BOUNDARY DIMENSIONS AND BEARING NUMBER

ISO Dimensional system for Bearings

Standardized dimension system is adopted worldwide for dimensioning the rolling bearings, as bore diameter, outer diameter, width and chamfer dimensions. The ISO dimensional system defines the nomenclatures for the following dimensions for rolling bearings: bore diameter: d, outside diameter: D, width: B and height: T and chamfer dimension: r.

The table 5.1 shows factor f_D and bore diameter d, from which the outer diameter of the bearing can be obtained. Symbols 9,0,2,3 are the common diameter series symbols. The diameter series helps to determine the thickness between the bore and the outer diameter of the bearings. Fig 5.1 shows the increasing order for the outer diameter series and same bore size i.e. 7, 8, 9, 0, 1, 2, 3, and 4. The factor f_B combines with the diameter series to classify the width series of the bearing. The combination of the diameter series and width series is the dimensional series.

The boundary dimensions of the thrust bearings are given same as the dimensions of the radial bearings as, outside diameter: $D=d+ f_D d0.8$, and height: $T= f_T \cdot (D–d)/2$. Minimum chamfer dimension: r_s min, should be selected from ISO table

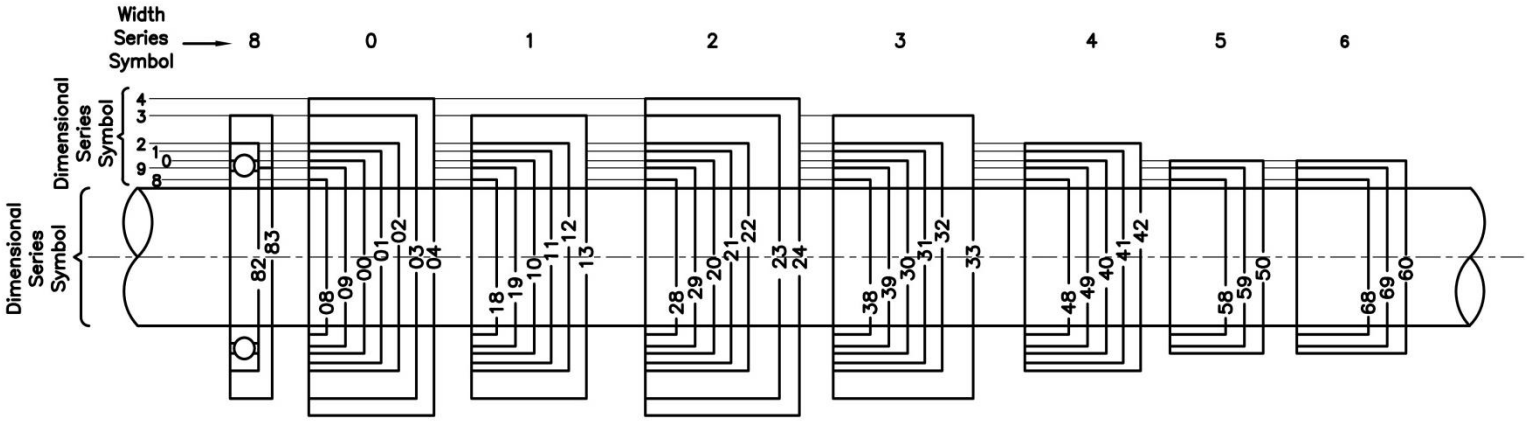


Fig. 9.1 Cross-sectional profiles of radial bearings by dimensional series

Diameter series f_D	7	8	9	0	1	2	3	4
	0.34	0.45	0.62	0.84	1.12	1.48	1.92	2.56
Width series f_B	0	1	2	3	4	5	6	7
	0.64	0.88	1.15	1.5	2	2.7	3.6	4.8

Table 9.1. Values of F_D and F_B of radial bearing

Diameter series fD	0	1	2	3	4	5
	0.36	0.72	1.2	1.84	2.68	3.8

Height series fT	7	9	1
	0.9	1.2	1.6

Table 9.2 Values of F_D and F_B of Thrust bearing

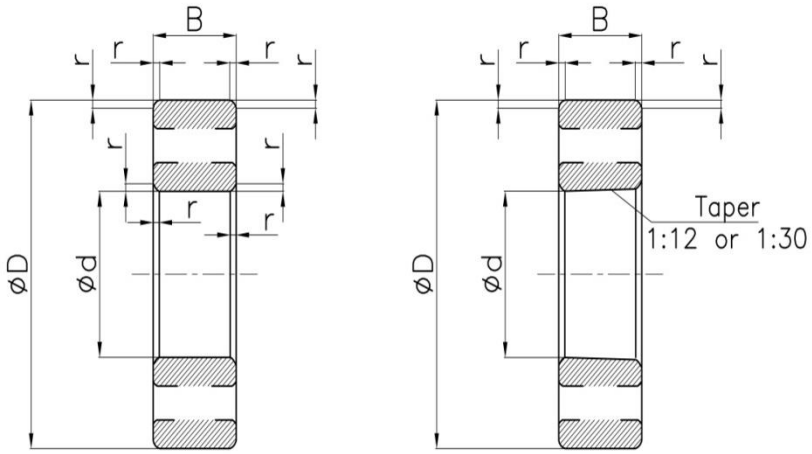


Fig.9.2 Radial bearing dimensions

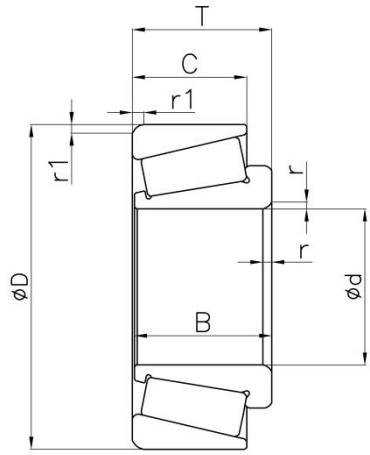


Fig.9.3 Taper roller bearing dimensions

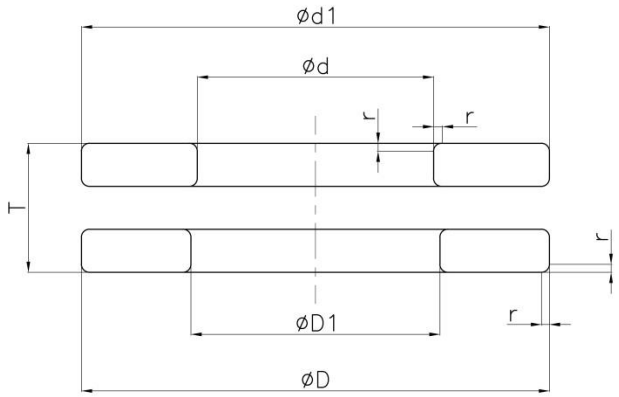


Fig.9.4 Thrust bearing dimensions

Bearing numbering system

A bearing number is defined with the basic number and a supplementary code. It also includes bearing specifications including type of bearing, boundary dimensions of bearing, running accuracy of bearing, and bearing internal clearances.

The combination of the width series symbol and diameter series symbol are defined as the dimensional series symbol. In diameter series symbols 7,8,9,0,1,2,3 and 4 the outer diameter increases with the increase of series for the radial bearing. Diameter series 9, 0, 2, and 3 are mostly used. 0, 1, 2,3,4,5 and 6 are width series symbols and these are combined with the respective diameter series symbols. The width series symbols, 0, 1, 2, and 3 are the most widely used. In order to match the respective diameter in the diameter series, the width series symbols gets wider with increases in series.

The width series symbol is neglected for the standard radial ball bearing. The standard radial ball bearing number is expressed by 4 digits. Also, zero symbols are neglected in the symbol of the cylindrical roller bearings.

Thrust bearings are mostly used in the term of the height symbol than width symbol used in radial bearings. The combination of the diameter symbols and the height symbols provides the dimensions symbol for the thrust bearings.

For the bore diameter 20mm or more the bore diameter symbol for the thrust bearings is give as the 1/5 of the size of the bore diameter. For example, if the bore diameter of the thrust bearing is 25 mm then the bore diameter symbol is 05.

Various number and letters are used for the identification of the various bearings as per the bearing size, bearing type. For example, cylindrical roller bearings use letters such as N, NU, NF, and NJ to indicate various roller guide rib positions.

Bearing series code

	Bearing types	Bearing series code	Type code	Width or height(1) series No.	Dia. Series No.
Radial ball bearing	Single-row deep groove type	60	6	(1)	0
		62	6	(0)	2
		63	6	(0)	3
		64	6	(0)	4
	Single-row angular type	70	7	(1)	0
		72	7	(0)	2
		73	7	(0)	3
		74	7	(0)	4
	Double-row self-aligning type	12	1	(0)	2
		22	2	(2)	2
		13	1	(0)	3
		23	2	(2)	3
Radial roller bearing	Single row Cylindrical roller	N10	NU *	1	0
		NU2	NU *	(0)	2
		NU22	NU *	2	2
		NU32	NU *	3	2
		NU3	NU *	(0)	3
		NU23	NU *	2	3
	Double row Cylindrical roller	NN30	NN	3	0
Radial roller bearing	Spherical roller	230	2	3	0
		231	2	3	1
		222	2	2	2
		232	2	3	2
		213	2	0	3
		223	2	2	3

Table 9.3 bearing series codes

Bearing series code for wide inner ring and housed unit

	Bearing Type	Bearing series code
WIR	Wide inner ring	GE-KRRB
		GRAE-RRB
		RAE
		GYE-KRRB
		G-KRRB
		GRA-RRB
		GYE-KRRB
		GE-M-KRRB
		GYE-M-KRRB
		GKE-M-RRB
		NTL
		RYE
		YY2
		KY
		GKE-RRB
		GYNE-KRRB
		BIN

Table 9.4 Bearing series codes for wide inner ring

	Bearing Type	Bearing series code
Housed unit	Housed unit	YT
		RAS
		YAS
		RCJ
		YCJ
		RCJT
		YCJT
		YCR
		YC
		NTLA
		YCJ-M
		YAS-M
		YTU-M

Table 9.5 Bearing series codes for housed units

Bearing series code Needle roller bearing

Bearing Type			Bearing sub class	Bearing series code
Solid race needle bearing	Cam follower type		Yoke type	NATV
				NATR
				NUTR
				RNAB
				STO
				RSTO
				SCH
			Stud type	KR
				KRV
				CCFH
				NUKR
Shell type	DB bush	Cage guided	DB/BP-P	
			DBF/DBF-P	
		Full compliment	Self- retained	DL, DL-P
				DLF, DLF-P
			Grease retained	SL, SL-P
				CH, CN-S
Axial Thrust bearing	unitized thrust bearing assembly		AX	AX thin
				AX thick
				AR thin
				AR thick
			AXZ	
			ARZ	
	Thrust needle roller & cage assembly		KAXK	
			CP	
	Thrust plate		CP thin	
			CP thick	
			CPR	
			AS WSF	
			LS WSF	
			WS 811	
			GS 811	
Combined bearing	Heavy duty with outer ring		RAX 4000	
			RAX 500	
			RAX PZ 400	
			RAX PZ 500	
	Drawn cup without inner ring		RAX 700 opened end	
			RAX 700 close end	
Needle cage assembly	Needle cages		TM	
			WD	
			TN	
			Single row	
			Double row	
			Drawn cup	
Needle rollers	Needles		BR	
			BP	
			BPM	
			BR 60	

Table 9.6 Bearing series code for needle roller bearings

Basic number			Supplementary					Code		
Bearing series code	Bore diameter No.	Contact angle code	Internal design code	Shield/seal code	Ring shape/ Lubrication hole code	Special treatment code	Matched pair code	Internal clearance code, preload code	Cage code	Tolerance code

Bearing series code

60	Deep groove ball bearing
.	.
.	.
.	.
62	.
64	
.	

Bore diameter No.

/0.6	0.6 mm
1	1
/1.5	1.5
.	.
.	.
.	.
9	9

Bore diameter (mm) of bearing in the bore diameter range 04 to 96 can be obtained by multiplying their bore diameter number by five

Internal design code

	High load carrying capacity
EG15	bearing with extra roller (for CRB)
V	Full compliment type bearing (Roller & Needle)

Shield / seal code

one side	Both side
Z	ZZ
RS	2RS

Internal clearance code, Preload code

C1	smaller than C2	Radial internal clearance for radial bearing
C2	smaller than standard clearance	
CN	Standard clearance	
C3	Greater than standard clearance	
C4	Greater than C3	
C5	Greater than C4	
CL	Light axial clearance	Axial clearance for ACBB
CM	Medium axial clearance	
CH	Heavy axial clearance	
GL	Light preload class	Preload class for ACBB
GM	Medium preload class	
GH	Heavy preload class	

Basic number		Supplementary		Code	
0	10	Ring shape / Lubrication hole code			
01	12			Cage material codes	
02	15	K	Inner ring tapered bore provided		
03	17			MB	fixed centre flange and an inner ring riding, machined, solid Brass cage
04	20	B33	Lubrication hole and lubrication groove on spherical roller bearing outer ring outside surface provided		
05	25			EM	window type solid brass cage guided on bearing outer ring
.	.	Special treatment code		EAB	Design with large Symmetrical rollers and a pressed steel cage.
96	480			EP	window type polyamide cage
/500	500	H0	Subzero treatment on bearing components	EG15	window type polyamide cage with extra pocket
/2500	2500			TN	SABB with polyamide cage
		Matched pair code			
Contact angle code		DB	Back to back arrangement	Tolerance class code	
A	30˚				
B	40˚	DF	face to face arrangement	Normal tolerance	class 0
C	15˚	DT	Tandem	P6	class 6
E	35˚			P6X	class 6X
				P5	class 5
				P4	class 4
				P2	class 2

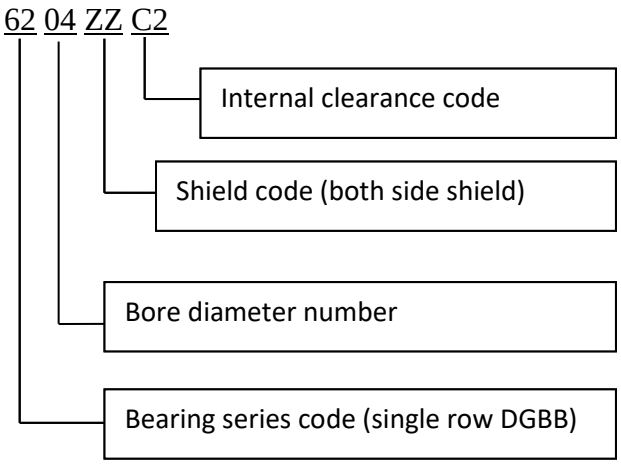
Table 9.7 Bearing Number configuration

Table 9.8 Bearing Number configurations for WIR and housed unit

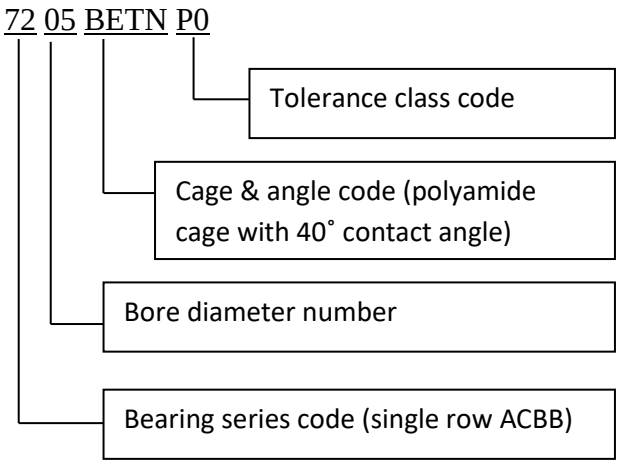
Bearing Type	Basic series	Bore sizes	Seals	Internal construction
Wide inner ring	1: Standard series (200 series bearings) L: light series N: heavy series (300 series bearings) RA: extended inner ring, one side only SM: standard series (open type of bearings) SMN: heavy series (open type of bearings) GY,ER,YA: set screw locking device series	last three numbers indicates bore sizes 15 103 203 25 40	L: one mechanic-seal LL: two mechanic-seal PP: two seal R: one land riding rubber seal RR: two land riding rubber seal PP2,3,4…etc : Tri-ply seals if preceded by K	C: concentric collar E: metric bore G: re-lubricated K: Conrad, non filling slot type W: maximum capacity filling slot type S:external self-aligned TDC: thin dense chrome plate
Housed unit	AK: low base AO: heavy series AS: high base C: cylindrical cartridge SA: high base H: heavy housing L: expansion unit TU: take up unit M: medium duty	inch 1/2 " - 2 15/16" metric 15 -75	L: labyrinth seal with self-locking collar R: contact shroud seal with self-locking collar S: contact shroud seal, narrow inner ring, set screw T: tri-ply shroud seal with self-locking collar V: contact shroud seal, narrow inner ring, self-locking collar Y: contact shroud seal, with wide inner ring, setscrew lock	C: concentric collar CJ: four bolt mount CJT: two bolt mount

- Examples of bearing numbers:

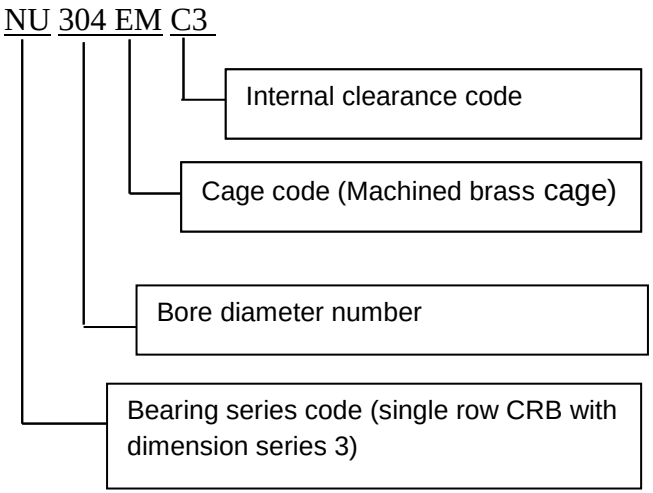
Ex 1:-



Ex 2:-



Ex 3:-



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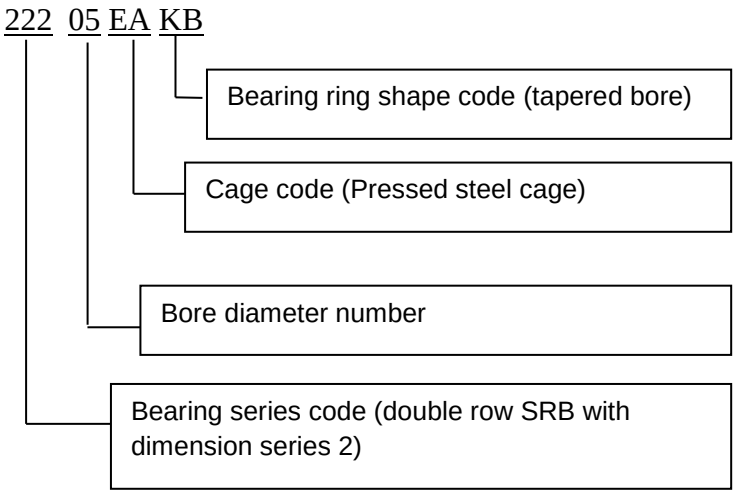
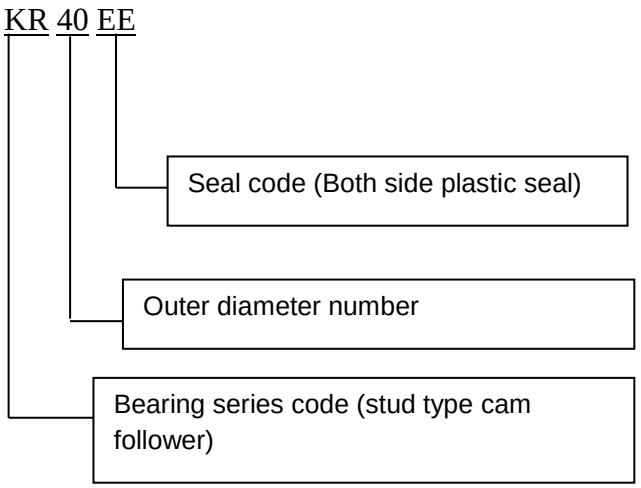
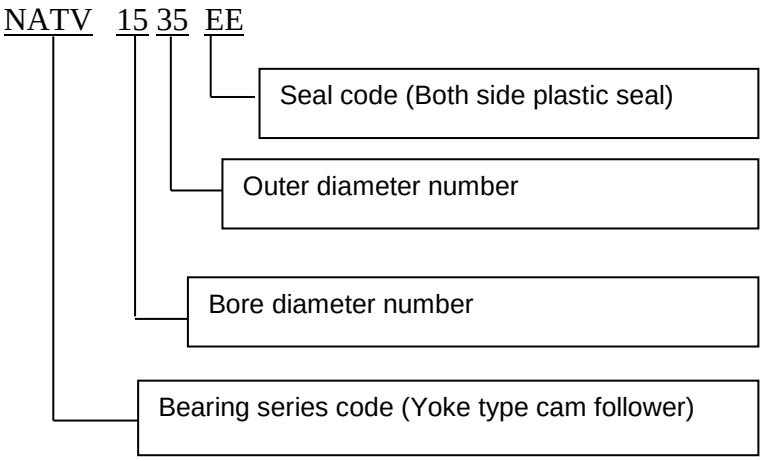


Ex 5:-


KR 40 EE
Seal code (Both side plastic seal)
Outer diameter number
Bearing series code (stud type cam follower)

Ex 6:-


NATV 15 35 EE
Seal code (Both side plastic seal)
Outer diameter number
Bore diameter number
Bearing series code (Yoke type cam follower)