



PRODUCT CATALOGUE



Your specialist in welded
stainless steel tubular products

A close-up photograph of a welder wearing a blue protective suit and a blue and yellow helmet. The welder is using a welding torch to work on a stainless steel tubular product. The scene is illuminated by a bright blue light, likely from the welding process. The background is blurred, showing an industrial setting.

Welded Stainless Steel Tubular products
for every need

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Always at your service providing
innovative, quality-based solutions
for your needs



“Our business decisions are taken in compliance with the highest ethical standards. We strive to achieve sustainable growth, always applying best practices and technologies to preserve the environment, the health and safety of our personnel and contractors as well as to constantly improve the quality of our products and services.”

Andrea Gatti, CEO

Our specialization gives your business a competitive edge

At OSTP we understand that specialization leads to improved product quality, productivity and production efficiencies. That's why we focus fundamentally on the production of welded stainless steel and higher alloy tubular products; that is pipes, tubes, butt weld fittings and fabrications.

Our specialization gives us the best opportunity to embrace the latest technologies and best practices. This keeps our business competitive whilst ensuring the highest product quality standards are maintained.

As a major player in both the European and global markets our welded pressure corrosion piping products and fabrications support applications and installations in the key industry sectors of Pulp & Paper, Oil & Gas, Chemical & Petrochemical, Water & Waste Water Treatment, Desalination, Chemical Tankers, Transportation, Energy, Building & Construction and Mining.

Our customers range from distributors and package builders to EPC contractors and end-users. Our business model and manufacturing base is structured to service both commodity product business and specialist project needs, including design and fabrication of fully engineered products, equipment and solutions.

We are dedicated to helping our customers with the products and services they require and delivering these with the highest priority on safety and reliable quality. Through one of the widest product and grade ranges available from any single producer and providing customers with application engineering, technical support and product development services we provide customers with a competitive business edge.

OSTP key facts:

- Product offerings: Process Pipes & Tubes, LOD Pipes, Butt Weld Fittings and Process Equipment.
- OSTP has two main manufacturing units, one in Sweden and one in Finland.
- OSTP employs around 460 people supported by dedicated local sales resources in ten countries, plus agents in selected markets.
- Our installed welded pipe and tube production capacity is approximately 56,000 tonnes complemented with a further 10,000 tonnes of welded butt weld fittings capacity.
- OSTP is a joint-venture company between Tubinoxia, a wholly owned Gatti family company, holding the majority, and Outokumpu EMEA Oy.



We provide
the solutions
to your needs

“At OSTP we target to fulfill our customer needs with trusted and reliable product quality, skilled local sales and technical support, fast and efficient service solutions both from extensive mill stocks and a comprehensive production program.”

*David Garrett, Head of Sales and Marketing and Product Manager
Process Pipes and Heat Exchanger Tubes*

“OSTP has almost a century of metal forming and welding experience.”



Operational excellence

OSTP focuses on providing world class quality based welded stainless steel process pipe and butt weld fittings. With production units based in Sweden and Finland, dedicated local sales resources in ten countries and agents in selected markets, combined with modern, cost efficient production lines. We are always close at hand with solutions to your needs.

In addition OSTP provides clients with access to skilled application engineering support and product development engineering, drawing on our extensive knowledge and experience in production and use of welded stainless steel tubes and fittings.



Jakobstad, Finland



Örnsköldsvik, Sweden



OMV, Sweden

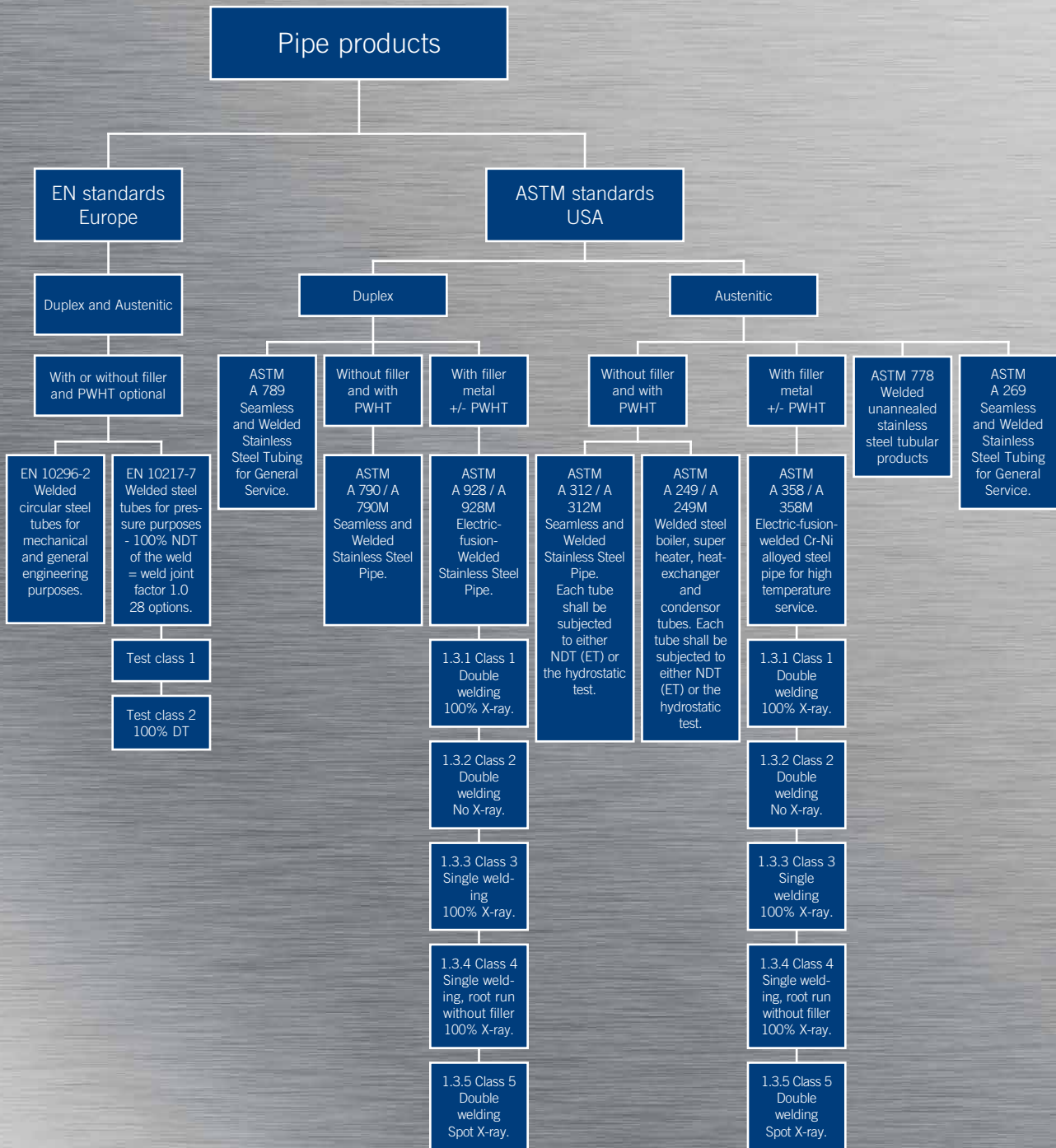


Svedjeholmen, Sweden

Product standards



Product standards



Welded tubes and pipes

Europe

EN 10217-7

Welded steel tubes for pressure purposes.
Technical Delivery Conditions – Part 7: Stainless Steel Tubes.

The standard prescribes 100% non-destructive testing. This gives a design utilization of 100%, and a weld factor $z = 1.0$. Heat treatment may be omitted if agreed. The standard inspection is normally in accordance with EN 10204 3.1. OSTP tubes manufactured according to this standard, can be used in all PED categories. The standard has two test classes, Test Class 1 (TC1) and Test Class 2 (TC2). TC1 is the conventional test class, TC2 is used when specific requirements are demanded.

EN 10296-2

Welded circular steel tubes for mechanical and general engineering purposes.
Technical Delivery Conditions – Part 2: Stainless Steel Tubes.

Non-destructive testing of the weld is not mandatory. This gives a possible design utilization of 70%, and a weld factor $z = 0.7$. Heat treatment may be omitted if agreed. The standard inspection is normally in accordance with EN 10204 3.1. See additional information on page 71.

USA

Welded pipes

ASTM A 312/A 312M

(M means mm dimension)

Seamless and welded Austenitic stainless steel pipe.

This standard contains analysis regulations and strength requirements. In addition, certain regulations of ASTM A 999 apply as regards inspection and tolerances. The scope of the sampling inspection to be carried out in respect of technological inspection is stated. Hydrostatic or Eddy Current testing is to be carried out as a 100% inspection. Welding is to be without filler material and the pipes are to be heat treated. This gives joint quality factor 0.8.

ASTM A 358/A 358M

Electric-fusion-welded Austenitic chromium-nickel alloy steel pipe for high temperature service.

Pipes are welded with filler material and are sub-classified in categories 1–5, see below.

1.3.1 *Class 1* – Pipe shall be double welded by processes employing filler metal in all passes and shall be completely radiographed.

1.3.2 *Class 2* – Pipe shall be double welded by processes employing filler metal in all passes. No radiography is required.

1.3.3 *Class 3* – Pipe shall be single welded by processes employing filler metal in all passes and shall be completely radiographed.

1.3.4 *Class 4* – Same as Class 3 except that the weld pass exposed to the inside pipe surface may be made without the addition of filler metal (see 6.2.2.1 and 6.2.2.2).

1.3.5 *Class 5* – Pipe shall be double welded by processes employing filler metal in all passes and shall be spot radiographed.

ASTM A 790/A 790 M

Seamless and welded Ferritic/Austenitic stainless steel pipes.

This standard is similar to ASTM A 312, but intended for Duplex grades.

ASTM A 928/A 928M

Ferritic/Austenitic (Duplex) stainless steel pipe electric-fusion-welded with addition of filler metal.

This standard is similar to ASTM A 358, but intended for Duplex grades. Pipes are welded with filler material and are sub-classified in categories 1-5, see below.

1.3.1 *Class 1* – Pipe shall be double welded by processes employing filler metal in all passes and shall be completely radiographed.

1.3.2 *Class 2* – Pipe shall be double welded by processes employing filler metal in all passes. No radiography is required.

1.3.3 *Class 3* – Pipe shall be single welded by processes employing filler metal in all passes and shall be completely radiographed.

1.3.4 *Class 4* – Same as Class 3 except that the weld pass exposed to the inside pipe surface may be made without the addition of filler metal (see 6.2.2.1 and 6.2.2.2).

1.3.5 *Class 5* – Pipe shall be double welded by processes employing filler metal in all passes and shall be spot radiographed.

Welded tubes

ASTM A 249

Welded Austenitic steel boiler, superheater, heat-exchanger and condenser tubes.

ASTM A 269

Seamless and welded Austenitic stainless steel tubing for general service.

ASTM A 789

Seamless and welded Ferritic/Austenitic stainless steel tubing for general service.

ASTM 778

Welded unannealed stainless steel tubular products.

Butt weld fittings

Europe

EN 10253-3

Butt-welding pipe fittings. Wrought Austenitic and Austenitic-Ferritic (Duplex) stainless steels without specific inspection requirements. See additional information on page 71.

EN 10253-4

Butt-welding pipe fittings. Wrought Austenitic and Austenitic-Ferritic (Duplex) stainless steels with specific inspection requirements. See additional information on page 71.

OSTP deliver normally Type A fittings as standard. Fittings of Type A have the same wall thickness at the welding ends and in the body of the fitting. Their resistance to internal pressure is less than of a straight pipe with the same dimensions and of the same steel grade. Fittings of Type B have increased wall thickness in the body of the fitting. They will, in general, withstand the same internal pressure as a straight pipe with the same dimensions and of the same steel grade.

USA

ASTM A 774

As-welded wrought Austenitic stainless steel fittings for general corrosive service at low and moderate temperatures.

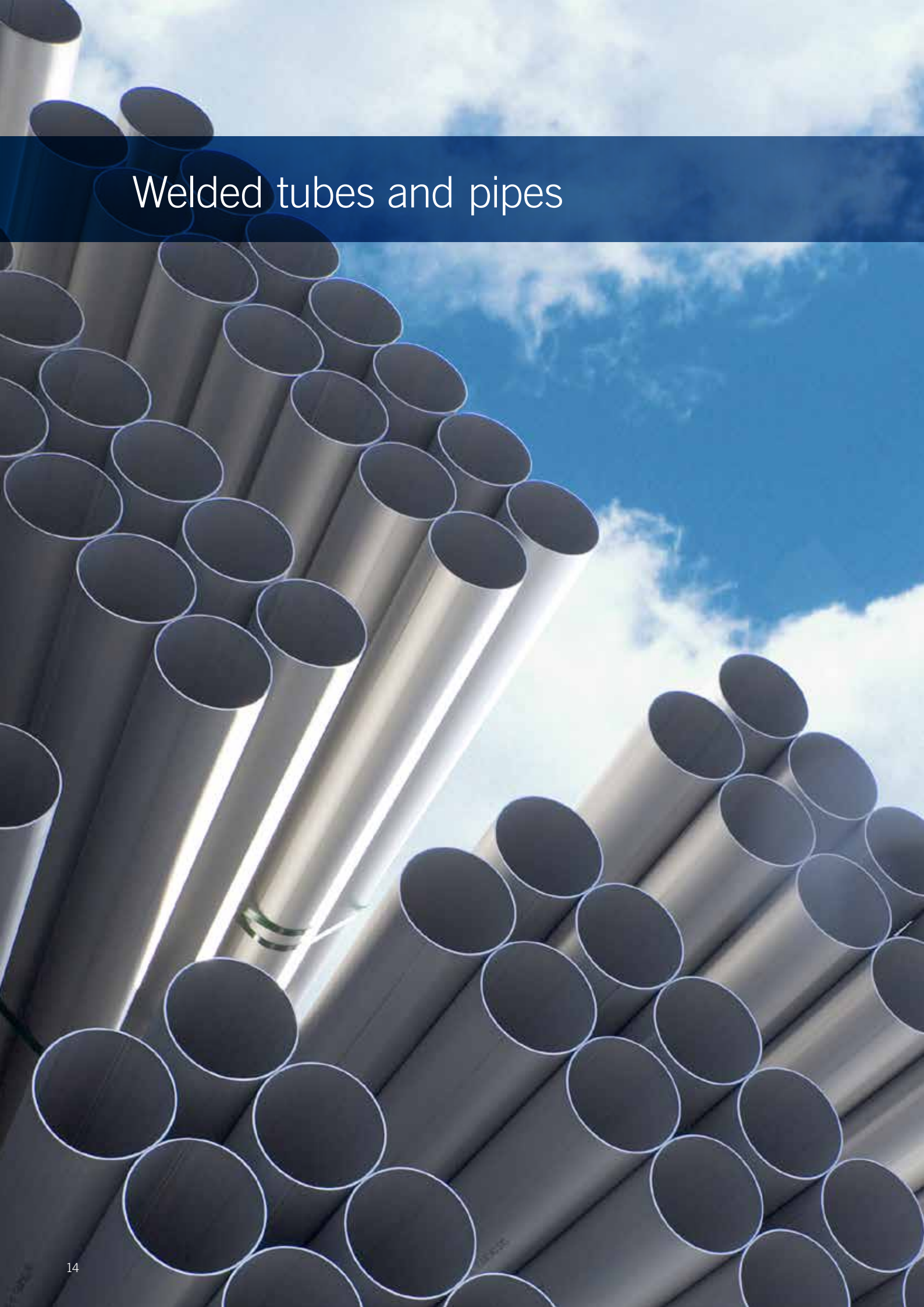
ASTM A 403

Wrought Austenitic stainless steel piping fittings.

ASTM A 815

Wrought Ferritic, Duplex, martensitic stainless steel piping fittings.

Welded tubes and pipes



Welded tubes and pipes

The manufacturing, distribution and sales of welded stainless steel process pipes and heat exchanger tubes, require that the customers' needs regarding the safe conveyance of corrosive, flammable and toxic fluids and gases must be fulfilled. OSTP's pipe and tube production is centered on our Jakobstad site in Finland and from here we offer both from production and our extensive stock program articles for all types of applications within the process industries.

We have total control through all processes in manufacture and inspection, with in-line production of the highest technology. We operate an EHSQ Management System in accordance with ISO 9001, ISO 14001 and OHSAS 18001.

Our plants are approved to European Pressure Equipment Directive 2014/68/EU (PED) and are certified by TUV Nord to AD 2000-Merkblatt W0, which fulfills the highest quality requirements from our customers. Our welding operators and processes for pipe production are also able to release material in accordance with ASTM/ASME.

Our stock program together with world-wide supply capabilities secures a high availability and fast delivery service for any application. If thin or thick, big or small, long or short, corrosion-, acid- or heat resistant, in different applications, OSTP always has the right solution for your needs.

Process pipes

This type of piping is used primarily in the Pulp and Paper, Chemical and Petrochemical industries. Pipes in chemical tankers, and for handling of water such as in pipelines, Water & Waste Water Treatment (W & WWT) plants and desalination plants, are yet other important applicational areas for these products. We stock a wide range of pipes in three primary process pipe systems, ISO, ANSI and Metric Tru-Bore®.

Standard stock range

	ANSI A312, A358	Metric Tru-Bore® EN 10217-7, EN 10296-2	ISO EN 10217-7, EN 10296-2
OD	1/2" - 16" NB	18 mm - 808 mm	17.2 mm - 813 mm
WT	SCH 5S - SCH 40S	1.5 mm - 4 mm	1.6 mm - 4 mm

Production range

OD: 16 - 2032 mm
Wall thickness: up to 10mm

Steel grade range

Austenitic / High-performance Austenitic / Lean Duplex / Duplex / Super Duplex and High-temperature grades and Ferritic grades.

Surfaces

Tubes and pipes can be manufactured from strip or plate with different types of surface finishes which in addition can be influenced within one pre-material type also by thickness and grade.

The surface of the pre-material significantly influences the surface roughness of the final tube (given no further surface treatment like grinding / polishing / brushing etc). The surface finish is defined according to EN 10028-7:2016 Table 6, see below.

Table 6 – Type of process route of sheet, plate and strip*

	Code**	Type of treatment	Surface finish	Notes
Hot rolled	1E	Hot rolled, heat treated, mechanically descaled	Free of scale	The type of mechanical descaling, e.g. coarse grinding or shot blasting, depends on the steel grade and the product, and is left to the manufacturer's discretion, unless otherwise agreed.
	1D	Hot rolled, heat treated, pickled	Free of scale	Usually standard for most steel types to ensure good corrosion resistance; also common finish for further processing. It is permissible for grinding marks to be present. Not as smooth as 2D or 2B.
Cold rolled	2E	Cold rolled, heat treated, mechanically descaled	Free of scale	Usually applied to steels with a scale which is very resistant to pickling solutions. May be followed by pickling. Different methods of mechanical descaling may be used. Shot blasting will result in a rough and dull surface while brushing may result in a smooth surface.
	2D	Cold rolled, heat treated, pickled	Smooth	Finish for good ductility, but not as smooth as 2B or 2R.
	2B	Cold rolled, heat treated, pickled, skin passed	Smoother than 2D	Most common finish for most steel types to ensure good corrosion resistance, smoothness and flatness. Also common finish for further processing. Tension levelling may be used as an alternative to skin passing.
	2R	Cold rolled, bright annealed***	Smooth, bright, reflective	Smoother and brighter than 2B. Also common finish for further processing.

*) Not all process routes and surface finishes are available for all steels.

**) First digit, 1 = hot rolled, 2 = cold rolled.

***) May be skin passed.

By experience we know approximately what surface roughness the coil material has before we start forming the coil into a tube that is welded. The welding method and amount of bead working influence the surface roughness of the weld. Process pipes with wall thicknesses less than 2 mm are normally produced from cold rolled strip. The surface condition on the coil material these tubes are produced from is mainly 2D or 2E (brushed), depending on the grade, and have Ra-values of around 1.5 µm.

Process pipes with wall thicknesses 2-6 mm are generally produced from cold rolled strip descaled with shot blasting and then pickled (2E). These tubes have Ra-values between 2.0-5.0 µm. Process pipes with wall thickness above 6 mm are generally produced from hot rolled plate that has a Ra-roughness around 5 µm.

Surface roughness of strip, sheet and plate materials used for tubes and pipes

Product	Code	Ra µm	Tubular product
Cold rolled, pickled	2D	≤ 1.5	Pipe and heat exchanger tubes. < 2 mm wall
Cold rolled, shot blast, pickled	2E	2.0 - 5.0	Pipe and heat exchanger tubes. 2 - 6.35 mm wall
Hot rolled, pickled	1D	3.5 - 5.0	Pipe > 6.35 mm wall

Note that even if the Ra-value is the most common way to describe the roughness it is not always the most accurate. For example, a ground surface with an Ra-value of 0.8 µm does not look as shiny as an electro polished surface with Ra-value 0.8 µm.

The following pages list data for tubes and pipes and butt weld fittings, giving guidance regarding design pressures for common OSTP tubular products and steel grades. The values should be regarded as rough indications only. Dimensioning of pipe systems is also dependant on external forces, thermal stress, static weight etc. Pipe systems with elbows, flanges, fastening, require often more detailed calculations.

OSTP will not be held responsible for any loss or damage caused by using this information!

Maximum allowable working pressure at 20°C, according to EN 13480

Welded pipe from OSTP

Grades 1.4306 and 1.4307 (listed values)

For grades 1.4404, 1.4432, 1.4435, 1.4438, 1.4539 and 1.4571 multiply "bar-value" with 1.08. To give guidance ratings.

Table 1

Weld factor	Metric ID	Wall thickness, mm																			
		1.5	2	2.5	3	4	5	6	7	8	9	10									
1.0	-125	34																			
1.0	150	28	38	48	57																
1.0	200	21	28	36	43	57															
1.0	250	17	23	28	34	46	57														
1.0	300		19	24	28	38	48														
1.0	350			20	24	33	41	49													
1.0	400				21	28	36	43	50												
0.7	450				13	18	22	27	32	36	41	45									
0.7	500				12	16	20	24	28	32	36	40									
0.7	600				10	13	17	20	23	27	30	33									
0.7	700				8	11	14	17	20	23	26	29									
0.7	800				7	10	12	15	18	20	23	25									
0.7	900				7	9	11	13	15	18	20	22									
0.7	1000				8	10	12	14	16	18	20										
0.7	1100				7	9	11	13	14	17	18										
0.7	1200				7	8	10	12	13	15	17										
0.7	1300				7	8	9	11	12	14	15										
0.7	1400				7	8	9	11	12	14											
0.7	1500				7	8	9	11	12	13											
0.7	1600				6	8	8	11	11												

6 - 9 bar inside pressure
 10 - 15 bar inside pressure
 16 - 25 bar inside pressure
 Limit for inside vacuum. Wall > 0.01 x OD

Table 2

Weld factor	ISO OD	Wall thickness, mm																			
		2	2.6	3	3.2	3.6	4	5	6	7	8	9	10								
1.0	-159	36																			
1.0	168.3	34	44	51	55	62	69	86													
1.0	219.1	26	34	39	42	47	52	66	79												
1.0	273.0	21	27	31	33	38	42	53	64	74											
1.0	323.9	18	23	26	28	32	35	44	53	62	71										
1.0	355.6		21	24	26	26	32	40	48	56	65	72									
1.0	406.4		18	21	22	25	28	35	42	49	57	63	70								
0.7	457		13	14	16	17	22	26	31	35	40	44									
0.7	508		12	13	14	16	20	24	28	32	36	40									
0.7	610		10	11	12	13	18	21	26	29	33										
0.7	711		8	9	10	11	16	17	20	22	25	28									
0.7	813		7	8	9	10	12	14	17	20	22	25									
0.7	914			7	8	9	11	13	15	17	20	22									
0.7	1016			7	8	10	12	14	16	18	20										
0.7	1118			7	9	11	13	14	16	18											
0.7	1219			7	8	10	11	13	14	16											
0.7	1321			7	8	10	12	13	15												
0.7	1422			7	8	10	11	13	14												
0.7	1524			7	8	10	11	13	14												
0.7	1626			7	8	10	11	13													

6 - 9 bar inside pressure
 10 - 15 bar inside pressure
 16 - 25 bar inside pressure
 Limit for inside vacuum. Wall > 0.01 x OD

Maximum allowable working pressure at 20°C, according to EN 13480

Welded pipe from OSTP

Grades 1.4162 (LDX 2101®)

Table 3

Weld factor	Metric ID	Wall thickness, mm																			
		1.5	2	2.5	3	4	5	6	7	8	9	10									
1.0	-125	59	79	99	120	161															
1.0	150	49	66	83	99	133	168	202	235	269	302	336									
1.0	200	37	49	62	74	99	125	150	175	200	225	250									
1.0	250	28	39	49	59	79	99	119	139	158	178	198									
1.0	300		33	41	49	66	83	100	116	133	149	166									
1.0	350			35	42	56	71	85	99	114	128	142									
1.0	400			37	49	62	74	87	99	112	124										
0.7	450			23	31	38	46	54	62	69	77										
0.7	500			21	28	34	41	48	55	62	70										
0.7	600			17	23	29	34	40	46	51	58										
0.7	700			15	20	25	29	34	39	44	49										
0.7	800			13	17	21	26	30	34	39	43										
0.7	900			11	15	19	23	27	29	35	38										
0.7	1000				14	17	21	25	28	32	34										
0.7	1100				12	16	19	22	25	29	31										
0.7	1200				11	14	17	20	23	26	29										
0.7	1300				13	16	19	21	24	26											
0.7	1400				12	15	18	20	23	25											
0.7	1500				11	14	16	18	21	23											
0.7	1600				13	15	17	20	21												

11 - 17 bar inside pressure
 18 - 26 bar inside pressure
 27 - 51 bar inside pressure
 ≥ 52 bar inside pressure
 Limit for inside vacuum. Wall > 0.01 x OD

Table 4

Weld factor	ISO OD	Wall thickness, mm																			
		2	2.6	3	3.2	3.6	4	5	6	7	8	9	10								
1.0	-159	62																			
1.0	168.3	59	76	88	94	106	106	149	179	209	242	268	298								
1.0	219.1	45	59	68	72	81	91	114	137	160	184	205	228								
1.0	273.0	36	47	54	58	65	72	91	109	127	147	164	182								
1.0	323.9	30	39	46	49	55	61	76	91	106	123	137	152								
1.0	355.6		36	41	44	50	55	69	83	97	112	124	138								
1.0	406.4		33	36	39	44	48	61	73	85	98	110	122								
0.7	457		23	24	27	30	38	46	53	61	68	106									
0.7	508		20	22	24	27	34	41	48	55	61	68									
0.7	610		17	18	20	23	28	34	39	45	50	57									
0.7	711		14	15	17	19	24	29	34	39	43	49									
0.7	813		12	13	15	17	21	25	29	34	38	42									
0.7	914			12	13	15	19	23	27	30	34	38									
0.7	1016				12	13	17	20	24	27	31	34									
0.7	1118				11	12	15	18	21	25	27	31									
0.7	1219				10	11	14	17	20	23	25	28									
0.7	1321				10	13	16	18	21	23	26										
0.7	1422				12	14	17	19	22	22											
0.7	1524				11	13	15	18	20	23											
0.7	1626				11	13	15	17	20	21											

OT 100 EN ISO 1127

DN	Series			Wall thickness mm								
	1	2	3	1.6	2.0	2.3	2.6	2.9	3.0	3.2	3.6	4.0
	OD, mm			Weight kg/m (Design pressure bar)								
10	17.2			0.63(278)								
15			18.0	0.66(264)	0.80(348)							
		19.0		0.70(249)	0.85(328)							
		20.0		0.74(236)	0.90(310)							
	21.3			0.79(220)	0.97(289)	1.09(337)	1.22(378)					
20			22.0	0.82(213)	1.00(279)	1.13(325)	1.26(273)					
		25.0		0.94(186)	1.15(243)	1.31(283)	1.46(324)					
		25.4		0.95(183)	1.17(239)	1.33(278)	1.48(318)					
	26.9			1.01(172)	1.25(225)	1.42(261)	1.58(299)	1.74(337)				
25			30.0	1.14(153)	1.40(200)	1.59(232)	1.78(265)	1.97(299)				
		31.8		1.21(144)	1.49(188)	1.70(218)	1.90(249)	2.10(280)				
		32.0		1.22(143)	1.50(187)	1.71(217)	1.91(247)	2.11(278)				
	33.7			1.28(136)	1.59(177)	1.81(205)	2.02(234)	2.23(263)	2.30(273)	2.44(293)		
32			35.0	1.34(131)	1.65(170)	1.88(197)	2.11(224)	2.33(252)	2.40(262)	2.55(281)		
		38.0		1.46(120)	1.80(156)	2.05(181)	2.30(206)	2.55(231)	2.63(240)	2.79(257)		
		40.0		1.54(114)	1.90(148)	2.17(171)	2.43(195)	2.69(219)	2.78(227)	2.95(243)		
	42.4			1.63(107)	2.02(139)	2.31(161)	2.59(183)	2.87(206)	2.96(213)	3.14(228)	3.49(259)	
40			44.5	1.72(102)	2.13(132)	2.43(153)	2.72(174)	3.02(195)	3.11(202)	3.31(217)	3.68(246)	
	48.3			1.87(94)	2.32(121)	2.65(140)	2.97(160)	3.29(179)	3.40(186)	3.61(199)	4.03(255)	
50			51.0	1.98(88)	2.45(115)	2.80(133)	3.15(151)	3.49(169)	3.60(175)	3.83(188)	4.27(213)	
		54.0		2.10(83)	2.60(108)	2.97(125)	3.34(142)	3.71(159)	3.83(165)	4.07(177)	4.50(200)	
		57.0		2.22(79)	2.75(102)	3.15(118)	3.54(134)	3.92(150)	4.05(156)	4.31(167)	4.81(189)	5.30(211)
	60.3			2.35(74)	2.92(96)	3.34(111)	3.75(127)	4.16(142)	4.30(147)	4.57(157)	5.11(178)	5.63(199)
65			63.5	2.48(71)	3.08(91)	3.52(106)	3.96(120)	4.40(134)	4.54(139)	4.83(149)	5.39(168)	5.95(188)
		70.0		2.74(64)	3.40(83)	3.89(95)	4.38(108)	4.87(121)	5.03(126)	5.35(134)	5.98(152)	6.60(170)
	76.1			2.98(59)	3.71(76)	4.25(88)	4.79(99)	5.31(111)	5.49(115)	5.84(123)	6.53(139)	7.21(156)
80			82.5	3.24(54)	4.03(70)	4.61(81)	5.20(91)	5.77(102)	5.97(106)	6.35(113)	7.10(128)	7.85(143)
	88.9			3.50(50)	4.35(65)	4.98(75)	5.61(85)	6.24(95)	6.45(98)	6.86(105)	7.68(119)	8.49(132)
100			101.6	4.00(44)	4.98(57)	5.71(65)	6.44(74)	7.16(83)	7.40(86)	7.88(91)	8.82(103)	9.78(115)
		108.0		4.26(41)	5.30(53)	6.08(61)	6.85(69)	7.63(78)	7.89(80)	8.39(86)	9.40(97)	10.4(108)
	114.3			4.51(39)	5.62(50)	6.44(58)	7.26(65)	8.09(73)	8.36(76)	8.89(81)	9.97(91)	11.0(102)
125			133.0	5.26(33)	6.55(43)	7.52(50)	8.49(56)	9.45(63)	9.77(65)	10.4(69)	11.7(78)	12.9(78)
	139.7			5.53(32)	6.89(41)	7.90(47)	8.91(53)	9.92(60)	10.3(62)	10.9(66)	12.3(74)	13.6(83)
150			159.0	6.30(28)	7.85(36)	9.02(41)	10.2(47)	11.3(52)	11.7(54)	12.5(58)	14.0(65)	15.5(73)
	168.3			6.67(26)	8.32(34)	9.55(39)	10.8(44)	12.0(49)	12.4(51)	13.2(55)	14.8(62)	16.4(68)
200					10.9(26)	12.5(30)	14.1(34)	15.7(38)	16.2(39)	17.3(42)	19.4(47)	21.5(52)
250					13.6(21)	15.6(24)	17.6(27)	19.6(30)	20.3(31)	21.6(33)	24.3(38)	26.9(42)
300					16.1(18)	18.5(20)	20.9(23)	23.3(25)	24.1(26)	25.7(28)	28.8(32)	32.0(35)
350							22.9(21)	25.6(23)	26.5(24)	28.2(26)	31.7(29)	35.2(32)
400							26.3(18)	29.3(20)	30.3(21)	32.3(22)	36.3(25)	40.3(28)
450								32.9(18)	34.1(19)	36.3(20)	40.8(22)	45.3(25)
500								36.6(16)	37.9(17)	40.4(18)	45.4(20)	50.4(22)
600								44.0(9)	45.6(10)	48.6(10)	54.6(12)	60.6(13)
700												70.7(11)
800												81.0(10)
900												91.0(8)
1000												101(8)
1100												111(7)
1200												122(6)

The table shows our production programme within the EN ISO 1127 standard.

Selected ISO-dimensions are stocked in following grades: EN 1.4307, 1.4404, 1.4432, 1.4541 and 1.4571. See tables on following pages.

DN 15 - DN 500 in accordance with EN 10217-7. Max. wall thickness T=6.0 mm. DN 125 - DN 1200 in accordance with EN 10296-2 produced from plate.

NOTE: The pressure calculations in this table have been done according to 13480-3 and EN 10217-7 for DN 15 - DN 500, $T_{max} = 6$ mm, the steel grade is EN 1.4307, room temperature 20 °C.

Pressure values in orange are calculated according to 13480-3 and EN 10296-2 weld factor z=0.7, the steel grade is EN 1.4307, room temperature 20 °C.

OT 100 EN ISO 1127

DN	Series		Wall thickness mm																			
	1	2	4.5	5.0	6.0	7.1	8.0	8.8	10	11	12	14										
OD. mm			Weight kg/m (Design pressure bar)																			
80	88.9		9.50(150)																			
100	101.6		10.9(130)																			
	108.0		11.6(122)																			
125	114.3		12.4(115)		13.7(128)																	
	133.0		14.5(98)		16.0(110)																	
150	139.7		15.2(94)		20.1(88)		23.5(105)		26.4(119)		28.8(132)		32.4(151)									
	159.0		17.4(82)		19.3(91)		23.0(77)		27.0(92)		30.2(104)		33.1(115)		37.3(132)							
200	168.3		18.4(77)		20.4(86)		24.4(73)		28.6(87)		32.1(98)		35.1(108)		39.6(124)		43.3(137)					
	219.1		24.2(59)		26.8(66)		32.0(55)		37.7(66)		42.2(75)		46.3(82)		52.3(94)		57.3(104)		64.6(114)			
250	273.0		30.2(47)		33.5(53)		40.1(44)		47.2(53)		53.0(59)		58.2(66)		65.8(75)		72.1(83)		81.4(90)		91.9(106)	
300	323.9		36.0(40)		39.9(44)		47.7(37)		56.3(44)		63.2(50)		69.5(55)		78.5(63)		86.1(69)		97.3(76)		110(89)	
350	355.6		39.5(36)		43.8(40)		52.5(34)		61.9(40)		69.6(45)		76.3(50)		86.5(57)		94.8(63)		108(69)		121(81)	
400	406.4		45.2(32)		50.2(35)		60.1(30)		70.9(35)		79.7(40)		87.5(44)		99.1(50)		109(55)		123(60)		13(70)	
450	457		50.9(28)		56.5(31)		67.7(26)		79.9(31)		89.8(35)		98.7(39)		112(44)		123(49)		139(53)		157(62)	
500	508		56.7(25)		62.9(28)		75.3(24)		89.0(28)		100(32)		110(35)		125(40)		137(44)		155(48)		175(56)	
600	610		68.2(15)		75.7(16)		90.6(20)		107(23)		121(26)		132(29)		150(33)		165(36)		187(40)		212(46)	
700	711		79.5(13)		88.4(14)		106(17)		125(20)		141(22)		155(25)		175(28)		193(31)		218(34)		247(40)	
800	813		91.0(11)		101(12)		121(15)		143(17)		161(20)		177(22)		201(25)		221(27)		250(30)		284(35)	
900	914		102(10)		114(11)		136(13)		161(15)		181(17)		199(19)		226(22)		248(24)		282(26)		320(31)	
1000	1016		114(9)		126(10)		152(12)		179(14)		202(16)		222(17)		252(20)		277(22)		314(24)			
1100	1118		125(8)		139(9)		167(11)		197(13)		222(14)		244(16)		277(18)		305(20)		346(21)			
1200	1219		137(7)		152(8)		182(10)		215(12)		242(13)		266(14)		302(16)		332(18)					

The table shows our production programme within the EN ISO 1127 standard.

Selected ISO-dimensions are stocked in following grades: EN 1.4307, 1.4404, 1.4432, 1.4541 and 1.4571. See tables on following pages.

DN 15 - DN 500 in accordance with EN 10217-7. Max. wall thickness T=6.0 mm. DN 125 - DN 1200 in accordance with EN 10296-2 produced from plate.

NOTE: The pressure calculations in this table have been done according to 13480-3 and EN 10217-7 for DN 15 - DN 500, $T_{max} = 6$ mm, the steel grade is EN 1.4307, room temperature 20 °C.

Pressure values in orange are calculated according to 13480-3 and EN 10296-2 weld factor $z=0.7$, the steel grade is EN 1.4307, room temperature 20 °C.

EN ISO 1127

Outside diameter D	Tolerance on outside diameter D		Tolerance on wall thickness T	
	Tolerance class	Permissible deviation	Tolerance class	Permissible deviation
D≤168.3	D3	± 0.75% or ± 0.3 mm whichever is the greater	T3	± 10% or ± 0.2 mm whichever is the greater
	D4*	± 0.5% or ± 0.1 mm whichever is the greater		
D>168.3	D2	± 1.0%		

*) Option 20: Tolerance class D4 if specified (at extra cost).

Standard stock program

The tables below reflect the OSTP standard stock program only, other dimensions and grades are available against special production according to our manufacturing range and capabilities.

Please refer enquiries to mill customer service contacts for review and quotation.

ISO tubes - HT (design pressures shown in brackets)

Welded tubes, annealed and pickled.

In 6 m random lengths, PE (Plain Ends).

Manufactured and inspected according to EN 10217-7 TC1, weld factor $z = 1.0$.

Tolerances in accordance with EN ISO 1127 (OD ≤ 168.3 mm = D3/T3 and OD > 168.3 mm = D2/T3).

Stock standard dimensions and grades in the table below are marked with design pressures.

The design pressures are calculated in bar according to: EN 13480, EN 10217-7, grade, T = 20 °C, weld factor $z = 1.0$.

ISO - HT

OD mm	z	Wall mm	Weight kg/m	4307	4541	4571	4404	4432
17.2	1.0	1.6	0.62	X (278)			X (298)	
21.3	1.0	1.6	0.79	X (220)		W (242)	X (237)	X (237)
21.3	1.0	2	0.97	X (289)	W (308)	W (308)	X (301)	X (301)
21.3	1.0	2.6	1.22	X (387)		W (411)	X (403)	
26.9	1.0	1.6	1.01	X (172)		W (189)	X (185)	X (185)
26.9	1.0	2	1.25	X (225)	W (239)	W (239)	X (234)	X (234)
26.9	1.0	2.6	1.58	X (299)		W (2318)	X (311)	
33.7	1.0	1.6	1.29	X (136)			X (146)	X (146)
33.7	1.0	2	1.59	X (177)	W (188)	W (188)	X (184)	X (184)
33.7	1.0	2.6	2.02		W (249)	W (249)		
33.7	1.0	3.2	2.44	X (293)		W (312)	X (305)	
42.4	1.0	1.6	1.63	X (107)			X (115)	X (115)
42.4	1.0	2	2.02	X (139)	W (148)	W (148)	X (145)	X (145)
42.4	1.0	2.6	2.59		W (195)	W (195)		
42.4	1.0	3.2	3.14	X (228)		W (243)	X (238)	
48.3	1.0	1.6	1.87	X (94)			X (100)	X (100)
48.3	1.0	2	2.32	X (121)	W (129)	W (129)	X (126)	X (126)
48.3	1.0	2.6	2.98		W (170)	W (170)		
48.3	1.0	3.2	3.61	X (199)		W (211)	X (207)	
60.3	1.0	1.6	2.35	X (74)			X (80)	X (80)
60.3	1.0	2	2.92	X (96)	W (103)	W (103)		X (100)
60.3	1.0	2.6	3.76		W (135)	W (135)		
60.3	1.0	2.9	4.17			W (151)		
60.3	1.0	3.6	5.11	X (178)		W (189)	X (185)	
70.0	1.0	2	3.41	X (83)			X (86)	X (86)
76.1	1.0	1.6	2.98	X (59)				X (63)
76.1	1.0	2	3.71	X (76)	W (81)	W (81)		X (79)
76.1	1.0	2.3	4.25			W (93)		
76.1	1.0	2.6	4.79		W (106)	W (106)		
76.1	1.0	2.9	5.32		W (118)	W (118)		
76.1	1.0	3.6	6.54	X (139)		W (148)	X (145)	
88.9	1.0	2	4.35		W (69)	W (69)		
88.9	1.0	2.3	4.99		W (79)	W (79)		
88.9	1.0	2.6	5.62		W (90)	W (90)		
88.9	1.0	2.9	6.24			W (101)		
88.9	1.0	3.2	6.87			W (112)		
88.9	1.0	4	8.50			W (141)		
114.3	1.0	2	5.62		W (53)	W (53)		
114.3	1.0	2.6	7.27		W (70)	W (70)		
114.3	1.0	3	8.36		W (81)	W (81)		
114.3	1.0	3.6	9.98			W (97)		

X = Stock standard available as TC1.

W = Stock standard available as TC2/AD-W2.

The stock standard program is subject to change without prior notice!

ISO tubes - NHT (design pressures shown in brackets)

Welded tubes, pickled.

In 6 m random lengths, PE (Plain Ends).

OD ≤ 813 mm manufactured and inspected according to EN 10217-7 TC1, weld factor z = 1.0.

Tolerances in accordance with EN ISO 1127 (OD ≤ 168.3 mm = D3/T3 and OD > 168.3 mm = D2/T3).

Stock standard dimensions and grades in the table below are marked with design pressures.

The design pressures are calculated in bar according to: EN 13480, EN 10217-7 or EN 10296-2, T = 20 °C, actual weld factor z.

Heat Exchanger Tubes (HT & NHT)

OD mm	0,8	0,9	1	1,2	1.5/1.65	2/2.11	2.5/2.6	3/3.05	3.4/3.5	4
101.6/114.3										
83/88.9										
73										
68/70										
63,5										
60,3										
50/51										
48,3										
42.2/42.4										
40										
38										
35										
33.4/33.7										
32										
30										
28										
26,9										
25/25.4										
22										
21,3										
20										
19/19.05										
18										
17,2										
16										
Wall tickness mm	0,8	0,9	1	1,2	1.5/1.65	2/2.11	2.5/2.6	3/3.05	3.4/3.5	4
Production Standards (size-thickness and grade dependant)										
Production to EN 10217-7 Tc1 and Tc2 / ASTM A249 / ASTM A269 / ASTM A790 / ASTM A789										

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Metric Tru-Bore®

DN	Outside diameter mm	Wall thickness mm									
		1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10	12
		Weight kg/m (Design pressure bar)									
15	18	0.62(244)	0.80(348)								
	20	0.70(218)	0.90(310)	1.10(397)							
20	22	0.77(197)	1.00(279)	1.22(357)							
	23	0.81(188)	1.05(266)	1.28(340)							
25	25	0.88(172)	1.15(243)	1.41(310)							
	28	1.00(153)	1.30(215)	1.60(274)							
32	30	1.07(142)	1.40(200)	1.72(254)	2.03(310)						
	32	1.15(133)	1.50(187)	1.85(237)	2.18(289)						
32	33	1.18(128)	1.55(181)	1.91(229)	2.25(279)						
	35	1.26(121)	1.65(170)	2.03(215)	2.40(262)						
40	38	1.37(111)	1.80(156)	2.22(197)	2.63(240)						
	40	1.45(105)	1.90(148)	2.35(187)	2.78(210)						
50	43	1.56(98)									
	44.5	1.62(94)	2.13(132)	2.63(167)	3.12(202)						
50	50	1.82(84)	2.40(117)	2.97(148)	3.53(179)						
	51	1.86(82)	2.45(115)	3.04(145)	3.61(175)						
65	53	1.93(79)									
	54	1.97(77)	2.60(108)								
65	57	2.08(73)	2.75(102)	3.41(129)	4.06(156)	5.31(211)					
	63.5	2.33(65)	3.08(91)	3.82(115)	4.55(139)	5.96(139)					
70	68	2.50(61)	3.31(85)								
	69		3.36(84)								
	70	2.57(59)	3.41(83)	4.23(104)	5.03(126)	6.61(170)					

DN	Inside diameter mm	Wall thickness mm									
		1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10	12
		Weight kg/m (Design pressure bar)									
80	80	3.06(52)	4.11(72)	5.16(91)	6.24(109)						
100	100	3.81(41)	5.11(57)	6.42(72)	7.74(87)	10.4(117)					
125	125	4.75(33)	6.36(46)	7.97(57)	9.62(69)	12.9(93)					
150	150	5.69(27)	7.61(38)	9.55(48)	11.5(57)	15.4(77)	19.4(97)	23.4(82)	31.6(111)	40.0(140)	48.6(170)
200	200	7.57(21)	10.1(28)	12.7(36)	15.3(43)	20.4(57)	25.7(72)	31.0(61)	41.6(82)	52.5(103)	63.6(125)
250	250	9.45(16)	12.6(23)	15.8(28)	19.0(34)	25.4(46)	31.9(57)	38.4(48)	51.6(65)	65.0(82)	78.7(99)
300	300	11.3(14)	15.1(19)	18.9(24)	22.8(28)	30.5(38)	38.2(48)	45.9(40)	61.6(54)	77.6(68)	93.7(82)
350	350	13.2(12)	17.6(16)	22.1(20)	26.5(24)	35.5(33)	44.4(41)	53.4(34)	71.6(46)	90.1(58)	109(70)
400	400				30.3(21)	40.5(28)	50.7(36)	60.9(30)	81.7(40)	103(50)	124(61)
450	450				34.0(19)	45.5(25)	57.0(32)	68.4(27)	91.7(36)	115(45)	139(54)
500	500				37.8(17)	50.5(23)	63.2(28)	76.0(24)	102(32)	128(40)	154(48)
600	600				45.3(10)	60.5(13)	75.8(17)	91.1(20)	122(27)	153(33)	184(40)
700	700				52.8(8)	70.5(11)	88.3(14)	106(17)	142(23)	178(29)	214(34)
800	800				60.3(7)	80.5(9)	101(12)	121(15)	162(20)	203(25)	244(30)
900	900				67.8(6)	90.6(8)	113(11)	136(13)	182(18)	228(22)	274(27)
1000	1000				75.4(5)	101(7)	126(10)	151(12)	202(16)	253(20)	304(24)
1100	1100				82.9(5)	111(7)	138(9)	166(11)	222(14)	278(18)	334(22)
1200	1200				90.4(5)	121(6)	151(8)	181(10)	242(13)	303(17)	364(20)
1300	1300				97.9(5)	131(6)	163(8)	196(9)	262(12)	328(15)	
1400	1400				105(4)	141(5)	176(7)	211(8)	282(11)	353(14)	
1500	1500				113(4)	151(5)	188(7)	226(8)	302(11)		
1600	1600				120(4)	161(5)	201(6)	241(7)	322(10)		

Selected Metric Tru-Bore®-dimensions are stocked in following grades: EN 1.4307, 1.4404, 1.4432 and 1.4571. See tables on following pages.
 DN 15 - DN 800 in accordance with EN 10217-7. Max. wall thickness T = 6.0 mm. DN 125 - DN 1600 in accordance with EN 10296-2 produced from plate.
 Dimensions 44.5, 57, 63.5 and 70 are ISO dimensions.

NOTE: The pressure calculations in this table have been done according to 13480-3 and EN 10217-7 for DN 15 - DN 500, $T_{max} = 6$ mm, the steel grade is EN 1.4307, room temperature 20 °C.
 Pressure values in orange are calculated according to 13480-3 and EN 10296-2 for DN 450, DN 600 - DN 1200, the steel grade is EN 1.4307, room temperature 20 °C.

The stock standard program is subject to change without prior notice!

Standard stock program

The tables below reflect the standard OSTP stock program only, other dimensions and grades are available against special production according to our manufacturing range and capabilities.

Please refer enquiries to mill customer service contacts for review and quotation.

Metric Tru-Bore® - NHT (design pressures shown in brackets)

Welded tubes, pickled.

In 6 m random lengths, PE (Plain Ends).

OD ≤ 808 mm manufactured and inspected according to EN 10217-7 TC1, weld factor z = 1.0.

Tolerances in accordance with EN ISO 1127 (OD ≤ 156 mm = D3/T3 and OD > 203 mm = D2/T3).

Stock standard dimensions and grades in the table below are marked with design pressures.

The design pressures are calculated in bar according to: EN 13480, EN 10217-7 or EN 10296-2, T = 20 °C, actual weld factor z.

Metric NHT

OD mm	z	Wall mm	Weight kg/m	4307	4571	4404	4432
28.0	1.0	1.5	1.00	X (159)		X (165)	
35.0	1.0	1.5	1.26	X (126)		X (131)	
43.0	1.0	1.5	1.56	X (102)		X (106)	
44.5	1.0	2	2.13	X (132)		X (138)	
53.0	1.0	1.5	1.93	X (82)		X (85)	
54.0	1.0	2	2.60	X (108)		X (113)	
68.0	1.0	1.5	2.50	X (63)		X (66)	
69.0	1.0	2	3.36	X (85)		X (89)	
70.0	1.0	2	3.41	X (83)		X (86)	
83.0	1.0	1.5	3.06	X (54)		X (56)	X (56)
84.0	1.0	2	4.11	X (72)	X (77)	X (75)	X (75)
103.0	1.0	1.5	3.81	X (43)		X (45)	X (45)
104.0	1.0	2	5.11	X (57)	X (61)	X (60)	X (60)
106.0	1.0	3	7.74	X (87)		X (91)	X (91)
128.0	1.0	1.5	4.75	X (34)		X (36)	X (36)
129.0	1.0	2	6.36	X (46)	X (49)	X (48)	X (48)
153.0	1.0	1.5	5.69	X (28)		X (30)	X (30)
154.0	1.0	2	7.61	X (38)	X (40)	X (40)	X (40)
156.0	1.0	3	11.5	X (57)	X (61)	X (60)	X (60)
203.0	1.0	1.5	7.57	X (21)		X (22)	
204.0	1.0	2	10.1	X (28)	X (30)	X (30)	X (30)
205.0	1.0	2.5	12.7	X (36)	X (38)	X (37)	X (37)
206.0	1.0	3	15.3	X (43)		X (45)	X (45)
254.0	1.0	2	12.6	X (23)	X (24)	X (24)	X (24)
255.0	1.0	2.5	15.8	X (28)	X (30)	X (30)	X (30)
256.0	1.0	3	19.0	X (34)		X (36)	X (36)
304.0	1.0	2	15.1	X (19)	X (20)	X (20)	X (20)
305.0	1.0	2.5	18.9	X (24)		X (25)	X (25)
306.0	1.0	3	22.8	X (28)	X (30)	X (30)	X (30)
355.0	1.0	2.5	22.0	X (20)		X (21)	X (21)
356.0	1.0	3	26.5	X (24)	X (26)	X (25)	X (25)
406.0	1.0	3	30.3	X (21)	X (23)	X (22)	X (22)
408.0	1.0	4	40.5	X (28)			X (30)
456.0	1.0	3	34.0	X (19)		X (20)	X (20)
458.0	1.0	4	45.5				X (26)
506.0	1.0	3	37.8	X (17)		X (18)	X (18)
508.0	1.0	4	50.5	X (23)		X (24)	X (24)
606.0	0.7	3	45.3	X (10)		X (10)	X (10)
608.0	0.7	4	60.5	X (13)		X (14)	X (14)
708.0	0.7	4	70.5	X (11)			X (12)
808.0	0.7	4	80.5	X (10)			X (10)

X = Stock standard.

The stock standard program is subject to change without prior notice!

Metric Tru-Bore® - HT (design pressures shown in brackets)

Welded tubes, annealed and pickled.

In 6 m random lengths, PE (Plain Ends).

Manufactured and inspected according to EN 10217-7 TC1, weld factor $z = 1.0$.

Tolerances in accordance with EN ISO 1127 ($OD \leq 156 \text{ mm} = D3/T3$ and $OD > 203 \text{ mm} = D2/T3$).

Stock standard dimensions and grades in the table below are marked with design pressures.

The design pressures are calculated in bar according to: EN 13480, EN 10217-7, Grade, $T = 20 \text{ }^\circ\text{C}$, weld factor $z = 1.0$.

Metric HT

OD mm	z	Wall mm	Weight kg/m	4307	4404	4432
18.0	1.0	1.5	0.62	X (254)	X (265)	
20.0	1.0	1.5	0.69	X (227)	X (236)	X (236)
20.0	1.0	2	0.90	X (310)	X (323)	X (323)
25.0	1.0	1.5	0.88	X (179)	X (186)	X (186)
25.0	1.0	2	1.15	X (243)	X (253)	X (253)
28.0	1.0	1.5	1.00	X (159)	X (165)	X (165)
30.0	1.0	1.5	1.07	X (148)	X (154)	
30.0	1.0	2	1.40	X (200)	X (208)	X (208)
35.0	1.0	1.5	1.26	X (126)	X (131)	X (131)
38.0	1.0	1.5	1.37	X (115)	X (120)	X (120)
38.0	1.0	2	1.80	X (156)	X (162)	X (162)
43.0	1.0	1.5	1.56	X (102)	X (106)	X (106)
44.5	1.0	2	2.13	X (132)	X (138)	X (138)
53.0	1.0	1.5	1.93	X (82)	X (85)	X (85)
54.0	1.0	2	2.60	X (108)	X (113)	X (113)
68.0	1.0	1.5	2.50	X (63)	X (66)	X (66)
69.0	1.0	2	3.36	X (85)	X (89)	X (89)

X = Stock standard available as TC1.

The stock standard program is subject to change without prior notice!

OT 120

ANSI/ASME B36.19M 2004

DN	NPS	OD mm	Sch 5S/5		Sch 10S		Sch 40S/STD	
			wt mm	kg/m	wt mm	kg/m (1)	wt mm	kg/m (1)
10	3/8	17.1			1.65	0.64(167)		
15	1/2	21.3	1.65	0.81	2.11	1.01(172)	2.77	1.29(231)
20	3/4	26.7	1.65	1.03	2.11	1.30(135)	2.87	1.71(187)
25	1	33.4	1.65	1.31	2.77	2.12(142)	3.38	2.54(177)
32	1 1/4	42.2	1.65	1.68	2.77	2.73(111)	3.56	3.44(144)
40	1 1/2	48.3	1.65	1.93	2.77	3.16(96)	3.68	4.11(128)
50	2	60.3	1.65	2.42	2.77	3.99(77)	3.91	5.52(109)
65	2 1/2	73.0	2.11	3.74	3.05	5.34(69)	5.16	8.76(120)
80	3	88.9	2.11	4.58	3.05	6.56(57)	5.49	11.5(104)
100	3 1/2	101.6	2.11	5.26	3.05	7.53(49)	5.74	13.8(95)
	4	114.3	2.11	5.93	3.05	8.49(44)	6.02	16.3(88)
125*	5	141.3	2.77	9.61	3.40	11.7(39)	6.55	22.1(77)
150	6	168.3	2.77	11.5	3.40	14.0(33)	7.11	28.7(70)
200	8	219.1	2.77	15.0	3.76	20.3(28)	8.18	43.2(62)
250	10	273.0	3.40	23.0	4.19	28.2(25)	9.27	61.2(56)
300	12	323.9	3.96	31.7	4.57	36.5(23)	9.53	75.0(48)
350	14	355.6	3.96	34.9	4.78	42.0(22)	9.53	82.6(44)
400	16	406.4	4.19	42.2	4.78	48.1(19)	9.53	94.7(38)
450*	18	457	4.19	47.5	4.78	54.1(17)	9.53	107(34)
500*	20	508	4.78	60.2	5.54	69.7(18)	9.53	119(31)
550*	22	559	4.78	66.3	5.54	76.8(16)	9.53	131(28)
600*	24	610	5.54	83.8	6.35	96.0(17)	9.53	143(25)

The table shows our production programme within the ANSI B36.19 standard.

Selected ANSI-dimensions are stocked in following grades: 304/304L, 316/316L, UNS S31803 and UNS S31254/254 SMO®. See tables on following pages.

The design pressures are calculated in bar according to: ASME B31.3, ASTM A312 pipes with NPS 3/8"-24" SCH 10S and 40S. Steel grade is 304L, T = 38 °C (100 °F), joint quality factor E_j = 0.8.

*) Not standardised schedules within our product range.

1) Design pressure bar.

The stock standard program is subject to change without prior notice!

OT 120

ASME B36.10M 2004

DN	NPS	OD mm	Sch 10		Sch 20	
			wt mm	kg/m	wt mm	kg/m
10	3/8	17.1	1.65	0.64		
15	1/2	21.3	2.11	1.01		
20	3/4	26.7	2.11	1.30		
25	1	33.4	2.77	2.12		
32	1 1/4	42.2	2.77	2.73		
40	1 1/2	48.3	2.77	3.16		
50	2	60.3	2.77	3.99		
65	2 1/2	73.0	3.05	5.34		
80	3	88.9	3.05	6.56		
100	3 1/2	101.6	3.05	7.53		
100	4	114.3	3.05	8.49		
125	5	141.3	3.40	11.7		
150	6	168.3	3.40	14.0		
200	8	219.1	3.76	20.3	6.35	33.8
250	10	273.0	4.19	28.2	6.35	42.4
300	12	323.9	4.57	36.5	6.35	50.5
350	14	355.6	6.35	55.5	7.92	68.9
400	16	406.4	6.35	63.6	7.92	79.0
450*	18	457	6.35	71.6	7.92	89.0
500*	20	508	6.35	79.7	9.53	119
550*	22	559	6.35	87.9	9.53	131
600*	24	610	6.35	96.0	9.53	143

The table shows our production programme within the ASME B36.10 standard.

Selected ANSI-dimensions are stocked in following grades: 304/304L, 316/316L, UNS S31803 and UNS S31254/254 SMO®. See tables on following pages.

*) Not standardised schedules within our product range.

The stock standard program is subject to change without prior notice!

ANSI/ASME B36.19M

Stainless steel pipe NPS 1/8"– 30". Schedule 5S, 10S, 40S and 80S. Nominal diameters, wall thicknesses and wall thickness tolerances. The schedule numbers (e.g. 40) indicate different wall thickness series.

The letter "S" in the designation stands for stainless material.

As ANSI/ASME B36.19M is not complete, the standard for carbon steel tubes ASME B36.10M is used as a complement for stainless tubes. In this standard there is no "S" after the schedule figure. The sizes are stated in the following standard published by the American National Standards Institute.

ASME B36.10M

Welded and Seamless wrought steel pipe NPS 1/8"– 80". Schedule 10–160. Nominal diameters, wall thicknesses and weight per length unit.

The ANSI system is a national system that is applied throughout the world, and particularly in certain industries and areas and especially within the petrochemical and offshore sectors.

Standard stock program

The tables below reflect the standard OSTP stock program only, other dimensions and grades are available against special production according to our manufacturing range and capabilities.

Please refer enquiries to mill customer service contacts for review and quotation.

ANSI pipes - Standard grades (design pressures shown in brackets)

Welded pipes, annealed and pickled.

In 6 m random lengths, PE (BE as an additional option).

Sizes < 18"NB 100% ET tested in lieu of hydrostatic test.

18"NB and over hydrostatic tested.

Manufactured and inspected according to ASTM A312.

General product requirements and tolerances according to Standard Specification and ASTM A999.

Stock standard dimensions and grades in the table below are marked with design pressures.

The design pressures are calculated in bar according to: ASME B31.3, ASTM A312, grade, T = 38 °C (100 °F), joint quality factor $E_j = 0.8$.

A312

NB	Sch	OD mm	Ej	Wall mm	Weight kg/m	1.4307 304L	1.4404 316L
1/2"	10S	21.3	0.8	2.11	1.01	X (172)	X (172)
1/2"	40S	21.3	0.8	2.77	1.29	X (231)	X (231)
3/4"	10S	26.67	0.8	2.11	1.30	X (135)	X (135)
3/4"	40S	26.67	0.8	2.87	1.71	X (180)	X (180)
1"	10S	33.4	0.8	2.77	2.12	X (142)	X (142)
1"	40S	33.4	0.8	3.38	2.54	X (176)	X (177)
1 1/4"	10S	42.16	0.8	2.77	2.73	X (111)	X (111)
1 1/4"	40S	42.16	0.8	3.56	3.44	X (145)	X (144)
1 1/2"	10S	48.28	0.8	2.77	3.16	X (96)	X (96)
1 1/2"	40S	48.28	0.8	3.68	4.11	X (130)	X (130)
2"	10S	60.33	0.8	2.77	3.99	X (77)	X (77)
2"	40S	60.33	0.8	3.91	5.52	X (109)	X (109)
2 1/2"	10S	73.03	0.8	3.05	5.34	X (69)	X (69)
3"	10S	88.9	0.8	3.05	6.56	X (57)	X (57)
3"	40S	88.9	0.8	5.49	11.5	X (104)	X (104)
4"	10S	114.3	0.8	3.05	8.50	X (44)	X (44)
4"	40S	114.3	0.8	6.02	16.3	X (88)	X (88)
6"	5S	168.3	0.8	2.77	11.5	X (27)	X (27)
6"	10S	168.3	0.8	3.40	14.0	X (33)	X (33)
6"	40S	168.3	0.8	7.11	28.7	X (70)	X (70)
8"	5S	219.1	0.8	2.77	15.0	X (21)	X (21)
8"	10S	219.1	0.8	3.76	20.3	X (28)	X (28)
8"	20	219.1	0.8	6.35	33.8	X (48)	X (48)
8"	40S	219.1	0.8	8.18	43.2	X (62)	X (62)
10"	5S	273	0.8	3.40	23.0	X (20)	X (20)
10"	10S	273	0.8	4.19	28.2	X (25)	X (25)
10"	20	273	0.8	6.35	42.4	X (38)	X (38)
10"	40S	273	0.8	9.27	61.2	X (56)	X (56)
12"	5S	323.9	0.8	3.96	31.7	X (20)	X (20)
12"	10S	323.9	0.8	4.57	36.5	X (23)	X (23)
12"	20	323.9	0.8	6.35	50.5	X (32)	X (32)
14"	10S	355.6	0.8	4.78	42.0	X (22)	X (22)
14"	10	355.6	0.8	6.35	55.5	X (29)	X (29)
16"	10S	406.4	0.8	4.78	48.1	X (19)	X (19)
16"	10	406.4	0.8	6.35	63.6	X (25)	X (25)

X = Standard stock.

The stock standard program is subject to change without prior notice!

ANSI pipes – Standard grades (design pressures shown in brackets)

Welded pipes, annealed and pickled.

In 6 m random lengths PE (BE as option), all hydrostatic tested.

Manufactured and inspected according to ASTM A358 Class 2.

(Can be upgraded to Class 1 or 5 according to thickness with additional X-raying at extra cost).

General product requirements and tolerances according to Standard Specification and ASTM A999.

Stock standard dimensions and grades in the table below are marked with design pressures.

The design pressures are calculated in bar according to: ASME B31.3, ASTM A358 Class 2, T = 38 °C (100 °F), joint quality factor $E_j = 0.85$ (higher ratings can be achieved by upgrading to other classes).

A358 Class 2

NB	Sch	OD mm	Ej	Wall mm	Weight kg/m	304L	316L
6"	40S	168.3	0.8	7.11	28.7	X (85)	X (85)
8"	40S	219.1	0.8	8.18	43.2	X (75)	X (75)
8"	80S	219.1	0.8	12.70	65.6	X (137)	X (137)
10"	40S	273	0.8	9.27	61.2	X (68)	X (68)
10"	80S	273	0.8	12.70	82.7	X (109)	X (109)
12"	40S	323.9	0.8	9.53	75.0	X (59)	X (59)
12"	80S	323.9	0.8	12.70	98.8	X (79)	X (79)
14"	40S	355.6	0.8	9.53	82.5	X (54)	X (54)
16"	40S	406.4	0.8	9.53	94.6	X (47)	X (47)

X = Standard stock.

Standard stock program

The tables below reflect the standard OSTP stock program only, other dimensions and grades are available against special production according to our manufacturing range and capabilities.

Please refer enquiries to mill customer support contacts for review and quotation.

ANSI pipes - Special grades (design pressures shown in brackets)

Welded pipes, annealed and pickled.

In 6 m random lengths, PE (BE as an additional option).

Manufactured and inspected according to ASTM A790, A928, A358, A312.

General product requirements and tolerances according to Standard Specification and ASTM A999.

Stock standard dimensions and grades in the table below are marked with design pressures.

Design pressures in bar according to: ASME B31.3, actual Product Standard, Grade, T = 38 °C (100 °F), actual joint quality factor Ej.

A790 & A928 & A358

NB	Sch	OD mm	Wall mm	Weight kg/m	A790 2205 Ej = 0.8
1"	10S	33.4	2.77	2.12	X (255)
1 1/4"	10S	42.16	2.77	2.73	X (199)
1 1/2"	10S	48.28	2.77	3.16	X (173)
2"	10S	60.33	2.77	3.99	X (137)
3"	10S	88.9	3.05	6.56	X (102)
4"	10S	114.3	3.05	8.50	X (79)
6"	10S	168.3	3.40	14.0	X (59)
6"	40S	168.3	7.11	28.7	
8"	10S	219.1	3.76	20.3	X (50)
8"	40S	219.1	8.18	43.2	
10"	10S	273	4.19	28.2	X (45)
10"	40S	273	9.27	61.2	
12"	10S	323.9	4.57	36.5	X (41)
12"	40S	323.9	9.53	75.0	
14"	10S	355.6	4.78	42.0	X (39)
16"	10S	406.4	4.78	48.1	X (34)

*) Material Data Sheets according to no stock standard.

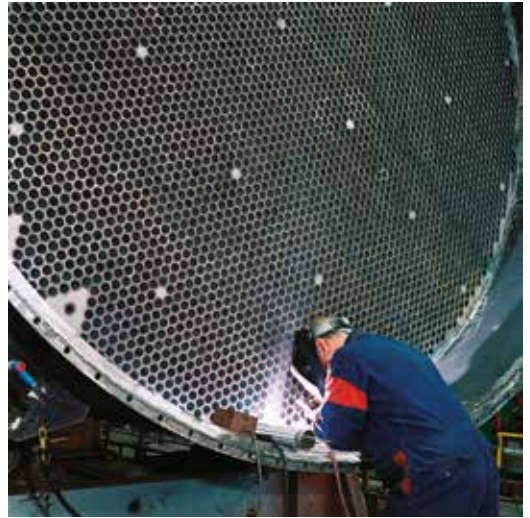
X = Standard stock.

The stock standard program is subject to change without prior notice!

OT 153

Heat exchanger tubes

Typical applications are coolers, heaters, evaporators, condensers and recuperators in harsh environments. The tubes are supplied according to defined international standards as well as customer specific specifications in a large variety of steel grades and dimensions. They are made from strips, normally delivered in annealed condition in fixed lengths. Specific requirements on execution, tolerances, lengths, mechanical and corrosion properties are offered on request.



Technical information

Approvals: 2014/68/EU (PED) and AD2000 W0.

Grades: Austenitic / High-performance Austenitic / Lean Duplex / Duplex / Super Duplex and High-temperature grades.

Sizes: Standard metric, imperial, and ISO outside diameters and wall thicknesses in the range:
 Tig welded OD 16 - 133 mm, WT 0.8 - 6.02 mm (depending on grade and D to T ratios) and in max lengths of 12 m, bead cold worked (BCW).
 Laser welded, OD 42.2 - 114.3 mm, WT 0.8 - 4.0 mm (depending on grade and D to T ratios) and in max lengths of 12 meter (no internal bead working, h = 0.15 mm max).

Product standards: AD2000-W2, EN 10217-7, ASTM A 249, A 269, A 789 (according to grade).

Heat Exchanger Tubes (HT & NHT)

OD mm	0,8	0,9	1	1,2	1.5/1.65	2/2.11	2.5/2.6	3/3.05	3.4/3.5	4
101.6/114.3										
83/88.9										
73										
68/70										
63,5										
60,3										
50/51										
48,3										
42.2/42.4										
40										
38										
35										
33.4/33.7										
32										
30										
28										
26,9										
25/25.4										
22										
21,3										
20										
19/19.05										
18										
17,2										
16										
Wall tickness mm	0,8	0,9	1	1,2	1.5/1.65	2/2.11	2.5/2.6	3/3.05	3.4/3.5	4
Production Standards (size-thickness and grade dependant)										
Production to EN 10217-7 Tc1 and Tc2 / ASTM A249 / ASTM A269 / ASTM A790 / ASTM A789										

WELDED TUBES AND PIPES



First walkwaybridge in LDX 2101® crossing Likholefossen at Gaularfjell in Norway.

Circular hollow sections are used in various industries

- Architecture, Building and Construction
- Machine and process equipment builders
- Decoration
- Automotive and transport

Grades: Austenitic, Duplex and Ferritic Stainless Steel.

Product Standards: EN 10296-2, A312, A358, A778, A790, A928, Mill standards etc.

Tolerances: According to requirements stated in the Product Standards.

Surfaces: As welded, pickled, ground or polished (with the support of external service routes).

Butt weld fittings



Butt weld fittings

Butt weld fittings are manufactured from either tubes, sheet or strip depending on product and dimension.

Our mills in Jakobstad and Örnsköldsvik are approved suppliers to the European Pressure Equipment Directive 2014/68/EU (PED) and certified to AD 2000 Merkblatt W0.

For general use our fittings are delivered with welding factor $z = 0.7$ without special inspection according to EN 10253-3. See additional information on page 71.

For the use in pressure equipment that require welding factor $z = 1.0$ we manufacture fittings with special inspection according to EN 10253-4.

Our stock standard is based on EN 1.4307, 1.4541, 1.4571, 1.4404 and 1.4432 unless other information is given. Other grades may be manufactured on request. If you cannot find what you need in our product range please do not hesitate to contact our sales department. We can offer special products as well.

Tolerances on wall thickness T, according to EN 10253-3/4, symbols described on page 13 in the standard.

Diameter D	Wall thickness T	Permissible deviation	
		Minus	Plus
D ≤ 610	All	- 12.5%	+ 15%
D > 610	≤ 10 mm	- 0.35 mm	+ 15%
	> 10 mm	- 0.50 mm	+ 15%

Tolerances on structural dimensions in mm

D	F-G-H-L	B	C	K
≤ 114.3	± 2	± 7	± 7	± 4
114.3 ≤ D ≤ 219.1	± 2	± 7	± 7	± 7
219.1 ≤ D ≤ 406.4	± 5	± 7	± 10	± 7
406.4 ≤ D ≤ 762	± 5	± 10	± 10	± 7
762 ≤ D ≤ 1219	± 10	± 10	± 10	± 10

Tolerances according to EN 1092-1

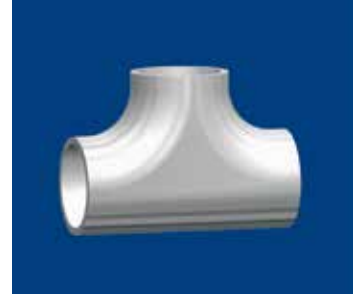
Dimension	Flange type	Size	Tolerance mm
Outside diameter of neck A	35, 37	≤ DN 150	± 0.75% min ± 0.3 mm
		> DN 150	± 1% min ± 3.0 mm
Wall thickness Sp	35, 37	≤ DN 600	- 12.5% / +15%
		> DN 600	- 0.5 / +15%
Outside diameter D	All	≤ DN 150	± 2.0 mm
		> DN 150 ≤ DN 500	± 3.0 mm
		> DN 500 ≤ DN 1200	± 5.0 mm
		> DN 1200 > DN 600	± 7.0 mm
Length through hub H4, H5	35, 37	≤ DN 80	± 1.5
		> DN 80 ≤ DN 250	± 2.0
		> DN 250	± 3.0
Collar thickness F	35	≤ 18 mm	± 1.0 mm
		> 18 mm ≤ 50 mm	± 1.5 mm
	37	≤ 5 mm thickness	± 0.2 mm
Facing diameter d1	All	≤ DN 250	+ 2.0 / - 1.0
		> DN 250	+ 3.0 / - 1.0



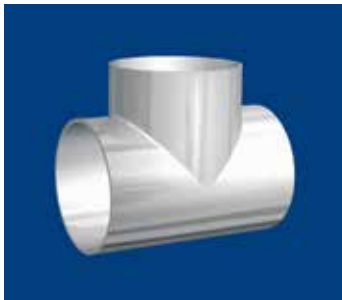
Elbows
PAGE 35



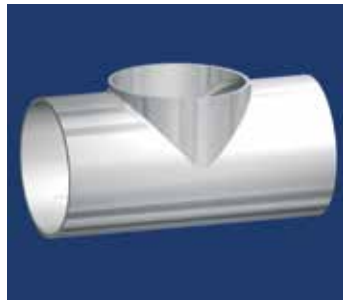
Elbows long radius
PAGE 35



Tees
PAGE 41



Tees fabricated



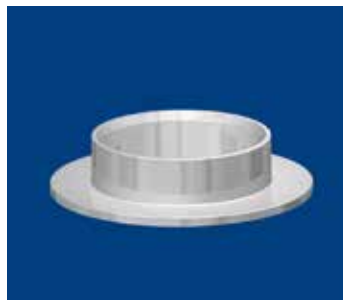
Tees drawn



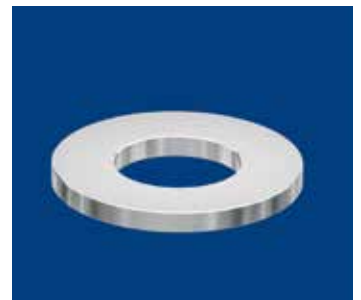
Reducers CC



Reducers EC



Welding necks



Weld-on plate collars



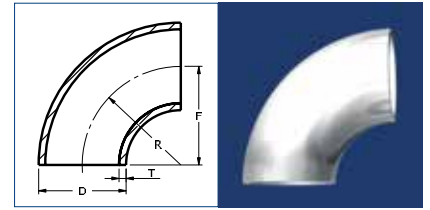
Angle collars



Caps



Others



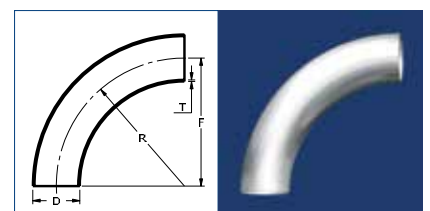
OT 200/207*

**ISO
Elbows 3D (R ~ 1.5 x D)**

DN	D	R=F	Wall thickness T mm										Max T mm	
			1.6	2.0	2.3	2.5	2.6	2.9	3.0	3.2	4.0	5.0		6.0
Weight kg/pce (Design pressure bar)														
10	17.2	28.0	0.02(212)	0.03(273)										
15	21.3	27.5	0.03(157)	0.04(201)			0.05(271)							
20	26.9	28.5	0.04(112)	0.06(143)			0.07(192)							
25	33.7	38.0	0.08(95)	0.10(120)			0.12(153)							
32	42.4	47.5	0.12(71)	0.15(90)			0.19(119)							
40	48.3	57.0	0.16(63)	0.21(80)			0.26(105)							
50	60.3	76.0	0.27(51)	0.35(65)			0.44(85)	0.52(96)						
65	76.1	95.0		0.55(50)			0.73(67)	0.81(74)						
80	88.9	114.0		0.78(43)	0.90(35)	0.98(39)	1.01(57)	1.13(64)	1.17(46)	1.24(50)	1.51(90)	1.89(80)		
100	101.6	152.0		1.20(28)										
100	114.3	152.0		1.30(37)		1.75(30)	1.94(45)	2.00(50)		3.29(39)	4.11(70)			
125	139.7	190.0		2.10(30)		2.70(25)	3.08(37)	3.10(41)		4.08(40)				
150	168.3	229.0		3.00(23)		3.90(20)	4.30(30)	4.50(34)		5.90(47)	7.40(42)	8.80(50)	14.0	
200	219.1	305.0		5.20(17)		6.80(22)	7.50(22)	7.80(25)		10.3(37)	12.8(32)		17.0	
250	273.0	381.0		8.00(20)			10.5(19)	12.1(30)		16.1(41)	20.1(26)	24.0(31)	25.0	
300	323.9	457.0		11.6(11)			15.0(15)	17.3(24)		23.0(34)	28.7(22)	34.3(26)	23.0	
350	355.6	533.0						22.2(21)		29.5(30)	36.8(27)	44.1(24)	10.0	
400	406.4	610.0						29.3(20)		38.6(28)	48.2(25)	57.6(21)	20.0	
450	457	686.0						36.8(9)		48.9(12)	61.0(15)		13.0	
500	508	762.0						45.4(8)		60.4(11)	75.4(14)	90.3(17)	25.0	
600	610	914.0						65.4(6)		87.1(9)	109(11)	130(14)	25.0	
700	711	1067.0								119(8)	148(10)	178(13)	13.0	
800	813	1219.0								156(7)	195(9)	232(11)	20.0	
900	914	1372.0								206(6)	246(8)	294(10)	22.0	
1000	1016	1524.0								243(6)	304(7)	365(9)	22.0	
1100	1118	1667.0								368(5)	441(6)		25.0	
1200	1219	1800.0									438(6)	526(7)	19.0	

Green values are kept in stock according to EN 10253-4 also in grade EN 1.4541 and EN 1.4571
 The pressure ratings for products printed in black are calculated for grade EN 1.4307 at 20°C according to EN 10253-4 type A.
 Pressure values in orange are calculated for grade EN 1.4307 at 20°C according to EN 10253-3 type A. (welding factor Z=0.7)
 All products can with additional testing be delivered to meet EN 10253-4 type A. This has to be confirmed when ordering.
 *Seamless execution. Max 219.1

Stock standard: EN 1.4307 and 1.4432 in the most common dimensions



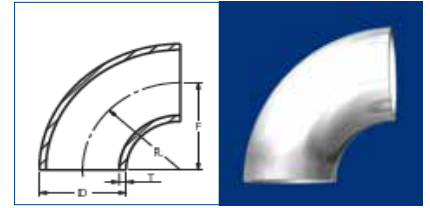
OT 201

**ISO
Elbows 5D(R~2.5xD)**

DN	D	R=F	Wall thickness T mm								Max T mm		
			2.0	2.6	2.9	3.0	3.2	4.0	5.0	6.0		8.0	
Weight kg/pce (Design pressure bar)													
80	88.9	205	1.40(35)				2.12(53)						13
100	114.3	270	2.40(27)				3.50(41)						14
125	139.7	330	3.60(22)	4.68(29)		5.20(34)			7.00(45)				15
150	168.3	390		6.63(24)		7.60(28)			9.80(37)				15
200	219.1	510	8.76(14)			13.0(21)			17.1(28)				20
250	273.0	650				20.8(17)			27.3(23)	34.4(29)			30
300	323.9	775				29.4(14)			38.7(19)	49.6(24)			24
350	355.6	850				36.0(13)			47.0(17)	59.0(22)			16
400	406.4	970				46.0(11)			61.0(15)	76.0(19)			22
500	508	1245							98.0(12)	122(15)			22
600	610	1524								182(13)	218(15)	290(20)	22
700	711	1778									297(14)	395(19)	20

The pressure ratings are calculated for grade EN 1.4307 at 20°C according to EN 10253-3 type A. (welding factor Z=0.7)
 All products can with additional testing be delivered to meet EN 10253-4 type A. This has to be confirmed when ordering.
 Product not stock standard, but can be supplied on demand.

Stock standard: EN 1.4307 and 1.4432 in the most common dimensions

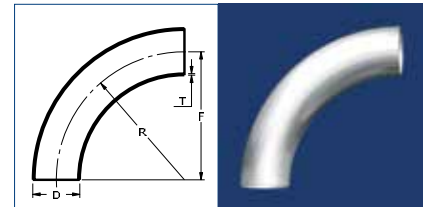


OT 209
ISO
Elbows 2D = R-1D

DN	D	R=F	3,0	4,0	5,0	6,0	Max
			Weight kg/pc				T mm
200	219,1	203	5,2	6,9			4
250	273	254	8,1	10,8	13,5		5
300	323,9	305	11,6	15,5	19,4		5
350	355,6	356	14,8	19,8	24,7		5
400	406,4	406	19,3	25,8	32,2		5

The pressure ratings are calculated for grade EN 1.4307 at 20°C according to EN 10253-3 type A. (welding factor Z=0.7)
 All products can with additional testing be delivered to meet EN 10253-4 type A. This has to be confirmed when ordering.
 Product not stock standard, but can be supplied on demand.

Stock standard: EN 1.4307 and 1.4432
 in the most common dimensions



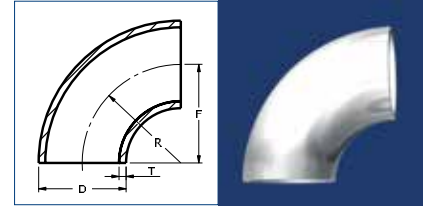
OT 213
Metric Tru-Bore®
Elbows 6 ID(R~3xD)

DN=ID	D	R	Wall thickness T mm						
			2.0	2.5	3.0	4.0	5.0	6.0	8.0
			Weight kg/pc (Design pressure bar)						
80	84/86	240	1.9(39)		2.4(57)				
100	104/106	300	2.4(31)		3.7(46)				
130	130/131	375		4.7(31)	5.7(37)				
150	155/156	450		6.7(26)	8.2(31)				
200	206/208	600			14.5(23)	19.5(31)			
250	256/258/260	750			22.5(19)	30.5(26)	37.8(31)		
300	306/308/310	900			32.5(16)	43.2(21)	54.0(26)		
350	356/358/360	1050			44.0(13)	58.7(18)	73.5(22)		
400	406/408/410	1200			58.0(12)	77.0(16)	97.0(19)		
450	456/458/460	1350			72.0(10)	97.0(14)	122(17)		
500	506/508/510	1500			90.0(9)	119(12)	152(15)		
600	606/608/610	1800			128(8)	169(10)	215(13)		
700	710/712/716	2100					292(12)	351(14)	470(19)
800	810/812/816	2400					304(16)	381(12)	458(17)
900	910/912/916	2700					482(9)	579(11)	774(15)

The pressure ratings are calculated for grade EN 1.4307 at 20°C according to EN 10253-3 type A. (welding factor Z=0.7)
 All products can with additional testing be delivered to meet EN 10253-4 type A. This has to be confirmed when ordering.
 Product not stock standard, but can be supplied on demand.

Stock standard: EN 1.4307 and 1.4432
 in the most common dimensions

BUTT WELD FITTINGS

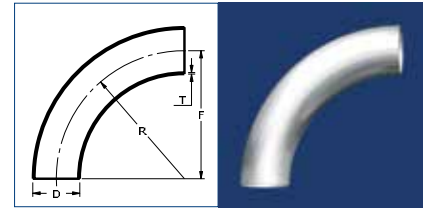


OT 212
Metric Tru-Bore®
Elbows 3D(R~1.5xD)

DN	D	R=F	Wall thickness T mm							Max T mm	
			1.5	2.0	2.5	3.0	4.0	5.0	6.0		8.0
15*	18.0	22.5	0.02(173)								
	20.0	25		0.04(212)							
20*	23.0	25	0.03(171)								
	25.0	27.5		0.05(157)							
25*	28.0	32.5	0.05(142)								
	30.0	33.5		0.07(129)							
32*	35.0	45	0.08(86)	0.11(116)							
	38.0	45	0.09(76)	0.12(103)							
40*	43.0	47.5	0.11(87)								
	44.5	51		0.16(86)							
50*	53.0	72.5	0.22(57)								
	54.0	70		0.28(73)							
65*	69.0	95		0.47(58)							
*	84.0/86.0	123		0.90(48)		1.40(71)					
100*	104/106	150		1.20(38)		1.80(57)					
125*	129/131	188		2.00(31)		3.00(45)					
150*	154/156	225		2.60(25)		3.90(38)					
200*	204/205/206	300		4.80(19)	6.00(24)	7.30(29)					9
250*	254/255/256	375		7.40(15)	9.20(19)	11.0(25)					6
300	304/306/308	450		10.7(9)		16.5(14)	22.0(18)				7
350	356/358/360	525				22.5(12)	30.0(16)	37.0(19)			9
400	406/408/410	600				29.0(10)	38.0(14)	48.0(17)			11
450	456/458/460	675				37.0(9)	49.0(12)	61.0(15)			13
500	506/508/510	750				45.0(8)	60.0(11)	75.0(14)			25
600	606/608/610	900				66.0(7)	88.0(9)	110(11)			25
700	708/710/712	1050					117(8)	147(10)	177(13)		13
800	808/810/812	1200					152(7)	190(9)	228(11)		11
900	910/912	1350						238(8)	286(10)		22
1000	1010/1012	1500						298(7)	357(9)		22
1100	1110/1112/1116	1650						360(6)	432(8)	577(11)	25

Green values are kept in stock according to EN 10253-4 also in grade EN 1.4541 and EN 1.4571
 The pressure ratings for products printed in black are calculated for grade EN 1.4307 at 20°C according to EN 10253-4 type A.
 Pressure values in orange are calculated for grade EN 1.4307 at 20°C according to EN 10253-3 type A. (welding factor Z=0.7)
 All products can with additional testing be delivered to meet EN 10253-4 type A. This has to be confirmed when ordering.
 Stock standard items are subject to change without notice.

Stock standard: EN 1.4307 and 1.4432
 in the most common dimensions



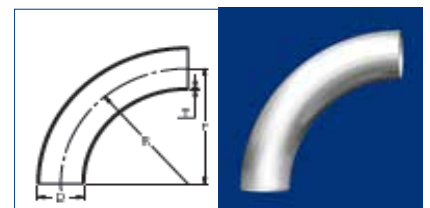
OT 214

**Metric Tru-Bore®
Elbows ID + 100 (R~ID+100)**

DN=ID	D	R	Wall thickness T mm				Max T mm	
			2.0	2.5	3.0	4.0		5.0
			Weight kg/pce (Design pressure bar)					
40	44.5	140	0.4(75)					
50	54	150	0.5(61)					
65	69	165	0.9(46)					
80	84	180	1.20(53)					
100	104/106	200	1.60(41)		2.40(44)			
125	129/131	225	2.40(33)		3.50(35)			6
150	154/156/158	250	3.10(27)		4.60(28)	6.10(37)		
	160/162					7.60(46)	9.12(55)	6
200	204/205/206	300	4.80(20)	6.00(25)	7.30(30)			
	208/210					9.70(27)	12.5(34)	9
250	254/255/256	350	7.00(23)	8.70(28)	10.5(33)			
	258/260					14.0(22)	17.5(27)	10
300	304/305/306	400	9.60(13)	12.0(16)	14.4(18)			
	306/308/310				14.4(13)	19.2(18)	23.9(23)	10
350	355/356/358	450		16.0(13)	19.0(44)	25.0(15)		10
	360/362					32.0(19)	38.0(23)	10
400	406/408	500			24.0(14)	32.0(19)		11
	410/412					40.0(16)	48.0(20)	12
450	456/458	550			30.0(9)	40.0(12)		
	460/462					49.0(14)	59.0(17)	
500	506/508	600			37.0(8)	48.0(10)		
	510/512					60.0(13)	72.0(15)	
600	606/608	700			49.0(6)	66.0(8)		
	610/612					82.0(11)	101(14)	10
700	708/710/712	800				89.0(7)	112(9)	8
800	808/810/812	900				115(6)	143(8)	172(10)
900	908/910/912	1000				143(6)	179(7)	215(9)
1000	1010/1012	1100					273(6)	327(8)

Green values are kept in stock according to EN 10253-4 also in grade EN 1.4541 and EN 1.4571
 The pressure ratings for products printed in black are calculated for grade EN 1.4307 at 20°C according to EN 10253-4 type A. (welding factor Z=0.7)
 Pressure values in orange are calculated for grade EN 1.4307 at 20°C according to EN 10253-3 type A. (welding factor Z=0.7)
 All products can with additional testing be delivered to meet EN 10253-4 type A. This has to be confirmed when ordering.
 Stock standard items are subject to change without notice.

Stock standard: EN 1.4307 and 1.4432 in the most common dimensions



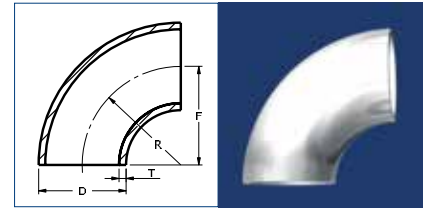
OT 219

**Metric
Elbows 4D = Rx2D**

DN	D	R=F	2,0	3,0	4,0	5,0	Max T mm
			Weight kg/pc				
125	124	250	4,8				3
125	129	250	6,0				3
150	154	300	7,2				3

Standard production acc to EN 10253-3, but can be delivered to meet EN 10253-4 Type A

Stock standard: EN 1.4307 and 1.4432



OT 226/227*

ANSI

Elbows ASTM A 403 WPW/WPWX/WPS LR

DN	NPS	D mm	R ²⁾ mm	H mm	Schedule							
					Sch 5S		Sch 10S		Sch 40S		STD	
					wt mm	kg/pce (1)	wt mm	kg/pce (1)	wt mm	kg/pce (1)	wt mm	kg/pce (1)
15	1/2"	21.3	38	38			2.11	0.06(173)	2.77	0.08(231)		
20	3/4"	26.7	38	38			2.11	0.06(130)	2.87	0.09(178)		
25	1"	33.4	38	38			2.77	0.13(124)	3.38	0.16(153)		
32	1 1/4"	42.2	48	48			2.77	0.21(98)	3.56	0.25(127)		
40	1 1/2"	48.3	57	57			2.77	0.29(86)	3.68	0.40(116)		
50	2"	60.3	76	76			2.77	0.49(71)	3.91	0.71(101)		
65	2 1/2"	73.0	95	95	2.11	0.55(45)	3.05	0.80(65)	5.16	1.40(112)		
80	3"	88.9	114	114	2.11	0.80(37)	3.05	1.20(53)	5.49	2.18(97)		
100	3 1/2"	101.6	133	133	2.11	1.19(32)	3.05	1.70(47)	5.74	2.83(89)		
	4"	114.3	152	152	2.11	1.33(29)	3.05	2.10(42)	6.02	4.17(83)		
125	5"	141.3	190	190	2.77	2.95(31)	3.40	3.63(38)	6.55	6.86(73)		
150	6"	168.3	229	229	2.77	4.05(26)	3.40	5.20(32)	7.11	10.9(67)		
200	8"	219.1	305	305	2.77	7.00(20)	3.76	10.1(27)	8.18	21.5(58)		
250	10"	273.0	381	381	3.40	13.2(20)	4.19	17.5(24)	9.27	38.6(54)		
300	12"	323.9	457	457	3.96	23.5(19)	4.57	27.0(2.2)	9.53	59.4(47)		
350	14"	355.6	533	533	3.96	30.0(18)	4.78	36.3(22)			9.53	70.3(44)
400	16"	406.4	610	610	4.19	40.8(17)	4.78	47.5(19)			9.53	91.6(38)
450	18"	457	686	686	4.19	51.8(15)	4.78	58.6(17)			9.53	122(34)
500	20"	508	762	762	4.78	72.0(15)	5.54	84.0(18)			9.53	150(30)
600	24"	610	914	914	5.54	127(15)	6.35	141(17)			9.53	211(25)

The pressure in bar are calculated for grade TP 304L at 38°C according to ASME B 31.3
Weld joint quality factor E_j = 1.0
Reference to ASTM A 403/A 403M, ASTM A 815

Table 1 Fitting classes for WP grades:

Class	Construction	NDT
S	Seamless	None
W	Welded	Radiography or ultrasonic
WX	Welded	Radiography or ultrasonic

1) Design pressure bar

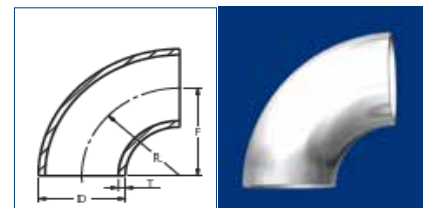
*Seamless execution. Max 8"

Stock standard: EN 1.4307 and 1.4404
in the most common dimensions
DN 150-600 in Sch 10S 304/304L, 316/316L
EN 1.4462 (2205), 1.4410 (2507) and EN 1.4547 (254 SMO) are available in
selected range
Stock standard items are subject to change without notice.

OT 229

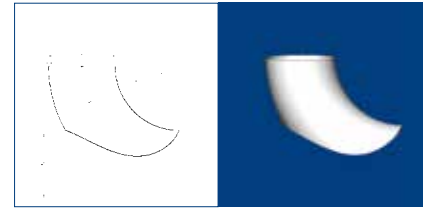
ANSI

Elbows ASTM A 403 WPW/WPWX SR



DN	NPS	D mm	R mm	H mm	Sch 5c wt mm / kg/pc	Sch 10c wt mm / kg/pc
200	8"	219,1	203	203	2,77 / 5,9	3,76 / 8,0
250	10"	273	254	254	3,4 / 10,1	4,19 / 12,4
300	12"	323,9	305	305	3,96 / 13,8	4,57 / 17,2
350	14"	355,6	356	356	3,96 / 1 8,9	4,78 / 23,6
400	16	406,4	406	406	4,19 / 24,8	4,78 / 30,9

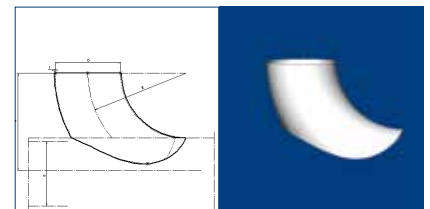
Stock standard: EN 1.4307 and 1.4432



OT 269
Metric
Elbow branches

D	d	T	R	H	Weight kg	D	d	T	R	H	Weight kg
54	50	2	73	73	0,3	254	250	2	375	375	4,7
	80	2		88	0,2		300	2		400	4,3
	100	2		98	0,2		350	2		425	4,3
84	80	2	123	123	0,4	306	400	2	450	450	4,3
	100	2		133	0,4		300	3		450	10,4
	125	2		149	0,4		350	3		475	9,7
104	100	2	150	150	0,8	356	400	3	525	500	9,7
	125	2		166	0,7		450	3		525	9,7
	150	2		175	0,7		350	3		525	14,2
129	125	2	188	188	1,3	406	400	3	600	550	13,2
	150	2		197	1,2		450	3		575	13,2
	200	2		222	1,2		500	3		600	13,2
154	150	2	225	225	1,6	406	400	3	600	600	18,3
	200	2		250	1,5		450	3		625	17,0
	250	2		275	1,5		500	3		650	17,0
	300	2		300	1,5		450	3		675	23,4
204	200	2	300	300	3,0	508	500	3	750	700	22,0
	250	2		325	2,8		500	4		750	38,0
	300	2		350	2,8		600	4		800	36,5
	350	2		375	2,8		608	4		900	41,0
						700 4 31,2					

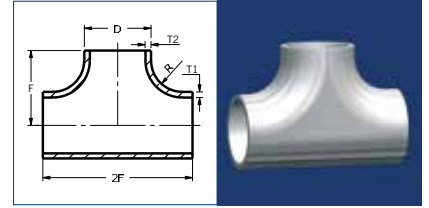
Stock standard: EN 1.4307 and 1.4432



OT 270
ISO
Elbow branches

D	d	T	R	H	Weight kg	D	d	T	R	H	Weight kg
60,3	60,3	2	73	73	0,3	273	273	2	375	375	4,7
	88,9	2		88	0,2		323,9	2		400	4,3
	114,3	2		98	0,2		355,6	2		425	4,3
88,9	88,9	2	123	123	0,4	306	400	2	450	450	4,3
	114,3	2		133	0,4		300	3		450	10,4
	139,7	2		149	0,4		350	3		475	9,7
114,3	114,3	2	150	150	0,8	356	400	3	525	500	9,7
	139,7	2		166	0,7		450	3		525	9,7
	168,3	2		175	0,7		350	3		525	14,2
139,7	139,7	2	188	188	1,3	406	400	3	600	550	13,2
	168,3	2		197	1,2		450	3		575	13,2
	219,1	2		222	1,2		500	3		600	13,2
168,3	168,3	2	225	225	1,6	406	400	3	600	600	18,3
	219,1	2		250	1,5		450	3		625	17,0
	273	2		275	1,5		500	3		650	17,0
	323,9	2		300	1,5		450	3		675	23,4
219,1	219,1	2	300	300	3,0	508	500	3	750	700	22,0
	273	2		325	2,8		500	4		750	38,0
	323,9	2		350	2,8		600	4		800	36,5
	355,6	2		375	2,8		608	4		900	41,0
						700 4 31,2					

Stock standard: EN 1.4307 and 1.4432

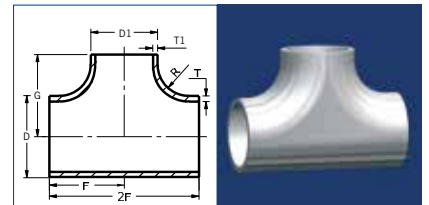


OT 300/307*
ISO
Tees equal pressed

DN	D	F	2F	R	Wall thickness T mm						Max T mm
					T1/T2 2.0/1.8	T1=T2 2.0	T1=T2 2.6	T1=T2 3.0	T1=T2 4.0	T1=T2 5.0	
Weight kg/pce (Design pressure bar)											
15	21.3	25	50	10.0	0.08(100)						
20	26.9	29	58	10.0	0.12(107)						
25	33.7	38.0	76	16.0		0.20(63)	0.20(89)	0.23(107)			
32	42.4	47.5	95	21.5		0.32(45)	0.31(64)	0.36(78)			
40	48.3	57.0	114	26.0		0.46(37)	0.44(53)	0.51(64)	0.68(94)		
50	60.3	64.0	128	27.0		0.57(29)	0.65(42)	0.75(51)	1.00(74)		
65	76.1	76.0	152	27.0		0.79(23)	0.91(33)	1.05(40)	1.40(58)		
80	88.9	86.0	172	30.0		0.90(19)	1.17(27)	1.35(33)	1.35(48)		
100	114.3	105	210	35.0		1.40(14)	1.70(19)	2.10(24)	2.80(32)		
125	139.7	124	248	40.0		2.30(10)	3.00(15)	4.60(24)			
150	168.3	143	286	32.0			4.10(12)	4.80(15)	6.30(20)		
200	219.1	178	356	50.0			6.60(8)	7.60(10)	10.2(13)		
250	273.0	216	432	60.0				10.0(8)	14.0(11)		13
300	323.9	254	508	70.0				15.0(6)	19.0(9)		13
350	355.6	279	558	72.0				18.0(5)	23.0(8)		13
400	406.4	305	610	90.0				28.0(4)	28.0(6)		13
450	457	343	686	100					36.0(5)	45.0(8)	19
500	508	381	762	105					55.0(7)	55.0(7)	19
600	610	432	864	110						72.0(5)	19

The pressures are calculated for grade EN 1.4307 at 20 °C according to EN 10253-4 Type A.
 Pressure values in orange are calculated for grade EN 1.4307 at 20 °C according to EN 10253-3 Type A.
 All dimensions can with additional testing be delivered to meet EN 10253-4 Type A. This has to be confirmed when ordering.
 *Seamless execution. 219.1 max

Stock standard: EN 1.4307 and 1.4432
 in the most common dimensions

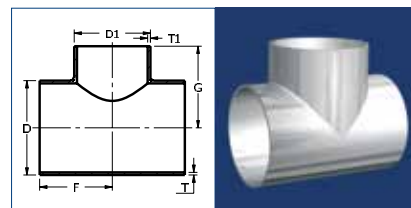


OT 300/307*
ISO
Tees reduced pressed

DN	D	DN1	D1	F	2F	G	R	T/T1 mm	Weight kg/pce	(Design pressure bar)
50	60.3	40	48.3	64	128	60	25	2/2	0.50	(35)
		25	33.7	64	128	51	16	2/2	0.50	(47)
80	88.9	50	60.3	86	172	76	25	2.3/2.3	1.00	(30)
		50	60.3	86	172	76	25	2.6/2.6	1.00	(33)
100	114.3	80	88.9	105	210	98	30	2.6/2.3	1.70	(22)
		50	60.3	105	210	89	25	2.6/2	1.70	(26)
150	168.3	125	139.7	143	286	137	38	3/3	4.80	(16)
		100	114.3	143	286	130	32	3/3	4.80	(19)

The pressures are calculated for grade EN 1.4307 at 20°C according to EN 10253-4 Type A.
 Product not stock standard, but can be supplied upon demand.
 *Seamless execution

Green values: Stock standard 1.4307 and 1.4432
 Stock standard 1.4432



OT 301

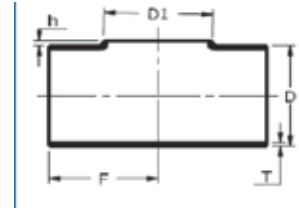
ISO

Tee reducing and equal fabricated (ISO 5251)

DN	D	D1	T=T1	F	G	Weight (Design pressure) kg/pce (bar)
100	114.3	76.1	3	105	95	1.90(36)
		88.9	3	105	98	2.00(33)
125	139.7	88.9	3	124	111	2.80(29)
		114.3	3	124	117	2.90(25)
150	168.3	114.3	3	148	130	3.90(22)
		139.7	3	148	137	4.00(19)
200	219.1	139.7	3	178	162	6.20(16)
		168.3	3	178	168	6.40(14)
250	273.0	168.3	3	216	194	9.30(12)
		219.1	3	216	203	9.70(10)
300	323.9	219.1	3	254	229	13.1(9)
		273.0	3	254	241	13.6(8)
350	355.6	273.0	3	279	257	16.1(7)
		323.9	3	279	270	16.8(6)
400	406.4	323.9	3	305	295	20.3(6)
		355.6	3	305	305	20.8(6)
450	457	406.4	3	343	330	26.0(5)
		355.6	3	343	330	25.6(5)
500	508	406.4	3	381	356	31.4(4)
		457	3	381	368	32.3(4)
600	610	457	3	432	419	42.4(3.6)
		508	3	432	432	43.3(3)

The pressure ratings are calculated for grade EN 1.4307 at 20°C according to EN 10253-3 type A. (welding factor Z=0.7)
 All products can with additional testing be delivered to meet EN 10253-4 type A. This has to be confirmed when ordering.
 Smaller, bigger and multiple thicknesses are available upon request.

Fabricated on request



OT 302

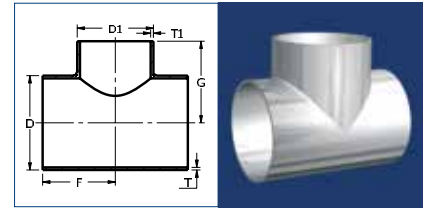
ISO

Tees reducing and equal drawn

DN	D	D1	F	h	Wall thickness T mm						
					2.0	2.5	2.6	3.0	4.0	5.0	6.0
Weight kg/pce											
50	60,3	33,7	50	2	1,6/0,22	2,0/0,29					
		42,4		?	1,6/0,21		2,0/0,28				
		48,3		3	1,6/0,21		2,0/0,28				
65	76,1	60,3	65	?	1,6/0,2		2,0/0,27				
		42,4		2	1,6/0,38	2,0/0,47					
		48,3		3	1,6/0,38	2,0/0,47					
		60,3		?	1,6/0,37	2,0/0,46					
80	88,9	76,1	80	?	1,6/0,36	2,0/0,45					
		48,3		3	1,6/0,52		2,0/0,68				
		60,3		?	1,6/0,52		2,0/0,68				
100	114,3	76,1	100	4	1,6/0,51		2,0/0,67				
		88,9		5	1,6/0,5		2,0/0,65				
		60,3		3	1,6/0,85		2,0/1,1	2,5/1,37			
		76,1		4	1,6/0,84		2,0/1,09	2,5/1,36			
125	139,7	88,9	125	5	1,6/0,83		2,0/1,08	2,5/1,35			
		114,3		7	1,6/0,81		2,0/1,05	2,5/1,31			
		76,1		4	1,6/1,4		2,0/1,82	2,5/2,1			
		88,9		5	1,6/1,39		2,0/1,81	2,5/2,09			
150	168,3	114,3	150	7	1,6/1,38		2,0/1,79	2,5/2,07			
		139,7		8	1,6/1,51		2,0/1,74	2,5/2,01			
		88,9		5	1,6/1,63		2,0/2,12	2,0/2,45	3,0/3,65		
		114,3		7	1,6/1,62		2,0/2,11	2,0/2,43	3,0/3,62		
200	219,1	139,7	200	8	1,6/1,59		2,0/2,07	2,0/2,39	3,0/3,58		
		168,3		10	1,6/1,35		2,0/2,02	2,0/2,33	3,0/3,49		
		114,3		7	1,6/?		2,0/4,15	2,5/?	3,0/6,38	4,0/7,98	
		139,7		8	1,6/?		2,0/4,11	2,5/?	3,0/6,32	4,0/7,90	
250	273	168,3	250	10	1,6/?		2,0/4,08	2,5/?	3,0/6,27	4,0/7,84	
		219,1		12	1,6/?		2,0/3,94	2,5/?	3,0/6,06	4,0/7,58	
		139,7		8	2,0/6,47	2,5/?	3,0/9,96	4,0/12,45			
		168,3		10	2,0/6,43	2,5/?	3,0/9,89	4,0/12,36			
300	323,9	219,1	300	12	2,0/6,33	2,5/?	3,0/9,74	4,0/12,18			
		273		13	2,0/6,12	2,5/?	3,0/9,41	4,0/11,76			
		168,3		10	2,0/9,23	2,5/10,65	3,0/14,2	4,0/17,75			
		219,1		12	2,0/9,1	2,5/10,5	3,0/14,0	4,0/17,50			
350	355,6	273	350	13	2,0/8,97	2,5/10,35	3,0/13,8	4,0/17,25			
		323,9		15	2,0/8,71	2,5/10,05	3,0/13,4	4,0/16,75			
		219,1		12	2,5/13,65	3,0/18,2	4,0/22,75				
		273		13	2,5/13,42	3,0/17,9	4,0/22,38				
400	406,4	323,9	400	15	2,5/13,2	3,0/17,6	4,0/22,00				
		355,6		17	2,5/12,98	3,0/17,3	4,0/21,63				
		273		13	2,5/18,98	3,0/25,3	4,0/31,63				
		323,9		13	2,5/17,4	3,0/23,2	4,0/29,00				
450	455,6	355,6	450	15	2,5/17,32	3,0/23,1	4,0/28,88				
		406,4		20	2,5/16,95	3,0/22,6	4,0/28,25				
		323,9		?	2,5/?	3,0/?	4,0/?				
		355,6		?	2,5/?	3,0/?	4,0/?				
500	508	406,4	500	?	2,5/?	3,0/?	4,0/?				
		323,9		?	2,5/?	3,0/?	4,0/?				
		355,6		?	2,5/?	3,0/?	4,0/?				
		406,4		?	2,5/?	3,0/?	4,0/?				

*) Pressure ratings can be done if tube dimension connected to the branch is known.
 Stock standard items are subject to change without notice.
 Smaller sizes available upon request.

Stock standard: EN 1.4432



OT 303

ISO

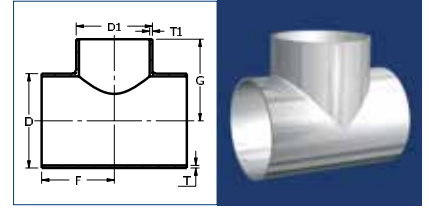
Tees reducing and equal fabricated (SFS 4164)

DN	D	D1	F	Wall thickness T mm					
				2.0	2.6	3.0	4.0	5.0	6.0
Weight kg/pce (Design pressure bar)									
50	60.3	33.7	125	0.87(53)	1.04(72)	1.28(89)			
		42.4		0.91(47)	1.08(63)	1.34(80)			
		48.3		0.93(44)	1.10(58)	1.38(74)			
65	76.1	60.3	140	0.98(38)	1.21(50)	1.45(64)			
		42.4		1.23(41)	1.48(53)	1.72(67)			
		48.3		1.26(38)	1.50(50)	1.86(63)			
		60.3		1.31(33)	1.55(44)	1.94(55)			
80	88.9	76.1	150	1.37(28)	1.70(38)	2.03(47)			
		48.3		1.53(33)	1.84(44)	2.15(56)			
		60.3		1.58(30)	1.89(39)	2.35(50)			
		76.1		1.65(25)	1.95(34)	2.45(42)			
100	114.3	88.9	160	1.70(23)	2.06(31)	2.53(39)			
		60.3		2.07(25)	2.50(33)	3.07(41)	3.91(60)	4.74(80)	
		76.1		2.13(22)	2.56(28)	3.17(36)	4.19(52)	5.00(70)	
		88.9		2.18(19)	2.60(27)	3.25(33)	4.29(49)	5.09(64)	
125	139.7	114.3	180	2.27(16)	2.83(22)	3.83(28)	4.47(41)	5.55(55)	
		76.1		2.84(19)	3.43(25)	4.23(31)	5.39(45)	6.54(61)	
		88.9		2.89(17)	3.48(22)	4.31(28)	5.70(42)	6.84(55)	
		114.3		3.00(14)	3.56(19)	4.46(23)	5.91(36)	7.01(49)	
150	168.3	139.7	200	3.07(12)	3.83(17)	4.59(22)	6.08(31)	7.56(42)	
		88.9		3.76(14)	4.56(23)	5.61(25)	7.18(36)	8.73(49)	10.4(61)
		114.3		3.87(12)	4.65(20)	5.77(22)	7.65(31)	9.17(42)	10.7(53)
		139.7		3.97(11)	4.95(17)	5.92(19)	7.86(28)	9.32(38)	11.2(47)
200	219.1	168.3	250	4.05(9)	5.05(16)	6.05(17)	8.03(25)	9.99(33)	
		114.3		7.40(14)	9.10(17)	11.7(27)	14.2(34)	17.2(44)	
		139.7		7.80(12)	9.30(16)	12.4(23)	14.9(31)	17.4(39)	
		168.3		7.90(11)	9.50(14)	12.6(20)	15.1(28)	18.1(34)	
250	273.0	219.1	300	8.20(9)	9.80(11)	13.0(17)	16.2(23)	19.4(30)	
		139.7		11.3(11)	13.6(12)	17.5(20)	21.3(52)	25.7(33)	
		168.3		11.5(9)	13.8(11)	18.4(17)	22.2(47)	25.9(30)	
		219.1		11.9(8)	14.2(9)	18.9(14)	22.6(39)	27.2(25)	
300	323.9	273.0	330	12.1(6)	14.5(8)	19.3(12)	24.0(34)	28.8(22)	
		168.3		14.3(8)	17.6(11)	22.7(16)	27.7(14)	33.4(27)	
		219.1		14.5(6)	18.0(9)	24.0(12)	28.8(17)	33.0(22)	
		273.0		14.7(6)	18.4(8)	24.5(11)	30.5(16)	35.2(20)	
350	355.6	323.9	360	15.5(5)	18.5(6)	26.7(9)	30.8(14)	36.9(17)	
		219.1		21.4(8)	27.4(12)	34.4(16)	40.3(22)		
		273.0		21.8(6)	29.0(11)	34.8(14)	41.9(19)		
		323.9		22.2(6)	29.5(9)	36.8(12)	44.0(17)		
400	406.4	355.6	400	22.2(6)	29.5(9)	36.9(12)	44.2(16)		
		219.1		27.3(6)	34.8(9)	43.7(12)	51.2(17)		
		273.0		27.7(5)	36.8(8)	44.0(12)	53.1(16)		
		323.9		27.9(5)	37.1(8)	46.3(11)	55.4(14)		
		406.4		27.9(5)	37.2(8)	46.5(9)	55.7(12)		

The pressure ratings are calculated for grade EN 1.4307 at 20°C according to EN 10253-3 type A. (welding factor Z=0.7)
 All products can with additional testing be delivered to meet EN 10253-4 type A. This has to be confirmed when ordering.
 Smaller, bigger and variable thicknesses are available upon request.

Stock standard: EN 1.4307 and 1.4432
 in the most common dimensions

BUTT WELD FITTINGS



OT 303

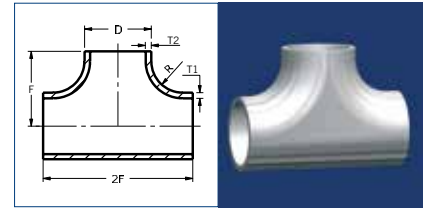
ISO

Tees reducing and equal fabricated (SFS 4164)

DN	D	D1	F	Wall thickness T mm				
				3.0	4.0	5.0	6.0	8.0
				Weight kg/pce (Design pressure bar)				
450	457	323.9	450	34.7(5)	46.1(8)	57.6(11)		
		355.6		35.0(5)	46.5(8)	58.1(9)		
		406.4		35.4(5)	47.1(6)	58.7(9)		
		457		35.4(3)	47.1(6)	58.8(8)		
500	508	355.6	500	42.8(5)	56.9(6)	68.6(9)		
		406.4		43.5(5)	57.6(6)	71.9(8)		
		457		43.7(3)	58.2(6)	72.6(8)		
		508		43.6(3)	58.2(5)	72.7(8)		
600	610	406.4	600		81.8(5)	98.7(9)	119(9)	
		457		82.6(5)	103(9)	124(9)		
		508		83.4(5)	104(8)	125(8)		
		610		83.8(5)	105(8)	126(8)		
700	711	457	700		111(5)	134(6)	162(12)	
		508		112(5)	135(6)	163(12)		
		610		113(3)	136(5)	170(11)		
		711		114(3)	134(5)	171(9)		
800	813	508	800		145(3)	175(5)	206(6)	272(11)
		610		147(3)	177(5)	213(6)	293(9)	
		711		149(3)	186(5)	223(5)	297(8)	
		813		149(3)	186(3)	223(5)	298(8)	
900	914	610	900		184(3)	230(5)	276(6)	367(8)
		711		187(3)	233(3)	280(5)	372(8)	
		813		189(1.5)	236(3)	283(5)	377(6)	
		914		188(1.5)	236(3)	283(5)	377(6)	
1000	1016	711	1000		229(3)	286(3)	342(5)	456(6)
		813		231(1.5)	289(3)	346(5)	461(6)	
		914		234(1.5)	292(3)	350(3)	466(6)	
		1016		233(1.5)	291(3)	349(3)	465(5)	

The pressure ratings are calculated for grade EN 1.4307 at 20°C according to EN 10253-3 type A. (welding factor Z=0.7)
 All products can with additional testing be delivered to meet EN 10253-4 type A. This has to be confirmed when ordering.
 Smaller, bigger and variable thicknesses are available upon request.

Stock standard: EN 1.4307 and 1.4432
 in the most common dimensions

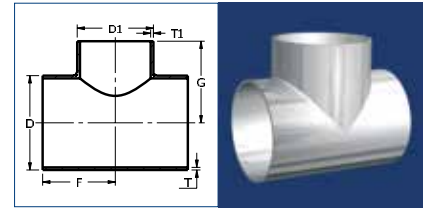


OT 310
Metric Tru-Bore®
Tees equal pressed

DN	D	F	2F	R	Wall thickness T mm						Max T mm
					T1/T2 2.0/1.8	T1=T2 2.0	T1=T2 2.5	T1=T2 3.0	T1=T2 4.0	T1=T2 5.0	
Weight kg/pce (Design pressure bar)											
15	20	25	50	9.5	0.08(127)						
20	25	30	60	9.5	0.10(99)						
25	30	35	70	14.0	0.14(73)						
32	38	43	86	18.0	0.22(52)						
40	44.5	50	100	15.0	0.32(46)						
50	54	61	122	17.0	0.48(36)						
65	69	73	146	25.0	0.79(25)						
65*	76	80	160	30.5							1.10(36)
65*	79	80	160	32.0	0.75(19)						
80*	84	80	160	30.0			0.80(20)	1.00(27)	1.20(35)		
100*	104	90	180	25.0			1.30(17)				
	105/106						1.80(23)	2.16(28)			
125*	129	115	230	40.0			2.10(12)				
	130/131						2.80(16)	3.36(20)			
150*	154	135	270	40.0			3.10(9)				
	155/156						4.00(13)	4.80(16)			
200*	205	175	350	57.0			6.10(8)				
	206						8.20(11)				
250	256	216	432	75.0			10.0(8)				8
	258								13.0(12)		
300	306	254	508	80.0			13.0(6)				13
	308								19.0(9)		
356	356	279	558	72.0			18.0(5)				20
	358								23.0(8)		
400	406	305	610	90.0			28.0(6)				19
	408								28.0(6)		
	410								36.0(9)		
450	456	343	686	100			36.0(6)				19
	458								36.0(6)		
	460								45.0(7)		
500	506	381	762	105			44.0(5)				19
	508								44.0(5)		
	510								55.0(6)		
600	606	432	864	110			72.0(5)				19
	508								72.0(5)		
	610								72.0(5)		

The pressure ratings for products printed in black are calculated for grade EN 1.4307 at 20°C according to EN 10253-4 type A.
 Pressure values in orange are calculated for grade EN 1.4307 at 20°C according to EN 10253-3 type A. (welding factor Z=0.7)
 All products can with additional testing be delivered to meet EN 10253-4 type A. This has to be confirmed when ordering.
 Note! All tees DN 400-500 are produced from 4 mm plate. All tees DN 600 are produced from 5 mm plate.
 Stock standard items are subject to change without notice.

Stock standard: EN 1.4307 and 1.4432
 in the most common dimensions



OT 311

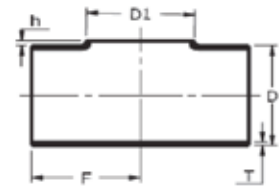
Metric Tru-Bore®

Tee reducing and equal fabricated

DN	D	D1	T=T1	F	G	Weight (Design pressure) kg/pce (bar)
100	104	54	2.0	50	75	0.60(28)
		84		80	90	1.00(22)
125	129	84	2.0	80	102	1.20(19)
		104		100	112	1.50(16)
150	154	84	2.0	80	115	1.40(14)
		104		100	125	1.80(9)
200	204	104	2.0	100	150	2.30(11)
		129		125	162	2.00(11)
		154		150	175	3.60(9)
200	206	106	3.0	100	150	3.40(12)
		131		125	162	4.40(11)
		156		150	175	5.40(11)
250	254	104	2.0	100	175	2.80(8)
		154		150	200	4.40(8)
		204		200	225	6.10(5)
250	256	106	3.0	100	175	4.20(17)
		156		150	200	6.60(14)
		206		200	225	9.10(11)
300	304	154	2.0	150	225	5.10(6)
		204		200	250	7.10(5)
		254		250	275	9.10(5)
300	306	156	3.0	150	225	7.70(12)
		206		200	250	10.6(9)
		256		250	275	13.7(8)
350	356	206	2.0	200	275	12.1(9)
		256		250	300	15.6(8)
		306		300	325	19.3(6)
350	358	208	4.0	200	275	16.2(12)
		258		250	300	20.9(11)
		308		300	325	25.8(9)
400	406	256	3.0	250	325	17.5(6)
		306		300	350	21.6(6)
		356		350	375	25.8(5)
400	408	308	4.0	300	350	28.8(9)
		258		250	325	23.4(11)
		358		350	375	34.5(8)
500	506	306	3.0	300	400	24.7(5)
		356		350	425	30.6(5)
		406		400	450	47.7(5)
500	508	308	4.0	300	400	34.8(8)
		358		350	425	41.5(6)
		408		400	450	48.5(6)
600	606	506	3.0	500	550	53.8(3)
		608		500	550	73.2(5)
		610		500	550	91.5(6)

The pressure ratings are calculated for grade EN 1.4307 at 20°C according to EN 10253-3 type A. (welding factor Z=0.7)
 All products can with additional testing be delivered to meet EN 10253-4 type A. This has to be confirmed when ordering.
 Smaller, bigger and variable thicknesses are available upon request.

Stock standard: EN 1.4307 and 1.4432
 in the most common dimensions



OT 312

Metric Tru-Bore®

Tees equal and reduced drawn

DN	D	d1	F	h	Wall thickness T mm						
					2.0	2.5	3.0	4.0	5.0	6.0	
Wall thickness T1 / Weight kg/pc											
50	50	25	50	2	1,6/0,23	2,0/0,29					
		32		?	1,6/0,2	2,0/0,25					
		40		3	1,6/0,2	2,0/0,25					
		50		?	1,6/0,2	2,0/0,25					
65	65	32	65	2	1,6/0,34	2,0/0,43					
		40		3	1,6/0,34	2,0/0,43					
		50		?	1,6/0,33	2,0/0,42					
		65		?	1,6/0,32	2,0/0,41					
80	80	40	80	3	1,6/0,52	2,0/0,65					
		50		?	1,6/0,51	2,0/0,64					
		65		4	1,6/0,50	2,0/0,63					
		80		5	1,6/0,49	2,0/0,62					
100	100	50	100	3	1,6/0,84		2,5/1,26				
		65		4	1,6/0,83		2,5/1,25				
		80		5	1,6/0,82		2,5/1,24				
		100		7	1,6/0,81		2,5/1,22				
125	125	65	125	4	1,6/1,31		2,5/1,96				
		80		5	1,6/1,30		2,5/1,95				
		100		7	1,6/1,28		2,5/1,93				
		125		8	1,6/1,25		2,5/1,88				
150	150	80	150	5	1,6/1,49		2,0/2,24	3,0/3,38			
		100		7	1,6/1,48		2,0/2,23	3,0/3,36			
		125		8	1,6/1,46		2,0/2,20	3,0/3,32			
		150		10	1,6/1,43		2,0/2,15	3,0/3,26			
200	200	100	200	7	1,6/?	2,0/3,75	2,5/4,5	3,0/6,00	4,0/7,50		
		125		8	1,6/?	2,0/3,75	2,5/4,5	3,0/5,96	4,0/7,50		
		150		10	1,6/?	2,0/3,67	2,5/4,4	3,0/5,91	4,0/7,35		
		200		12	1,6/?	2,0/3,58	2,5/4,3	3,0/5,73	4,0/7,20		
250	250	125	250	8		2,0/5,83	2,5/7,0	3,0/9,35	4,0/10,70		
		150		10		2,0/5,75	2,5/6,9	3,0/9,30	4,0/11,50		
		200		12		2,0/5,67	2,5/6,8	3,0/9,2	4,0/11,40		
		250		13		2,0/5,58	2,5/6,7	3,0/8,9	4,0/11,20		
300	300	150	300	10		2,0/8,42	2,5/10,1	3,0/13,4	4,0/16,85		
		200		12		2,0/8,25	2,5/9,9	3,0/13,3	4,0/16,50		
		250		13		2,0/8,17	2,5/9,8	3,0/13,1	4,0/16,35		
		300		15		2,0/7,92	2,5/9,5	3,0/12,7	4,0/15,85		
350	350	200	350	12		2,0/11,42	2,5/13,7	3,0/18,2	4,0/22,85		
		250		13		2,0/11,25	2,5/13,5	3,0/18,0	4,0/22,50		
		300		15		2,0/11,08	2,5/13,3	3,0/17,8	4,0/22,20		
		350		17		2,0/10,75	2,5/12,9	3,0/17,3	4,0/21,50		
400	400	250	400	13			2,5/17,7	3,0/23,6	4,0/29,50		
		300		13			2,5/17,5	3,0/23,4	4,0/29,20		
		350		15			2,5/17,3	3,0/23,1	4,0/28,85		
		400		20			2,5/16,9	3,0/22,6	4,0/28,20		
450	450	300	450	?			2,5/?	3,0/?	4,0/?		
		350		?			2,5/?	3,0/?	4,0/?		
		400		?			2,5/?	3,0/?	4,0/?		
500	500	300	500	?			2,5/?	3,0/?	4,0/?		
		350		?			2,5/?	3,0/?	4,0/?		
		400		?			2,5/?	3,0/?	4,0/?		

*) Pressure ratings can be done if tube dimension connected to the branch is known.
 Stock standard items are subject to change without notice.
 Smaller sizes available upon request.

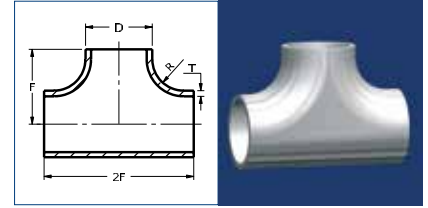
Stock standard: EN 1.4432

OT 320/327*

ANSI

Tees equal pressed

Tees ASTM A 403 WPW/WPWX/WPS



DN	NPS	D mm	L mm	H mm	R mm	Schedule			
						Sch 10S		Sch 40S(STD)	
						wt mm	kg/pce () ¹⁾	wt mm	kg/pce () ¹⁾
15	1/2	21.3	50	25	12.0	2.11	0.08(133)	2.77	0.11(194)
20	3/4	26.7	58	29	14.0	2.11	0.11(99)	2.87	0.20(152)
25	1	33.4	76	38	17.0	2.77	0.30(107)	3.38	0.30(141)
32	1 1/4	42.2	96	48	16.0	2.77	0.05(85)	3.56	0.63(119)
40	1 1/2	48.3	114	57	20.0	2.77	0.70(69)	3.68	0.90(102)
50	2	60.3	128	64	25.0	2.77	0.80(50)	3.91	1.20(81)
65	2 1/2	73.0	152	76	20.0	3.05	1.36(49)	5.16	2.30(100)
80	3	88.9	172	86	28.0	3.05	1.80(36)	5.49	3.20(81)
100	4	114.3	210	105	30.0	3.05	2.62(26)	6.02	5.10(67)
125	5	141.3	248	124	38.0	3.40	4.60(23)	6.55	9.40(56)
150	6	168.3	286	143	45.0	3.40	6.30(18)	7.11	16.1(50)
200	8	219.1	356	178	50.0	3.76	11.4(15)	8.18	51.0(43)
250	10	273.0	432	216	60.0	4.19	27.1(12)	9.27	53.1(38)
300	12	323.9	508	254	70.0	4.57	38.0(11)	9.53	77.0(31)
350	14	355.6	558	279	72.0	4.78	46.0(10)	9.53	93.0(28)
400	16	406.4	610	305	90.0	4.78	57.0(8)	9.53	116(23)
450	18	457	686	343	100	4.78	73.0(7)	9.53	147(19)
500	20	508	762	381	105	5.54	111(8)	9.53	182(17)
600	24	610	864	432	110	6.35	149(7)	9.53	254(13)

The pressure in bar are calculated for grade TP 316 at 38°C
Reference to ASTM A 403(A 403M, ASTM A 815

Not stock standard in 304L and 316L,
but can be supplied upon demand.
Partly stocked in EN 1.4462 and EN 1.4547 (254 SMO).
Stock standard items are subject to change without notice.

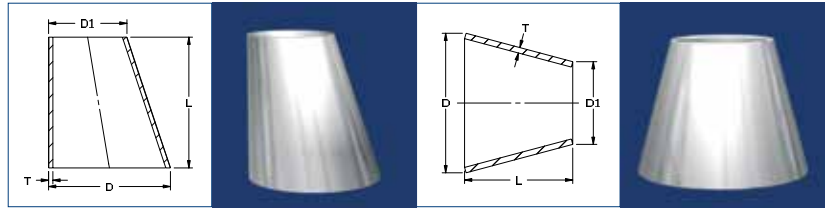
Table 1 Fitting classes for WP grades:

Class	Construction	NDT
S	Seamless	None
W	Welded	Radiography or ultrasonic
WX	Welded	Radiography or ultrasonic

1) Design pressure bar

*Seamless execution. Max 8"

EC OT 430
 CC OT 431
ISO
Reducers type CC, EC (ISO 5251)



DN	D	D1	L	Wall thickness T mm		
				2.0	3.0	4.0
				Weight kg/pce (Design pressure bar for CC*)		
20	26.9	21.3	38	0.10(139)		
25	33.7	21.3	51	0.10(109)		
		26.9	51	0.10(109)		
32	42.4	33.7		0.10(86)		
40	48.3	33.7	64	0.10(75)		
		42.4		0.10(75)		
50	60.3	33.7	76	0.20(59)		
		48.3		0.20(59)		
65	76.1	48.3	90	0.30(46)		
		60.3		0.30(47)		
80	88.9	60.3	90	0.30(39)		
		76.1		0.30(40)		
100	114.3	76.1	102	0.50(30)		
		88.9		0.50(31)		
125	139.7	88.9	127	1.10(25)		
		114.3		1.10(25)		
150	168.3	88.9	140	1.00(20)		
		114.3		1.00(21)		
		139.7		1.10(21)		
200	219.1	139.7	152	1.30(15)		
		168.3			2.00(23)	
		168.3		1.50(15)		
		168.3			2.20(23)	
250	273.0	168.3	178	2.00(12)		
		168.3			3.00(18)	
		219.1		2.20(13)		
		219.1			3.30(19)	
300	323.9	168.3	203		3.70(16)	
		219.1			4.20(16)	
		273.0			4.60(16)	
350	355.6	219.1	330		7.00(15)	
		273.0			7.70(15)	
		323.3			8.40(15)	
400	406.4	273.0	356		9.00(13)	
		323.9			9.70(13)	
		355.6			10.2(13)	
450	457	323.9	381		11.2(11)	
		355.6			11.5(11)	
		406.4			12.4(11)	
500	508	355.6	508		16.4(11)	
		406.4			17.4(11)	
		457			18.3(11)	
600	610	406.4	508			25.7(10)
		457				27.0(10)
		508				28.3(10)

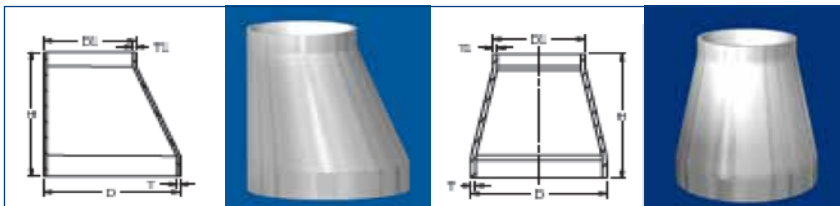
*) For EC reducers the pressure is appr. 10% lower
 The pressure ratings are calculated for grade EN 1.4307 at 20°C according to EN 10253-3 type A. (welding factor Z=0.7)
 All products can with additional testing be delivered to meet EN 10253-4 type A. This has to be confirmed when ordering.
 Stock standard items are subject to change without notice.

Stock standard: EN 1.4307 and 1.4432
 in the most common dimensions

EC OT 437
CC OT 438

ISO

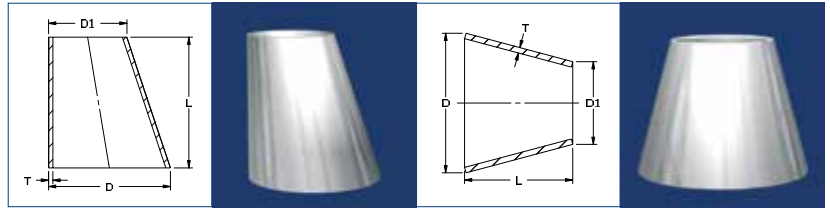
Reducers type CC, EC (ISO 5251)



DN	D	D1	L	Wall thickness T mm							
				1.6	2.0	2.3	2.6	2.9	4.0	5.0	
				Wall thickness T1 / Weight kg/pce							
20	26,9	21,3	38	0,06							
25	33,7	21,3	51		0,07						
		26,9	51		0,07						
32	42,4	33,7	51		0,08						
		33,7	64		0,14						
40	48,3	42,4	64		0,15						
		42,4	76		0,20						
50	60,3	48,3	76		0,19						
		48,3	90			0,41					
65	76,1	60,3	90			0,45					
		60,3	90			0,56					
80	88,9	76,1	90			0,46					
		76,1	102				0,89				
100	114,3	88,9	102				0,86				
		88,9	127				1,11				
125	139,7	114,3	127				1,20				
		114,3	140				1,40				
150	168,3	139,7	140				1,45				
		139,7	152					3,30			
200	219,1	168,3	152					3,45			
		168,3	178					2,90			
250	273	219,1	178					3,20			
		219,1	203					4,20			
300	323,9	219,1	203					4,20			
		273	203					4,60			

Stock standard: EN 1.4541 and 1.4571

EC OT 400
CC ISO OT 401
ISO



Reducers type CC, EC 3x (D-D1) (SFS 4162, EN 10253-4 and EN 10253-3)

DN	D	D1	L	Wall thickness T mm						
				2.0	2.5	3.0	4.0	5.0	6.0	8.0
				Weight kg/pce (Design pressure bar)						
15	21.3	13.7	23	0.02(250)						
		17.2	12	0.01(250)						
20	26.9	13.7	40	0.04(194)						
		17.2	29	0.03(194)						
25	33.7	21.3	17	0.02(194)						
		17.2	50	0.06(153)						
		21.3	37	0.05(153)						
32	42.4	26.9	20	0.03(153)						
		21.3	63	0.10(120)						
		26.9	46	0.08(120)						
40	48.3	33.7	26	0.05(120)						
		21.3	81	0.14(105)						
		26.9	63	0.11(105)						
50	60.3	33.7	43	0.09(105)						
		42.4	17	0.04(105)						
		21.3	117	0.24(83)						
		26.9	99	0.21(83)	0.26(105)					
65	76.1	33.7	79	0.18(83)	0.22(105)					
		42.4	53	0.13(83)	0.16(105)					
		48.3	36	0.10(83)	0.12(105)	0.14(127)				
		26.9	148	0.38(66)						
		33.7	126	0.34(66)	0.42(83)	0.50(127)				
80	88.9	42.4	100	0.29(66)	0.36(83)	0.43(127)				
		48.3	82	0.25(66)	0.31(83)	0.37(127)				
		60.3	47	0.16(66)	0.20(83)	0.23(127)				
		33.7	165	0.51(56)						
		42.4	138	0.45(56)	0.55(71)	0.66(85)				
100	114.3	48.3	120	0.41(56)	0.50(71)	0.60(85)				
		60.3	85	0.31(56)	0.39(71)	0.46(85)				
		76.1	38	0.16(56)	0.19(71)	0.23(85)				
		42.4	216	0.85(44)						
		48.3	195	0.78(44)	0.97(55)	1.16(65)	1.53(62)			
125	139.7	60.3	160	0.69(44)	0.86(55)	1.03(65)	1.35(62)			
		76.1	113	0.53(44)	0.66(55)	0.79(65)	1.05(62)			
		88.9	75	0.38(44)	0.47(55)	0.56(65)	0.74(62)			
		60.3	235	1.17(35)	1.45(45)	1.74(53)	2.29(51)			
		76.1	188	1.01(35)	1.26(45)	1.50(53)	1.98(51)			
150	168.3	88.9	151	0.86(35)	1.07(45)	1.28(53)	1.69(51)			
		114.3	75	0.46(35)	0.59(45)	0.71(53)	0.94(51)			
		88.9	235	1.67(29)	2.07(36)	2.48(45)	3.23(42)			
		114.3	160	1.13(29)	0.82(36)	0.98(45)	1.29(42)			
200	219.1	139.7	85	0.66(2)	0.82(36)	0.98(45)	1.29(42)			
		88.9	385	2.97(16)	3.70(20)	4.43(24)	5.86(32)	7.28(40)		
		114.3	310	2.59(16)	3.23(20)	3.86(24)	5.12(32)	6.36(40)		
		139.7	235	2.12(16)	2.64(20)	3.16(24)	4.18(32)	5.20(40)		
		168.3	150	1.46(16)	1.82(20)	2.18(24)	2.89(32)	3.59(40)		

*) For EC reducers the pressure is appr. 10% lower

The pressure ratings for products printed in black are calculated for grade EN 1.4307 at 20°C according to EN 10253-4 type A.

Pressure values in orange are calculated for grade EN 1.4307 at 20°C according to EN 10253-3 type A. (welding factor Z=0.7)

All products can with additional testing be delivered to meet EN 10253-4 type A. This has to be confirmed when ordering.

We will extend the dimensions up to DN 400 that fulfill EN 10253-4.

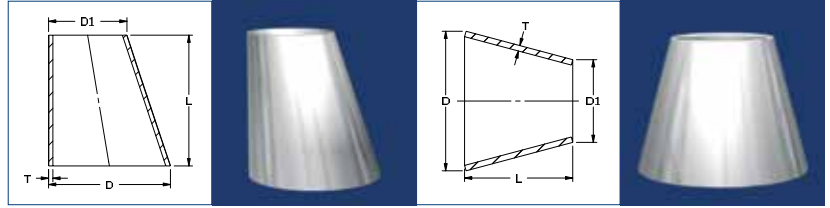
Pressure values in orange have to be multiplied by 1.42 to get the pressure ratings according to EN 10253-4.

Stock standard items are subject to change without notice.

Stock standard: EN 1.4307 and 1.4432
in the most common dimensions

EC OT 400
CC ISO OT 401
ISO

Reducers type CC, EC 3x (D-D1) (SFS 4162, EN 10253-3)



DN	D	D1	L	Wall thickness T mm						8.0	10
				2.0	2.5	3.0	4.0	5.0	6.0		
				Weight kg/pce (Design pressure bar for CC*)							
250	273	114.3	470	4.57(13)	5.70(16)	6.82(19)	9.05(25)	11.3(32)	13.4(39)		
		139.7	395	4.10(13)	5.11(16)	6.12(19)	8.11(25)	10.1(32)	12.1(39)		
		168.3	310	3.44(13)	4.29(16)	5.14(19)	6.82(25)	8.48(32)	10.1(39)		
300	323.9	219.1	160	1.98(13)	2.47(16)	2.96(19)	3.93(25)	4.89(32)	5.85(39)		
		139.7	545	6.36(11)	7.93(13)	9.49(16)	12.6(21)	15.7(27)	18.7(33)		
		168.3	461	5.71(11)	7.13(13)	8.53(16)	11.3(21)	14.1(27)	16.9(33)		
		219.1	310	4.24(11)	5.29(13)	6.34(16)	8.42(21)	10.5(27)	12.5(33)		
350	355.6	273	151	2.27(11)	2.84(13)	3.40(16)	4.51(21)	5.62(27)	6.72(33)		
		168.3	554	7.31(10)	9.12(12)	10.9(15)	14.5(19)	18.1(15)	21.6(29)		
		219.1	404	5.85(10)	7.30(12)	8.75(15)	11.6(19)	14.5(15)	17.3(29)		
		273	244	3.87(10)	4.83(12)	5.78(15)	7.69(19)	9.58(15)	11.5(29)		
400	406.4	323.9	94	1.61(10)	2.01(12)	2.41(15)	3.20(19)	3.99(15)	4.78(29)		
		219.1	554		10.9(11)	13.1(13)	17.4(17)	21.6(21)	25.9(26)	34.3(35)	
		273	395		8.45(11)	10.1(13)	13.5(17)	16.8(21)	20.1(26)	26.6(35)	
		323.9	244		5.61(11)	6.73(13)	8.59(17)	11.2(21)	13.3(26)	17.7(35)	
450	457	355.6	150		3.60(11)	4.20(13)	5.74(17)	7.16(21)	8.57(26)	11.4(35)	
		273	545		15.0(11)	20.0(15)	25.0(19)	29.8(23)	39.5(31)		
		323.9	395		11.7(11)	15.5(15)	19.3(19)	23.1(23)	24.4(31)		
		355.6	301		9.30(11)	12.3(15)	15.3(19)	18.4(23)	24.4(31)		
500	508	406.4	150		4.90(11)	6.51(15)	8.12(19)	9.73(23)	12.9(31)		
		323.9	545		17.1(10)	22.8(14)	28.4(17)	34.0(21)	45.1(27)		
		355.6	451		14.7(10)	19.6(14)	24.4(17)	29.2(21)	38.1(27)		
		406.4	301		10.4(10)	13.9(14)	17.3(17)	20.7(21)	25.5(27)		
600	610	457.2	150		5.48(10)	7.29(14)	9.09(17)	10.9(21)	14.5(27)		
		355.6	752		27.5(9)	36.5(11)	45.6(14)	54.6(17)	74.5(23)		
		406.4	601		23.1(9)	30.8(11)	38.4(14)	45.9(17)	61.0(23)		
		457	451		18.2(9)	24.2(11)	30.2(14)	36.2(17)	48.1(23)		
700	711	508	301		12.7(9)	17.0(11)	21.2(14)	25.3(17)	33.7(23)		
		406.4	902		38.2(7)	50.8(10)	63.4(13)	75.9(16)	101(21)	126(27)	
		457	752		33.3(7)	44.3(10)	55.3(13)	66.2(16)	88.0(21)	110(27)	
		508	601		27.8(7)	37.0(10)	46.1(13)	55.2(16)	73.4(21)	91.5(27)	
800	813	610	301		15.1(7)	20.1(10)	25.0(13)	30.0(16)	40.0(21)	50.0(27)	
		457	1053		50.7(7)	67.5(9)	84.2(11)	101(14)	134(19)	167(24)	
		508	902		45.2(7)	60.1(9)	75.0(11)	90.0(14)	120(19)	149(24)	
		610	601		32.4(7)	43.2(9)	53.9(11)	64.5(14)	85.8(19)	107(24)	
900	914	711	301		17.4(7)	23.2(9)	28.9(11)	34.7(14)	46.1(19)	57.5(24)	
		508	1203		64.9(6)	86.4(8)	108(10)	129(12)	172(17)	214(15)	
		610	902		52.1(6)	69.4(8)	86.7(10)	104(12)	138(17)	172(15)	
		711	601		37.1(6)	49.4(8)	61.6(10)	73.8(12)	98.2(17)	122(15)	
1000	1016	813	301		19.7(6)	26.3(8)	32.8(10)	39.3(12)	52.3(17)	65.2(15)	
		610	1203		74.2(5)	98.8(7)	123(9)	148(11)	197(15)	245(19)	
		711	902		59.1(5)	78.7(7)	98.3(9)	118(11)	157(15)	195(19)	
		813	601		41.7(5)	55.6(7)	69.4(9)	83.1(11)	111(15)	138(19)	
1100	1118	914	301		22.1(5)	29.4(7)	36.7(9)	44.0(11)	58.5(15)	73.0(19)	
		711	1203		84.1(5)	112(7)	140(8)	168(10)	223(13)	278(17)	
		813	909		66.7(5)	88.8(7)	111(8)	133(10)	177(13)	221(17)	
		914	609		47.0(5)	62.7(7)	78.2(8)	93.8(10)	125(13)	156(17)	
1200	1219	1016	308		25.0(5)	33.3(7)	41.6(8)	49.8(10)	66.3(13)	82.7(17)	
		813	1205		93.0(4)	124(6)	155(7)	185(9)	247(13)	308(16)	
		914	905		73.3(4)	97.7(6)	122(7)	146(9)	195(13)	243(16)	
		1016	604		51.3(4)	68.3(6)	85.3(7)	102(9)	136(13)	170(16)	
		1118	296		26.3(4)	35.0(6)	43.8(7)	54.3(9)	69.8(13)	87.2(16)	

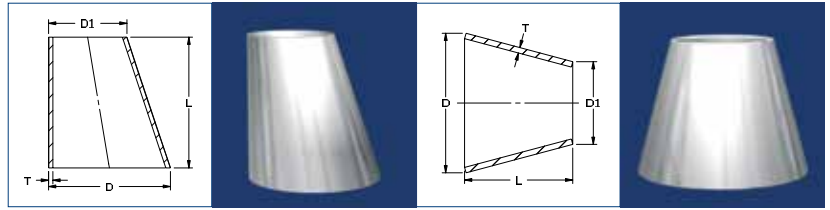
*) For EC reducers the pressure is appr. 10% lower
The pressure ratings are calculated for grade EN 1.4307 at 20°C according to EN 10253-3 type A. (welding factor Z=0.7)
All products can with additional testing be delivered to meet EN 10253-4 type A. This has to be confirmed when ordering.
We will extend the dimensions up to DN 400 that fulfill EN 10253-4.
Pressure values have to be multiplied by 1.42 to get the pressure ratings according to EN 10253-4.
Stock standard items are subject to change without notice.

Stock standard: EN 1.4307 and 1.4432
in the most common dimensions

EC OT 410
CC OT 411

Metric Tru-Bore®

Reducers type CC, EC 3x (D-D1), half angle 9.5°



DN	D	D1	L	Wall thickness T mm						
				1.5	2.0	2.5	3.0	4.0	5.0	6.0
Weight kg/pce (Design pressure bar for CC*)										
20	25	17	24	0.02(235)	0.02(210)					
		20	15	0.01(235)	0.02(210)					
25	28	20	24	0.02(137)						
		23	15	0.01(137)						
	30	20	30	0.03(127)	0.05(161)					
		25	15	0.02(127)	0.03(161)					
	32	20	36		0.05(161)					
		25	21		0.03(161)					
33	38	23	30	0.03(115)						
		28	15	0.02(115)						
32	40	20	54	0.06(99)						
		25	39	0.05(99)						
	43	28	30	0.04(99)						
		30	24	0.03(99)						
40	50	20	60		0.10(127)					
		25	45		0.08(127)					
	54	28	36	0.05(95)						
		32	24		0.05(127)					
40	65	25	54	0.09(88)						
		28	45	0.08(88)						
	70	33	30	0.04(88)						
		44	42		0.09(115)					
50	80	25	75		0.15(100)	0.19(127)	0.23(235)			
		30	72		0.17(93)					
	90	32	54		0.12(100)	0.15(127)	0.18(235)			
		34	60		0.13(93)					
	100	38	48		0.11(93)					
		40	42	0.09(69)						
65	110	44	30		0.07(93)	0.09(117)	0.11(142)			
		32	99		0.25(76)	0.32(96)	0.39(117)			
	120	40	75		0.21(76)	0.26(96)	0.32(117)			
		50	45		0.14(76)	0.17(96)	0.21(117)			
69	130	30	117		0.29(72)					
		38	93		0.25(72)					
	140	44	75		0.20(72)					
		54	45		0.13(72)					
70	150	54	48		0.15(71)					
		80	75		0.30(62)					
80	160	40	120		0.38(62)	0.48(78)	0.58(93)			
		50	90		0.31(62)	0.39(78)	0.47(93)			
	170	65	45		0.17(62)	0.21(78)	0.26(93)			
		84	120		0.48(59)					
	180	54	90		0.38(59)					
		69	45		0.17(59)					
100	190	50	150		0.59(49)	0.74(62)	0.89(75)	1.20(71)		
		65	105		0.45(49)	0.57(62)	0.68(75)	0.92(71)		
	200	80	60		0.28(49)	0.35(62)	0.42(75)	0.57(71)		
		125	180		0.89(39)	1.11(49)	1.34(59)	1.81(56)		
125	210	80	135		0.72(39)	0.90(49)	1.08(59)	1.46(56)		
		100	75		0.44(39)	0.55(49)	0.66(59)	0.89(56)		

*) For EC reducers the pressure is appr. 10% lower

The pressure ratings for products printed in black are calculated for grade EN 1.4307 at 20°C according to EN 10253-4 type A.

Pressure values in orange are calculated for grade EN 1.4307 at 20°C according to EN 10253-3 type A. (welding factor Z=0.7)

All products can with additional testing be delivered to meet EN 10253-4 type A. This has to be confirmed when ordering.

We will extend the dimensions up to DN 400 that fulfill EN 10253-4.

Pressure values in orange have to be multiplied by 1.42 to get the pressure ratings according to EN 10253-4.

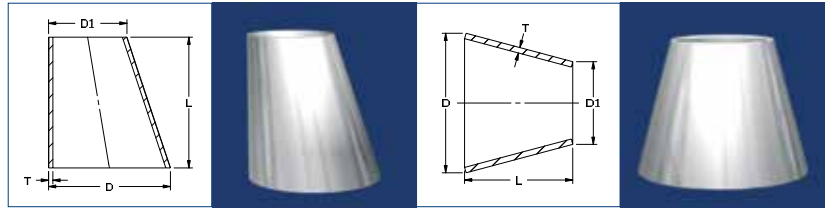
Stock standard items are subject to change without notice.

Stock standard: EN 1.4307 and 1.4432
in the most common dimensions

EC OT 410
CC OT 411

Metric Tru-Bore®

Reducers type CC, EC 3x (D-D1), half angle 9.5°



DN	D	D1	L	Wall thickness T mm								
				1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10
				Weight kg/pce (Design pressure bar for CC*)								
150	150	80	210		1.25(32)	1.57(38)	1.89(49)	2.54(47)				
		100	150		0.97(32)	1.21(38)	1.46(49)	1.96(47)				
		125	75		0.53(32)	0.67(38)	0.80(49)	1.08(47)				
200	200	100	300		2.31(17)	2.90(22)	3.49(26)	4.69(35)	5.90(44)			
		125	225		1.88(17)	2.36(22)	2.83(26)	3.80(35)	4.78(44)			
		150	150		1.35(17)	1.69(22)	2.03(26)	2.73(35)	3.43(44)			
250	250	125	375		3.61(14)	4.52(17)	5.44(20)	7.29(28)	9.16(35)	11.1(42)		
		150	300		3.08(14)	3.85(17)	4.64(20)	6.21(28)	7.80(35)	9.41(42)		
		200	150		1.73(14)	2.17(17)	2.60(20)	3.49(28)	4.38(35)	5.28(42)		
300	300	150	450		5.19(11)	6.50(14)	7.81(17)	10.5(23)	13.1(29)	15.8(35)		
		200	300		3.84(11)	4.81(14)	5.78(17)	7.74(23)	9.71(29)	11.7(35)		
		250	150		2.11(11)	2.64(14)	3.18(17)	4.25(23)	5.33(29)	6.42(35)		
350	350	200	450		6.33(10)	7.92(12)	9.53(14)	12.8(20)	16.0(25)	19.3(30)		
		250	300		4.60(10)	5.76(12)	6.92(14)	9.26(20)	11.6(25)	14.0(30)		
		300	150		2.49(10)	3.12(12)	3.75(14)	5.01(20)	6.28(25)	7.56(30)		
400	400	250	450			9.35(10)	11.2(13)	15.0(17)	18.8(22)	22.7(26)		
		300	300			6.71(10)	8.06(13)	10.8(17)	13.5(22)	16.3(26)		
		350	150			3.59(10)	4.32(13)	5.77(17)	7.23(22)	8.70(26)		
450	450	300	450				13.0(11)	17.3(15)	21.7(19)	26.1(23)		
		350	300				9.20(11)	12.3(15)	15.4(19)	18.6(23)		
		400	150				4.90(11)	6.50(15)	8.20(19)	9.8(23)		
500	500	300	600				18.4(10)	24.6(14)	30.8(17)	37.1(21)		
		350	450				14.7(10)	19.6(14)	24.6(17)	29.5(21)		
		400	300				10.4(10)	13.8(14)	17.3(17)	20.8(21)		
600	600	450	150				5.50(10)	7.30(14)	9.10(17)	11.0(21)		
		350	750				27.3(8)	36.5(11)	45.7(14)	54.9(17)	73.6(23)	
		400	600				23.0(8)	30.7(11)	38.5(14)	46.2(17)	61.9(23)	
700	700	450	450				18.1(8)	24.2(11)	30.3(14)	36.4(17)	48.7(23)	
		500	300				12.6(8)	16.9(11)	21.1(14)	25.4(17)	34.0(23)	
		400	900				37.9(7)	50.6(10)	63.4(13)	76.2(16)	102(22)	128(27)
800	800	450	750				33.0(7)	44.1(10)	55.2(13)	66.4(16)	88.8(22)	111(27)
		500	600				27.6(7)	36.8(10)	46.1(13)	55.4(16)	74.1(22)	92.9(27)
		600	300				14.9(7)	19.9(10)	24.9(13)	30.0(16)	40.1(22)	50.2(27)
900	900	450	1050				50.2(6)	67.1(9)	84.0(11)	101(14)	135(19)	169(24)
		500	900				44.8(6)	59.8(9)	74.8(11)	90.0(14)	120(19)	151(24)
		600	600				32.1(6)	42.9(9)	53.7(11)	64.5(14)	86.3(19)	108(24)
1000	1000	700	300				17.2(6)	23.0(9)	28.0(11)	34.5(14)	46.2(19)	57.9(24)
		500	1200				64.2(6)	85.8(8)	107(10)	129(12)	173(17)	216(21)
		600	900				51.6(6)	68.9(8)	86.2(10)	104(12)	138(17)	174(21)
1100	1100	700	600				36.7(6)	49.0(8)	61.3(10)	73.7(12)	98.4(17)	123(21)
		800	300				19.5(6)	26.0(8)	32.6(10)	39.1(12)	52.3(17)	65.5(21)
		900	900				73.4(5)	98.0(7)	123(9)	147(11)	197(15)	247(19)
1200	1200	700	900				58.5(5)	78.0(7)	97.7(9)	117(11)	157(15)	196(19)
		800	600				41.3(5)	55.1(7)	68.9(9)	82.8(11)	111(15)	139(19)
		900	300				21.8(5)	29.1(7)	36.4(9)	43.7(11)	58.4(15)	73.1(19)
1100	1100	700	1200				82.5(4)	110(6)	138(8)	166(10)	221(13)	277(17)
		800	900				65.3(4)	97.2(6)	109(8)	131(10)	175(13)	219(17)
		900	600				45.8(4)	61.2(6)	76.5(8)	92.0(10)	123(13)	154(17)
1200	1200	1000	300				24.1(4)	32.1(6)	40.2(8)	48.3(10)	64.5(13)	80.7(17)
		800	1200				91.7(6)	122(6)	153(7)	184(9)	246(12)	308(16)
		900	900				72.2(6)	96.3(6)	120(7)	145(9)	193(12)	242(16)
1100	1100	1000	600				50.4(6)	67.3(6)	84.1(7)	101(9)	135(12)	169(16)
		1100	300				26.3(6)	35.2(6)	44.0(7)	52.8(9)	70.5(12)	88.3(16)

*) For EC reducers the pressure is appr. 10% lower
 The pressure ratings for products printed in green are calculated for grade EN 1.4307 at 20°C according to EN 10253-4 type A.
 The pressure ratings are calculated for grade EN 1.4307 at 20°C according to EN 10253-3 type A. (welding factor Z=0.7)
 All products can with additional testing be delivered to meet EN 10253-4 type A. This has to be confirmed when ordering.
 We will extend the dimensions up to DN 400 that fulfill EN 10253-4.
 Pressure values have to be multiplied by 1.42 to get the pressure ratings according to EN 10253-4.
 Stock standard items are subject to change without notice.

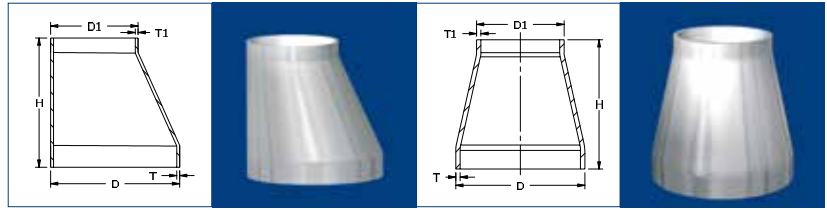
Stock standard: EN 1.4307 and 1.4432
 in the most common dimensions

EC OT 420/427*

CC OT 421/428*

ANSI

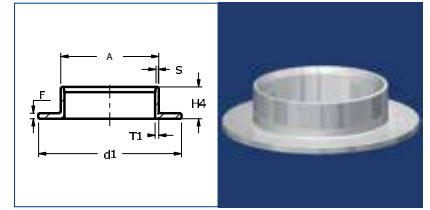
Reducers CC, EC, ASTM A 403 WPS/WPW/WPWX



Dim. NPS	D	D1	H	T	T1	Weight kg/pce
3/4"x 1/2"	26.7	21.3	38	2.11	2.11	0.10
1"x 3/4"	33.4	26.7	51	2.77	2.11	0.13
1"x 1/2"		21.3		2.77	2.11	0.12
1 1/4"x 1"	42.2	33.4		2.77	2.77	0.18
1 1/4"x 3/4"		26.7		2.77	2.11	0.18
1 1/4"x 1/2"		21.3		2.77	2.11	0.17
1 1/2"x 1 1/4"	48.3	42.2	64	2.77	2.77	0.21
1 1/2"x 1"		33.4		2.77	2.77	0.20
1 1/2"x 3/4"		26.7		2.77	2.11	0.20
2"x 1 1/2"	60.3	48.3	76	2.77	2.77	0.31
2"x 1 1/4"		42.2		2.77	2.77	0.30
2"x 1"		33.4		2.77	2.77	0.28
2 1/2"x 2"	73.0	60.3	89	3.05	2.77	0.47
2 1/2"x 1 1/2"		48.3		3.05	2.77	0.44
2 1/2"x 1 1/4"		42.2		3.05	2.77	0.43
3"x 2 1/2"	88.9	73.0		3.05	3.05	0.59
3"x 2"		60.3		3.05	2.77	0.55
3"x 1 1/2"		48.3		3.05	2.77	0.51
4"x 3"	114.3	88.9	102	3.05	3.05	0.87
4"x 2 1/2"		73.0		3.05	3.05	0.83
4"x 2"		60.3		3.05	2.77	0.78
5"x 4"	141.3	114.3	127	3.40	3.05	1.49
5"x 3"		88.9		3.40	3.05	1.45
6"x 5"	168.3	141.3	140	3.40	3.40	2.08
6"x 4"		114.3		3.40	3.05	1.95
6"x 3"		88.9		3.40	3.05	1.82
8"x 6"	219.1	168.3	152	3.76	3.40	3.19
8"x 4"		114.3		3.76	3.05	3.01
10"x 8"	273.0	219.1	178	4.19	3.76	5.20
10"x 6"		168.3		4.19	3.40	5.00
12"x 10"	323.9	273.0	203	4.57	4.19	7.98
12"x 8"		219.1		4.57	3.76	7.67

*Seamless execution. Max 12"

Stock standard: Not stock standard in 304L and 316L, but can be supplied upon demand. Partly stocked in EN 1.4462 and EN 1.4547 (254 SMO). Stock standard items are subject to change without notice.



OT 502

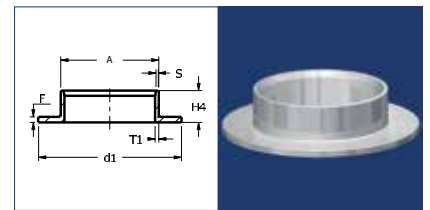
ISO

Welding necks PN 10 in accordance with EN 13480 (SSG 7465; EN 1092-1 Type 35; SFS 4167)

DN	A	d1	H4	F	S	T1	Weight kg/pce
15-32	Use PN 40 (SSG 7468)						
40-250	Use PN 16 (SSG 7466)						
300	323.9	370	68	12	3.2	8.0	6.80
350	355.6	430	68	13	3.2	8.0	9.50
400	406.4	482	72	14	3.2	8.0	11.6
450	457	532	72	15	3.6	8.0	15.0
500	508	585	75	16	4.0	8.0	15.9
600	610	685	80	18	5.0	10	23.0
	700	711	80	20	6.3	10	30.9

Use with loose flange according to EN 1092-1 type 02. See illustration on page 69.

Stock standard: EN 1.4307 and 1.4432



OT 502

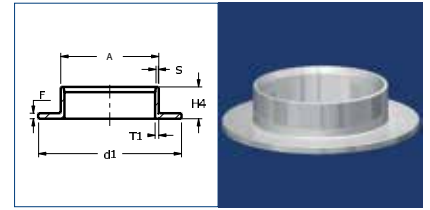
ISO

Welding necks PN 16 in accordance with EN 13480 (SSG 7466; EN 1092-1 Type 35; SFS 4168)

DN	A	d1	H4	F	S	T1	Weight kg/pce
15-40	Use PN 40 (SSG 7468)						
50	60.3	102	45	8.0	2.0	3.0	0.53
65	76.1	122	45	8.0	2.0	4.0	0.70
80	88.9	138	50	8.0	2.0	4.0	1.00
100	114.3	158	52	10	2.0	4.0	1.30
125	139.7	188	55	10	2.0	5.0	1.90
150	168.3	212	55	10	2.0	6.0	2.40
200	219.1	268	62	11	2.6	6.0	3.90
250	273.0	320	70	12	3.2	8.0	5.80
300	323.9	378	78	14	4.0	10	9.50*
350	355.6	438	82	18	4.0	10	15.2*
400	406.4	490	85	20	5.0	12	18.7*
450	457	550	87	22	5.0	12	24.4*
500	508	610	90	22	6.3	12	29.1*
600	610	725	95	24	8.0	12	40.3*

Use with loose flange according to EN 1092-1 type 02. See illustration on page 69.
Stock standard items are subject to change without notice.

Stock standard: EN 1.4432 and EN 1.4301
(*) No stock standard



OT 502

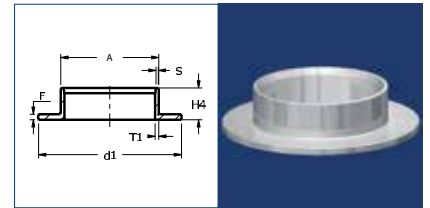
ISO

Welding necks PN 25 in accordance with EN 13480 (SSG 7467; EN 1092-1 Type 35; SFS 4169)

DN	A	d1	H4	F	S	T1	Weight kg/pce
15-100	Use PN 40 (SSG 7468)						
125	139.7	188	68	16	3.2	6	2.70*
150	168.3	218	75	18	3.2	8	3.50*
200	219.1	278	80	18	3.2	8	6.60*
250	273.0	335	88	18	5.0	10	10.0*
300	323.9	395	92	20	6.3	10	15.3*
350	355.6	450	100	22	6.3	12	20.8*
400	406.4	505	110	24	8	14	28.6*
450	457	555	110	26	8	15	34.4*
500	508	615	125	28	10	16	45.8*
600	610	720	115	30	10	18	61.0*

Use with loose flange according to EN 1092-1 type 02. See illustration on page 69.

*) No stock standard



OT 502

ISO

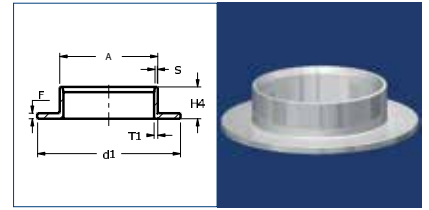
Welding necks PN 40 in accordance with EN 13480 (SSG 7468; EN 1092-1 Type 35; SFS 4170)

DN	A	d1	H4	F	S	T1	Weight kg/pce
15	21.3	45	38	5	2.0	3.0	0.09
20	26.9	58	40	6	2.0	3.0	0.17
25	33.7	68	40	7	2.0	3.0	0.26
32	42.4	78	42	8	2.0	3.0	0.36
40	48.3	88	45	8	2.0	3.0	0.45
50	60.3	102	48	10	2.6	4.0	0.69*
65	76.1	122	52	11	2.6	5.0	1.10*
80	88.9	138	58	12	2.6	6.0	1.60*
100	114.3	162	65	14	3.2	6.0	2.40*
125	139.7	188	68	16	3.2	6.0	3.20*
150	168.3	218	75	18	4.0	8.0	4.60*
200	219.1	285	88	20	5.0	10	8.80*
250	273.0	345	105	22	6.3	12	14.4*
300	323.9	410	115	25	8.0	12	20.7*
350	355.6	465	125	28	8.0	14	30.7*
400	406.4	535	135	32	10	16	45.4*
450	457.0	560	**	**	**	**	**
500	508.0	615	**	**	**	**	**
600	610.0	735	**	**	**	**	**

Use with loose flange according to EN 1092-1 type 02. See illustration on page 69.
Stock standard items are subject to change without notice.

Stock standard: EN 1.4432 and EN 1.4301
*) No stock standard
**) Specified by the customer, no stock standard

BUTT WELD FITTINGS



OT 512

Metric Tru-Bore®

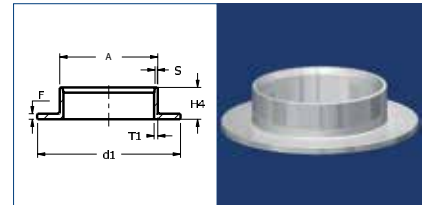
Welding necks PN 10 in accordance with EN 13480 (EN 1092-1 Type 35M; SSG 7365)

DN	A	d1	H4	F	S	T1	Weight kg/pce
20-250	Use PN 16 (SSG 7366)						
300	316	370	60	12	3.0	8.0	6.80
350	366	430	60	12	3.5	8.0	9.50
400	416	482	65	12	3.5	8.0	11.6*
450	466	532	70	15	3.5	8.0	15.0*
500	518	585	75	15	4.0	9.0	15.9*
600	620	685	80	15	4.0	10	23.0*
700	724	800	90	15	4.5	12	30.9*
800	826	905	100	15	5.0	13	41.5*
900	916	1005	110	18	6.0	15	50.0*
1000	1016	1110	120	18	8.0	18	58.9*
1200	1220	1330	130	22	10	18	93.2*

Use with loose flange according to EN 1092-1 type 02. See illustration on page 69.

Stock standard: EN 1.4432

*) No stock standard



OT 512

Metric Tru-Bore®

Welding necks PN 16 in accordance with EN 13480 (EN 1092-1 Type 35M; SSG 7366)

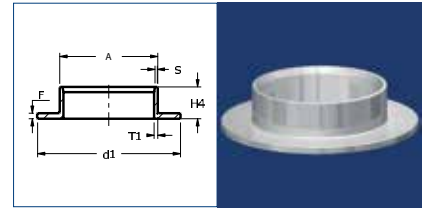
DN	A	d1	H4	F	S	T1	Weight kg/pce
20	24	58	40	6.0	2.0	2.0	0.17*
25	29	68	40	6.0	2.0	2.0	0.26*
32	36	78	40	6.0	2.0	2.0	0.36*
40	44	88	45	6.0	2.0	2.0	0.45
50	54	102	45	8.0	2.0	2.0	0.53
65	70	122	45	8.0	2.5	2.5	0.70
80	86	138	50	10	3.0	3.0	1.00
100	108	158	50	10	3.0	4.0	1.30
125	135	188	50	10	3.0	5.0	1.90
150	160	212	50	10	3.0	5.0	2.40
200	214	268	65	10	3.0	7.0	3.90
250	266	320	65	12	3.5	8.0	5.80
300	320	370	65	12	4.0	10	9.50*
350	370	430	70	15	4.5	10	15.2*
400	424	482	80	15	5.0	12	18.7*
450	474	532	85	15	5.0	12	24.4*
500	524	585	95	18	5.0	12	29.1*
600	628	685	100	18	6.0	14	40.3*
700	728	795	110	20	10	14	45.2*
800	832	900	110	22	12	16	59.9*
900	936	1000	115	24	12	18	75.6*
1000	1036	1115	130	32	15	18	106.45*
1200	1244	1330	130	32	15	22	130.5*

Use with loose flange according to EN 1092-1 type 02. See illustration on page 69.

Stock standard items are subject to change without notice.

Stock standard: EN 1.4432

*) No stock standard



OT 512

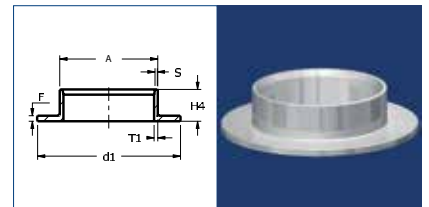
Metric Tru-Bore®

Welding necks PN 25 in accordance with EN 13480 (EN 1092-1 Type 35M; SSG 7367)

DN	A	d1	H4	F	S	T1	Weight kg/pce
20-150	Use DN 20-150 (SSG 7370)						
200	219	278	65	12	5.0	9	6.60*
250	274	335	75	15	6.5	10	10.0*
300	325	390	80	16	7.5	11.5	15.3*
350	374	450	85	18	5.0	12	20.8*
400	427	505	95	18	6.0	13.5	28.6*
450	480	555	105	20	8.0	15	34.4*
500	530	615	115	22	8.0	15	45.8*
600	636	720	115	24	12	18	61.0*
700	730	820	**	**	**	**	**
800	830	930	**	**	**	**	**
900	936	1030	**	**	**	**	**

Use with loose flange according to EN 1092-1 type 02. See illustration on page 69.

* No stock standard
**) Specified by the customer, no stock standard



OT 512

Metric Tru-Bore®

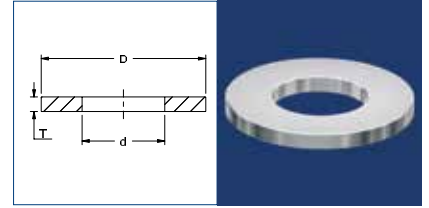
Welding necks PN 40 in accordance with EN 13480 (EN 1092-1 Type 35M; SSG 7370)

DN	A	d1	H4	F	S	T1	Weight kg/pce
20	26	58	40	6	2.5	3.0	0.17
25	31	68	40	6	2.5	3.0	0.26
32	39	78	40	6	2.5	3.5	0.36
40	47	88	45	8	2.5	3.5	0.45*
50	58	102	45	8	2.5	4.0	0.69*
65	74	122	45	10	2.5	4.5	1.10*
80	89	138	55	10	2.5	4.5	1.60*
100	110	162	55	10	3.0	5.0	2.40*
125	137	188	55	12	3.5	6.0	3.20*
150	164	218	65	12	4.0	7.0	4.60*
200	220	285	85	20	6.0	10	8.80*
250	274	345	100	22	8.0	12	14.4*
300	330	410	110	24	9.0	15	20.7*
350	380	465	120	30	10	15	20.7*
400	440	535	130	30	12	20	45.4*
450	490	560	135	30	12	20	39.0*
500	540	615	140	35	15	20	49.0*
600	648	735	150	40	15	24	118.4*

Use with loose flange according to EN 1092-1 type 02. See illustration on page 69.
Stock standard items are subject to change without notice.

Stock standard: EN 1.4432
*) No stock standard

BUTT WELD FITTINGS

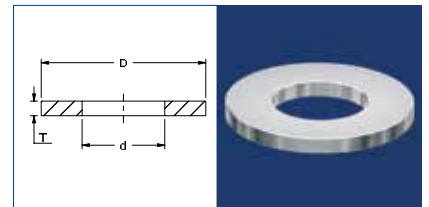


OT 501

**ISO
Weld-on plate collars**

DN	d	D	T	Weight kg/pce
10	17.7	40	6.0	0.05
15	21.8	45	6.0	0.06
20	27.4	58	6.0	0.10
25	34.2	68	6.0	0.14
32	43.0	78	6.0	0.16
40	48.8	88	6.0	0.21
50	60.8	102	8.0	0.35
65	76.6	122	8.0	0.48
80	89.4	138	10	0.70
100	115.5	158	10	0.75
125	140.7	184	10	0.90
150	169.3	212	10	1.04
200	220.1	268	10	1.50

Product not stock standard but can be supplied upon demand.

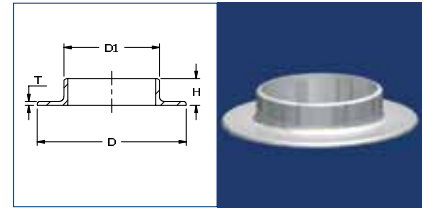


OT 511

**Metric Tru-Bore®
Weld-on plate collars**

DN	d	D	T	Weight kg/pce
10	15.0	40	6.0	0.05
15	20.5	45	6.0	0.06
20	25.5	58	6.0	0.10
25	30.5	68	6.0	0.14
32	39.0	78	6.0	0.17
40	45.0	88	6.0	0.22
50	55.0	102	8.0	0.38
65	70.0	122	8.0	0.50
70	75.0	122	10	0.59
75	80.0	138	10	0.79
80	85.0	138	10	0.75
100	105.0	158	10	0.88
125	130.0	184	10	1.10
150	155.0	212	10	1.30
200	205.0	268	10	1.90
250	255.0	320	12	2.80
300	306.0	370	12	3.30
350	356.0	430	12	4.40
400	406.0	482	12	5.10
450	456	532	15	7.10
500	508	585	15	8.00

Product not stock standard but can be supplied upon demand.

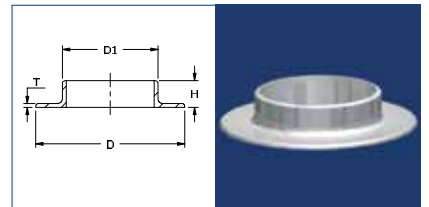


OT 503
ISO
Angle collars

DN	D1	T	D	H	Weight kg/pce (Design pressure bar)
200	219,1	4	271	30	1,2 (10)
250	273	4	325	30	1,4 (10)
300	323,9	4	376	30	1,8 (10)
350	355,6	4	430	40	2,1 (6)
400	406,4	4	480	40	3,3 (6)
450	457	4	530	40	3,5 (6)
500	508	4	580	40	4
500	508	5	585	50	5,7 (6)
600	610	4	680	40	4,8
600	610	5	685	50	7,2 (6)
700	711	5	800	50	8,7
700	711	6	800	60	12
800	813	5	900	50	9,9
800	813	6	905	60	13,8
900	914	5	1000	50	11,2
900	914	6	1005	60	15,5
1000	1016	5	1100	50	14,5
1000	1016	6	1110	60	17,2

The pressures are calculated for grade EN 1.4307 at 20 °C.
Full face gasket with thickness ≥ 0.5 mm. Gasket factor 4.94 and design seating stress ≥ 90 Mpa.
See also appendix H in EN 13445-3.
Loose flange for dimension DN 200 - 300 and DN 500 - 600 SS 2049/DIN 2642/EN 1092-1 type O2 can be used.
For DN 350-450 use SS 2049/DIN2642.

Stock standard: EN 1.4404.
EN 1.4307 can be supplied upon demand.

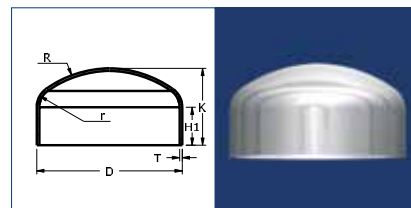


OT 513
Metric Tru-Bore®
Angle collars

DN	D1	T	D	H	Weight kg/pce (Design pressure bar)
200	208	4	260	30	1,1 (10)
250	258	4	310	30	1,4 (10)
300	308	4	360	30	1,7 (10)
350	358	4	430	40	2,8 (6)
400	408	4	480	40	3,2 (6)
450	458	4	530	40	3,3 (6)
500	508	4	580	40	4
500	510	5	585	50	5,7 (6)
600	608	4	680	40	4,8
600	610	5	685	50	7,2 (6)
700	710	5	800	50	8,7
700	712	6	800	60	12
800	810	5	900	50	9,9
800	812	6	905	60	13,8
900	910	5	1000	50	11,2
900	912	6	1005	60	15,5
1000	1010	5	1100	50	14,5
1000	1012	6	1110	60	17,2

The pressures are calculated for grade EN 1.4307 at 20 °C.
Full face gasket with thickness ≥ 0.5 mm. Gasket factor 4.94 and design seating stress ≥ 90 Mpa.
See also appendix H in EN 13445-3.
Loose flange for dimension DN 200 - 300 and DN 500-600 SS 2049/DIN 2642/EN 1092-1 type O2 can be used.
For DN 350 - 450 use SS 2049/DIN2642.
Stock standard items are subject to change without notice.

Stock standard: EN 1.4404.
EN 1.4307 can be supplied upon demand.



OT 60

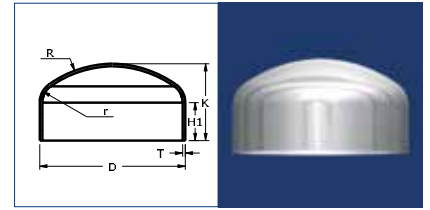
ISO

Caps, ISO 5251, EN 10253-4

D	T	R	r	K	H1	Weight kg/pce (Design pressure bar)
33.7	2.0	27	5	38	25	0.08(100)*
48.3	2.0	32	6	38	25	0.10(100)
60.3	2.0	48	9	38	22	0.14(60)
76.1	2.0	60	11	38	18	0.17(50)
88.9	2.0	64	12	51	26	0.28(80)*
88.9	3.0	64	12	51	26	0.42(100)
114.3	2.0	88	17	64	34	0.45(60)*
114.3	3.0	88	17	64	34	0.67(100)
139.7	3.0	112	21	76	40	1.00(40)
168.3	3.0	130	26	89	44	1.42(40)
219.1	3.0	175	34	102	45	2.26(25)
273.0	3.0	215	42	127	56	3.40(16)
273.0	4.0	215	42	127	56	4.52(30)*
323.9	4.0	250	50	152	68	6.40(25)
355.6	4.0	285	57	165	70	7.72(20)*
406.4	4.0	325	65	178	71	9.73(20)*
457	4.0	365	73	203	83	12.1(16)*
508	4.0	406	80	229	92	15.1(16)*
610	4.0	488	98	267	108	18.2(14)*

The pressures are calculated according to EN 13445-3 for grade EN 1.4432 at 20 °C.
Bigger sizes and thicker wall available upon request.

Stock standard: EN 1.4432
*) No stock standard.



OT 61

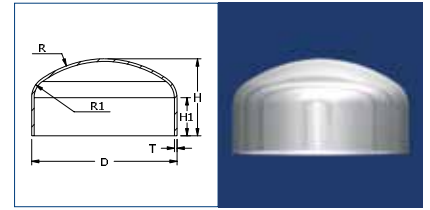
Metric Tru-Bore®

Caps, SMS 482; SSG 1369

D	T	R	r	K	H1	Volume Litres	Weight kg/pce (Design pressure bar)
54	2.0	40	8	25	10	0.02	0.10(80)
84	2.0	64	13	38	15	0.1	0.20(50)
86	3.0	64	13	38	15	0.1	0.30(80)*
104	2.0	80	16	44	15	0.1	0.30(40)
106	3.0	80	16	44	15	0.1	0.40(60)*
129	2.0	100	20	50	15	0.3	0.40(30)
131	3.0	100	20	50	15	0.3	0.60(50)*
154	2.0	120	24	56	15	0.5	0.50(25)
156	3.0	120	24	56	15	0.5	0.80(40)*
204	2.0	160	32	74	20	1.0	0.90(20)*
206	3.0	160	32	74	20	1.0	1.30(25)
208	4.0	160	32	74	20	1.0	1.70(40)*
254	2.0	200	40	86	20	2.0	1.30(16)*
256	3.0	200	40	86	20	2.0	2.00(25)
258	4.0	200	40	86	20	2.0	2.60(25)*
306	3.0	240	48	100	20	3.5	2.70(20)
308	4.0	240	48	100	20	3.5	3.60(25)*
356	3.0	280	56	115	20	5.6	3.70(16)
358	4.0	280	56	115	20	5.6	4.90(20)*
406	3.0	320	65	128	20	8.7	4.70(16)
408	4.0	320	65	128	20	8.7	6.30(20)*
456	3.0	360	72	140	20	14.0	6.30(12)*
458	4.0	360	72	140	20	14.0	7.80(16)*
506	3.0	400	80	152	20	19.0	7.20(12)*
508	4.0	400	80	152	20	19.0	9.60(16)*
606	3.0	480	96	180	20	30.0	12.7(10)*
608	4.0	480	96	180	20	30.0	13.5(12)*
708	4.0	560	112	205	20	46.0	18.2(12)*
710	5.0	560	112	205	20	46.0	24.8(15)*

The pressures are calculated according to EN 13445-3 for grade EN 1.4432 at 20 °C.
Stock standard items are subject to change without notice. Bigger sizes and thicker wall upon request.

Stock standard: EN 1.4432
*) No stock standard.

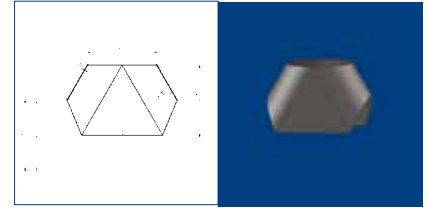


OT 62
ANSI
Caps

N.P.S.	D	SCH	T	R1	R	H	H1	Weight kg/pce (Design pressure bar)
1 1/2"	48.3	10S	2.77	7	34	38	24	0.14(190)
1 1/2"	48.3	40S	3.68	7	33	38	24	0.23(265)
2"	60.3	10S	2.77	9	44	38	21	0.17(147)
2"	60.3	40S	3.91	8	42	38	20	0.27(219)
2 1/2"	73.0	10S	3.05	11	54	38	18	0.25(133)
2 1/2"	73.0	40S	5.16	10	50	38	17	0.45(242)
3"	88.9	10S	3.05	13	66	51	26	0.40(107)
3"	88.9	40S	5.49	12	62	51	26	0.71(206)
4"	114.3	10S	3.05	17	87	64	33	0.65(82)
4"	114.3	40S	6.02	16	82	64	32	1.22(172)
5"	141.3	10S	3.40	22	108	76	38	1.02(73)
5"	141.3	40S	6.55	21	103	76	36	1.84(149)
6"	168.3	10S	3.40	26	129	89	44	1.36(61)
6"	168.3	40S	7.11	25	123	89	42	3.23(134)
8"	219.1	10S	3.76	34	169	102	44	2.49(51)
8"	219.1	40S	8.18	32	162	102	42	5.67(117)
10"	273.0	10S	4.19	42	212	127	55	4.90(46)
10"	273.0	40S	9.27	41	204	127	52	9.21(106)
12"	323.9	10S	4.57	50	252	152	66	6.53(42)
12"	323.9	40S	9.53	49	244	152	64	13.1(91)
14"	355.6	10S	4.78	55	277	165	71	8.16(40)
14"	355.6	STD	9.53	54	269	165	69	16.2(82)
16"	406.4	10S	4.78	63	317	178	71	14.5(35)
16"	406.4	STD	9.53	62	310	178	69	22.0(71)
18"	457	10S	4.78	72	358	203	83	18.0(31)
18"	457	STD	9.53	70	350	203	81	27.0(63)
20"	508	10S	5.54	80	398	229	95	27.2(32)
20"	508	STD	9.53	78	391	229	93	34.0(56)
24"	610	10S	6.35	96	478	267	106	34.5(31)
24"	610	STD	9.53	95	473	267	105	44.5(47)

Product not stock standard, but can be supplied upon demand.

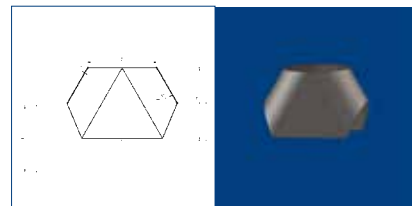
OT 768
Metric Tru-Bore
Saddles



d	D	T	H	Weight kg	Gross Weight kg	d	D	T	H	Weight kg	Gross Weight kg
40	44	2	40	0,3		350	356	3	350	10,0	
50	54	2	50	0,4			306	3	325	8,2	
	44	2	45	0,4			256	3	300	6,3	
	36	2	41	0,4			206	3	275	4,9	
80	84	2	80	0,5		400	406	3	400	12,4	
	54	2	65	0,4			356	3	375	10,6	
	44	2	60	0,4			306	3	350	8,7	
100	104	2	100	0,7			256	3	325	6,0	
	84	2	90	0,5		450	456	3			
	54	2	75	0,3			406	3			
125	129	2	125	0,9			356	3			
	104	2	112	0,5			306	3			
	84	2	102	0,3		500	508	4	500	23,9	
150	154	2	150	1,4			458	4			
	129	2	138	1,0			408	4	450	19,8	
	104	2	125	0,7			358	4	425	16,1	
	84	2	115	0,5		600	608	4	600	41,0	
200	206	3	200	3,4			508	4	550	31,2	
	156	3	175	2,3			408	4	500	23,0	
	131	3	162	1,8			358	4	475	17,0	
	106	3	150	1,4		700	708	4			
250	256	3	250	5,2			608	4			
	206	3	225	4,3			508	4			
	156	3	200	2,9			458	4			
	131	3	188	2,5		800	808	4			
300	306	3	300	8,9			708	4			
	256	3	275	6,2			608	4			
	206	3	250	4,7			508	4			

Stock standard: EN 1.4307 and 1.4432

OT769
ISO
Saddles



					Gross							Gross					
d	D	T	H	Weight kg	Weight kg	d	D	T	H	Weight kg	Weight kg	d	D	T	H	Weight kg	Weight kg
						350	355,6	3	350	10,0							
							323,9	3	325	8,2							
							273	3	300	6,3							
						400	406,4	3	400	12,4							
							355,6	3	375	10,6							
							323,9	3	350	8,7							
						450	457,2	3									
							406,4	3									
							355,6	3									
						500	508	4	500	23,9							
							457,2	4									
							406,4	4	450	19,8							
						600	610	4	600	41,0							
200	219,1	3	200	3,4			508	4	550	31,2							
	168,3	3	175	2,3			457,2	4	500	23,0							
	139,7	3	162	1,8													
						700	711	4									
250	273	3	250	5,2			610	4									
	219,1	3	225	4,3			508	4									
	168,3	3	200	2,9													
						800	813	4									
300	323,9	3	300	8,9			711	4									
	273	3	275	6,2			610	4									
	219,1	3	250	4,7													

Stock standard: EN 1.4307 and 1.4432

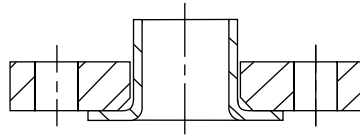


BUTT WELD FITTINGS



Flange joints

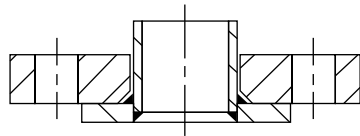
The most common joints are illustrated by the following drawings referring to EN 1092-1. Flange connections according to ASME B 16.9 look similar.



Type 02 and 37 according to EN 1092-1

Loose flange – pressed collar joint

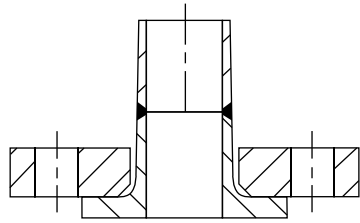
The inside diameter (ID) should be 3-7 mm larger than the outside diameter (OD) of the tube or neck, depending on size.



Type 02 and 32 according to EN 1092-1

Loose flange – weld-on collar plate joint

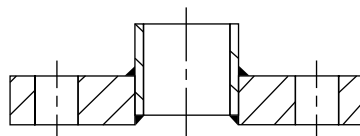
The inside diameter (ID) of the flange should be 3-7 mm larger than the outside diameter (OD) of the tube, depending on size.



Type 02 and 35 according to EN 1092-1

Loose flange – weld-neck collar joint

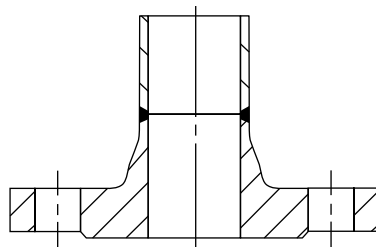
The inside diameter (ID) of the flange should be 3-7 mm larger than the outside diameter (OD) of the stub, depending on size. Stub ends are available in a variety of types. If stub type is specified when ordering, the appropriate ID of the flange can be more easily selected or turned down from standard sizes.



Type 01 according to EN 1092-1

Plate flange for welding – tube joint

The inside diameter (ID) of the flange should be 0.5-2.0 mm larger than the outside diameter (OD) or the tube, depending on size.




Type 11 according to EN 1092-1

Weld-neck flange – tube joint

The relationship between the diameter of the tube and the diameter of the flange is given in the dimension tables.

Miscellaneous





Technical information regarding OSTP products in Pressure Equipment Directive 2014/68/EU (PED) applications

Technical information regarding OSTP products in Pressure Equipment Directive 2014/68/EU (PED) applications

Tubes and fittings produced and supplied by OSTP according to EN 10217-7 and EN 10253-4 respectively are PED-compliant.

As all European OSTP manufacturing & production systems satisfy the requirements of the Pressure Equipment Directive 2014/68/EU (PED), tubes and fittings with joint coefficients of $z=0.7$ and 0.85 , produced and supplied according to EN 10296-2 and EN 10253-3 respectively, also fulfil the PED essential safety requirements, which qualifies them for use in PED category I-IV applications.

It is the responsibility of the equipment designers/manufacturers to ensure that the correct technical products are used for the required applications.

For any further technical queries or additional information, please contact our application engineers.

Tubes and pipes

(Process pipes – HEX – HWP):

- Product Standard (e.g. EN 10217-7, ASTM A 358/A 358M)
- Dimension (OD, WT, Length). For HEX tubes also length tolerances
- Dimensional Standard (ISO, ANSI, Metric Tru-Bore®)
- Steel grade (e.g. EN 1.4404 / TP 316L)
- Quantity (m). For HEX tubes number of tubes. Also quantity tolerances
- Delivery time, address (goods), address (documents), conditions
- Type of Inspection certificate (e.g. 3.1 acc. to EN 10204, 3.2 acc. to EN 10204)
- Type of packing, if different from OSTP mill standard
- Additional options:
 - NHT, HT (Not Heat Treated, Heat Treated)
 - NDT, DT (Non Destructive Testing, Destructive Testing)
 - Weld factor z, joint quality factor Ej
 - End preparation BE (Bevelled Ends)
 - Tolerances (e.g. D4/T3 acc. to EN ISO 1127)
 - Surface condition on raw material (e.g. 2B, 2E, 2D)
 - Sub classes (e.g. ASTM A 358/A 358M Class 3)
 - For HEX tubes details regarding internal weld bead requirements if applicable
 - If it is a Project – Project Name and Application / Segment
 - Etc.

Note! Some options can already be required in the Product Standard.

Butt weld fittings:

- Product type (e.g. elbow, tee, reducer)
- Product Standard (eg. EN 10253-3, EN 10253-4, ASTM A 403/A 403M)
- Dimension (OD, WT)
- Dimensional Standard (ISO, ANSI, Metric Tru-Bore®)
- Steel grade (EN 1.4404 / TP 316L)
- Quantity (pieces)
- Delivery time, address (goods), address (documents), conditions
- Type of Inspection certificate (3.1 acc. to EN 10204, 3.2 acc. to EN 10204 etc.)
- Type of packing if different from OSTP mill standard
- Additional options
 - NHT, HT (Not Heat Treated, Heat Treated)
 - NDT, DT (Non Destructive Testing, Destructive Testing)
 - Welding factor z, joint quality factor Ej
 - End preparation BE (Bevelled Ends)
 - Tolerances (e.g. D4/T3 acc. to EN ISO 1127)
 - Surface condition (e.g. 2B,2D)
 - Sub class (e.g. WP-WX)
 - If it is a Project – Project Name and Application / Segment
 - Etc.

Note! Some options can already be required in the Product Standard.

Circular hollow sections:

- Dimension (e.g. OD 139.7x3 mm)
- Standard length 6 m or fixed lengths
- Product Standard (e.g. EN 10296-2)
- Outside finishes: as welded, pickled, ground or polished
- Steel grade (e.g. EN 1.4404 / TP 316L)
- Quantity (m)
- Delivery time, address (goods), address (documents), conditions
- Type of packing, if different from OSTP mill standard
- Additional options:
 - NDT, DT (e.g. 100% ET)
 - Tolerances (e.g. D3/T3 acc. to EN ISO 1127)
 - If it is a Project – Project Name and Application / Segment
 - Etc.

Contact OSTP customer service for additional information!

Tubes and pipes

Product	Product standard	Dimension standard
Process pipes	EN 10217-7	EN ISO 1127
	EN 10296-2	SSG 1361
	AD 2000 W2	ASME B36.19
	ASTM A 312	ASME B36.10
	ASTM A 358	
	ASTM A 409	
	ASTM B 673	
	ASTM A 778	
	ASTM A 790	
	ASTM A 928	
Heat exchanger tubes	EN 10217-7	EN ISO 1127
	ASTM A 249	SSG 1361
	ASTM A 269	ANSI B36.19
	ASTM A 789	Imperial
	ASTM B 674	DIN 28180
	AD 2000 W2	
Circular hollow sections	Mill std.	Mill std.
	EN 10296-2	EN ISO 1127
	ASTM A 312	ASME B36.19
	ASTM A 790	ASME B36.10
Decorative	EN 10296-2	EN ISO 1127

Tolerances according to EN ISO 1127

Tolerance class	Tolerance on outside diameter		
D1	± 1.5%	with ± 0.75	mm min
D2	± 1%	with ± 0.5	mm min
D3	± 0.75%	with ± 0.3	mm min
D4	± 0.5%	with ± 0.1	mm min

The tolerances on outside diameter include ovality.

Tolerance class	Tolerance on thickness		
T1	± 15%	with ± 0.6	mm min
T2	± 12.5%	with ± 0.4	mm min
T3	± 10%	with ± 0.2	mm min
T4	± 7.5%	with ± 0.15	mm min
T5	± 5%	with ± 0.1	mm min

The tolerances on thickness include eccentricity.

Butt weld fittings

Product	Product standard	Dimension standard
Elbows	ASTM A 403	EN ISO 1127
	ASTM A 403 WP-S	ASME B16.9
	ASTM A 815	Mill std.
	Mill std.	ISO 5251
	EN 10253-3	SSG 1362
Reducers	EN 10253-4	
	ASTM A 403	EN ISO 1127
	ASTM A 403 WP-S	ASME B16.9
	EN 10253-3	ISO 5251
	EN 10253-4	SSG 1364
	Mill std.	(SFS 4162)
Tees	ASTM A 403	EN ISO 1127
	ASTM A 403 WP-S	ASME B16.9
	EN 10253-3	ISO 5251
	EN 10253-4	SSG 1363
	Mill std.	
Collars	EN 1092-1	EN ISO 1127
	Mill std.	(SFS 4167)
		(SFS 4168)
		(SFS 4169)
		(SFS 4170)
		SSG 1366
	EN 1092-1	
	Mill std.	
Weldring necks	EN 1092-1	EN ISO 1127
		EN 1092-1
Caps	EN 10253-3	EN ISO 1127
	EN 10253-4	ISO 5251
	ASTM A403 WP-S	ASME B16.9
		SSG 1369

Dimension standards (for information only)

ISO 4200 Nominal diameter DN	SSG 1361 Tab 3-4 OD mm	EN ISO 1127 Outer Diameter mm Serie			Old	ANSI B36,19M			Imperial OD		Hygienic OD mm	Hydraul OD mm
		1	2	3		NPS	mm	mm	Inch			
4	6		6					6.35	1/4		6	
6			8					9.35	3/8		8	
8	10	10.2					10.3					
	12	13.5	10 121			1/8 1/4	13.7	12.7	1/2		10 12	
10											15	
	16	17.2	16	14	14	3/8	17.1	15.88	5/8		16	
15											18	
	20	21.3	19 20	18	20	1/2	21.3	19.05	3/4	18/19	20	
20										22/23	22	
	25	26.9	25	22 25.4	25	3/4	26.7	25.4	1	25	25	
25										28/29	28	
	30	33.7	31.8 32	30	30	1	33.4	31.75	1 1/4	32	30	
32												
										34/35 38		
	38	42.4	38 40	35	38	1 1/4	42.2	38.1	1 1/2	40/41	38	
40	43/44	48.3		44.5	44.5	1 1/2	48.3	44.5	1 3/4		50	
50			51					50.8	2	51		
	53/54		57	54						52/53		
		60.3			57	2	60.3				60	
65			63.5									
			70							63.5		
								63.5	2 1/2	70		
								76.2	3	76.1	65	
80	83/84	88.9		82.5		3	88.9	88.9	3 1/2	85		
100	103/104		101.6		108		101.6	101.6	4	101.6		
		114.3				3 1/2 4	114.3	114.3	4 1/2	104		
125	128/129						127.0	127.0	5	129		
		139.7			133	5	139.7	139.7	5 1/2			
150	154				159			152.4		154		
		168.3				6	168.3		6			
200	204											
		219.1				8	219.1					
250	254											
					267							
		273				10	273.0					
300	305											
		323.9				12	323.9					
350	355	355.6				14	355.6					
					368							
400	406	406.4				16	404.6					
					419							
450		457				18	457					
500	506/508	508				20	508					
						22	559					
600	606/608	310				24	610					
						26	660					
700	706/708	711				28	711					
						30	762					
800	806/808	813				32	813					
						34	864					
900	906/908	914				36	914					
						38	965					
1000		1016				40	1016					
						42	1067					
1100						44	1118					
						46	1168					
1200						48	1219					
						52	1321					
1400						56	1422					
						60	1524					
1600						64	1626					
						68	1727					
1800						72	1829					
						76	1930					
2000						80	2032					

AISI	American Iron and Steel Institute	NP	Nominal Pressure
ANSI	American National Standard Institute	NPS	Nominal Pipe Size
API	American Petroleum Institute	NS	Norsk Standard
ASME	American Society for Mechanical Engineers	NDT	Non Destructive Testing
ASTM	American Society for Testing and Materials	OD	Outside Diameter
AV	Arbetsmiljöverket	PAW	Plasma Arc Welding
BCW	Bead Cold Worked	PE	Plain Ends
BE	Bevelled Ends	PED	Pressure Equipment Directive
BS	British Standard	PMA	Particular Material Appraisal
BWG	Birmingham Wire Gauge	PN	Pressure Number
CCT	Critical Crevice Temperature	QA	Quality Assurance
CPT	Critical Pitting Temperature	R/L	Random Lengths (6 m)
DIN	Deutsche Institut für Normen	RN-78	Rörledningsnormer -78
DN	Nominell Diameter, Nenn Weite	RSEW-HF	High frequency resistance seam welding (same as HF)
DNV	Det Norske Veritas	SAW	Submerged Arc Welding
DR/L	Double Random Lengths (12 m)	Sch	The "Schedule" designation tells you how thick the wall is for any size of pipe with the higher schedule numbers meaning a thicker wall.
DT	Destructive Testing	SEP	Stahl Eisen Prüfblatt
EAM	European Approval for Materials	SEW	Stahl Eisen Werkstoffblatt
EN	European Standard	SIS	Swedish Standard Institute
EFW	Electric Fusion Welding	SSG	Standard Solutions Group
ERW	Electric Resistance Welding (HF)	SW	Seam Welding
ET (= EC)	Eddy Current	SWG	British Standard Wire Gauge
GTAW	Gas Tungsten Arc Welding (same as TIG and WIG)	TIG	Tungsten Inert Gas
HF	High Frequency welding	TÜV	Technische Überwachungs-Verein
HT	Heat Treated	UNS	Unified Numbering System
IGC-test	Intergranular Corrosion test	UP	= SAW = Submerged Arc Welding
ID	Inside Diameter	Vd TÜVWb	Vereinigung der TÜV-Werkstoffblatt
ISO	International Standardization Organization	WIG	Wolfram Inert Gas (German TIG)
JIS	Japanese Standard	W.-Nr.	Werkstoffnummer
LBW	Laser Beam Welding	2014/68/EU (PED)	Directive 2014/68/EU of the European Parliament and the Council of 15 May 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment.
LNG	Liquefied Natural Gas		
LPG	Liquefied Petroleum Gas		
NB	Nominal Bore		
NF	Norme Francaise		
NHT	Not Heat Treated		

Standard grades

Outokumpu	EN	ASTM	Typical		Minimum		Others	SS	DIN	Stock standard Pipe/Fittings
			C	Cr	Ni	Mo				
4301	1.4301	(304)	0.04	17.0	8.5	-		2333	1.4301	
4307	1.4307	304L	0.02	18.0	8.0	-		(2352)	(1.4306)	ANSI/ISO/Metric
4541	1.4541	321	0.04	17.0	9.0	-	Ti	2337	1.4541	ISO
4306	1.4306	304L	0.02	18.0	10.0	-		2352	1.4306	
4401	1.4401	316	0.04	16.5	10.0	2.0		(2347)	(1.4401)	
4404	1.4404	316L	0.02	16.5	10.0	2.0		(2348)	(1.4404)	ANSI/ISO/Metric
4571	1.4571	316Ti	0.04	16.5	10.5	2.0	Ti	2350	1.4571	ISO/Metric
4436	1.4436	316	0.04	16.5	10.5	2.5		2343	(1.4436)	
4432	1.4432	316L	0.02	16.5	10.5	2.5		2343	(1.4435)	ISO/Metric
4435	1.4435	316L	0.02	17.0	12.5	2.5		2353	1.4435	
4438	1.4438	317L	0.02	18.0	13.0	3.0		2367	1.4438	

The compositions comply with EN, which do not always comply exactly with the old national standards.
Old SS and DIN-designations within brackets specifies a slightly higher Ni-content, that is insignificant for the corrosion resistance.

Wet corrosion resistant grades

Outokumpu	EN	ASTM	Typical		Mo	N	Other	SS	DIN	Stockpipe
			C	Cr						
Duplex										
LDX 2101®	1.4162	S32101	0.03	21.5	1.5	0.3	0.22	5,5 Mn	-	Duralite™
2304	1.4362	S32304	0.02	23.0	4.8	0.3	0.10		2327	1.4362
LDX 2404™	1.4662	S82441	0.02	24.0	3.6	1.6	0.27	3 Mn		
2205	1.4462	S32205	0.02	22.0	5.7	3.1	0.17		2377	1.4462
2507	1.4410	S32750	0.02	25.0	7.0	4.0	0.27		2328	-
Austenitic										
904L	1.4539	N08904	0.01	20.0	25.0	4.3	0.06		2562	1.4539
254 SMO®	1.4547	S31254	0.01	20.0	18.0	6.1	0.20		2378	-
654 SMO®	1.4652	S32654	0.01	24.0	22.0	7.3	0.50	3 Mn, Cu	-	ANSI

Heat and creep resistant grades

Outokumpu	EN	ASTM	Typical		Si	N	SS	DIN
			C	Cr				
4948	1.4948	304H	0.05	18.1	8.3	-	0.06	2333
4878	1.4878	321	0.05	17.3	9.1	-	0.01	2337
153 MA™	1.4818	S30415	0.05	18.5	9.5	1.3	0.15	2372
253 MA®	1.4835	S30815	0.09	21.0	11.0	1.6	0.17	2368
4828	1.4828	-	0.04	20.0	12.0	2.0	0.04	-
4833	1.4833	309S	0.06	22.3	12.6	-	0.08	-
4845	1.4845	310S	0.05	25.0	20.0	-	0.04	2361

These grades are available as heat exchanger tubes in minimum quantities.
For other types of tube and pipe the availability is more limited and each inquiry will be evaluated individually.

Ferritic grade

Outokumpu	EN	ASTM	Typical		Ti	N	DIN
			C	Cr			
4003	1.4003	S40977	0.02	11.0	-	-	1.4003

Designations			Strength at 20°C EN min values				Strength at high temperatures EN min values N/mm ²								Coefficient of linear expansion 20-100°C x10 ⁻⁶ /°C	Thermal conduct. 20°C W/m°C
			R _{p0.2} N/mm ²	R _{p1.0} N/mm ²	R _m N/mm ²	A5 %	R _{p0.2}				R _{p1.0}					
Outokumpu	EN	ASTM					50°C	100°C	200°C	400°C	50°C	100°C	200°C	400°C		
4301	1.4301	304	195	230	500	40	180	157	127	98	218	191	157	125	16	15
4541	1.4541	321	200	235	500	35	190	176	157	125	222	208	186	156	17	15
4307	1.4307	304L	180	215	470	40	165	147	118	89	200	181	147	116	17	15
4306	1.4306	304L	180	215	460	40	165	147	118	90	200	181	147	116	15	15
4401	1.4401	316	205	240	510	40	193	177	147	115	230	211	177	144	16	15
4404	1.4404	316L	190	225	490	40	182	166	137	108	217	199	167	135	16	15
4571	1.4571	316Ti	210	245	500	35	202	185	167	135	232	218	196	164	16	15
4436	1.4436	316	205	240	510	40	195	177	147	115	228	211	177	144	16	15
4432	1.4432	316L	190	225	490	40	182	166	137	108	217	199	167	135	16	15
4435	1.4435	316L	190	225	490	40	180	165	137	108	217	200	165	135	16	15
4438	1.4438	317L	220	250	490	35	200	172	147	115	232	206	177	144	16	14
LDX 2101®	1.4162	S32101	515	-	700	25	430	380	330	*320	-	-	-	-	13	15
LDX 2404™	1.4662	S82441	550	-	750	25	445	385	325	*312	-	-	-	-	13	14.5
2304	1.4362	S32304	385	-	600	20	347	330	290	*265	-	-	-	-	13	15
2205	1.4462	S32205	450	-	700	25	415	360	310	*295	-	-	-	-	13	15
2507	1.4410	S32750	550	-	800	20	502	450	400	*380	-	-	-	-	13	15
904L	1.4539	N08904	285	315	580	35	216	205	175	125	244	235	205	155	16	12
254 SMO®	1.4547	S31254	300	340	650	35	267	230	190	160	306	270	225	190	16.5	14
654 SMO®	1.4652	S32654	430	470	750	40	-	350	315	295	470	390	355	330	15	11

Austenitic creep resisting grades							R _{p1.0} 100,000h N/mm ²				E _m 100,000h N/mm ²				20-300°C	
							600°C	700°C	800°C	900°C	600°C	700°C	800°C	900°C		
EN 10095 table 6							EN 10095 table 3				EN 10095 table 4					
4878	1.4878	321	190	230	500	40	-	-	-	-	65	22	10	3	19	15
4845	1.4845	310S	210	250	500	33	-	-	-	-	80	18	7	3	18.5	15
153 MA™	1.4818	S30415	290	330	600	40	80	26	9	3	88	35	14	5	19	15
253 MA®	1.4835	S30815	310	350	650	40	80	26	11	6	88	35	15	8	19	15

Proof strength at elevated temperatures in the solution annealed condition.

NOTE! For steel grade EN 1.4162, LDX 2101®, EN 1.4462 (2205) the figures are expressed in R_m. The figures in the table refer to EN 10217-7, EN 10253-4, except steel grade 1.4162.

Steel Grade Design temp. °C	1.4436 R _{p1.0} N/mm ²	1.4301 R _{p1.0} N/mm ²	1.44307 R _{p1.0} N/mm ²	1.4432 R _{p1.0} N/mm ²	1.4404 R _{p1.0} N/mm ²	1.4541 R _{p1.0} N/mm ²	1.4571 R _{p1.0} N/mm ²	1.45439 R _{p1.0} N/mm ²	1.4162* R _m N/mm ²	1.4462 R _m N/mm ²
20	215	230	215	225	225	235	235	315	515	450
50	200	218	200	217	217	222	232	244	430	415
100	181	191	181	199	199	208	218	235	380	360
150	162	172	162	181	181	196	206	220	350	335
200	147	157	147	167	167	186	196	205	330	310
250	137	145	137	157	157	177	186	190	320	295
300	127	135	127	145	145	167	175	175	-	-
350	121	129	121	139	139	161	169	165	-	-
400	116	125	116	135	135	156	164	155	-	-
450	112	122	112	130	130	152	160	145	-	-
500	109	120	109	128	128	149	158	140	-	-
550	108	120	108	127	127	147	157	135	-	-

*) EN 1.4162 is not included in EN 10217-7 yet. For pressure purpose use EAM-0045-01:2012/01 Please contact our application engineers for more information

Conversion factors
 1Pa = 0.00001 bar
 1kPa = 0.01 bar
 1Mpa = 10 bar
 1ksi = 6.894757 MPa

Selection of a stainless steel grade

Stainless steels are used mainly due to their corrosion resistance, but also thanks to their excellent mechanical properties, formability, weldability and appearance. There are several aspects to consider at material selection before the choice finally can be decided. Earlier experience is an important factor in order to put together a group of candidate materials. The next step is to investigate the availability of the specified product forms, dimensions, standards, minimum quantities etc. when the order is placed, but also the availability for future construction or maintenance. Other factors are cost for material and construction, expected lifetime and approvals.

Corrosion resistance

Stainless steels are resistant thanks to the invisible passive layer consisting of chromium- and iron oxides that forms spontaneously in contact with oxidants. With increasing amounts of Cr the corrosion resistance increases.

Molybdenum (Mo) is an alloy that is added because it has a 3.3 times higher effect than Cr, in order to prevent pitting and crevice corrosion. Nitrogen (N) is also added in the modern developed stainless steels, and its effect on corrosion resistance is 16 times that of Cr. A number calculated from the Pitting Resistance Equivalent PRE indicates the pitting corrosion resistance of an alloy.

$$PRE = \%Cr + 3.3 \times \%Mo + 16 \times \%N$$

Typical composition	Cr	Mo	N	PRE
Cr-Ni	18.0	-		18
Cr-Ni-Mo	17.0	2.1		23
Cr-Ni-2.5Mo	17.0	2.6		25
LDX 2101®	21.5	0.3	0.22	26
2304	23.0	0.3	0.10	26
LDX 2404™	24.0	1.6	0.27	33
2205	22.0	3.1	0.17	35
904L	20.0	4.3	0.06	35
2507	25.0	4.0	0.27	43
254 SMO®	20.0	6.1	0.20	43

Factors influencing the corrosivity

The risk for corrosion attack on stainless steels in waters increases when following parameters increase. For decreasing pH-values below 7 the risk for corrosion increases.

- Temperature °C
- Chloride content ppm Cl⁻
- Oxygen content ppm O₂
- Chlorination ppm ClO₂
- pH-value

Recommended maximum chloride contents (ppm or mg/l)

at different temperatures and normal conditions.

pH = 6-8, O₂ = 4-8 ppm, chlorination <1 ppm.

Temp, °C	Cr-Ni	Cr-Ni-Mo	904 L 2205	254 SMO® 2507
20	400	1000	14500	35000
30	350	750	11500	28000
40	300	600	9500	22000
50	200	450	7500	18000

Stainless steel grades for different waters at ambient temperatures

Drinking water:	4307, 4404, LDX 2101®
Polluted water:	4432, LDX 2101®
Brackish water:	2205
Deaerated seawater:	2205
Fresh seawater, offshore:	254 SMO®, 2507
Desalination SWRO:	254 SMO®, 2507

Design of dimension and grade

Pipe systems have to be designed according to the valid safety and design regulation. In most European countries the Pressure Equipment Directive 2014/68/EU (PED) is mandatory, and in many other countries ASME B31.1 or B31.3 are used. The user is however free to select the dimension standard and grade. Using pipe systems with thinner walls and/or grades with higher strength makes significant weight and cost savings. Pipe systems designed with Metric Tru-Bore® and/or ISO are lighter compared to pipe systems designed with ANSI dimensions. By using thin walled pipe made from any of the high strength Duplex stainless steels, as substitute for the Austenitic standard grades, more cost saving is possible.

Pressure calculation tool is available at www.ostp.biz, select "Products", "Tools" and "Pressure Calculation".

Calculation of loss of pressure due to friction

Stainless steels are not sensitive for high water velocity. Water speeds exceeding 20 m/sec are not a problem. The stainless surface is corrosion resistant and durable, and will remain the same through the years. The friction coefficient can be set to 0.04 for standard pipe products, for fittings the friction coefficient can be set to 0.2–0.4 for a 90° elbow and for a tee to 0.5–3.0.

Our main certifications and approvals

OSTP is proud of its reputation as a reliable supplier and a manufacturer of high quality products. In addition to satisfied customers, the proof of this can be seen in our main quality certifications, listed below:

- Our EHSQ Management Systems are certified by TÜV NORD in accordance with the ISO 9001 (Quality), ISO 14001 (Environment) and OHSAS 18001 (Health & Safety) Standards.
- OSTP is approved according to 2014/68/EU (PED), demonstrating that our quality systems are suitable for the manufacturing of pressure equipment components and for manufacturing components.
- OSTP is certified according to AD2000-W0 by TÜV NORD Systems GmbH.



MISCELLANEOUS

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We provide world-class quality that increases our customers' competitiveness

OSTP is a joint-venture company between Tubinoxia and Outokumpu EMEA Oy. OSTP manufactures the broadest range of stainless steel tubular products:

PROCESS PIPES

- Jakobstad, Finland

BUTT WELDED FITTINGS

- Örnsköldsvik, Sweden
- Jakobstad, Finland

PROCESS EQUIPMENT

- ÖMV, Örnsköldsvik, Sweden

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