505	636				5050	3790	6310
415	334	367	490	3340	2510	4180	3670	2750	4590
415	364	401	592	3640	2730	4550	4010	3010	5010
491		411	510				4110	3080	5140
491		428	561				4280	3210	5350
604		502	616				5020	3770	6280
604		511	641				5110	3830	6390
604		519	667				5190	3890	6490
604		511	641				5110	3830	6390
679		563	687				5630	4220	7040
717		593	722				5930	4550	7410
717		593	722				5930	4550	7410
830		693	853				6930	5200	8660
830		693	853				6930	5200	8660
549		473	571				4730	3550	5910
549		492	628				4920	3690	6150
676		587	718				5870	4480	7460
676		597	746				5970	4400	7340
676		587	718				5870	4400	7340
760		648	768				6480	4860	8100
803		683	808				6830	5120	8540
803		683	808				6830	5120	8540
929		797	955				7970	5980	9960
929		797	955				7970	5980	9960
606		554	692				5540	4160	6930
745		661	791				6610	4960	8260
745		672	823				6720	5040	8400
839		729	847				7290	5470	9110
885		768	891				7680	5760	9600
885		768	891				7680	5760	9600
1025		897	1053				8970	6730	11210

Casing Dimensional Range and Performance Properties 7 - 7 5/8

Method	Plant	Size O.D.	Wall Thickness	Weight T&C	Grade	Dimensions				Performance Properties			
				Weight Plain End		Inside Diameter	Drift diameter	Outside Diameter of Coupling	Collapse Pressure	Burst Pressure, psi			
			in	lb/ft		in	in	in	psi	Minimum Internal Yield Pressure			
										Plain End, psi	Round Thread Short, psi	Round Thread Long, psi	Buttress Thread, psi
S	4,1	7	0.498	35.00 34.61	L80	6.004	5.879	7.656	10180	9960		9240	8460
S	4,1				N80				10180	9960		9240	8460
S	1				C90				11170	11210		10390	9520
S	4,1				C95				11650	11830		10970	10050
S	1				T95				11650	11830		10970	10050
S	4,1				P110				13030	13700		12700	11640
S	1				Q125				14310	15560		14430	13220
S	1				7				0.540	38.00 37.29	L80	5.920	5.795
S	1	N80	11390	10800			9240	8460					
S	1	C90	12810	12150			10390	9520					
S	1	C95	13430	12830			10970	10050					
S	1	T95	13430	12830			10970	10050					
S	1	P110	15130	14850			12700	11640					
S	1	Q125	16740	16880			14430	13220					
S	1	7	0.625	42.70 42.59		C90	5.750	5.625					
S	1				T95	15450			14840				
S	1	7	0.687	46.40 46.36	C90	5.626	5.501		15930	15460			
S	1				T95				16820	16320			
S	1	7	0.750	50.10 50.11	C90	5.500	5.375		17220	16880			
S	1				T95				18180	17810			
		7	0.812	53.60 53.71	C90	5.376	5.251		18460	18270			
					T95				19480	19290			
		7	0.875	57.1 57.29	C90	5.250	5.125		19690	19690			
					T95				20780	20780			
ERW	2w	7 5/8	0.300	24	H40	7.025	6.900	8.500	2030	2750	2750		
S,ERW	4,2w,W	7 5/8	0.328	26.40 25.59	J55	6.969	6.844	8.500	2900	4140	4140	4140	4140
S,ERW	4,2w				K55				2900	4140	4140	4140	4140
					M65				3100	4890	4890	4890	4890
S,ERW	4,W				L80				3400	6020		6020	6020
S,ERW	4,W				N80				3400	6020		6020	6020
					C90				3610	6780		6780	6780
S	4				C95				3710	7150		7150	7150
					T95				3710	7150		7150	7150
		7 5/8	0.375	29.70 29.06	M65	6.875	6.750	8.500	4310	5590		5590	5590
S,ERW	4,W				L80				4790	6890		6890	6890
S,ERW	4,W				N80				4790	6890		6890	6890
					C90				5030	7750		7750	7750
S	4				C95				5130	8180		8180	8180
					T95				5130	8180		8180	8180
S	4				P110				5350	9470		9470	9470
ERW	W				HC-P110*				7150	9470		9470	9470

Method: S - seamless; ERW - electric resistance welded

Plant designation:

Russia: 1 – Volzhsky/Smls/; 2 – Seversky/Smls/; 2w – Seversky /ERW/; 3 – Sinarsky/Smls/; 4 – TAGMET/Smls/;

The USA: A – Ambridge /Smls/; B – Blytheville/ERW/; C – Camanche/ERW/; W- Wilder/ERW/

* Indicates TMK IPSCO proprietary grades

Performance Properties				Recommended Make-up Torque 8-Round - Thread Casing					
Tension, 1000 lbs				Torque, ft-lbs					
Pipe Body	Joint Strength			Short Thread			Long Thread		
	Yield Strength,	Round Thread		Optimum	Minimum	Maximum	Optimum	Minimum	Maximum
Short		Long	Buttress Thread						
814		734	832				7340	5510	9180
814		746	876				7460	5600	9330
916		809	876				8090	6070	10110
966		853	920				8530	6400	10660
966		853	920				8530	6400	10660
1119		996	1095				9960	7470	12450
1272		1106	1183				11150	8360	13940
877		801	832				8010	6010	10010
877		814	876				8140	6110	10180
986		883	876				8830	6620	11040
1041		931	920				9310	6980	11640
1041		931	920				9310	6980	11640
1206		1087	1095				10870	8150	13590
1370		1207	1183				12160	9120	15200
1127									
1189									
1226									
1294									
1325									
1399									
1421									
1500									
1515									
1600									
276	212			2120	1590	2650			
414	315	346	483	3150	2360	3940	3460	2600	4330
414	342	377	581	3420	2570	4280	3770	2830	4710
489	368	404	554	3680	2760	4600	4040	3030	5050
602		482	635				4820	3620	6030
602		490	659				4900	3680	6130
677		532	681				5320	3990	6650
714		560	716				5600	4200	7000
714		560	716				5600	4200	7000
555		474	629				4740	3560	5930
683		567	721				5670	4250	7090
683		575	749				5750	4310	7190
769		625	773				6250	4690	7810
811		659	813				6590	4940	8240
811		659	813				6590	4940	8240
940		769	960				7690	5770	9610
940		769	960				7690	5770	9610

Casing Dimensional Range and Performance Properties 7 5/8 - 7 3/4

Method	Plant	Size O.D.	Wall Thickness	Weight T&C	Grade	Dimensions				Performance Properties			
				Weight Plain End		Inside Diameter	Drift diameter	Outside Diameter of Coupling	Collapse Pressure	Burst Pressure, psi			
			in	lb/ft		in	in	in	psi	Minimum Internal Yield Pressure			
										Plain End, psi	Round Thread		Buttress Thread, psi
										Short, psi	Long, psi		
S,ERW	4,W	7 5/8	0.430	33.70	M65	6.765	6.640	8.500	5730	6410		6410	6410
					L80				6560	7900		7900	7900
					N80				6560	7900		7900	7900
					C90				7050	8880		8880	8880
					C95				7280	9380		9380	9380
					T95				7280	9380		9380	9380
					P110				7870	10860		10860	10860
ERW	W			HC-P110*				8800	10860		10860	10860	
S,ERW	4,W	7 5/8	0.500	39.00	L80	6.625	6.500	8.500	8820	9180		9180	9180
S,ERW	4,W				N80				8820	9180		9180	9180
					C90				9620	10330		10330	10330
S	4				C95				10000	10900		10900	10900
					T95				10000	10900		10900	10900
S,ERW	4,W				P110				11080	12620		12620	12620
ERW	W				HC-P110*				12800	12620		12620	12620
		Q125	12060	14340		14340	14340						
				L80	6.501	6.376	8.500	10810	10320		10320	9790	
			42.80	N80				10810	10320		10320	9790	
			42.43	C90				11890	11610		11610	11610	
				C95				12410	12250		12250	11620	
				T95				12410	12250		12250	11620	
				P110				13930	14190		14190	13460	
				Q125				15350	16120		16120	15290	
				L80	6.435	6.310	8.500	11510	10920		10490	9790	
			45.30	N80				11510	10920		10490	9790	
			44.71	C90				12950	12290		11810	11010	
				C95				13670	12970		12460	11620	
				T95				13670	12970		12460	11620	
				P110				15430	15020		14430	13460	
				Q125				17090	17070		16400	15290	
				L80	6.375	6.250	8.500	12040	11480		10490	9790	
			47.10	N80				12040	11480		10490	9790	
			46.77	C90				13540	12910		11810	11010	
				C95				14300	13630		12460	11620	
				T95				14300	13630		12460	11620	
				P110				16550	15780		14430	13460	
				Q125				18700	17930		16400	15290	
				C90	6.251	6.126		14760	14190				
		7 5/8	0.687	51.20				T95	15580	14980			
				50.95									
				55.30	6.125	6.000		15960	15490				
		7 5/8	0.750	55.12				T95	16850	16350			
				46.10	6.560	6.435	6.500		11340	10750			
			45.51	N80					11340	10750			
				C90					12750	12090			
				C95					13320	12760			
				T95					13320	12760			
				P110					15000	14780			
				Q125					16590	16790			

Method: S - seamless; ERW - electric resistance welded

Plant designation:

Russia: 1 – Volzhsky/Smls/; 2 – Seversky/Smls/; 2w – Seversky /ERW/; 3 – Sinarsky/Smls/; 4 – TAGMET/Smls/;

The USA: A – Ambridge /Smls/; B – Blytheville/ERW/; C – Camanche/ERW/; W- Wilder/ERW/

* Indicates TMK IPSCO proprietary grades

Performance Properties				Recommended Make-up Torque 8-Round - Thread Casing					
Tension, 1000 lbs				Torque, ft-lbs					
Pipe Body	Joint Strength			Short Thread			Long Thread		
Yield Strength	Round Thread		Buttress Thread	Optimum	Minimum	Maximum	Optimum	Minimum	Maximum
	Short	Long							
632		556	716				5560	4170	6950
778		664	820				6640	4980	8300
778		674	852				6740	5060	8430
875		733	880				7330	5500	9160
923		772	925				7720	5790	9650
923		772	925				7720	5790	9650
1069		901	1093				9010	6760	11260
1069		901	1093				9010	6760	11260
895		786	945				7860	5900	9830
895		798	981				7980	5990	9980
1007		867	1013				8670	6500	10840
1063		914	1065				9140	6860	11430
1063		914	1065				9140	6860	11430
1231		1066	1258				10660	8000	13330
1231		1066	1258				10660	8000	13330
1399		1194	1379				11940	8960	14930
998		891	1053				8910	6680	11140
998		906	1093				9060	6800	11330
1122		984	1129				9840	7380	12300
1185		1037	1187				10370	7780	12960
1185		1037	1187				10370	7780	12960
1372		1210	1402				12100	9080	15130
1559		1355	1536				13550	10160	16940
1051		947	1109				9470	7100	11840
1051		962	1152				9620	7220	12030
1183		1045	1189				10450	7840	13060
1248		1101	1251				11010	8260	13760
1248		1101	1251				11010	8260	13760
1445		1285	1477				12850	9640	16060
1643		1439	1619				14390	10790	17990
1100		997	1160				9970	7480	12460
1100		1013	1205				10130	7600	12660
1237		1100	1239				11000	8250	13750
1306		1159	1301				11590	8690	14490
1306		1159	1301				11590	8690	14490
1512		1353	1545				13530	10150	16910
1718		1515	1673				15150	11360	18940
1348									
1423									
1458									
1539									
1070									
1070									
1204									
1271									
1271									
1471									
1672									

Casing Dimensional Range and Performance Properties 8 5/8

Method	Plant	Size O.D.	Wall Thickness	Weight T&C	Grade	Dimensions				Performance Properties												
				Weight Plain End		Inside diameter	Drift diameter	Outside Diameter of Coupling	Collapse Pressure	Burst Pressure, psi												
			in	lb/ft		in	in	in	psi	Minimum Internal Yield Pressure												
										Plain End, psi	Round Thread		Buttress Thread, psi									
										Short, psi	Long, psi											
ERW	2w,C,W,G	8 5/8	0.264	24.00	J55	8.097	7.972	9.625	1370	2950	2950											
ERW	2w,G			23.6	K55					1370	2950	2950										
					M65					1420	3480	3480										
ERW	2w,C,G	8 5/8	0.304	28.00	H40	8.017	7.892	9.625	1610	2470	2470											
ERW	2w,C,W				27.04					J55*	1880	3390	3390									
										I65*	2020	4010	4010									
										M65	2020	4010	4010									
S,ERW	4,2w,C,G	8 5/8	0.352	32.00	H40	7.921	7.796	9.625	2200	2860	2860											
S,ERW	4,1,2,2w,C,W,G				31.13					J55	2530	3930	3930	3930	3930							
S,ERW	4,1,2,2w,G									K55	2530	3930	3930	3930	3930							
										I65*	2740	4640	4640	4640	4640							
										M65	2740	4640	4640	4640	4640							
S,ERW	4,2,W,G	8 5/8	0.400	36.00	J55	7.825	7.700	9.625	3450	4460	4460	4460	4460									
S,ERW	4,2,G				35.17					K55	3450	4460	4460	4460	4460							
										I65*	3760	5280	5280	5280	5280							
										M65	3760	5280	5280	5280	5280							
S,ERW	4,2,W									L80	4100	6490		6490	6490							
S,ERW	4,2,W,G									N80	4100	6490		6490	6490							
										C90	4250	7300		7300	7300							
S	4,2									C95	4350	7710		7710	7710							
										T95	4350	7710		7710	7710							
										M65	4900	5930		5930	5930							
S,ERW	4,2,W	8 5/8	0.450	40.00	L80	7.725	7.600	9.625	5520	7300		7300	7300									
S,ERW	4,2,W				39.33					N80	5520	7300		7300	7300							
										HC-L80*	7000	7300		7300	7300							
										C90	5870	8220		8220	8220							
S	4,2									C95	6020	8670		8670	8670							
										T95	6020	8670		8670	8670							
S,ERW	4,2,W									P110	6390	10040		10040	10040							
S,ERW	4,2,W				8 5/8					0.500	44.00	L80	7.625	7.500	9.625	6950	8120		8120	8120		
S,ERW	4,2,W											43.43					N80	6950	8120		8120	8120
																	C90	7490	9130		9130	9130
S	4,2		C95	7740		9640		9640	9640													
			T95	7740		9640		9640	9640													
S,ERW	4,2,W		P110	8420		11160		11160	11160													
S	2	8 5/8	0.557	49.00	L80	7.511	7.386	9.625	8570	9040		9040	9040									
S	2				48.04					N80	8570	9040		9040	9040							
										C90	9340	10170		10170	10170							
S	2									C95	9700	10740		10740	10740							
										T95	9700	10740		10740	10740							
	2									P110	10740	12430		12430	12430							
										Q125	11660	14130		14130	14130							

Method: S - seamless; ERW - electric resistance welded

Plant designation:

Russia: 1 - Volzhsky/Smls/; 2 - Seversky/Smls/; 2w - Seversky /ERW/; 3 - Sinarsky/Smls/; 4 - TAGMET/Smls/;

The USA: A - Ambridge /Smls/; B - Blytheville/ERW/; C - Camanche/ERW/; W - Wilder/ERW/; G - GIPI/ERW/

* Indicates TMK IPSCO proprietary grades

Performance Properties				Recommended Make-up Torque 8-Round - Thread Casing					
Tension, 1000 lbs				Torque, ft-lbs					
Pipe Body	Joint Strength			Short Thread			Long Thread		
Yield Strength	Round Thread		Buttress Thread	Optimum	Minimum	Maximum	Optimum	Minimum	Maximum
	Short	Long							
381	244			2440	1830	3050			
381	263			2630	1970	3290			
451	285			2850	2140	3560			
318	233			2330	1750	2910			
437	311			3110	2330	3890			
517	350			3500	2630	4380			
517	362			3620	2720	4530			
366	279			2790	2090	3490			
503	372	417	579	3720	2790	4650	4170	3130	5210
503	402	452	690	4020	3020	5030	4520	3390	5650
595	420	469	609	4200	3150	5250	4690	3520	5860
595	435	487	664	4350	3260	5440	4870	3650	6090
568	434	486	654	4340	3260	5430	4860	3650	6080
568	468	526	780	4680	3510	5850	5260	3950	6580
672	489	547	688	4890	3670	6110	5470	4100	6840
672	506	567	751	5060	3800	6330	5670	4250	7090
827		678	864				6780	5090	8480
827		688	895				6880	5160	8600
930		749	928				7490	5620	9360
982		789	976				7890	5920	9860
982		789	976				7890	5920	9860
751		649	839				6490	4870	8110
925		776	966				7760	5820	9700
925		788	1001				7880	5910	9850
925		776	966				7760	5820	9700
1040		858	1038				8580	6440	10730
1098		904	1092				9040	6780	11300
1098		904	1092				9040	6780	11300
1271		1055	1288				10550	7910	13190
1021		874	1066				8740	6560	10930
1021		887	1105				8870	6650	11090
1149		965	1146				9650	7240	12060
1212		1017	1206				10170	7630	12710
1212		1017	1206				10170	7630	12710
1404		1186	1423				11860	8900	14830
1129		983	1180				9830	7370	12290
1129		997	1222				9970	7480	12460
1271		1085	1268				10850	8140	13560
1341		1144	1334				11440	8580	14300
1341		1144	1334				11440	8580	14300
1553		1335	1574				13350	10010	16690
1765		1496	1728				14960	11220	18700

Casing Dimensional Range and Performance Properties 9 5/8

Method	Plant	Size O.D.	Wall	Weight	Grade	Dimensions				Performance Properties			
			Thickness	T&C		Inside Diameter	Drift diameter	Outside Diameter of Coupling	Collapse Pressure	Burst Pressure, psi			
				Weight Plain End						Minimum Internal Yield Pressure			
			in	lb/ft		in	in	in	psi	Plain End, psi	Round Thread		Buttress Thread, psi
							Short, psi	Long, psi					
ERW	2w,W,G	9 5/8	0,312	32,3	H40	9.001	8.845	10.625	1370	2270	2270		
ERW	2w,W,G	9 5/8	0.352	36.00	H40	8.921	8.765	10.625	1720	2560	2560		
S,ERW	1,2,2w,W,G				J55				2020	3520	3520	3520	3520
S,ERW	1,2,2w,G				K55				2020	3520	3520	3520	3520
					I65*				2190	4160	4160	4160	4160
S	1				M65				2190	4160	4160	4160	4160
S,ERW	1,2,2w,W,G	9 5/8	0.395	40.00	J55	8.835	8.679	10.625	2570	3950	3950	3950	3950
S,ERW	1,2,2w,G				K55				2570	3950	3950	3950	3950
					I65*				2770	4670	4670	4670	4670
S	1				M65				2770	4670	4670	4670	4670
S,ERW	1,2,W				L80				3090	5750		5750	5750
S,ERW	1,2,W,G				N80				3090	5750		5750	5750
S	1				C90				3260	6460		6460	6460
S	1,2				C95				3330	6820		6820	6820
S	1				T95				3330	6820		6820	6820
S	1				M65				3530	5140		5140	5140
S,ERW	1,2,W	9 5/8	0.435	43.50	L80	8.755	8.599	10.625	3810	6330		6330	6330
S,ERW	1,2,W				N80				3810	6330		6330	6330
S	1				C90				4010	7120		7120	7120
S	1,2				C95				4130	7510		7510	7510
S	1				T95				4130	7510		7510	7510
S,ERW	1,2,W				P110				4420	8700		8700	8700
EW	W				HC-P110*				5600	8700		8700	8700
S	1				M65				4280	5580		5580	5580
S,ERW	1,2,W	9 5/8	0.472	47.00	L80	8.681	8.525	10.625	4760	6870		6870	6870
S,ERW	1,2,W				N80				4760	6870		6870	6870
					HC-L80*				6000	6870		6870	6870
S	1				C90				4990	7720		7720	7720
S,ERW	1,2,W				C95				5090	8150		8150	8150
S	1				T95				5090	8150		8150	8150
S	1,2				P110				5300	9440		9440	9440
ERW	W				HC-P110*				7100	9440		9440	9440
S	1				Q125				5640	10730		10730	10730
S,ERW	1,2,W				9 5/8				0.545	53.50	L80	8.535	8.379
S,ERW	1,2,W	N80	6620	7930			7930	7930					
S	1	C90	7110	8920			8920	8920					
S	1,2	C95	7340	9410			9410	9410					
S	1	T95	7340	9410			9410	9410					
S,ERW	1,2,W	P110	7950	10900			10900	10900					
S	1	Q125	8440	12390			12390	12390					

Method: S - seamless; ERW - electric resistance welded

Plant designation:

Russia: 1 – Volzhsky/Smls; 2 – Seversky/Smls; 2w – Seversky/ERW; 3 – Sinarsky/Smls; 4 – TAGMET/Smls;

The USA: A – Ambridge/Smls; B – Blytheville/ERW; C – Camanche/ERW; W – Wilder/ERW; G – GIPI/ERW/

* Indicates TMK IPSCO proprietary grades

Performance Properties				Recommended Make-up Torque 8-Round - Thread Casing					
Tension, 1000 lbs				Torque, ft-lbs					
Pipe Body	Joint Strength			Short Thread			Long Thread		
Yield Strength	Round Thread		Buttress Thread	Optimum	Minimum	Maximum	Optimum	Minimum	Maximum
	Short	Long							
365	254			2540	1910	3180			
410	294			2940	2210	3680			
564	394	453	639	3940	2960	4930	4530	3400	5660
564	423	489	755	4230	3170	5290	4890	3670	6110
667	445	511	676	4450	3340	5560	5110	3830	6390
667	460	529	734	4600	3450	5750	5290	3970	6610
630	452	520	714	4520	3390	5650	5200	3900	6500
630	486	561	843	4860	3650	6080	5610	4210	7010
744	511	586	755	5110	3830	6390	5860	4400	7330
744	528	607	820	5280	3960	6600	6070	4550	7590
916		727	947				7270	5450	9090
916		737	979				7370	5530	9210
1031		804	1021				8040	6030	10050
1088		847	1074				8470	6350	10590
1088		847	1074				8470	6350	10590
816		679	899				6790	5090	8490
1005		813	1038				8130	6100	10160
1005		825	1074				8250	6190	10310
1130		899	1119				8990	6740	11240
1193		948	1178				9480	7110	11850
1193		948	1178				9480	7110	11850
1381		1105	1388				11050	8290	13810
1381		1105	1388				11050	8290	13810
882		745	972				7450	5590	9310
1086		893	1122				8930	6700	11160
1086		905	1161				9050	6790	11310
1086		893	1122				8930	6700	11160
1222		987	1210				9870	7400	12340
1289		1040	1273				10400	7800	13000
1289		1040	1273				10400	7800	13000
1493		1213	1500				12130	9100	15160
1493		1213	1500				12130	9100	15160
1697		1361	1650				13600	10200	17000
1244		1047	1285				10470	7850	13090
1244		1062	1329				10620	7970	13280
1399		1157	1386				11570	8680	14460
1477		1220	1458				12200	9150	15250
1477		1220	1458				12200	9150	15250
1710		1422	1718				14220	10670	17770
1943		1595	1890				15950	11960	19940

Casing Dimensional Range and Performance Properties 9 5/8 - 10 3/4

Method	Plant	Size O.D.	Wall Thickness	Weight T&C	Grade	Dimensions				Performance Properties			
				Weight Plain End		Inside Diameter	Drift diameter	Outside Diameter of Coupling	Collapse Pressure	Burst Pressure, psi			
			in	lb/ft	in	in	in	psi	Minimum Internal Yield Pressure				
									Plain End, psi	Round Thread		Buttress Thread, psi	
										Short, psi	Long, psi		
S	1,2	9 5/8	0.595	58.40 57.44	L80	8.435	8.279 8.375	10.625	7890	8650		8650	8650
S	1,2				N80				7890	8650		8650	8650
S	1				C90				8560	9740		9740	9740
S	1,2				C95				8880	10280		10280	10280
S	1				T95				8880	10280		10280	10280
S	1,2				P110				9770	11900		11900	11900
S	1				Q125				10540	13520		13520	13520
		9 5/8	0.609	59.40	C90	8.407	8.251	10.625	8970	9970			
				58.70	T95				9320	10520			
		9 5/8	0.672	64.90	C90	8.281	8.125	10.625	10800	11000			
				64.32	T95				11260	11610			
		9 5/8	0.734	70.30	C90	8.157	8.001	10.625	12600	12010			
				69.76	T95				13170	12680			
		9 5/8	0.797	75.60	C90	8.031	7.875	10.625	13670	13040			
				75.21	T95				14430	13770			
ERW	2w,G	10 3/4	0.279	32.75	H40	10.192	10.036	11.750	840	1820	1820		
ERW	2w,G	10 3/4	0.350	40.50 38.91	H40	10.050	9.894	11.750	1390	2280	2280		2280
S,ERW	2,2w,W,G				J55				1580	3130	3130		3130
S,ERW	2,2w,G				K55				1580	3130	3130		3130
					M65				1670	3700	3700		3700
S,ERW	2,2w,W,G	10 3/4	0.400	45.50 44.26	J55	9.950	9.794 9.875	11.750	2090	3580	3580		3580
S,ERW	2,2w,G				K55				2090	3580	3580		3580
					M65				2270	4230	4230		4230
S,ERW	2,2w,W,G	10 3/4	0.450	51.00 49.55	J55	9.850	9.694	11.750	2700	4030	4030		4030
S,ERW	2,2w,G				K55				2700	4030	4030		4030
					M65				2870	4760	4760		4760
S,ERW	2,W				L80				3220	5860	5860		5860
S,ERW	2,W,G				N80				3220	5860	5860		5860
S	2				C90				3400	6590	6590		6590
					C95				3480	6960	6960		6960
					T95				3480	6960	6960		6960
S,ERW	2,W				P110				3660	8060	8060		8060
					10 3/4				0.495	55.50 54.26	M65	9.760	9.604 9.625
S,ERW	2,W	L80	4020	6450		6450		6450					
S,ERW	2,W	N80	4020	6450		6450		6450					
		C90	4160	7250		7250		7250					
S	2	C95	4290	7660		7660		7660					
		T95	4290	7660		7660		7660					
S,ERW	2,W	P110	4610	8860		8860		8860					

Method: S - seamless; ERW - electric resistance welded

Plant designation:

Russia: 1 - Volzhsky/Smls/; 2 - Seversky/Smls/; 2w - Seversky /ERW/; 3 - Sinarsky/Smls/; 4 - TAGMET/Smls/;

The USA: A - Ambridge /Smls/; B - Blytheville/ERW/; C - Camanche/ERW/; W- Wilder/ERW/; G - GIPI/ERW/

* Indicates TMK IPSCO proprietary grades

Performance Properties				Recommended Make-up Torque 8-Round - Thread Casing					
Tension, 1000 lbs				Torque, ft-lbs					
Pipe Body	Joint Strength			Short Thread			Long Thread		
Yield Strength	Round Thread		Buttress Thread	Optimum	Minimum	Maximum	Optimum	Minimum	Maximum
	Short	Long							
1350		1151	1396				11510	8630	14390
1350		1167	1443				11670	8750	14590
1519		1272	1505				12720	9540	15900
1604		1341	1583				13410	10060	16760
1604		1341	1583				13410	10060	16760
1857		1564	1865				15640	11730	19550
2110		1754	2052				17540	13160	21930
1552									
1639									
1701									
1796									
1845									
1948									
1989									
2100									
367	205			2050	1540	2560			
457	314			3140	2360	3930			
629	420		700	4200	3150	5250			
629	450		819	4500	3380	5630			
743	491		806	4910	3680	6140			
715	493		796	4930	3700	6160			
715	528		931	5280	3960	6600			
845	576		916	5760	4320	7200			
801	565		891	5650	4240	7060			
801	606		1043	6060	4550	7580			
946	661		1026	6610	4960	8260			
1165	794		1190	7940	5960	9930			
1165	804		1228	8040	6030	10050			
1311	879		1287	8790	6590	10990			
1383	927		1354	9270	6950	11590			
1383	927		1354	9270	6950	11590			
1602	1080		1594	10790	8090	13490			
1037	736		1124	7360	5520	9200			
1276	884		1303	8840	6630	11050			
1276	895		1345	8950	6710	11190			
1435	979		1409	9790	7340	12240			
1515	1032		1483	10320	7740	12900			
1515	1032		1483	10320	7740	12900			
1754	1203		1745	12020	9020	15030			

Casing Dimensional Range and Performance Properties 10 3/4 - 11 3/4

Method	Plant	Size O.D.	Wall Thickness	Weight T&C	Grade	Dimensions				Performance Properties				
				Weight Plain End		Inside Diameter	Drift diameter	Outside Diameter of Coupling	Collapse Pressure	Burst Pressure, psi				
			in	lb/ft	in	in	in	psi	Minimum Internal Yield Pressure					
									Plain End, psi	Round Thread		Buttress Thread, psi		
										Short, psi	Long, psi			
S	2	10 3/4	0.545	60.70 59.45	C90	9.660	9.504	11.750	5460	7980	7980		7980	
					T95					5580	8430	8430	8430	
					P110					5880	9760	9760	9760	
					Q125					6070	11090	11090	11090	
S	2	10 3/4	0.595	65.70 64.59	C90	9.560	9.404	11.750	6760	8720	8720		8720	
					T95					6960	9200	9200	9200	
					P110					7500	10650	10650	10650	
					Q125					7920	12110	12110	12110	
		10 3/4	0.672	73.20 72.40	C90	9.406	9.250	11.750	8760	9850				
					T95					9090	10390			
		10 3/4	0.734	79.20 78.59	C90	9.282	9.126	11.750	10370	10750				
					T95					10800	11350			
		10 3/4	0.797	85.30 84.80	C90	9.156	9.000	11.750	12010	11680				
					T95					12540	12330			
		11 3/4	0.333	42.00	H40	11.084	10.928	12.750	1040	1980	1980			
		11 3/4	0.375	47.00 45.60	J55	11.000	10.844	12.750	1510	3070	3070		3070	
					K55					1510	3070	3070	3070	
					M65					1590	3630	3630	3630	
		11 3/4	0.435	54.00 52.62	J55	10.880	10.724	12.750	2070	3560	3560		3560	
					K55					2070	3560	3560	3560	
					M65					2250	4210	4210	4210	
		11 3/4	0.489	60.00 58.87	J55	10.772	10.616 10.625	12.750	2660	4010	4010		4010	
					K55					2660	4010	4010	4010	
					M65					2840	4730	4730	4730	
					L80					3180	5830	5830	5830	
					N80					3180	5830	5830	5830	
					C90					3360	6550	6550	6550	
					C95					3440	6920	6920	6920	
					T95					3440	6920	6920	6920	
					P110					3610	8010	8010	8010	
					Q125					3680	9100	9100	9100	
		11 3/4	0.534	65.00 64.03	L80	10.682	10.526 10.625	12.750	3870	6360				
					N80					3870	6360			
					C90					4060	7160			
					C95					4170	7560			
					T95					4170	7560			
					P110					4480	8750			
					Q125					4690	9940			
		11 3/4	0.582	71.00 69.48	L80	10.586	10.430	12.750	4880	6930				
					N80					4880	6930			
					C90					5130	7800			
					C95					5240	8230			
					T95					5240	8230			
					P110					5470	9530			
					Q125					5760	10840			

Method: S - seamless; ERW - electric resistance welded

Plant designation:

Russia: 1 - Volzhsky/Smls/; 2 - Seversky/Smls/; 2w - Seversky/ERW/; 3 - Sinarsky/Smls/; 4 - TAGMET/Smls/;

The USA: A - Ambridge/Smls/; B - Blytheville/ERW/; C - Camanche/ERW/; W - Wilder/ERW/

Performance Properties				Recommended Make-up Torque 8-Round - Thread Casing					
Tension, 1000 lbs				Torque, ft-lbs					
Pipe Body	Joint Strength			Short Thread			Long Thread		
Yield Strength	Round Thread		Buttress Thread	Optimum	Minimum	Maximum	Optimum	Minimum	Maximum
	Short	Long							
1573	1089		1544	10890	8170	13610			
1660	1148		1625	11480	8610	14350			
1922	1338		1912	13370	10030	16710			
2184	1503		2109	15020	11270	18790			
1708	1198		1677	11980	8990	14980			
1803	1263		1765	12630	9470	15790			
2088	1472		2077	14710	11030	18390			
2373	1653		2291	16520	12390	20650			
1915									
2021									
2079									
2194									
2243									
2367									
478	307			3070	2300	3840			
737	477		807	4770	3580	5960			
737	509		935	5090	3820	6360			
871	557		931	5570	4180	6960			
850	568		931	5680	4260	7100			
850	606		1079	6060	4550	7580			
1005	664		1074	6640	4980	8300			
951	649		1042	6490	4870	8110			
951	693		1208	6930	5200	8660			
1124	759		1201	7590	5690	9490			
1384	913		1399	9130	6850	11410			
1384	924		1440	9240	6930	11550			
1557	1011		1517	10110	7580	12640			
1643	1066		1596	10660	8000	13330			
1643	1066		1596	10660	8000	13330			
1903	1242		1877	12420	9320	15530			
2162	1396		2074	13960	10470	17450			
1505									
1505									
1693									
1788									
1788									
2070									
2352									
1634									
1634									
1838									
1940									
1940									
2246									
2552									

Casing Dimensional Range and Performance Properties 13 3/8 - 20

Method	Plant	Size O.D.	Wall Thickness	Weight T&C	Grade	Dimensions				Performance Properties									
				Weight Plain End		Inside Diameter	Drift diameter	Outside Diameter of Coupling	Collapse Pressure	Burst Pressure, psi									
			in	lb/ft		in	in	in	psi	Minimum Internal Yield Pressure									
										Plain End, psi	Round Thread		Buttress Thread, psi						
										Short, psi	Long, psi								
ERW	W,G	13 3/8	0.330	48.00	H40	12.715	12.559	14.375	740	1730	1730								
S,ERW	1,2w,W,G	13 3/8	0.380	54.50	J55	12.615	12.459	14.375	1130	2730	2730		2730						
S,ERW	1,2w,G			52.79	K55				1130	2730	2730		2730						
S	1				M65				1140	3230	3230		3230						
S,ERW	1,2w,W,G	13 3/8	0.430	61.00	J55	12.515	12.359	14.375	1540	3090	3090		3090						
S,ERW	1,2w,G			59.50	K55				1540	3090	3090		3090						
S	1				M65				1620	3660	3660		3660						
S,ERW	1,W,G	13 3/8	0.480	68.00 66.17	J55	12.415	12.259	14.375	1950	3450	3450		3450						
S	1,G				K55				1950	3450	3450		3450						
S	1				M65				2100	4080	4080		4080						
S,ERW	1,W				L80				2260	5020	5020		5020						
S,ERW	1W,G				N80				2260	5020	5020		5020						
					HC-L80*				2910	5020	5020		5020						
S	1				C90				2320	5650	5650		5650						
S	1				C95				2330	5970	5970		5970						
S	1				T95				2330	5970	5970		5970						
S,ERW	1,W				P110				2340	6910	6910		6910						
S,ERW	1,W				13 3/8				0.514	72.00	L80	12.347	12.191 12.250	14.375	2670	5380	5380		5380
S,ERW	1,W	N80	2670	5380		5380		5380											
		HC-L80*	3470	5380		5380		5380											
S	1	C90	2780	6050		6050		6050											
S	1	C95	2820	6390		6390		6390											
S	1	T95	2820	6390		6390		6390											
S,ERW	1,W	P110	2880	7400		7400		7400											
S	1	Q125	2880	8410		8410		8410											
ERW	2w,G	16	0.375	65.00		H40	15.250	15.062			17.000				630	1640	1640		1640
ERW	2w,W,G	16	0.438	75.00		J55	15.124	14.936			17.000				1020	2630	2630		2630
ERW	2w,G			72.86		K55									1020	2630	2630		2630
					M65	1020			3110	3110			3110						
ERW	W,G	16	0.495	84.00	J55	15.010	14.822	17.000	1410	2980	2980		2980						
	G			82.05	K55				1410	2980	2980		2980						
					M65				1460	3520	3520		3520						
		16	0.656	109.00 107.60	J55	14.688	14.500	17.000	2560	3950									
					K55				2560	3950									
					L80				3080	5740									
					N80				3080	5740									
					C95				3320	6820									
					P110				3470	7890									
		Q125	3520	8970															
ERW	G	18-5/8	0.435	87.50	H40	17.755	17.567	20.000	630	1630	1630								
	G			84.59	J55				630	2250	2250		2250						
	G				K55				630	2250	2250		2250						
ERW	G	18-5/8	0.594	115.00	H40	17.430	17.25	20.000	1630	3600	3600		3600						
	G			114.38	J55				1630	4950	4950		4950						
	G				K55				1630	4950	4950		4950						
ERW	G	20	0.438	94.00	H40	19.124	18.936	21.000	520	1530	1530	1530							
	G			91.59	J55				520	2110	2110	2110	2110						
	G				K55				520	2110	2110	2110	2110						
ERW	2w,G	20	0.500	106.50	J55	19.000	18.812	21.000	770	2410	2410	2410	2410						
ERW	2w,G			104.23	K55				770	2410	2410	2410	2410						
ERW	G	20	0.635	133.00	J55	18.730	18.542	21.000	1500	3060	3060	3060	3060						
	G			131.45	K55				1500	3060	3060	3060	3060						

Method: S - seamless; ERW - electric resistance welded

Plant designation:

Russia: 1 - Volzhsky/Smls/; 2 - Seversky/Smls/; 2w - Seversky /ERW/; 3 - Sinarsky/Smls/; 4 - TAGMET/Smls/;

The USA: A - Ambridge /Smls/; B - Blytheville/ERW/; C - Camanche/ERW/; W - Wilder/ERW/; G - GIPI/ERW/

* Indicates TMK IPSCO proprietary grades

Seamless Process Flowchart (PQF)

1. Billet heating in circular furnace



2. Cross-rolling piercing



3. Hydrodescaling



4. Elongating



5. Reheating



6. Hydrodescaling



7. Stretch reducing mill



8. Cutting



9. Cooling



10. Batch sawing



Casing Pipe Finishing Process

1. Control of pipe geometry



2. Heat treatment



3. Flaw-detecting



4. Geometrics inspection



5. Magnetic-fluoroscopic flaw inspection of pipe ends



6. Threading, thread inspection



7. Coupling screw-on and drifting



8. Hydrostatic testing



9. Protectors screw-on



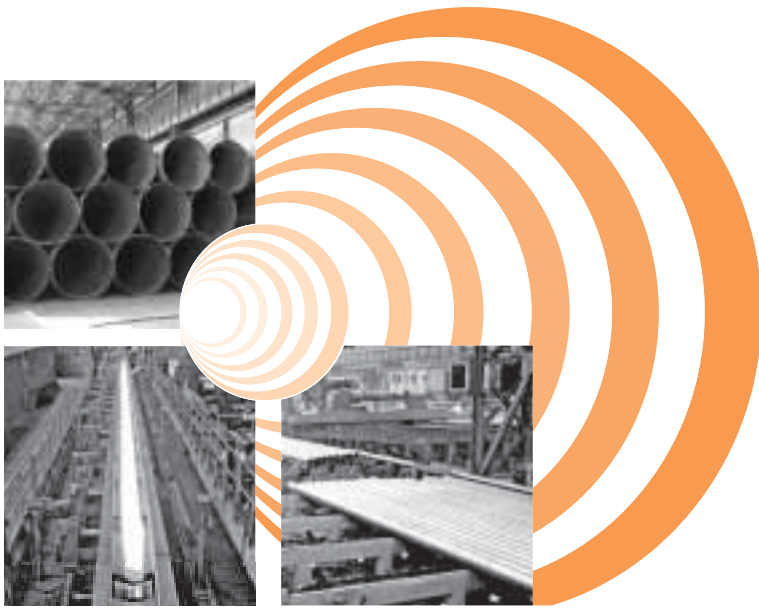
10. Coating application



11. Marking, packing, storage







Line Pipe

TMK manufactures a wide range of line pipe for onshore and offshore applications. Line pipe is available in sizes ranging from 0.500 to 100 inches and can be produced by seamless, ERW, SAWL and SAWH methods according to API Spec 5L, CSA, DIN EN, BS EN and DNV standards.

In 2008, TMK launched a 650,000 tpa Haeusler RB(E) SAWL pipe mill at our Volzhsky plant (Russia) that is certified according to DNV-OSS-313. Operating its own coating facilities, pipes can be supplied with 3-layer FBE or PE external and internal coating. The pipe is inspected for internal and external defects using automated electromagnetic and ultrasonic inspection equipment. Pipe ends undergo magnetic-fluoroscopic detection after beveling. For wall thicknesses exceeding 16 mm, ends can be double beveled. The pipe also undergoes tensile, flattening and hydrostatic testing. The pipe is automatically packed in bundles and tied with steel banding or wires in compliance with API loading and transportation standards.

Line Pipe Producers

Plant Location	Method	OD	WT	Standards/Grades
Volzhsky Pipe Plant /Russia/	SAWL	20" - 56"	0.312" - 1.250"	API Spec 5L, X42-X100, DNV 485 FD
	SAWH	22" - 100"	0.250" - 1.000"	API Spec 5L, DIN EN ISO 3183
	Seamless	6.625" - 16"	0.280" - 1.062"	API Spec 5L, DNV 250-450 S/F/P/D
Seversky Tube Works /Russia/	Seamless	8.626" - 12.752"	0.315" - 0.984"	API Spec 5L, PSL 1,2 A,B, X42-X60
	ERW	0.839" - 20"	0.114" - 0.500"	API Spec 5L, PSL 1, A,B, X42-X60
Sinarsky Pipe Plant /Russia/	Seamless	1.315" - 6.625"	0.133" - 0.562"	API Spec 5L, PSL 1,2 A,B, X42-X65
TAGMET /Russia/	Seamless	0.260" - 0.720"	4,500" - 8,625"	API Spec 5L, PSL 1,2 A,B, X42-X65
Ambridge /US/	Seamless	2.375" - 4.500"	0.154" - 0.600"	API Spec 5L, PSL 1,2, A, B, X42-X65
Blytheville /US/	ERW	2.375" - 4.500"	0.156" - 0.337"	API Spec 5L, PSL 1,2 X42-X60, CSA Z245.1 Grades 290-414
Camanche/US/	ERW	4.500" - 8.825"	0.156" - 0.500"	API Spec 5L, PSL 1,2 X42-X60, CSA Z245.1 Grades 290-414
Wilder /US/	ERW	4.500" - 16"	0.219" - 0.500"	API 5L, PSL 1,2 B, X42 - X70, CSA Z245.1 Grades 241-483
Artrom /Romania/	Seamless	0.840" - 8.625"	0.109" - 1.000"	API 5L, A, B, X42-X60, DIN EN ISO 3183, L210GA-L360GA, DIN EN ISO 3183, L245NB

Seamless Line Pipe Dimensional Range

OD,		Wall Thickness																												
		0,065	0,079	0,118	0,131	0,137	0,157	0,196	0,216	0,255	0,275	0,295	0,314	0,354	0,374	0,393	0,433	0,472	0,511	0,551	0,590	0,629	0,669	0,748	0,787	0,866	0,944	0,984	1,063	
in	mm	1,65	2,0	3,0	3,35	3,5	4,0	5,0	5,5	6,5	7,0	7,5	8,0	9,0	9,5	10,0	11,0	12,0	13,0	14,0	15,0	16,0	17,0	19,0	20,0	22,0	24,0	25,0	27,0	
0,673	17,1																													
0,838	21,3																													
1,051	26,7																													
1,314	33,4																													
1,661	42,2																													
1,902	48,3																													
2,374	60,3																													
2,874	73																													
3,500	88,9																													
4,000	101,6																													
4,500	114,3																													
5,562	141,3																													
6,625	168,3																													
8,625	219,1																													
9,625	244,5																													
10,748	273,0																													
12,748	323,8																													
14,000	355,6																													
16,000	406,4																													

- Cold drawn
 - Hot rolled

Seamless Line Pipe Finishing Process

1. Geometrics inspection



2. Beveling



3. Hydrostatic testing



4. Magnetic-fluoroscopic flaw inspection of pipe ends



5. Ultrasonic inspection



6. Coating application (on Customer's request)



7. Marking, packing, storage



Longitudinally Welded Line Pipe Dimensional Range SAWL acc. to API Spec 5L

OD		Wall Thickness																			
		Weight, kg/m																			
in	mm	0,311	0,342	0,374	0,406	0,437	0,468	0,500	0,562	0,625	0,688	0,751	0,811	0,874	0,937	1,000	1,063	1,125	1,188	1,251	
		7,9	8,7	9,5	10,3	11,1	11,9	12,7	14,3	15,9	17,5	19,1	20,6	22,2	23,8	25,4	27	28,6	30,2	31,8	
20	508	97,43	107,12	116,78	126,41	136,01	145,58	155,12	174,10	192,95	211,68	230,27	247,60								
22	559	107,36	118,06	128,73	139,37	149,97	160,55	171,09	192,08	212,95	233,68	254,30	273,51	293,87	314,11						
24	610	117,30	129,00	140,68	152,32	163,93	175,51	187,06	210,07	232,94	255,69	278,32	299,41	321,79	344,05	366,17					
26	660	127,04	139,73	152,39	165,02	177,62	190,19	202,72	227,70	252,55	277,27	301,87	324,81	349,16	373,39	397,49					
28	711	136,97	150,67	164,34	177,98	191,58	205,15	218,70	245,68	272,54	299,28	325,89	350,72	377,09	403,32	429,44					
30	762	146,91	161,61	176,29	190,93	205,54	220,12	234,67	263,67	292,54	321,29	349,91	376,63	405,01	433,26	461,38					
32	813	156,84	172,56	188,24	203,88	219,50	235,09	250,64	281,65	312,54	343,30	373,93	402,54	432,93	463,19	493,32					
34	864	166,78	183,50	200,18	216,84	233,46	250,05	266,61	299,64	332,54	365,31	397,95	428,44	460,85	493,12	525,27					
36	914	176,52	194,22	211,90	229,54	247,15	264,72	282,27	317,27	352,14	386,88	421,50	453,84	488,22	522,47	556,59					
38	965	186,46	205,17	223,85	242,49	261,11	279,69	298,24	335,25	372,14	408,89	445,52	479,75	516,14	552,40	588,53	624,54	660,42	696,18	731,80	
40	1016	196,39	216,11	235,79	255,45	275,07	294,66	314,22	353,24	392,13	430,90	469,55	505,66	544,06	582,33	620,48	658,50	696,39	734,16	771,80	
42	1067		227,05	247,74	268,40	289,03	309,62	330,19	371,22	412,13	452,91	493,57	531,57	571,98	612,26	652,42	692,45	732,36	772,14	811,79	
44	1118		237,99	259,69	281,35	302,99	324,59	346,16	389,21	432,13	474,92	517,59	557,47	599,90	642,19	684,37	726,41	768,33	810,12	851,79	
46	1168		248,72	271,40	294,05	316,67	339,26	361,82	406,84	451,73	496,50	541,14	582,87	627,27	671,54	715,68	759,70	803,59	847,36	890,99	
48	1219		259,66	283,35	307,01	330,63	354,23	377,79	424,82	471,73	518,51	565,16	608,78	655,19	701,47	747,63	793,66	839,56	885,34	930,99	
52	1321			307,25	332,92	358,55	384,16	409,74	460,79	511,72	562,53	613,20	660,60	711,03	761,34	811,52	861,57	911,50	961,30	1010,98	
56	1422			330,91	358,57	386,20	413,80	441,37	496,41	551,32	606,11	660,77	711,91	766,32	820,61	874,78	928,82	982,73	1036,52	1090,18	

Helicallly Welded Line Pipe Dimensional Range SAWH acc. to DIN EN ISO 3183

Outside Diameter, mm	Wall Thickness, mm														
	5,6	6,3	7,1	8	8,8	10	11	12,5	14,2	16	17,5	20	22,2	25	
559	76,4	85,9	96,6	109	119	135	149								
610	83,5	93,8	106	119	130	148	162								
660	90,4	102	114	129	141	160	176								
711	97,4	109	123	139	152	173	190	215							
762	104	117	132	149	163	185	204	231							
813	112	125	141	159	175	198	218	247							
864			150	169	186	211	231	262	298						
914			159	179	196	223	245	278	315						
1016			177	199	219	248	273	309	351						
1220			212	239	263	298	328	372	422						
1420			247	279	306	348	382	434	492	554	605	691	765		
1620									562	633	692	789	875		
1820									632	712	778	888	984		
2020									702	791	864	986	1094	1230	
2220										870	951	1085	1203	1353	
2520										988	1080	1233	1367	1538	

Longitudinal Process Flowchart 20" - 56" /508 - 1422 mm/

1. Infeed of plates Identity check



2. Milling of longitudinal plate edges



5. Tack welding



6. Inside welding



9. UT of weld



10. X-ray testing of weld seam



13. Hydrostatic testing



14. UT of weld seam



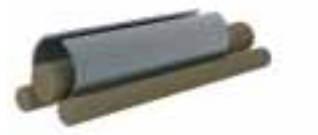
17. Inspection, weighing, marking, stamping



18. Storage



3. Forming by the 3-roll bending process



4. Post-bending of the longitudinal plate edges



7. Outside welding



8. Visual control



11. Mechanical expanding



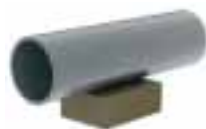
12. Grinding of weld at pipe ends and beveling



15. X-ray testing of weld seam and pipe ends



16. Magnetic particle and ultrasonic inspection of both pipe ends



ERW Line Pipe Dimensional Range

Outside Diameter		Wall Thickness																																			
in	mm	0.102	0.114	0.126	0.142	0.156	0.177	0.188	0.220	0.224	0.248	0.250	0.280	0.300	0.311	0.315	0.322	0.327	0.328	0.337	0.343	0.365	0.375	0.406	0.432	0.438	0.450	0.500	0.562	0.625	0.689	0.750	0.866	0.944	1.000		
0.839	21.3																																				
1.059	26.9																																				
1.327	33.7																																				
1.669	42.4																																				
1.902	48.3																																				
2.244	57																																				
2.375	60.3																																				
2.996	76.1																																				
3.500	88.9																																				
4.000	101.6																																				
4.252	108																																				
4.500	114.3																																				
5.000	127																																				
5.236	133																																				
6.000	152.4																																				
6.260	159																																				
6.625	168.3																																				
7.000	177.8																																				
7.625	193.68																																				
8.625	219.1																																				
8.825	224.16																																				
9.625	244.48																																				
9 5/8	244.5																																				
10.748	273																																				
10 3/4	273.1																																				
12.752	323.9																																				
13 3/8	339.7																																				
14.000	355.6																																				
16.000	406.4																																				
17.992	457																																				
18.000	457.2																																				
18 5/8	473.1																																				
20.000	508																																				
22.000	559																																				
24.000	610																																				

Mechanical Properties PSL 2, API Spec 5L

Steel Grade	Pipe body (seamless and welded)				Weld Seam
	Yield Strength $R_{10,5}$ MPa (psi)		Tensile Strength R_m MPa (psi)		Tensile Strength R_m MPa (psi), min.
	min	max	min	max	
X42/L290	290 (42 100)	495 (71 800)	415 (60 200)	760 (110 200)	415 (60 200)
X46/L320	320 (46 400)	525 (76 100)	435 (63 100)	760 (110 200)	435 (63 100)
X52/L360	360 (52 200)	530 (76 900)	460 (66 700)	760 (110 200)	460 (66 700)
X56/L390	390 (56 600)	545 (79 000)	490 (71 100)	760 (110 200)	490 (71 100)
X60/L415	415 (60 200)	565 (81 900)	520 (75 400)	760 (110 200)	520 (75 400)
X65/L450	450 (65 300)	600 (87 000)	535 (77 600)	760 (110 200)	535 (77 600)
X70/L485	485 (70 300)	635 (92 100)	570 (82 700)	760 (110 200)	570 (82 700)
X80/L555	555 (80 500)	705 (102 300)	625 (90 600)	825 (119 700)	625 (90 600)
X90/L625	625 (90 600)	775 (112 400)	695 (100 800)	915 (132 700)	695 (100 800)
X100/L690	690 (100 100)	840 (121 800)	760 (110 200)	990 (143 600)	760 (110 200)
X120/L830	830 (120 400)	1050 (152 300)	915 (132 700)	1 145 (166 100)	915 (132 700)

Chemical Composition for PSL 2, API Spec 5L

Steel Grade (Steel Name)	Mass fraction, based upon heat and product analyses % maximum									Carbon equivalent %, max	
	C ^b	Si	Mn ^b	P	S	V	Nb	Ti	other	CE _{IIW}	CE _{cm}
Seamless and welded pipes											
L245R or BR	0,24	0,4	1,2	0,025	0,015	*	*	0,04	*	0,43	0,25
L290R or X42R	0,24	0,4	1,2	0,025	0,015	0,06	0,05	0,04	*	0,43	0,25
L245N or BN	0,24	0,4	1,2	0,025	0,015	*	*	0,04	*	0,43	0,25
L290N or X42N	0,24	0,4	1,2	0,025	0,015	0,06	0,05	0,04	*	0,43	0,25
L320N or X46N	0,24	0,4	1,4	0,025	0,015	0,07	0,05	0,04	*	0,43	0,25
L360N or X52N	0,24	0,45	1,4	0,025	0,015	0,1	0,05	0,04	*	0,43	0,25
L390N or X56N	0,24	0,45	1,4	0,025	0,015	0,1	0,05	0,04	*	0,43	0,25
L415N or X60N	0,24	0,45	1,4	0,025	0,015	0,1	0,05	0,04	*	as agreed	
L245Q or BQ	0,18	0,45	1,4	0,025	0,015	0,05	0,05	0,04	*	0,43	0,25
L290Q or X42Q	0,18	0,45	1,4	0,025	0,015	0,05	0,05	0,04	*	0,43	0,25
L320Q or X46Q	0,18	0,45	1,4	0,025	0,015	0,05	0,05	0,04	*	0,43	0,25
L360Q or X52Q	0,18	0,45	1,5	0,025	0,05	0,05	0,05	0,04	*	0,43	0,25
L390Q or X56Q	0,18	0,45	1,5	0,025	0,015	0,07	0,05	0,04	*	0,43	0,25
L415Q or X60Q	0,18	0,45	1,70	0,025	0,015	*	*	*	*	0,43	0,25
L450Q or X65Q	0,18	0,45	1,70	0,025	0,015	*	*	*	*	0,43	0,25
L485Q or X70Q	0,18	0,45	1,80	0,025	0,015	*	*	*	*	0,43	0,25
L555Q or X80Q	0,18	0,45	1,90	0,025	0,015	*	*	*	*	as agreed	
Welded pipes											
L245M or BM	0,22	0,45	1,2	0,025	0,015	0,05	0,05	0,04	*	0,43	0,25
L290M or X42M	0,22	0,45	1,3	0,025	0,015	0,05	0,05	0,04	*	0,43	0,25
L320M or X46M	0,22	0,45	1,3	0,025	0,015	0,05	0,05	0,04	*	0,43	0,25
L360M or X52M	0,22	0,45	1,4	0,025	0,015	*	*	*	*	0,43	0,25
L390M or X56M	0,22	0,45	1,4	0,025	0,015	*	*	*	*	0,43	0,25
L415M or X60M	0,12	0,45	1,6	0,025	0,015	*	*	*	*	0,43	0,25
L450M or X65M	0,12	0,45	1,60	0,025	0,015	*	*	*	*	0,43	0,25
L485M or X70M	0,12	0,45	1,7	0,025	0,015	*	*	*	*	0,43	0,25
L555M or X80M	0,12	0,45	1,85	0,025	0,015	*	*	*	*	0,43	0,25
L625M or X90M	0,1	0,55	2,1	0,02	0,01	*	*	*	*	-	0,25
L690M or X100M	0,1	0,55	2,1	0,02	0,01	*	*	*	*		0,25
L830M or X120M	0,1	0,55	2,1	0,02	0,01	*	*	*	*		0,25

* Calculated according to API Spec 5L/ISO 3183

ERW Process Flowchart

1. Strip Storage



2. Uncoiling



5. Fin removing



6. Straightening



9. Induction heat treatment



10. Pipe reducing and sizing



13. Pipe straightening



14. Cutting



17. Inspection and weighing



18. Bundling



3. Strip forming



4. High Frequency Induction Welding



7. Heating in continuous furnace



8. Preliminary reduction



11. Specified lengths sawing



12. Pipe handling, cooling and passing to the finishing lines



15. End machining (beveling)



16. Hydrostatic testing



Seamless Line Pipe Dimensional Range acc. to DNV-OS-F101

NS	OD,		wall thickness																				
			Weight, kg/m																				
	in	mm	0,280	0,312	0,322	0,344	0,365	0,375	0,406	0,432	0,438	0,469	0,500	0,562	0,625	0,688	0,719	0,750	0,812	0,875	0,938	1,000	1,062
	7,1	7,9	8,2	8,7	9,3	9,3	9,5	10,3	11,0	11,1	11,9	12,7	14,3	15,9	17,5	18,3	19,1	20,6	22,2	23,8	25,4	27,0	
6 5/8	168,3	31,25	34,24		37,20		42,67					48,73	54,31	59,76		67,69	70,27			79,98			
8 5/8	219,1	41,14	42,65	45,14		49,10			56,94			64,64	72,02	79,67		90,62	94,20	100,84	107,79			121,32	
10 3/4	273,0				60,50				71,87			71,72	81,55	91,26		100,85		114,99	128,27	137,36	146,30		
12 3/4	323,8						73,65	79,65			85,62	97,46	109,18	120,76	132,23		143,56	154,08	165,17	176,13	186,97	197,68	
14	355,6							87,71		94,30	100,86	107,39	120,36	133,19	145,91		158,49	170,18	182,52	194,74	206,83	218,79	
16	406,4										115,77	123,30	138,27	153,11	167,87		182,42	195,98	210,33	224,55	238,64	252,61	

Mechanical Properties

SMYS (MPa) (T+L)	SMYS (MPa) (T)	YS/TS ratio	Hardness		Elongation		Charpy V-notch energy (KVT), J	
			(HV 10) BM, WM, HAZ		A ₅ min % (T+L)		average	min
245	370	0,9	270		22		27	22
290	415	0,9	270		21		30	24
360	460	0,9	270		20		36	30
415	520	0,92	270		18		42	35
450	535	0,92	270		18		45	38
485	570	0,92	300		18		50	40
555	625	0,92	300		18		56	45

Chemical Composition

SMYS	maximum %											Pcm	CE				
	C	Mn	Si	P	S	Cu	Ni	Mo	Cr	Al	Nb			V	Ti	N	B
245	0,14	1,35	0,4	0,02	0,01	0,35	0,3	0,1	0,3	0,06	-	-	-	0,01	0,000	0,20 0,21	0,34 0,35
290	0,14	1,65	0,4	0,02	0,01	0,35	0,3	0,1	0,3	0,06	0,04	0,04	0,04	0,01	0,000	0,20 0,21	0,34 0,35
360	0,14	1,65	0,45	0,02	0,01	0,5	0,5	0,5	0,5	0,06	0,05	0,07	0,04	0,01	0,000	0,21 0,22	0,37 0,38
415	0,14	1,65	0,45	0,02	0,01	0,5	0,5	0,5	0,5	0,06	0,05	0,08	0,04	0,01	0,000	0,22 0,23	0,39 0,4
450	0,15	1,65	0,45	0,02	0,01	0,5	0,5	0,5	0,5	0,06	0,05	0,09	0,06	0,01	0,000	0,23 0,24	0,4 0,41

Anti-Corrosion Coating

Types of coatings used: one- and two-layer FBE coating; two- and three-layer PE coating; two- and three-layer polypropylene coating; internal flow coating. Working temperature range from – 40°C up to + 80°C. Life time min 30 years.

Standards

Coatings	Standards	Application
External	DIN 30670: 2012 /EN 10288, Polyethylene insulation of pipes and shape articles	Insulation of pipes in the ground and water
External	DIN 30678: 2013, Polypropylene coating for steel pipes	Insulation of pipes in the ground and water
External PE	DIN 30670, ISO 21809-1(2,3,4,5), CSA Z245.20 SERIES, Shell DEP 31.40.30.31	Underground/above ground
External PP	DIN 30678: 2013, ISO 21809-1(2,3,4,5)	Underground/above ground
Internal	API RP 5L2, ISO 15724, Shell DEP 31.40.30.35	Gas, oil, water transmission

Coated Pipes Range

Coatings	OD, mm	Wall Thickness, mm	Length, m
External	114–426	6–35	9–12.5
External	530–1420	7–22	8–11.6
External	168,3-1219,2	4-38	8-18
Internal	508–1420	12–48	9–12.5
Internal	219,1-1219,2	4-38	8-13

Internal Flow Coating Properties

Parameter	Limit
1. Cured coating thickness	60–150 µm
2. Coating adhesion by lattice cut method	1
3. Coating adhesion after 240 hours ageing in water at (20±5)°C by lattice cut method, not more than	2
4. Bend resistance	10 mm
5. Buchholz Hardness, not less than	94
6. Pinchholes, not more than a) in uncured coating b) in cured coating	0 pcs/cm ² 1 pcs/cm ²
7. Gas pressure fluctuation resistance	After the 10 th cycle: No blistering, fractures
8. Hydraulic pressure fluctuation resistance	After 1 cycle: No blistering, fractures
9. Salt spray resistance at (20±5)°C, 240 hours	No blistering, flaking
10. Coating roughness(R _z), not more than	15 µm

External Three-Layer PE Coating Properties

1. Thickness, min, mkm (mil)	
1st layer	100–175 (4–7)
2d layer	150–400 (6–16)
3d layer for pipe body	3000
for weld zone	2500
2. Space between coating and pipe ends, mm	130–180
3. Adhesion strength *, N/cm length	
under temperature: + 20 ± 5°C	150
under temperature: + 50 ± 5°C	40
4. Pressure resistance *, max, mm	
under temperature: + 25 ± 2°C	0.2
under temperature: + 50 ± 2°C	0.3
5. Impact resistance, min, J	
under temperature: + 23 ± 2°C	18
6. Elongation, min, % under temperature: -40°C	100

External Coating Process Flowchart

1. The entrance control of pipes.
Visual inspection



2. Preliminary heating in the gas furnace



3. Abrasive cleaning of external pipes surface in a shotblast unit by steel chipped fraction



4. Removal of dust from pipes internal cavity by a purge



5. Visual inspection of pipe



6. Having heated pipes



7. Having heated pipes



8. One- and two-layer FBE coating
a) Epoxy powder paint coating
b) Epoxy impact-resistant coating
(only in case of a two-layer coating)



9. Three-layer PE and polypropylene coating
a) Epoxy primer coating
b) Adhesive coating
c) Polyethylene (or polypropylene) coating



10. Water cooling of coated pipes



11. Uniformity coating inspection with high-voltage flaw detector



12. Coating removal from pipe ends



13. Final quality inspection of coated pipes (visual)



14. Pipe marking and Pipe storage



Internal Coating Process Flowchart

1. Pipe storage before pipe delivery



2. Pipe incoming control



3. Pipe heating



4. Internal pipe surface degreasing



5. Second heating of pipes



6. Internal pipe surface blast cleaning in



7. Blaster internal surface quality examination



8. Internal pipe surface blast cleaning in Shot Blaster № 2



9. Internal surface blowout



10. Internal surface preparation quality inspection



11. Coating application on pipes (in coating chamber)



12. Internal coating pre-curing



13. Pipe induction heating



14. Pipe coating curing in the full-polymerization chamber



15. Internal flow coating quality inspection



15. Marking of coated pipes. Stocking of pipes provided tarpaulin protective caps







Process & Power Generation

TMK provides tube and pipe serving the power generation industry where critically high temperatures and pressures necessitate rigorous quality standards. Made of carbon, alloy and stainless steel and in accordance with DIN EN, BS EN and ASTM standards, TMK produces a broad range of high quality cold-drawn and hot-rolled tube and pipe for process and power generation applications. Cold-drawn pipe is manufactured at our Sinarsky plant (from purchased tubular billets or from semi finished hot extruded pipes made at our Volzhsky plant). Hot-rolled pipe is produced at our Russian plants. Pipe is made in random lengths from 3 to 12m and fixed lengths upon customer request.

Producers

Plant Location	Standards	OD, mm	WT, mm	Method
Volzhsky Pipe Plant /Russia/	DIN EN 10216-1,2, ASTM A106-13, A210-02 (2012), A333-13	42 - 406,4	4 - 34,8	Seamless, hot-rolled
	ASTM A 213-14, A312-14, A335-11	42,2 - 406,4	on request	Stainless, hot-rolled
Seversky Tube Works /Russia/	DIN EN 10217-1, ASTM A 106-13	88,9 - 323,8	4 - 23,58	Seamless, hot-rolled
	DIN EN 10217-1	21,3 - 508	2,9 - 12,5	ERW
Sinarsky Pipe Plant /Russia/	DIN EN 10216-1,2,3, ASTM A106-13	33,4 - 168,3	2,9 - 18,26	Seamless, hot-rolled
	EN 10216-1,2,3, ASTM A106-13, A179-90a (2012), A192-02(2012)	10,3 - 76,2	1,73 - 9,53	Seamless, cold-drawn
	DIN EN 10216-5, ASTM A213-14, A312-14	10,29 - 60,30	1,24 - 5,54	Stainless, cold-drawn
TAGMET /Russia/	EN 10216-1, ASTM A106	114,3 - 273,8	7,1 - 28,58	Seamless, hot-rolled
Ambridge /US/	ASTM A106, A333	60,3 - 114,3	5,54 - 15,24	Seamless, hot-rolled
Artrom /Romania/	EN 10216-2, ASTM A106, A210	21,3-219,1	2,3 - 60	Seamless, hot-rolled
	DIN EN 10216-2, ASTM A179-90a (2012), A210-02 (2012)	15,88 - 210	1,5 - 20	Seamless, cold-drawn

List of Standards and Ranges for Process and Power Generation

Standarts	OD mm	WT mm	Steel Grade
Carbon and alloyed steel			
DIN EN 10216-1 Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 1: Non-alloy steel tubes with specified room temperature properties.	16 - 273	1,8 - 60	P195TR1, P235TR1, P265TR1, P195TR2, P235TR2, P265TR2.
DIN EN 10216-2 Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 2: Non-alloy and alloy steel tubes with specified elevated temperature properties.	16 - 245	1,8 - 60	St.45.8, St.35.8, 17Mn5, 19Mn5, 15Mo3, 16Mo3, 13CrMo4-5, P235GH, P265GH
DIN EN 10216-3 Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 3: Alloy fine grain steel tubes	16 - 219,1	1,8 - 60	P355N, P355NH, P275NL1, P355NL1
DIN EN 10217-1 Welded steel tubes for pressure purposes - Technical delivery conditions - Part 1: Non-alloy steel tubes with specified room temperature properties;	21,3 - 508	4,0 - 12,5	P195TR1, P195TR2, P235 TR1, P235 TR2, P265 TR1, P265TR2
ASTM A106-13 Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service	17,1 - 406,4	1,65 - 28,58	Grade A, Grade B, Grade C
ASTM A210-02(2012) Standard Specification for Seamless Medium-Carbon Steel Boiler and Superheater Tubes	19,05 - 127	2,11-12,7	Grade A-1, Grade C
ASTM A179/A179M-90a(2012) Standard Specification for Seamless Cold-Drawn Low-Carbon Steel Heat-Exchanger and Condenser Tubes	15,88 - 88,9	1,65- 7,62	Low carbon steel
ASTM A192-02(2012) Standard Specification for Seamless Carbon Steel Boiler Tubes for High-Pressure Service	19,05 - 114,3	2,11 - 11,53	Low carbon steel
DIN 17175 Seamless Tubes of Heat-resistant Steels/ SUPERSEDE BY DIN EN 10216-2	10 - 219,1	1,8 - 60	St 35.8, St 45.8, 15Mo3, 13CrMo4-4
Stainless steel			
DIN EN 10216-5 Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 5: Stainless steel tubes	21,34 - 60,32	3,73 - 3,91	X5CrNiMo17-12-2, X2CrNiMo17-12-2 X6CrNiTi18-10, X5CrNi18-10, X2CrNi19-11
ASTM A335-11 Standard Specification for Seamless Ferritic Alloy-Steel Pipe for High-Temperature Service	42,2 - 406,4	on request	P5, P9, P11, P12, P22, P91 and others
ASTM A213-14 Standard Specification for Seamless Ferritic and Austenitic Alloy-Steel Boiler, Superheater, and Heat-Exchanger Tubes	20,6 - 127	2,87 - 12,7	T5, T9, T91, T22, TP304, TP316, TP304L, TP316L, TP 321
ASTM A312-14 Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes	42,16 - 219,1	on request	TP304/TP304L, TP321/TP321L, TP347/TP347H TP316/TP316L, TP316Ti
Low temperature service			
DIN EN 10216-4 Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 4: Non-alloy and alloy steel tubes with specified low temperature properties	16 - 219,1	1,8 - 60	P215NL; P265NL
ASTM A333-13 Standard Specification for Seamless and Welded Steel Pipe for Low-Temperature Service and Other Applications with Required Notch Toughness	17,1 - 406,4	1,65 - 25,4	Grade 1; Grade 6
ASTM A 334 ASTM A334-04a(2010) Standard Specification for Seamless and Welded Carbon and Alloy-Steel Tubes for Low-Temperature Service	17,1 - 219,1	1,65 - 25,4	Grade 1; Grade 6

Mechanical Properties acc. to DIN EN 10216-2

Steel Grades		Tensile testing at room temperature						Elongation at fracture			Impact Strength			
Grade designation	Material Number	Upper Yield strength ReH Mpa minimum For T ≤ 16 mm			Tensile Strength			A% minimum		Minimum average value KV J at temperature in °C				
		T ≤ 16	16 < T ≤ 40	40 < T ≤ 60	60 < T ≤ 100	Mpa	Mpa	longitud.	transverse	20	0	-10	20	20
P195GH	1,034	195	-	-	-	320 ... 440		27	25	-	40e	28d	-	27c
P235GH	1,034	235	225	215	-	360 ... 500		25	23	-	40e	28d	-	27c
P265GH	1,042	265	255	245	-	410 ... 570		23	21	-	40e	28d	-	27c
20MnNb6	1,047	355	345	335	-	500 ... 650		22	20	-	40e	-	-	27c
16Mo3	1,541	280	270	260	-	450 ... 600		22	20	40e	-	-	27c	-
8MoB5-4	1,545	400	-	-	-	540 ... 690		19	17	40e	-	-	27c	-
14MoV6-3	1,771	320	320	310	-	460 ... 610		20	18	40e,f	-	-	27c	-
10CrMo5-5	1,733	275	275	265	-	410 ... 560		22	20	40e	-	-	27c	-
13CrMo4-5	1,733	290	290	280	-	440 ... 590		22	20	40e	-	-	27c	-
10CrMo9-10	1,738	280	280	270	-	480 ... 630		22	20	40e	-	-	27c	-
11CrMo9-10	1,738	355	355	355	-	540 ... 680		20	18	40e	-	-	27c	-
25CrMo4	1,721	345	345	345	-	540 ... 690		18	15	40e,f	-	-	27c	-
20CrMoV13-5-5	1,777	590	590	590	-	740 ... 880		16	14	40e,f	-	-	27c	-
15NiCuMoNb5-6-4	1,636	440	440	440	440e	610 ... 780		19	17	40e,f	-	-	27c	-
7CrWVMoNb9-6	1,820	400	400	400	-	510 ... 740		20	18	40e,f	-	-	27c	-
7CrMoVTiB10-10	1,737	450	430	430h	-	565 ... 840		17	15	40e,f	-	-	27c	-
X11CrMo5+l	1,7362+1	175	175	175	175	430 ... 580		22	20	40e	-	-	27c	-
X11CrMo5+NT1	1,7362+NT1	280	280	280	280	480 ... 640		20	18	40e	-	-	27c	-
X11CrMo5+NT2	1,7362+NT2	390	390	390	390	570 ... 740		18	16	40e	-	-	27c	-
X11CrMo9-l+l	1,7386+1	210	210	210	-	460 ... 640		20	18	40e	-	-	27c	-
X11CrMo9-l+NT	1,7386+NT	390	390	390	-	590 ... 740		18	16	40e	-	-	27c	-
X10CrMoVNb9-l	1,490	450	450	450	450	630 ... 830		19	17	40e,f	-	-	27c	-
X10CrWMoVNb9-2	1,490	440	440	440	440	620 ... 850		19	17	40e,f	-	-	27c	-
X11CrMoWVNb9-l-l	1,490	450	450	450	450	620 ... 850		19	17	40e,f	-	-	27c	-
X20CrMoVl-l	1,492	490	490	490	490	690 ... 840		17	14	40e,f	-	-	27c	-

Dimensional Range according to DIN EN 10216-2

OD mm	Wall Thickness, mm																		OD mm				
	1,6	1,8	2,0	2,3	2,6	2,9	3,2	3,6	4,0	4,5	5,0	5,6	6,3	7,1	8,0	8,8	10,0	11,0		12,5	14,2		
10,2																						10,2	
12,0																							12,0
12,7																							12,7
13,5																							13,5
14,0																							14,0
16,0																							16,0
17,2																							17,2
18,0																							18,0
19,0																							19,0
20,0																							20,0
21,3																							21,3
22,0																							22,0
25,0																							25,0
25,4																							25,4
26,9																							26,9
30,0																							30,0
31,8																							31,8
32,0																							32,0
33,7																							33,7
35,0																							35,0
38,0																							38,0
40,0																							40,0
42,4																							42,4
44,5																							44,5
48,3																							48,3
51,0																							51,0
54,0																							54,0
57,0																							57,0
60,3																							60,3
63,5																							63,5
70,0																							70,0
73,0																							73,0
76,1																							76,1
82,5																							82,5
88,9																							88,9
101,6																							101,6
108,0																							108,0
114,3																							114,3
127,0																							127,0
133,0																							133,0
139,7																							139,7
141,3																							141,3
152,4																							152,4
159,0																							159,0
168,3																							168,3
177,8																							177,8
193,7																							193,7
219,1																							219,1
244,5																							244,5
273,0																							273,0
323,9																							323,9
355,6																							355,6
406,4																							406,4
457,0																							457,0
508,0																							508,0
559,0																							559,0
610,0																							610,0
660,0																							660,0
711,0																							711,0
OD mm	1,6	1,8	2,0	2,3	2,6	2,9	3,2	3,6	4,0	4,5	5,0	5,6	6,3	7,1	8,0	8,8	10,0	11,0	12,5	14,2	OD mm		

- EN 10216-2 Standard Range
 TMK Scheduled: - Hot Rolled
 - Cold Drawn

OD	Wall Thickness, mm																			OD
	16,0	17,5	20,0	22,2	25,0	28,0	30,0	32,0	36,0	40,0	45,0	50,0	55,0	60,0	65,0	70,0	80,0	90,0	100,0	
10,2																				10,2
12,0																				12,0
12,7																				12,7
13,5																				13,5
14,0																				14,0
16,0																				16,0
17,2																				17,2
18,0																				18,0
19,0																				19,0
20,0																				20,0
21,3																				21,3
22,0																				22,0
25,0																				25,0
25,4																				25,4
26,9																				26,9
30,0																				30,0
31,8																				31,8
32,0																				32,0
33,7																				33,7
35,0																				35,0
38,0																				38,0
40,0																				40,0
42,4																				42,4
44,5																				44,5
48,3																				48,3
51,0																				51,0
54,0																				54,0
57,0																				57,0
60,3																				60,3
63,5																				63,5
70,0																				70,0
73,0																				73,0
76,1																				76,1
82,5																				82,5
88,9																				88,9
101,6																				101,6
108,0																				108,0
114,3																				114,3
127,0																				127,0
133,0																				133,0
139,7																				139,7
141,3																				141,3
152,4																				152,4
159,0																				159,0
168,3																				168,3
177,8																				177,8
193,7																				193,7
219,1																				219,1
244,5																				244,5
273,0																				273,0
323,9																				323,9
355,6																				355,6
406,4																				406,4
457,0																				457,0
508,0																				508,0
559,0																				559,0
610,0																				610,0
660,0																				660,0
711,0																				711,0
OD	16,0	17,5	20,0	22,2	25,0	28,0	30,0	32,0	36,0	40,0	45,0	50,0	55,0	60,0	65,0	70,0	80,0	90,0	100,0	OD
mm	Wall Thickness, mm																			mm

Chemical Composition % acc. to DIN EN 10216-2

Steel Grade	Material Number	C	Si	Mn	P max.	S max.	Cr	Mo
P195GH	1,034	≤0,13	≤0,35	≤0,70	0,025	0,02	≤0,30	≤0,08
P235GH	1,034	≤0,16	≤0,35	≤1,20	0,025	0,02	≤0,30	≤0,08
P265GH	1,042	≤0,20	≤0,40	<1,40	0,025	0,02	≤0,30	≤0,08
20MnNb6	1,047	≤0,22	0,15 to 0,35	1,00 to 1,50	0,025	0,02	—	—
16Mo3	1,541	0,12 to 0,20	≤0,35	0,40 to 0,90	0,025	0,02	≤0,30	0,25 to 0,35
8MoB5-4	1,545	0,06 to 0,10	0,10 to 0,35	0,60 to 0,80	0,025	0,02	≤0,20	0,40 to 0,50
14MoV6-3	1,771	0,10 to 0,15	0,15 to 0,35	0,40 to 0,70	0,025	0,02	0,30 to 0,60	0,50 to 0,70
10CrMo5-5	1,733	≤ 0,15	0,50 to 1,00	0,30 to 0,60	0,025	0,02	1,00 to 1,50	0,45 to 0,65
13CrMo4-5	1,733	0,10 to 0,17e	≤0,35	0,40 to 0,70	0,025	0,02	0,70 to 1,15	0,40 to 0,60
10CrMo9-10	1,738	0,08 to 0,14	S 0,50	0,30 to 0,70	0,025	0,02	2,00 to 2,50	0,90 to 1,10
11CrMo9-10	1,738	0,08 to 0,15	≤0,50	0,40 to 0,80	0,025	0,02	2,00 to 2,50	0,90 to 1,10
25CrMo4	1 7218	0,22 to 0,29	≤ 0,40	0,60 to 0,90	0,025	0,02	0,90 to 1,20	0,1 5 to 0,30
20CrMoV1 3-5-5	1,777	0,17 to 0,23	0,15 to 0,35	0,30 to 0,50	0,025	0,02	3,00 to 3,30	0,50 to 0,60
15NiCuMoNb5-6-4	1,636	≤0,17	0,25 to 0,50	0,80 to 1,20	0,025	0,02	50,3	0,25 to 0,50
7CrWMoNb9-6	1,820	0,04 to 0,10	≤0,50	0,10 to 0,60	0,03	0,01	1,90 to 2,60	0,05 to 0,30
7CrMoVTiB10-10	1,737	0,05 to 0,10	0,15 to 0,45	0,30 to 0,70	0,02	0,01	2,20 to 2,60	0,90 to 1,10
X11CrMo5+l X11CrMo-5+NT1 X11CrMo5+NT2	1.7362+1 1.7362+NT1 17362+NT2	0,08 to 0,15	0,15 to 0,50	0,30 to 0,60	0,025	0,02	4,00 to 6,00	0,45 to 0,65
X11CrMo9-1+l X11CrMo9-1+NT	1.7386+1 1.7386+NT	0,08 to 0,15	0,25 to 1,00	0,30 to 0,60	0,025	0,02	8,00 to 10,00	0,90 to 1,10
X10CrMoVNB9-1	1,490	0,08 to 0,12	0,20 to 0,50	0,30 to 0,60	0,02	0,01	8,00 to 9,50	0,85 to 1,05
X10CrWMoVNB9-2	1,490	0,07 to 0,13	≤0,50	0,30 to 0,60	0,02	0,01	8,50 to 9,50	0,30 to 0,60
X11CrMoVWNb9-1-1	1,490	0,09 to 0,13	0,10 to 0,50	0,30 to 0,60	0,02	0,01	8,50 to 9,50	0,90 to 1,10
X20CrMoV11-1	1,492	0,17 to 0,23	0,15 to 0,50	s 1,00	0,025	0,02	10,00 to 12,50	0,80 to 1,20

Tolerances on Outside Diameter and Wall Thickness acc. to EN 10216-2

Outside Diameter D mm	Tolerance on D	Tolerances on T for a T/D ratio			
		≤ 0.025	> 0.025 < 0.050	> 0.050 < 0.10	> 0.10
D ≤ 219.1	± 1% or ± 0.5 mm	± 12.5 % or ± 0.4 mm whichever is the greater			
D > 219.1	whichever is the greater	± 20%	± 15%	± 12.5%	± 10 % ^a

^a For outside diameters D > 355.6 mm it is permitted to exceed the upper wall thickness locally by a further 5 % of the wall thickness T

Ni	Al	Cu	Nb	Ti max.	V	Cr+Cu+ Mo+N max.	others
≤0,30	≥ 0,020"	≤ 0,30c	≤0,010d	0,040d	≤ 0,02d	0,7	—
≤0,30	≥ 0,020"	≤ 0,30c	≤0,010d	0,040d	≤ 0,02d	0,7	—
≤0,30	≥ 0,020"	≤ 0,30c	≤ 0,010d	0,040d	≤ 0,02d	0,7	—
—	≤ 0,060	≤ 0,30c	0,015 to 0,10	—	—	—	—
≤0,30	≤ 0,040	≤ 0,30c	—	—	—	—	—
—	≤ 0,060	≤ 0,30c	—	0,06	—	—	B: 0,002 to 0,006
≤0,30	≤ 0,040	≤ 0,30c	—	—	0,22 to 0,28	—	—
≤0,30	≤ 0,040	≤ 0,30c	—	—	—	—	—
≤0,30	≤ 0,040	≤ 0,30c	—	—	—	—	—
≤0,30	≤ 0,040	≤ 0,30c	—	—	—	—	—
≤0,30	≤ 0,040	≤ 0,30c	—	—	—	—	—
≤0,30	≤ 0,040	≤ 0,30c	—	—	—	—	—
≤0,30	≤ 0,040	≤ 0,30c	—	—	0,45 to 0,55	—	—
1,00 to 1,30	≤ 0,050	0,50 to 0,80	0,015 to 0,045	—	—	—	—
—	≤ 0,030	—	0,02 to 0,08	—	0,20 to 0,30	—	N≤0,03 B:0,0005 to 0.006 W:1,45to 1,75
—	≤ 0,020	—	—	0,05 to 0,10	0,20 to 0,30	—	N≤ 0,010 B: 0,0015 to 0,0070
—	50,04	≤ 0,30c	—	—	—	—	—
—	≤ 0,040	≤ 0,30c	—	—	—	—	—
≤0,40	50,04	≤ 0,30c	0,06 to 0,10	—	0,18 to 0,25	—	N: 0,030 to 0,070
≤0,40	≤ 0,040	—	0,04 to 0,09	—	0,15 to 0,25	—	N: 0,030 to 0,070 B: 0,001 to 0.006 W: 1,50 to 2,00
0,10 to 0,40	≤ 0,040	—	0,06 to 0,10	—	0,18 to 0,25	—	N: 0,050 to 0,090 B: 0,000 5 to 0,005 W: 0,90 to 1,10
0,30 to 0,80	≤ 0,040	≤ 0,30c	—	—	0,25 to 0,35	—	—

Dimensional Range acc. to ASTM A106-13

OD mm	Wall Thickness, mm																								
	1,65	2,0	3,0	3,5	4,0	4,5	5,0	5,6	6,3	7,1	8,0	8,8	10,0	11,0	12,5	14,2	16,0	17,5	20,0	22,2	25,0	28,0	30,0		
10,3																									
13,7																									
17,1																									
21,3																									
26,7																									
33,4																									
42,4																									
44,5																									
48,3																									
51,0																									
54,3																									
57,0																									
60,3																									
63,5																									
70,0																									
73,0																									
76,1																									
82,5																									
88,9																									
101,6																									
108,0																									
114,3																									
127,0																									
133,0																									
139,7																									
141,3																									
152,4																									
159,0																									
168,3																									
177,8																									
193,7																									
219,1																									
244,5																									
273,0																									
323,9																									
355,6																									
406,4																									

TMK Scheduled
 - Cold drawn
 - Hot Rolled

Correlation Between DIN EN and ASTM Grades

EN	ASTM					
	A 106	A 179	A 192	A 210	A 213	A 335
DIN EN 10216-2						
P195GH	Grade A	low carbon	low carbon			
P235GH						
P265GH	Grade B			Grade A1		
	Grade C			Grade C		
20MnNb6						
16Mo3						P1
8MoB5-4						
14MoV6-3						
10CrMo5-5					T11	P11
13CrMo4-5					T12	P12
10CrMo9-10					T22	P22
11CrMo9-10						
25CrMo4						
20CrMoV 13-5-5						
15NiCuMoNb5-6-4					T36	P36
7CrWVMoNb9-6						
7CrMoVTiB10-10						
X11CrMo5+I					T5	P5
X11CrMo5+NT1						
X11CrMo5+NT2						
X11CrMo9-1+I					T9	P9
X11CrMo9-L+NT						
X10CrMoVNB9-1					T91	P91
X10CrWMoVNB9-2					T92	P92
X11CrMoWVNB9-1-1					T911	P911
X20CrMoVLL-L						

Mechanical Properties of Stainless Steel Tubes according to ASTM A213-14

Grade	UNS Designation	Tensile strength ksi (MPa) minimum	Yield strength ksi (MPa) minimum	Elongation in 2 in (50 mm) % minimum	Hardness, maximum	
					Brinell/Vickers	Rockwell
TP 304	S30400	75 (515)	30 (205)	35	192HBW / 200HV	90 HRB
TP 304L	S30403	70 (485)	25 (170)	35	192HBW / 200HV	90 HRB
TP 316	S31600	75 (515)	30 (205)	35	192HBW / 200HV	90 HRB
TP 316L	S31603	70 (485)	25 (170)	35	192HBW / 200HV	90 HRB

Marking is according to the standards and customers' requests.

Mechanical Properties of Stainless Steel Tubes according to ASTM A312-14

Grade	UNS Designation	Tensile strength ksi (MPa) minimum	Yield strength ksi (MPa) minimum	Elongation in 2 in (50 mm) %, minimum	
				longitudinal	transverse
TP 304	S30400	75 (515)	30 (205)	35	25
TP 304L	S30403	70 (485)	25 (170)	35	25
TP 316L	S31603	70 (485)	25 (170)	35	25
TP 321	S32100				
≤ 3/8 in.		75 (515)	30 (205)	35	25
> 3/8 in.		70 (485)	25 (170)	35	25

Marking is according to the standards and customers' requests.

Mechanical Properties of Stainless Steel Tubes according to DIN EN 10216-5

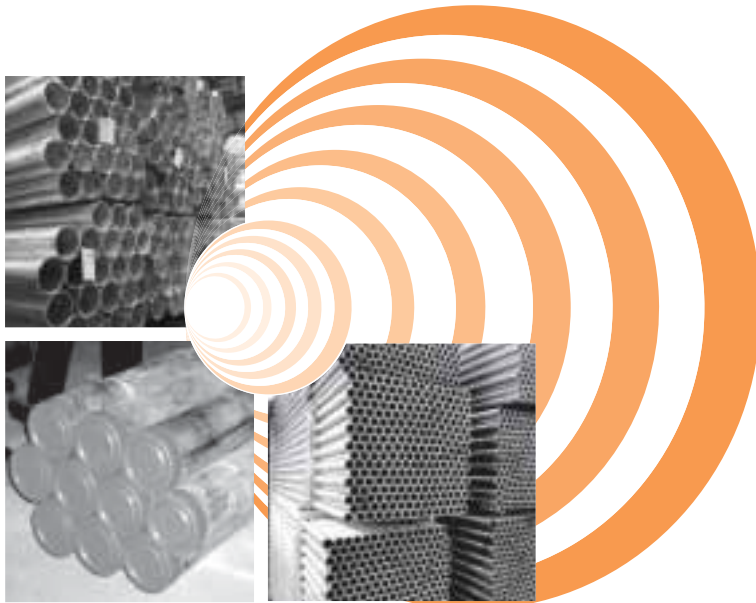
Steel grade		Tensile testing at room temperature				Impact strength KV J, minimum				Heat treatment		Intergranular corrosion resistance
Grade designation	Material number	Yield strength		Tensile strength MPa	Elongation A% minimum		At room temperature °C		at -196 °C	Temperature for solid solution	Cooling media	
		Rp 0,2 MPa minimum	Rp 1,0 MPa minimum		longitud.	transverse	longitud.	transverse				
X2CrNi19-11	1,430	180	215	460-680	40	35	100	60	60	1000-1100	w, a	✓
X5CrNi18-10	1,4301	195	230	500-700	40	35	100	60	60	1000-1100	w, a	✓
X6CrNiTi1810	1,4541	180	215	460-680	35	30	100	60	60	1020-1120	w, a	✓
X2CrNiMo17-12-2	1,4404	190	225	490-690	40	30	100	60	60	1020-1120	w, a	✓
X5CrNiMo17-12-2	1,4401	205	240	510-710	40	30	100	60	60	1020-1120	w, a	✓

w - water, a - air for sufficiently rapid cooling

Marking is according to the standards and customers' requests.







Mechanical Tube

TMK produces hot-rolled and cold-drawn mechanical tubes made of non-alloy, alloy and stainless steel that meet or exceed various international standards including, ASTM A519 and ASTM A511. Mechanical pipe can be produced according to customer specifications for dimensions and tolerances, including precise tolerances for wall thickness (+/- 6%) and for outside diameter (+/- 0.5%), as well as heavy weight pipes with WT up to 67 mm. Isothermal annealing and outside surface peeling and grinding services are available.

Mechanical Tube Producers

Plant Location	Standards	OD, mm	WT, mm	Method
Volzhsky Pipe Plant /Russia/	DIN EN 10297-1, ASTM A519	57 - 245	6 - 50,0	Seamless, hot rolled
	DIN EN 10297-2	57 - 245	6 - 50,0	Seamless stainless
Seversky Tube Works /Russia/	EN 10296-1	21.3 - 76.1	2.9 - 8.0	ERW
Sinarsky Pipe Plant /Russia/	DIN EN 10305-1	12.0 - 46.0	1.5 - 5.0	Seamless, cold drawn
	ASTM A511	21.3 - 33.4	2.77 - 3.38	Seamless stainless
Ambridge /US/	ASTM A519	2.375" - 5.500"	0.244 - 0.600	Seamless hot rolled
Artrom /Romania/	EN 10297-1, ASTM A519	21.3 - 229	2.3 - 60	Seamless hot rolled
Artrom /Romania/	DIN EN 10305-1	15 - 210	1.5 - 20	Seamless cold drawn

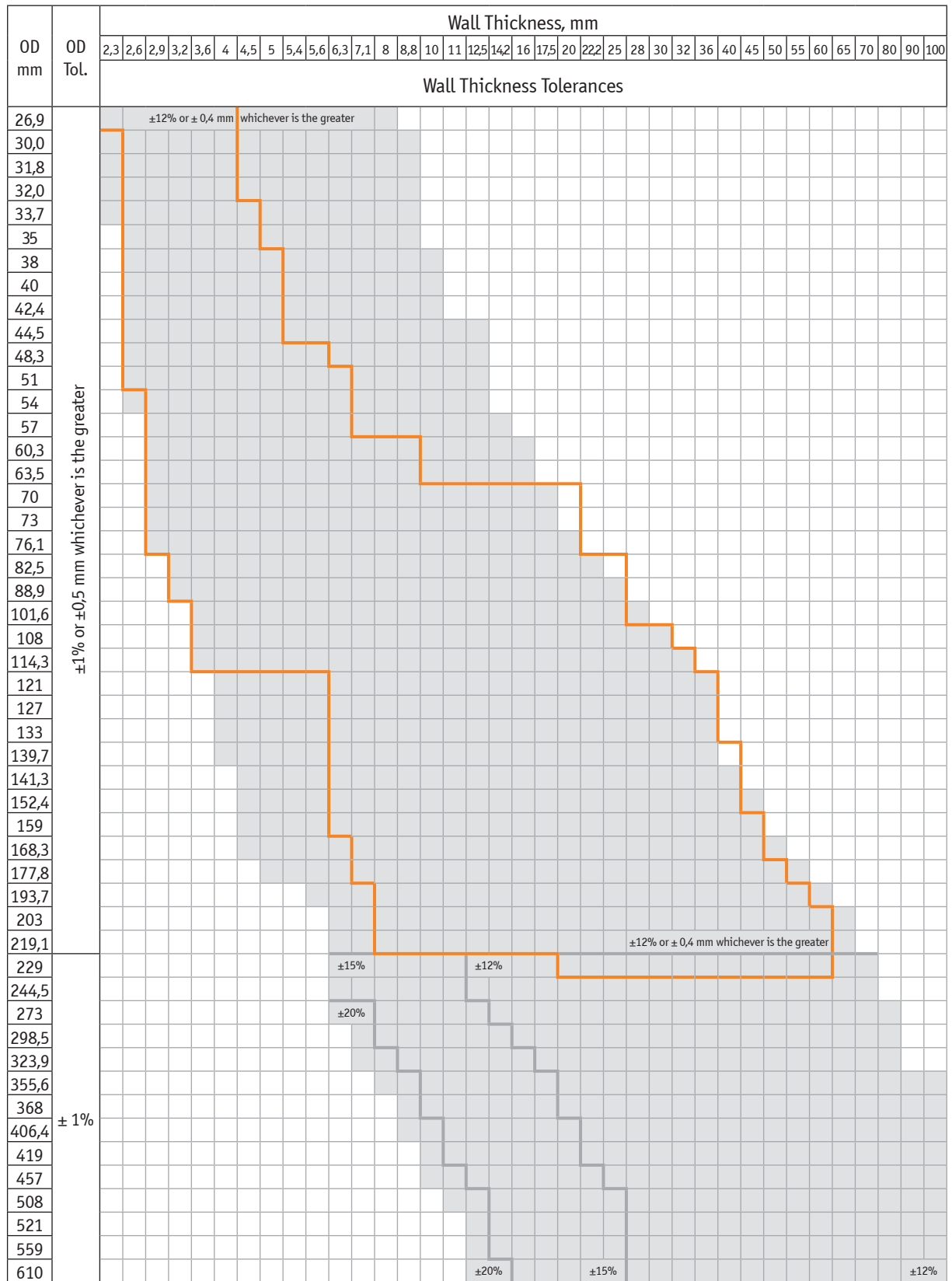
List of Standards and Ranges for Mechanical Application

Specification	OD, mm	WT, mm	Steel Grade
DIN EN 10296-1 Welded circular steel tubes for mechanical and general engineering purposes; Non-alloy and alloy steel tubes	21,3 - 219,1	2,9 - 8,0	E155, E190, E195, E220, E235, E260, E275, E320, E355, E370
DIN EN 10297-1 Seamless circular steel tubes for mechanical and general engineering purposes; Non-alloy and alloy steel tubes	26,9-245	2,3-60	E235, E355, E470 and others according to standards
DIN EN 10297-2 Seamless steel tubes for mechanical and general engineering purposes; Stainless steel	57-245	4-28	X6CRNiTi1810 and others according to standards
DIN EN 10305-1 Steel tubes for precision applications; Seamless cold drawn tubes	12 - 210	1,0-20	E235, E355
ASTM A 511 Seamless Stainless Steel Mechanical Tubes	21,3 - 33,4	2,77 - 3,38	MT 316, MT 321

Mechanical Properties DIN EN 10297-1

Steel Grade	Delivery Condition	Minimum Yield Strength R_{eH} , MPa		Minimum Tensile Strength R_m , Mpa		Minimum Elongation A_1 , %						
		<16	>6...40	>40...80	>16...40	≤16	>16...40		>40...80			
C22E	N	240	210	210	410	24	22	25	23	25	23	23
C35E	N	300	270	270	520	18	16	19	17	19	17	17
C45E	N	340	305	305	580	14	12	16	14	16	14	14
C60E	N	390	350	340	670	10	8	11	9	11	9	9
38Mn6	N	400	380	360	570	14	12	15	13	16	14	14

Dimensional Range acc. to EN 10297-1



— TMK Scheduled

Mechanical Properties DIN EN 10297-1

Steel Grade	Delivery Condition	Minimum Yield Strength R _{0.2} MPa			Minimum Tensile Strength R _m Mpa			Minimum Elongation A ₅ %							
		≤8	>8...20	>20..50	≤8	>8..20	>20..50	≤8		>8...20		>20...50		>50...80	
								l	t	l	t	l	t	l	t
C22E	QT	340	290	270	260	440	420	20	18	22	20	22	20	22	20
C35E	QT	430	380	320	290	500	500	17	15	19	17	20	18	20	18
C45E	QT	490	430	370	340	700	600	14	12	16	14	17	15	17	15
C60E	QT	580	520	450	420	850	710	11	9	13	11	14	12	14	12
38Mn6	QT	620	570	470	400	850	550	13	11	14	12	15	13	16	14
41Cr4	QT	800	660	560	-	1000	800	11	9	12	10	14	12	-	-
25CrMo4	QT	700	600	450	400	900	700	12	10	14	12	15	13	16	14
30CrMo4	QT	750	630	520	480	950	750	12	10	13	11	14	12	15	13
34CrMo4	QT	800	650	550	500	1000	750	11	9	12	10	14	12	15	13
42CrMo4	QT	900	750	650	550	1100	800	10	8	11	9	12	10	13	11
36CrNiMo4	QT	900	800	700	600	1100	800	10	8	11	9	12	10	13	11
30CrNiMo8	QT	1050	1050	900	800	1250	1000	9	7	9	7	10	8	11	9
41NiCrMo7-3-2	QT	950	870	800	750	1150	900	9	7	10	8	11	9	12	10

Steel Grade	Delivery Condition	Minimum Yield Strength R _{0.2} MPa			Minimum Tensile Strength R _m Mpa			Minimum Elongation A ₅ %		Minimum Impact Strength KV, t -20 °C		
		≤16	>16...40	>40...65	>65...80	≤16	>16...40	>40...65	>65...80	Minimum Elongation A ₅ %		Minimum Impact Strength KV, t -20 °C
										l	t	
E235	AR or N	235	225	215	205	360	360	340	25	23		
E275	AR or N	275	265	255	245	410	410	380	22	20		
E315	AR or N	315	305	295	280	450	450	420	21	19		
E355	AR or N	355	345	335	315	490	490	470	20	18		
E470	AR	470	430	-	-	650	600	-	17	15		
E275K2	N	275	265	255	245	410	410	380	22	20	40	
E355K2	N	355	345	335	315	490	490	470	20	18	40	
E420J2	N	420	400	390	370	600	560	500	19	17	27	
E460K2	N	460	440	430	410	550	550	520	19	17	40	
E590K2	QT	590	540	480	455	700	650	520	16	14	40	
E730K2	QT	730	670	620	580	790	750	680	15	13	40	

Orientation: l - longitudinal; t - transversal

Chemical Composition DIN EN 10297-1

Steel Grade	C	Si	Mn	P	S	Cr	Mo	Ni	Al	Cu	N	Nb	Ti	V
E235	≤0,17	≤0,35	≤1,2	≤0,03	≤0,035									
E275	≤0,21	≤0,35	≤1,4	≤0,03	≤0,035									
E315	≤0,21	≤0,3	≤1,5	≤0,03	≤0,035									
E355	≤0,22	≤0,55	≤1,6	≤0,03	≤0,035									
E470	0,16 - 0,22	0,1 - 0,5	1,3 - 1,7	≤0,03	≤0,035				≥0,010		≤0,020	≤0,07		0,08 - 0,15
E275K2	≤0,2	≤0,4	0,5 - 1,4	≤0,03	≤0,03	≤0,3	≤0,1	≤0,3	≥0,02	≤0,35	≤0,015	≤0,05	≤0,03	≤0,05
E355K2	≤0,2	≤0,5	0,9 - 1,65	≤0,03	≤0,03	≤0,3	≤0,1	≤0,5	≥0,02	≤0,35	≤0,015	≤0,05	≤0,05	≤0,12
E420J2	0,16 - 0,22	0,1 - 0,5	1,3 - 1,7	≤0,03	≤0,035	≤0,3	≤0,08	≤0,4	≥0,01	≤0,3	≤0,02	≤0,07	≤0,05	0,08 - 0,15
E460K2	≤0,2	≤0,6	1 - 1,7	≤0,03	≤0,03	≤0,3	≤0,1	≤0,8	≥0,02	≤0,7	≤0,025	≤0,05	≤0,05	≤0,2
E590K2	0,16 - 0,22	0,1 - 0,5	1,3 - 1,7	≤0,03	≤0,035	≤0,3	≤0,08	≤0,4	≥0,01	≤0,3	≤0,02	≤0,07	≤0,05	0,08
E730K2	≤0,2	≤0,5	1,4 - 1,7	≤0,025	≤0,025	≤0,3	0,3 - 0,45	0,3 - 0,7	≥0,02	≤0,2	≤0,02	≤0,05	≤0,05	≤0,12
C22E	0,17 - 0,24	≤0,4	0,4 - 0,7	≤0,035	≤0,035									
C35E	0,32 - 0,39	≤0,4	0,5 - 0,8	≤0,035	≤0,035									
C45E	0,42 - 0,5	≤0,4	0,5 - 0,8	≤0,035	≤0,035									
C60E	0,57 - 0,65	≤0,4	0,6 - 0,9	≤0,035	≤0,035									
38Mn6	0,34 - 0,42	0,15 - 0,35	1,4 - 1,65	≤0,035	≤0,035									
41Cr4	0,38 - 0,45	≤0,4	0,6 - 0,9	≤0,035	≤0,035	0,9 - 1,2	-							
25CrMo4	0,22 - 0,29	≤0,4	0,6 - 0,9	≤0,035	≤0,035	0,9 - 1,2	0,15 - 0,3							
30CrMo4	0,27 - 0,34	≤0,35	0,35 - 0,6	≤0,035	≤0,035	0,8 - 1,15	0,15 - 0,3							
34CrMo4	0,3 - 0,37	≤0,4	0,6 - 0,9	≤0,035	≤0,035	0,9 - 1,2	0,15 - 0,3							
42CrMo4	0,38 - 0,45	≤0,4	0,6 - 0,9	≤0,035	≤0,035	0,9 - 1,2	0,15 - 0,3							
36CrNiMo4	0,32 - 0,4	≤0,4	0,5 - 0,8	≤0,035	≤0,035	0,9 - 1,2	0,15 - 0,3	0,9 - 1,2						
30CrNiMo8	0,26 - 0,34	≤0,4	0,3 - 0,6	≤0,035	≤0,035	1,8 - 2,2	0,3 - 0,5	1,8 - 2,2						
41NiCrMo7-3-2	0,38 - 0,44	≤0,3	0,6 - 0,9	0,025	0,025	0,7 - 0,9	0,15 - 0,3	1,65 - 2						

Dimensional Range and Tolerances acc. to DIN EN 10305-1

OD mm	OD Tol.	Wall Thickness, mm																											
		0,5	0,8	1	1,2	1,5	1,8	2	2,2	2,5	2,8	3	3,5	4	4,5	5	5,5	6	7	8	9	10	12	14	16	18	20	22	25
		Inside Diameter tolerances																											
4		±0,15																											
5																													
6																													
7																													
8	±0,15																												
9																													
10																													
12																													
14		±0,08																											
15																													
16																													
18																													
20																													
22	±0,08																												
25																													
26																													
28																													
30																													
32		±0,15																											
35																													
38	±0,15																												
40																													
42																													
45																													
48	±0,20																												
50																													
55	±0,25																												
60																													
65																													
70	±0,30																												
75																													
80	±0,35																												
85																													
90	±0,40																												
95																													
100	±0,45																												
110																													
120	±0,50																												
130																													
140	±0,70																												
150																													
160																													
170	±0,90																												
180																													
190																													
200	±1,00																												
220																													
240	±1,20																												
260	±1,30																												

— TMK Scheduled

Mechanical Properties DIN EN 10305-1

Steel Grade	Material Number	C		LC		SR			A		N		
		R _m MPa, not less	A %, not less	R _m MPa, not less	A %, not less	R _m MPa, not less	R _{eH} MPa, not less	A %, not less	R _m MPa, not less	A %, not less	R _m MPa	R _{eH} MPa, not less	A %, not less
E215	1,021	430	8	380	12	380	280	16	280	30	290-430	215	30
E235	1,030	480	6	420	10	420	350	16	315	25	340-480	235	25
E255	1,040	580	5	520	8	520	375	12	390	21	440 - 570	255	21
E355	1,058	640	4	580	7	580	450	10	450	22	490-630	355	22
E410	1,050	750	4	620	8	690	590	12	520	22	550 - 700	410	22
26Mn5	1,116	700	4	650	7	—	—	—	—	—	—	—	—
C35E	1,118	590	5	540	7	—	—	—	440	22	≥460	280	21
C45E	1,119	720	4	670	6	—	—	—	510	20	≥540	340	18
26Mo2	1,541	720	4	670	6	—	—	—	—	—	—	—	—
25CrMo4	1,721	720	4	670	6	—	—	—	—	—	—	—	—
42CrMo4	1,722	720	4	670	6	—	—	—	—	—	—	—	—
10S10	1,071	510	8	—	—	440	370	16	—	—	360 - 500	240	25
15S10	1,071	550	7	—	—	490	415	14	—	—	380 - 540	260	22
18S10	1,071	650	6	—	—	600	520	12	—	—	520 - 650	360	22
37S10	1,071	720	4	—	—	700	630	12	—	—	650 - 720	420	16

Chemical Composition DIN EN 10305-1

Steel Grade	Material Number	%										
		C	Si	Mn	P, not less	S	Cr	Mo	V	Others	Cr+Mo+Ni	
E215	1,021	≤0,1	≤0,05	≤0,7	0,025	≤ 0,025					≤ 0,025 Al	
E235	1,030	≤0,17	≤0,35	≤1,2	0,025	≤ 0,025					≤ 0,025 Al	
E255	1,040	≤0,21	≤0,35	40 -1,10	0,025	≤ 0,025	—	—	—		—	—
E355I	1,058	≤0,22	≤0,55	≤1,6	0,025	≤ 0,025					≤ 0,025 Al	
E410	1,050	0,16-0,22	0,10-0,50	1,30-1,70	0,03	≤ 0,035			0,08-0,15		0,010-0,060 Al ≤ 0,07Nb ≤ 0,05 Ti	
26Mn5	1,116	0,20-0,30	≤0,40	1,20-1,50	0,035	≤ 0,035	—	—	—		—	—
C35E	1,118	0,32-0,39	≤0,40	0,50-0,80	0,035	≤ 0,035	≤0,40	≤0,10	—		—	≤ 0,63
C45E	1,119	0,42-0,55	≤0,40	0,50-0,80	0,035	≤ 0,035	≤0,40	≤0,10	—		—	≤ 0,63
26Mo2	1,541	0,22-0,29	≤0,40	≤1,50	0,035	≤ 0,035	—	0,15-0,25	—		≤ 0,40 Ni	—
25CrMo4	1,721	0,22-0,29	≤0,40	0,60-0,90	0,035	≤ 0,035	0,90-1,20	0,15-0,30	—		—	—
42CrMo4	1,722	0,38-0,45	≤0,40	0,60-0,90	0,035	≤ 0,035	0,90-1,20	0,15-0,30	—		—	—
10S10	1,071	≤ 0,12	0,10-0,35	0,75-1,10	0,03	0,08-0,13	—	—	—		—	—
15S10	1,071	0,12-0,18	0,10-0,35	0,70-1,10	0,03	0,07-0,13	—	—	—		—	—
18S10	1,071	0,14-0,20	0,10-0,35	1,30-1,60	0,03	0,08-0,13	—	—	—		—	—
37S10	1,071	0,32-0,39	0,10-0,35	1,35-1,65	0,03	0,07-0,13	—	—	—		—	—

Nb + V: ≤ 0,20%

I Nb, Ti and V upon request

TMK IPSCO A53 - SA53 3.5 X .216 BE 21 FT
HT AB9K509 BV-332A USA
MELTED AND MADE IN THE USA

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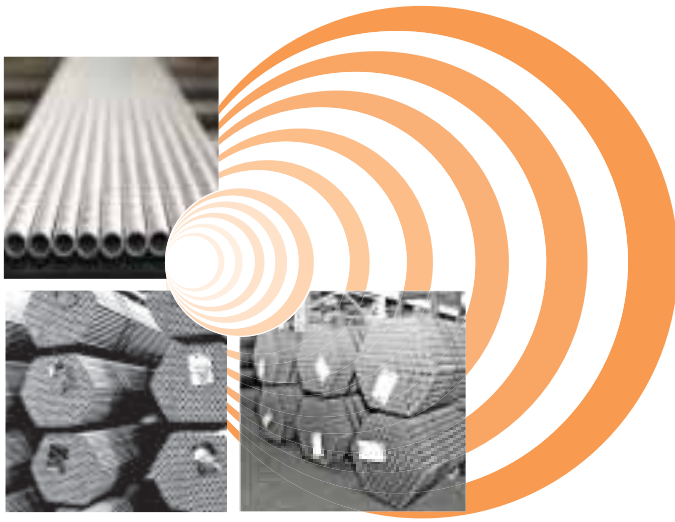
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Structurals and Standard Pipe

TMK produces hot finished structural hollow sections of non-alloy and fine grain steel according to the standard DIN EN 10210-1,2 and cold-formed seamless and welded carbon steel structural tubing in rounds in accordance with ASTM A500.

For standard uses such as steam, gas and water supply, TMK manufactures seamless and welded tube and pipe according to ASTM A53, EN 10208-1,2, DIN EN 10224 and EN 10255 specifications.

Producers

Plant Location	Standards	OD	Wall Thickness	Method
Structurals				
Volzhsky Pipe Plant /Russia/	EN 10210 1,2	57 - 245 mm	6,0 -50 mm	Seamless, hot rolled
Sinarsky Pipe Plant /Russia/	EN 10210 1,2	33,7 - 168,3 mm	2,9 - 16 mm	Seamless, hot rolled
	ASTM A500	23 - 76 mm	2,0 -10 mm	Seamless, cold drawn
TAGMET /Russia/	EN 10210 1	114,3 - 273 mm	8,0 - 20 mm	Seamless hot rolled
Blytheville /US/	ASTM A500	1.900"-4.500"	0.109"-0.337"	ERW
Camanche /US/	ASTM A500	4.500" - 8.625"	0.134" - 0.500"	ERW
Artrom /Romania/	EN 10210-1,2	21,3 - 219,1 mm	2,3 - 60 mm	Seamless hot rolled
Standard pipe				
Volzhsky Pipe Plant /Russia/	ASTM A53	219,1 - 406,4 mm	7,92 - 34,8 mm	Seamless
Seversky Tube Works /Russia/	ASTM A53	219,1-323,8 mm	7,92 - 23,32 mm	Seamless
	EN 10208-1, 10255, 10224, ASTM A53	21,3 - 530 mm	2,9 - 13 mm	ERW
Sinarsky Pipe Plant /Russia/	EN 10255	33,7 - 88,9 mm	4,05 - 4,85 mm	Seamless, hot rolled
	EN 10255, ASTM A53	10,2 - 76,1 mm	1,73 - 9,53 mm	Seamless, cold drawn
TAGMET /Russia/	EN 10255	21,3 - 60,3 mm	2,65 - 3,65 mm	ERW
Ambridge /US/	ASTM A53	2.375" - 4.500"	0.218" - 0.600"	Seamless
Blytheville /US/	ASTM A53	1.900"-4.500"	0.109"-0.337"	ERW
Camanche /US/	ASTM A53	4.500" - 8.625"	0.134" - 0.500"	ERW
Wilder /US/	ASTM A53	4.500" - 16.000"	0.188" - 0.550"	ERW
Artrom /Romania/	ASTM A53	21,3 - 219,1 mm	2,3 - 25,4 mm	Seamless hot rolled
	EN 10255	21,3 - 114,3 mm	2,3 - 5,4 mm	Seamless hot rolled
	EN 10208-1,2	21,3 - 219,1 mm	2,3 - 60 mm	Seamless hot rolled
Geneva, NE/US	HSS - A500	2sq - 7sq	120 - 250	B, C
	HSS - A500	3x2 - 8x6	120 - 250	B, C

List of Standards and Ranges for Structural and Standard Application

Standarts	OD	WT	Steel Grade
Structurals			
DIN EN 10210-1 Hot finished structural hollow sections of non-alloy and fine grain steels - Part 1: Technical delivery conditions DIN EN 10210-2 Hot finished structural hollow sections of non-alloy and fine grain steels - Part 2: Tolerances, dimensions and sectional properties	21,3 - 273	2,3 - 60	S235JRH; S275J0H; S275J2H; S355J0H; S355J2H; S355K2H
ASTM A500-13 Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes	23 - 76	2-10	Grade A, Grade B, Grade C, Grade D
DIN EN 10210-1 Hot finished structural hollow sections of non-alloy and fine grain steels - Part 1: Technical delivery conditions	10,2 - 193,7	1,0 - 20	St 37.2, St 44.2, St 52.3, St 37.3, St 44.3
DIN EN 10210-1 Hot finished structural hollow sections of non-alloy and fine grain steels - Part 1: Technical delivery conditions	21,3 - 229	2,3 - 60	St 52.3
Standard pipe			
ASTM A53-12 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless	21,3 - 530	2,3 - 34,8	Grade A, Grade B
DIN EN 10224 Non-alloy steel tubes and fittings for the conveyance of water and other aqueous liquids - Technical delivery conditions	21,3-219,1	2,9 - 8,0	L235, L275, L355
DIN EN 10208 P1 STEEL PIPES FOR PIPE LINES FOR COMBUSTIBLE FLUIDS; TECHNICAL DELIVERY CONDITIONS; PART 1: PIPES OF REQUIREMENT CLASS A	21,3 - 508	2,76 - 25,4	L210GA, L235GA, L245GA, L290GA, L360GA
DIN EN 10255 NON-ALLOY STEEL TUBES SUITABLE FOR WELDING AND THREADING - TECHNICAL DELIVERY CONDITIONS	10,2 - 114,3	2,0 - 5,4	S195T

Chemical Compositon DIN EN 10210

Steel Grade	Material Number	Contents %, not less						
		C WT, mm		Si	Mn	P	S	N
		≤40	>40 ≤120					
S235JRH	1,003	0,17	0,2	-	1,4	0,04	0,04	0,009
S275J0H	1,014	0,2	0,22	-	1,5	0,035	0,035	0,009
S275J2H	1,013	0,2	0,22	-	1,5	0,03	0,03	-
S355J0H	1,054	0,22	0,22	0,55	1,6	0,035	0,035	0,009
S355J2H	1,057	0,22	0,22	0,55	1,6	0,03	0,03	-
S355K2H	1,051	0,22	0,22	0,55	1,6	0,03	0,03	-

Steel Grade	Material Number	Carbon Equivalent, CEV, %, not less			
		WT, mm			
		≤16	>16 ≤40	>40 ≤65	>65 ≤ 120
S235JRH	1,003	0,37	0,39	0,41	0,44
S275J0H	1,014	0,41	0,43	0,45	0,48
S275J2H	1,013	0,41	0,43	0,45	0,48
S355J0H	1,054	0,45	0,47	0,5	0,53
S355J2H	1,057	0,45	0,47	0,5	0,53
S35K2H	1,051	0,45	0,47	0,5	0,53

Mechanical Properties DIN EN 10210

Steel Grade	Material Number	Yield Strength ReH Mpa, not less						Tensile Strength Rm, Mpa			Elongation %, not less			Impact Strength, not less			
		Wall thickness, mm						Wall thickness, mm			Wall thickness, mm			T, °C			
		≤16	>16 ≤40	>40 ≤63	>63 ≤80	>80 ≤100	>100 ≤120	≤3	>3 ≤65	>65 ≤120	≤40	>40 ≤63	>63 ≤80	>80 ≤120	-20	0	20
S235JRH	1,003	235	225	215	215	215	195	360-510	360-510	350-500	26	25	24	22	-	-	27
S275J0H	1,014	275	265	245	235	225	225	430-580	410-560	400-540	23	22	21	19	-	27	-
S275J2H	1,013																
S355J0H	1,054	355	345	335	315	295	295	510-680	470-630	450-600	22	21	20	18	-	27	-
S355J2H	1,057																
S355K2H	1,051																

Semi-finished Steel Products



Continuous Cast Billets

Geometric Parameters

Mill	Nom. size	Max. tolerances	Difference between diagonals/Ovality	Length	Length tolerance	Streightness deviation %	Streightcut deviation
1	240 x 240 mm	±7.0 mm	±9.8 mm	4,1 – 8.1 m	±50.0 mm	0.3	8.0
1	300 x 300 mm	±8.0 mm	±11.2 mm				15.0
1	360 x 360 mm	±10.0 mm	±14.0 mm				15.0
R	260 x 340 mm	±5.2 x ±6.8mm	±5.0 mm	4 – 10.5 m	+0/-100 mm*	0.5	7.0
2	∅ 150 mm	+3.0/-5.0 mm	≤ 8.0 mm	5.6 – 12 m	+70/-0 mm	0.3	7.0
4		±3/-5 mm	≤ 8.0 mm	4.5 – 12 m	+70/-10.0 mm		7.0
1	∅ 156 mm	+4.0/-5.0 mm	≤ 9.0mm	9 – 11.3m	±50.0 or +100.0/-0*	0.3	7.0
2		+3.0/-5.0 mm	≤ 8.0 mm	5.6 – 12 m			+70/-0.0
R	∅ 177 mm	+2.0/-4.0 mm	≤ 2/3 of the ultimate O.D. deviation	4-10.5 m	+0/-100 mm*	0.4	7.0
1	∅ 196 mm	+4.0/-5.0 mm	≤ 9.0 mm	8 – 11.3 m	±50.0 or +100.0/-0*	0.3	7.0
4	∅ 210 mm	±3.0 mm	≤ 3.0 mm	4.5 – 12 m	+55 mm	0.3	6.0
R	∅ 220mm	+3.0/-4.0 mm	≤ 2/3 of the ultimate O.D. deviation	4-10.5 m	+0/-100 mm*	0.4	7.0
1	∅ 228 mm	+4.0/-5.0 mm	≤ 9.0mm	6 – 11.5 m	±50.0 or +100.0/-0*	0.3	7.0
1	∅ 260 mm	+4.0/-5.0 mm	**	6 – 11.5 m	±50.0 or ±100.0/-0*	0.3	7.0
R	∅ 280 mm	+3.0/-5.0 mm	≤ 2/3 of the ultimate O.D. deviation	4-10.5 m	+0/-100 mm*	0.4	7.0
4	∅ 300 mm	±3.0 mm	≤ 3.0 mm	3.5 – 12 m	+55 mm	0.3	7.0
1	∅ 340 mm	±5.0 mm	≤ 3/4 of the ultimate O.D. deviation	4 – 11 m	±50.0 or +100.0/-0*	0.3	15.0
4		±4.0 mm	≤ 7.0 mm	3.5 – 12 m			+50.0/-10.0 mm
R	∅ 350 mm	+2.0/-7.0 mm	≤ 2/3 of the ultimate O.D. deviation	6-7 m (4-10.5)***	+0.0/-100.0 mm*	0.4	15.0
1	∅ 360 mm	±5.0 mm	≤ 3/4 of the ultimate O.D. deviation	4 – 11 m	±50.0 or +100.0/-0*	–	15.0
4	∅ 400 mm	±4.0 mm	≤ 7.0	3.5 – 12 m	+50.0/-10.0 mm	0.3	7.0
1	∅ 410 mm	+4.0/-6.0 mm	≤ 3/4 of the ultimate O.D. deviation	4 – 8.5 m	±50.0 or +100.0/-0*	0.3	15.0
K	∅ 5.5"	±0.250"	±0.125"	30 – 40 ft	±4"	0.250" in 5 ft	±0.250"
K	∅ 6.5"	±0.250"	±0.125"	30 – 40 ft	±4"	0.250" in 5 ft	±0.250"

Mill Designation: 1 – Volzhsky/Rus/; 2 – Seversky/Rus/; 4 – TAGMET/Rus/; K – Koppel /US/; R – Resita /Rom/
 * up to 10 % in random length ** shall not exceed of the ultimate O.D. deviation *** special cases

Steel Grades according to the following standards:

Volzhsky: ASTM A106-13, ASTM A210-02(2012), ASTM A213-14, ASTM A333-13, ASTM A335-11, ASTM A519-06(2012), DIN EN 10083-3, 10208-2-заменен на DIN EN ISO 3183, DIN EN 10210-1, DIN EN 10216-2, DIN EN 10297-1, ISO 3183-3;

Seversky: API Spec 5CT, API Spec 5L, ASTM A53-12, ASTM A106-13;

TAGMET: API 5DP, API Spec 5CT, ASTM A53-12, ASTM A106-13, ASTM A333-13, ASME SA 106, DIN EN 10210-1, DIN EN 10216-1, DIN EN 10255;

Koppel: API Spec 5CT, API Spec 5L , A106-13, A210-02 (2012), A333-13;

Resita: API Spec 5CT, API Spec 5L, ASTM A106-13, A519-06(2012), 10216-1/2/3/4, DIN EN 10216-2, ISO 2938.

Steel Melting and Casting Flowchart

- Preparation of scrap
- Preparation of deoxidizers, materials and ferroalloys.
- Charging of steel making furnace

Electric arc furnace

1. Melting



2. Treatment of steel in ladle furnace

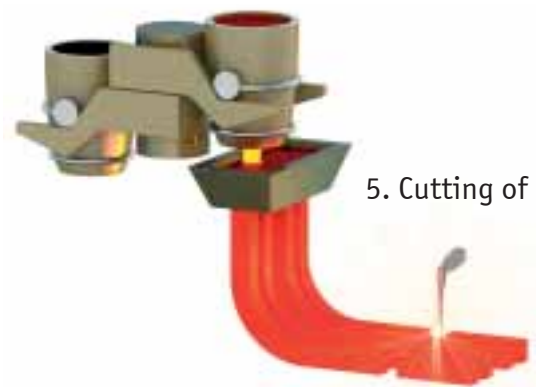
Ladle furnace



3. Vacuum degassing
(applicable for high grades of steel)



4. Continuous steel casting.
Production of square and round billets



6. Cooling and marking of billets*



7. Acceptance of billets, heats.
Delivery to storage or shipment



*Turning of round billets is performed if required.

Controlled parameters: scrap weight, chemical composition and sizes; materials gravimetric and chemical composition, humidity, weight; metal temperature; vacuum degree, cooling regimens, casting rate; cut length and quality; billetwise traceability, outside surface, geometric sizes, billet quality, macrostructure.

Calculations, Formulas, Conversions, and Constants

US CUSTOMARY UNITS

Capacity of Pipe

Barrels per linear ft	Equation	UNITS
Linear Ft/Barrel	$= 0.0009714 \times D^2$	
Cubic Ft/linear ft	$= 1029.4/D^2$	
Linear Ft/Cubic ft	$= 0.005454 \times D^2$	
	$= 183.35/D^2$	
D	= Pipe inside diameter inches	inches
d	= OD - 2 x w.t.	inches
w.t.	= wall thickness	inches

Volume and Height between tubing and casing, or between casing and hole (annular volume)

Barrels per linear ft	Equation	UNITS
Linear Ft/Barrel	$= 0.0009714 \times (D^2 - nd^2)$	bbbl/ft
Cubic Ft/linear ft	$= 1029.4 / (D^2 - nd^2)$	ft ³ /ft
Linear Ft/Cubic ft	$= 0.005454 \times (D^2 - nd^2)$	ft ³ /ft ³
	$= 183.35 / (D^2 - nd^2)$	
D	= Pipe inside diameter inches of the casing	inches
d	= OD - 2 x w.t.	inches
w.t.	= wall thickness	inches
d	= Outside diameter of tubing or casing, inches	inches
n	= number of strings of tubing	

Hydrostatic Pressure

p	= tvd x s.g. x 0.4330	psi
p	= tvd x ppg x 0.051981	psi
s.g.	= specific gravity, water is 1.0	
tvd	= true vertical depth in ft	ft
ppg	= fluid density, #/gal (pounds per gallon)	#/gal

Effect of Temperature on Steel (Steel expands or contracts 0.0000828"/ft/°F)

Pipe Expansion Uniformly heated	Equation	UNITS
Pipe Expansion Downhole	$= \Delta T \times \text{Length} \times 0.0000828$	inches
	$= [(BHST - \text{ambT}) / 2 - PT] \times \text{Length} \times 0.0000828$	inches
BHST	= Bottom Hole Static Temp	°F
ΔT	= Change in Temperature	°F
ambT	= year-around ambient temperature (70 °F)	°F
PT	= Pipe Temperature, or outside temp	°F
Length	= Total length of pipe	ft

Plain end pipe weight #/ft

Weight	= $10.69 \times (D-t) \times t$	Lb/ft
D	= Pipe OD	inches
t	= wall thickness	inches

CONVERSION FACTORS

1 inch	= 25.4 mm exact, all linear conversions are derived from this factor	1 N/cm ²
1 Pound (lb)	= .45359 kilograms (kg)	1 N/cm ²
1 Pound/ft	= 1.4882 kilograms per meter (kg/m)	1 oilfield barrel
1 foot-pound	= 1.3558 newton-meters (N·m) for torque	= 42 US Gallons, = 5.6146 ft ³

METRIC CALCULATIONS

Capacity of Pipe

Cubic meters per linear meter	Equation	UNITS
Linear Meters per cubic meter	$= D^2 / 1,273,000$	meter
Liter per linear Meter	$= 1,273,000 / D^2$	meter
Meter per linear Liter	$= D^2 / 1273$	
	$= 1273 / D^2$	
D	= Pipe inside diameter millimeters	mm
d	= OD - 2 x w.t.	mm
w.t.	= wall thickness	mm

Volume and Height between tubing and casing, or between casing and hole (annular volume)

Cubic meters/meter	Equation	UNITS
Meters/cubic meter	$= (D^2 - nd^2) / 1,273,000$	m ³ /m
Liters/meter	$= 1,273,000 / (D^2 - nd^2)$	m ³ /m
Meters/liter	$= 1273 / (D^2 - nd^2)$	l/m
	$= 1273 / (D^2 - nd^2)$	
D	= Pipe inside diameter inches of the casing	mm
d	= OD - 2 x w.t.	mm
w.t.	= wall thickness	mm
d	= Outside diameter of tubing or casing, mm	mm
n	= number of strings of tubing	

Hydrostatic Pressure

p	= tvd x s.g. x 9.807	kPa
p	= tvd x kg/l x 9.807	kPa
s.g.	= specific gravity, water is 1.0	
tvd	= true vertical depth in meters	meters

Effect of Temperature on Steel (Steel expands or contracts 0.01242 mm/m/°C)

Pipe Expansion Uniformly heated	Equation	UNITS
Pipe Expansion Downhole	$= \Delta T \times \text{Length} \times 0.0000828$	mm
	$= [(BHST - \text{ambT}) / 2 - PT] \times \text{Length} \times 0.01242$	mm
BHST	= Bottom Hole Static Temp	°C
ΔT	= Change in Temperature	°C
ambT	= year-around ambient temperature (21 °C)	°C
PT	= Pipe Temperature, or outside temp	°C
Length	= Total length of pipe	m

Plain end pipe mass/meter (kg/m)

Mass	= $0.0246615 \times (D-t) \times t$	kg/m
D	= Pipe OD	mm
t	= wall thickness	mm

10 kPa	= 1.450377 psi (for compressive strength comparison)
1 N/cm ²	= 42 US Gallons, = 5.6146 ft ³

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