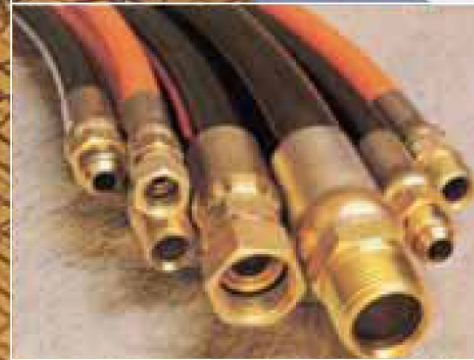


Hydraulic & Offshore Supplies



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KR Brochure & Price List



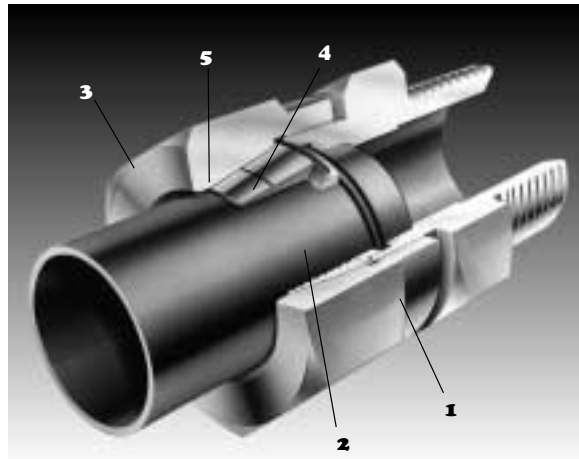
"We have set out to be the best specialist supplier of hydraulic tube, fittings, instrumentation and pipeline materials you will ever want to deal with."

Alan Wills · Managing Director



Benefits

- ❑ Leak free - "O" ring seal
- ❑ Safe joint every time - low tightening torque and clamping force rises with the internal pressure.
- ❑ Low installed cost - no welding (so inert gas purging, NDT and excessive flushing are not required), minimal tube preparation and no special assembly equipment are required.
- ❑ Demountable and reusable - Can be used with most tube materials.



Features

1. Body- mild or stainless steel or cupro-nickel, compatible with most fluids and environments. Locates O ring and tube.
2. O-ring- nitrile, FPM (viton), EP or FEP encapsulated FPM, compatible with most fluids, highly resistant to leakage even under severe vibration, pressure pulsation and temperature cycling. Provides diametric seal between tube O/D and body cavity.
3. Nut- mild or stainless steel or cupro-nickel, compatible with most environments. Closes split collet and retains sealing mechanism.
4. Back-up washer- mild or stainless steel or cupro-nickel. Provides additional support for the tube and locates the O-ring.
5. Split collet- mild or stainless steel or cupro-nickel. Clamping force rises with pressure. Large clamping area ensures minimal deformation of the tube. Retains tube in position.





Metric KR couplings 6 to 50 mm O/DPage 4 to 23

Imperial KR couplings to 2 inch O/DPage 24 to 25

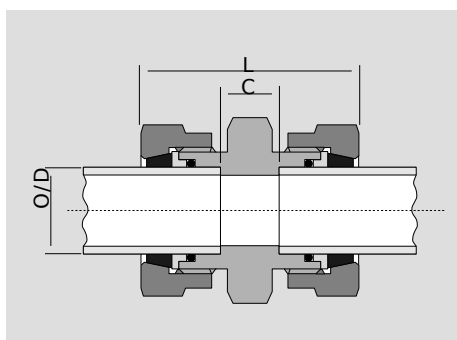
KR couplings over 50mm & 2 inch O/DPage 26 to 28

Threaded Adaptors to 2 inchPage 29 to 44

Tube 6 to 125 mm O/DPage 45 to 46

KR Couplings Specifications and assemblyPage 47 to 53

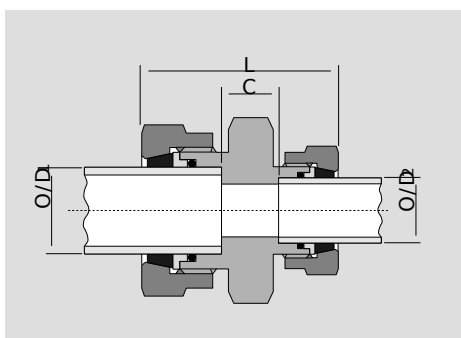
Installation Guidelines, Pressure drop &
Pipe stress Calculations and Conversion Tables . .Page 54 to 59



Straight Coupling

O/D mm	Part No	Dimensions - mm			
		C	L	Nut	Body
6	AM6CR	14	44	16	14
8	AM8CR	14	44	17	17
10	AM10CR	10	54	27	27
12	AM12CR	10	54	27	27
16	AM16CR	11	57	32	27
20	AM20CR	13	73	41	36
22	AM22CR	13	73	41	41
25	AM25CR	17	76	46	41
30	AM30CR	22	89	50	46
38	AM38CR	29	105	60	55
50	AM50CR	37	137	80	80

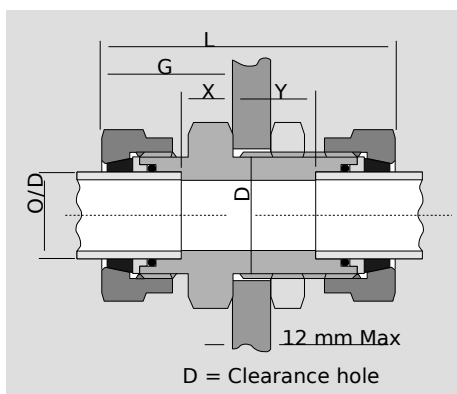
- 4 We aim to stock all **highlighted** carbon steel items for standard next day delivery



KR Metc

Straight Reducing Coupling

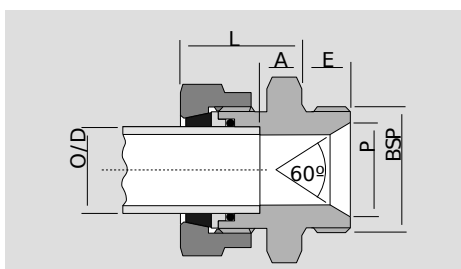
O/D mm		Part No	Dimensions - mm		Nut	Nut	Body
12			CL12				
8	6	AM8-M6RR	14	44	17	16	17
10	8	AM10-M8RR	13	50	27	17	27
10	6	AM10-M6RR	13	50	27	16	27
12	10	AM12-M10RR	10	54	27	27	27
12	8	AM12-M8RR	13	50	27	17	27
16	12	AM16-M12RR	11	57	32	27	27
16	10	AM16-M10RR	11	57	32	27	27
16	8	AM16-M8RR	14	52	32	17	27
20	16	AM20-M16RR	14	67	41	32	36
20	12	AM20-M12RR	14	66	41	27	36
20	10	AM20-M10RR	14	66	41	27	36
25	20	AM25-M20RR	16	77	46	41	41
25	16	AM25-M16RR	16	68	46	32	41
25	12	AM25-M12RR	16	69	46	27	41
30	25	AM30-M25RR	21	84	50	46	46
30	20	AM30-M20RR	19	83	50	41	46
38	30	AM38-M30RR	27	98	60	50	55
38	25	AM38-M25RR	25	93	60	46	55



Straight Bulkhead Coupling

O/D mm	Part No	Dimensions - mm						
		D	G	L	X	Y	Nut	Body
6	AM6BPR	14	25	67	10	27	16	17
8	AM8BPR	16	25	67	10	27	17	17
10	AM10BPR	24	30	76	8	24	27	27
12	AM12BPR	24	30	76	8	24	27	27
16	AM16BPR	27	33	82	10	25	32	32
20	AM20BPR	37	46	101	16	32	41	41
22	AM22BPR	37	43	99	13	25	41	41
25	AM25BPR	40	49	109	18	34	46	41
30	AM30BPR	46	51	115	18	32	50	50
38	AM38BPR	52	62	134	23	34	60	60
50	AM50BPR	71	79	171	29	42	80	80

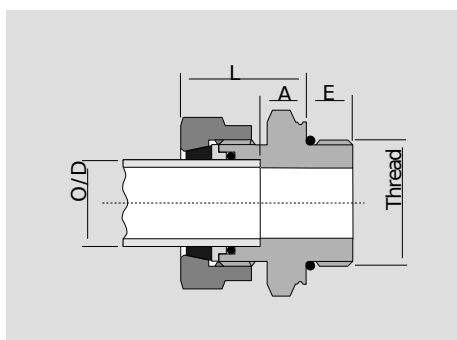
6 We aim to stock all **highlighted** carbon steel items for standard next day delivery



KR Metc

Male Stud Coupling BSP

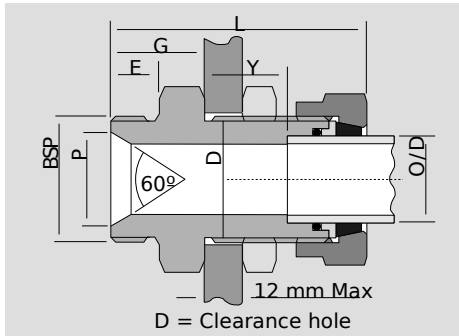
O/D Stud		Part No	Dimensions - mm					
mm	BSP		A	E	L	P	Nut	Body
6	"	AM6-4MSCR	11	11	26	11	16	19
6	"	AM6-6MSCR	13	13	28	14	16	22
8	"	AM8-2MSCR	11	10	26	8	17	17
8	"	AM8-4MSCR	11	11	26	11	17	19
8	"	AM8-6MSCR	13	13	28	14	17	22
10	"	AM10-4MSCR	10	11	32	11	27	27
10	"	AM10-6MSCR	10	13	32	14	27	27
10	"	AM10-8MSCR	10	16	32	18	27	27
12	"	AM12-6MSCR	10	13	32	14	27	27
12	"	AM12-8MSCR	10	16	32	18	27	27
12	"	AM12-12MSCR	11	19	33	23	27	33
16	"	AM16-6MSCR	11	13	34	14	32	27
16	"	AM16-8MSCR	11	16	34	18	32	27
16	"	AM16-12MSCR	13	19	36	23	32	33
20	"	AM20-8MSCR	11	16	41	18	41	36
20	"	AM20-12MSCR	11	19	41	23	41	36
20	1"	AM20-16MSCR	13	21	44	29	41	41
22	"	AM22-12MSCR	13	19	44	23	41	41
25	"	AM25-12MSCR	15	19	46	23	46	41
25	1"	AM25-16MSCR	15	21	46	29	46	41
25	1"	AM25-20MSCR	18	21	49	37	46	50
30	1"	AM30-16MSCR	19	21	53	29	50	46
30	1"	AM30-20MSCR	19	21	53	37	50	50
38	1"	AM38-16MSCR	24	21	62	29	60	55
38	1"	AM38-20MSCR	24	21	62	37	60	55
38	1"	AM38-24MSCR	24	25	62	43	60	60
50	1"	AM50-20MSCR	30	21	80	37	80	80
50	1"	AM50-24MSCR	30	25	81	43	80	80
50	2"	AM50-32MSCR	30	30	81	55	80	80



Male Stud Coupling ISO

O/D Stud mm	Part No	Dimensions - mm					
		A	E	L	Nut	Body	
6	M12 AM6-IM12MSCR	10	11.0	26	16	17	
8	M14 AM8-IM14MSCR	10	11.0	26	17	19	
10	M16 AM10-IM16MSCR	9	12.5	32	27	27	
12	M18 AM12-IM18MSCR	9	14.0	32	27	27	
16	M22 AM16-IM22MSCR	10	15.0	34	32	27	
20	M27 AM20-IM27MSCR	13	18.5	43	41	36	
25	M33 AM25-IM33MSCR	15	18.5	46	46	41	
30	M42 AM30-IM42MSCR	18	19.0	51	50	50	
38	M48 AM38-IM48MSCR	23	21.5	62	60	55	
50	M60 AM50-IM60MSCR	29	24.0	79	80	80	

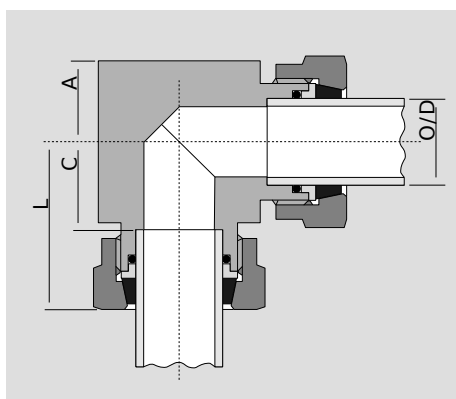
8 We aim to stock all **highlighted** carbon steel items for standard next day delivery



KR Metc

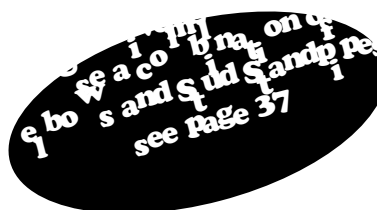
Male Stud Bulkhead Coupling BSP

O/DStud		Part No	Dimensions - mm							
mm	BSP		D	E	G	L	Y	P	Nut	Body
6	"	AM6-4BHR	14	11	18	60	27	11	16	17
8	"	AM8-4BHR	16	11	18	61	27	11	17	17
10	"	AM10-6BHR	24	13	21	67	24	14	27	27
12	"	AM12-6BHR	24	13	21	67	24	14	27	27
12	"	AM12-8BHR	27	16	25	74	25	18	27	27
16	"	AM16-8BHR	27	16	25	74	25	18	32	32
20	"	AM20-12BHR	37	19	31	87	25	23	41	41
25	1"	AM25-16BHR	40	21	33	92	28	29	46	41
30	1"	AM30-16BHR	46	21	35	99	32	29	50	50
30	1 "	AM30-20BHR	46	21	38	102	32	37	50	50
38	1 "	AM38-20BHR	52	21	38	110	34	37	60	60
38	1 "	AM38-24BHR	52	25	48	120	34	43	60	60

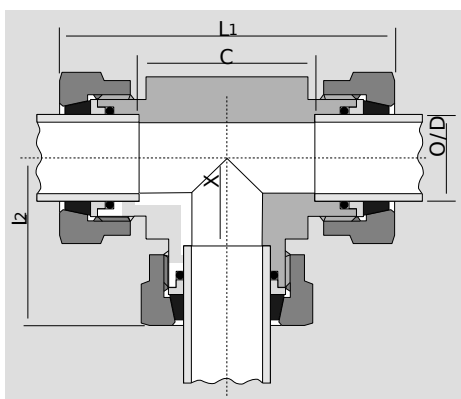


Equal Elbow

O/D mm	Part No	Dimensions - mm				
		A	C	L	Nut	Body
6	AM6ER	8	12	27	16	16
8	AM8ER	10	13	29	17	19
10	AM10ER	13	13	35	27	27
12	AM12ER	13	13	35	27	27
16	AM16ER	16	17	41	32	31
20	AM20ER	21	21	51	41	39
22	AM22ER	21	21	52	41	39
25	AM25ER	20	22	53	46	42
30	AM30ER	24	29	63	50	48
38	AM38ER	27	36	74	60	54
50	AM50ER	38	49	99	80	77



10 We aim to stock all **highlighted** carbon steel items for standard next day delivery

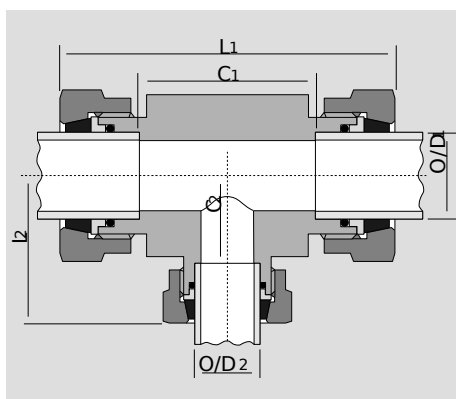


KR Metric

Equal Tee

O/D mm	Part No	Dimensions - mm					Nut	Body
		C	L1	L2	X			
6	AM6TR	24	54	27	12	16	16	
8	AM8TR	27	57	29	14	17	19	
10	AM10TR	27	71	35	14	27	27	
12	AM12TR	27	71	35	14	27	27	
16	AM16TR	33	80	40	17	32	30	
20	AM20TR	43	103	51	21	41	38	
22	AM22TR	43	103	51	21	41	38	
25	AM25TR	44	104	53	22	46	41	
30	AM30TR	59	126	62	29	50	48	
38	AM38TR	71	147	74	36	60	54	
50	AM50TR	98	199	99	49	80	76	

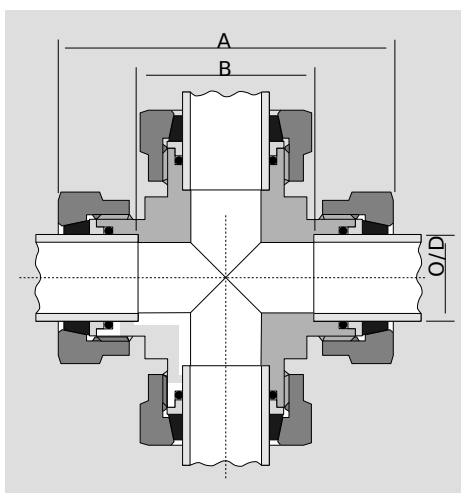




Reducing Outlet Tee

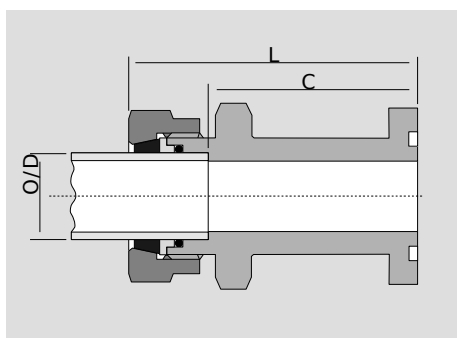
O/D mm		Part No	Dimensions - mm				Nut	Body	
12			L ₁	L ₂	C ₁	C ₂			
8	6	AM8-M6ROTR	57	29	27	14	17	16	19
10	6	AM10-M6ROTR	71	32	27	17	27	16	27
12	8	AM12-M8ROTR	71	32	27	17	27	17	27
16	8	AM16-M8ROTR	79	39	33	17	32	17	30
20	8	AM20-M8ROTR	103	37	43	22	41	17	38
20	12	AM20-M12ROTRL03	44	43	22	41	27	38	
25	12	AM25-M12ROTRL05	44	45	22	46	27	41	
25	16	AM25-M16ROTRL05	44	45	22	46	32	41	
30	16	AM30-M16ROTRL25	50	57	27	50	32	48	
38	8	AM38-M8ROTR	147	48	32	33	60	17	54
38	12	AM38-M12ROTRL47	53	71	31	60	27	54	
38	25	AM38-M25ROTRL47	63	71	33	60	46	54	

12 We aim to stock all **highlighted** carbon steel items for standard next day delivery



KR Metric

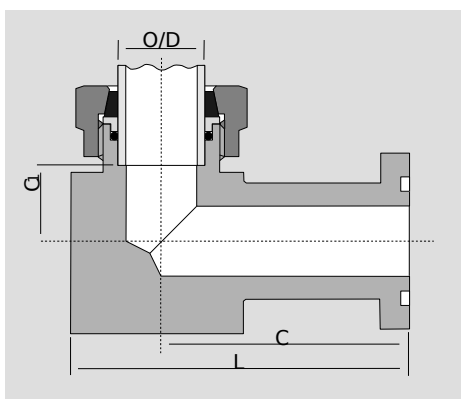
O/D mm	Part No	Dimensions - mm		Nut	Body
		A	B		
6	AM6XR	54	24	16	19
8	AM8XR	57	27	17	19
10	AM10XR	71	27	27	26
12	AM12XR	71	27	27	26
16	AM16XR	79	33	32	32
38	AM38XR	149	72	60	60



SAE Flange Adaptor (Code 62) Straight

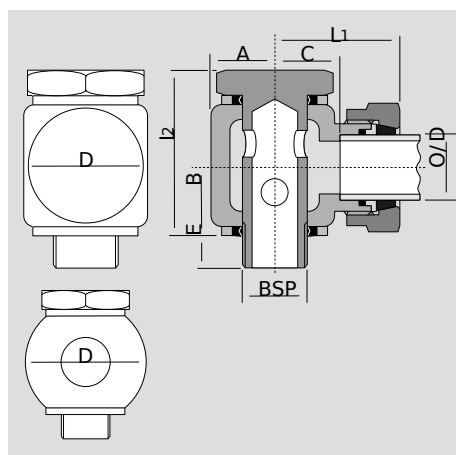
O/DNom		Part No	Dimensions - mm			
mm	size		C	L	Nut	Body
20	"	AM20-12SHR	60	90	41	41
25	"	AM25-12SHR	62	92	46	41
25	1"	AM25-16SHR	74	104	46	50
25	1"	AM25-20SHR	74	104	46	55
30	1"	AM30-16SHR	75	109	50	50
30	1"	AM30-20SHR	75	109	50	55

14 We aim to stock all **highlighted** carbon steel items for standard next day delivery



KR Metc

O/DNom		Part No	Dimensions - mm				
mm	size		C	C1	L	Nut	Body
20	"	AM20-12SHER	71	18	90	41	45
25	"	AM25-12SHER	73	19	94	46	45
25	1"	AM25-16SHER	83	22	104	46	51
25	1"	AM25-20SHER	83	25	104	46	64
30	1"	AM30-16SHER	85	24	109	50	51
30	1"	AM30-20SHER	85	27	109	50	64

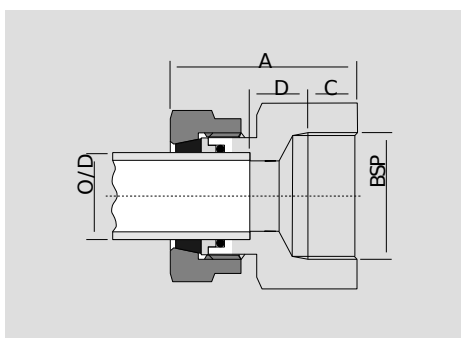


Banjo BSP

O/DStud mm	BSP	Part No	Dimensions - mm								Nut	Body
			L ₁	L ₂	C	A	B	E	D			
6		AM6-4BJR	32	30	17	13	12	100	29	16	19	
8		AM8-4BJR	32	30	17	13	12	100	29	17	19	
10		AM10-6BJR	40	42	18	18	17	110	38	27	22	
12		AM12-6BJR	40	42	18	18	17	110	38	27	22	
16		AM16-8BJR	45	47	21	21	20	130	45	32	27	
20		AM20-12BJR	56	63	26	25	26	160	59	41	33	
22		AM22-12BJR	56	63	26	25	26	160	59	41	33	
25	1	AM25-16BJR	62	75	31	29	31	17	57	46	41	
30	1	AM30-16BJR	69	81	36	32	34	17	64	50	41	
30	1	AM30-20BJR	75	89	42	38	38	17	76	50	50	
38	1	AM38-20BJR	82	96	44	38	41	17	76	60	50	
38	1	AM38-24BJR	86	107	48	43	46	22	86	60	60	

16

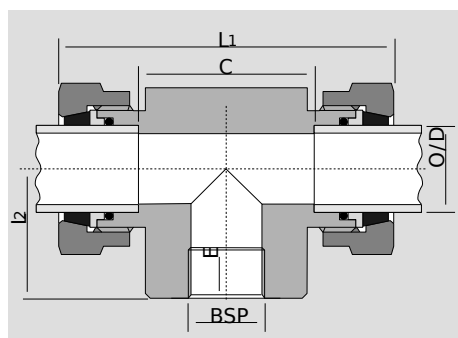
We aim to stock all **highlighted** carbon steel items for standard next day delivery



KR Metric

Female Stud Coupling BSP

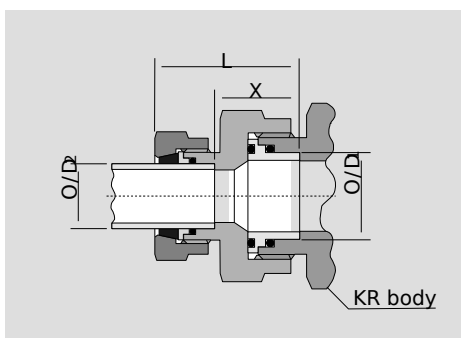
O/D mm	Thread BSP	Part No	Dimensions - mm			
			A	C	D	Nut Body
6		AM6-4FSCR	39	11	13	16 22
8		AM8-4FSCR	40	11	14	17 22
8		AM8-6FSCR	42	13	14	17 24
10		AM10-6FSCR	44	13	9	27 27
12		AM12-6FSCR	44	13	9	27 27
16		AM16-8FSCR	52	16	12	32 32
20		AM20-12FSCR	61	19	12	41 41
22		AM22-12FSCR	61	19	12	41 41
25	1	AM25-16FSCR	68	21	16	46 46
30	1	AM30-20FSCR	75	21	20	50 55
38	1	AM38-20FSCR	80	21	21	60 55
38	1	AM38-24FSCR	85	25	22	60 60
50	2	AM50-32FSCR	107	30	27	80 80



Female Outlet Tee

O/DStud mm	BSP	Part No	Dimensions - mm					Nut	Body
			L ₁	L ₂	C	E			
6		AM6-4FOTR	63	21	33	11	16	22	
8		AM8-4FOTR	63	21	33	11	17	22	
10		AM10-6FOTR	73	25	29	13	27	27	
12		AM12-6FOTR	73	25	29	13	27	27	
16		AM16-8FOTR	79	30	33	16	32	30	
20		AM20-12FOTR	103	37	43	19	41	38	
25	1	AM25-16FOTR	116	42	56	21	46	48	
30	1	AM30-20FOTR	134	45	68	21	50	51	
38	1	AM38-20FOTR	144	48	68	21	60	54	
38	1	AM38-24FOTR	149	53	73	25	60	60	
50	1	AM50-24FOTR	198	64	98	25	80	76	

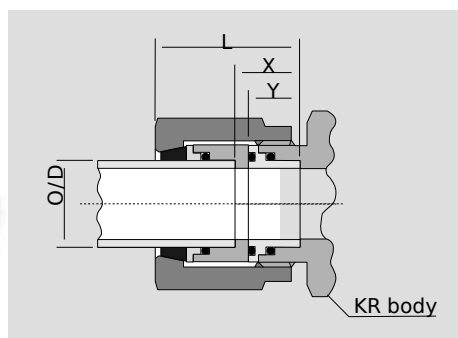
18 We aim to stock all **highlighted** carbon steel items for standard next day delivery



KR Metric

Reducing Nut Adaptor

O/D mm		Part No	Dimensions - mm		Nut	Nut
12			LX12			
8	6	AM8-M6RNR	35	18	17	16
10	8	AM10-M8RNR	39	24	17	27
10	6	AM10-M6RNR	39	24	16	27
12	10	AM12-M10RNR	43	21	27	27
12	8	AM12-M8RNR	39	24	17	27
12	6	AM12-M6RNR	39	24	16	27
16	12	AM16-M12RNR	43	21	27	32
16	10	AM16-M10RNR	43	21	27	32
16	8	AM16-M8RNR	40	25	17	32
16	6	AM16-M6RNR	40	25	16	32
20	16	AM20-M16RNR	52	28	32	41
20	12	AM20-M12RNR	50	28	27	41
20	10	AM20-M10RNR	50	28	27	41
25	20	AM25-M20RNR	58	28	41	46
25	16	AM25-M16RNR	53	29	32	46
25	12	AM25-M12RNR	51	29	27	46
30	25	AM30-M25RNR	61	29	46	50
30	20	AM30-M20RNR	58	28	41	50
30	16	AM30-M16RNR	53	29	32	50
38	30	AM38-M30RNR	70	36	50	60
38	25	AM38-M25RNR	67	36	46	60
38	20	AM38-M20RNR	66	36	41	60
50	38	AM50-M38RNR	86	48	60	80
50	30	AM50-M30RNR	82	49	50	80
50	25	AM50-M25RNR	79	49	46	80



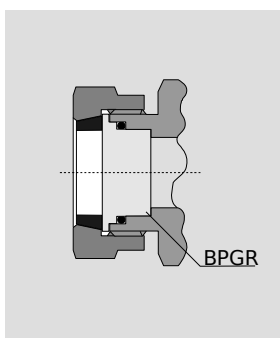
Breakaway Adaptor

The unique KR breakaway adaptor allows easy access to in-line components. Awkward and time consuming dismantling of pipe work normally required to remove components is eliminated. The breakaway adaptor will fit any of the KR Couplings up to 50 mm and 2"O/D. The adaptor replaces the nut, washer and collet of a conventional KR Coupling therefore all the tube couplings shown on pages 4 to 19 can be converted.

O/D mm	Part No	Dimensions - mm			
		L	X	Y	Nut
6	AM6BCR	26	12	11	16
8	AM8BCR	26	12	11	17
10	AM10BCR	38	17	15	27
12	AM12BCR	38	17	15	27
16	AM16BCR	38	17	15	32
20	AM20BCR	49	21	19	41
22	AM22BCR	49	21	19	41
25	AM25BCR	49	21	19	46
30	AM30BCR	53	21	19	50
38	AM38BCR	62	25	22	60
50	AM50BCR	80	32	29	80

20

We aim to stock all **highlighted** carbon steel items for standard next day delivery

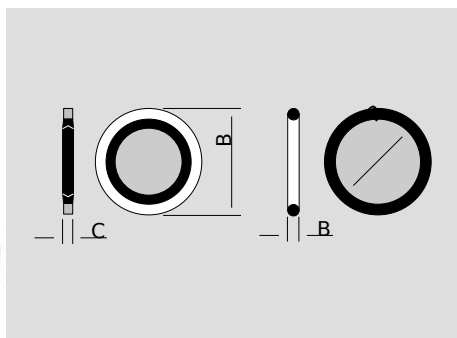


KR Metric

Spare Parts

O/D mm	Part No Blanking Plug	Part No Nut	Part No Collet	Part No Washer
6 mm	M6BPGR	M6NCR	M6R	M6W
8 mm	M8BPGR	M8NCR	M8R	M8W
10 mm	M10BPGR	M10NCR	M10R	M10W
12 mm	M12BPGR	M12NCR	M12R	M12W
16 mm	M16BPGR	M16NCR	M16R	M16W
20 mm	M20BPGR	M20NCR	M20R	M20W
22 mm	M22BPGR	M22NCR	M22R	M22W
25 mm	M25BPGR	M25NCR	M25R	M25W
30 mm	M30BPGR	M30NCR	M30R	M30W
38 mm	M38BPGR	M38NCR	M38R	M38W
50 mm	M50BPGR	M50NCR	M50R	M50W

We aim to stock all **highlighted** carbon steel items for standard next day delivery



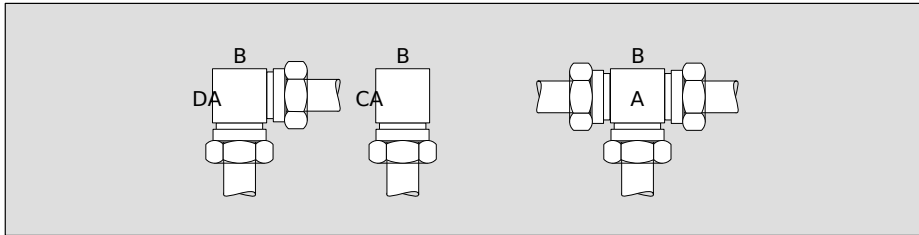
Seals

O Ring for tube coupling			Bonded Washer Self Centering			O Ring for ISO thread		
O/D	Part No	A B	BSPPart No	B C	ISOPart No	A B		
6	200-010-4490	6.11.8	PP45A-SC	15.92.03	M12300-000-4490	9.3 2.2		
8	200-011-4490	7.71.8	PP45B-SC	20.62.0	M14300-005-4490	11.3 2.2		
10	200-613-4490	9.92.6	PP45C-SC	23.82.0	M16300-010-4490	13.3 2.2		
12	200-614-4490	11.92.6	PP45D-SC	28.62.3	M18300-015-4490	15.3 2.2		
16	200-114-4490	15.52.6	PP45E-SC	31.8 2.3	M22300-020-4490	19.3 2.2		
20	200-211-4490	20.23.5	PP45F-SC	34.9 2.3	M27300-025-4490	23.6 2.9		
22	200-212-4490	21.83.5	PP45G-SC	38.12.3	M33300-030-4490	29.6 2.9		
25	200-214-4490	25.03.5	1 PP45H-SC	42.83.3	M42300-035-4490	38.6 2.9		
30	200-217-4490	29.83.5	1 PP45J-SC	52.4 3.3	M48300-040-4490	44.6 2.9		
38	200-222-4490	37.73.5	1 PP45K-SC	58.63.3	M60300-045-4490	56.6 2.2		
50	2007-071-4490	49.55.3	2 PP45M-SC	73.03.3				

The standard seal material is nitrile, if alternative materials are required please contact our technical department for details.



Tappings in Tee, Elbow & Cross Couplings



KR Metric

Couplings can be supplied with any combination of tappings, subject to the maximum and minimum sizes determined by the body dimensions and pressure rating.

To order, indicate the BSP size or an inch (eg BSP = 6) and use the appropriate letter code for the face to be tapped. For tapers, add **T** for BSPT, **AT** for NPTF or **AA** for NPT after the thread size code.

For example:

A16ER/B6 = 1" Elbow with BSP tapping in face B

or

A16ER/B6AT = 1" Elbow with NPTF tapping in face B.

For scheduled forward requirements quantities of special couplings can be held in stock.

Part No.	Max thread size
AM10ER/TR/XR	inch
AM12ER/TR/XR	inch
AM16ER/TR/XR	inch
AM20ER/TR	inch
AM22ER/TR	inch
AM25ER/TR	inch
AM30ER/TR	1 inch
AM38ER/TR/XR	1 inch
AM50ER/TR	2 inch



Imperial Range

Straight	A5ER	A16-8ROTR	A20BCR	A16-12MSCR
A4CR	A6ER	A16-12ROTR	A24BCR	A16-16MSCR
A5CR	A8ER	A20-12ROTR	A32BCR	A16-20MSCR
A6CR	A10ER	A20-16ROTR	SAE Adaptor	A20-12MSCR
A8CR	A12ER	A24-16ROTR	Straight	A20-16MSCR
A10CR	A14ER	A24-20ROTR	A12-12SHR	A20-20MSCR
A12CR	A16ER	Reducing	A12-16SHR	A20-24MSCR
A14CR	A20ER	Adaptor	A16-12SHR	A24-16MSCR
A16CR	A24ER	A6-5RNR	A16-16SHR	A24-20MSCR
A20CR	A32ER	A6-4RNR	A16-20SHR	A24-24MSCR
A24CR	Tee	A8-6RNR	A20-20SHR	A32-20MSCR
A32CR	A4TR	A8-5RNR	SAE Adaptor	A32-24MSCR
Reducer	A5TR	A8-4RNR	Elbow	A32-32MSCR
A5-4RR	A6TR	A10-8RNR	A12-12SHER	Stud Bulkhead
A6-5RR	A8TR	A10-6RNR	A12-16SHER	A4-4BHR
A6-4RR	A10TR	A10-5RNR	A16-12SHER	A5-4BHR
A8-6RR	A12TR	A12-10RNR	A16-16SHER	A6-4BHR
A8-4RR	A14TR	A12-8RNR	A16-20SHER	A8-6BHR
A10-8RR	A16TR	A12-6RNR	A20-20SHER	A10-8BHR
A12-10RR	A20TR	A14-10RNR	Male Stud	A12-12BHR
A12-8RR	A24TR	A14-8RNR	A4-2MSCR	A14-12BHR
A12-6RR	A32TR	A14-5RNR	A4-4MSCR	A16-16BHR
A14-12RR	Cross	A16-14RNR	A4-6MSCR	A20-16BHR
A16-14RR	A4XR	A16-12RNR	A4-8MSCR	A24-20BHR
A16-12RR	A5XR	A16-10RNR	A5-2MSCR	A32-24BHR
A16-8RR	A6XR	A16-8RNR	A5-4MSCR	Taper Male Stud
A20-16RR	A8XR	A20-16RNR	A5-6MSCR	A4-2TMSCR
A20-12RR	A10XR	A20-12RNR	A6-2MSCR	A4-4TMSCR
A24-20RR	A12XR	A20-10RNR	A6-4MSCR	A4-6TMSCR
A24-16RR	A14XR	A20-8RNR	A6-6MSCR	A5-2TMSCR
A32-24RR	A16XR	A24-20RNR	A6-8MSCR	A5-4TMSCR
Bulkhead	A20XR	A24-16RNR	A8-4MSCR	A5-6TMSCR
A4BPR	A24XR	A32-24RNR	A8-6MSCR	A6-2TMSCR
A5BPR	Reducing Outlet	A32-20RNR	A8-8MSCR	A6-4TMSCR
A6BPR	Tee	A32-16RNR	A8-12MSCR	A6-6TMSCR
A8BPR	A5-4ROTR	Breakaway	A10-6MSCR	A6-8TMSCR
A10BPR	A6-4ROTR	Adaptor	A10-8MSCR	A8-4TMSCR
A12BPR	A8-4ROTR	A4BCR	A10-12MSCR	A8-6TMSCR
A14BPR	A8-5ROTR	A5BCR	A12-6MSCR	A8-8TMSCR
A16BPR	A8-6ROTR	A6BCR	A12-8MSCR	A8-12TMSCR
A20BPR	A10-8ROTR	A8BCR	A12-12MSCR	A10-6TMSCR
A24BPR	A12-6ROTR	A10BCR	A12-16MSCR	A10-8TMSCR
A32BPR	A12-8ROTR	A12BCR	A14-8MSCR	A10-12TMSCR
Elbow	A14-12ROTR	A14BCR	A14-12MSCR	A12-8TMSCR
A4ER	A16-6ROTR	A16BCR	A14-16MSCR	A12-12TMSCR



Imperial Range

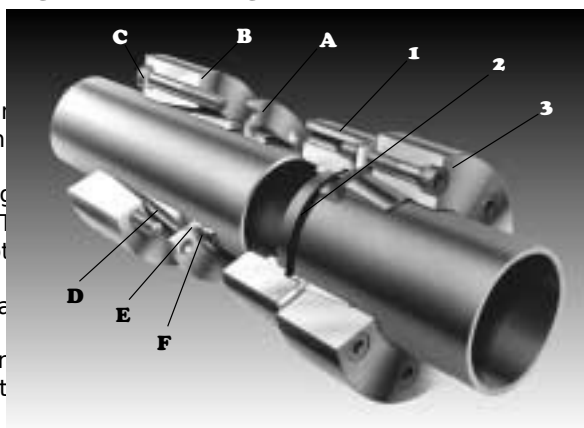
A12-16TMSCR	A24-24BJR	A6-6MOTR	A24-20FOTR	No. 2 JET
A14-8TMSCR	Male Elbow	A8-6MOTR	A24-24FOTR	Spare Parts
A14-12TMSCR	A4-2MER	A8-8MOTR	A32-16FOTR	Nut
A14-16TMSCR	A4-4MER	A10-8MOTR	Plug	4NCR
A16-12TMSCR	A5-4MER	A12-8MOTR	4BPGR	5NCR
A16-16TMSCR	A6-4MER	A12-12MOTR	5BPGR	6NCR
A16-20TMSCR	A6-6MER	A16-12MOTR	6BPGR	8NCR
A20-16TMSCR	A8-4MER	Female Stud	8BPGR	10NCR
A20-20TMSCR	A8-6MER	A4-2FSCR	10BPGR	12NCR
A20-24TMSCR	A8-8MER	A4-4FSCR	12BPGR	14NCR
A24-16TMSCR	A10-8MER	A4-6FSCR	14BPGR	16NCR
A24-20TMSCR	A12-8MER	A5-4FSCR	16BPGR	20NCR
A24-24TMSCR	A12-12MER	A5-6FSCR	20BPGR	24NCR
A32-24TMSCR	A14-12MER	A6-4FSCR	24BPGR	32NCR
Taper Male Stud	A16-12MER	A6-6FSCR	32BPGR	Collet
NPT	A16-16MER	A8-4FSCR	Stud Standpipe	4R
A4-4AAMSCR	A20-16MER	A8-6FSCR	4-2SSAR	5R
A5-4AAMSCR	A20-20MER	A8-8FSCR	4-4SSAR	6R
A6-6AAMSCR	A24-16MER	A10-8FSCR	5-2SSAR	8R
A8-8AAMSCR	A24-20MER	A12-8FSCR	5-4SSAR	10R
A10-8AAMSCR	A24-24MER	A12-12FSCR	5-6SSAR	12R
A12-12AAMSCR	Taper Male	A12-16FSCR	6-4SSAR	14R
A14-12AAMSCR	Elbow	A14-12FSCR	6-6SSAR	16R
A16-16AAMSCR	A4-2TMER	A16-12FSCR	8-4SSAR	20R
A20-20AAMSCR	A4-4TMER	A16-16FSCR	8-6SSAR	24R
A24-24AAMSCR	A5-4TMER	A20-16FSCR	8-8SSAR	32R
A32-24AAMSCR	A6-4TMER	A20-20FSCR	10-6SSAR	Washer
Banjo	A6-6TMER	A24-20FSCR	10-8SSAR	4W
A4-2BJR	A8-4TMER	A24-24FSCR	10-12SSAR	5W
A4-4BJR	A8-6TMER	A32-24FSCR	12-8SSAR	6W
A5-4BJR	A8-8TMER	A32-32FSCR	12-12SSAR	8W
A5-6BJR	A10-8TMER	Female Outlet	14-8SSAR	10W
A6-4BJR	A12-8TMER	Tee	14-12SSAR	12W
A6-6BJR	A12-12TMER	A4-4FOTR	14-16SSAR	14W
A8-6BJR	A14-12TMER	A6-4FOTR	16-12SSAR	16W
A8-8BJR	A16-12TMER	A6-6FOTR	16-16SSAR	20W
A10-8BJR	A16-16TMER	A6-8FOTR	20-12SSAR	24W
A12-8BJR	A20-16TMER	A8-6FOTR	20-16SSAR	32W
A12-12BJR	A20-20TMER	A8-8FOTR	20-20SSAR	
A14-12BJR	A24-20TMER	A10-8FOTR	32-24SSAR	
A16-12BJR	A24-24TMER	A12-8FOTR	32-32SSAR	
A16-16BJR	Male Outlet Tee	A12-12FOTR	Gauge Adaptors	
A20-16BJR	A4-4MOTR	A16-12FOTR	A4-6GAR-JET	
A20-20BJR	A5-4MOTR	A16-16FOTR	A6-4GAR	
A24-20BJR	A6-4MOTR	A20-16FOTR	No. 1 JET	



KR Couplings 50 to 125 mm & 2 to 5 inch

Benefits

- ❑ Leak free - "O" ring seal
- ❑ Safe joint every time
tightening torque and clamping force rises with the internal pressure.
- ❑ Low installed cost
(so inert gas purging, NDT, excessive flushing are not required), minimal tube preparation and no special assembly equipment are required. Demountable and reusable. Can be used with tube materials.



Features

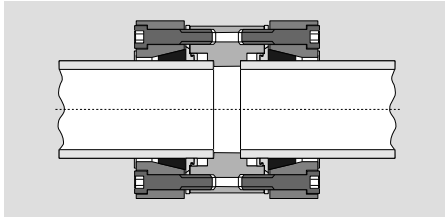
1. Body- mild or stainless steel or cupro-nickel, compatible with most fluids and environments. Locates O ring and tube.
2. O-ring- nitrile, FPM (viton), EP or FEP encapsulated FPM, compatible with most fluids, highly resistant to leakage even under severe vibration, pressure pulsation and temperature cycling. Provides diametric seal between tube O/D and body cavity.
3. Flange Sub-assembly- mild or stainless steel or cupro-nickel, compatible with most environments. Secures the tube and retains sealing mechanism.

Comprising of:-

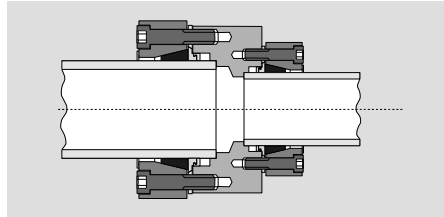
- A. Retaining Plate- holds the following components in one secure sub-assembly so easing assembly.
- B. Flange- Closes the split collet and retains sealing mechanism.
- C. Bolts- high tensile, cap head, give high compressive force at low tightening torque.
- D. Split collet- Clamping force rises with pressure. Large clamping area ensures minimal deformation of the tube. Retains tube in position.
- E. Back-up washer- provides additional support for the tube and locates the O-ring
- F. Anti-extrusion ring- provides additional support for the O-ring, giving larger acceptable tolerances on tube O/D found on larger sizes.

Product Approvals

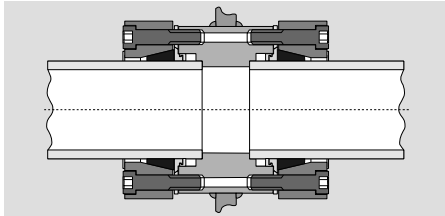
- Tested to BS4368 Part 4
- Lloyds Register of Shipping
- American Bureau of Shipping
- MOD(N)



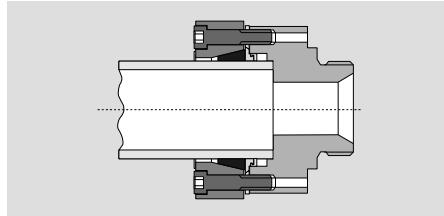
Straight



Straight Reducer

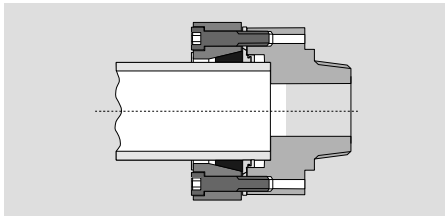


Welded Bulkhead Straight

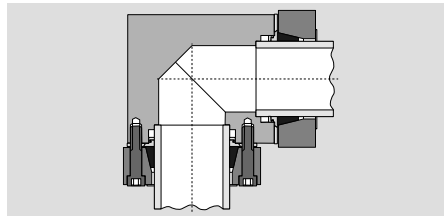


Male Stud BSP

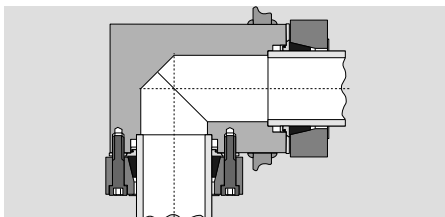
KR Range



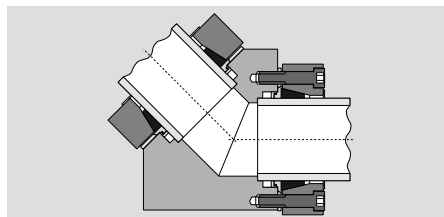
Male Stud BSPT



Elbow



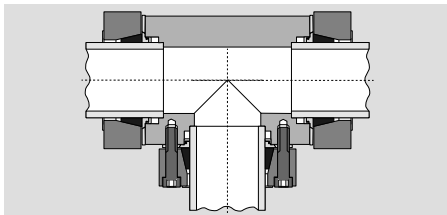
Welded Bulkhead Elbow



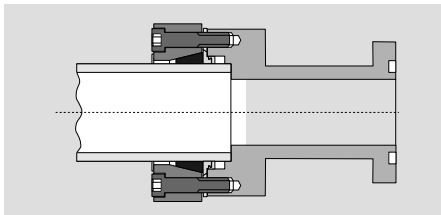
45° Elbow



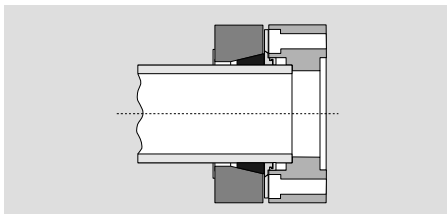
KR Couplings 50 to 125 mm & 2 to 5 inch



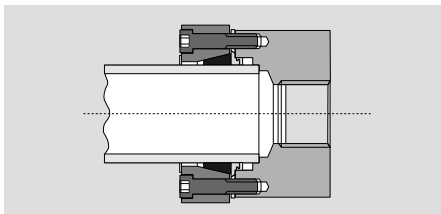
Tee



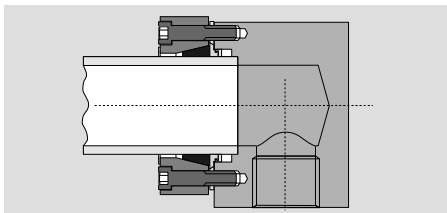
SAE Flange Adaptor, Code 61 & 62



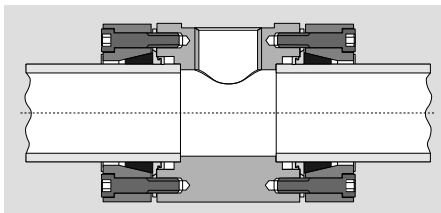
SAE Port Adaptor, Code 61 & 62



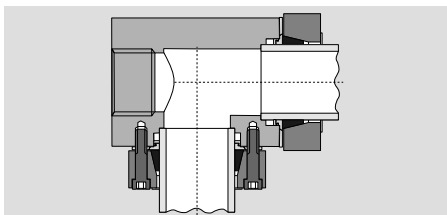
Female Stud



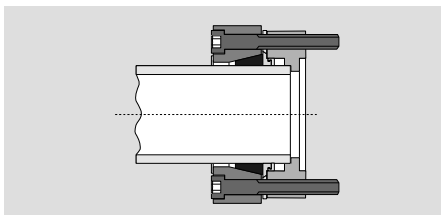
Female Elbow



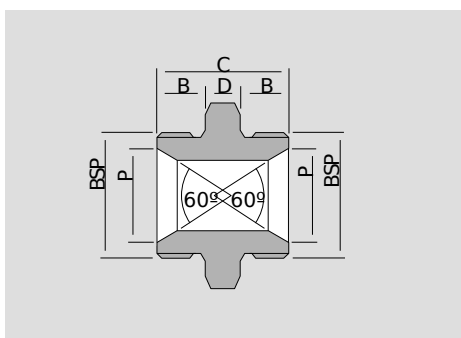
Female Outlet Tee, Single & double



Female Run Tee

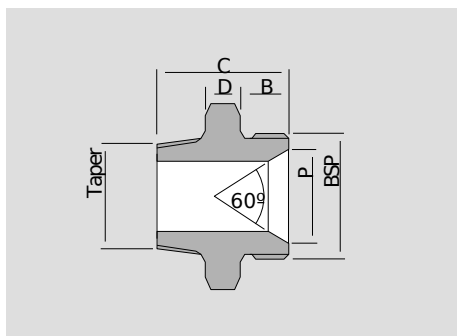


Breakaway Adaptor



Equal Union

Stud BSP	Part No	Dimensions - mm					
		B	C	D	P	A/F	A/C
	EU2	10	27	8	8	14	16.1
	EU4	11	30	8	11	19	22.0
	EU6	13	35	10	14	22	25.4
	EU8	16	41	10	18	27	31.2
	EU10	16	41	10	19	32	36.9
	EU12	19	49	11	23	32	36.9
1	EU16	21	54	13	29	41	47.2
1	EU20	21	56	14	37	50	57.5
1	EU24	25	67	16	43	55	63.3
2	EU32	30	78	18	55	70	80.8

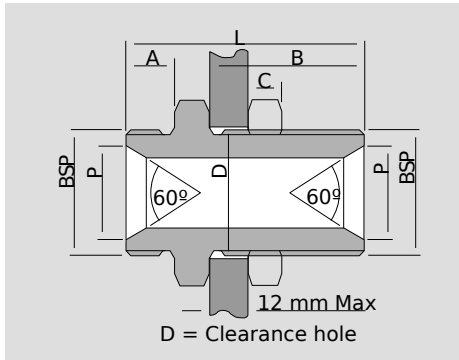


Equal Union, Parallel/Taper

Stud		Part No	Dimensions - mm					
BSP	BSPT		B	C	D	P	A/F	A/C
		EUPT2	10	25	6	8	14	16.2
		EUPT4	11	29	6	11	19	21.9
		EUPT6	13	33	8	14	22	25.4
		EUPT8	16	40	8	18	27	31.2
		EUPT12	19	48	10	23	33	38.1
1	1	EUPT16	21	54	11	29	41	47.4
1	1	EUPT20	21	59	13	37	50	57.8
1	1	EUPT24	25	65	14	43	55	63.5
2	2	EUPT32	30	76	16	55	70	80.8
BSP NPTF								
		EUPAT2	10	25	6	8	14	16.2
		EUPAT4	11	32	6	11	19	21.9
		EUPAT6	13	35	8	14	22	25.4
		EUPAT8	16	43	8	18	27	31.2
		EUPAT12	19	48	10	23	33	38.1
1	1	EUPAT16	21	56	11	29	41	47.4
1	1	EUPAT20	21	58	13	37	50	57.5

30

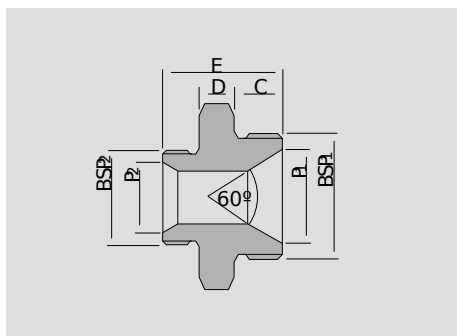
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Equal Union Bulkhead

Stud BSP	Part No	Dimensions - mm						Body		Nut
		A	B	L	C	D	P	A/F	A/C	A/F
	EUBH4	11.1	28.6	47.6	6	15	10.5	19	21.9	19
	EUBH6	12.7	31.7	53.9	7	18	14.0	22	25.4	22
	EUBH8	15.9	34.9	60.3	8	23	17.6	27	31.1	27
	EUBH10	15.9	34.9	60.3	8	24	19.4	33	38.1	33
	EUBH12	19.1	38.1	68.2	9	28	22.9	33	38.1	32
1	EUBH16	20.6	41.3	74.6	10	35	28.8	41	47.4	41
1	EUBH20	20.6	44.5	79.4	14	43	36.9	50	57.8	50
1	EUBH24	25.4	47.6	88.9	15	49	42.8	55	63.0	55

Adaptors

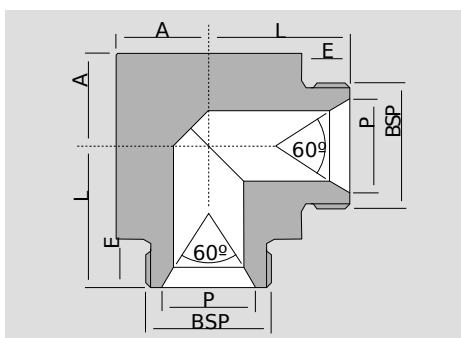


Unequal Union

Stud BSP		Part No	Dimensions - mm					
	12		CDEP	1	P2	A/F		
		UU4-2	11	8	29	11	8	19
		UU6-4	13	10	33	14	11	22
		UU8-4	16	10	37	18	11	27
		UU8-6	16	10	38	18	14	27
		UU10-4	16	10	37	19	11	32
		UU10-6	16	10	38	19	14	32
		UU10-8	16	10	41	19	18	32
		UU12-6	19	11	43	23	14	33
		UU12-8	19	11	46	23	18	33
		UU12-10	19	11	46	23	19	33
		UU14-12	19	13	51	26	23	36
	1	UU16-8	21	13	49	29	18	41
	1	UU16-10	21	14	51	29	19	41
	1	UU16-12	21	13	52	29	23	41
	1	UU16-14	21	13	52	29	26	41
	1 1	UU20-16	21	14	56	37	29	50
	1 1	UU24-16	25	16	62	43	29	55
	1 1	UU24-20	25	16	62	43	37	55
	2 1	UU32-16	30	18	68	55	29	70
	21	UU32-20	30	18	68	55	37	70
	21	UU32-24	30	18	73	55	43	70

32

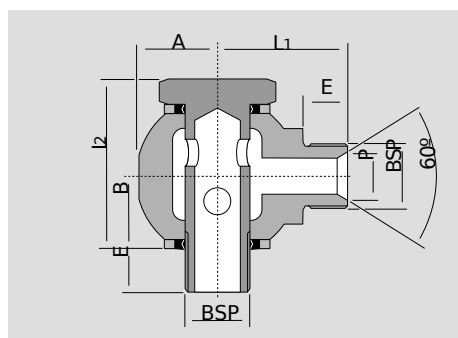
We aim to stock all carbon steel items for standard next day delivery



Equal Male Elbow

Stud BSP	Part No	Dimensions - mm				
		L	E	A	P	A/F
	EME2	20	10	8	8	16
	EME4	27	11	10	11	22
	EME6	29	13	13	14	27
	EME8	33	16	16	18	32
	EME12	41	19	18	23	41
1	EME16	45	21	23	29	48
1	EME20	52	21	27	37	54
1	EME24	60	25	30	43	60
2	EME32	75	30	37	55	76

Adaptors

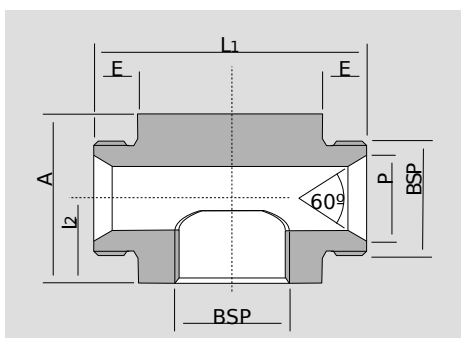


Banjo

Stud BSP		Part No	Dimensions - mm							
1	2		L1	L2	A	B	E	P	A/F	A/C
		A4-4Bj	25	34	14	14	11	11	19	21.9
		A6-6Bj	29	42	17	17	13	14	22	25.4
		A8-8Bj	37	47	21	20	16	18	27	31.2
		A12-12Bj	45	63	25	26	19	23	34	38.1

34

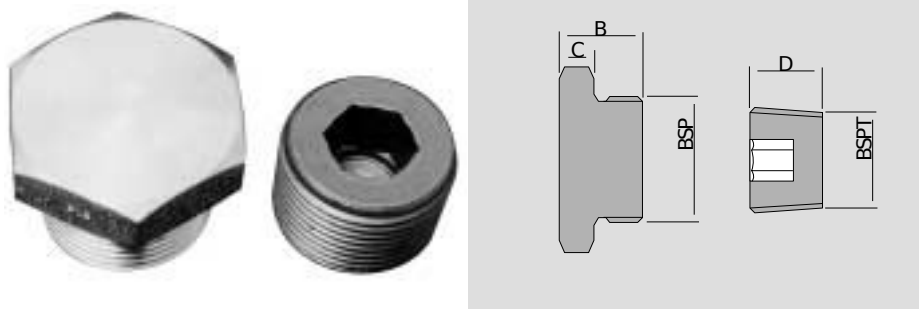
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Female Outlet Male Tee

Thread	Part No	Dimensions - mm					
		L1	L2	E	A	P	A/F
BSP	FOMT 4	50.8	12.7	11.1	24.8	10.5	25
	FOMT 6	57.2	14.3	12.7	28.6	14.1	30
	FOMT 8	70.0	17.5	15.9	34.9	17.7	35
	FOMT 12	82.6	23.8	19.1	39.8	23.0	40
1	FOMT 16	95.3	27.0	20.6	47.6	28.3	50
1	FOMT 20	108.0	30.2	20.6	57.2	37.0	60
1	FOMT 24	121.0	34.9	25.4	63.5	42.8	65

Adaptors

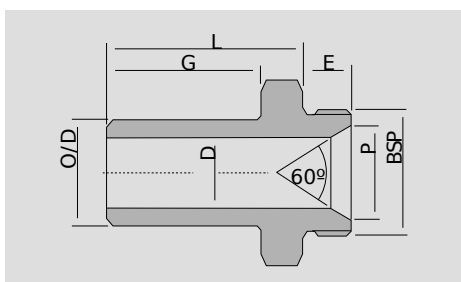


Plug, Parallel & taper

Stud BSP	Part No	Dimensions - mm				
		B	C	D	A/F	A/C
	P2	17	7		14	16.2
	P4	18	7		19	21.9
	P6	21	8		22	25.4
	P8	25	9		27	31.2
	P10	26	10		32	36.9
	P12	29	10		33	38.1
	P14	31	12		36	41.6
1	P16	33	12		41	47.4
1	P20	34	14		50	57.8
1	P24	41	15		55	63.5
2	P32	47	17		70	80.8
BSPT						
	PT2			9.5	"	
	PT4			12.7	"	
	PT6			14.3	"	
	PT8			17.5	"	
	PT12			20.6	"	
1	PT16			25.4	"	

36

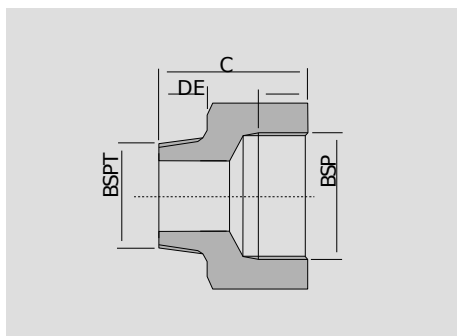
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Stud Standpipe

O/D Stud		Part No	Dimensions - mm					A/F
mm	BSP		E	G	L	D	P	
6		M6-2SSAR	10	29	35	4	8	14
6		M6-4SSAR	11	29	35	4	11	19
8		M8-2SSAR	10	29	35	6	8	14
8		M8-4SSAR	11	29	35	6	11	19
8		M8-6SSAR	13	29	35	6	14	22
10		M10-4SSAR	11	37	43	6	11	19
10		M10-6SSAR	13	37	43	6	14	22
12		M12-4SSAR	11	37	43	6	11	19
12		M12-6SSAR	13	37	43	8	14	22
12		M12-8SSAR	16	37	45	8	18	29
16		M16-6SSAR	13	37	44	10	14	22
16		M16-8SSAR	16	37	45	10	18	29
16		M16-12SSAR	19	37	48	10	23	33
20		M20-8SSAR	16	48	56	11	18	29
20		M20-12SSAR	19	48	60	14	23	33
22		M22-8SSAR	11	48	56	11	18	29
22		M22-12SSAR	19	48	60	16	23	33
22	1	M22-16SSAR	21	48	60	16	29	41
25		M25-12SSAR	19	48	60	18	23	33
25	1	M25-16SSAR	21	48	60	18	29	41
30		M30-12SSAR	19	55	67	18	23	33
30	1	M30-16SSAR	21	55	67	22	29	41
30	1	M30-20SSAR	21	55	69	22	37	50
38	1	M38-16SSAR	21	64	76	26	29	41
38	1	M38-20SSAR	21	64	79	26	37	50
38	1	M38-24SSAR	25	64	79	26	43	55
50	1	M50-24SSAR	25	83	98	35	43	55
50	2	M50-32SSAR	30	83	106	35	55	70

Adaptors

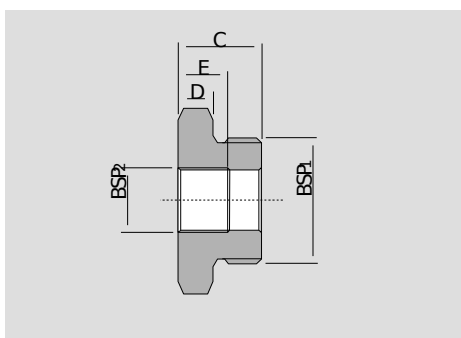


Adaptor Bush

BSPT		BSP		Part No	Dimensions - mm		
1	2				C	D	E
				AB4T-4	30	11	11
				AB6T-4	30	13	11
				AB6T-6	35	13	13
				AB8T-8	43	16	16
				AB12T-12	49	19	19
1	1			AB16T-16	57	22	21
1	1			AB20T-20	61	25	21
1	1			AB24T-24	68	25	25
2	2			AB32T-32	79	30	30
							A/F
							A/C
							19
							19
							24
							29
							36
							46
							55
							60
							80

38

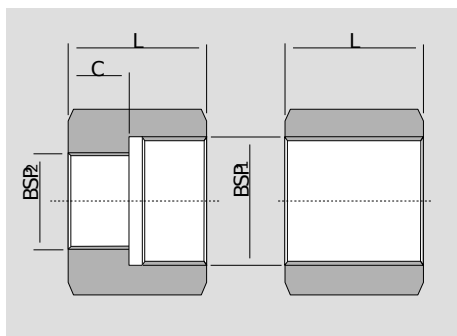
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Reducing Bush

BSP		Part No	Dimensions - mm			
1	2		C	D	E	A/F
		RB4-2	29	8	10	19
		RB6-2	29	16	10	22
		RB6-4	32	19	11	22
		RB8-2	30	14	10	27
		RB8-4	32	16	11	27
		RB8-6	35	19	13	27
		RB10-8	43	27	16	32
		RB12-4	29	10	11	32
		RB12-6	35	16	13	32
		RB12-8	41	22	16	32
1		RB16-4	33	12	11	41
1		RB16-6	33	12	13	41
1		RB16-8	33	12	16	41
1		RB16-12	45	24	19	41
1		RB20-6	34	14	13	50
1		RB20-8	34	14	16	50
1		RB20-12	34	14	19	50
1	1	RB20-16	51	30	20	50
1		RB24-8	41	15	16	55
1		RB24-12	41	15	19	55
1	1	RB24-16	41	15	20	55
1	1	RB24-20	59	33	20	55
2	1	RB32-16	47	17	20	70
21		RB32-20	47	17	20	70
21		RB32-24	47	17	25	70

Adaptors

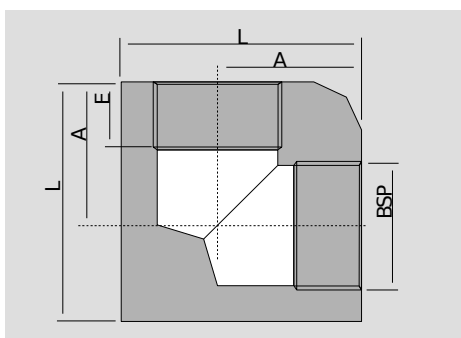


Female Union

BSP		Part No	Dimensions - mm		
1	2		L	C	A/F
		FA2-2	22	-	17
		FA4-2	25	12	22
		FA4-4	25	-	22
		FA6-2	27	13	27
		FA6-4	27	13	27
		FA6-6	29	-	27
		FA8-2	30	12	32
		FA8-4	30	12	32
		FA8-6	32	14	32
		FA8-8	35	-	32
		FA12-12	41	-	41
1	1	FA16-16	45	-	50
1	1	FA20-20	45	-	60

40

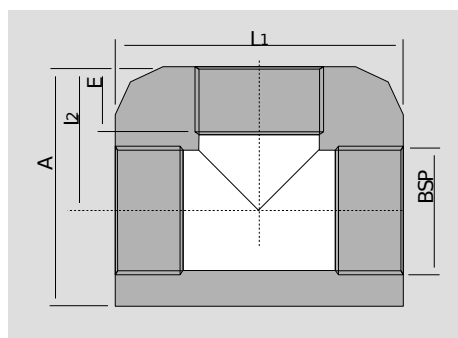
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Equal Female Elbow

BSP	Part No	Dimensions - mm			
		A	L	E	Body
	EFE2	17	27	10	19
	EFE4	21	33	11	25
	EFE6	24	37	13	25
	EFE8	29	44	16	32
	EFE12	35	56	19	41
1	EFE16	41	67	21	51
1	EFE20	44	73	21	57
1	EFE24	52	83	25	60
2	EFE32	64	102	30	76

Adaptors

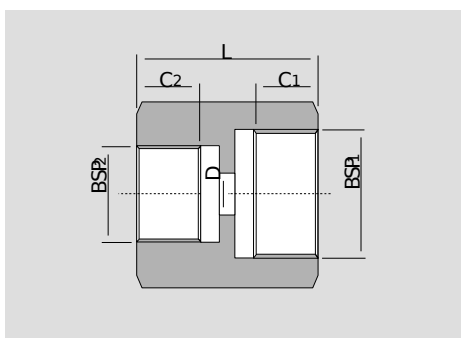


Equal Female Tee

BSP	Part No	Dimensions - mm				
		L ₁	L ₂	E	A	Body
	EFT2	35	17	10	27	19
	EFT4	41	21	11	33	25
	EFT6	48	24	13	37	25
	EFT8	57	29	16	44	32
	EFT12	70	35	19	56	41
1	EFT16	83	41	21	67	51
1	EFT20	89	44	21	73	64
1	EFT24	105	52	25	83	64
2	EFT32	127	64	30	102	76

42

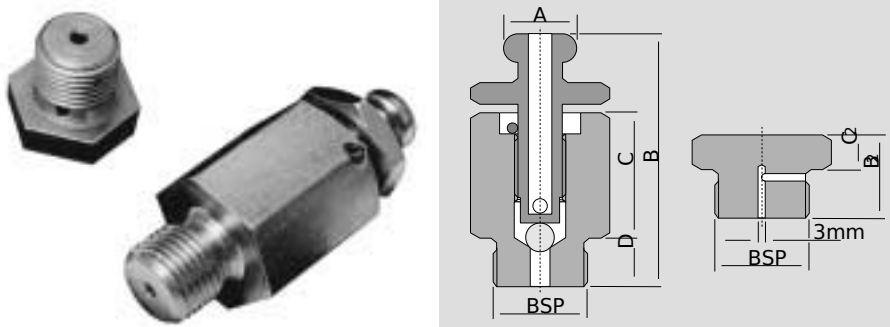
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Gauge Adaptor

BSP	BSP	Part No	Dimensions - mm					
			LC	1	C2	D	A/F	A/C
12		GA4-4	30	13	13	6	22	25.4
		GA6-4	33	16	13	6	24	27.7
		GA8-4	37	19	13	6	29	33.5

Adaptors



Bleed Valve

BSP	Part No	Dimensions - mm							
		A	B	B ₂	CC	z	D	Nut	Body
	BV2	8	40		18		10	14	16
	P2AB			17		7			14

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Hydraulic Tube

Berendsen PMC recommends and supplies cold finished tubing. This method of manufacture ensures very accurate sizing, particularly on outside diameter. This means maximum grip and zero leakage when used with O/D high pressure couplings. The cold drawing process ensures remarkably good surface finish both internally and externally. This gives reduced pressure drop of the transmitted fluid and enables compression couplings to be fitted quickly and efficiently with minimum risk of damage to such items as rubber seals.

All tubing up to and including 2"/50 mm O/D is scaleless annealed, enabling simple cold manipulation for installations whilst retaining surface finish. Tube over 50 mm can be supplied in either a stress relieved or normalised condition dependent upon application. Stress relieved tubes are not suitable for cold bending but a full range of angle joints are available. Tube suffix ST354 and ST524 being fully annealed are suitable for cold bending.

All working pressures are for guidance only. Several formulae can be used for calculating the dimensions of tubes to withstand internal pressures at normal temperatures. All figures given are based upon UTS and a factor of safety of 3:1 neglecting bending. All tube is generally supplied in random lengths (4 to 6.5m). Carbon steel tube is either oil dipped or phosphated and the ends plugged. Mill certificates can be supplied if requested at the time of placing an order. Imperial, Stainless steel and cupro-nickel tube are also available on request.

Material Specification:

Part Number Suffix

Blank (standard) = CDMS to BS3602 CFS360/DIN 2391C ST35.4
with minimum UTS of 360 N/mm²
DOM = DOM 1026 to ASTMA513
with minimum UTS of 585 N/mm²
ST524 = CDMS to DIN 2391C/DIN2445 ST52.4
with minimum UTS of 520 N/mm²





Hydraulic Tube

O/D I/D		Pressure	Max	Part No	Min bend	
mm	mm	mm	bar		radius	Kg/m
6 x 1	4		390	STM6 x 1	20	0.123
6 x 1.5	3		600	STM6 x 15	20	0.166
8 x 1	6		300	STM8 x 1	25	0.173
8 x 1.5	5		440	STM8 x 15	25	0.240
10 x 1.5	7		350	STM10 x 15	25	0.314
10 x 2	6		470	STM10 x 2	25	0.395
12 x 1.5	9		300	STM12 x 15	30	0.388
12 x 2	8		390	STM12 x 2	30	0.493
16 x 2	12		300	STM16 x 2	40	0.691
16 x 3	10		440	STM16 x 3	40	0.962
20 x 2	16		230	STM20 x 2	55	0.888
20 x 3	14		350	STM20 x 3	55	1.26
22 x 2	18		210	STM22 x 2	60	1.2
22 x 3	16		320	STM22 x 3	60	1.41
25 x 3	19		280	STM25 x 3	70	1.63
25 x 4	17		380	STM25 x 4	70	2.07
30 x 3	24		230	STM30 x 3	90	2.0
30 x 4	22		310	STM30 x 4	90	2.57
30 x 5	20		390	STM30 x 5	90	3.08
38 x 3	32		180	STM38 x 3	125	2.59
38 x 5	28		310	STM38 x 5	125	4.07
42 x 3	36		170	STM42 x 3	130	2.89
50 x 3.5	43		160	STM50 x 35	160	4.012
50 x 6	38		285	STM50 x 6	160	6.51
50 x 8	34		380	STM50 x 8	60	8.282
60 x 5	50		300	STM60 x 5 DOM		6.904
60 x 5	50		275	STM60 x 5 ST524		6.904
70 x 5	60		270	STM70 x 5 DOM		8.205
75 x 7.5	60		326	STM75 x 75 ST524		12.405
80 x 5	70		240	STM80 x 5 DOM		9.419
80 x 8	64		326	STM50 x 8 ST524		14.114
90 x 5	80		200	STM90 x 5 DOM		10.728
97 x 10	77		336	STM97 x 10 ST524		21.318
100 x 10	80		350	STM100 x 10 DOM		22.379



KR Coupling Specifications

Tube O/D		Working Pressure	Tube O/D tolerance	Tube specification	Max Surface Hardness - VPN		
mm	inch	Bar	mm	annealed	With Mild Steel Collet	With Stainless Steel Collet	With Cupro-Nickel Collet
6		680	±0.1				
8		680	±0.1	Mild steel -			
10		680	±0.1	BS3602 with O/D			
12		680	±0.1	tolerance to			
16		680	±0.1	BS3602 & DIN2391C			
20		680	±0.1	Stainless steel	180	180	140
22		680	±0.1	ASTM A 269			
25	1	500	±0.1	grade 316 or 304			
30	1	500	±0.1	Cupro-nickel -			
38	1	500	±0.15	90-10 or 70-30			
50	2	500	±0.2	Alumium Silicon Brass			
50	2	500	±0.2				
	2	333	±0.2				
60	2	300	±0.2				
	2	300	±0.2				
70		350	±0.25	Mild steel -			
75	3	300	±0.25	DOM 1026	180	180	140
80		250	±0.25	ASTM A513			
90	3	250	±0.25				
100	4	207	±0.25				
	4	207	±0.25				
125	5	207	±0.25				

Specification

*Derate by 50% for high pressure gas systems.

†All tube must be of good outside surface finish and within the tolerance quoted.

Coupling Materials

Standard Couplings

Body, nut/flange, washer - Metric: mild steel-zinc plated and treated, clear finish
Imperial; mild steel-zinc plated and golden passivated
Collet - carbon steel - heat treated, phosphated with dry oil finish

Collet -

Stainless Steel Couplings

Body, flange - AISI 316
Nut, washer - AISI 303
Collet - carbon steel or treated stainless steel or Cupro-Nickel

Cupro-Nickel Couplings

Body, nut/flange, collet, washer - Cupro-Nickel, NES 835



O Ring Data

Berendsen Fluid Power stocks four different grades of 'O' rings which cover most applications encountered.

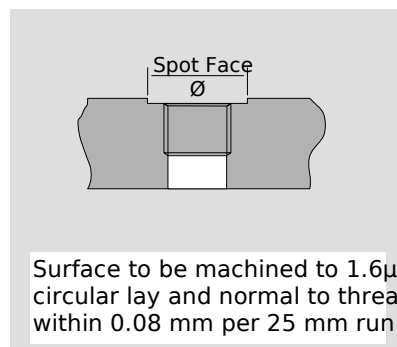
Elastomer Type	Temperature Range	General Fluid Compatibility*
Medium Nitrile 90 Shore Hardness	-40°C to +100°C	Mineral Oil Water in Oil Emulsion Water Glycol Air Nitrogen Carbon Dioxide Water
FPM (Viton) 90 Shore Hardness	-20°C to +150°C	Phosphate Ester (not Skydrol) Oxygen
EP (Ethylene Propylene)	-40°C to +100°C	Skydrol 500B Hot Water Castor Based Brake Fluid
FEP encapsulated FPM	-20°C to +150°C	Very good chemical resistance to most liquids and chemicals, with the exception of liquid alkaline metals and some fluorine compounds

*For specific fluid compatibility and other applications e.g. paint lines, underseal, food processing, petro-chemical etc., please consult our Sales Office.



Bonded Seal Installation Data

BSP	Torque (Nm) Single Seal	Min Spot Face Ø
	22	17.0 mm
	40	21.0 mm
	75	26.0 mm
	80	29.0 mm
	150	33.0 mm
	160	36.0 mm
1	190	44.0 mm
1	205	53.0 mm
1	210	59.0 mm
2	215	74.0 mm



General Tube Preparation

1. Ensure that tube is right for the application. It should be clean and supplied plugged and oiled with no scoring or surface deformation. It must be the correct size for the coupling, to the correct specification and within the tolerances given for the coupling to be used.
2. Berendsen Fluid Power supply 'O' rings, boom rings and fire safe seals separately, ie. not installed in the coupling. Ensure seals are the correct size for the coupling. For KR couplings use only seals supplied by Berendsen Fluid Power as these are of specific quality and specification to suit KRcouplings. Nitrile, FPM (viton), E.P. and FEP encapsulated FPM 'O' rings are available. Please consult our technical department for the correct material selection.
3. All metallic tubes should be cut using a hacksaw or similar tool, preferably with a guide to ensure a 90° cut. Both the inside and outside edges should be deburred and the tube pulled through to ensure no debris is left inside. Note, if roller cutters are used on tube there is a danger of swaging the outside diameter and leaving a burr on the diameter.
4. Ensure tube runs are correctly aligned. Do not attempt to use tube couplings on misaligned tubes together.

Assembly



KR Assembly Couplings up to 50 mm & 2"

Assembly of KRcouplings is very simple and requires no special tools . To ensure speedy and safe assembly every time the following instructions should be followed.

1. Before installing KRcouplings follow the guidelines given for general tube preparation.
2. Unscrew the nut from the body (1). Slide nut (5), collet (4) and backup washer (3) over the tube as in fig.1. Lubricate the 'O' ring (2) and the outer surface of the collet with system fluid (for air or gas systems use silicon grease) and slide the 'O' ring over the tube taking particular care not to damage it. When used in extremely hostile environments, such as offshore, lubricate the couplings threads and the collet with grease.
3. Locate the tube end against the tube abutment in the body (1). Slide the 'O' ring and the backup washer along the tube until they are correctly located in the body's counter bore. It is important that the 'O' ring and the backup washer are fully located in the body, as fig. 2.
4. Slide the collet against the washer.
5. Screw the nut onto the body and tighten holding the body with a second spanner. The completed assembly should be as fig. 3. An indication of correct assembly is given by the gap between the nut and body shoulder being approximately 3mm. The final position of the nut in relation to the body will vary with the O/D tolerance of the tube.

Note:

If a number of couplings are assembled in a straight line, ensure the previous joint is not slackened when tightening a coupling.

6. Pressurise the system, switch off and check all nuts for tightness, retighten as necessary. It is quite common for collets to 'bed in' during initial pressurisation. Torque wrenches need not be used in normal assembly work but recommendations for the guidance of quality assurance personnel are available from our technical department.

IMPORTANT:

When refitting a used coupling always use new seals and ensure that the old seals have been removed from the body.

Additional instructions for the assembly of cupro-nickel and fire safe couplings.

Fire safe couplings are fitted with an additional seal. This secondary seal takes over when the 'O' ring is destroyed by the heat of a fire. Assembly is as for our standard couplings except that the fire safe seal is placed between the 'O' ring and the backup washer, see fig. 4. Components for the fire safe coupling are NOT interchangeable with those for our other couplings.

Cupro-nickel couplings can be specified with or without a boom ring. For couplings without a boom ring assemble as above. For couplings with a boom ring, place the boom ring between the 'O' ring and the backup washer with its concave side facing the 'O' ring, see fig. 5.



KRAssembly

Hint:

To help push the 'O' ring into the counter bore on large sizes, lightly tap the backup washer with the flats of a spanner or slide the collet against the backup washer and gently screw the nut by hand onto the body. If this method is used the nut must be removed to check the 'O' ring and washer are fully located.

Figure 1.

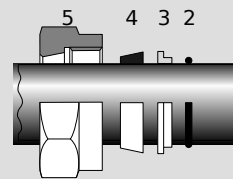


Figure 2.

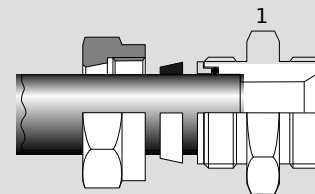


Figure 3.

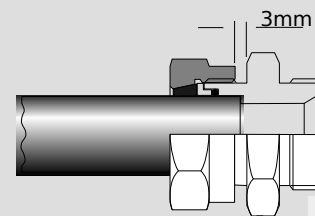


Figure 4.

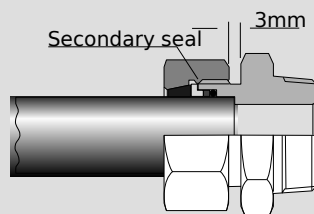
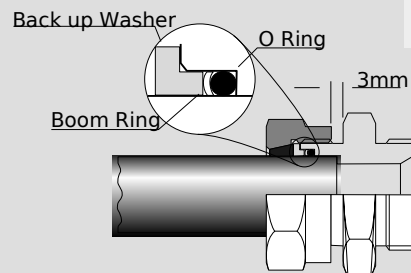


Figure 5.



Assembly



KR Flange Assembly Couplings over 50 mm & 2"

Assembly of KRflange couplings is very simple and requires no special tools (other than that provided with the coupling). To ensure speedy and safe assembly every time the following instructions should be followed.

1. Before installing KRflange couplings follow the guidelines given on page 49 for tube preparation.
2. Remove the flange sub-assembly (A) from the coupling body (F). Do not unscrew the bolts past the retaining plate (B). Slide sub-assembly over the tube (fig. 1). Lubricate the 'O' ring (E) with system fluid (for air or gas systems use silicon grease) and slide it over the tube taking particular care not to damage it. When used in extremely hostile environments, such as offshore, lubricate the couplings threads and the collet with grease.
3. Locate the tube end against the tube abutment in the body (F). Slide the 'O' ring along the tube until it is correctly located in the chamfer to the counter bore of the body.
4. Slide the flange sub-assembly up to the 'O' ring, enter the tapered end of the assembly tool (provided with the coupling) as far as possible into the collet gap. Locate bolts 1 and 2 and tighten evenly until the backup washer is in its correct position (indicated by the gap between the retaining plate and the body being about 2 mm), fig 2.
5. Unscrew bolts 1 and 2 three turns and withdraw the assembly tool.
6. Fully tighten all bolts evenly in the order given, fig 3, to the correct torque, see ask our technical department for correct torque figures quoting part number, pressure rating and safety factor.

The final position of the flange in relation to the body will vary according to the O/D tolerance of the tube.

7. Pressurise the system, switch off and check all joints.

If in doubt please consult our technical department.

Note:

Do not weld a bulkhead coupling in place without first removing its flange sub-assemblies and 'O' rings.

IMPORTANT:

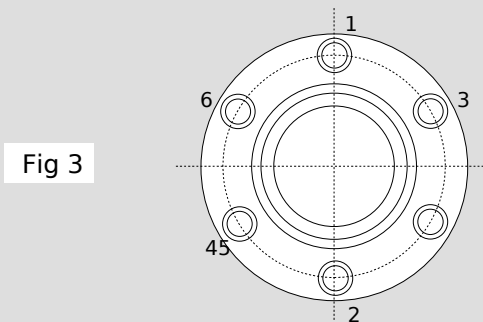
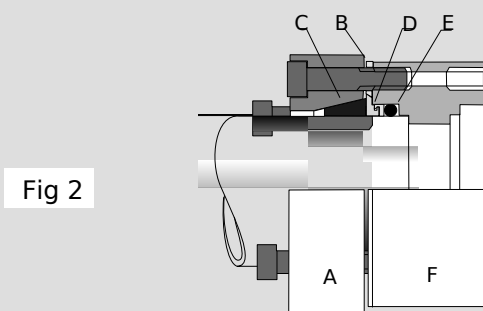
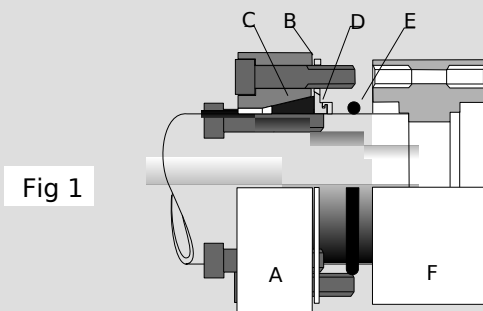
When refitting a used coupling always use new seals and ensure that the old seals have been removed from the body of the coupling.

Trouble shooting

In the unlikely event of a correctly assembled KR coupling leaking check for a damaged 'O' ring, malformed or misaligned tube. Simply tightening a leaking coupling cannot cure the leak; something is wrong and the tube and 'O' ring must be checked.



KRFlange Assembly



Assembly



Pipework Installation

Obviously pipe installations are vitally important and must not be left as an afterthought to the system in which they serve a critical function.

Pipework should be laid out and should be considered early in the system design in order that the best results are achieved.

The basic operating parameters must be known to the designer to enable the correct selection of components. To help in this selection process the following hints will act as a guide.

Tube

1. Material should be compatible with the fluid or gas to be carried and the external environment. Due consideration should be given to the life expectancy. e.g. A carbon steel tube on an open deck of a ship would corrode through within 2 years without suitable protection. The use of stainless steel, copper nickel or aluminium silicon bronze tubes could well be more cost effective in the longer term.

2. Pressure rating should be capable of meeting system demand for both steady state and shock loading.

3. Outside diameter should conform to the size requirements including ovality and have a suitable surface finish.

4. Inside diameter must be clean and free from scale; this is essential in hydraulic systems. Hot finished tube will not generally provide adequate cleanliness.

5. All tube should be plugged to prevent ingress of dirt and carbon steel tube should be oiled.

Pipework Layout

1. Good appearance of pipe installation is not always easy to attain but good installation will be rewarded by reliability and can be seen by good vertical and horizontal layout.

2. Where space permits, pipe forming on the tube sizes up to 50 mm O/D is preferable to using couplings. Cold forming should always be used on annealed tubing as applying heat for bending often causes scaling in the bore of carbon steel tube and can damage the properties of copper based tubes.

3. Accessibility of couplings and inline mounted equipment is very important. Couplings in long runs should be staggered to allow for maintenance.

It is also worth considering the use of breakaway couplings to allow for the removal of inline components, should the need arise.

4. Wherever possible flexible hoses should be used to mount between rigid pipework and pumps, motors or any flexibly mounted unit. This will reduce transmitted vibration to the pipework.

Clamping

1. External vibration is difficult to predict in the early design stages but vibration and shock have an adverse effect on reliability. Firmly anchored clamping is necessary to restrain pipes from excessive movement. Clamps should be well positioned and arranged to avoid strain on pipework. A reliable system will only remain so as long as it has an equally reliable piping installation.

Couplings

1. Material must be compatible with the fluid or gas to be carried and compatible with the tube to be joined. The same comments with regard to life of the tube apply to the couplings. It is possible to use a proprietary mastic tape to protect carbon steel couplings when used with non-ferrous tubing.

2. Pressure rating should be capable of meeting system demand for both steady state and shock loading.

3. The coupling seal must be compatible with the fluid or gas in the system.

4. The coupling design must be capable of withstanding any external vibration or shock loading and where necessary must comply to the necessary certification requirements.

5. Pipes should be arranged so that they enter the coupling freely and in line. Straining pipe into couplings at an angle could cause premature failure. Bends adjacent to couplings should have a minimum of 25 mm straight pipe before the start of the radius to the back of the coupling nut. Bends in pipes close to couplings can effect the diameter and hence the gripping and sealing mechanism of the coupling.



Pressure Drop Calculations

Pressure Losses in Pipework

The calculation below will give the pressure drop within the pipework, the pressure at the pump and/or bore of the tube can be adjusted accordingly

Fluid flow in pipework system will result in an energy loss due to surface friction, changes in flow area and direction. Pressure loss is dependent amongst other factors on density and viscosity which will vary with temperature. The pressure loss will also vary according to whether the flow is laminar or turbulent.

There are several methods available to calculate the theoretical loss in a straight piece of pipe, one of which is shown below. To be added to this are the additional losses caused by changes in section or direction. These can be established using the equivalent length method. Table 2, page 55, gives the additional lengths of pipe to be added to the overall length for each fitting, etc

Nomenclature

Q = Flow Rate, m³/s
 A = Pipe Area, m²
 P = Density of Oil, kg/m³
 V = Velocity of Oil, m/s
 ν = Kinematic Viscosity of Oil, m²/s
 μ = Absolute or dynamic viscosity, Ns/m²
 F = Friction Factor for Tube
 L = Total Length of Pipe including additions for joints, m
 d = Pipe Bore, m
 ΔP = Pressure drop, N/m²

Conversion Factors

Flow
 1 L/min = $\frac{10^{-3}}{60}$ m³/s
 Kinematic Viscosity
 1 cst = 10⁻⁶ m²/s
 Pressure
 1 bar = 10⁵ N/m²
 Dynamic viscosity
 1 Poise = 0.1 Ns/m²

Calculation

1) Velocity of Oil in Pipe

$$V = \frac{Q}{A} \quad \text{m/s}$$

2) Reynolds number

$$Re = \frac{Vd}{\nu} \quad \text{or} \quad Re = \frac{Vdp}{\mu}$$

For Reynolds numbers up to 1800 flow is laminar. For Reynolds numbers from 2200 flow is turbulent. For Reynolds numbers in region 1800-2200 flow is transient and both conditions should be calculated.

For Laminar Flow

3) Darcy formula

$$F = \frac{16}{Re}$$

For Turbulent Flow

4) Blasius Formula

$$F = \frac{0.079}{Re^{1/4}}$$

5) Total Pressure Drop for Laminar or Turbulent flow

$$\Delta P = \frac{2FLV^2}{d} \quad \text{N/m}^2$$

6) Total Pressure Drop for Laminar flow

$$\Delta P = \frac{128\mu LQ}{\pi d^4} \quad \text{N/m}^2$$

These calculations assume the use of smooth bore tube, cold drawn tube being recommended.

Fluid Viscosities & Densities

Fluid	Approximate Kinematic Viscosity @40° C	Density @ 15° C
Mineral Oil		
Grade 32	32 cSt	873 kg/m ³
Grade 46	46 cSt	878 kg/m ³
HFB Water in oil emulsion 60/40		
Light Grade	46 cSt	935 kg/m ³
Heavy Grade	90 cSt	950 kg/m ³
HFA 5/95	1.0 cSt	1000 kg/m ³
HFC Water Glycol	42 cSt	1060 kg/m ³
HFD Phosphate Ester	30 - 45 cSt	1130 - 1170 kg/m ³

Note: These figure are typical values only, sepcific values must be obtained from the oil manufacturer.



Wall Thickness Calculations

Calculation of Pipework Wall Thickness

Calculation for wall thickness is given below or if standard sizes of tube are required the table on page 46 gives the working pressure with a safety factor of 3:1 neglecting the effects of bending.

A number of formulae can be employed for calculating the wall thickness of tubes to withstand internal pressure. The two most often used are:

1) Barlows Formula

$$p = \frac{2St}{D2S} \text{ or } = PD \text{ mm}$$
 2) Lame's Formula

$$p = \frac{10S(R_2 - r_2)}{(R_2 + r_2)} \text{ mm}$$
 Or

$$t = r \left(\frac{S + p}{S - p} \right) - 1 \text{ mm}$$

Note:
 A reduction of 12.5% in the permissible stress (S) should be made if the tube is to be bent.

Lame's formulae is considered more accurate for thick wall tubes where high pressures are used.

P = Internal Pressure, N/m²
 S = Permissible Stress, N/m²
 t = Wall Thickness, mm
 D = Outside Diameter, mm
 d = Inside Diameter, mm
 R = Outside Radius, mm
 r = Inside Radius, mm

Tube Material Stress

Tube Material	UTS (min) N/mm ²	Yield Stress N/mm ²	0.2% Proof stress N/mm ²
Mild Steel			
BS 3602, CFS 360	360	215	207
BS 3602, CFS 410	410	245	237
BS 3602, CFS 460	460	280	264
BS 3603, CFS 410	410	235	-
DOM 1026 to ASTM A513			
Stress relieved	585	518	-
Normalised	493	355	-
Stainless Steel			
ASTM A269 Grade 316	517	207	206
Aluminium Silicon Bronze			
DGS 1182 D	450	-	210
Copper Nickel			
90/10	270	68.6**	108*
70/30	360	79.4**	123*

* As quoted in BS 1306 - 1975. ** Permissible stress for metal temperatures up to 75° C

Note: These figures are for guidance only. Please consult the tube manufacturer for the latest specification.



Conversion Tables

Multiply by to obtain

Acceleration

cm/s/s	0.03281	ft/s/s
ft/s/s	30.48	cm/s/s
ft/s/s	0.3048	m/s/s
inch/s/s	0.0254	m/s/s
m/s/s	3.28084	ft/s/s
m/s/s	39.37008	in/s/s

Area

cm ²	0.1550003	in ²
cm ²	0.001076391	ft ²
ft ²	0.09290304	m ²
ft ²	929.0304	cm ²
in ²	92903.04	mm ²
in ²	645.16	mm ²
in ²	6.4516	cm ²
in ²	0.00064516	m ²
m ²	1550.003	in ²
m ²	10.76391	ft ²
m ²	1.19599	yd ²
mm ²	0.0000107639	ft ²
mm ²	0.001550003	in ²
yd ²	0.8361274	m ²

Density

g/cm ³	0.03612730	lb/in ³
kg/m ³	0.06242797	lb/ft ³
kg/m ³	0.01002242	lb/Imp gal
kg/m ³	0.000036046	lb/in ³
lb/ft ³	16.01846	kg/m ³
lb/in ³	27.67990	g/cm ³
lb/Imp gal	99.77633	kg/m ³

Flow

ft ³ /min	28.31685	l/min
ft ³ /min	0.0004719474	m ³ /s
l/min	0.03531466	ft ³ /min
l/min	0.0005886	ft ³ /s
l/min	0.22	Imp gal/min
l/min	0.264172	US gal/min
m ³ /s	2118.88	ft ³ /min
m ³ /s	35.31	ft ³ /s
m ³ /s	13198.15	Imp gal/min
Imp gal/min	4.546	l/min
Imp gal/min	0.004546092	m ³ /min

Multiply by to obtain

Imp gal/min	0.0000757682	m ³ /s
Imp gal/min	1.20095	US gal/min
US gal/min	0.83267	Imp gal/min
US gal/min	3.785412	l/min

Force

kg f	2.2046	lb f
kg f	9.80665	N
kg f	0.0009842	ton f
lb f	0.4536	kg f
lb f	4.448	N
N	0.1019716	kg f
N	0.2248089	lb f
N	0.0001004	ton f
ton f	1016.0	kg f
ton f	9964.0	N

Kinematic viscosity

cSt	1.0	mm ² /s
cSt	0.00001076	ft ² /s
cSt	0.00155	in ² /s
cSt	0.000001	m ² /s
ft ² /s	92903.0	cSt
ft ² /s	144.0	in ² /s
ft ² /s	0.0929	m ² /s
in ² /s	645.2	cSt
in ² /s	0.006944	ft ² /s
in ² /s	0.0006452	m ² /s
m ² /s	1000000.0	cSt
m ² /s	10.76	ft ² /s
m ² /s	1550.0	in ² /s

Length

cm	0.0328084	ft
cm	0.3937008	in
ft	0.3048	m
ft	30.48	cm
ft	304.8	mm
in	0.0254	m
in	2.54	cm
in	25.4	mm
m	39.37008	in
m	3.28084	ft
m	1.093613	yd
mm	0.00328084	ft

Multiply by to obtain

mm	0.03937008	in
yd	0.9144	m

Power

ft lbf/s	0.00818	hp
ft lbf/s	0.001356	kW
ft lbf/s	1.3558	W
hp	550.0	ft lbf/s
hp	0.7457	kW
hp	745.7	W
kW	737.6	ft lbf/s
kW	1.341	hp
kW	1000.0	W
W	0.7376	ft lbf/s
W	0.001341	hp
W	0.001	kW

Pressure

atm	1.013	bar
atm	29.92	in Hg
atm	1.013	kgf/cm ²
atm	14.6959	lbf/in ²
atm	760.0	mm Hg
atm	101325.0	N/m ²
bar	29.53	in Hg
bar	1.02	kgf/cm ²
bar	14.50377	lbf/in ²
bar	750.1	mm Hg
bar	100000.0	N/m ²
in Hg	0.03342	atm
in Hg	0.03386	bar
in Hg	0.03453	kgf/cm ²
in Hg	0.4911	lbf/in ²
in Hg	25.4	mm Hg
in Hg	3386.0	N/m ²
kgf/cm ²	0.9807	bar
kgf/cm ²	28.96	in Hg
kgf/cm ²	14.22	lbf/in ²
kgf/cm ²	735.6	mm Hg
kgf/cm ²	98066.5	N/m ²
lbf/in ²	0.06894757	bar
lbf/in ²	2.036	in Hg
lbf/in ²	0.07030697	kgf/cm ²
lbf/in ²	51.71	mm Hg
lbf/in ²	6894.757	N/m ²



Hydraulic & Offshore Supplies

Multiply	by	to obtain
mm Hg	0.001316	atm
mm Hg	0.001333	bar
mm Hg	0.03937	in Hg
mm Hg	0.00136	kgf/cm ²
mm Hg	133.3	N/m ²
N/m ²	0.00001	bar
N/m ²	0.0002953	in Hg
N/m ²	0.0000101972	kgf/cm ²
N/m ²	0.000145	lbf/in ²
N/m ²	0.007501	mm Hg
Stress		
kgf/cm ²	2048.0	lbf/ft ²
kgf/cm ²	14.22	lbf/in ²
kgf/cm ²	98070.0	N/m ²
kgf/cm ²	0.00635	tonf/in ²
lbf/ft ²	0.0004882	kgf/cm ²
lbf/ft ²	0.006944	lbf/in ²
lbf/ft ²	47.88	N/m ²
lbf/ft ²	0.0000031	tonf/in ²
lbf/in ²	0.07031	kgf/cm ²
lbf/in ²	144.0	lbf/ft ²
lbf/in ²	6895.0	N/m ²
lbf/in ²	0.0004464	tonf/in ²
tonf/in ²	157.5	kgf/cm ²
tonf/in ²	322600.0	lbf/ft ²
tonf/in ²	2240.0	lbf/in ²
tonf/in ²	15440000.0	N/m ²
N/m ²	0.0000102	kgf/cm ²
N/m ²	0.02089	lbf/ft ²
N/m ²	0.000145	lbf/in ²
N/m ²	0.000000648	tonf/in ²
Torque		
kgf m	7.233	lbf ft
kgf m	86.8	lbf in
kgf m	9.80665	N.m
lbf ft	0.1383	kgf m
lbf ft	12.0	lbf in
lbf ft	1.355818	N.m
lbf in	0.01152	kgf m
lbf in	0.08333	lbf ft
lbf in	0.113	N.m
N.m	0.1019716	kgf m
N.m	0.7375621	lbf ft

Multiply	by	to obtain
N.m	8.851	lbf in
Velocity		
cm/s	1.968504	ft/min
cm/s	0.0328084	ft/s
ft/min	0.508	cm/s
ft/min	0.00508	m/s
ft/min	5.08	mm/s
ft/s	30.48	cm/s
ft/s	0.3048	m/s
ft/s	304.8	mm/s
m/s	11811.02	ft/hour
m/s	196.8504	ft/min
m/s	3.28084	ft/s
mm/s	0.19685	ft/min
mm/s	0.003281	ft/s
Volume		
cm ³	0.06102376	in ³
ft ³	0.02831685	m ³
ft ³	28.31685	litre
Imp gal	0.004546092	m ³
Imp gal	4.546092	litre
in ³	16387.06	mm ³
in ³	16.38706	cm ³
in ³	0.00001638706	m ³
litre	0.001	m ³
litre	0.2199692	Imp gal
litre	0.03531466	ft ³
m ³	219.9692	Imp gal
m ³	35.31466	ft ³
m ³	1000.0	litre
m ³	61023.76	in ³
mm ³	0.0000610238	in ³
Weight		
g	0.0022046	lb
kg	2.20462	lb
lb	453.592	g
lb	0.453592	kg
ton	1.01605	tonne
tonne	0.984207	ton

NOTE: whilst every effort has been made to ensure the accuracy of these tables Berendsen PMC Limited cannot accept any responsibilities of any inaccuracies.