

# CPI Fiber Glass Reinforced Pipes and Fittings- Corrosion solutions.

CPI supplies a fully engineered piping system with an integrated service such as design, stress analysis, manufacturing, prefabrication of spools, construction, and field services. CPI corrosion resistant piping systems are used in a wide range of applications to both above ground and underground installations.

## PRODUCTION RANGE

The production capacity of the plant is 12000 MT annually. The product range are available from 25-1400mm diameters for pipes and fittings.

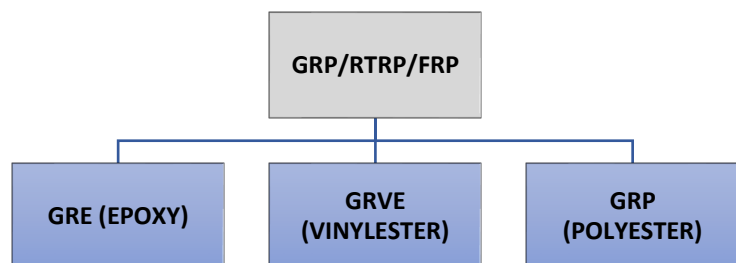
Production unit consists of six separate lines of CNC controlled winding machines of which two are specially made with double pipe winding system and the process is carried out by employees who are skilled and trained in winding of pipe and fittings. The overall manpower capacity in the production unit is 180 plus. Fitting production unit consists of two separate semi-automatic winding machine and curing oven, with trained fitting winders.

Separate spooling unit provides a wide range of spools made in-house based on the clients' requirement. The spool range varies from 25-1400 mm.

## APPLICATIONS

OIL & GAS	PETROCHEMICALS	REFINERIES	DESALINATION	WATER TREATMENT
Crude Oil Transmission Lines	Utility Lines	Sea Water Intake Process Lines	Chemical Injection Skids	Effluent Water Transfer
Hydrocarbon Flow Lines	Cooling Water System	Utility Lines	Water Treatment Systems	Produced Water
Water Injection Lines	Fire Fighting Lines	Chemical Injection Lines	Sea Water Intake	Sewage & Commercial Water
Multi-Phase Fluids	Process Lines	Sea Water Intake	Chlorination Systems	Drainage Systems
Lift Gas System	Process Equipment Fluids	Process Equipment Lines	Cooling Water Systems	Construction Water Pipelines
Open & Closed Drain Lines		Interconnecting Pipes	Pump Circulation Systems	Down Hole Piping
Produced Water Lines				Chlorination Skid Systems
Raw Water Transfer				
Sour Lines				

## PRODUCT DESIGN



## SELECTION BASIS

FLUID TYPE	GRE (ALIPHATIC)	GRE (AROMATIC)	GRE (ANHYDRIDE)	GRV (VINYLESTER)	GRP (POLYESTER)
Acids					
Alkalis (Caustic)					
Solvents (BTX)					
Water- Sea/Brackish					

## CERTIFICATION & ACCREDITATION

- American Petroleum Institute (API) 15HR • American Petroleum Institute (API) 15LR
- National Sanitation Foundation (U.S.) • Factory Mutual (FM)
- ISO 9001:2015 • ISO 14001:2015 • ISO 45001:2018

## TEMPERATURE LIMITATIONS

TYPE OF RESIN SYSTEM	T <sub>d</sub> (°C)	TYPICAL T <sub>g</sub> VALUE OF FULLY CURED RESIN (°C)
<b>Glass Reinforced Epoxy System (GRE)</b>		
Aromatic-amine cured (MDA)	110	130
Cyclo-aliphatic cured (IPD)	110	130
Aliphatic amine cured	85	115
Anhydride cured	85	115
<b>Glass Reinforced Vinylester (GRV)</b>		
Bisphenol A	100	140
<b>Glass Reinforced Polyester System (GRP)</b>		
Isophthalic	60	90

## PRODCUTION RANGE

Diameter Range (mm)	Joint Length (mtr)	P <sub>d</sub> (bar)	T <sub>d</sub> (°C)
15 – 40	2	86.20	110
50 - 80	6	86.20	110
150,200, 250,300	12	86.20	110
100, 350, 400	9	86.20	110
450 - 600	9	50	110
700-1400	9	20	110

## TESTING AND STANDARDS

CPI manufactures pipes and fittings inline with international standards like Shell Group, the American Society for Testing and Materials (ASTM), the American Petroleum Institute (API), the American Society of Mechanical Engineers (ASME), the American National Standards Institute (ANSI), and the International Organization for Standardization (ISO).

CPI QA/QC is fully equipped with all the resources required to comply with International Standards and Customer Requirements.

## PIPE MANUFACTURING



CNC controlled program is used to wind the pipe with proper design parameters. The CNC program controls the rotation speed of the mandrel and the speed at which the carriage transports the impregnated filament wound the mandrel. The winding angle is also controlled along with the number of layers in the pipe. A dispenser unit provides the exact ratio of resin and curing agent which controlled by PLC machine.

## FITTINGS MANUFACTURING



Fittings are manufactured by winding discontinuous reinforcements of woven roving, which is impregnated with the resin and a hardener component and is manually wound on the molds. All manufactured fittings are tested in-house in compliance with international standards such as ASTM, ISO 14692-2 etc.

## SPOOLING

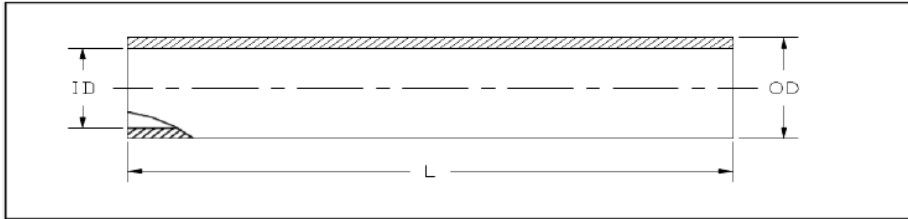


The term pipe spool refers to a prefabricated section of a piping system that includes the pipe, fittings and flanges that are pre-assembled in the CPI fabrication facility and then transported to the required site. CPI offer wide range of spools from 25 - 1400 mm fabricated in house by skilled and trained fabricators & bonders.

## TYPICAL TECHNICAL DIMENSION DATA SHEET \*Data shall vary based on specific project parameters.

<b>Resin</b>	Epoxy (GRE)
<b>Service</b>	Water & hydrocarbon
<b>Material</b>	Glass fiber Reinforced Epoxy (GRE)
<b>CA</b>	NA
<b>Design Code</b>	ISO 14692
<b>NACE</b>	Non-Corrosive
<b>PWHT</b>	NA
<b>RT</b>	NA
<b>Design Pressure</b>	10 bar
<b>Design Temperature</b>	100 Degree C
<b>Application</b>	Under Ground
<b>End Connection</b>	Lamination (Butt and Wrap)/Plain Ends

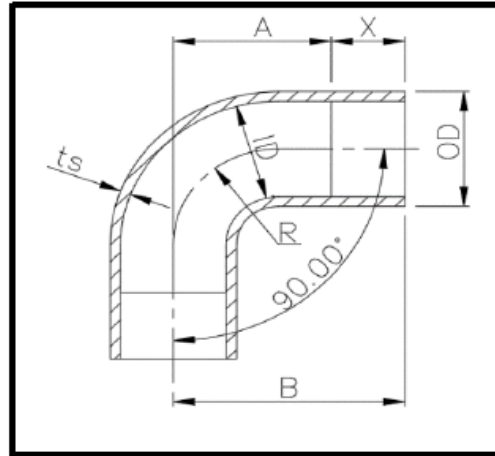
### 1. PIPES



#### PLAIN ENDS

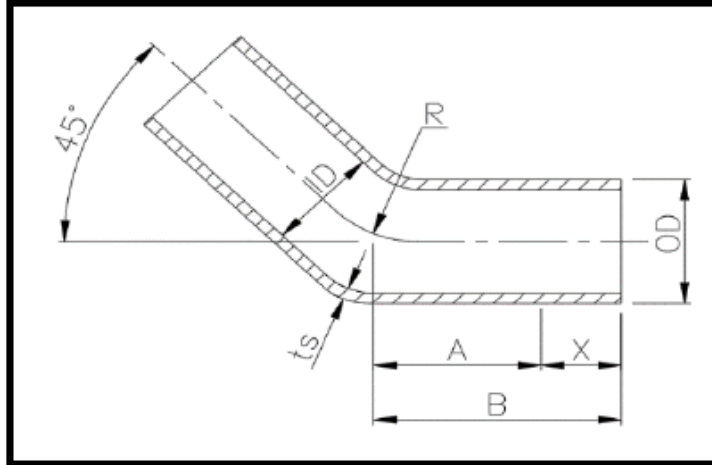
Inside Diameter	Type Ends	User Length	Outside Diameter	Overall Length	Structural Wall Thickness	Lamination Length	Weight
<b>ID</b> <b>mm</b>		<b>L</b> <b>m</b>	<b>OD</b> <b>mm</b>	<b>m</b>	<b>ts</b> <b>mm</b>	<b>X</b> <b>mm</b>	<b>kg</b>
600	Plain end	9	620.0	9.0	9.0	160	39.08
500	Plain end	9	517.0	9.0	7.5	135	28.22
450	Plain end	9	465.6	9.0	6.8	120	23.45
400	Plain end	9	414.0	9.0	6.0	105	19.10
350	Plain end	9	362.6	9.0	5.3	95	15.20
300	Plain end	12	311.0	12.0	4.5	80	11.51
250	Plain end	12	259.6	12.0	3.8	70	8.53
200	Plain end	12	208.0	12.0	3.0	55	5.97
150	Plain end	12	158.0	12.0	3.0	50	4.51
100	Plain end	9	108.0	9.0	3.0	50	3.11
80	Plain end	6	88.0	6.0	3.0	50	2.60
50	Plain end	6	58.0	6.0	3.0	50	1.68
40	Plain end	2	48.0	2.0	3.0	50	1.65
25	Plain end	2	33.0	2.0	3.0	50	1.09
20	Plain end	2	28.0	2.0	3.0	50	0.91
15	Plain end	2	23.0	2.0	3.0	50	0.72

## 2. ELBOW 90 DEG.



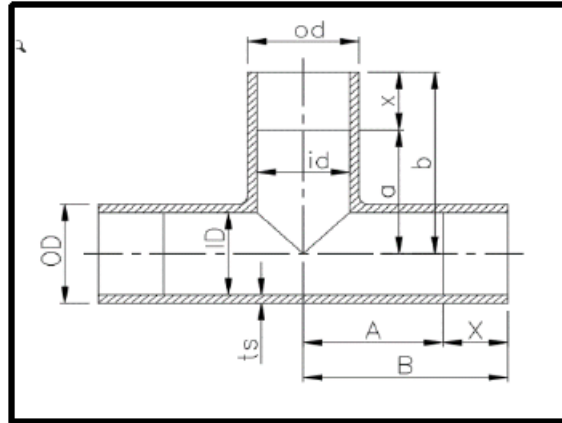
Inside Diameter	Outside Diameter	Radius	Structural Wall Thickness	Iso Length	Overall Length	Lamination Length	Weight
ID mm	OD mm	R mm	ts mm	A mm	B mm	X mm	kg
600	633.5	900	15.75	900	1060	160	125.86
500	528.25	750	13.125	750	885	135	72.97
450	475.8	675	11.9	675	795	120	53.50
400	423	600	10.5	600	705	105	37.20
350	370.55	525	9.275	525	620	95	25.30
300	317.75	450	7.875	450	530	80	15.73
250	265.3	375	6.65	375	445	70	12.19
200	212.5	300	5.25	300	355	55	6.53
150	162.5	225	5.25	225	275	50	3.84
100	112.5	150	5.25	150	200	50	1.90
80	92.5	120	5.25	120	170	50	1.32
50	62.5	75	5.25	75	125	50	0.64
40	52.5	60	5.25	60	110	50	0.46
25	37.5	37.5	5.25	37.5	87.5	50	0.25
20	32.5	30	5.25	30	80	50	0.19
15	27.5	22.5	5.25	22.5	72.5	50	0.14

### 3. ELBOW 45 DEG.



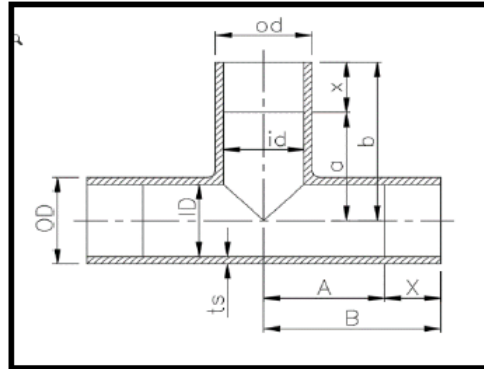
Inside Diameter	Outside Diameter	Radius	Structural Wall Thickness	Iso Length	Overall Length	Lamination Length	Weight
ID mm	OD mm	R mm	ts mm	A mm	B mm	X mm	kg
600	633.5	900	15.75	372.6	533	160	63.26
500	528.25	750	13.125	310.5	446	135	36.75
450	475.8	675	11.9	279	399	120	26.89
400	423	600	10.5	248	353	105	18.66
350	370.55	525	9.275	217	312	95	12.75
300	317.75	450	7.875	186	266	80	7.91
250	265.3	375	6.65	155	225	70	6.17
200	212.5	300	5.25	124	179	55	3.30
150	162.5	225	5.25	93	143	50	2.00
100	112.5	150	5.25	62	112	50	1.07
80	92.5	120	5.25	50	100	50	0.77
50	62.5	75	5.25	31	81	50	0.41
40	52.5	60	5.25	25	75	50	0.31
25	37.5	37.5	5.25	16	66	50	0.19
20	32.5	30	5.25	13	63	50	0.15
15	27.5	22.5	5.25	10	60	50	0.12

#### 4. TEE (EQUAL)



Header Inside Diameter	Branch Inside Diameter	Header Outside Diameter	Branch Outside Diameter	Header Structural Wall Thk.	Branch Structural Wall Thk.	Header Lamination Length	Branch Lamination Length	Header Length	Branch Length	Header Isometric Length	Branch Isometric Length	Weight
ID mm	id mm	OD mm	od mm	Ts mm	ts mm	X mm	x mm	A mm	a mm	B mm	b mm	kg
600	600	638	638	18.00	18.00	160	160	400	400	560	560	114.41
500	500	532	532	15.00	15.00	135	135	350	350	485	485	68.81
450	450	479	479	13.60	13.60	120	120	320	320	440	440	50.95
400	400	426	426	12.00	12.00	105	105	295	295	400	400	36.32
350	350	373	373	10.60	10.60	95	95	270	270	365	365	25.62
300	300	320	320	9.00	9.00	80	80	255	255	335	335	17.11
250	250	267	267	7.6	7.6	70	70	225	225	295	295	13.50
200	200	214	214	6.0	6.0	55	55	140	140	195	195	5.96
150	150	164	164	6.0	6.0	50	50	110	110	160	160	3.71
100	100	114	114	6.0	6.0	50	50	90	90	140	140	2.22
80	80	94	94	6.0	6.0	50	50	90	90	140	140	1.81
50	50	64	64	6.0	6.0	50	50	80	80	130	130	1.11
40	40	54	54	6.0	6.0	50	50	66	66	116	116	0.82
25	25	39	39	6.0	6.0	50	50	60	60	110	110	0.53
20	20	34	34	6.0	6.0	50	50	60	60	110	110	0.45
15	15	29	29	6.0	6.0	50	50	60	60	110	110	0.37

**5. TEE (REDUCED)**



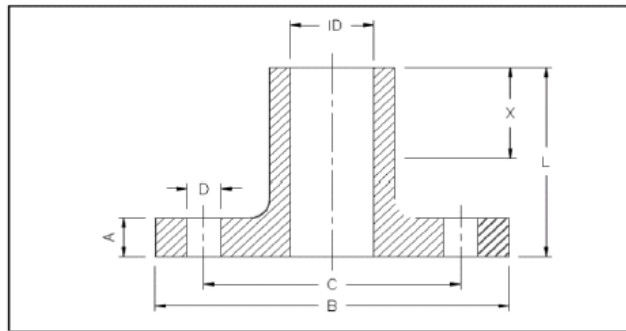
Header Inside Diameter	Branch Inside Diameter	Header Outside Diameter	Branch Outside Diameter	Header Structural Wall Thk.	Branch Structural Wall Thk.	Header Lamination Length	Branch Lamination Length	Header Length	Branch Length	Header Isometric Length	Branch Isometric Length	Weight
ID	id	OD	od	Ts	ts	X	x	A	a	B	b	kg
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
600	500	638	538	18.00	18.00	160	135	400	400	560	535	106.81
600	400	638	438	18.00	18.00	160	105	400	400	560	505	99.53
600	300	638	338	18.00	18.00	160	80	400	400	560	480	93.09
600	250	638	288	18.00	18.00	160	70	400	400	560	470	90.15
600	200	638	238	18.00	18.00	160	55	400	400	560	455	87.20
500	400	532	432	15.00	15.00	135	105	350	350	485	455	63.21
500	300	532	332	15.00	15.00	135	80	350	350	485	430	58.31
500	250	532	282	15.00	15.00	135	70	350	350	485	420	56.09
500	200	532	232	15.00	15.00	135	55	350	350	485	405	53.87
450	400	479	429	13.60	13.60	120	105	320	320	440	425	48.60
450	350	479	379	13.60	13.60	120	95	320	320	440	415	46.53
450	300	479	329	13.60	13.60	120	80	320	320	440	400	44.41
450	250	479	279	13.60	13.60	120	70	320	320	440	390	42.52
400	350	426	376	12.00	12.00	105	95	295	295	400	390	34.58
400	300	426	326	12.00	12.00	105	80	295	295	400	375	32.81
400	250	426	276	12.00	12.00	105	70	295	295	400	365	31.24
400	200	426	226	12.00	12.00	105	55	295	295	400	350	29.66
350	300	373	323	10.60	10.60	95	80	270	270	365	350	24.14
350	250	373	273	10.60	10.60	95	70	270	270	365	340	22.83
350	200	373	223	10.60	10.60	95	55	270	270	365	325	21.52
300	250	320	270	9.00	9.00	80	70	255	255	335	325	16.04
300	200	320	220	9.00	9.00	80	55	255	255	335	310	14.98
300	150	320	170	9.00	9.00	80	50	255	255	335	305	14.08
300	100	320	120	9.0	9.0	80	50	255	255	335	305	13.24
250	200	267	217	7.6	7.6	70	55	225	225	295	280	12.45
250	150	267	167	7.6	7.6	70	50	225	225	295	275	11.58
250	100	267	117	7.6	7.6	70	50	225	225	295	275	10.77
200	150	214	164	6.0	6.0	55	50	140	140	195	190	5.44
200	100	214	114	6.0	6.0	55	50	140	140	195	190	4.98
150	100	164	114	6.0	6.0	50	50	110	110	160	160	3.32
150	80	164	94	6.0	6.0	50	50	110	110	160	160	3.17
150	50	164	64	6.0	6.0	50	50	110	110	160	160	2.93
100	80	114	94	6.0	6.0	50	50	90	90	140	140	2.08
100	50	114	64	6.0	6.0	50	50	90	90	140	140	1.88
100	25	114	39	6.0	6.0	50	50	90	90	140	140	1.71



Header Inside Diameter	Branch Inside Diameter	Header Outside Diameter	Branch Outside Diameter	Header Structural Wall Thk.	Branch Structural Wall Thk.	Header Lamination Length	Branch Lamination Length	Header Length	Branch Length	Header Isometric Length	Branch Isometric Length	Weight
ID mm	id mm	OD mm	od mm	Ts mm	ts mm	X mm	x mm	A mm	a mm	B mm	b mm	kg
80	50	94	64	6.0	6.0	50	50	90	90	140	140	1.60
80	25	94	39	6.0	6.0	50	50	90	90	140	140	1.43
50	40	64	54	6.0	6.0	50	50	80	80	130	130	1.04
50	25	64	39	6.0	6.0	50	50	80	80	130	130	0.95
50	15	64	29	6.0	6.0	50	50	80	80	130	130	0.89
40	25	54	39	6.0	6.0	50	50	66	66	116	116	0.73
25	20	39	34	6.0	6.0	50	50	60	60	110	110	0.51
25	15	39	29	6.0	6.0	50	50	60	60	110	110	0.48

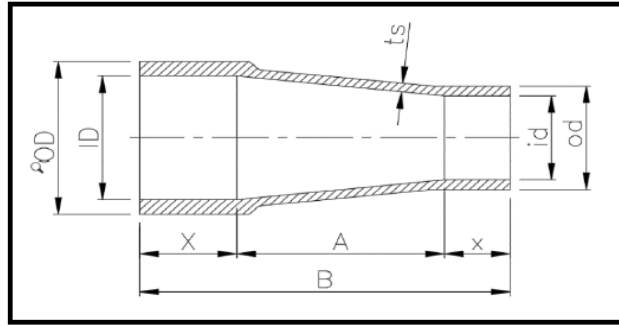
## 6. FLANGES

Drilling for ANSI 150



Inside Diameter	Face Thickness	Isometric Length	External Diameter	Lamination Length	Holes circle Diameter	Holes Diameter	No of Holes	Bolt Size	Weight
ID mm	A mm	L mm	B mm	X mm	C mm	D mm			kg
600	83	263	812.8	160	749.3	35	20	M 33	56.07
500	72	227	698.5	135	635	32	20	M 30	38.34
450	66	206	635	120	578	32	16	M 30	29.49
400	65	190	597	105	540	28	16	M 24	27.42
350	58	173	533	95	476	28	12	M 24	20.42
300	55	155	483	80	432	25	12	M 22	16.77
250	46	136	406	70	362	25	12	M 22	10.47
200	39	114	343	55	298	22	8	M 20	6.84
150	32	102	279	50	241	22	8	M 20	4.27
100	30	100	229	50	191	19	8	M 16	3.08
80	30	100	191	50	152	19	4	M 16	2.28
50	30	100	152	50	121	19	4	M 16	1.58
40	30	100	127	50	99	16	4	M 14	1.18
25	30	100	108	50	79	16	4	M 14	0.90
20	30	100	98	50	70	16	4	M 14	0.76
15	30	100	89	50	60	16	4	M 14	0.64

7. REDUCER (Concentric / Eccentric)

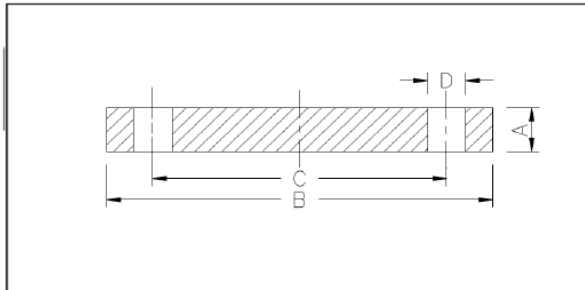


Header Inside Diameter	Branch Inside Diameter	Header Inside Diameter	Branch Inside Diameter	Header Structural Wall Thk.	Branch Structural Wall Thk.	Lamination Length	Lamination Length	Main Length	Total Length	Weight
ID	id	OD	od	Ts	ts	X	x	A	B	kg
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
600	500	634	534	15.75	15.75	160	135	260	555	31.65
600	400	634	434	15.75	15.75	160	105	510	775	43.99
600	300	634	334	15.75	15.75	160	80	760	1000	57.06
600	250	634	284	15.75	15.75	160	70	885	1115	63.83
600	200	634	234	15.75	15.75	160	55	1010	1225	70.61
500	400	528	428	13.13	13.13	135	105	260	500	19.77
500	300	528	328	13.13	13.13	135	80	510	725	28.61
500	250	528	278	13.13	13.13	135	70	635	840	33.23
500	200	528	228	13.13	13.13	135	55	760	950	37.84
450	400	476	426	11.90	11.90	120	105	135	360	11.73
450	350	476	376	11.90	11.90	120	95	260	475	15.29
450	300	476	326	11.90	11.90	120	80	385	585	18.81
450	250	476	276	11.90	11.90	120	70	510	700	22.53
450	200	476	226	11.90	11.90	120	55	635	810	26.25
400	350	423	373	10.50	10.50	105	95	135	335	8.53
400	300	423	323	10.50	10.50	105	80	260	445	11.23
400	250	423	273	10.50	10.50	105	70	385	560	14.10
400	200	423	223	10.50	10.50	105	55	510	670	16.97
350	300	371	321	9.28	9.28	95	80	135	310	6.10
350	250	371	271	9.28	9.28	95	70	260	425	8.27
350	200	371	221	9.28	9.28	95	55	385	535	10.45
300	250	318	268	7.88	7.88	80	70	135	285	4.06
300	200	318	218	7.88	7.88	80	55	260	395	5.60
300	150	318	168	7.88	7.88	80	50	385	515	7.28
300	100	318	118	7.88	7.88	80	50	510	640	9.02
250	200	265	215	6.65	6.65	70	55	135	260	3.42
250	150	265	165	6.65	6.65	70	50	260	380	4.94
250	100	265	115	6.65	6.65	70	50	385	505	6.52
200	150	213	163	5.25	5.25	55	5	135	195	2.10
200	100	213	113	5.25	5.25	55	50	260	365	3.14
150	100	163	113	5.25	5.25	50	50	135	235	1.53

Header Inside Diameter	Branch Inside Diameter	Header Inside Diameter	Branch Inside Diameter	Header Structural Wall Thk.	Branch Structural Wall Thk.	Lamination Length	Lamination Length	Main Length	Total Length	Weight
ID mm	id mm	OD mm	od mm	Ts mm	ts mm	X mm	x mm	A mm	B mm	kg
150	80	163	93	5.25	5.25	50	50	185	285	1.83
150	50	163	63	5.25	5.25	50	50	260	360	2.29
100	80	113	93	5.25	5.25	50	50	60	160	0.72
100	50	113	63	5.25	5.25	50	50	135	235	1.01
100	25	113	38	5.25	5.25	50	50	198	298	1.25
80	50	93	63	5.25	5.25	50	50	85	185	0.65
80	25	93	38	5.25	5.25	50	50	147.5	248	0.84
50	40	63	53	5.25	5.25	50	50	35	135	0.32
50	25	63	38	5.25	5.25	50	50	72.5	173	0.38
50	15	63	28	5.25	5.25	50	50	97.5	198	0.42
40	25	53	38	5.25	5.25	50	50	47.5	148	0.28
25	20	38	33	5.25	5.25	50	50	22.5	123	0.16
25	15	38	28	5.25	5.25	50	50	35	135	0.17

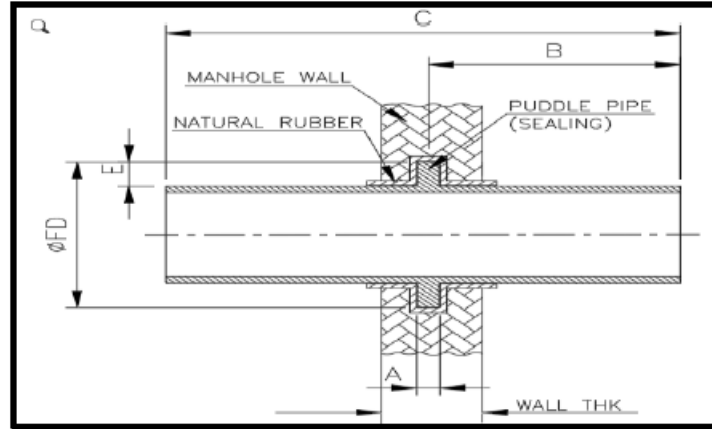
### 8. BLIND FLANGES

Drilling for ANSI 150



Nominal Diameter	Plate Thickness	External Diameter	Holes Circle Diameter	No of Holes	Holes Diameter	Weight
ID mm	A mm	B mm	C mm		D mm	kg
600	71	813	749	20	35	78.97
500	60	699	635	20	32	50.76
450	54	635	578	16	32	38.47
400	48	597	540	16	28	30.77
350	42	533	476	12	28	22.10
300	36	483	432	12	25	19.22
250	30	406	362	12	25	12.31
200	25	343	298	8	22	8.05
150	25	279	241	8	22	5.89
100	25	229	191	8	19	4.44
80	21	191	152	4	19	2.99
50	16	152	121	4	19	1.80
40	16	127	99	4	16	1.46
25	16	108	79	4	16	1.22
20	16	98	70	4	16	1.01
15	16	89	60	4	16	1.01

## 9. PUDDLE FLANGES



Nominal Diameter	Pipe Outside Diameter	Puddle Flange Outside Diameter	Puddle Flange Thickness	Puddle Flange Length	Isometric Length	Overall Length	Weight
ID mm	OD mm	FD mm	E mm	A mm	B mm	C mm	kg
600	620.0	770	75	75	800	1600	88.54
500	517.0	617	50	50	500	1000	38.84
450	465.6	566	50	50	500	1000	33.00
400	414.0	514	50	50	500	1000	27.27
350	362.6	463	50	50	500	1000	22.38
300	311.0	411	50	50	500	1000	17.70
250	259.6	360	50	50	500	1000	13.78
200	208.0	308	50	50	500	1000	10.15
150	158.0	258	50	50	500	1000	7.93
100	108.0	208	50	50	500	1000	5.71
80	88.0	188	50	50	500	1000	4.83
50	58.0	158	50	50	500	1000	3.50
40	48.0	148	50	50	500	1000	3.05
25	33.0	133	50	50	500	1000	2.39
20	28.0	128	50	50	500	1000	2.17
15	23.0	123	50	50	500	1000	1.94