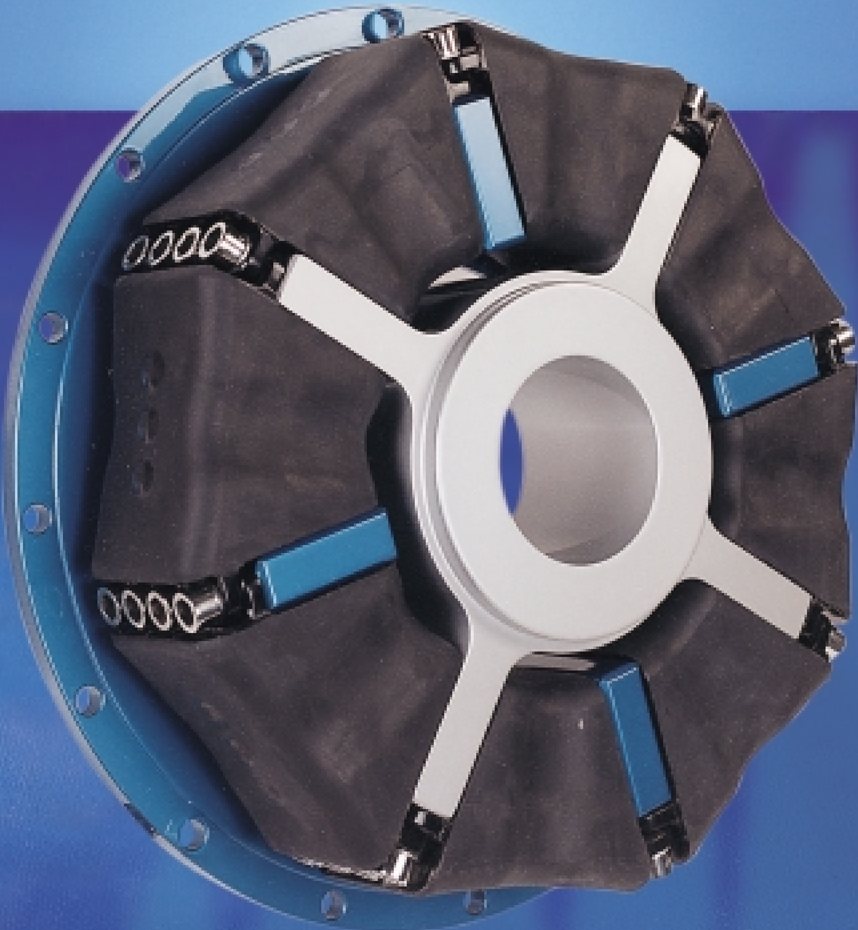
RENOLD

Hi-Tec Couplings

MSC Catalogue



The complete solution

RENOLD Hi-Tec Couplings

Renold Hi-Tec Couplings has been a world leader in the design and manufacture of flexible couplings for over 50 years.

- Measurement of torsional stiffness up to 220 kNm
- Full scale radial and axial stiffness measurement
- Misalignment testing of couplings up to 2 metres in diameter
- Noise attenuation testing
- Latest CAD technology
- Torsional vibration analysis
- Transient and finite element analysis

- World class manufacturing
- Total quality system
- Latest machining and tooling technology
- Static and dynamic balance capability
- Integrated cellular manufacturing
- Synchronised work flow

МОРСКОЙ РЕГИСТР СУДОХОДСТВА 1913

Lloyd's Register

GERMANISCHER LLOYD 1867

NQA ISO 9001 REGISTERED COMPANY — NATIONAL ACCREDITATION OF CERTIFICATION BODIES

BUREAU VERITAS 1828

ABS TYPE APPROVAL PROGRAM

RENOLD Hi-Tec Couplings. Tel: +44 (0) 1422 255000 Fax: + (0) 14422 255100 E-Mail: sales@hitec.renold.com

Product Range

MSC Flexible Couplings

Product Range

The products comprise of rubber in compression couplings, developed over 50 years for the complete range of diesel and industrial applications.

RENOLD **Hi-Tec Couplings** deliver the durability, reliability and long life that customers demand.

In particular our design capability and innovation is recognised in customising couplings to meet exacting requirements.

RENOLD **Hi-Tec Couplings** is "the complete solution".

RB Range

General purpose, cost effective range available in either shaft to shaft or flywheel to shaft configurations with a maximum torque of 41 kNm.

Applications
- Generator and Pump Sets
- Compressors
- Metal manufacture
- Bulk Handling
- Pulp and Paper Industry
- General Industrial Applications

Benefits
- Control of Resonant Torsional Vibration
- Intrinsically Fail Safe Operation
- Maintenance Free
- Zero Backlash
- Lowest Lifetime Cost
- Misalignment Capability

PM Range

This range of couplings is specially designed for heavy industrial applications providing exceptional protection against severe shock loads and vibration. Maximum torque 6000 kNm.

Applications
- Metal manufacture
- Mining
- Pumps, Fans and Compressors
- Cranes and Hoists
- Power Generation
- Pulp and Paper Industry
- General Heavy Duty Industrial Applications

Benefits
- Severe Shock Load Protection
- Intrinsically Fail Safe Operation
- Maintenance Free
- Vibration Control
- Zero Backlash
- Misalignment Capability
- Lowest Lifetime Cost

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 applications where long life, fail safe operation and control of resonant torsional vibrations are essential. Maximum torque range 5520 kNm.

Applications
- Marine Propulsion
- High Power Generator Sets
- Reciprocating Compressors

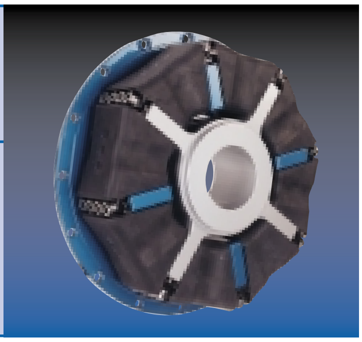
Benefits
- Control of Resonant Torsional Vibration
- Intrinsically Fail Safe Operation
- Long Life
- Misalignment Capability
- Zero Backlash
- Severe Shock Load Protection

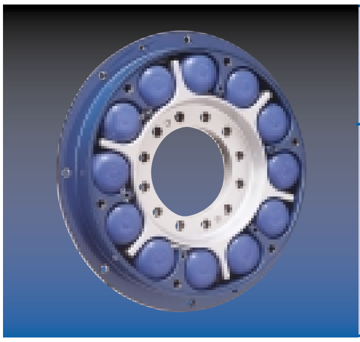
MSC Range

This innovative coupling has been designed to satisfy a vast spectrum of diesel drive and compressor applications providing low linear stiffness and control of resonant torsional vibration with intrinsically fail safe operation. Maximum torque 375 kNm.

Applications
- Marine Propulsion
- High Power Generator Sets
- Compressors

Benefits
- Low Linear Stiffness
- Intrinsically Fail Safe Operation
- Control of Resonant Torsional Vibration
- High Heat Capacity
- Large Misalignment Capability
- Noise Attenuation
- Radial Removal of Rubber Elements





HTB Range

The HTB coupling is a high temperature blind assembly coupling designed for mounting inside bell housings.

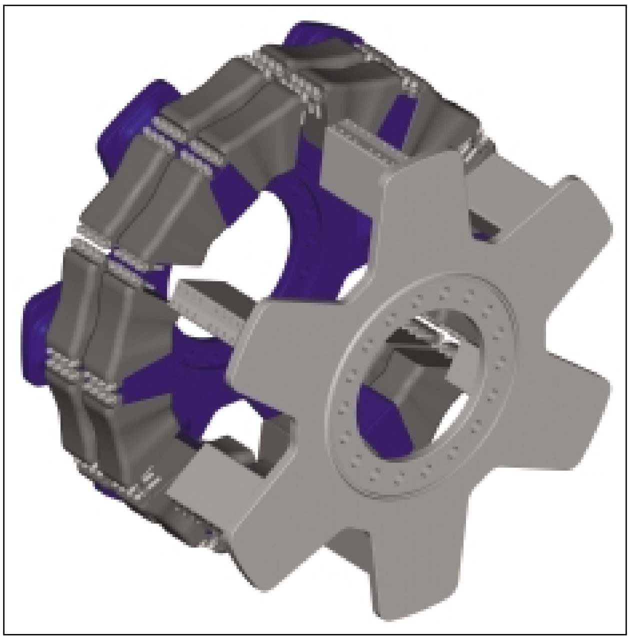
Applications

- Marine Propulsion
- Compressors
- Generator and Pump Sets
- Rail Traction

Benefits

- Allows easy assembly for applications in bell housings.
- Allows operation in bell housings where ambient temperatures can be high.
- Giving quiet running conditions in sensitive applications by the elimination of metal to metal contact.
- Ensuring continuous operation of the driveline in the unlikely event of rubber damage.

Special Couplings



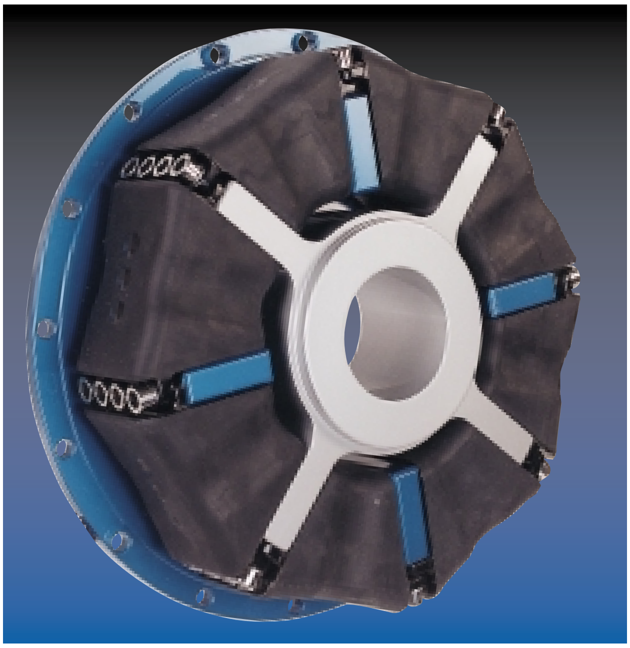
Renold Hi-Tec Couplings has a unique capability to design and manufacture special couplings.

Finite element analysis, computer modelling and extensive testing facilities can be used to design and manufacture couplings to suit all applications.

Extensive rubber manufacturing expertise allows couplings with special properties to be made, from fire resistant materials to highly elastic noise attenuating compounds.

Coupling type	Benefits
Universal joint shaft coupling	Introduces torsional flexibility while accepting the sinusoidal loads from the UJ shaft
Limited end float coupling	Limits the axial movement on machines without axial location
Torque limiting couplings	Protects driving and driven machines from shock and overload torques
Clutch couplings	Allows the drive to be engaged and disengaged easily
Disc and drum brakes	Allows the drive to be slowed, stopped or held in position
Aluminium coupling	Anti-magnetic and lightweight
Cardan shaft coupling	Gives high misalignment capability and gives increased distance between shaft ends

MSC Flexible Coupling



Innovative coupling designed to satisfy a vast spectrum of diesel drive and compressor applications.

The Standard range comprises

- Flywheel to shaft
- Shaft to shaft
- Flange to flange
- Flywheel to shaft ½ stiffness
- Shaft to shaft ½ stiffness

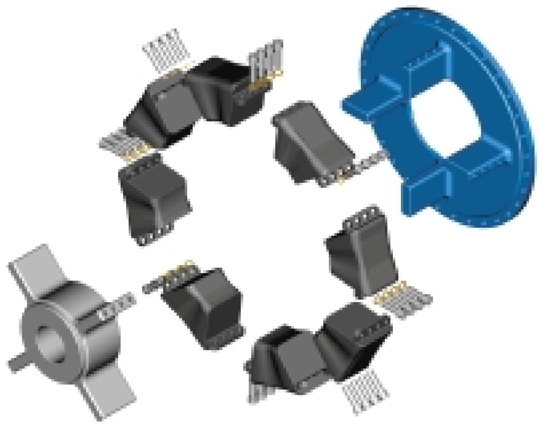
Applications

- Marine propulsion
- High power generator sets
- Reciprocating compressors

Features	Benefits
Radial removal of rubber elements	Allows rubber elements to be changed without moving driven or driving machine.
Low linear stiffness	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 pre - compression of the rubber elements.
Noise attenuation	Giving quiet running conditions in sensitive applications by the elimination of metal to metal contact.

Construction details

- The driving member is manufactured in steel to BS3100 Grade BT2
- The inner member is manufactured in steel to BS3100 Grade A6
- The driving flange is manufactured in steel to BS3100 Grade A3
- Rubber elements can be fitted and removed without moving the driving or driven machine

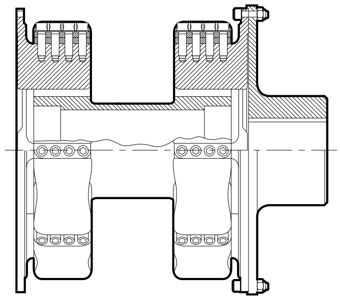


MSC Design Variations

The MSC coupling is available in standard and half stiffness versions for both flywheel to shaft and shaft to shaft applications.

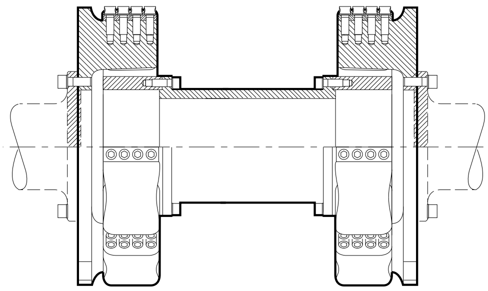
The MSC coupling can be adapted to meet customer needs as can be seen from some of the design variations shown below.

Cardan Shaft Coupling



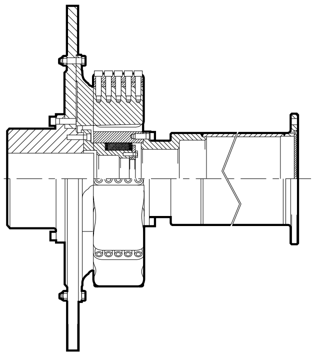
Cardan shaft coupling to give high misalignment capability, low axial and angular stiffness and high noise attenuation.

Lightweight Anti-Magnetic Coupling



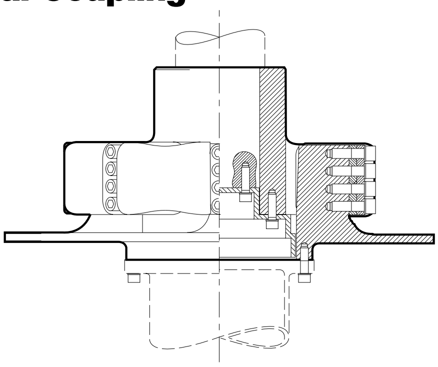
Aluminium coupling for use on military applications requiring low weight, high misalignment and low magnetic permeability.

Coupling with Radial Support Bearing



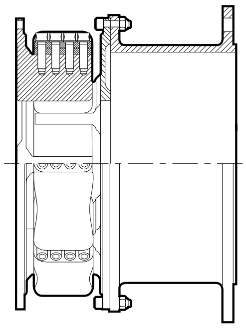
Coupling with radial support bearing for high speed applications or to support intermediate shafts.

Vertical Coupling



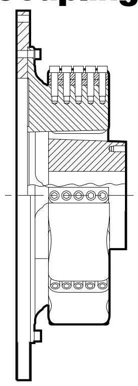
Coupling with brake disc, radial support bearing and end plate for vertical applications.

Spacer Coupling



Spacer coupling to increase the distance between the flange faces and to allow easy access to driven and driving machines.

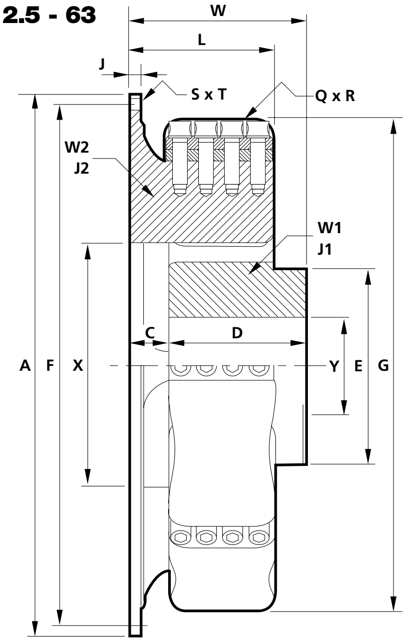
Adaptor Plate Coupling



Adaptor plate coupling for adapting standard MSC coupling to meet customer requirements.

MSC Flywheel to Shaft

12.5 - 63



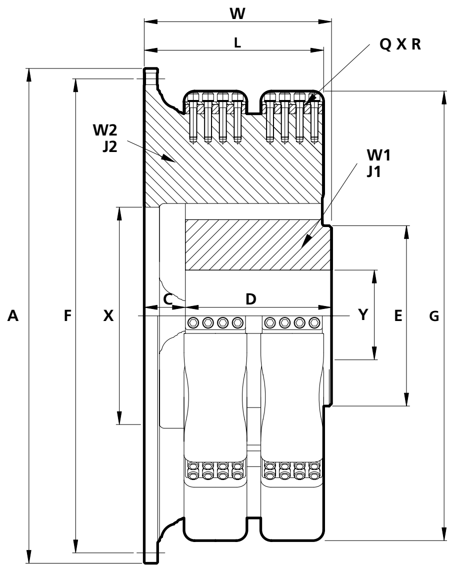
Features

- Radial removal of rubber element
- Choice of rubber hardness and compound
- Short axial length

Benefits

- Allows the rubber elements to be changed without moving driving or driven machine
- Allows control of the torsional vibration system
- Minimises the overall length of the installation

80-125



Dimensions, Weight, Inertia and Alignment

COUPLING SIZE		12.5		20		31.5	40	63	80	125	
		STD	SAE21	STD	SAE21				STD	STD	1200
DIMENSIONS (mm)	A	585.0	673.14	680.0	673.14	790.0	860.0	995.0	1070.0	1240.0	1200.0
	C	37.0	37.0	53.0	53.0	56.0	64.0	83.0	89.0	101.5	101.5
	D	129.0	129.0	168.0	168.0	184.0	225.0	274.0	316.0	349.0	349.0
	E	210.0	210.0	230.0	230.0	280.0	315.0	360.0	390.0	450.0	450.0
	F	558.0	641.35	650.0	641.35	755.0	820.0	950.0	1025.0	1190.0	1150.0
	G	530.0	530.0	607.0	607.0	720.0	755.0	904.0	972.0	1091.0	1091.0
	J	16.0	16.0	17.0	17.0	18.0	19.0	22.0	29.0	34.0	34.0
	L	153.0	153.0	195.0	195.0	218.0	241.5	292.0	388.0	428.5	428.5
	Q	M16	M16	M18	M18	M22	M20	M30	M16	M20	M20
	R	32	32	32	32	32	40	32	128	128	128
	S	32	12	32	24	32	32	32	25.0	25.0	25.0
	T	17.0	17.0	17.0	17.0	19.0	21.0	23.0	32	32	32
	W	166.0	166.0	221.0	221.0	240.0	289.0	357.0	405.0	450.5	450.5
	X	260.0	260.0	288.0	288.0	350.0	368.0	446.0	470.0	540.0	540.0
	MAX. Y	160.0	160.0	180.0	180.0	210.0	235.0	273.0	297.0	340.0	340.0
	MIN. Y	85.0	85.0	90.0	90.0	105.0	120.0	155.0	170.0	205.0	205.0
RUBBER ELEMENTS PER COUPLING		8	8	8	8	8	8	8	16	16	16
TIGHTENING TORQUE FOR Q (Nm)		220.0	220.0	250.0	250.0	470.0	360.0	1250.0	275.0	450.0	450.0
MAXIMUM SPEED (rpm) (1)		2300	1900	2050	1900	1700	1600	1350	1250	1040	1040
WEIGHT (2) (kg)	W1	61.9	61.9	99.1	99.1	156.6	211.0	350.8	649.0	752.0	752.0
	W2	52.7	63.6	92.2	91.3	134.3	169.6	281.0	534.0	639.0	619.0
	TOTAL	114.6	125.5	191.3	190.4	290.9	380.6	631.8	1183.0	1391.0	1371.0
INERTIA (2) (kgm^2)	J1	1.3	1.3	2.8	2.8	6.1	9.0	22.9	64.0	74.0	74.0
	J2	2.4	3.4	5.3	5.2	10.8	15.6	35.9	96.0	119.0	112.0
ALLOWABLE MISALIGNMENT (3)											
RADIAL (mm)		6.0	6.0	6.0	6.0	6.0	8.0	8.0	9.0	11.0	11.0
AXIAL (mm)		6.0	6.0	6.0	6.0	6.0	8.0	8.0	9.0	11.0	11.0
CONICAL (degree)		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

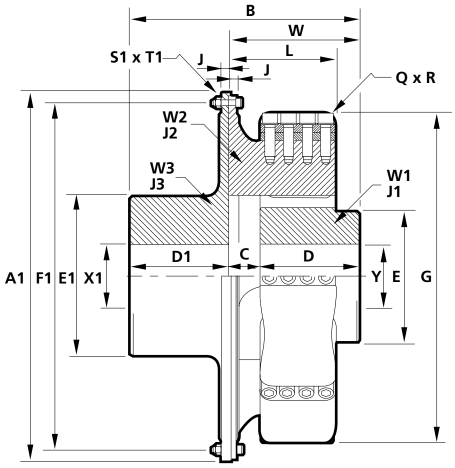
(1) For operation above 80% of the declared maximum coupling speed it is recommended that the coupling is balanced.

(2) Weights and inertias are based on 67% of the maximum bore.

(3) 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.

MSC Shaft to Shaft

MSC Flange to Flange

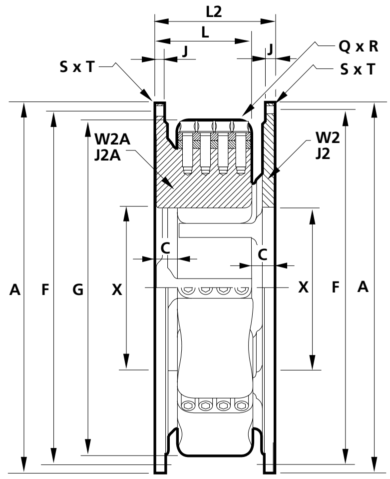


Features

- Easy disconnection of the driveline

Benefit

- allows maintenance to be carried out on driving and driven machine



Dimensions, Weight, Inertia and Alignment

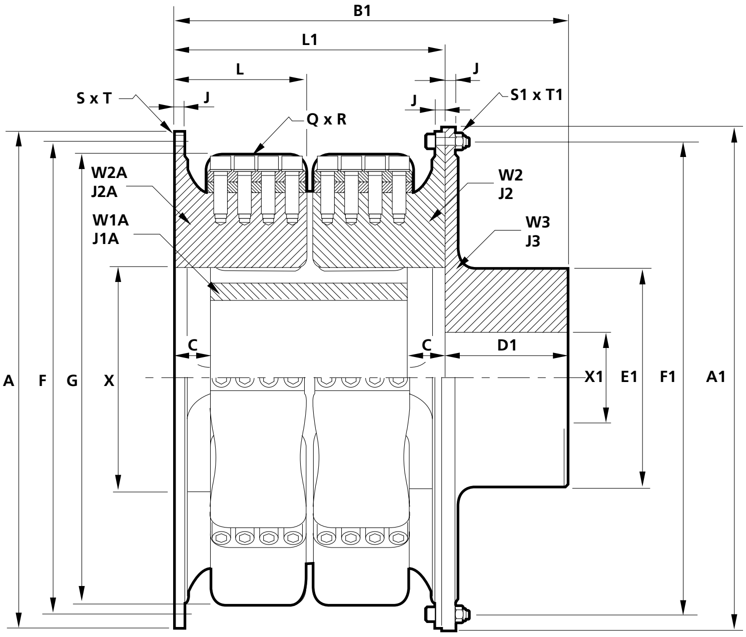
COUPLING SIZE		12.5		20		31.5	40	63	80	125	
		STD	SAE21	STD	SAE21				STD	STD	1200
DIMENSIONS (mm)	A	585.0	673.14	680.0	673.14	790.0	860.0	995.0	1070.0	1240.0	1200.0
	A1	595.0		690.0		800.0	870.0	1010	1090.0	1260.0	1220.0
	B	326.0		401.0		450.0	524.0	631.0	702.0	790.5	790.5
	C	37.0	37.0	53.0	53.0	56.0	64.0	83.0	89.0	101.5	101.5
	D	129.0		168.0		184.0	225.0	274.0	316.0	349.0	349.0
	D1	160.0		180.0		210.0	235.0	274.0	297.0	340.0	340.0
	E	210.0		230.0		280.0	315.0	360.0	390.0	450.0	450.0
	E1	250.0		290.0		340.0	380.0	440.0	416.0	476.0	476.0
	F	558.0	641.35	650.0	641.35	755.0	820.0	950.0	1025.0	1190.0	1150.0
	F1	558.0		650.0		755.0	820.0	950.0	1025.0	1190.0	1150.0
	G	530.0	530.0	607.0	607.0	720.0	755.0	904.0	972.0	1091.0	1091.0
	J	16.0	16.0	17.0	17.0	18.0	19.0	22.0	29.0	34.0	34.0
	L	153.0	153.0	195.0	195.0	218.0	241.5	292.0	388.0	428.5	428.5
	L2	188.0	188.0	246.0	246.0	272.0	303.0	372.0	474.0	527.0	527.0
	Q	M16	M16	M18	M18	M22	M20	M30	M16	M20	M20
	R	32	32	32	32	32	40	32	128	128	128
	S	17.0	17.0	17.0	17.0	19.0	21.0	23.0	25.0	25.0	25.0
	S1	M16		M16		M18	M20	M22	M24	M24	M25
	T	32	12	32	24	32	32	32	32	32	32
	T1	32		32		32	32	32	32	32	32
	W	166.0		221.0		240.0	289.0	357.0	405.0	450.5	450.5
	X	260.0	260.0	288.0	288.0	350.0	368.0	446.0	470.0	540.0	540.0
	MAX. X1 & Y	160.0		180.0		210.0	235.0	273.0	297.0	340.0	340.0
	MIN. X1 & Y	85.0		90.0		105.0	120.0	155.0	170.0	205.0	205.0
RUBBER ELEMENTS PER COUPLING		8	8	8	8	8	8	8	16	16	16
TIGHTENING TORQUE FOR Q (Nm)		220.0	220.0	250.0	250.0	470.0	360.0	1250.0	275.0	450.0	450.0
MAXIMUM SPEED (rpm) (1)		2300	1900	2050	1900	1700	1600	1350	1250.0	1040.0	1040.0
WEIGHT (2) (kg)	W1	61.9		99.1		156.6	211.0	350.8	649.0	752.0	752.0
	W2	52.7	63.6	92.2	91.3	134.3	169.6	281.0	534.0	639.0	619.0
	W2A	52.7	63.6	92.2	91.3	134.3	169.6	281.0	534.0	639.0	639.0
	W3	83.1		127.6		187.2	256.5	404.0	434.0	504.0	504.0
INERTIA (2) (kgm^2)	J1	1.3		2.8		6.1	9.0	22.9	64.0	74.0	74.0
	J2	2.4	3.4	5.3	5.2	10.8	15.6	35.9	96.0	119.0	112.0
	J2A	2.4	3.4	5.3	5.2	10.8	15.6	35.9	96.0	119.0	112.0
	J3	2.2		4.4		8.0	13.0	27.8	30.0	35.0	35.0
ALLOWABLE MISALIGNMENT (3)											
RADIAL (mm)		6.0	6.0	6.0	6.0	6.0	8.0	8.0	9.0	11.0	11.0
AXIAL (mm)		6.0	6.0	6.0	6.0	6.0	8.0	8.0	9.0	11.0	11.0
CONICAL (degree)		0.5	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 balanced.

(2) Weights and inertias are based on 67% of maximum bore.

(3) 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.

MSC Flywheel to Shaft Half Stiffness



Features

- High misalignment capability
- Low radial and axial stiffness

Benefits

- Suitable for use on engines fitted with elastic anti-vibration mounts
- Reduces the loads on driving and driven machines due to misalignment

Dimensions, Weight, Inertia and Alignment

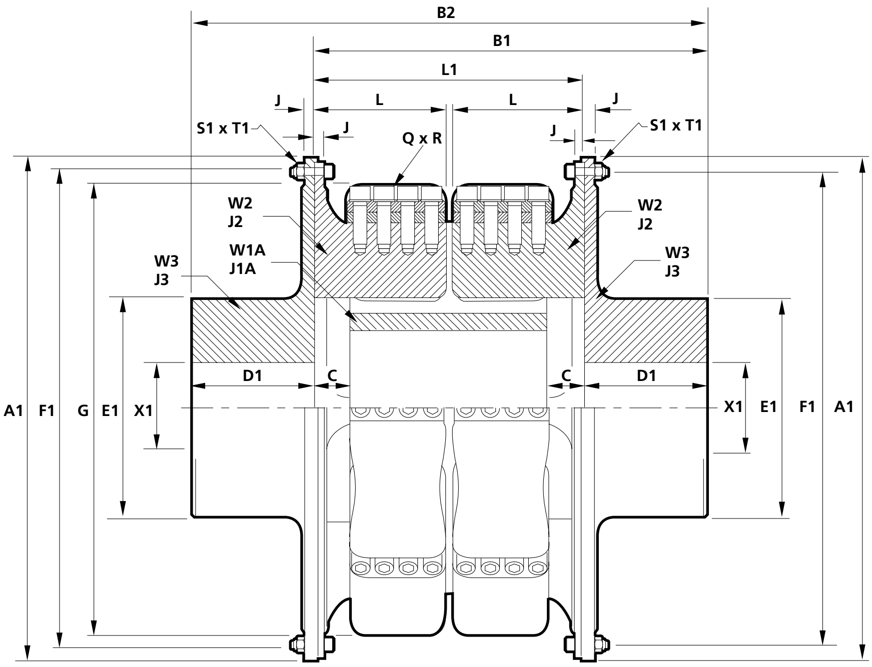
COUPLING SIZE		12.5		20		31.5	40	63	80	125	
		STD	SAE21	STD	SAE21				STD	STD	1200
DIMENSIONS (mm)	A	585.0	673.14	680.0	673.14	790.0	860.0	995.0	1070.0	1240.0	1200.0
	A1	595.0	595.0	690.0	690.0	800.0	870.0	1010.0	1090.0	1260.0	1260.0
	B1	482.0	482.0	586.0	586.0	657.0	738.0	875.5	1137.0	1227.0	1227.0
	C	37.0	37.0	53.0	53.0	56.0	64.0	83.0	89.0	101.5	101.5
	D1	160.0	160.0	180.0	180.0	210.0	235.0	274.0	297.0	340.0	340.0
	E1	250.0	250.0	290.0	290.0	340.0	380.0	440.0	416.0	476.0	476.0
	F	558.0	641.35	650.0	641.35	755.0	820.0	950.0	1025.0	1190.0	1150.0
	F1	558.0	558.0	650.0	650.0	755.0	820.0	950.0	1025.0	1190.0	1190.0
	G	530.0	530.0	607.0	607.0	720.0	755.0	904.0	972.0	1091.0	1091.0
	J	16.0	16.0	17.0	17.0	18.0	19.0	22.0	29.0	34.0	34.0
	L	153.0	153.0	195.0	195.0	218.0	241.5	292.0	388.0	428.5	428.5
	L1	322.0	322.0	406.0	406.0	447.0	503.0	601.5	840.0	887.0	887.0
	Q	M16	M16	M18	M18	M22	M20	M30	M16	M20	M20
	R	32	32	32	32	32	40	32	128	128	128
	S	32	12	32	24	32	32	32	25.0	25.0	25.0
	S1	32	32	32	32	32	32	32	M24	M24	M24
	T	17.0	17.0	17.0	17.0	19.0	21.0	23.0	32	32	32
	T1	M16	M16	M16	M16	M18	M20	M22	32	32	32
	X	260.0	260.0	288.0	288.0	350.0	368.0	446.0	470.0	540.0	540.0
	MAX. X1	160.0	160.0	180.0	180.0	210.0	235.0	273.0	297.0	340.0	340.0
	MIN. X1	85.0	85.0	90.0	90.0	105.0	120.0	155.0	170.0	205.0	205.0
RUBBER ELEMENTS PER COUPLING		16	16	16	16	16	16	16	32	32	32
TIGHTENING TORQUE FOR Q (Nm)		220.0	220.0	250.0	250.0	470.0	360.0	1250.0	275.0	450.0	450.0
MAXIMUM SPEED (rpm) (1)		2300	1900	2050	1900	1700	1600	1350	1250	1040	1040
WEIGHT (2) (kg)	W1A	53.9	53.9	87.7	87.7	136.8	172.6	297.5	580.0	681.0	651.0
	W2	52.7	52.7	92.2	92.2	134.3	169.6	281.0	534.0	639.0	619.0
	W2A	52.7	63.6	92.2	91.3	134.3	169.6	281.0	534.0	639.0	639.0
	W3	83.1	83.1	127.6	127.6	187.2	256.5	404.0	434.0	504.0	504.0
	TOTAL	242.4	253.3	399.7	398.8	592.6	768.3	1263.5	2082.0	2463.0	2413.0
INERTIA (2) (kgm^2)	J1A	1.7	1.7	3.6	3.6	7.8	12.3	27.5	123.0	138.0	138.0
	J2	2.4	2.4	5.3	5.3	10.8	15.6	35.9	96.0	119.0	112.0
	J2A	2.4	3.4	5.3	5.2	10.8	15.6	35.9	96.0	119.0	112.0
	J3	2.2	2.2	4.4	4.4	8.0	13.0	27.8	30.0	35.0	35.0
ALLOWABLE MISALIGNMENT (3)											
RADIAL (mm)		12.0	12.0	12.0	12.0	12.0	16.0	16.0	18.0	22.0	22.0
AXIAL (mm)		12.0	12.0	12.0	12.0	12.0	16.0	16.0	18.0	22.0	22.0
CONICAL (degree)		0.5	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 balanced.

(2) Weights and inertias are based on 67% of maximum bore.

(3) 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.

MSC Shaft to Shaft Half Stiffness



Features

- Very low torsional stiffness
- Easy removal of coupling

Benefits

- Ideal for use on gear box power take offs
- Allows disconnection and access to the driving and driven machines without moving either

Dimensions, Weight, Inertia and Alignment

COUPLING SIZE		12.5	20	31.5	40	63	80	125
DIMENSIONS (mm)	A1	595.0	690.0	800.0	870.0	1010.0	1090.0	1260.0
	B1	482.0	586.0	657.0	738.0	875.5	1137.0	1227.0
	B2	642.0	766.0	867.0	973.0	1149.5	1434.0	1567.0
	C	37.0	53.0	56.0	64.0	83.0	89.0	101.5
	D1	160.0	180.0	210.0	235.0	274.0	297.0	340.0
	E1	250.0	290.0	340.0	380.0	440.0	416.0	476.0
	F1	558.0	650.0	755.0	820.0	950.0	1025.0	1190.0
	G	530.0	607.0	720.0	755.0	904.0	972.0	1091.0
	J	16.0	17.0	18.0	19.0	22.0	29.0	34.0
	L	153.0	195.0	218.0	241.5	292.0	388.0	428.5
	L1	322.0	406.0	447.0	503.0	601.5	840.0	887.0
	Q	M16	M18	M22	M20	M30	M16	M20
	R	32	32	32	40	32	128	128
	S1	32	32	32	32	32	25.0	25.0
	T1	M16	M16	M18	M20	M22	M24	M24
	MAX. X1	160.0	180.0	210.0	235.0	273.0	297.0	340.0
	MIN. X1	85.0	90.0	105.0	120.0	155.0	170.0	205.0
RUBBER ELEMENTS PER COUPLING		16	16	16	16	16	32	32
TIGHTENING TORQUE FOR Q (Nm)		220.0	250.0	470.0	360.0	1250.0	275.0	450.0
MAXIMUM SPEED (rpm) (1)		2300	2050	1700	1600	1350	1250	1040
WEIGHT (2) (kg)	W1A	53.9	87.7	136.8	172.6	297.5	580.0	681.0
	W2	52.7	92.2	134.3	169.6	281.0	534.0	639.0
	W3	83.1	127.6	187.2	256.5	404.0	534.0	639.0
	TOTAL	325.5	527.3	779.8	1024.8	1667.5	2082.0	2463.0
INERTIA (2) (kgm²)	J1A	1.7	3.6	7.8	12.3	27.5	123.0	138.0
	J2	2.4	5.3	10.8	15.6	35.9	96.0	119.0
	J3	2.2	4.4	8.0	13.0	27.8	30.0	35.0
ALLOWABLE MISALIGNMENT (3)								
RADIAL (mm)		12.0	12.0	12.0	16.0	16.0	18.0	22.0
AXIAL (mm)		12.0	12.0	12.0	16.0	16.0	18.0	22.0
CONICAL (degree)		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 balanced.

(2) Weights and inertias are based on 67% of maximum bore.

(3) 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.

MSC Technical Data

1.1 Torque Capacity - Diesel Engine Drives

The MSC Coupling is selected on the *"nominal torqueT_{KN}"* without service factors.

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}

$T_{KMAX} = 3 \times T_{KN}$.

There is additional torque capacity built within the coupling for short circuit torques.

The Published "Vibratory Torque, T_{KW}" is a fatigue function according to DIN740 and not so significant in diesel engine drives, the vibratory torque values shown in the Technical Data are at a frequency of 10Hz. The measure acceptability of the coupling for vibrating drives is published as "Allowable Dissipated Heat at Ambient Temperature 30°C".

1.2 Transient Torques

Prediction of transient torques in a marine drive can be more complex. Normal installations are well provided by the selection of the coupling based on the "Nominal Torque T_{KN}." Transients such as start up and clutch manoeuvre are usually within the "Maximum Torque" T_{KMAX} for the coupling.

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

Sudden torque applications of propulsion devices such as the thrusters or water jets need to be considered when designing the coupling connection.

2.0 Stiffness Properties

The MSC coupling consists of rubber elements in compression and in tension. It is available in four different stiffnesses which are F60, F70, a combination of F60 and F50 and a combination of F70 and F60. The coupling rubber grade is defined as shown below:
F (compression elements) - F (tension elements)
For example F60 - F50 is a coupling with F60 rubber in the compression elements and F50 in the tension elements. The harder rubber should always be used in the compression elements therefore it is important to know the direction of rotation of the coupling to ensure that the elements are fitted in the correct position.
If all the elements are of one rubber hardness, that is F60 - F60, the direction of rotation is not required.

2.1 Axial Stiffness

The axial stiffness of the coupling is linear and independent of applied torque as shown on page 13.

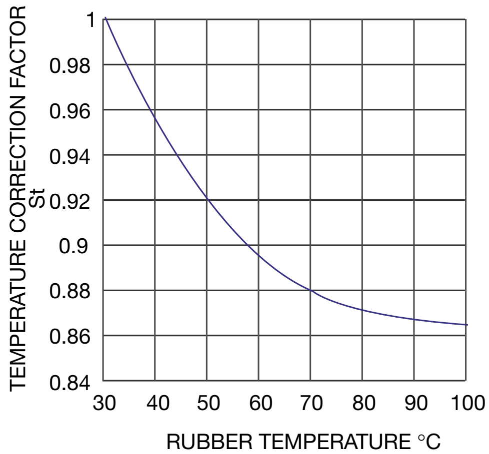
2.2 Radial Stiffness

The radial stiffness of the coupling is linear and independent of applied torque as shown on page 13.

2.3 Torsional Stiffness

The torsional stiffness of the coupling is linear as shown on page 13, but it should be corrected for temperature as per graph 2.3.1 below.

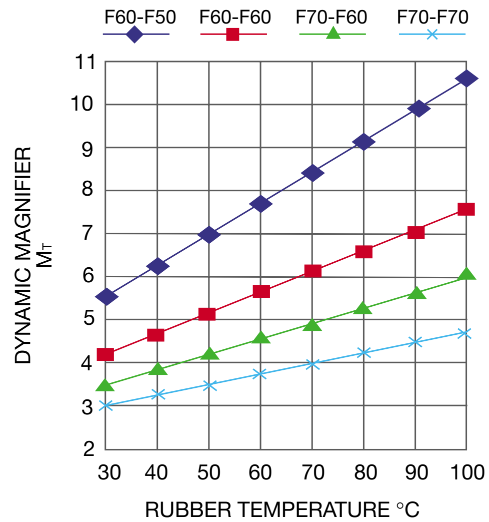
2.3.1 Temperature Correction Factor for all rubber grades



2.4 Dynamic Magnifier

The Dynamic Magnifier of the rubber is dependent on rubber temperature and can be established from graph 2.4.1 below

2.4.1 Dynamic Magnifier



2.5 Prediction of the system torsional vibration characteristics

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

2.5.1 Use the torsional stiffness as published below which is based upon data measured at a 30°C ambient temperature.

2.5.2 Repeat the calculation made as 2.5.1 but using the maximum temperature correction factor and dynamic magnifier at 100°C (St_{100} and M_{100}) for the rubber selected for both torsional stiffness and dynamic magnifier from the graph on page 12.

2.5.3 Review the calculations 2.5.1 and 2.5.2 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.

2.6 Prediction of the actual coupling temperature and torsional stiffness

2.6.1 Use the torsional stiffness as published below which is based upon data measured at a 30°C and the dynamic magnifier at 30°C. (M_{30})

2.6.2 Compare the synthesis value of the calculated heat load in the coupling (P_K) at the speed of interest to the "Allowed Heat Dissipation"(Pkw).

The coupling temperature rise

$$°C = Temp_{coup} = \left(\frac{P_K}{P_{KW}}\right) \times 70$$

The coupling rubber temperature = ϑ

$$\vartheta = Temp_{coup} + \text{Ambient Temp}$$

2.6.3 Calculate the temperature correction factor S_t from 2.3.1 (if the coupling temperature > 100°C, then use S_{t100}). Establish the dynamic magnifier from 2.4.1. Repeat the calculation with the new value of coupling stiffness and dynamic magnifier.

2.6.4 Calculate the coupling temperature as per 2.6. Repeat calculation until the coupling temperature agrees with the calculation factors for torsional stiffness and dynamic magnifier used in the calculation.

MSC Technical Data-Standard Blocks MSC 12.5 - MSC 125

COUPLING SIZE		12.5	20	31.5	40	63	80	125
NORMAL TORQUE T_{KN} (kNm)	F60-F50	12.5	20.0	31.5	40.0	63.0	80.0	125.0
	F60-F60	12.5	20.0	31.5	40.0	63.0	80.0	125.0
	F70-F60	16.0	25.0	40.0	50.0	80.0	100.0	160.0
	F70-F70	16.0	25.0	40.0	50.0	80.0	100.0	160.0
MAXIMUM TORQUE T_{Kmax} (kNm)	F60-F50	37.5	60.0	94.5	120.0	189.0	240.0	375.0
	F60-F60	37.5	60.0	94.5	120.0	189.0	240.0	375.0
	F70-F60	37.5	60.0	94.5	120.0	189.0	240.0	375.0
	F70-F70	37.5	60.0	94.5	120.0	189.0	240.0	375.0
VIBRATORY TORQUE T_{KW} (kNm)	F60-F50	3.5	5.6	8.8	11.5	17.5	22.4	34.9
	F60-F60	3.5	5.6	8.8	11.5	17.5	22.4	34.9
	F70-F60	4.48	7.0	11.5	14.0	22.4	28.0	44.7
	F70-F70	4.48	7.0	11.5	14.0	22.4	28.0	44.7
ALLOWABLE DISSIPATED HEAT AT AMB. TEMP. 30°C P_{KW} (W)	F60-F50	600.0	650.0	800.0	1000.0	1350.0	1500.0	2000.0
	F60-F60	600.0	650.0	800.0	1000.0	1350.0	1500.0	2000.0
	F70-F60	625.0	715.0	1000.0	1150.0	1500.0	1680.0	2240.0
	F70-F70	625.0	715.0	1000.0	1150.0	1500.0	1680.0	2240.0
DYNAMIC TORSIONAL STIFFNESS C_{Tdyn} (MNm/rad)	F60-F50	0.15	0.25	0.38	0.45	0.75	1.11	1.49
	F60-F60	0.20	0.33	0.51	0.60	1.00	1.48	1.98
	F70-F60	0.40	0.65	1.02	1.20	2.00	2.96	3.97
	F70-F70	0.60	0.98	1.52	1.80	3.00	4.44	5.95
RADIAL STIFFNESS K_r (N/mm)	F60-F50	1.8	2.3	2.3	2.6	3.0	6.37	6.70
	F60-F60	2.3	3.0	3.1	3.5	4.0	8.42	8.86
	F70-F60	3.4	4.4	4.5	5.1	5.8	12.31	12.95
	F70-F70	4.5	5.8	6.0	6.7	7.6	16.23	17.07
AXIAL STIFFNESS K_a (N/mm)	F60-F50	1.7	2.0	2.1	2.5	2.8	2.05	2.16
	F60-F60	2.0	2.5	2.6	3.0	3.3	2.59	2.73
	F70-F60	3.0	3.9	4.0	4.5	5.0	3.89	4.09
	F70-F70	3.7	4.7	4.8	8.2	9.2	4.75	5.00
DYNAMIC MAGNIFIER AT AMB. TEMP. 30°C (M)	F60-F50	7.0	7.0	7.0	7.0	7.0	7.0	7.0
	F60-F60	5.2	5.2	5.2	5.2	5.2	5.2	5.2
	F70-F60	4.4	4.4	4.4	4.4	4.4	4.4	4.4
	F70-F70	3.5	3.5	3.5	3.5	3.5	3.5	3.5

Coupling Selection

Coupling Selection Check List

Photocopy this page and complete the following check list to ensure the correct coupling selection is achieved, then fax it to the Renold Hi-Tec Couplings Sales Fax Line at +44 (0) 1422 255100.

Customer:	
Project:	
Prime mover:	
Driven equipment:	
Continuous power:	**Maximum power:**
Operating speed:	**Overspeed:**
Driving shaft diameter:	**Driven shaft diameter:**
Driving shaft length:	**Driven shaft length:**
Flywheel location diameter:	**Hole size and PCD:**
Continuous misalignment:	**Transient misalignment:**
Diameter constraints:	**Length constraints:**
Distance between shaft ends:	

If you require help with coupling selections contact Renold Hi-Tec Couplings:

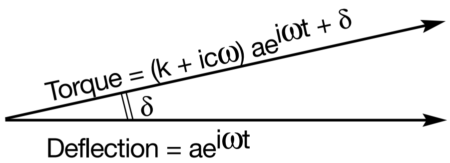
Tel: +44 (0) 1422 255000

Fax: +44 (0) 1422 255100

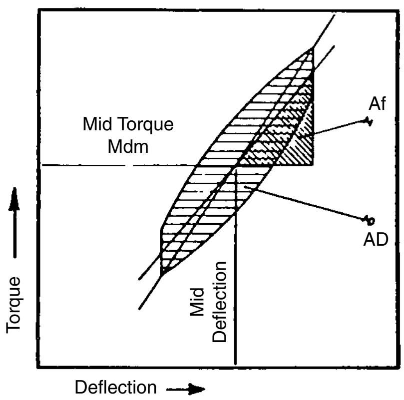
Damping Characteristics

Coupling damping varies directly 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.

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



$$\tan\delta = \frac{C\omega}{K} = \frac{1}{M}$$



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

This property may also be expressed as the Damping Energy Ratio or Relative Damping, ψ, 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
	δ	= Phase Angle (rad)
	ψ	= Damping Energy Ratio

The rubber compound dynamic magnifier values are shown in the table on page 13 and should be corrected for Temperature as shown in the graph on page 12.

Health and Safety at Work

Customers are reminded that when purchasing Renold Hi-Tec Couplings products, for use at work or otherwise, additional and up-to-date information, which is not possible to include in Renold Hi-Tec Couplings publications, is available from your local Sales Company in relation to:

(a) guidance on individual product suitability based on the various existing applications of the extensive range of Renold Hi-Tec Couplings products.

(b) guidance on safe and proper use provided that full disclosure is made of the precise details of the intended or existing application.
All relevant information should be passed on to the persons engaged in, likely to be affected by and those responsible for the use of the product.
Nothing contained in this publication shall constitute a part of any contract, express or implied.

Product Performance

'The performance levels and tolerances of our product stated in this catalogue (including without limitation, serviceability, wearlife, resistance to fatigue, corrosion protection) have been shown in a programme of testing and quality control in accordance with Renold Hi-Tec Couplings, Independent and or International standard recommendations.

No representation warranty or condition is given that our products shall meet the stated performance levels or tolerances for any given application outside the controlled environment required by such tests'.

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