

SVENDBORG BRAKES

global leading experts

Industrial Range RB Couplings

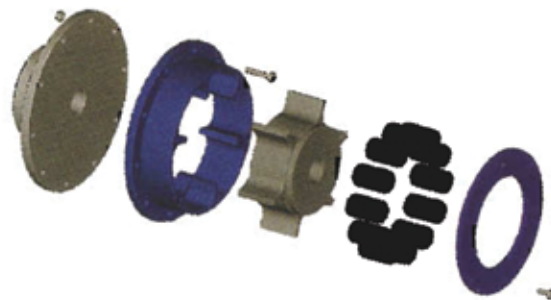


The Correct Solution

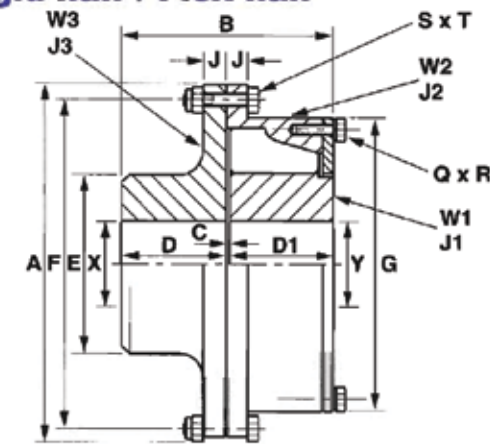
FEATURES	BENEFITS
● Intrinsically fail safe	● Ensuring continuous operation of the driveline in the unlikely event of rubber damage
● Control of resonant torsional vibration	● Achieving low vibratory loads in the driveline components by selection of optimum stiffness characteristics.
● Maintenance free	● With no lubrication or adjustment required resulting in low running costs.
● Severe shock load protection	● Avoiding failure of the driveline under short circuit and other transient conditions.
● Misalignment capability	● Allows axial and radial misalignment between the driving and driven machines.
● Zero backlash	● Eliminating torque amplifications through precompression of rubber elements.
● Low cost	● The RB Coupling gives the lowest lifetime cost.

Construction details

- Cast iron to BS 17 grade
- Spheroidal graphite to BS 2789 Grade 420/12.
- Separate rubber elements with a choice of grade and hardness with SM70 shore hardness being the standard.
- Rubber elements which are totally enclosed and loaded in compression.



RB Shaft to shaft Rigid half / Flex half



Features	Benefits
● Can accommodate a wide range of shaft diameters	● Allows the optimum coupling to be selected.
● Easy disconnection of the outer member and driving flange	● Allows the driving and machines to be disconnected.
	● Provides axial location for

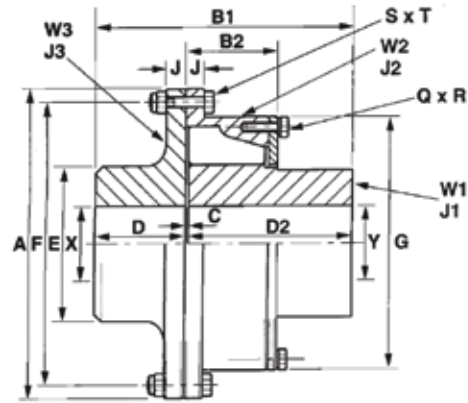
Dimensions, Weight, Inertia And Alignment

COUPLING SIZE		0.12	0.2	0.24	0.37	0.73	1.15	2.15	3.86	5.5
DIMENSIONS (mm)	A	200.0	222.2	238.1	260.3	308.0	358.8	466.7	508.0	577.8
	B	104.8	111.2	123.8	136.5	174.6	193.7	233.4	260.4	285.8
	C	3.2	3.2	3.2	3.2	3.2	3.2	4.8	6.4	6.4
	D	50.8	54.0	60.3	66.7	85.7	95.2	114.3	127.0	139.7
	D1	50.8	54.0	60.3	66.7	85.7	95.2	114.3	127.0	139.7
	E	79.4	95.2	101.6	120.6	152.4	184.1	222.2	279.4	330.2
	F	177.8	200.0	212.7	235.0	279.4	323.8	438.15	469.9	536.6
	G	156.5	178	186.5	210	251	295	362	435	501.5
	J	12.7	14.3	15.9	17.5	19.0	19.0	19.0	22.2	25.4
	Q	5	6	6	6	6	6	6	7	8
	R	M8	M8	M8	M10	M10	M12	M12	M12	M12
	S	6	6	6	8	8	10	16	12	12
	T	M8	M8	M10	M10	M12	M12	M12	M16	M16
	U	9.2	9.2	11.2	11.2	13.2	13.2	13.2	17.25	17.25
	MAX.X	50	60	65	80	95	115	140	170	210
	MIN.Y	55	70	75	85	95	115	140	170	210
	MIN.X&Y	30	35	40	40	55	55	70	80	90
RUBBER ELEMENTS	PER CAVITY	1	1	1	1	1	1	1	1	1
	PER COUPLING	10	12	12	12	12	12	12	14	16
MAXIMUM SPEED(rpm)		5250	4725	4410	4035	3410	2925	2250	2070	1820
WEIGHT (kg)	W1	2.82	4.04	5.29	7.49	12.82	23.39	35.88	62.81	102.09
	W2	4.0	5.05	6.38	8.14	13.29	18.41	33.98	43.87	59.0
	W3	4.06	5.82	7.42	10.44	18.03	27.37	47.43	75.39	113.32
INERTIA (kg m ²)	J1	0.0044	0.0084	0.0131	0.0233	0.0563	0.1399	0.3227	0.8489	1.9633
	J2	0.0232	0.0375	0.0546	0.0887	0.20	0.3674	1.1035	1.9161	3.4391
	J3	0.0153	0.027	0.0396	0.0644	0.1475	0.2862	0.7998	1.512	2.9796
ALLOWABLE MISALIGNMENT										
RADIAL (mm)		0.75	0.75	0.75	0.75	1.0	1.5	1.5	1.5	1.5
AXIAL (mm)		1.5	1.5	1.5	1.5	1.5	1.5	2.0	3.0	3.0
CONICAL (degree)		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

- (1) For operation above 80% of the declared maximum coupling speed it is recommended that the coupling is dynamically balanced.
- (2) Installations should be initially aligned as accurately as possible. In order to allow for deterioration in alignment over time it is recommended that initial alignment should not exceed 25% of the above noted data. The forces on the driving and driven machinery should be calculated to ensure that these do not exceed the manufacturers allowables.
- (3) Weights and inertias are based on the minimum bore size.

RB Shaft to shaft With Increased Shaft Engagement

Rigid half / Flex half



Features	Benefits
• Long Boss Inner member	• Allows small diameter long length shafts to be used
	• Reduces key stress
	• Allows increased distances between shaft ends
	• Full shaft engagement avoids the need for spacer collars

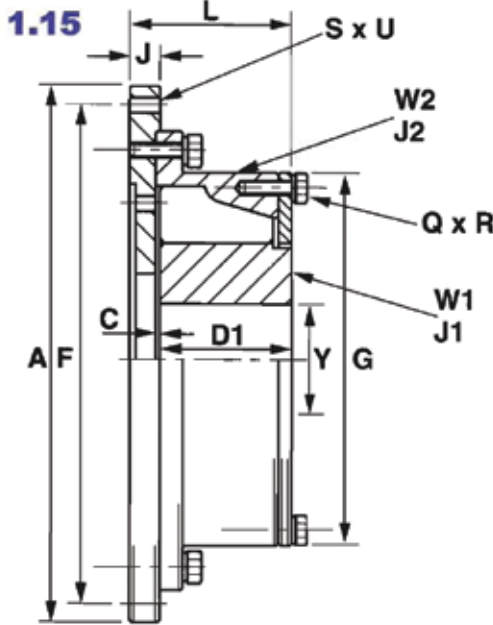
Dimensions, Weight, Inertia And Alignment

COUPLING SIZE		0.12	0.2	0.24	0.37	0.73	1.15	2.15	3.86	5.5
DIMENSIONS (mm)	A	200.0	222.2	238.1	260.3	308.0	358.8	466.7	508.0	577.8
	B1	139.0	152.2	173.5	189.9	233.9	268.4	309.1	343.4	386.1
	B2	54.0	57.2	63.5	69.8	88.9	98.4	119.1	133.4	146.0
	C	3.2	3.2	3.2	3.2	3.2	3.2	4.8	6.4	6.4
	D	50.8	54.0	60.3	66.7	85.7	95.2	114.3	127.0	139.7
	D2	85	95	110	120	145	170	190	210	240
	E	79.4	95.2	101.6	120.6	152.4	184.1	222.2	279.4	330.2
	F	177.8	200.0	212.7	235.0	279.4	323.8	438.15	469.9	536.6
	G	156.5	178	186.5	210	251	295	362	435	501.5
	J	12.7	14.3	15.9	17.5	19.0	19.0	19.0	22.2	25.4
	Q	5	6	6	6	6	6	6	7	8
	R	M8	M8	M8	M10	M10	M12	M12	M12	M12
	S	6	6	6	8	8	10	16	12	12
	T	M8	M8	M10	M10	M12	M12	M12	M16	M16
	U	9.2	9.2	11.2	11.2	13.2	13.2	13.2	17.25	17.25
	MAX.X	50	60	65	80	95	115	140	170	210
	MIN.Y	55	70	75	85	95	115	140	170	210
	MIN.X&Y	30	35	40	40	55	55	70	80	90
	RUBBER ELEMENTS PER CAVITY PER COUPLING	1	1	1	1	1	1	1	1	1
	MAXIMUM SPEED(rpm)	5250	4725	4410	4035	3410	2925	2250	2070	1820
WEIGHT (kg)	W1	4.21	6.42	8.67	11.85	19.43	35.28	53.81	95.50	162.79
	W2	4.0	5.05	6.38	8.14	13.29	18.41	33.98	43.87	59.0
	W3	4.06	5.82	7.42	10.44	18.03	27.37	47.43	75.39	113.32
INERTIA (kg m ²)	J1	0.0059	0.0121	0.0193	0.0326	0.0770	0.1896	0.4347	1.1833	2.8953
	J2	0.0232	0.0375	0.0546	0.0887	0.20	0.3674	1.1035	1.9161	3.4391
	J3	0.0153	0.027	0.0396	0.0644	0.1475	0.2862	0.7998	1.512	2.9796
ALLOWABLE MISALIGNMENT RADIAL (mm)		0.75	0.75	0.75	0.75	1.0	1.5	1.5	1.5	1.5
AXIAL (mm)		1.5	1.5	1.5	1.5	1.5	1.5	2.0	3.0	3.0
CONICAL (degree)		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

- (1) For operation above 80% of the declared maximum coupling speed it is recommended that the coupling is dynamically balanced.
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- (3) Weights and inertias are based on the minimum bore size.

RB Standard SAE Flywheel to shaft

0.24 to 1.15



Features	Benefits
• Wide range of adaptor plates	• Allows the coupling to be adapted to suit most engine flywheels
• Choice of rubber compound and hardness	• Allows control of the torsional vibration system
• Short axial length	• Allows the coupling to fit in bell housed applications

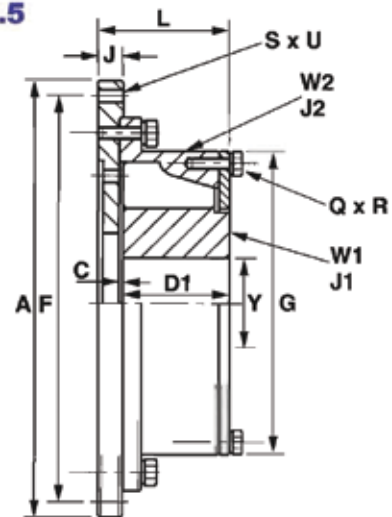
Dimensions, Weight, Inertia And Alignment

COUPLING SIZE		0.24		0.37		0.73		1.15	
		SAE 10	SAE 11.5	SAE 11.5	SAE 14	SAE 11.5	SAE 14	SAE 14	SAE 18
DIMENSIONS (mm)	A	314.3	352.4	352.4	466.7	352.4	466.7	466.7	571.5
	C	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	D1	60.3	60.3	66.7	66.7	85.7	85.7	95.2	95.2
	F	295.27	333.38	333.38	438.15	333.38	438.15	438.15	542.92
	G	186.5	186.5	210	210	251	251	295	295
	J	20	20	20	20	20	20	20	28
	L	79.5	79.5	85.8	85.8	104.9	104.9	114.4	122.4
	Q	6	6	6	6	6	6	6	6
	R	M8	M8	M10	M10	M10	M10	M12	M12
	S	8	8	8	8	8	8	8	6
	U	10.5	10.5	10.5	13.5	10.5	13.5	13.5	16.7
	MAX.Y	75	75	85	85	95	95	115	115
	MIN.Y	40	40	40	40	55	55	55	55
	RUBBER ELEMENTS PER CAVITY PER COUPLING	1	1	1	1	1	1	1	1
	MAXIMUM SPEED(rpm)	3710	3305	3305	2500	3310	2500	2500	2040
WEIGHT (kg)	W1	5.29	5.29	7.49	7.49	12.82	12.82	23.39	23.39
	W2	15.71	17.1	19.96	28.76	24.01	35.31	39.03	61.0
INERTIA (kg m ²)	J1	0.0131	0.0131	0.0233	0.0233	0.0563	0.0563	0.1399	0.1399
	J2	0.1922	0.2546	0.3087	0.7487	0.40	0.89	1.0274	2.3974
ALLOWABLE MISALIGNMENT RADIAL (mm)		0.75	0.75	0.75	0.75	1.0	1.0	1.5	1.5
AXIAL (mm)		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
CONICAL (degree)		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

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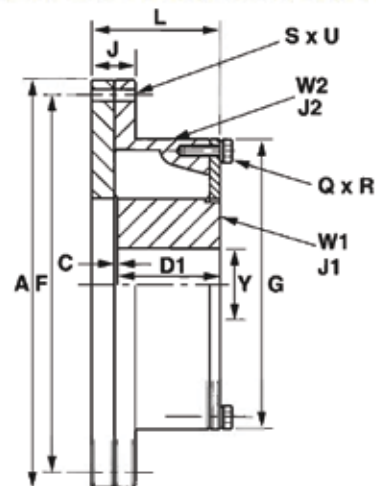
RB Standard SAE Flywheel to shaft

2.15 - 5.5



Keep Plate

(2.15 SAE 14 and 5.5 SAE 18)



Dimensions, Weight, Inertia And Alignment

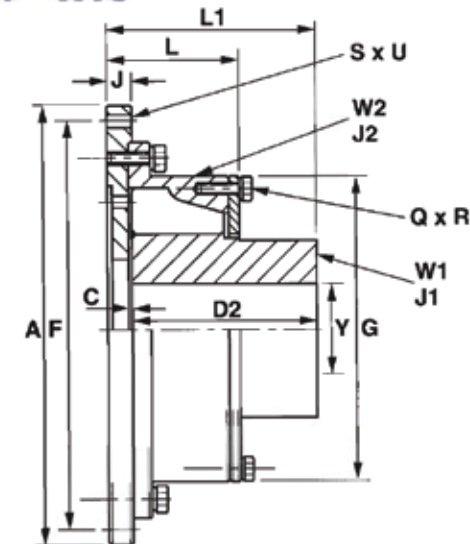
COUPLING SIZE		2.15			3.86			5.5		
		SAE 14	SAE 18	SAE 21	SAE 18	SAE 21	SAE 24	SAE 18	SAE 21	SAE 24
DIMENSIONS (mm)	A	466.7	571.5	673.1	571.5	673.1	733.4	571.5	673.1	733.4
	C	4.8	4.8	4.8	6.4	6.4	6.4	6.4	6.4	6.4
	D1	114.3	114.3	114.3	127.0	127.0	127.0	139.7	139.7	139.7
	F	438.15	542.92	641.35	542.92	641.35	692.15	542.92	641.35	692.15
	G	362.0	362.0	362.0	435.0	435.0	435.0	501.5	501.5	501.5
	J	35.0	28.0	28.0	28.0	31.0	31.0	41.4	28.0	31.0
	L	135.05	143.0	143.0	157.35	160.35	160.35	162.05	170.0	173.05
	Q	6	6	6	7	7	7	8	8	8
	R	M12	M12	M12	M12	M12	M12	M12	M12	M12
	S	8	6	12	6	12	12	6	12	12
	U	13.2	16.7	16.7	16.7	16.7	22	16.7	16.7	22
	MAX.Y	140	140	140	170	170	170	210	210	210
	MIN.Y	70	70	70	80	80	80	90	90	90
	RUBBER ELEMENTS PER CAVITY PER COUPLING	1	1	1	1	1	1	1	1	1
MAXIMUM SPEED (rpm)		2500	2040	1800	2040	1800	1590	2040	1800	1590
WEIGHT (kg)	W1	35.88	35.88	35.88	62.81	62.81	62.81	102.09	102.09	102.09
	W2	50.42	79.17	92.19	86.46	110.35	120.33	79.14	117.21	135.46
INERTIA (kg m ²)	J1	0.3227	0.3227	0.3227	0.8489	0.8489	0.8489	1.9633	1.9633	1.9633
	J2	1.6535	3.2935	4.9935	3.9461	6.4661	8.1461	4.5684	7.3291	9.6691
ALLOWABLE MISALIGNMENT RADIAL (mm)		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
AXIAL (mm)		2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0
CONICAL (degree)		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

- (1) For operation above 80% of the declared maximum coupling speed it is recommended that the coupling is dynamically balanced.
- (2) Installations should be initially aligned as accurately as possible. In order to allow for deterioration in alignment over time it is recommended that initial alignment should not exceed 25% of the above noted data. The forces on the driving and driven machinery should be calculated to ensure that these do not exceed the manufacturers allowables.
- (3) Weights and inertias are based on the minimum bore size.

The Correct Solution

RB Standard SAE Flywheel to shaft with Increased shaft Engagement

0.24 - 1.15



Features	Benefits
● Long Boss Inner member	● Allows small diameter long length shafts to be used
	● Reduces key stress
	● Allows increased distances between shaft end and flywheel

Dimensions, Weight, Inertia And Alignment

COUPLING SIZE		0.24		0.37		0.73		1.15	
		SAE 10	SAE 11.5	SAE 11.5	SAE 14	SAE 11.5	SAE 14	SAE 14	SAE 18
DIMENSIONS (mm)	A	314.3	352.4	352.4	466.7	352.4	466.7	466.7	571.5
	C	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	D2	110	110	120	120	145	145	170	170
	F	295.27	333.38	333.38	438.15	333.38	438.15	438.15	542.92
	G	186.5	186.5	210	210	251	251	295	295
	J	20	20	20	20	20	20	20	28
	L	79.5	79.5	85.8	85.8	104.9	104.9	114.4	122.4
	L1	129.2	129.2	139.1	139.1	164.2	164.2	189.2	197.2
	Q	6	6	6	6	6	6	6	6
	R	M8	M8	M10	M10	M10	M10	M12	M12
	S	8	8	8	8	8	8	8	6
	U	10.5	10.5	10.5	13.5	10.5	13.5	13.5	16.7
	MAX.Y	75	75	85	85	95	95	115	115
	MIN.Y	40	40	40	40	55	55	55	55
RUBBER ELEMENTS PER CAVITY PER COUPLING		1	1	1	1	1	1	1	1
		12	12	12	12	12	12	12	12
MAXIMUM SPEED (rpm)		3710	3305	3305	2500	3305	2500	2500	2040
WEIGHT (kg)	W1	8.67	8.67	11.85	11.85	19.43	19.43	35.28	35.28
	W2	15.71	17.10	19.96	28.76	24.01	35.31	39.03	61.0
INERTIA (kg m ²)	J1	0.0193	0.0193	0.0326	0.0326	0.0770	0.0770	0.1896	0.1896
	J2	0.1922	0.2546	0.3087	0.7487	0.40	0.89	1.0274	2.3974
ALLOWABLE MISALIGNMENT RADIAL (mm)		0.75	0.75	0.75	0.75	1.0	1.0	1.5	1.5
AXIAL (mm)		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
CONICAL (degree)		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

- (1) For operation above 80% of the declared maximum coupling speed it is recommended that the coupling is dynamically balanced.
- (2) Installations should be initially aligned as accurately as possible. In order to allow for deterioration in alignment over time it is recommended that initial alignment should not exceed 25% of the above noted data. The forces on the driving and driven machinery should be calculated to ensure that these do not exceed the manufacturers allowables.
- (3) Weights and inertias are based on the minimum bore size.

The Correct Solution

RB Technical Data

1.1 Diesel Engine Drives

The RB Coupling is selected on the "nominal torque" T_{KN} without services factors for diesel drive applications.

The full torque capacity of the coupling for transient vibration whilst passing through major criticals on run up is published as the maximum torque.
($T_{Kmax} = 3 \times T_{KN}$).

There is an additional torque capacity built into the coupling for short circuit and shock torques, which is $3 \times T_{Kmax}$.

The published "Vibratory torque T_{rv} ", is a fatigue function according to DIN740 and not significant in diesel engine drives, the vibratory torque values shown in the Technical Data are at the frequency of 10Hz. The measure used for acceptability of the coupling under vibratory torque is heat dissipation of the rubber elements. The maximum allowable heat dissipation shown in the technical data is at a 30°C ambient temperature.

1.2 Industrial Drives

For industrial Electrical Motor Applications refer to the "Selection Procedures" and base the selection on T_{Kmax} with the appropriate services factors.

(The services factors used in the "Selection Procedures" are based upon 40 years of Holset's experience of drives and their shock frequency / amplitude. The stated T_{Kmax} quoted should not be exceeded by design, without reference to PCPL.)

Care needs to be taken in the design of couplings with shaft brakes to ensure the coupling torques are not increased by severe deceleration.

2.0 Stiffness Properties

The RB Coupling remains fully flexible under all torque conditions. The RB series is a non-bonded type operating with the Rubber-in-Compression principle.

2.1 Axial Stiffness

When subject to misalignment forces in the axial direction, the coupling will have an axial resistance which gradually reduces due to the effect of vibratory torques.

Given sufficient axial force as shown in the catalogue, the coupling will slip to its new position immediately.

2.2 Radial Stiffness

The radial stiffness of the coupling is torque dependent, and is as shown in the Technical Data.

2.3 Torsional Stiffness

The torsional stiffness of the coupling is dependent upon applied torque (see Technical Data) and temperature

2.4 Prediction of the system torsional vibration characteristics.

An adequate prediction of the system torsional vibration characteristics can be made by the following method.

2.4.1 Use the torsional stiffness as published in the catalogue which is based upon data measured at 30°C ambient temperature.

2.4.2 Repeat the calculation made as 2.4.1 but using the maximum temperature correction factor St_{100} and M_{100} for the rubber selected for both torsional stiffness and dynamic magnifier from the table.

2.4.3 Review the calculations 2.4.1 and 2.4.2 and if the speed range is clear of criticals which do not exceed the allowable heat dissipation value as published in the catalogue, the coupling is then considered suitable for the application with respect to the torsional vibration characteristics. If there is a critical in the speed range the actual temperature of the coupling will need to be calculated at this speed.

Rubber Grade	(Temp) max°C	St
SM 60	100	$St_{100} = 0.75$
SM 70	100	$St_{100} = 0.63$
SM 80	100	$St_{100} = 0.58$
SM 70 is considered "standard"		

Rubber Grade	Dynamic Magnifier at 30°C (M_{30})	Magnifier at 100°C (M_{100})
SM 60	8	10.7
SM 70	6	9.5
SM 80	4	6.9
SM 70 is considered "standard"		

2.5 Prediction of the actual coupling temperature and torsional stiffness

2.5.1 Use the torsional stiffness as published in the catalogue, which is based upon data measured at 30°C and the dynamic magnifier at 30°C (M_{30})

2.5.2 Compare the synthesis value of the calculated heat load in the coupling (P_k) at the speed of interest to the "Allowable Heat Dissipation" (P_{KH})

The coupling temperature rise

$$^{\circ}\text{C} = \text{Temp}_{\text{coup}} = \left(\frac{P_k}{P_{KH}} \right) \times 70$$

The coupling temperature = ☺

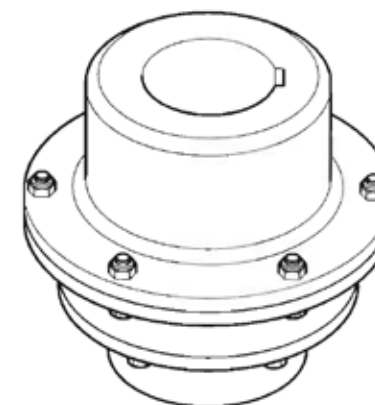
☺ = $\text{Temp}_{\text{coup}} + \text{Ambient Temp.}$

2.5.3 Calculate the temperature correction factor S_t from 2.6 (if the coupling temperature $> 100^{\circ}\text{C}$, then use S_{t100}). Calculate the dynamic magnifier as per 2.7. Repeat the calculation with the new value of coupling stiffness and dynamic magnifier.

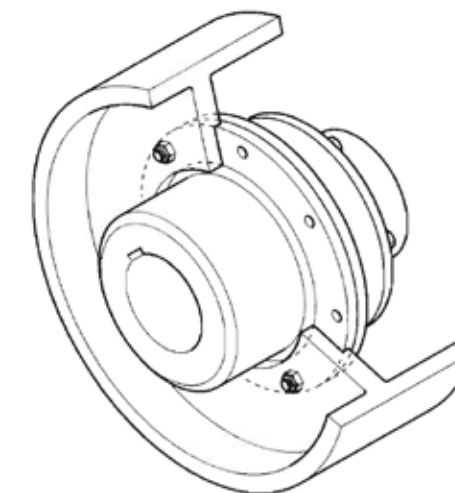
2.5.4 Calculate the coupling temperature as per 2.5. Repeat calculation until the coupling temperature agrees with the correction factors for torsional stiffness and dynamic magnifier used in the calculation.

RB Design Variations

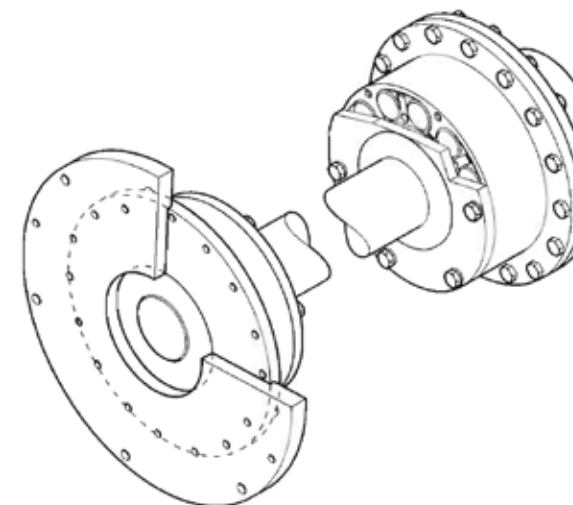
The RB coupling range can be adapted to meet customer needs. Below are some of the arrangements that have been produced. For more comprehensive list contact **Svendborg Brakes**.



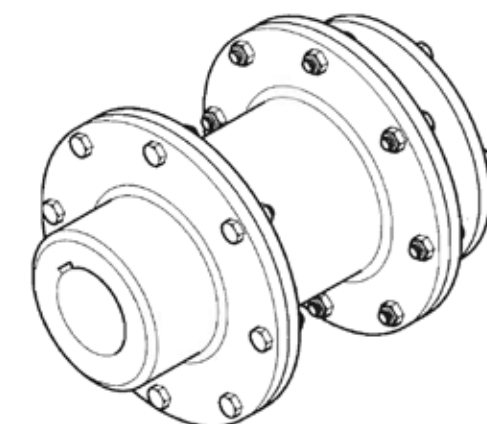
Coupling with large boss driving flange and long boss inner member for vertical applications.



Coupling with brake drum for use on cranes, fans and conveyor drives.



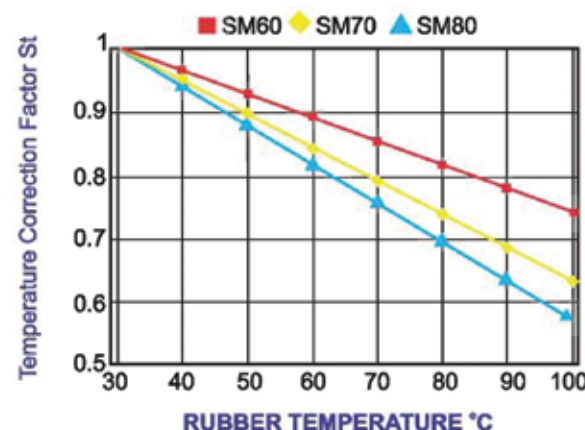
Cardan shaft coupling used to increase the misalignment capability and halve the torsional stiffness.



Spacer coupling used to increase the distance between shaft ends and allow easy access to driven and driving machine.

RB Technical Data

2.6 Temperature Correction Factor



2.7 Dynamic Magnifier Correction Factor

The Dynamic Magnifier of the rubber is subject to temperature variation in the same way as the torsional stiffness.

$$M_r = \frac{M_{20}}{S_t} \quad \alpha_r = \alpha_{20} \times S_t$$

Rubber Grade	Dynamic Magnifier (M ₂₀)	Relative Damping @ 30
SM 60	8	0.78
SM 70	6	1.05
SM 80	4	1.57

SM 70 is considered "standard"

COUPLING SIZE	0.12	0.2	0.24	0.37	0.73	1.15	2.15	3.86	5.5
NOMINAL TORQUE T _{KN} (kNm)	0.314	0.483	0.57	0.879	1.73	2.731	5.115	9.159	13.05
MAXIMUM TORQUE T _{KMAX} (kNm)	0.925	1.425	1.72	2.635	5.35	8.1	15.303	27.4	41.0
VIBRATORY TORQUE T _{KV} (kNm)	0.122	0.188	0.222	0.342	0.672	1.062	1.989	3.561	5.075
ALLOWABLE DISSIPATED HEAT AT AMBIENT TEMP 30°C P _{KW} (W)	SM60 90 SM70 98 SM80 100	112 123 138	125 138 154	140 155 173	185 204 228	204 224 250	246 270 302	336 369 410	426 465 520
DYNAMIC TORSIONAL STIFFNESS C _{Tdyn} (MNm/rad)									
@0.25 T _{KN}	SM60 0.007 SM70 0.011 SM80 0.016	0.009 0.014 0.021	0.010 0.017 0.025	0.016 0.026 0.039	0.032 0.052 0.079	0.049 0.079 0.119	0.093 0.150 0.225	0.142 0.230 0.346	0.186 0.300 0.453
@0.5 T _{KN}	SM60 0.016 SM70 0.022 SM80 0.026	0.021 0.028 0.033	0.025 0.034 0.040	0.038 0.052 0.062	0.078 0.105 0.125	0.118 0.159 0.189	0.223 0.300 0.358	0.343 0.460 0.549	0.449 0.602 0.719
@0.75 T _{KN}	SM60 0.035 SM70 0.043 SM80 0.049	0.045 0.055 0.063	0.054 0.066 0.076	0.082 0.101 0.117	0.167 0.205 0.238	0.253 0.310 0.360	0.479 0.586 0.680	0.735 0.900 1.043	0.962 1.178 1.366
@1.0 T _{KN}	SM60 0.057 SM70 0.066 SM80 0.078	0.073 0.085 0.100	0.088 0.103 0.121	0.134 0.157 0.185	0.273 0.319 0.377	0.413 0.483 0.570	0.780 0.912 1.077	1.197 1.400 1.653	1.567 1.833 2.164
RADIAL STIFFNESS NO LOAD (N/mm)	SM60 1020 SM70 1255 SM80 1728	1260 1550 2135	1435 1765 2430	1594 1962 2700	2116 2586 3654	2310 2845 3915	2870 3530 4860	3740 4600 6330	4728 5810 8008
RADIAL STIFFNESS @T _{KN} (N/mm)	SM60 2046 SM70 2134 SM80 2310	2536 2638 2855	2880 3000 3250	3207 3435 3610	4250 4396 4885	4650 4835 5235	5780 6000 6500	7520 7820 8465	9510 9890 10700
AXIAL STIFFNESS NO LOAD (N/mm)	SM60 1030 SM70 1100 SM80 2940	1250 1350 3690	1400 1510 4060	1600 1710 4620	2095 2200 6060	2310 2500 6700	2850 3100 8220	3700 4100 10760	4700 5200 13580
MAX AXIAL FORCE (N)@T _{KN}	SM60 1080 SM70 1150 SM80 1300	1350 1440 1600	1500 1600 1760	1700 1800 2000	2200 2360 2600	2460 2600 2900	3000 3200 3500	3900 4100 4600	5000 5300 5800

NB. SM70 is supplied as standard rubber grade with options of rubber grades SM60 or SM80 if these are considered a better solution to a dynamic application problem. It should be noted that for operation above 80% of the declared maximum coupling speed the coupling should be dynamically balanced.

(1) The Coupling will "slip" axially when the maximum axial force is reached.

The Correct Solution

Coupling Selection

To select a coupling for a given application the appropriate prime mover and driven equipment service factors must be applied.

$$\text{COUPLING RATING} = \frac{\text{hp}}{\text{rpm}} \quad (\text{Prime mover Service factor} + \text{Driven Equipment Service factor})$$

For example, the coupling rating for a centrifugal pump driven by a 6 cylinder diesel engine rated at 1000 bhp at 900rpm would be

$$\frac{1000}{900} (1.7 + 1.25) = 3.28 \text{ hp/rpm}$$

A coupling rating of 3.86 hp/rpm would therefore be chosen.

Prime Mover Service Factors			Driven Equipment Service Factors			
Diesel Engine	1 Cylinder	*	Alternator	1.5	Crushers-Cane	3.0
	2 Cylinder	*	Banbury Mixer	3.0	Dynamometer	1.5
	3 Cylinder	2.5	Blowers-Centrifugal	1.5	Fans - Centrifugal	1.5
	4 Cylinder	2.0	Blowers-Lobe or vane	2.0	Fans - Mine Ventilating	2.5
	5 Cylinder	1.8	Cement Mill	2.5	Generator	1.5
	6 Cylinder	1.7	Compressor-Axial Screw	1.5	Generator- Welding	2.2
More than 6 Cylinders		1.5	Compressor-Centrifugal	1.5	Machine Tool	2.0
			Compressor-Lobe	2.0	Pump - Centrifugal	1.25
Vee Engine		1.5	Compressor-Reciprocating	3.0	Pump - Gear	2.0
Petrol Engine		1.5	Compressor-Rotary	2.0	Pump - Ram	3.0
Electric Motor/Turbines		0	Conveyor-Belt,Chain, Screw	1.5	Pump - Reciprocating	3.0
Synchronous Motor		†	Conveyor-Bucket	2.0	Propeller - Marine	2.0
					Planer - Reversing	2.5

† These applications require special consideration and transient response analysis.

* The application of these drive type is highly specialised so please contact **Svendborg Brakes** for coupling selection.

• Operation at speeds in excess of catalogue maximum could be approved in certain applications. Such cases would require dynamic balancing and should only be applied following approval from **Svendborg Brakes**.

• For ease of assembly the coupling rubber elements and cavity areas should be coated with silicone fluid. Insert the elements in pairs, with the second pair diametrically opposite the first and the third and four pair at 90° etc.

Selection Procedure

- From the continuous Power (P) and operating Speed (n) calculate the Application Torque T_{NORM} from the formula:
 $T_{NORM} = 9549 \times (P/n) \text{ Nm}$
 - Select Prime Mover Service Factor (Fp) and Driven Equipment Service Factor (Fm) from table above
 - The minimum Service Factor has been set at 1.5.
 - Calculate T_{MAX} from the formula:
 $T_{MAX} = T_{NORM} (Fp + Fm)$
 - Select coupling such that T_{MAX} < T_{KMAX}
 - Check n < Coupling maximum speed (from catalogue data)
 - Check n < Coupling Bore Capacity such that dmin < d < dmax.
 - Consult the factory for alternatives if catalogue limits are exceeded.
- N.B. If you are within 80% of maximum speed, dynamic balancing is required.
- T_{NORM} = Application Torque (Nm)
 T_{MAX} = Peak Application Torque (Nm)
 T_{KN} = Nominal Coupling Rating according to DIN 740 (kNm)(with service factor =3 according to Poona Couplings standard)
 T_{KMAX} = Maximum Coupling Rating according to DIN 740 (kNm)
 P = Continuous Power to be transmitted by coupling (kW)
 n = Speed of coupling application (rpm)
 Fp = Prime Mover Service Factor
 Fm = Driven Equipment Service Factor
 dmax = Coupling maximum bore (mm)
 dmin = Coupling minimum bore (mm)



It is the responsibility of the system designer to ensure that the application of the coupling does not endanger the other constituent components in the system. Service factors given are an initial selection guide.

The Correct Solution

Selection Example

- Selection of 6 Cylinder Diesel Engine 750 kW at 900 rpm driving a Centrifugal Pump.

The coupling is Flywheel mounted
Pump shaft diameter = dm

$$\begin{aligned}
 P &= 750 \text{ kW} & n &= 900 \text{ rpm} \\
 dm &= 95 \text{ mm} & \text{temp} &= 30^\circ\text{C} \\
 F_p &= 1.7 & F_m &= 1.5 \\
 T_{\text{NORM}} &= (P/n) \times 9549 \text{ Nm} \\
 &= (750/900) \times 9549 \text{ Nm} \\
 &= 7.958 \text{ kNm} \\
 T_{\text{MAX}} &= T_{\text{NORM}} (F_p + F_m) \\
 &= 7.958 (1.7 + 1.5) \\
 &= 25.466 \text{ kNm}
 \end{aligned}$$

- The application is considered light industrial and RB type coupling should be selected.


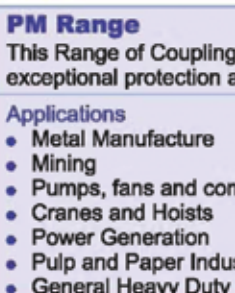

Examination of RB catalogue shows RB 3.86 as:

$$T_{\text{Kmax}} = 27.4 \text{ kNm} \quad T_{\text{KN}} = 9.159 \text{ kNm}$$

Which satisfies the condition

- $T_{\text{Max}} < T_{\text{Kmax}}$ ($25.466 < 27.4$) kNm
- $T_{\text{NORM}} < T_{\text{KN}}$ ($7.859 < 9.159$) kNm
- $n < \text{Coupling Maximum Speed}$ ($900 < 2500$) rpm
- $d_{\text{min}} < dm < d_{\text{max}}$ ($80 < 95 < 170$) mm

Product Range

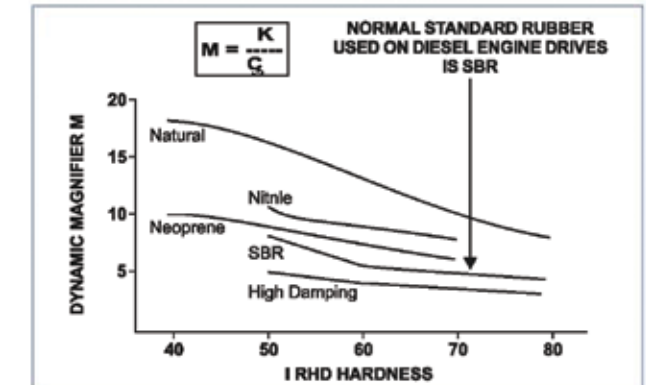
	<p>RB Range General purpose, cost effective range available in either shaft to shaft or flywheel to shaft configuration with a maximum torque of 41 kNm.</p> <p>Applications</p> <ul style="list-style-type: none"> Generators and Pump Sets Compressors Metal Manufacture Bulk Handling Pulp and Paper Industry General Heavy Duty Industrial Applications <p>Benefits</p> <ul style="list-style-type: none"> Control of Resonant Torsional Vibration Intrinsically Fail Safe Operation Maintenance Free Zero Backlash Lowest Lifetime Cost Misalignment Capability
	<p>PM Range This Range of Couplings are specifically designed for heavy industrial applications providing exceptional protection against severe shock loads and vibration. Maximum torque 6000 kNm.</p> <p>Applications</p> <ul style="list-style-type: none"> Metal Manufacture Mining Pumps, fans and compressors Cranes and Hoists Power Generation Pulp and Paper Industry General Heavy Duty Industrial Applications <p>Benefits</p> <ul style="list-style-type: none"> Severe Shock Load Protection Intrinsically Fail Safe Operation Maintenance Free Vibration Control Zero Backlash Lowest Lifetime Cost Misalignment Capability
	<p>DCB Range The unrivalled quality and endurance capability designed into every DCB coupling make it ideally suited for marine propulsion, power generation and reciprocating compressor application where long life, fail safe operation and control of resonant torsional vibrations are essential. Maximum torque range 520 kNm.</p> <p>Applications</p> <ul style="list-style-type: none"> Marine Propulsion High Power Generator Sets Reciprocating Compressors <p>Benefits</p> <ul style="list-style-type: none"> Control of Resonant Torsional Vibration Intrinsically Fail Safe Operation Severe Shock Load Protection Zero Backlash Long life Misalignment Capability

Rubber

- Full laboratory control,
- supported by a wide range of specialised equipment,
- maintain high quality standards,
- consistency in product performance.

Specialised compounds can be developed to meet specific requirements.

Standard compounds are listed below.



Rubber Compounds	Natural	Styrene-Butadiene (SBR)	Neoprene	Nitrile
Identification Label	Red (NM)	Green (SM)	Yellow (CM)	White (AM)
General Characteristics				
Resistance to Compression Set	Good	Good	Fair	Good
Resistance to Flexing	Excellent	Good	Good	Good
Resistance to Cutting	Excellent	Fair	Good	Good
Resistance to Abrasion	Excellent	Good	Good	Good
Resistance to Oxidation	Fair	Fair	Very Good	Good
Resistance to Oil and Gasoline	Poor	Poor	Excellent	Excellent
Resistance to Acids	Good	Good	Fair	Fair
Resistance to Water Swelling	Good	Good	Good	Good
Service Temperature Max. Continuous	80°C	100°C	100°C	120°C
Service Temperature Minimum	-50°C	-40°C	-30°C	-40°C

Damping Characteristics

Coupling damping varies with torsional stiffness and inversely with frequency for a given rubber grade. This relationship is conventionally described by the dynamic magnifier, M, varying with hardness for the various rubber types.

This property may also be expressed as the Damping Energy Ratio or Relative Damping, ϕ , which is the ratio of the damping energy, AD, produced mechanically by the coupling during a vibration cycle and converted into heat energy, to the flexible strain energy, Af, with respect to the mean position.

Where C = Specific Damping (Nms/rad)
K = Torsional Stiffness (Nm/rad)
 ω = Frequency (Rad/s)
M = Dynamic Magnifier
 ϕ = Phase Angle Rad
 ϕ = Damping Energy Ratio

The rubber compound dynamic magnifier values are shown in the table below.

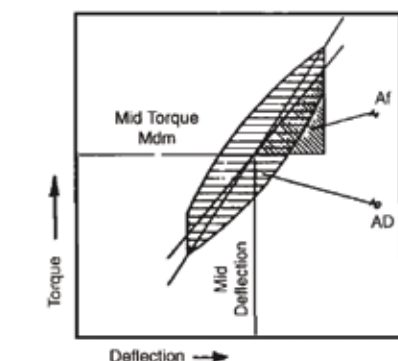
Rubber Grade	M
NM 45	15
SM 50	10
SM 60	8
SM 70 SM 70 is considered "standard"	6
SM 80	4

$$M = \frac{K}{C\omega}$$

$$\text{Torque} = (k + i\phi) a e^{i\omega t + \phi}$$

$$\text{Deflection} = a e^{i\omega t + \phi}$$

$$\tan \phi = \frac{C}{K} = \frac{1}{M}$$



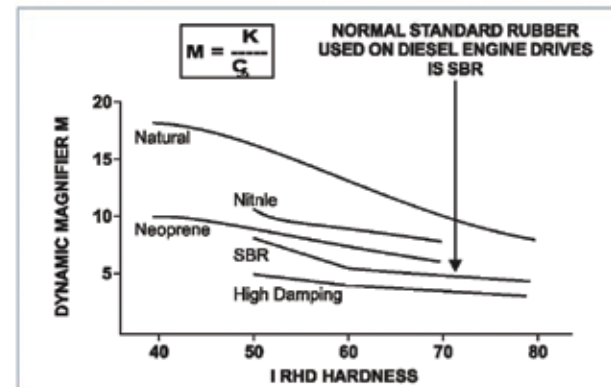
$$\phi = \frac{AD}{Af} = \frac{2\pi}{M}$$

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 $\frac{AD}{Af}$ = Damping Energy Ratio

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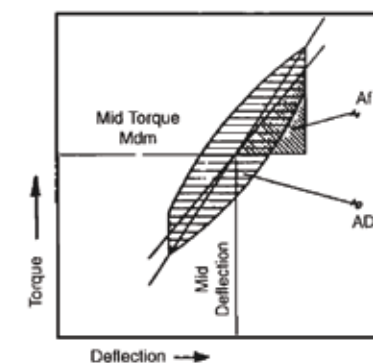
Rubber Grade	M
NM 45	15
SM 50	10
SM 60	8
SM 70 SM 70 is considered "standard"	6
SM 80	4

$$M = \frac{K}{C}$$

$$\text{Torque} = (k + iC\omega) ae^{i\omega t + \alpha}$$

$$\text{Deflection} = ae^{i\omega t + \alpha}$$

$$\tan \alpha = \frac{C}{K} = \frac{1}{M}$$



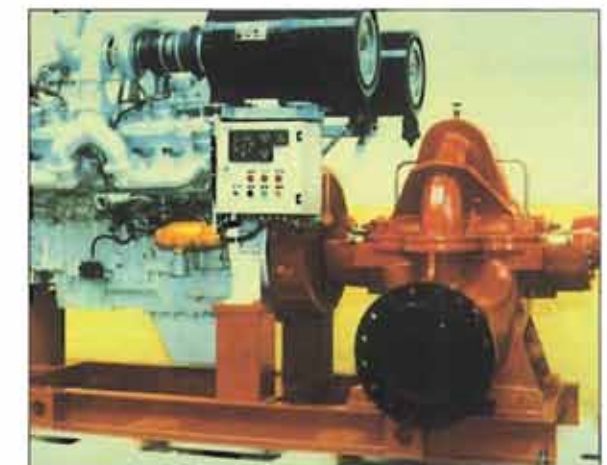
$$\frac{AD}{Af} = \frac{2\pi}{M}$$



Mobile diesel generator sets. Coupling fitted between diesel engine and alternator.



CHP plants. Couplings fitted between diesel engines and alternators.



Pump sets. Coupling fitted between diesel engine and centrifugal pump.



Steel mills. Couplings fitted on 35 tonne overhead crane, and on table roller drives.



Steel mills. Couplings fitted to table roller drives on rolling mills and furnace discharge tables.

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Scope development, manufacture,
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