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INDUSTRY GUIDELINES

METAL BACKING FLANGES FOR USE WITH PP/PE/FRP/PVC PIPE FLANGE ADAPTORS

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Mission Against Corrosion....

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METAL BACKING FLANGES FOR USE WITH PVC/FRP/PP/PE PIPE

FLANGE ADAPTORS

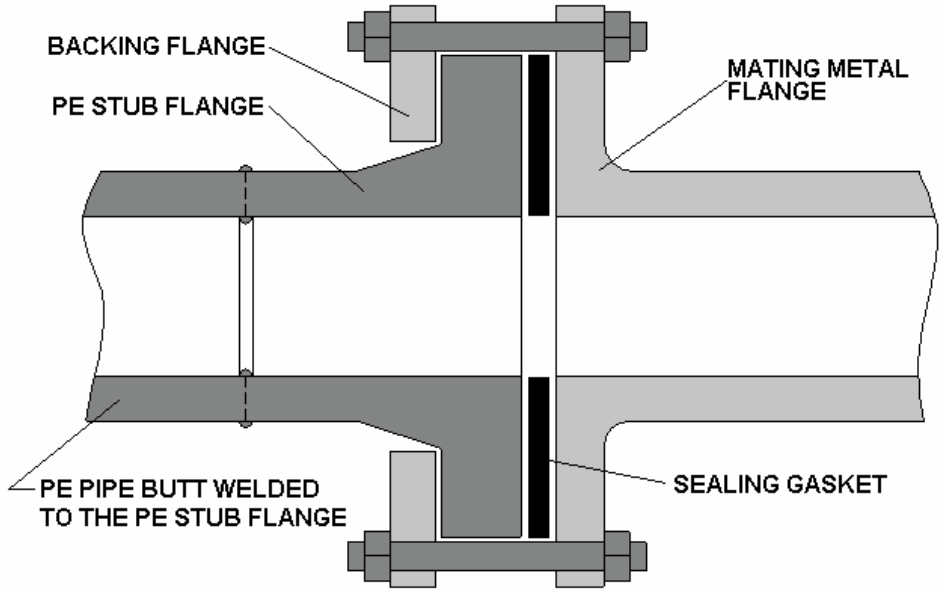
This document provides guidelines for the geometric specification of metal backing flanges suitable for the use with PE flange adaptors in the sizes DN20 through to DN1000 and flanges in accordance with AS 2129, ANSI/ASTM B16.5, AS/NZS 4331.1 (ISO 7005-1) and AS 4087.

NOTE: The thicknesses noted in the tables are applicable to steel. Different metals demand different thicknesses for the same performance, so for metals other than steel, consideration must be given to thickness.

Although tables 4, 5, 6 and 7 in these guidelines make reference to pressure ratings (PN / Class), these pressure ratings are nominal only, and advice from the flange adaptor manufacturer should be sought to clarify the actual pressure rating of the assembly.

BACKGROUND

Where there is a need to join polyethylene pipe to pipe of another material or ancillary equipment such as valves and pumps then mechanical flanges may be used. They provide not only a means of transition but a fully end load resistant joint that can also be disassembled for maintenance purposes.



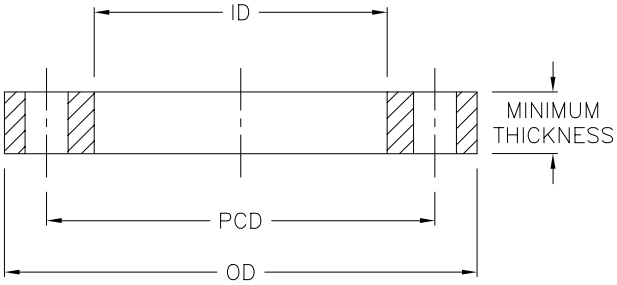
NON-CONFORMING FLANGES

The flange dimensions listed in this guideline conform to the Standards nominated. Flanges with

reduced thickness are used by industry for non-critical, low performance
Applications and are not recommended by PIPA.

Table 1: STEEL BACKING FLANGES

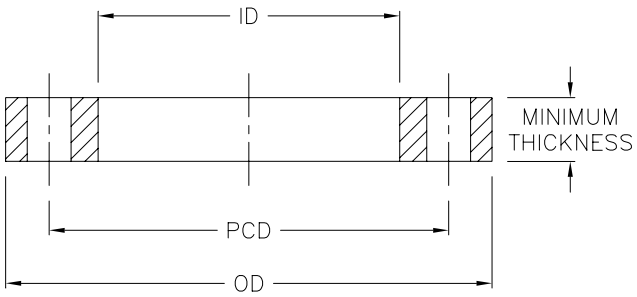
AS2129: TABLE D



Nominal Pipe OD	Flange Size	OD	ID	Minimum Thickness	PCD	Bolt Hole No. x Dia.	Bolt Size
20	**15**	95	28	6	67	4X14	M12
25	**20**	100	34	6	73	4X14	M12
32	**25**	115	42	7	83	4X14	M12
40	**32**	120	51	8	87	4X14	M12
50	**40**	135	62	9	98	4X14	M12
63	**50**	150	78	10	114	4X18	M16
75	**65**	165	92	10	127	4X18	M16
90	**80**	185	108	11	146	4X18	M16
110	**100**	215	128	10	178	4X18	M16
125	**100**	215	135	10	178	4X18	M16
125	**125**	255	140	13	210	8X18	M16
140	**125**	255	158	13	210	8X18	M16
160	**150**	280	178	13	235	8X18	M16
180	**150**	280	188	13	235	8X18	M16
200	**200**	335	235	13	292	8X18	M16
225	**200**	335	238	13	292	8X18	M16
250	**250**	405	288	16	356	8X22	M20
280	**250**	405	294	16	356	8X22	M20
315	**300**	455	338	19	406	12X22	M20
355	**350**	525	376	22	470	12X26	M24
400	**400**	580	430	22	521	12X26	M24
450	**450**	640	470	25	584	12X26	M24
500	**500**	705	533	29	641	16X26	M24
560	**550**	760	618	29	699	16X30	M27
630	**600**	825	645	32	756	16X30	M27
710	**700**	910	740	35	845	20X30	M27
800	**800**	1060	843	41	984	20X36	M33
900	**900**	1175	947	48	1092	24X36	M33
1000	**1000**	1255	1050	51	1175	24X36	M33

As per ISO 9624: "The inside diameter of the loose backing flange shall conform to the design of the flange adaptor. In some applications, values of the inside diameter of the loose backing flange differing from those given in the tables may be used."

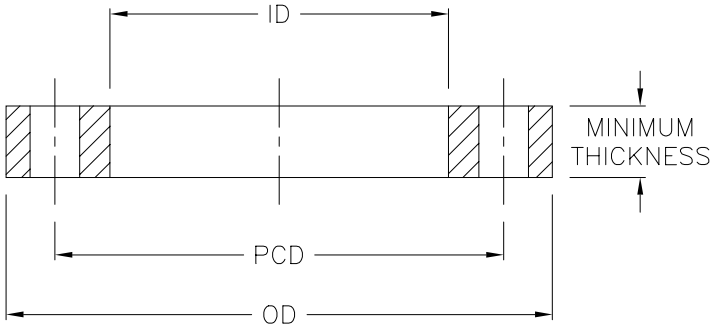
Table 2: STEEL BACKING FLANGES
AS 2129: TABLE E



Nominal Pipe OD	Flange Size	OD	ID	Minimum Thickness	PCD	Bolt Hole No. x Dia.	Bolt Size
20	**15**	95	28	6	67	4X14	M12
25	**20**	100	34	6	73	4X14	M12
32	**25**	115	42	7	83	4X14	M12
40	**32**	120	51	8	87	4X14	M12
50	**40**	135	62	9	98	4X14	M12
63	**50**	150	78	10	114	4X18	M16
75	**65**	165	92	10	127	4X18	M16
90	**80**	185	108	11	146	4X18	M16
110	**100**	215	128	13	178	8X18	M16
125	**100**	215	135	13	178	8X18	M16
125	**125**	255	140	14	210	8X18	M16
140	**125**	255	158	14	210	8X18	M16
160	**150**	280	178	17	235	8X22	M20
180	**150**	280	188	17	235	8X22	M20
200	**200**	335	235	19	292	8X22	M20
225	**200**	335	238	19	292	8X22	M20
250	**250**	405	288	22	356	12X22	M20
280	**250**	405	294	22	356	12X22	M20
315	**300**	455	338	25	406	12X26	M24
355	**350**	525	376	29	470	12X26	M24
400	**400**	580	430	32	521	12X26	M24
450	**450**	640	470	35	584	16X26	M24
500	**500**	705	533	38	641	16X26	M24
560	**550**	760	618	44	699	16X30	M27
630	**600**	825	645	48	756	16X33	M30
710	**700**	910	740	51	845	20X33	M30
800	**800**	1060	843	54	984	20X36	M33
900	**900**	1175	947	64	1092	24X36	M33
1000	**1000**	1255	1050	67	1175	24X39	M36

As per ISO 9624: "The inside diameter of the loose backing flange shall conform to the design of the flange adaptor. In some applications, values of the inside diameter of the loose backing flange differing from those given in the tables may be used."

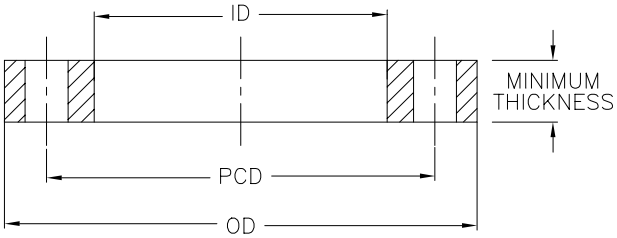
Table 3: STEEL BACKING FLANGES
A.N.S.I. 150



Nominal Pipe OD	Flange Size	OD	ID	Minimum Thickness	PCD	Bolt Hole No. x Dia.	Bolt Size
20	**½"**	90	28	11.2	60.5	4X16	M14
25	**¾"**	98	34	12.8	70	4X16	M14
32	**1"**	108	42	14.2	79.5	4X16	M14
40	**1 ¼"**	117	51	15.7	89	4X16	M14
50	**1 ½"**	127	62	17.5	98.5	4X16	M14
63	**2"**	152	78	19.0	120.5	4X20	M18
75	**2 ½"**	178	92	22.3	139.5	4X20	M18
90	**3"**	191	108	23.9	152	4X20	M18
110	**4"**	229	128	23.9	190.5	8X20	M18
125	**5"**	254	135	23.9	216	8X22	M20
140	**5"**	254	158	23.9	216	8X22	M20
160	**6"**	279	178	25.4	241	8X22	M20
180	**6"**	279	188	25.4	241	8X22	M20
200	**8"**	343	235	28.4	298.5	8X22	M20
225	**8"**	343	238	28.4	298.5	8X22	M20
250	**10"**	406	288	30.2	362	12X26	M24
280	**10"**	406	294	30.2	362	12X26	M24
315	**12"**	482	338	31.8	432	12X26	M24
355	**14"**	533	376	35.0	476	12X30	M27
400	**16"**	600	430	36.6	540	16X30	M27
450	**18"**	635	470	39.6	578	16X33	M30
500	**20"**	700	533	43.0	635	20X33	M30
630	**24"**	815	645	47.8	750	20X36	M33

As per ISO 9624: "The inside diameter of the loose backing flange shall conform to the design of the flange adaptor. In some applications, values of the inside diameter of the loose backing flange differing from those given in the tables may be used."

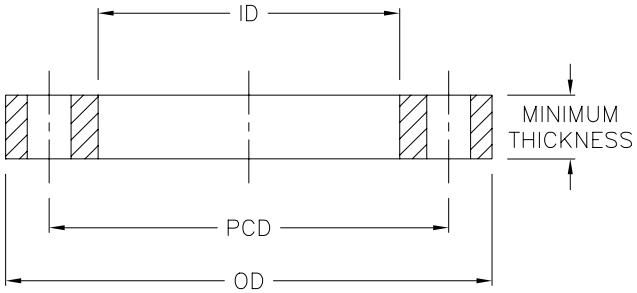
Table 4: STEEL BACKING FLANGES
AS/NZS4331.1(ISO7005-1)–Table 10
PN10



Nominal Pipe OD	Flange Size	OD	ID	Minimum Thickness	PCD	Bolt Hole No. x Dia.	Bolt Size
20	**15**	95	28	14	65	4X14	M12
25	**20**	105	34	16	75	4X14	M12
32	**25**	115	42	16	85	4X14	M12
40	**32**	140	51	18	100	4X18	M16
50	**40**	150	62	18	110	4X18	M16
63	**50**	165	78	20	125	4X18	M16
75	**65**	185	92	20	145	8X18	M16
90	**80**	200	108	20	160	8X18	M16
110	**100**	220	128	22	180	8X18	M16
125	**100**	220	135	22	180	8X18	M16
140	**125**	250	158	22	210	8X18	M16
160	**150**	285	178	24	240	8X22	M20
180	**150**	285	188	24	240	8X22	M20
200	**200**	340	235	24	295	8X22	M20
225	**200**	340	238	24	295	8X22	M20
250	**250**	395	288	26	350	12X22	M20
280	**250**	395	294	26	350	12X22	M20
315	**300**	445	338	28	400	12X22	M20
355	**350**	505	376	30	460	16X22	M20
400	**400**	565	430	32	515	16X26	M24
450	**450**	615	470	35	565	20X26	M24
450	**500**	670	517	38	620	20X26	M24
500	**500**	670	533	38	620	20X26	M24
560	**600**	780	618	42	725	20X29.5	M27
630	**600**	780	645	42	725	20X29.5	M27
710	**700**	895	740	-	840	24X29.5	M27
800	**800**	1015	843	-	950	24X32.5	M30
900	**900**	1115	947	-	1050	28X32.5	M30
1000	**1000**	1230	1050	-	1160	28X35.5	M33

As per ISO 9624: "The inside diameter of the loose backing flange shall conform to the design of the flange adaptor. In some applications, values of the inside diameter of the loose backing flange differing from those given in the tables may be used."

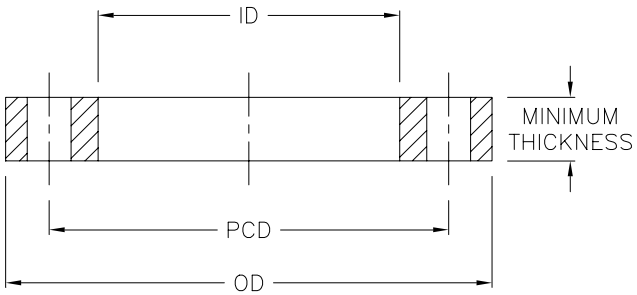
Table 5: STEEL BACKING FLANGES
AS/NZS 4331.1 (ISO 7005-1) – Table 11
PN16



Nominal Pipe OD	Flange Size	OD	ID	Minimum Thickness	PCD	Bolt Hole No. x Dia.	Bolt Size
20	**15**	95	28	14	65	4X14	M12
25	**20**	105	34	16	75	4X14	M12
32	**25**	115	42	16	85	4X14	M12
40	**32**	140	51	18	100	4X18	M16
50	**40**	150	62	18	110	4X18	M16
63	**50**	165	78	20	125	4X18	M16
75	**65**	185	92	20	145	8X18	M16
90	**80**	200	108	20	160	8X18	M16
110	**100**	220	128	22	180	8X18	M16
125	**100**	220	135	22	180	8X18	M16
140	**125**	250	158	22	210	8X18	M16
160	**150**	285	178	24	240	8X22	M20
180	**150**	285	188	24	240	8X22	M20
200	**200**	340	235	26	295	12X22	M20
225	**200**	340	238	26	295	12X22	M20
250	**250**	405	288	28	355	12X26	M24
280	**250**	405	294	28	355	12X26	M24
315	**300**	460	338	32	410	12X26	M24
355	**350**	520	376	35	470	16X26	M24
400	**400**	580	430	38	525	16X29.5	M27
450	**450**	640	470	42	585	20X29.5	M27
500	**500**	715	533	46	650	20X32.5	M30
560	**600**	840	618	52	770	20X35.5	M33
630	**600**	840	645	52	770	20X35.5	M33
710	**700**	910	740	-	840	24X35.5	M33
800	**800**	1025	843	-	950	24X39	M36
900	**900**	1125	947	-	1050	28X39	M36
1000	**1000**	1255	1050	-	1170	28X42	M39

As per ISO 9624: "The inside diameter of the loose backing flange shall conform to the design of the flange adaptor. In some applications, values of the inside diameter of the loose backing flange differing from those given in the tables may be used."

Table 6: STEEL BACKING FLANGES
AS 4087 - Figure B7
PN16



Nominal Pipe OD	Flange Size	OD	ID	Minimum Thickness	PCD	Bolt Hole No. x Dia.	Bolt Size
63	**50**	150	78	11	114	4X18	M16
75	**65**	165	92	11	127	4X18	M16
90	**80**	185	108	11	146	4X18	M16
110	**100**	215	128	13	178	4X18	M16
160	**150**	280	178	13	235	8X18	M16
200	**200**	335	235	19	292	8X18	M16
225	**225**	370	238	19	324	8X18	M16
250	**250**	405	288	19	356	8X22	M20
315	**300**	455	338	23	406	12X22	M20
355	**350**	525	376	30	470	12X26	M24
n/a	**375**	550	n/a	30	495	12X26	M24
400	**400**	580	430	30	521	12X26	M24
450	**450**	640	470	30	584	12X26	M24
500	**500**	705	533	38	641	16X26	M24
630	**600**	825	645	48	756	16X30	M27
710	**700**	910	740	56	845	20X30	M27
n/a	**750**	995	n/a	56	927	20X33	M30
800	**800**	1060	843	56	984	20X36	M33
900	**900**	1175	947	66	1092	24X36	M33
1000	**1000**	1255	1050	66	1175	24X36	M33

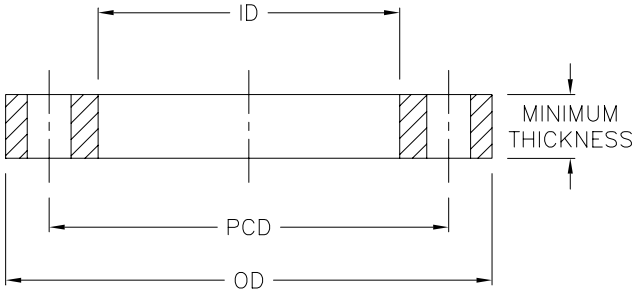
Note: This table has bolting compatibility with AS 2129 Table D flanges.

As per ISO 9624: "The inside diameter of the loose backing flange shall conform to the design of the flange adaptor. In some applications, values of the inside diameter of the loose backing flange differing from those given in the tables may be used."

Table 7: STEEL BACKING FLANGES

AS 4087 - Figure B8

PN21



Nominal Pipe OD	Flange Size	OD	ID	Minimum Thickness	PCD	Bolt Hole No. x Dia.	Bolt Size
63	**50**	165	78	15	127	4X18	M16
75	**65**	185	92	15	146	8X18	M16
90	**80**	205	108	15	165	8X18	M16
110	**100**	230	128	19	191	8X18	M16
160	**150**	305	178	24	260	12X22	M20
200	**200**	370	235	24	324	12X22	M20
225	**225**	405	238	30	356	12X26	M24
250	**250**	430	288	30	381	12X26	M24
315	**300**	490	338	30	438	16X26	M24
355	**350**	550	376	30	495	16X30	M27
n/a	**375**	580	n/a	38	521	16X30	M27
400	**400**	610	430	38	552	20X30	M27
450	**450**	675	470	38	610	20X33	M30
500	**500**	735	533	48	673	24X33	M30
630	**600**	850	645	58	781	24X36	M33
710	**700**	935	740	58	857	24X36	M33
n/a	**750**	1015	n/a	58	940	28X36	M33
800	**800**	1060	843	68	984	28X36	M33
900	**900**	1185	947	68	1105	32X39	M36
1000	**1000**	1275	1050	78	1194	36X39	M36

Note: This table has bolting compatibility with AS 2129 Table F & H flanges.

As per ISO 9624: "The inside diameter of the loose backing flange shall conform to the design of the flange adaptor. In some applications, values of the inside diameter of the loose backing flange differing from those given in the tables may be used."

CORROSION PROTECTION

Flanges and fasteners should be plated in accordance with Australian standards or codes such as AS/NZS 4680 for galvanizing. Alternatively, stainless steel flanges and fasteners can be used or flanges can be protected with polymeric coatings in accordance with AS/NZS 4158 and be used in conjunction with stainless steel fasteners.

MARKING

Flanges should be permanently and legibly marked with the flange designation and the manufacturer's name, either on the rim or on the back of the flange between the rim and the pitch circle diameter.

TEMPERATURE DERATING

For continuous operation at temperatures above 20° C, specific design data should be obtained from the pipe and fitting manufacturers.

GASKETS

The gasket material shall be suitable for the flange, the fluid and the environment. For specific requirements contact the manufacturer.

For flanged joints intended for use with potable water the gasket material must comply with AS/NZS 4020.

INSTALLATION

Caution - Since polyethylene pipe systems are end load bearing, care must be taken where connection is made to pipe of another material, to prevent pullout of any non end-load bearing joints.

1) Ensure the backing flange is placed over the pipe before the stub flange is fused to the pipe.
2) Ensure the mating faces are clean and free for contamination and damage.
3) Pipe work configuration shall be such that the mating faces are in true alignment and butted square to each other prior to bolting up.
4) The gasket must be centered properly between the two flanges before tightening commences.
5) The nuts and bolts must be progressively tightened and as uniformly possible in a diagonally opposite sequence.

REFERENCED DOCUMENTS

AS 2129	"Flanges for pipes, valves and fittings"
AS 4087	"Metallic flanges for waterworks purposes"
AS/NZS 4020	"Testing of products for use in contact with drinking water" AS/NZS 4158
	"Thermal-bonded polymeric coatings on valves and fittings for Water industry purposes"
AS/NZS 4331.1	"Metallic flanges Part 1: Steel flanges" (identical to ISO 7005-1) AS/NZS
4680	"Hot-dip galvanized (zinc) coatings on fabricated ferrous articles"
ANSI/ASTM B16.5	"Pipe Flanges and Flanged Fittings"
ISO 9624	"Thermoplastics pipes for fluids under pressure – Mating dimensions of flange adaptors and loose backing flanges"