

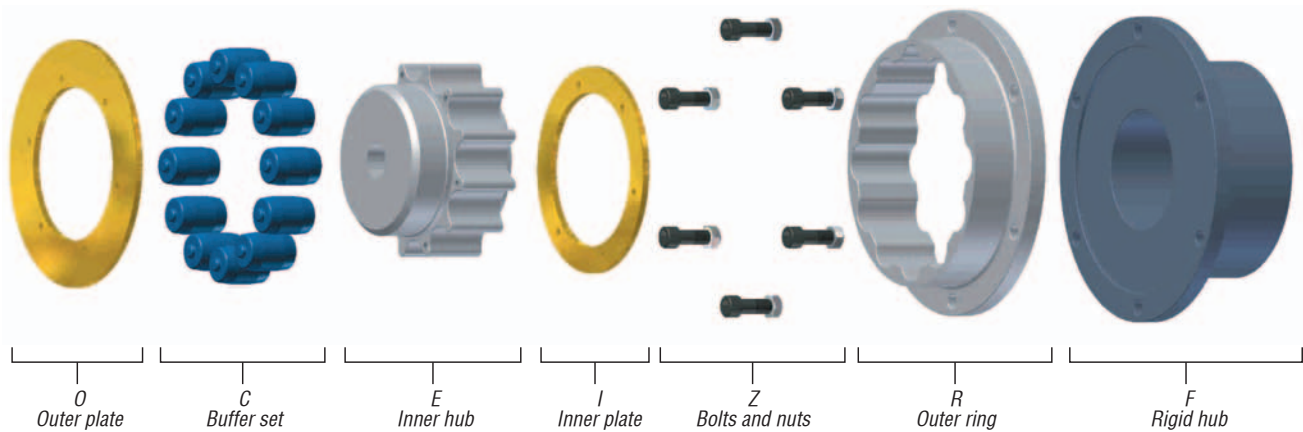
Voith Turbo

VOITH

Voith Buffer Roller Coupling



The patented Voith Buffer Roller (BR) Coupling transmits torque, between connected drive shafts.



Overview of standard components

Product description

The coupling uses a ring of flexible buffers, which compensate for axial, radial and angular offsets within the limits given in the table of alignment values on page 2.

The patented buffer elements in the Voith BR Coupling are elastomeric cylinders located in pockets formed between the inner hub and outer ring. The large- volume buffers ensure that severe vibration loads are dampened. Buffers of softer compounds reduce vibrational loading more effectively than harder compound buffers, while harder compound buffers have a greater torque load capability.

The life of the buffers is determined by the accuracy of alignment as well as the workload. The coupling has ample operation life in ideal working conditions.

Fatigue failures can be avoided by scheduling a buffer change after 15 000 hours of operation or by adjusting this period according to the life of the initial buffer set.

Typical Applications

- Centrifugal pumps
- Fans and vane compressors.
- Hammer mills.
- Bucket elevators.
- Scraper conveyors.
- Belt conveyors.
- Power generators.
- Ball mills.
- Turbine drives.
- Fluid couplings.
- Crushers.
- Calendars and shaker screens
- Reciprocating pumps.
- Piston compressors.
- Axial float applications.
- Cross travel & long crane drives.
- Steel mill roller tables.
- Heavy reverse drives.
- Limited float available.

Key benefits

- Overload protection capacity.
- Shock and vibration absorption.
- Choice of buffer materials.
- Alignment compensation.
- Ease of buffer replacement.

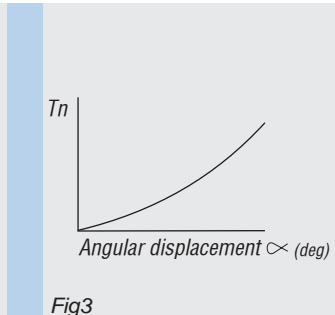
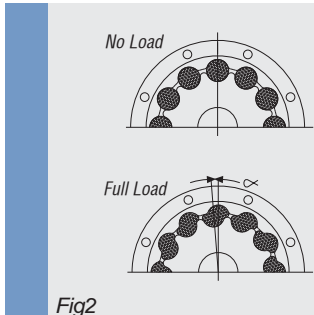
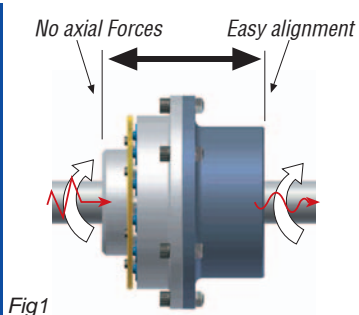
Coupling operation and overload protection

For almost 100% of its operational time, a Voith BR overload protection flexible coupling is in a loaded mode of operation. When loaded, the flexible buffers are subjected to radial compression as the torque increases. Overload protection is achieved by a buffer rolling action.

Overload protection can be adjusted by using fewer buffers with a minimum of two. Divide the couplings nominal torque by the full quantity of buffers. Divide this value into the required torque to establish how many buffers should be used. Insert evenly spaced.

Reduces shock and vibration

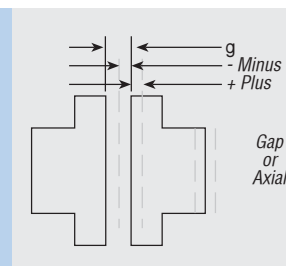
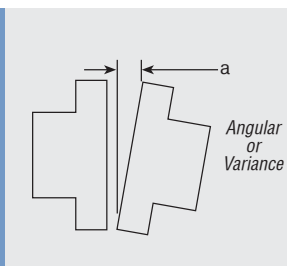
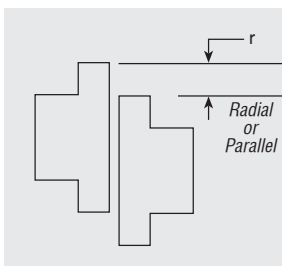
The Voith BR Coupling has high torsional flexibility, significantly dampens shock loads and torsional vibrations, protecting connected equipment. The non-linear spring characteristic of the coupling and the buffer damping properties counteracts any magnification of vibrations.



The coupling in Fig1 is recommended for axial float as seen in the gap tolerance in the table of alignment values below.

Fig2 shows overload protection.

Fig3 shows torsional angle.



Alignment compensation

The radial, angular as well as axial alignment values may be exceeded. However compensation of serious alignment, in particular the radial alignment, can adversely affect the

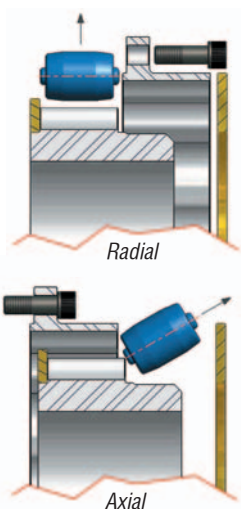
bearing life of driver and driven machine as well as the buffer life. Regular alignment checking is, therefore, important. When aligning the coupling, ensure that the dimensions r,a, and g

are considered. Correct aligning of the coupling will increase the service life of the buffers. If the alignment is beyond the limits, the effect will be seen on the buffers and a shorter operational life will be the result.

Table of alignment values

Coupling Size	BR 095	BR 115	BR 135	BR 155	BR 179	BR 206	BR 236	BR 276	BR 306
Radial (mm)	0.18	0.22	0.26	0.29	0.34	0.39	0.45	0.52	0.58
Angular (mm)	±0.12	±0.1495	±0.17	±0.20	±0.23	±0.26	±0.31	±0.36	±0.39
Gap (mm) Cg	3±1.5	4±2.0	5±2.5	5±2.5	5±2.5	5±2.5	5±2.5	7±3.5	7±3.5

Coupling Size	BR 336	BR 366	BR 406	BR 446	BR 506	BR 556	BR 636	BR 716	BR 826
Radial (mm)	0.64	0.70	0.77	0.85	0.96	1.06	1.21	1.36	1.57
Angular (mm)	±0.43	±0.48	±0.53	±0.58	±0.66	±0.73	±0.83	±0.93	±1.07
Gap (mm) Cg	9±4.5	9±4.5	9±4.5	11±5.5	11±5.5	15±7.5	15±7.5	15±7.5	15±7.5



Buffer replacement

Couplings do not require any servicing during operation. We recommend that a new buffer set is fitted during any major overhauls of the drive system.

The coupling inner hub has a fastened plate that can be removed for access to the buffers, for inspection or replacing in situ, where enough space is available.

Coat the buffers with a suitable lubricant before assembly. French chalk or silicon

oil for natural rubber and oil or grease for nitrile urethane and composite materials.

Apply the tightening torques listed in table below when fastening this plate and the ring with connecting set screws.

When assembling ring onto hubs, gently tighten the set screws in cross order until the spigot is fully located before progressively tightening to the required torque as listed below.

Diagram left illustrates buffer replacement.

Bolt Tightening Torques												
Bolt or nut size	M4	M5	M6	M8	M10	M12	M16	M20	M24	M27	M30	M36
Applied in Nm	3	6	10	25	49	86	210	410	710	1050	1450	2480

Coupling selection procedure

Step 1. Calculate Nominal Torque Tn (Nm) using Absorbed power Pa(kW). When not available use motor power. The installed or motor power (kW) is preferred in cases where the coupling must hold the stall power.

Nominal Torque is:

$$T_n \text{ (Nm)} = \frac{P_a \text{ (kW)} \times 9\,550}{\text{Shaft speed (rpm)}}$$

Step 2. Multiply the answer by the service factor (SF) from Table 3.

Torque required is:

$$T_r \text{ (Nm)} = T_n \times \text{SF (Nm)}$$

Note: Tr (Nm) must be smaller than Tp (Nm) (peak torque of coupling).

Step 3. Using this answer check coupling torque (Tp) in Table 2 and select the correct buffer material from Table 1.

Step 4. Check the maximum speed (rpm), inertia, mass, bore sizes, keys and taperbush torque capacity where applicable.

Table 1 - Buffer materials

Material Used	Nitrile 80a	Urethane 93a	Urethane 60d	Urethane 75d	Composite 90d
Colour	Black	Yellow	Blue	Green	Tan
Buffer part code	BR (size) C80nt	BR (size) C93uy	BR (size) C60db	BR (size) C75dg	BR (size) C90dt
Permissible temperature					
Continuous range	-30° to 80°C	-35° to 80°C	-35° to 80°C	-35° to 80°C	-35° to 200°C
Intermittent range	-65° to 120°C	-40° to 100°C	-40° to 100°C	-40° to 100°C	-40° to 230°C
Fatigue capacity	Good	Excellent	Excellent	Excellent	Excellent
Abrasion resistance	Good	Excellent	Excellent	Excellent	Excellent
Torsional rigidity	Medium	High	Very high	Very high	Extreme
Buffer availability	Ex-stock	Ex-stock	Ex-stock	Ex-stock	Ex-stock
Resistance to:					
Petrol	Good	Very good	Very good	Very good	Very good
Benzole	Low	Good	Good	Good	Good
Oil & grease	Good	Very good	Very good	Very good	Very good
Acids	Very good	Nil	Nil	Nil	Good < 20%
Alkalines	Very good	Nil	Nil	Nil	Good
Hot water	Good	Low	Low	Low	Excellent
Normal weather	Good	Low	Low	Low	Excellent
Tropical climates	Good	Satisfactory	Satisfactory	Satisfactory	Excellent

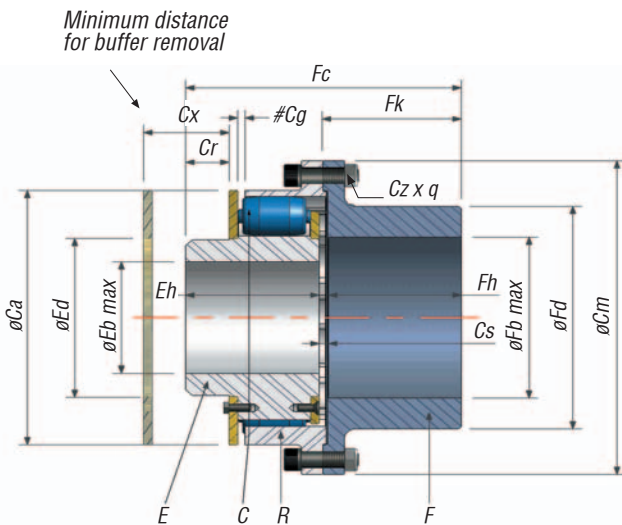
Table 2 - Buffer torque capacity

Coupling Type & Size	Nitrile 80a Shore Black		Urethane 93a Shore Yellow		Urethane 60d Shore Blue		Urethane 75d Shore Green		Composite 90d Shore Tan		Speed Max (rpm)
	Torque Nom (Tn) (Nm)	Torque Peak (Tp) (Nm)	Torque Nom (Tn) (Nm)	Torque Peak (Tp) (Nm)	Torque Nom (Tn) (Nm)	Torque Peak (Tp) (Nm)	Torque Nom (Tn) (Nm)	Torque Peak (Tp) (Nm)	Torque Nom (Tn) (Nm)	Torque Peak (Tp) (Nm)	
BR 095	118	267	161	364	237	534	323	729	517	1 166	15 000
BR 115	199	449	271	612	398	898	542	1 224	868	1 958	12 000
BR 135	319	720	435	982	638	1 440	870	1 963	1 392	3 141	9 800
BR 155	550	1 241	749	1 692	1 099	2 481	1 499	3 383	2 398	5 413	8 400
BR 179	810	1 829	1 105	2 494	1 620	3 658	2 210	4 988	3 536	7 981	7 300
BR 206	1 343	3 032	1 831	4 134	2 686	6 063	3 663	8 268	5 860	13 229	6 500
BR 236	2 079	4 693	2 835	6 399	4 158	9 385	5 670	12 798	9 071	20 477	5 500
BR 276	3 061	6 911	4 175	9 424	6 123	13 821	8 349	18 847	13 359	30 156	4 800
BR 306	4 614	10 416	6 292	14 203	9 228	20 832	12 548	28 407	20 135	45 451	4 100
BR 336	6 455	14 571	8 802	19 869	12 910	29 141	17 604	39 738	28 166	63 581	3 755
BR 366	8 155	18 408	11 120	25 101	16 309	36 816	22 240	50 203	35 584	80 325	3 400
BR 406	10 492	23 684	14 307	32 297	20 984	47 368	28 615	64 593	45 784	103 349	3 100
BR 446	13 333	30 098	18 182	41 042	26 667	60 195	36 364	82 085	58 182	131 336	2 800
BR 506	19 852	44 813	27 071	61 108	39 704	89 625	54 142	122 216	86 627	195 546	2 500
BR 556	31 231	70 500	42 588	96 136	62 463	141 000	85 177	192 272	136 282	307 635	2 300
BR 636	40 888	92 299	55 757	125 862	81 777	184 598	111 514	251 724	178 422	402 759	2 100
BR 716	53 834	121 522	73 410	165 712	107 669	243 045	146 821	331 424	234 914	530 279	1 800
BR 826	84 068	189 770	114 638	258 777	168 136	379 540	229 277	517 554	366 843	828 087	1 550

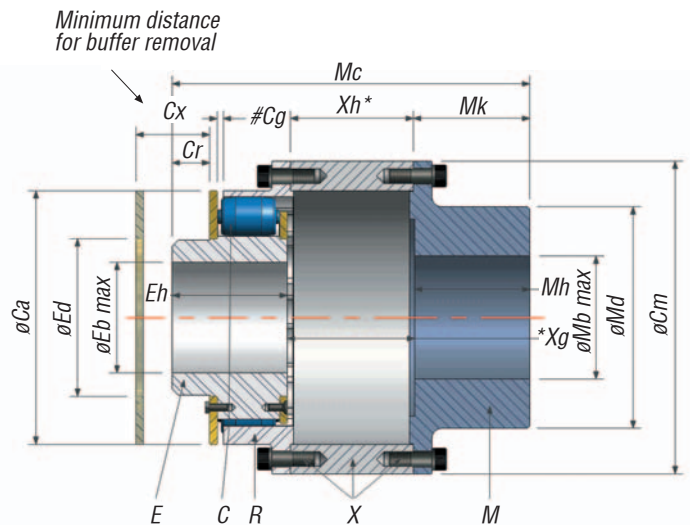
Table 3 - Service factor (SF)

Duty Type	Driven Machine (Examples)	Electric Motors	Internal Combustion Engines		
		+ Turbines	1 Cylinder	2+3 Cylinder	+4 Cylinder
Light duty	Centrifugal pumps, fans, belt conveyors	1.2	2.4	2.0	1.6
Medium duty	Hammer mill, bucket elevator, scraper conveyors	1.6	2.8	2.4	2.0
Heavy duty	Crushers, calendar, shaker screens, compressors	2.0	3.2	2.8	2.4
Extra heavy duty	Reciprocating pumps, compressors (3 cyl. or less)	2.4	3.6	3.2	2.8
Ultra heavy duty	Steel mill roller tables, heavy reversing drives	>4.0	5.2	4.8	4.4

Voith buffer roller overload protection flexible drive coupling



Assembly ERF - Standard coupling



Assembly EXM - Spacer coupling

Coupling dimensions

Coupling Size	Cm	Ca	Fc	Mc	*Xg	*Xh	F/Mk	Cz x q	#Cg/s	E/ F/Mh	Ed	F/Md	Cr	Cx	Eb Max	F/Mb Max	Mass (kg)	Inertia (kgm ²)
BR 095	119	95	81	181	100	99	41	M6x16	3	39.0	52	75	4.0	17	37	56	3.346	0.00759
BR 115	147	115	88	188	100	98	44	M8x12	4	42.0	66	90	1.0	22	48	67	5.585	0.01507
BR 135	167	135	110	230	120	117	54.4	M8x16	5	52.5	80	100	5.5	27	58	75	8.552	0.02555
BR 155	195	155	145	265	120	117	72	M10x12	5	70.0	86	120	15.0	32	62	90	14.74	0.04997
BR 179	219	179	145	285	140	137	72	M10x16	5	70.0	110	140	15.0	32	80	105	19.92	0.08254
BR 206	254	206	192	332	140	138	93.5	M12x12	5	93.5	126	180	30.5	40	91	135	36.59	0.18948
BR 236	284	236	201	341	140	138	101	M12x16	5	98.0	144	200	24.0	45	105	150	49.42	0.31346
BR 276	340	276	219	399	180	177	110	M16x12	7	106.0	174	220	22.0	53	127	165	73.74	0.65205
BR 306	370	306	291	471	180	177	146	M16x16	7	142.0	190	250	42.0	63	138	187	115.9	1.14390
BR 336	416	336	309	489	180	175	154	M20x12	9	150.0	210	280	38.0	73	153	210	154.3	1.93224
BR 366	446	366	359	609	250	245	179	M20x16	9	175.0	230	300	59.0	77	167	225	202.1	2.80796
BR 406	494	406	401	651	250	247	196	M24x12	9	196.0	260	330	74.0	83	189	247	278.2	4.78446
BR 446	534	446	427	677	250	245	208	M24x16	11	208.0	285	370	73.0	88	208	277	359.5	7.31041
BR 506	614	506	491	791	300	295	240	M27x12	11	240.0	325	430	82.0	99	237	322	381.7	27.6940
BR 556	664	556	535	835	300	291	260	M27x16	15	260.0	356	460	66.0	131	259	345	485.0	40.7651
BR 636	756	636	615	915	300	291	300	M30x12	15	300.0	408	530	101.0	136	297	397	726.0	72.4321
BR 716	836	716	695	1145	450	441	340	M30x16	15	340.0	464	590	128.0	149	338	442	999.1	118.845
BR 826	970	826	775	1225	450	435	380	M36x18	15	380.0	535	680	143.0	174	390	510	1474	214.685

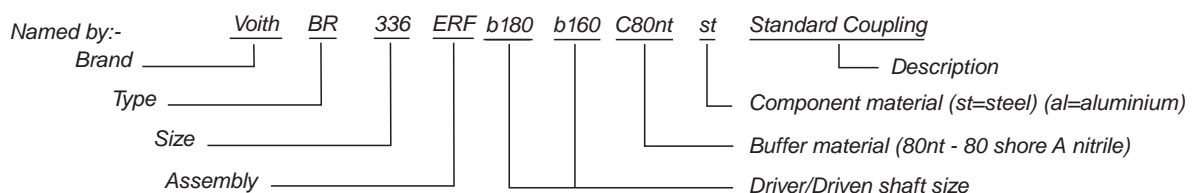
When special length spacers are required, the dimension Xh or Xg must be specified by the customer on order.

The spacer inertia and mass must be added to the given values in the table above on request.

Notes: The spacer dimensions are only a suggestion as customer requirements can be suited at a low cost.

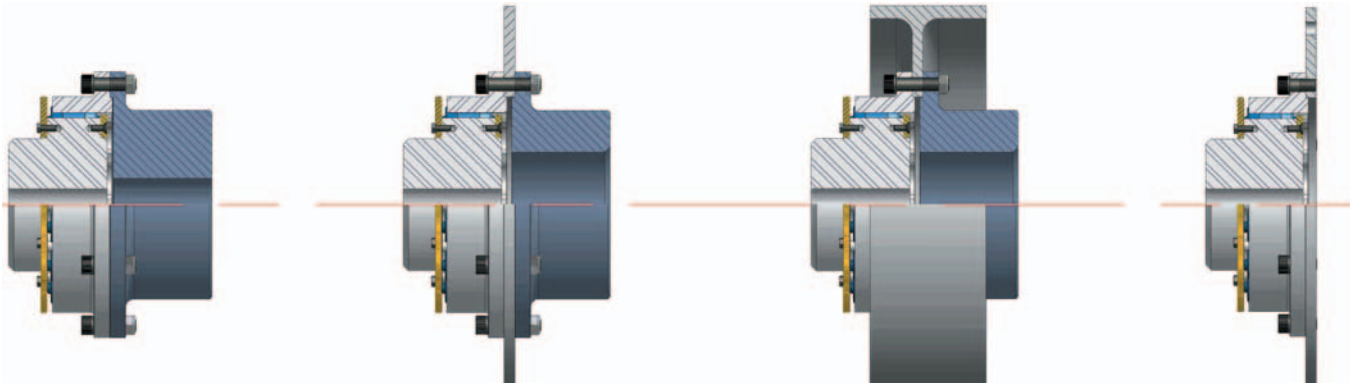
Refer to page 2 for gap variation.

When ordering please specify



Modular designs

Examples below show the versatility of the modular system of the Voith BR. From the selection below, find the arrangement that suits you best. Consult our representatives to discuss other options.

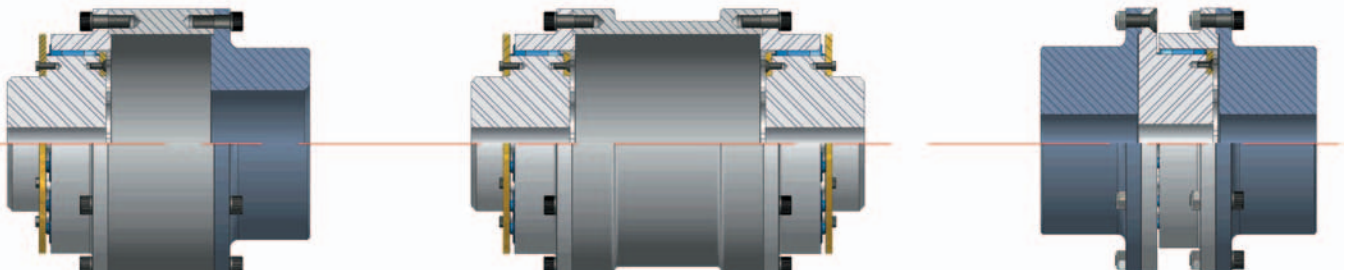


ERF Standard

EDM Standard with brake disc

EBM Standard with brake drum

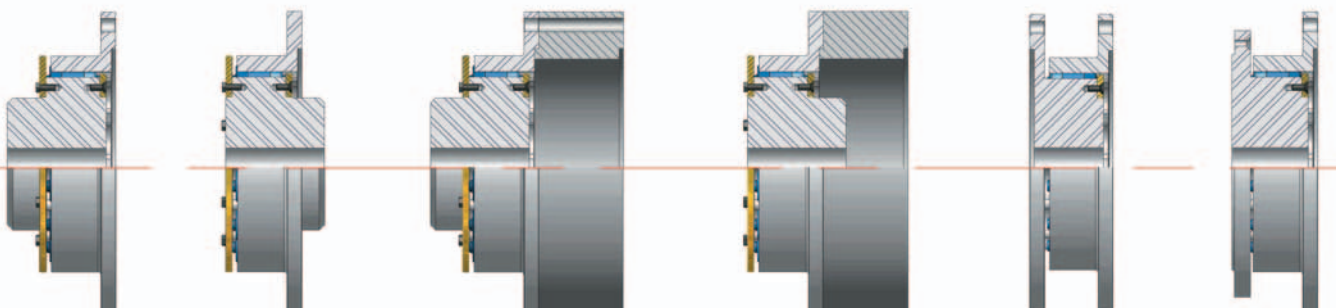
ERA Adaptor flange coupling



EXM Spacer coupling

EXE Double buffer coupling

FNF Compact with hub



ECK-P Fluid standard

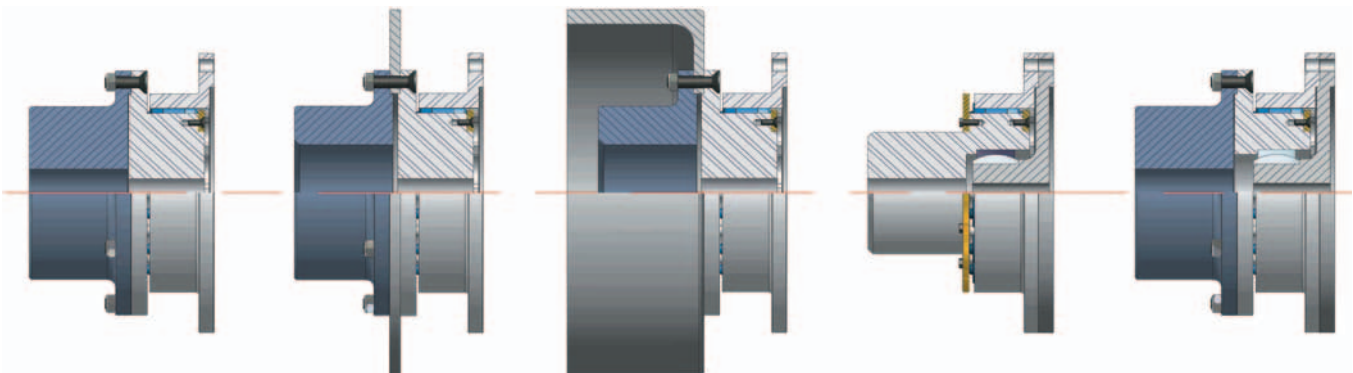
ECK-V Fluid inverted

ECK-X Fluid spacer

ECK-S Fluid inverted spacer

ECK-Z Fluid flange

ECK-N Fluid to standard flange



ECK-F Fluid compact

ECK-D Fluid compact with brake disc

ECK-B Fluid compact with brake drum

ECK-Y Fluid bearing supported

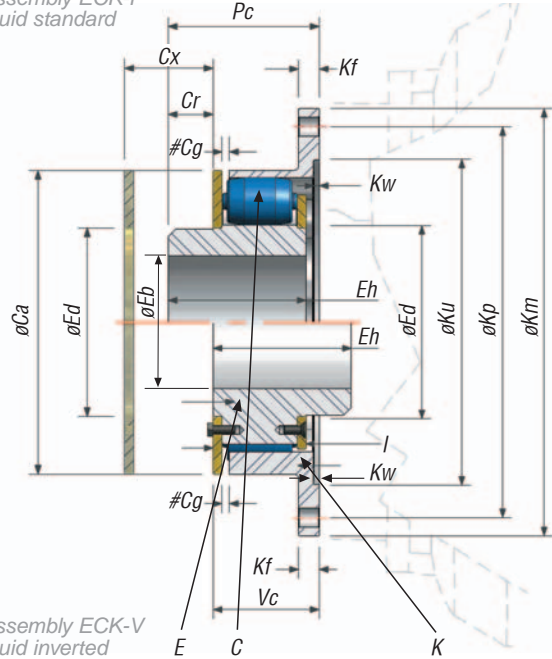
ECK-W Fluid compact bearing supported

Voith buffer roller overload protection flexible coupling. Model ECK

The coupling assembly with nitrile 80a (black) buffers are pre-selected to suit Voith and other similar fluid-drive couplings. Checks are therefore, only required

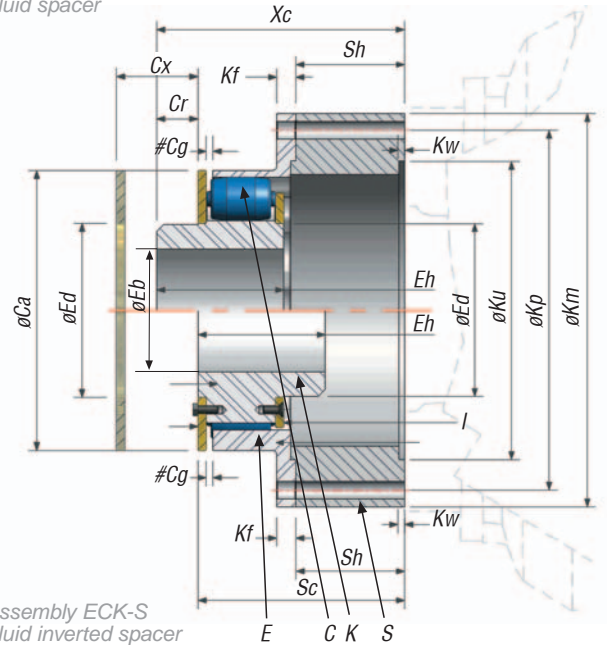
when the other buffer materials are used. This coupling accommodates the axial growth due to heat expansion and allows the axial movement required.

Assembly ECK-P
Fluid standard



Assembly ECK-V
Fluid inverted

Assembly ECK-X
Fluid spacer



Assembly ECK-S
Fluid inverted spacer

Coupling Dimensions

Coupling Size	øKm	øKp	øKo	øKu H7	øSi	øCa	øEd	Kf	Sh	#Cg	Cx	Cr	Kw	Eh	Pc	Vc	Sc	Xc	øEb max	Mass (kg)	Inertia (kgm ²)	Voith Size
BR 115	170	148	9.5	130	120	115	66	10	48	5	20	2	3	42	57	48.5	81.5	83.5	48	3.56	0.012	DT/T154
BR 135	194	172	9.5	150	140	135	80	12	46.5	5	27	5.5	4	52.5	70	58.5	87.5	93.0	58	5.60	0.022	DT/T206
BR 155	252	228	14	195	185	155	86	14	76.5	5	32	15	4	70	82	67.0	134.5	149.5	62	10.06	0.051	DT/T274
BR 179	252	228	14	195	185	179	110	14	76.5	5	32	15	4	70	82	67.0	134.5	149.5	80	12.13	0.062	T366
BR 206	290	265	14	220	210	207	126	14	70.5	5	40	30.5	4	93.5	102.5	72.0	133.0	163.5	91	18.72	0.102	T422
BR 236	335	310	14	265	255	236	144	18	78.5	5	45	24	4	98	111.5	87.5	155.0	179.0	105	28.33	0.215	T487
BR 276	385	360	14	315	305	276	174	24	96.5	5	53	22	4	106	124.5	102.5	188.0	210.0	127	44.48	0.448	T562
BR 306	455	420	18	360	350	306	190	28	106.5	7	63	42	5	142	165	123	216.5	258.5	138	72.73	0.955	T650
BR 336	514	480	18	420	410	336	210	30	111.5	9	74	37	5	150	164.5	127.5	225.0	262.0	153	95.65	1.596	T750
BR 366	595	555	22	485	475	366	230	30	98.5	9	79	57	6	175	189	132	215.5	272.5	167	131.46	2.828	T866
BR 406	690	650	22	580	570	406	260	30	77.5	9	83	74	6	196	210	136	198.5	272.5	189	178.93	6.475	T1000
BR 446	895	840	30	770	570	446	285	33	77.5	11	88	73	-7.5	208	210	137	214.5	284.5	208	281.05	12.254	T1150

All dimensions in mm. Voith reserves the right to make design and dimensional changes without prior notice.

In case a special length of spacer is required, the dimension Xc and Sc can be specified by the customer on order. Mass and inertia values do not include the spacer.

Admissible Radial Displacement			
Speed (rpm)	Voith Coupling Size		
	154 to 487	562 to 750	866 to 1150
up to 750	0.6mm	0.8mm	0.8mm
up to 1200	0.4mm	0.6mm	0.6mm
up to 1800	0.3mm	0.4mm	-
up to 3600	0.2mm	-	-

Admissible Angular Displacement										
Coupling Type ECK-(all)	Voith Coupling Size									
	<274	366	422	487	562	650	750	866	1000	1150
	±0.5°			±0.5°			±0.5°			

Admissible Axial Displacement							
Coupling Type ECK-(all)	Voith Coupling Size						
	154 to 487	487	562	650	750	866	1150
	±2.5	±3.5	±4.5	±4.5	±4.5	±5.5	±5.5

Installation

Installation is done to normal engineering practice, applicable to the type of application required. The BR design has large bore size capacities that allow for various types of taper bushes or locking

elements to be fitted.

The Voith QF bush has been used successfully in both keyed and keyless applications. Higher torque may require the use of Voith SLD units.

Diameter (mm)	>= 40	>= 60	>= 70	>= 90	>= 100	>= 125	>= 140	>= 150	>= 180	>= 200	>= 250
Fit (mm)	>= 0.026	>= 0.025	>= 0.04	>= 0.04	>= 0.05	>= 0.05	>= 0.08	>= 0.10	>= 0.25	>= 0.15	>= 0.15

Recommended bore sizes (BS:4500); (DIN748) standard bore sizes available ex-stock. Recommended tolerances: Bore/Shaft ISO H7/m6. Shaft finish of 6.3 micron (μm) is recommended. Key ways according to (ISOR773); (BS4235) and (DIN6885). Couplings with circumferential speeds over 36m/s should be balanced in two planes

according to quality grade Q6.3 VDI Standard 2060. Certified dimensions are provided for Voith BR flexible overload protection coupling when required, or on order. Please request further details on our non-standard coupling alternatives for specific applications such as limited end float or longer axial movement.

Admissable Radial Displacement at Speed			
Coupling Shaft (r/min)	Coupling Size Range		
	BR095-179	BR206-276	BR306-826
0 to 400	0.143-0.340	0.391-0.524	0.581-0.847
401 to 800	0.139-0.331	0.381-0.511	0.566-0.825
801 to 1200	0.135-0.332	0.371-0.497	0.551-0.803
1201 to 1800	0.105-0.251	0.288-0.386	0.428-0.624
1801 to 3600	0.083-0.197	0.227-0.303	0.337-0.491
3601 + above	0.060-0.143	0.165-0.221	0.245-0.357

Admissable Axial Displacement			
Coupling Type	Coupling Size Range		
	BR095-179	BR206-276	BR306-826
ERF	$\pm 1 - \pm 1.5^\circ$	$\pm 1.5 - \pm 2.5^\circ$	$\pm 2.5 - \pm 3.5^\circ$

Admissable Angular Displacement			
Coupling Type	Coupling Size Range		
	BR095-179	BR206-276	BR306-826
ERF	$\pm 0.5^\circ$	$\pm 0.5^\circ$	$\pm 0.5^\circ$



Voith BR assembly
ECK-P fluid standard coupling
bolted at flange to Voith fluid coupling.

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