

TECHNICAL INFORMATION

75mm TO 180mm
SPLIT TAPERED BEARINGS



COOPER
SPLIT ROLLER BEARINGS

INTRODUCTION

The Cooper split tapered bearing is intended for the 'fixed' bearing position of shafts where there is both radial and axial loading and our 'GR' cylindrical roller bearing is unsuitable.

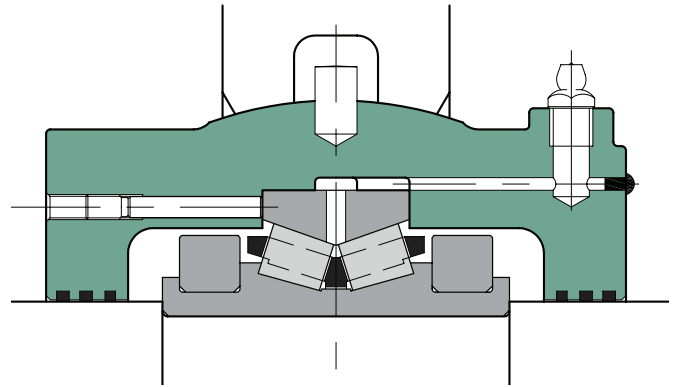
It is constructed with two opposed rows of rollers to take axial loading in either direction, and is intended to be used with 'expansion' type bearings in all other positions on the shaft.

Cooper split tapered roller bearings are generally mounted in a 'cartridge' in a similar way to Cooper cylindrical roller bearings. This is a spherically-machined inner housing that can be fitted into a number of types of outer housing.

The spherical seat between the cartridge and the outer housing accommodates misalignment between the shaft and mounting structure.

The cartridge also houses the seals. This ensures that the seals are maintained concentric to the shaft, even if there is significant misalignment of the shaft relative to the outer housing.

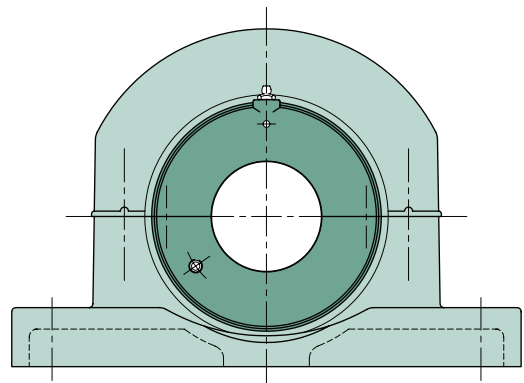
Cartridges for tapered bearings are fitted with a hole in communication with the outer race, for fitment of a temperature element, as standard. The standard hole position is in the end face of the cartridge. The proximity of this hole to the shaft means that if the temperature element is of the headed type, generally it will need to have a cranked probe. Alternative hole positions are possible, including radial holes requiring additional holes in the outer housing.



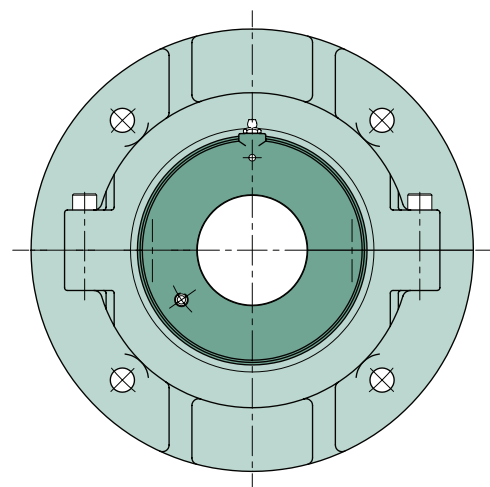
Tapered bearing in cartridge

Outer Housings

As the cartridge spherical seat diameters are common to the seats for Cooper cylindrical bearings, the bearing and cartridge unit can be fitted in a wide variety of existing housing designs. However, the two types most commonly used are the pedestal (or 'pillow block') and flange.

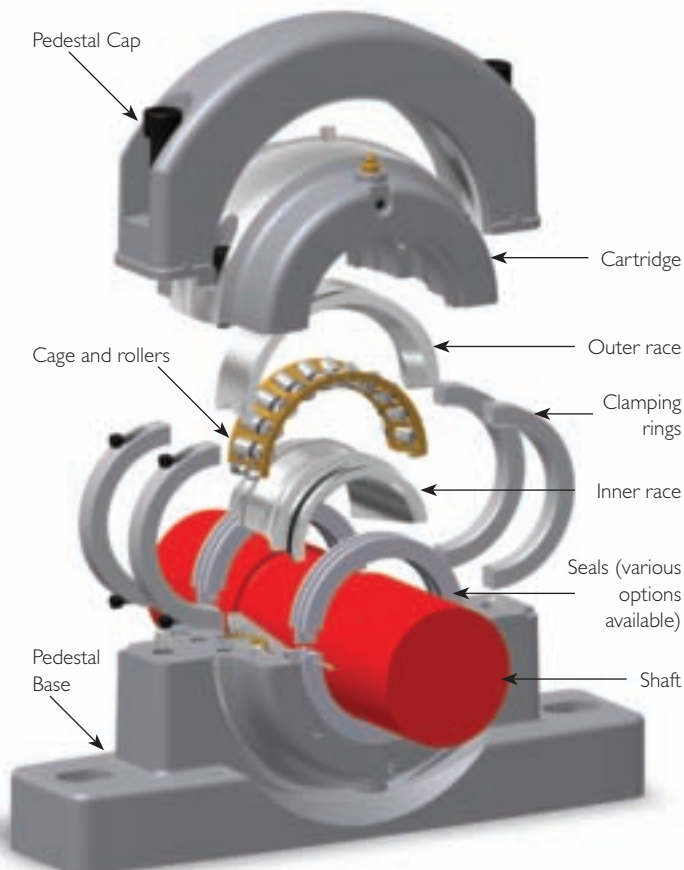


Pedestal (or 'pillow block')



Flange

Ductile iron pillow blocks and flanges are offered as standard with these bearings. Please confirm load capacities of housings with our technical department before finalising designs.

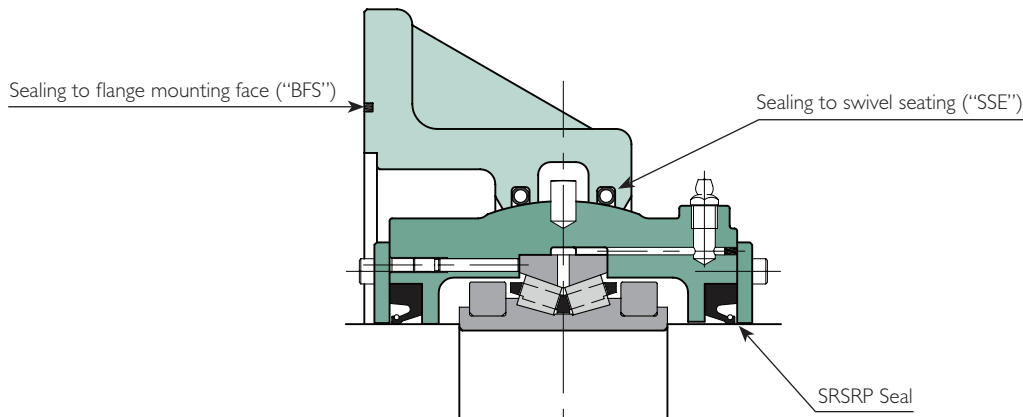


Bulkhead sealing

It is often found economical to combine a bearing and bulkhead seal into one unit. This reduces the number of individual units required, and prevents problems with shaft eccentricity sometimes encountered at the bulkhead seal when it is separated from the bearing.

Generally, a specially adapted flange mounting is used and the bearing is fitted with SRSRP seals (see page 6). Generally, the flange incorporates additional sealing to the cartridge seating, and may include sealing on the mounting face ('backface').

Where the shaft surface speed is too high for standard SRSRP seals, an alternative high speed version is available, or alternative seal types can be used if a moderate leakage of water is permitted through the bearing in an emergency.



Combined bearing and bulkhead seal

Bearing Selection

Bearing ratings for dynamic radial capacity (C_r) and static radial capacity (C_{or}) shown in this leaflet are in accordance with ISO 281-1990 and ISO 76-1987 respectively.

Radial and axial loads must be considered together as combined 'equivalent loads', as explained below. Generally, maximum instantaneous loading is governed by housing strength rather than bearing static capacity.

Dynamic rating

Expected bearing life is calculated by the following equation:

$$L_{10} = [C_r / (P \times f_d)]^{10/3}$$

where:

- L_{10} = expected life of 90% of similar bearings under similar operating conditions
- C_r = radial dynamic rating
- P = equivalent dynamic load
- f_d = dynamic or service factor, generally from 1 for steady loading to 3.5 for heavy shock, reciprocation or vibration

The dynamic equivalent load is calculated as follows:

$$\text{when } F_a/F_r \leq e : P = F_r + Y_1 F_a$$

$$\text{when } F_a/F_r > e : P = 0.67 F_r + Y_2 F_a$$

where:

- F_r = applied radial load
- F_a = applied axial load

and calculation factors Y_1 , Y_2 and e are given in the product data tables.

Life calculation with multiple load conditions

Where varying loads are experienced in operation, using the maximum load condition may lead to an unrealistically low calculated life. For n load conditions constituting the full load cycle (at constant speed), an overall dynamic equivalent load may be calculated as follows:

$$P = \left[\sum_{i=1}^n P_i^{10/3} p_i \right]^{0.3}$$

where:

- P_i = dynamic equivalent load under load condition i
- p_i = proportion of time load condition i is applicable

Where the load is continuously variable it may be broken down into a discrete approximation to the actual load cycle.

Minimum loading

In order to avoid excessive skidding of the rollers, sufficient loading must be applied to the bearing, as follows:

$$P \geq 0.01 C_r$$

Static rating

The static load rating is defined as the load at which a contact stress of 4GPa occurs at the centre of the most heavily loaded contact, and at which a permanent deformation of 0.0001 times the roller diameter is sustained at the location of the contact. This has been found to not cause significant deterioration in bearing performance under typical operating conditions.

The suitability of a bearing for sustaining a specified static (or instantaneous maximum) load is determined as follows:

$$C_{or} \geq S_o \times P_o$$

where:

C_{or} = static radial capacity

S_o = static safety factor

$P_o = F_r + Y_o F_a$ where calculation factor Y_o is given in the product data tables.

Temperature Characteristics

Standard bearings can operate at between -20°C and 100°C. Operation outside this range is possible but may require special treatment of bearings parts – please contact our technical department.

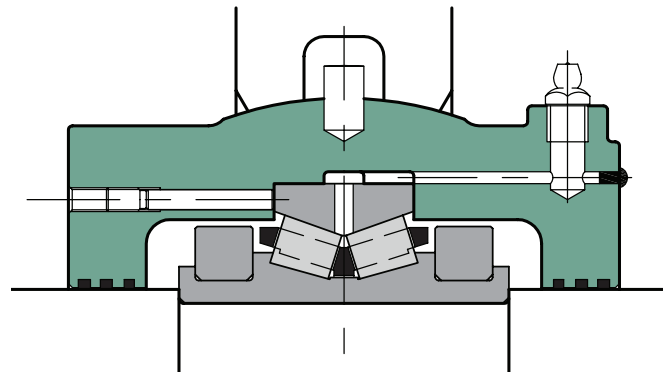
The difference in temperature between the shaft and housing should not exceed 40°C.

Mounting Arrangements

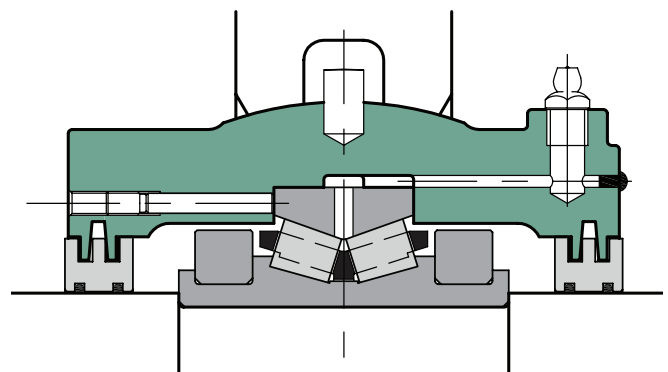
General arrangements

In order to provide accurate and positive location of the inner race on the shaft, these bearings are generally mounted on a recessed journal, and the standard cartridges and seals are designed to suit this arrangement. As the bearings are completely split to the shaft, there is no need to provide separate collars to create this recess – it can be machined directly into a solid shaft. Also, there is no need to design the surrounding parts to allow for axial assembly of the bearing and it can be fitted between integral shaft flanges, cranks, mounted parts and assemblies etc.

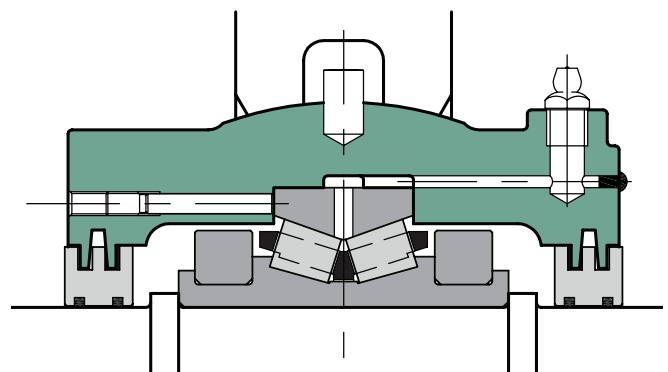
Usually, the shaft is carried through the end of the cartridge at the diameter of the journal abutment, with the seals operating on this larger diameter. If aluminium triple labyrinth (ATL) seals are to be used, on some sizes the diameter of the cartridge end bore would be excessive with this arrangement, so the shaft has only narrow shoulders abutting the inner race, with the seals operating on a diameter equal to the journal diameter.



Standard shaft design

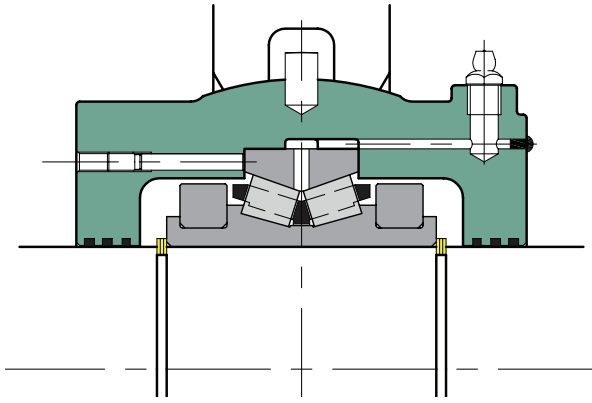


Standard shaft design with ATL seals
(where applicable)



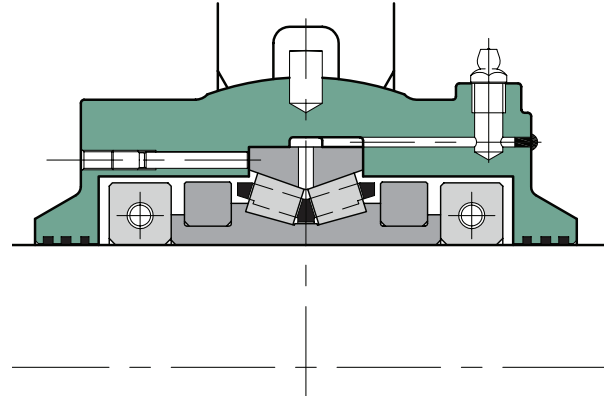
Shaft design for ATL seals
where standard not applicable

If the journal and the portions of the shaft under the seals are required to be of the same diameter and integral abutting shoulders are not possible, alternatives are to use spirally wound retaining rings mounted in grooves in the shaft, or special split location collars (usually requiring special cartridges to accommodate them). It may be possible to locate the inner race on the shaft using only the clamping effort provided by the inner race clamping rings, without auxiliary location features, but this should only be done in consultation with Cooper technical department.



Use of retaining rings
to locate inner race

All arrangements not conforming to the standard designs illustrated in the product data tables will require confirmation of dimensions and part codes for the cartridges and seals.



Use of split collars
to locate inner race

Alternative abutment diameters can be accommodated using alternative seals and housing end bores. If larger shaft fillet radii are required, we can supply bearings with extra large chamfers to the inner race bores.

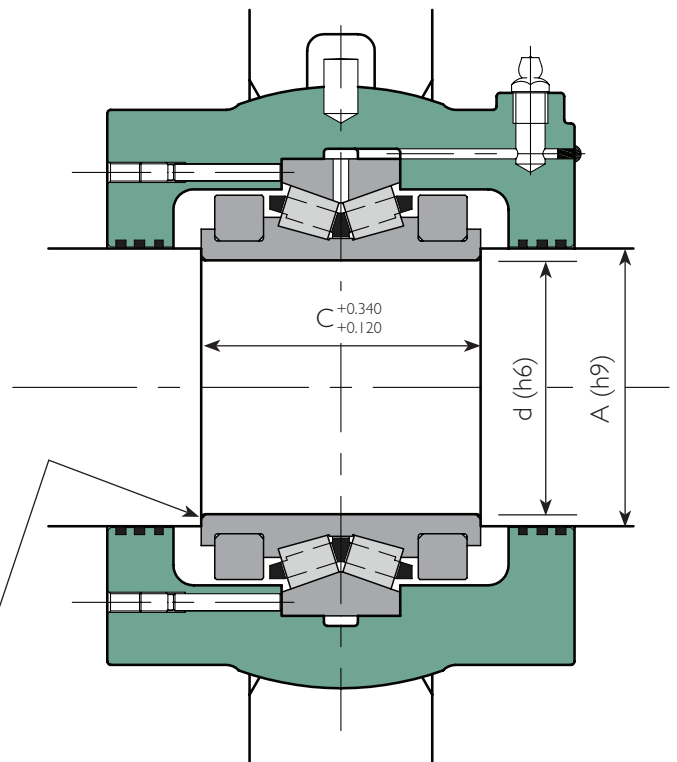
Shaft tolerance

Shaft tolerances are as illustrated opposite. The tolerance on roundness and parallelism of the journal is IT6.

A tolerance of h9 is applicable to the seal seating area even when it is the same nominal diameter as the journal.

diameter (mm)	over	50	80	120	180
	up to and incl.	80	120	180	250
Tolerance band (to BS 4500)	h6	+0 -19	+0 -22	+0 -25	+0 -29
	h9	+0 -74	+0 -87	+0 -100	+0 -115
	IT6	19	22	25	29

max. shaft fillet radii:
75mm bore size: 1.2mm
all others: 2.3mm



Standard shaft design

Sealing

Standard Cooper housed tapered bearing units incorporate a cartridge with spherical seating, which maintains the seals concentric with the shaft under misaligned conditions. Compared to units where the misalignment is taken up between the bearing and outside housing, closer running clearances (in non-contact seals) or more even seal pressure can be maintained.

Cooper offer a wide range of seals, together suitable for most environments. Some of the more common options are shown below. Further types, or combinations of seals, are possible.

Different cartridges are required depending upon seal type. Felt, high temperature packing and single lip (SRS) seals all use a common cartridge.

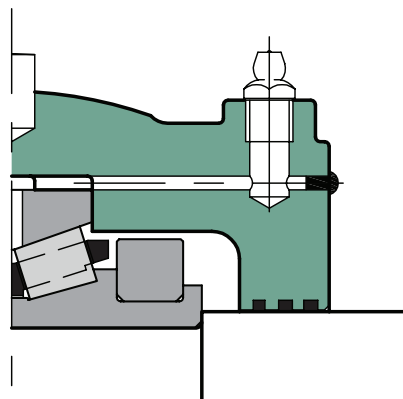
If felt seal are specified, these are supplied with the cartridge (although they can still be ordered separately). Other seal types must be ordered separately (i.e. they are not automatically supplied with the cartridge).

Maximum operating speeds of the various types of seals are specified in $dn(mm)$. To calculate the speed in $dn(mm)$ multiply the shaft speed (in rpm) by the diameter of the seal seating area (in mm).

5

Grease groove (LAB)

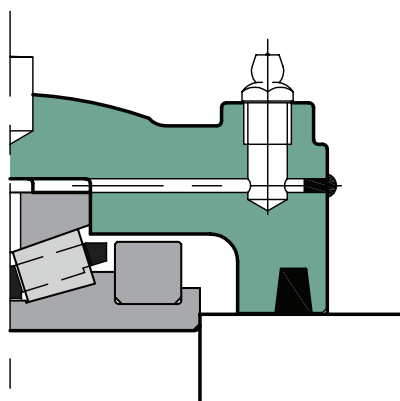
Supplied as standard. Suitable for high or slow speed operations. Particularly successful on marine applications when conditions are clean and dry.



Temperature limits	bearing maximum
Maximum speed	bearing maximum
Shaft surface finish (max. roughness)	3.2µm Ra

Felt (F)

Suitable for dry, dusty conditions.

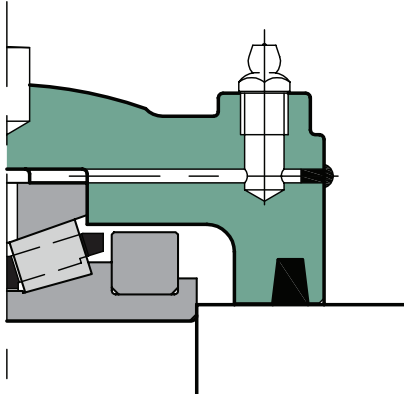


Temperature limits	-70°C to 100°C
Maximum speed	150,000 $dn(mm)$
Shaft surface finish (max. roughness)	1.6µm Ra

75mm TO 180mm SPLIT TAPERED BEARINGS

High temperature packing (HTP)

A direct replacement for felt in high temperature applications, or for use in fire-resistant bulkheads.

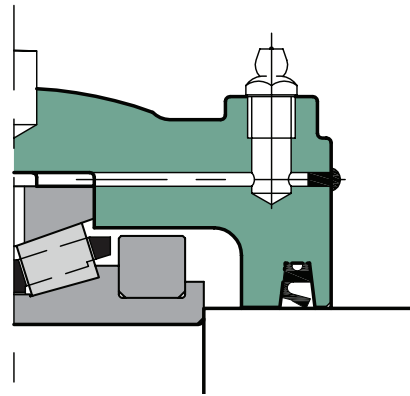


Temperature limits	-70°C to 260°C
Maximum speed	150,000 dn(mm)
Shaft surface finish (max. roughness)	0.8µm Ra

Synthetic rubber single lip (SRS)

High temperature version (SRS HT)
Low temperature version (SRS LT)

Suitable for wet but not submerged conditions. Can be used for improved lubricant retention by mounting lip inwards.

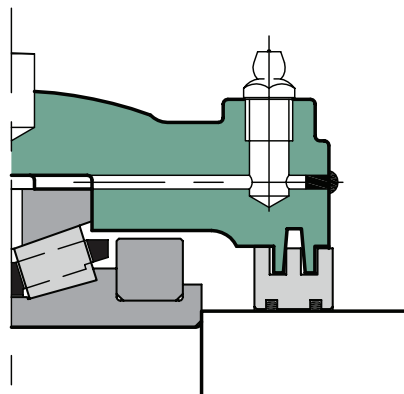


Temperature limits	SRS	-20°C to 100°C
	SRS HT	-20°C to 175°C
	SRS LT	-60°C to 100°C
Maximum speed		150,000 dn(mm)
Shaft surface finish (max. roughness)		0.8µm Ra

Aluminium triple labyrinth (ATL)

High temperature version (ATL HT)
Low temperature version (ATL LT)

Machined aluminium bodied triple labyrinth seal for high speed and general applications.

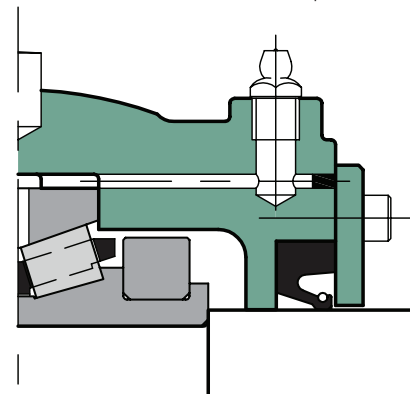


Temperature limits	ATL	-20°C to 100°C
	ATL HT	-20°C to 175°C
	ATL LT	-60°C to 100°C
Maximum speed		bearing maximum
Shaft surface finish (max. roughness)		3.2µm Ra

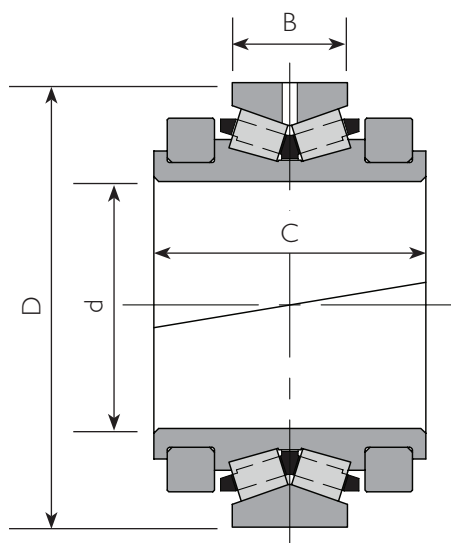
Spring-loaded single lip with retaining plate (SRSRP)

High pressure version (SRSRP 40M)

Suitable for severe splash or completely submerged conditions. The standard version is suitable for up to 2m of water. The high pressure version is suitable for up to 40m of water.

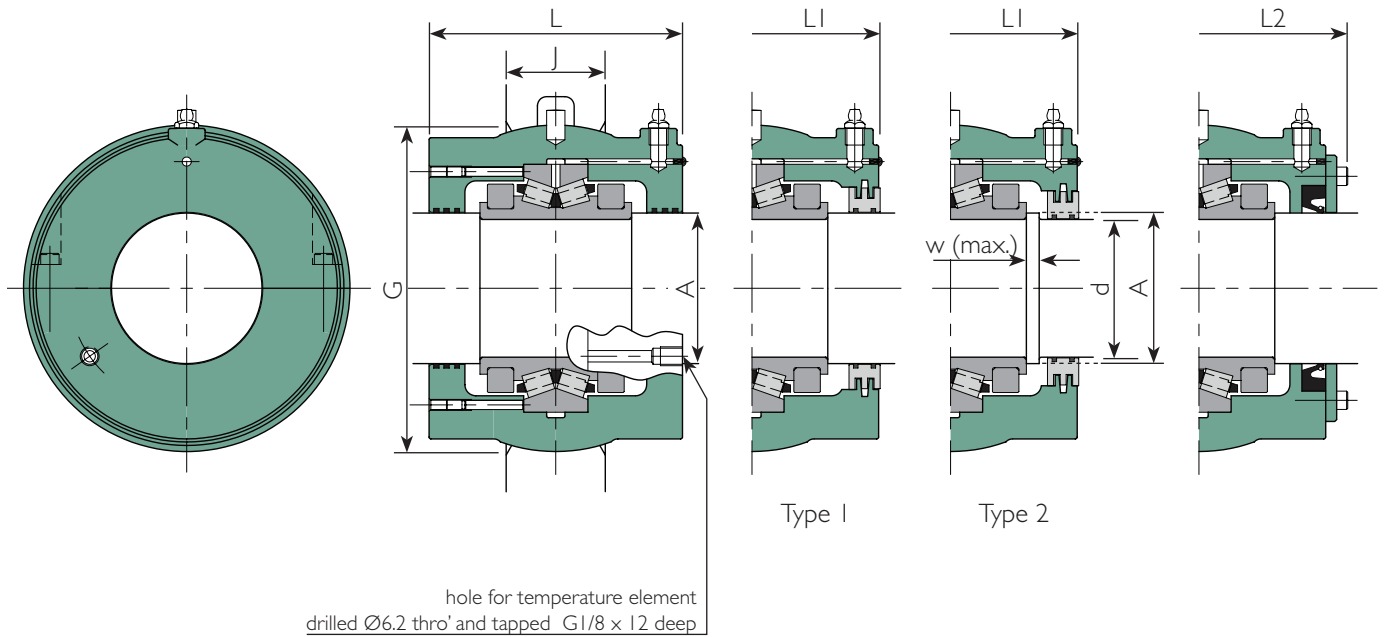


Temperature limits		-20°C to 100°C
Maximum speed		150,000 dn(mm)
Shaft surface finish (max. roughness)		0.4µm Ra



BEARING DATA

Shaft Diameter d (mm)	Reference	Bearing Ratings			Calculation Factors				Principal Dimensions			Mass (Kg)
		C_r (kN)	C_{or} (kN)	Max. Speed (rpm)	Y_1	Y_2	e	Y_o	D (mm)	C (mm)	B (mm)	
75	IDTB75M	143	208	3410	1.27	1.89	0.53	1.24	135	82.6	35	4.0
80	IDTB80M	152	232	3200	1.20	1.79	0.56	1.18	145	85	35	4.6
90	IDTB90M	160	254	2840	1.11	1.65	0.61	1.08	150	85	35	4.7
100	IDTB100M	235	379	2560	1.17	1.75	0.58	1.15	175	100	40	8.3
110	IDTB110M	282	504	2330	1.05	1.56	0.64	1.02	190	110	48	11.4
120	IDTB120M	295	544	2130	1.00	1.49	0.68	0.98	200	110	48	11.9
140	IDTB140M	296	555	1830	1.27	1.90	0.53	1.24	215	110	45	12.2
160	IDTB160M	350	670	1600	1.34	1.99	0.50	1.31	240	110	45	14.8
180	IDTB180M	358	716	1420	1.21	1.80	0.56	1.18	265	110	45	17.0



CARTRIDGE DATA

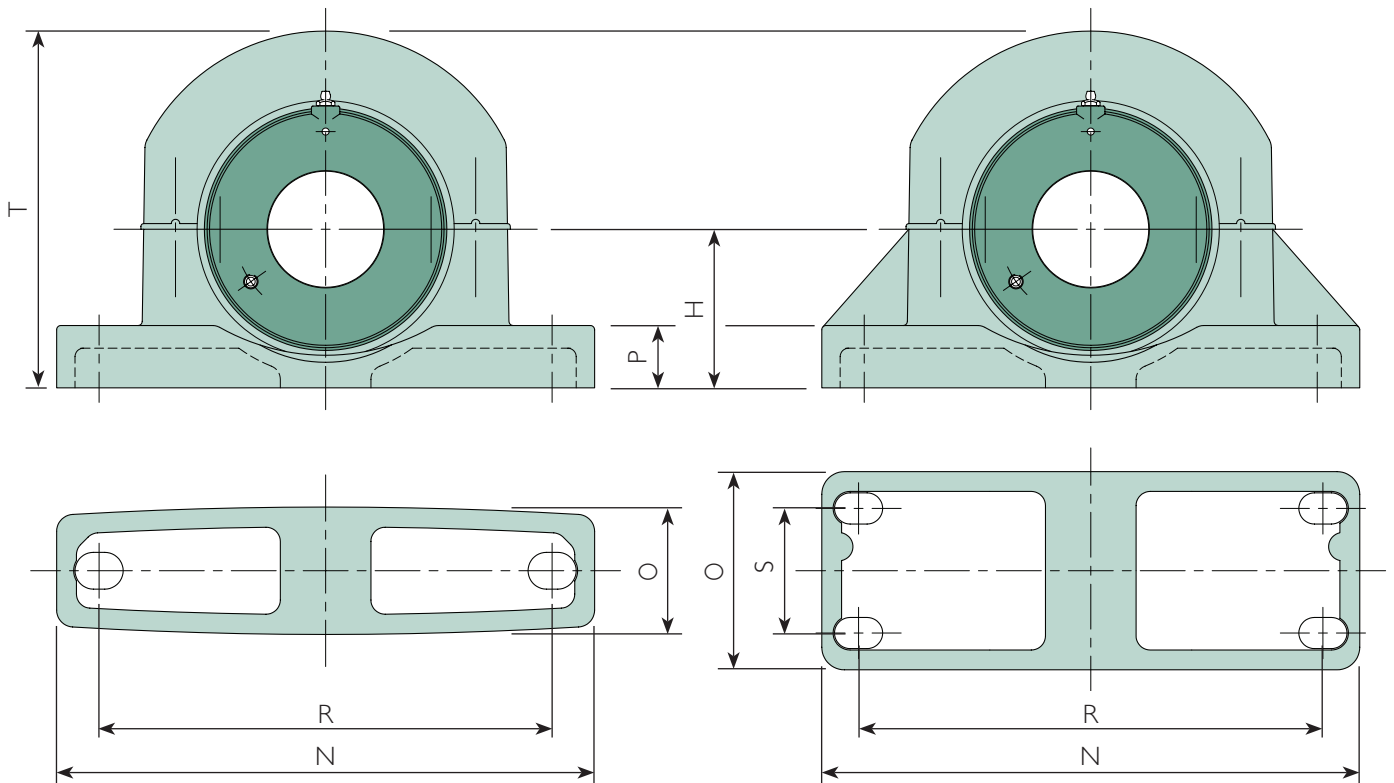
References (1)		Shaft type (2)	Principal Dimensions					Mass (Kg)
Cartridge for LAB seals	Cartridge for ATL seals		G (mm)	J (mm)	L (mm)	LI (mm)	L2 (mm)	
IDTC75M-80M	IDTC05	2	177.80	50	138	140	162	11.8
IDTC80M-90M	IDTC06-80M	1	203.20	50	140	142	164	15.1
IDTC90M-100M	IDTC06-90M	2	203.20	50	146	148	170	13.5
IDTC100M-110M	IDTC07	2	231.78	64	170	172	202	20.1
IDTC110M-120M	IDTC08-110M	1	266.70	76	178	180	210	29.8
IDTC120M-130M	IDTC08-120M	1	266.70	76	178	180	210	26.5
IDTC140M-150M	IDTC09	2	279.40	76	190	192	222	31.2
IDTC160M-170M	IDTC11	2	311.15	76	200	202	232	47.0
IDTC180M-195M	IDTC31	2	336.55	95	200	206	232	42.5

ABUTMENT

A (mm)	w (2) (mm)
80	7
90	-
100	7.5
110	7.5
120	-
130	-
150	10
170	10
195	9

- 1) For other seal types add seal type designation to end of reference for cartridge for LAB seals
e.g. 120mm cartridge with SRSRP seals: IDTC120M-130M SRSRP
- 2) Only applicable when fitted with TL seals. All other seal types run on shaft diameter A.

PEDESTALS

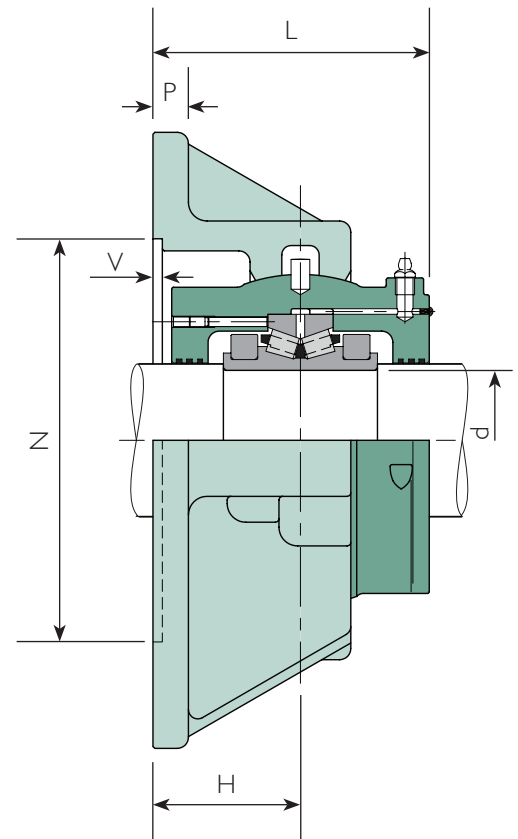
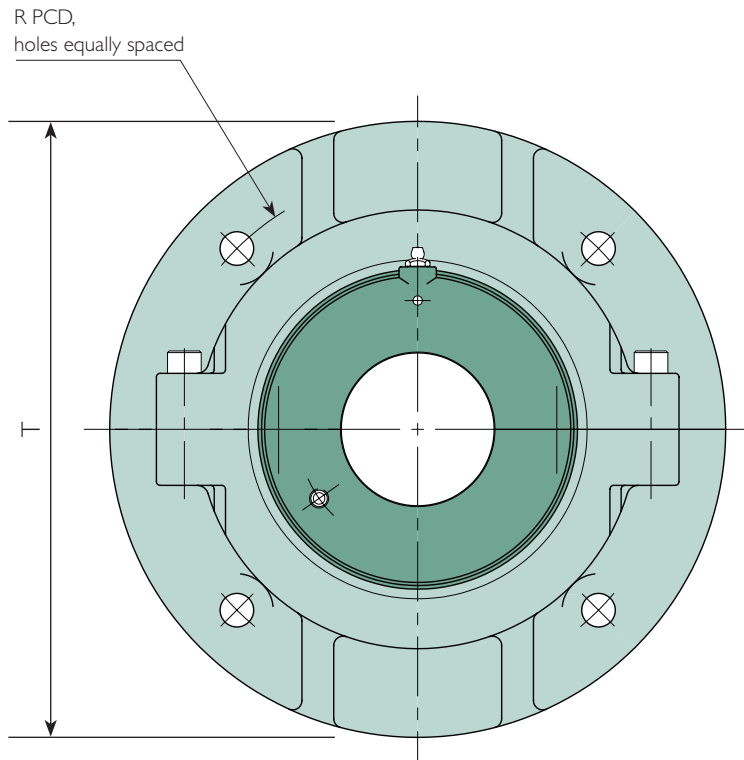


9 Note: Pedestals with solid bases also available.

PEDESTAL DATA

Shaft Diameter d (mm)	Bearing Reference	Reference (I) (pedestal only)	H (mm)	R		S (mm)	Bolts		N (mm)	O (mm)	P (mm)	T (mm)	Mass (pedestal only) (Kg)
				Min. (mm)	Max. (mm)		No.	Size					
75	IDTB75M	PN05	112	312	328	-	2	M24	380	90	44	252	13.3
80	IDTB80M	PN06	125	342	366	-	2	M24	420	102	52	272	14.7
90	IDTB90M	PN06	125	342	366	-	2	M24	420	102	52	272	14.7
100	IDTB100M	PN07	143	374	410	-	2	M24	466	120	60	314	20.6
110	IDTB110M	PN08	162	438	462	120	4	M24	508	178	38	372	43.3
120	IDTB120M	PN08	162	438	462	120	4	M24	508	178	38	372	43.3
140	IDTB140M	PN09	181	470	494	120	4	M24	558	178	41	405	52
160	IDTB160M	PN11	213	356	380	114	4	M24	508	178	32	430	53
180	IDTB180M	PN31	210	546	570	128	4	M24	636	204	50	470	83

I) For lubrication point to spherical seating add 'SLUB' to reference, e.g. PN08 SLUB



FLANGE BEARING DATA

Shaft Diameter d (mm)	Bearing Reference	Reference (1) (flange only)	T (2) (mm)	Bolt Size	R (mm)	P (mm)	H (mm)	N (3) (mm)	V (3) (mm)	Mass (flange only) (Kg)
75	IDTB75M	FN05	330	M16	274	19	79	215.90	3	19.4
80	IDTB80M	FN06	356	M16	302	19	86	244.48	3	22.0
90	IDTB90M	FN06	356	M16	302	19	86	244.48	3	22.0
100	IDTB100M	FN07	382	M16	334	22	92	276.23	3	26.6
110	IDTB110M	FN08	432	M24	374	22	98	314.33	3	34.9
120	IDTB120M	FN08	432	M24	374	22	98	314.33	3	34.9
140	IDTB140M	FN09	444	M24	384	25	98	317.50	3	40.8
160	IDTB160M	FN11	496	M24	426	25	105	352.43	3	58
180	IDTB180M	FN31	534	M24	466	25	124	393.70	3	81

- 1) For lubrication point to spherical seating add 'SLUB' to reference, e.g. FN08 SLUB
- 2) Dimension shown is as-cast dimension. Depending upon manufacturing method used, flanges supplied may be machined 5mm smaller
- 3) Dimensions shown are for locating spigot for mounting flange on to. Diameter tolerance of locating spigot: f8
Where SRSRP seals are used cartridge assembly may protrude into bulkhead. Consult Cooper for minimum bulkhead aperture size.

Lubrication

Fittings

Lubrication points are tapped 1/8"NPT and fitted with nipples for grease lubrication as standard. Grease nipples may be removed and replaced with other fittings or pipes. Pipework must be flexible to allow the swivel cartridge to function correctly.

BSP fittings may be used, but care must be taken to avoid blocking off the lubricant cross-drilling as these fittings generally screw in further than NPT fittings.

Lubricant type

Cooper tapered bearings and housings are designed for grease lubrication. Grease is easier to retain in the housing than oil, offering reduced lubricant loss and improved sealing. It also offers better protection against corrosion to the rolling surfaces.

Greases of NLGI No.2 designation are recommended for most applications. For centrally pumped systems a No.1 grease may be used for increased 'pumpability'.

Greases with extreme pressure (EP) additives are recommended.

Grease with a lithium complex thickener is usually used for normal applications operating at temperatures between 0°C and 80°C. When water resistance is required a grease with aluminium complex thickener can be used. Aluminium complex greases are not compatible with some other types of grease. The bearing must therefore be solvent cleaned of other greases before adding an aluminium complex based grease.

For extreme temperatures, speeds and loads always obtain a lubricant recommendation from our technical department.

Selection of base oil viscosity

In order for the bearing to have a long service life the grease selected for bearing lubrication must have a base oil of sufficiently high viscosity to adequately separate the rolling elements and race parts under operating conditions.

The charts in Figure 2 show the recommended operating ranges for three common oil viscosities, for bearings under normal loading (up to Cr/10).

To use these charts, find the 'geometry factor' for the bearing from the table below and multiply this by the bearing speed in thousands of rpm to obtain the velocity factor:

GEOMETRY FACTOR

Shaft Diameter d (mm)	Bearing Reference	Geometry factor
75	IDTB75M	63
80	IDTB80M	69
90	IDTB90M	78
100	IDTB100M	96
110	IDTB110M	110
120	IDTB120M	118
140	IDTB140M	144
160	IDTB160M	169
180	IDTB180M	196

For example, if a 100mm bearing is to be run at 1200rpm:

The geometry factor is 96 from the table
Velocity factor = $96 \times (1200/1000) = 115.2$

To determine the suitability of one of these oils, draw a vertical line from the horizontal axis at the calculated velocity factor; and draw a horizontal line from the vertical axis at the operating temperature.

If the lines intersect in the shaded area the viscosity of oil is suitable. If the lines intersect above the shaded area a higher viscosity oil is required. If the lines intersect below the shaded area the bearing may operate satisfactorily but it is suggested that a grease with a lower viscosity base oil is used.

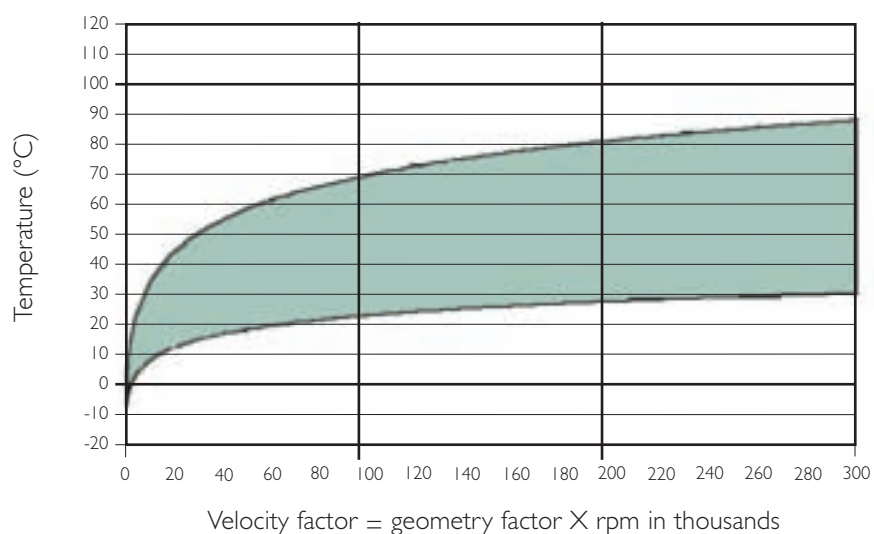
The use of these charts is subject to the operating conditions being within the recommended ranges for the lubricant as specified by the lubricant manufacturer.

For conditions not covered by these charts please contact our technical department.

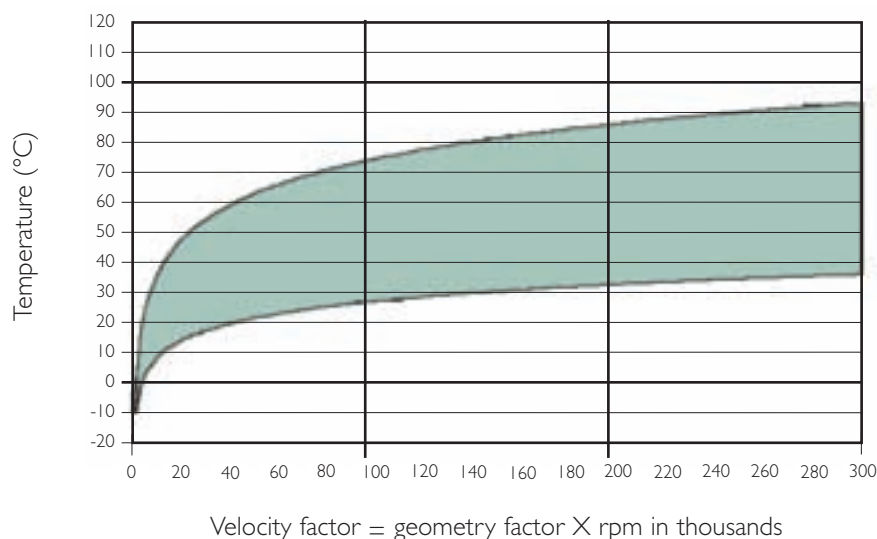
Note that the lubrication film thickness is not particularly sensitive to load, so for heavier loading the lubricant selection as provided by these charts is usually sufficient provided that the lines drawn on the chart as explained above do not intersect at the upper edge of the shaded area.

Figure 2

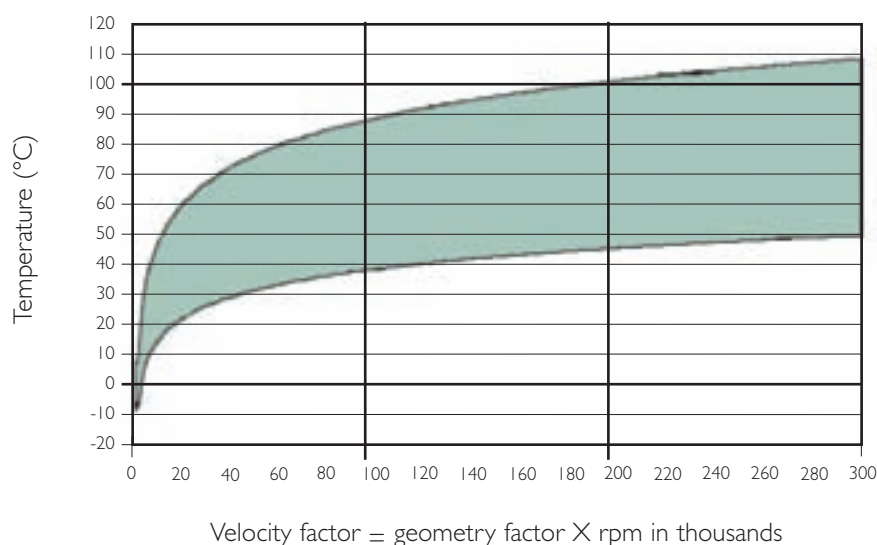
Cooper Bearing recommended speed and temperature range for VG 150 grease and oils



Cooper Bearing recommended speed and temperature range for VG 220 grease and oils



Cooper Bearing recommended speed and temperature range for VG 460 grease and oils



Grease quantity for initial lubrication

The quantity of grease required on initial lubrication is dependent upon operating speed and temperature.

If the operating temperature is below 80°C the quantity of grease may be determined directly according to the bearing reference and operating speed from the table below. If the operating temperature is above 80°C a 25% pack of grease should be used regardless of operating speed (refer to the right hand column of the table).

With a 'full pack' of grease the space within the housing (i.e. surrounding the bearing components) in the assembled unit is completely filled with grease.

The table assumes normal density grease (about 0.85 g/cm³).

Routine Greasing

Relubricate the bearing weekly or every 150 hours of operation.

Sizes up to and including 120mm: Use 2ml of fresh grease.

Sizes over 120mm: Use 4ml of fresh grease.

Note that 2ml is approximately 1 shot from a conventional side-lever grease gun.

Automatic lubrication systems should be metered to deliver grease at an average rate equivalent to the routine greasing periods and quantities specified.

If it can be done safely, the bearing should be re-greased as it rotates to help distribute the grease.

Do not mix different types of grease in the bearing. Excessive quantities of lubricant should not be used, particularly at high speeds, as this may result in excessive churning and overheating.

INITIAL LUBRICANT QUANTITIES

Shaft Diameter d (mm)	Bearing Reference	Speed (rpm) up to	Grease (full pack) (Kg)	Speed (rpm)		Grease (75% full pack) (Kg)	Speed (rpm)		Grease (50% full pack) (Kg)	Speed (rpm)		Grease (33% full pack) (Kg)	Speed (rpm) over	Grease (25% full pack) (Kg)
				from	to		from	to		from	to			
75	IDTB75M	667	0.19	667	1333	0.14	1333	2000	0.10	2000	2667	0.06	2667	0.05
80	IDTB80M	625	0.23	625	1250	0.17	1250	1875	0.12	1875	2500	0.08	2500	0.06
90	IDTB90M	556	0.25	556	1111	0.19	1111	1667	0.12	1667	2222	0.08	2222	0.06
100	IDTB100M	500	0.41	500	1000	0.31	1000	1500	0.20	1500	2000	0.13	2000	0.10
110	IDTB110M	455	0.44	455	909	0.33	909	1364	0.22	1364	1818	0.14	1818	0.11
120	IDTB120M	417	0.50	417	833	0.38	833	1250	0.25	1250	1667	0.17	1667	0.13
140	IDTB140M	357	0.65	357	714	0.48	714	1071	0.32	1071	1429	0.21	1429	0.16
160	IDTB160M	313	0.63	313	625	0.47	625	938	0.32	938	1250	0.21	1250	0.16
180	IDTB180M	278	0.77	278	556	0.58	556	833	0.39	833	1111	0.25	1111	0.19

Frequency Data

Bearing frequency data are included in this document for two purposes:

- to allow machine designers to check excitation frequencies against resonant frequencies in the machine,
- to allow correct input into condition monitoring equipment that uses these data.

A roller bearing will excite vibrations at certain frequencies related to the number, size and pitch circle diameter of the rollers. To some extent this excitation is present even with new bearings in perfect condition, as the load is carried on discrete, elastic, rolling elements which are constantly changing in angular position.

The table at the top of the page opposite indicates the frequencies of bearing parts per shaft revolution, which can be used to calculate excitation frequencies directly by multiplying the tabulated frequencies by the shaft speed.

The frequencies listed are explained as follows:

'Cage' – the frequency at which a point on the cage enters and leaves the loaded zone of the bearing

'Roller' – the frequency at which a point on a given roller passes into contact with either the inner or outer race

'Outer' – the frequency at which a point on the outer race comes into contact with successive rollers

'Inner' – the frequency at which a point on the inner race comes into contact with successive rollers

The table also lists the pitch circle diameters, number of rollers and contact angle for use with condition monitoring equipment that accepts this information.

BEARING FREQUENCIES

Shaft Diameter (mm)	Bearing Reference	Part Frequencies (per shaft rev.)				Roller Details			
		Cage	Roller	Outer	Inner	PCD (mm)	No.	Diameter (mm)	Contact angle (°)
75	IDTB75M	0.445	4.264	8.006	9.994	102.6	18	11.95	17.50
80	IDTB80M	0.448	4.507	8.959	11.041	108.2	20	11.95	18.50
90	IDTB90M	0.453	4.898	9.955	12.045	117.4	22	11.95	20.13
100	IDTB100M	0.449	4.627	9.888	12.112	136.0	22	14.63	19.00
110	IDTB110M	0.455	5.167	10.926	13.074	147.9	24	14.29	21.25
120	IDTB120M	0.457	5.404	11.895	14.105	154.5	26	14.29	22.25
140	IDTB140M	0.461	6.022	12.901	15.099	176.4	28	14.62	18.00
160	IDTB160M	0.461	6.145	12.918	15.082	196.9	28	15.99	17.21
180	IDTB180M	0.465	6.776	13.959	16.041	216.8	30	15.99	19.00

Tightening Torques

The tightening torques for the assembly of the bearings and housing are given in the following table. All screws are metric coarse thread, grade 12.9. Full assembly instructions are provided with each order, and are available separately if required.

TIGHTENING TORQUES

Shaft Diameter (mm)	Bearing Reference	Clamping ring screw			Cartridge joint screw			Side screw			Pedestal joint screw			Flange joint screw		
		Screw size	Key size A/F (mm)	Torque (Nm)	Screw size	Key size A/F (mm)	Torque (Nm)	Screw size	Key size A/F (mm)	Torque (Nm)	Screw size	Key size A/F (mm)	Torque (Nm)	Screw size	Key size A/F (mm)	Torque (Nm)
75	IDTB75M	M5x25	4	8.5	M6x25	5	11	M6x10	3	7.8	M16x65	14	225	M12x55	10	90
80	IDTB80M	M5x25	4	8.5	M10x45	8	52.5	M6x10	3	7.8	M16x65	14	225	M16x65	14	225
90	IDTB90M	M5x25	4	8.5	M10x45	8	52.5	M6x10	3	7.8	M16x65	14	225	M16x65	14	225
100	IDTB100M	M8x30	6	35	M10x45	8	52.5	M6x10	3	7.8	M20x80	17	420	M16x65	14	225
110	IDTB110M	M8x30	6	35	M12x55	10	90	M6x10	3	7.8	M20x80	17	420	M20x80	17	420
120	IDTB120M	M8x30	6	35	M10x45	8	52.5	M6x10	3	7.8	M20x80	17	420	M20x80	17	420
140	IDTB140M	M8x30	6	35	M10x45	8	52.5	M6x10	3	7.8	M20x80	17	420	M20x80	17	420
160	IDTB160M	M8x30	6	35	M10x45	8	52.5	M10x16	5	30	M16x65	14	225	M20x100	17	420
180	IDTB180M	M8x30	6	35	M10x55	8	52.5	M10x16	5	30	M20x80	17	420	M24x100	19	712

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