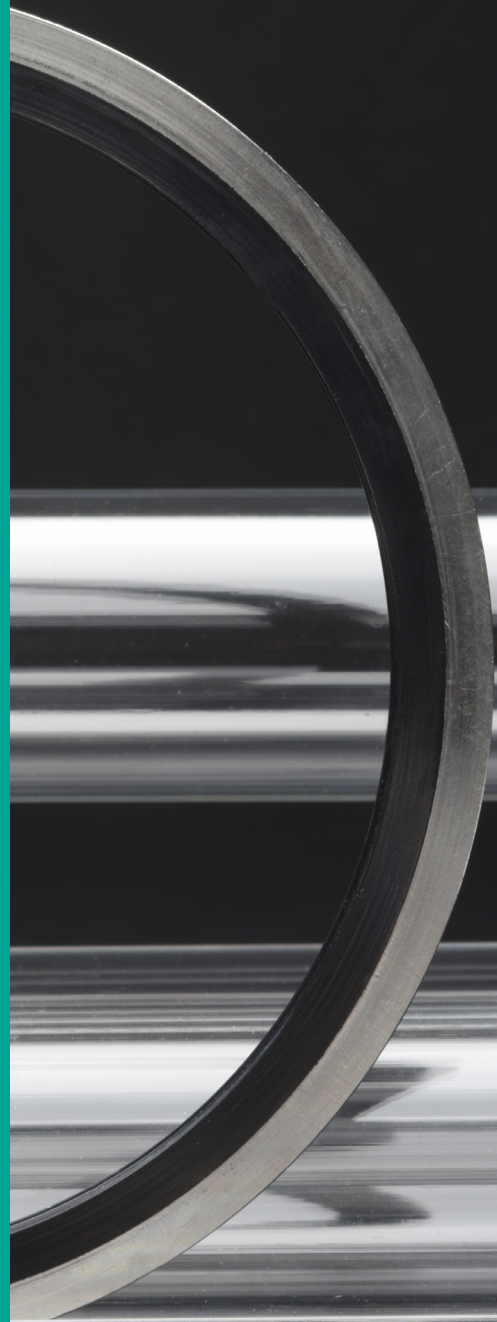


METAL-RUBBER BONDED SEALS



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1 – BONDED SEALS

1.1 – General information

The bonded seal consist of a metal washer of rectangular cross-section with a bonded and vulcanised inner rubber ring of trapezoidal cross-section.

The type of metal and rubber family are selected according to application, fluid to be sealed, temperature and pressure.

The bonded seal is particularly suitable for sealing under screw heads, bolts and in Banjo fittings and pipe fittings (high and low pressure). It has the advantage of being removable and reusable, unlike other seals such as copper washers.

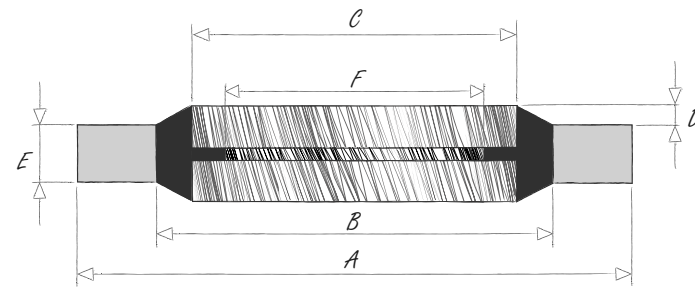


Self-centralising bonded seal

The centred positioning of the bonded seal is achieved by a thin membrane with an inner diameter equal to the core diameter of the locating thread.

Benefits of self-centralisation:

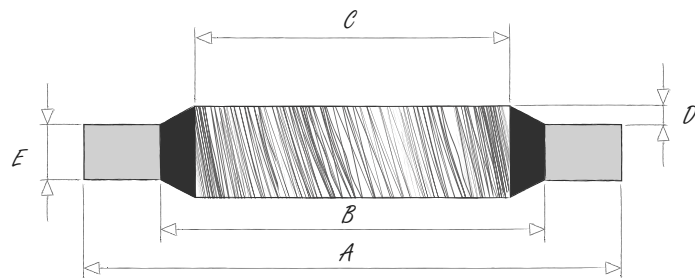
- Correct positioning of the seal and retention in case of disassembly
- Ease of installation
- Reduced assembly time
- Lower machining costs



Bonded seal without self-centralisation

The bonded seal can also be made in a version without self-centralisation.

This version does not have a lip to ensure centralisation, so the recommendations in section 1.2.2 on page 147 should be followed for its correct positioning.



Hutchinson offers two standard metal washer:

- Rolled cold-worked mild steel with a tensile strength of 540 MPa protected by an anti-corrosion treatment
- Cold-worked T316 stainless steel with a tensile strength of 540 MPa

Other metals are listed in the table below with their specifications. The ring metal must be softer than the sub-assembly in which it is fitted. Special attention should be paid to combinations of metals that may form a bimetallic couple.

Metal	Tensile strength (MPa min.)	Specification
Rolled cold-worked mild steel DC01 (standard)	540	EN 10139
Machined mild steel EN8	540	EN 10083-2
Cold-worked stainless steel T316 (standard)	540	EN 10088-2
Machined stainless steel T316	540	EN 10088-3
T316 S1000 grade machined stainless steel	1000	EN 10088-3
Super duplex stainless steel	750	EN 10088-3
High-tensile steel	880	S154
Machined brass CZ121	380	EN 12164
Cold-worked brass CZ108	380	EN 1652
Machined cupro-aluminium alloy	700	CA104 & NES 833
Cold-worked aluminium, 5251-H22 grade	220	EN 485-2
Machined aluminium alloy	370	L102 & L168
Machined aluminium alloy (6082-T6)	295	EN 573-3

1.1.1 – Surface treatments

The metal insert can be protected by anti-corrosion surface treatment.

Surface treatment	Code	Specification
Trivalent zinc nickel passivation (transparent)	P18 (standard)	12-15% nickel - 5 microns min.
Trivalent zinc nickel passivation (black)	P26	12-15% nickel - 5 microns min.

Bonded seals are offered in the catalogue in the 4 compounds below, in combination with a mild steel or T316 stainless steel metal insert. A selection of standard dimensions to meet the needs of industrial markets is available on page 148.

To meet special requirements, our bonded seals can also be made with other compounds in our range (pages 41 to 43).

This is an extract of our catalog, find the compound list in the full version by scanning this QR code..



Family	Compound	Colour	Hardness (Sh.A)	Temperature of use			Compression Set	
				Min (°C)	Max continuous (°C)	Max peak (°C)	%	Conditions
NBR	PC851	black	78	-30	100	120	15	24h at 100°C
FKM	DF851	black	84	-25	200	250	20	72h at 200°C
FKM	7DF2075	green	78	-25	200	250	23	72h at 200°C
EPDM	7EP1197	black	70	-50	140	175	12	24h at 150°C

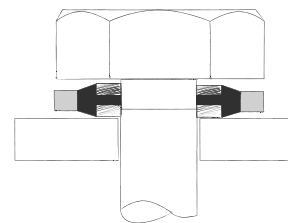
1.2 - Fitting instructions

1.2.1 - Tightening torque

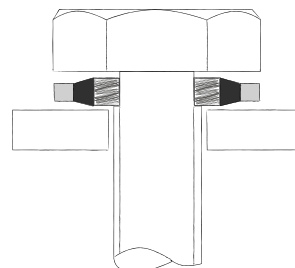
The performance of the bonded seal depends on the quality of the fitting and the compression rate. The table opposite shows the torque required to ensure correct operation of the seal. In the case of a two-seal assembly, a coefficient should be applied to the tightening torque.

Metric	Dimensions		Recommended torque	
	BOLT	BSP	Torque single ring (Nm)	Torque double ring (Nm)
< M 8	5/16	-	5.3	8.5
M 10	3/8	1/8	7.1	11.4
M 11	7/16	-	11.8	15.3
M 12	1/2	1/4	15.8	20.5
M 14	9/16	-	22.6	29.4
M 16	5/8	3/8	30.5	39.7
M 18	3/4	-	40.7	52.9
M 20	13/16	1/2	56.5	67.8
M 22	7/8	5/8	67.8	74.6
M 24	1.0	3/4	73.4	73.4
> M 27	1.1/16	-	79.0	79.0

Self-centrising bonded seal



Bonded seal without self-centrisation

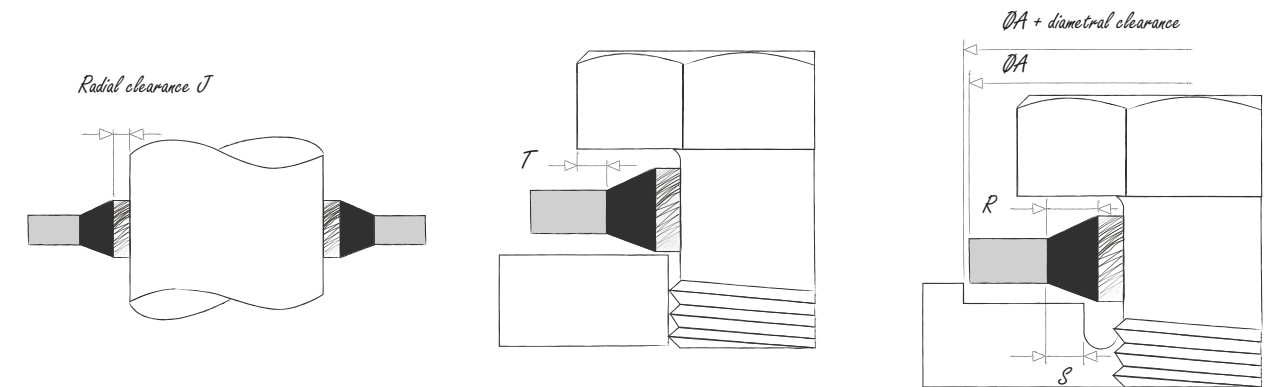


If the maximum radial clearance cannot be respected, the seal must be centred on its outer diameter by using a counter-bore.

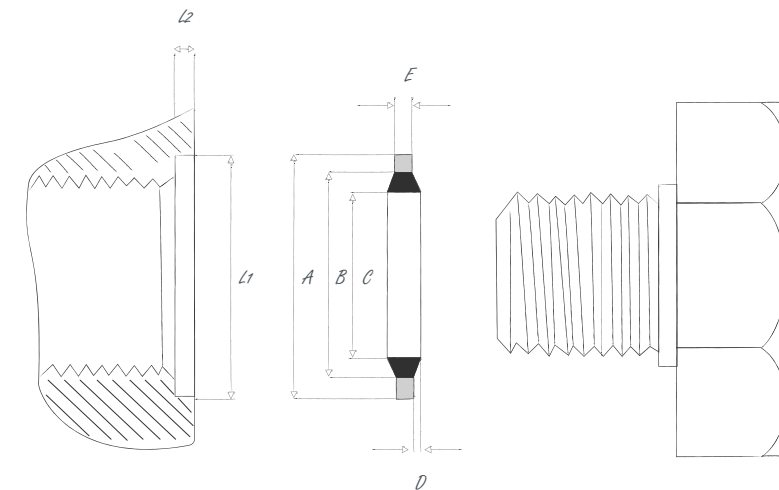
In all cases, the overlapping (T) of the metal ring must be a minimum of 0.7 mm and the overlapping of the rubber ring at least 75% (S ≥ 0.75 R).

Counter-bore = Diameter A + diametral clearance (mm)

Metric	Max. clearance J at radius (mm)	Counter-bore (mm)
M 3 to M 8.5	0.30	Ø A + 0.20
M 9 to M 33	0.35	Ø A + 0.40
M 34 to M 60	0.50	Ø A + 0.60



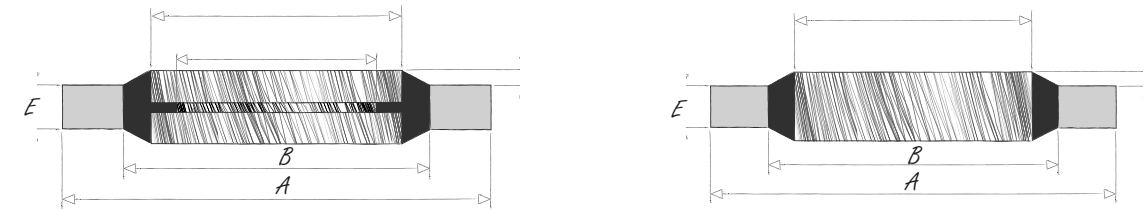
Overall view



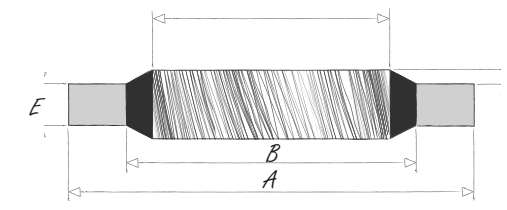
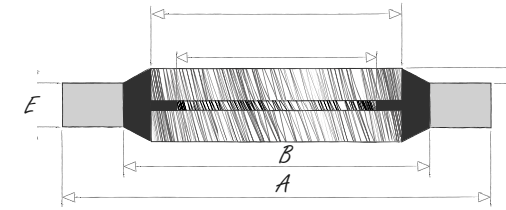
L1: ØA + diametral clearance
L2: E/2 maximum

1.3 – British Imperial size guide

The following list of dimensions present the standard codes of our bonded seals with and without self-centralisation, available in two types of steel or stainless steel metal inserts and in 4 compounds (page 146) to meet the needs of the applications.



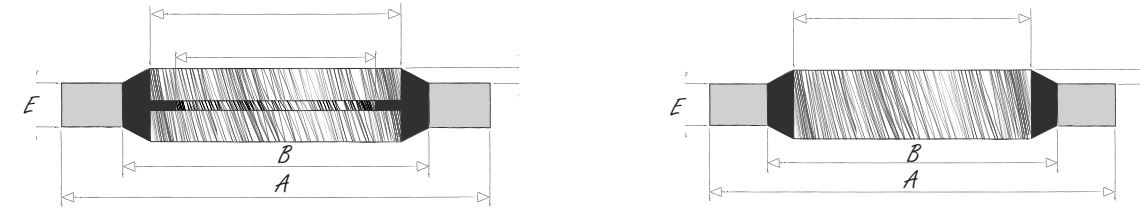
Dimension ref.	Size standards		Seal number	Dimensions (mm)						Min. burst pressure (bar)	WITH SELF-CENTRALISING					WITHOUT SELF-CENTRALISING				
	BSP	BOLT		A +0.13 -0.00	B +0.10 -0.10	C +0.10 -0.10	D	E +0.15 -0.15	F* +0.20 -0.20		LJF part number by metal-rubber combination					LJF part number by metal-rubber combination				
											STEEL + PC851	STEEL + DF851	S/STEEL + 7EP1197	S/STEEL + PC851	S/STEEL + 7DF2075	STEEL + PC851	STEEL + DF851	S/STEEL + 7EP1197	S/STEEL + PC851	S/STEEL + 7DF2075
001	-	6BA	AS2,5	6.35	4.09	3.05	0.20/0.45	1.22	-	2485	-	-	-	-	-	205112	212634	205484	205566	205525
002	-	4BA	AS3,5	7.26	5.26	4.12	0.20/0.45	1.22	-	1710	-	-	-	-	-	205114	212635	205485	205567	205526
003	-	2BA	AS4,6	8.38	6.35	5.21	0.20/0.45	1.22	-	1435	-	-	-	-	-	205115	212636	205486	205568	205527
004	-	1/4	A6,3	13.21	8.00	6.86	0.20/0.45	1.22	4.70	2930	207377	205812	205487	205569	211903	205116	212637	205921	207455	212452
005	-	1/4	A6,4	13.34	9.53	6.99	0.20/0.45	1.22	4.70	1795	206380	212780	212816	212792	212801	205126	212638	205922	205851	212453
006	-	5/16	AS7,7	13.34	9.53	8.31	0.20/0.45	1.22	6.10	1795	205242	211977	205488	205570	205529	205118	212639	212856	212128	212833
007	-	5/16	A7,9	14.22	10.04	8.64	0.20/0.45	1.22	6.10	1870	207378	212781	212817	211703	212802	205119	212640	212857	205281	212834
020	1/8	3/8	B9,7	15.88	11.84	10.37	0.25/0.51	2.03	8.56	1535	206261	206014	211662	211756	211911	206123	206191	205923	212155	212461
008	-	0.4	B10,6	18.36	12.45	11.26	0.25/0.51	2.03	8.56	2135	207379	205817	205489	205571	205530	206125	212641	212858	212133	212835
009	-	7/16	B11	19.05	13.08	11.69	0.25/0.51	2.03	8.80	2050	211344	211978	212818	212793	212803	206126	212642	212859	212135	212836
021	1/4	1/2	B13	20.57	15.21	13.74	0.25/0.51	2.03	11.45	1585	206262	206328	205490	205572	205531	210880	212649	205924	206115	212541
010	-	9/16	BS14,2	22.23	16.39	14.86	0.25/0.51	2.03	11.58	1600	206295	211979	205491	205573	205532	210864	212643	212860	212137	212837
022	-	0.6	B15,1	22.23	17.30	15.83	0.25/0.51	2.03	12.10	1280	206381	212782	212819	212794	212804	206147	212652	212861	212162	212838
011	-	5/8	BS15,8	25.40	18.75	16.51	0.25/0.51	2.03	12.90	1595	206285	205081	205492	205574	205533	206133	207424	205925	212139	212455
023	3/8	-	B16,6	23.80	18.75	17.28	0.25/0.51	2.03	14.96	1210	206263	205053	205493	205575	205534	206136	212654	212095	212165	206034
012	-	11/16	CS17,5	25.40	19.69	18.16	0.25/0.51	2.50	14.50	1300	207231	205809	205494	205576	205535	210868	205988	212862	212142	212839
024	-	3/4	CS19	26.92	21.21	19.69	0.25/0.51	2.50	15.80	1210	207242	205810	205495	205577	205536	207119	212655	205926	212167	212469
025	1/2	13/16	C20,8	28.58	23.01	21.54	0.25/0.51	2.50	18.64	1085	207210	207267	205496	205578	205537	207121	205077	205927	205290	212542
026	5/8	7/8	C22,8	31.75	24.97	23.49	0.25/0.51	2.50	20.60	1220	207211	211981	205497	205579	205538	207136	205989	205928	212175	212471
013	-	15/16	C23,6	33.27	26.04	24.26	0.25/0.51	2.50	20.20	1245	207380	205813	205498	205580	205539	210869	205990	205929	212143	212456
027	3/4	1.0	C26,4	34.93	28.53	27.05	0.25/0.51	2.50	24.13	1005	207212	205309	205499	205581	205540	207135	212657	212863	212179	212840
028	-	1.1/16	C27,1	38.61	30.61	27.82	0.25/0.51	2.50	22.90	1175	207381	212783	212820	212795	212805	210892	212659	212864	212841	212842
014	-	1.1/8	C28,6	36.58	30.86	29.33	0.25/0.51	2.50	23.90	830	211350	211980	212821	212796	212806	208105	212644	212865	212144	212843
029	7/8	1.3/16	C30,1	38.10	32.29	30.81	0.25/0.51	2.50	27.89	805	208174	211982	205500	205582	205541	208118	212660	205930	212182	205786
015	-	1.1/4	C31,9	41.40	35.69	32.64	0.25/0.51	3.38	27.10	715	207382	212784	212822	212797	212807	208117	208142	212866	212146	212844
030	1.0	1.5/16	C33,2	42.80	36.88	33.89	0.25/0.51	3.38	30.30	720	211370	211983	205980	211734	206063	210917	212661	212097	212186	212475
016	-	1.3/8	D34,9	44.45	38.99	35.94	0.25/0.51	3.38	29.50	630	207384	205811	205502	205584	205543	210872	205991	212867	212147	212458
017	-	1.1/2	D38	47.75	42.04	38.96	0.25/0.51	3.38	32.70	610	207385	212785	212823	212798	212808	205804	212645	212868	212149	212845
032	1.1/4	1.5/8	D41,9	52.38	45.93	42.93	0.25/0.51	3.38	38.96	630	205881	211984	205981	211738	206064	210918	212664	212098	212191	206035
018	-	1.3/4	D44,3	57.15	48.39	45.34	0.25/0.51	3.38	37.90	810	207386	212786	212824	212799	212809	205984	212646	212869	212846	212847
033	1.1/2	1.7/8	D47,4	58.60	51.39	48.44	0.25/0.51	3.38	44.86	630	205882	211985	205982	211740	206065	208120	212665	212870	212194	212848



Dimension ref.	Size standards		Seal number	Dimensions (mm)						Min. burst pressure (bar)	WITH SELF-CENTRALISING					WITHOUT SELF-CENTRALISING				
	BSP	BOLT		A +0.13 -0.00	B +0.10 -0.10	C +0.10 -0.10	D	E +0.15 -0.15	F* +0.20 -0.20		LJF part number by metal-rubber combination					LJF part number by metal-rubber combination				
											STEEL + PC851	STEEL + DF851	S/STEEL + 7EP1197	S/STEEL + PC851	S/STEEL + 7DF2075	STEEL + PC851	STEEL + DF851	S/STEEL + 7EP1197	S/STEEL + PC851	S/STEEL + 7DF2075
019	-	2.0	D50,7	63.50	54.74	51.69	0.25/0.51	3.38	43.60	720	211355	212787	212825	212800	212810	210876	212647	212871	212151	212849
034	1.3/4	2.1/8	D53,9	69.85	58.30	54.89	0.25/0.51	3.38	50.80	890	207387	206016	205983	211742	206066	208121	212666	212872	212196	212850
036	2.0	-	D59,6	73.03	63.63	60.58	0.25/0.51	3.38	56.67	660	211375	211986	212826	211743	212811	205875	212667	212873	212197	212851
037	-	2.1/2	D63,4	77.72	67.44	64.39	0.25/0.51	3.38	55.40	685	212788	212789	212827	211744	212812	205876	205992	212874	212199	212852
038	2.1/4	-	D65,7	79.50	69.98	66.68	0.25/0.51	3.38	62.80	610	211376	211987	212828	211745	212813	210903	205993	212875	212201	212853
039	2.1/2	-	D75,1	90.17	79.38	76.08	0.25/0.51	3.38	72.20	610	207388	212790	212829	211746	212814	210905	212668	212876	212203	212854
079	3.0	-	D88,1	101.47	92.84	89.09	0.25/0.51	3.38	85.00	415	208190	212791	212830	211747	212815	210906	212669	212877	212204	212484
9030	1.0	-	C33,2	42.80	36.88	33.89	0.25/0.51	2.50	30.30	720	207383	207459	205501	205583	205542	207341	212746	212878	212416	212855
9032	1.1/4	-	D41,9	52.38	45.93	42.93	0.25/0.51	2.50	38.96	630	208176	205310	205503	205585	205544	207343	212747	205931	212417	212584
9033	1.1/2	-	D47,4	58.60	51.39	48.44	0.25/0.51	2.50	44.86	630	208177	205664	212831	211832	211940	207340	212748	205932	212418	212586
9036	2.0	-	D59,6	73.03	63.63	60.58	0.25/0.51	2.50	56.67	660	207336	212044	212832	211833	211941	207342	212750	205933	205852	212587

1.4 – French metric size guide

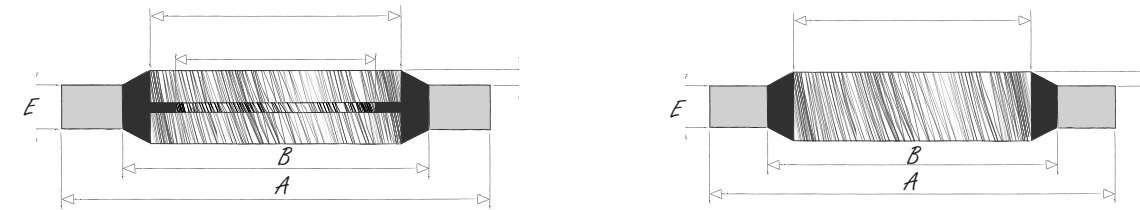
The following list of dimensions present the standard codes of our bonded seals with and without self-centralisation, available in two types of steel or stainless steel metal inserts and in 4 compounds (page 146) to meet the needs of the applications.



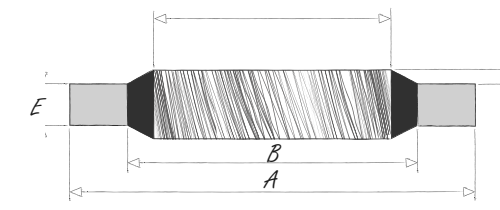
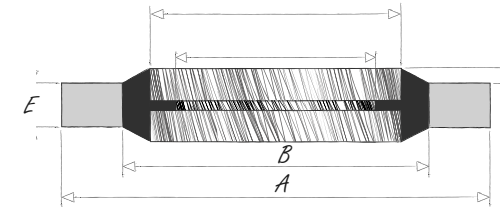
Dimension ref.	Size standard	Seal number	Dimensions (mm)							Min. burst pressure (bar)	WITH SELF-CENTRALISING					WITHOUT SELF-CENTRALISING				
			A	B	C	D	E	F*	LJF part number by metal-rubber combination					LJF part number by metal-rubber combination						
			+0.13 -0.00	+0.10 -0.10	+0.10 -0.10	+0.25 -0.00	+0.10 -0.10	+0.20 -0.20	STEEL + PC851		STEEL + DF851	S/STEEL + 7EP1197	S/STEEL + PC851	S/STEEL + 7DF2075	STEEL + PC851	STEEL + DF851	S/STEEL + 7EP1197	S/STEEL + PC851	S/STEEL + 7DF2075	
301	M3	A3	7.50	5.00	3.60	0.30	1.00	-	2250	-	-	-	-	-	205113	212720	205464	205545	205504	
302	M4	A4	9.00	6.00	4.60	0.30	1.00	-	2250	-	-	-	-	-	205122	205164	212105	205123	212549	
303	M5	A5	10.00	7.00	5.60	0.30	1.00	4.50	1925	205241	205070	212885	205157	212886	205111	205166	207419	205292	212550	
304	M6	A6	11.00	8.00	6.60	0.30	1.00	4.70	1685	205237	205003	205468	205550	205508	207349	205167	205934	205248	212554	
306	M6	A6,4	11.40	8.40	7.00	0.30	1.00	4.70	1605	205883	206020	205909	205858	206072	205117	205994	205935	205218	206036	
307	M8	AX8	13.00	10.00	8.60	0.30	1.00	6.40	1350	207403	212887	212888	205406	212889	205121	205172	205936	205291	205227	
310	M10	BX10	17.00	12.10	10.70	0.30	1.50	8.56	1820	207410	207335	206154	205407	211942	206124	206174	205937	206145	212560	
312	M11	B11,1	18.10	13.20	11.80	0.30	1.50	9.80	1670	207404	206021	211684	205859	206073	206127	205995	205938	205856	206037	
313	M12	B12	19.00	14.10	12.70	0.30	1.50	9.73	1560	206283	207452	205474	205556	205515	206128	206197	206113	206278	206038	
315	M13	B13,1	20.10	15.20	13.80	0.40	1.50	10.80	1450	205884	205001	212890	205860	205012	206130	206198	205939	206141	207435	
316	M14	BS14	21.00	16.10	14.70	0.30	1.50	11.38	1365	207405	212891	205595	205079	211935	206131	206175	205940	205896	212551	
317	M16	BS16	23.00	18.10	16.70	0.30	1.50	13.41	1215	207406	205593	205478	205560	205519	206134	206202	205942	212380	206253	
318	M17	B16,7	23.70	18.80	17.40	0.40	1.50	13.08	1170	205885	206022	205910	205861	206074	207348	212726	205943	206277	206039	
320	M18	C18	27.00	20.40	18.70	0.30	2.00	14.76	1455	205886	206023	205911	205862	206075	207118	207150	207365	207106	206040	
321	M20	C20	29.00	22.40	20.70	0.30	2.00	16.76	1325	205887	206024	205912	205863	206076	207120	207160	205944	212382	206041	
323	M21	C21	30.00	23.40	21.70	0.40	2.00	17.80	1265	205888	212892	212893	205440	212894	207122	207156	205945	212387	206042	
324	M22	C22	31.00	24.40	22.70	0.40	2.00	18.74	1215	207407	206025	205913	205864	206077	207123	205403	205941	212389	206043	
325	M23	C23	32.00	25.40	23.70	0.40	2.00	19.30	1165	206384	212895	212897	212896	212898	207124	206386	212880	212879	212881	
326	M24	C24	33.00	26.40	24.70	0.40	2.00	20.11	1125	207408	206026	205914	205865	206078	210949	212728	205946	212390	212561	
327	M26	C26,3	35.30	28.70	27.00	0.40	2.00	22.30	1030	206385	206027	205915	205866	206079	207127	207172	205947	212391	206044	
328	M27	C27	36.00	29.40	27.70	0.40	2.00	23.30	1010	205889	206028	205916	205867	206080	207128	205996	205948	205461	206045	
329	M28	C27,9	36.00	30.30	28.60	0.40	2.00	24.80	845	211465	206029	205917	205868	206081	208103	205997	205949	212393	206046	
331	M30	C30	39.00	32.40	30.70	0.40	2.00	25.70	915	211391	206387	212900	212899	212901	208106	207465	212883	212882	212884	
332	M33	C33	42.00	35.40	33.70	0.40	2.00	28.70	835	205890	206030	205918	205869	206082	208108	212732	205950	212394	206047	
333	M36	D36	48.00	39.60	37.00	0.40	2.50	31.10	950	207409	206031	205317	205870	206083	208110	205998	205951	212395	212552	
334	M39	D39	51.00	42.60	40.00	0.40	2.50	34.10	885	205891	212902	212903	205871	212904	208111	205999	205952	212396	206048	
335	M42	D42	54.00	45.60	43.00	0.40	2.50	36.50	825	208189	205017	205483	205565	205524	208113	212733	205953	208150	206049	
336	M45	D45	57.00	48.60	46.00	0.40	2.50	39.50	775	211468	206032	205919	205872	206084	208114	206000	205954	212397	206050	
337	M48	D48	60.00	51.60	49.00	0.40	2.50	41.90	730	205892	206033	205920	205873	206085	208115	206001	205955	212398	206051	

1.5 – German metric size guide

The following list of dimensions present the standard codes of our bonded seals with and without self-centralisation, available in two types of steel or stainless steel metal inserts and in 4 compounds (page 146) to meet the needs of the applications.



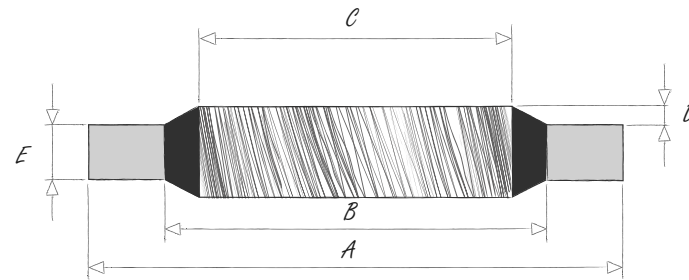
Dimension ref.	Size standard	Seal number	Dimensions (mm)							Min. burst pressure (bar)	WITH SELF-CENTRALISING					WITHOUT SELF-CENTRALISING				
			A	B	C	D	E	F*	LJF part number by metal-rubber combination					LJF part number by metal-rubber combination						
			+0.13 -0.00	+0.10 -0.10	+0.10 -0.10	+0.25 -0.00	+0.10 -0.10	+0.20 -0.20	STEEL + PC851		STEEL + DF851	S/STEEL + 7EP1197	S/STEEL + PC851	S/STEEL + 7DF2075	STEEL + PC851	STEEL + DF851	S/STEEL + 7EP1197	S/STEEL + PC851	S/STEEL + 7DF2075	
202	M4	A3,9	7.00	5.40	4.50	0.30	1.00	3.40	1330	205236	205030	205302	205082	211919	210977	212681	205465	205546	205505	
203	M5	A5,1	9.00	6.80	5.70	0.30	1.00	4.50	1455	207390	205816	205467	205549	205507	210979	212682	205956	212256	212503	
204	M5	AS5,1	10.00	7.40	5.70	0.30	1.00	4.50	1580	205240	205016	211671	205548	205506	210921	212683	205957	205124	212544	
205	M5,5	A5,6	9.20	7.20	6.20	0.30	1.00	4.70	1250	206390	212941	212965	212953	212982	210981	206002	212090	212258	212506	
206	M6	AS6,1	10.00	8.00	6.70	0.30	1.00	4.70	1125	207391	212007	205469	205551	205509	210922	212684	212091	212259	212545	
207	M6	AX6,1	11.00	8.20	6.70	0.30	1.00	4.70	1535	207392	212008	205905	211795	206067	205120	212685	205067	212235	212508	
210	M6,7	A6,7	10.20	8.60	7.30	0.30	1.00	5.77	835	205594	212942	212966	212954	212983	212905	212908	212922	212261	212930	
212	M8	AS8,1	13.00	10.00	8.70	0.30	1.00	6.40	1350	207393	205815	205471	205553	205511	210990	212686	205340	205313	212509	
213	M8	A8,1	14.00	10.40	8.70	0.30	1.00	6.40	1555	205238	207460	205470	205552	205510	210923	212687	205958	212263	212546	
215	M8,5	A8,7	13.30	10.50	9.30	0.30	1.00	6.90	1200	207394	212009	205906	205857	206068	207451	206003	212101	205853	212512	
216	M10	B9,6	15.88	12.00	10.35	0.40	2.00	8.56	1455	212938	212943	211690	211799	212984	206383	212909	212923	212264	212931	
217	M10	B10	16.00	12.40	10.70	0.40	1.50	8.05	1305	206282	205002	205472	205554	205512	210996	212688	212102	212266	212514	
218	M10	BS10	18.00	12.40	10.70	0.40	1.50	8.05	2030	212939	205814	212967	212955	212985	207395	206004	205473	205555	205513	
219	M11	B10,7	16.30	12.70	11.40	0.40	1.50	9.80	1275	212940	212010	212968	212956	212986	210998	212910	212924	212916	212932	
221	M11	BS11,1	19.10	13.50	11.80	0.40	1.50	9.80	1865	207397	206017	205475	205557	205516	210999	206005	205959	205854	206052	
222	M12	BS12	18.00	14.30	12.70	0.40	1.50	9.73	1160	207398	207314	205907	205427	211898	210924	212689	205960	212270	212515	
223	M12	B12	20.00	14.40	12.70	0.40	1.50	9.73	1750	211416	212944	212969	211804	212987	205877	207464	212103	205855	212517	
225	M13	B13	22.00	15.40	13.70	0.40	1.50	10.80	1925	206391	212945	212970	212957	212988	206388	212911	212925	212917	212933	
226	M13,5	B13,3	18.70	15.70	14.00	0.40	1.50	11.30	855	207399	206018	205354	211805	206069	205878	212912	212099	212273	206053	
227	M14	B14	22.00	16.40	14.70	0.40	1.50	11.38	1535	206284	205328	205476	205558	205517	205355	212690	205961	212275	212519	
229	M16	B16	24.00	18.40	16.70	0.40	1.50	13.41	1365	206286	205371	205477	205559	205518	211007	212691	205962	212277	212520	
230	M17	B16,7	24.00	19.20	17.40	0.40	1.50	13.08	1125	207400	205040	211678	211817	205092	207320	206006	205963	212326	206054	
231	M17,5	B17,3	24.70	20.10	18.00	0.40	1.50	13.60	1025	206392	212946	212971	212958	212989	211047	207255	212926	212918	212934	
232	M18	CS18	26.00	20.40	18.70	0.40	1.50	14.76	1235	207232	205389	205479	205561	205520	210925	212693	205964	212327	212524	
233	M20	CS20	28.00	22.50	20.70	0.40	1.50	16.76	1100	207233	205333	205316	205424	206070	211050	212694	205965	212239	212526	
234	M21	C20,8	28.70	23.30	21.50	0.40	2.50	17.80	1040	206393	212947	212972	212959	212990	211051	206007	205966	212919	206055	
235	M22	C21,8	28.00	24.20	22.50	0.40	1.50	18.10	705	206394	212948	212973	212960	212991	206389	212913	212927	212920	212935	
236	M22	CS22	30.00	24.40	22.70	0.40	2.00	18.74	1030	207204	212011	205480	205562	205521	210926	212695	205967	212331	212529	
237	M22	CX22	30.00	24.40	22.70	0.40	3.00	18.74	1030	206395	212949	212974	212961	212992	212907	212914	212928	212332	212531	
238	M24	CS24	32.00	26.40	24.70	0.40	2.00	20.11	950	207235	212012	205481	205563	205522	205657	212696	205968	212334	212532	



Dimension ref.	Size standard	Seal number	Dimensions (mm)							Min. burst pressure (bar)	WITH SELF-CENTRALISING					WITHOUT SELF-CENTRALISING				
			A	B	C	D	E	F*	LJF part number by metal-rubber combination					LJF part number by metal-rubber combination						
			+0.13 -0.00	+0.10 -0.10	+0.10 -0.10	+0.25 -0.00	+0.10 -0.10	+0.20 -0.20	STEEL + PC851		STEEL + DF851	S/STEEL + 7EP1197	S/STEEL + PC851	S/STEEL + 7DF2075	STEEL + PC851	STEEL + DF851	S/STEEL + 7EP1197	S/STEEL + PC851	S/STEEL + 7DF2075	
239	M26	C26	35.00	28.40	26.70	0.40	2.00	22.30	1045	207401	212013	205482	205564	205523	210927	206008	205969	212335	212533	
240	M27	C26,5	36.00	29.00	27.20	0.40	2.00	23.30	1085	211441	212014	212975	211821	212993	211057	206009	205970	212336	212534	
242	M30	C30,3	39.00	33.00	31.00	0.40	2.00	25.70	815	211385	212015	212976	211822	212994	210928	212697	205971	212337	212936	
243	M33	C33	42.00	35.80	33.70	0.40	2.00	28.70	775	211443	212016	212977	212962	212995	210929	212698	205972	212338	212537	
244	M33	C33,6	43.00	36.40	34.30	0.40	2.00	28.70	815	211444	212950	212978	211823	212996	211059	212915	212929	212921	212937	
245	M36	D35,7	46.00	38.80	36.70	0.40	2.00	31.10	835	207402	206019	205908	205425	206071	205880	206010	205973	212340	206056	
246	M39	D39	51.00	41.90	40.00	0.40	2.50	34.10	975	206396	212951	212979	212963	212997	211061	206011	205974	205682	206057	
247	M42	D41,7	53.00	44.40	42.70	0.40	3.00	36.50	870	211446	212017	212980	211824	212998	205879	206012	212104	212341	206058	
248	M48	D47,7	59.00	50.80	48.70	0.40	3.00	41.90	725	206397	212952	212981	212964	212999	210930	212699	205976	212342	206059	
250	M52	D52,3	64.50	56.40	53.30	0.40	3.00	45.90	645	206482	206483	206486	206484	206485	211072	212700	205975	212350	206060	
254	M88	D88	101.35	92.10	89.09	0.40	3.25	-	450	-	-	-	-	-	211073	206013	205977	212351	206061	

The CETOPS seal is recommended for general applications and hydraulic and pneumatic transmissions in accordance with standard NF EN ISO 1179.

For each thread diameter, two metal washers widths are offered, affecting the outer diameters A.



Dimension ref.	Size standard BSP	A +0.00 -0.20	B +0.20 -0.00	C +0.20 0.00	D +0.25 0.00	E +0.15 -0.15	Min. burst pressure (bar)	LJF part number combination PC851 STEEL P18
519	1/16	12.70	9.90	8.30	0.25	1.25	1270	206477
510	1/8a	14.70	12.00	10.40	0.25	1.25	1010	206321
501	1/8	16.20	12.00	10.40	0.25	1.25	1575	211114
511	1/4a	18.70	15.75	13.85	0.25	1.25	840	206314
502	1/4	20.20	15.75	13.85	0.25	1.25	1270	211115
512	3/8a	22.70	19.25	17.35	0.25	1.25	805	206315
503	3/8	24.20	19.25	17.35	0.25	1.25	1155	211116
513	1/2a	26.70	23.55	21.65	0.25	1.25	600	207259
504	1/2	29.20	23.55	21.65	0.25	1.25	1075	211118
514	3/4a	32.50	29.20	27.30	0.25	1.25	505	207258
505	3/4	35.00	29.20	27.30	0.25	1.25	890	211119
515	1.0a	39.50	36.10	34.20	0.25	2.00	420	208197
506	1.0	43.00	36.10	34.20	0.25	2.00	860	211120
516	1.1/4a	49.50	44.70	42.80	0.25	2.00	480	208198
507	1.1/4	53.00	44.70	42.80	0.25	2.00	835	211121
517	1.1/2a	55.50	50.60	48.70	0.25	2.00	435	206478
508	1.1/2	59.00	50.60	48.70	0.25	2.00	745	211122
518	2.0a	68.50	62.40	60.50	0.25	2.00	435	206479
509	2.0	73.00	62.40	60.50	0.25	2.00	760	211123

2-BANJO SEALS

2.1 - General information

Banjo seals have been developed for systems using couplings for fluid transfer in cars and heavy goods vehicles. They offer significant advantages over copper or aluminium washers (without elastomer). The elasticity of rubber provides very reliable sealing and the self-centralsing lip allows for easy fitting.

- Design and sizes based on standards: DIN 7642 for the coupling and DIN 7643 for the hollow screws.
- Standard sizes from M8 to M32
- Standard FKM compounds: DF851 - 7DF2067; other possible compounds in AEM (7DE2138) and HNBR (8DT1706)...
- Temperature range from -60°C to +250°C (depending on the rubber)
- Metal: DC01 mild steel; Tensile strength: min. 540 MPa; Specification: NF EN 10139
- Surface treatment: P18 Zinc Nickel coating; Resistance: red rust corrosion 600 hours; Specification: ISO 9227

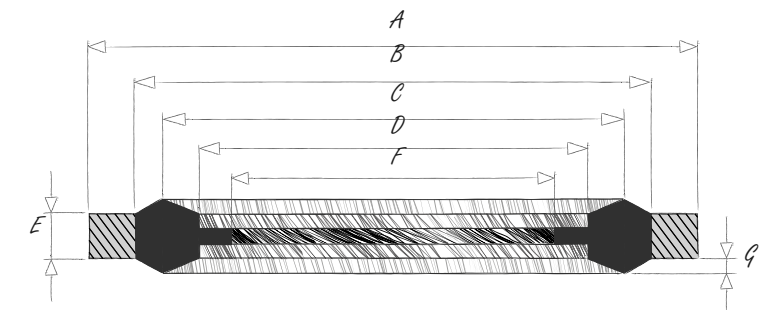


Application markets

- Hydraulic fittings
- Turbo connections
- Banjo fuel lines
- Oil tank drain plug
- Oil return to pump
- Trucks
- Off-road
- Automotive
- Oil & Gas

2.2 - Technical advantages

- Easy fitting with self-centralisation
- Improved sealing capacity thanks to the rubber lip
- Long-life sealing solution
- Suitable for sealing surfaces with roughness requirements



Other sizes available on request

2.3 - Dimensions

Dimension ref.	Size standard	A +0.13 -0.00	B +0.10 -0.10	C +0.10 -0.10	D +0.10 -0.10	E +0.10 -0.10	F +0.10 -0.10	G +0.05 -0.05
3413	M8	14.00	10.40	9.80	8.30	1.00	7.00	0.20
3414	M10	16.00	12.40	11.80	10.30	1.50	9.00	0.20
3397	M12	18.00	14.80	13.80	12.30	1.50	11.00	0.20
3398	M14	22.00	16.80	15.80	14.30	1.50	13.00	0.20
3415	M16	24.00	18.80	17.80	16.30	1.50	14.30	0.20
3441	M18	26.00	20.80	19.80	18.30	1.50	16.30	0.20
3456	M22	30.00	24.80	23.80	22.30	2.00	19.75	0.20

3 – SLIMLINE SEALING WASHERS

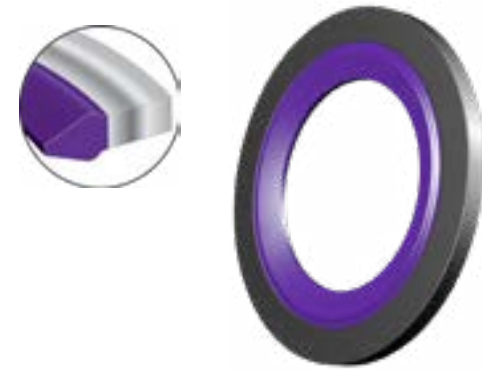
3.1 – General information

Material

The slimline seal is a metal washer with a specially shaped vulcanised elastomer lip bonded to the inside.

Our purple EPDM offers optimised chemical resistance to R1234yf fluid and is certified by many OEMs such as BMW, Daimler and GM. Other EPDM or HNBR elastomers are available on request.

The metal insert is made of carbon steel (cold-rolled and cold-worked strip) and protected by anti-corrosion treatment (Zn-Ni). Other materials are available on request: aluminium, stainless steel, etc.

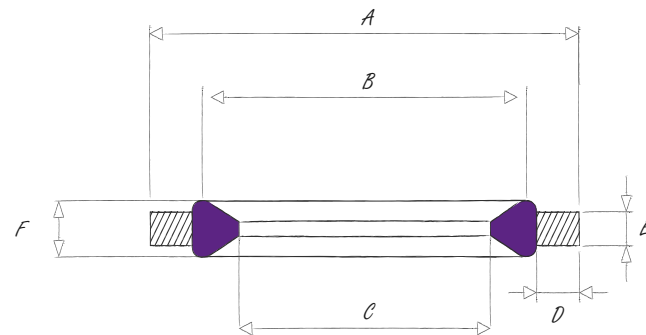


HVAC applications

The slimline sealing washer is a sealing solution for axial application of HVAC fittings in place of radially tightened O-Rings (standard air-conditioning fittings). It is compatible with the coolants R134a and R1234yf.

3.2 – Technical advantages

- Very low permeability
- Improved sealing performance
- No groove machining - reduced total cost of the fitting
- Easy fitting (no assembly force)
- Assembly without risk of seal deterioration
- Poka-Yoke thanks to the colours of the compounds



3.3 – Dimensions

Standard dimensions corresponding to the generic dimensions of the fittings:

Dimension ref.	Size standard Outer Ø of male part	A +0.13 -0.13	B +0.13 -0.13	C +0.13 -0.13	D	E +0.05 -0.05	F +0.10 -0.10	LJF part number combination 8EP2147 STEEL
3270	3/8"	16.00	10.67	8.13	1.78	1.27	2.03	205367
3249	1/2"	19.10	13.66	11.18	1.78	1.27	2.03	205364
3279	5/8"	23.62	18.03	15.49	2.00	1.27	2.13	205366
3250	3/4"	25.27	20.58	17.16	1.78	1.27	2.13	205365

4 – PFS FLANGE SEALS

4.1 – General information

Specially designed for flange-fitting pipes, the PFS flange seal is made of a stainless-steel washer and a vulcanised elastomer lip.

With its double lip, the PFS flange seal ensures permanent sealing, eliminates fugitive emissions and reduces downtime during maintenance operations. It is the ideal solution for all bolted flange fittings.

This innovative product developed by Hutchinson can usefully replace SWG (spiral wounded gaskets). The PFS flange seal guarantees a durable, safe and economical sealing. Because of its reusable design, it can be considered a life-long sealing system.

General information

- Dimensions: from 15 mm
- Temperature: -50°C to +200°C (depending on the rubber)
- Various combinations of rubbers and metal inserts (aluminium, stainless steel, etc.)
- Possibility of using materials that meet the standards for drinking water, food and oil & gas



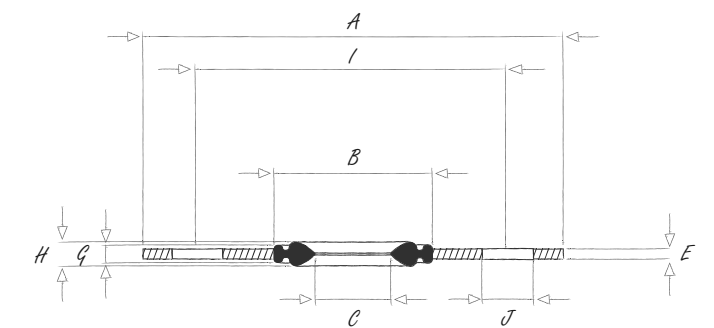
Application markets

- Food industry
- Oil & Gas
- Hydraulic
- Transport of industrial fluids
- Energy production
- Industrial water & wastewater treatment
- Chemical industry

4.2 – Technical advantages

4.2.1 – Conditions for use

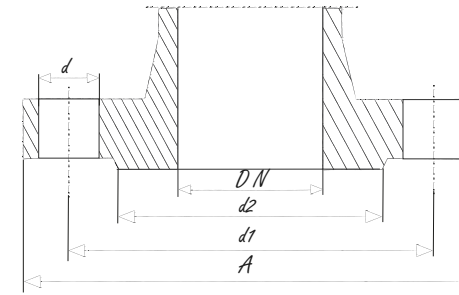
- Compatible with any type of fluid (depending on the rubber)
- Available with or without drilled bolt holes
- Easily replaces existing sealing solutions (flat-faced, raised-face and grooved flanges)
- Usable on corroded or scratched surfaces
- Resists extreme terrain conditions: handling, shocks, dust, etc.



- Reusable sealing solution
- Reduced installation time
- Reduced downtime maintenance and costs
- Improved performance with a double sealing line
- Uniform compression independent of torque
- Fitting without a support ring on GRP flanges
- Compression stop and blow-out preventer



Lloyd's Register
Pressure tested



Key

- A = outer \varnothing of flange
- d1 = centre-to-centre distance
- d2 = min. \varnothing of support for the seal
- n = Number of holes
- d = drilling \varnothing
- DN = nominal \varnothing
- PN = nominal pressure

4.3 – Flange size table DIN EN 1092-1 / DIN 2501-1

DN	PN6				PN10				PN16				PN25				PN40			
	A	d1	d2	n x d	A	d1	d2	n x d	A	d1	d2	n x d	A	d1	d2	n x d	A	d1	d2	n x d
10	75	50	35	4x11	90	60	40	4x14	90	60	40	4x14	90	60	40	4x14	90	60	40	4x14
15	80	55	40	4x11	95	65	45	4x14	95	65	45	4x14	95	65	45	4x14	95	65	45	4x14
20	90	65	50	4x11	105	75	58	4x14	105	75	58	4x14	105	75	58	4x14	105	75	58	4x14
25	100	75	60	4x11	115	85	68	4x14	115	85	68	4x14	115	85	68	4x14	115	85	68	4x14
32	120	90	70	4x14	140	100	78	4x18	140	100	78	4x18	140	100	78	4x18	140	100	78	4x18
40	130	100	80	4x14	150	110	88	4x18	150	110	88	4x18	150	110	88	4x18	150	110	88	4x18
50	140	110	90	4x14	165	125	102	4x18	165	125	102	4x18	165	125	102	4x18	165	125	102	4x18
65	160	130	110	4x14	185	145	122	4x18	185	145	122	4x18	185	145	122	8x18	185	145	122	8x18
80	190	150	128	4x18	200	160	138	8x18	200	160	138	8x18	200	160	138	8x18	200	160	138	8x18
100	210	170	148	4x18	220	180	158	8x18	220	180	158	8x18	235	190	162	8x22	235	190	162	8x22
125	240	200	178	8x18	250	210	188	8x18	250	210	188	8x18	270	220	188	8x26	270	220	188	8x26
150	265	225	202	8x18	285	240	212	8x22	285	240	212	8x22	300	250	218	8x26	300	250	218	8x26
175	-	-	-	-	315	270	242	8x22	315	270	242	8x22	330	280	248	12x26	350	295	260	12x30
200	320	280	258	8x18	340	295	268	8x22	340	295	268	12x22	360	310	278	12x26	375	320	285	12x30
250	375	335	312	12x22	395	350	320	12x22	405	355	320	12x26	425	370	335	12x30	450	395	345	12x36
300	440	395	365	12x22	445	400	370	12x22	460	410	378	12x26	485	430	395	16x30	-	-	-	-
350	490	445	415	12x22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

DN	PN64				PN100				PN160				PN250				PN320			
	A	d1	d2	n x d	A	d1	d2	n x d	A	d1	d2	n x d	A	d1	d2	n x d	A	d1	d2	n x d
10	100	70	40	4x14	100	70	40	4x14	100	70	40	4x14	125	85	40	4x18	125	85	40	4x18
15	105	75	45	4x14	105	75	45	4x14	105	75	45	4x14	130	90	45	4x18	130	90	45	4x18
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	140	100	68	4x18	140	100	68	4x18	140	100	68	4x18	150	105	68	4x22	160	115	68	4x22
32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	170	125	88	4x22	170	125	88	4x22	170	125	88	4x22	185	135	88	4x26	195	145	88	4x26
50	180	135	102	4x22	195	145	102	4x26	195	145	102	4x26	200	150	105	8x26	210	160	102	8x26
65	205	160	122	8x22	220	170	122	8x26	220	170	122	8x26	230	180	122	8x26	255	200	122	8x30
80	215	170	138	8x22	230	180	138	8x26	230	180	138	8x26	255	200	138	8x30	275	220	138	8x30
100	250	200	162	8x26	265	210	162	8x30	265	210	162	8x30	300	235	162	8x33	335	265	162	12x36
125	295	240	188	8x30	315	250	188	8x33	315	250	188	8x33	340	275	188	12x33	380	310	188	12x36
150	345	280	218	8x33	355	290	218	12x33	355	290	218	12x33	390	320	218	12x36	-	-	-	-
175	375	310	260	12x33	385	320	260	12x33	390	320	260	12x36	-	-	-	-	-	-	-	-
200	415	345	285	12x36	430	360	285	12x36	430	360	285	12x36	485	400	285	12x42	-	-	-	-
250	470	400	345	12x36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
350	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Many environmental factors influence a seal's sealing performance (fluids in contact, materials, manufacturing process, operating conditions, etc.).

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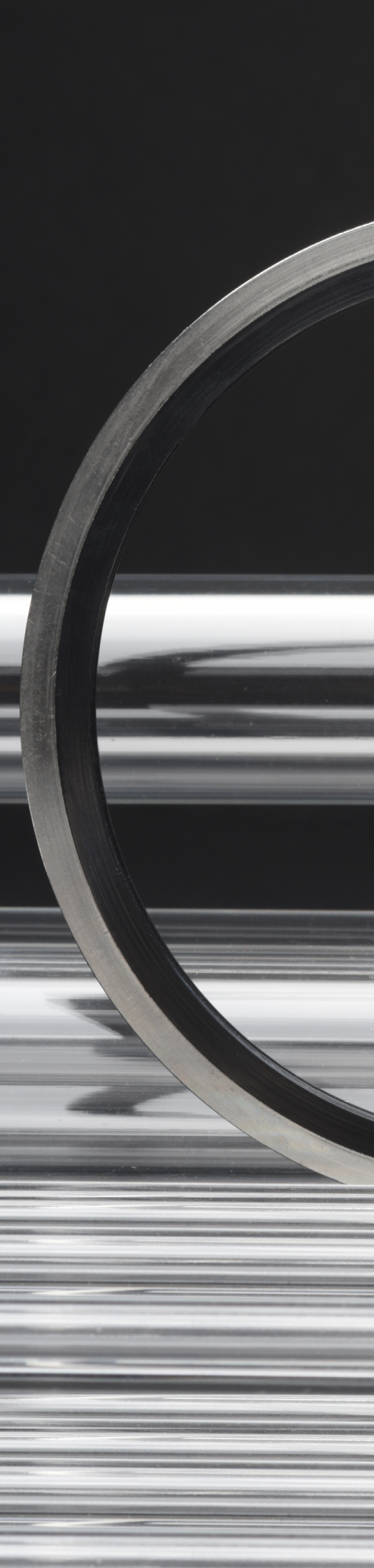
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