

RATHI TRANSPower PVT. LTD. PUNE - INDIA

PRODUCT MANUAL
B-FLEX COUPLING



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B-FLEX COUPLING

FEATURES OF B-FLEX COUPLING

- Simplicity of construction
- Varying stiffness characteristics
- No lubrication
- Simple or easy maintenance
- Low operational cost
- Smooth & quite operation
- All metal parts are coated with Anti corrosive agent.

AT A GLANCE

- SIZES: 27 sizes (RB-105 to RB-2000)
- POWER RATING: 1 kW to 13614 kW @ 100 RPM
(1.3 HP to 18249 HP @ 100 RPM)
- MAX. BORE RANGE: 30 mm to 600 mm
- MISALIGNMENTS :
- a) Axial - ± 2 mm. to ± 4 mm.
- b) Parallel - 0.3 mm. to 3.8 mm.
- c) Angular - 0.1° to 1°

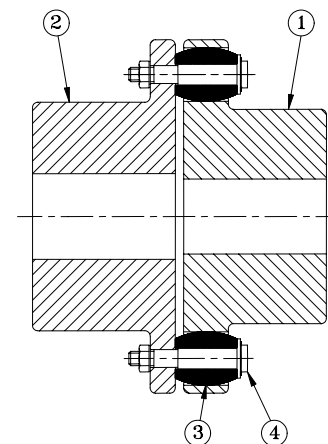
B-FLEX COUPLING COMPONENTS OF B-FLEX COUPLING

B-FLEX coupling consists of following main parts.

1. Bush half
2. Pin half
3. Bush
4. Pin

The above construction is used for sizes from RB-105 to RB-360.

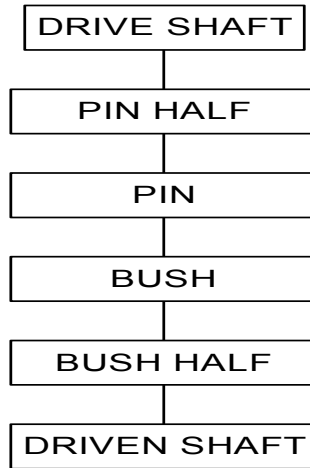
For sizes from RB-400 to RB-2000 the bushes are used on either of the hubs for alternative pin bushes.



B-FLEX COUPLING

HOW B-FLEX COUPLING WORKS

B-FLEX coupling consists of four components viz. bush half, pin half, pin & bush.



Torque is transmitted from driver shaft to driven shaft as per above order.

STANDARD MATERIAL OF CONSTRUCTION

MATERIAL OF CONSTRUCTION	
COMPONENT	MATERIAL
PIN HALF & BUSH HALF	
RB-105 to RB-500	C.I. IS 210 Gr. FG 200
RB-560 to RB-2000	C.I. IS 210 Gr. FG 200
PIN (SIZES: UPTO RB-500)	EN 8D
PIN (SIZES: 560 ONWARDS)	MS (ASTM A 105)
BUSH	NATURAL RUBBER/PU/HY
HEX. NUT (SIZES: UPTO RB-500)	STD
NYLOCK NUT(SIZES: RB-560 ONWARDS)	STD

VARYING TORSIONAL STIFFNESS

An exclusive feature of B-FLEX coupling

B-FLEX coupling consists of a set of resilient BARREL shaped bushes. These bushes provide varying torsional stiffness characteristics.

Torsional stiffness is the property of flexible coupling which enables the coupling to absorb shocks & vibrations. If torsional stiffness of a coupling varies according to loading level, coupling can give better performance in shock & vibration absorption.

B-FLEX coupling is having a specially designed barrel shaped bush. Due to its peculiar shape, at light loads, torque is transmitted through line of contact of mating parts giving less torsional stiffness. As load goes on increasing area of contact also increases, hence coupling gives more torsional stiffness.

Thus varying torsional stiffness is achieved in B-FLEX coupling.

B-FLEX COUPLING
TORSIONAL STIFFNESS FOR STANDARD B-FLEX COUPLING

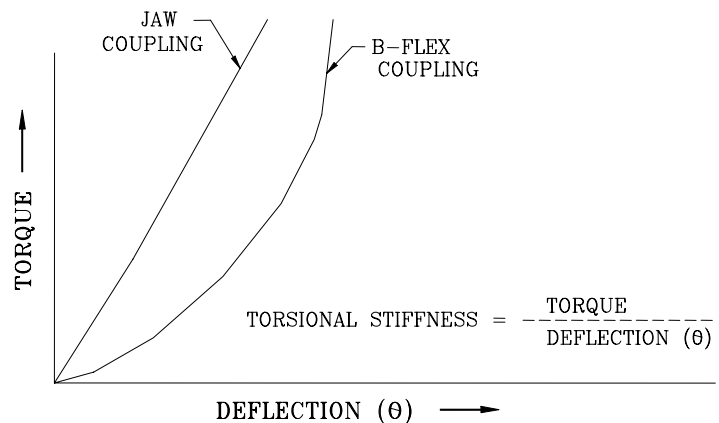
COUPLING SIZE	# TORSIONAL STIFFNESS Nm/°
RB-105	25.9
RB-116	56.3
RB-125	79
RB-144	146
RB-162	170
RB-178	266
RB-198	443
RB-228	637
RB-252	1077
RB-285	1112
RB-320	1664
RB-360	2416
RB-400	3010
RB-450	5238
RB-500	8084
RB-560	9918
RB-630	15056
RB-710	25616
RB-800	38019
RB-900	65984
RB-1000	*
RB-1120	*
RB-1250	*
RB-1400	*
RB-1600	*
RB-1800	*
RB-2000	*

At Rated Torque.

Note: '*' marked products are yet to be developed, data will be updated later.

Comparison of Torsional Stiffness Characteristics for B-FLEX & JAW Coupling

As torsional stiffness of B-FLEX coupling is varying in nature at different torque transmission values it gives better performance for shock & vibration absorption. Hence results in smooth power transmission.



B-FLEX COUPLING

RATING FOR STANDARD B-FLEX COUPLINGS

Coupling Size	Rated Torque			Rated Power			
	Nm	Kg-m	Lbs-in.	@100 RPM		@1500 RPM	
				kW	HP	Kw	HP
RB-105	95	9.69	841	1	1.341	15	20.12
RB-116	146	14.89	1292	1.5	2.012	22.5	30.17
RB-125	166	16.93	1469	1.7	2.28	25.5	34.2
RB-144	318	32.43	2815	3.3	4.43	49.5	66.4
RB-162	525	53.54	4647	5.5	7.38	82.5	110.6
RB-178	643	65.57	5691	6.7	8.98	100.5	134.8
RB-198	1248	127.26	11046	13	17.43	195	261.5
RB-228	2050	209.04	18144	21	28.16	315	422.4
RB-252	3069	312.95	27163	32	42.91	480	643.7
RB-285	4552	464.17	40289	48	64.37	720	965.5
RB-320	6099	621.92	53981	64	85.83	960	1287.4
RB-360	8900	907.55	78772	93	124.72	1395	1870.7
RB-400	12051	1228.9	106660	126	168.97	1890	2534.5
RB-450	18602	1896.9	164642	195	261	2925	3922
RB-500	25802	2631.1	228367	270	362	4050	5431
RB-560	31003	3161.4	274400	325	436	4875	6537
RB-630	41998	4282.6	371714	440	590	6600	8851
RB-710	75000	7647.9	663806	785	1053	11775	15791
RB-800	100000	10197.2	885075	1047	1404	15705	21061
RB-900	154998	15805.4	1371849	1623	2176	24345	32647
RB-1000	194997	19884.2	1725870	2042	2738	30630	41076
RB-1120	269997	27532	2389676	2827	3791	42405	56866
RB-1250	344997	35180	3053482	3613	4845	54195	72677
RB-1400	529999	54045	4690889	5550	7443	83250	111640
RB-1600	749995	76478	6638018	7854	10532	117810	157986
RB-1800	974996	99422	8629446	10210	13692	153150	205378
RB-2000	1299997	132563	11505948	13614	18257	204210	273850

NOTE: Each coupling is capable of withstanding maximum torque of 3 times of nominal torque for short durations such as during start-up.

**B-FLEX COUPLING
WEIGHT & MI FOR B-FLEX COUPLING**

COUPLING SIZE	Wt. kg	MI in kgm ² Approx.	
		WR ²	GD ²
RB-105	2	0.003	0.012
RB-116	2.6	0.005	0.02
RB-125	3.1	0.007	0.028
RB-144	4.3	0.012	0.048
RB-162	7.5	0.03	0.12
RB-178	10	0.04	0.16
RB-198	13	0.062	0.248
RB-228	18	0.10	0.4
RB-252	24	0.17	0.68
RB-285	35	0.31	1.24
RB-320	51	0.53	2.12
RB-360	73	1.02	4.08
RB-400	101	1.7	6.8
RB-450	137	2.9	11.6
RB-500	180	4.7	18.8
RB-560	278	10.7	42.8
RB-630	365	17.4	69.6
RB-710	516	33	132
RB-800	691	53	212
RB-900	927	86	344
RB-1000	1224	142.8	571.2
RB-1120	1584	231	924
RB-1250	2070	367.5	1470
RB-1400	3060	693	2772
RB-1600	3960	1155	4620
RB-1800	5760	2205	8820
RB-2000	7020	3255	13020

Note: Weight & MI are at maximum Bores.

APPLICATIONS OF B-FLEX COUPLING

B-FLEX coupling is suitable for general engineering application requiring reliable power transmission, even under conditions of shaft misalignments, which are often unavoidable.

Applications of B-FLEX coupling can be classified according to intensity of load i.e. light, medium & heavy.

- **LIGHT** – Agitators, Centrifugal Blowers, Centrifugal Fans & Pumps, Generators
- **MEDIUM** - Crane Hoists, Machine Tools, Rotary Mills, Centrifugal Compressors, Oil Industry, Gear Pumps,
- **HEAVY** - Reciprocating Conveyors, Crushers, Metal Mills, Reciprocating, Compressors, Cooling Tower Fans, Reciprocating Pumps

B-FLEX COUPLING

HOW TO SELECT B-FLEX COUPLING

I. SELECTION PROCEDURE

- (a) **Service Factor**
Determine appropriate SERVICE FACTOR from table A on Page no.9 .
- (b) **Design Power**
Multiply running power of driven machinery by the service factor. This gives DESIGN POWER, which is used as a basis for coupling selection.
- (c) **Coupling Size**
Refer to respective table for your required coupling type and read from the appropriate speed column until a power equal to or greater than the DESIGN POWER is found.
- (d) **Bore size**
Refer respective coupling dimensional table to check that the reqd. bores can be accommodated. If bore size of selected coupling can't accommodate, the shaft size then go for next coupling size where shaft size can be accommodated.

II. SELECTION EXAMPLE

A coupling is required to transmit 75 kW from an electric motor, which runs at 1500 rev/min to a rotary mill. Shaft diameters for motor & rotary mill are 70 mm. & 65 mm. resp.

- (a) **Service Factor**
From Table 'A', service factor is 1.25.
- (b) **Design Power**
Design Power = $75 \times 1.25 = 93.75 \text{ kW @ } 1500 \text{ RPM}$
- (c) **Coupling Size**
First power rating for 1500 rev/min, which exceeds the design power of 93.75 kW, is 100 kW. Hence coupling size will be RB-162.
- (d) **Bore Size**
Max. bore sizes for RB-162 can not accommodate given shaft dias. Hence next coupling sizes are checked, and found RB-178 (Max. Bores 70 & 75 mm) can accommodate the required bores; hence selection of RB-178 is OK for this application.

(Contd. on next page....)

B-FLEX COUPLING

SERVICE FACTOR TABLE 'A'

DRIVEN MACHINE CLASS	TYPE OF DRIVING UNIT		
	Electric motor, steam turbine	Multi cylinder IC engine or steam engine or water turbine	Single cylinder IC engine or steam engine
<u>UNIFORM</u> Agitators, Brewing machinery, Centrifugal Blowers, Conveyors, Centrifugal fans and pumps, Generators, Sewage disposal equipments, Evaporators, Feeders, Textile machines, Wood working machines.	1.00	1.25	1.50
<u>MODERATE SHOCK</u> Clay working machinery, Crane Hoists, Laundry machinery, Machine Tools, Rotary mills, Paper mill machinery, Non-uniformly loaded centrifugal pumps, Rotary screens, Centrifugal compressors, Shredders, Printing presses, Oil industry, Mixers, Food industry, Beaters, Bucket elevators, Gear pumps, Wood working machinery, Textile machinery.	1.25	1.50	1.75
<u>HEAVY SHOCK</u> Reciprocating conveyors, Crushers, Shakers, Metal mills, Rubber machinery (Banbury mixers & mills), Reciprocating compressors, Welding sets, Freight & passenger elevators, Cooling tower fans, Hammer mills, Reciprocating pumps, Vibrating screens, Winches, Wire drawing machines.	1.75	2.00	2.25

B-FLEX COUPLING**COMPARISON OF B-FLEX (RB) & CONE-FLEX (RC) COUPLINGS**

There is a substantial difference in prices of RB & RC couplings. RB is relatively cheaper than RC coupling.

The causes of price difference are as follows.

CONE-FLEX RC	B-FLEX (RB)
Pin material is EN-1A.	Pin material is EN-8D .
Multiple cone rings are used for single pin.	One bush is used for one pin.
Holes on bush half are reamed.	Holes on bush half are drilled.
Holes are machined with close tol. on PCD & Pitch.	Holes are machined with comparatively loose tol. on PCD & Pitch.
Nylock nuts are used on pins.	Std. nuts are used on pins.
Cone rings are made from nitrile rubber.	Bushes are made from natural rubber.

B-FLEX COUPLING

<u>EQUIVALENT RATHI B-FLEX RB COUPLING FOR RATHI RC COUPLING</u>						
RATHI RC			RATHI B-FLEX RB			
COUPLING SIZE	kW AT 1500 rpm	MAX. BORE (mm.)	COUPLING SIZE	kW AT 1500 rpm	MAX. BORE (mm.)	
					BH	PH
20	8.4	20	105	15	30	32
30	18	30	116	22.5	39	42
38	30	38	116	22.5	39	42
42	45	42	125	25.5	45	50
48	75	48	144	49.5	50	60
58	120	58	178	100.5	70	75
70	165	70	198	195	80	90
75	405	75	252	480	105	115
85	555	85	285	720	115	125
105	840	105	320	960	125	135
120	1410	120	360	1395	135	150
135	1920	135	400	1890	160	160
150	2505	150	450	2925	180	180
170	3870	170	500	4050	200	200
190	5400	190	630	6600	250	250
215	7005	215	710	11775	260	260
240	11820	240	710	11775	260	260
265	15660	265	800	15705	280	280

NOTE:

Above comparison is done on the basis of both, kW rating & maximum bore sizes.

COMPETITORS FOR B-FLEX COUPLING

SR	COMPETITOR	MAX. kW @ 1500 rpm	MAX. BORE (MM.)
1	Flender Rupex (RWN Series) (GERMANY)	157500	600
2	SNS Coupling (CL & HCL Series) (JAPAN)	17259	280

B-FLEX COUPLING

<u>EQUIVALENT RATHI B-FLEX RB COUPLING FOR FLENDER RUPEX COUPLING</u>							
RUPEX RWN				RATHI B-FLEX RB			
COUPLING	kW AT	MAX. BORE (mm.)		COUPLING	kW AT	MAX. BORE (mm.)	
SIZE	1500 rpm	BH	PH	SIZE	1500 rpm	BH	PH
105	23.4	32	38	116	23	39	42
125	40.8	40	48	144	50	50	60
144	61.2	45	55	162	82.5	60	65
162	91.05	50	60	178	101	70	75
178	113.1	60	70	198	196	80	90
198	157.5	70	80	198	196	80	90
228	265.5	80	90	228	323	90	100
252	330	90	100	228 *	323	90	100
285	519	100	110	285	720	115	125
320	660	110	120	285	720	115	125
360	942	120	130	320	960	125	135
400	1530	140	140	400	1890	160	160
450	2280	160	160	450	2925	180	180
500	2985	180	180	450 *	2925	180	180
560	4710	180	200	560	4875	225	225
630	6285	180	220	630	6600	250	250
710	10200	200	240	710	11775	260	260
800	13500	220	260	800	15705	280	280
900	18750	260	290	900	24345	305	305
1000	24000	280	320	1000	30630	320	320
1120	33000	300	350	1120	42405	350	350
1250	42000	330	380	1250	54195	380	380
1400	64500	380	440	1400	83250	440	440
1600	91500	440	480	1600	117810	480	480
1800	118500	500	540	1800	153150	540	540
2000	157500	560	600	2000	204210	600	600

* Rating of RB is marginally less than Flender.

NOTE: Above comparison is done on the basis of both, kW rating & maximum bore sizes.

B-FLEX COUPLING

<u>EQUIVALENT RATHI B-FLEX RB COUPLING FOR SNS CL & HCL COUPLING</u>						
SNS COUPLING			RATHI B-FLEX COUPLING			
COUPLING	KW AT	MAX. BORE	COUPLING	KW AT	MAX. BORE (mm.)	
SIZE	1500 rpm	(mm)	SIZE	1500 rpm	BH	PH
CL-90	0.6	18	RB-105	15	30	32
CL-100	1.5	22	RB-105	15	30	32
CL-112	2.5	25	RB-105	15	30	32
CL-125	3.9	28	RB-105	15	30	32
CL-140	7.7	35	RB-116	23	39	42
CL-160	17.3	45	RB-144	50	50	60
CL-180	24.6	50	RB-144	50	50	60
CL-200	39	56	RB-144	50	50	60
CL-224	62	63	RB-162	82.5	60	65
CL-250	97	71	RB-178 *	105	70	75
CL-280	154	80	RB-198	196	80	90
CL-315	247	90	RB-228	322	90	100
CL-355	385	100	RB-252	482	105	115
CL-400	616	110	RB-285	715	115	125
CL-450	971	125	RB-320**	958	125	135
CL-560	1541	140	RB-400	1893	160	160
CL-630	2466	160	RB-450	2922	180	180
HCL-710B	3852	180	RB-500	4053	200	200
HCL-711B	5239	200	RB-630	6597	250	250
HCL-800B	6934	210	RB-710	11781	260	260
HCL-900B	8629	225	RB-710	11781	260	260
HCL-901B	10941	250	RB-710	11781	260	260
HCL-1000B	13869	265	RB-800	15708	280	280
HCL-1120B	17259	280	RB-900	24347	305	305

NOTE: Above comparison is done on the basis of both, kW rating & maximum bore sizes.

* The max. bore BH of RB size is only marginally less than that of SNS CL size.

** The rating of RB size is only marginally less than that of SNS CL size.