



PIPING TECHNIC

PIPE
FLANGE
FITTING
VALVE
GASKET
STUD BOLT AND NUTS

FLANGE

FLANGE

FLANGE ANSI, ASME B16.5 : SIZE 1/2" - 24"
 : CLASS 150LB, 300LB, 600LB, 900LB, 1500LB AND 2500LB

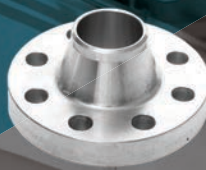
FLANGE ASME B16.47 SERIES A/MSS SP-44 : SIZE 26"-48"

FLANGE ASME B16.47 SERIES B/API 605 : SIZE 26"-48"

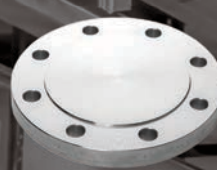
FLANGE FACINGS : RF (RAISE FACE), FF (FLAT FACE), (RTJ) RING TYPE JOINT, LARGE TONGUE & GROOVE, SMALL TONGUE & GROOVE

FLANGE TYPE

WELDING NECK
 BLIND
 SOCKET WELD
 SLIP ON
 THREAD
 LAP JOINT
 ORIFICE FLANGE



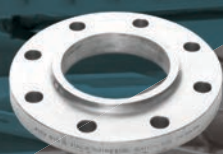
WELDING NECK



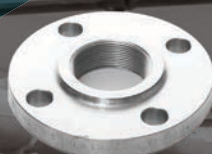
BLIND



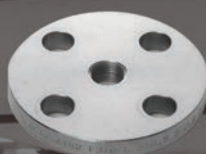
SOCKET WELD



SLIP ON



THREAD



FLANGE REDUCED



LAP JOINT



ORIFICE FLANGE

FITTING

FORGE FITTING

FORGE FITTING ASME B16.11 /BS 3799 (ANSI) Socket weld end (SW) or Thread end (NPT)
 CLASS 3000LB AND 6000LB : SIZE 1/4" - 4"



ELBOW 45 AND ELBOW 90



TEE AND REDUCE TEE



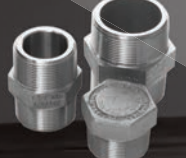
UNION



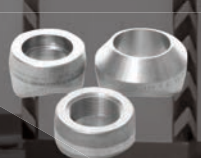
CAP



CON SWAGE NIPPLE AND
 ECC SWAGE NIPPLE



HEX PLUG,
 HEX NIPPLE AND
 REDUCE BUSHING



SOCKOLET,
 WELDOLET AND
 THREDOLET



FULL COUPLING,
 HALF COUPLING AND
 REDUCE COUPLING

Material Grade	Pipe	Flange	Fitting	
			Forge Fitting	Butt Weld Fitting
Carbon and Low Alloy	A53 GR.B A106 GR.B, GR.C API5L GR.B/GR.X42	A105N	A105N	A234 WPB,WPC
	A333 GR.3 A333 GR.6	A350 LF3 A350 LF2	A350 LF3 A350 LF2	A420 WPL3 A420 WPL6
High Yield	API 5L GR.X52-65	A694 GR.F52-65	A694 GR.F52-65	A860 WPHY 52-65
Chromium Molybdenum	A335 P1,P5,P9,P11,P22	A182 F1,F5,F9,F11,F22	A182 F1,F5,F9,F11,F22	A234 WP1,5,9,11,22
Austenitic Stainless Steel	A312/358 TP304/304L/304H	A182 F304/304L/304H	A182 F304/304L/304H	A403 WP304/304L/304H
	A312/358 TP316/316L/316Ti	A182 F316/316L/316Ti	A182 F316/316L/316Ti	A403 WP316/316L/316Ti
	A312/358 TP321/321H	A182 F321/321H	A182 F321/321H	A403 WP321/321H
	A312/358 TP347/347H	A182 F347/347H	A182 F347/347H	A403 WP347/347H
	A312/358 UNS S32154	A182 F44	A182 F44	A403 WP31254
	ALLOY20	A182 F20 (ALLOY 20)	A182 F20 (ALLOY 20)	B366 WP20CB

BUTTWELD FITTING

BUTT WELD FITTING ASME B 16.19 / ASME B16.28



ELBOW 45 AND
ELBOW 90



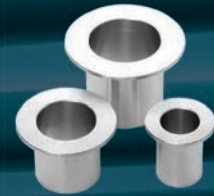
TEE AND
REDUCE TEE



REDUCE CON AND
REDUCE ECC



CAP



STUB END

GASKET

GASKET

GASKET SHEET

GASKET SHEET WITH
ENVELOPE

GASKET SPIRAL
WOUND

GASKET RING TYPE
JOINT (RTJ)



GASKET SHEET



GASKET SHEET WITH
ENVELOPE



GASKET SPIRAL WOUND



GASKET RING TYPE
JOINT (RTJ)

VALVE

FORGE AND CAST STEEL VALVE:

GATE VALVE

GLOBE VALVE

CHECK VALVE

BALL VALVE

BUTTERFLY VALVE

BELLOW SEAL VALVE

CRYOGENIC VALVE



GATE AND GLOBE VALVE
(SOCKET OR THREAD)



BELLOW SEAL
GATE AND GLOBE VALVE
(FLANGE TYPE)



CRYOGENIC
GATE AND GLOBE VALVE
(SOCKET OR THREAD)

VALVE TRIM MATERIAL:

TRIM NO	TRIM CODE	DISC	SEAT	STEM
1	F6	13%Cr	13%Cr	13%Cr
2	304	SS304	SS304	SS304
5	F6HF	Stellite	Stellite	13%Cr
8	F6HFS	13%Cr	Stellite	13%Cr
10	316	SS316	SS316	SS316
12	316HFS	SS316	Stellite	SS316



CHECK VALVE
(SOCKET OR THREAD)



BALL VALVE
(FLANGE TYPE)



GATE, GLOBE AND CHECK VALVE
(FLANGE TYPE)

	Valve		Stud bolt & Nut	Gasket
	Forging Valve	Casting valve		
A105N		A216 WCB,WCC	A193-B7/A194-2H	GASKET SHEET GASKET SPIRAL WOUND (SPW) GASKET RING TYPE JOINT (RTJ)
A350 LF2		A352 LCB, LCC	A320-L7/A194-4,7	
A694 GR.F52-65			A193-B7M/A194-2HM	
A182 F1,F5,F9,F11,F22		A217 WC5,6,9	A193-B16/A194-4,7	
A182 F304/304L/304H		A351 CF8/CF3	A193-B8/A194-8	
A182 F316/316L/316TI		A351 CF8M/CF3M	A193-B8M/A194-8M	
A182 F321/321H				
A182 F347/347H		A351 CF8C	A193-B8C/A194-8CA	
A182 F44		A351 CK3MCunN		
A182 F20 (ALLOY 20)		A351 CN7M	ALLOY20	

MATERIAL GRADE TABLE

STUD BOLT AND NUTS FOR FLANGE ANSI,ASME B16.5

Flange Size	150LB		300LB		600LB	
	Bolt Size	Qty	Bolt Size	Qty	Bolt Size	Qty
1/2"	1/2"X65	4	1/2"X70	4	1/2"X80	4
3/4"	1/2"X65	4	5/8"X75	4	5/8"X90	4
1"	1/2"X70	4	5/8"X85	4	5/8"X90	4
1-1/2"	1/2"X75	4	3/4"X95	4	3/4"X105	4
2"	5/8"X85	4	5/8"X90	8	5/8"X105	8
2-1/2"	5/8"X90	4	3/4"X100	8	3/4"X120	8
3"	5/8"X95	4	3/4"X110	8	3/4"X125	8
4"	5/8"X95	8	3/4"X115	8	7/8"X145	8
5"	5/8"X95	8	3/4"X120	8	1"X165	8
6"	3/4"X100	8	3/4"X125	12	1"X170	12
8"	3/4"X100	8	7/8"X140	12	1-1/8"X195	12
10"	7/8"X110	12	1"X160	16	1-1/4"X215	16
12"	7/8"X120	12	1-1/8"X170	16	1-1/4"X220	20
14"	1"X135	12	1-1/8"X180	20	1-3/8"X235	20
16"	1"X140	16	1-1/4"X190	20	1-1/2"X255	20
18"	1-1/8"X150	16	1-1/4"X195	24	1-5/8"X275	20
20"	1-1/8"X160	20	1-1/4"X210	24	1-5/8"X290	24
24"	1-1/4"X180	20	1-1/2"X235	24	1-7/8"X330	24



Fluoropolymer Coating (PTFE)

Electro Galvanized



Hot Dip Galvanized

Yellow Zinc Bichromate

ASME B16.47 SERIES A/MSS SP-44

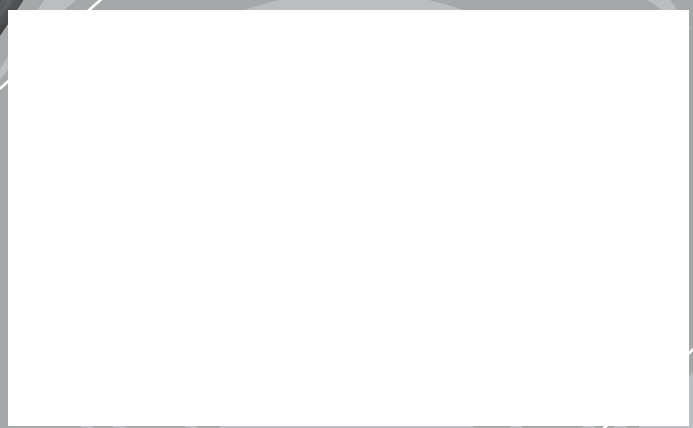
Flange Size	150LB		300LB	
	Bolt Size	Qty	Bolt Size	Qty
26"	1-1/4"X230	24	1-5/8"X270	28
28"	1-1/4"X235	28	1-5/8"X285	28
30"	1-1/4"X240	28	1-3/4"X305	28
32"	1-1/2"X265	28	1-7/8"X320	28
34"	1-1/2"X270	32	1-7/8"X325	28
36"	1-1/2"X285	32	2"X340	32
38"	1-1/2"X280	32	1-1/2"X320	32
40"	1-1/2"X285	36	1-3/4"X340	32
42"	1-1/2"X300	36	1-3/4"X350	32
44"	1-1/2"X305	40	1-3/4"X365	32
46"	1-1/2"X310	40	1-7/8"X380	28
48"	1-1/2"X320	44	1-7/8"X390	32

ASME B16.47 SERIES B/API 605

Flange Size	150LB		300LB	
	Bolt Size	Qty	Bolt Size	Qty
26"	3/4"X140	36	1-1/4"X260	32
28"	3/4"X145	40	1-1/4"X260	36
30"	3/4"X145	44	1-3/8"X275	36
32"	3/4"X145	48	1-1/2"X300	32
34"	7/8"X160	40	1-1/2"X300	36
36"	1"X165	44	1-5/8"X305	32
38"	1"X180	40	1-5/8"X325	36
40"	1"X180	44	1-5/8"X330	40
42"	1"X185	48	1-3/4"X345	36
44"	1"X190	52	1-3/4"X360	40
46"	1-1/8"X205	40	1-7/8"X370	36
48"	1-1/8"X205	44	1-7/8"X370	40

SCREW THREAD : AS PER ASTM A193 AND A320

ANSI B 1.1			ANSI B1.13M		
SIZE (IN)	UNC	UNF	SIZE (MM)	UNC	UNF
1/2"	13	20	12	1.75	1.25
5/8"	11	18	14	2	1.5
3/4"	10	16	16	2	1.5
7/8"	9	14	20	2.5	1.5
1"	8	12	22	2.5	1.5
1-1/8"	8	12	24	3	2
1-1/4"	8	12	27	3	2
1-3/8"	8	12	30	3	2
1-1/2"	8	12	33	3	
1-3/4"	8		36	3	
2"	8		39	3	



DIMENSIONAL FITTINGS SPECIFICATION:

- ANSI B 16.9 - Steel Butt-Welding Fitting. Covers dimensions and tolerances of Welding Fitting 1/2" to 24" with the exception of Short Radius Elbows and return
- ANSI B 16.11 - Steel socket welding Fittings.
- ANSI B 16.25 - Butt-Welding Ends. Covers the preparation and design details of butt-Welded Pipe Systems.
- MSS SP-43 - Wrought Stainless Steel Butt-Welding Fittings. Covers dimensions and tolerances of Elbow and Returns. Schedule 5S and 10S only in sizes 3/4"-24".

DIMENSIONAL PIPE SPECIFICATIONS:

- ANSI B 36.10 - Wrought Steel and Wrought-Iron Pipe. Covers diameters and wall thicknesses of pipe 1/2" to 36" with the exception of Schedules 5S and 10S.
- ANSI B 36.19 - Stainless Steel Pipe. Cover diameters and wall thickness of Stainless Steel Pipe in Schedules 5S, 10S, 40S and 80S in sizes 1/8" to 30".

MATERIAL SPECIFICATIONS FOR FITTINGS:

- ASTM A 234 - Factory-Made Wrought Carbon Steel and Ferritic Alloy Steel Welding Fittings. Covers materials and physical properties of Carbon, Carbon-Molybdenum Fittings.
- ASTM A 403 - Factory-Made Wrought Austenitic Steel Welding Fittings.
- ASTM A 420 - Factory-Made Wrought Carbon Steel and Alloy Steel Welding Fitting of Seamless or Welded Construction for Low Temperature Service.

MATERIAL SPECIFICATIONS FOR PIPES AND TUBES:

- ASTM A 53 - Welded and Seamless Steel Pipe
- ASTM A 106 - Seamless Carbon Steel Pipe for High Temperature, Service.
- ASTM A 135 - Electric Fusion Welded Steel Pipe for High Temperature. Service.
- ASTM A 17 - Seamless Cold Drawn Low Carbon Steel. Heat-Exchanger and Condenser Tubes.
- ASTM A 269 - Seamless and Welded Austenitic Stainless Tubing of General Service.
- ASTM A 312 - Seamless and Welded Austenitic Stainless Steel Pipe.
- ASTM A 333 - Seamless and Welded Steel Pipe for Low temperature Service.
- ASTM A 335 - Seamless Ferritic Alloy-Steel Pipe for High Temperature Service.

SPECIFICATIONS FOR FLANGES:

- ANSI B 16.5 - Steel Pipe Flanges and Flanged Fittings (150-2,500).
- ASTM A 105 - Forged or Rolled Steel Pipe Flanges. Forged Fittings and Valves and Parts for High-Temperature Service.
- ASTM A 182 - Forged or Rolled Alloy-Steel Pipe Flanged, Forged Fittings and Valves and Parts for High-Temperature Service.
- ASTM A 350 - Forged or Rolled Carbon and Alloy Steel Flanges Fittings

MISCELLANEOUS AMERICAN SPECIFICATIONS:

- ANSI B 31.1 - Code for pressure Piping.
- ANSI B 31.3 - Code for pressure Piping: Petroleum Refinery Piping.
- API STD 5L - API Specification for Line Pipe.
- API STD 5LX - API Specification for High Test Line Pipe.
- ASME - Boiler and Pressure Vessel Code Specifications.

PIPE SCHEDULE

Nominal pipe Size mm./Inch	OD mm	5S	5	10S	10	20	30	STD	40S	40	60	XS	80S	80	100	120	140	160	XXS	
6 1/8	10.3		0.88 0.20	1.24 0.28	1.24 0.28			1.73 0.37	1.73 0.37	1.73 0.37		2.41 0.47	2.41 0.47	2.41 0.47						
8 1/4	13.7		1.24 0.38	1.65 0.51	1.65 0.51			2.24 0.63	2.24 0.64	2.24 0.63		3.02 0.80	3.02 0.82	3.02 0.80						
10 3/8	17.1		1.24 0.49	1.65 0.64	1.65 0.64			2.31 0.84	2.31 0.86	2.31 0.84		3.20 1.10	3.20 1.12	3.20 1.10						
15 1/2	21.3	1.65 0.82	1.65 0.82	2.11 1.01	2.11 1.01			2.77 1.27	2.77 1.30	2.77 1.27		3.73 1.62	3.73 1.65	3.73 1.62				4.78 1.95	7.47 2.55	
20 3/4	26.7	1.65 1.04	1.65 1.04	2.11 1.31	2.11 1.31			2.87 1.69	2.87 1.71	2.87 1.69		3.91 2.20	3.91 2.22	3.91 2.20				5.56 2.90	7.82 3.64	
25 1	33.4	1.65 1.33	1.65 1.33	2.77 2.13	2.77 2.13			3.38 2.50	3.38 2.55	3.38 2.50		4.55 3.24	4.55 3.29	4.55 3.24				6.35 4.24	9.09 5.45	
32 1-1/4	42.2	1.65 1.68	1.65 1.68	2.77 2.76	2.77 2.76			3.56 3.39	3.56 3.46	3.56 3.39		4.85 4.47	4.85 4.56	4.85 4.47				6.35 5.61	9.70 7.77	
40 1-1/2	48.3	1.65 1.95	1.65 1.95	2.77 3.10	2.77 3.10			3.68 4.05	3.68 4.13	3.68 4.05		5.08 5.41	5.08 5.51	5.08 5.41				7.14 7.25	10.15 9.56	
50 2	60.3	1.65 2.44	1.65 2.44	2.77 4.01	2.77 4.01			3.91 5.44	3.91 5.54	3.91 5.44		5.54 7.48	5.54 7.63	5.54 7.48				8.74 11.11	11.07 13.44	
65 2-1/2	73.0	2.11 3.77	2.11 3.77	3.05 5.36	3.05 5.36			5.16 8.63	5.16 8.81	5.16 8.63		7.01 11.41	7.01 11.64	7.01 11.41				9.53 14.92	14.02 20.39	
80 3	88.9	2.11 4.60	2.11 4.60	3.05 6.59	3.05 6.59			5.49 11.29	5.49 11.52	5.49 11.29		7.62 15.27	7.62 15.59	7.62 15.27				11.13 21.35	15.24 27.68	
90 3-1/2	101.6	2.11 5.29	2.11 5.29	3.05 7.55	3.05 7.55			5.74 13.57	5.74 13.84	5.74 13.57		8.08 18.63	8.08 19.01	8.08 18.63				16.15 34.20		
100 4	114.3	2.11 5.96	2.11 5.96	3.05 8.52	3.05 8.52			6.02 16.07	6.02 16.40	6.02 16.07	7.13 18.98	8.56 22.32	8.56 22.77	8.56 22.32		11.13 28.32		13.49 33.54	17.12 41.03	
125 5	141.3	2.77 9.67	2.77 9.67	3.40 11.82	3.40 11.82	5.15 17.35		6.55 21.77	6.55 22.20	6.55 21.77		9.53 30.97	9.53 31.59	9.53 30.97		12.70 40.28		15.88 49.11	19.05 57.43	
150 6	168.3	2.77 11.55	2.77 11.55	3.40 14.13	3.40 14.13	5.15 20.83		7.11 28.26	7.11 28.83	7.11 28.26		10.97 42.56	10.97 43.42	10.97 42.56		14.27 54.20		18.26 67.56	21.95 79.22	
200 8	219.1	2.77 15.09	2.77 15.09	3.76 20.37	3.76 20.37	6.35 33.31	7.04 36.81	8.18 42.55	8.18 43.39	8.18 42.55	10.31 53.08	12.70 64.64	12.70 65.95	12.70 64.64	15.09 75.92	18.26 90.44	20.62 100.92	23.01 111.27	22.23 107.92	
250 10	273.1	3.40 23.08	3.40 23.08	4.19 28.34	4.19 28.34	6.35 41.77	7.80 51.03	9.27 60.31	9.27 61.52	9.27 60.31	12.70 81.55	12.70 81.55	12.70 83.19	12.70 96.01	15.09 114.75	18.26 133.06	21.44 155.15	25.40 172.33	28.58 172.33	25.40 155.15
300 12	323.9	3.96 31.89	3.96 31.89	4.57 33.17	4.57 36.73	6.35 49.73	6.35 65.20	8.38 73.88	8.38 75.32	8.38 79.73	10.31 108.96	12.70 97.46	12.70 99.49	12.70 132.08	15.09 159.91	18.26 186.75	21.44 208.14	25.40 238.76	28.58 238.76	25.40 186.97
350 14	355.6	3.96 35.06	3.96 35.06	4.78 42.14	4.78 54.69	6.35 67.90	6.35 81.33	9.53 81.33	9.53 81.83	9.53 94.55	11.13 126.71	12.70 107.39	12.70 107.90	12.70 158.10	15.09 194.96	18.26 224.65	21.44 253.56	25.40 281.70	28.58 281.70	25.40 217.00
400 16	406.4	4.19 42.41	4.19 42.41	4.78 48.26	4.78 62.64	6.35 77.83	6.35 93.27	9.53 93.27	9.53 93.27	9.53 123.30	11.13 160.12	12.70 123.30	12.70 123.89	12.70 203.53	15.09 245.56	18.26 286.64	21.44 333.19	25.40 365.35	28.58 365.35	25.40 281.70
450 18	457.2	4.19 47.77	4.19 47.77	4.78 54.36	4.78 70.57	6.35 87.71	6.35 122.38	9.53 105.16	9.53 105.66	9.53 155.80	11.13 205.74	12.70 139.15	12.70 139.88	12.70 254.55	15.09 309.62	18.26 363.56	21.44 408.26	25.40 459.37	28.58 459.37	25.40 381.70
500 20	508.0	4.78 60.46	4.78 60.46	5.54 70.00	5.54 78.55	6.35 117.15	6.35 155.12	9.53 117.15	9.53 114.65	9.53 183.42	11.13 247.83	12.70 155.12	12.70 155.82	12.70 311.17	15.09 381.53	18.26 441.49	21.44 506.11	25.40 564.81	28.58 564.81	25.40 441.49
550 22	558.8	4.78 66.57	4.78 66.57	5.54 77.06	5.54 86.54	6.35 129.13	6.35 171.09	9.53 129.13	9.53 128.14	9.53 294.25	11.13 294.25	12.70 171.09	12.70 216.75	12.70 373.83	15.09 451.42	18.26 527.02	21.44 600.63	25.40 672.26	28.58 672.26	25.40 527.02
600 24	609.6	5.54 84.16	5.54 84.16	6.35 96.37	6.35 94.53	6.35 141.12	6.35 209.64	9.53 141.12	9.53 141.63	9.53 255.41	11.13 355.26	12.70 187.06	12.70 187.85	12.70 442.08	15.09 547.71	18.26 640.03	21.44 720.15	25.40 808.22	28.58 808.22	25.40 640.03
650 26	660.4			7.92 127.36	7.92 202.72	6.35 152.87	6.35 153.62	9.53 152.87	9.53 153.62	9.53 355.26	11.13 355.26	12.70 202.72	12.70 203.82	12.70 442.08	15.09 547.71	18.26 640.03	21.44 720.15	25.40 808.22	28.58 808.22	25.40 640.03
700 28	711.2			7.92 137.32	7.92 218.69	6.35 271.21	6.35 164.85	9.53 164.85	9.53 165.61	9.53 355.26	11.13 355.26	12.70 218.69	12.70 218.69	12.70 442.08	15.09 547.71	18.26 640.03	21.44 720.15	25.40 808.22	28.58 808.22	25.40 640.03
750 30	762.0	6.35 120.72	6.35 120.72	7.92 150.36	7.92 147.28	6.35 234.67	6.35 292.18	9.53 176.84	9.53 174.60	9.53 355.26	11.13 355.26	12.70 234.67	12.70 235.79	12.70 442.08	15.09 547.71	18.26 640.03	21.44 720.15	25.40 808.22	28.58 808.22	25.40 640.03
800 32	812.8			7.92 157.24	7.92 250.64	6.35 312.15	6.35 188.82	9.53 188.82	9.53 177.60	9.53 342.91	11.13 342.91	12.70 250.64	12.70 248.79	12.70 442.08	15.09 547.71	18.26 640.03	21.44 720.15	25.40 808.22	28.58 808.22	25.40 640.03
850 34	863.6			7.92 167.20	7.92 266.61	6.35 332.12	6.35 202.31	9.53 201.58	9.53 364.90	9.53 364.90	11.13 364.90	12.70 266.61	12.70 267.77	12.70 442.08	15.09 547.71	18.26 640.03	21.44 720.15	25.40 808.22	28.58 808.22	25.40 640.03
900 36	914.4			7.92 176.96	7.92 282.27	6.35 351.70	6.35 212.56	9.53 213.57	9.53 420.40	9.53 420.40	11.13 420.40	12.70 282.27	12.70 283.75	12.70 442.08	15.09 547.71	18.26 640.03	21.44 720.15	25.40 808.22	28.58 808.22	25.40 640.03
950 38	965.2							9.53 224.54				12.70 298.24								
1000 40	1016.0							9.53 236.53				12.70 314.22								
1050 42	1066.8							9.53 248.52	9.53 249.54			12.70 330.19	12.70 331.71							
1100 44	1117.8							9.53 260.50				12.70 346.16								
1150 46	1168.4							9.53 272.25				12.70 351.82								
1200 48	1219.2							9.53 284.24	9.53 285.51			12.70 377.79	12.70 379.67							

Wall Thk (mm)
Weight (Kg/M)



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