

Self-Lube[®] product range

NSK manufactures several ranges of mounted units. These include Self-Lube[®], our recognised standard, and recently introduced ranges such as Silver-Lube[®], Life-Lube[®] and Molded-Oil units. In each type, there are two basic components, the insert and the housing.

Self-Lube[®] bearing inserts

The Self-Lube[®] bearing insert, commonly known as a wide inner ring bearing, is designed to suit the wide range of housings offered by NSK in the Self-Lube[®] bearing family and is also suitable for applications where the user's own housing is preferred.

They are basically deep-groove ball bearings, to the popular 6200 series configuration, with integral design features making them more functional and versatile than standard ball bearings. The radial internal clearance is C3 for standard bearing inserts and bearings can be offered with either parallel or spherical outside diameter outer rings with the latter being the type fitted in the bearing unit. The integral design features of the bearing insert, such as shaft locking, sealing and lubrication, are explained in the following pages.

Self-Lube[®] bearing units

The range of Self-Lube[®] bearing units offers a wide choice of cast iron, pressed steel, synthetic rubber, thermoplastic or stainless steel housings fitted with spherical outside diameter Self-Lube[®] bearing inserts. They will generally accommodate initial housing misalignment up to 0.030 radians but are not recommended for running misalignment in excess of 0.001 radians.

The general housing types are pillow blocks, flange units, take-up units, cartridge units and hanger units. Choice is very much determined by the requirements of the application, although the aesthetic appearance of the machine design is often an important consideration. Self-Lube[®] units have been designed to meet the needs of both criteria.

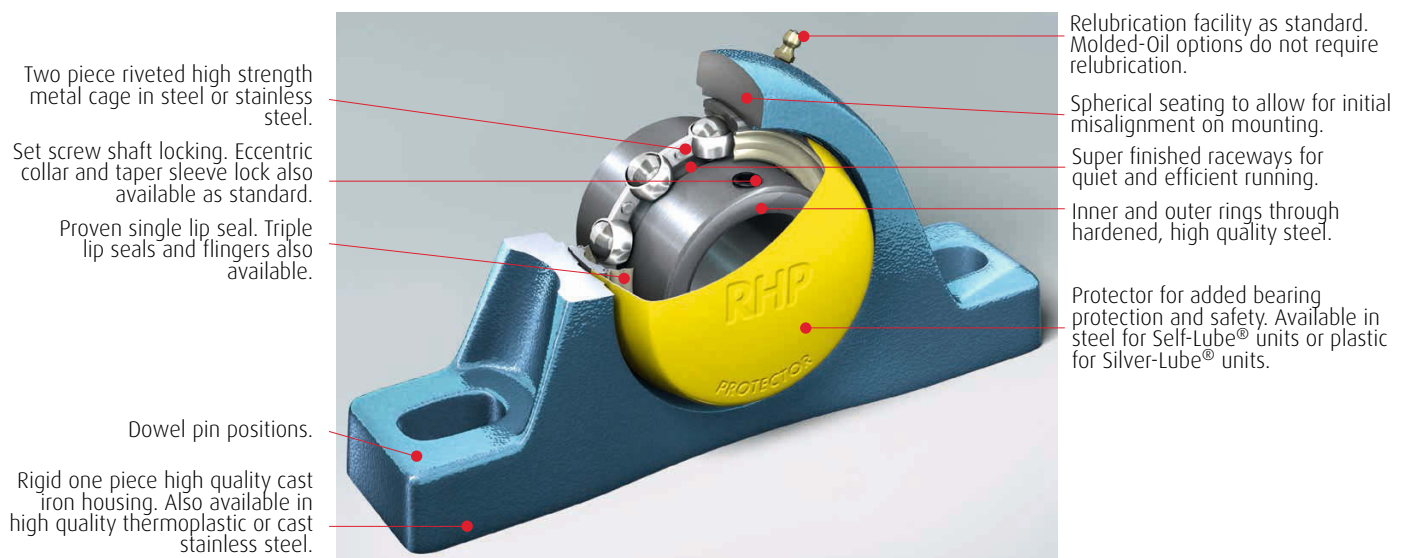
- › Cast iron unit castings are made from high-quality cast iron, and finished on unmachined surfaces with an electrostatic air-drying paint.
- › Pressed steel housings are made from mild steel strip, and are zinc plated.
- › Thermoplastic housings are moulded in highgrade PBT, a high quality thermoplastic polyester resin.
- › Stainless steel housings are made from austenitic stainless steel castings (SCS13).

Additional products

NSK recognises the need for 'tailor made' solutions and is always willing to help customers who have a requirement for something out of the ordinary.

Dynamic load ratings

The NSK dynamic load ratings given in this catalogue and the relationship between these and bearing fatigue life are based on ISO standard 281.



Bearing load ratings and endurance

Basic dynamic radial load rating C_r

This is defined as the load that can be applied to the bearing to give a basic L_{10} rating life of one million revolutions. This is the life associated with 90% reliability which has been found by experience to be acceptable for normal engineering bearing applications. The majority of the bearings attain a much longer life and the median life is approximately five times the L_{10} life. Ratings for each series are given in the bearing tables and are used to calculate life for radial loads of constant magnitude and direction.

Equivalent dynamic radial load P_r

For applications where axial and radial loads are present they must be converted into a single equivalent radial load P_r and calculated as follows, where:

F_r = actual radial load (N)
 F_a = actual axial load (N)
 Y = axial factor from table 18.2
 C_{or} = basic static load rating
 C_r = dynamic radial load rating
 f_o = axial load factor

Note: Axial load F_a must not exceed $0.5 C_{or}$.
 Select f_o from table 18.1 for the appropriate bearing insert.

Calculate $\frac{f_o F_a}{C_{or}}$ and obtain the value of Y from table 18.2.
 Calculate P_r where:

$$P_r = F_r \quad \text{or}$$

$$P_r = 0.56 F_r + Y F_a$$

Use whichever P_r value is the greatest.

Relationship between load and life

Having determined the equivalent load P_r the nominal L_{10} bearing life is calculated as follows:

$$L_{10} \text{ life in hours} = \left(\frac{C_r}{P_r} \right)^3 \cdot \frac{10^6}{60n}$$

where n = bearing operating speed (rev/min).

Alternatively, by using the loading ratio $\frac{C_r}{P_r}$ the bearing L_{10} life can be estimated by reading off directly from the tables on page 12 under the appropriate speed column.

Basic static load rating C_{or}

This value is calculated in accordance with ISO standard 76. Ratings for each series are given in the bearing tables.

Static equivalent radial load P_{or}

When static axial and radial loads are applied to a bearing these must be converted to an equivalent static radial load P_{or} where:

F_{or} = actual static radial load (N)

F_{oa} = actual static axial load (N)

Calculate P_{or} where:

$$P_{or} = F_{or} \quad \text{or}$$

$$P_{or} = 0.6 F_{or} + 0.5 F_{oa}$$

Use whichever P_{or} value is greater, but this value **should not exceed** the bearing static radial load rating C_{or} .

Service factors

It is customary when calculating bearing life to include application factors which allow for fluctuations in loading that occur in service, and from experience the following may be used as a guide.

For steady and light shock loads multiply load by 1.2 to 1.5.

For moderate shock loads multiply load by 1.7 to 2.0.

When selecting the size of bearing for a given load, the calculated life should conform to the L_{10} lives shown in the next column:

- ▶ Machines in use 8 hours/day – not fully utilised – 10,000 to 20,000 hours
- ▶ Machines in use 8 hours/day – fully utilised – 20,000 to 30,000 hours.
- ▶ Machines in use 24 hours/day – 40,000 to 80,000 hours.
- ▶ Machines in seasonal use – 4,000 to 8,000 hours.

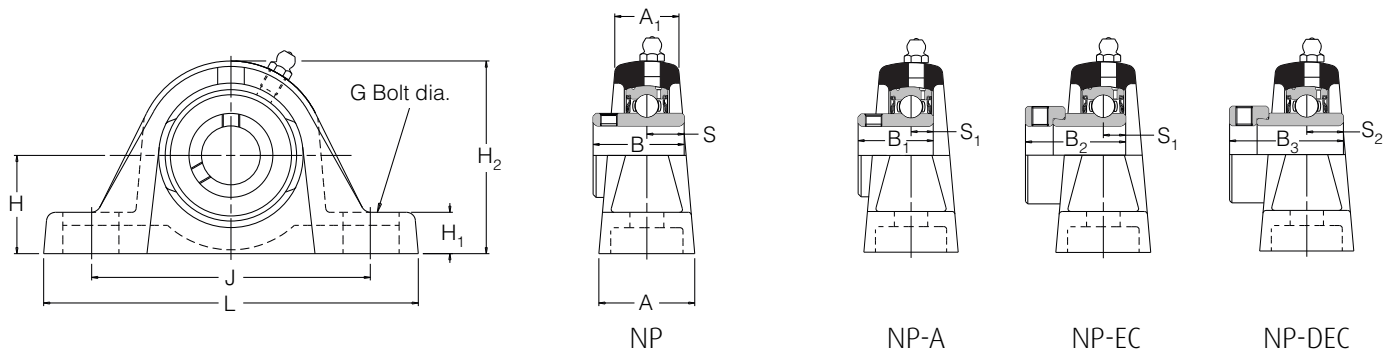
Limiting loads

The axial load F_{oa} must not exceed half the basic static load rating C_{or} . Housing strengths must also be considered as a limiting factor - see detail on page 17.

Basic bearing insert	f_o	Basic bearing insert	f_o	$\frac{f_o F_a}{C_{or}}$	Y
1017	13.1	1060	14.3	0.172	2.30
1020	13.1	1065	14.4	0.345	1.99
1025	13.9	1070	14.4	0.689	1.71
1030	13.8	1075	14.7	1.03	1.55
1035	13.8	1080	14.6	1.38	1.45
1040	14.0	1085	14.7	2.07	1.31
1045	14.1	1090	14.5	3.45	1.15
1050	14.4	3095	13.6	5.17	1.04
1055	14.3			6.89	1.00

Self-Lube[®] cast iron pillow block units

NP Series

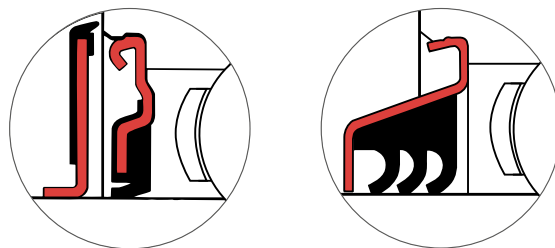


Shaft diameter		RHP designation				Basic bearing insert	Casting group	Dimensions (mm)				Bolt centres	
mm	inches							L	H	H1	H2	J _{max}	J _{min}
12		NP12		NP12EC		1017	1	126.5	30.20	14.2	57.2	100.5	85.5
15		NP15		NP15EC									
16		NP16		NP16EC									
17		NP17		NP17EC									
	½	NP½		NP½EC									
	⅝	NP⅝		NP⅝EC									
20		NP20	NP20A	NP20EC	NP20DEC	1020	2	127.0	33.30	14.0	65.2	100.5	88.5
	¾	NP¾	NP¾A	NP¾EC	NP¾DEC								
25		NP25	NP25A	NP25EC	NP25DEC	1025	3	139.0	36.50	16.0	71.0	112.7	96.8
	⅞	NP⅞		NP⅞EC	NP⅞DEC								
	1⅕	NP1⅕		NP1⅕EC	NP1⅕DEC								
	1	NP1	NP1A	NP1EC	NP1DEC								
30		NP30	NP30A	NP30EC	NP30DEC	1030	4	160.5	42.90	17.7	82.7	129.5	108.5
	1⅛	NP1⅛		NP1⅛EC	NP1⅛DEC								
	1⅜	NP1⅜		NP1⅜EC	NP1⅜DEC								
	1¼	NP1¼R	NP1¼AR	NP1¼ECR	NP1¼DECR								
35		NP35	NP35A	NP35EC	NP35DEC	1035	5	166.0	47.60	17.5	93.0	136.5	121.5
	1¼	NP1¼	NP1¼A	NP1¼EC	NP1¼DEC								
	1⅜	NP1⅜		NP1⅜EC	NP1⅜DEC								
	1⅞	NP1⅞		NP1⅞EC	NP1⅞DEC								
40		NP40	NP40A	NP40EC	NP40DEC	1040	6	180.5	49.20	18.5	98.5	148.0	127.0
	1½	NP1½	NP1½A	NP1½EC	NP1½DEC								
45		NP45	NP45A	NP45EC	NP45DEC	1045	7	190.5	54.00	20.0	108.0	154.5	140.5
	1⅝	NP1⅝		NP1⅝EC	NP1⅝DEC								
	1⅞	NP1⅞		NP1⅞EC	NP1⅞DEC								
	1¾	NP1¾	NP1¾A	NP1¾EC	NP1¾DEC								
50		NP50	NP50A	NP50EC	NP50DEC	1050	8	206.0	57.20	21.0	115.2	163.0	154.0
	1⅞	NP1⅞		NP1⅞EC	NP1⅞DEC								
	1⅞	NP1⅞		NP1⅞EC	NP1⅞DEC								
	2	NP2R			NP2DECR								
55		NP55			NP55DEC	1055	9	219.5	63.50	24.8	129.5	178.5	162.5
	2	NP2			NP2DEC								
	2⅛	NP2⅛			NP2⅛DEC								
	2⅜	NP2⅜			NP2⅜DEC								
60		NP60			NP60DEC	1060	10	240.0	69.90	26.3	142.3	201.0	176.0
	2¼	NP2¼			NP2¼DEC								
	2⅜	NP2⅜			NP2⅜DEC								
	2⅞	NP2⅞			NP2⅞DEC								

Please check availability

Bearing inserts with flinger seals shown on pages 89 and 90 can be fitted into these housings. The unit reference has the suffix 'FS', e.g. NP40FS.

Triple seal bearing inserts shown on pages 86 to 88 can be fitted into these housings. The unit reference has a prefix 'T', e.g. TNP25.



Dimensions (mm)										ISO Load ratings		Rec. max. speed	Mass (approx.)
G	A	A1	B	B1	B2	B3	s	s1	s2	dynamic Cr newtons	static Cor newtons	rev/min	kg
10	30.5	20.5	27.38	-	28.63	-	11.58	6.53	-	9550	4800	7000	0.5
10	32.5	22.5	31.00	25.80	31.03	43.73	12.73	7.53	17.13	12800	6650	6700	0.6
10	36.5	24.5	34.10	27.30	31.03	44.43	14.33	7.53	17.53	14000	7880	6250	0.7
12	41.5	27.5	38.10	31.20	35.73	48.43	15.93	9.03	18.33	19500	11300	5300	1.3
12	44.5	30.5	42.90	34.90	38.93	51.13	17.53	9.53	18.83	25700	15300	4500	1.7
12	51.0	34.5	49.20	41.20	43.73	56.33	19.03	11.03	21.43	32500	19900	4000	2.1
12	54.0	35.0	49.20	41.20	43.73	56.33	19.04	11.04	21.43	32500	20500	3700	2.8
16	55.0	36.0	51.60	43.50	43.73	62.73	19.04	11.04	24.64	35000	23200	3400	3.2
16	60.0	39.5	55.60	-	-	71.42	22.24	-	27.84	43500	29200	3100	4.0
16	70.0	46.0	65.10	-	-	77.84	25.44	-	31.04	48000	33000	2800	5.9