

CONSTRUCTION & TECHNICAL CHARACTERISTICS**FOR PIPES, COUPLINGS, JOINTS AND FITTINGS****fiberSol[®] - FiberMarine CATALOGUE**

PROJECT :	
PROJECT No. :	
DOCUMENT No. :	

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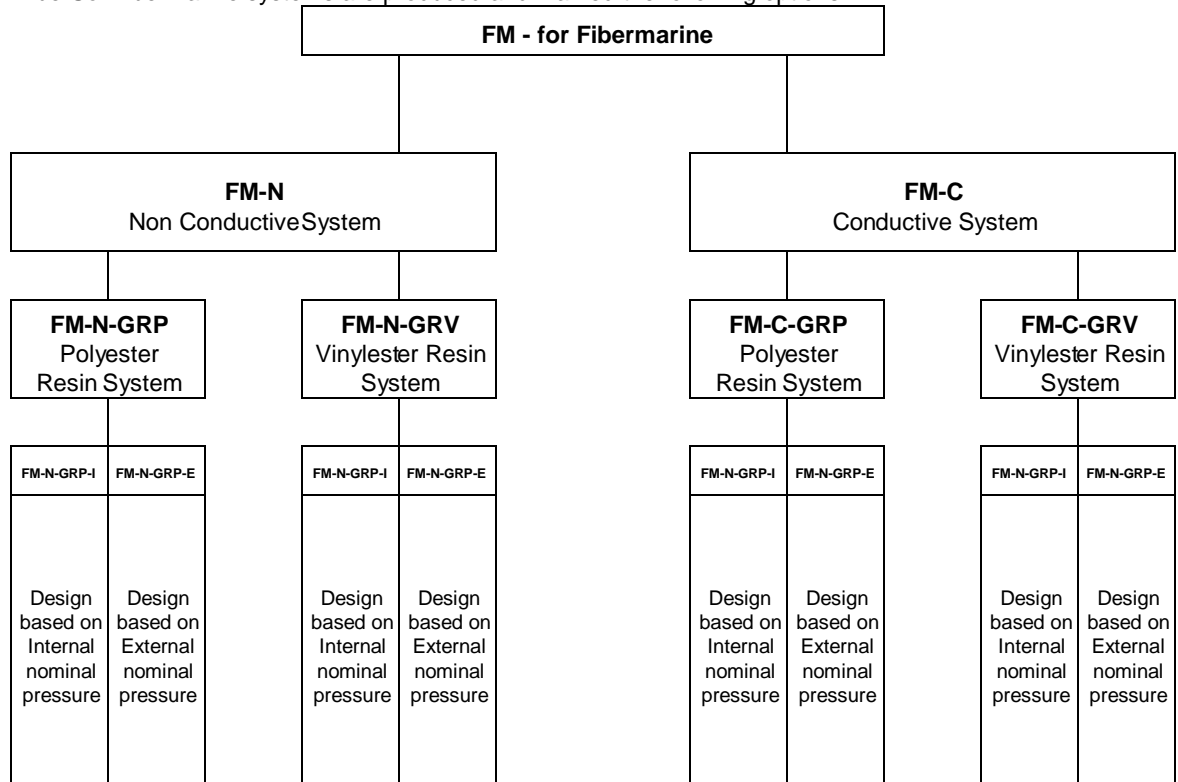
FiberSol Fibermarine systems are the best choice for piping systems on board of ships.

Due to extremely corrosive environment metallic pipes are not suitable and because of this in the past 30 years more and more systems on board are designed and installed with GRP systems.

The following systems are suitable for our Fibermarine piping (all approved by IMO):

- ballast system
- bilge system
- scrubber system
- seawater cooling systems
- fuel lines
- inert gas
- crude oil cargo systems
- tank cleaning systems
- refrigerated cargo cooling systems
- Water and Black water lines
- Swimming pool drainage lines
- fire resistant piping systems in acc. with IMO Res. 753 (18) L3 class.

FiberSol Fibermarine systems are produced and marked the following options:



Example of two Piping System marking:

1. FM-C-GRP-E (KP Fibermarine System resistant to 4 bar external pressure - conductive)
2. FM-GRV-I (KP Fibermarine System resistant to 10/16 bar internal pressure)

FiberSol Fibermarine systems are basically designed only for two different conditions:

- Full vacuum and internal Pressure of 10/16 bar - this system is marked with letter "I" at the end of code.
- External pressure of 4 bar for Ballast Systems and other systems bellow water line. This system is marked with letter "E" at the end of code.

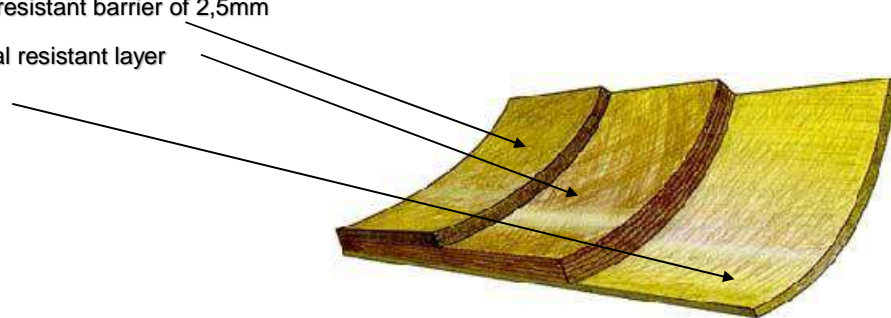
Next variations of Systems, where different resin is used:

- Polyester resin
- Polyester conductive resin
- Polyester L3 fire resistant resin
- Polyester abrasion resistant inner layer of 2,5mm
- Vinylester resin
- Vinylester conductive resin
- Vinylester L3 fire resistant resin
- Vinylester chemical and abrasion resistant inner layer of 2,5mm

All pipes are produced on computer controlled machines. Fittings are produced with hand lay-up technique.

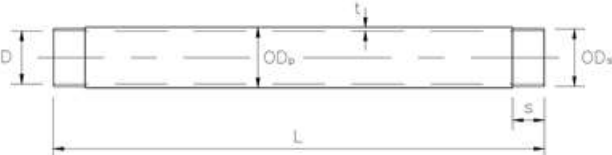
Wall thickness is produced in 3 layers:

1. Chemical resistant barrier of 2,5mm
2. Mechanical resistant layer
3. Top coat



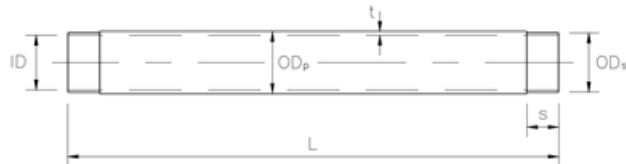
PIPING CODE	FM-GRV-I-PN10/16		FM-GRV-E-PE4	
INTERNAL PRESSURE CLASS	10/16	bar	10/16	
EXTERNAL PRESSURE CLASS	1	bar	4	
MAX DESIGN TEMPERATURE	95°	m	95°	
MAX PIPE SECTIONS LENGTH	12,0	m	12,0	
1. RESIN				
1.1 Liner Resin Type	Isophthalic / Vinylester		Isophthalic / Vinylester	
1.2 Mechanical Structure Resin Type	Isophthalic / Vinylester		Isophthalic / Vinylester	
2. PIPE & SLEEVE CONSTRUCTION CHARACTERISTICS				
2.1 Liner Type	Reinforced		Reinforced	
2.2 Liner Thickness	2,5	mm	2,5	
2.3 Top Layer Type	Reinforced		Reinforced	
2.4 Top Layer Thickness	0,2	mm	0,2	
2.5 Mechanical Structure Type	Filament winding		Filament winding	
3. PIPE MECHANICAL CHARACTERISTICS				
3.1 Allowable Hoop Tensile Strength	56,3	MPa	56,3	
3.2 Allowable Longitudinal Tensile Strength	28,1	MPa	28,1	
3.3 Hoop Modulus of Elasticity	22.500	MPa	22.500	
3.4 Longitudinal Modulus of Elasticity	11.250	MPa	11.150	
3.5 Allowable strain	0,0017	mm/mm	0,0017	
3.6 Thermal Expansion	1,8 E-6	mm/mm°C	1,8 E-6	
3.7 Pipe Specific Weight	1,850	kg/m³	1,850	
3.8 Safety factor	6			
4. FITTINGS CHARACTERISTICS				
4.1 Allowable Hoop Tensile Strength	28,1	MPa	28,1	
4.2 Allowable Longitudinal Tensile Strength	28,1	MPa	28,1	
4.3 Hoop Modulus of Elasticity	11.250	MPa	11.250	
4.4 Longitudinal Modulus of Elasticity	11.250	MPa	11.250	
4.5 Allowable Shear Strength for lamination	0,6	MPa	0,6	
4.6 Allowable strain	0,0017	mm/mm	0,0017	
4.7 Allowable shear strength for bonding	2,5	MPa	2,5	
4.8 Thermal Expansion	2,5 E-6	mm/mm°C	2,5 E-6	
4.9 Fittings Specific Weight	1,65	kg/m³	1,65	
4.10 Safety factor	6			
5. RESIN / GLASS %				
5.1 Liner	90 / 10	%	90 / 10	
5.2 Pipes	70 / 30	%	70 / 30	
5.3 Fittings	50 / 50	%	50 / 50	
6. Roughness coefficient				
6.1 Hazen-William roughness coefficient C=150				
6.2 Manning roughness coefficient n=0,009				

PIPING CODE FM-GRV-I-PN10/16



ND [inch]	ND [mm]	ext.P [bar]	OD _p [mm]	OD _s [mm]	ID [mm]	t [mm]	L [m]	s [mm]	W [kg/m]	Note
1	25	1	33,0	32,8	25	4,0	6,0	25	0,7	
1,25	32	1	40,0	39,8	32	4,0	6,0	25	0,8	
1,5	40	1	48,0	47,8	40	4,0	6,0	25	1,0	
2	50	1	58,0	57,8	50	4,0	6,0	25	1,3	
2,5	65	1	73,0	72,8	65	4,0	6,0	25	1,6	
3	80	1	88,0	87,8	80	4,0	6,0	35	2,0	
4	100	1	108,8	108,6	100	4,4	6,0	40	2,7	
5	125	1	134,8	134,4	125	4,8	12,0	50	3,6	
6	150	1	160,6	160,4	150	5,3	12,0	50	4,8	
8	200	1	212,0	211,8	200	6,0	12,0	50	7,2	
10	250	1	263,6	263,4	250	6,8	12,0	65	10,1	
12	300	1	315,4	315,2	300	7,7	12,0	75	13,8	
14	350	1	367,2	367,0	350	8,6	12,0	90	17,9	
16	400	1	419,0	418,8	400	9,5	12,0	100	22,6	
18	450	1	470,6	470,6	450	10,3	12,0	115	27,6	
20	500	1	521,8	521,8	500	10,9	12,0	125	32,4	
24	600	1	625,4	625,2	600	12,7	12,0	125	45,2	
28	700	1	728,4	728,2	700	14,2	12,0	130	58,9	1
32	800	1	832,4	832,2	800	16,2	12,0	140	76,8	1
36	900	1	935,4	935,2	900	17,7	12,0	155	94,4	1
40	1000	1	1040,6	1040,4	1000	20,3	12,0	175	120,4	1

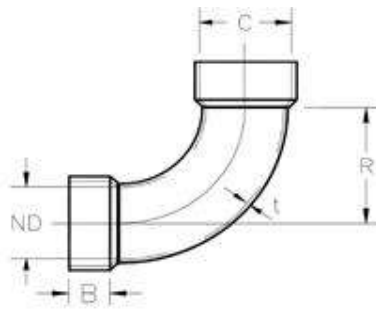
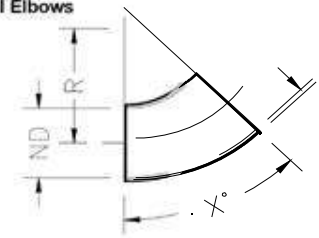
PIPING CODE FM-GRV-E-PE4



ND [inch]	ND [mm]	ext.P [bar]	OD _p [mm]	OD _s [mm]	ID [mm]	t [mm]	L [m]	s [mm]	W [kg/m]	Note
1	25	4	33,0	32,8	25	5,3	6,0	25	0,7	
1,25	32	4	40,0	39,8	32	5,3	6,0	25	0,8	
1,5	40	4	48,0	47,8	40	5,3	6,0	25	1,0	
2	50	4	58,0	57,8	50	5,3	6,0	25	1,3	
2,5	65	4	73,0	72,8	65	5,3	6,0	25	1,6	
3	80	4	88,0	87,8	80	5,3	6,0	35	2,0	
4	100	4	108,8	108,6	100	5,7	6,0	40	2,7	
5	125	4	135,4	135,2	125	6,5	12,0	50	3,9	
6	150	4	161,8	161,6	150	7,2	12,0	50	5,3	
8	200	4	215,0	214,8	200	8,8	12,0	50	9,0	
10	250	4	268,0	267,8	250	10,3	12,0	65	13,5	
12	300	4	321,2	321,0	300	11,9	12,0	75	19,1	
14	350	4	372,6	372,4	350	12,6	12,0	90	23,7	
16	400	4	425,8	425,6	400	14,2	12,0	100	31,0	
18	450	4	478,8	478,6	450	15,7	12,0	115	38,9	
20	500	4	532,0	531,8	500	17,3	12,0	125	48,0	
24	600	4	638,0	637,8	600	20,3	12,0	125	68,4	
28	700	4	744,2	744,0	700	23,4	12,0	130	92,7	1
32	800	4	850,4	850,2	800	26,5	12,0	140	120,9	1
36	900	4	956,2	956,0	900	29,4	12,0	155	151,6	1
40	1000	4	1062,2	1062,0	1000	32,4	12,0	175	186,2	1

Note - 1 : Length of glued joint is suitable for only 6 bar internal pressure and is supplied only on special demand.

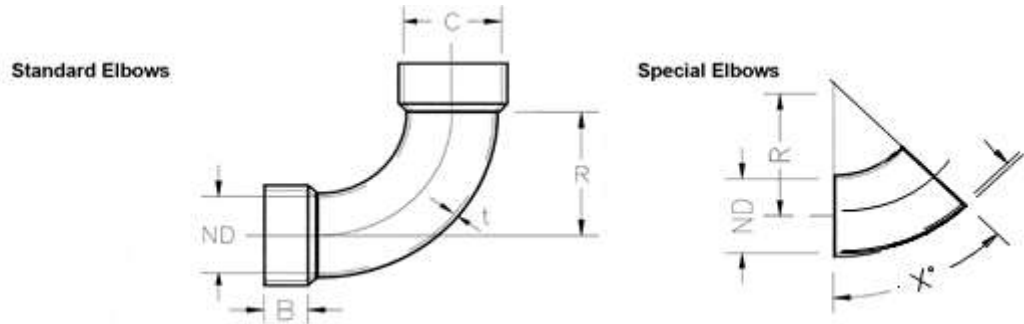
Note - 2 : Pipe thicknesses are calculated theoretically and are intended as minimum. with additives.
 Pipes produced during winter and classes which are conductive and fire resistant might have higher thicknesses because of additives in resin.

Standard Elbows

Special Elbows

PIPING CODE FM-GRV-I-PN10/16

ND [inch]	ND [mm]	ext.P [bar]	R 1 [mm]	R 1,5 [mm]	B [mm]	C [mm]	t [mm]	R1 [kg/p]	R1,5 [kg/p]	Note
1	25	1		37,5	25	33	4,5		0,09	1
1,25	32	1		48	25	40	4,5		0,12	1
1,5	40	1		60	25	48	4,5		0,16	1
2	50	1		75	25	58	4,9		0,25	1
2,5	65	1		97,5	25	73	4,9		0,38	1
3	80	1		120	35	88	4,9		0,58	1
4	100	1		150	40	108,8	4,9		0,87	1
5	125	1	125	187,5	50	134,6	6,5	1,37	1,8	
6	150	1	150	225	50	160,6	6,5	1,83	2,5	
8	200	1	200	300	50	212	8,1	3,72	5,1	
10	250	1	250	375	65	263,6	9,7	7,02	9,6	
12	300	1	300	450	75	315,4	11,3	11,64	16,0	
14	350	1	350	525	90	367,2	11,6	16,3	22,4	
16	400	1	400	600	100	419	12,9	23,47	32,3	
18	450	1	450	675	115	470,6	14,5	33,57	46,1	
20	500	1	500	750	125	521,8	16,1	45,73	62,9	
24	600	1	600	900			19,3	59,278	88,9	
28	700	1	700	1050			22,7	94,922	142,4	
32	800	1	800	1200			25,4	138,63	208,0	
36	900	1	900	1350			28,4	196,15	294,2	
40	1000	1	1000	1500			31,4	267,7	401,5	

Note - 1 : Small diameter Elbows are available only with Radius R-1,5

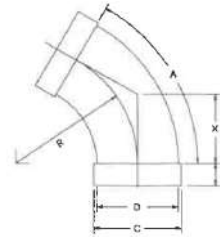
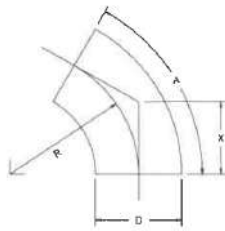
Note - 2 : Special execution Elbows with 11,25° / 22,5° / 30° / 60° are produced on demand.


PIPING CODE FM-GRV-E-PE4

ND [inch]	ND [mm]	ext.P [bar]	R 1 [mm]	R 1,5 [mm]	B [mm]	C [mm]	t [mm]	R1 [kg/p]	R1,5 [kg/p]	Note
1	25	4		37,5	25	32,8	5		0,10	1
1,25	32	4		48	25	39,8	5		0,13	1
1,5	40	4		60	25	47,8	5		0,18	1
2	50	4		75	25	57,8	5		0,25	1
2,5	65	4		97,5	25	72,8	5		0,38	1
3	80	4		120	35	87,8	5		0,59	1
4	100	4		150	40	108,6	5,6		1,00	1
5	125	4	125	187,5	50	135,2	6,3	1,3	1,8	
6	150	4	150	225	50	161,6	7,7	2,2	2,9	
8	200	4	200	300	50	214,8	9	4,2	5,7	
10	250	4	250	375	65	267,8	11,7	8,6	11,7	
12	300	4	300	450	75	321	13,1	13,6	18,7	
14	350	4	350	525	90	372,4	14,4	20,5	28,0	
16	400	4	400	600	100	425,6	17,1	31,5	43,3	
18	450	4	450	675	115	478,6	18,5	43,4	59,5	
20	500	4	500	750	125	531,8	19,8	56,9	78,2	
24	600	4	600	900			23,8	73,6	110,4	
28	700	4	700	1050			27,9	117,5	176,3	
32	800	4	800	1200			31,9	175,5	263,2	
36	900	4	900	1350			35,4	246,3	369,5	
40	1000	4	1000	1500			39,1	335,8	503,7	

Note - 1 : Small diameter Elbows are available only with Radius R-1,5

Note - 2 : Special execution Elbows with 11,25° / 22,5° / 30° / 60° are produced on demand.

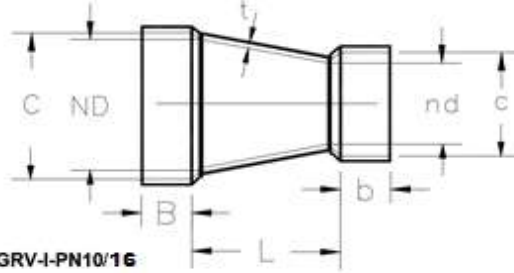
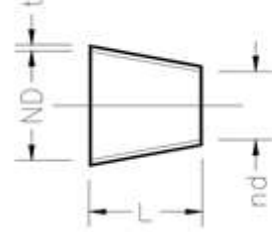


D [mm]	B [mm]	C [mm]	R 1 [mm]
125	50	134,6	125
150	50	160,6	150
200	50	212	200
250	65	263,6	250
300	75	315,4	300
350	90	367,2	350
400	100	419	400
450	115	470,6	450
500	125	521,8	500
600			600
700			700
800			800
900			900
1000			1000

Elbow Radius [°]					
11,25	22,5	30	45	60	90
X [mm]					
12	25	33	52	72	125
15	30	40	62	87	150
20	40	54	83	115	200
25	50	67	104	144	250
30	60	80	124	173	300
34	70	94	145	202	350
39	80	107	166	231	400
44	90	121	186	260	450
49	99	134	207	289	500
59	119	161	249	346	600
69	139	188	290	404	700
79	159	214	331	462	800
89	179	241	373	520	900
98	199	268	414	577	1000

D [mm]	B [mm]	C [mm]	R 1,5 [mm]
25	25	33	37,5
32	25	40	48
40	25	48	60
50	25	58	75
65	25	73	97,5
80	35	88	120
100	40	108,8	150
125	50	134,6	187,5
150	50	160,6	225
200	50	212	300
250	65	263,6	375
300	75	315,4	450
350	90	367,2	525
400	100	419	600
450	115	470,6	675
500	125	521,8	750
600			900
700			1050
800			1200
900			1350
1000			1500

Elbow Radius [°]					
11,25	22,5	30	45	60	90
X [mm]					
4	7	10	16	22	37,5
5	10	13	20	28	48
6	12	16	25	35	60
7	15	20	31	43	75
10	19	26	40	56	97,5
12	24	32	50	69	120
15	30	40	62	87	150
18	37	50	78	108	188
22	45	60	93	130	225
30	60	80	124	173	300
37	75	100	155	217	375
44	90	121	186	260	450
52	104	141	217	303	525
59	119	161	249	346	600
66	134	181	280	390	675
74	149	201	311	433	750
89	179	241	373	520	900
103	209	281	435	606	1050
118	239	322	497	693	1200
133	269	362	559	779	1350
148	298	402	621	866	1500

Standard Reducers

Special Reducer

PIPING CODE FM-GRV-I-PN10/16
PIPING CODE FM-GRV-I-PN10/16

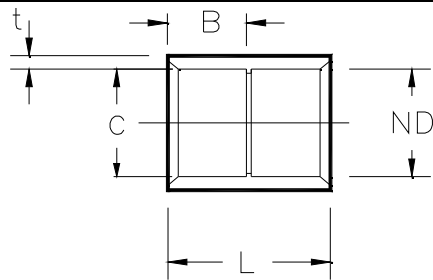
ND [mm]	nd [mm]	int.P [bar]	ext.P [bar]	L - L [mm]	C [mm]	c [mm]	B [mm]	b [mm]	t [mm]	Weight L-L
32	25	10	1	18	40	33	25	25	4,5	0,06
40	32	10	1	20	48	40	25	25	4,5	0,07
50	40	10	1	25	58	48	25	25	4,9	0,10
65	50	10	1	38	73	58	25	25	4,9	0,15
80	65	10	1	38	88	73	35	25	4,9	0,21
100	80	10	1	50	108,8	88	40	35	4,9	0,32
125	100	10	1	63	134,6	108,8	50	40	6,5	0,64
150	125	10	1	63	160,6	134,6	50	50	6,5	0,83
200	150	10	1	125	212	160,6	50	50	8,1	1,78
250	200	10	1	125	263,6	212	65	50	9,7	2,94
300	250	10	1	125	315,4	263,6	75	65	11,3	4,61
350	300	10	1	125	367,2	315,4	90	75	11,6	6,11
400	350	10	1	125	419	367,2	100	90	12,9	8,50
450	400	10	1	125	470,6	419	115	100	14,5	11,70
500	450	10	1	125	521,8	470,6	125	115	16,1	15,57
600	500	10	1	250					19,3	14,25
700	600	10	1	250					22,7	19,81
800	700	10	1	250					25,4	25,58
900	800	10	1	250					28,4	32,41
1000	900	10	1	250					31,4	40,05

PIPING CODE FM-GRV-E-PE4

ND [mm]	nd [mm]	int.P [bar]	ext.P [bar]	L - L [mm]	C [mm]	c [mm]	B [mm]	b [mm]	t [mm]	Weight L-L
40	25	10	4	38	48	33	25	25	5	0,07
40	32	10	4	20	48	40	25	25	5	0,08
50	40	10	4	25	58	48	25	25	5	0,11
65	50	10	4	38	73	58	25	25	5	0,15
80	65	10	4	38	88	73	35	25	5	0,21
100	80	10	4	50	108,8	88	40	35	5,6	0,37
125	100	10	4	63	135,4	108,8	50	40	6,3	0,62
150	125	10	4	63	161,8	135,4	50	50	7,7	0,98
200	150	10	4	125	215	161,8	50	50	9	1,98
250	200	10	4	125	268	215	65	50	11,7	13,73
300	250	10	4	125	321,2	268	75	65	13,1	5,36
350	300	10	4	125	372,6	321,2	90	75	14,4	7,62
400	350	10	4	125	425,8	372,6	100	90	17,1	11,34
450	400	10	4	125	478,8	425,8	115	100	18,5	15,01
500	450	10	4	125	532	478,8	125	115	19,8	19,24
600	500	10	4	250					23,8	17,58
700	600	10	4	250					27,9	24,35
800	700	10	4	250					31,9	32,13
900	800	10	4	250					35,4	40,40
1000	900	10	4	250					39,1	49,88

Note - 1 : Longer reducers or reducers for example ND500 x nd250 are available and produced based on project requirement.

Note - 2 : "L - L" stand for standard long reducer
 $L - L = (ND - nd) \times 2,5$ (angle of 22,6 degrees)

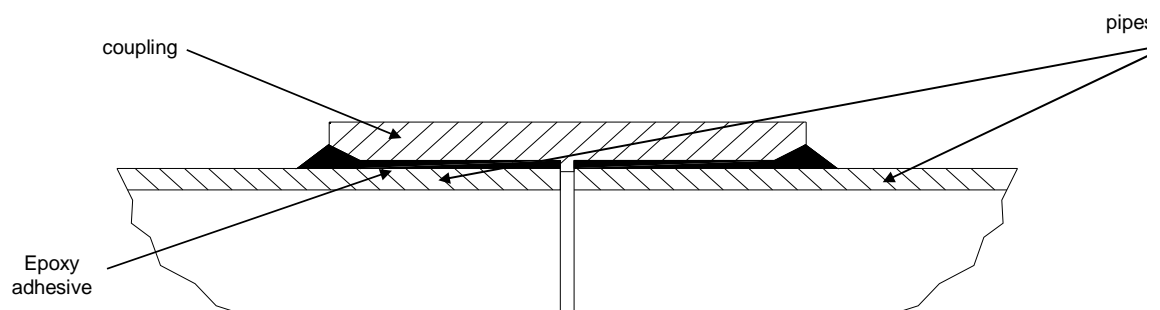


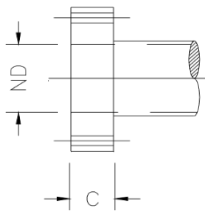
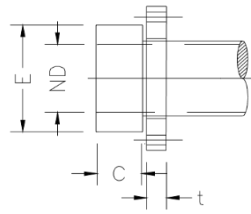
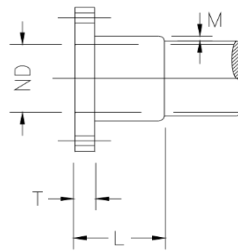
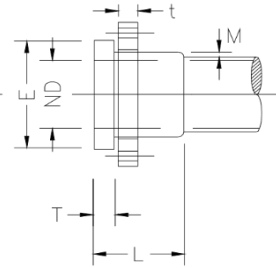
PIPING CODE FM-GRV-I-PN10/16
PIPING CODE FM-GRV-E-PE4

ND [inch]	ND [mm]	ext.P [bar]	L [mm]	OD [mm]	B [mm]	C [mm]	t [mm]	W [kg/p]	Note
1	25	4	55	42,0	25	33,0	4,5	0,05	
1,25	32	4	55	49,0	25	40,0	4,5	0,06	
1,5	40	4	55	57,0	25	48,0	4,5	0,08	
2	50	4	55	67,8	25	58,0	4,9	0,1	
2,5	65	4	55	82,8	25	73,0	4,9	0,12	
3	80	4	75	97,8	35	88,0	4,9	0,2	
4	100	4	85	118,6	40	108,8	4,9	0,28	
5	125	4	105	147,6	50	134,6	6,5	0,56	
6	150	4	105	173,6	50	160,6	6,5	0,66	
8	200	4	105	228,2	50	212,0	8,1	1,09	
10	250	4	135	283,0	65	263,6	9,7	2,08	
12	300	4	155	338,0	75	315,4	11,3	3,33	
14	350	4	185	390,4	90	367,2	11,6	4,72	
16	400	4	205	444,8	100	419,0	12,9	6,64	
18	450	4	235	499,6	115	470,6	14,5	9,61	
20	500	4	255	554,0	125	521,8	16,1	12,83	

Note - 1 : Coupling is intended for axially restrained joint. Connection / sealing between pipe and coupling is done by special adhesive kit which bond two surfaces together.

Note - 2 : Bellow is sketch of glued joint.



HDF FIXED FLANGE

HSE STUB END

LFF FIXED FLANGE

LSE STUB END


PIPING CODE FM-GRV-I-PN10
PIPING CODE FM-GRV-E-PE4

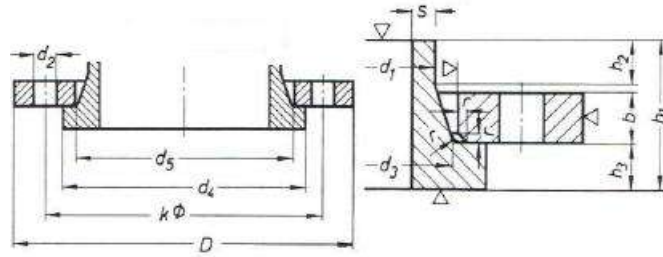
ND [inch]	ND [mm]	ext.P [bar]	C [mm]	T [mm]	L [mm]	M [mm]	E [mm]	HDF [kg/p]	LFF [kg/p]	HSE [kg/p]	LSE [kg/p]
1	25	4	40	18	70	4,5	69	0,7		0,2	
1,25	32	4	40	18	70	4,5	80	1,0		0,3	
1,5	40	4	40	20	80	4,5	90	1,1		0,3	
2	50	4	40	20	80	4,9	105	1,3		0,5	
2,5	65	4	40	20	80	4,9	125	1,5		0,6	
3	80	4	40	20	80	4,9	140	1,7		0,7	
4	100	4	55	23	80	4,9	160	2,8		1,1	
5	125	4	55	24	90	4,9	190	3,4		1,5	
6	150	4	55	25	100	6,5	216	4,2		1,7	
8	200	4	55	30	112	6,5	271	5,4		2,3	
10	250	4	75	35	128	8,1	327	8,9		4,1	
12	300	4	75	40	135	9,7	376	10,2		4,6	
14	350	4	95	41	140	9,7	438	15,7		7,7	
16	400	4	105	44	145	11,3	486	20,5		9,4	
18	450	4	115	44	160	12,9	536	24,3		11,1	
20	500	4	125	47	175	14,5	591	30,0		14,2	
24	600	4		53	205	18,1	693		22,2		14,5
28	700	4		61	240	17,7	808		62,5		52,4
32	800	4		67	270	20,9	914		88,5		73,6
36	900	4		70	300	23,6	1014		111,7		94,7
40	1000	4		78	335	26,0	1121		151,5		128,9

PIPING CODE FM-GRV-I-PN16
PIPING CODE FM-GRV-E-PE4

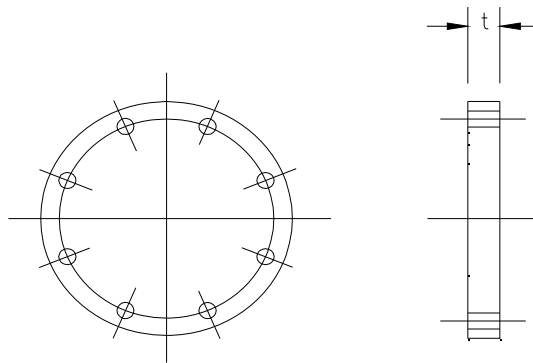
ND [inch]	ND [mm]	ext.P [bar]	C [mm]	T [mm]	L [mm]	M [mm]	E [mm]	HDF [kg/p]	LFF [kg/p]	HSE [kg/p]	LSE [kg/p]
1	25	4	40	18	80	5,1	68	0,7		0,2	
1,25	32	4	40	18	80	5,1	80	1,0		0,3	
1,5	40	4	40	20	80	5,8	90	1,1		0,3	
2	50	4	40	20	90	5,8	105	1,3		0,5	
2,5	65	4	40	23	90	6,8	125	1,5		0,6	
3	80	4	40	23	100	6,8	140	1,7		0,7	
4	100	4	55	28	105	8,4	160	2,8		1,1	
5	125	4	55	30	112	9,1	190	3,4		1,4	
6	150	4	55	31	120	9,4	216	4,1		1,7	
8	200	4	55	36	148	11,1	271	5,1		2,2	
10	250	4	75	41	160	12,7	327	9,3		3,9	
12	300	4	75	48	175	15,0	382	11,1		4,7	
14	350	4	95	50	195	15,7	441	16,9		7,8	
16	400	4	105	55	215	17,3	492	21,8		9,4	
18	450	4	115	55	235	17,3	552	27,5		12,8	
20	500	4	125	60	260	19,0	614	38,0		17,3	
24	600	4		66	305	21,0	731		40,7		28,0
28	700	4		76	355	24,3	801		79,7		64,1
32	800	4		85	405	27,2	908		113,4		92,2
36	900	4		100	450	32,2	1007		160,9		133,4
40	1000	4		110	500	35,5	1124		220,8		182,8

Note - 1 : The external diameter (dimension E) depend on pressure class and flange drilling standard.

PN6 – ref. DIN2501					PN10 – ref. DIN2501					PN16 – ref. DIN2501				
DN (mm)	OD (mm)	f	d	N°	OD (mm)	f	d	N°	OD (mm)	f	d	N°		
		(mm)	(mm)			(mm)	(mm)			(mm)	(mm)			
25	100	75	11	4	115	85	14	4	115	85	14	4		
32	120	90	14	4	140	100	18	4	140	100	18	4		
40	130	100	14	4	150	110	18	4	150	110	18	4		
50	140	110	14	4	165	125	18	4	165	125	18	4		
65	160	130	14	4	185	145	18	4	185	145	18	4		
80	190	150	18	4	200	160	18	8	200	160	18	8		
100	210	170	18	4	220	180	18	8	220	180	18	8		
125	240	200	18	8	250	210	18	8	250	210	18	8		
150	265	225	18	8	285	240	22	8	285	240	22	8		
200	320	280	18	8	340	295	22	8	340	295	22	12		
250	375	335	18	12	395	350	22	12	405	355	26	12		
300	440	395	22	12	445	400	22	12	460	410	26	12		
350	490	445	22	12	505	460	22	16	520	470	26	16		
400	540	495	22	16	565	515	26	16	580	525	30	16		
450	595	550	22	16	615	565	26	20	640	585	30	20		
500	645	600	22	20	670	620	26	20	715	650	33	20		
600	755	705	26	20	780	725	30	20	840	770	36	20		
700	860	810	26	24	895	840	30	24	910	840	36	24		
800	975	920	30	24	1015	950	33	24	1025	950	39	24		
900	1075	980	30	24	1115	1050	33	28	1125	1050	39	28		
1000	1175	1080	30	28	1230	1160	36	28	1255	1170	42	28		



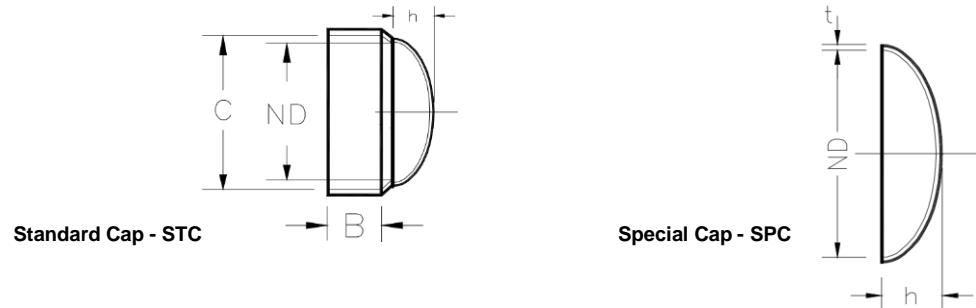
ND [inch]	ND [mm]	ND [bar]	b	d5	D (mm)	k (mm)	d2 (mm)	No	W [kg/p]
1	25	10	16	33,7	115	85	14	4	1,0
1,25	32	10	16	42,4	140	100	18	4	1,5
1,5	40	10	16	48,3	150	110	18	4	1,7
2	50	10	16	60,3	165	125	18	4	2,0
2,5	65	10	16	76,1	185	145	18	4	2,4
3	80	10	18	88,9	200	160	18	8	3,0
4	100	10	18	114,3	220	180	18	8	3,3
5	125	10	18	139,7	250	210	18	8	4,5
6	150	10	18	168,3	285	240	22	8	6,1
8	200	10	20	219,1	340	295	22	8	8,6
10	250	10	22	273,0	395	350	22	12	11,2
12	300	10	26	323,9	445	400	22	12	12,5
14	350	10	28	375,0	505	460	22	16	17,1
16	400	10	32	430,0	565	515	26	16	22,4
20	500	10	38	535,0	670	620	26	20	32,5
24	600	10	44	667	780	725	30	20	47,2
28	700	10	50	775	895	840	30	24	67,6
32	800	10	56	883	1015	950	33	24	97,0
36	900	10	62	988	1115	1050	33	28	117,0
40	1000	10	68	1099	1230	1160	36	28	152,0


PIPING CODE FM-GRV-I-PN10/16
PIPING CODE FM-GRV-E-PE4

ND [inch]	ND [mm]	int.P [bar]	ext.P [bar]	t [mm]	W [kg/p]	Note
1	25	10	4	18	0,3	
1,25	32	10	4	18	0,5	
1,5	40	10	4	20	0,7	
2	50	10	4	20	0,8	
2,5	65	10	4	20	0,8	
3	80	10	4	20	1,2	
4	100	10	4	23	1,6	
5	125	10	4	24	2,2	
6	150	10	4	25	3	
8	200	10	4	30	5	
10	250	10	4	35	7,9	
12	300	10	4	40	11,5	
14	350	10	4	41	15,2	
16	400	10	4	44	20,4	
18	450	10	4	44	24,2	
20	500	10	4	47	30,7	
24	600	10	4	53	46,9	
28	700	10	4	61	71	
32	800	10	4	67	100,3	
36	900	10	4	75	135,5	
40	1000	10	4	90	197,8	

Note - 1 : The external diameter and the drilling depend on pressure class and flange drilling standard.

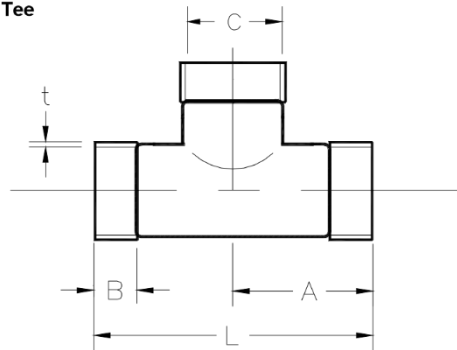
Note - 2 : The weight of blind flange is calculated on PN10 class and can vary slightly in base on different pressure class and flange drilling standard.


PIPING CODE FM-GRV-I-PN10/16

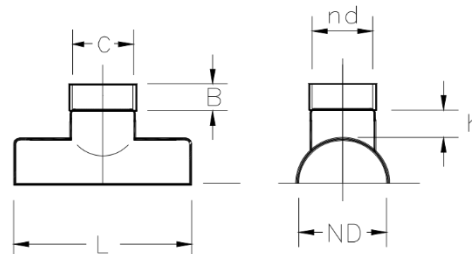
ND [inch]	ND [mm]	ext.P [bar]	h [mm]	B [mm]	C [mm]	t [mm]	STC [kg/p]	SPC [kg/p]	Note
1	25	1	6	25	33,0	4,5	0,02	0,01	
1,25	32	1	8	25	40,0	4,5	0,03	0,01	
1,5	40	1	10	25	48,0	4,5	0,04	0,01	
2	50	1	13	25	58,0	4,9	0,10	0,02	
2,5	65	1	16	25	73,0	4,9	0,10	0,04	
3	80	1	20	35	88,0	4,9	0,20	0,10	
4	100	1	25	40	108,8	4,9	0,30	0,10	
5	125	1	31	50	134,6	6,5	0,60	0,20	
6	150	1	38	50	160,6	6,5	0,90	0,30	
8	200	1	50	50	212,0	8,1	1,90	0,60	
10	250	1	63	65	263,6	9,7	3,50	1,20	
12	300	1	75	75	315,4	11,3	5,90	2,00	
14	350	1	88	90	367,2	11,6	8,30	2,80	
16	400	1	100	100	419,0	12,9	12,00	4,00	
18	450	1	113	115	470,6	14,5	17,10	5,70	
20	500	1	125	125	521,8	16,1	23,50	7,80	
24	600	1	150			19,3	40,50	13,50	
28	700	1	175			22,7	64,90	21,60	
32	800	1	200			25,4	94,80	31,60	
36	900	1	225			28,4	134,30	44,80	
40	1000	1	250			31,4	183,40	61,10	

PIPING CODE FM-GRV-E-PE4

ND [inch]	ND [mm]	ext.P [bar]	h [mm]	B [mm]	C [mm]	t [mm]	STC [kg/p]	SPC [kg/p]	Note
1	25	4	6	25	33,0	5,0	0,02	0,01	
1,25	32	4	8	25	40,0	5,0	0,03	0,01	
1,5	40	4	10	25	48,0	5,0	0,05	0,02	
2	50	4	13	25	58,0	5,0	0,07	0,02	
2,5	65	4	16	25	73,0	5,0	0,12	0,04	
3	80	4	20	35	88,0	5,0	0,19	0,06	
4	100	4	25	40	108,8	5,6	0,33	0,11	
5	125	4	31	50	135,4	6,3	0,57	0,19	
6	150	4	38	50	161,8	7,7	1,01	0,34	
8	200	4	50	50	215,0	9,0	2,10	0,70	
10	250	4	63	65	268,0	11,7	4,26	1,42	
12	300	4	75	75	321,2	13,1	6,88	2,29	
14	350	4	88	90	372,6	14,4	10,29	3,43	
16	400	4	100	100	425,8	17,1	15,96	5,32	
18	450	4	113	115	478,8	18,5	21,85	7,28	
20	500	4	125	125	532,0	19,8	28,87	9,62	
24	600	4	150			23,8	49,96	16,65	
28	700	4	175			27,9	79,72	26,57	
32	800	4	200			31,9	119,06	39,69	
36	900	4	225			35,4	167,06	55,69	
40	1000	4	250			39,1	228,26	76,09	

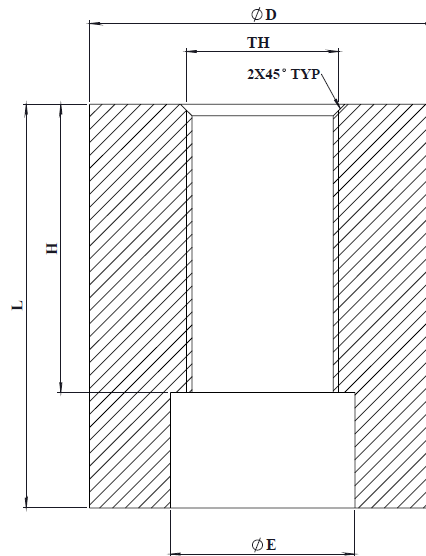
Moulded Tee


ND [inch]	ND [mm]	ext.P [bar]	L [mm]	A [mm]	B [mm]	C [mm]	t [mm]	W [kg/p]	Note
1	25	1	126	63	25	33	4,5	0,1	
1,25	32	1	132	66	25	40	4,5	0,2	
1,5	40	1	140	70	25	48	4,5	0,2	
2	50	1	150	75	25	58	4,9	0,4	
2,5	65	1	166	83	25	73	4,9	0,5	
3	80	1	180	90	25	88	4,9	0,7	
4	100	1	240	120	35	109	4,9	1,1	
5	125	1	286	143	40	135	4,9	1,6	
6	150	1	350	175	50	161	6,5	3,1	
8	200	1	400	200	50	212	6,5	4,7	
10	250	1	450	225	50	264	8,1	8,2	
12	300	1	560	280	65	315	9,7	14,7	
14	350	1	650	325	75	367	9,7	19,8	
16	400	1	760	380	90	419	11,3	30,8	
18	450	1	850	425	100	471	12,9	44,2	
20	500	1	960	480	115	522	14,5	62,4	

Saddle Tee


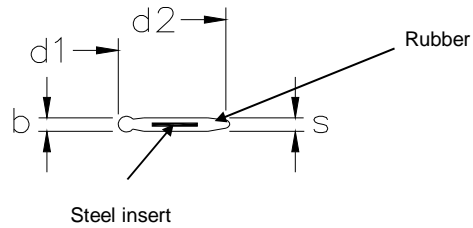
ND [inch]	ND [mm]	ext.P [bar]	L [mm]	h [mm]	B [mm]	C [mm]	t [mm]	W [kg/p]	Note
1	25	1	75	50	25	33	4,5	0,1	
1,25	32	1	96	50	25	40	4,5	0,1	
1,5	40	1	120	50	25	48	4,5	0,2	
2	50	1	150	50	25	58	4,9	0,4	
2,5	65	1	163	50	25	73	4,9	0,5	
3	80	1	200	70	35	88	4,9	0,7	
4	100	1	250	80	40	109	4,9	1,1	
5	125	1	250	100	50	135	6,5	1,9	
6	150	1	300	100	50	161	6,5	2,7	
8	200	1	400	100	50	212	8,1	5,9	
10	250	1	500	130	65	264	9,7	11	
12	300	1	600	150	75	315	11,3	18,4	
14	350	1	700	180	90	367	11,6	25,6	
16	400	1	800	200	100	419	12,9	37,1	
18	450	1	900	230	115	471	14,5	52,8	
20	500	1	1000	250	125	522	16,1	72,4	

Note - 1 : Withe the order ND must be specified.

Nipples with internal thread


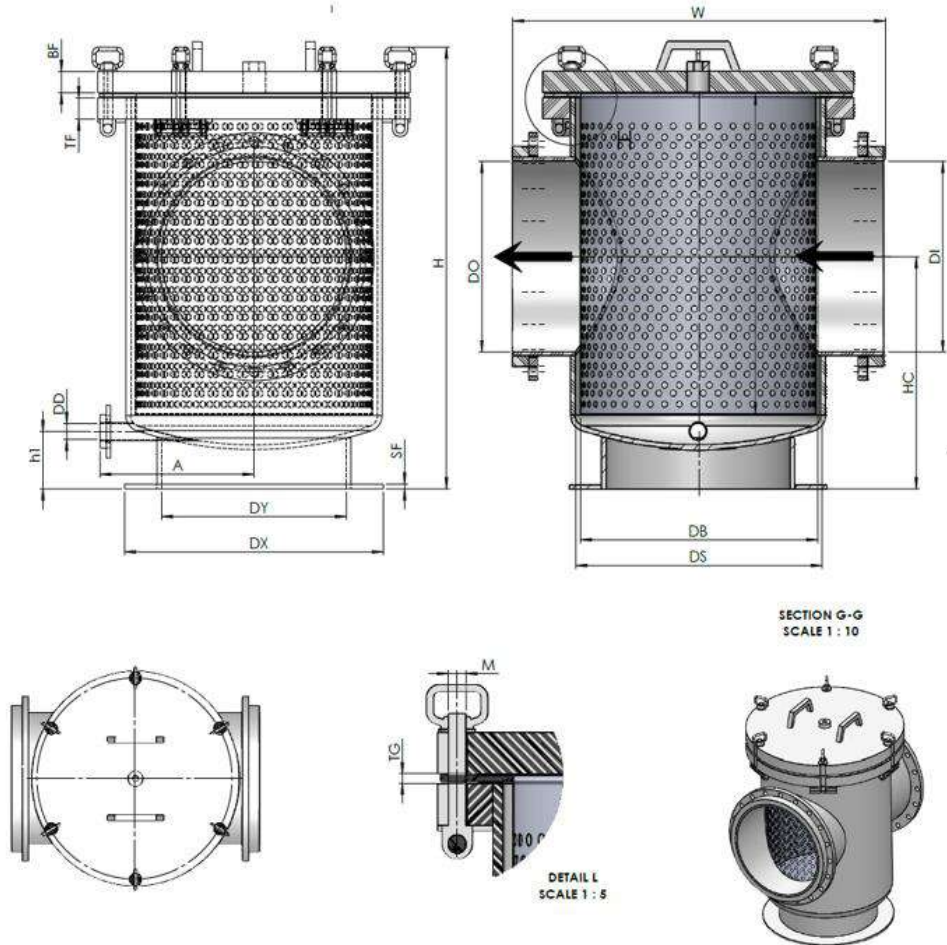
PIPING CODE FM-GRV-I-PN10/16
PIPING CODE FM-GRV-E-PE4

TH	D[mm]	L [mm]	E [mm]	H [mm]
G1/4"-19TPI	55	50	24	30
G3/8"-19TPI	55	50	24	30
G1/2"-14TPI	60	50	24	30
G3/4"-14TPI	60	70	32	50
G1"-11TPI	75	70	42	50
G1 1/4"-11TPI	85	70	56	50
G1 1/2"-11TPI	90	90	56	75
G2"-11TPI	100	90	63	75

Profile Flange EPDM gaskets


According EN 1514-1 Standard

ND [inch]	ND [mm]	d1 [mm]	d2 - 6 bar	d2 - 10 bar	d2 - 16 bar	s [mm]
1	25	34	71	71	71	4
1,25	32	43	76	82	82	4
1,5	40	49	92	92	92	4
2	50	61	96	107	107	4
2,5	65	77	116	127	127	4
3	80	89	132	142	142	4
4	100	115	152	162	162	5
5	125	141	182	192	192	5
6	150	169	207	218	218	5
8	200	220	262	273	273	6
10	250	273	317	328	329	6
12	300	324	373	378	384	6
14	350	356	423	438	444	7
16	400	407	473	489	495	7
18	450	458	528	539	555	7
20	500	508	578	594	617	7
24	600	610	679	695	734	7
28	700	712	784	810	804	8
32	800	813	890	917	911	8
36	900	915	990	1017	1011	8
40	1000	1016	1090	1124	1128	8

STRAINER TYPE H

Dimensional Data

DI [mm]	DO [mm]	DS [mm]	DB [mm]	DX [mm]	DY [mm]	DD [mm]	H [mm]	HC [mm]	h1 [mm]	SF [mm]	A [mm]	W [mm]	M x TG
200	200	500	460	500	300	32	775	440	42	15	350	775	M18 x 6
250	250	500	460	500	300	32	850	475	42	15	350	790	M18 x 6
300	300	600	560	600	400	32	880	485	50	15	400	910	M18 x 6
350	350	600	560	600	400	32	980	535	50	15	400	915	M18 x 7
400	400	700	650	700	500	32	1085	585	50	15	450	1040	M20 x 7
450	450	700	650	700	500	32	1095	590	50	15	450	1040	M20 x 7
500	500	800	750	800	600	50	1140	615	50	15	500	1170	M20 x 7
600	600	900	840	900	700	50	1320	700	50	15	550	1280	M24 x 7
700	700	900	840	900	700	50	1490	775	50	15	550	1300	M24 x 8
800	800	1000	940	1000	800	50	1665	865	50	15	600	1430	M26 x 8
900	900	1200	1.120	1200	1000	50	1860	965	50	15	700	1700	M26 x 8
1000	1000	1200	1.120	1200	1000	50	2030	1035	50	15	700	1700	M28 x 8

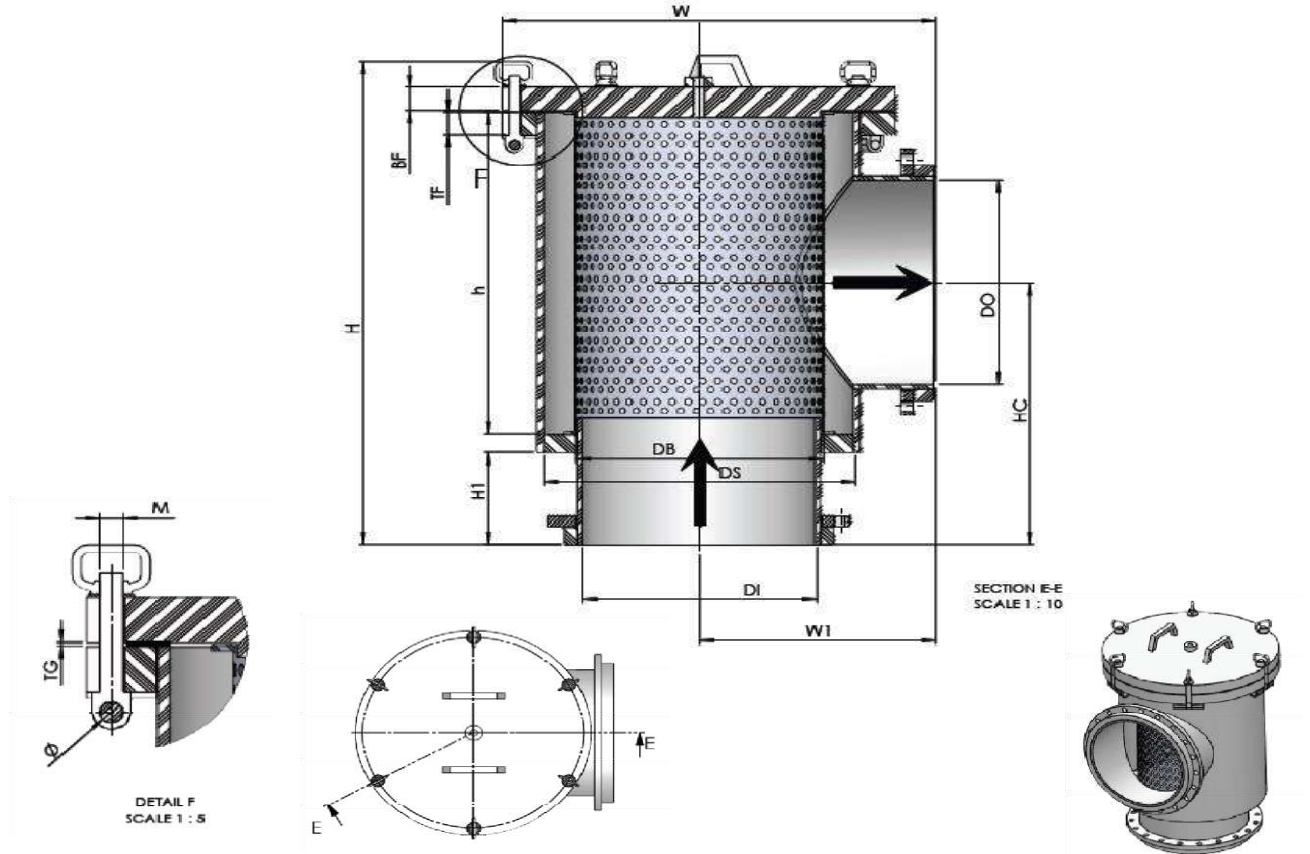
Flow Characteristics Data			Max capacity [m³/h]				Pressure drop Dp [bar]				Flange		
DI [mm]	DO [mm]	DS [mm]	1.5 m/s	2.0 m/s	2.5 m/s	3.0 m/s	1.5 m/s	2.0 m/s	2.5 m/s	3.0 m/s	TF [mm]	BF [mm]	Weight
200	200	500	169	223	292	360	0,02	0,04	0,04	0,09	47	47	113,2
250	250	500	266	360	450	540					47	47	125,2
300	300	600	382	504	630	756					53	53	184,4
350	350	600	522	720	882	1044					53	53	200,5
400	400	700	680	900	1134	1368					61	61	288,3
450	450	700	864	1152	1440	1728					61	61	308,1
500	500	800	1073	1440	1800	2160					67	67	428,5
600	600	900	1530	2088	2574	3060					75	75	580,6
700	700	900	2088	2772	3456	4140					75	75	671,3
800	800	1000	2700	3600	4500	5400					90	90	936,6
900	900	1200	3420	4680	5760	6840	90	90	1067,5				
1000	1000	1200	4266	5652	6966	8280	90	90	1238,9				

Note: 1 - Intake and Outfall diameters are selected by the customer and they could be also different. Orientation of the inlet and outlet pipe can be set in line or at any desired angle

2 - All Strainers are made in base of order and everything can be customized in base of clients wish. Above data are our standard for reference

3 - weight is calculated as reference and could vary in base of accessories.

4 - Mud Box is made in Stainless steel plate with perforation 6mm holes, 9mm spacing - 40% o.a. (other holes like 8mm are available with 40% o.a.)

STRAINER TYPE L

Dimensional Data

DI [mm]	DO [mm]	DS [mm]	DB [mm]	H [mm]	H1 [mm]	h [mm]	HC [mm]	W [mm]	W1 [mm]	M x TG
200	200	300	250	550	100	285	300	545	323	M18 x 6
250	250	350	300	675	125	364	375	605	353	M18 x 6
300	300	400	350	800	150	451	450	665	383	M18 x 6
350	350	450	400	925	175	541	525	715	408	M18 x 7
400	400	500	450	1050	200	628	600	770	435	M20 x 7
450	450	550	500	1175	225	720	675	770	435	M20 x 7
500	500	600	550	1300	250	812	750	880	490	M20 x 7
600	600	700	650	1550	300	1139	900	995	548	M24 x 7
700	700	800	750	1800	350	1333	1050	1115	608	M24 x 8
800	800	900	850	2050	400	1525	1200	1215	658	M26 x 8
900	900	1000	950	2300	450	1710	1350	1330	715	M26 x 8
1000	1000	1200	1.050	2550	500	1910	1500	1330	715	M28 x 8

Flow Characteristics Data			Max capacity [m³/h]				Pressure drop Dp [bar]				Flange thicknesses	
DI [mm]	DO [mm]	DS [mm]	1,5 m/s	2,0 m/s	2,5 m/s	3,0 m/s	1,5 m/s	2,0 m/s	2,5 m/s	3,0 m/s	TF [mm]	BF [mm]
200	200	300	169	223	292	360	0,03	0,05	0,05	0,11	47	47
250	250	350	266	360	450	540					47	47
300	300	400	382	504	630	756					53	53
350	350	450	522	720	882	1044					53	53
400	400	500	680	900	1134	1368					61	61
450	450	550	864	1152	1440	1728					61	61
500	500	600	1073	1440	1800	2160					67	67
600	600	700	1530	2088	2574	3060					75	75
700	700	800	2088	2772	3456	4140					75	75
800	800	900	2700	3600	4500	5400					90	90
900	900	1000	3420	4680	5760	6840					90	90
1000	1000	1200	4266	5652	6966	8280					90	90

- Note:** 1 - Intake and Outfall diameters are selected by the customer and they could be different. Orientation of the inlet and outlet pipe can be set in line or at any desired angle
 2 - All Strainers are made in base of order and everything can be customized in base of clients wish. Above data are our standard for reference
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