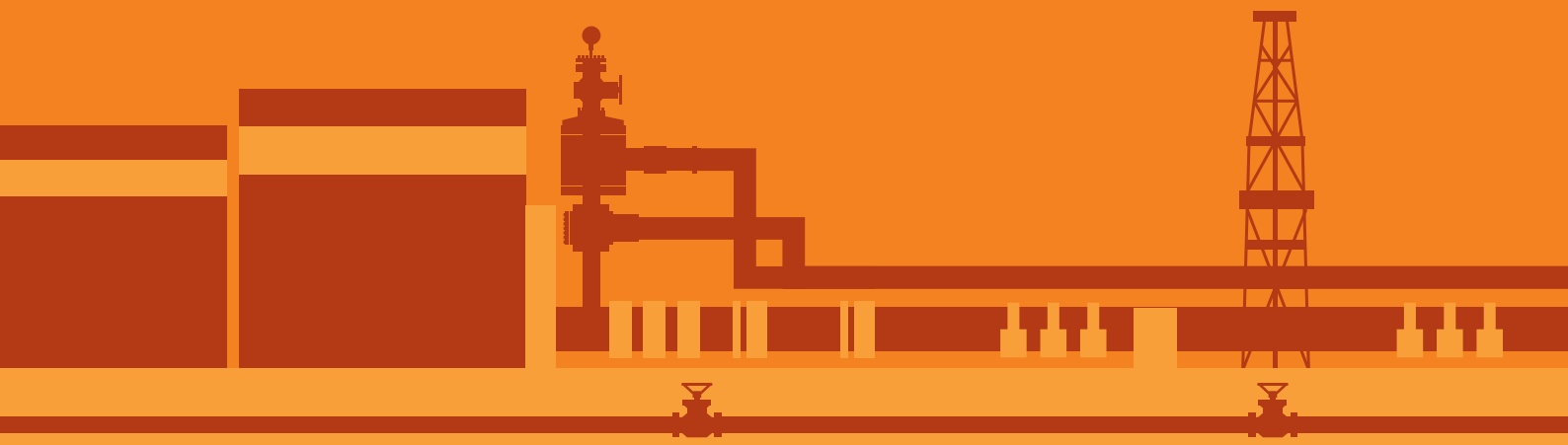
INTERPIPE

EXPERT PIPE SOLUTIONS:

PIPE PRODUCTS FOR OIL AND GAS OPERATIONS IN SOUR ENVIRONMENTS



Interpipe is a global steel pipe producer and supplier

Interpipe is a global steel pipe producer - one of the top ten largest manufacturers of seamless pipes in the world. In 2013 the company sold over 1 million tons of steel pipes.

The company's products are supplied to 80 countries all over the world through a chain of commercial offices located in Ukraine, Russia, Kazakhstan, Europe, the USA and the Middle East.

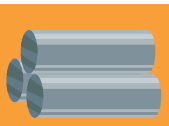
Interpipe structure includes production facilities located in Dnepropetrovsk region, one of the major industrial centers of Ukraine. The company continues to invest heavily in the development and modernization of its mills.

Interpipe has a vertically integrated business structure which includes 5 high efficient mills. Such structure allows controlling product quality at every stage: from manufacturing of raw materials to delivery of final products to customers.

Interpipe Vtormet
Dnepropetrovsk, Ukraine

SCRAP PROCESSING

Interpipe Steel
Dnepropetrovsk, Ukraine

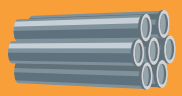


STEEL PRODUCTION

Interpipe NTRP
Dnepropetrovsk, Ukraine

Interpipe Niko Tube
Nikopol, Ukraine

Interpipe NMPP
Novomoskovsk, Ukraine



SEAMLESS STEEL PIPES AND RAILWAY WHEEL PRODUCTION

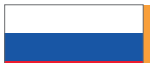
Selling to customers globally – key markets

North American Interpipe

Interpipe Middle East

Interpipe Kazakhstan

Interpipe Europe SA



Interpipe M

Interpipe Ukraine

PIPES FOR TRANSPORTATION OF OIL AND GAS, CONTAINING H_2S (SOUR SERVICE) ACCORDING TO API 5L STANDARD (APPLICATION H)

Nominal sizeer	Outside diameter		Wall thickness		Weight per length unit	
	in	mm	in	mm	lb/ft	kg/m
1.315	1,315	33,4	0,134	3,40	1,69	2,52
1.660	1,660	42,2	0,142	3,60	2,30	3,43
1.900	1,900	48,3	0,146	3,70	2,73	4,07
2⅜	2,375	60,3	0,142	3,60	3,38	5,03
			0,154	3,90	3,65	5,42
			0,173	4,40	4,08	6,07
			0,189	4,80	4,42	6,57
			0,217	5,50	5,00	7,43
2⅞	2,875	73	0,157	4,00	4,57	6,81
			0,173	4,40	5,00	7,44
			0,189	4,80	5,43	8,07
			0,205	5,20	5,84	8,69
			0,217	5,50	6,15	9,16
			0,252	6,40	7,07	10,51
			0,276	7,00	7,66	11,39
3½	3,500	88,9	0,157	4,00	5,63	8,38
			0,173	4,40	6,16	9,17
			0,189	4,80	6,69	9,96
			0,217	5,50	7,60	11,31
			0,252	6,40	8,75	13,02
			0,280	7,10	9,62	14,32
			0,299	7,60	10,24	15,24
4	4,000	101,6	0,157	4,00	6,47	9,63
			0,173	4,40	7,09	10,55
			0,189	4,80	7,70	11,46
			0,224	5,70	9,06	13,48
			0,252	6,40	10,10	15,03
			0,280	7,10	11,12	16,55
			0,319	8,10	12,55	18,68
4½	4,500	114,3	0,157	4,00	7,31	10,88
			0,173	4,40	8,01	11,93
			0,189	4,80	8,71	12,96
			0,205	5,20	9,40	13,99
			0,220	5,60	10,09	15,01
			0,236	6,00	10,77	16,03
			0,252	6,40	11,44	17,03
			0,280	7,10	12,61	18,77
			0,339	8,60	15,06	22,42
6	6,625	168,3	0,280	7,10	18,71	27,85
			0,312	7,90	21,25	31,63
			0,344	8,70	23,00	34,24
			0,375	9,50	24,99	37,20
			0,432	11,00	28,67	42,67
			0,563	14,30	36,48	54,31
			0,720	18,30	45,48	67,70
			0,874	22,20	53,73	79,99
8	8,625	219,1	0,277	7,00	24,60	36,61
			0,312	7,90	27,98	41,65
			0,322	8,20	28,65	42,65
			0,344	8,70	30,33	45,14
			0,375	9,50	32,99	49,11
			0,406	10,30	35,63	53,04
			0,500	12,70	43,43	64,64
			0,563	14,30	48,52	72,22
			0,591	15,00	50,72	75,50
			0,630	16,00	53,84	80,14
			0,720	18,30	60,88	90,62
			0,748	19,00	62,99	93,76
			0,811	20,60	67,75	100,84
			0,874	22,20	72,42	107,80
			0,906	23,00	74,72	111,23
			0,921	23,40	75,87	112,93

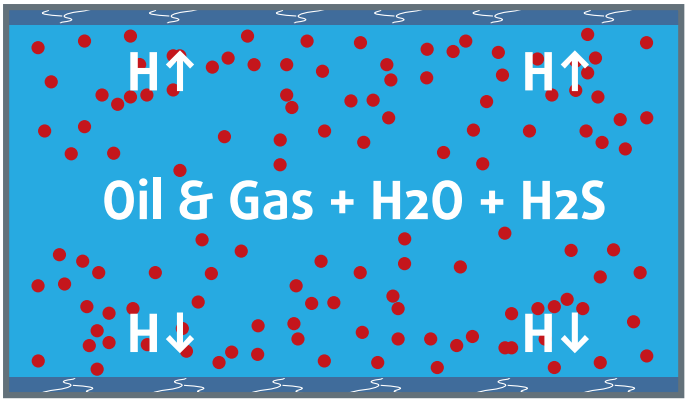
Nominal sizeer	Outside diameter		Wall thickness		Weight per length unit	
	in	mm	in	mm	lb/ft	kg/m
10	10,750	273	0,279	7,10	30,86	45,92
			0,307	7,80	34,28	51,01
			0,344	8,70	38,11	56,71
			0,365	9,30	??	??
			0,374	9,50	41,49	61,73
			0,438	11,10	47,76	71,07
			0,500	12,70	54,79	81,53
			0,563	14,30	61,31	91,23
			0,591	15,00	64,14	95,44
			0,630	16,00	68,15	101,41
			0,720	18,30	77,25	114,95
			0,811	20,60	86,17	128,23
			0,843	21,40	89,23	132,78
			0,874	22,20	92,27	137,31
			0,937	23,80	98,29	146,27
12	12,750	323,9	0,276	7,00	36,75	54,69
			0,312	7,90	41,87	62,30
			0,330	8,40	43,91	65,34
			0,344	8,70	45,43	67,61
			0,375	9,50	49,48	73,64
			0,406	10,30	53,51	79,63
			0,438	11,10	57,02	84,86
			0,500	12,70	65,48	97,44
			0,563	14,30	73,35	109,15
			0,630	16,00	81,61	121,45
			0,689	17,50	88,83	132,19
			0,748	19,00	95,97	142,82
			0,811	20,60	103,51	154,03
			0,843	21,40	107,25	159,59
			0,874	22,20	110,96	165,12
			0,937	23,80	118,33	176,08

Length from 2,74 m to 12,1 m (from 9 ft to 39,7 ft).

GENERAL INFORMATION ABOUT SOUR SERVICE

SOUR SERVICE OR SOUR ENVIRONMENTS CAN BE DEFINED AS AN OIL AND GAS MEDIUM, CONTAINING HYDROGEN SULFIDE H_2S

All transported oil and gas contains hydrogen sulfide and moisture, which often leads to metal corrosion. A part of this hydrogen sulfide is accumulated in metal, which reduces adhesion of interatomic forces in particular areas and thereby promotes formations of micro-cracks, leading to the subsequent rapid development of larger cracks.

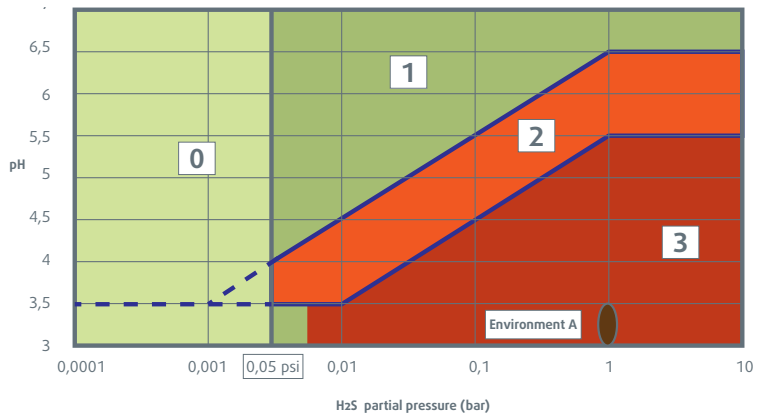


In general, operating in sour environments faces similar extreme corrosive conditions to that of deep-hole high pressure drilling.

STANDARDS DEFINING THE SELECTION OF THE MATERIAL

NACE MR0175 / ISO 15156 standards regulate the selection of the material and clearly define the requirements and recommendations for the selection of carbon and low-alloy steels, as well as other alloys used for transporting oil and gas containing H2S.

Classification according to NACE MR0175/ISO 15156



Areas with partial pressure of hydrogen sulfide pH < 0.3 kPa (0.05 psi). This does not normally require any precautionary measures in the selection of steels for application in such operating conditions (area 0).

Areas with partial pressure of hydrogen sulfide pH > 0.3 kPa (0.05 psi). It is necessary to use special steel alloys which are resistant to corrosive cracking. A selection of steels is carried out in accordance with NACE MR0175/ISO 15156 standards (areas 1, 2).

SOUR SERVICE STEEL GRADES

Interpipe produces tubular goods for operation in sour environments according to the requirements of API 5L standard (Appendix H) and NACE MR0175/ISO 15156 recommendations.


Certificate of Authority to use the Official API Monogram


Certificate of Authority to use the Official API Monogram

Pipes are produced out of the following steel grades:

Grade	TENSILE STRENGTH MPa (psi)		YIELD STRENGTH MPa (psi)	
	min.	max.	min.	max.
L245NS или BNS L245QS или BQS	415 (60200)	655 (95000)	245 (35500)	450 (65300)
L290NS или X42NS L290QS или X42QS	415 (60200)	655 (95000)	290 (42100)	495 (71800)
L320NS или X46NS L320QS или X46QS	435 (63100)	655 (95000)	320 (46400)	525 (76100)
L360NS или X52NS L360QS или X52QS	460 (66700)	760 (110200)	360 (52200)	530 (76900)
L390QS или X56QS	490 (71100)	760 (110200)	390 (56600)	545 (79000)
L415QS или X60QS	520 (75400)	760 (110200)	415 (60200)	565 (81900)
L450QS или X65QS	535 (77600)	760 (110200)	450 (65300)	600 (87000)
L485QS или X70QS	570 (82700)	760 (110200)	485 (70300)	635 (92100)

The designed chemical composition of the continuously cast billets, produced by the innovative Interpipe Steel mill for sour service pipes, demonstrates enhanced resistance to stress corrosion cracking.

Pipes, complying with API Spec. 5L requirements for PSL 2, as well as with additional requirements of Appendix H, are marked as complying with this standard and are labeled with “S” in the class name to designate pipes for service in aggressive sour environments.

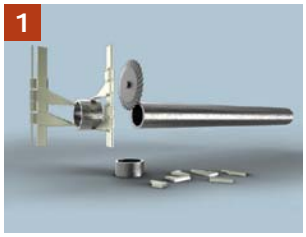
FOCUSED ON QUALITY

High quality of Interpipe products is ensured due to the use of vacuum degassed steels with minimal contents of nonmetallic elements, optimal chemical composition of billets and a fine-grained structure of pipes.

For producing pipes for sour environments, Interpipe follows the recommendations of NACE MR0175, with all materials inspected for compliance with NACE TM0177 and NACE TM 0284 requirements.

Product quality control is the principal factor in Interpipe's production development. Company mills are equipped with state-of-the-art machinery and equipment, enabling the control of product quality at all stages of production.

QUALITY CONTROL ON PIPE PRODUCTS FOR SOUR SERVICE IS ENSURED BY THE FOLLOWING MANDATORY INSPECTIONS AND TESTS:

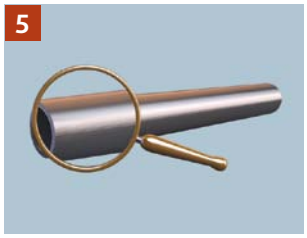


Chemical composition analysis

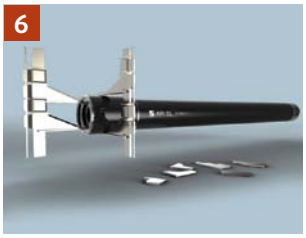
HIC tests to define resistance to hydrogen-stress cracking

Tests to define resistance to sulfide stress-corrosion cracking

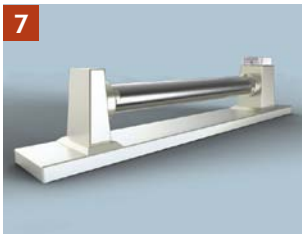
Hardness control



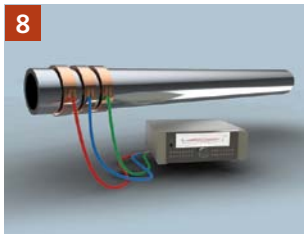
Visual inspection



Geometrical dimensions inspection

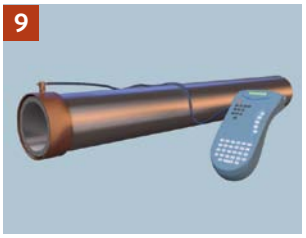


Hydro testing



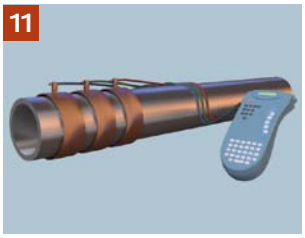
Nondestructive control of pipe body

ADDITIONAL TESTS FOR QUALITY CONTROL ON PIPE PRODUCTS FOR SOUR SERVICE



Final ultrasonic inspection of pipe ends for 50 (100) mm and wall thickness

Weighing



Eddy current and MPI control of pipe body

Inspections for resistance to hydrogen-stress cracking and resistance to sulfide stress-corrosion cracking are carried out at Dnipropetrovsk's independent Scientific and Research Center, which aims to test the pipes' resistance to hydrogen-stress cracking and resistance to sulfide stress-corrosion cracking.

The testing laboratory has accreditation under ISO 17025:2006 and is equipped with CORTEST units, allowing the assessment of step-wise cracking resistance (NACE TM 0284-2003) and resistance to sulfide stress cracking (NACE TM 0177-2005).

The Scientific and Research Center's testing laboratory is also fully equipped with state-of-the-art units for protective coating testing

COATING

To ensure additional protection from the threat of corrosion, Interpipe applies two to three layers of polyethylene coating for 114mm - 323.9mm diameter pipes. External coating applications are also possible for pipes with diameters which are less than 114 mm, and an internal coating can be applied to the entire product range*.

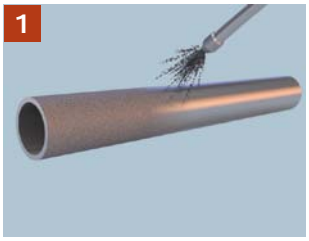
Coating thickness is dependent on the required service conditions with the layers, dependent on the number of layers, ranging between 1.5mm - 6mm in thickness.

There are several types of coating execution, depending on the purpose and operating conditions of pipes. These include:

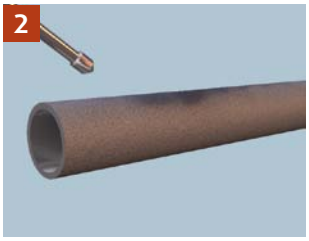
Heat-resistant coating
Enhanced frost-resistant coating
Special coating (for pipeline sections and underwater tapers, arranged with a closed construction method).

Coating quality ensures the possibility for pipe service under different climate conditions, with the temperature range from -40°C to +80°C.

PROTECTIVE COATING APPLICATION

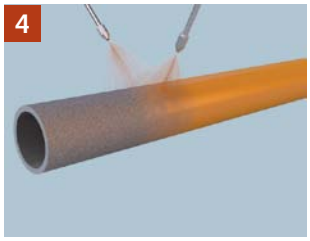


Shot blasting



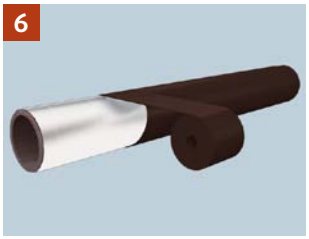
Dust removal

Induction heating



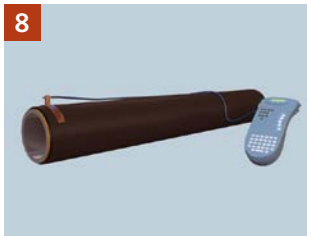
Epoxy powder application

Adhesive application



Polyethylene application

Pipe cooling

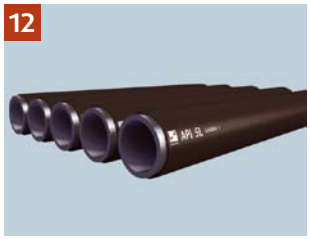


Coating solidity control

Pipe marking

Pipe ends processing

Final visual inspection marking ends protect



Storing

Coating quality is finalised through certificates of compliance, which are issued by organisations such as TUV NORD (ISO 9001), “Russian Register”, and “UKRSEPRO”.

*Upon agreement with a mill

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