



MM0002 Piping Standard

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PIPING STANDARD MM0002
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GENERAL

1 GENERAL

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PIPING STANDARD 301-001 – GENERAL – PIPE CLASS CODING DEFINITION

1. GENERAL

Name of pipe classes consist of 5 marks. First 2 marks defines nominal pressure class of pipe class. Next 2 marks are definition of material and last mark is additional info.

2. PIPE CLASS CODING

For example Pipe class 10H1A:

10	H1	A
Nominal pressure class. Typically: 10, 16, 25, 40		
Material code. Typically: H1: Austenitic stainless CrNi-steel (1.4307) H2: Austenitic stainless CrNiMo-steel (1.4432) C1: Carbon steel (P235GH)		
Additional info. Typically: A: Pipes in the pipe class are welded B: Pipes in the pipe class are seamless C: Small pipes (DN15-DN300) are seamless and bigger pipes are welded D: Pipes with extra corrosion allowance		

More material codes are defined in the flow substance list, annex of document “MM0001 Technical Specification for Piping”.

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PIPING STANDARD 301-021 – GENERAL - MAXIMUM VACUUM FOR AUSTENITIC STAINLESS STEEL PIPES

Table 1. Vacuum strength for Material Grades 1.4307 and 1.4404 at T = 100 °C. p = maximum external pressure for pipe without stiffening rings. External pressure p = bar (1 bar = 0,1 MPa). “*” means that the pipe withstands full vacuum. The minimum wall thickness shall be according to the pipe classes.

DN	Do (mm)	Stiffening ring hs x enw	Wall thickness (mm)																	
			2		2.6		3.2		4		5		6.3		8		10		12.5	
			p	L	p	L	p	L	p	L	p	L	p	L	p	L	p	L	p	L
10	17.2		*		*		*		*		*		*		*		*		*	
15	21.3		*		*		*		*		*		*		*		*		*	
20	26.9		*		*		*		*		*		*		*		*		*	
25	33.7		*		*		*		*		*		*		*		*		*	
32	42.4		*		*		*		*		*		*		*		*		*	
40	48.3		*		*		*		*		*		*		*		*		*	
50	60.3		*		*		*		*		*		*		*		*		*	
65	76.1		*		*		*		*		*		*		*		*		*	
80	88.9		*		*		*		*		*		*		*		*		*	
100	114.3		*		*		*		*		*		*		*		*		*	
125	139.7		*		*		*		*		*		*		*		*		*	
150	168.3	15 x 6	*		*		*		*		*		*		*		*		*	
200	219.1	20 x 6	0.8	2000	*		*		*		*		*		*		*		*	
250	273.0	25 x 6	0.41	1700	0.91	2300	*		*		*		*		*		*		*	
300	323.9	30 x 6	0.25	1200	0.54	2200	*		*		*		*		*		*		*	
350	355.6	35 x 8	0.19	1100	0.41	2300	0.77	3100	*		*		*		*		*		*	
400	406.4	40 x 8	0.12	900	0.27	1600	0.51	2800	*		*		*		*		*		*	
450	457.0	40 x 8	0.09	700	0.19	1500	0.36	2800	0.71	3100	*		*		*		*		*	
500	508.0	50 x 8	0.06	600	0.14	1200	0.26	1900	0.51	3500	*		*		*		*		*	
600	610.0	60 x 6	0.04	500	0.08	900	0.15	1500	0.29	2600	0.58	3600	*		*		*		*	
700	711.0	60 x 6	0.02	400	0.05	700	0.09	1200	0.19	2300	0.36	3000	0.73	3000	*		*		*	
800	813.0	60 x 6	**		0.03	600	0.06	1000	0.12	1700	0.24	2600	0.49	2600	*		*		*	
900	914.0	60 x 6	**		0.02	500	0.04	800	0.09	1500	0.17	2200	0.34	2200	0.71	2300	*		*	
1000	1016.0	70 x 8	**		0.02	400	0.03	700	0.06	1200	0.12	2200	0.25	3000	0.51	3000	*		*	

NOTE: The stiffening ring material is 1.4307

L (mm) maximum distance for stiffening rings for the full vacuum strength of pipe

h_s stiffening ring height (mm)

e_{nw} stiffening ring thickness (mm)

* Nominal pipe size will resist full vacuum = 1 bar (0,1 MPa) external pressure.

** The structure is not reasonable.

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PIPING STANDARD 301-022 – GENERAL - MAXIMUM VACUUM FOR CARBON STEEL PIPES

Table 1. Vacuum strength for material grade 235GH at T = 100 °C. = maximum external pressure for pipe without stiffening rings External pressure p = bar (1 bar = 0,1 MPa). “**” means that the pipe withstands full vacuum. The minimum wall thickness shall be according to the pipe classes.

			Wall thickness (mm)																																											
DN	Do (mm)	SR hs x enw	2.0		2.3		2.6		2.9		3.2		3.6		4		4.5		5		5.6		6.3		7.1		8		8.8		10		11		12.5		14.2									
			p	L	p	L	p	L	p	L	p	L	p	L	p	L	p	L	p	L	p	L	p	L	p	L	p	L	p	L	p	L	p	L	p	L										
10	17.2		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*							
15	21.3		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*									
20	26.9		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*									
25	33.7		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*									
32	42.4		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*									
40	48.3		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*									
50	60.3		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*									
65	76.1		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*									
80	88.9		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*									
100	114.3	15 x 6	**		**		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*									
125	139.7		**		**		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*		*									
150	168.3		**		0.23	600	0.56	1200	*		*		*		*		*		*		*		*		*		*		*		*		*		*		*									
200	219.1	20 x 6	**		0.11	400	0.25	800	0.49	1500	0.85	2200	*		*		*		*		*		*		*		*		*		*		*		*		*									
250	273.0	25 x 6	**		**		0.09	400	0.17	800	0.29	1100	0.5	1900	0.81	2500	*		*		*		*		*		*		*		*		*		*		*									
300	323.9	30 x 6	**		**		0.06	300	0.1	600	0.17	900	0.3	1400	0.48	2200	0.8	2900	*		*		*		*		*		*		*		*		*		*									
350	355.6	35 x 8	**		**		0.07	500	0.14	700	0.23	1200	0.38	2200	0.6	2600	0.97	4600	*		*		*		*		*		*		*		*		*		*									
400	406.4	40 x 8	**		**		0.05	400	0.09	700	0.15	1000	0.25	1500	0.4	2600	0.65	3100	0.99	4800	*		*		*		*		*		*		*		*		*									
450	457.0	40 x 8	**		**		0.03	300	0.07	600	0.11	900	0.18	1400	0.28	1900	0.46	3000	0.69	3700	*		*		*		*		*		*		*		*		*									
500	508.0	50 x 8	**		**		0.03	300	0.05	500	0.08	700	0.13	1100	0.2	1700	0.33	2600	0.5	3500	0.84	4900	*		*		*		*		*		*		*		*									
600	610.0	60 x 6	**		**		**		0.03	400	0.04	500	0.08	900	0.12	1300	0.19	2000	0.29	2500	0.48	4100	0.75	4800	*		*		*		*		*		*		*									
700	711.0	60 x 6	**		**		**		0.02	300	0.03	400	0.05	700	0.07	1000	0.12	1500	0.18	2300	0.3	3200	0.47	4000	0.73	4000	*		*		*		*		*		*									
800	813.0	60 x 6	**		**		**		0.02	300	0.03	500	0.05	800	0.08	1200	0.12	1700	0.2	2800	0.31	3400	0.48	3400	0.74	3400	*		*		*		*		*		*									
900	914.0	60 x 6	**		**		**		**		0.02	500	0.03	700	0.06	1000	0.09	1400	0.14	2200	0.22	2900	0.34	3000	0.52	3000	0.72	3000	*		*		*		*		*									
1000	1016.0	70 x 8	**		**		**		**		0.02	400	0.03	600	0.04	900	0.06	1200	0.1	2000	0.16	2700	0.25	3800	0.38	4000	0.52	4000	0.81	4000	*		*		*		*									
1200	1220.0	90 x 8	**		**		**		**		**		**		0.02	700	0.04	1000	0.06	1400	0.09	2100	0.14	2900	0.22	4300	0.3	4000	0.47	4800	0.64	4800	0.98	4800	*		*									

NOTE: The stiffening ring material is P235GH

L (mm) maximum distance for stiffening rings for the full vacuum strength of pipe | h_s stiffening ring height (mm) | e_{nw} stiffening ring thickness (mm)

* Nominal pipe size will resist full vacuum = 1 bar (0,1 MPa) external pressure.

** The structure is not reasonable

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PIPING STANDARD 301-090 – GENERAL - SELECTION OF TEE CONNECTION TYPES**1. GENERAL**

Branch connection, reinforced-branch connection and factory-made tees are the main types of tee connections. The selection between these types is mainly based on the pressure strength, DN1:DN2 ratio, price and space.

2. AUSTENITIC STAINLESS STEEL, AUSTENITIC FERRITIC AND FERRITIC STEEL BRANCH CONNECTIONS

Branch connection tables, where connection type for every variation is defined, are presented in pipe class specifications. Branch connections are defined according to the design values of the pipe class. The branch connection tables apply only to 90° branches, other branches shall be dimensioned case by case.

In case of significant external forces, branch connections have to be studied case by case, by detail engineering supplier. External forces or moments may be caused by, for example, heavy accessories or thermal expansions.

If there is risk for cyclic or dynamic loads, reinforced branches shall be used instead of unreinforced branch connection. Cyclic or dynamic loads shall be taken into account also in the support design.

For instrumentation connection a reinforced branch connection shall be selected. See the instrumentation standards of this document

Reinforcement plates are not allowed at temperatures over 300 °C.

3. GRP PIPES

Tee-piece shall be specified for tee connections where the size of the branch pipe is equal or up to two DN sizes smaller than the main pipe. Otherwise reinforced branches shall be used.

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PIPING STANDARD 301-091 – GENERAL - TYPICAL BRANCH JOINTS

UB	UNREINFORCED BRANCH
RB + P	REINFORCED BRANCH WITH REINFORCEMENT PLATE
RB + W	REINFORCED BRANCH WITH INCREASED WALL THICKNESS OF THE NOZZLE PIPE
RB + WP	REINFORCED BRANCH WITH REINFORCEMENT PLATE AND INCREASED WALL THICKNESS OF THE NOZZLE PIPE

1. GENERAL

Branch is a T-shaped joint with perpendicular header and branch (nozzle) pipes. Reinforced Branch is a T-shaped joint with perpendicular header and branch (nozzle) pipes and may include increased header and/or branch wall thickness. The increased header pipe wall thickness is done with reinforcement plate, adapted over the header pipe and around the branch. The increased branch pipe wall thickness is done by using a thicker walled pipe at the branch joint.

Unreinforced and Reinforced Branch types and dimensions are shown in Branch Table of each Piping Standard and Piping Isometric drawings.

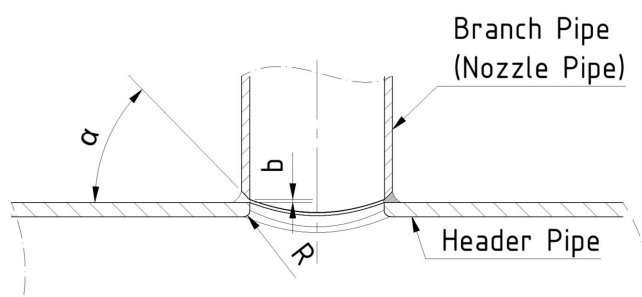
Reinforcement plate thicknesses shall correspond to the header pipe thicknesses.

2. MATERIAL

The material according to the pipe class of the pipe.

3. DESIGNATION OF UB

UB (no other definitions)



α = bevel of Branch Pipe ($\sim 35-60^\circ$)
 b = welding clearance ($\sim 2-4\text{mm}$)
 R = inside radius of the Header Pipe borehole ($> 3\text{mm}$)

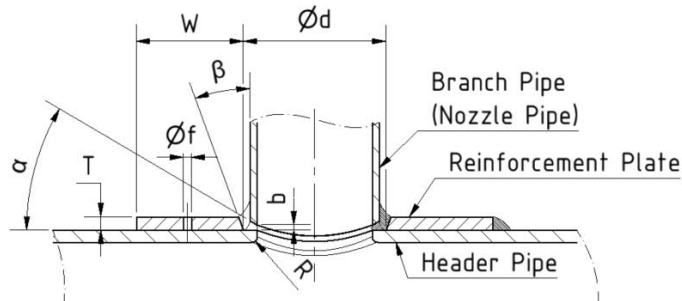
Picture 1. UB, Unreinforced Branch (set-on). Bevelling of branches.

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4. DESIGNATION OF RB + P

RB+P, width x thickness

Example: RB+P, 120 x 12.5



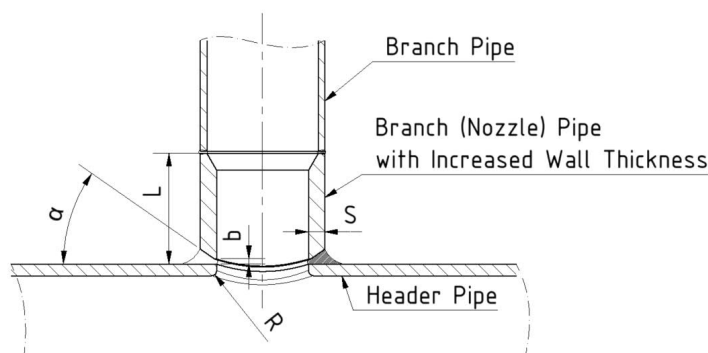
W = min. width of Reinforcement Plate (each side of Branch Pipe)
 T = thickness of Reinforcement Plate (T = Header Pipe thickness → can be cut from header pipe material)
 Ød = diameter of Reinforcement Plate hole for the branch (Ø Branch Pipe + 3-6mm)
 Øf = diameter of pressure relief hole (3-5mm), 1 hole / plate
 α / β = bevel of Branch Pipe / Reinforcement Plate (~35-60°)
 b = welding clearance (~2-4mm)
 R = inside radius of the Header Pipe borehole (> 3mm)

Picture 2. RB + P, Reinforced Branch (set-on) with reinforcement plate. Bevelling of branches.

5. DESIGNATION OF RB + W

RB+W, length x thickness

Example: RB+W, 100 x 6.3



L = min. length of Branch Pipe with increased wall thickness
 S = thickness of Branch Pipe with increased wall thickness
 α = bevel of Branch Pipe (~35-60°)
 b = welding clearance (~2-4mm)
 R = inside radius of the Header Pipe borehole (> 3mm)

Picture 3. RB + W, Reinforced Branch (set-on) with increased wall thickness of the nozzle pipe. Bevelling of branches.

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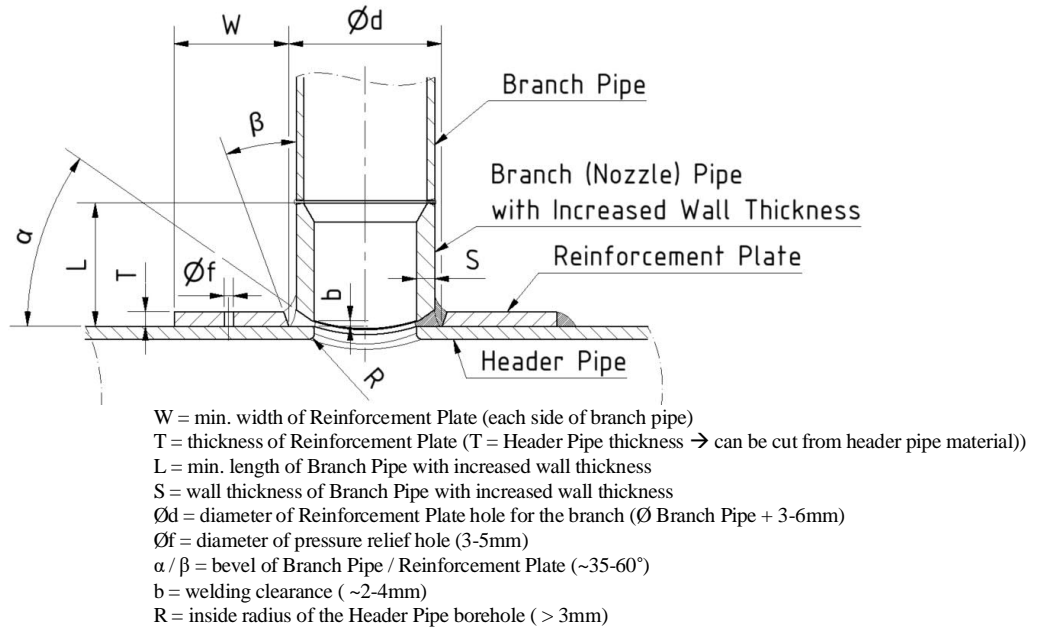
6. DESIGNATION OF RB + WP

RB+WP, RP width x thickness + W length x thickness

Reinforcement
Plate

Nozzle Pipe
Increased wall thickness

Example: RB+WP, RP 100 x 14.2 + W 100 x 16



Picture 4. RB + WP, Reinforced Branch (set-on) with reinforcement plate and increased wall thickness of the nozzle pipe. Bevelling of branches.

AUSTENITIC STAINLESS STEEL PIPING

2 AUSTENITIC STAINLESS STEEL PIPING

PIPING STANDARD 310-003

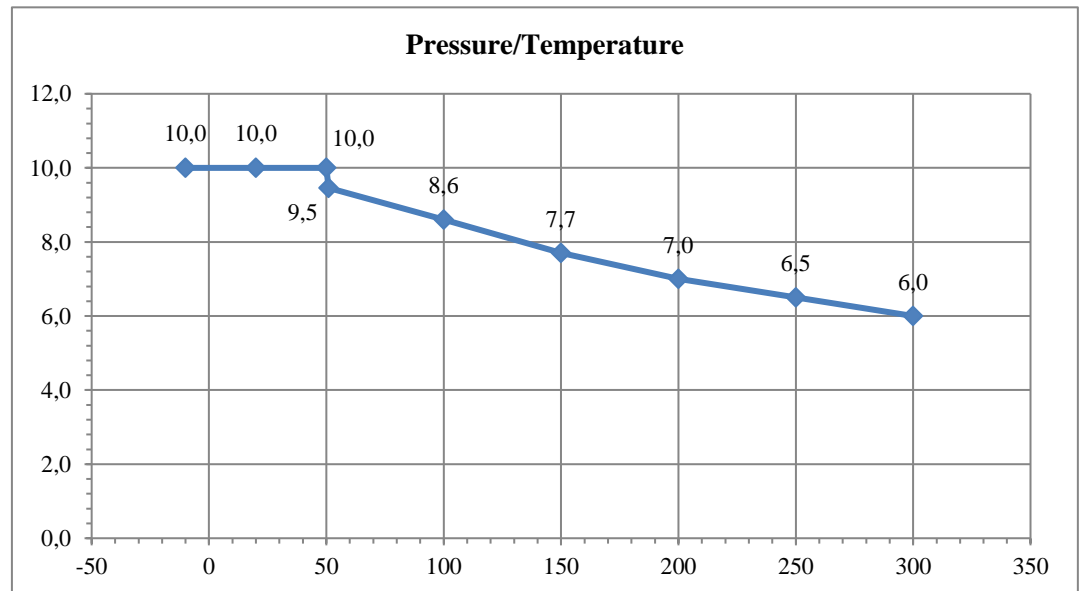
AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 10H1A

General:	Pipe Class:	Austenitic stainless steel pipe class 10H1A
	Design code:	EN 13480-3
	Pipe material:	EN 10217-7 material grade 1.4307. Also mechanical strength of the material 1.4306 has been verified.
	Corrosion allowance:	0 mm

Allowable overpressures:

T [°C]	p [bar]
-10	10,0
20	10,0
50	10,0
100	8,6
150	7,7
200	7,0
250	6,5
300	6,0



Linear interpolation of pressure between two adjacent temperature values shall be applied for temperature above 50°C. For temperature between 50-100 linear interpolation shall be made using pressure and temperature values of 20°C and 100°C.

External pressure rating:

Pipes in the pipe class are resistant for full vacuum up to DN 150 at temperature 100°C. Maximum external pressure for bigger pipes and stiffening ring requirements shall be checked from standard 301-021

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PIPING STANDARD 310-003

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 10H1A

Piping components	DN-range	Dimension standard	Dimension type / additional definition	Material		Material Certificate EN 10204	Remarks
				Designation	Standard		
Pipes	15-400	EN 10217-7:2014		1.4307	EN 10217-7:2014	3.1	4
	450-1000	EN 10217-7:2014		1.4307	EN 10217-7:2014	3.1	4
Elbows	15-400	EN 10253-4:2008	Type A, 3D	1.4307	EN 10253-4:2008	3.1	5
	450-1000	EN 10253-4:2008	Type A, 3D	1.4307	EN 10253-4:2008	3.1	
Tee pieces	15-40	EN 10253-4:2008	Type A, table A.2	1.4307	EN 10253-4:2008	3.1	
	50-1000	EN 10253-4:2008	Type A, table A.4	1.4307	EN 10253-4:2008	3.1	
Reducers	15-400	EN 10253-4:2008	Type A, table A.6	1.4307	EN 10253-4:2008	3.1	
	450-1200	EN 10253-4:2008	Type A, table A.6	1.4307	EN 10253-4:2008	3.1	
Caps	15-1000	EN 10253-4:2008	Type A	1.4307	EN 10253-4:2008	3.1	
Welding neck flanges	15-40	EN 1092-1:2018	Type 11, PN40	1.4307	EN 10222-5:2017	3.1	
	50	EN 1092-1:2018	Type 11, PN16	1.4307	EN 10222-5:2017	3.1	
Collar	65 - 150	EN 1092-1:2018	Type 35, PN16	1.4307		3.1	
	200 - 1000	EN 1092-1:2018	Type 35, PN10	1.4307		3.1	
Loose flange	65 - 150	EN 1092-1:2018	Type 02, PN16	P265GH HDG	EN 10028-2:2017	3.1	
	200 - 1000	EN 1092-1:2018	Type 02, PN10	P265GH HDG	EN 10028-2:2017	3.1	
Blind flanges	15-40	EN 1092-1:2018	Type 05, PN40	1.4307	EN 10028-7:2017	3.1	
	50-150	EN 1092-1:2018	Type 05, PN16	1.4307	EN 10028-7:2017	3.1	
	200-400	EN 1092-1:2018	Type 05, PN10	1.4307	EN 10028-7:2017	3.1	
	450-1000	EN 1092-1:2018	Type 05, PN10	P265GH + Lining	EN 10028-2:2017	3.1	
Lining plates		316-010		1.4307	EN 10028-7:2017	2.2	
Spades		317-010/011		P265GH + 1.4307		3.1	
Spectacle blind		317-012		1.4307	EN 10028-7:2017	3.1	

PIPING STANDARD 310-003

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 10H1A

Piping components	DN-range	Dimension standard	Dimension type / additional definition	Material		Material Certificate EN 10204	Remarks
				Designation	Standard		
Gaskets	15-80 100-200 250-1000	EN 1514-1: 1997 EN 1514-1: 1997 EN 1514-1: 1997	Type IBC, PN40 Type IBC, PN16 Type IBC, PN10				1, 2 1, 2 1, 2
Bolts		EN ISO 4014:2011		A2	EN ISO 3506-1	2.2	
Nuts		EN ISO 4032:2013		A2	EN ISO 3506-2	2.2	
Washers		EN ISO7089:2001	Grade A	1.4307	EN 10028-7		
Threaded fittings	DN15-50	EN 10241:2000		1.4307	EN 10272:2016	3.1	6

1. Gasket material according to the Flow Substance. If spiral gaskets are used, gasket dimension standard is EN1514-2

2. Gasket thickness 2mm. Spiral gasket thickness 4.5mm.

3

4. Pipe delivery condition Option 5: W1 (EN10217-7, table 2). Testing category TC1 (EN10217-7 table 13). Material certificate shall contain information of approvals of welding procedures, welders and NDT-personnel. In PED categories II and III these shall be approved by the notified body or competent third party.

5. Bend R=100 is alternative for Elbows in the size range DN15-DN25. Bends shall fill the requirements of EN13480.

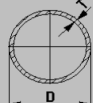
6. Pipe designer shall confirm correct type of the threads case by case when threaded components are used. Preferable thread types EN 10226-1.


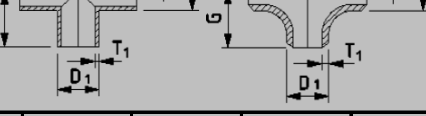
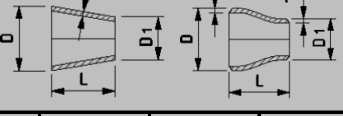
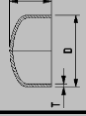
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PIPING STANDARD 310-003

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 10H1A

DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4	
															
	D x T	D x T	R	R	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s	
15	21,3 x 2,0	21,3 x 2,0	28,0	-	15	21,3	2,0	2,0	25					21,3 x 2,0	
20	26,9 x 2,0	26,9 x 2,0	29,0	-	20	26,9	2,0	2,0	29					26,9 x 2,0	
						21,3	2,0	2,0	29	15	21,3	2,0	17	26,9 x 2,0	
25	33,7 x 2,0	33,7 x 2,0	38,0	-	25	33,7	2,0	2,0	38					33,7 x 2,0	
						26,9	2,0	2,0	38	20	26,9	2,0	20	33,7 x 2,0	
						21,3	2,0	2,0	38	15	21,3	2,0	37	33,7 x 2,0	
32	42,4 x 2,0	42,4 x 2,0	48,0	-	32	42,4	2,0	2,0	48					42,4 x 2,0	
						33,7	2,0	2,0	48	25	33,7	2,0	26	42,4 x 2,0	
						26,9	2,0	2,0	48	20	26,9	2,0	46	42,4 x 2,0	
						21,3	2,0	2,0	48						
40	48,3 x 2,0	48,3 x 2,0	57,0	-	40	48,3	2,0	2,0	57					48,3 x 2,0	
						42,4	2,0	2,0	57	32	42,4	2,0	17	48,3 x 2,0	
						33,7	2,0	2,0	57	25	33,7	2,0	43	48,3 x 2,0	
						26,9	2,0	2,0	57	20	26,9	2,0	63	48,3 x 2,0	

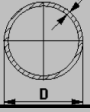
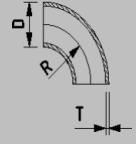
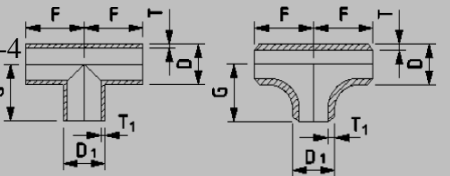
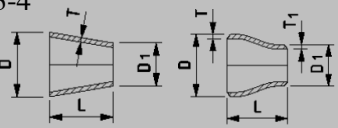
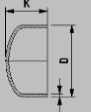
DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4
		D x T	R	R										
	D x T		3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
50	60,3 x 2,0	60,3 x 2,0	76,0	-	50	60,3	2,0	2,0	125	40	48,3	2,0	36	60,3 x 2,0
					40	48,3	2,0	2,0	125	32	42,4	2,0	53	
					32	42,4	2,0	2,0	125	25	33,7	2,0	79	
					25	33,7	2,0	2,0	125	20	26,9	2,0	99	
65	76,1 x 2,0	76,1 x 2,0	95,0	-	65	76,1	2,0	2,0	140	50	60,3	2,0	47	76,1 x 2,0
					50	60,3	2,0	2,0	140	40	48,3	2,0	82	
					40	48,3	2,0	2,0	140	32	42,4	2,0	100	
					32	42,4	2,0	2,0	140	25	33,7	2,0	126	
80	88,9 x 2,0	88,9 x 2,0	114,0	-	80	88,9	2,0	2,0	150	65	76,1	2,0	38	88,9 x 2,0
					65	76,1	2,0	2,0	150	50	60,3	2,0	85	
					50	60,3	2,0	2,0	150	40	48,3	2,0	120	
					40	48,3	2,0	2,0	150	32	42,4	2,0	138	

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PIPING STANDARD 310-003

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 10H1A

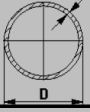
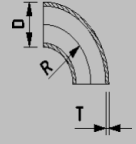
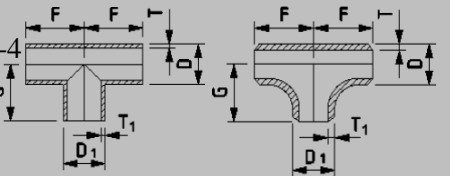
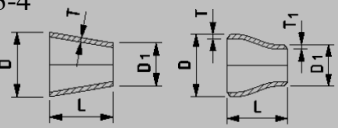
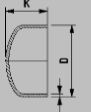
DN	PIPE 10217-7 	ELBOW 10253-4 	TEE 10253-4 							REDUCER 10253-4 				CAP 10253-4 
	D x T		R	R										D x s
		D x T	3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	
100	114,3 x 2,0	114,3 x 2,0	152,0	-	100	114,3	2,0	2,0	160	80	88,9	2,0	75	114,3 x 2,0
					80	88,9	2,0	2,0	160	65	76,1	2,0	113	
					65	76,1	2,0	2,0	160	50	60,3	2,0	160	
					50	60,3	2,0	2,0	160	40	48,3	2,0	195	
125	139,7 x 2,0	139,7 x 2,0	190,0	-	125	139,7	2,0	2,0	180	100	114,3	2,0	75	139,7 x 2,0
					100	114,3	2,0	2,0	180	80	88,9	2,0	151	
					80	88,9	2,0	2,0	180	65	76,1	2,0	188	
					65	76,1	2,0	2,0	180	50	60,3	2,0	235	
150	168,3 x 2,0	168,3 x 2,0	229,0	-	150	168,3	2,6	2,6	200	125	139,7	2,0	85	168,3 x 2,0
					125	139,7	2,6	2,0	200	100	114,3	2,0	160	
					100	114,3	2,6	2,0	200	80	88,9	2,0	235	
					80	88,9	2,6	2,0	200	65	76,1	2,0	273	


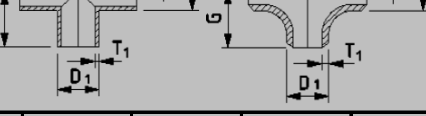
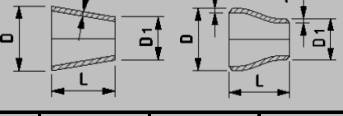
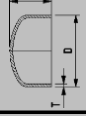
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PIPING STANDARD 310-003

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 10H1A

DN	PIPE 10217-7 	ELBOW 10253-4 	TEE 10253-4 							REDUCER 10253-4 				CAP 10253-4 
	D x T		R	R										D x s
		D x T	3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	
200	219,1 x 2,0	219,1 x 2,0	305,0	-	200	219,1	3,2	3,2	250	150	168,3	2,0	150	219,1 x 2,0
					150	168,3	3,2	2,6	250	125	139,7	2,0	235	
					125	139,7	3,2	2,0	250	100	114,3	2,0	310	
					100	114,3	3,2	2,0	250	80	88,9	2,0	385	
250	273,0 x 2,0	273,0 x 2,6	381,0	-	250	273	4,0	4,0	300	200	219,1	2,0	160	273,0 x 2,0
					200	219,1	4,0	3,2	300	150	168,3	2,0	310	
					150	168,3	4,0	2,0	300	125	139,7	2,0	395	
					125	139,7	4,0	2,0	300	100	114,3	2,0	470	
300	323,9 x 2,6	323,9 x 3,2	457,0	-	300	323,9	5,0	5,0	330	250	273	2,6	151	323,9 x 2,6
					250	273	5,0	4,0	330	200	219,1	2,6	310	
					200	219,1	5,0	2,6	330	150	168,3	2,6	461	
					150	168,3	5,0	2,6	330	125	139,7	2,6	545	

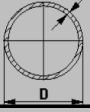
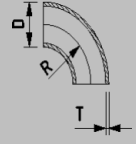
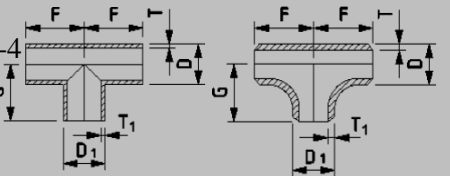
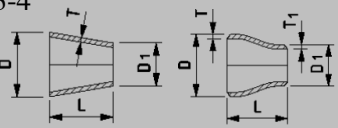
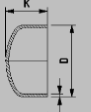
DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4
		D x T	R	R										
	D		3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
350	355,6 x 2,6	355,6 x 3,2	533	-	350	355,6	5,0	5,0	360	300	323,9	2,6	94	355,6 x 2,6
					250	273	5,0	4,0	360	250	273	2,6	244	
					200	219,1	5,0	3,2	360	200	219,1	2,6	404	
										150	168,3	2,6	554	
400	406,4 x 3,2	406,4 x 4,0	610	-	400	406,4	6,3	6,3	400	350	355,6	3,2	150	406,4 x 3,2
					350	355,6	6,3	5,0	400	300	323,9	3,2	244	
					300	323,9	6,3	4,0	400	250	273	3,2	395	
					250	273	6,3	3,2	400	200	219,1	3,2	554	
450	457 x 3,2	457,0 x 4,0	686	-	450	457	6,3	6,3	450	400	406,4	4,0	150	457 x 3,2
					400	406,4	6,3	6,3	450	350	355,6	4,0	301	
					350	355,6	6,3	5,0	450	300	323,9	4,0	395	
					300	323,9	6,3	5,0	450	250	273	4,0	545	

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PIPING STANDARD 310-003

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 10H1A

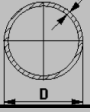
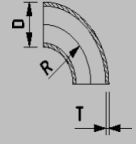
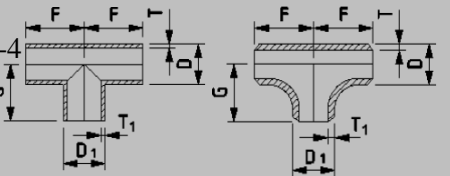
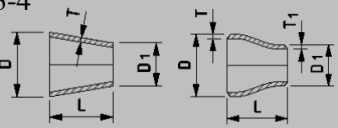
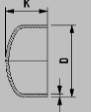
DN	PIPE 10217-7 	ELBOW 10253-4 	TEE 10253-4 							REDUCER 10253-4 				CAP 10253-4 
	D x T		R	R										D x s
			3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	
500	508 x 4,0	508 x 5,0	762	-	500	508	8,0	8,0	500	450	457	5,0	150	508 x 4,0
					450	457	8,0	6,3	500	400	406,4	5,0	301	
					400	406,4	8,0	5,0	500	350	355,6	5,0	451	
					350	355,6	8,0	4,0	500	300	323,9	5,0	545	
600	610 x 5,0	610 x 6,3	914	-	600	610	10,0	10,0	600	500	508	5,0	301	610 x 5,0
					500	508	10,0	6,3	600	450	457	5,0	451	
					450	457	10,0	6,3	600	400	406,4	5,0	601	
					400	406,4	10,0	5,0	600	350	355,6	5,0	752	
700	711 x 5,0	711 x 6,3	1067	-	700	711	10,0	10,0	700	600	610	6,3	301	711 x 5,0
					600	610	10,0	10,0	700	500	508	6,3	601	
					500	508	10,0	8,0	700	450	457	6,3	752	
					450	457	10,0	6,3	700	400	406,4	6,3	902	

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PIPING STANDARD 310-003

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 10H1A

DN	PIPE 10217-7 	ELBOW 10253-4 			TEE 10253-4 					REDUCER 10253-4 				CAP 10253-4 
	D x T		R	R										D x s
		D x T	3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	
800	813 x 6,3	813 x 8,0	1219	-	800	813	12,5	12,5	800	700	711	6,3	301	813 x 6,3
					700	711	12,5	10,0	800					
					600	610	12,5	8,0	800					
					500	508	12,5	6,3	800					
900	914 x 8,0	914 x 8,0	1372	-	900	914	12,5	12,5	900	800	813	8,0	301	914 x 8,0
					800	813	12,5	12,5	900					
					700	711	12,5	10,0	900					
					600	610	12,5	10,0	900					
1000	1016 x 8,0	1016 x 10,0	1524	-	1000	1016	14,2	14,2	1000	900	914	8,0	301	1016 x 8,0
					900	914	14,2	12,5	1000					
					800	813	14,2	12,5	1000					
					700	711	14,2	10,0	1000					
										600	610	8,0	1203	

PIPING STANDARD 310-003
AUSTENITIC STAINLESS STEEL PIPING
PIPE CLASS 10H1A

HEADER PIPE			BRANCH PIPE																										
			15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	DN			
			21,3	26,9	33,7	42,4	48,3	60,3	76,1	88,9	114,3	139,7	168,3	219,1	273,0	323,9	355,6	406,4	457	508	610	711	813	914	1016	D			
DN	D	t	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,6	2,6	3,2	3,2	4,0	5,0	5,0	6,3	8,0	8,0	t			
15	21,3	2,0	T																										
20	26,9	2,0	T	T																									
25	33,7	2,0	UB	T	T																								
32	42,4	2,0	UB	UB	T	T																							
40	48,3	2,0	UB	UB	UB	T	T																						
50	60,3	2,0	UB	UB	UB	UB	T	T																	T	T-piece			
65	76,1	2,0	UB	UB	UB	UB	UB	T	T															UB	Unreinforced branch (+note5)				
80	88,9	2,0	UB	UB	UB	UB	UB	UB	T	T													RB+W	Reinforced branch - Increased wall thickness of the nozzle pipe					
100	114,3	2,0	UB	UB	UB	UB	UB	UB	UB	T	T											RB+P	Reinforced branch - Reinforcement plate						
125	139,7	2,0	UB	UB	UB	UB	UB	UB	UB	UB	T	T									RB+WP	Reinforced branch - Reinforcement plate + Increased wall thickness of the nozzle pipe							
150	168,3	2,0	UB	UB	UB	UB	UB	UB	UB	UB	UB	T	T							SP	Special Tee - To be defined case by case when needed								
200	219,1	2,0	UB	UB	UB	UB	UB	UB	UB	UB	T	T	T	T															
250	273,0	2,0	UB	UB	UB	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	T	T	T	T														
300	323,9	2,6	UB	UB	UB	UB	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+P 30x2,6	T	T	T	T												
350	355,6	2,6	UB	UB	UB	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+P 30x2,6	RB+P 30x2,6	T	T	T	T												
400	406,4	3,2	UB	UB	UB	UB	UB	UB	UB	UB	RB+W 100x4	RB+P 40x3,2	RB+P 40x3,2	RB-WP RP40x3,2 + W100x4	T	T	T	T											
450	457	3,2	UB	UB	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+P 40x3,2	RB+P 40x3,2	RB-WP RP40x3,2 + W100x4	RB-WP RP40x3,2 + W100x4	T	T	T	T											
500	508	4,0	UB	UB	UB	UB	UB	UB	UB	UB	RB+W 100x4	RB+P 50x4	RB+P 50x4	RB+P 50x4	RB-WP RP50x4 + W100x4	RB-WP RP50x4 + W100x6,3	T	T	T	T									
600	610	5,0	UB	UB	UB	UB	UB	UB	UB	UB	RB+P 60x5	RB+P 60x5	RB+P 60x5	RB+P 60x5	RB+P 60x5	RB-WP RP60x5 + W100x6,3	RB-WP RP60x5 + W100x6,3	T	T	T	T								
700	711	5,0	UB	UB	UB	UB	UB	UB	UB	RB+W 100x4	RB+P 60x5	RB+P 60x5	RB+P 60x5	RB+P 60x5	RB-WP RP60x5 + W100x6,3	RB-WP RP60x5 + W100x6,3	RB+WP RP70x6,3 + W100x6,3	T	T	T	T								
800	813	6,3	UB	UB	UB	UB	UB	UB	UB	UB	RB+P 70x6,3	RB+P 70x6,3	RB+P 70x6,3	RB+P 70x6,3	RB+P 70x6,3	RB+P 70x6,3	RB-WP RP70x6,3 + W100x6,3	RB-WP RP70x6,3 + W100x6,3	T	T	T	T							
900	914	8,0	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	RB+P 90x8	RB+P 90x8	RB+P 90x8	RB+P 90x8	RB+P 90x8	RB+P 90x8	RB+P 90x8	RB+P 90x8	T	T	T	T				
1000	1016	8,0	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	RB+P 90x8	RB+P 90x8	RB+P 90x8	RB+P 90x8	RB+P 90x8	RB+P 90x8	RB+P 90x8	RB+P 90x8	RB-WP RP90x8 + W100x10	T	T	T	T	T			

T	T-piece
UB	Unreinforced branch (+note5)
RB+W	Reinforced branch - Increased wall thickness of the nozzle pipe
RB+P	Reinforced branch - Reinforcement plate
RB+WP	Reinforced branch - Reinforcement plate + Increased wall thickness of the nozzle pipe
SP	Special Tee - To be defined case by case when needed

Notes!

1. The branch table is to be used only for straight pipe branches. The angle of branch connection must be $90^{\circ} \pm 5^{\circ}$.
2. Thickness of the reinforcement plates are always the thickness of header pipe and width of plate is shown in the table.
3. Significant external forces or moments to branch connection are not taken into account. In those cases strenght of branch connection has to be studied case by case
4. If there is risk for cyclic or dynamic loads in the piping, reinforced branch shall be used instead of UB.

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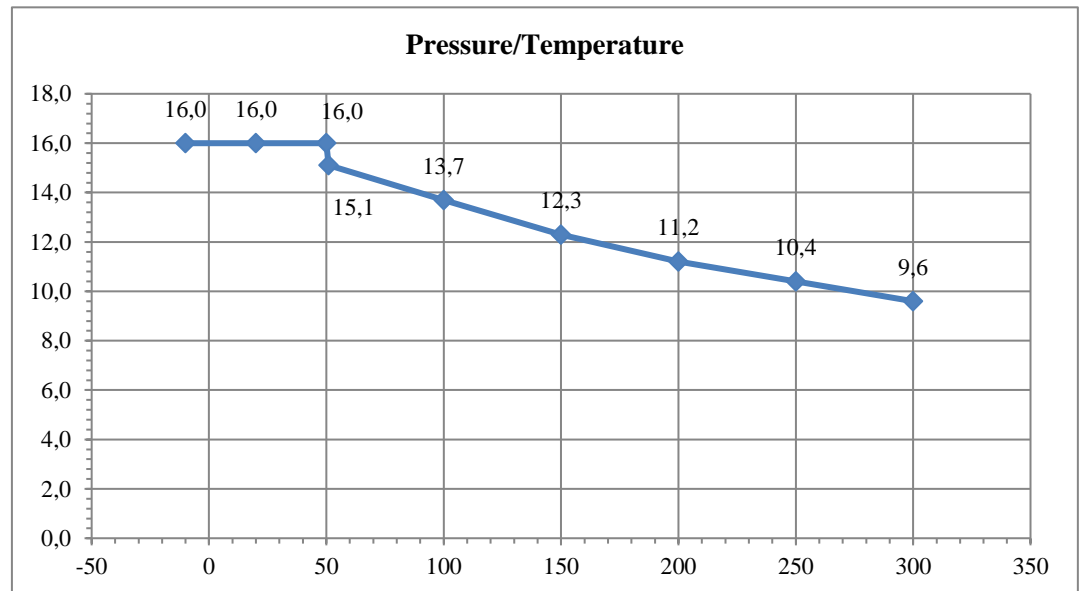
AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 16H1A

General:	Pipe Class:	Austenitic stainless steel pipe class 16H1A
	Design code:	EN 13480-3
	Pipe material:	EN 10217-7 material grade 1.4307. Also mechanical strength of the material 1.4306 has been verified.
	Corrosion allowance:	0 mm

Allowable overpressures:

T [°C]	p [bar]
-10	16,0
20	16,0
50	16,0
100	13,7
150	12,3
200	11,2
250	10,4
300	9,6



Linear interpolation of pressure between two adjacent temperature values shall be applied for temperature above 50°C. For temperature between 50-100 linear interpolation shall be made using pressure and temperature values of 20°C and 100°C.

External pressure rating:

Pipes in the pipe class are resistant for full vacuum up to DN 150 at temperature 100°C. Maximum external pressure for bigger pipes and stiffening ring requirements shall be checked from standard 301-021

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PIPING STANDARD 310-004

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 16H1A

Piping components	DN-range	Dimension standard	Dimension type / additional definition	Material		Material Certificate EN 10204	Remarks
				Designation	Standard		
Pipes	15-400	EN 10217-7:2014		1.4307	EN 10217-7:2014	3.1	4
	450-1000	EN 10217-7:2014		1.4307	EN 10217-7:2014	3.1	4
Elbows	15-400	EN 10253-4:2008	Type A, 3D	1.4307	EN 10253-4:2008	3.1	5
	450-1000	EN 10253-4:2008	Type A, 3D	1.4307	EN 10253-4:2008	3.1	
Tee pieces	15-40	EN 10253-4:2008	Type A, table A.2	1.4307	EN 10253-4:2008	3.1	
	50-1000	EN 10253-4:2008	Type A, table A.4	1.4307	EN 10253-4:2008	3.1	
Reducers	15-400	EN 10253-4:2008	Type A, table A.6	1.4307	EN 10253-4:2008	3.1	
	450-1000	EN 10253-4:2008	Type A, table A.6	1.4307	EN 10253-4:2008	3.1	
Caps	15-1000	EN 10253-4:2008	Type A	1.4307	EN 10253-4:2008	3.1	
Welding neck flanges	15-40	EN 1092-1:2018	Type 11, PN40	1.4307	EN 10222-5:2017	3.1	
	50	EN 1092-1:2018	Type 11, PN16	1.4307	EN 10222-5:2017	3.1	
Collar	65 - 1000	EN 1092-1:2018	Type 35, PN16	1.4307		3.1	
Loose flange	65 - 1000	EN 1092-1:2018	Type 02, PN16	P265GH HDG	EN 10028-2:2017	3.1	
Blind flanges	15-40	EN 1092-1:2018	Type 05, PN40	1.4307	EN 10028-7:2017	3.1	
	50-400	EN 1092-1:2018	Type 05, PN16	1.4307	EN 10028-7:2017	3.1	
	450-1000	EN 1092-1:2018	Type 05, PN16	P265GH + Lining	EN 10028-2:2017	3.1	
Lining plates		316-010		1.4307	EN 10028-7:2017	2.2	
Spades		317-010/011		P265GH + 1.4307		3.1	
Spectacle blind		317-012		1.4307	EN 10028-7:2017	3.1	
Gaskets	15-80 100-1000	EN 1514-1: 1997 EN 1514-1: 1997	Type IBC, PN40 Type IBC, PN16				1, 2 1, 2
Bolts		EN ISO 4014:2011		A2	EN ISO 3506-1	2.2	

PIPING STANDARD 310-004

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 16H1A

Piping components	DN-range	Dimension standard	Dimension type / additional definition	Material		Material Certificate EN 10204	Remarks
				Designation	Standard		
Nuts		EN ISO 4032:2013		A2	EN ISO 3506-2	2.2	
Washers		EN ISO7089:2001	Grade A	1.4307	EN 10028-7		
Threaded fittings	DN15-50	EN 10241:2000		1.4307	EN 10272:2016	3.1	6

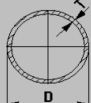
1. Gasket material according to the Flow Substance. If spiral gaskets are used, gasket dimension standard is EN1514-2
2. Gasket thickness 2mm. Spiral gasket thickness 4.5mm.
- 3
4. Pipe delivery condition Option 5: W1 (EN10217-7, table 2). Testing category TC1 (EN10217-7 table 13). Material certificate shall contain information of approvals of welding procedures, welders and NDT-personnel. In PED categories II and III these shall be approved by the notified body or competent third party.
5. Bend R=100 is alternative for Elbows in the size range DN15-DN25. Bends shall fill the requirements of EN13480.
6. Pipe designer shall confirm correct type of the threads case by case when threaded components are used. Preferable thread types EN 10226-1.


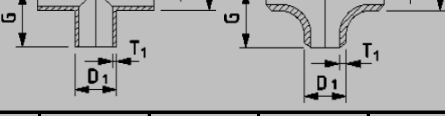
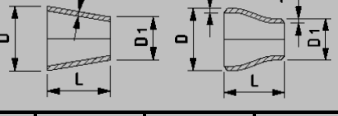
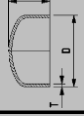
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PIPING STANDARD 310-004

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 16H1A


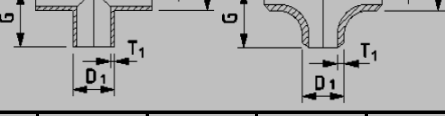
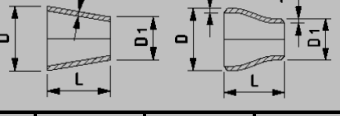
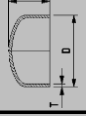
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	D x T	D x T	R	R	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
15	21,3 x 2,0	21,3 x 2,0	28,0	-	15	21,3	2,0	2,0	25					21,3 x 2,0
20	26,9 x 2,0	26,9 x 2,0	29,0	-	20	26,9 21,3	2,0 2,0	2,0 2,0	29 29	15	21,3	2,0	17	26,9 x 2,0
25	33,7 x 2,0	33,7 x 2,0	38,0	-	25	33,7 26,9 21,3	2,0 2,0 2,0	2,0 2,0 2,0	38 38 38	20 15	26,9 21,3	2,0 2,0	20 37	33,7 x 2,0
32	42,4 x 2,0	42,4 x 2,0	48,0	-	32	42,4 33,7 26,9 21,3	2,0 2,0 2,0 2,0	2,0 2,0 2,0 2,0	48 48 48 48	25 20	33,7 26,9	2,0 2,0	26 46	42,4 x 2,0
40	48,3 x 2,0	48,3 x 2,0	57,0	-	40	48,3 42,4 33,7 26,9	2,0 2,0 2,0 2,0	2,0 2,0 2,0 2,0	57 57 57 57	32 25 20	42,4 33,7 26,9	2,0 2,0 2,0	17 43 63	48,3 x 2,0

DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4
		D x T	R	R										
			3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
50	60,3 x 2,0	60,3 x 2,0	76,0	-	50	60,3	2,0	2,0	125					60,3 x 2,0
					40	48,3	2,0	2,0	125	40	48,3	2,0	36	
					32	42,4	2,0	2,0	125	32	42,4	2,0	53	
					25	33,7	2,0	2,0	125	25	33,7	2,0	79	
										20	26,9	2,0	99	
65	76,1 x 2,0	76,1 x 2,0	95,0	-	65	76,1	2,0	2,0	140					76,1 x 2,0
					50	60,3	2,0	2,0	140	50	60,3	2,0	47	
					40	48,3	2,0	2,0	140	40	48,3	2,0	82	
					32	42,4	2,0	2,0	140	32	42,4	2,0	100	
										25	33,7	2,0	126	
80	88,9 x 2,0	88,9 x 2,0	114,0	-	80	88,9	2,0	2,0	150					88,9 x 2,0
					65	76,1	2,0	2,0	150	65	76,1	2,0	38	
					50	60,3	2,0	2,0	150	50	60,3	2,0	85	
					40	48,3	2,0	2,0	150	40	48,3	2,0	120	
										32	42,4	2,0	138	

PIPING STANDARD 310-004

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 16H1A


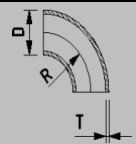
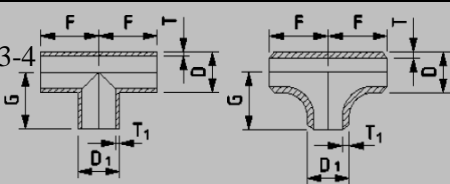
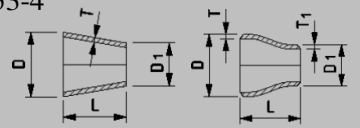
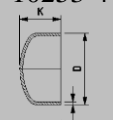
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		D x T	R	R										
			3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
100	114,3 x 2,0	114,3 x 2,0	152,0	-	100	114,3	2,6	2,6	160	80	88,9	2,0	75	114,3 x 2,0
					80	88,9	2,6	2,0	160	65	76,1	2,0	113	
					65	76,1	2,6	2,0	160	50	60,3	2,0	160	
					50	60,3	2,6	2,0	160	40	48,3	2,0	195	
125	139,7 x 2,0	139,7 x 2,0	190,0	-	125	139,7	3,2	3,2	180	100	114,3	2,0	75	139,7 x 2,0
					100	114,3	3,2	2,0	180	80	88,9	2,0	151	
					80	88,9	3,2	2,0	180	65	76,1	2,0	188	
					65	76,1	3,2	1,6	180	50	60,3	2,0	235	
150	168,3 x 2,0	168,3 x 2,6	229,0	-	150	168,3	4,0	4,0	200	125	139,7	2,0	85	168,3 x 2,0
					125	139,7	4,0	2,0	200	100	114,3	2,0	160	
					100	114,3	4,0	2,0	200	80	88,9	2,0	235	
					80	88,9	4,0	2,0	200	65	76,1	2,0	273	

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PIPING STANDARD 310-004

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 16H1A

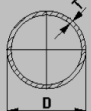
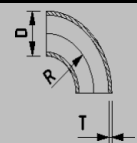
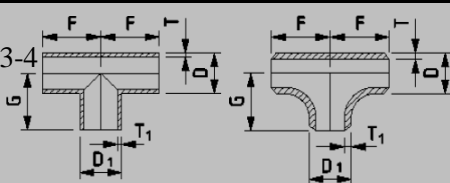
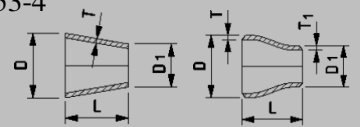
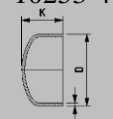
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	D x T		R	R										D x s
			3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	
200	219,1 x 2,0	219,1 x 3,2	305,0	-	200	219,1	5,0	5,0	250	150	168,3	2,6	150	219,1 x 2,0
					150	168,3	5,0	2,6	250	125	139,7	2,6	235	
					125	139,7	5,0	2,6	250	100	114,3	2,6	310	
					100	114,3	5,0	2,6	250	80	88,9	2,6	385	
250	273,0 x 2,6	273,0 x 4,0	381,0	-	250	273	6,3	6,3	300	200	219,1	3,2	160	273,0 x 2,6
					200	219,1	6,3	3,2	300	150	168,3	3,2	310	
					150	168,3	6,3	3,2	300	125	139,7	3,2	395	
					125	139,7	6,3	3,2	300	100	114,3	3,2	470	
300	323,9 x 3,2	323,9 x 4,0	457,0	-	300	323,9	6,3	6,3	330	250	273	3,2	151	323,9 x 3,2
					250	273	6,3	6,3	330	200	219,1	3,2	310	
					200	219,1	6,3	5,0	330	150	168,3	3,2	461	
					150	168,3	6,3	3,2	330	125	139,7	3,2	545	

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PIPING STANDARD 310-004

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 16H1A


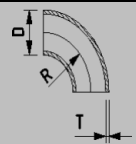
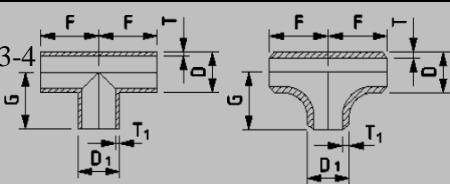
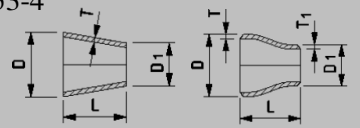
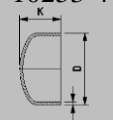
DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4	
															
	D x T	D x T	R	R	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s	
350	355,6 x 3,2	355,6 x 4,0	533,0	-	350	355,6	8,0	8,0	360		300	323,9	4,0	94	355,6 x 3,2
					300	323,9	8,0	6,3	360		250	273	4,0	244	
					250	273	8,0	5,0	360		200	219,1	4,0	404	
					200	219,1	8,0	4,0	360		150	168,3	4,0	554	
400	406,4 x 4,0	406,4 x 5,0	610,0	-	400	406,4	8,0	8,0	400		350	355,6	4,0	150	406,4 x 4,0
					350	355,6	8,0	8,0	400		300	323,9	4,0	244	
					300	323,9	8,0	6,3	400		250	273	4,0	395	
					250	273	8,0	5,0	400		200	219,1	4,0	554	
450	457,0 x 5,0	457,0 x 6,3	686,0	-	450	457	10,0	10,0	450		400	406,4	6,3	150	457,0 x 5,0
					400	406,4	10,0	8,0	450		350	355,6	6,3	301	
					350	355,6	10,0	8,0	450		300	323,9	6,3	395	
					300	323,9	10,0	6,3	450		250	273	6,3	545	

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PIPING STANDARD 310-004

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 16H1A

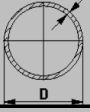
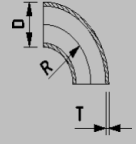
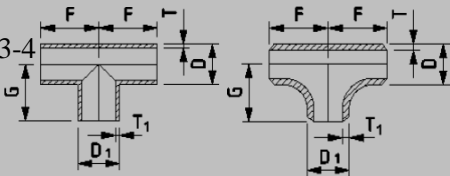
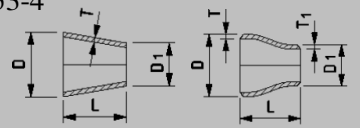
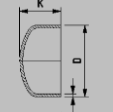
DN	PIPE 10217-7 	ELBOW 10253-4 	TEE 10253-4 							REDUCER 10253-4 				CAP 10253-4 
	D x T		R	R										D x s
			3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	
500	508 x 6,3	508 x 8,0	762	-	500	508	10,0	10,0	500	450	457	6,3	150	508 x 6,3
					450	457	10,0	10,0	500	400	406,4	6,3	301	
					400	406,4	10,0	8,0	500	350	355,6	6,3	451	
					350	355,6	10,0	8,0	500	300	323,9	6,3	545	
600	610 x 8,0	610 x 10,0	914	-	600	610	12,5	12,5	600	500	508	8,0	301	610 x 8,0
					500	508	12,5	10,0	600	450	457	8,0	451	
					450	457	12,5	8,0	600	400	406,4	8,0	601	
					400	406,4	12,5	8,0	600	350	355,6	8,0	752	
700	711 x 8,0	711 x 10,0	1067	-	700	711	14,2	14,2	700	600	610	10,0	301	711 x 8,0
					600	610	14,2	12,5	700	500	508	10,0	601	
					500	508	14,2	10,0	700	450	457	10,0	752	
					450	457	14,2	8,0	700	400	406,4	10,0	902	

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PIPING STANDARD 310-004

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 16H1A

DN	PIPE 10217-7 	ELBOW 10253-4 	TEE 10253-4 							REDUCER 10253-4 				CAP 10253-4 
	D x T		R	R										D x s
		D x T	3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	
800	813 x 10,0	813 x 12,5	1219	-	800	813	16,0	16,0	800	700	711	10,0	301	813 x 10,0
					700	711	16,0	14,2	800	600	610	10,0	601	
					600	610	16,0	12,5	800	500	508	10,0	902	
					500	508	16,0	10,0	800	450	457	10,0	1053	
900	914 x 10,0	914 x 12,5	1372	-	900	914	16,0	16,0	900	800	813	12,5	301	914 x 10,0
					800	813	16,0	16,0	900	700	711	12,5	601	
					700	711	16,0	14,2	900	600	610	12,5	902	
					600	610	16,0	12,5	900	500	508	12,5	1203	
1000	1016 x 12,5	1016 x 12,5	1524	-	1000	1016	20,0	20,0	1000	900	914	12,5	301	1016 x 12,5
					900	914	20,0	16,0	1000	800	813	12,5	601	
					800	813	20,0	16,0	1000	700	711	12,5	902	
					700	711	20,0	14,2	1000	600	610	12,5	1203	

PIPING STANDARD 310-004
AUSTENITIC STAINLESS STEEL PIPING
PIPE CLASS 16H1A

HEADER PIPE			BRANCH PIPE																							
			15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	DN
			21,3	26,9	33,7	42,4	48,3	60,3	76,1	88,9	114,3	139,7	168,3	219,1	273,0	323,9	355,6	406,4	457	508	610	711	813	914	1016	D
DN	D	t	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,6	3,2	3,2	4,0	5,0	6,3	8,0	8,0	10,0	10,0	12,5	t
15	21,3	2,0	T																							
20	26,9	2,0	T	T																						
25	33,7	2,0	UB	T	T																					
32	42,4	2,0	UB	UB	T	T																				
40	48,3	2,0	UB	UB	UB	T	T																			
50	60,3	2,0	UB	UB	UB	UB	T	T																		
65	76,1	2,0	UB	UB	UB	UB	UB	T	T																	
80	88,9	2,0	UB	UB	UB	UB	UB	UB	T	T																
100	114,3	2,0	UB	UB	UB	UB	UB	UB	UB	T	T															
125	139,7	2,0	UB	UB	UB	UB	UB	UB	UB	T	T	T														
150	168,3	2,0	UB	UB	UB	UB	UB	UB	RB-W 100x4	T	T	T	T													
200	219,1	2,0	UB	UB	UB	RB-W 100x4	RB-W 100x4	RB-W 100x4	RB-W 100x4	RB-W 100x4	T	T	T	T												
250	273,0	2,6	UB	UB	UB	UB	RB-W 100x4	RB-W 100x4	RB-W 100x4	RB-W 100x4	RB-W 100x4	RB-P 30x2,6	T	T	T	T										
300	323,9	3,2	UB	UB	UB	UB	UB	RB-W 100x4	RB-P 40x3,2	RB-P 40x3,2	RB-WP RP40x3,2 + W100x4	RB-WP RP40x3,2 + W100x4	T	T	T	T										
350	355,6	3,2	UB	UB	UB	RB-W 100x4	RB-W 100x4	RB-W 100x4	RB-W 100x4	RB-P 40x3,2	RB-WP RP40x3,2 + W100x4	RB-WP RP40x3,2 + W100x4	T	T	T	T	T									
400	406,4	4,0	UB	UB	UB	UB	UB	RB-P 40x4	RB-P 40x4	RB-P 40x4	RB-WP RP40x4 + W100x4	RB-WP RP40x4 + W100x4	RB-WP RP40x4 + W100x6,3	RB-WP RP40x4 + W100x6,3	T	T	T	T								
450	457	5,0	UB	UB	UB	UB	UB	UB	RB-P 50x5	RB-P 50x5	RB-P 50x5	RB-P 50x5	RB-WP RP50x5 + W100x4	RB-WP RP50x5 + W100x6,3	RB-WP RP50x5 + W100x8	T	T	T	T							
500	508	6,3	UB	UB	UB	UB	UB	UB	UB	RB-P 60x6,3	RB-P 60x6,3	RB-P 60x6,3	RB-WP RP60x6,3 + W100x4	RB-WP RP60x6,3 + W100x8	RB-WP RP60x6,3 + W100x8	T	T	T	T	T						
600	610	8,0	UB	UB	UB	UB	UB	UB	UB	UB	UB	RB-P 70x8	RB-P 70x8	RB-WP RP70x8 + W100x4	RB-WP RP70x8 + W100x8	RB-WP RP70x8 + W100x8	T	T	T	T	T					
700	711	8,0	UB	UB	UB	UB	UB	UB	UB	RB-W 100x4	RB-P 80x8	RB-P 80x8	RB-P 80x8	RB-P 80x8	RB-WP RP80x8 + W100x6,3	RB-WP RP80x8 + W100x8	RB-WP RP80x8 + W100x8	T	T	T	T	T				
800	813	10,0	UB	UB	UB	UB	UB	UB	UB	UB	UB	RB-P 90x10	RB-P 90x10	RB-P 90x10	RB-WP RP90x10 + W100x6,3	RB-WP RP90x10 + W100x8	RB-WP RP90x10 + W100x8	T	T	T	T	T				
900	914	10,0	UB	UB	UB	UB	UB	UB	UB	UB	UB	RB-P 100x10	RB-P 100x10	RB-P 100x10	RB-P 100x10	RB-P 100x10	RB-P 100x10	RB-WP RP100x10 + W100x10	RB-WP RP100x10 + W100x12,5	RB-WP RP100x10 + W100x12,5	T	T	T	T		
1000	1016	12,5	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	RB-P 110x12,5	RB-P 110x12,5	RB-P 110x12,5	RB-P 110x12,5	RB-WP RP110x12,5 + W100x8	RB-WP RP110x12,5 + W100x10	RB-WP RP110x12,5 + W100x12,5	RB-WP RP110x12,5 + W100x12,5	RB-WP RP110x12,5 + W100x16	T	T	T	T

T	T-piece
UB	Unreinforced branch
RB+W	Reinforced branch - Increased wall thickness of the nozzle pipe
RB+P	Reinforced branch - Reinforcement plate
RB+WP	Reinforced branch - Reinforcement plate + Increased wall thickness of the nozzle pipe
SP	Special Tee - To be defined case by case when needed

Notes!

- The branch table is to be used only for straight pipe branches. The angle of branch connection must be $90^{\circ} \pm 5^{\circ}$.
- Thickness of the reinforcement plates are always the thickness of header pipe and width of plate is shown in the table.
- Significant external forces or moments to branch connection are not taken into account. In those cases strenght of branch connection has to be studied case by case
- If there is risk for cyclic or dynamic loads in the piping, reinforced branch shall be used instead of UB.

Pipes in the pipe class are resistant for full vacuum up to DN 800 at temperature 100°C. Maximum external pressure for bigger pipes and stiffening ring requirements shall be checked from standard 301-021

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PIPING STANDARD 310-005

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 25H1A

Piping components	DN-range	Dimension standard	Dimension type / additional definition	Material		Material Certificate EN 10204	Remarks
				Designation	Standard		
Pipes	15-400	EN 10217-7:2014		1.4307	EN 10217-7:2014	3.1	4
	450-800	EN 10217-7:2014		1.4307	EN 10217-7:2014	3.1	4
Elbows	15-400	EN 10253-4:2008	Type A, 3D	1.4307	EN 10253-4:2008	3.1	5
	450-800	EN 10253-4:2008	Type A, 3D	1.4307	EN 10253-4:2008	3.1	
Tee pieces	15-40	EN 10253-4:2008	Type A, table A.2	1.4307	EN 10253-4:2008	3.1	
	50-800	EN 10253-4:2008	Type A, table A.4	1.4307	EN 10253-4:2008	3.1	
Reducers	15-400	EN 10253-4:2008	Type A, table A.6	1.4307	EN 10253-4:2008	3.1	
	450-800	EN 10253-4:2008	Type A, table A.6	1.4307	EN 10253-4:2008	3.1	
Caps	15-800	EN 10253-4:2008	Type A	1.4307	EN 10253-4:2008	3.1	
Welding neck flanges	15-50	EN 1092-1:2018	Type 11, PN40	1.4307	EN 10222-5:2017	3.1	
Collar	65 - 125	EN 1092-1:2018	Type 35, PN40	1.4307		3.1	
	150 - 800	EN 1092-1:2018	Type 35, PN25	1.4307		3.1	
Loose flange	65 - 125 150 - 800	EN 1092-1:2018 EN 1092-1:2018	Type 02, PN40 Type 02, PN25	P265GH HDG P265GH HDG	EN 10028-2:2017 EN 10028-2:2017	3.1	
Blind flanges	15-150	EN 1092-1:2018	Type 05, PN40	1.4307	EN 10028-7:2017	3.1	
	200-400	EN 1092-1:2018	Type 05, PN25	1.4307	EN 10028-7:2017	3.1	
	450-800	EN 1092-1:2018	Type 05, PN25	P265GH + Lining	EN 10028-2:2017		
Lining plates		316-010		1.4307	EN 10028-7:2017	2.2	
Spades		317-010/011		P265GH + 1.4307		3.1	
Spectacle blind		317-012		1.4307	EN 10028-7:2017	3.1	
Gaskets	15-150 200-800	EN 1514-1: 1997 EN 1514-1: 1997	Type IBC, PN40 Type IBC, PN25				1, 2 1, 2
Bolts		EN ISO 4014:2011		A2	EN ISO 3506-2	2.2	

PIPING STANDARD 310-005

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 25H1A

Piping components	DN-range	Dimension standard	Dimension type / additional definition	Material		Material Certificate EN 10204	Remarks
				Designation	Standard		
Nuts		EN ISO 4032:2013		A2	EN ISO 3506-2	2.2	
Washers		EN ISO7089:2001	Grade A	1.4307	EN 10028-7		
Threaded fittings	DN15-50	EN 10241:2000		1.4307	EN 10272:2016	3.1	6

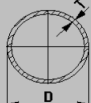
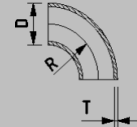
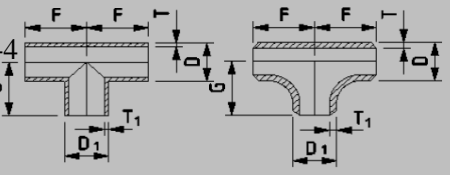
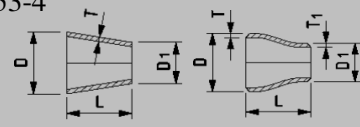
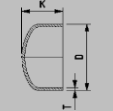
1. Gasket material according to the Flow Substance. If spiral gaskets are used, gasket dimension standard is EN1514-2
2. Gasket thickness 2mm. Spiral gasket thickness 4.5mm.
- 3
4. Pipe delivery condition Option 5: W1 (EN10217-7, table 2). Testing category TC1 (EN10217-7 table 13). Material certificate shall contain information of approvals of welding procedures, welders and NDT-personnel. In PED categories II and III these shall be approved by the notified body or competent third party.
5. Bend R=100 is alternative for Elbows in the size range DN15-DN25. Bends shall fill the requirements of EN13480.
6. Pipe designer shall confirm correct type of the threads case by case when threaded components are used. Preferable thread types EN 10226-1.


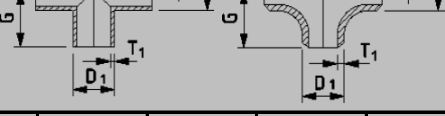
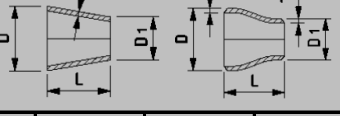
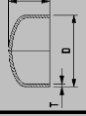
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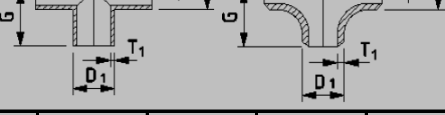
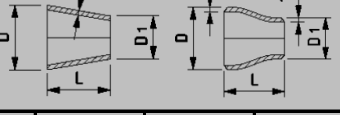
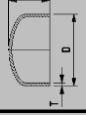
PIPING STANDARD 310-005

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 25H1A

DN	PIPE 10217-7 	ELBOW 10253-4 			TEE 10253-4 						REDUCER 10253-4 				CAP 10253-4 
	D x T	D x T	R	R	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s	
			3D	5D											
15	21,3 x 2,0	21,3 x 2,0	28,0	-	15	21,3	2,0	2,0	25					21,3 x 2,0	
20	26,9 x 2,0	26,9 x 2,0	29,0	-	20	26,9 21,3	2,0 2,0	2,0 2,0	29 29		15	21,3	2,0	17	26,9 x 2,0
25	33,7 x 2,0	33,7 x 2,0	38,0	-	25	33,7 26,9 21,3	2,0 2,0 2,0	2,0 2,0 2,0	38 38 38		20 15	26,9 21,3	2,0 2,0	20 37	33,7 x 2,0
32	42,4 x 2,0	42,4 x 2,0	48,0	-	32	42,4 33,7 26,9 21,3	2,0 2,0 2,0 2,0	2,0 2,0 2,0 2,0	48 48 48 48		25 20	33,7 26,9	2,0 2,0	26 46	42,4 x 2,0
40	48,3 x 2,0	48,3 x 2,0	57,0	-	40	48,3 42,4 33,7 26,9	2,0 2,0 2,0 2,0	2,0 2,0 2,0 2,0	57 57 57 57		32 25 20	42,4 33,7 26,9	2,0 2,0 2,0	17 43 63	48,3 x 2,0

DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4
		D x T	R	R										
			3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
50	60,3 x 2,0	60,3 x 2,0	76,0	-	50	60,3	2,0	2,0	125	40	48,3	2,0	36	60,3 x 2,0
					40	48,3	2,0	2,0	125	32	42,4	2,0	53	
					32	42,4	2,0	2,0	125	25	33,7	2,0	79	
					25	33,7	2,0	2,0	125	20	26,9	2,0	99	
65	76,1 x 2,0	76,1 x 2,0	95,0	-	65	76,1	2,6	2,6	140	50	60,3	2,0	47	76,1 x 2,0
					50	60,3	2,6	2,0	140	40	48,3	2,0	82	
					40	48,3	2,6	2,0	140	32	42,4	2,0	100	
					32	42,4	2,6	2,0	140	25	33,7	2,0	126	
80	88,9 x 2,0	88,9 x 2,0	114,0	-	80	88,9	2,6	2,6	150	65	76,1	2,0	38	88,9 x 2,0
					65	76,1	2,6	2,0	150	50	60,3	2,0	85	
					50	60,3	2,6	2,0	150	40	48,3	2,0	120	
					40	48,3	2,6	2,0	150	32	42,4	2,0	138	


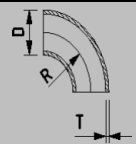
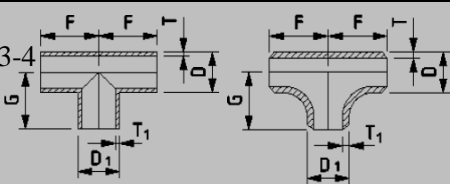
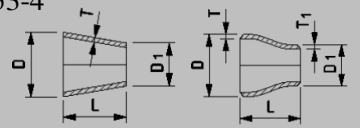
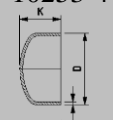
DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4
		D x T	R	R										
			3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
100	114,3 x 2,0	114,3 x 2,6	152,0	-	100	114,3	3,2	3,2	160	80	88,9	2,6	75	114,3 x 2,0
					80	88,9	3,2	2,6	160	65	76,1	2,6	113	
					65	76,1	3,2	2,0	160	50	60,3	2,6	160	
					50	60,3	3,2	2,0	160	40	48,3	2,6	195	
125	139,7 x 2,0	139,7 x 3,2	190,0	-	125	139,7	4,0	4,0	180	100	114,3	2,6	75	139,7 x 2,0
					100	114,3	4,0	3,2	180	80	88,9	2,6	151	
					80	88,9	4,0	2,6	180	65	76,1	2,6	188	
					65	76,1	4,0	2,0	180	50	60,3	2,6	235	
150	168,3 x 2,6	168,3 x 4,0	229,0	-	150	168,3	5,0	5,0	200	125	139,7	3,2	85	168,3 x 2,6
					125	139,7	5,0	4,0	200	100	114,3	3,2	160	
					100	114,3	5,0	2,6	200	80	88,9	3,2	235	
					80	88,9	5,0	2,6	200	65	76,1	3,2	273	

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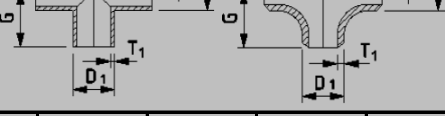
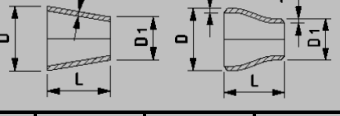
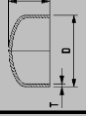
PIPING STANDARD 310-005

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 25H1A

DN	PIPE 10217-7 	ELBOW 10253-4 			TEE 10253-4 					REDUCER 10253-4 				CAP 10253-4 
	D x T		R	R										D x s
		D x T	3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	
200	219,1 x 3,2	219,1 x 5,0	305,0	-	200	219,1	6,3	6,3	250	150	168,3	4,0	150	219,1 x 3,2
					150	168,3	6,3	5,0	250	125	139,7	4,0	235	
					125	139,7	6,3	3,2	250	100	114,3	4,0	310	
					100	114,3	6,3	3,2	250	80	88,9	4,0	385	
250	273,0 x 4,0	273,0 x 6,3	381,0	-	250	273	8,0	8,0	300	200	219,1	5,0	160	273,0 x 4,0
					200	219,1	8,0	6,3	300	150	168,3	5,0	310	
					150	168,3	8,0	4,0	300	125	139,7	5,0	395	
					125	139,7	8,0	4,0	300	100	114,3	5,0	470	
300	323,9 x 5,0	323,9 x 6,3	457,0	-	300	323,9	10,0	10,0	330	250	273	5,0	151	323,9 x 5,0
					250	273	10,0	6,3	330	200	219,1	5,0	310	
					200	219,1	10,0	5,0	330	150	168,3	5,0	461	
					150	168,3	10,0	5,0	330	125	139,7	5,0	545	

PIPE CLASS 25H1A

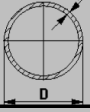
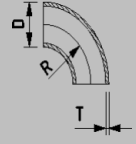
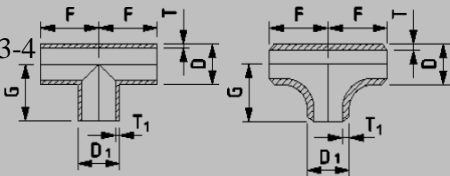
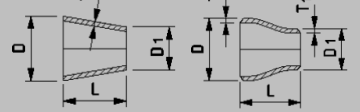
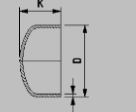
DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4
		D x T	R	R										
	D		3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
350	355,6 x 5,0	355,6 x 6,3	533,0	-	350	355,6	10,0	10,0	360	300	323,9	5,0	94	355,6 x 5,0
					300	323,9	10,0	10,0	360	250	273	5,0	244	
					250	273	10,0	8,0	360	200	219,1	5,0	404	
					200	219,1	10,0	6,3	360	150	168,3	5,0	554	
400	406,4 x 6,3	406,4 x 8,0	610,0	-	400	406,4	12,5	12,5	400	350	355,6	6,3	150	406,4 x 6,3
					350	355,6	12,5	10,0	400	300	323,9	6,3	244	
					300	323,9	12,5	8,0	400	250	273	6,3	395	
					250	273	12,5	6,3	400	200	219,1	6,3	554	
450	457,0 x 8,0	457,0 x 10,0	686,0	-	450	457	12,5	12,5	450	400	406,4	10,0	150	457,0 x 8,0
					400	406,4	12,5	12,5	450	350	355,6	10,0	301	
					350	355,6	12,5	10,0	450	300	323,9	10,0	395	
					300	323,9	12,5	8,0	450	250	273	10,0	545	

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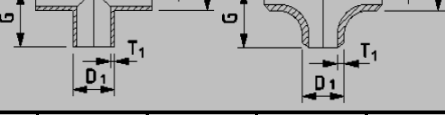
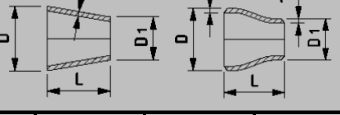
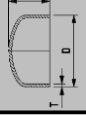
PIPING STANDARD 310-005

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 25H1A

DN	PIPE 10217-7 	ELBOW 10253-4 	TEE 10253-4 							REDUCER 10253-4 				CAP 10253-4 
	D x T		R	R										D x s
			3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	
500	508 x 10,0	508 x 12,5	762	-	500	508	14,2	14,2	500	450	457	10,0	150	508 x 10,0
					450	457	14,2	12,5	500	400	406,4	10,0	301	
					400	406,4	14,2	12,5	500	350	355,6	10,0	451	
					350	355,6	14,2	10,0	500	300	323,9	10,0	545	
600	610 x 12,5	610 x 12,5	914	-	600	610	17,5	17,5	600	500	508	12,5	301	610 x 12,5
					500	508	17,5	14,2	600	450	457	12,5	451	
					450	457	17,5	12,5	600	400	406,4	12,5	601	
					400	406,4	17,5	12,5	600	350	355,6	12,5	752	
700	711 x 12,5	711 x 12,5	1067	-	700	711	20,0	20,0	700	600	610	12,5	301	711 x 12,5
					600	610	20,0	16,0	700	500	508	12,5	601	
					500	508	20,0	14,2	700	450	457	12,5	752	
					450	457	20,0	12,5	700	400	406,4	12,5	902	

PIPE CLASS 25H1A

DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4
		D x T	R	R										
			3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
800	813 x 12,5	813 x 14,2	1219	-	800	813	20,0	20,0	800	700	711	12,5	301	813 x 12,5
					700	711	20,0	20,0	800	600	610	12,5	601	
					600	610	20,0	16,0	800	500	508	12,5	902	
					500	508	20,0	12,5	800	450	457	12,5	1053	
900														
1000														

PIPING STANDARD 310-005

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 25H1A

HEADER PIPE			BRANCH PIPE																					
			15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	DN
DN	D	t	21,3	26,9	33,7	42,4	48,3	60,3	76,1	88,9	114,3	139,7	168,3	219,1	273,0	323,9	355,6	406,4	457,0	508,0	610,0	711,0	813,0	D
DN	D	t	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,6	3,2	4,0	5,0	5,0	6,3	8,0	10,0	12,5	12,5	12,5	t
15	21,3	2,0	T																					
20	26,9	2,0	T	T																				
25	33,7	2,0	UB	T	T																			
32	42,4	2,0	UB	UB	T	T																		
40	48,3	2,0	UB	UB	UB	T	T																	
50	60,3	2,0	UB	UB	UB	UB	T	T																
65	76,1	2,0	UB	UB	UB	UB	UB	T	T															
80	88,9	2,0	UB	UB	UB	UB	UB	UB	T	T														
100	114,3	2,0	UB	UB	UB	UB	UB	T	T	T	T													
125	139,7	2,0	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	T	T	T	T												
150	168,3	2,6	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+W 100x4	T	T	T	T											
200	219,1	3,2	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+P 30x3.2	T	T	T	T										
250	273,0	4,0	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+P 40x4	RB+P 40x4	RB+P 40x4	T	T	T	T									
300	323,9	5,0	UB	UB	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+P 40x5	RB+P 40x5	RB+P 40x5	T	T	T	T								
350	355,6	5,0	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+P 40x5	RB+P 40x5	RB+P 40x5	RB+P 40x5	RB+WP RP40x5 + W100x6.3	T	T	T	T							
400	406,4	6,3	UB	UB	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+P 50x6.3	RB+P 50x6.3	RB+P 50x6.3	RB+P 50x6.3	RB+WP RP50x6.3 + W100x6.3	T	T	T	T	T					
450	457	8,0	UB	UB	UB	UB	UB	UB	UB	RB+W 100x4	RB+P 60x8	RB+P 60x8	RB+P 60x8	RB+P 60x8	T	T	T	T	T					
500	508	10,0	UB	UB	UB	UB	UB	UB	UB	UB	RB+P 70x10	RB+P 70x10	RB+P 70x10	RB+P 70x10	RB+P 70x10	T	T	T	T	T				
600	610	12,5	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	RB+P 90x12.5	RB+P 90x12.5	RB+P 90x12.5	RB+P 90x12.5	RB+P 90x12.5	T	T	T	T	T	
700	711	12,5	UB	UB	UB	UB	UB	UB	UB	UB	RB+P 90x12.5	RB+P 90x12.5	RB+P 90x12.5	RB+P 90x12.5	RB+P 90x12.5	RB+P 90x12.5	RB+P 90x12.5	RB+P 90x12.5	T	T	T	T	T	
800	813	12,5	UB	UB	UB	UB	UB	UB	UB	UB	RB+P 100x12.5	RB+P 100x12.5	RB+P 100x12.5	RB+P 100x12.5	RB+P 100x12.5	RB+P 100x12.5	RB+P 100x12.5	RB+P 100x12.5	RB+WP RP100x12.5 + W100x16	T	T	T	T	T

T	T-piece
UB	Unreinforced branch
RB+W	Reinforced branch - Increased wall thickness of the nozzle pipe
RB+P	Reinforced branch - Reinforcement plate
RB+WP	Reinforced branch - Reinforcement plate + Increased wall thickness of the nozzle pipe

Notes!

1. The branch table is to be used only for straight pipe branches. The angle of branch connection must be $90^{\circ} \pm 5^{\circ}$.
2. Thickness of the reinforcement plates are always the thickness of header pipe and width of plate is shown in the table.
3. Significant external forces or moments to branch connection are not taken into account. In those cases strenght of branch connection has to be studied case by case
4. If there is risk for cyclic or dynamic loads in the piping, reinforced branch shall be used instead of UB.

Pipes in the pipe class are resistant for full vacuum up to DN 400 at temperature 100°C. Maximum external pressure for bigger pipes and stiffening ring requirements shall be checked from standard 301-021

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PIPING STANDARD 310-006

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 40H1A

Piping components	DN-range	Dimension standard	Dimension type / additional definition	Material		Material Certificate EN 10204	Remarks
				Designation	Standard		
Pipes	15-400	EN 10217-7:2014		1.4307	EN 10217-7:2014	3.1	4
Elbows	15-400	EN 10253-4:2008	Type A, 3D	1.4307	EN 10253-4:2008	3.1	5
Tee pieces	15-40	EN 10253-4:2008	Type A, table A.2	1.4307	EN 10253-4:2008	3.1	
	50-400	EN 10253-4:2008	Type A, table A.4	1.4307	EN 10253-4:2008	3.1	
Reducers	15-400	EN 10253-4:2008	Type A, table A.6	1.4307	EN 10253-4:2008	3.1	
Caps	15-400	EN 10253-4:2008	Type A	1.4307	EN 10253-4:2008	3.1	
Welding neck flanges	15-50	EN 1092-1:2018	Type 11, PN40	1.4307	EN 10222-5:2017	3.1	
Collar	65 - 400	EN 1092-1:2018	Type 35, PN40	1.4307		3.1	
Loose flange	65 - 400	EN 1092-1:2018	Type 02, PN40	P265GH HDG	EN 10028-2:2017	3.1	
Blind flanges	15-400	EN 1092-1:2018	Type 05, PN40	1.4307	EN 10028-7:2017	3.1	
Lining plates							
Spades		317-010/011		1.4307	EN 10028-7:2017	3.1	
Spectacle blind		317-012		1.4307	EN 10028-7:2017	3.1	
Gaskets	15-400	EN 1514-1: 1997	Type IBC, PN40				1, 2
Bolts		EN ISO 4014:2011		A2	EN ISO 3506-1	2.2	
Nuts		EN ISO 4032:2013		A2	EN ISO 3506-2	2.2	
Washers		EN ISO7089:2001	Grade A	1.4307	EN 10028-7		
Threaded fittings	DN15-50	EN 10241:2000		1.4307	EN 10272:2016	3.1	6

1. Gasket material according to the Flow Substance. If spiral gaskets are used, gasket dimension standard is EN1514-2

2. Gasket thickness 2mm. Spiral gasket thickness 4.5mm.

3

4. Pipe delivery condition Option 5: W1 (EN10217-7, table 2). Testing category TC1 (EN10217-7 table 13). Material certificate shall contain information of approvals of welding procedures, welders and NDT-personnel. In PED categories II and III these shall be approved by the notified body or competent third party.

5. Bend R=100 is alternative for Elbows in the size range DN15-DN25. Bends shall fill the requirements of EN13480.

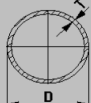
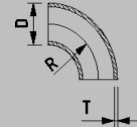
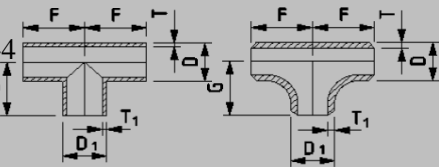
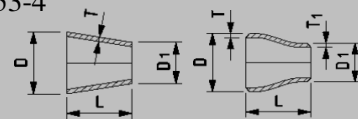
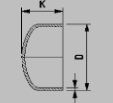
6. Pipe designer shall confirm correct type of the threads case by case when threaded components are used. Preferable thread types EN 10226-1.

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PIPING STANDARD 310-006

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 40H1A

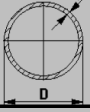
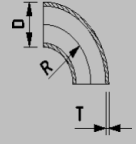
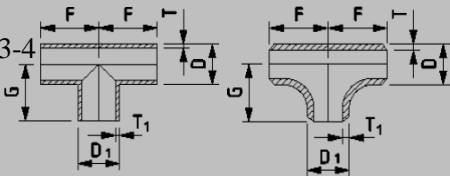
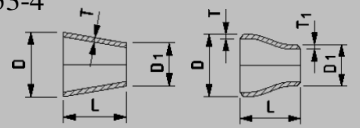
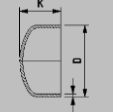
DN	PIPE 10217-7 	ELBOW 10253-4 			TEE 10253-4 					REDUCER 10253-4 				CAP 10253-4 	
	D x T	D x T	R	R	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s	
			3D	5D											
15	21,3 x 2,0	21,3 x 2,0	28,0	-	15	21,3	2,0	2,0	25					21,3 x 2,0	
20	26,9 x 2,0	26,9 x 2,0	29,0	-	20	26,9 21,3	2,0 2,0	2,0 2,0	29 29		15	21,3	2,0	17	26,9 x 2,0
25	33,7 x 2,0	33,7 x 2,0	38,0	-	25	33,7 26,9 21,3	2,0 2,0 2,0	2,0 2,0 2,0	38 38 38		20 15	26,9 21,3	2,0 2,0	20 37	33,7 x 2,0
32	42,4 x 2,0	42,4 x 2,0	48,0	-	32	42,4 33,7 26,9 21,3	2,0 2,0 2,0 2,0	2,0 2,0 2,0 2,0	48 48 48 48		25 20	33,7 26,9	2,0 2,0	26 46	42,4 x 2,0
40	48,3 x 2,0	48,3 x 2,0	57,0	-	40	48,3 42,4 33,7 26,9	2,0 2,0 2,0 2,0	2,0 2,0 2,0 2,0	57 57 57 57		32 25 20	42,4 33,7 26,9	2,0 2,0 2,0	17 43 63	48,3 x 2,0

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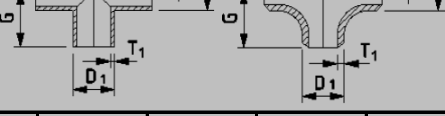
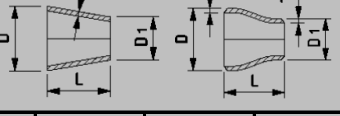
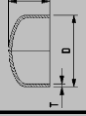
PIPING STANDARD 310-006

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 40H1A

DN	PIPE 10217-7 	ELBOW 10253-4 			TEE 10253-4 					REDUCER 10253-4 				CAP 10253-4 
	D x T	D x T												D x s
			R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	
50	60,3 x 2,0	60,3 x 2,6	76,0	-	50	60,3	2,6	2,6	125	40	48,3	2,0	36	60,3 x 2,0
					40	48,3	2,6	2,0	125	32	42,4	2,0	53	
					32	42,4	2,6	2,0	125	25	33,7	2,0	79	
					25	33,7	2,6	2,0	125	20	26,9	2,0	99	
65	76,1 x 2,0	76,1 x 3,2	95,0	-	65	76,1	3,2	3,2	140	50	60,3	2,6	47	76,1 x 2,0
					50	60,3	3,2	2,6	140	40	48,3	2,6	82	
					40	48,3	3,2	2,0	140	32	42,4	2,6	100	
					32	42,4	3,2	2,0	140	25	33,7	2,6	126	
80	88,9 x 2,0	88,9 x 3,2	114,0	-	80	88,9	4,0	4,0	150	65	76,1	2,6	38	88,9 x 2,0
					65	76,1	4,0	2,6	150	50	60,3	2,6	85	
					50	60,3	4,0	2,0	150	40	48,3	2,6	120	
					40	48,3	4,0	2,0	150	32	42,4	2,6	138	

PIPE CLASS 40H1A


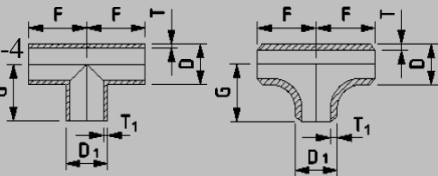
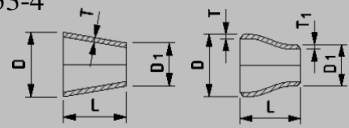
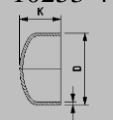
DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4
		D x T	R	R										
			3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
100	114,3 x 2,6	114,3 x 5,0	152,0	-	100	114,3	5,0	5,0	160	80	88,9	3,2	75	114,3 x 2,6
					80	88,9	5,0	3,2	160	65	76,1	3,2	113	
					65	76,1	5,0	2,6	160	50	60,3	3,2	160	
					50	60,3	5,0	2,6	160	40	48,3	3,2	195	
125	139,7 x 3,2	139,7 x 5,0	190,0	-	125	139,7	6,3	6,3	180	100	114,3	4,0	75	139,7 x 3,2
					100	114,3	6,3	4,0	180	80	88,9	4,0	151	
					80	88,9	6,3	3,2	180	65	76,1	4,0	188	
					65	76,1	6,3	3,2	180	50	60,3	4,0	235	
150	168,3 x 4,0	168,3 x 6,3	229,0	-	150	168,3	8,0	8,0	200	125	139,7	5,0	85	168,3 x 4,0
					125	139,7	8,0	4,0	200	100	114,3	5,0	160	
					100	114,3	8,0	4,0	200	80	88,9	5,0	235	
					80	88,9	8,0	4,0	200	65	76,1	5,0	273	

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PIPING STANDARD 310-006

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 40H1A


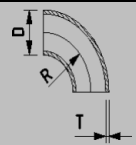
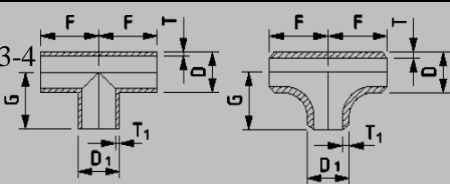
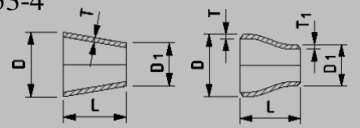
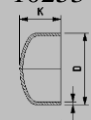
DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
200	219,1 x 5,0	219,1 x 8,0	305,0	-	200	219,1	10,0	10,0	250	150	168,3	6,3	150	219,1 x 5,0
					150	168,3	10,0	5,0	250	125	139,7	6,3	235	
					125	139,7	10,0	5,0	250	100	114,3	6,3	310	
					100	114,3	10,0	5,0	250	80	88,9	6,3	385	
250	273,0 x 6,3	273,0 x 10,0	381,0	-	250	273	12,5	12,5	300	200	219,1	8,0	160	273,0 x 6,3
					200	219,1	12,5	8,0	300	150	168,3	8,0	310	
					150	168,3	12,5	6,3	300	125	139,7	8,0	395	
					125	139,7	12,5	6,3	300	100	114,3	8,0	470	
300	323,9 x 8,0	323,9 x 10,0	457,0	-	300	323,9	12,5	12,5	330	250	273	10,0	151	323,9 x 8,0
					250	273	12,5	12,5	330	200	219,1	10,0	310	
					200	219,1	12,5	10,0	330	150	168,3	10,0	461	
					150	168,3	12,5	6,3	330	125	139,7	10,0	545	

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PIPING STANDARD 310-006

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 40H1A

DN	PIPE 10217-7 	ELBOW 10253-4 			TEE 10253-4 					REDUCER 10253-4 				CAP 10253-4 
	D x T	D x T	R	R	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
			3D	5D										
350	355,6 x 8,0	355,6 x 10,0	533,0	-	350	355,6	14,2	14,2	360	300	323,9	10,0	94	355,6 x 8,0
					300	323,9	14,2	12,5	360	250	273	10,0	244	
					250	273	14,2	12,5	360	200	219,1	10,0	404	
					200	219,1	14,2	8,0	360	150	168,3	10,0	554	
400	406,4 x 10,0	406,4 x 12,5	610,0	-	400	406,4	16,0	16,0	400	350	355,6	10,0	150	406,4 x 10,0
					350	355,6	16,0	14,2	400	300	323,9	10,0	244	
					300	323,9	16,0	12,5	400	250	273	10,0	395	
					250	273	16,0	10,0	400	200	219,1	10,0	554	

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PIPING STANDARD 310-006
AUSTENITIC STAINLESS STEEL PIPING
PIPE CLASS 40H1A

HEADER PIPE			BRANCH PIPE																												
			15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	DN												
			21,3	26,9	33,7	42,4	48,3	60,3	76,1	88,9	114,3	139,7	168,3	219,1	273,0	323,9	355,6	406,4	D												
DN	D	t	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,6	3,2	4,0	5,0	6,3	8,0	8,0	10,0	t												
15	21,3	2,0	T	<table><tr><td>T</td><td>T-piece</td></tr><tr><td>UB</td><td>Unreinforced branch</td></tr><tr><td>RB+W</td><td>Reinforced branch - Increased wall thickness of the nozzle pipe</td></tr><tr><td>RB+P</td><td>Reinforced branch - Reinforcement plate</td></tr><tr><td>RB+WP</td><td>Reinforced branch - Reinforcement plate + Increased wall thickness of the nozzle pipe</td></tr><tr><td>SP</td><td>Special Tee - To be defined case by case when needed</td></tr></table>																T	T-piece	UB	Unreinforced branch	RB+W	Reinforced branch - Increased wall thickness of the nozzle pipe	RB+P	Reinforced branch - Reinforcement plate	RB+WP	Reinforced branch - Reinforcement plate + Increased wall thickness of the nozzle pipe	SP	Special Tee - To be defined case by case when needed
T	T-piece																														
UB	Unreinforced branch																														
RB+W	Reinforced branch - Increased wall thickness of the nozzle pipe																														
RB+P	Reinforced branch - Reinforcement plate																														
RB+WP	Reinforced branch - Reinforcement plate + Increased wall thickness of the nozzle pipe																														
SP	Special Tee - To be defined case by case when needed																														
20	26,9	2,0	T	T																											
25	33,7	2,0	UB	T	T																										
32	42,4	2,0	UB	UB	T	T																									
40	48,3	2,0	UB	UB	UB	T	T																								
50	60,3	2,0	UB	UB	UB	UB	T	T																							
65	76,1	2,0	UB	UB	UB	T	T	T	T																						
80	88,9	2,0	UB	UB	RB+W 100x4	RB+W 100x4	T	T	T	T																					
100	114,3	2,6	UB	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	T	T	T	T																				
125	139,7	3,2	UB	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+W 100x4	T	T	T	T																			
150	168,3	4,0	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	SP	T	T	T	T																		
200	219,1	5,0	UB	UB	UB	RB+W 100x4	RB+W 100x4	SP	SP	SP	T	T	T	T																	
250	273,0	6,3	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	SP	SP	SP	T	T	T	T																
300	323,9	8,0	UB	UB	UB	UB	UB	RB+W 100x4	SP	SP	SP	SP	T	T	T	T															
350	355,6	8,0	UB	UB	UB	UB	RB+W 100x4	RB+W 100x4	SP	SP	SP	SP	SP	T	T	T	T														
400	406,4	10,0	UB	UB	UB	UB	UB	UB	RB+W 100x4	SP	SP	SP	SP	SP	T	T	T	T													

Notes!

1. The branch table is to be used only for straight pipe branches. The angle of branch connection must be $90^\circ \pm 5^\circ$.
2. Thickness of the reinforcement plates are always the thickness of header pipe and width of plate is shown in the table.
3. Significant external forces or moments to branch connection are not taken into account. In those cases strenght of branch connection has to be studied case by case
4. If there is risk for cyclic or dynamic loads in the piping, reinforced branch shall be used instead of UB.

PIPING STANDARD 311-003

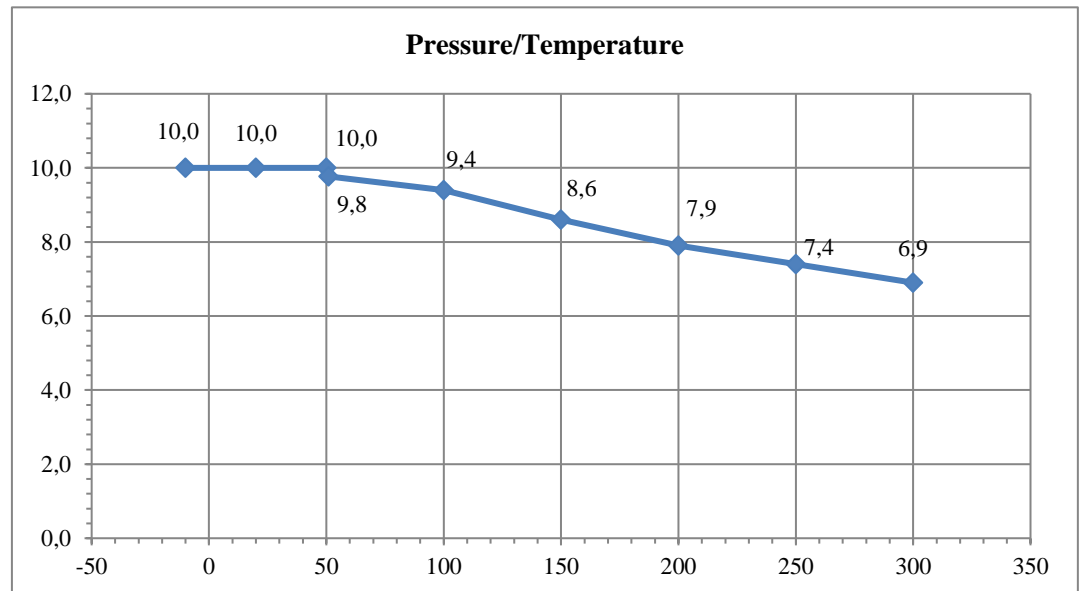
AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 10H2A

General:	Pipe Class:	Austenitic stainless steel pipe class 10H2A
	Design code:	EN 13480-3
	Pipe material:	EN 10217-7 material grade 1.4432. Also mechanical strength of the material 1.4404 and 1.4571 has been verified.
	Corrosion allowance:	0 mm

Allowable overpressures:

T [°C]	p [bar]
-10	10,0
20	10,0
50	10,0
100	9,4
150	8,6
200	7,9
250	7,4
300	6,9



Linear interpolation of pressure between two adjacent temperature values shall be applied for temperature above 50°C. For temperature between 50-100 linear interpolation shall be made using pressure and temperature values of 20°C and 100°C.

External pressure rating:

Pipes in the pipe class are resistant for full vacuum up to DN 150 at temperature 100°C. Maximum external pressure for bigger pipes and stiffening ring requirements shall be checked from standard 301-021

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PIPING STANDARD 311-003

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 10H2A

Piping components	DN-range	Dimension standard	Dimension type / additional definition	Material		Material Certificate EN 10204	Remarks
				Designation	Standard		
Pipes	15-400	EN 10217-7:2014		1.4432	EN 10217-7:2014	3.1	4
	450-1000	EN 10217-7:2014		1.4432	EN 10217-7:2014	3.1	4
Elbows	15-400	EN 10253-4:2008	Type A, 3D	1.4432	EN 10253-4:2008	3.1	5
	450-1000	EN 10253-4:2008	Type A, 3D	1.4432	EN 10253-4:2008	3.1	
Tee pieces	15-40	EN 10253-4:2008	Type A, table A.2	1.4432	EN 10253-4:2008	3.1	
	50-1000	EN 10253-4:2008	Type A, table A.4	1.4432	EN 10253-4:2008	3.1	
Reducers	15-400	EN 10253-4:2008	Type A, table A.6	1.4432	EN 10253-4:2008	3.1	
	450-1000	EN 10253-4:2008	Type A, table A.6	1.4432	EN 10253-4:2008	3.1	
Caps	15-1000	EN 10253-4:2008	Type A	1.4432	EN 10253-4:2008	3.1	
Welding neck flanges	15-40	EN 1092-1:2018	Type 11, PN40	1.4432	EN 10222-5:2017	3.1	
	50	EN 1092-1:2018	Type 11, PN16	1.4432	EN 10222-5:2017	3.1	
Collar	65 - 150	EN 1092-1:2018	Type 35, PN16	1.4432		3.1	
	200 - 1000	EN 1092-1:2018	Type 35, PN10	1.4432		3.1	
Loose flange	65 - 150	EN 1092-1:2018	Type 02, PN16	P265GH HDG	EN 10028-2:2017	3.1	
	200 - 1000	EN 1092-1:2018	Type 02, PN10	P265GH HDG	EN 10028-2:2017	3.1	
Blind flanges	15-40	EN 1092-1:2018	Type 05, PN40	1.4404	EN 10028-7:2017	3.1	
	50-150	EN 1092-1:2018	Type 05, PN16	1.4404	EN 10028-7:2017	3.1	
	200-400	EN 1092-1:2018	Type 05, PN10	1.4404	EN 10028-7:2017	3.1	
	450-1000	EN 1092-1:2018	Type 05, PN10	P265GH + Lining	EN 10028-2:2017		
Lining plates		316-010		1.4404	EN 10028-7:2017	2.2	
Spades		317-010/011		P265GH + 1.4404		3.1	
Spectacle blind		317-012		1.4404	EN 10028-7:2017	3.1	
Gaskets	15-80	EN 1514-1: 1997	Type IBC, PN40				1, 2
	100-200	EN 1514-1: 1997	Type IBC, PN16				1, 2
	250-1000	EN 1514-1: 1997	Type IBC, PN10				1, 2
Bolts		EN ISO 4014:2011		A2	EN ISO 3506-1	2.2	

PIPING STANDARD 311-003

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 10H2A

Piping components	DN-range	Dimension standard	Dimension type / additional definition	Material		Material Certificate EN 10204	Remarks
				Designation	Standard		
Nuts		EN ISO 4032:2013		A2	EN ISO 3506-2	2.2	
Washers		EN ISO7089:2001	Grade A	1.4404	EN 10028-7		
Threaded fittings	DN15-50	EN 10241:2000		1.4404	EN 10272:2016	3.1	6

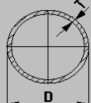
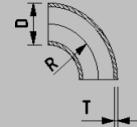
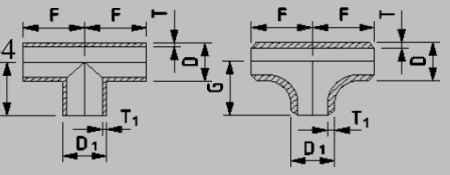
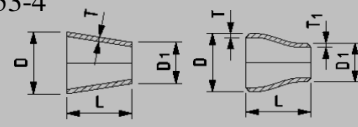
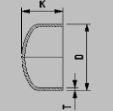
1. Gasket material according to the Flow Substance. If spiral gaskets are used, gasket dimension standard is EN1514-2
2. Gasket thickness 2mm. Spiral gasket thickness 4.5mm.
- 3
4. Pipe delivery condition Option 5: W1 (EN10217-7, table 2). Testing category TC1 (EN10217-7 table 13). Material certificate shall contain information of approvals of welding procedures, welders and NDT-personnel. In PED categories II and III these shall be approved by the notified body or competent third party.
5. Bend R=100 is alternative for Elbows in the size range DN15-DN25. Bends shall fill the requirements of EN13480.
6. Pipe designer shall confirm correct type of the threads case by case when threaded components are used. Preferable thread types EN 10226-1.

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PIPING STANDARD 311-003

AUSTENITIC STAINLESS STEEL PIPING


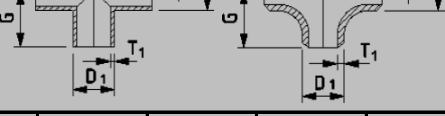
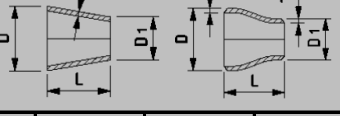
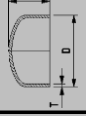
PIPE CLASS 10H2A


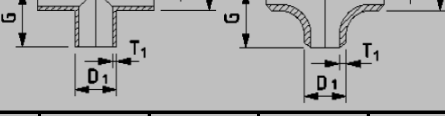
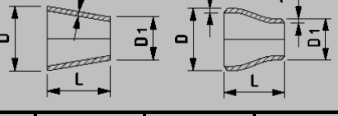

DN	PIPE 10217-7 	ELBOW 10253-4 			TEE 10253-4 					REDUCER 10253-4 				CAP 10253-4 
	D x T	D x T	R	R	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
			3D	5D										
15	21,3 x 2,0	21,3 x 2,0	28,0	-	15	21,3	2,0	2,0	25					21,3 x 2,0
20	26,9 x 2,0	26,9 x 2,0	29,0	-	20	26,9 21,3	2,0 2,0	2,0 2,0	29 29		15	21,3	2,0 17	26,9 x 2,0
25	33,7 x 2,0	33,7 x 2,0	38,0	-	25	33,7 26,9 21,3	2,0 2,0 2,0	2,0 2,0 2,0	38 38 38		20 15	26,9 21,3	2,0 2,0 37	33,7 x 2,0
32	42,4 x 2,0	42,4 x 2,0	48,0	-	32	42,4 33,7 26,9 21,3	2,0 2,0 2,0 2,0	2,0 2,0 2,0 2,0	48 48 48 48		25 20	33,7 26,9	2,0 2,0 46	42,4 x 2,0
40	48,3 x 2,0	48,3 x 2,0	57,0	-	40	48,3 42,4 33,7 26,9	2,0 2,0 2,0 2,0	2,0 2,0 2,0 2,0	57 57 57 57		32 25 20	42,4 33,7 26,9	2,0 2,0 2,0 63	48,3 x 2,0

PIPING STANDARD 311-003

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 10H2A

DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4
		D x T	R	R										
			3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
50	60,3 x 2,0	60,3 x 2,0	76,0	-	50	60,3	2,0	2,0	125	40	48,3	2,0	36	60,3 x 2,0
					40	48,3	2,0	2,0	125	32	42,4	2,0	53	
					32	42,4	2,0	2,0	125	25	33,7	2,0	79	
					25	33,7	2,0	2,0	125	20	26,9	2,0	99	
65	76,1 x 2,0	76,1 x 2,0	95,0	-	65	76,1	2,0	2,0	140	50	60,3	2,0	47	76,1 x 2,0
					50	60,3	2,0	2,0	140	40	48,3	2,0	82	
					40	48,3	2,0	2,0	140	32	42,4	2,0	100	
					32	42,4	2,0	2,0	140	25	33,7	2,0	126	
80	88,9 x 2,0	88,9 x 2,0	114,0	-	80	88,9	2,0	2,0	150	65	76,1	2,0	38	88,9 x 2,0
					65	76,1	2,0	2,0	150	50	60,3	2,0	85	
					50	60,3	2,0	2,0	150	40	48,3	2,0	120	
					40	48,3	2,0	2,0	150	32	42,4	2,0	138	


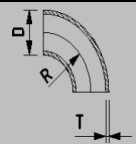
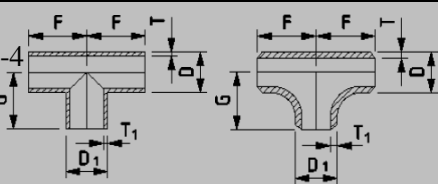
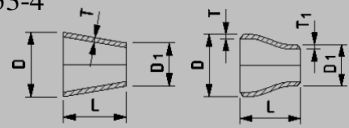
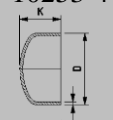
DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4
		D x T	R	R										
			3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
100	114,3 x 2,0	114,3 x 2,0	152,0	-	100	114,3	2,0	2,0	160	80	88,9	2,0	75	114,3 x 2,0
					80	88,9	2,0	2,0	160	65	76,1	2,0	113	
					65	76,1	2,0	2,0	160	50	60,3	2,0	160	
					50	60,3	2,0	2,0	160	40	48,3	2,0	195	
125	139,7 x 2,0	139,7 x 2,0	190,0	-	125	139,7	2,0	2,0	180	100	114,3	2,0	75	139,7 x 2,0
					100	114,3	2,0	2,0	180	80	88,9	2,0	151	
					80	88,9	2,0	2,0	180	65	76,1	2,0	188	
					65	76,1	2,0	2,0	180	50	60,3	2,0	235	
150	168,3 x 2,0	168,3 x 2,0	229,0	-	150	168,3	2,6	2,6	200	125	139,7	2,0	85	168,3 x 2,0
					125	139,7	2,6	2,0	200	100	114,3	2,0	160	
					100	114,3	2,6	2,0	200	80	88,9	2,0	235	
					80	88,9	2,6	2,0	200	65	76,1	2,0	273	

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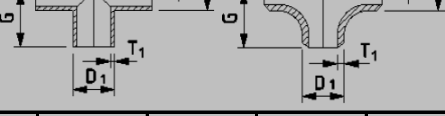
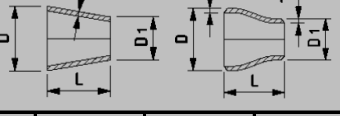
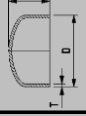
PIPING STANDARD 311-003

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 10H2A

DN	PIPE 10217-7 	ELBOW 10253-4 	TEE 10253-4 							REDUCER 10253-4 				CAP 10253-4 
	D x T		R	R										D x s
		D x T	3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	
200	219,1 x 2,0	219,1 x 2,0	305,0	-	200	219,1	3,2	3,2	250	150	168,3	2,0	150	219,1 x 2,0
					150	168,3	3,2	2,0	250	125	139,7	2,0	235	
					125	139,7	3,2	2,0	250	100	114,3	2,0	310	
					100	114,3	3,2	2,0	250	80	88,9	2,0	385	
250	273,0 x 2,0	273,0 x 2,6	381,0	-	250	273	4,0	4,0	300	200	219,1	2,0	160	273,0 x 2,0
					200	219,1	4,0	2,6	300	150	168,3	2,0	310	
					150	168,3	4,0	2,0	300	125	139,7	2,0	395	
					125	139,7	4,0	2,0	300	100	114,3	2,0	470	
300	323,9 x 2,6	323,9 x 2,6	457,0	-	300	323,9	5,0	5,0	330	250	273	2,6	151	323,9 x 2,6
					250	273	5,0	3,2	330	200	219,1	2,6	310	
					200	219,1	5,0	2,6	330	150	168,3	2,6	461	
					150	168,3	5,0	2,6	330	125	139,7	2,6	545	

PIPE CLASS 10H2A


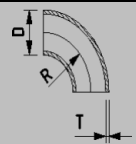
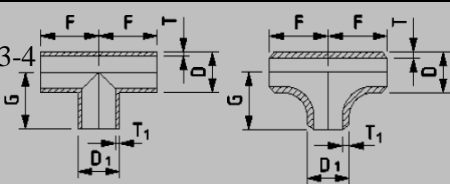
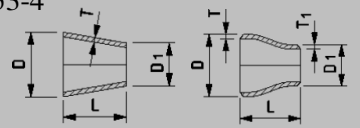
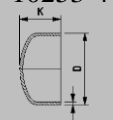
DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4
		D x T	R	R										
			3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
350	355,6 x 2,6	355,6 x 2,6	533,0	-	350	355,6	5,0	5,0	360	300	323,9	2,6	94	355,6 x 2,6
					300	323,9	5,0	4,0	360	250	273	2,6	244	
					250	273	5,0	3,2	360	200	219,1	2,6	404	
					200	219,1	5,0	2,6	360	150	168,3	2,6	554	
400	406,4 x 3,2	406,4 x 3,2	610,0	-	400	406,4	6,3	6,3	400	350	355,6	3,2	150	406,4 x 3,2
					350	355,6	6,3	4,0	400	300	323,9	3,2	244	
					300	323,9	6,3	3,2	400	250	273	3,2	395	
					250	273	6,3	3,2	400	200	219,1	3,2	554	
450	457,0 x 3,2	457,0 x 4,0	686,0	-	450	457	6,3	6,3	450	400	406,4	4,0	150	457,0 x 3,2
					400	406,4	6,3	6,3	450	350	355,6	4,0	301	
					350	355,6	6,3	5,0	450	300	323,9	4,0	395	
					300	323,9	6,3	5,0	450	250	273	4,0	545	

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PIPING STANDARD 311-003

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 10H2A

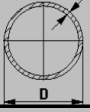
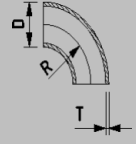
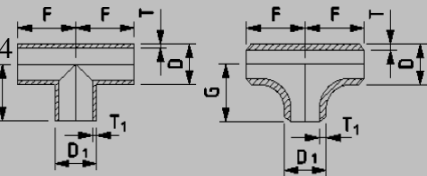
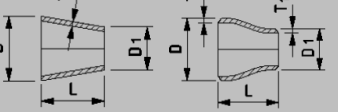
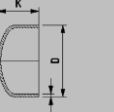
DN	PIPE 10217-7 	ELBOW 10253-4 	TEE 10253-4 							REDUCER 10253-4 				CAP 10253-4 
	D x T		R	R										D x s
		D x T	3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	
500	508,0 x 4,0	508,0 x 4,0	762,0	-	500	508	8,0	8,0	500	450	457	4,0	150	508,0 x 4,0
					450	457	8,0	6,3	500	400	406,4	4,0	301	
					400	406,4	8,0	4,0	500	350	355,6	4,0	451	
					350	355,6	8,0	4,0	500	300	323,9	4,0	545	
600	610,0 x 4,0	610,0 x 5,0	914,0	-	600	610	8,0	8,0	600	500	508	4,0	301	610,0 x 4,0
					500	508	8,0	8,0	600	450	457	4,0	451	
					450	457	8,0	6,3	600	400	406,4	4,0	601	
					400	406,4	8,0	5,0	600	350	355,6	4,0	752	
700	711,0 x 5,0	711,0 x 6,3	1067,0	-	700	711	10,0	10,0	700	600	610	6,3	301	711,0 x 5,0
					600	610	10,0	8,0	700	500	508	6,3	601	
					500	508	10,0	5,0	700	450	457	6,3	752	
					450	457	10,0	5,0	700	400	406,4	6,3	902	

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PIPING STANDARD 311-003

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 10H2A

DN	PIPE 10217-7 	ELBOW 10253-4 	TEE 10253-4 							REDUCER 10253-4 				CAP 10253-4 
	D x T		R	R										D x s
			3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	
800	813,0 x 6,3	813,0 x 8,0	1219,0	-	800	813	10,0	10,0	800	700	711	6,3	301	813,0 x 6,3
					700	711	10,0	10,0	800					
					600	610	10,0	8,0	800					
					500	508	10,0	6,3	800					
900	914,0 x 6,3	914,0 x 8,0	1372,0	-	900	914	12,5	12,5	900	800	813	6,3	301	914,0 x 6,3
					800	813	12,5	10,0	900					
					700	711	12,5	8,0	900					
					600	610	12,5	6,3	900					
1000	1016,0 x 8,0	1016,0 x 10,0	1524,0	-	1000	1016	12,5	12,5	1000	900	914	8,0	301	1016,0 x 8,0
					900	914	12,5	12,5	1000					
					800	813	12,5	12,5	1000					
					700	711	12,5	10,0	1000					
										600	610	8,0	1203	

PIPING STANDARD 311-003
AUSTENITIC STAINLESS STEEL PIPING
PIPE CLASS 10H2A

T	T-piece
UB	Unreinforced branch
RB+W	Reinforced branch - Increased wall thickness of the nozzle pipe
RB+P	Reinforced branch - Reinforcement plate
RB+WP	Reinforced branch - Reinforcement plate + Increased wall thickness of the nozzle pipe
SP	Special Tee - To be defined when required

Notes!

1. The branch table is to be used only for straight pipe branches. The angle of branch connection must be $90^{\circ} \pm 5^{\circ}$.
2. Thickness of the reinforcement plates are always the thickness of header pipe and width of plate is shown in the table.
3. Significant external forces or moments to branch connection are not taken into account. In those cases strength of branch connection has to be studied case by case.
4. If there is risk for cyclic or dynamic loads in the piping, reinforced branch shall be used instead of UB.

PIPING STANDARD 311-004

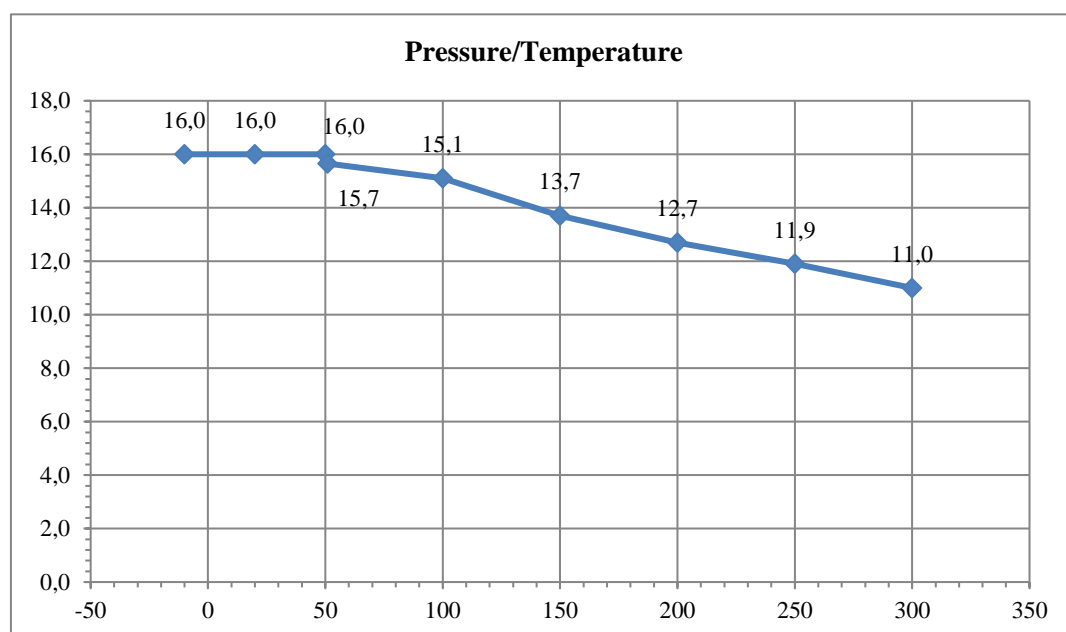
AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 16H2A

General:	Pipe Class:	Austenitic stainless steel pipe class 16H2A
	Design code:	EN 13480-3
	Pipe material:	EN 10217-7 material grade 1.4432. Also mechanical strength of the material 1.4404 and 1.4571 has been verified.
	Corrosion allowance:	0 mm

Allowable overpressures:

T [°C]	p [bar]
-10	16,0
20	16,0
50	16,0
51	15,7
100	15,1
150	13,7
200	12,7
250	11,9
300	11,0



Linear interpolation of pressure between two adjacent temperature values shall be applied for temperature above 50°C. For temperature between 50-100 linear interpolation shall be made using pressure and temperature values of 20°C and 100°C.

External pressure rating:

Pipes in the pipe class are resistant for full vacuum up to DN 150 at temperature 100°C. Maximum external pressure for bigger pipes and stiffening ring requirements shall be checked from standard 301-021

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PIPING STANDARD 311-004

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 16H2A

Piping components	DN-range	Dimension standard	Dimension type / additional definition	Material		Material Certificate EN 10204	Remarks
				Designation	Standard		
Pipes	15-400	EN 10217-7:2014		1.4432	EN 10217-7:2014	3.1	4
	450-1000	EN 10217-7:2014		1.4432	EN 10217-7:2014	3.1	4
Elbows	15-400	EN 10253-4:2008	Type A, 3D	1.4432	EN 10253-4:2008	3.1	5
	450-1000	EN 10253-4:2008	Type A, 3D	1.4432	EN 10253-4:2008	3.1	
Tee pieces	15-40	EN 10253-4:2008	Type A, table A.2	1.4432	EN 10253-4:2008	3.1	
	50-1000	EN 10253-4:2008	Type A, table A.4	1.4432	EN 10253-4:2008	3.1	
Reducers	15-400	EN 10253-4:2008	Type A, table A.6	1.4432	EN 10253-4:2008	3.1	
	450-1000	EN 10253-4:2008	Type A, table A.6	1.4432	EN 10253-4:2008	3.1	
Caps	15-1000	EN 10253-4:2008	Type A	1.4432	EN 10253-4:2008	3.1	
Welding neck flanges	15-40	EN 1092-1:2018	Type 11, PN40	1.4432	EN 10222-5:2017	3.1	
	50	EN 1092-1:2018	Type 11, PN16	1.4432	EN 10222-5:2017	3.1	
Collar	65 - 1000	EN 1092-1:2018	Type 35, PN16	1.4432		3.1	
Loose flange	65 - 1000	EN 1092-1:2018	Type 02, PN16	P265GH HDG	EN 10028-2:2017	3.1	
Blind flanges	15-40	EN 1092-1:2018	Type 05, PN40	1.4404	EN 10028-7:2017	3.1	
	50-400	EN 1092-1:2018	Type 05, PN16	1.4404	EN 10028-7:2017	3.1	
	450-1000	EN 1092-1:2018	Type 05, PN16	P265GH + Lining	EN10028-2:2017		
Lining plates		316-010		1.4404	EN 10028-7:2017	2.2	
Spades		317-010/011		P265GH + 1.4404		3.1	
Spectacle blind		317-012		1.4404	EN 10028-7:2017	3.1	
Gaskets	15-80 100-1000	EN 1514-1: 1997 EN 1514-1: 1997	Type IBC, PN40 Type IBC, PN16				1, 2 1, 2
Bolts		EN ISO 4014:2011		A2	EN ISO 3506-1	2.2	

PIPING STANDARD 311-004

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 16H2A

Piping components	DN-range	Dimension standard	Dimension type / additional definition	Material		Material Certificate EN 10204	Remarks
				Designation	Standard		
Nuts		EN ISO 4032:2013		A2	EN ISO 3506-2	2.2	
Washers		EN ISO7089:2001	Grade A	1.4404	EN 10028-7		
Threaded fittings	DN15-50	EN 10241:2000		1.4404	EN 10272:2016	3.1	6

1. Gasket material according to the Flow Substance. If spiral gaskets are used, gasket dimension standard is EN1514-2

2. Gasket thickness 2mm. Spiral gasket thickness 4.5mm.

3

4. Pipe delivery condition Option 5: W1 (EN10217-7, table 2). Testing category TC1 (EN10217-7 table 13). Material certificate shall contain information of approvals of welding procedures, welders and NDT-personnel. In PED categories II and III these shall be approved by the notified body or competent third party.

5. Bend R=100 is alternative for Elbows in the size range DN15-DN25. Bends shall fill the requirements of EN13480.


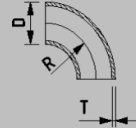
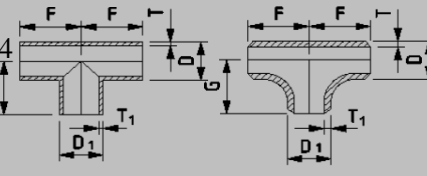
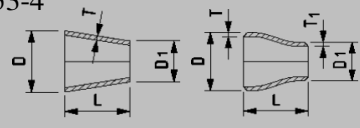
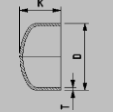
6. Pipe designer shall confirm correct type of the threads case by case when threaded components are used. Preferable thread types EN 10226-1.


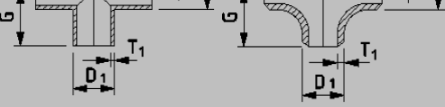
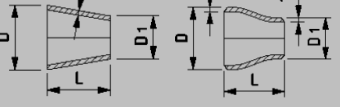
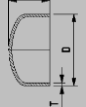
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PIPING STANDARD 311-004


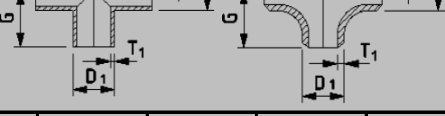
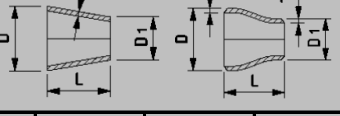
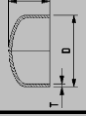
AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 16H2A

DN	PIPE 10217-7 	ELBOW 10253-4 			TEE 10253-4 					REDUCER 10253-4 				CAP 10253-4 
	D x T	D x T			DN1 D1 T T1 F/G					DN1 D1 T/T1 L				D x s
			R	R										
15	21,3 x 2,0	21,3 x 2,0	28,0	-	15	21,3	2,0	2,0	25					21,3 x 2,0
20	26,9 x 2,0	26,9 x 2,0	29,0	-	20	26,9	2,0	2,0	29					26,9 x 2,0
						21,3	2,0	2,0	29	15	21,3	2,0	17	
25	33,7 x 2,0	33,7 x 2,0	38,0	-	25	33,7	2,0	2,0	38					33,7 x 2,0
						26,9	2,0	2,0	38	20	26,9	2,0	20	
						21,3	2,0	2,0	38	15	21,3	2,0	37	
32	42,4 x 2,0	42,4 x 2,0	48,0	-	32	42,4	2,0	2,0	48					42,4 x 2,0
						33,7	2,0	2,0	48	25	33,7	2,0	26	
						26,9	2,0	2,0	48	20	26,9	2,0	46	
						21,3	2,0	2,0	48					
40	48,3 x 2,0	48,3 x 2,0	57,0	-	40	48,3	2,0	2,0	57					48,3 x 2,0
						42,4	2,0	2,0	57	32	42,4	2,0	17	
						33,7	2,0	2,0	57	25	33,7	2,0	43	
						26,9	2,0	2,0	57	20	26,9	2,0	63	

DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4
		D x T	R	R										
			3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
50	60,3 x 2,0	60,3 x 2,0	76,0	-	50	60,3	2,0	2,0	125	40	48,3	2,0	36	60,3 x 2,0
					40	48,3	2,0	2,0	125	32	42,4	2,0	53	
					32	42,4	2,0	2,0	125	25	33,7	2,0	79	
					25	33,7	2,0	2,0	125	20	26,9	2,0	99	
65	76,1 x 2,0	76,1 x 2,0	95,0	-	65	76,1	2,0	2,0	140	50	60,3	2,0	47	76,1 x 2,0
					50	60,3	2,0	2,0	140	40	48,3	2,0	82	
					40	48,3	2,0	2,0	140	32	42,4	2,0	100	
					32	42,4	2,0	2,0	140	25	33,7	2,0	126	
80	88,9 x 2,0	88,9 x 2,0	114,0	-	80	88,9	2,0	2,0	150	65	76,1	2,0	38	88,9 x 2,0
					65	76,1	2,0	2,0	150	50	60,3	2,0	85	
					50	60,3	2,0	2,0	150	40	48,3	2,0	120	
					40	48,3	2,0	2,0	150	32	42,4	2,0	138	

PIPE CLASS 16H2A

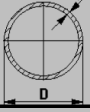
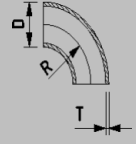
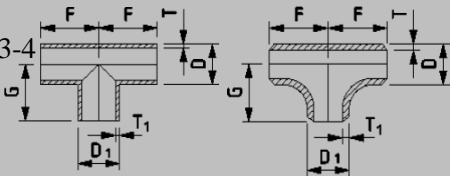
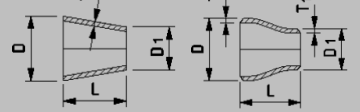
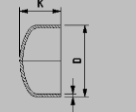
DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4
		D x T	R	R										
			3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
100	114,3 x 2,0	114,3 x 2,0	152,0	-	100	114,3	2,6	2,6	160	80	88,9	2,0	75	114,3 x 2,0
					80	88,9	2,6	2,0	160	65	76,1	2,0	113	
					65	76,1	2,6	2,0	160	50	60,3	2,0	160	
					50	60,3	2,6	2,0	160	40	48,3	2,0	195	
125	139,7 x 2,0	139,7 x 2,0	190,0	-	125	139,7	3,2	3,2	180	100	114,3	2,0	75	139,7 x 2,0
					100	114,3	3,2	2,0	180	80	88,9	2,0	151	
					80	88,9	3,2	2,0	180	65	76,1	2,0	188	
					65	76,1	3,2	2,0	180	50	60,3	2,0	235	
150	168,3 x 2,0	168,3 x 2,6	229,0	-	150	168,3	3,2	3,2	200	125	139,7	2,0	85	168,3 x 2,0
					125	139,7	3,2	2,6	200	100	114,3	2,0	160	
					100	114,3	3,2	2,0	200	80	88,9	2,0	235	
					80	88,9	3,2	2,0	200	65	76,1	2,0	273	


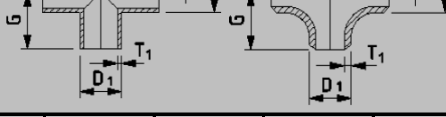
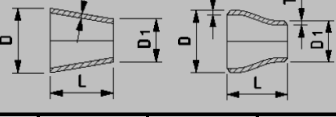
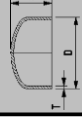
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PIPING STANDARD 311-004

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 16H2A

DN	PIPE 10217-7 	ELBOW 10253-4 	TEE 10253-4 							REDUCER 10253-4 				CAP 10253-4 
	D x T		R	R										D x s
		D x T	3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	
200	219,1 x 2,0	219,1 x 3,2	305,0	-	200	219,1	5,0	5,0	250	150	168,3	2,6	150	219,1 x 2,0
					150	168,3	5,0	2,6	250	125	139,7	2,6	235	
					125	139,7	5,0	2,6	250	100	114,3	2,6	310	
					100	114,3	5,0	2,6	250	80	88,9	2,6	385	
250	273,0 x 2,6	273,0 x 4,0	381,0	-	250	273	6,3	6,3	300	200	219,1	3,2	160	273,0 x 2,6
					200	219,1	6,3	3,2	300	150	168,3	3,2	310	
					150	168,3	6,3	3,2	300	125	139,7	3,2	395	
					125	139,7	6,3	3,2	300	100	114,3	3,2	470	
300	323,9 x 3,2	323,9 x 4,0	457,0	-	300	323,9	6,3	6,3	330	250	273	3,2	151	323,9 x 3,2
					250	273	6,3	5,0	330	200	219,1	3,2	310	
					200	219,1	6,3	4,0	330	150	168,3	3,2	461	
					150	168,3	6,3	3,2	330	125	139,7	3,2	545	


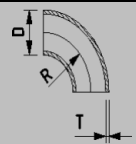
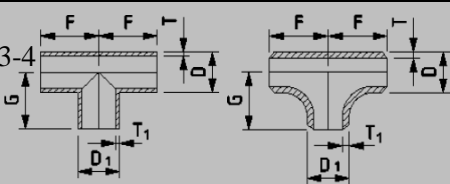
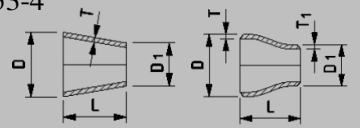
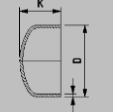
DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4	
		D x T	R	R											
	D x T		3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s	
350	355,6 x 3,2	355,6 x 4,0	533,0	-	350	355,6	8,0	8,0	360	300	323,9	3,2	94	355,6 x 3,2	
					300	323,9	8,0	6,3	360	250	273	3,2	244		
					250	273	8,0	5,0	360	200	219,1	3,2	404		
					200	219,1	8,0	4,0	360	150	168,3	3,2	554		
400	406,4 x 4,0	406,4 x 5,0	610,0	-	400	406,4	8,0	8,0	400	350	355,6	4,0	150	406,4 x 4,0	
					350	355,6	8,0	6,3	400	300	323,9	4,0	244		
					300	323,9	8,0	6,3	400	250	273	4,0	395		
					250	273	8,0	4,0	400	200	219,1	4,0	554		
450	457 x 5,0	457 x 6,3	686	-	450	457	10,0	10,0	450	400	406,4	6,3	150	457 x 5,0	
					400	406,4	10,0	8,0	450	350	355,6	6,3	301		
					350	355,6	10,0	8,0	450	300	323,9	6,3	395		
					300	323,9	10,0	6,3	450	250	273	6,3	545		

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PIPING STANDARD 311-004

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 16H2A

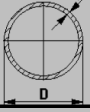
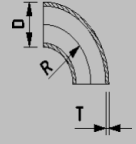
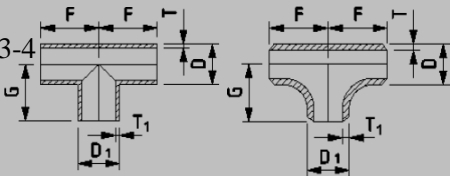
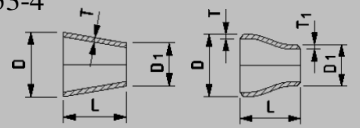
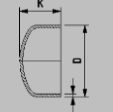
DN	PIPE 10217-7 	ELBOW 10253-4 	TEE 10253-4 							REDUCER 10253-4 				CAP 10253-4 
	D x T		R	R										D x s
			3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	
500	508 x 5,0	508 x 6,3	762	-	500	508	10,0	10,0	500	450	457	6,3	150	508 x 5,0
					450	457	10,0	10,0	500	400	406,4	6,3	301	
					400	406,4	10,0	8,0	500	350	355,6	6,3	451	
					350	355,6	10,0	6,3	500	300	323,9	6,3	545	
600	610 x 6,3	610 x 8,0	914	-	600	610	12,5	12,5	600	500	508	8,0	301	610 x 6,3
					500	508	12,5	8,0	600	450	457	8,0	451	
					450	457	12,5	8,0	600	400	406,4	8,0	601	
					400	406,4	12,5	6,3	600	350	355,6	8,0	752	
700	711 x 8,0	711 x 10,0	1067	-	700	711	12,5	12,5	700	600	610	8,0	301	711 x 8,0
					600	610	12,5	12,5	700	500	508	8,0	601	
					500	508	12,5	10,0	700	450	457	8,0	752	
					450	457	12,5	8,0	700	400	406,4	8,0	902	

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PIPING STANDARD 311-004

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 16H2A

DN	PIPE 10217-7 	ELBOW 10253-4 			TEE 10253-4 					REDUCER 10253-4 				CAP 10253-4 
	D x T		R	R										D x s
		D x T	3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	
800	813 x 8,0	813 x 10,0	1219	-	800	813	14,2	14,2	800	700	711	10,0	301	813 x 8,0
					700	711	14,2	12,5	800					
					600	610	14,2	12,5	800					
					500	508	14,2	10,0	800					
900	914 x 10,0	914 x 12,5	1372	-	900	914	16,0	16,0	900	800	813	10,0	301	914 x 10,0
					800	813	16,0	16,0	900					
					700	711	16,0	14,2	900					
					600	610	16,0	12,5	900					
1000	1016 x 10,0	1016 x 12,5	1524	-	1000	1016	20,0	20,0	1000	900	914	12,5	301	1016 x 10,0
					900	914	20,0	16,0	1000					
					800	813	20,0	16,0	1000					
					700	711	20,0	14,2	1000					
										600	610	12,5	1203	

PIPING STANDARD 311-004
AUSTENITIC STAINLESS STEEL PIPING
PIPE CLASS 16H2A

HEADER PIPE			BRANCH PIPE																							
			15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	DN
			21,3	26,9	33,7	42,4	48,3	60,3	76,1	88,9	114,3	139,7	168,3	219,1	273,0	323,9	355,6	406,4	457	508	610	711	813	914	1016	D
DN	D	t	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,6	3,2	3,2	4,0	5,0	5,0	6,3	8,0	8,0	10,0	10,0	t
15	21,3	2,0	T																							
20	26,9	2,0	T	T																						
25	33,7	2,0	UB	T	T																					
32	42,4	2,0	UB	UB	T	T																				
40	48,3	2,0	UB	UB	UB	T	T																			
50	60,3	2,0	UB	UB	UB	UB	T	T																		
65	76,1	2,0	UB	UB	UB	UB	UB	T	T																	
80	88,9	2,0	UB	UB	UB	UB	UB	UB	T	T																
100	114,3	2,0	UB	UB	UB	UB	UB	UB	UB	T	T															
125	139,7	2,0	UB	UB	UB	UB	UB	UB	UB	T	T	T														
150	168,3	2,0	UB	UB	UB	UB	UB	UB	RB+W 100x4	T	T	T	T													
200	219,1	2,0	UB	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+W 100x4	T	T	T	T												
250	273,0	2,6	UB	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+P 30x2,6	T	T	T	T											
300	323,9	3,2	UB	UB	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+P 40x3,2	RB+P 40x3,2	T	T	T	T										
350	355,6	3,2	UB	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+P 40x3,2	RB+P 40x3,2	RB+P 40x3,2 + W100x4	T	T	T	T									
400	406,4	4,0	UB	UB	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+P 40x4	RB+P 40x4	RB+P 40x4	RB+P 40x4	RB+P 40x4	RB+P 40x4	RB+P 40x4	RB+P 40x4	RB+P 40x4	RB+P 40x4	RB+P 40x4	RB+P 40x4	RB+P 40x4	RB+P 40x4	RB+P 40x4	
450	457	5,0	UB	UB	UB	UB	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	
500	508	5,0	UB	UB	UB	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	
600	610	6,3	UB	UB	UB	UB	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+P 60x6,3	RB+P 60x6,3	RB+P 60x6,3	RB+P 60x6,3	RB+P 60x6,3	RB+P 60x6,3	RB+P 60x6,3	RB+P 60x6,3	RB+P 60x6,3	RB+P 60x6,3	RB+P 60x6,3	RB+P 60x6,3	RB+P 60x6,3	RB+P 60x6,3	
700	711	8,0	UB	UB	UB	UB	UB	UB	UB	UB	UB	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	
800	813	8,0	UB	UB	UB	UB	UB	UB	UB	UB	RB+W 100x4	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	
900	914	10,0	UB	UB	UB	UB	UB	UB	UB	UB	UB	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	
1000	1016	10,0	UB	UB	UB	UB	UB	UB	UB	UB	UB	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	

T	T-piece
UB	Unreinforced branch
RB+W	Reinforced branch - Increased wall thickness of the nozzle pipe
RB+P	Reinforced branch - Reinforcement plate
RB+WP	Reinforced branch - Reinforcement plate + Increased wall thickness of the nozzle pipe

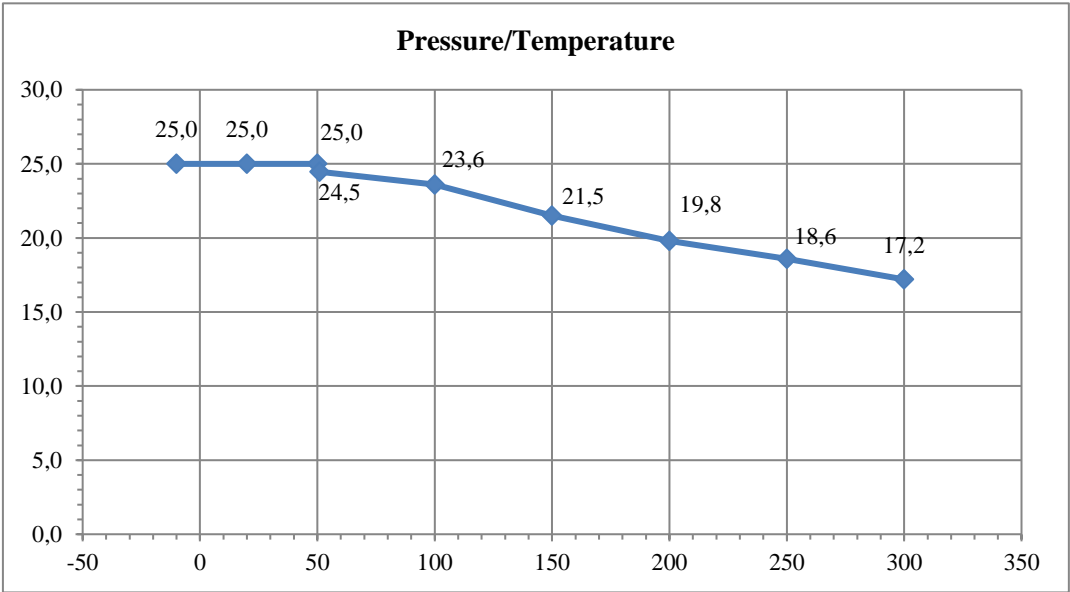
- Notes!
1. The branch table is to be used only for straight pipe branches. The angle of branch connection must be $90^{\circ} \pm 5^{\circ}$.
 2. Thickness of the reinforcement plates are always the thickness of header pipe and width of plate is shown in the table.
 3. Significant external forces or moments to branch connection are not taken into account. In those cases strenght of branch connection has to be studied case by case
 4. If there is risk for cyclic or dynamic loads in the piping, reinforced branch shall be used instead of UB.

PIPING STANDARD 311-005
AUSTENITIC STAINLESS STEEL PIPING
PIPE CLASS 25H2A

General:	Pipe Class:	Austenitic stainless steel pipe class 25H2A
	Design code:	EN 13480-3
	Pipe material:	EN 10217-7 material grade 1.4432. Also mechanical strength of the material 1.4404 and 1.4571 has been verified.
	Corrosion allowance:	0 mm

Allowable overpressures:

T [°C]	p [bar]
-10	25,0
20	25,0
50	25,0
100	23,6
150	21,5
200	19,8
250	18,6
300	17,2



Linear interpolation of pressure between two adjacent temperature values shall be applied for temperature above 50°C. For temperature between 50-100 linear interpolation shall be made using pressure and temperature values of 20°C and 100°C.

External pressure rating:

Pipes in the pipe class are resistant for full vacuum up to DN 800 at temperature 100°C. Maximum external pressure for bigger pipes and stiffening ring requirements shall be checked from standard 301-021

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PIPING STANDARD 311-005

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 25H2A

Piping components	DN-range	Dimension standard	Dimension type / additional definition	Material		Material Certificate EN 10204	Remarks
				Designation	Standard		
Pipes	15-400	EN 10217-7:2014		1.4432	EN 10217-7:2014	3.1	4
	450-800	EN 10217-7:2014		1.4432	EN 10217-7:2014	3.1	4
Elbows	15-400	EN 10253-4:2008	Type A, 3D	1.4432	EN 10253-4:2008	3.1	5
	450-800	EN 10253-4:2008	Type A, 3D	1.4432	EN 10253-4:2008	3.1	
Tee pieces	15-40	EN 10253-4:2008	Type A, table A.2	1.4432	EN 10253-4:2008	3.1	
	50-800	EN 10253-4:2008	Type A, table A.4	1.4432	EN 10253-4:2008	3.1	
Reducers	15-400	EN 10253-4:2008	Type A, table A.6	1.4432	EN 10253-4:2008	3.1	
	450-800	EN 10253-4:2008	Type A, table A.6	1.4432	EN 10253-4:2008	3.1	
Caps	15-800	EN 10253-4:2008	Type A	1.4432	EN 10253-4:2008	3.1	
Welding neck flanges	15-50	EN 1092-1:2018	Type 11, PN40	1.4432	EN 10222-5:2017	3.1	
Collar	65 - 125	EN 1092-1:2018	Type 35, PN40	1.4432		3.1	
	150 - 800	EN 1092-1:2018	Type 35, PN25	1.4432		3.1	
Loose flange	65 - 125	EN 1092-1:2018	Type 02, PN40	P265GH HDG	EN 10028-2:2017	3.1	
	150 - 800	EN 1092-1:2018	Type 02, PN25	P265GH HDG	EN 10028-2:2017	3.1	
Blind flanges	15-150	EN 1092-1:2018	Type 05, PN40	1.4404	EN 10028-7:2017	3.1	
	200-400	EN 1092-1:2018	Type 05, PN25	1.4404	EN 10028-7:2017	3.1	
	450-800	EN 1092-1:2018	Type 05, PN25	P265GH+Lining	EN 10028-2:2017		
Lining plates		316-010		1.4404	EN 10028-7:2017	2.2	
Spades		317-010/011		P265GH + 1.4404		3.1	
Spectacle blind		317-012		1.4404	EN 10028-7:2017	3.1	
Gaskets	15-150	EN 1514-1: 1997	Type IBC, PN40				1, 2
	200-800	EN 1514-1: 1997	Type IBC, PN25				1, 2
Bolts		EN ISO 4014:2011		A2	EN ISO 3506-1	2.2	

PIPING STANDARD 311-005

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 25H2A

Piping components	DN-range	Dimension standard	Dimension type / additional definition	Material		Material Certificate EN 10204	Remarks
				Designation	Standard		
Nuts		EN ISO 4032:2013		A2	EN ISO 3506-2	2.2	
Washers		EN ISO7089:2001	Grade A	1.4404	EN 10028-7		
Threaded fittings	DN15-50	EN 10241:2000		1.4404	EN 10272:2016	3.1	6

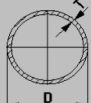
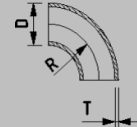
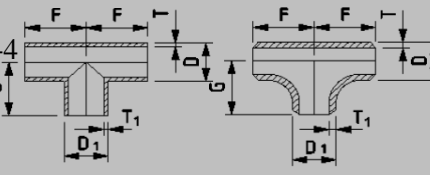
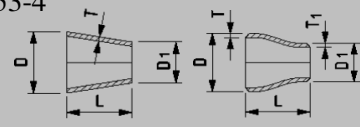
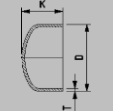
1. Gasket material according to the Flow Substance. If spiral gaskets are used, gasket dimension standard is EN1514-2
2. Gasket thickness 2mm. Spiral gasket thickness 4.5mm.
- 3
4. Pipe delivery condition Option 5: W1 (EN10217-7, table 2). Testing category TC1 (EN10217-7 table 13). Material certificate shall contain information of approvals of welding procedures, welders and NDT-personnel. In PED categories II and III these shall be approved by the notified body or competent third party.
5. Bend R=100 is alternative for Elbows in the size range DN15-DN25. Bends shall fill the requirements of EN13480.
6. Pipe designer shall confirm correct type of the threads case by case when threaded components are used. Preferable thread types EN 10226-1.

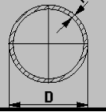
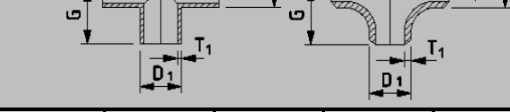
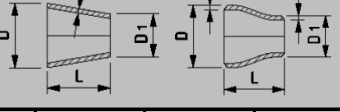
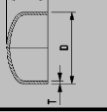
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PIPING STANDARD 311-005


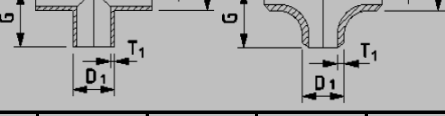
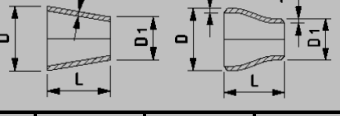
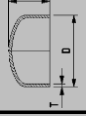
AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 25H2A

DN	PIPE 10217-7 	ELBOW 10253-4 			TEE 10253-4 					REDUCER 10253-4 				CAP 10253-4 
	D x T	D x T	R	R	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
			3D	5D										
15	21,3 x 2,0	21,3 x 2,0	28,0	-	15	21,3	2,0	2,0	25					21,3 x 2,0
20	26,9 x 2,0	26,9 x 2,0	29,0	-	20	26,9 21,3	2,0 2,0	2,0 2,0	29 29	15	21,3	2,0	17	26,9 x 2,0
25	33,7 x 2,0	33,7 x 2,0	38,0	-	25	33,7 26,9 21,3	2,0 2,0 2,0	2,0 2,0 2,0	38 38 38	20 15	26,9 21,3	2,0 2,0	20 37	33,7 x 2,0
32	42,4 x 2,0	42,4 x 2,0	48,0	-	32	42,4 33,7 26,9 21,3	2,0 2,0 2,0 2,0	2,0 2,0 2,0 2,0	48 48 48 48	25 20	33,7 26,9	2,0 2,0	26 46	42,4 x 2,0
40	48,3 x 2,0	48,3 x 2,0	57,0	-	40	48,3 42,4 33,7 26,9	2,0 2,0 2,0 2,0	2,0 2,0 2,0 2,0	57 57 57 57	32 25 20	42,4 33,7 26,9	2,0 2,0 2,0	17 43 63	48,3 x 2,0

DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4
		D x T	R	R										
	D x T		3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
50	60,3 x 2,0	60,3 x 2,0	76,0	-	50	60,3	2,0	2,0	125	40	48,3	2,0	36	60,3 x 2,0
					40	48,3	2,0	2,0	125	32	42,4	2,0	53	
					32	42,4	2,0	2,0	125	25	33,7	2,0	79	
					25	33,7	2,0	2,0	125	20	26,9	2,0	99	
65	76,1 x 2,0	76,1 x 2,0	95,0	-	65	76,1	2,0	2,0	140	50	60,3	2,0	47	76,1 x 2,0
					50	60,3	2,0	2,0	140	40	48,3	2,0	82	
					40	48,3	2,0	2,0	140	32	42,4	2,0	100	
					32	42,4	2,0	2,0	140	25	33,7	2,0	126	
80	88,9 x 2,0	88,9 x 2,0	114,0	-	80	88,9	2,6	2,6	150	65	76,1	2,0	38	88,9 x 2,0
					65	76,1	2,6	2,0	150	50	60,3	2,0	85	
					50	60,3	2,6	2,0	150	40	48,3	2,0	120	
					40	48,3	2,6	2,0	150	32	42,4	2,0	138	

PIPE CLASS 25H2A

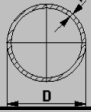
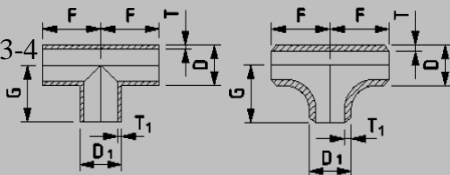
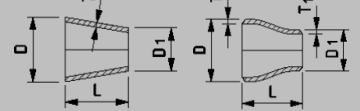
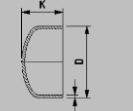
DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4
		D x T	R	R										
			3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
100	114,3 x 2,0	114,3 x 2,6	152,0	-	100	114,3	3,2	3,2	160	80	88,9	2,0	75	114,3 x 2,0
					80	88,9	3,2	2,6	160	65	76,1	2,0	113	
					65	76,1	3,2	2,0	160	50	60,3	2,0	160	
					50	60,3	3,2	2,0	160	40	48,3	2,0	195	
125	139,7 x 2,0	139,7 x 3,2	190,0	-	125	139,7	4,0	4,0	180	100	114,3	2,6	75	139,7 x 2,0
					100	114,3	4,0	2,6	180	80	88,9	2,6	151	
					80	88,9	4,0	2,0	180	65	76,1	2,6	188	
					65	76,1	4,0	2,0	180	50	60,3	2,6	235	
150	168,3 x 2,0	168,3 x 4,0	229,0	-	150	168,3	5,0	5,0	200	125	139,7	3,2	85	168,3 x 2,0
					125	139,7	5,0	3,2	200	100	114,3	3,2	160	
					100	114,3	5,0	2,6	200	80	88,9	3,2	235	
					80	88,9	5,0	2,6	200	65	76,1	3,2	273	

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PIPING STANDARD 311-005

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 25H2A

DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4
														
	D x T	D x T	R	R	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
200	219,1 x 2,6	219,1 x 5,0	305,0	-	200	219,1	6,3	6,3	250	150	168,3	4,0	150	219,1 x 2,6
					150	168,3	6,3	4,0	250	125	139,7	4,0	235	
					125	139,7	6,3	3,2	250	100	114,3	4,0	310	
					100	114,3	6,3	3,2	250	80	88,9	4,0	385	
250	273,0 x 3,2	273,0 x 6,3	381,0	-	250	273	8,0	8,0	300	200	219,1	5,0	160	273,0 x 3,2
					200	219,1	8,0	5,0	300	150	168,3	5,0	310	
					150	168,3	8,0	4,0	300	125	139,7	5,0	395	
					125	139,7	8,0	4,0	300	100	114,3	5,0	470	
300	323,9 x 4,0	323,9 x 6,3	457,0	-	300	323,9	10,0	10,0	330	250	273	5,0	151	323,9 x 4,0
					250	273	10,0	6,3	330	200	219,1	5,0	310	
					200	219,1	10,0	5,0	330	150	168,3	5,0	461	
					150	168,3	10,0	5,0	330	125	139,7	5,0	545	

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 25H2A

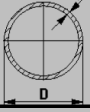
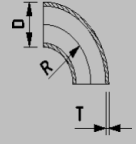
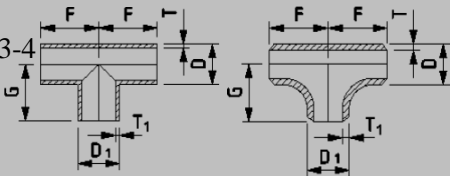
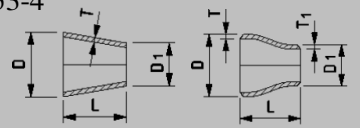
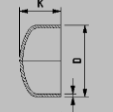
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PIPING STANDARD 311-005

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 25H2A


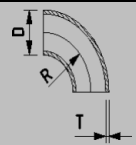
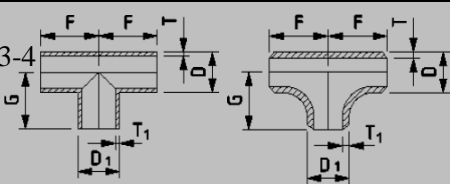
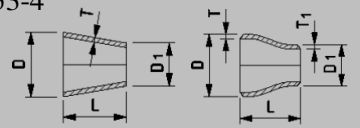
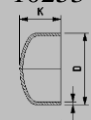
DN	PIPE 10217-7 	ELBOW 10253-4 	TEE 10253-4 							REDUCER 10253-4 				CAP 10253-4 
	D x T		R	R										D x s
			3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	
500	508 x 8,0	508 x 10,0	762	-	500	508	14,2	14,2	500	450	457	10,0	150	508 x 8,0
					450	457	14,2	12,5	500	400	406,4	10,0	301	
					400	406,4	14,2	12,5	500	350	355,6	10,0	451	
					350	355,6	14,2	10,0	500	300	323,9	10,0	545	
600	610 x 10,0	610 x 12,5	914	-	600	610	16,0	16,0	600	500	508	10,0	301	610 x 10,0
					500	508	16,0	14,2	600	450	457	10,0	451	
					450	457	16,0	12,5	600	400	406,4	10,0	601	
					400	406,4	16,0	10,0	600	350	355,6	10,0	752	
700	711 x 12,5	711 x 12,5	1067	-	700	711	17,5	17,5	700	600	610	12,5	301	711 x 12,5
					600	610	17,5	14,2	700	500	508	12,5	601	
					500	508	17,5	12,5	700	450	457	12,5	752	
					450	457	17,5	12,5	700	400	406,4	12,5	902	

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PIPING STANDARD 311-005

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 25H2A

DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4
		D x T												
	D x T		R	R	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
800	813 x 12,5	813 x 14,2	1219	-	800	813	20,0	20,0	800	700	711	12,5	301	813 x 12,5
					700	711	20,0	16,0	800	600	610	12,5	601	
					600	610	20,0	16,0	800	500	508	12,5	902	
					500	508	20,0	12,5	800	450	457	12,5	1053	

HEADER PIPE			BRANCH PIPE																					
			15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	DN
			21,3	26,9	33,7	42,4	48,3	60,3	76,1	88,9	114,3	139,7	168,3	219,1	273,0	323,9	355,6	406,4	457	508	610	711	813	D
DN	D	t	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,6	3,2	4,0	5,0	5,0	8,0	8,0	10,0	12,5	12,5	t
15	21,3	2,0	T																					
20	26,9	2,0	T	T																				
25	33,7	2,0	UB	T	T																			
32	42,4	2,0	UB	UB	T	T																		
40	48,3	2,0	UB	UB	UB	T	T																	
50	60,3	2,0	UB	UB	UB	UB	T	T																
65	76,1	2,0	UB	UB	UB	UB	UB	T	T															
80	88,9	2,0	UB	UB	UB	UB	UB	UB	T	T														
100	114,3	2,0	UB	UB	UB	UB	UB	T	T	T	T													
125	139,7	2,0	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	T	T	T	T												
150	168,3	2,0	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+W 100x4	T	T	T	T											
200	219,1	2,6	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+P 30x2.6	RB+WP RP30x2.6 + W100x4	T	T	T	T									
250	273,0	3,2	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+P 30x3.2	RB+P 30x3.2	RB+P 30x3.2	RB+WP RP30x3.2 + W100x4	T	T	T	T								
300	323,9	4,0	UB	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+P 40x4	RB+P 40x4	RB+P 40x4	RB+WP RP40x4 + W100x4	RB+WP RP40x4 + W100x4	T	T	T	T							
350	355,6	5,0	UB	UB	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+P 40x5	RB+P 40x5	RB+P 40x5	RB+P 40x5	RB+WP RP40x5 + W100x6.3	T	T	T	T	T						
400	406,4	5,0	UB	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+P 50x5	RB+WP RP50x5 + W100x4	RB+WP RP50x5 + W100x6.3	RB+WP RP50x5 + W100x8	RB+WP RP50x5 + W100x8	T	T	T	T				
450	457	8,0	UB	UB	UB	UB	UB	UB	UB	UB	RB+W 100x4	RB+P 60x8	RB+P 60x8	RB+P 60x8	RB+P 60x8	RB+P 60x8	T	T	T	T				
500	508	8,0	UB	UB	UB	UB	UB	UB	UB	RB+W 100x4	RB+P 70x8	RB+P 70x8	RB+P 70x8	RB+P 70x8	RB+P 70x8	RB+WP RP70x8 + W100x10	T	T	T	T	T			
600	610	10,0	UB	UB	UB	UB	UB	UB	UB	UB	RB+W 100x4	RB+P 80x10	RB+P 80x10	RB+P 80x10	RB+P 80x10	RB+P 80x10	RB+P 80x10	T	T	T	T	T		
700	711	12,5	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	RB+W 100x4	RB+P 90x12.5	RB+P 90x12.5	RB+P 90x12.5	RB+P 90x12.5	RB+P 90x12.5	RB+P 90x12.5	T	T	T	T	
800	813	12,5	UB	UB	UB	UB	UB	UB	UB	UB	RB+W 100x4	RB+P 100x12.5	RB+P 100x12.5	RB+P 100x12.5	RB+P 100x12.5	RB+P 100x12.5	RB+P 100x12.5	RB+P 100x12.5	RB+WP RP100x12.5 + W100x16	T	T	T	T	T

T	T-piece
UB	Unreinforced branch
RB+W	Reinforced branch - Increased wall thickness of the nozzle pipe
RB+P	Reinforced branch - Reinforcement plate
RB+WP	Reinforced branch - Reinforcement plate + Increased wall thickness of the nozzle pipe

Notes!

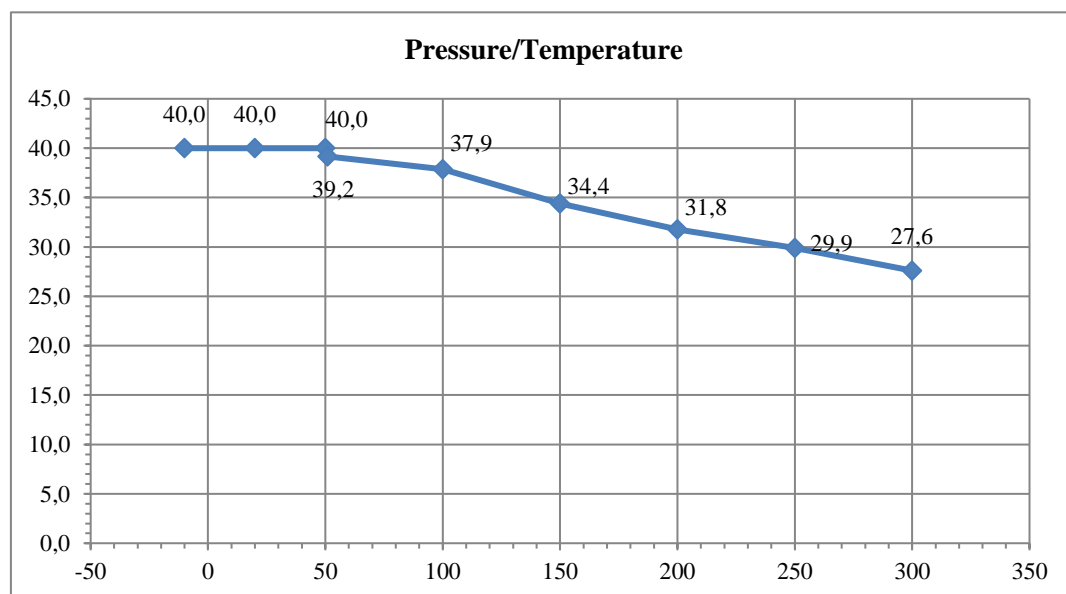
1. The branch table is to be used only for straight pipe branches. The angle of branch connection must be 90°±5°.
2. Thickness of the reinforcement plates are always the thickness of header pipe and width of plate is shown in the table.
3. Significant external forces or moments to branch connection are not taken into account. In those cases strenght of branch connection has to be studied case by case
4. If there is risk for cyclic or dynamic loads in the piping, reinforced branch shall be used instead of UB.

PIPING STANDARD 311-006
AUSTENITIC STAINLESS STEEL PIPING**PIPE CLASS 40H2A**

General:	Pipe Class:	Austenitic stainless steel pipe class 40H2A
	Design code:	EN 13480-3
	Pipe material:	EN 10217-7 material grade 1.4432. Also mechanical strength of the material 1.4404 and 1.4571 has been verified.
	Corrosion allowance:	0 mm

Allowable overpressures:

T [°C]	p [bar]
-10	40,0
20	40,0
50	40,0
100	37,9
150	34,4
200	31,8
250	29,9
300	27,6



Linear interpolation of pressure between two adjacent temperature values shall be applied for temperature above 50°C. For temperature between 50-100 linear interpolation shall be made using pressure and temperature values of 20°C and 100°C.

External pressure rating:

Pipes in the pipe class are resistant for full vacuum up to DN 400 at temperature 100°C. Maximum external pressure for bigger pipes and stiffening ring requirements shall be checked from standard 301-021

PIPING STANDARD 311-006

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 40H2A

Piping components	DN-range	Dimension standard	Dimension type / additional definition	Material		Material Certificate EN 10204	Remarks
				Designation	Standard		
Pipes	15-400	EN 10217-7:2014		1.4432	EN 10217-7:2014	3.1	4
Elbows	15-400	EN 10253-4:2008	Type A, 3D	1.4432	EN 10253-4:2008	3.1	5
Tee pieces	15-40	EN 10253-4:2008	Type A, table A.2	1.4432	EN 10253-4:2008	3.1	
	50-400	EN 10253-4:2008	Type A, table A.4	1.4432	EN 10253-4:2008	3.1	
Reducers	15-400	EN 10253-4:2008	Type A, table A.6	1.4432	EN 10253-4:2008	3.1	
Caps	15-400	EN 10253-4:2008	Type A	1.4432	EN 10253-4:2008	3.1	
Welding neck flanges	15-50	EN 1092-1:2018	Type 11, PN40	1.4432	EN 10222-5:2017	3.1	
Collar	65 - 400	EN 1092-1:2018	Type 35, PN40	1.4432		3.1	
Loose flange	65 - 400	EN 1092-1:2018	Type 02, PN40	P265GH HDG	EN 10028-2:2017	3.1	
Blind flanges	15-400	EN 1092-1:2018	Type 05, PN40	1.4404	EN 10028-7:2017	3.1	
Lining plates							
Spades		317-010/011		1.4404	EN 10028-7:2017	3.1	
Spectacle blind		317-012		1.4404	EN 10028-7:2017	3.1	
Gaskets	15-400	EN 1514-1: 1997	Type IBC, PN40				1, 2
Bolts		EN ISO 4014:2011		A2	EN ISO 3506-1	2.2	
Nuts		EN ISO 4032:2013		A2	EN ISO 3506-2	2.2	
Washers		EN ISO 7089:2001	Grade A	1.4307	EN10028-7		
Threaded fittings	DN15-50	EN 10241:2000		1.4404	EN 10272:2016	3.1	6

1. Gasket material according to the Flow Substance. If spiral gaskets are used, gasket dimension standard is EN1514-2

2. Gasket thickness 2mm. Spiral gasket thickness 4.5mm.

3

4. Pipe delivery condition Option 5: W1 (EN10217-7, table 2). Testing category TC1 (EN10217-7 table 13). Material certificate shall contain information of approvals of welding procedures, welders and NDT-personnel. In PED categories II and III these shall be approved by the notified body or competent third party.

5. Bend R=100 is alternative for Elbows in the size range DN15-DN25. Bends shall fill the requirements of EN13480.

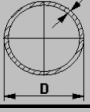
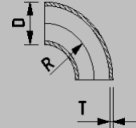
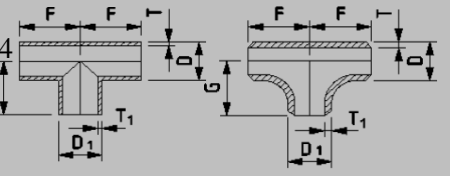
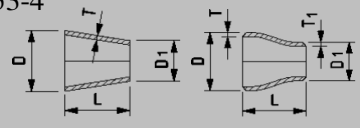
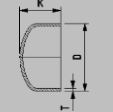
6. Pipe designer shall confirm correct type of the threads case by case when threaded components are used. Preferable thread types EN 10226-1.


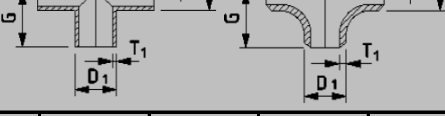
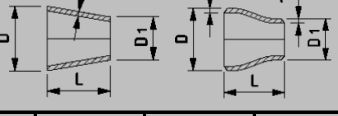
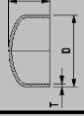
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PIPING STANDARD 311-006

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 40H2A


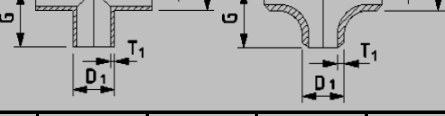
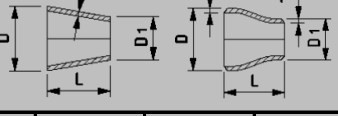
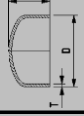
DN	PIPE 10217-7 	ELBOW 10253-4 			TEE 10253-4 					REDUCER 10253-4 				CAP 10253-4 
	D x T	D x T			DN1 D1 T T1 F/G					DN1 D1 T/T1 L				D x s
			R	R										
15	21,3 x 2,0	21,3 x 2,0	28,0	-	15	21,3	2,0	2,0	25					21,3 x 2,0
20	26,9 x 2,0	26,9 x 2,0	29,0	-	20	26,9	2,0	2,0	29	15	21,3	2,0	17	26,9 x 2,0
25	33,7 x 2,0	33,7 x 2,0	38,0	-		33,7	2,0	2,0	38					33,7 x 2,0
					25	26,9	2,0	2,0	38	20	26,9	2,0	20	
						21,3	2,0	2,0	38	15	21,3	2,0	37	
32	42,4 x 2,0	42,4 x 2,0	48,0	-		42,4	2,0	2,0	48					42,4 x 2,0
					32	33,7	2,0	2,0	48	25	33,7	2,0	26	
						26,9	2,0	2,0	48	20	26,9	2,0	46	
						21,3	2,0	2,0	48					
40	48,3 x 2,0	48,3 x 2,0	57,0	-		48,3	2,0	2,0	57					48,3 x 2,0
					40	42,4	2,0	2,0	57	32	42,4	2,0	17	
						33,7	2,0	2,0	57	25	33,7	2,0	43	
						26,9	2,0	2,0	57	20	26,9	2,0	63	

DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4
		D x T	R	R										
			3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
50	60,3 x 2,0	60,3 x 2,0	76,0	-	50	60,3	2,6	2,6	125	40	48,3	2,0	36	60,3 x 2,0
					40	48,3	2,6	2,0	125	32	42,4	2,0	53	
					32	42,4	2,6	2,0	125	25	33,7	2,0	79	
					25	33,7	2,6	2,0	125	20	26,9	2,0	99	
65	76,1 x 2,0	76,1 x 2,6	95,0	-	65	76,1	3,2	3,2	140	50	60,3	2,0	47	76,1 x 2,0
					50	60,3	3,2	2,6	140	40	48,3	2,0	82	
					40	48,3	3,2	2,0	140	32	42,4	2,0	100	
					32	42,4	3,2	2,0	140	25	33,7	2,0	126	
80	88,9 x 2,0	88,9 x 3,2	114,0	-	80	88,9	4,0	4,0	150	65	76,1	2,6	38	88,9 x 2,0
					65	76,1	4,0	2,0	150	50	60,3	2,6	85	
					50	60,3	4,0	2,0	150	40	48,3	2,6	120	
					40	48,3	4,0	2,0	150	32	42,4	2,6	138	

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AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 40H2A


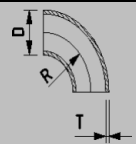
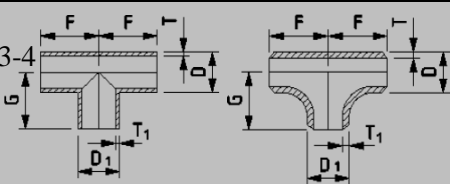
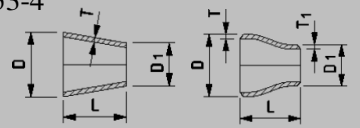
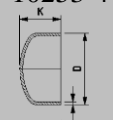
DN	PIPE 10217-7	ELBOW 10253-4			TEE 10253-4					REDUCER 10253-4				CAP 10253-4
		D x T	R	R										
	D		3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
100	114,3 x 2,0	114,3 x 4,0	152,0	-	100	114,3	5,0	5,0	160	80	88,9	3,2	75	114,3 x 2,0
					80	88,9	5,0	3,2	160	65	76,1	3,2	113	
					65	76,1	5,0	2,6	160	50	60,3	3,2	160	
					50	60,3	5,0	2,6	160	40	48,3	3,2	195	
125	139,7 x 2,6	139,7 x 5,0	190,0	-	125	139,7	6,3	6,3	180	100	114,3	4,0	75	139,7 x 2,6
					100	114,3	6,3	4,0	180	80	88,9	4,0	151	
					80	88,9	6,3	3,2	180	65	76,1	4,0	188	
					65	76,1	6,3	3,2	180	50	60,3	4,0	235	
150	168,3 x 3,2	168,3 x 5,0	229,0	-	150	168,3	6,3	6,3	200	125	139,7	5,0	85	168,3 x 3,2
					125	139,7	6,3	5,0	200	100	114,3	5,0	160	
					100	114,3	6,3	4,0	200	80	88,9	5,0	235	
					80	88,9	6,3	4,0	200	65	76,1	5,0	273	

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PIPING STANDARD 311-006

AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 40H2A

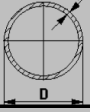
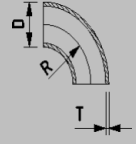
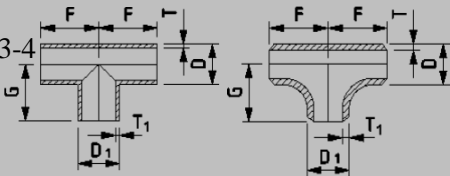
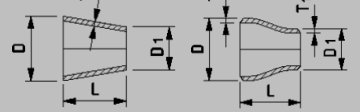
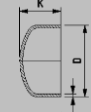
DN	PIPE 10217-7 	ELBOW 10253-4 	TEE 10253-4 							REDUCER 10253-4 				CAP 10253-4 
	D x T		R	R										D x s
			3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	
200	219,1 x 4,0	219,1 x 6,3	305,0	-	200	219,1	10,0	10,0	250	150	168,3	6,3	150	219,1 x 4,0
					150	168,3	10,0	5,0	250	125	139,7	6,3	235	
					125	139,7	10,0	5,0	250	100	114,3	6,3	310	
					100	114,3	10,0	5,0	250	80	88,9	6,3	385	
250	273,0 x 5,0	273,0 x 8,0	381,0	-	250	273	12,5	12,5	300	200	219,1	8,0	160	273,0 x 5,0
					200	219,1	12,5	8,0	300	150	168,3	8,0	310	
					150	168,3	12,5	6,3	300	125	139,7	8,0	395	
					125	139,7	12,5	6,3	300	100	114,3	8,0	470	
300	323,9 x 6,3	323,9 x 10,0	457,0	-	300	323,9	12,5	12,5	330	250	273	10,0	151	323,9 x 6,3
					250	273	12,5	10,0	330	200	219,1	10,0	310	
					200	219,1	12,5	8,0	330	150	168,3	10,0	461	
					150	168,3	12,5	6,3	330	125	139,7	10,0	545	

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AUSTENITIC STAINLESS STEEL PIPING

PIPE CLASS 40H2A

DN	PIPE 10217-7 	ELBOW 10253-4 	TEE 10253-4 							REDUCER 10253-4 				CAP 10253-4 
	D x T		R	R										D x s
			3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	
350	355,6 x 8,0	355,6 x 10,0	533,0	-	350	355,6	14,2	14,2	360	300	323,9	10,0	94	355,6 x 8,0
					300	323,9	14,2	12,5	360	250	273	10,0	244	
					250	273	14,2	10,0	360	200	219,1	10,0	404	
					200	219,1	14,2	8,0	360	150	168,3	10,0	554	
400	406,4 x 8,0	406,4 x 10,0	610,0	-	400	406,4	16,0	16,0	400	350	355,6	10,0	150	406,4 x 8,0
					350	355,6	16,0	14,2	400	300	323,9	10,0	244	
					300	323,9	16,0	12,5	400	250	273	10,0	395	
					250	273	16,0	10,0	400	200	219,1	10,0	554	

PIPING STANDARD 311-006
AUSTENITIC STAINLESS STEEL PIPING
PIPE CLASS 40H2A

HEADER PIPE			BRANCH PIPE																	
			15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	DN	
			21,3	26,9	33,7	42,4	48,3	60,3	76,1	88,9	114,3	139,7	168,3	219,1	273,0	323,9	355,6	406,4	D	
DN	D	t	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,6	3,2	4,0	5,0	6,3	8,0	8,0	t	
15	21,3	2,0	T																	
20	26,9	2,0	T	T							T	T-piece								
25	33,7	2,0	UB	T	T						UB	Unreinforced branch								
32	42,4	2,0	UB	UB	T	T					RB+W	Reinforced branch - Increased wall thickness of the nozzle pipe								
40	48,3	2,0	UB	UB	UB	T	T				RB+P	Reinforced branch - Reinforcement plate								
50	60,3	2,0	UB	UB	UB	UB	T	T			RB+WP	Reinforced branch - Reinforcement plate + Increased wall thickness of the nozzle pipe								
65	76,1	2,0	UB	UB	UB	RB+W 100x4	T	T	T			SP	Special Tee - To be defined case by case when needed							
80	88,9	2,0	UB	UB	RB+W 100x4	RB+W 100x4	T	T	T	T										
100	114,3	2,0	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+W 100x4	T	T	T	T									
125	139,7	2,6	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+W 100x4	SP	T	T	T	T								
150	168,3	3,2	UB	RB+W 100x4	RB+W 100x4	RB+W 100x4	SP	SP	SP	T	T	T	T							
200	219,1	4,0	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+W 100x6,3	SP	SP	SP	SP	T	T	T	T						
250	273,0	5,0	RB+W 100x4	RB+W 100x4	RB+W 100x4	RB+W 100x6,3	SP	SP	SP	SP	SP	T	T	T	T					
300	323,9	6,3	UB	UB	RB+W 100x4	RB+W 100x4	SP	SP	SP	SP	SP	SP	T	T	T	T				
350	355,6	8,0	UB	UB	UB	UB	UB	RB+W 100x4	SP	SP	SP	SP	SP	T	T	T	T			
400	406,4	8,0	UB	UB	UB	RB+W 100x4	SP	SP	SP	SP	SP	SP	SP	T	T	T	T	T		

Notes!

1. The branch table is to be used only for straight pipe branches. The angle of branch connection must be $90^{\circ} \pm 5^{\circ}$.
2. Thickness of the reinforcement plates are always the thickness of header pipe and width of plate is shown in the table.
3. Significant external forces or moments to branch connection are not taken into account. In those cases strenght of branch connection has to be studied case by case
4. If there is risk for cyclic or dynamic loads in the piping, reinforced branch shall be used instead of UB.

PIPING STANDARDS 316-010 - AUSTENITIC STAINLESS STEEL PIPING - LINING PLATE

1. DIMENSIONS

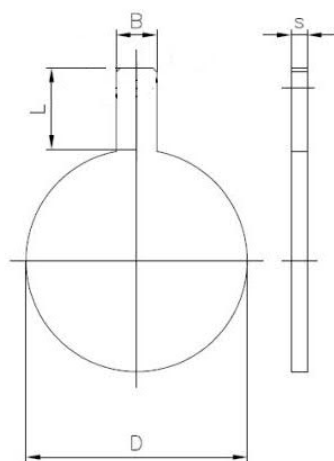


Table 1

DN	PN 10 D	PN 16 D	PN 25 D	B	L	S*
450	539	555	564	50	150	2
500	594	617	624	50	150	2
600	695	734	731	50	150	2
700	810	804	833	50	150	2
800	917	911	942	50	150	2
900	1017	1011		50	200	2
1000	1124	1128		50	200	2

Lining plates shall be used between carbon steel blind flanges and gasket according to Figure 2.

*Lining plate use in the piping where vacuum is possible shall be considered case by case.

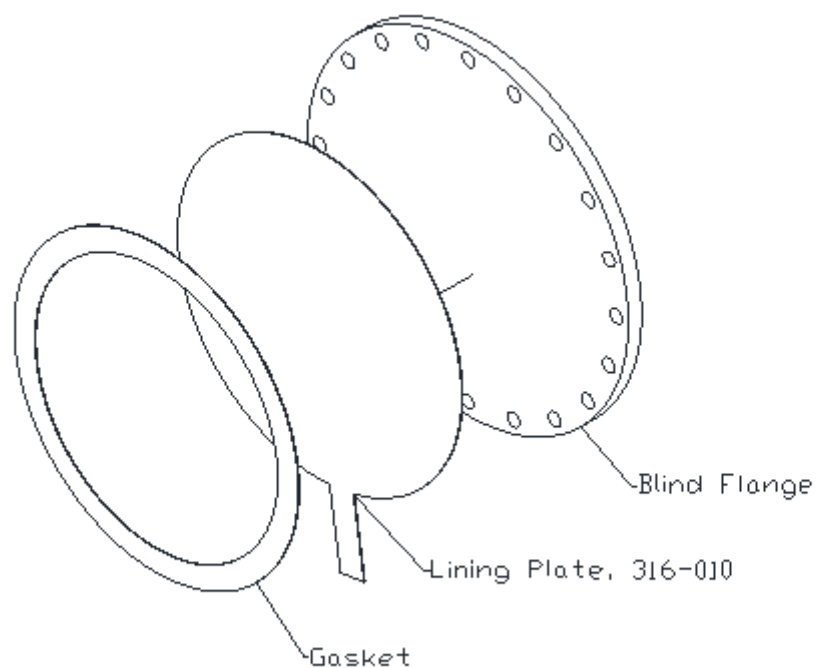


Figure 1. Assembly principle of Lining Plate with Blind Flange and Gasket.

2. DESIGNATION

Name, DN, pressure class of pipe class, material of lining plate, standard No.

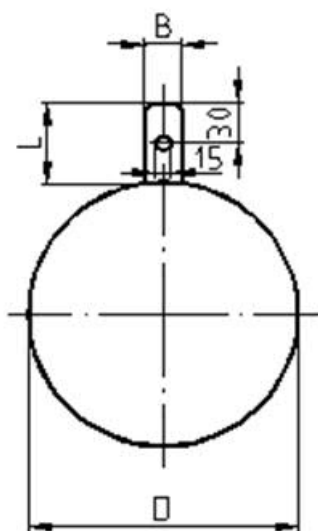
Example: Lining Plate, DN 600, PN 16, 1.4404, 316-010

PIPING STANDARDS 317-010 - AUSTENITIC STAINLESS STEEL PIPING - SPADE BLANK**1. GENERAL**

Spade according to this standard can be used between flanges.

If the pipe size $DN \leq 400$, the plate material is 1.4307 or 1.4404 according to the pipe class.

When $DN > 400$, the plate material is P265GH HDG. P265GH HDG spades must be fitted together with lining plate. Lining plates shall be according to the standard 316-010. Lining plates should be used as alternative.



Dimensions are in Table 1.

Table 1

DN	Plate thickness (mm) s								L	B	
	Pipe Class										
	10H1A 10H2A		16H1A 16H2A		25H1A 25H2A		40H1A 40H2A				
	s	D	s	D	s	D	s	D			
15	5	51	5	51	5	51	5	51	75	20	
20	5	61	5	61	5	61	5	61		30	
25	5	71	5	71	5	71	5	71			
32	5	82	5	82	5	82	5	82			
40	5	92	5	92	5	92	8	92			
50	5	107	5	107	8	107	8	107			
65	5	127	5	127	8	127	8	127	100	50	
80	5	142	8	142	8	142	10	142			
100	5	162	8	162	10	168	12	168			
125	8	192	8	192	10	194	15	194			
150	8	218	10	218	12	224	15	224			
200	8	273	12	273	15	284	20	290			
250	10	328	15	329	20	340	25	352		150	85
300	12	378	20	384	25	400	30	417			
350	12	438	20	444	25	457	30	474			
400	15	489	20	495	30	514	35	546			
450	15 + 4	539	25 + 4	555	30 + 4	564					
500	20 + 4	594	25 + 4	617	35 + 4	624					
600	20 + 4	695	30 + 4	734	40 + 4	731					
700	25 + 4	810	35 + 4	804	45 + 4	833					
800	25 + 4	917	40 + 4	911	50 + 4	942			200		
900	30 + 4	1017	45 + 4	1011							
1000	30 + 4	1124	50 + 4	1128							

Notes: 1. One hole in handle for spade (two for ring spacer).
 2. The + value in the table specifies the thickness of lining plate (2 x 2.0 mm),
 e.g. 20+4=20 mm carbon steel+ 2x 2.0 mm stainless steel=24 mm

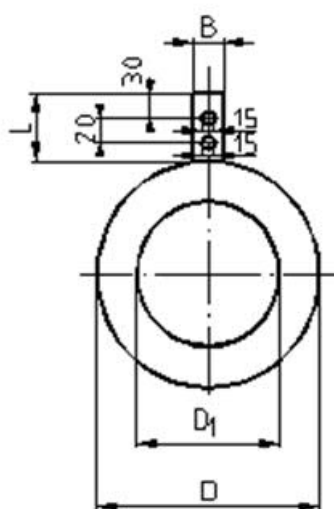
2. DESIGNATION

Name, DN, pressure difference, standard No.

Example: Spade blank, 150, 0.6, 317-010

PIPING STANDARDS 317-011 - AUSTENITIC STAINLESS STEEL PIPING - OPEN SPADE**1. GENERAL**

Open spade according to this standard shall be used between flanges when blind disc according to standard 317-010 has been removed.

2. DIMENSIONS

Dimensions are in Table 1.

Table 1

	Plate thickness (mm)												L	B
DN	Pipe Class													
	10H1A 10H2A			16H1A 16H2A			25H1A 25H2A			40H1A 40H2A			75	30
	s	D1	D	s	D1	D	s	D1	D	s	D1	D		
15	5	22	51	5	22	51	5	22	51	5	22	51	75	30
20	5	27	61	5	27	61	5	27	61	5	27	61		
25	5	34	71	5	34	71	5	34	71	5	34	71		
32	5	43	82	5	43	82	5	43	82	5	43	82		
40	5	49	92	5	49	92	5	49	92	8	49	92		
50	5	61	107	5	61	107	8	57	107	8	61	107		
65	5	77	127	5	77	127	8	73	127	8	77	127		
80	5	89	142	8	89	142	8	86	142	10	89	142	100	50
100	5	115	162	8	115	162	10	111	168	12	115	168		
125	8	141	192	8	141	192	10	137	194	15	141	194		
150	8	169	218	10	169	218	12	164	224	15	169	224		
200	8	220	273	12	220	273	15	220	284	20	220	290		
250	10	273	328	15	273	329	20	237	340	25	273	352		
300	12	324	378	20	324	384	25	324	400	30	324	417		
350	12	356	438	20	356	444	25	356	457	30	356	474	150	85
400	15	407	489	20	407	495	30	407	514	35	407	546		
450	19	458	539	29	458	555	34	458	564					
500	24	508	594	29	508	617	39	508	624					
600	24	610	695	34	610	734	44	610	731					
700	29	712	810	39	712	804	49	712	833					
800	29	813	917	44	813	911	54	813	942					
9000	34	914	1017	49	914	1011							200	
1000	34	1016	1124	54	1016	1128								

3. MATERIAL

Material according to the Pipe Class.

4. NOTES

1) Two holes in handle indicates open spade (one for spade blank)

5. DESIGNATION

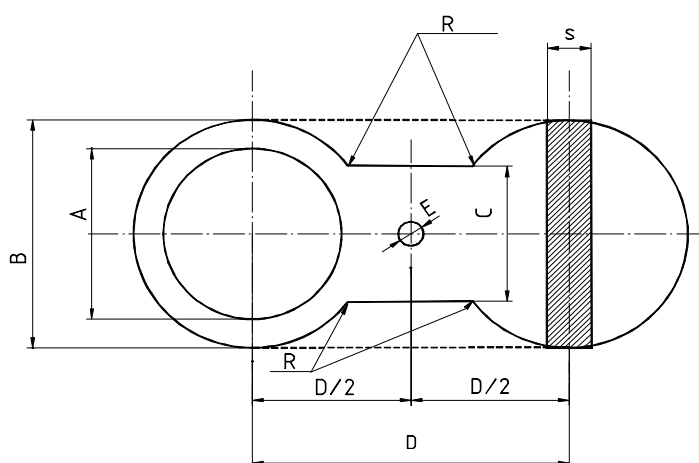
Name, DN, pressure difference, standard No.

Example: Open spade, 250, 0.25, 317-011

PIPING STANDARDS 317-012 - AUSTENITIC STAINLESS STEEL PIPING - SPECTACLE BLIND

1. GENERAL

Spectacle blind shall be used between flanges.



2. DIMENSIONS

DN	0H1A - 10H1A 0H2A - 10H2A							
	A	B	C	D	E	R	S	bar
50	61	107	65	125	18	15	5	10
65	77	127	65	145	18	15	5	10
80	89	142	40	160	18	15	5	10
100	115	162	45	180	18	15	5	10
125	141	192	55	210	18	15	8	10
150	169	218	90	240	22	15	8	10
200	220	273	90	295	22	15	8	10
250	273	328	140	350	22	15	14	10
300	324	378	140	400	22	15	16	10
350	356	438	140	460	22	15	16	10
400	407	489	140	515	26	15	19	10

AUSTENITIC STAINLESS STEEL PIPING 317-01102.12.2021

DN	16H1A 16H2A							
	A	B	C	D	E	R	S	bar
50	61	107	65	125	18	15	5	16
65	77	127	65	145	18	15	5	16
80	89	142	40	160	18	15	8	16
100	115	162	45	180	18	15	8	16
125	141	192	55	210	18	15	8	16
150	169	218	90	240	22	15	10	16
200	220	273	90	295	22	15	16	16
250	273	329	140	355	26	15	19	16
300	324	384	140	410	26	15	24	16
350	356	444	140	470	26	15	24	16
400	407	495	140	525	30	15	24	16

DN	25H1A 25H2A							
	A	B	C	D	E	R	S	bar
50	61	107	65	125	18	15	8	25
65	77	127	70	145	18	15	8	25
80	89	142	70	160	18	15	8	25
100	115	168	70	190	22	15	10	25
125	141	194	90	220	26	15	10	25
150	169	224	90	250	26	15	16	25
200	220	284	90	310	26	15	19	25
250	273	340	140	370	30	15	24	25
300	324	400	140	430	30	15	29	25

DN	40H1A 40H2A							
	A	B	C	D	E	R	S	bar
50	61	107	65	125	18	15	8	40
65	77	127	70	145	18	15	8	40
80	89	142	70	160	18	15	10	40
100	115	168	70	190	22	15	16	40
125	141	194	90	220	26	15	19	40
150	169	224	90	250	26	15	19	40
200	220	290	90	320	30	15	24	40
250	273	352	140	385	33	15	29	40
300	324	417	140	450	33	15	34	40

3. MATERIAL

Material according to the Pipe Class.

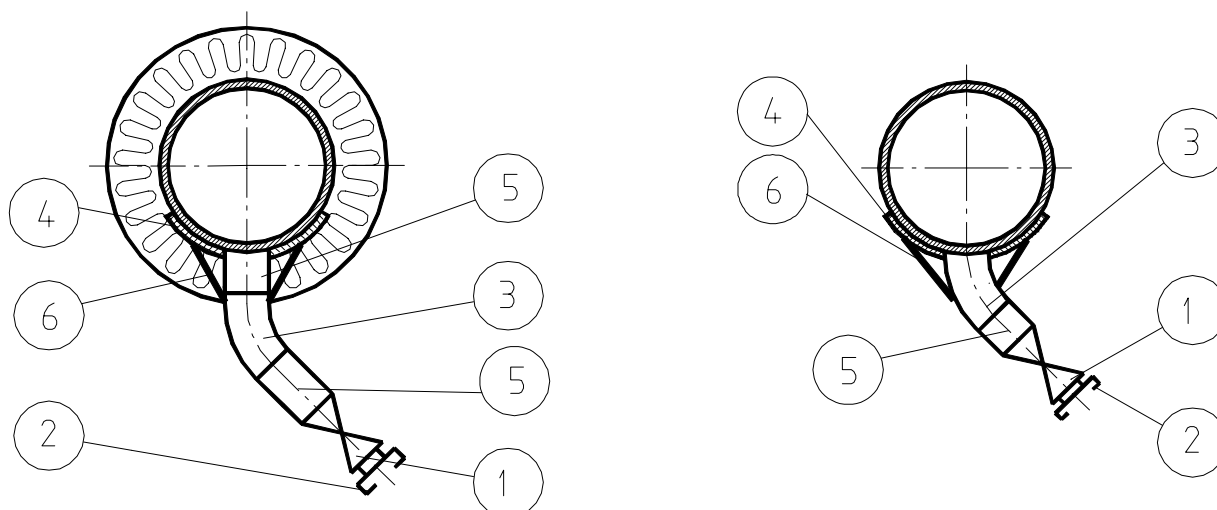
4. DESIGNATION

Name, DN, PN, standard No.

Example: Spectacle blind, DN 250, PN10, 317-012

PIPING STANDARDS 320-012 - AUSTENITIC STAINLESS STEEL PIPING - DRAIN AND SPOOLING CONNECTION DN 40 AND DN 50. UP TO PN40

1. DIMENSIONS



DN 50

6	2	Flat bar 40 x 4	EN 10058	1.4404 or equal
5	1	Pipe 60.3 x 2.0	EN 10217-7	1)
4	1	Reinforcement ring	Thickness 4.0 mm	1.4307 or 1.4432 1)
3	1	Bend 60° 60.3 x 2.0	EN 10253-4	1)
2	1	Kamlok coupling R2" with ext. thread	EN 14420-7 Form FF	1)
1	1	Valve DN 50 TH/WE see valve spec.		
Part	Pcs	Description	Standard No.	Material

DN 40

6	2	Flat bar 30 x 3	EN 10058	1.4404 or equal
5	1	Pipe 48.3 x 2.0	EN 10217-7	1)
4	1	Reinforcement ring	Thickness 4.0 mm	1.4307 or 1.4432 1)
3	1	Bend 60° 48.3 x 2.0	EN 10253-4	1)
2	1	Kamlok coupling R 1 1/4" ext. thread	EN 14420-7 Form FF	1)
1	1	Valve DN 40 TH/WE see valve spec.		
Part	Pcs	Description	Standard No.	Material

NOTE

- 1) Material and pipe parts according to each pipe class.
- 2) Thickness of the reinforcement ring = wall thickness of the main pipe, min.3mm

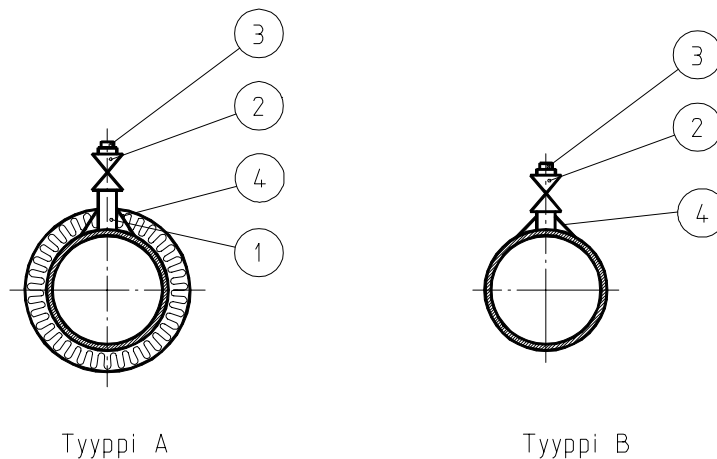
2. DESIGNATION

Name, DN, type, material, standard No.

Example: Drain connection, DN 50, A, 1.4432, 320-012

PIPING STANDARDS 320-015 - AUSTENITIC STAINLESS STEEL PIPING - VENT CONNECTION DN 25. UP TO PN40

1. DIMENSIONS



4	2	Flat bar 30 x 4mm	EN 10058	1.4404 or equal
3	1	Hex head plug DN 25	EN 10241	1.4404 or equal
2	1	Valve DN 25, TH/WE according to valve spec.		
1	1	Pipe 33.7 x 2.0	EN 10217-7	1)
Part	Pcs	Description	Standard No.	Material

NOTE 1) Material and pipe parts according to each pipe class.

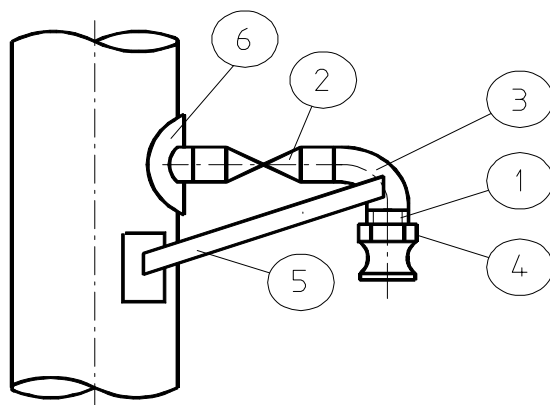
2. DESIGNATION

Name, DN, type, material, standard No.

Example: Vent connection, DN 25, A, 1.4432, 320-015

PIPING STANDARDS 320-020 - AUSTENITIC STAINLESS STEEL PIPING - SAMPLE TAKING CONNECTION DN 40 UP TO PN40

1. DIMENSIONS



DN 40

6	1	Reinforcement ring 2)		1.4307 or 1.4432 1)
5	2	Flat bar 30 x 2	EN 10058	1.4404 or equal
4	1	Hose coupling R 1 1/2" int. thread		AlSi1Mg 3)
3	1	Elbow 90°C 48.3 x 2.0	EN 10253-4	1)
2	1	Valve DN 40 WE see valve spec.		
1	1	Screwed end R 1 1/2"	EN 10241	1.4404 or equal
Part	Pcs	Description	Standard No.	Material

NOTE

- 1) Material and pipe parts according to each pipe class.
- 2) Thickness of the reinforcement ring = the wall thickness of the main pipe, min. 3mm
- 3) Material 1.4404 / 1.4432 in chemical lines.

2. DESIGNATION

Name, material, standard No.

Example: Sample taking connection, DN 40, 1.4404, 320-020

CARBON STEEL PIPING

3 CARBON STEEL PIPING

PIPING STANDARD 330-003

CARBON STEEL PIPING

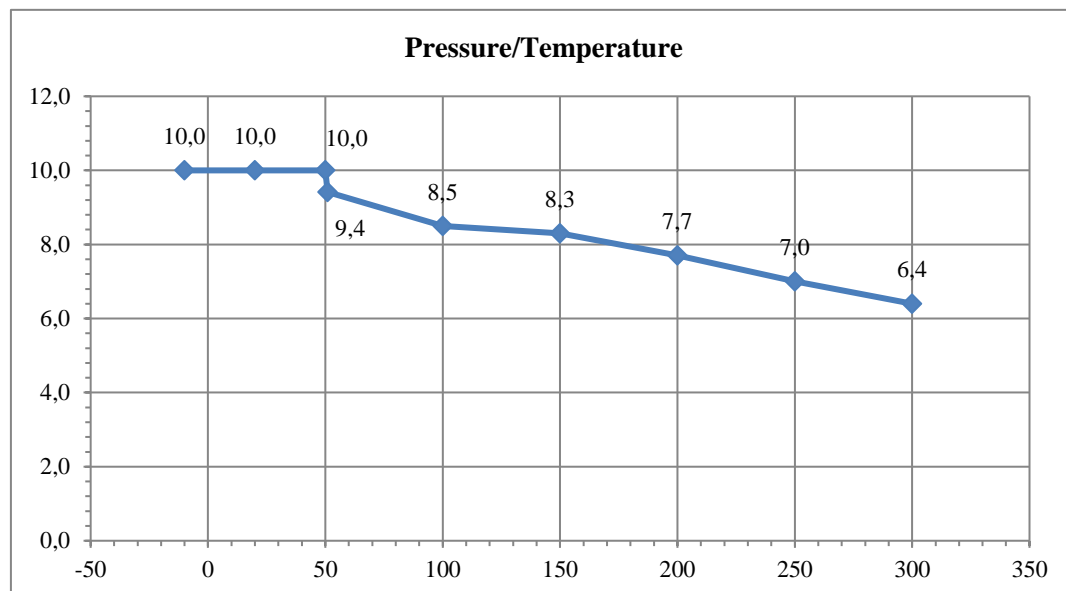
PIPE CLASS 10C1C

General: Pipe Class: Carbon steel pipe class 10C1C
 Design code: EN 13480-3
 Pipe material: EN10216-2, EN10217-2 and EN 10217-5 material grade P235GH

 Corrosion allowance: 1 mm

Allowable overpressures:

T [°C]	p [bar]
-10	10,0
20	10,0
50	10,0
100	8,5
150	8,3
200	7,7
250	7,0
300	6,4



Linear interpolation of pressure between two adjacent temperature values shall be applied for temperature above 50°C. For temperature between 50-100 linear interpolation shall be made using pressure and temperature values of 20°C and 100°C.

External pressure rating:

Pipes in the pipe class are resistant for full vacuum up to DN 500 at temperature 100°C. Maximum external pressure for bigger pipes and stiffening ring requirements shall be checked from standard 301-022

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PIPING STANDARD 330-003

CARBON STEEL PIPING

PIPE CLASS 10C1C

Piping components	DN-range	Dimension standard	Dimension type / additional definition	Material		Material Certificate EN 10204	Remarks
				Designation	Standard		
Pipes	15-300	EN 10216-2:2014	SAWL	P235GH	EN 10216-2:2014	3.1	4
	350-500	EN 10217-2:2019		P235GH	EN 10217-2:2019	3.1	
	600-1200	EN 10217-5:2019		P235GH	EN 10217-5:2019	3.1	
Elbows	15-1200	EN 10253-2:2007	Type A, 3D	P235GH	EN 10253-2:2007	3.1	5
Tee pieces	15-1200	EN 10253-2:2007	Type A	P235GH	EN 10253-2:2007	3.1	
Reducers	15-1200	EN 10253-2:2007	Type A	P235GH	EN 10253-2:2007	3.1	
Caps	15-1200	EN 10253-2:2007	Type A	P235GH	EN 10253-2:2007	3.1	
Welding neck flanges	15-40	EN 1092-1:2018	Type 11, PN40	P245GH	EN 10222-2:2017	3.1	
	50-150	EN 1092-1:2018	Type 11, PN16	P245GH	EN 10222-2:2017	3.1	
	200-1200	EN 1092-1:2018	Type 11, PN10	P245GH	EN 10222-2:2017	3.1	
Blind flanges	15-40	EN 1092-1:2018	Type 05, PN40	P265GH	EN 10028-2:2017	3.1	
	50-150	EN 1092-1:2018	Type 05, PN16	P265GH	EN 10028-2:2017	3.1	
	200-1200	EN 1092-1:2018	Type 05, PN10	P265GH	EN 10028-2:2017	3.1	
Gaskets	15-80	EN 1514-1: 1997	Type IBC, PN40				1, 2
	100-200	EN 1514-1: 1997	Type IBC, PN16				1, 2
	250 - 1200	EN 1514-1: 1997	Type IBC, PN10				1, 2
Bolts		EN ISO 4014:2011		25CrMo4	EN 10269:2013	2.2	
Nuts		EN ISO 4032:2013		C35E	EN 10269:2013	2.2	
Washers		EN ISO7089:2001	Grade A	S235JR	EN 10025-2:2004		
Threaded fittings	DN15-50	EN 10241:2000		P235GH	EN 10273:2016	3.1	6

1. Gasket material according to the Flow Substance. If spiral gaskets are used, gasket dimension standard is EN1514-2

2. Gasket thickness 2mm. Spiral gasket thickness 4.5mm.

3

4. Testing category TC1. Material certificate shall contain information of approvals of welding procedures, welders and NDT-personnel. In PED categories II and III these shall be approved by the notified body or competent third party.

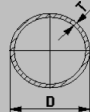
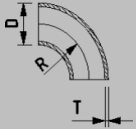
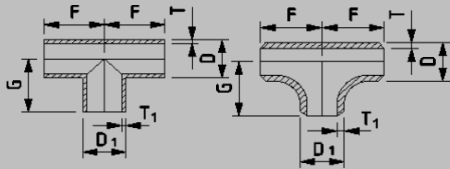
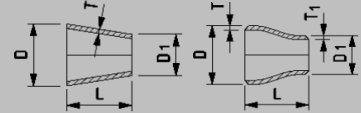
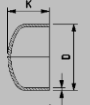
5. Bend R=100 is alternative for Elbows in the size range DN15-DN40. Bends shall fill the requirements of EN13480.

6. Pipe designer shall confirm correct type of the threads case by case when threaded components are used. Preferable thread types EN 10226-1.

PIPING STANDARD 330-003

CARBON STEEL PIPING

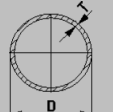
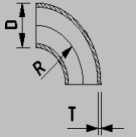
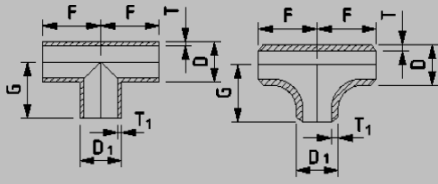
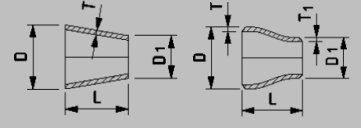
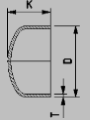
PIPE CLASS 10C1C

DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R	R	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
15	21,3 x 2,0	21,3 x 2,0	38,0	-	15	21,3	2,0	2,0	25/25					21,3 x 2,0
20	26,9 x 2,3	26,9 x 2,3	38,0	-	20	26,9	2,3	2,3	29/29					26,9 x 2,3
					15	21,3	2,3	2,0	29/29	15	21,3	2,3	38	
25	33,7 x 2,6	33,7 x 2,6	38,0	-	25	33,7	2,6	2,6	38/38					33,7 x 2,6
					20	26,9	2,6	2,3	38/38	20	26,9	2,6	51	
					15	21,3	2,6	2,0	38/38	15	21,3	2,6	51	
32	42,4 x 2,6	42,4 x 2,6	48,0	-	32	42,4	2,6	2,6	48/48					42,4 x 2,6
					25	33,7	2,6	2,6	48/48	25	33,7	2,6	51	
					20	26,9	2,6	2,3	48/48	20	26,9	2,6	51	
					15	21,3	2,6	2,0	48/48	15	21,3	2,6	51	
40	48,3 x 2,6	48,3 x 2,6	57,0	-	40	48,3	2,6	2,6	57/57					48,3 x 2,6
					32	42,4	2,6	2,6	57/57	32	42,4	2,6	64	
					25	33,7	2,6	2,6	57/57	25	33,7	2,6	64	
					20	26,9	2,6	2,3	57/57	20	26,9	2,6	64	
					15	21,3	2,6	2,0	57/57					

PIPING STANDARD 330-003

CARBON STEEL PIPING

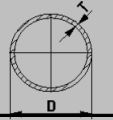
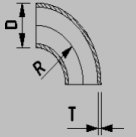
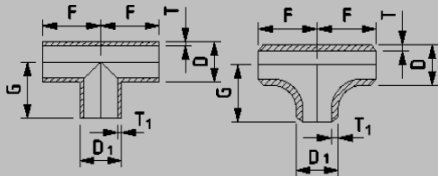
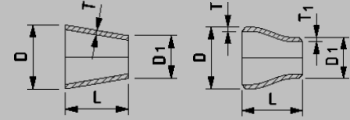
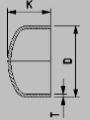
PIPE CLASS 10C1C

DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
50	60,3 x 2,9	60,3 x 2,9	76,0	-	50	60,3	2,9	2,9	64/64	40	48,3	2,9	76	60,3 x 2,9
					40	48,3	2,9	2,6	64/60	32	42,4	2,9	76	
					32	42,4	2,9	2,6	64/57	25	33,7	2,9	76	
					25	33,7	2,9	2,6	64/51	20	26,9	2,9	76	
					20	26,9	2,9	2,3	64/44					
65	76,1 x 2,9	76,1 x 2,9	95,0	-	65	76,1	2,9	2,9	76/76	50	60,3	2,9	89	76,1 x 2,9
					50	60,3	2,9	2,9	76/70	40	48,3	2,9	89	
					40	48,3	2,9	2,6	76/67	32	42,4	2,9	89	
					32	42,4	2,9	2,6	76/64	25	33,7	2,9	89	
					25	33,7	2,9	2,6	76/57					
80	88,9 x 3,2	88,9 x 3,2	114,0	-	80	88,9	3,2	3,2	86/86	65	76,1	3,2	89	88,9 x 3,2
					65	76,1	3,2	2,9	86/83	50	60,3	3,2	89	
					50	60,3	3,2	2,9	86/76	40	48,3	3,2	89	
					40	48,3	3,2	2,6	86/73	32	42,4	3,2	89	
					32	42,4	3,2	2,6	86/70					

PIPING STANDARD 330-003

CARBON STEEL PIPING

PIPE CLASS 10C1C

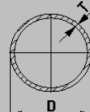
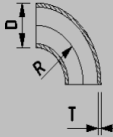
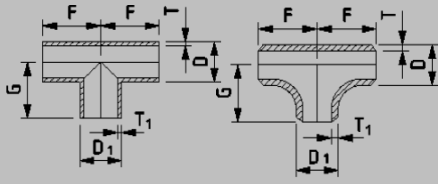
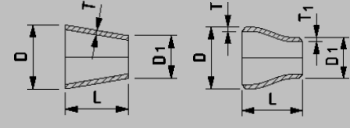
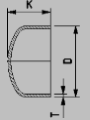
DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R	R	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
100	114,3 x 3,6	114,3 x 3,6	152,0	-	100	114,3	3,6	3,6	105/105	80	88,9	3,6	102	114,3 x 3,6
					80	88,9	3,6	3,2	105/98					
					65	76,1	3,6	2,9	105/95					
					50	60,3	3,6	2,9	105/89					
					40	48,3	3,6	2,6	105/86					
125	139,7 x 4,0	139,7 x 4,0	190,0	-	125	139,7	4,0	4,0	124/124	100	114,3	4,0	127	139,7 x 4,0
					100	114,3	4,0	3,6	124/117					
					80	88,9	4,0	3,2	124/111					
					65	76,1	4,0	2,9	124/108					
					50	60,3	4,0	2,9	124/105					
150	168,3 x 4,5	168,3 x 4,5	229,0	-	150	168,3	4,5	4,5	143/143	125	139,7	4,5	140	168,3 x 4,5
					125	139,7	4,5	4,0	143/137					
					100	114,3	4,5	3,6	143/130					
					80	88,9	4,5	3,2	143/124					
										80	88,9	4,5	140	
										65	76,1	4,5	140	

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PIPING STANDARD 330-003

CARBON STEEL PIPING

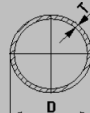
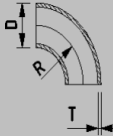
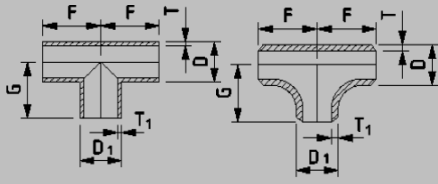
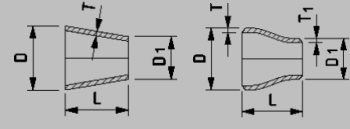
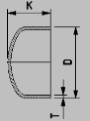
PIPE CLASS 10C1C

DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
200	219,1 x 6,3	219,1 x 6,3	305,0	-	200	219,1	6,3	6,3	178/178	150	168,3	6,3	152	219,1 x 6,3
					150	168,3	6,3	4,5	178/168	125	139,7	6,3	152	
					125	139,7	6,3	4,0	178/162	100	114,3	6,3	152	
					100	114,3	6,3	3,6	178/156	80	88,9	6,3	152	
250	273,0 x 6,3	273,0 x 6,3	381,0	-	250	273	6,3	6,3	216/216	200	219,1	6,3	178	273,0 x 6,3
					200	219,1	6,3	6,3	216/203	150	168,3	6,3	178	
					150	168,3	6,3	4,5	216/194	125	139,7	6,3	178	
					125	139,7	6,3	4,0	216/191	100	114,3	6,3	178	
					100	114,3	6,3	3,6	216/184					
300	323,9 x 7,1	323,9 x 7,1	457,0	-	300	323,9	7,1	7,1	254/254	250	273	7,1	203	323,9 x 7,1
					250	273	7,1	6,3	254/241	200	219,1	7,1	203	
					200	219,1	7,1	6,3	254/229	150	168,3	7,1	203	
					150	168,3	7,1	4,5	254/219	125	139,7	7,1	203	

PIPING STANDARD 330-003

CARBON STEEL PIPING

PIPE CLASS 10C1C

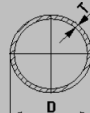
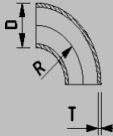
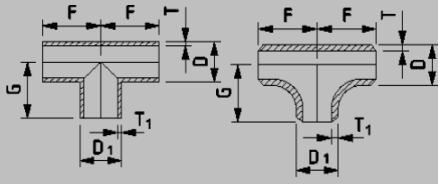
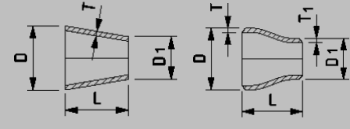
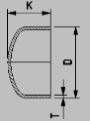
DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
350	355,6 x 5,6	355,6 x 5,6	533,0	-	350	—	6,3	6,3	279/279	300 250 200 150	323,9 273 219,1 168,3	7,1 7,1 7,1 7,1	330 330 330 330	355,6 x 5,6
					300	323,9	6,3	7,1	279/270					
					250	273	6,3	6,3	279/257					
					200	219,1	6,3	6,3	279/248					
400	406,4 x 6,3	406,4 x 6,3	610,0	-	400	406,4	7,1	7,1	305/305	350 300 250 200	355,6 323,9 273 219,1	7,1 7,1 7,1 7,1	356 356 356 356	406,4 x 6,3
					350	355,6	7,1	6,3	305/305					
					300	323,9	7,1	7,1	305/295					
					250	273	7,1	6,3	305/283					
					200	219,1	7,1	6,3	305/273					
					150	168,3	7,1	4,5	305/264					
450	457,0 x 6,3	457,0 x 6,3	686,0	-	450	457	8,0	8,0	343/343	400 350 300 250	406,4 355,6 323,9 273	7,1 7,1 7,1 7,1	381 381 381 381	457,0 x 6,3
					400	406,4	8,0	7,1	343/330					
					350	355,6	8,0	6,3	343/330					
					300	323,9	8,0	7,1	343/321					
					250	273	8,0	6,3	343/308					
					200	219,1	8,0	6,3	343/298					

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PIPING STANDARD 330-003

CARBON STEEL PIPING

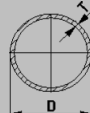
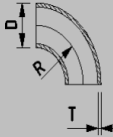
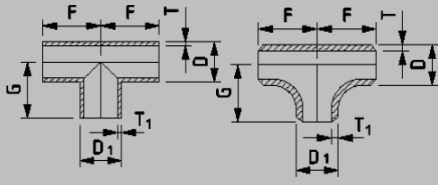
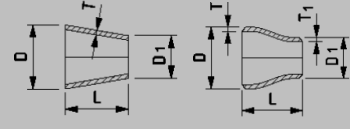
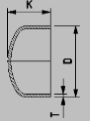
PIPE CLASS 10C1C

DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R	R	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
500	508,0 x 6,3	508,0 x 6,3	762,0	-	500	508	8,8	8,8	381/381	450	457	7,1	508	508,0 x 6,3
					450	457	8,8	7,1	381/368					
					400	406,4	8,8	7,1	381/356					
					300	323,9	8,8	7,1	381/346					
					250	273	8,8	6,3	381/333					
600	610,0 x 6,3	610,0 x 6,3	914,0	-	600	610	10,0	10,0	432/432	500	508	6,3	508	610,0 x 6,3
					500	508	10,0	8,0	432/432					
					400	406,4	10,0	7,1	432/406					
					300	323,9	10,0	7,1	432/397					
					250	273	10,0	6,3	432/384					
700	711,0 x 7,1	711,0 x 7,1	1070,0	-	700	711	10,0	10,0	521/521	600	610	7,1	610	711,0 x 7,1
					600	610	10,0	10,0	521/508					
					500	508	10,0	8,0	521/483					
					400	406,4	10,0	7,1	521/457					
					300	323,9	10,0	7,1	521/448					

PIPING STANDARD 330-003

CARBON STEEL PIPING

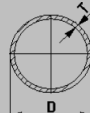
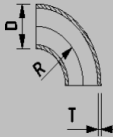
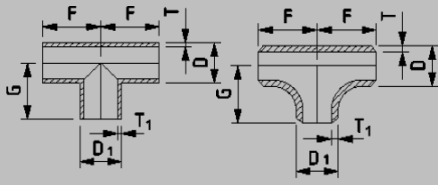
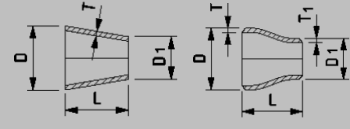
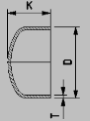
PIPE CLASS 10C1C

DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
800	813,0 x 8,0	813,0 x 8,0	1219,0	-	800	813	12,5	12,5	597/597	700	711	8,0	610	813,0 x 8,0
					700	711	12,5	10,0	597/572					
					600	610	12,5	10,0	597/559					
					500	508	12,5	8,0	597/533					
					400	406,4	12,5	7,1	597/508					
900	914,0 x 10,0	914,0 x 10,0	1370,0	-	900	914	12,5	12,5	673/673	800	813	10,0	610	914,0 x 10,0
					800	813	12,5	12,5	673/648					
					700	711	12,5	10,0	673/622					
					600	610	12,5	10,0	673/610					
					500	508	12,5	8,0	673/584					
					400	406,4	12,5	7,1	673/559					
1000	1016,0 x 10,0	1016,0 x 10,0	1525,0	-	1000	1016	14,2	14,2	749/749	900	914	10,0	610	1016,0 x 10,0
					900	914	14,2	12,5	749/737					
					800	813	14,2	11,0	749/711					
					700	711	14,2	10,0	749/673					
					600	610	14,2	10,0	749/660					

PIPING STANDARD 330-003

CARBON STEEL PIPING

PIPE CLASS 10C1C

DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R	R	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
1200	1219,0 x 12,5	1219,0 x 12,5	1830,0	-	1200	1219	16,0	16,0	889/838	1000	1016	12,5	711	1219,0 x 12,5
					1000	1016	16,0	14,2	889/813	900	914	12,5	711	
					900	914	16,0	14,2	889/787	800	813	12,5	711	
					800	813	16,0	14,2	889/787					
					700	711	16,0	14,2	889/762					

PIPING STANDARD 330-003
CARBON STEEL PIPING
PIPE CLASS 10C1C

Header Pipe			Branch Pipe																											
			15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	1200	DN			
			21,3	26,9	33,7	42,4	48,3	60,3	76,1	88,9	114,3	139,7	168,3	219,1	273,0	323,9	355,6	406,4	457	508	610	711	813	914	1016	1219	D			
DN	D	t	2,0	2,3	2,6	2,6	2,6	2,9	2,9	3,2	3,6	4,0	4,5	6,3	6,3	7,1	5,6	6,3	6,3	6,3	6,3	7,1	8,0	10,0	10,0	12,5	t			
15	21,3	2,0	T																											
20	26,9	2,3	T	T																										
25	33,7	2,6	UB	T	T																									
32	42,4	2,6	UB	UB	T	T																								
40	48,3	2,6	UB	UB	UB	T	T																							
50	60,3	2,9	UB	UB	UB	UB	T	T																<div>T</div> <div>T-piece</div> <div>UB</div> <div>Unreinforced branch</div> <div>RB+W</div> <div>Reinforced branch - Increased wall thickness of the nozzle pipe</div> <div>RB+P</div> <div>Reinforced branch - Reinforcement plate</div> <div>RB+WP</div> <div>Reinforced branch - Reinforcement plate + Increased wall thickness of the nozzle pipe</div>						
65	76,1	2,9	UB	UB	UB	UB	UB	T	T																					
80	88,9	3,2	UB	UB	UB	UB	UB	UB	T	T																				
100	114,3	3,6	UB	UB	UB	UB	UB	UB	UB	T	T																			
125	139,7	4,0	UB	UB	UB	UB	UB	UB	UB	T	T																			
150	168,3	4,5	UB	UB	UB	UB	UB	UB	UB	UB	UB	T	T																	
200	219,1	6,3	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	T	T																
250	273,0	6,3	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	T	T																
300	323,9	7,1	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	T	T															
350	355,6	5,6	UB	UB	UB	UB	UB	UB	UB	UB	RB+W 100x8	RB+P 40x5,6	RB+P 40x5,6	T	T	T	T													
400	406,4	6,3	UB	UB	UB	UB	UB	UB	UB	UB	UB	RB+P 50x6,3	RB+P 50x6,3	RB+P 50x6,3	T	T	T	T												
450	457	6,3	UB	UB	UB	UB	UB	UB	UB	UB	RB+W 100x8	RB+P 50x6,3	RB+P 50x6,3	RB+P 50x6,3	RB+P 50x6,3	T	T	T	T											
500	508	6,3	UB	UB	UB	UB	UB	UB	RB+W 100x6,3	RB+W 100x8	RB+W 100x8	RB+P 50x6,3	RB+P 50x6,3	RB+P 50x6,3	RB+P 50x6,3	RB+W 100x14,2	RB+W 100x14,2	T	T	T										
600	610	6,3	UB	UB	UB	UB	RB+W 100x6,3	RB+W 100x6,3	RB+W 100x6,3	RB+W 100x8	RB+W 100x8	RB+P 60x6,3	RB+P 60x6,3	RB+P 60x6,3	RB-WP RP60x7,1 + W100x12,5	RB-WP RP60x6,3 + W100x12,5	RB-W 100x14,2	T	RB-WP RP60x6,3 + W100x12,5	T	T									
700	711	7,1	UB	UB	UB	UB	RB+W 100x6,3	RB+W 100x6,3	RB+W 100x8	RB+W 100x8	RB+P 70x7,1	RB+P 70x7,1	RB+P 70x7,1	RB-WP RP70x7,1 + W100x12,5	RB-WP RP70x7,1 + W100x12,5	RB-WP RP70x7,1 + W100x12,5	T	RB-WP RP70x7,1 + W100x12,5	T	T	T									
800	813	8,0	UB	UB	UB	UB	RB+W 100x6,3	RB+W 100x6,3	RB+W 100x8	RB+W 100x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB+P 80x8	RB-WP RP80x8 + W100x12,5	RB-WP RP80x8 + W100x12,5	RB-WP RP80x8 + W100x12,5	RB-WP RP80x8 + W100x12,5	T	T	T	T								
900	914	10,0	UB	UB	UB	UB	UB	UB	UB	RB+W 100x8	RB+P 90x10	RB+P 90x10	RB+P 90x10	RB+P 90x10	RB+P 90x10	RB+P 90x10	RB+P 90x10	RB-WP RP90x10 + W100x12,5	T	T	T	T	T							
1000	1016	10,0	UB	UB	UB	UB	UB	UB	RB+W 100x8	RB+W 100x8	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB+P 100x10	RB-WP RP100x10 + W100x12,5	RB-WP RP100x10 + W100x12,5	T	T	T	T	T						
1200	1219	12,5	UB	UB	UB	UB	UB	UB	UB	UB	RB+P 120x12,5	RB+P 120x12,5	RB+P 120x12,5	RB+P 120x12,5	RB+P 120x12,5	RB+P 120x12,5	RB+P 120x12,5	RB+P 120x12,5	RB+P 120x12,5	RB+P 120x12,5	T	T	T	T	T					

T	T-piece
UB	Unreinforced branch
RB+W	Reinforced branch - Increased wall thickness of the nozzle pipe
RB+P	Reinforced branch - Reinforcement plate
RB+WP	Reinforced branch - Reinforcement plate + Increased wall thickness of the nozzle pipe

- Notes!
1. The branch table is to be used only for straight pipe branches. The angle of branch connection must be 90°±5°.
 2. Thickness of the reinforcement plates are always the thickness of header pipe and width of plate is shown in the table.
 3. Significant external forces or moments to branch connection are not taken into account. In those cases strenght of branch connection has to be studied case by case
 4. If there is risk for cyclic or dynamic loads in the piping, reinforced branch shall be used instead of UB.

PIPING STANDARD 330-004

CARBON STEEL PIPING

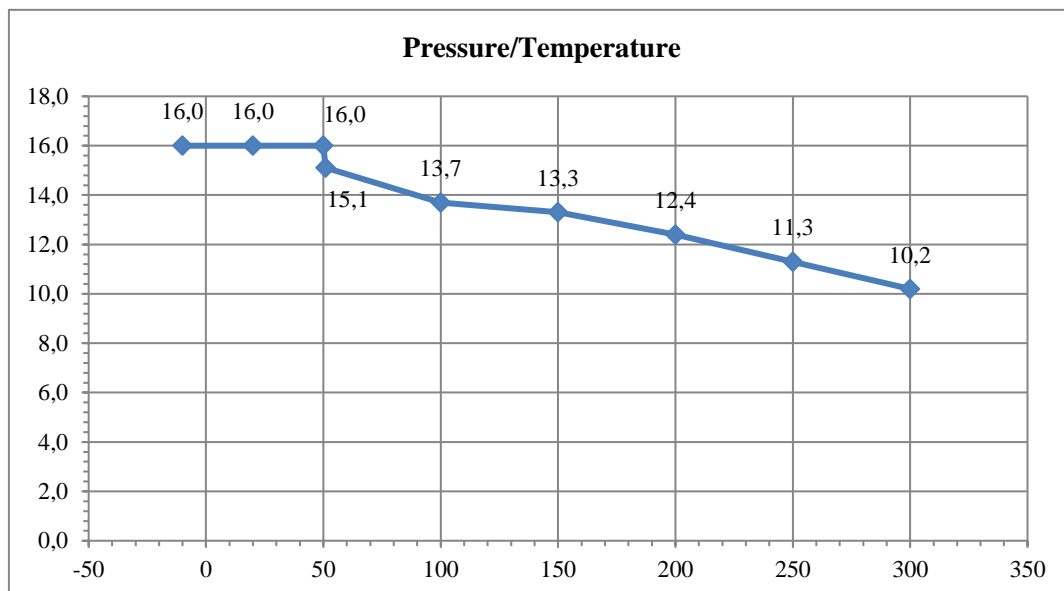
PIPE CLASS 16C1C

General: Pipe Class: Carbon steel pipe class 16C1C
 Design code: EN 13480-3
 Pipe material: EN10216-2, EN10217-2 and EN 10217-5 material grade P235GH

 Corrosion allowance: 1 mm

Allowable overpressures:

T [°C]	p [bar]
-10	16,0
20	16,0
50	16,0
100	13,7
150	13,3
200	12,4
250	11,3
300	10,2



Linear interpolation of pressure between two adjacent temperature values shall be applied for temperature above 50°C. For temperature between 50-100 linear interpolation shall be made using pressure and temperature values of 20°C and 100°C.

External pressure rating:

Pipes in the pipe class are resistant for full vacuum up to DN 1000 at temperature 100°C. Maximum external pressure for bigger pipes and stiffening ring requirements shall be checked from standard 301-022.

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PIPING STANDARD 330-004

CARBON STEEL PIPING

PIPE CLASS 16C1C

Piping components	DN-range	Dimension standard	Dimension type / additional definition	Material		Material Certificate EN 10204	Remarks
				Designation	Standard		
Pipes	15-300	EN 10216-2:2014		P235GH	EN 10216-2:2014	3.1	
	350-500	EN 10217-2:2019		P235GH	EN 10217-2:2019	3.1	4
	600-1200	EN 10217-5:2019		P235GH	EN 10217-5:2019	3.1	4
Elbows	15-1200	EN 10253-2:2007	Type A, 3D	P235GH	EN 10253-2:2007	3.1	5
Tee pieces	15-1200	EN 10253-2:2007	Type A	P235GH	EN 10253-2:2007	3.1	
Reducers	15-1200	EN 10253-2:2007	Type A	P235GH	EN 10253-2:2007	3.1	
Caps	15-1200	EN 10253-2:2007	Type A	P235GH	EN 10253-2:2007	3.1	
Welding neck flanges	15-40	EN 1092-1:2018	Type 11, PN40	P245GH	EN 10222-2:2017	3.1	
	50-1200	EN 1092-1:2018	Type 11, PN16	P245GH	EN 10222-2:2017	3.1	
Blind flanges	15-40	EN 1092-1:2018	Type 05, PN40	P265GH	EN 10028-2:2017	3.1	
	50-1200	EN 1092-1:2018	Type 05, PN16	P265GH	EN 10028-2:2017	3.1	
Gaskets	15-80 100-1200	EN 1514-1: 1997 EN 1514-1: 1997	Type IBC, PN40 Type IBC, PN16				1, 2 1, 2
Bolts		EN ISO 4014:2011		25CrMo4	EN 10269:2013	2.2	
Nuts		EN ISO 4032:2013		C35E	EN 10269:2013	2.2	
Washers		EN ISO7089:2001	Grade A	S235JR	EN 10025-2:2004		
Threaded fittings	DN15-50	EN 10241:2000		P235GH	EN 10273:2016	3.1	6

1. Gasket material according to the Flow Substance. If spiral gaskets are used, gasket dimension standard is EN1514-2

2. Gasket thickness 2mm. Spiral gasket thickness 4.5mm.

3

4. Testing category TC1. Material certificate shall contain information of approvals of welding procedures, welders and NDT-personnel. In PED categories II and III these shall be approved by the notified body or competent third party.

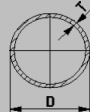
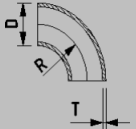
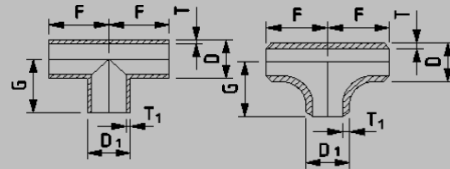

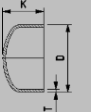
5. Bend R=100 is alternative for Elbows in the size range DN15-DN40. Bends shall fill the requirements of EN13480.

6. Pipe designer shall confirm correct type of the threads case by case when threaded components are used. Preferable thread types EN 10226-1.

PIPING STANDARD 330-004

CARBON STEEL PIPING

PIPE CLASS 16C1C

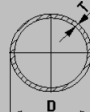
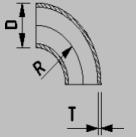
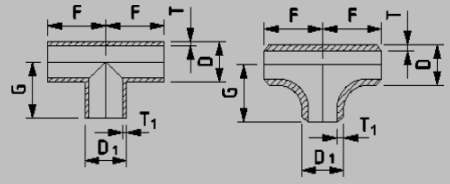
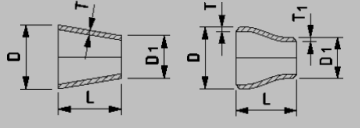
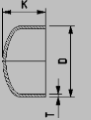
DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
15	21,3 x 2,0	21,3 x 2,0	38,0	-	15	21,3	2,0	2,0	25/25					21,3 x 2,0
20	26,9 x 2,3	26,9 x 2,3	38,0	-	20	26,9	2,3	2,3	29/29					26,9 x 2,3
					15	21,3	2,3	2,0	29/29	15	21,3	2,3	38	
25	33,7 x 2,6	33,7 x 2,6	38,0	-	25	33,7	2,6	2,6	38/38					33,7 x 2,6
					20	26,9	2,6	2,3	38/38	20	26,9	2,6	51	
					15	21,3	2,6	2,0	38/38	15	21,3	2,6	51	
32	42,4 x 2,6	42,4 x 2,6	48,0	-	32	42,4	2,6	2,6	48/48					42,4 x 2,6
					25	33,7	2,6	2,6	48/48	25	33,7	2,6	51	
					20	26,9	2,6	2,3	48/48	20	26,9	2,6	51	
					15	21,3	2,6	2,0	48/48	15	21,3	2,6	51	
40	48,3 x 2,6	48,3 x 2,6	57,0	-	40	48,3	2,6	2,6	57/57					48,3 x 2,6
					32	42,4	2,6	2,6	57/57	32	42,4	2,6	64	
					25	33,7	2,6	2,6	57/57	25	33,7	2,6	64	
					20	26,9	2,6	2,3	57/57	20	26,9	2,6	64	
					15	21,3	2,6	2,0	57/57					


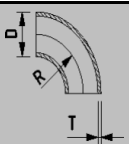
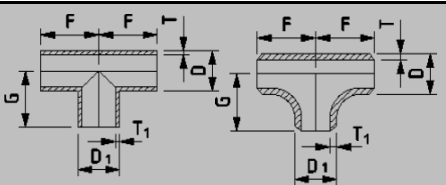
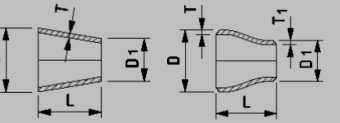
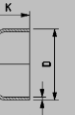
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PIPING STANDARD 330-004

CARBON STEEL PIPING

PIPE CLASS 16C1C

DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
50	60,3 x 2,9	60,3 x 2,9	76,0	-	50	60,3	2,9	2,9	64/64	40	48,3	2,9	76	60,3 x 2,9
					40	48,3	2,9	2,6	64/60	32	42,4	2,9	76	
					32	42,4	2,9	2,6	64/57	25	33,7	2,9	76	
					25	33,7	2,9	2,6	64/51	20	26,9	2,9	76	
					20	26,9	2,9	2,3	64/44					
65	76,1 x 2,9	76,1 x 2,9	95,0	-	65	76,1	2,9	2,9	76/76	50	60,3	2,9	89	76,1 x 2,9
					50	60,3	2,9	2,9	76/70	40	48,3	2,9	89	
					40	48,3	2,9	2,6	76/67	32	42,4	2,9	89	
					32	42,4	2,9	2,6	76/64	25	33,7	2,9	89	
					25	33,7	2,9	2,6	76/57					
80	88,9 x 3,2	88,9 x 3,2	114,0	-	80	88,9	3,2	3,2	86/86	65	76,1	3,2	89	88,9 x 3,2
					65	76,1	3,2	2,9	86/83	50	60,3	3,2	89	
					50	60,3	3,2	2,9	86/76	40	48,3	3,2	89	
					40	48,3	3,2	2,6	86/73	32	42,4	3,2	89	
					32	42,4	3,2	2,6	86/70					

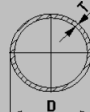
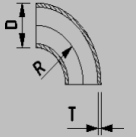
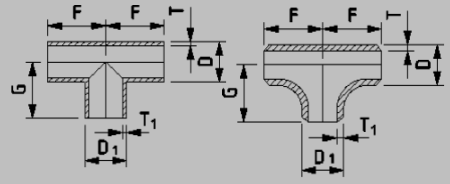
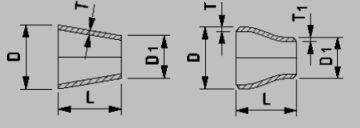
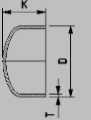
DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R	R	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
			3D	5D										
100	114,3 x 3,6	114,3 x 3,6	152,0	-	100	114,3	3,6	3,6	105/105					114,3 x 3,6
					80	88,9	3,6	3,2	105/98	80	88,9	3,6	102	
					65	76,1	3,6	2,9	105/95	65	76,1	3,6	102	
					50	60,3	3,6	2,9	105/89	50	60,3	3,6	102	
					40	48,3	3,6	2,6	105/86	40	48,3	3,6	102	
125	139,7 x 4,0	139,7 x 4,0	190,0	-	125	139,7	4,0	4,0	124/124					139,7 x 4,0
					100	114,3	4,0	3,6	124/117	100	114,3	4,0	127	
					80	88,9	4,0	3,2	124/111	80	88,9	4,0	127	
					65	76,1	4,0	2,9	124/108	65	76,1	4,0	127	
					50	60,3	4,0	2,9	124/105	50	60,3	4,0	127	
150	168,3 x 4,5	168,3 x 4,5	229,0	-	150	168,3	4,5	4,5	143/143					168,3 x 4,5
					125	139,7	4,5	4,0	143/137	125	139,7	4,5	140	
					100	114,3	4,5	3,6	143/130	100	114,3	4,5	140	
					80	88,9	4,5	3,2	143/124	80	88,9	4,5	140	
										65	76,1	4,5	140	

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PIPING STANDARD 330-004

CARBON STEEL PIPING

PIPE CLASS 16C1C

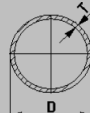
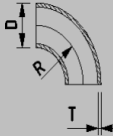
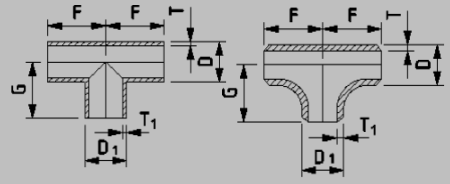
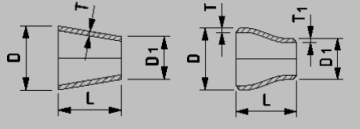
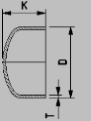
DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
200	219,1 x 6,3	219,1 x 6,3	305,0	-	200	219,1	6,3	6,3	178/178	150	168,3	6,3	152	219,1 x 6,3
					150	168,3	6,3	4,5	178/168	125	139,7	6,3	152	
					125	139,7	6,3	4,0	178/162	100	114,3	6,3	152	
					100	114,3	6,3	3,6	178/156	80	88,9	6,3	152	
250	273,0 x 6,3	273,0 x 6,3	381,0	-	250	273	7,1	7,1	216/216	200	219,1	6,3	178	273,0 x 6,3
					200	219,1	7,1	6,3	216/203	150	168,3	6,3	178	
					150	168,3	7,1	4,5	216/194	125	139,7	6,3	178	
					125	139,7	7,1	4,0	216/191	100	114,3	6,3	178	
					100	114,3	7,1	3,6	216/184					
300	323,9 x 7,1	323,9 x 7,1	457,0	-	300	323,9	8,0	8,0	254/254	250	273	7,1	203	323,9 x 7,1
					250	273	8,0	6,3	254/241	200	219,1	7,1	203	
					200	219,1	8,0	6,3	254/229	150	168,3	7,1	203	
					150	168,3	8,0	4,5	254/219	125	139,7	7,1	203	

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PIPING STANDARD 330-004

CARBON STEEL PIPING

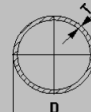
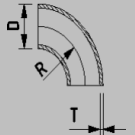
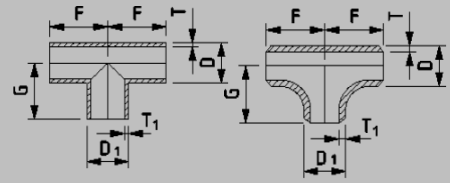
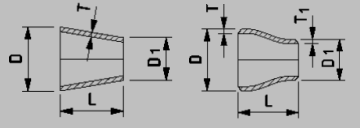
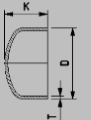
PIPE CLASS 16C1C

DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
350	355,6 x 5,6	355,6 x 5,6	533,0	-	350	—	8,8	8,8	279/279	300	323,9	7,1	330	355,6 x 5,6
					300	323,9	8,8	7,1	279/270	250	273	7,1	330	
					250	273	8,8	6,3	279/257	200	219,1	7,1	330	
					200	219,1	8,8	6,3	279/248	150	168,3	7,1	330	
400	406,4 x 6,3	406,4 x 6,3	610,0	-	400	406,4	10,0	10,0	305/305	350	355,6	7,1	356	406,4 x 6,3
					350	355,6	10,0	8,0	305/305	300	323,9	7,1	356	
					300	323,9	10,0	7,1	305/295	250	273	7,1	356	
					250	273	10,0	6,3	305/283	200	219,1	7,1	356	
					200	219,1	10,0	6,3	305/273					
					150	168,3	10,0	4,5	305/264					
450	457,0 x 6,3	457,0 x 6,3	686,0	-	450	457	10,0	10,0	343/343	400	406,4	7,1	381	457,0 x 6,3
					400	406,4	10,0	8,8	343/330	350	355,6	7,1	381	
					350	355,6	10,0	8,0	343/330	300	323,9	7,1	381	
					300	323,9	10,0	7,1	343/321	250	273	7,1	381	
					250	273	10,0	6,3	343/308					
					200	219,1	10,0	6,3	343/298					

PIPING STANDARD 330-004

CARBON STEEL PIPING

PIPE CLASS 16C1C

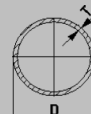
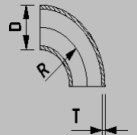
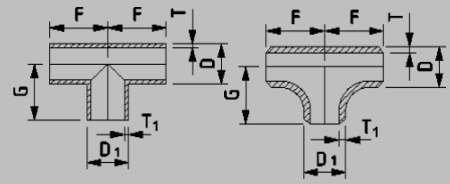
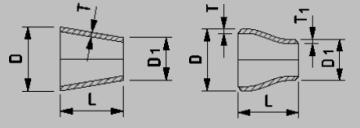
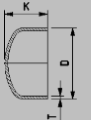
DN	PIPE	ELBOW			TEE					REDUCER				CAP	
															
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s	
500	508,0 x 6,3	508,0 x 6,3	762,0	-	500	508	11,0	11,0	381/381	450	457	7,1	508	508,0 x 6,3	
					450	457	11,0	10,0	381/368						
					400	406,4	11,0	8,8	381/356						
					300	323,9	11,0	7,1	381/346						
					250	273	11,0	6,3	381/333						
600	610,0 x 7,1	610,0 x 7,1	914,0	-	600	610	14,2	14,2	432/432	500	508	6,3	508	610,0 x 7,1	
					500	508	14,2	11,0	432/432						
					400	406,4	14,2	8,8	432/406						
					300	323,9	14,2	7,1	432/397						
					250	273	14,2	6,3	432/384	400	406,4	6,3	508		
700	711,0 x 8,0	711,0 x 8,0	1070,0	-	700	711	14,2	14,2	521/521	600	610	7,1	610	711,0 x 8,0	
					600	610	14,2	12,5	521/508						
					500	508	14,2	11,0	521/483						
					400	406,4	14,2	8,8	521/457						
					300	323,9	14,2	7,1	521/448	450	457	7,1	610		

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PIPING STANDARD 330-004

CARBON STEEL PIPING

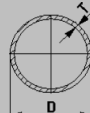
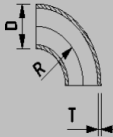
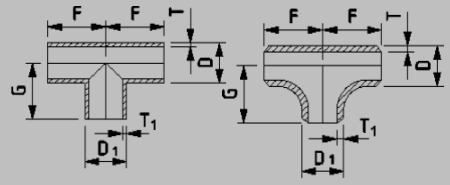
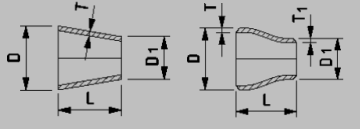
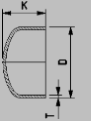
PIPE CLASS 16C1C

DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
800	813,0 x 8,8	813,0 x 8,8	1219,0	-	800	813	16,0	16,0	597/597	700	711	8,0	610	813,0 x 8,8
					700	711	16,0	14,2	597/572					
					600	610	16,0	12,5	597/559					
					500	508	16,0	11,0	597/533					
					400	406,4	16,0	8,8	597/508					
900	914,0 x 10,0	914,0 x 10,0	1370,0	-	900	914	17,5	17,5	673/673	800	813	10,0	610	914,0 x 10,0
					800	813	17,5	16,0	673/648					
					700	711	17,5	14,2	673/622					
					600	610	17,5	12,5	673/610					
					500	508	17,5	11,0	673/584					
					400	406,4	17,5	8,8	673/559					
1000	1016,0 x 11,0	1016,0 x 11,0	1525,0	-	1000	1016	20,0	20,0	749/749	900	914	10,0	610	1016,0 x 11,0
					900	914	20,0	17,5	749/737					
					800	813	20,0	16,0	749/711					
					700	711	20,0	14,2	749/673					
					600	610	20,0	12,5	749/660					
					700	711	10,0	610						

PIPING STANDARD 330-004

CARBON STEEL PIPING

PIPE CLASS 16C1C

DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
1200	1219,0 x 12,5	1219,0 x 12,5	1830,0	-	1200	1219	22,2	22,2	889/838					1219,0 x 12,5
					1000	1016	22,2	20,0	889/813	1000	1016	12,5	711	
					900	914	22,2	17,1	889/787	900	914	12,5	711	
					800	813	22,2	16,0	889/787	800	813	12,5	711	
					700	711	22,2	14,2	889/762					

PIPING STANDARD 330-004
CARBON STEEL PIPING
PIPE CLASS 16C1C

HEADER PIPE			BRANCH PIPE																								
			15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	1200	DN
DN	D	t	21,3	26,9	33,7	42,4	48,3	60,3	76,1	88,9	114,3	139,7	168,3	219,1	273,0	323,9	355,6	406,4	457	508	610	711	813	914	1016	1219	D
			2,0	2,3	2,6	2,6	2,6	2,9	2,9	3,2	3,6	4,0	4,5	6,3	6,3	7,1	5,6	6,3	6,3	6,3	7,1	8,0	8,8	10,0	11,0	12,5	t
15	21,3	2,0	T																								
20	26,9	2,3	T	T																							
25	33,7	2,6	UB	T	T																						
32	42,4	2,6	UB	UB	T	T																					
40	48,3	2,6	UB	UB	UB	T	T																				
50	60,3	2,9	UB	UB	UB	UB	T	T																			
65	76,1	2,9	UB	UB	UB	UB	UB	T	T																		
80	88,9	3,2	UB	UB	UB	UB	UB	UB	T	T																	
100	114,3	3,6	UB	UB	UB	UB	UB	UB	UB	T	T																
125	139,7	4,0	UB	UB	UB	UB	UB	UB	UB	UB	T	T															
150	168,3	4,5	UB	UB	UB	UB	UB	UB	UB	UB	UB	T	T														
200	219,1	6,3	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	T	T													
250	273,0	6,3	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	T	T												
300	323,9	7,1	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	T	T											
350	355,6	5,6	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	T	T	T	T										
400	406,4	6,3	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	RB+W 100x8	RB+P 40x5,6	RB+P 40x5,6	T	T	T	T							
450	457	6,3	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	RB+W 100x8	RB+P 50x6,3	RB+P 50x6,3	RB+P 50x6,3	RB+P 50x6,3	T	T	T	T					
500	508	6,3	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB	RB+W 100x8	RB+P 50x6,3	RB+P 50x6,3	RB+P 50x6,3	RB+P 50x6,3	RB+W 100x14,2	RB+W 100x14,2	T	T	T				
600	610	7,1	UB	UB	UB	UB	UB	UB	RB+W 100x6,3	RB+W 100x6,3	RB+W 100x8	RB+W 100x8	RB+W 100x8	RB+P 60x7,1	RB+P 60x7,1	RB+P 60x7,1	RB+P 60x7,1	RB+W 100x14,2	SP	T	SP	T	T				
700	711	8,0	UB	UB	UB	UB	UB	UB	RB+W 100x6,3	RB+W 100x8	RB+W 100x8	RB+P 70x8	RB+P 70x8	RB+P 70x8	RB+P 70x8	RB+P 70x8	RB+P 70x8	RB+P 70x8	SP	T	SP	T	T	T			
800	813	8,8	UB	UB	UB	UB	UB	UB	RB+W 100x6,3	RB+W 100x8	RB+W 100x8	RB+P 80x8,8	RB+P 80x8,8	RB+P 80x8,8	RB+P 80x8,8	RB+P 80x8,8	RB+P 80x8,8	SP	SP	SP	T	T	T	T			
900	914	10,0	UB	UB	UB	UB	UB	UB	UB	UB	RB+W 100x8	RB+P 90x10	RB+P 90x10	RB+P 90x10	RB+P 90x10	RB+P 90x10	RB+P 90x10	RB+P 90x10	RB+P 90x10	RB+P 90x10	RB+P 90x10	RB+P 90x10	RB+P 90x10	RB+P 90x10	RB+P 90x10	RB+P 90x10	
1000	1016	11,0	UB	UB	UB	UB	UB	UB	UB	UB	RB+W 100x8	RB+P 100x11	RB+P 100x11	RB+P 100x11	RB+P 100x11	RB+P 100x11	RB+P 100x11	RB+P 100x11	RB+P 100x11	RB+P 100x11	RB+P 100x11	RB+P 100x11	RB+P 100x11	RB+P 100x11	RB+P 100x11	RB+P 100x11	
1200	1219	12,5	UB	UB	UB	UB	UB	UB	UB	UB	UB	RB+P 120x12,5	RB+P 120x12,5	RB+P 120x12,5	RB+P 120x12,5	RB+P 120x12,5	RB+P 120x12,5	RB+P 120x12,5	RB+P 120x12,5	RB+P 120x12,5	RB+P 120x12,5	RB+P 120x12,5	RB+P 120x12,5	RB+P 120x12,5	RB+P 120x12,5	RB+P 120x12,5	T

T	T-piece
UB	Unreinforced branch
RB+W	Reinforced branch - Increased wall thickness of the nozzle pipe
RB+P	Reinforced branch - Reinforcement plate
RB+WP	Reinforced branch - Reinforcement plate + Increased wall thickness of the nozzle pipe
SP	Special Tee - To be defined case by case when needed

- Notes!
1. The branch table is to be used only for straight pipe branches. The angle of branch connection must be 90°±5°.
 2. Thickness of the reinforcement plates are always the thickness of header pipe and width of plate is shown in the table.
 3. Significant external forces or moments to branch connection are not taken into account. In those cases strenght of branch connection has to be studied case by case
 4. If there is risk for cyclic or dynamic loads in the piping, reinforced branch shall be used instead of UB.

PIPING STANDARD 330-005

CARBON STEEL PIPING

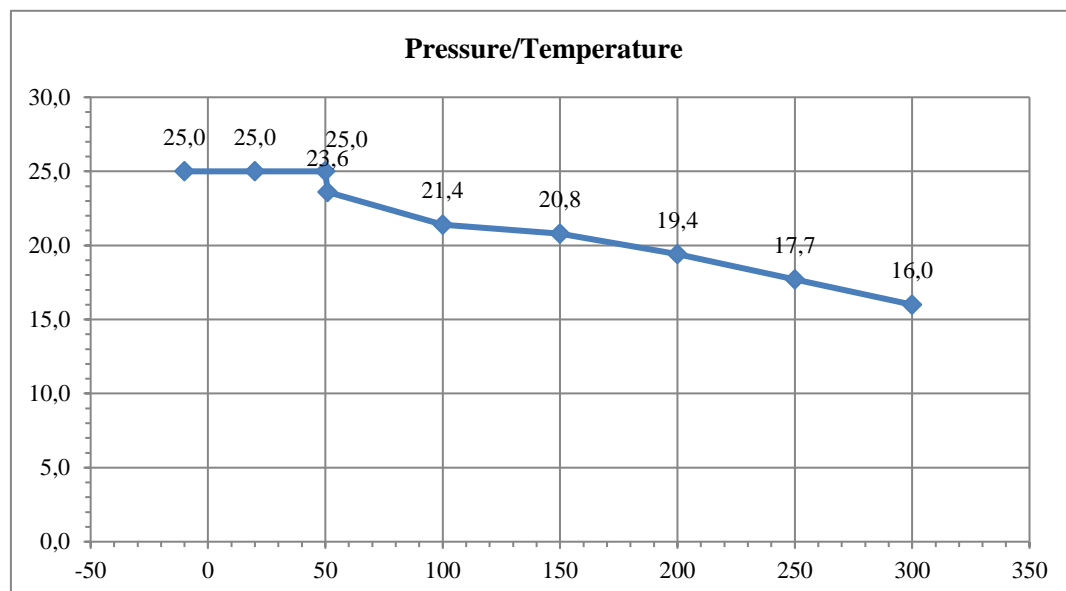
PIPE CLASS 25C1B

General: Pipe Class: Carbon steel pipe class 25C1B
 Design code: EN 13480-3
 Pipe material: EN 10216-2 material grade P235GH

 Corrosion allowance: 1 mm

Allowable overpressures:

T [°C]	p [bar]
-10	25,0
20	25,0
50	25,0
100	21,4
150	20,8
200	19,4
250	17,7
300	16,0



Linear interpolation of pressure between two adjacent temperature values shall be applied for temperature above 50°C. For temperature between 50-100 linear interpolation shall be made based on pressure values at 20° and 100°C.

External pressure rating:

Pipes in the pipe class are resistant for full vacuum up to DN 800.

PIPING STANDARD 330-005

CARBON STEEL PIPING

PIPE CLASS 25C1B

Piping components	DN-range	Dimension standard	Dimension type / additional definition	Material		Material Certificate EN 10204	Remarks
				Designation	Standard		
Pipes	15-800	EN 10216-2:2014		P235GH	EN 10216-2:2014	3.1	
Elbows	15-800	EN 10253-2:2007	Type A, 3D	P235GH	EN 10253-2:2007	3.1	5
Tee pieces	15-800	EN 10253-2:2007	Type A	P235GH	EN 10253-2:2007	3.1	
Reducers	15-800	EN 10253-2:2007	Type A	P235GH	EN 10253-2:2007	3.1	
Caps	15-800	EN 10253-2:2007	Type A	P235GH	EN 10253-2:2007	3.1	
Welding neck flanges	15-150	EN 1092-1:2018	Type 11, PN40	P245GH	EN 10222-2:2017	3.1	
	200-800	EN 1092-1:2018	Type 11, PN25	P245GH	EN 10222-2:2017	3.1	
Blind flanges	15-150	EN 1092-1:2018	Type 05, PN40	P265GH	EN 10028-2:2017	3.1	
	200-800	EN 1092-1:2018	Type 05, PN25	P265GH	EN 10028-2:2017	3.1	
Gaskets	15-80	EN 1514-1: 1997	Type IBC, PN40				1, 2
	100-800	EN 1514-1: 1997	Type IBC, PN25				1, 2
Bolts		EN ISO 4014:2011		25CrMo4	EN 10269:2013	2.2	
Nuts		EN ISO 4032:2013		C35E	EN 10269:2013	2.2	
Washers		EN ISO7089:2001	Grade A	S235JR	EN 10025-2:2004		
Threaded fittings	DN15-50	EN 10241:2000		P235GH	EN 10273:2016	3.1	6

1. Gasket material according to the Flow Substance. If spiral gaskets are used, gasket dimension standard is EN1514-2

2. Gasket thickness 2mm. Spiral gasket thickness 4.5mm.

3

4

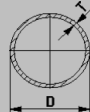
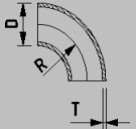
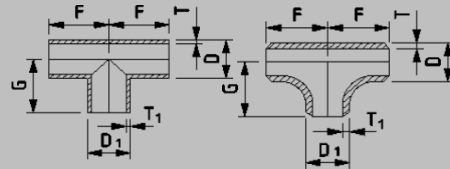

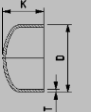
5. Bend R=100 is alternative for Elbows in the size range DN15-DN40. Bends shall fill the requirements of EN13480.

6. Pipe designer shall confirm correct type of the threads case by case when threaded components are used. Preferable thread types EN 10226-1.

PIPING STANDARD 330-005

CARBON STEEL PIPING

PIPE CLASS 25C1B

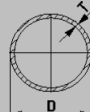
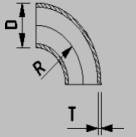
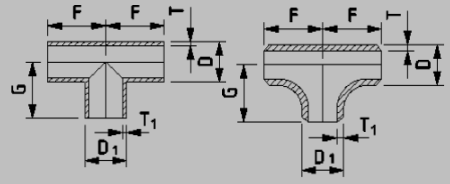
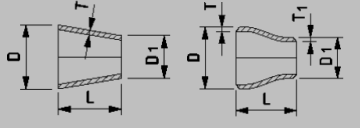
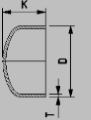
DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
15	21,3 x 2,0	21,3 x 2,0	38,0	-	15	21,3	2,0	2,0	25/25					21,3 x 2,0
20	26,9 x 2,3	26,9 x 2,3	38,0	-	20	26,9	2,3	2,3	29/29					26,9 x 2,3
					15	21,3	2,3	2,0	29/29	15	21,3	2,3	38	
25	33,7 x 2,6	33,7 x 2,6	38,0	-	25	33,7	2,6	2,6	38/38					33,7 x 2,6
					20	26,9	2,6	2,3	38/38	20	26,9	2,6	51	
					15	21,3	2,6	2,0	38/38	15	21,3	2,6	51	
32	42,4 x 2,6	42,4 x 2,6	48,0	-	32	42,4	2,6	2,6	48/48					42,4 x 2,6
					25	33,7	2,6	2,6	48/48	25	33,7	2,6	51	
					20	26,9	2,6	2,3	48/48	20	26,9	2,6	51	
					15	21,3	2,6	2,0	48/48	15	21,3	2,6	51	
40	48,3 x 2,6	48,3 x 2,6	57,0	-	40	48,3	2,6	2,6	57/57					48,3 x 2,6
					32	42,4	2,6	2,6	57/57	32	42,4	2,6	64	
					25	33,7	2,6	2,6	57/57	25	33,7	2,6	64	
					20	26,9	2,6	2,3	57/57	20	26,9	2,6	64	
					15	21,3	2,6	2,0	57/57					

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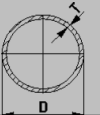
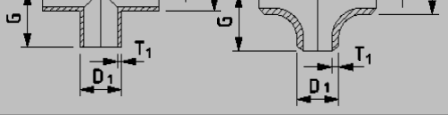
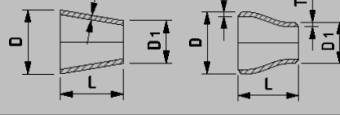
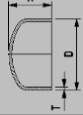
PIPING STANDARD 330-005


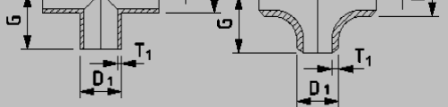
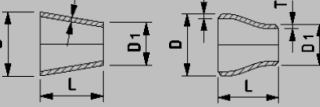

CARBON STEEL PIPING

PIPE CLASS 25C1B

DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
50	60,3 x 2,9	60,3 x 2,9	76,0	-	50	60,3	2,9	2,9	64/64	40	48,3	2,9	76	60,3 x 2,9
					40	48,3	2,9	2,6	64/60	32	42,4	2,9	76	
					32	42,4	2,9	2,6	64/57	25	33,7	2,9	76	
					25	33,7	2,9	2,6	64/51	20	26,9	2,9	76	
					20	26,9	2,9	2,3	64/44					
65	76,1 x 2,9	76,1 x 2,9	95,0	-	65	76,1	3,2	3,2	76/76	50	60,3	2,9	89	76,1 x 2,9
					50	60,3	3,2	2,9	76/70	40	48,3	2,9	89	
					40	48,3	3,2	2,6	76/67	32	42,4	2,9	89	
					32	42,4	3,2	2,6	76/64	25	33,7	2,9	89	
					25	33,7	3,2	2,6	76/57					
80	88,9 x 3,2	88,9 x 3,2	114,0	-	80	88,9	3,6	3,6	86/86	65	76,1	3,2	89	88,9 x 3,2
					65	76,1	3,6	3,2	86/83	50	60,3	3,2	89	
					50	60,3	3,6	2,9	86/76	40	48,3	3,2	89	
					40	48,3	3,6	2,6	86/73	32	42,4	3,2	89	
					32	42,4	3,6	2,6	86/70					

PIPE CLASS 25C1B

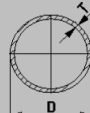
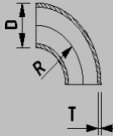
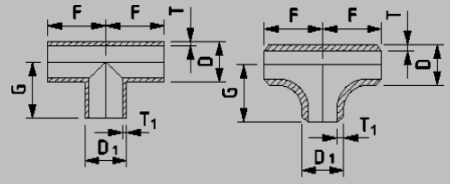
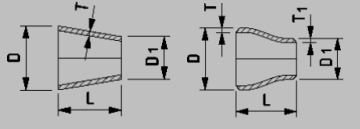
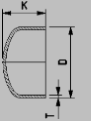
DN	PIPE	ELBOW			TEE					REDUCER				CAP
		D x T	R	R										
	D x T		3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
100	114,3 x 3,6	114,3 x 3,6	152,0	-	100 80 65 50 40	114,3 88,9 76,1 60,3 48,3	4,5 4,5 4,5 4,5 4,5	4,5 3,6 3,2 2,9 2,6	105/105 105/98 105/95 105/89 105/86	80 65 50 40	88,9 76,1 60,3 48,3	3,6 3,6 3,6 3,6	102 102 102 102	114,3 x 3,6
125	139,7 x 4,0	139,7 x 4,0	190,0	-	125 100 80 65 50	139,7 114,3 88,9 76,1 60,3	5,0 5,0 5,0 5,0 5,0	5,0 4,5 3,6 3,2 2,9	124/124 124/117 124/111 124/108 124/105	100 80 65 50	114,3 88,9 76,1 60,3	4,0 4,0 4,0 4,0	127 127 127 127	139,7 x 4,0
150	168,3 x 4,5	168,3 x 4,5	229,0	-	150 125 100 80	168,3 139,7 114,3 88,9	6,3 6,3 6,3 6,3	6,3 5,0 4,5 3,6	143/143 143/137 143/130 143/124	125 100 80 65	139,7 114,3 88,9 76,1	4,5 4,5 4,5 4,5	140 140 140 140	168,3 x 4,5

DN	PIPE	ELBOW			TEE					REDUCER				CAP
		D x T	R	R										
	D x T		3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
200	219,1 x 6,3	219,1 x 6,3	305,0	-	200	219,1	7,1	7,1	178/178					219,1 x 6,3
					150	168,3	7,1	5,6	178/168	150	168,3	6,3	152	
					125	139,7	7,1	5,0	178/162	125	139,7	6,3	152	
					100	114,3	7,1	4,5	178/156	100	114,3	6,3	152	
										80	88,9	6,3	152	
250	273,0 x 6,3	273,0 x 6,3	381,0	-	250	273	8,8	8,8	216/216					273,0 x 6,3
					200	219,1	8,8	7,1	216/203	200	219,1	6,3	178	
					150	168,3	8,8	5,6	216/194	150	168,3	6,3	178	
					125	139,7	8,8	5,0	216/191	125	139,7	6,3	178	
					100	114,3	8,8	4,5	216/184	100	114,3	6,3	178	
300	323,9 x 7,1	323,9 x 7,1	457,0	-	300	323,9	10,0	10,0	254/254					323,9 x 7,1
					250	273	10,0	8,8	254/241	250	273	7,1	203	
					200	219,1	10,0	7,1	254/229	200	219,1	7,1	203	
					150	168,3	10,0	5,6	254/219	150	168,3	7,1	203	
										125	139,7	7,1	203	

PIPING STANDARD 330-005

CARBON STEEL PIPING

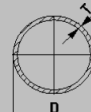
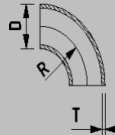
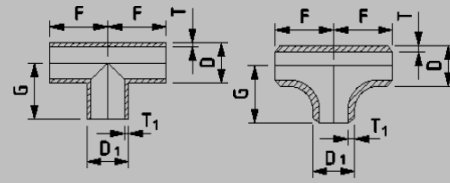
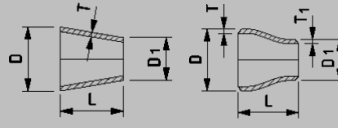
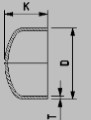
PIPE CLASS 25C1B

DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
350	355,6 x 8,0	355,6 x 8,0	533,0	-	350	—	11,0	11,0	279/279					355,6 x 8,0
					300	323,9	11,0	10,0	279/270	300	323,9	8,0	330	
					250	273	11,0	8,8	279/257	250	273	8,0	330	
					200	219,1	11,0	7,1	279/248	200	219,1	8,0	330	
										150	168,3	8,0	330	
400	406,4 x 8,8	406,4 x 8,8	610,0	-	400	406,4	12,5	12,5	305/305					406,4 x 8,8
					350	355,6	12,5	11,0	305/305	350	355,6	8,8	356	
					300	323,9	12,5	10,0	305/295	300	323,9	8,8	356	
					250	273	12,5	8,8	305/283	250	273	8,8	356	
					200	219,1	12,5	7,1	305/273	200	219,1	8,8	356	
					150	168,3	12,5	5,6	305/264					
450	457,0 x 10,0	457,0 x 10,0	686,0	-	450	457	14,2	14,2	343/343					457,0 x 10,0
					400	406,4	14,2	12,5	343/330	400	406,4	10,0	381	
					350	355,6	14,2	11,0	343/330	350	355,6	10,0	381	
					300	323,9	14,2	10,0	343/321	300	323,9	10,0	381	
					250	273	14,2	8,8	343/308	250	273	10,0	381	
					200	219,1	14,2	7,1	343/298					

PIPING STANDARD 330-005

CARBON STEEL PIPING

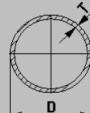
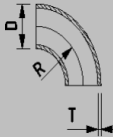
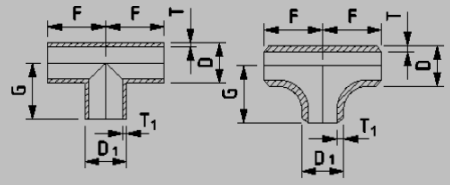
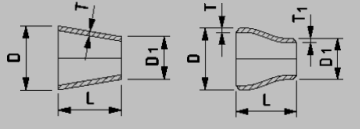
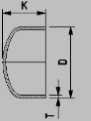
PIPE CLASS 25C1B

DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R	R	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
500	508,0 x 11,0	508,0 x 11,0	762,0	-	500	508	16,0	16,0	381/381	450	457	11,0	508	508,0 x 11,0
					450	457	16,0	14,2	381/368					
					400	406,4	16,0	12,5	381/356					
					300	323,9	16,0	10,0	381/346					
					250	273	16,0	8,8	381/333					
600	610,0 x 12,5	610,0 x 12,5	914,0	-	600	610	17,5	17,5	432/432	500	508	12,5	508	610,0 x 12,5
					500	508	17,5	16,0	432/432					
					400	406,4	17,5	12,5	432/406					
					300	323,9	17,5	10,0	432/397					
					250	273	17,5	8,8	432/384					
700	711,0 x 14,2	711,0 x 14,2	1070,0	-	700	711	20,0	20,0	521/521	600	610	14,2	610	711,0 x 14,2
					600	610	20,0	17,5	521/508					
					500	508	20,0	16,0	521/483					
					400	406	20,0	12,5	521/457					
					300	323,9	20,0	10,0	521/448					

PIPING STANDARD 330-005

CARBON STEEL PIPING

PIPE CLASS 25C1B

DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
800	813,0 x 14,2	813,0 x 14,2	1220,0	-	800	813	22,2	20,0	597/597	700	711	14,2	610	813,0 x 14,2
					700	711	20,0	20,0	597/572	600	610	14,2	610	
					600	610	20,0	16,0	597/559	500	508	14,2	610	
					500	508	20,0	16,0	597/533					
					400	406,4	20,0	16,0	597/508					

PIPING STANDARD 330-005
CARBON STEEL PIPING
PIPE CLASS 25C1B

Header Pipe			Branch Pipe																						
			15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	DN	
DN	D	t	2,0	2,3	2,6	2,6	2,6	2,9	2,9	3,2	3,6	4,0	4,5	6,3	6,3	7,1	8,0	8,8	10,0	11,0	12,5	14,2	14,2	t	
15	21,3	2,0	T																						
20	26,9	2,3	T	T																					
25	33,7	2,6	T	T	T																				
32	42,4	2,6	T	T	T	T																			
40	48,3	2,6	T	T	T	T	T																		
50	60,3	2,9	UB	T	T	T	T	T																	
65	76,1	2,9	UB	UB	T	T	T	T	T																
80	88,9	3,2	UB	UB	UB	T	T	T	T	T															
100	114,3	3,6	UB	UB	UB	UB	T	T	T	T	T														
125	139,7	4,0	UB	UB	UB	UB	RB+W 100x6,3	T	T	T	T	T													
150	168,3	4,5	UB	UB	UB	UB	UB	RB+W 100x6,3	RB+W 100x6,3	T	T	T	T												
200	219,1	6,3	UB	UB	UB	UB	UB	UB	UB	UB	T	T	T	T											
250	273,0	6,3	UB	UB	UB	UB	RB+W 100x6,3	RB+W 100x6,3	RB+W 100x6,3	RB+W 100x8	T	T	T	T	T										
300	323,9	7,1	UB	UB	UB	UB	UB	RB+W 100x6,3	RB+W 100x6,3	RB+W 100x8	RB+W 100x8	RB+P 40x7,1	T	T	T	T									
350	355,6	8,0	UB	UB	UB	UB	UB	UB	RB+W 100x6,3	RB+W 100x8	RB+W 100x8	RB+P 50x8	RB+P 50x8	T	T	T	T								
400	406,4	8,8	UB	UB	UB	UB	UB	UB	RB+W 100x6,3	RB+W 100x8	RB+W 100x8	RB+P 50x8,8	T	T	T	T	T	T							
450	457	10,0	UB	UB	UB	UB	UB	UB	UB	RB+W 100x8	RB+W 100x8	RB+P 60x10	RB+P 60x10	T	T	T	T	T	T						
500	508	11,0	UB	UB	UB	UB	UB	UB	UB	UB	RB+W 100x8	RB+P 70x11	RB+P 70x11	RB+P 70x11	T	T	SP	T	T	T					
600	610	12,5	UB	UB	UB	UB	UB	RB+W 100x6,3	RB+W 100x6,3	RB+W 100x8	RB+W 100x8	RB+P 80x12,5	RB+P 80x12,5	RB+P 80x12,5	RB+P 80x12,5	T	RB+P 80x12,5	T	SP	T	T				
700	711	14,2	UB	UB	UB	UB	UB	RB+W 100x6,3	RB+W 100x6,3	RB+W 100x8	RB+W 100x8	RB+P 90x14,2	RB+P 90x14,2	RB+P 90x14,2	RB+P 90x14,2	RB+P 90x14,2	RB+P 90x14,2	T	SP	T	T	T			
800	813	14,2	UB	UB	UB	UB	UB	UB	RB+W 100x6,3	RB+W 100x8	RB+W 100x8	RB+P 100x14,2	RB+P 100x14,2	RB+P 100x14,2	RB+P 100x14,2	RB+P 100x14,2	SP	SP	SP	T	T	T	T		

T	T-piece
UB	Unreinforced branch
RB+W	Reinforced branch - Increased wall thickness of the nozzle pipe
RB+P	Reinforced branch - Reinforcement plate
RB+WP	Reinforced branch - Reinforcement plate + Increased wall thickness of the nozzle pipe
SP	Special Tee - To be defined case by case when needed

T	T-piece
UB	Unreinforced branch
RB+W	Reinforced branch - Increased wall thickness of the nozzle pipe
RB+P	Reinforced branch - Reinforcement plate
RB+WP	Reinforced branch - Reinforcement plate + Increased wall thickness of the nozzle pipe
SP	Special Tee - To be defined case by case when needed

- Notes!
1. The branch table is to be used only for straight pipe branches. The angle of branch connection must be 90°±5°.
 2. Thickness of the reinforcement plates are always the thickness of header pipe and width of plate is shown in the table.
 3. Significant external forces or moments to branch connection are not taken into account. In those cases strenght of branch connection has to be studied case by case
 4. If there is risk for cyclic or dynamic loads in the piping, reinforced branch shall be used instead of UB.

PIPING STANDARD 330-006

CARBON STEEL PIPING

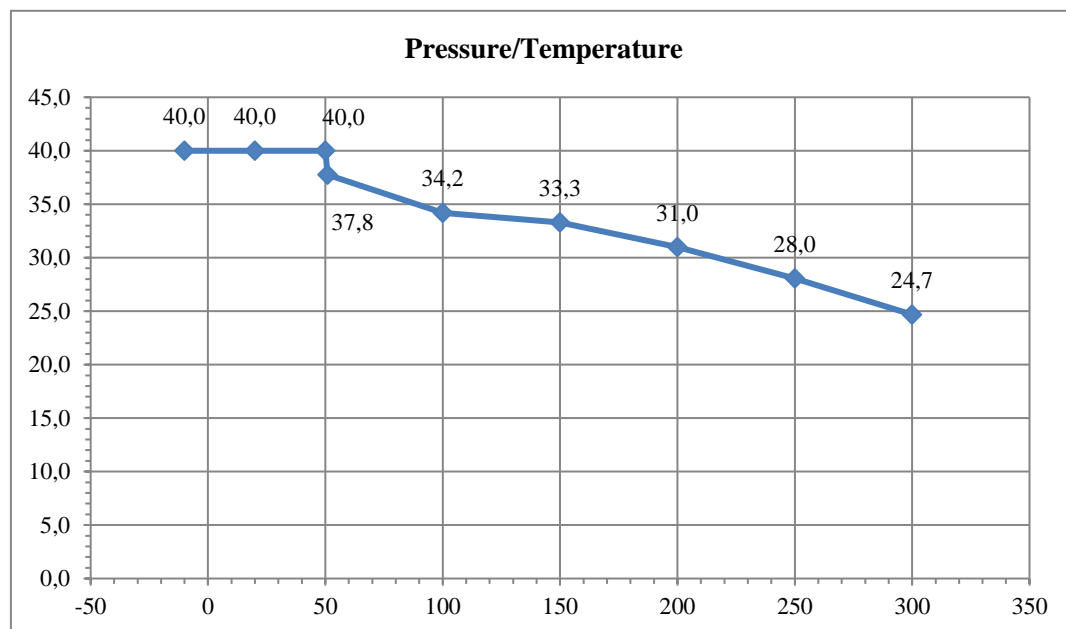
PIPE CLASS 40C1B

General: Pipe Class: Carbon steel pipe class 40C1B
 Design code: EN 13480-3
 Pipe material: EN 10216-2 material grade P235GH

 Corrosion allowance: 1 mm

Allowable overpressures:

T [°C]	p [bar]
-10	40,0
20	40,0
50	40,0
51	37,8
100	34,2
150	33,3
200	31,0
250	28,0
300	24,7



Linear interpolation of pressure between two adjacent temperature values shall be applied for temperature above 50°C. For temperature between 50-100 linear interpolation shall be made based on pressure values at 20° and 100°C.

External pressure rating:

Pipes in the pipe class are resistant for full vacuum up to DN 600.

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PIPING STANDARD 330-006

CARBON STEEL PIPING

PIPE CLASS 40C1B

Piping components	DN-range	Dimension standard	Dimension type / additional definition	Material		Material Certificate EN 10204	Remarks
				Designation	Standard		
Pipes	15-600	EN 10216-2:2014		P235GH	EN 10216-2:2014	3.1	
Elbows	15-600	EN 10253-2:2007	Type A, 3D	P235GH	EN 10253-2:2007	3.1	5
Tee pieces	15-600	EN 10253-2:2007	Type A	P235GH	EN 10253-2:2007	3.1	
Reducers	15-600	EN 10253-2:2007	Type A	P235GH	EN 10253-2:2007	3.1	
Caps	15-600	EN 10253-2:2007	Type A	P235GH	EN 10253-2:2007	3.1	
Welding neck flanges	15-600	EN 1092-1:2018	Type 11, PN40	P245GH	EN 10222-2:2017	3.1	
Blind flanges	15-600	EN 1092-1:2018	Type 05, PN40	P265GH	EN 10028-2:2017	3.1	
Gaskets	15-600	EN 1514-1: 1997	Type IBC, PN40				1, 2
Bolts		EN ISO 4014:2011		25CrMo4	EN 10269:2013	2.2	
Nuts		EN ISO 4032:2013		C35E	EN 10269:2013	2.2	
Washers		EN ISO7089:2001	Grade A	S235JR	EN 10025-2:2004		
Threaded fittings	DN15-50	EN 10241:2000		P235GH	EN 10273:2016	3.1	6

1. Gasket material according to the Flow Substance. If spiral gaskets are used, gasket dimension standard is EN1514-2

2. Gasket thickness 2mm. Spiral gasket thickness 4.5mm.

3

4

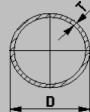
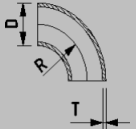
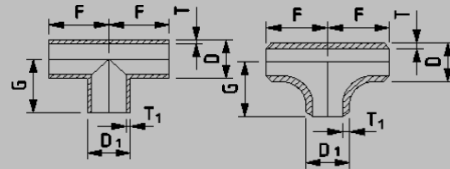

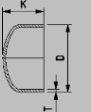
5. Bend R=100 is alternative for Elbows in the size range DN15-DN40. Bends shall fill the requirements of EN13480.

6. Pipe designer shall confirm correct type of the threads case by case when threaded components are used. Preferable thread types EN 10226-1.

PIPING STANDARD 330-006

CARBON STEEL PIPING

PIPE CLASS 40C1B

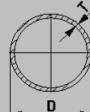
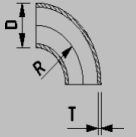
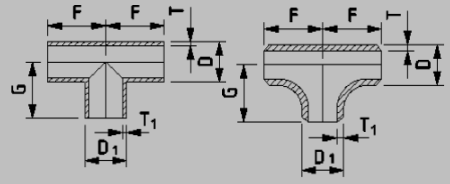
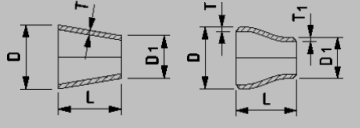
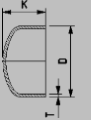
DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
15	21,3 x 2,0	21,3 x 2,0	38,0	-	15	21,3	2,0	2,0	25/25					21,3 x 2,0
20	26,9 x 2,6	26,9 x 2,3	38,0	-	20	26,9	2,3	2,3	29/29					26,9 x 2,3
					15	21,3	2,3	2,0	29/29	15	21,3	2,3	38	
25	33,7 x 2,9	33,7 x 2,6	38,0	-	25	33,7	2,6	2,6	38/38					33,7 x 2,6
					20	26,9	2,6	2,3	38/38	20	26,9	2,6	51	
					15	21,3	2,6	2,0	38/38	15	21,3	2,6	51	
32	42,4 x 2,9	42,4 x 2,6	48,0	-	32	42,4	2,9	2,9	48/48					42,4 x 2,6
					25	33,7	2,9	2,6	48/48	25	33,7	2,6	51	
					20	26,9	2,9	2,3	48/48	20	26,9	2,6	51	
					15	21,3	2,9	2,0	48/48	15	21,3	2,6	51	
40	48,3 x 2,9	48,3 x 2,6	57,0	-	40	48,3	3,2	3,2	57/57					48,3 x 2,6
					32	42,4	3,2	2,9	57/57	32	42,4	2,6	64	
					25	33,7	3,2	2,6	57/57	25	33,7	2,6	64	
					20	26,9	3,2	2,3	57/57	20	26,9	2,6	64	
					15	21,3	3,2	2,0	57/57					

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PIPING STANDARD 330-006

CARBON STEEL PIPING

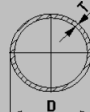
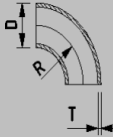
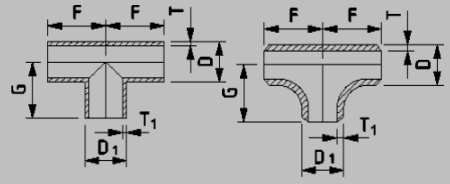
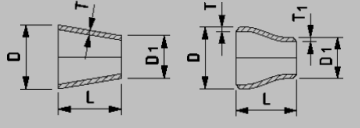
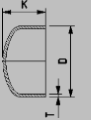
PIPE CLASS 40C1B

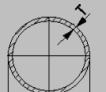
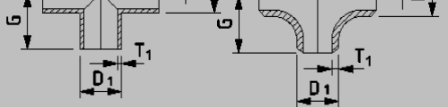
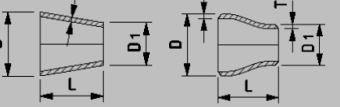
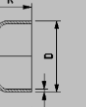
DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
50	60,3 x 3,2	60,3 x 2,9	76,0	-	50	60,3	3,6	3,6	64/64	40	48,3	2,9	76	60,3 x 2,9
					40	48,3	3,6	2,9	64/60					
					32	42,4	3,6	2,9	64/57					
					25	33,7	3,6	2,6	64/51					
					20	26,9	3,6	2,3	64/44					
65	76,1 x 3,6	76,1 x 2,9	95,0	-	65	76,1	4,5	4,5	76/76	50	60,3	2,9	89	76,1 x 2,9
					50	60,3	4,5	3,2	76/70					
					40	48,3	4,5	2,9	76/67					
					32	42,4	4,5	2,9	76/64					
					25	33,7	4,5	2,6	76/57					
80	88,9 x 3,6	88,9 x 3,2	114,0	-	80	88,9	5,0	5,0	86/86	65	76,1	3,2	89	88,9 x 3,2
					65	76,1	5,0	4,0	86/83					
					50	60,3	5,0	3,6	86/76					
					40	48,3	5,0	2,9	86/73					
					32	42,4	5,0	2,9	86/70					

PIPING STANDARD 330-006

CARBON STEEL PIPING

PIPE CLASS 40C1B

DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
100	114,3 x 4,0	114,3 x 4,0	152,0	-	100	114,3	5,6	5,6	105/105					114,3 x 3,6
					80	88,9	5,6	4,5	105/98	80	88,9	4,0	102	
					65	76,1	5,6	4,0	105/95	65	76,1	4,0	102	
					50	60,3	5,6	3,6	105/89	50	60,3	4,0	102	
					40	48,3	5,6	2,9	105/86	40	48,3	4,0	102	
125	139,7 x 4,5	139,7 x 4,5	190,0	-	125	139,7	7,1	7,1	124/124					139,7 x 4,0
					100	114,3	7,1	5,6	124/117	100	114,3	4,5	127	
					80	88,9	7,1	4,5	124/111	80	88,9	4,5	127	
					65	76,1	7,1	4,0	124/108	65	76,1	4,5	127	
					50	60,3	7,1	3,6	124/105	50	60,3	4,5	127	
150	168,3 x 5,6	168,3 x 5,6	229,0	-	150	168,3	8,0	8,0	143/143					168,3 x 4,5
					125	139,7	8,0	6,3	143/137	125	139,7	5,6	140	
					100	114,3	8,0	5,6	143/130	100	114,3	5,6	140	
					80	88,9	8,0	4,5	143/124	80	88,9	5,6	140	
										65	76,1	5,6	140	

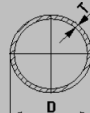
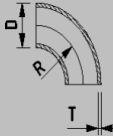
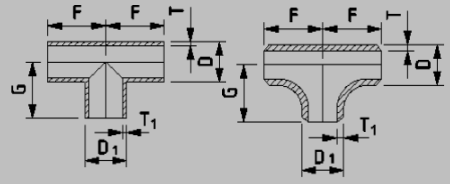
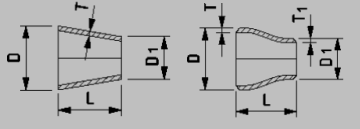
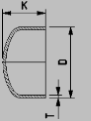
DN	PIPE	ELBOW			TEE					REDUCER				CAP
		D x T	R	R										
	D x T		3D	5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
200	219,1 x 7,1	219,1 x 6,3	305,0	-	200	219,1	10,0	10,0	178/178					219,1 x 6,3
					150	168,3	10,0	8,0	178/168	150	168,3	8,0	152	
					125	139,7	10,0	6,3	178/162	125	139,7	8,0	152	
					100	114,3	10,0	5,6	178/156	100	114,3	8,0	152	
										80	88,9	8,0	152	
250	273,0 x 8,0	273,0 x 8,0	381,0	-	250	273	12,5	12,5	216/216					273,0 x 6,3
					200	219,1	12,5	10,0	216/203	200	219,1	8,8	178	
					150	168,3	12,5	8,0	216/194	150	168,3	8,8	178	
					125	139,7	12,5	6,3	216/191	125	139,7	8,8	178	
					100	114,3	12,5	5,6	216/184	100	114,3	8,8	178	
300	323,9 x 10,0	323,9 x 8,8	457,0	-	300	323,9	14,2	14,2	254/254					323,9 x 7,1
					250	273	14,2	12,5	254/241	250	273	10,0	203	
					200	219,1	14,2	10,0	254/229	200	219,1	10,0	203	
					150	168,3	14,2	8,0	254/219	150	168,3	10,0	203	
										125	139,7	10,0	203	

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PIPING STANDARD 330-006

CARBON STEEL PIPING

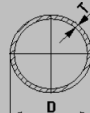
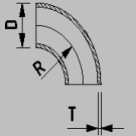
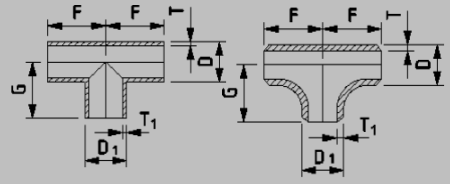
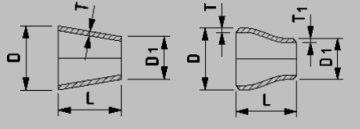
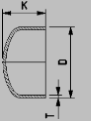
PIPE CLASS 40C1B

DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
350	355,6 x 10,0	355,6 x 8,8	533,0	-	350	—	16,0	16,0	279/279					355,6 x 8,0
					300	323,9	16,0	14,2	279/270	300	323,9	10,0	330	
					250	273	16,0	12,5	279/257	250	273	10,0	330	
					200	219,1	16,0	10,0	279/248	200	219,1	10,0	330	
										150	168,9	10,0	330	
400	406,4 x 11,0	406,4 x 10,0	610,0	-	400	406,4	17,5	17,5	305/305					406,4 x 8,8
					350	355,6	17,5	16,0	305/305	350	355,6	10,0	356	
					300	323,9	17,5	14,2	305/295	300	323,9	10,0	356	
					250	273	17,5	12,5	305/283	250	273	10,0	356	
					200	219,1	17,5	10,0	305/273	200	219,1	10,0	356	
					150	168,3	17,5	8,0	305/264					
450	457,0 x 11,0	457,0 x 11,0	686,0	-	450	457	20,0	20,0	343/343					457,0 x 10,0
					400	406,4	20,0	17,5	343/330	400	406,4	11,0	381	
					350	355,6	20,0	16,0	343/330	350	355,6	11,0	381	
					300	323,9	20,0	14,2	343/321	300	323,9	11,0	381	
					250	273	20,0	12,5	343/308	250	273	11,0	381	
					200	219,1	20,0	10,0	343/298					

PIPING STANDARD 330-006

CARBON STEEL PIPING

PIPE CLASS 40C1B

DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
500	508,0 x 12,5	508,0 x 12,5	762,0	-	500	508	22,2	22,5	381/381	450	457	11,0	508	508,0 x 11,0
					450	457	22,2	20,0	381/368					
					400	406,4	22,2	17,5	381/356					
					300	323,9	22,2	14,2	381/346					
					250	273	22,2	12,5	381/333					
600	610,0 x 14,2	610,0 x 16,0	914,0	-	600	610	25,0	25,0	432/432	500	508	12,5	508	610,0 x 12,5
					500	508	25,0	20,0	432/432					
					400	406,4	25,0	17,5	432/406					
					300	323,9	25,0	14,2	432/397					
					250	273	25,0	12,5	432/384					

PIPING STANDARD 330-006
CARBON STEEL PIPING
PIPE CLASS 40C1B

HEADER PIPE			BRANCH PIPE																			
			15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	DN
			21,3	26,9	33,7	42,4	48,3	60,3	76,1	88,9	114,3	139,7	168,3	219,1	273,0	323,9	355,6	406,4	457	508	610	D
DN	D	t	2,0	2,6	2,9	2,9	2,9	3,2	3,6	3,6	4,0	4,5	5,6	7,1	8,0	10,0	10,0	11,0	11,0	12,5	14,2	t
15	21,3	2,0	T																			
20	26,9	2,6	T	T																		
25	33,7	2,9	T	T	T																	
32	42,4	2,9	T	T	T	T																
40	48,3	2,9	T	T	T	T	T															
50	60,3	3,2	UB	T	T	T	T	T														
65	76,1	3,6	UB	UB	T	T	T	T	T													
80	88,9	3,6	UB	UB	UB	T	T	T	T	T												
100	114,3	4,0	UB	UB	RB+W 100x6.3	RB+W 100x6.3	T	T	T	T	T											
125	139,7	4,5	UB	UB	RB+W 100x6.3	RB+W 100x6.3	RB+W 100x6.3	T	T	T	T	T										
150	168,3	5,6	UB	UB	UB	UB	RB+W 100x6.3	RB+W 100x6.3	RB+W 100x6.3	T	T	T	T									
200	219,1	7,1	UB	UB	UB	UB	UB	UB	RB+W 100x6.3	RB+W 100x8	T	T	T	T								
250	273,0	8,0	UB	UB	UB	RB+W 100x6.3	RB+W 100x6.3	RB+W 100x6.3	RB+W 100x6.3	RB+W 100x8	T	T	T	T	T							
300	323,9	10,0	UB	UB	UB	UB	UB	UB	RB+W 100x6.3	RB+W 100x8	RB+W 100x8	RB+W 100x10	T	T	T	T						
350	355,6	10,0	UB	UB	UB	UB	UB	RB+W 100x6.3	RB+W 100x6.3	RB+W 100x8	SP	SP	SP	T	T	T	T	T				
400	406,4	11,0	UB	UB	UB	UB	UB	SP	RB+W 100x6.3	RB+W 100x8	SP	SP	T	T	T	T	T	T	T			
450	457	11,0	UB	UB	UB	RB+W 100x6.3	RB+W 100x6.3	SP	SP	SP	SP	SP	SP	T	T	T	T	T	T	T		
500	508	12,5	UB	UB	UB	UB	RB+W 100x6.3	RB+W 100x6.3	SP	SP	SP	SP	SP	SP	T	T	T	T	T	T	T	
600	610	14,2	UB	UB	UB	RB+W 100x6.3	RB+W 100x6.3	RB+W 100x6.3	SP	SP	SP	SP	SP	SP	SP	T	T	T	T	T	T	T

Notes!

1. The branch table is to be used only for straight pipe branches. The angle of branch connection must be $90^{\circ} \pm 5^{\circ}$.
2. Header pipe and branch pipe must be according to this pipe class.
3. Thickness of the reinforcement plates are always the thickness of header pipe and width of plate is shown in the table.
4. Significant external forces or moments to branch connection are not taken into account. In those cases strenght of branch connection has to be studied case by case
5. If there is risk for cyclic or dynamic loads in the piping, reinforced branch shall be used instead of UB.

PIPING STANDARD 330-007

CARBON STEEL PIPING

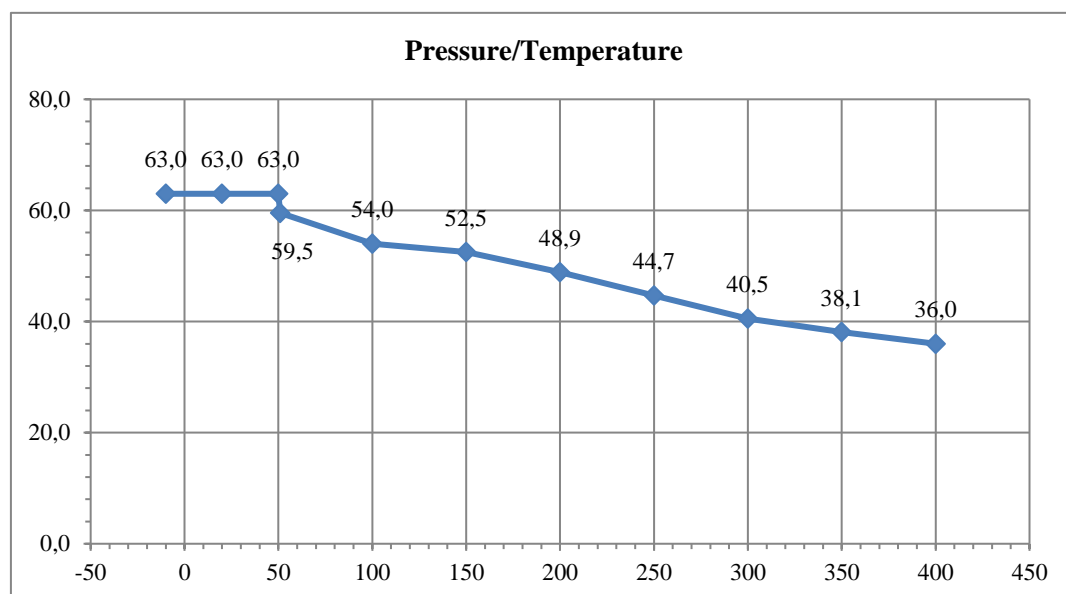
PIPE CLASS 63C1B

General: Pipe Class: Carbon steel pipe class 63C1B
 Design code: EN 13480-3
 Pipe material: EN10216-2, material grade P235GH

Corrosion allowance: 1 mm

Allowable overpressures:

T [°C]	p [bar]
-10	63,0
20	63,0
50	63,0
100	54,0
150	52,5
200	48,9
250	44,7
300	40,5
350	38,1
400	36,0



Linear interpolation of pressure between two adjacent temperature values shall be applied for temperature above 50°C. For temperature between 50-100 linear interpolation shall be made using pressure and temperature values of 20°C and 100°C.

External pressure rating:

Pipes in the pipe class are resistant for full vacuum up to DN 400 at temperature 100°C.

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PIPING STANDARD 330-007

CARBON STEEL PIPING

PIPE CLASS 63C1B

Piping components	DN-range	Dimension standard	Dimension type / additional definition	Material		Material Certificate EN 10204	Remarks
				Designation	Standard		
Pipes	15-400	EN 10216-2:2014		P235GH	EN 10216-2:2014	3.1	
Elbows	15-400	EN 10253-2:2007	Type A, 3D	P235GH	EN 10253-2:2007	3.1	5
Tee pieces	15-400	EN 10253-2:2007	Type A	P235GH	EN 10253-2:2007	3.1	
Reducers	15-400	EN 10253-2:2007	Type A	P235GH	EN 10253-2:2007	3.1	
Caps	15-400	EN 10253-2:2007	Type A	P235GH	EN 10253-2:2007	3.1	
Welding neck flanges	15-40	EN 1092-1:2018	Type 11, PN100	P245GH	EN 10222-2:2017	3.1	
	50-400	EN 1092-1:2018	Type 11, PN63	P245GH	EN 10222-2:2017	3.1	
Blind flanges	15-40	EN 1092-1:2018	Type 05, PN100	P265GH	EN 10028-2:2017	3.1	
	15-400	EN 1092-1:2018	Type 05, PN63	P265GH	EN 10028-2:2017	3.1	
Gaskets	15-400	EN 1514-1: 1997	Type IBC, PN63				1, 2
Bolts		EN ISO 4014:2011		25CrMo4	EN 10269:2013	2.2	
Nuts		EN ISO 4032:2013		C35E	EN 10269:2013	2.2	
Washers		EN ISO7089:2001	Grade A	S235JR	EN 10025-2:2004		

1. Gasket material according to the Flow Substance.

2. Spiral gasket thickness 4.5mm.

3

4

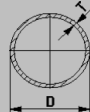
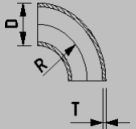
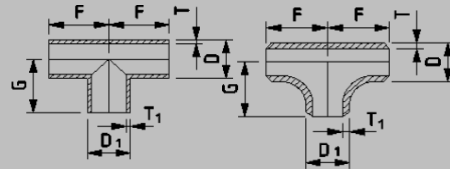

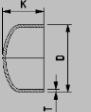
5. Bend R=100 is alternative for Elbows in the size range DN15-DN40. Bends shall fill the requirements of EN13480.

6

PIPING STANDARD 330-007

CARBON STEEL PIPING

PIPE CLASS 63C1B

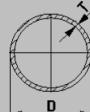
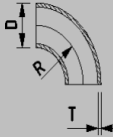
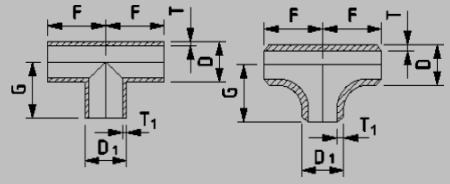
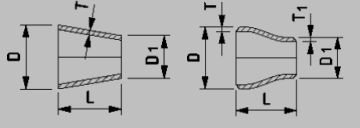
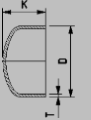
DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
15	21,3 x 2,9	21,3 x 2,6	38,0	-	15	21,3	2,6	2,6	25					21,3 x 2,0
20	26,9 x 2,9	26,9 x 2,6	38,0	-	20	26,9	2,6	2,6	29					26,9 x 2,3
					15	21,3	2,6	2,6	29	15	21,3	2,6	38	
25	33,7 x 3,2	33,7 x 3,2	38,0	-	25	33,7	3,2	3,2	38					33,7 x 2,6
					20	26,9	3,2	2,6	38	20	26,9	3,2	51	
					15	21,3	3,2	2,6	38	15	21,3	3,2	51	
32	42,4 x 3,6	42,4 x 3,6	48,0	-	32	42,4	3,6	3,6	48					42,4 x 2,6
					25	33,7	3,6	3,2	48	25	33,7	3,6	51	
					20	26,9	3,6	2,6	48	20	26,9	3,6	51	
					15	21,3	3,6	2,6	48	15	21,3	3,6	51	
40	48,3 x 4,0	48,3 x 3,6	57,0	-	40	48,3	4,0	4,0	57					48,3 x 3,6
					32	42,4	4,0	4,0	57	32	42,4	3,6	64	
					25	33,7	4,0	4,0	57	25	33,7	3,6	64	
					20	26,9	4,0	3,2	57	20	26,9	3,6	64	
					15	21,3	4,0	3,2	57					

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PIPING STANDARD 330-007

CARBON STEEL PIPING

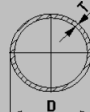
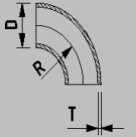
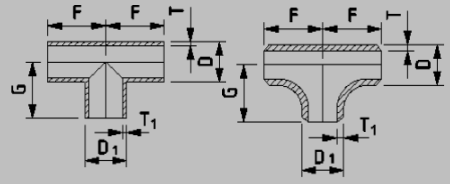
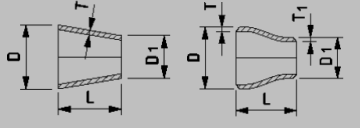
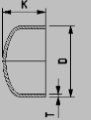
PIPE CLASS 63C1B

DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
50	60,3 x 4,5	60,3 x 4,0	76,0	-	50	60,3	5,6	5,6	64	40	48,3	4,0	76	60,3 x 3,6
					40	48,3	5,6	5,0	64					
					32	42,4	5,6	5,0	64					
					25	33,7	5,6	4,5	64					
					20	26,9	5,6	4,0	64					
65	76,1 x 5,0	76,1 x 5,6	95,0	-	65	76,1	5,6	5,6	76	50	60,3	5,6	89	76,1 x 3,6
					50	60,3	5,6	4,0	76					
					40	48,3	5,6	4,0	76					
					32	42,4	5,6	4,0	76					
					25	33,7	5,6	4,0	76					
80	88,9 x 5,6	88,9 x 5,6	114,0	-	80	88,9	8,0	8,0	86	65	76,1	5,6	89	88,9 x 4,0
					65	76,1	8,0	7,1	86					
					50	60,3	8,0	5,6	86					
					40	48,3	8,0	5,0	86					
					32	42,4	8,0	5,0	86					

PIPING STANDARD 330-007

CARBON STEEL PIPING

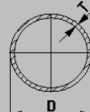
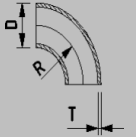
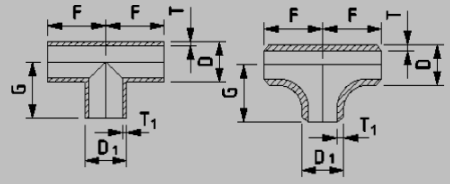
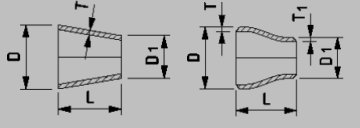
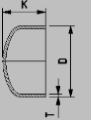
PIPE CLASS 63C1B

DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
100	114,3 x 6,3	114,3 x 6,3	152,0	-	100	114,3	8,8	8,8	105	80	88,9	6,3	102	114,3 x 4,5
					80	88,9	8,8	8,0	105					
					65	76,1	8,8	7,1	105					
					50	60,3	8,8	5,6	105					
					40	48,3	8,8	5,0	105					
125	139,7 x 7,1	139,7 x 6,3	190,0	-	125	139,7	10,0	10,0	124	100	114,3	6,3	127	139,7 x 6,3
					100	114,3	10,0	8,8	124					
					80	88,9	10,0	8,0	124					
					65	76,1	10,0	7,1	124					
					50	60,3	10,0	5,6	124					
150	168,3 x 7,1	168,3 x 7,1	229,0	-	150	168,3	11,0	11,0	143	125	139,7	7,1	140	168,3 x 7,1
					125	139,7	11,0	10,0	143					
					100	114,3	11,0	8,8	143					
					80	88,9	11,0	8,0	143					
					65	76,1	11	7,1	143					

PIPING STANDARD 330-007

CARBON STEEL PIPING

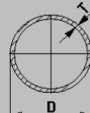
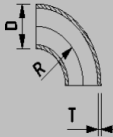
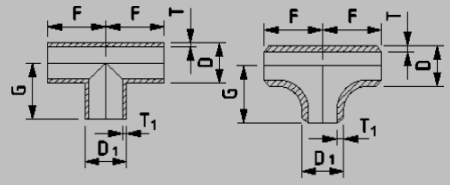
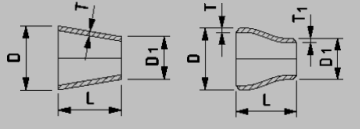
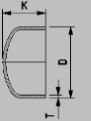
PIPE CLASS 63C1B

DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
200	219,1 x 8,8	219,1 x 10,0	305,0	-	200	219,1	14,2	12,5	178	150	168,3	12,5	152	219,1 x 8,0
					150	168,3	12,5	11,0	178	125	139,7	12,5	152	
					125	139,7	12,5	10,0	178	100	114,3	12,5	152	
					100	114,3	12,5	8,8	178	80	88,9	12,5	152	
250	273,0 x 10,0	273,0 x 12,5	381,0	-	250	273	16,0	16,0	216	200	219,1	12,5	178	273,0 x 10,0
					200	219,1	16,0	16,0	216	150	168,3	12,5	178	
					150	168,3	16,0	14,2	216	125	139,7	12,5	178	
					125	139,7	16,0	12,5	216	100	114,3	12,5	178	
300	323,9 x 12,5	323,9 x 12,5	457,0	-	300	323,9	20,0	17,5	254	250	273	12,5	203	323,9 x 12,5
					250	273	17,5	17,5	254	200	219,1	12,5	203	
					200	219,1	17,5	16,0	254	150	168,3	12,5	203	
					150	168,3	17,5	14,2	254	125	139,7	12,5	203	

PIPING STANDARD 330-007

CARBON STEEL PIPING

PIPE CLASS 63C1B

DN	PIPE	ELBOW			TEE					REDUCER				CAP
														
	D x T	D x T	R 3D	R 5D	DN1	D1	T	T1	F/G	DN1	D1	T/T1	L	D x s
350	355,6 x 12,5	355,6 x 14,2	533,0	-	350	355,6	20,0	20,0	279	300	323,9	16,0	330	355,6 x 12,5
					300	323,9	20,0	20,0	279					
					250	273	20,0	16,0	279					
					200	219,1	20,0	16,0	279					
					150	168,9	20,0	14,2	279					
400	406,4 x 14,2	406,4 x 16,0	610,0	-	400	406,4	25,0	22,2	305	350	355,6	17,5	356	406,4 x 12,5
					350	355,6	22,2	22,2	305					
					300	323,9	22,2	20,0	305					
					250	273	22,2	16,0	305					
					200	219,1	22,2	16,0	305					
					150	168,3	22,2	14,2	305					

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PIPING STANDARD 330-007
CARBON STEEL PIPING
PIPE CLASS 63C1B

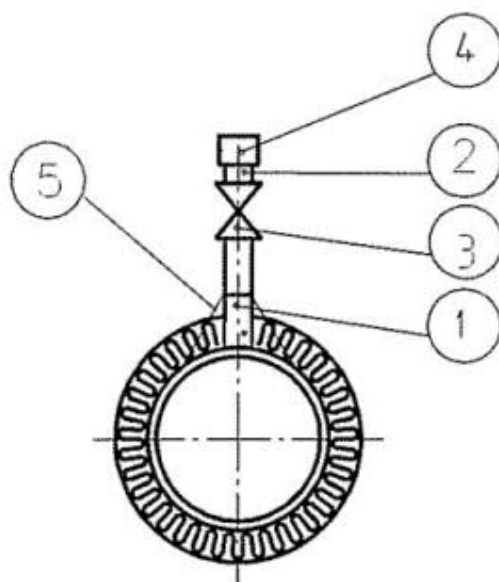
HEADER PIPE			BRANCH PIPE																
			15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	DN
			21,3	26,9	33,7	42,4	48,3	60,3	76,1	88,9	114,3	139,7	168,3	219,1	273,0	323,9	355,6	406,4	D
DN	D	t	2,9	2,9	3,2	3,6	4,0	4,5	5,0	5,6	6,3	7,1	7,1	8,8	10,0	12,5	12,5	14,2	t
15	21,3	2,9	T																
20	26,9	2,9	T	T															
25	33,7	3,2	UB	T	T								T	T-piece					
32	42,4	3,6	UB	UB	T	T							UB	Unreinforced branch					
40	48,3	4,0	UB	UB	UB	T	T						RB+W	Reinforced branch - Increased wall thickness of the nozzle pipe					
50	60,3	4,5	UB	UB	UB	UB	T	T					RB+P	Reinforced branch - Reinforcement plate					
65	76,1	5,0	UB	UB	UB	UB	UB	T	T				RB+WP	Reinforced branch - Reinforcement plate + Increased wall thickness of the nozzle pipe					
80	88,9	5,6	UB	UB	UB	UB	UB	T	T	T			SP	Special Tee - To be defined case by case when needed					
100	114,3	6,3	UB	UB	UB	UB	UB	T	T	T	T								
125	139,7	7,1	UB	UB	UB	UB	SP	T	T	T	T	T							
150	168,3	7,1	UB	RB+W 100x6.3	RB+W 100x6.3	SP	SP	SP	T	T	T	T	T						
200	219,1	8,8	SP	SP	SP	SP	SP	SP	SP	SP	T	T	T	T					
250	273,0	10,0	RB+W 100x6.3	RB+W 100x6.3	RB+W 100x10	SP	SP	SP	SP	RB+W 100x12.5	T	T	T	T	T				
300	323,9	12,5	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	T	T	T	T			
350	355,6	12,5	UB	UB	UB	SP	SP	SP	SP	SP	SP	SP	T	T	T	T	T		
400	406,4	14,2	UB	UB	UB	UB	SP	SP	SP	SP	SP	SP	T	T	T	T	T	T	

Notes!

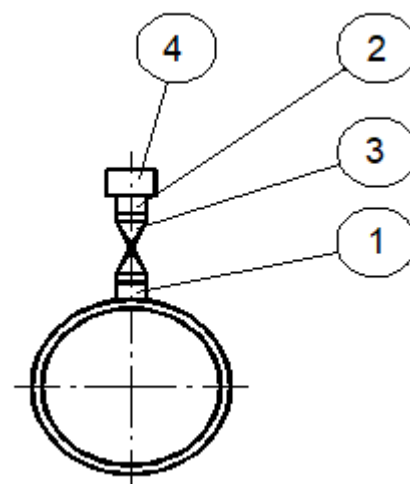
1. The branch table is to be used only for straight pipe branches. The angle of branch connection must be $90^{\circ} \pm 5^{\circ}$.
2. Thickness of the reinforcement plates are always the thickness of header pipe and width of plate is shown in the table.
3. Significant external forces or moments to branch connection are not taken into account. In those cases strenght of branch connection has to be studied case by case
4. If there is risk for cyclic or dynamic loads in the piping, reinforced branch shall be used instead of UB.

PIPING STANDARDS 333-018 - CARBON STEEL PIPING - VENT CONNECTION DN 25 UP TO PN40

1. DIMENSIONS



Type A



Type B

5	2	Plate s=3mm	EN10028-2	P235GH or equal
4	1	Hex head cap DN 25	EN 10241	P235GH or equal
3	1	Valve DN 25, see valve spec.		
2	1	Welding nipple R 1"	EN 10241	P235GH or equal
1	1	Pipe 33.7 x 2.6	EN 10216-2	P235GH or equal
Part	Pcs	Description	Standard No.	Material

2. NOTE

The length of the pipe depends on insulation thickness.

3. DESIGNATION

Name, DN, type, material, standard No.

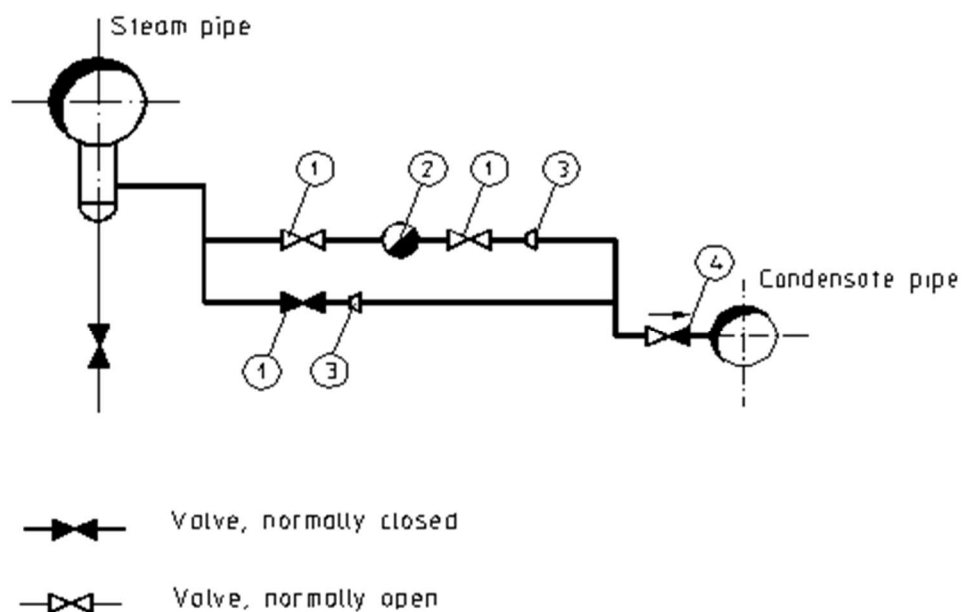
Example: Vent connection, DN 25, A, P235GH, 333-018

PIPING ARRANGEMENTS FOR STEAM, AIRS AND WATERS

4 PIPING ARRANGEMENTS FOR STEAMS, AIRS AND WATERS

PIPING STANDARD 360-010 - STEAM TRAPS - MEDIUM AND LOW PRESSURE STEAM - PIPING, $P \leq 4$ MPA - TYPICAL ARRANGEMENT INDOORS

1. DIMENSIONS



4	Check valve
3	Reducer
2	Steam trap with inside filter
1	Shut off valve
Part	Description

2. NOTES

Channel pipe end must not reach to the water.

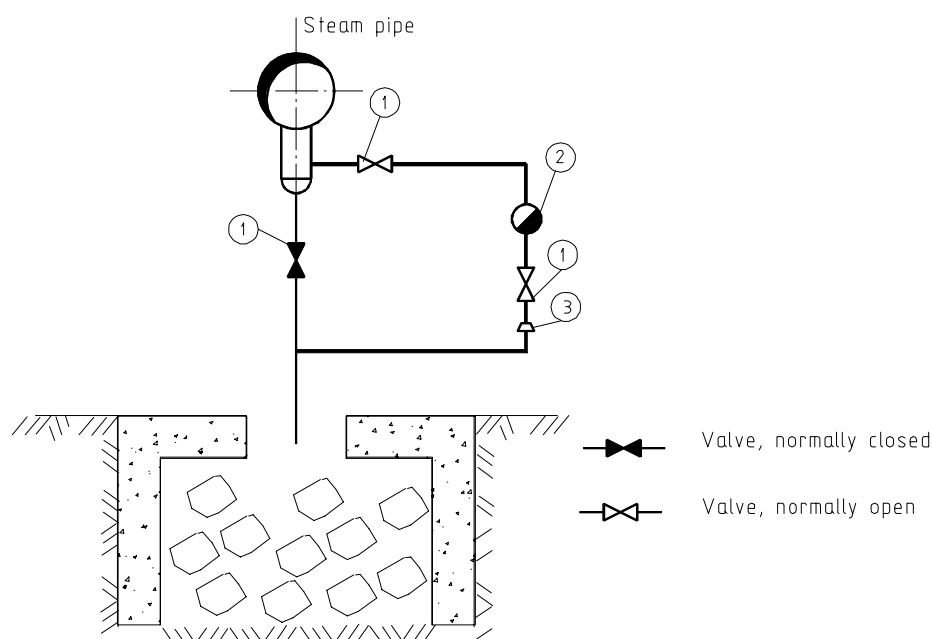
3. DESIGNATION

Name, standard No.

Example: Steam trap arrangement, 360-010

PIPING STANDARD 360-012 - STEAM TRAPS - MEDIUM AND LOW PRESSURE STEAM PIPING, $P \leq 4$ MPA - TYPICAL ARRANGEMENT OUTDOORS

1. DIMENSIONS



3	Reducer
2	Steam trap with inbuilt filter
1	Shut off valve
Part	Description

2. NOTES

Pipe end to the cooling pit must not reach to the water.

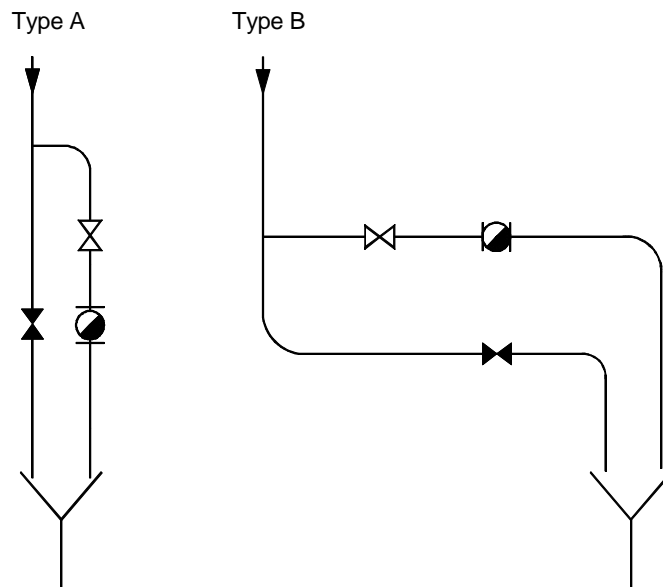
Nominal size of the piping at least DN 50.

3. DESIGNATION

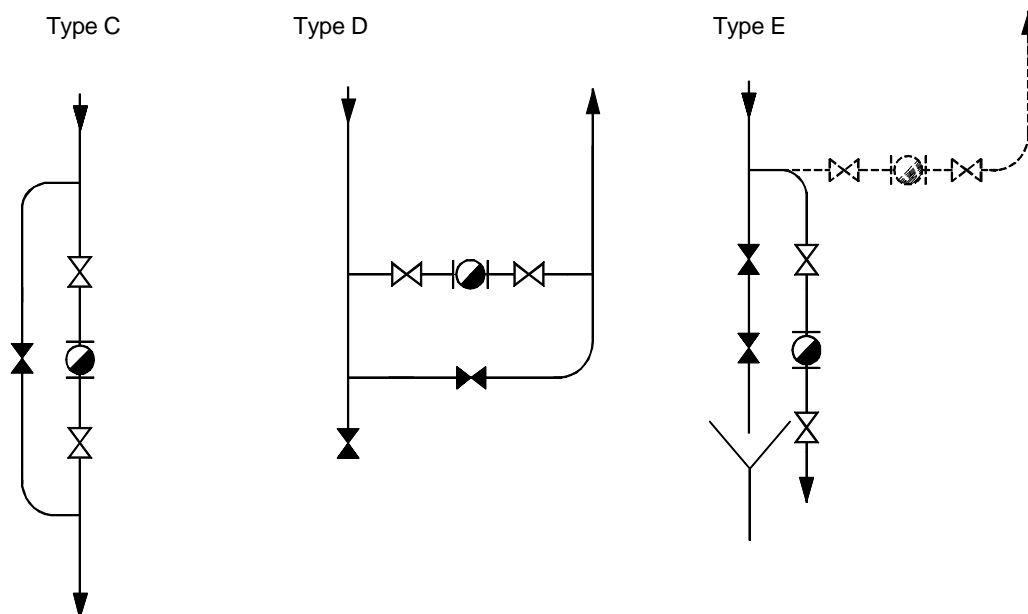
Name, standard No.

Example: Steam trap arrangement, 360-012

PIPING STANDARD 360-015 - STEAM TRAPS - STEAM TRAP MOUNTING ARRANGEMENTS



DRAIN TO THE CHANNEL



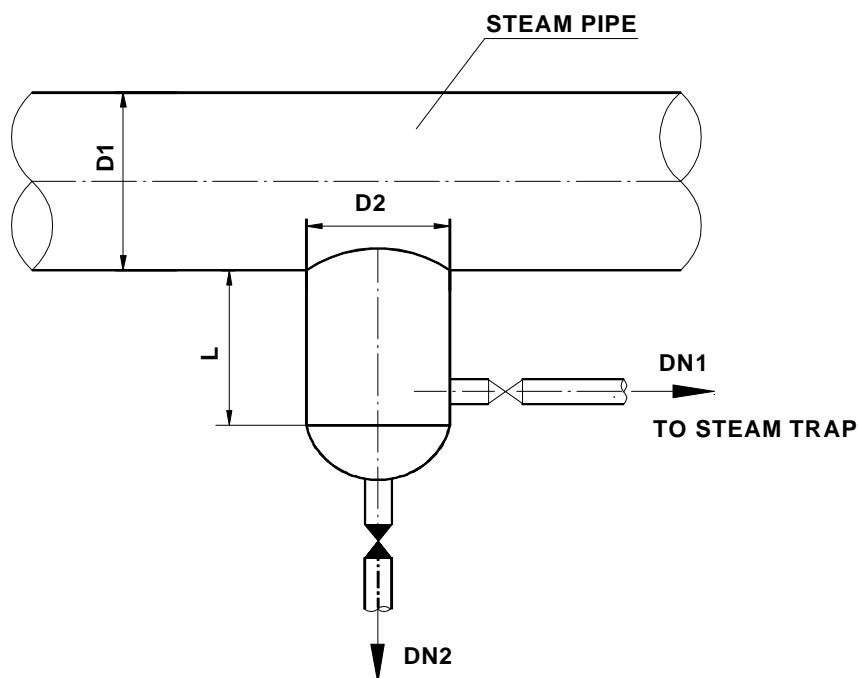
CONDENSATE RETURN TO THE PIPE OR TANK

NOTES

Equipment shall be placed handling level.

PIPING STANDARD 361-010 - STEAM TRAPS - MEDIUM AND LOW PRESSURE STEAM - PIPING, $P \leq 4$ MPA - DRAIN AT STEAM PIPE

1. DIMENSIONS



D ₁	50	65	80	100	125	150	200	250	300	350	400	450	500	≥600
mm	60.3	76.1	88.9	114.3	139.7	168.3	219.1	273.0	323.9	355.6	406.4	457.2	508.0	610.0
D ₂	25	25	50	50	80	100	150	150	150	200	200	250	250	300
mm	33.7	33.7	60.3	60.3	139.7	168.3	168.3	168.3	168.3	219.1	219.1	273.0	273.0	323.9
L, mm	L=200							L=250						L=300
DN ₁	25	25	25	25	25	25	25	22	25	25	25	25	40	40
DN ₂	25	25	25	40	40	40	40	50	50	50	50	50	50	50

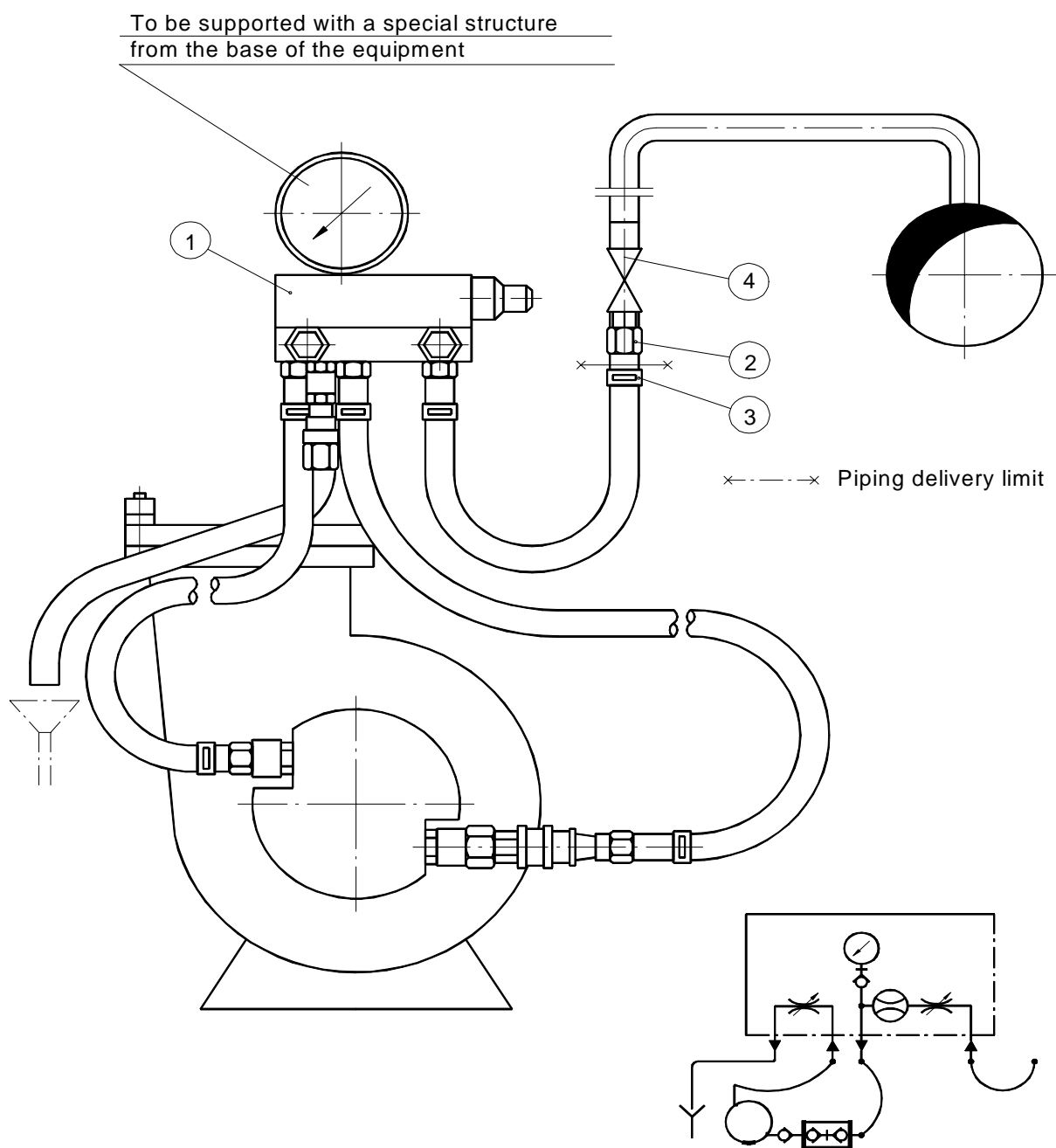
2. DESIGNATION

Name, D₁ / D₂, material (according to the pipe class), standard No.

Example: Drain of steam pipe, 150 / 125, P235GH , 361-010

PIPING STANDARD 362-010 - SEAL WATER CONNECTION FOR PUMP - STUFFING BOX OR MECHANICAL SEAL - WITH FLOW-THROUGH - PRINCIPAL ARRANGEMENT

1. DIMENSIONS



4	1	Ball valve DN 15 welded/threaded		
3	1	Hose clamp 13 - 20 mm		1.4404 or 1.4432
2	1	Hose coupling R 1/2 ext. thread for hose 3/8"		1.4404 or 1.4432
1	1	Sealing water unit		
Part	PCS	Description	Standard No	Material

2. DESIGNATION

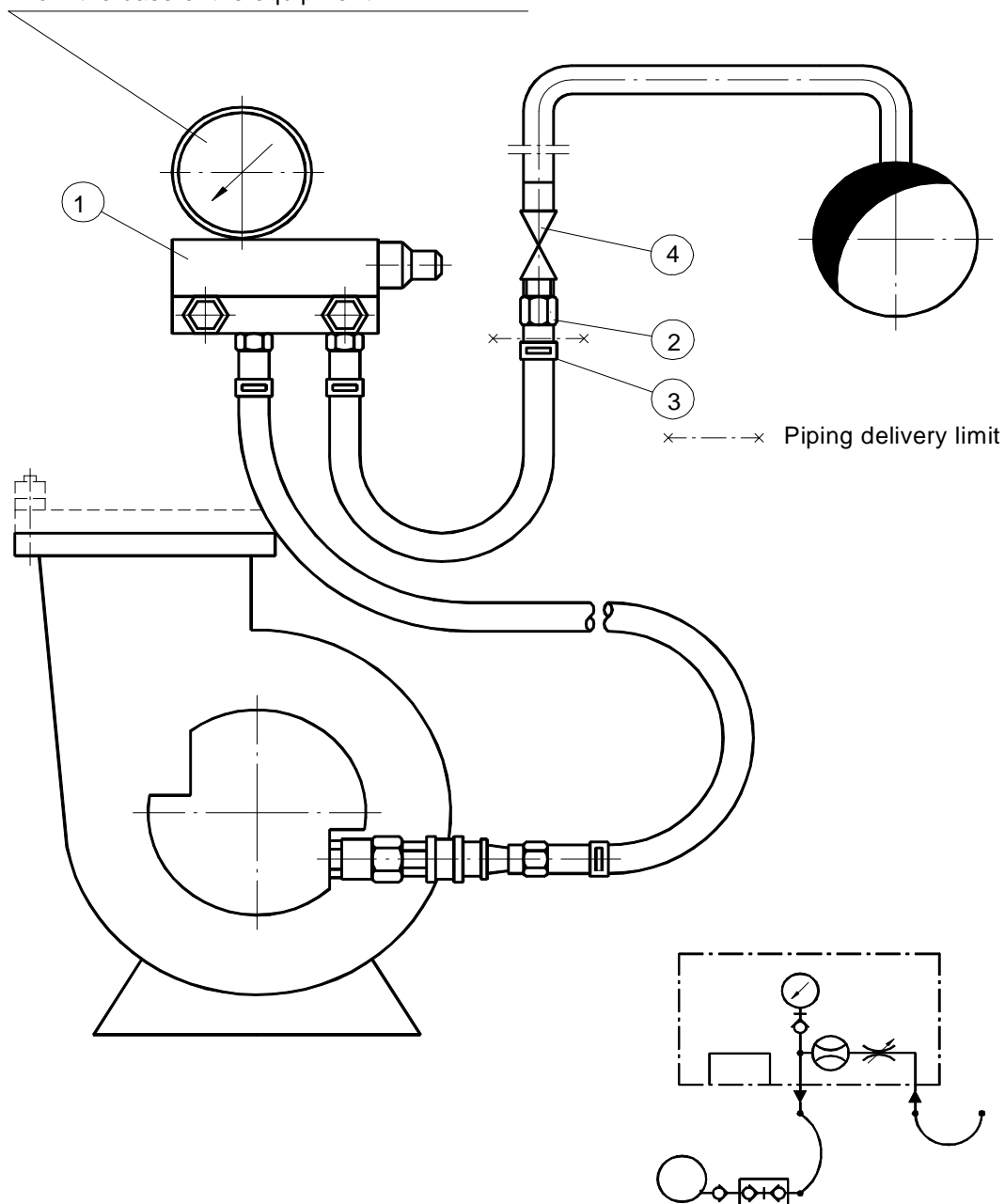
Name, size, standard No.

Example: Seal water connection, R 1/2", 362-010

PIPING STANDARD 362-011 - SEALING WATER CONNECTION FOR PUMP - STUFFING BOX WITH INFLOW - PRINCIPAL ARRANGEMENT

1. ARRANGEMENT

To be supported with a special structure
from the base of the equipment



4	1	Ball valve DN 15 welded/threaded		
3	1	Hose clamp 13 - 20 mm		1.4404 or 1.4432
2	1	Hose coupling R 1/2 ext. thread for hose 3/8"		1.4404 or 1.4432
1	1	Sealing water unit		
Part	PCS	Description	Standard No	Material

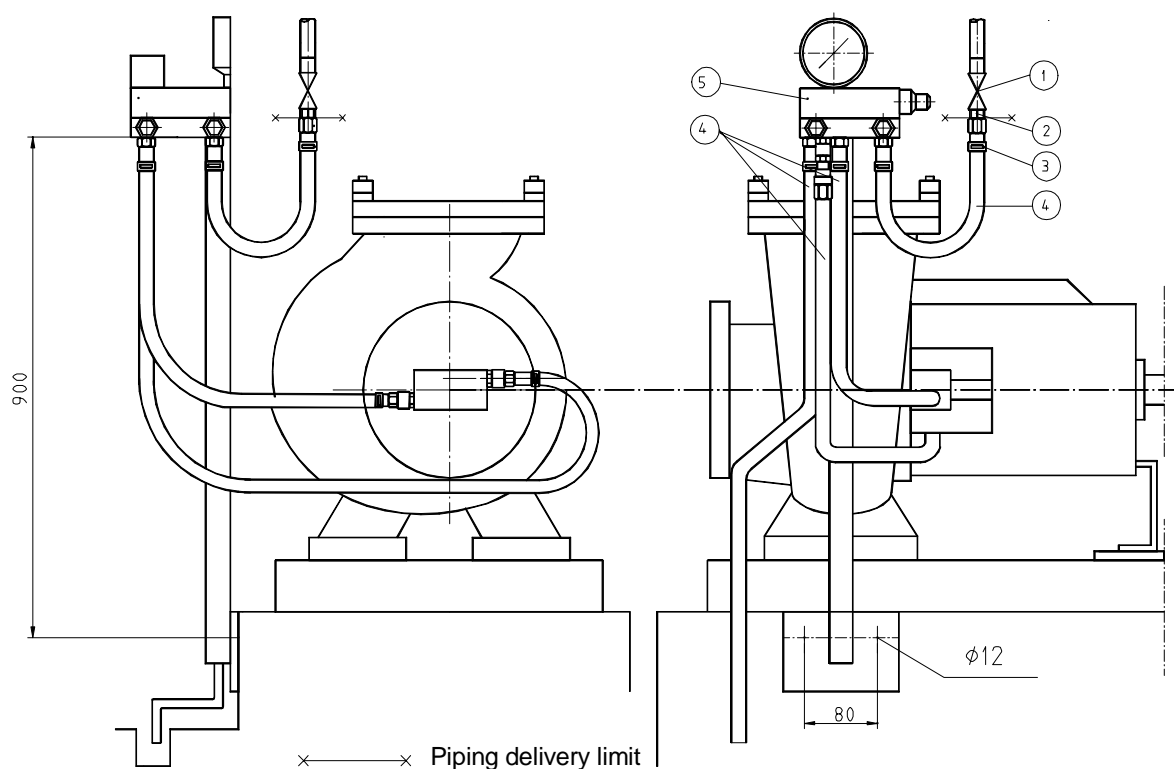
2. DESIGNATION

Name, size, standard No.

Example: Seal water connection, R 1/2", 362-011

PIPING STANDARD 362-012 - SEALING WATER CONNECTION FOR PUMP - STUFFING BOX OR MECHANICAL SEAL - SUPPORT OF SEALING WATER UNIT

1. ARRANGEMENT



5	1	Sealing water unit		
4	1	Steel fibre reinforced hose 3/8"		
3	2	Hose clamp 13 - 20 mm		1.4404 or 1.4432
2	1	Hose coupling R 1/2 ext. thread for hose 3/8"		1.4404 or 1.4432
1	1	Ball valve DN 15 welded/threaded		
Part	PCS	Description	Standard No	Material

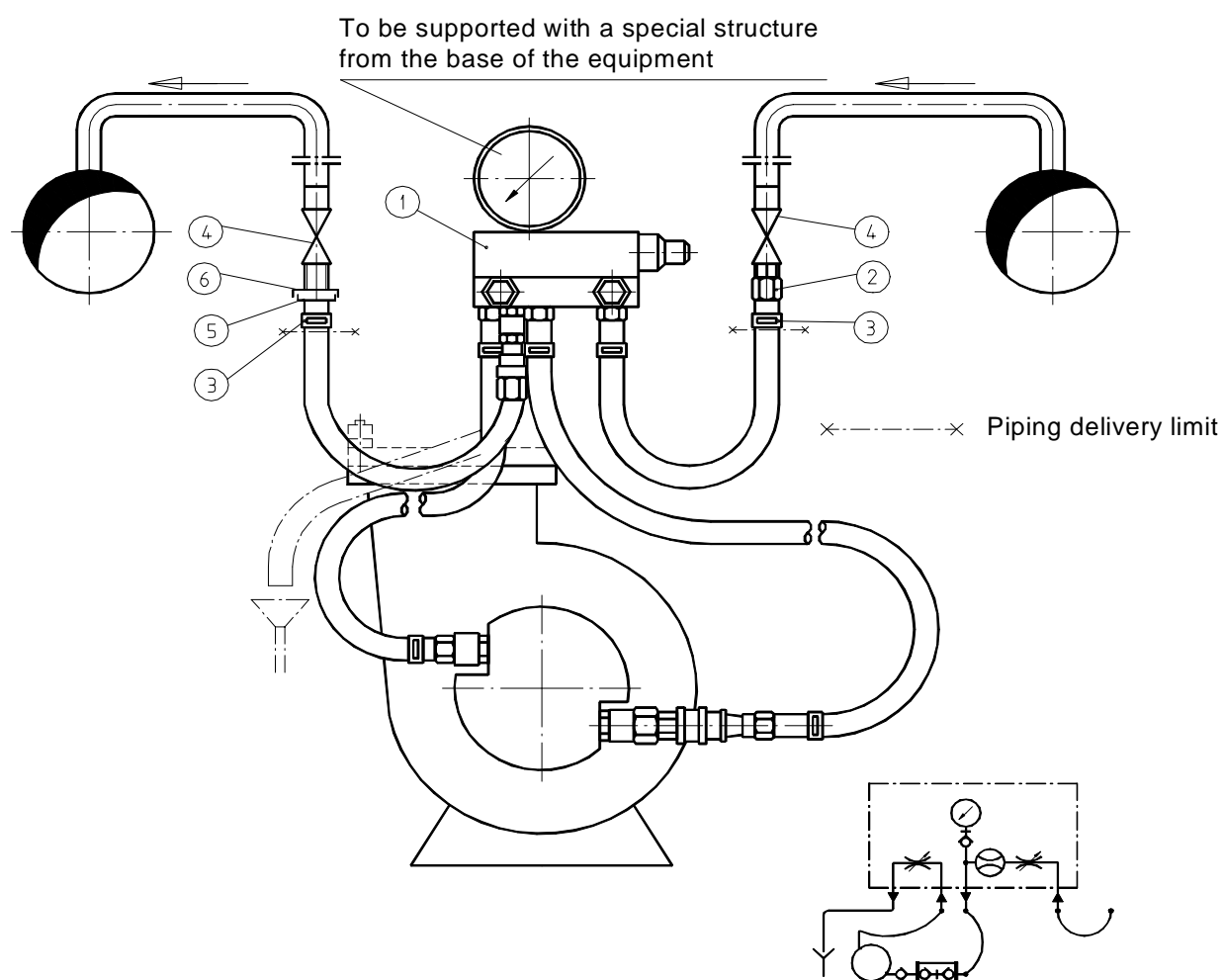
2. DESIGNATION

Name, size, standard No.

Example: Seal water connection, R 1/2", 362-012

PIPING STANDARD 362-013 - SEALING WATER CONNECTION FOR PUMP - STUFFING BOX OR MECHANICAL SEAL - WITH FLOW-THROUGH - PRINCIPAL ARRANGEMENT

1. DIMENSIONS

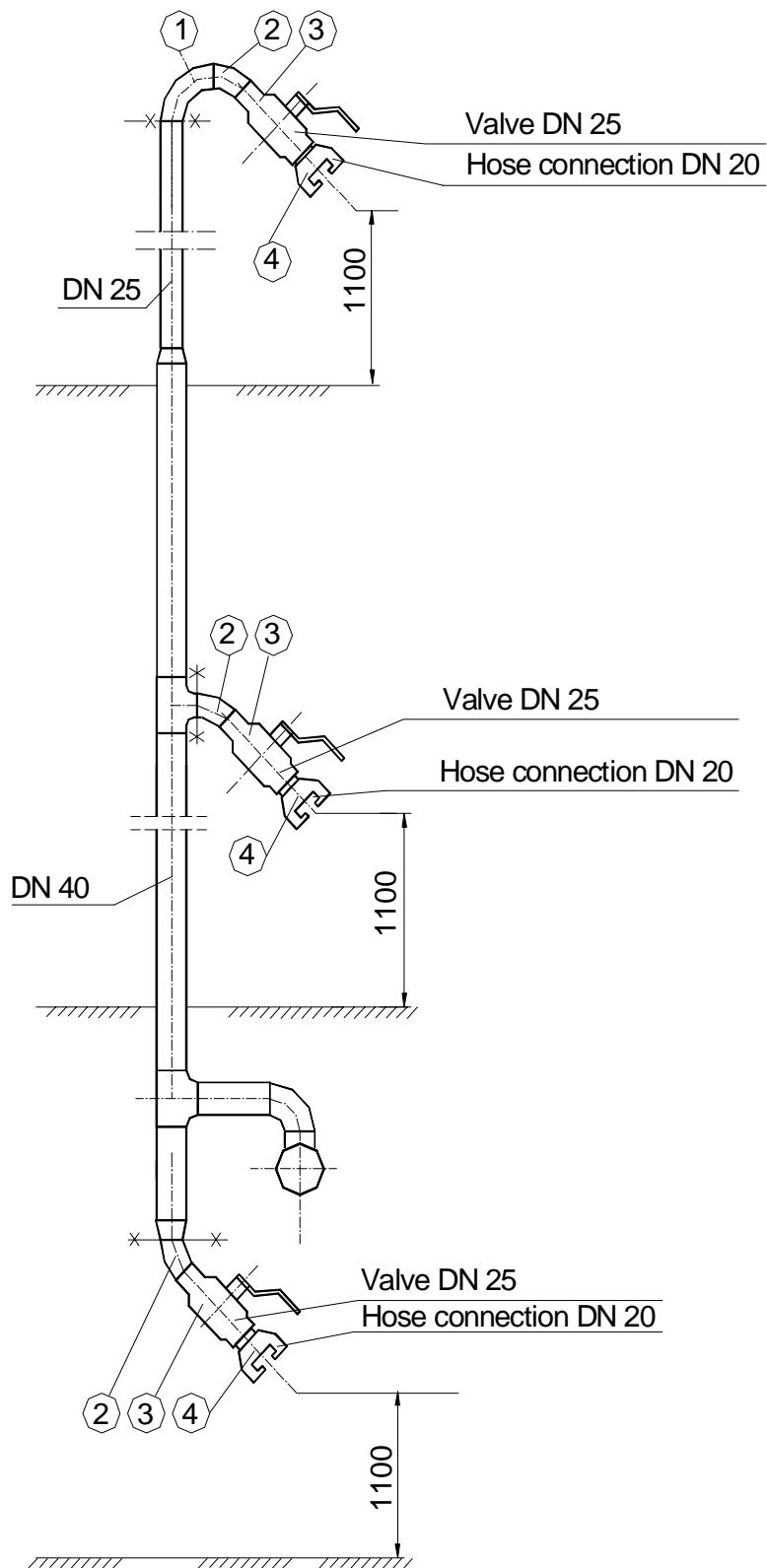


6	1	Hose connection R 1/2" ext. thread		
5	1	Hose coupling DN 15		
4	2	Ball valve DN 15 welded/threaded		
3	2	Hose clamp 13 - 20 mm		1.4404 or 1.4432
2	1	Hose coupling R 1/2 ext. thread for hose 3/8"		1.4404 or 1.4432
1	1	Sealing water unit		
Part	PCS	Description	Standard No	Material

2. DESIGNATION

Name, size, standard No.

Example: Seal water connection, R 1/2", 362-013

PIPING STANDARD 365-011 - COMPRESSED AIR SUPPLY SYSTEM DN 20**1. DIMENSIONS**

4	3	Hose connection R ¾" external thread R 1"	
3	3	Valve DN 25 welded/R1" thread see valve specification	according to the pipe class
2	3	Elbow 45° / DN25 – 33.7 x 2.0	according to the pipe class
1	1	Elbow 90° / DN25 – 33.7 x 2.0	according to the pipe class
Part	Pcs	Description	Material

2. DESIGNATION

Name, DN, standard No.

Example: Compressed air supply system DN 20, 365-011

1. DIMENSIONS



7	1	Ball valve with welding ends DN 40	
6	1	Union with butt weld ends R1 ½ "	according to the pipe class
5		Elbow 48.3 x 2	according to the pipe class
4		Pipe 48.3 x 2	according to the pipe class
2	1	Steel reinforced hose 1 1/2" Length 30 m	
1	1	Hose reel, hose 1 1/2"	
Part	Pcs	Description	Material

Example: Wash water hydrant DN 40 with hose reel, 366-011

Hose reel, hose 1", 30 m
Connection R 1 with int. thread

Valve DN 40

DN 80

Valve DN 40

Valve DN 40

650

1200

1100

560

420

635

1200

1100

560

420

635

1200

1100

560

420

635

A — A

3. DIMENSIONS

9	3	Bend with socket 90°, R 1"	EN 10241	red painted carbon steel
8	3	Welding nipple, R 1"	EN 10241	red painted carbon steel
7	6	Elbow 90° / DN 25 – 33.7 x 2.6	EN 10253-2	red painted carbon steel
6	3	Valve DN 25 welding ends		
5		Pipe DN 25 - 33.7 x 2.6	EN 10216-2	red painted carbon steel
4	3	Fire fighting nipple		Aluminium
3	3	Valve DN 40 welded/1 1/2" thread		
2	3	Elbow 45° / DN 40 – 48.3 x 2.6	EN 10253-2	red painted carbon steel
1	1	Elbow 90° / DN 40 - 48.3 x 2.6	EN 10253-2	red painted carbon steel
Part	Pcs	Description	Material	

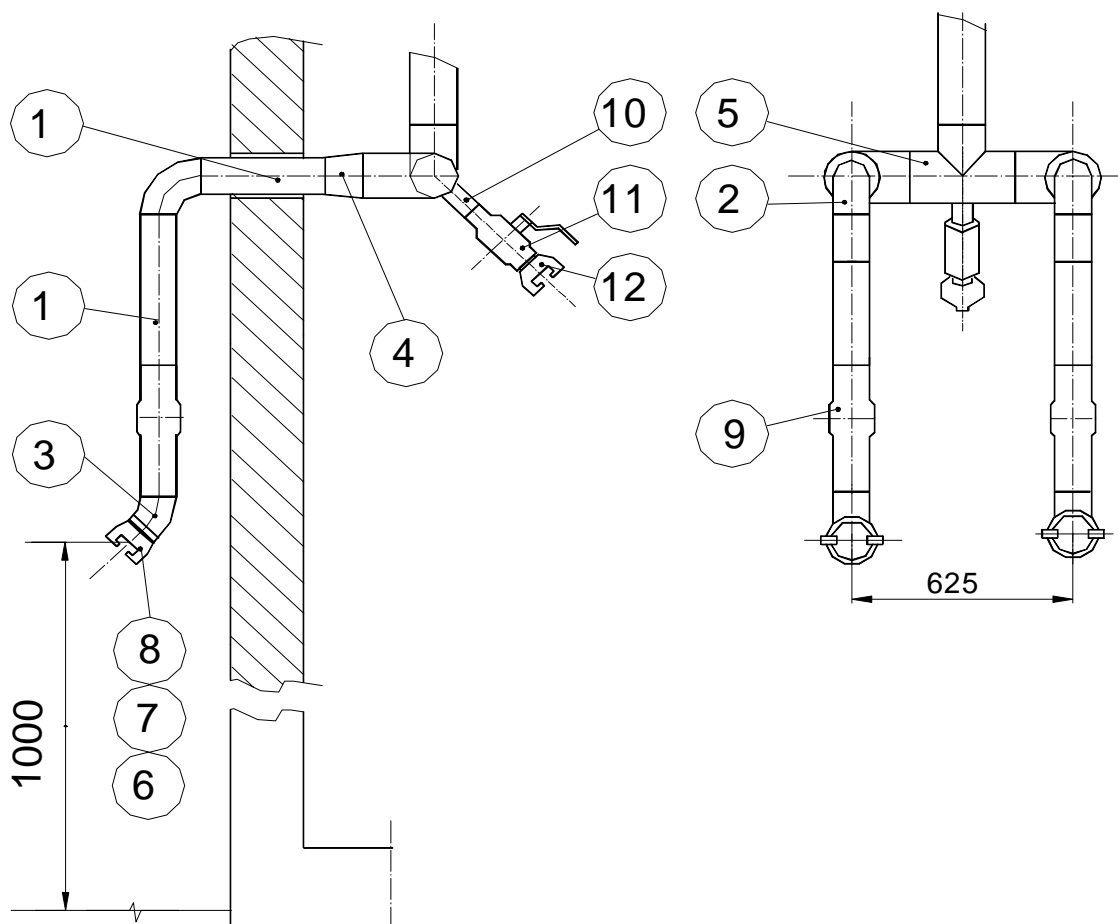
4. DESIGNATION

Name, DN, standard No.

Example: Fire hydrant indoors, DN 40, 367-010

PIPING STANDARD 367-011 - FIRE HYDRANT 2 X DN 80, OUTDOORS**1. GENERAL**

National and local regulations, and practises shall be followed in fire hydrant constructions and connections. If not otherwise stated in local regulations or in the project documents, the constructions below can be used. The Contractor is responsible for ensuring that the constructions and connections fulfil the local and national regulations, and practises.

2. DIMENSIONS

12	1	Fire fighting nipple	Aluminium
11	1	Valve DN 40 PN 16 welded/ R 1 1/2" thread	
10	1	Pipe DN 40-48.3 x 2.6, EN 10216-2	red painted carbon steel
9	2	Valve DN 80 PN 16 with long welding ends	
8	2	Quick coupling cover	Aluminium
7	2	Quick coupling nipple	Aluminium
6	2	Welding nipple R 3" external thread	red painted carbon steel
5	1	T-piece DN 100/ DN 100 – 114.3 x 114.3 x 3.6, EN 10253-2	red painted carbon steel
4	2	Reducer DN 100/ DN 80 – 114.3/ 88.9 x3.6/3.2, EN 10253-2	red painted carbon steel
3	2	Elbow 45° / DN 80 – 88.9 x 3.2, EN 10253-2	red painted carbon steel
2	2	Elbow 90° / DN 80 – 88.9 x3.2, EN 10253-2	red painted carbon steel
1	4	Pipe DN 80 – 88.9 x 3.2, EN 10216-2	red painted carbon steel
Part	Pcs	Description	Material

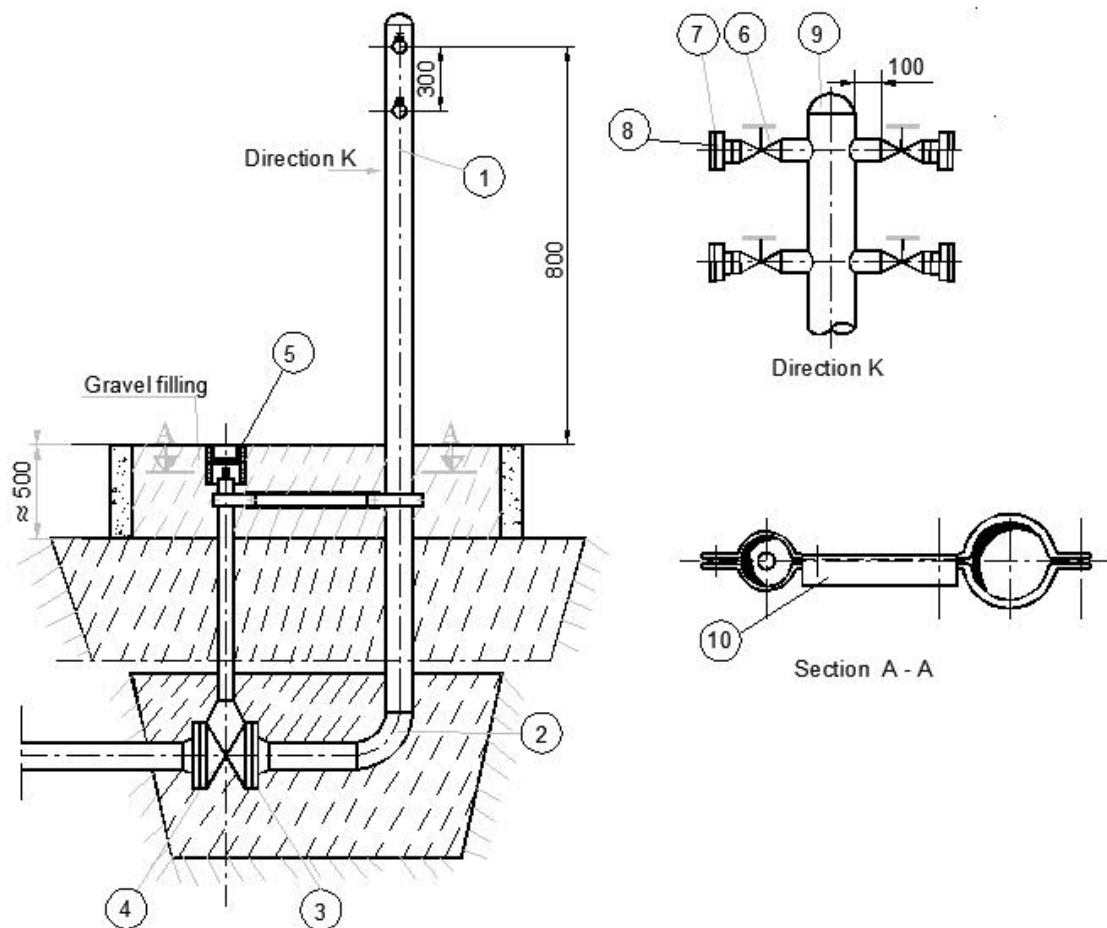
3. DESIGNATION

Name, DN, standard No.

Example: Fire hydrant outdoors, 2 x DN 80, 367-011

PIPING STANDARD 367-012 - FIRE HYDRANT 4 X DN 80, OUTDOOR AREA**1. GENERAL**

National and local regulations, and practises shall be followed in fire hydrant constructions and connections. If not otherwise stated in local regulations or in the project documents, the constructions below can be used. The Contractor is responsible for ensuring that the constructions and connections fulfil the local and national regulations, and practises.

2. DIMENSIONS

10	1	Support	
9	1	Cap DN 150 – 168.3 x 4.5 EN 10253-4	
8	4	Quick coupling cover	Aluminium
7	4	Quick coupling nipple	Aluminium
6	4	Ball valve DN 80, PN 16 internal thread, long welding end / R 3" thread	
5	1	Embedded collar with cover	Cast iron
4	1	Shut-off valve DN 150 PN 16 (ball or gate valve), flanged	
3	2	Weld-neck flange DN 150, PN 16, EN 1092-1	red painted carbon steel
2	1	Elbow 90° / DN 150 – 168.3 x 5.0, EN 10253-2	red painted carbon steel
1	1	Pipe DN 150 – 168.3 x 5.0, EN 10216-2	red painted carbon steel
Part	QUANTITY/Pcs	Description	Material

3. DESIGNATION

Name, DN, standard No.

Example: Fire hydrant outdoor area, 4 x DN 80, 367-012

INSTRUMENTATION DESIGN STANDARDS

5 INSTRUMENTATION DESIGN STANDARDS

Instrumentation design standards in this Piping Standard shall comply with the MEIA00XX instrumentation standards

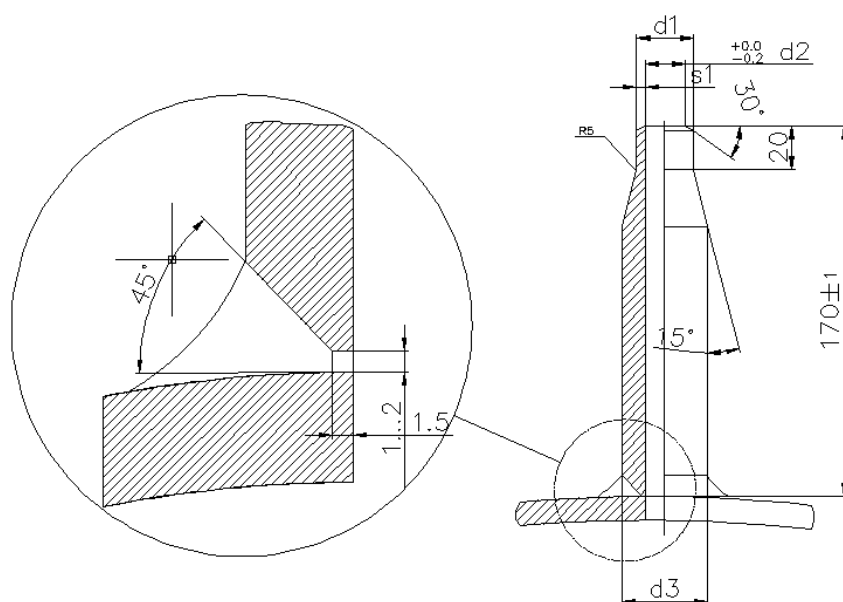
PIPING STANDARD 631-011 - INSTRUMENTATION DESIGN STANDARDS - PRESSURE CONNECTION, TWO SHUT-OFF VALVES AND REDUCER DN 10...DN 25 - PRESSURE FROM 4 MPa TO 16 MPa

1. GENERAL

Pressure measurement point for high pressure applications.

2. DIMENSIONS

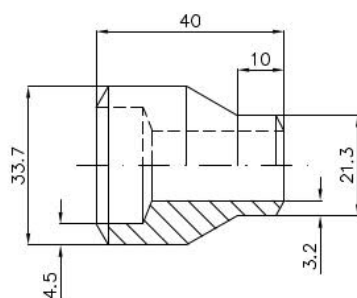
Pressure connection



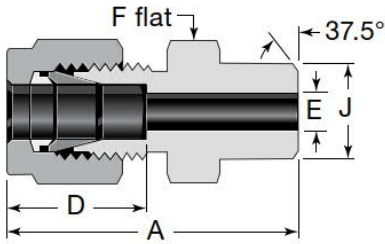
DN	d3	d2	d1 and ØE	s
10	35	12	17.2	2,6
15	40	14.9	21.3	3,2
20	40	18.9	26.9	4,0
25	50	24.7	33.7	4,5

Shaded sizes shall be avoid.

Reducer



Weld connector



DN	A	D	E	J	F	Type (Swagelok)
10	43.4	22.8	9.5	17.1	22	SS-12MO-1-6W
15	49	22.8	9.5	21.3	22	SS-12MO-1-8W
20	50.5	22.8	9.5	26.7	27	SS-12MO-1-12W

Shaded sizes shall be avoid.

3. MATERIAL

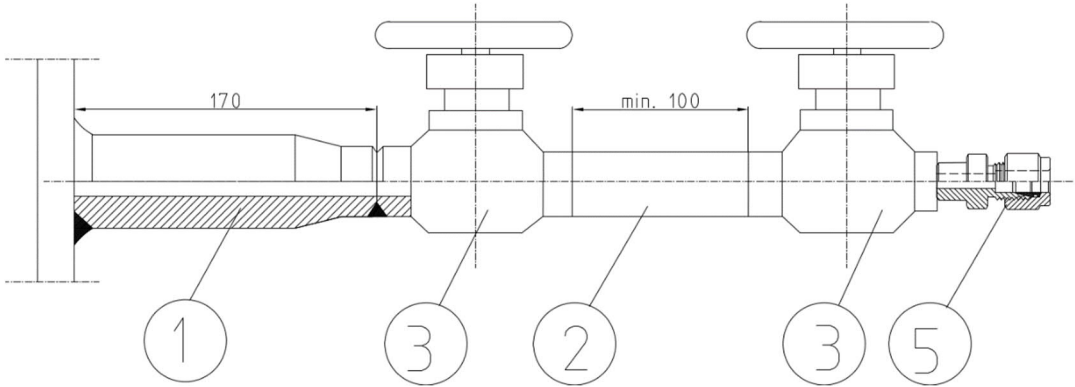
Material and certificates same as the base material onto which the connection is to be welded.

4. NOTES

The strength calculation of the pressure connection (according to the pressure and temperature conditions) is to be made as indicated in the pressure vessels requirements.

5. COMBINATION

DN10-DN20:

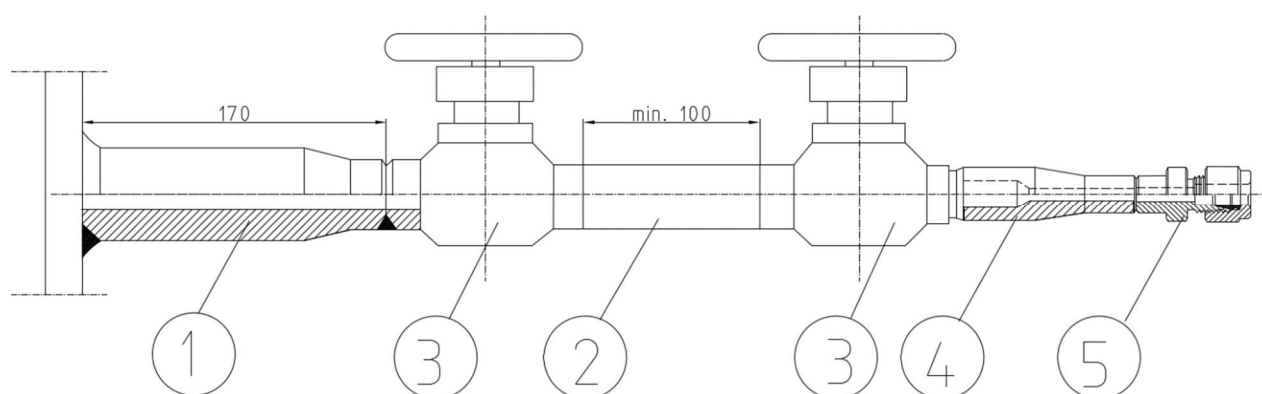


5	1	Weld connector, see point 2	
3	2	Valve DN 10...20, see valve specification	
2	1	Pipe DN 10...20, EN 10216-2	
1	1	Pressure connection, see point 2	
Part	Pc	Description	Material

The combination consists of pressure connection, pipe, two globe valves and weld connector and is included in piping or equipment supply.

If needed, because of the insulation thickness, extra pipe may be added between parts 1 and 3. See space requirements in the point 7.

DN25:



5	1	Weld connector, see point 2	
4	1	Reducer, see point 2	
3	2	Valve DN 25, see valve specification	
2	1	Pipe DN 25, EN 10216-2	
1	1	Pressure connection, see point 2	
Part	Pc	Description	Material

The combination consists of pressure connection, pipe, two globe valves, reducer and weld connector and is included in piping or equipment supply.

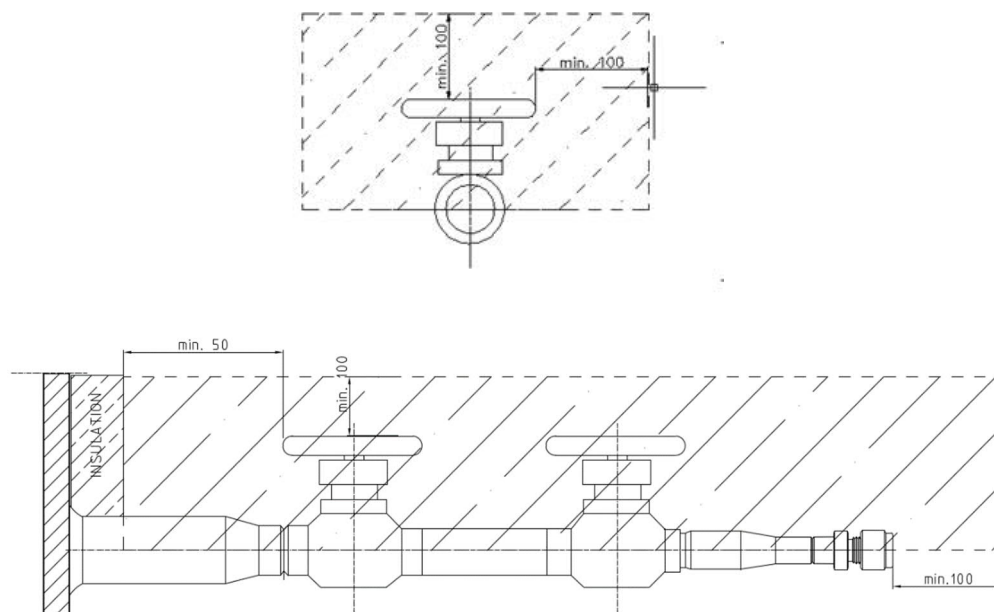
If needed, because of the insulation thickness, extra pipe may be added between parts 1 and 3. See space requirements in the point 7

6. DESIGNATION

Tag, name, DN, material, valve code, standard No.

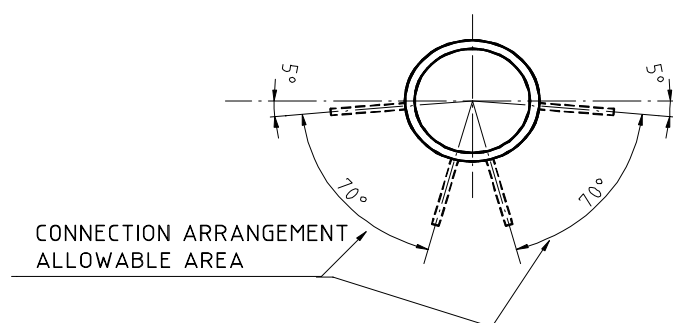
Example: 42A1900-PW, Pressure connection, DN 15, 13CrMo 4-5, 205, 631-011

7. SPACE RESERVATIONS

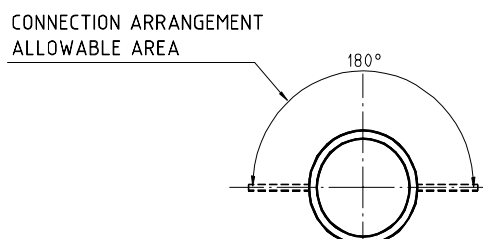


8. CONNECTION ARRANGEMENT IN THE PIPING

Pressure measurement



Local measurement



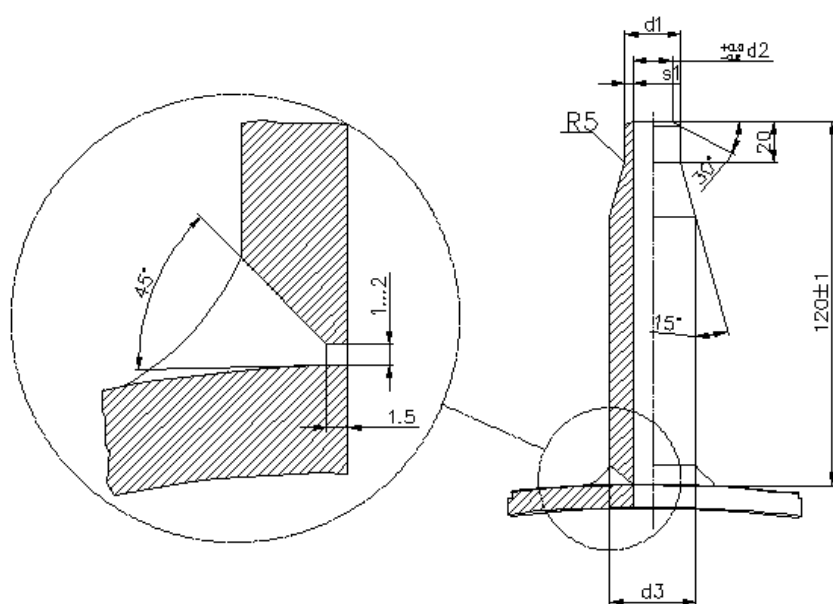
PIPING STANDARD 631-012 - INSTRUMENTATION DESIGN STANDARDS - PRESSURE CONNECTION, SHUT-OFF VALVE - AND REDUCER DN 10...DN 25 - PRESSURE UP TO 4 MPA

1. GENERAL

Pressure measurement point for low pressure applications.

2. DIMENSIONS

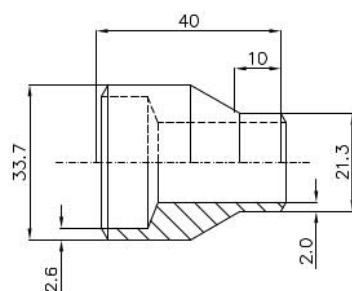
Pressure connection

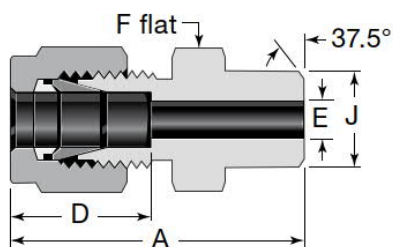


DN	d3	d2	d1 and ØE	s
10	25	13.2	17.2	2,0
15	35	17.3	21.3	2.0
20	35	22.3	26.9	2.3
25	40	28.5	33.7	2.6

Shaded sizes shall be avoid

Reducer



Weld connector

DN	A	D	E	J	F	Type (Swagelok)
10	43.4	22.8	9.5	17.1	22	SS-12MO-1-6W
15	49	22.8	9.5	21.3	22	SS-12MO-1-8W
20	50.5	22.8	9.5	26.7	27	SS-12MO-1-12W

Shaded sizes shall be avoid.

3. MATERIAL

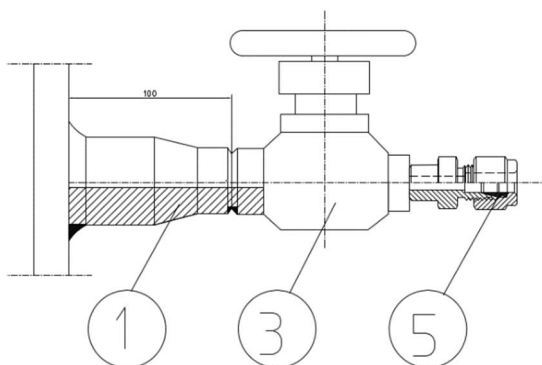
Material same as the base material onto which the connection is to be welded.

4. NOTES

The strength calculation of the low and middle steam pressure connection (according to the pressure and temperature conditions) is to be made as indicated in the pressure vessels requirements.

5. COMBINATION

DN10-DN20:

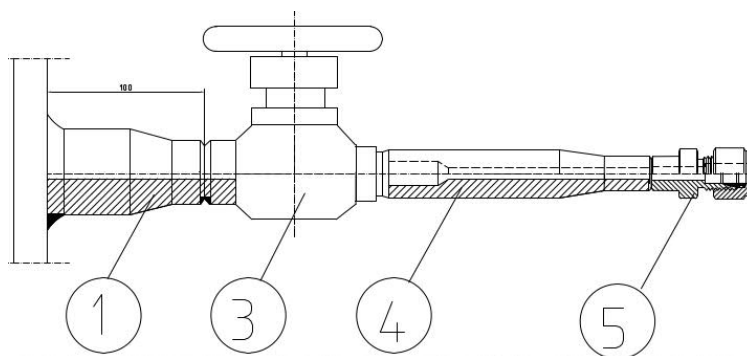


5	1	Weld connector, see point 2	
3	1	Valve DN 10...20, see valve specification	
2	1	Pipe DN 10...20, EN 10216-2	
1	1	Pressure connection, see point 2	
Part	Pc	Description	Material

The combination consists of pressure connection, pipe, globe valve and weld connector and is included in piping or equipment supply.

If needed, because of the insulation thickness, extra pipe may be added between parts 1 and 3. See space requirements in the point 7

DN25:



5	1	Weld connector, see point 2	
4	1	Reducer, see point 2	
3	1	Valve DN 10...20, see valve specification	
2	1	Pipe DN 10...20, EN 10216-2	
1	1	Pressure connection, see point 2	
Part	Pc	Description	Material

The combination consists of pressure connection, pipe, globe valve, reducer and weld connector and is included in piping or equipment supply.

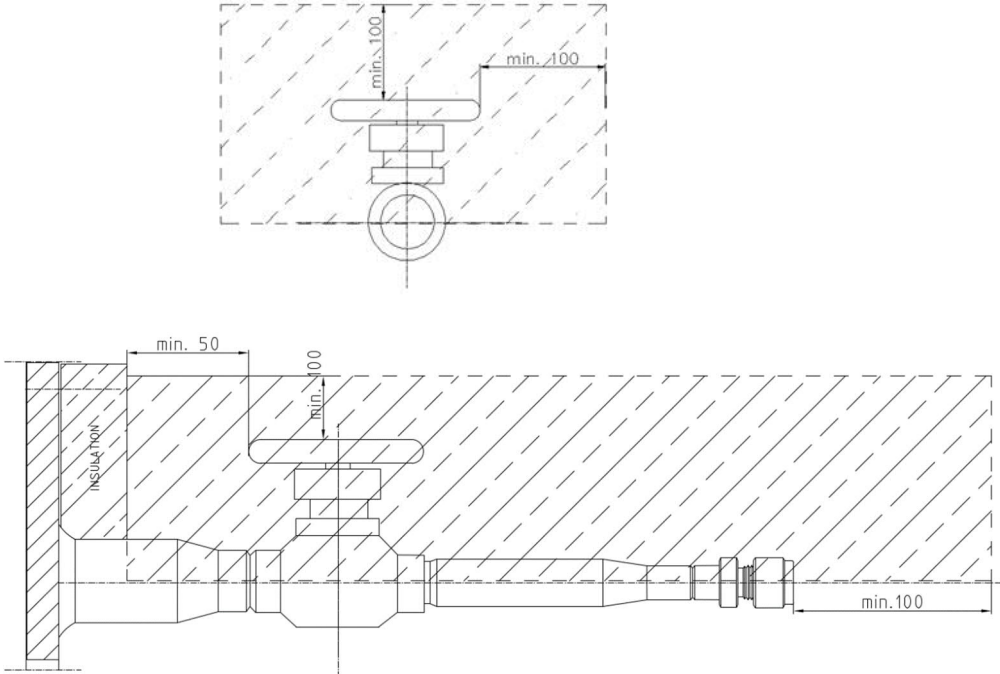
If needed, because of the insulation thickness, extra pipe may be added between parts 1 and 3. See space requirements in the point 7

6. DESIGNATION

Tag, name, DN, material, valve code, standard No.

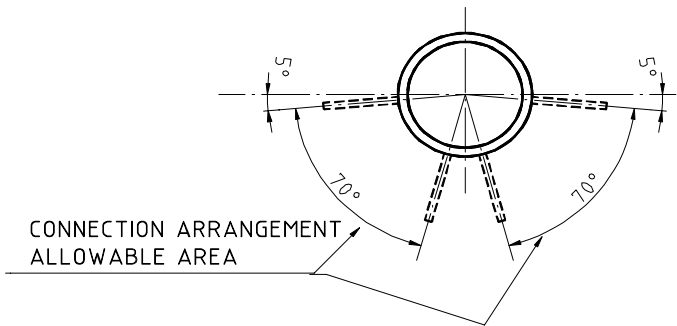
Example: 41A1512-PW, Pressure connection, DN 15, P235GH, 204, 631-012

7. SPACE RESERVATIONS

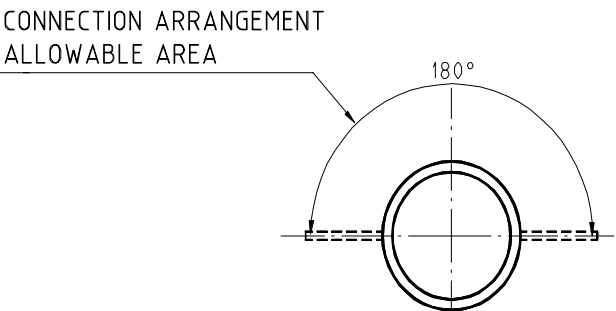


8. CONNECTION ARRANGEMENT IN THE PIPING

Pressure measurement



Local measurement



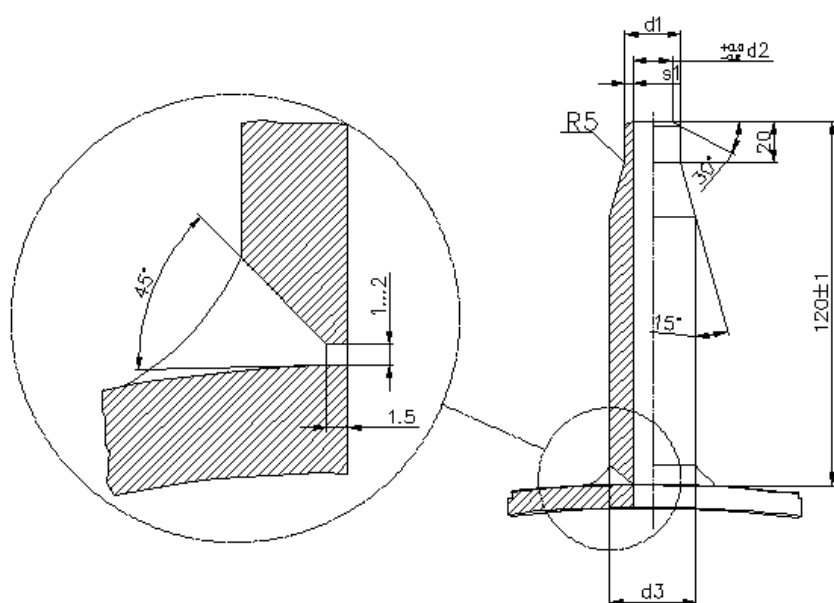
PIPING STANDARD 631-015 - INSTRUMENTATION DESIGN STANDARDS - PRESSURE CONNECTION, TWO SHUT-OFF VALVES, CONDENSATE CHAMBER AND REDUCER DN 10...DN 25 – PRESSURE UP TO 4 MPA

1. GENERAL

Pressure measurement point for low pressure applications.

2. DIMENSIONS

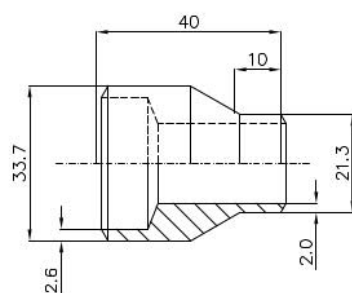
Pressure connection



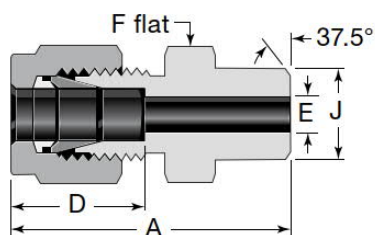
DN	d3	d2	d1 and ØE	s
10	25	13.2	17.2	2,0
15	35	17.3	21.3	2.0
20	35	22.3	26.9	2.3
25	40	28.5	33.7	2.6

Shaded sizes shall be avoid

Reducer



Weld connector



DN	A	D	E	J	F	Type (Swagelok)
10	43.4	22.8	9.5	17.1	22	SS-12MO-1-6W
15	49	22.8	9.5	21.3	22	SS-12MO-1-8W
20	50.5	22.8	9.5	26.7	27	SS-12MO-1-12W

Shaded sizes shall be avoid.

3. MATERIAL

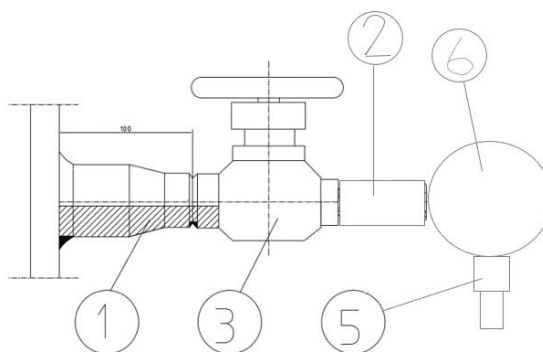
Material same as the base material onto which the connection is to be welded.

4. NOTES

The strength calculation of the low and middle steam pressure connection (according to the pressure and temperature conditions) is to be made as indicated in the pressure vessels requirements.

5. COMBINATION

DN10-DN20:



6	1	Condensate chamber	
5	1	Weld connector, see point 2, Male pipe weld for 12mm pipe, Welding end 1/2", Swagelok, SS-12MO-1-8W	
3	1	Valve DN 10...20, see valve specification	
2	1	Pipe DN 10...20, EN 10216-2	
1	1	Pressure connection, see point 2	
Part	Pc	Description	Material

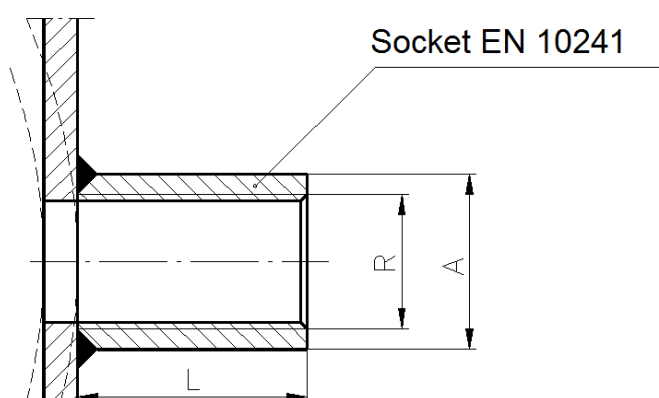
The combination consists of pressure connection, pipe, globe valve, weld connector and condensate chamber.

PIPING STANDARDS 631-040 - INSTRUMENTATION DESIGN STANDARDS
MEASUREMENT CONNECTION DN 10...DN 40 INTERNAL THREAD R 3/8"... R 1 1/2"
PRESSURE UP TO 4.0 MPa

1 GENERAL

Measurement point.

2 DIMENSIONS



DN	Thread R	Outside diameter Do	Length L
10	R 3/8"	21.3	26
15	R 1/2"	26.4	34
20	R 3/4"	31.8	36
25	R 1"	39.5	43
40	R 1 1/2"	54.5	48

3 MATERIAL

Material same as the base material onto which the connection is to be welded.

4 NOTES

The strength to be checked according to pressure and temperature conditions as indicated in the pressure vessel requirements.

5 DESIGNATION

Tag, name, DN, material, standard No.

Example: =21A1210-QW, Measurement connection, DN 25, 1.4404, 631-040

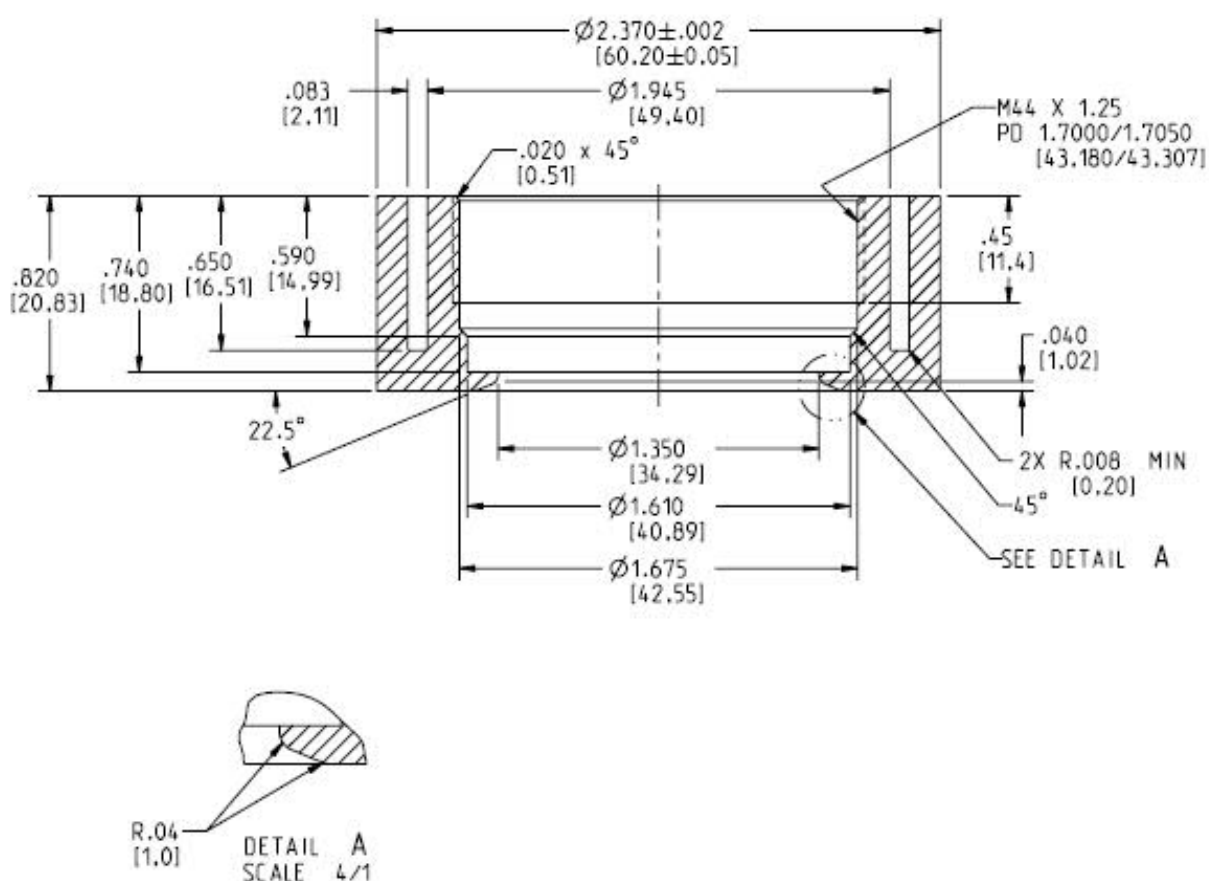
PIPING STANDARDS 631-041 - INSTRUMENTATION DESIGN STANDARDS MEASUREMENT CONNECTION M44 - INTERNAL THREAD DIN13 M44 - PRESSURE UP TO 4.0 MPA

1. GENERAL

Connections are smoothly installed at the pressure measuring points of the pipeline, so that the pipeline flow flushes them.

Sleeve and welding dummy supplied by the instrument supplier.

2. DIMENSIONS



3. MATERIAL

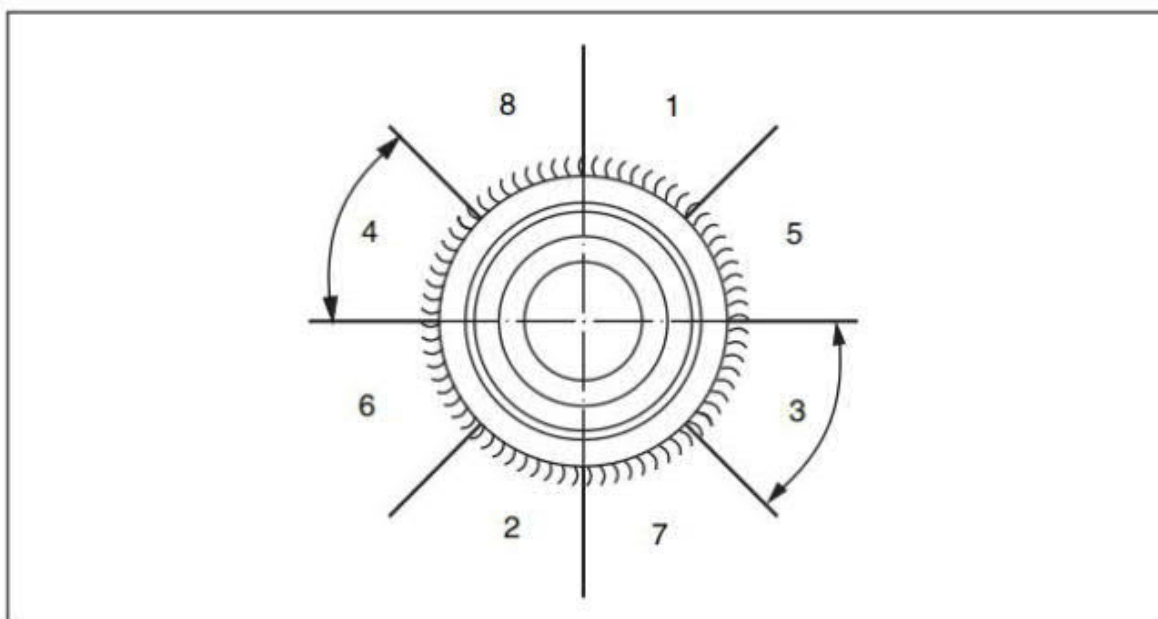
Material and certificates correspond to the base material on which the connection is to be welded.

Note: The strength test (according to the pressure and Temperature conditions) is as specified in the pressure vessel requirements to undertake.

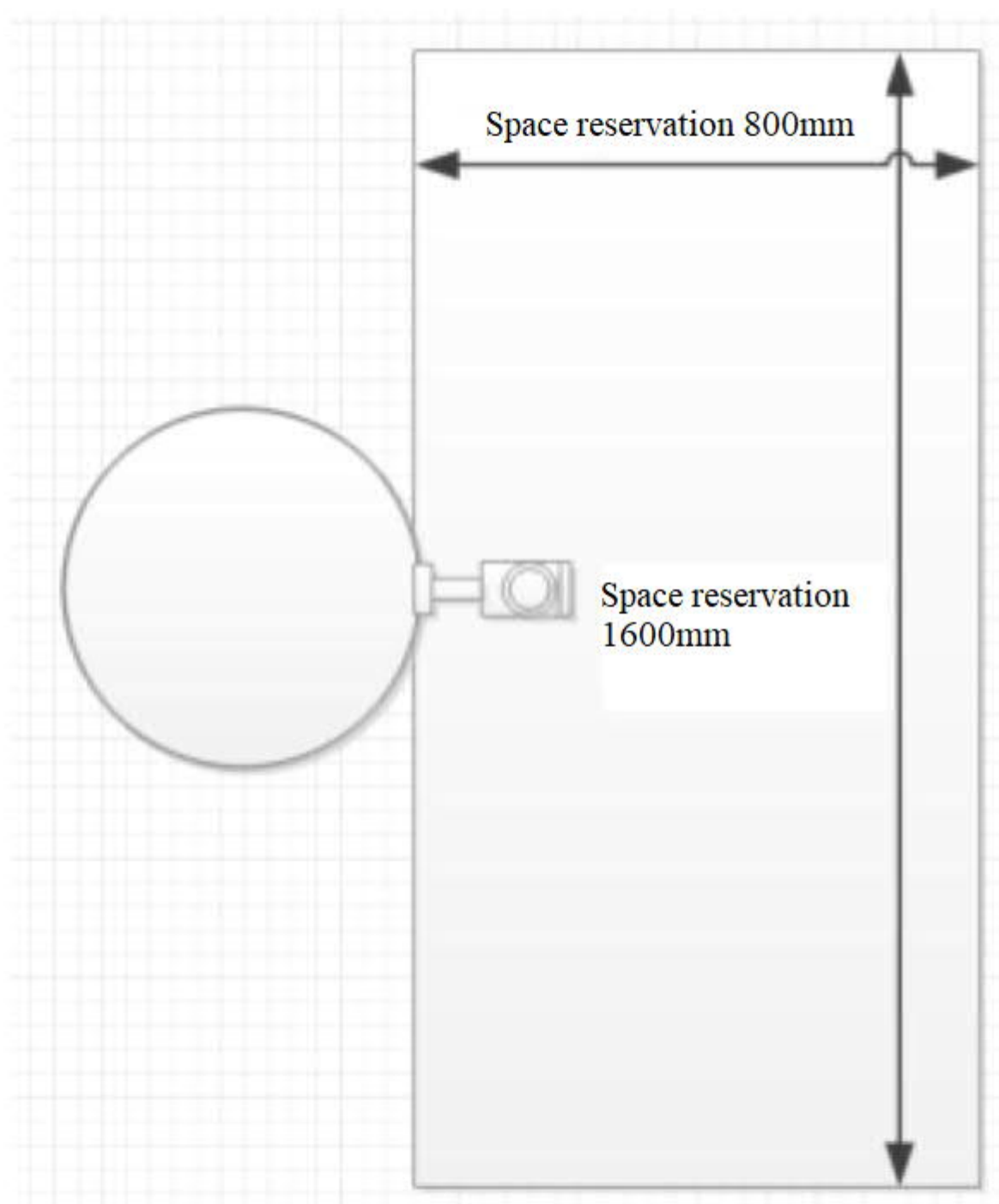
4. WELDING INSTRUCTIONS

To avoid deformation of the process connection, the following instructions must be followed:

1. Make sure that a welding dummy supplied with the process connection has been screwed into the socket.
2. Divide the welded joint into 8 segments as shown below.
3. After welding a segment, weld that accurately immediately opposite segment. Then stop welding until the Welded joint has cooled down properly (example: segments 1 + 2, Break, 3 + 4, break, 5 + 6, break, 7 + 8).



5. SPACE RESERVATIONS



6. DESIGNATION

Tag, name, DN, material, standard No.

Example: 310A1210PW, Pressure connection-PW, Pressure connection, M44, 1.4432, 631-041

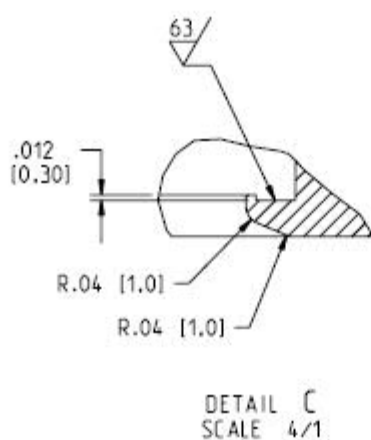
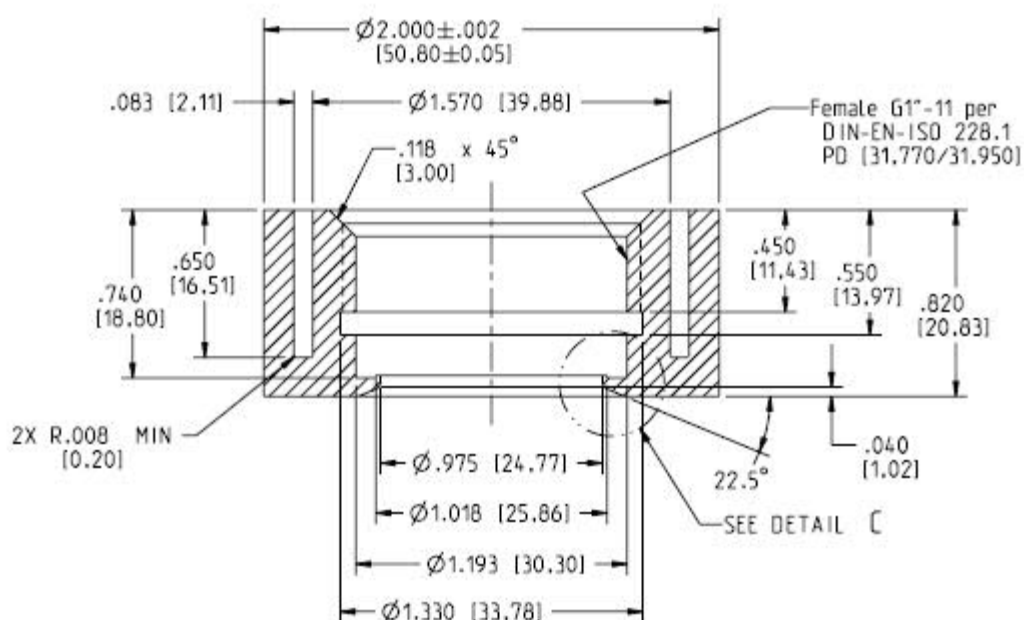
**PIPING STANDARDS 631-042 - INSTRUMENTATION DESIGN STANDARDS
MEASUREMENT CONNECTION G1" - INTERNAL THREAD DIN EN ISO 228.1
PRESSURE UP TO 2.0 MPa**

1. GENERAL

Connections are smoothly installed at the pressure measuring points of the pipeline, so that the pipeline flow flushes them.

Sleeve and welding dummy supplied by the instrument supplier.

2. DIMENSIONS



3. Material

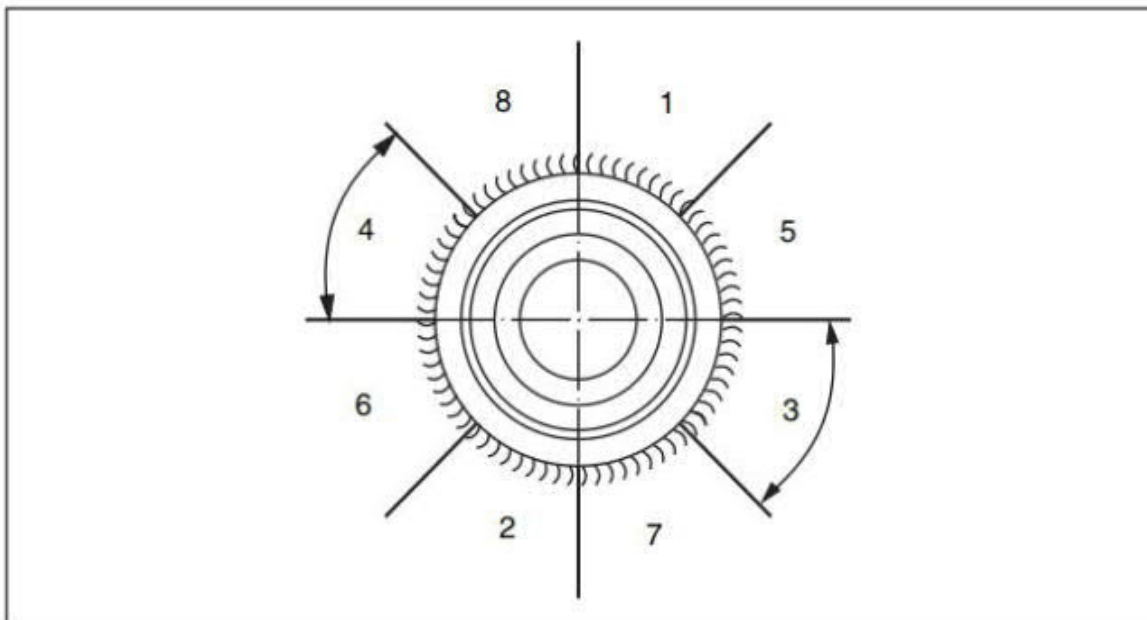
Material and certificates correspond to the base material on which the connection is to be welded.

Note: The strength test (according to the pressure and Temperature conditions) is as specified in the pressure vessel requirements to undertake.

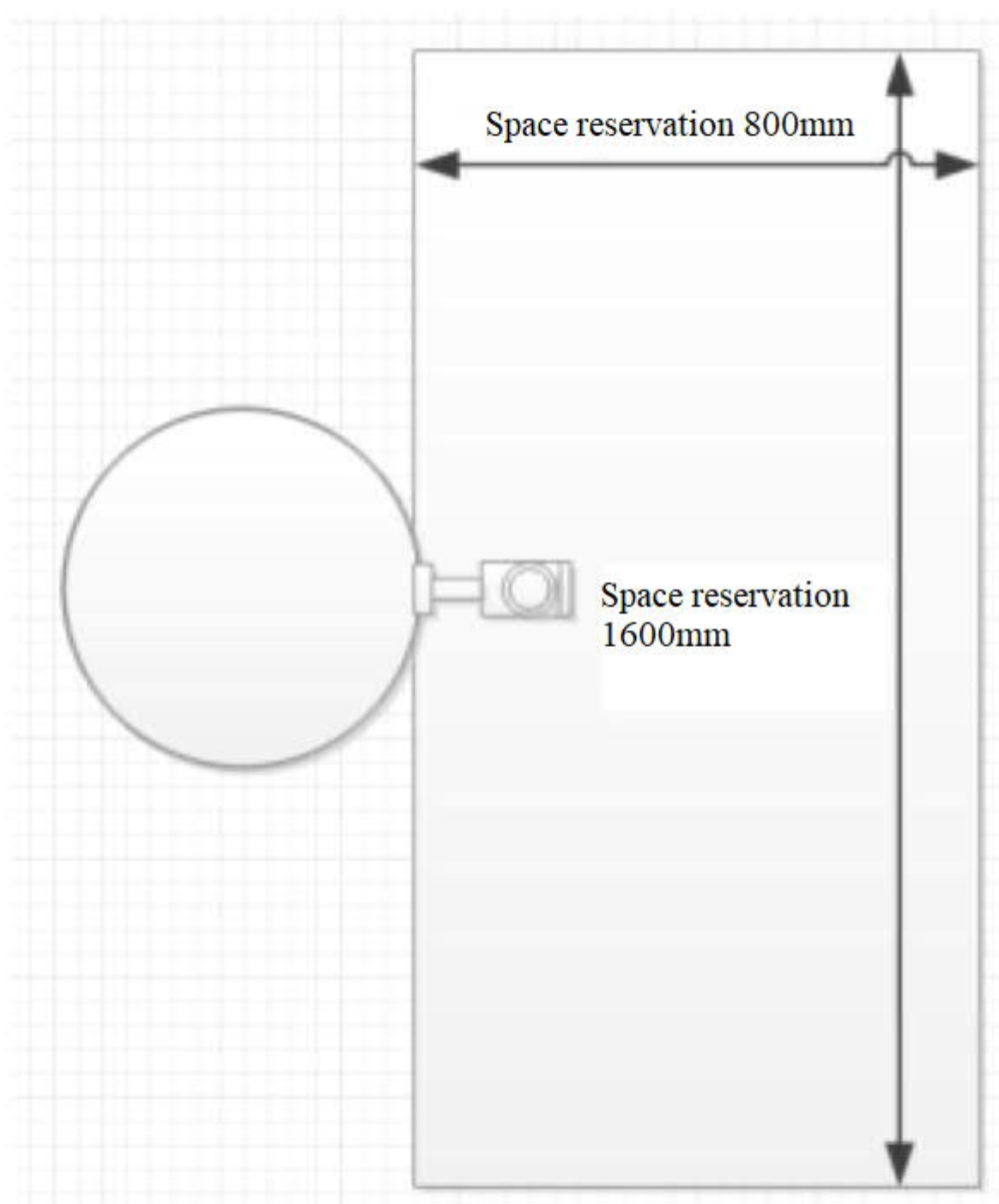
4. WELDING INSTRUCTIONS

To avoid deformation of the process connection, the following instructions must be followed:

1. Make sure that a welding dummy supplied with the process connection has been screwed into the socket.
2. Divide the welded joint into 8 segments as shown below.
3. After welding a segment, weld that accurately immediately opposite segment. Then stop welding until the Welded joint has cooled down properly (example: segments 1 + 2, Break, 3 + 4, break, 5 + 6, break, 7 + 8).



5. SPACE RESERVATIONS



6. DESIGNATION

Tag, name, DN, material, standard No.

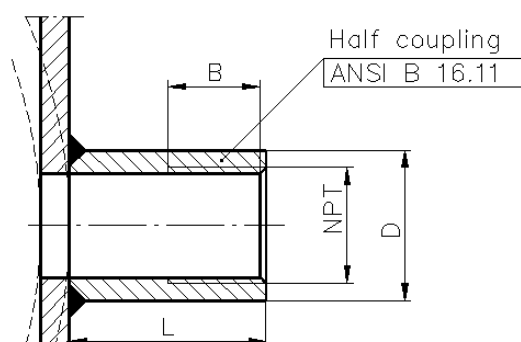
Example: 310A1210PW, Pressure connection-PW, Pressure connection, G1", 1.4432, 631-042

PIPING STANDARDS 631-051 - INSTRUMENTATION DESIGN STANDARDS
MEASUREMENT CONNECTION DN 10...DN 40 INTERNAL THREAD NPT 3/8.”...NPT 1 ½”
PRESSURE UP TO 4.0 MPA

1 GENERAL

Measurement point.

2 DIMENSIONS



DN	Thread NPT	Outside diameter Do	Length L
10	NPT 3/8"	21.3	26
15	NPT ½"	26.4	34
20	NPT ¾"	31.8	36
25	NPT 1"	39.5	43
32	NPT 1 ¼"	48.3	48
40	NPT 1 ½"	54.5	48

3 MATERIAL

Material same as the base material onto which the connection is to be welded.

4 NOTES

The strength to be checked according to pressure and temperature conditions as indicated in the pressure vessel requirements.

5 DESIGNATION

Tag, name, DN, material, standard No.

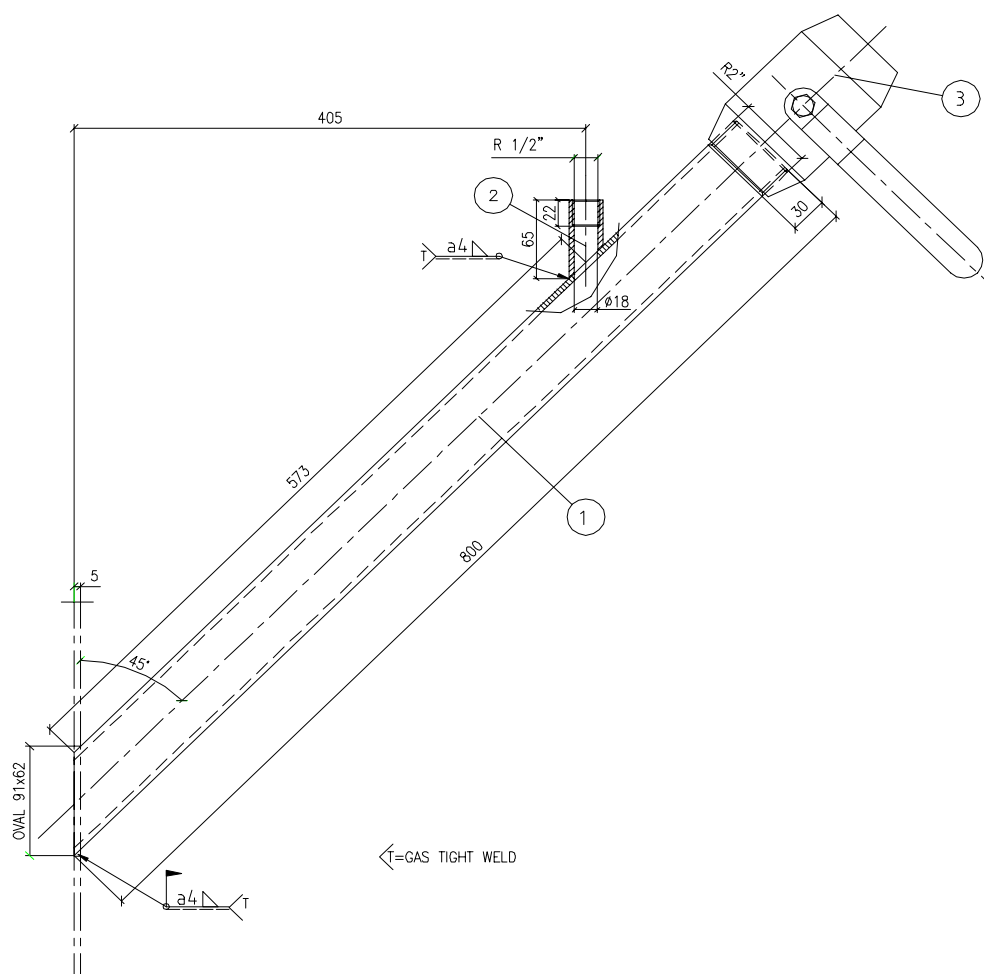
Example: = 22A1610-QW, Measurement connection, DN 25, 1.4404, 631-051

PIPING STANDARD 631-053 - INSTRUMENTATION DESIGN STANDARDS - PRESSURE MEASUREMENT NOZZLE

1. GENERAL

Pressure measurement of the boiler parts.

2. DIMENSIONS



3	1	Ball valve R2" inside thread		1.4432
2	1	Pipe 26,9x4.....65	EN 10216-5	1.4432
1	1	Pipe 60,3x 4,5...800	EN 10216-5	1.4432
Part	Pcs	Description	Stand. no	Material

3. DESIGNATION

Name, material, standard No.

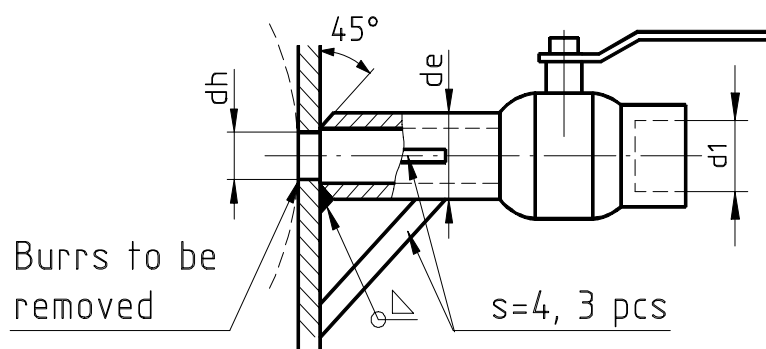
Example: Pressure measurement nozzle, 1.4432, 631-053

PIPING STANDARDS 631-061 - INSTRUMENTATION DESIGN STANDARDS
PRESSURE AND SAMPLING CONNECTION FOR PROCESS PIPING WITH SHUT OFF
VALVE DN 10 ...DN 25, LONG WELDING/INSIDE THREAD END R 3/8"...R 1"

1 GENERAL

The pressure and sampling connection covered by this standard is to be welded on to the tanks, pipes or other equipment. This type of ball valve sampling connection is not to be used for hazardous fluids.

2 DIMENSIONS



DN	Thread	de	dh
10	R 3/8"	17.2	12
15	R 1/2"	21.3	15
20	R 3/4"	26.9	20
25	R 1"	33.7	25

3 MATERIAL

Material same as the base material onto which the connection is to be welded.

4 NOTES

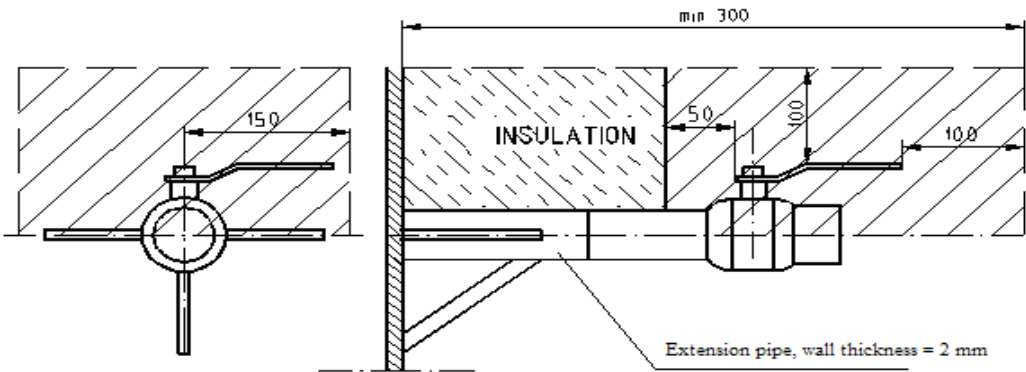
Strength of the connection to be checked according to pressure and temperature conditions as indicated in the pressure vessels requirements

5 DESIGNATION

Tag, name, DN-thread, material, standard No.

Example: = 30A1120-PW, Pressure and sampling connection, DN 15 - R 1/2", 1.4404, 631-061

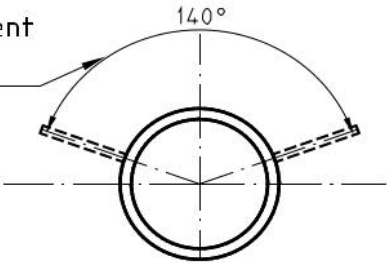
6 SPACE RESERVATIONS



7 CONNECTION ARRANGEMENT IN THE PIPING

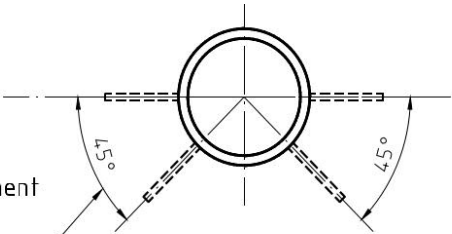
7.1 Pressure measurement of air and gases

Connection arrangement allowable area



7.2 Pressure measurement of fluids

Connection arrangement allowable area

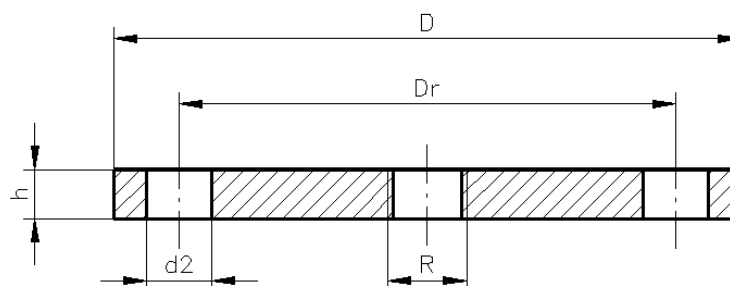


PIPING STANDARD 631-190 - INSTRUMENTATION DESIGN STANDARDS - MOUNTING FLANGE - DN 25...DN 100 - PRESSURE UP TO 1.6 MPA

1. GENERAL

The flange covered by this standard is meant to be used as a blind flange, in case a screwed connection instrument or other equipment is connected to it. The thread shall be according to ISO 7-1 (R thread).

2. DIMENSIONS



DN	D	Dr	d2	Bolts	h
25	115	85	14	4 x M12	18
50	165	125	18	4 x M16	18
80	200	160	18	8 x M16	20
100	220	180	18	8 x M16	20

3. MATERIAL

Material same as the base material onto which the connection is to be welded.

4. NOTES

1. Dimension R according to that of screwed connection instrument or other equipment which has to be connected onto the blind flange.
2. Flange drilling according to EN 1092-1 PN 16
3. Blind flange EN 1092-1 Type 05 PN16

5. DESIGNATION

Tag, name, DN, R, material, standard No.

Example: 30A1401-LW, Mounting flange, DN 80, R 1/2", 1.4404, 631-190

PIPING STANDARD 631-191 - INSTRUMENTATION DESIGN STANDARDS - PRESSURE AND SAMPLING CONNECTION - SHUT OFF VALVE WITH DN 25...DN 80 FLANGE - LONG WELDING/INSIDE THREAD END R 3/8...R1 PN \leq 40

1. GENERAL

The pressure and sampling connection by this standard is to be connected to tanks, pipes and other equipment. This type of ball valve sampling connection is not to be used for hazardous fluids.

2. DIMENSIONS

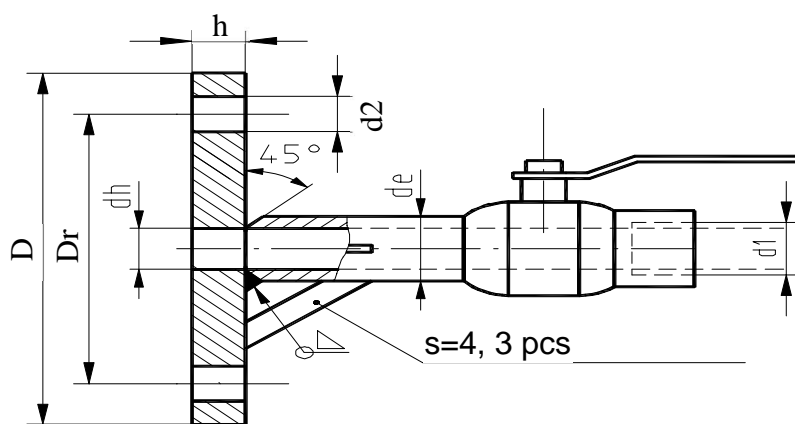


Table 1. Valve dimensions

DN	Thread	de	Dh
10	R 3/8	17.2	12
15	R 1/2	21.3	15
20	R 3/4	26.9	20
25	R 1	33.7	25

Table 2. Flange dimensions

DN	D	Dr	d2	Bolts	h
25	115	85	14	4 x M12	16
50	165	125	18	4 x M16	18
80	200	160	18	8 x M16	20

3. NOTES

Strength of the connection to be checked according to pressure and temperature conditions as indicated in the pressure equipment requirements.

4. MATERIAL

1.4432

5. DESIGNATION

Tag, name, DN-thread, material, standard No.

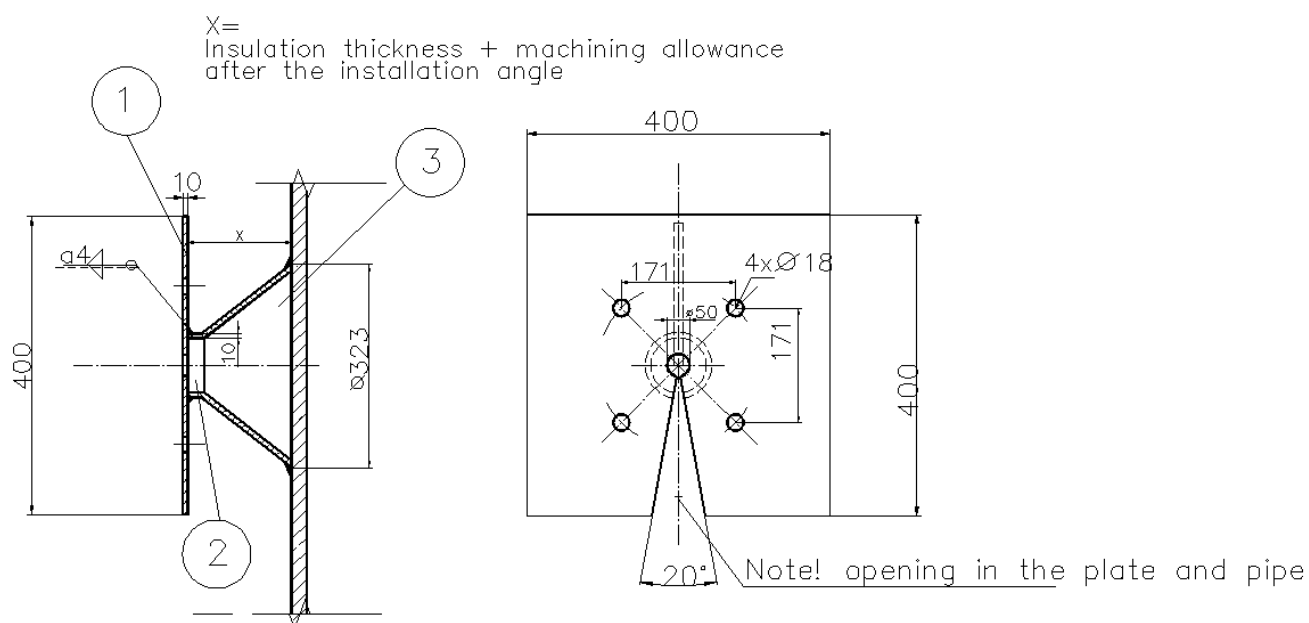
Example: 30A1301-PW, Pressure sampling connection, DN 15-R 1/2", 1.4432, 631-191

PIPING STANDARD 631-310 - INSTRUMENTATION DESIGN STANDARDS - LEVEL MEASUREMENT - MOUNTING BRACKET FOR RADIOMETRIC RADIATION SOURCE (SH-F1)

1. PURPOSE OF USE

Mounting bracket is ment to be welded on to tanks and equipment at the location of level measurement.

2. DIMENSIONS



Note! Weight of radiation source. (preliminary 50 kg.)

Part	Designation	Size	Std.	Pcs.
1	Plate s=10 mm	400 x 400	1.4432	1
2	Pipe	168,3 x 10	1.4432	1
3	Reducer DN 300 / DN 150 EN 10253-3. L=203mm	323,9 x 10 / 168,3 x 10	1.4432	1

3. MATERIAL

1.4432, pipe classes H1A and H2A.

4. DESIGNATION

Name, nominal size (DN), material, std-number

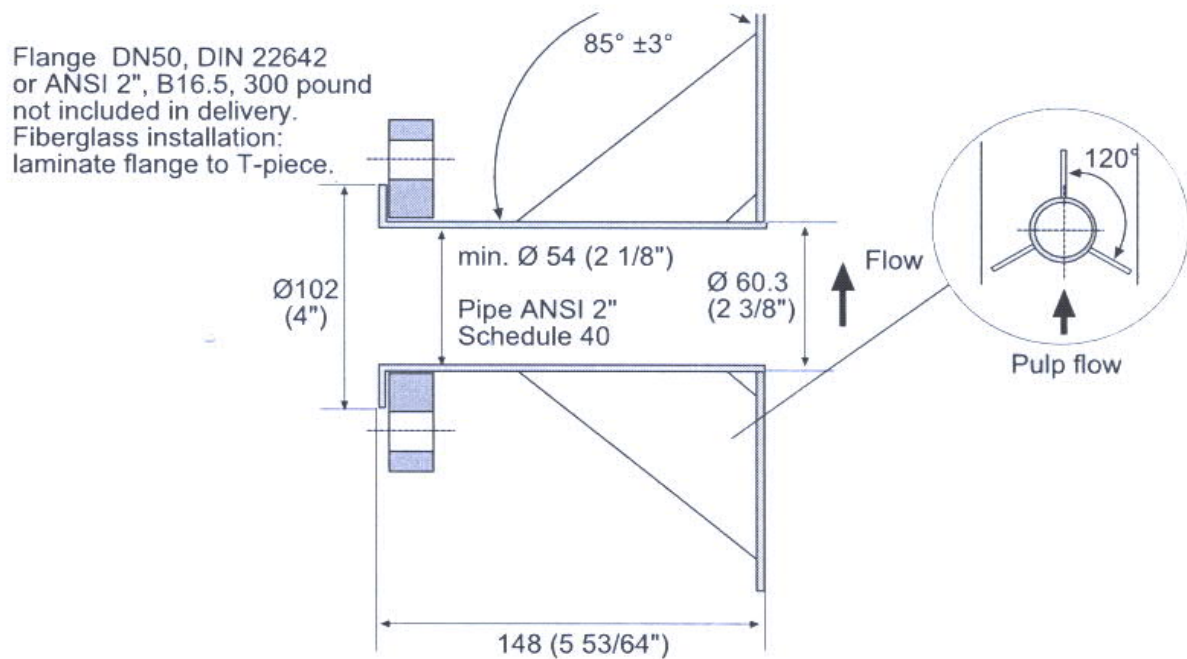
Example: 400-LW-1000, Mounting bracket, 1.4432, 631-310

PIPING STANDARD 631-440 - INSTRUMENTATION DESIGN STANDARDS - MOUNTING NOZZLE FOR BRIGHTNESS, RESIDUAL - AND FILTRATE PISTON-SENSORS

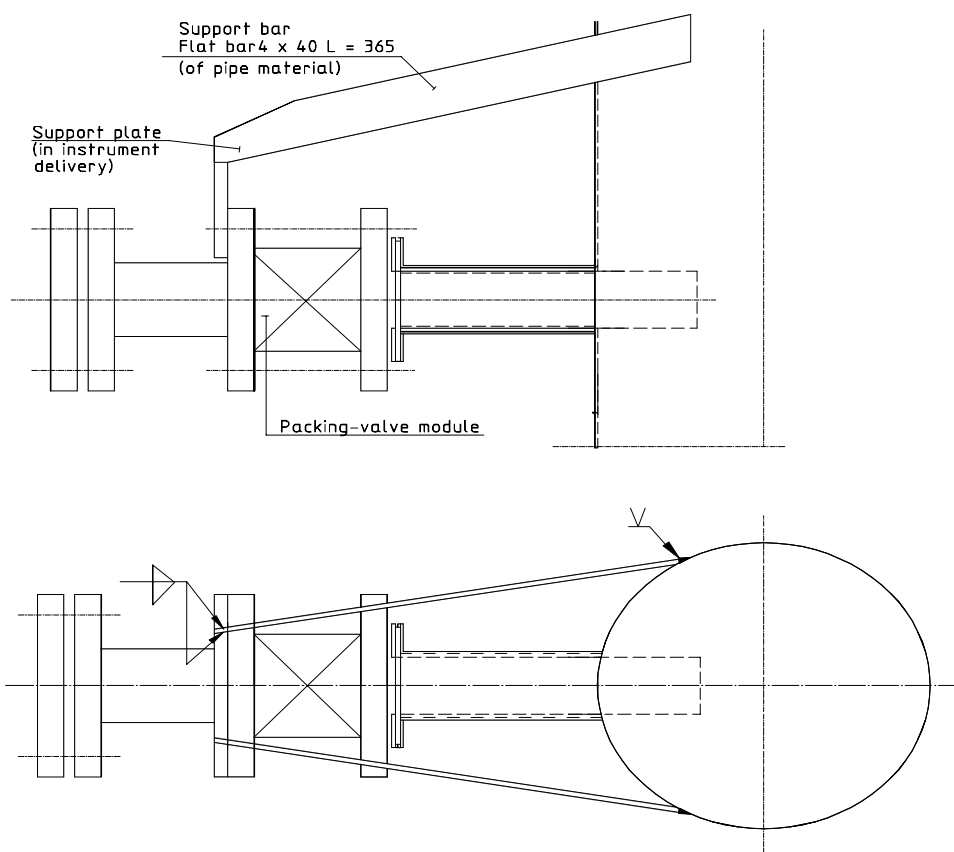
1. PURPOSE OF USE

Mounting nozzle is ment to be welded on to piping and tanks at the location of measurement.

2. DIMENSIONS



3. SUPPORT OF PACKING-VALVE MODULE



4. MATERIAL

Same as the base material on which the nozzle is welded.

5. DESIGNATION

Name, nominal size (DN), material, std-number

Example= 123A1000-QW, Mounting nozzle, 1.4432, 631-440

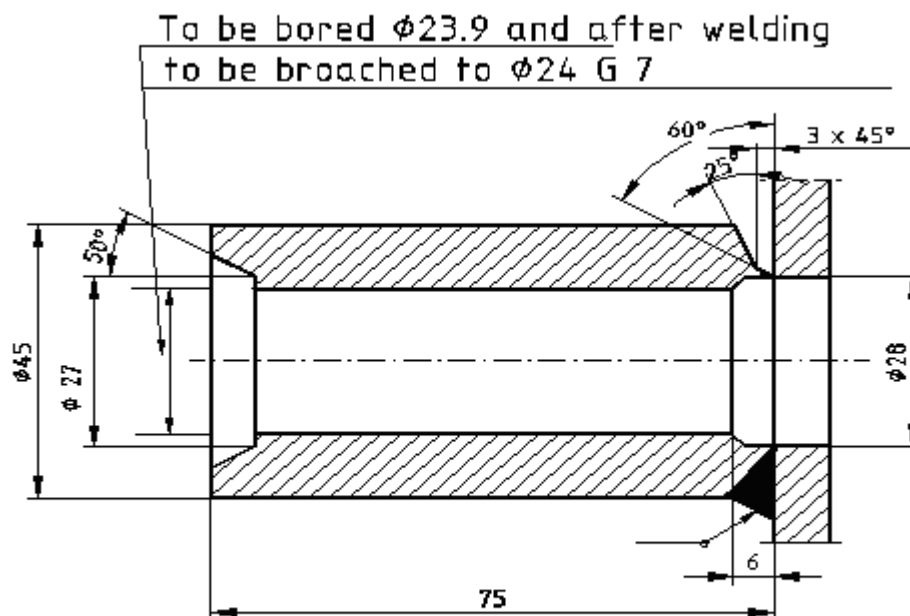
6. NOTES

The strength to be checked according to pressure and temperature conditions as indicated in the pressure equipment requirements.

**PIPING STANDARD 632-020 - INSTRUMENTATION DESIGN STANDARDS -
SUPPORTING SOCKET FOR TEMPERATURE BULB - DIN 43722 FORM 4 - PRESSURE
FROM 4.0 MPA UP TO 25 MPA**

1. GENERAL

The supporting socket covered by this standard is meant to be welded onto a hole of diameter 28 mm bored into pressure vessels, pipes or other equipment at the desired point of temperature measurement.



2. Material

Material same as the base material onto which the connection is to be welded.

3. NOTES

The strength calculation for the inner diameter is to be made case by case as indicated in the pressure vessel requirements.

4. DESIGNATION

Tag, name, material, standard No.

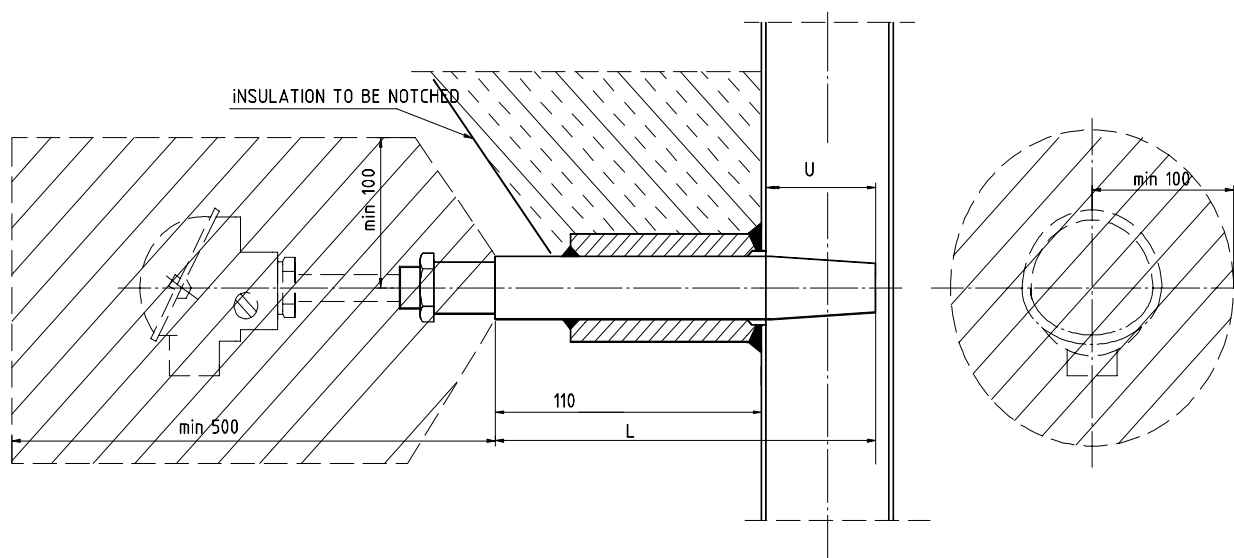
Example: 41A1601-TW, Supporting socket, 13CrMo 4-5, 632-020

5. THERMOWELL

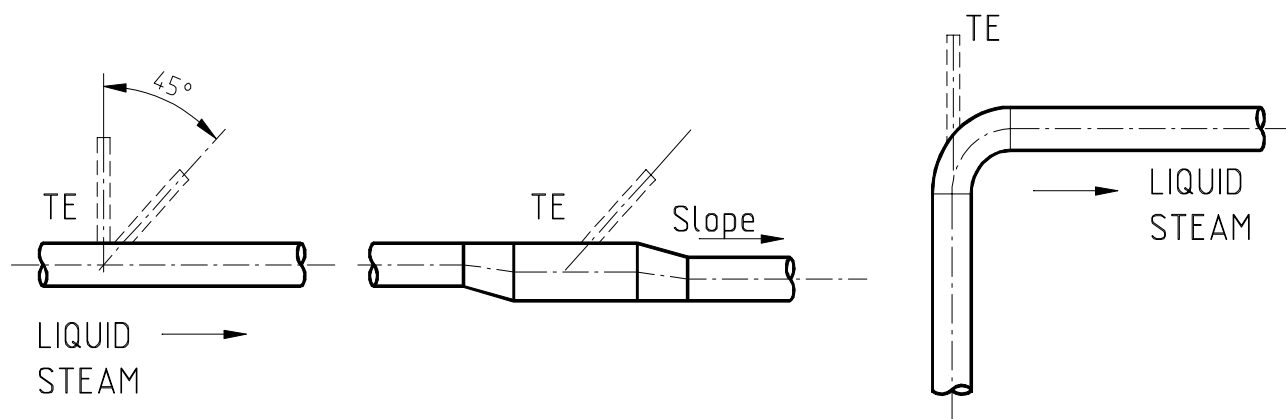
Following thermo well lengths according to standard DIN 43772 shall be used.

DN	L/mm	U/mm
$100 \leq \text{pipe} \leq 200$	200	65
pipe > 200	260	125
Tanks	260	125

6. SPACE RESERVATIONS



7. CONNECTION ARRANGEMENT IN THE PIPING



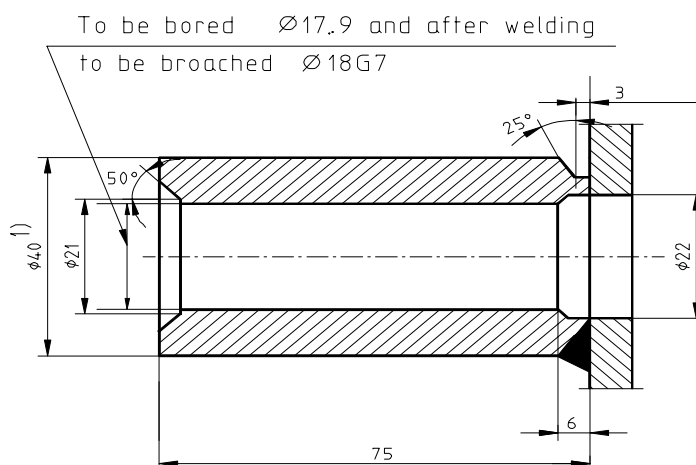
If mixing device is not used the sensor shall be placed min. 20 x DN distance after the mixing point of flows with different temperature.

For steam cooling the distance given by the manufacturer between cooling and measurement points shall be respected.

**PIPING STANDARD 632-021 - INSTRUMENTATION DESIGN STANDARDS -
SUPPORTING SOCKET FOR TEMPERATURE BULB - DIN 43722 FORM 4 - PRESSURE \leq
25 MPA**

1. GENERAL

The supporting socket covered by this standard is meant to be welded onto a hole of diameter 22 mm bored into high pressure steam pipes at the desired point of temperature measurement.



- 1) The strength calculation for the inner diameter is to be made case by case as indicated in the pressure vessel requirements.

2. MATERIAL

Material same as the base material onto which the connection is to be welded.

3. DESIGNATION

Tag, name, material, standard No.

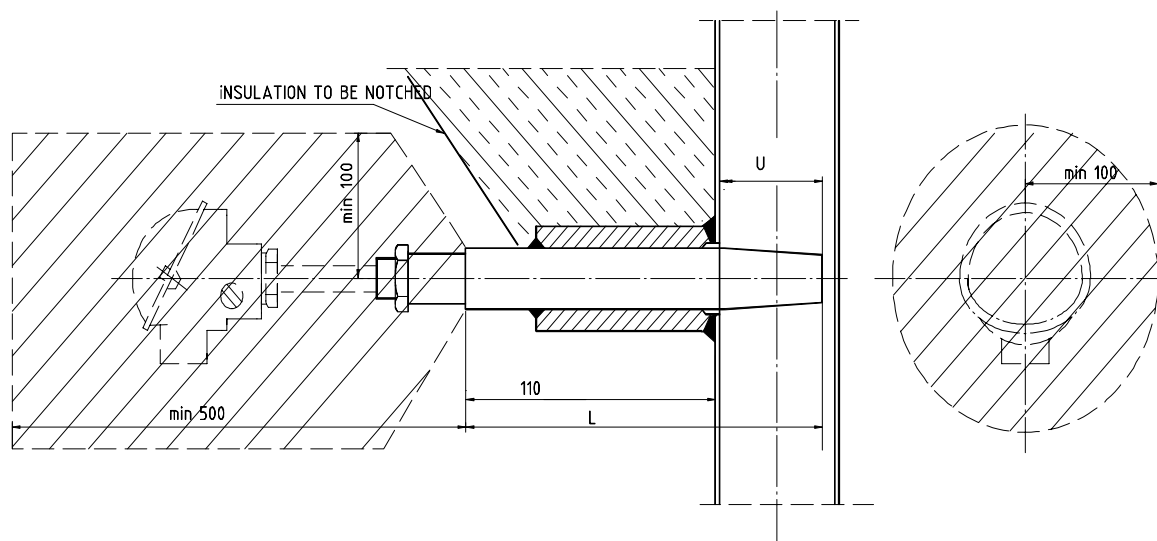
Example: 43A1701-TW, Supporting socket, 13CrMo 4-5, 632-021

4. THERMOWELL

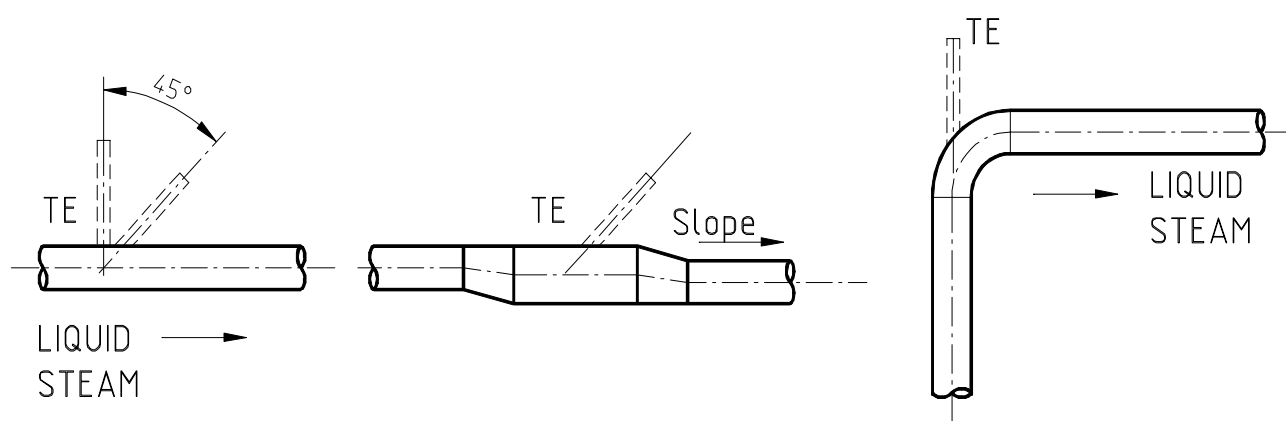
Following thermowell lengths according to standard DIN 43772 shall be used.

DN	L/mm	U/mm
100 \leq pipe \leq 200	200	65
pipe > 200	260	125
Tanks	260	125

5. SPACE RESERVATIONS



6. CONNECTION ARRANGEMENT IN THE PIPING



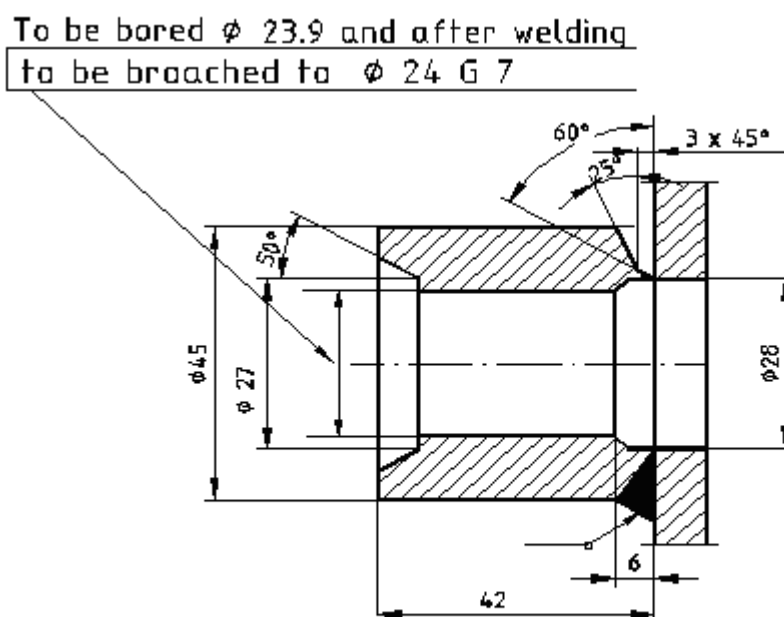
If mixing device is not used the sensor shall be placed min. 20 x DN distance after the mixing point of flows with different temperature.

Erection direction of the thermowell is perpendicular or counter current for fluid and steam lines and downstream in pulp lines.

**PIPING STANDARD 632-022 - INSTRUMENTATION DESIGN STANDARDS -
SUPPORTING SOCKET FOR TEMPERATURE BULB - DIN 43722 FORM 4 - PRESSURE \leq
4.0 MPa**

1 GENERAL

The supporting socket covered by this standard is meant to be welded onto a hole of diameter 28 mm bored into pipes $DN \leq 80$ at the desired point of temperature measurement.



2 MATERIAL

Material same as the base material onto which the connection is to be welded.

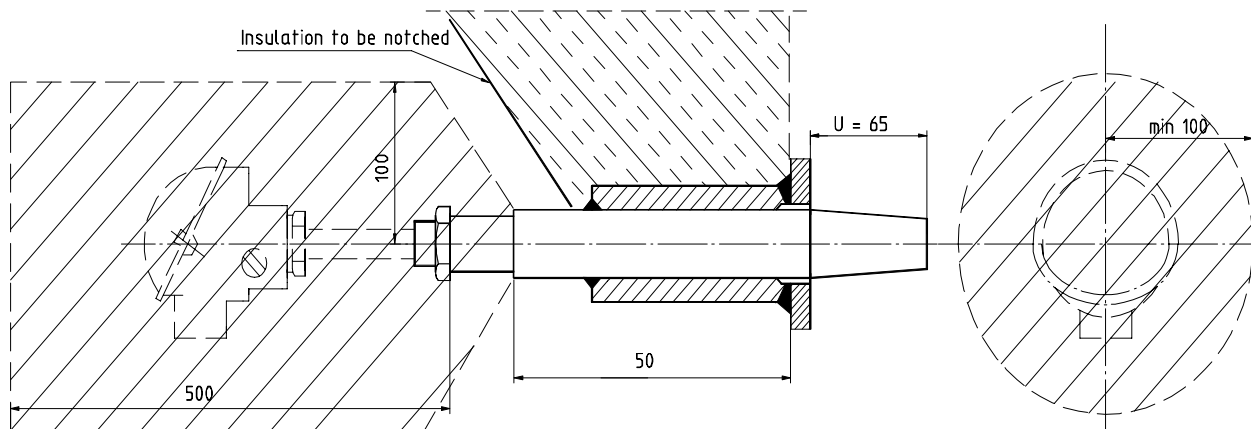
Note: The strength calculation for the minimum outside diameter is to be made case by case as indicated in the pressure vessel requirements.

3 DESIGNATION

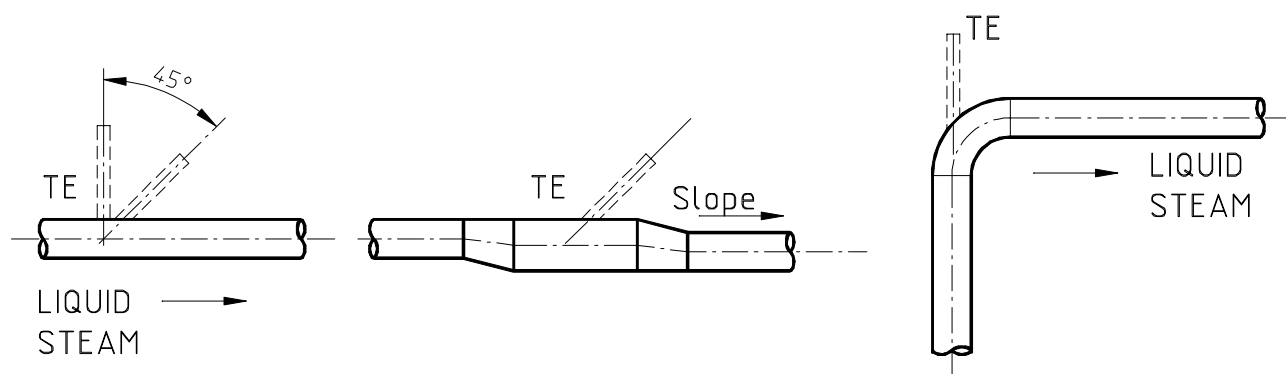
Tag, name, material, standard No.

Example: 41A1402-TW, Supporting socket, 13CrMo 4-5, 632-022

4 SPACE RESERVATIONS



5 CONNECTION ARRANGEMENT IN THE PIPING



If mixing device is not used the sensor shall be placed min. $20 \times DN$ distance after the mixing point of flows with different temperature.

At steam cooling shall be considered the distance between cooling and measurement place given by the manufactures.

Temperature sensor shall be placed as close as possible to the heat exchanger connection.

Erection direction of the thermos well is in the liquid and gas pipes perpendicular or counter current.

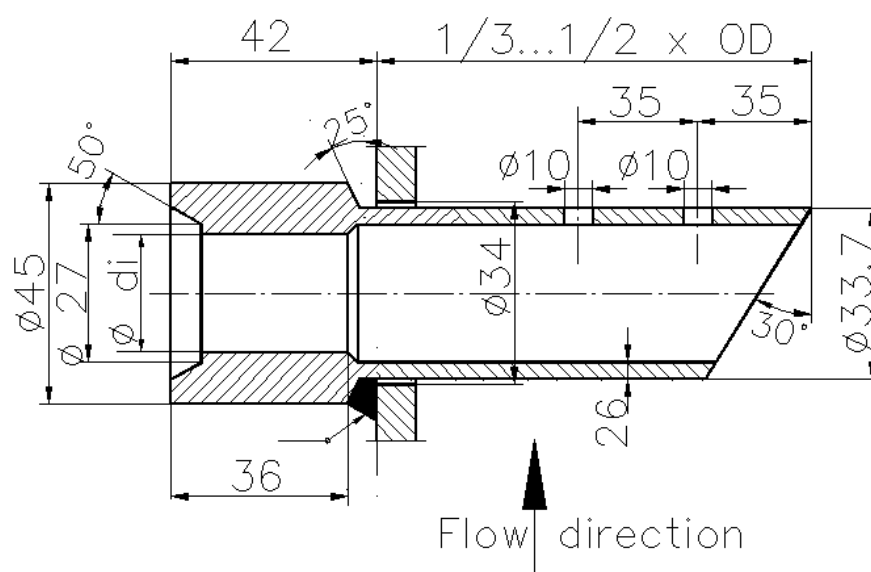
**PIPING STANDARD 632-023 - INSTRUMENTATION DESIGN STANDARDS - WATER
PROTECTED SUPPORTING SOCKET - FOR TEMPERATURE BULB - DIN 43722 FORM
D4 AND D4S - PRESSURE ≤ 4.0 MPA**

1. GENERAL

The supporting socket covered by this standard is meant to be welded onto a hole of diameter 34 mm bored into pipes at the desired point of temperature measurement.

Type A $d_i = 24G7$

Type B $d_i = 18G7$



2. MATERIAL

Material of the fixing coupling is round bar according to the standard EN 10273. Material grade shall be same or similar as the base material of piping.

3. NOTES

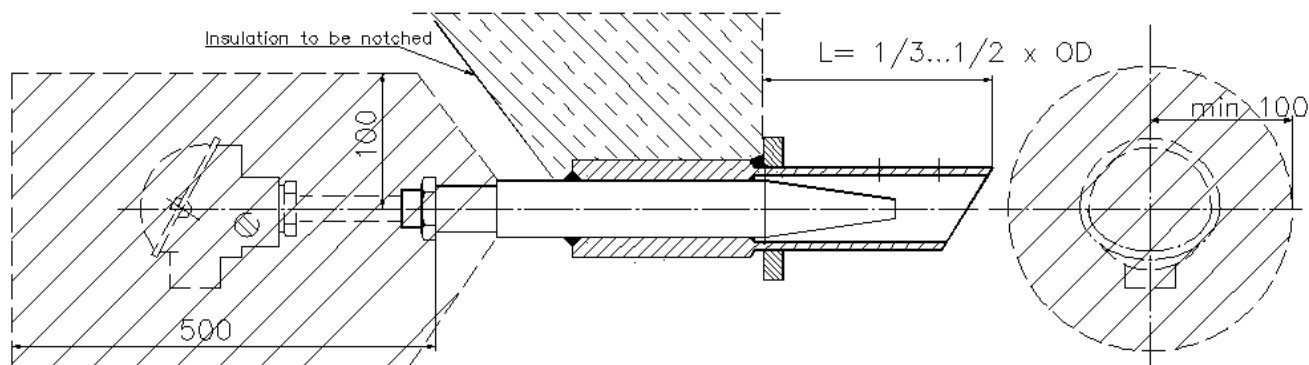
The strength calculation for the inner diameter is to be made case by case as indicated in the pressure vessel requirements.

4. DESIGNATION

Tag, name, type, material, standard No.

Example: 41A1402-TW, Supporting socket, Type A, 16Mo3, 632-023

5. SPACE RESERVATIONS



6. CONNECTION ARRANGEMENT IN THE PIPING

The sensor shall be placed min. $20 \times DN$ distance after the mixing point of flows with different temperature.

At steam cooling shall be considered the distance between cooling and measurement place given by the manufactures.

Temperature sensor shall be placed as close as possible to the heat exchanger connection.

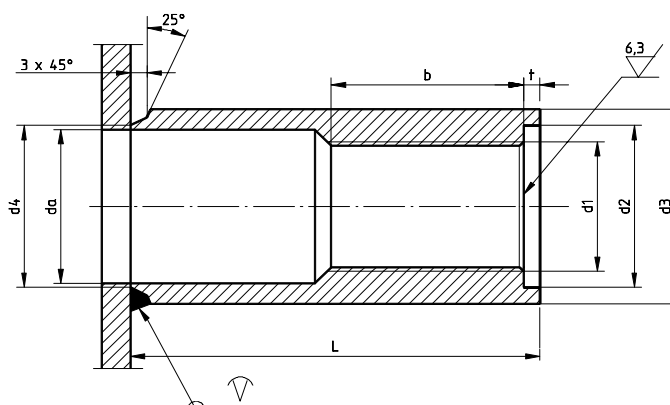
Erection direction of the thermowell is in the liquid and gas pipes perpendicular or counter current.

PIPING STANDARD 632-030 - INSTRUMENTATION DESIGN STANDARDS - MOUNTING SOCKET FOR TEMPERATURE - BULB DN 15...DN 25 - THREAD R ½"...R 1" PRESSURE UP TO 4.0 MPA

1. GENERAL

The mounting sockets covered by this standard are meant to be welded onto holes bored into tanks and pipes with a wall thickness ≤ 10 mm and water temperature $\leq 55^\circ\text{C}$.

2. DIMENSIONS



DN	Thread	Connection dimensions					L	
		d1	d2	d3	b	t	da	
15	R ½"	31	38	15	3	30	125	100
20	R ¾"	39	48	25	4	40		
25	R 1"	46	55	35	4	45		

Shaded sizes can be used only with the Purchaser's special permission

3. MATERIAL

Material same as the base material onto which the connection is to be welded.

4. NOTES

1. The broached bore (da) shown in this standard is given for guidance only; the actual dimension is defined by the supplier to suit manufacturing.
2. The strength of the socket is to be calculated according to the pressure and temperature conditions, as indicated in the pressure vessel requirements.

5. DESIGNATION

Tag, name, DN, thread, L, material, standard No.

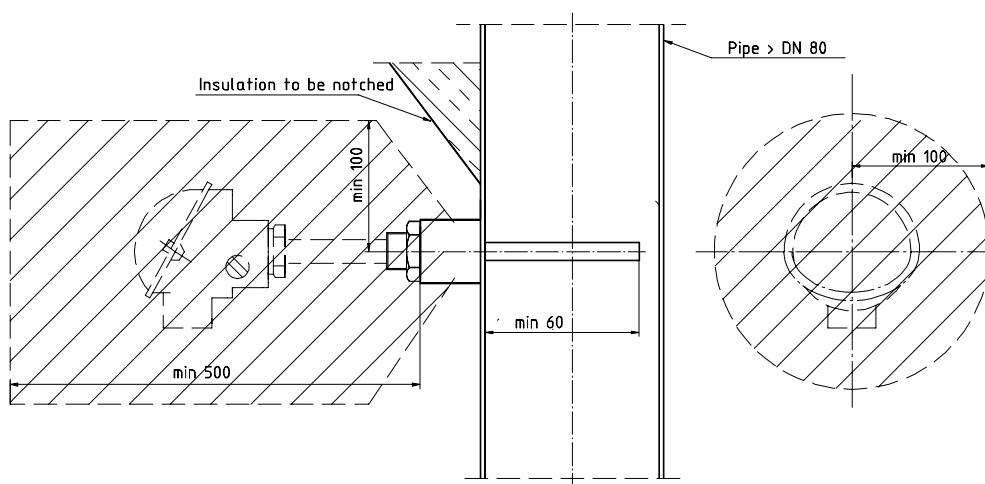
Example: 23TW0823, Mounting socket, DN 15, R ½", 100, 1.4404, 632-030

6. TEMPERATURE BULB

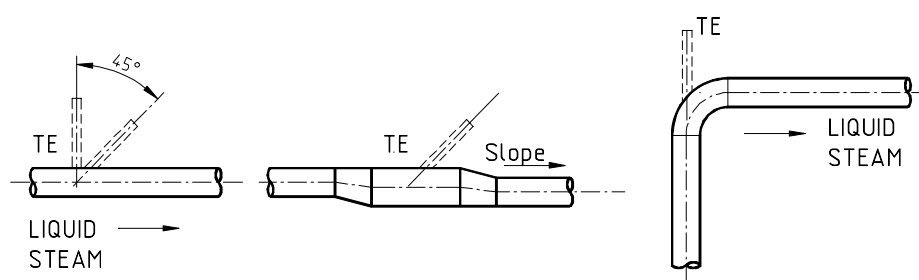
Following DIN 43722 shall be used.

DN	L/mm
Pipe < 300	160
Pipe ≥ 300	250
Vessels	250

7. SPACE RESERVATIONS



8. CONNECTION ARRANGEMENT IN THE PIPING



If mixing device is not used the sensor shall be placed min. 20 x DN distance after the mixing point of flows with different temperature.

Erection direction of the sensor protection pipe is in the liquid and gas pipes perpendicular or counter current.

If pipe size is smaller than DN 80 the sensor shall be placed in the pipe bend or in the enlargement in the pipe.

PIPING STANDARD 632-040 – INSTRUMENTATION STANDARDS - SURFACE TEMPERATURE SENSOR HOLDER

1. GENERAL

The surface temperature of the Pipe can be measured with Temperature Sensors. The Temperature Sensor is mounted in contact with the surface of the pipe using the Sensor Holder.

Typical Surface Temperature Sensor's cross section is 5 x 5 mm and the groove machined into the holder is 6 x 6 mm. The Sensor Holder is lightly welded to the surface of the pipe to be measured. The Sensor is pushed inside the holder and locked in place by tightening the fixing screw carefully.

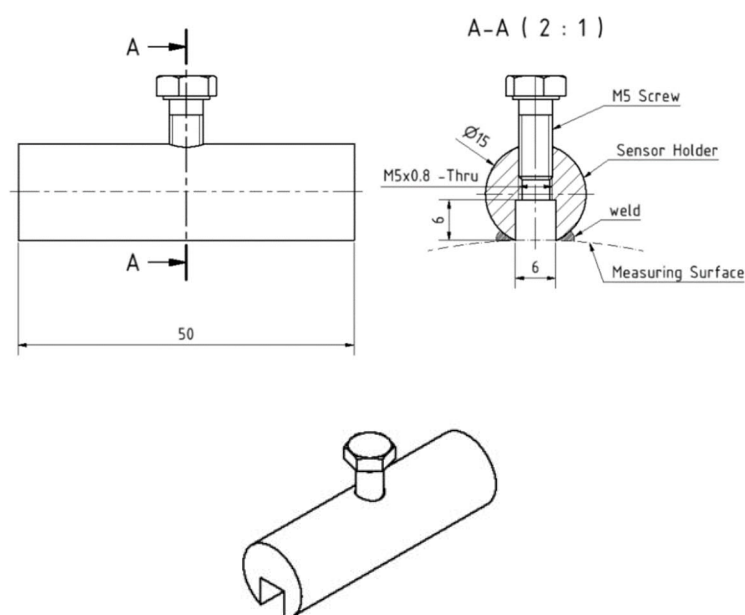
2. MATERIAL

The materials according to the pipe class of the pipe.

3. DESIGNATION OF SURFACE TEMPERATURE SENSOR HOLDER

Surface Temperature Sensor Holder, diameter x length, material, standard

Example: Surface Temperature Sensor Holder, D15x50, 10CrMo9-10, 632-040.

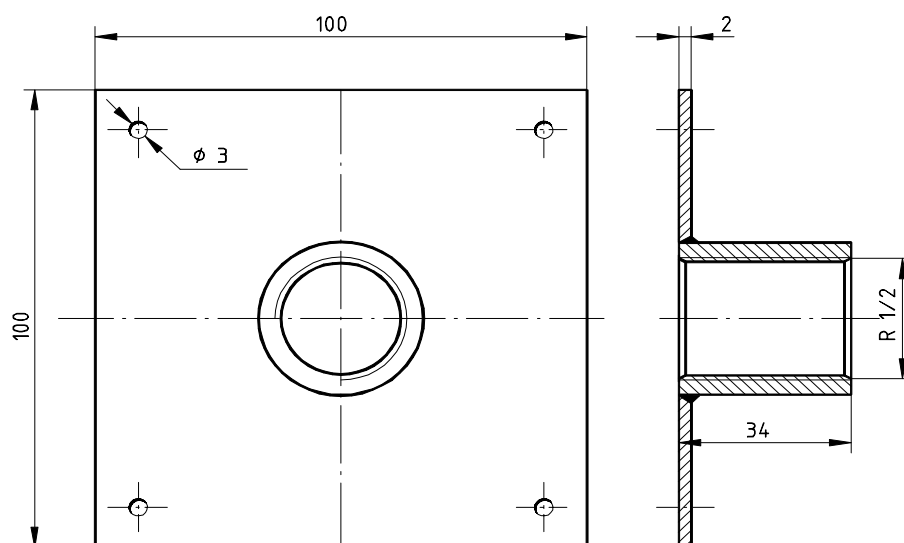


Picture 1. Dimensions for the Surface Temperature Sensor Holder.

PIPING STANDARD 632-060 - INSTRUMENTATION DESIGN STANDARDS - MOUNTING SOCKET FOR TEMPERATURE BULB - FOR AIR CONDITION CHANNEL - THREAD R 1/2"

1. GENERAL

The mounting socket covered by this standard is meant to be installed onto the air condition channel.



2. Material

Material 1.4404

3. DESIGNATION

Tag, name, DN, material, standard No.

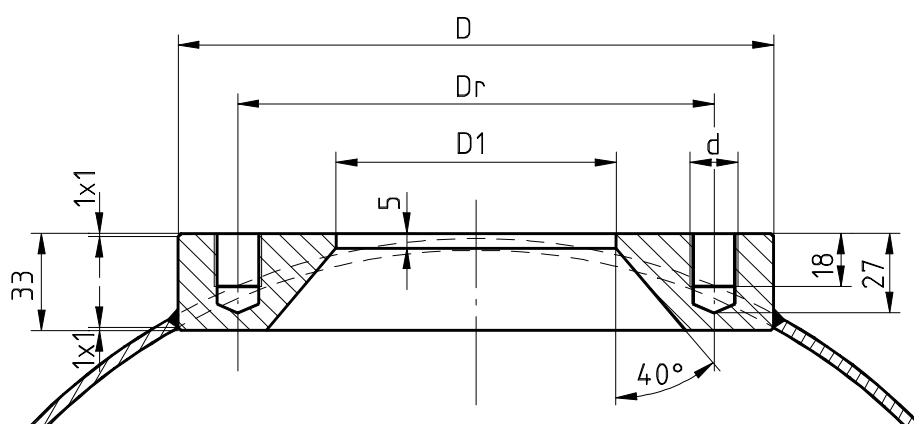
Example: 23TW9101, Mounting socket for temperature bulb, R 1/2", 1.4404, 632-060

PIPING STANDARD 633-010 - INSTRUMENTATION DESIGN STANDARDS - MOUNTING FLANGES OF TRANSMITTER DN 25...100 - FLANGE DRILLING ACCORDING TO EN 1092-1 - PN 10...PN 40 WITH THREADED HOLES

1. GENERAL

The flanges covered by this standard are meant to be welded onto tanks and pipes DN > 400 or equipment at the location of the transmitters.

2. DIMENSIONS



DN	Flange			Studs 1)		PN
	D	Dr	D1	d	pcs	
25	115	85	38	M12	4	10-40
50	165	125	65	M16	4	10-40
80	200	160	94	M16	8	10-40
100	220	180	120	M16	8	10-16
150	285	240	174	M20	8	10-16

1) The stud bolts to be supplied by the instrument Supplier.

Shaded sizes can be used only with the Purchaser's special permission.

3. MATERIAL

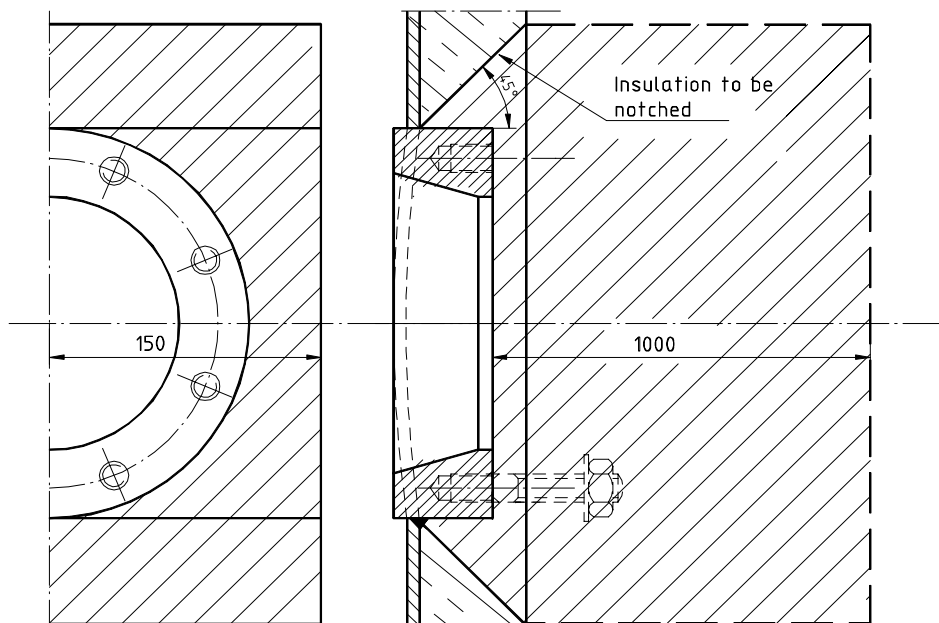
Material same as the base material onto which the connection is to be welded.

4. DESIGNATION

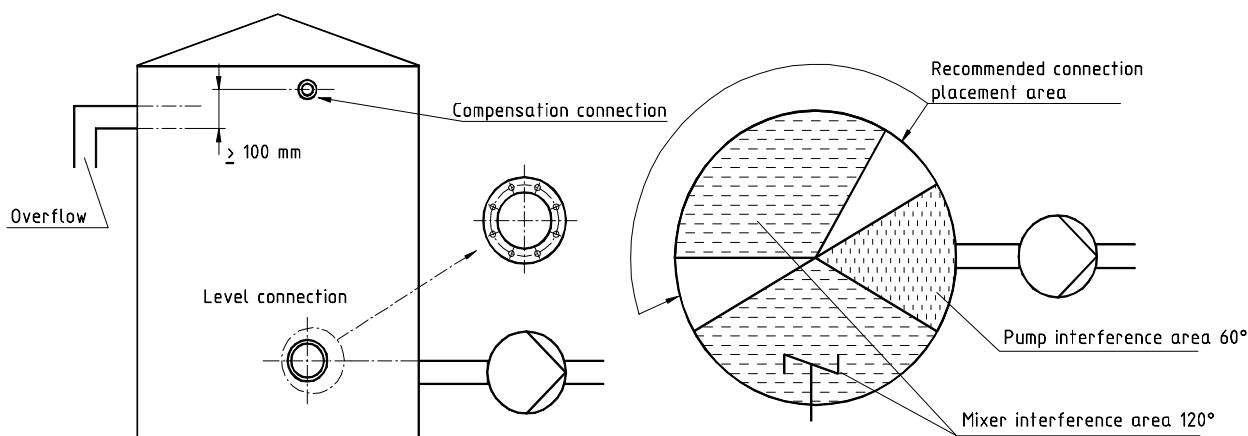
Tag, name, DN, material, standard No.

Example: 22A1615-LW, Mounting flange of transmitter, DN 80, 1.4404, 633-010

5. SPACE RESERVATION



6. CONNECTION ARRANGEMENT ON THE TANK



Measurement connection shall be placed outside the interference areas of pump suction connection, inlet connection and mixer.

In special cases the measurement connection can be placed for example to the pump suction pipe if the flow does not cause too large error in the measurement.

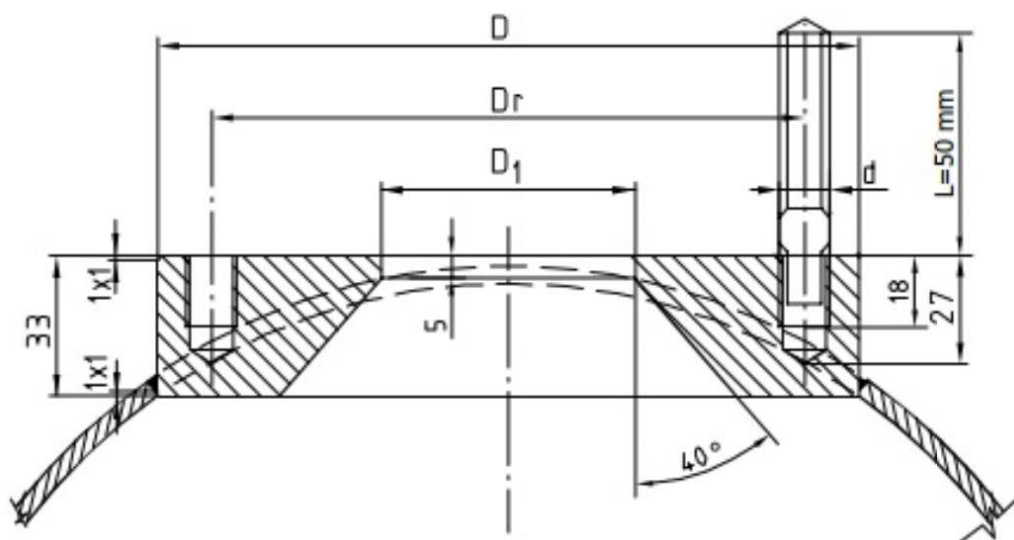
The compensation connection of the tank gas space pressure shall be located at least 100 mm above the liquid level at the location of the level connection at well accessible place.

PIPING STANDARDS 633-011 - INSTRUMENTATION DESIGN STANDARDS - MOUNTING FLANGES OF TRANSMITTER DN 50...100 FLANGE DRILLING ACCORDING TO PN 10...PN 16 EN 1092-1 +A1 2013 WITH THREADED HOLES AND STUD BOLTS

1 GENERAL

The flanges covered by this standard are meant to be welded onto tanks and pipes DN > 400 or equipment at the location of the transmitters.

2 DIMENSIONS



DN	Flange			Studs		PN
	D	Dr	D1	d	pcs	
50	165	125	65	M16	4	10-40
80	200	160	94	M16	8	10-40
100	220	180	119	M16	8	10-16
150	285	240	174	M20	8	10-16

Shaded sizes can be used only with the Purchaser's special permission.

3 MATERIAL

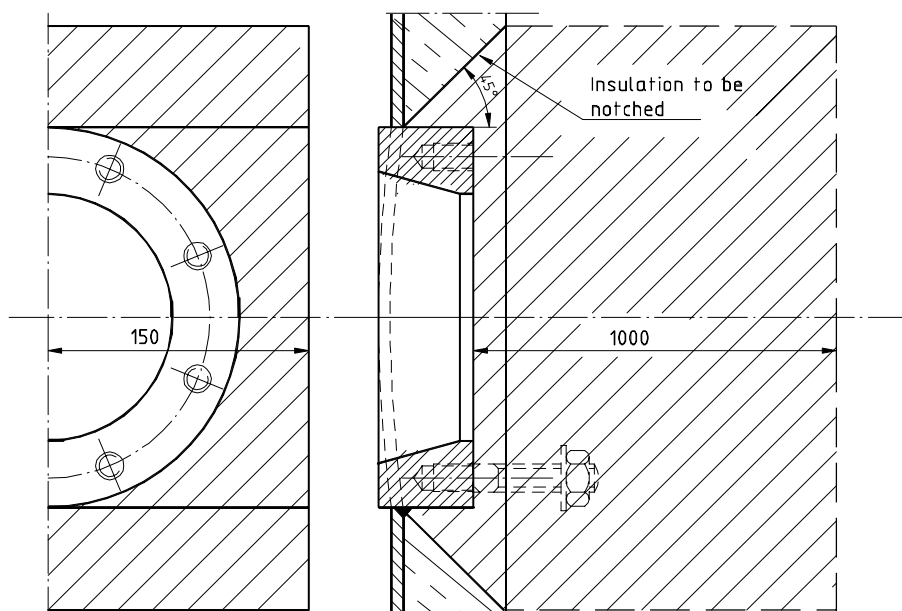
Material same as the base material onto which the connection is to be welded.

4 DESIGNATION

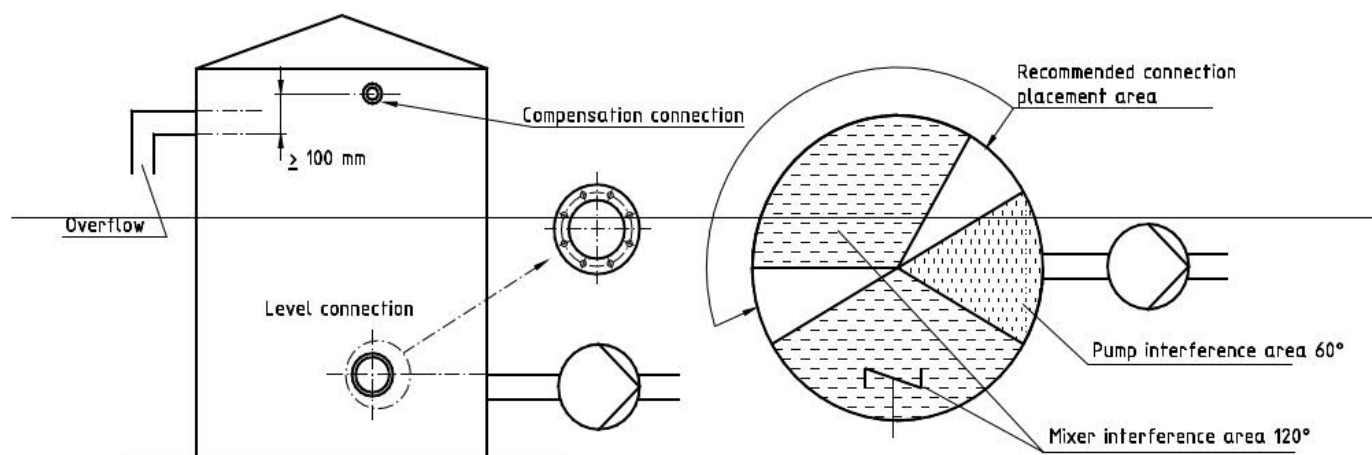
Tag, name, DN, material, standard No.

Example: = 122A1615-LW, Mounting flange of transmitter, DN 80, 1.4432, 633-011

5 SPACE RESERVATION



6 CONNECTION ARRANGEMENT ON THE TANK



Measurement connection shall be placed outside the interference areas of pump suction connection, inlet connection and mixer.

In special cases the measurement connection can be placed for example to the pump suction pipe if the flow does not cause too large error in the measurement.

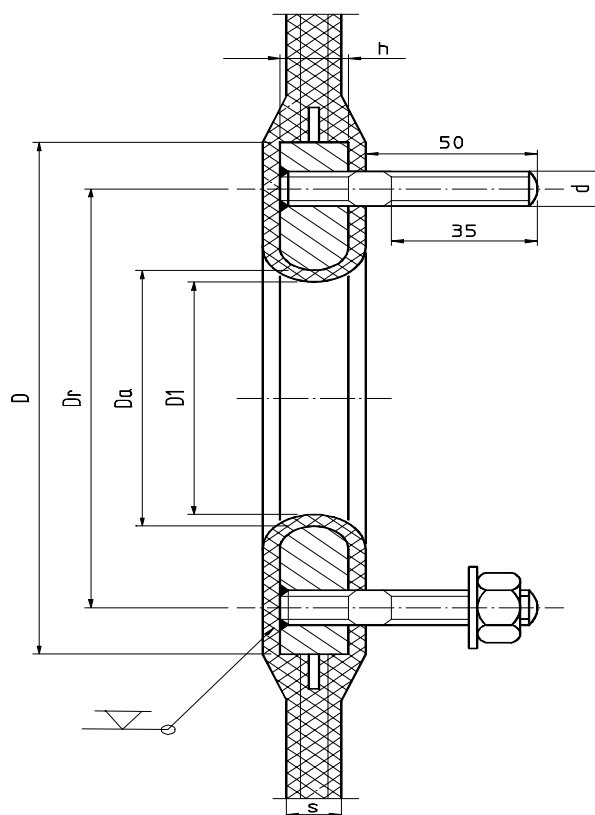
The compensation connection of the tank gas space pressure shall be located at least 100 mm above the liquid level at the location of the level connection at well accessible place.

PIPING STANDARD 633-040 - INSTRUMENTATION DESIGN STANDARDS - MOUNTING FLANGES OF TRANSMITTER - DN 50...DN150 FOR PLASTIC TANK - FLANGE DRILLING ACCORDING TO EN 1092-1 - PN 10...PN 16 WITH THREADED HOLES

1. GENERAL

The flanges covered by this standard are meant to be fixed onto tanks and equipment of reinforced plastic at the location of the transmitters.

2. DIMENSIONS



DN 1)	Flange					Bolts	
	D	Dr	Da	D1	h	d	Pcs
50	165	125	Defined by the manufacturer	62	18	M 16	4
80	200	160		92	20	M 16	8
100	220	180		117	20	M 16	8
150	285	240		174	22	M 20	8

1) DN 80 shall be used. Other sizes may be used after Purchaser's approval.

3. NOTES

Material of flange, bolts and nuts is stainless steel and they are supplied by the tank contractor.

The stud side flange surface shall not be sunk in regard to the outer surface of the tank or equipment if the wall thickness (s) of the reinforced plastic becomes bigger then that of the flange (h).

4. DESIGNATION

Tag, name, DN, standard No.

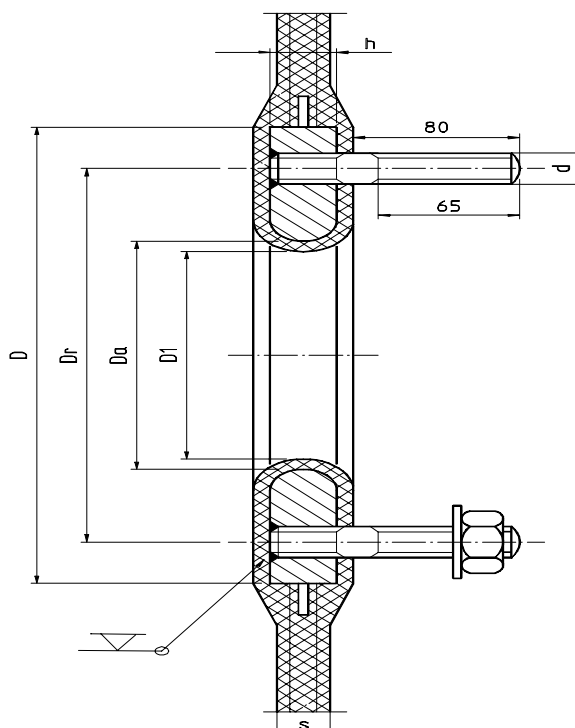
Example: 23A1610-LW, Mounting flange of transmitter, DN 80, 633-040

PIPING STANDARD 633-041 - INSTRUMENTATION DESIGN STANDARDS - MOUNTING FLANGES OF TRANSMITTER - DN 50...DN150 FOR PLASTIC TANK - FLANGE DRILLING ACCORDING TO EN 1092-1 - PN 10...PN 16 WITH THREADED HOLES

1. GENERAL

The flanges covered by this standard are meant to be fixed onto tanks and equipment of reinforced plastic at the location of the transmitters.

2. DIMENSIONS



DN	Flange					Bolts	
	D	Dr	Da	D1	h	d	Pcs
50	165	125	Defined	62	18	M 16	4
80	200	160	by the	92	20	M 16	8
100	220	180	manufacturer	117	20	M 16	8
150	285	240		174	22	M 20	8

Shaded sizes can be used only with the Purchaser's special permission.

3. NOTES

Material of flange, bolts and nuts is stainless steel and they are supplied by the tank contractor.

The stud side flange surface shall not be sunk in regard to the outer surface of the tank or equipment if the wall thickness (s) of the reinforced plastic becomes bigger than that of the flange (h).

4. DESIGNATION

Tag, name, DN, standard No.

Example: 23LW8802, Mounting flange of transmitter, DN 80, 633-041

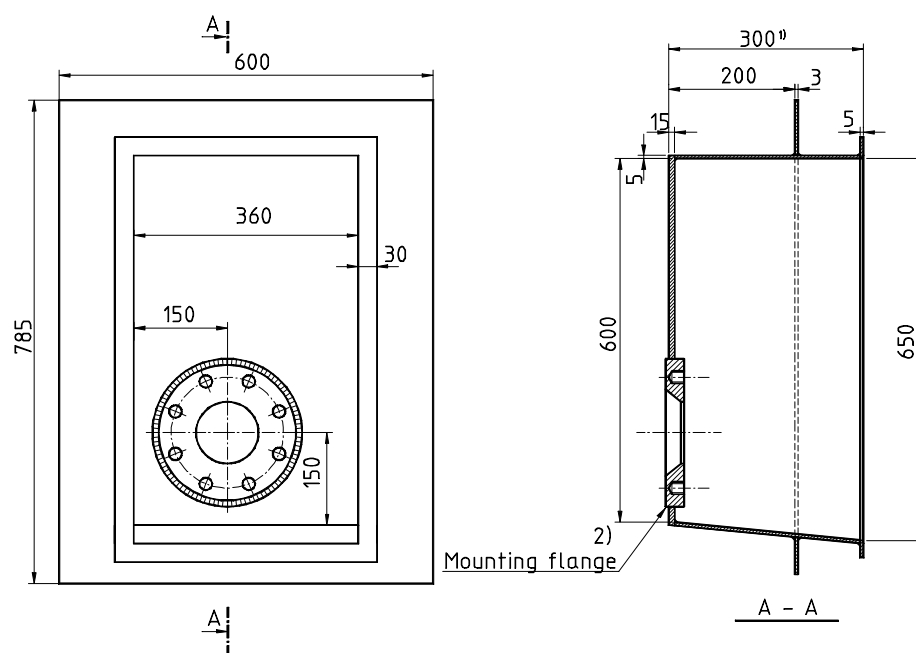
Example: 221-LW-0037, Mounting flange of transmitter, DN 80, 1.4404, 633-160

PIPING STANDARD 633-200 - INSTRUMENTATION DESIGN STANDARDS - MOUNTING CASE OF LEVEL TRANSMITTER - ONTO CONCRETE CHEST DN 80 - FLANGE DRILLING ACCORDING TO EN 1092-1 - PN 10

1. GENERAL

The mounting case covered by this standard is meant to be fixed on a concrete chest at the location of the level transmitter in connection with the ground casting or fine screed.

2. DIMENSIONS



3. MATERIAL

Stainless steel.

4. NOTES

- 1) Dimensions for guidance: determined by the wall thickness of the concrete chest.
- 2) Flange: See standard 633-010.

5. DESIGNATION

Tag, name, material, standard No.

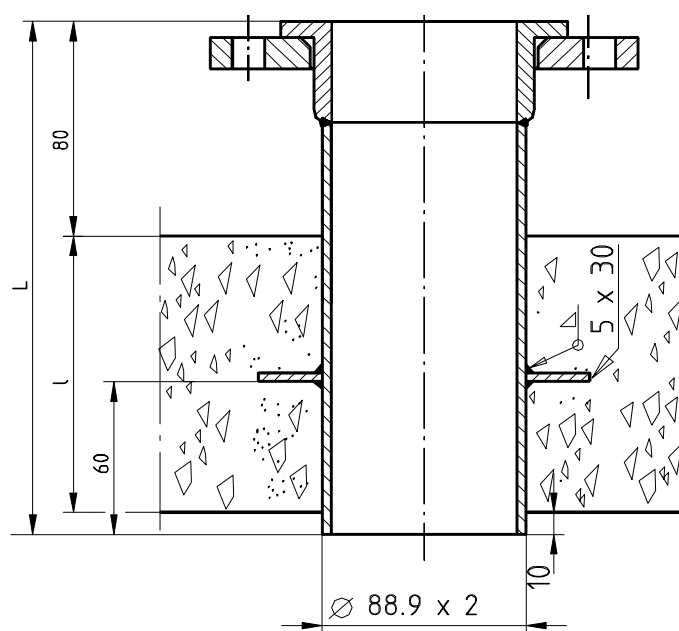
Example: 22A1815-LW, Mounting flange of level transmitter, 1.4404, 633-200

PIPING STANDARD 633-230 - INSTRUMENTATION DESIGN STANDARDS - PIPE CONNECTION ONTO CONCRETE CHEST DN80 - FLANGE DRILLING ACCORDING TO EN 1092-1- PN 10

1. GENERAL

The connection case covered by this standard is meant to be fixed onto concrete chest at the location of the level transmitter in connection with the ground casting or fine screed. The connection is made of standard piping parts.

2. DIMENSIONS



3. MATERIAL

Material stainless steel 1.4404.

4. NOTES

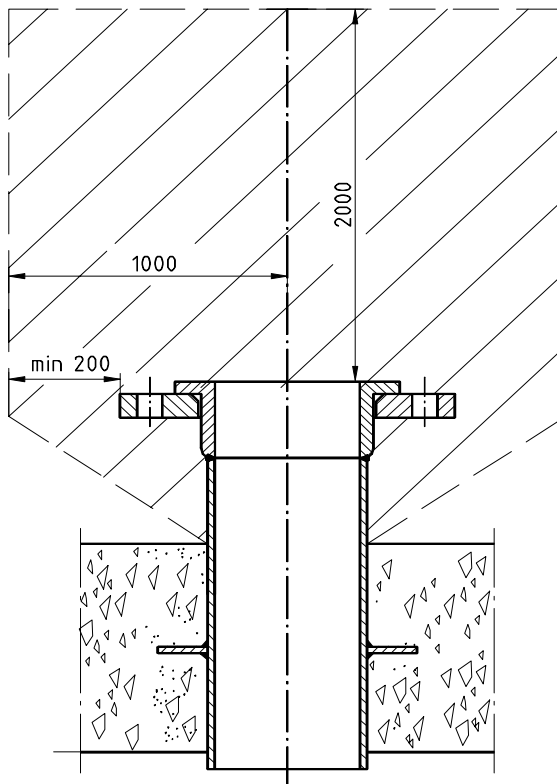
- 1) Dimensions L shall be determined according to the wall thickness of the concrete chest.
- 2) Flange: DN 80, flange drilling according to EN 1092-1, PN 10

5. DESIGNATION

Tag, name, material, standard No.

Example: 22A1816-LW, Pipe connection for concrete chest, 1.4404, 633-230

6. SPACE RESERVATION



7. CONNECTION ARRANGEMENT ON CONCRETE TANK

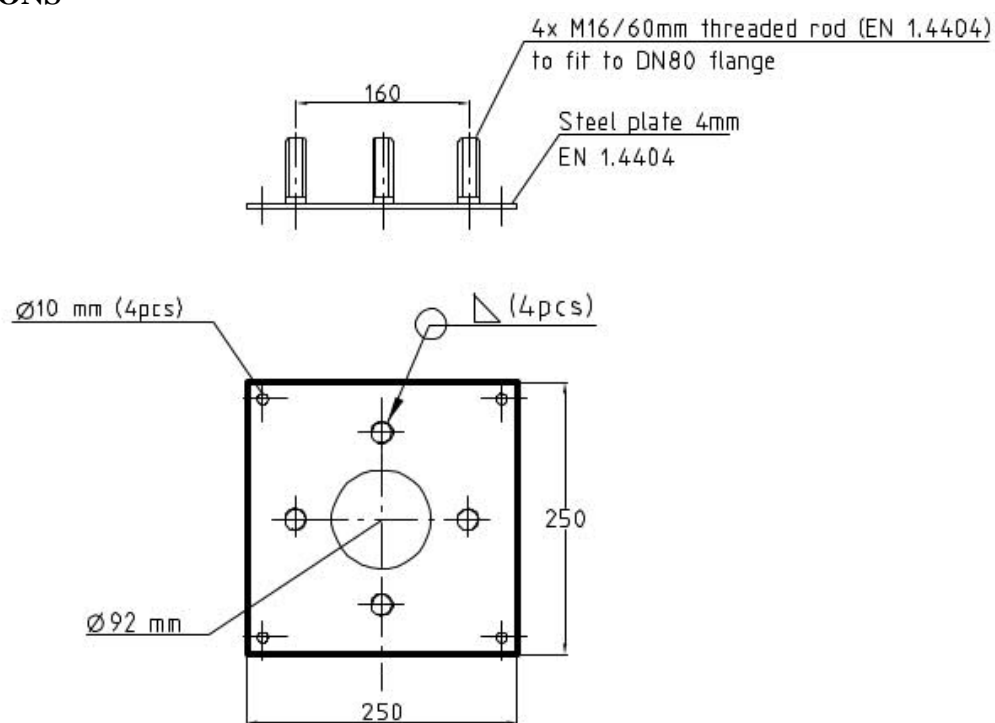
The connection shall be fixed case by case either on the tank or to the tank wall.

PIPING STANDARDS 633-231 - INSTRUMENTATION DESIGN STANDARDS - PROCESS CONNECTION FOR DN80 FLANGE INSTRUMENT ON THE OPEN VESSEL

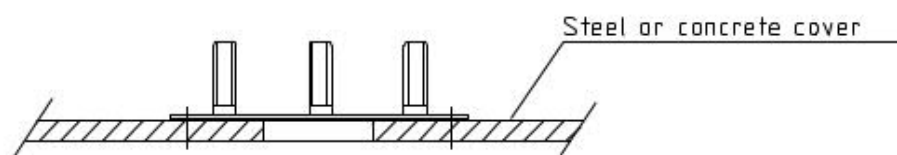
1 GENERAL

The process connection covered by this standard is suitable for fixing on the checker, grating or concrete cover on open vessel like a floor flume.

2 DIMENSIONS



3 INSTALLATION



4 MATERIAL

Stainless steel EN 1.4404

5 DESIGNATION

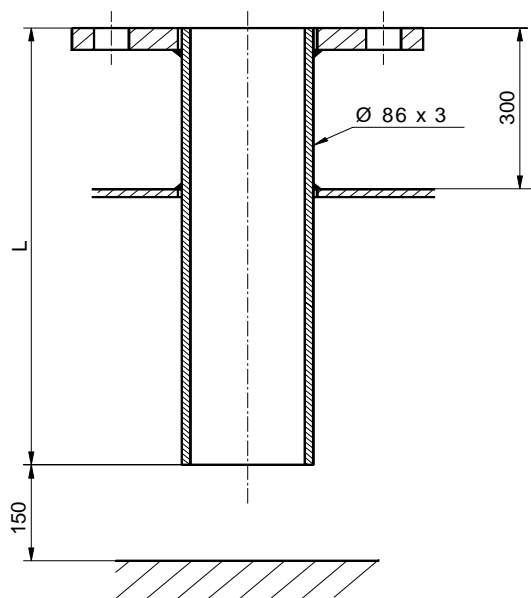
Tag, name, material, standard No.

Example: = 122A1816-LW, Instrument connection for open vessel, 1.4404, 633-231

PIPING STANDARDS 633-232 - INSTRUMENTATION DESIGN STANDARDS - PROCESS CONNECTION FOR SUBMERSION TYPE TRANSMITTER, DN80 FLANGE AND PROTECTION PIPE

1 GENERAL

The process connection covered by this standard is suitable for welding onto the roof of a tank or onto a cover in an open vessel.



2 DIMENSIONS

Length L is to be defined case by case.
Flange drilling according to DIN EN 1092-1 PN 10 DN 80.

3 NOTE

Material is to be defined case by case.

4 DESIGNATION

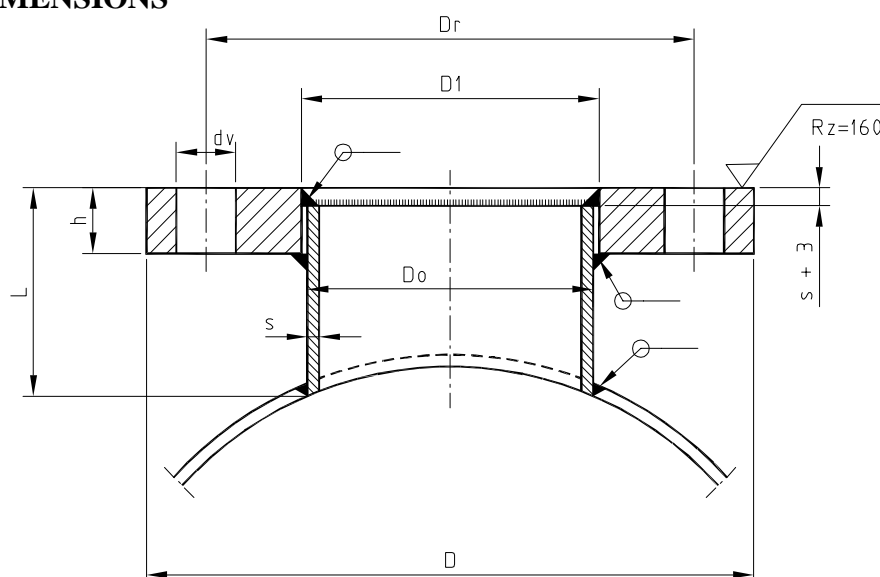
Name, DN, length L, material, standard No.
Example: Pipe with mounting flange, DN 80, 1.4404, 633-232

PIPING STANDARDS 633-300 - INSTRUMENTATION DESIGN STANDARDS - PIPE CONNECTION FOR MOUNTING OF TRANSMITTER DN 50...DN 150 FLANGE DRILLING ACCORDING TO EN 1092-1, PN 10

1 GENERAL

The connections with loose flange covered by this standard are meant to be welded onto the stainless steel pipes DN < 400 at the locations of transmitters.

2 DIMENSIONS



DN	Pipe	Flange				Holes		PN
	Do	D	Dr	D1	h	dv	pcs	
25	33.7	115	85	36	16	16	4	10-40
40 2)	48.3	150	110	52	18	18	4	10-40
50 2)	60.3	165	125	64	20	18	4	10-40
80	88.9	200	160	94	20	18	8	10-40
100 2)	114.3	220	180	113	22	18	8	10-16
150 2)	168.3	285	240	165	24	22	8	10-16

1) Length of connection (L) as short as possible, defined case by case.

2) Sizes can be used only with the Purchaser's special permission.

3 MATERIAL

The material according to the pipe class of the pipe.

4 DESIGNATION

Tag, name, DN, length, L, material, standard No.

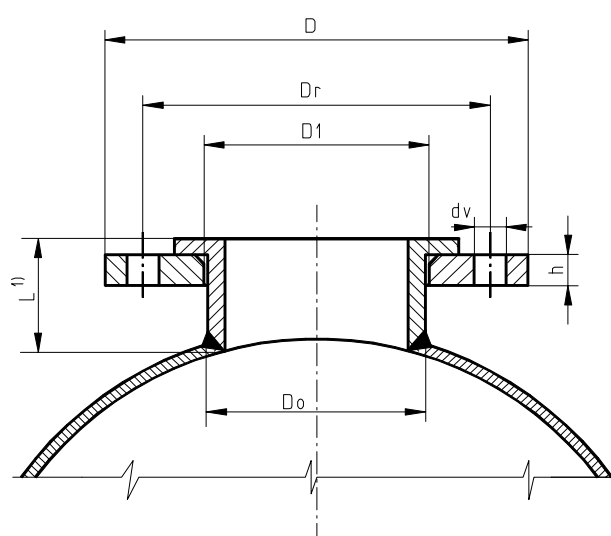
Example: 221-PW-0035, Pipe connection for mounting of transmitter, DN 150, 60, 1.4404, 633-300

PIPING STANDARD 633-302 - INSTRUMENTATION DESIGN STANDARDS - PIPE CONNECTION FOR MOUNTING OF TRANSMITTER DN 50...DN 150 FLANGE DRILLING ACCORDING TO EN 1092-1, PN10

1 GENERAL

The connections with loose flange covered by this standard are meant to be welded onto the pipes or onto top of the tank at the locations of transmitters.

2 DIMENSIONS



DN	Pipe	Flange				Holes		PN
	Do	D	Dr	D1	h	dv	pcs	
50	60.3	165	125	65	20	18	4	10-40
80	88.9	200	160	94	24	18	8	10-40
100	114.3	220	180	120	22	18	8	10-16
150	168.3	285	240	174	24	22	8	10-16

1) Length of connection (L) as short as possible, defined case by case.

3 MATERIAL

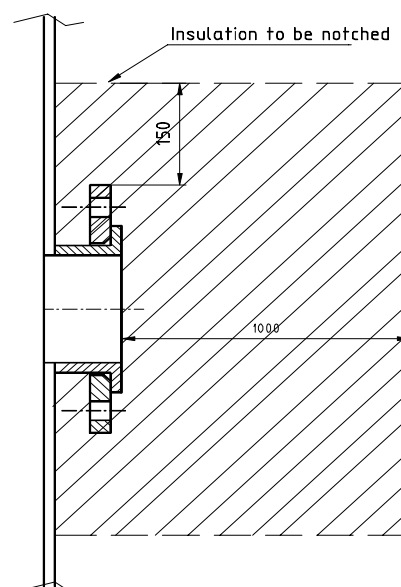
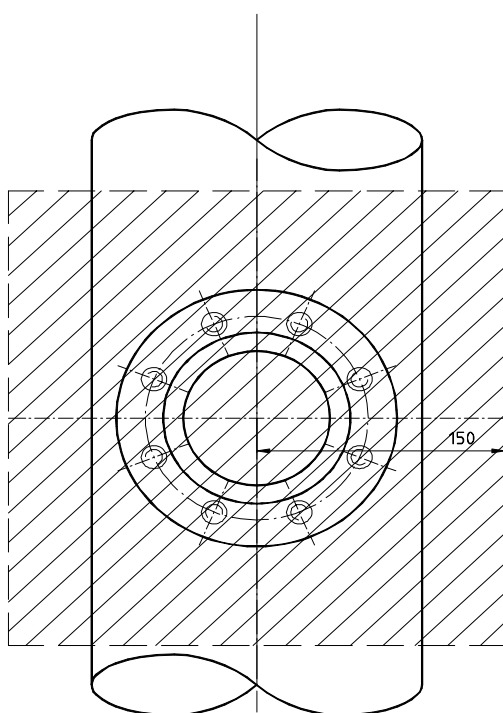
The material according to the pipe class of the pipe.

4 DESIGNATION

Tag, name, DN, length, L, material, standard No.

Example: 22A1617-PW, Pipe connection for mounting of transmitter, DN 150, 60, 1.4404, 633-302

5 SPACE RESERVATIONS

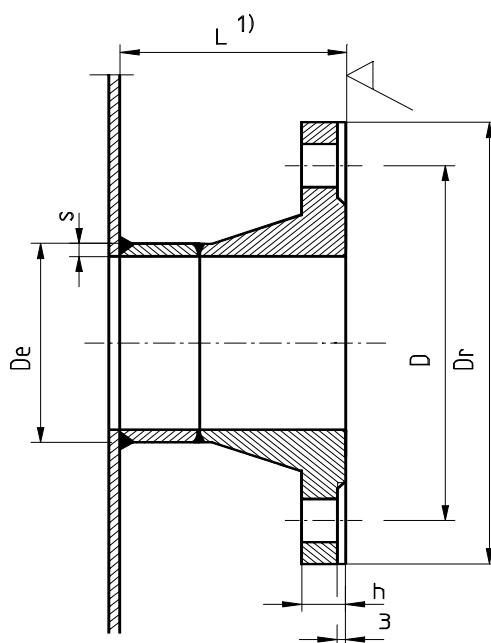


PIPING STANDARD 633-303 - INSTRUMENTATION DESIGN STANDARDS - PIPE CONNECTION OF CARBON STEEL FOR MOUNTING OF TRANSMITTER DN 50...DN 150 FLANGE DRILLING ACCORDING TO EN 1092-1, PN 10

1 GENERAL

The connections with welding neck flange covered by this standard are meant to be welded onto the carbon steel pipes at the locations of transmitters.

2 DIMENSIONS



DN	Pipe	Flange				Holes			PN
1)	de	s	D	Dr	h	d	pcs	dv	
50	60,3	2.9	165	125	20	M16	4	18	10-40
80	88,9	3.2	200	160	24	M16	8	18	10-40
100	114,3	3.6	220	180	20	M16	8	18	10-16
150	168,3	4.5	285	240	22	M20	8	22	10-16

1) DN 80 shall be used. Other sizes may be used with Purchaser's approval.

3 MATERIAL

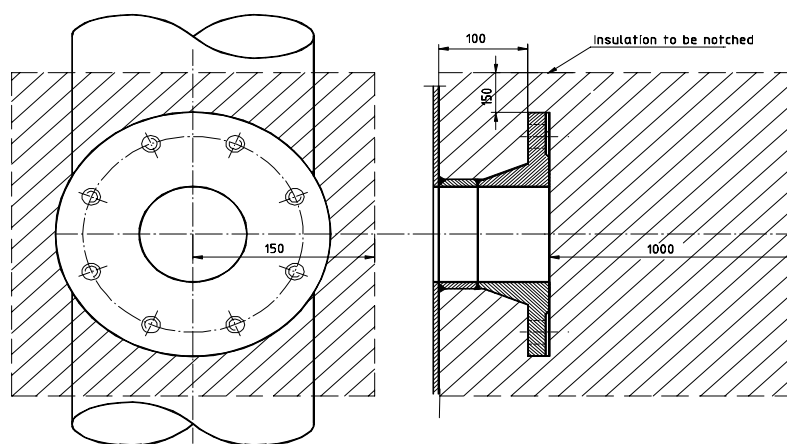
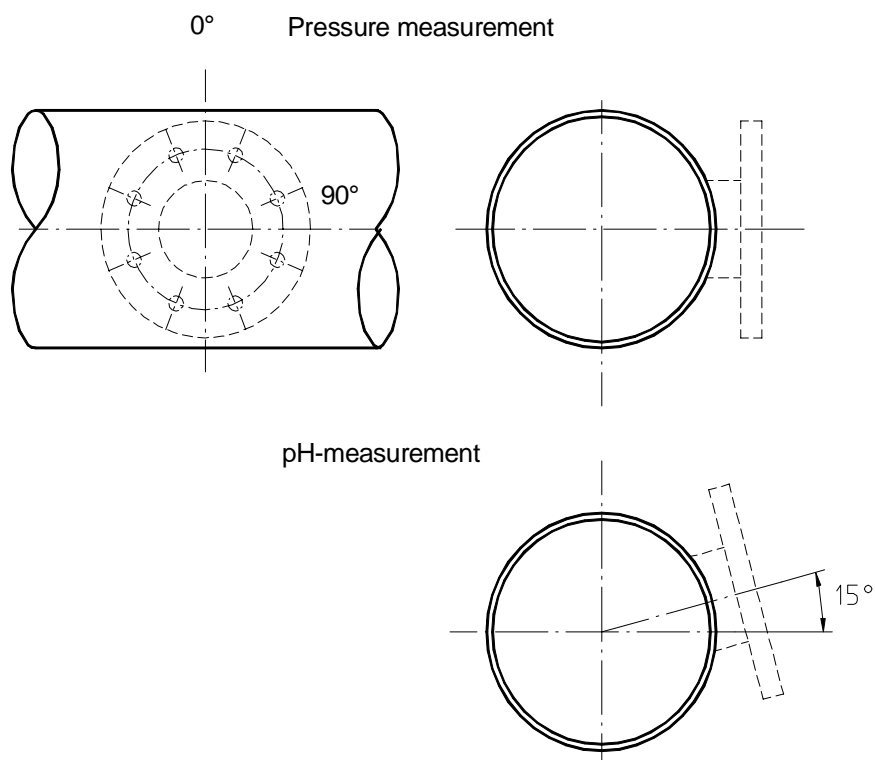
The material according to the pipe class of the pipe.

Notes: 1. Length of connection (L) as short as possible defined case by case.

4 DESIGNATION

Tag, name, DN, length, L, material, standard No.

Example: 22A1631-PW, Pipe connection for mounting of transmitter, DN 150, 60, P235GH, 633-303

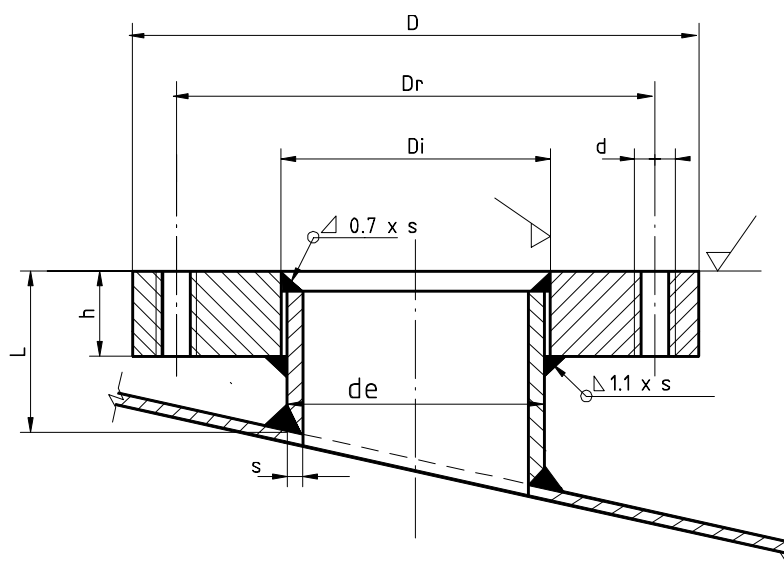
5 SPACE RESERVATIONS**6 CONNECTION ARRANGEMENT IN THE PIPING**

PIPING STANDARD 633-306 - INSTRUMENTATION DESIGN STANDARDS - PIPE CONNECTION FOR MOUNTING OF TRANSMITTER DN 50...DN 500 FLANGE DRILLING ACCORDING TO EN 1092-1, PN 10

1 GENERAL

The connection covered by this standard is meant to be welded onto the top of stainless steel tank at the locations of transmitters.

2 DIMENSIONS



DN	Pipe		Flange				Thread		PN
	de	s	D	Dr	Di	h	d	kpl	
50	60.3	2.0	165	125	64	20	M16	4	10 - 40
80	88.9	2.0	200	160	94	24	M16	8	10 - 40
100	114.3	2.6	220	180	120	22	M16	8	10 - 16
150	168.3	2.6	285	240	174	24	M20	8	10 - 16
200	219.1	3.2	340	295	226	24	M20	8	10
250	273	4.0	395	350	281	26	M20	12	10
500	508	6.3	670	620	519	38	M24	20	10

3 MATERIAL

Material same as the base material onto which the connection is to be welded.

4 NOTES

Length of connection (L) as short as possible, defined case by case.

5 DESIGNATION

Tag, name, DN – length (L), material, standard No.

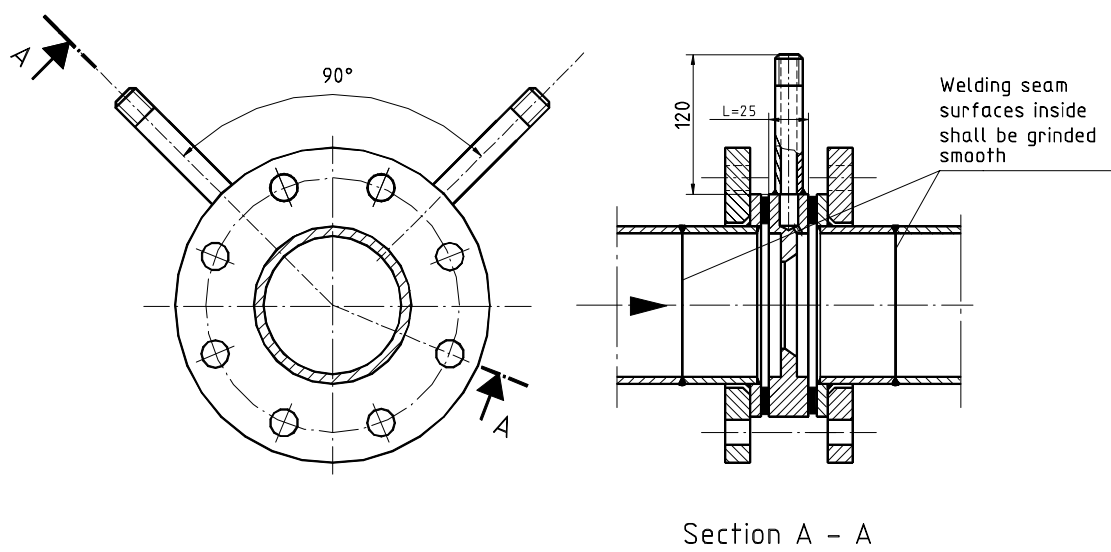
Example: 30A1626-LW, Pipe connection for mounting of transmitter, DN 250 - 60,
1.4404, 633-306

PIPING STANDARD 634-040
INSTRUMENTATION DESIGN STANDARDS
INSTALLATION OF ORIFICE PLATE

1. GENERAL

The orifice plates covered by this standard are to be placed at flow measurement point in air or gas pipes.

2. DIMENSIONS



3. STRAIGHT PIPE RUNS

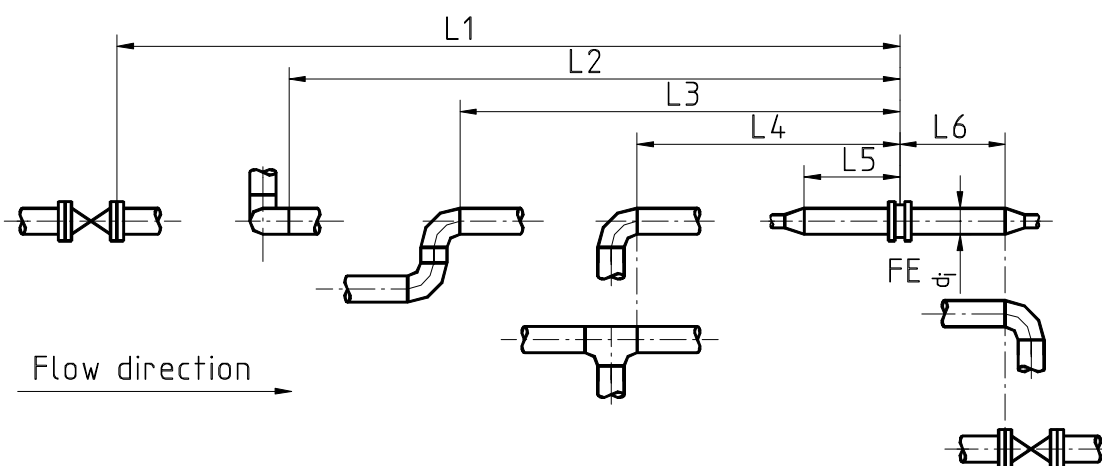
To reach adequate measurement accuracy the straight pipe runs before and after the orifice plate shall in minimum meet the values in table 1.

Table 1

	d/d _i	L1 x d _i	L2 x d _i	L3 x d _i	L4 x d _i	L5 x d _i	L6 x d _i
Not recommended	0,25	18	34	14	10	16	4
	0,35	18	34	16	10	16	5
Suitable dimensioning area	0,35	18	36	16	12	16	5
	0,40	20	36	18	14	16	6
	0,45	20	38	18	14	17	6
	0,50	22	40	20	14	18	6
	0,55	24	44	22	16	20	6
	0,60	26	48	26	18	22	7
	0,65	28	54	32	22	25	7
	0,70	32	62	36	28	30	7
Not recommended	0,75	36	70	42	36	38	8
	0,80	44	80	50	46	54	8

Table 1 is based on international standard ISO 5167 and presents how the straight runs are defined based on the diameter of opening in the orifice plate (d) and the inner diameter (d_i) of the pipe.

d/d_i = diameter relation



Picture above shows the straight pipe runs when there are elbows, branches and valves in the piping.

4. NOTES

Orifice plate and the gaskets shall be sented carefully between flanges.

Orifice plate is equipped with arrow showing the flow direction.

Flanges, gaskets, bolts, nuts and washers are included in piping supply.

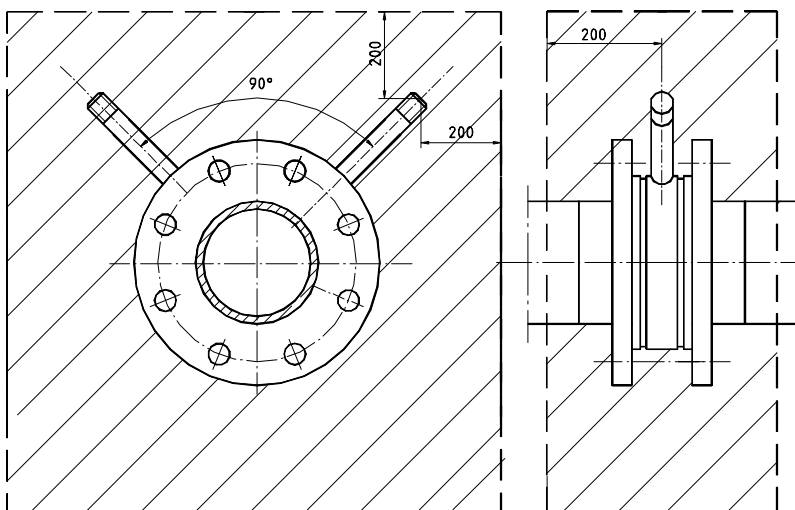
5. DESIGNATION

Position, name, DN, L, material, standard No.

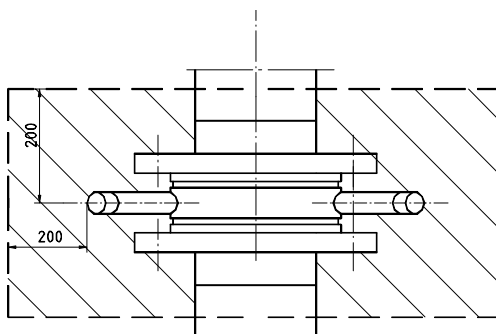
Example: VA5-FE005, Installation of orifice plate, DN 150, 42, EN 1.4432, 634-040

6. SPACE RESERVATIONS

a. Horizontal pipe

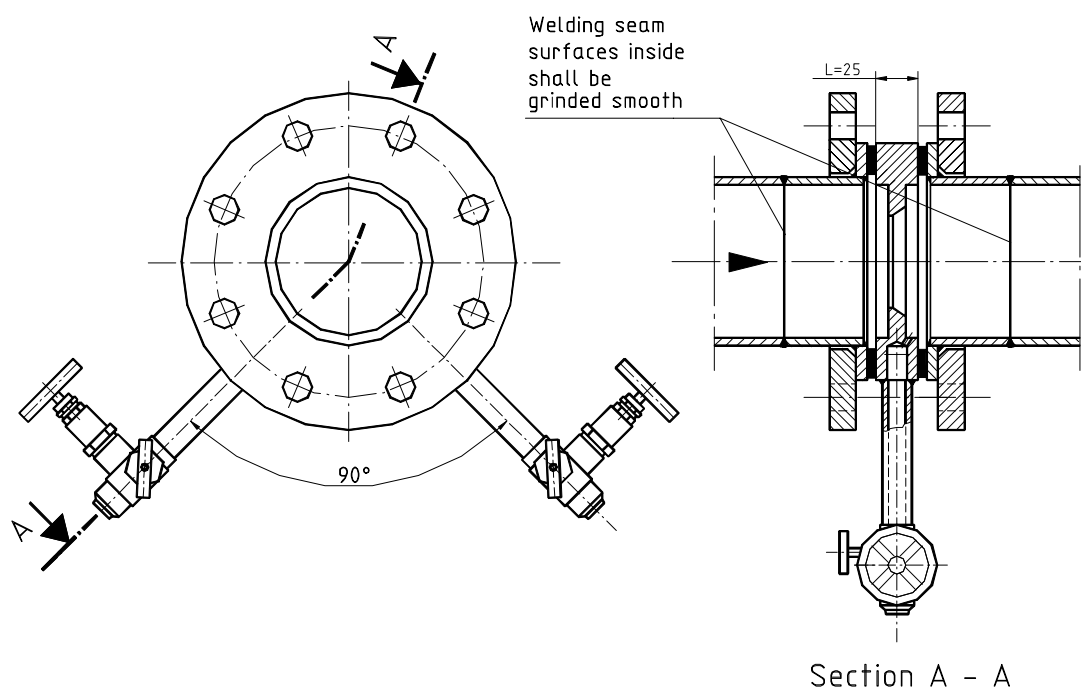


b. Vertical pipe



**PIPING STANDARD 634-041 - INSTRUMENTATION DESIGN STANDARDS -
INSTALLATION OF ORIFICE PLATE****1. GENERAL**

The orifice plates covered by this standard are to be placed at flow measurement point in condensate pipes.

2. DIMENSIONS

3. STRAIGHT PIPE RUNS

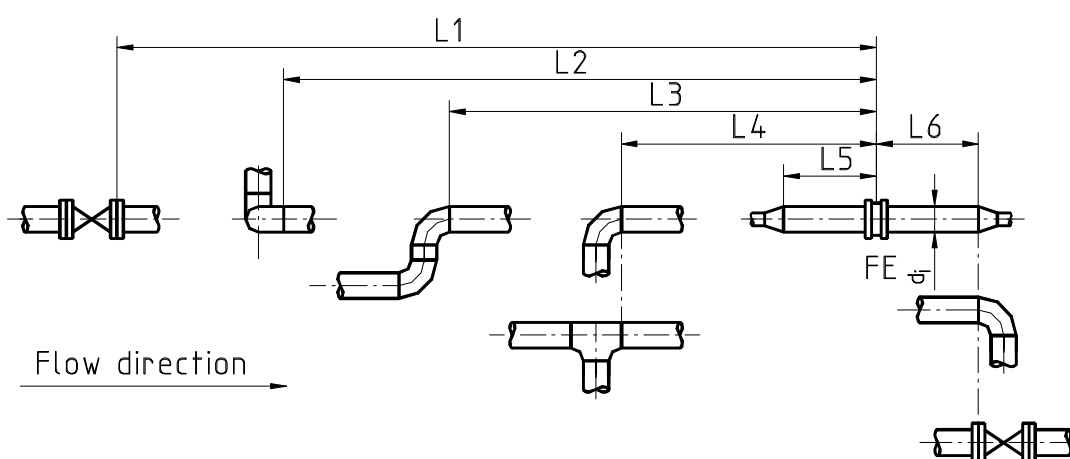
To reach adequate measurement accuracy the straight pipe runs before and after the orifice plate shall in minimum meet the values in table 1.

Table 1

	d/d_i	$L1 \times d_i$	$L2 \times d_i$	$L3 \times d_i$	$L4 \times d_i$	$L5 \times d_i$	$L6 \times d_i$
Not recommended	0,25	18	34	14	10	16	4
	0,35	18	34	16	10	16	5
Suitable dimensioning area	0,35	18	36	16	12	16	5
	0,40	20	36	18	14	16	6
	0,45	20	38	18	14	17	6
	0,50	22	40	20	14	18	6
	0,55	24	44	22	16	20	6
	0,60	26	48	26	18	22	7
	0,65	28	54	32	22	25	7
	0,70	32	62	36	28	30	7
Not recommended	0,75	36	70	42	36	38	8
	0,80	44	80	50	46	54	8

Table 1 is based on international standard ISO 5167 and presents how the straight runs are defined based on the diameter of opening in the orifice plate (d) and the inner diameter (d_i) of the pipe.

d/d_i = diameter relation



Picture above show the straight pipe runs when there are elbows, branches and valves in the piping.

4. NOTES

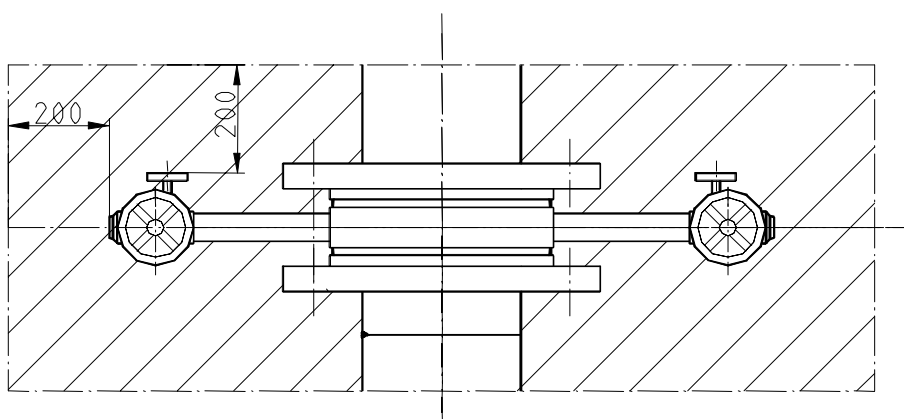
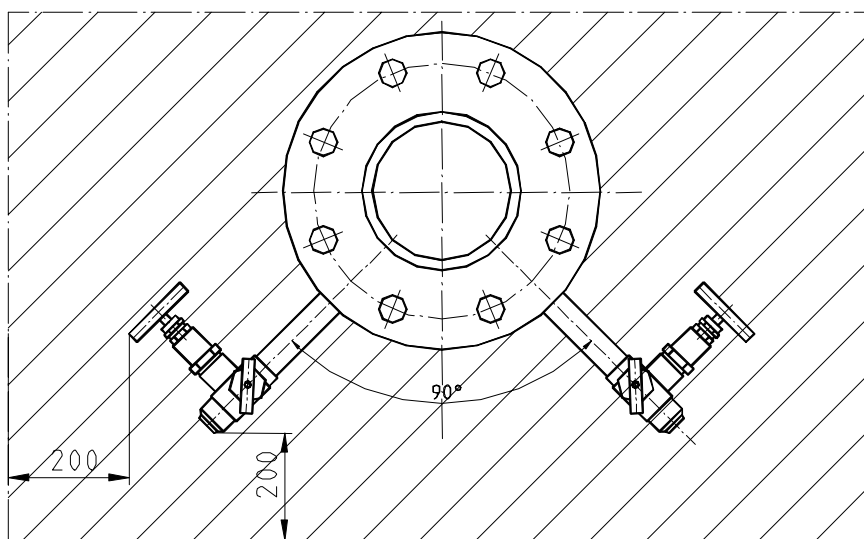
Orifice plate and the gaskets shall be sentered carefully between flanges. Orifice plate is equipped with arrow showing the flow direction.

Flanges, gaskets, bolts, nuts and washers are included in piping supply.

5. DESIGNATION

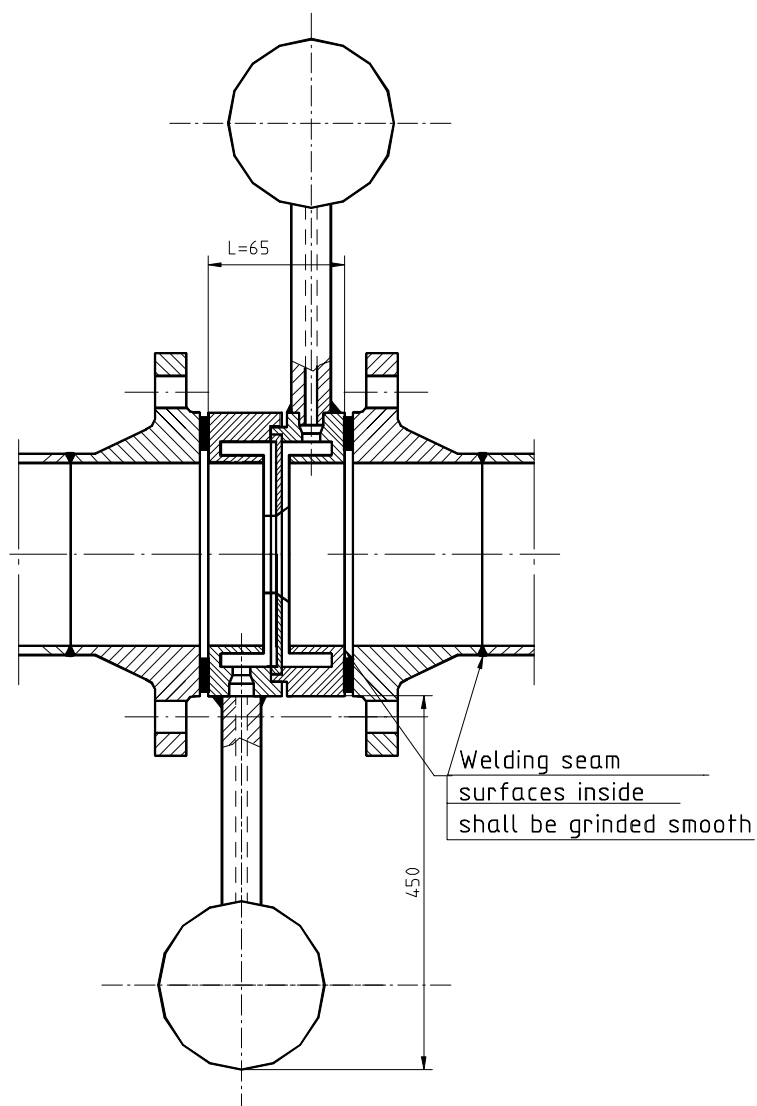
Position, name, DN, L, material, standard No.
Example: VA5-FE005, Installation of orifice plate, DN 150, 42, EN 1.4432, 634-041

6. SPACE RESERVATIONS HORIZONTALPIPE



**PIPING STANDARD 634-042 - INSTRUMENTATION DESIGN STANDARDS -
INSTALLATION OF ORIFICE PLATE****1. GENERAL**

The orifice plates covered by this standard are to be placed at flow measurement point in steam in pipes.

2. DIMENSIONS

3. STRAIGHT PIPE RUNS

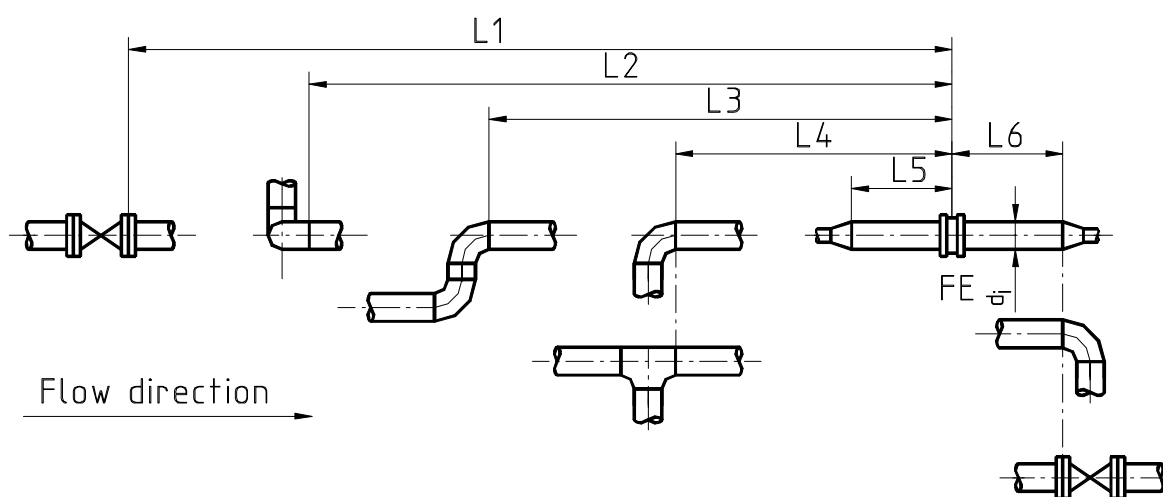
To reach adequate measurement accuracy the straight pipe runs before and after the orifice plate shall in minimum meet the values in table 1.

Table 1

	d/d_i	$L1 \times d_i$	$L2 \times d_i$	$L3 \times d_i$	$L4 \times d_i$	$L5 \times d_i$	$L6 \times d_i$
Not recommended	0,25	18	34	14	10	16	4
	0,35	18	34	16	10	16	5
Suitable dimensioning area	0,35	18	36	16	12	16	5
	0,40	20	36	18	14	16	6
	0,45	20	38	18	14	17	6
	0,50	22	40	20	14	18	6
	0,55	24	44	22	16	20	6
	0,60	26	48	26	18	22	7
	0,65	28	54	32	22	25	7
	0,70	32	62	36	28	30	7
Not recommended	0,75	36	70	42	36	38	8
	0,80	44	80	50	46	54	8

Table 1 is based on international standard ISO 5167 and presents how the straight runs are defined based on the diameter of opening in the orifice plate (d) and the inner diameter (d_i) of the pipe.

d/d_i = diameter relation



Picture above show the straight pipe runs when there are elbows, branches and valves in the piping.

4. NOTES

Orifice plate and the gaskets shall be sentered carefully between flanges.

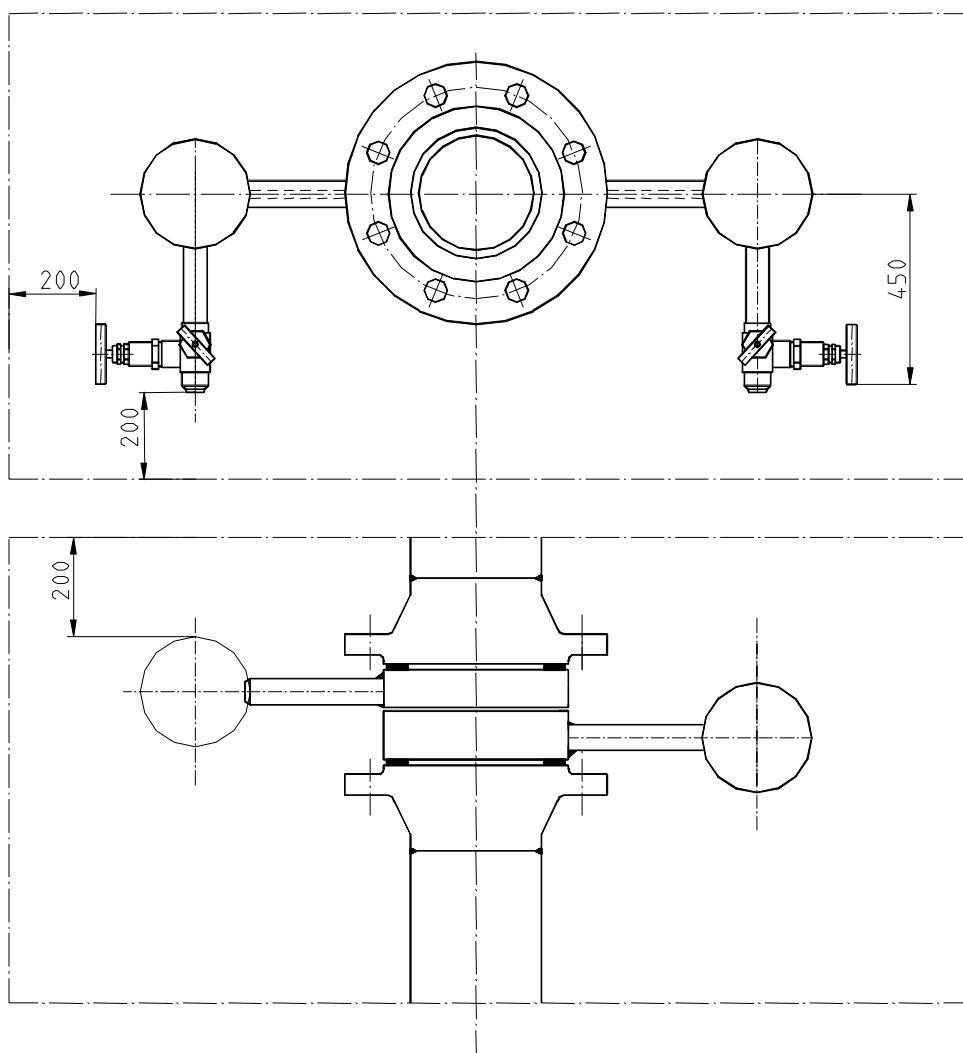
Orifice plate is equipped with arrow showing the flow direction.

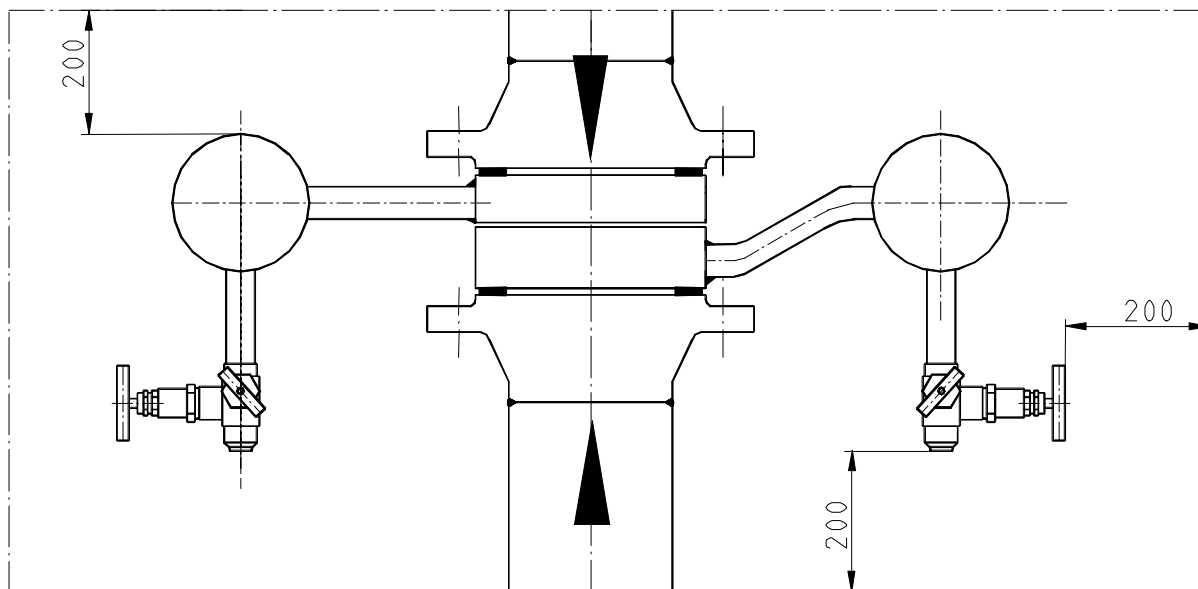
Flanges, gaskets, bolts, nuts and washers are included in piping supply.

5. DESIGNATION

Position, name, DN, L, material, standard No.

Example: VA5-FE005, Installation of orifice plate, DN 150, 42, EN 1.4432, 634-042

6. SPACE RESERVATIONS HORIZONTAL PIPE

7. SPACE RESERVATIONS VERTICAL PIPE

**PIPING STANDARD 635-410 - INSTRUMENTATION DESIGN STANDARDS –
INSTRUMENTATION CONNECTIONS – INSTALLATION OF AUTOMATIC VALVES****1 GENERAL**

Standard system for installation of all automatic valves.

2 ACTUATOR ORIENTATION

Recommended installation positions and codes for valve actuators. This need to be specified in 3D-modell and transfer to the process design system. Space reservation needs to be taken in account.

3 ACTUATOR SUPPORT

Recommended actuator supports for automatic which are listed below drawings needs additional actuator support.

4 MARKING

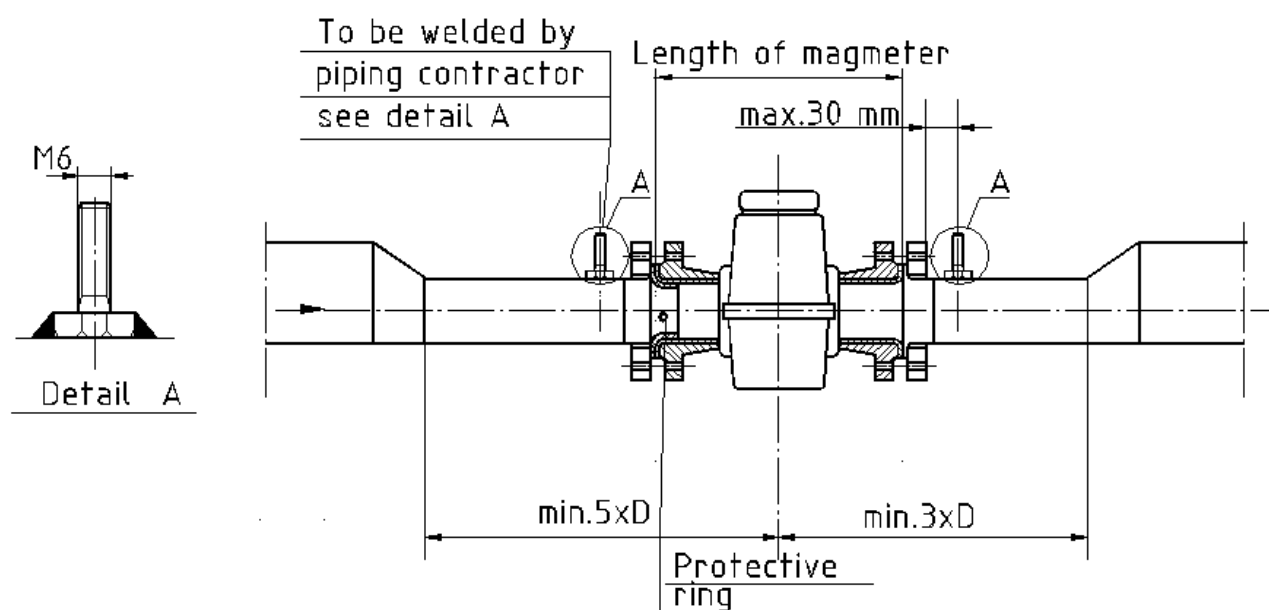
Name, size, Number of standard.

Example: Installation of Automatic Valve, DN 150, 635-410

PIPING STANDARD 635-510 - INSTRUMENTATION CONNECTIONS - INSTALLATION OF PROTECTIVE RING AND STRAIGHT RUNS FOR MAGMETER

1 GENERAL

Standard system for installation of all magnetic flow transmitters. Straight inlet/outlet runs are made according attached table.



1) Dimensions and materials according to the pipe class of the pipe line

2 DESIGNATION

Name, size, Number of standard.

Example: Installation of magmeter, DN 150, 635-510

3 REMARK

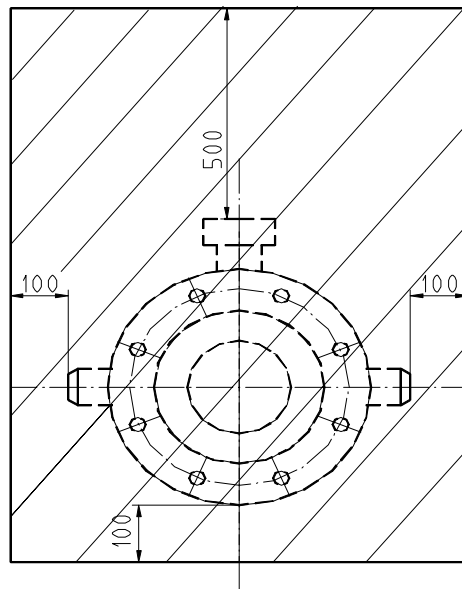
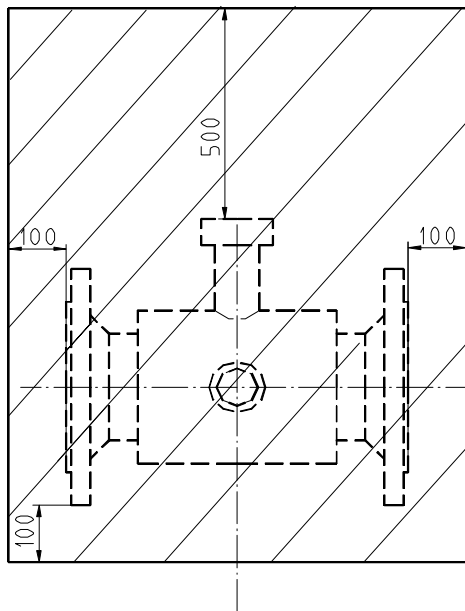
Straight runs to be arranged before and after the magmeter according to manufacturers instructions. No gaskets against magmeter. Torque forces shall be followed. **DO NOT BREAK PTFE LINING!** when protective ring is not used.

Between protective ring and pipe collar shall be a gasket that is suitable for magmeter's torque forces.

Protective ring restricts the wearing of PTFE lining in the flow tube. It shall be used for abrasive medias like pulp slurry, liquors etc.

Magmeter shall not be insulated.

4 SPACE RESERVATIONS



SUPPORT STANDARDS FOR PIPING

6 SUPPORT STANDARDS FOR PIPING

PIPING STANDARD 390-010 - SUPPORT STANDARDS FOR PIPING - LIST OF SUPPORT STANDARDS

Primary Supports must comply with requirements of PED and EN13480. Requirements for Engineering are presented in the standard EN 13480-3 /section 13. Requirements for Manufacturing and installation are presented in the standard EN13480-4 / section 5. Requirements for documentation are presented in the Annex N of standard EN13480-3.

The primary support parts that are connected to the pipe (for example clamp) shall be same material grade as the pipe. Body of primary supports shall be painted carbon steel.

Secondary steel material shall be similar as the material of steel structure in which the secondary steel is connected.

Recommendation is to follow dimensions, allowable loads and instructions of PSK Handbook 8 "Pipe Supporting".

Also other supporting systems (e.g. commonly known primary support Manufacturer's catalogs) can be accepted in the project. In those cases, Supplier shall propose supporting system for Purchaser's approval.

PIPING STANDARD 391-010 - SUPPORT STANDARDS FOR PIPING – SECONDARY PROFILES

Rectangular hollow section RHS steel profiles shall primarily be used as material for the secondary supports. Open section ends shall be closed by welding with metal plates thickness 3-5mm.

RHS profiles	EN 10219-2	S355J2H EN 10219-1
RHS	50x 50x4	
RHS	80 x 80 x 4	
RHS	100x 50x4	
RHS	100x100x5	
RHS	120x80x5	
RHS	150x100x5	
RHS	150x150x5	
RHS	160x80x5	
RHS	200x100x5	
RHS	200x100x8	
RHS	200x200x8	
L bar	EN 10056	S235JRG2
L 50 × 5		
L 70 × 7		
L 100 × 10		
U channel	EN 10365	S235JRG2 EN10025-2
U 50 x 38		
U 80 × 45		
U 100 × 50		
U 140 × 60		
U 160 × 65		
U 200 × 75		
I and H sections	EN 10365	S235JRG2 EN10025-2
IPE 160		
IPE 200		
IPE 300		
HE 100 B		
HE 120 B		
HE 160 B		
HE 200 B		
HE 240 B		
HE 300 B		
Flat bar	EN 10025	S235JRG2
5 × 30		
5 x 50		
6 × 60		

Attachment plate	EN 10025	S235JRG2
8 x 150 x 150		
10 x 200 x 200		
12 x 250 x 250		
16 x 300 x 300		
16 x 400 x 400		
8 x 100 x 150		
10 x 100 x 200		
12 x 150 x 150		
16 x 200 x 300		
Plate	EN 10029	S235JRG2
PL 10		
PL 16		
PL 20		
Threaded rod	EN 10277	S235JRG2
M 10		
M 12		
M 16		
M 20		
M 24		
Chemical anchor		
M10		
M12		
M16		
M20		