DISTITEC®

LARGE SIZE BEARINGS' CATALOGUE

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INTRODUCTION

This catalogue provides an overview of the products made – partially outsourced – by DISTITEC S.R.L. and employed in the steel and mechanical industry.
Bearings described in this catalogue are mainly used in flattening and straightening lines of steel sheet, stainless steel sheet and aluminum sheet, but also in rolling mills on the rolling cylinder necks, in overhead conveyors and in many applications of the mechanical industry such as LIFTING VEHICLES, NAVAL CRANES, PALLETIZERS, SOLAR PANELS, WIND TURBINES, WOOD PROCESSING MACHINES, RADARS,
BOTTLING MACHINES, REVOLVING LIFTING CLAMPS, WELDING ROBOTS, REVOLVING TABLES and OTHERS.

DISTITEC relies on qualified and certified technicians with extensive experience in the field and advanced machine tools to produce high-precision mechanical parts.
DISTITEC handles the design, assembly, and testing of its products and provides efficient technical support to customers.
After sizing the bearings and completing the construction drawings, we monitor the progress of the order: the components are machined, inspected, tested, and assembled.
Finally, we perform final testing. If the assembled bearing meets the technical requirements and roller bearing standards, it is ready for packing and shipment.
Our stock is capable of meeting customers' demands with short delivery times.

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BEARINGS FOR MACHINE TOOLS:

LARGE SIZE BEARINGS:

INDEX

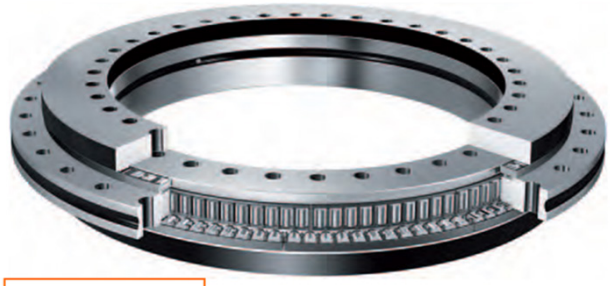
YRT axial-radial bearings described here are a combination of a double-acting needle roller axial bearing with a full complement radial cylindrical roller bearing

These bearings support radial loads, two-dimensional axial loads and overturning moments of large entities related to small overall dimensions

These units are equipped with grease and they are already ready for the assembly that can be done through fixing with screws or bolts to its adjacent components.

Outer ring, inner ring and corner ring have bored holes.
They were conceived originally, for rotary tables and they allow the implementation of systems with a high load capacity.
They are very rigid and they guarantee high rotational precision to the system.
Their use has expanded over the years and they are now used also in self-centerings and metrological and test equipment.

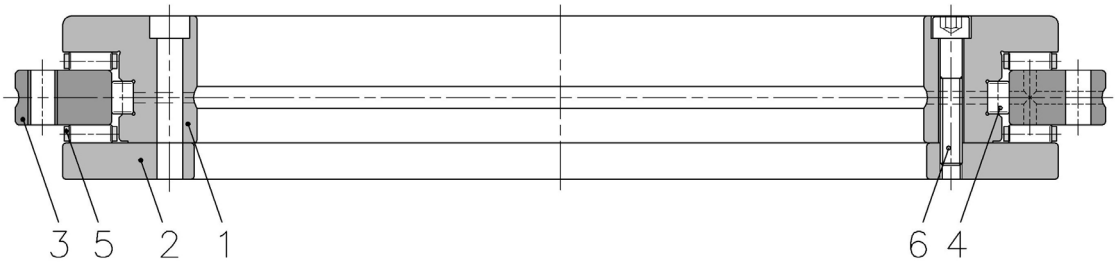
Serie **DS-YRT**



Serie **DS-YRTS**

Axial radial cylindrical roller bearings and radial needle roller bearings of the series DS-YRT (see image below) include:
a ring (1) that is the fusion of the inner ring of a radial bearing and a washer for shaft of an axial bearing: a washer for shaft (2);
Housing locating washer (3) radially driven by the group (4) of cylindrical rollers;
Two roller axial groups enclosed by brass cages (5)
Retaining screws are needed to facilitate the manipulation during transport and installation.

As already mentioned, for the fixing to adjacent components, rings have bored holes, with or without counterbore for bolts according to regulations DIN 912 and ISO 4762.



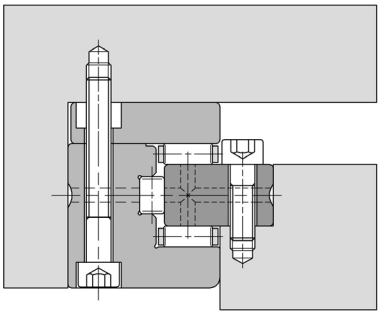
Unlike bearings of the series DS-YRT, bearings of the series DS-YRTS provide a rollers group (4) with spacers made in plastic (NYLON) interposed among each roller.
This guarantees to the complete bearing an increased permissible rotation speed, as the friction generated during rotation is lower.

DIMENSIONS

Standard bearings' overall dimensions (identified by a standard designation and not by a drawing number) indicated in the dimensional tables in the following pages, are identical for both the executions DS-YRT & DS-YRTS.

PRELOAD

The height of each component is chosen so that, after the assembly and once the fixing bolts are tightened,
there is an appropriate preload in the axial component. The radial component, that is full complement of rollers, has a light preload.

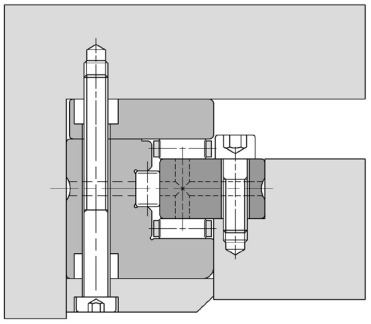


1a

RIGIDITY

Thanks to the big quantity of long rollers and the type of contact between the rolling elements and the raceways, there are only little deformations in the bearing and, most of all in big dimension types, there is a high rigidity.

The table on page 30-35 provides indicative values of the radial rigidity, the axial one and that one in presence of overturning moments.
For bearings fixed like those ones in image 1a, these values are in the admissibility range of the load if the indicated tightening torques are used.
System's rigidity can be increased by using a support ring similar to that shown in image 1b.



1b

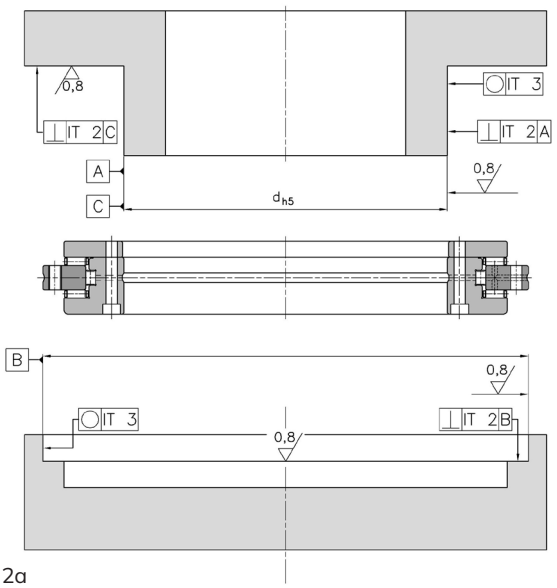
FRICTION

The friction moment regardless of the load of these combined bearings is mainly a function of the preload in the axial component, of the quantity of lubrificating grease and of bearing's dimensions.
For the standard types, the no-load torque is needed as a reference indicated in the table on page 32-33.
Values are approximate and they refer to bearings lubricated with grease and rotating at a speed of 5 revolutions/min;
the actual ones may deviate from the nominal value by approximately ± 25%.
Empty pairs are obtained if, when mounting the bearing, tightening torques indicated in tables on page 30-35 are applied. Higher tightening torques increase the preload and so the empty pair. If the tightening torque is too little, there is a negative effect on rigidity and on system's precision.

LUBRIFICATION

This type of bearings can be lubricated with grease but also with oil. It is normally recommended to use grease.
Bearings are supplied with lithium anti-rust grease and suitable for operating temperatures between -30°C & +120°C.
For basic speed higher than those indicated in the tables, bearings have to be lubricated with oil. In thes cases, please contact our technical office.
The lubrification and the relubrication can be done using the scroove and the holes present in the ring (1) an d in the Housing locating washer. The quantity of lubrification holes on rings, depends on bearing's dimensions.

Execution of adjacent components
In image 2a are indicated the dimensional shape tolerances of the surfaces that accommodate the bearing as well as the necessary finishing of the surfaces themselves



2a

ASSEMBLY

To center the bearing easily, you have to loosen up and if possible to take off the screws that hold together the bearing. The rings of this bearing have to be fixed to the support surfaces using cylindrical head bolts with hexagon built-in (DIN 912-UNI 5931), whose quantity and size depend on bearing's dimensions; these bolts must have a class of resistance 10.9 and they must be tightened with a torque wrench, acting alternately first on one of them then on the opposite one.

TOLERANCES

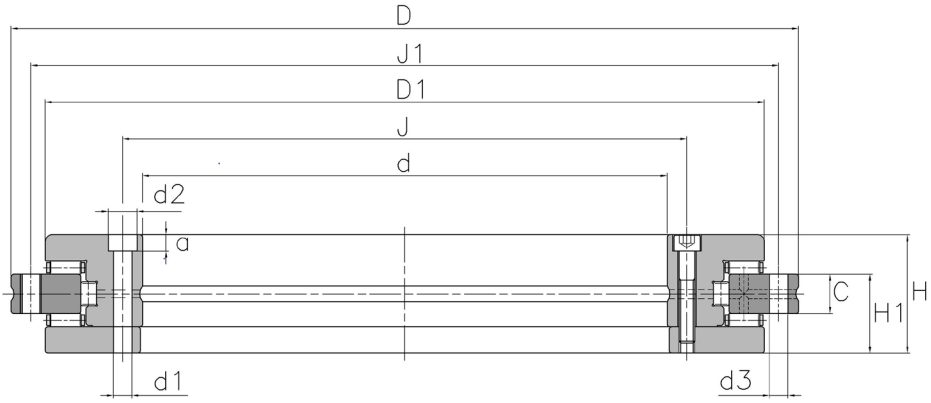
Cylindrical combined roller bearings and axial roller berings standard versiona are made with the dimensional tolerances class P5, shape precision is included in the limits of class P4 according to regulation DIN 620.
On request, special bearings with reduced tolerances on dimension H1, flatness and roundness can be supplied.
All tolerances values are shown in the below table.

Inner ring	Dimensional tolerances				Tolleranza sulla quota H1		Flatness and roundness	
d (mm)	Outer diameter		Hole		normal	restricted	normal	restricted
	D		d		±	±	±	±
	mm		mm		mm	mm	mm	mm
50	126	0/ -0,011	50	0/ -0,008	0,125	0,025	2	1
80	146	0/ -0,011	80	0/ -0,009	0,150	0,025	3	1,5
100	185	0/ -0,015	100	0/ -0,010	0,175	0,025	3	1,5
120	210	0/ -0,015	120	0/ -0,010	0,175	0,025	3	1,5
150	240	0/ -0,015	150	0/ -0,013	0,175	0,030	3	1,5
180	280	0/ -0,018	180	0/ -0,013	0,175	0,030	4	2
200	300	0/ -0,018	200	0/ -0,015	0,175	0,030	4	2
260	385	0/ -0,020	260	0/ -0,018	0,200	0,040	6	3
325	450	0/ -0,023	325	0/ -0,023	0,200	0,050	6	3
395	525	0/ -0,028	395	0/ -0,023	0,200	0,050	6	3
460	600	0/ -0,028	460	0/ -0,023	0,225	0,060	6	3
580	750	0/ -0,035	580	0/ -0,025	0,250	0,075	10	5
650	870	0/ -0,050	650	0/ -0,038	0,250	0,100	10	5
850	1095	0/ -0,063	850	0/ -0,050	0,300	0,120	12	6
180	28	139	161	2	1	49	130	170
215	40	150	187	2,1	1,1	43	132	203
215	40	150	187	2,1	1,1	60	132	203
215	40	157	180	2,1	1,1	90	132	203
215	40	157	180	2,1	1,1	90	132	203
180	24	145	165	1,5	0,6	33	139	171
180	24	145	165	1,5	0,6	48	139	171
200	33	152	178	2	1	39	140	190
200	33	152	178	2	1	55	140	190
230	40	162	200	3	1,1	44	144	216
230	40	162	200	3	1,1	62	144	216
230	40	169	193	3	1,1	96	144	216
190	24	155	175	1,5	0,6	34	149	181
190	24	155	175	1,5	0,6	51	149	181
210	33	162	188	2	1	40	150	200
210	33	162	188	2	1	58	150	200
250	42	169	208	3	1,1	103	154	236

DIMENSION TABLES - DS.YRT

DOUBLE EFFECT AXIAL-RADIAL BEARINGS

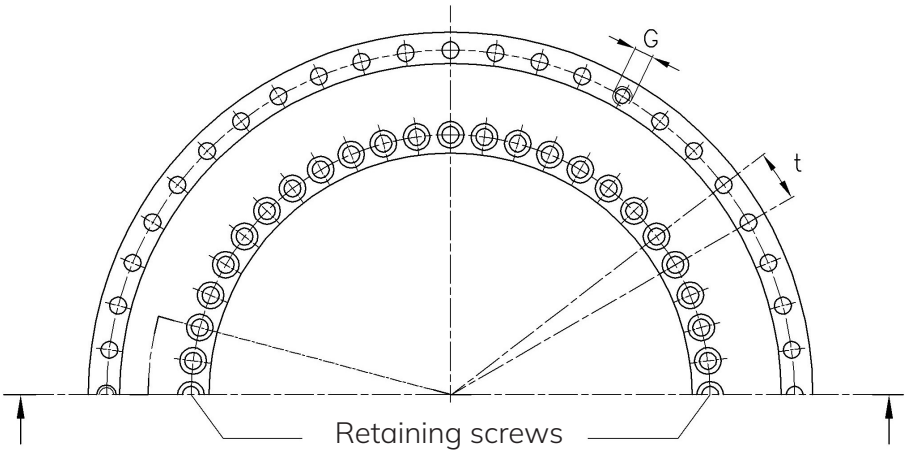
DS.YRT SERIES



Ø hole	CODE	Weight	Dimensions (mm)								Fixing Holes					
											Inner ring				Outer ring	
		Kg	d	D	H	H_1	C	D_1 max	J	J_1	d_1	d_2	a	Q.ty	d_3	Q.ty
50	DS.YRT 50	1,6	50	126	30	20	10	105	63	116	5,6	9	4,2	10	5,6	12
80	DS.YRT 80	2,4	80	146	35	23,35	12	130	92	138	5,6	10	4	10	4,6	12
100	DS.YRT 100	4,1	100	185	38	25	12	161	112	170	5,6	10	5,4	16	5,6	15
120	DS.YRT 120	5,3	120	210	40	26	12	185	135	195	7	11	6,2	22	7	21
150	DS.YRT 150	6,2	150	240	40	26	12	214	165	225	7	11	6,2	34	7	33
180	DS.YRT 180	7,7	180	280	43	29	15	244	194	260	7	11	6,2	46	7	45
200	DS.YRT 200	9,7	200	300	45	30	15	274	215	285	7	11	6,2	46	7	45
260	DS.YRT 260	18,3	260	385	55	36,5	18	345	280	365	9,3	15	8,2	34	9,3	33
325	DS.YRT 325	25	325	450	60	40	20	415	342	430	9,3	15	8,2	34	9,3	33
395	DS.YRT 395	33	395	525	65	42,5	20	486	415	505	9,3	15	8,2	46	9,3	45
460	DS.YRT 460	45	460	600	70	46	22	560	482	580	9,3	15	8,2	46	9,3	45
580	DS.YRT 580	89	580	750	90	60	30	700	610	720	11,4	18	11	46	11,4	42
650	DS.YRT 650	170	650	870	122	78	34	800	680	830	14	20	13	46	14	42
850	DS.YRT 850	253	850	1095	124	80,5	37	1018	890	1055	18	26	17	58	18	54

1) Retaining screws and extraction holes included
2) Tightening torque for screws according to DIN 912 (UNI 5931), quality 10.9
3) T_{RL} measured at 5 rpm (statistical indicative value for bearings with original greasing).
   In sizing the command for bearings DS.YRTS it is necessary to consider that the starting torque can be higher compared to the value indicated in the dimensional tables and that the moment of friction can increase in function to the number of revolutions.
4) Rigidity values in consideration of rolling elements, the deformation of bearing's rings and of the fixing screws.
5) For the fixing holes in the surrounding construction, respect the pitch of the bearing holes.

DIMENSION TABLES - DS.YRT

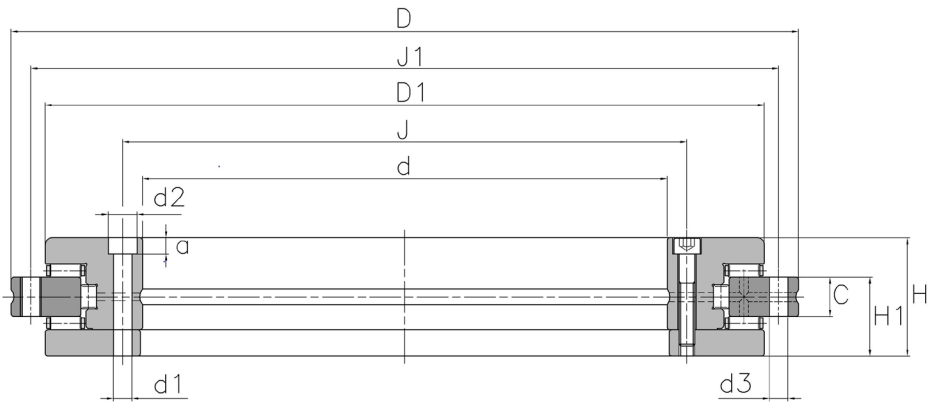


Retaining screws	Pitch t[1])	Extraction holes		Screws' tightening torque	Load coefficients				N° revolutions limit	Bearing's friction torque[3])	Axial rigidity [4])	Radial rigidity [4])	Angular rigidity [4])	Ø hole
					Axial		Radial							
Q.ty	Q.ty x t	G	Q.ty	M_A2) Nm	C_{adyn} KN	C_{0astat} KN	C_{dyn} KN	C_{0stat} KN	n_G min^{-1}	T_{RL} Nm	C_{aL} N/µm	C_{rL} N/µm	C_{kL} Nm/mrad	
2	12x30°	-	-	8,5	56	280	28,5	49,5	440	2,5	1300	1100	1250	50
2	12x30°	-	-	8,5	38	158	44	98	350	3	1600	1800	2500	80
2	18x20°	M5	3	8,5	73	370	52	108	280	3	2000	2000	5000	100
2	24x15°	M8	3	14	80	445	70	148	230	7	2100	2200	7000	120
2	36x10°	M8	3	14	85	510	77	179	210	13	2300	2600	11000	150
2	48x7,5°	M8	3	14	92	580	83	209	190	14	2600	3000	17000	180
2	48x7,5°	M8	3	14	98	650	89	236	170	15	3000	3500	23000	200
2	36x10°	M12	3	34	109	810	102	310	130	25	3500	4500	45000	260
2	36x10°	M12	3	34	186	1710	134	415	110	48	4300	5000	80000	325
2	48x7,5°	M12	3	34	202	2010	133	435	90	55	4900	6000	130000	395
2	48x7,5°	M12	3	34	217	2300	187	650	80	70	5700	7000	200000	460
2	48x7,5°	M12	6	68	390	3600	211	820	60	140	6900	9000	380000	580
2	48x7,5°	M12	6	116	495	5200	415	1500	55	200	7600	10000	550000	650
2	60x6°	M16	6	284	560	6600	475	1970	40	300	9300	13000	1100000	850

DIMENSION TABLES - DS.YRTS

DOUBLE EFFECT AXIAL-RADIAL BEARINGS

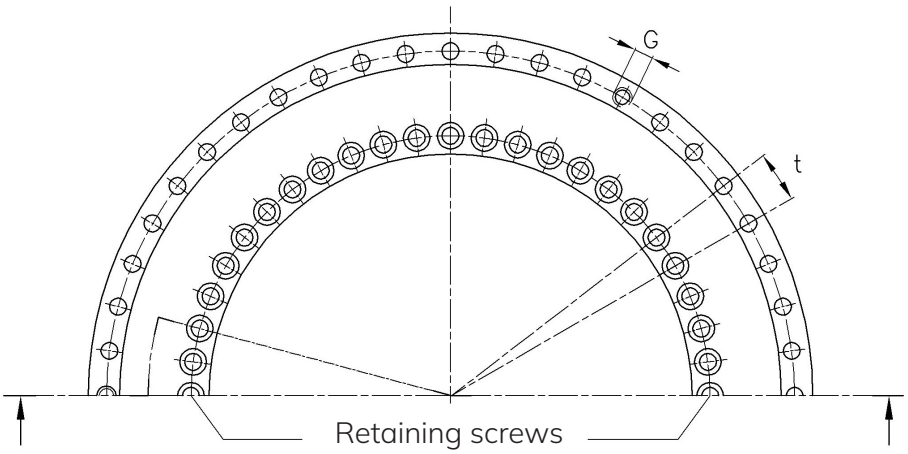
DS.YRT SERIES



Ø hole	CODE	Weight	Dimensions (mm)								Fixing holes						Retaining screws
											Inner ring				Outer ring		
		Kg	d	D	H	H1	C	D1 max	J	J1	d1	d2	a	Q.ty	d3	Q.ty	Q.ty
200	DS.YRTS 200	9,7	200	300	45	30	15	274	215	285	7	11	6,2	46	7	45	2
260	DS.YRTS 260	18,3	260	385	55	36,5	18	345	280	365	9,3	15	8,2	34	9,3	33	2
325	DS.YRTS 325	25	325	450	60	40	20	415	342	430	9,3	15	8,2	34	9,3	33	2
395	DS.YRTS 395	33	395	525	65	42,5	20	486	415	505	9,3	15	8,2	46	9,3	45	2
460	DS.YRTS 460	45	460	600	70	46	22	560	482	580	9,3	15	8,2	46	9,3	45	2

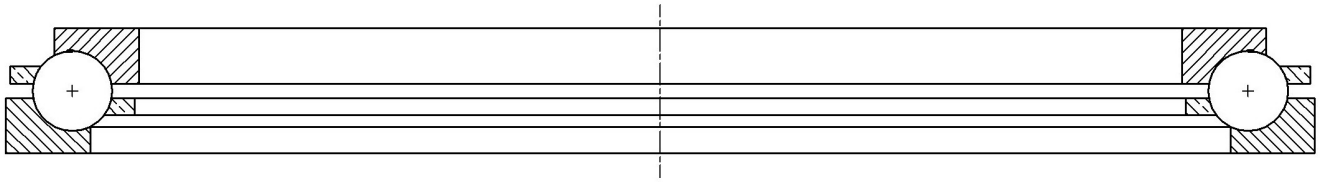
1) Retaining screws and extraction holes included
2) Tightening torque for screws according to DIN 912 (UNI 5931), quality 10.9
3) T_{RL} measured at 5 rpm (statistical indicative value for bearings with original greasing).
   In sizing the command for bearings DS.YRTS it is necessary to consider that the starting torque can be higher compared to the value indicated in the dimensional tables and that the moment of friction can increase in function to the number of revolutions.
4) Rigidity values in consideration of rolling elements, the deformation of bearing's rings and of the fixing screws.
5) For the fixing holes in the surrounding construction, respect the pitch of the bearing holes.

DIMENSION TABLES - DS.YRTS



Pitch t[1])	Extraction holes		Screws' tightening torque	Load coefficients				N° revolutions limit	Moment of inertia for rotation of		Axial rigidity [4])	Radial rigidity [4])	Angular rigidity [4])	Ø hole
				Axial		Radial			Inner ring	Outer ring				
Q.ty x t	G	Q.ty	M_A2) Nm	C_{adyn} KN	C_{0astat} KN	C_{dyn} KN	C_{0stat} KN	n_G min^{-1}	M_{mi} Kg*cm^2	M_{mo} Kg*cm^2	C_{aL} N/µm	C_{rL} N/µm	C_{kL} Nm/mrad	
48x7,5°	M8	3	14	155	840	94	226	1160	667	435	4	1,2	29	200
36x10°	M12	3	34	173	1050	110	305	910	2074	1422	5,4	1,6	67	260
36x10°	M12	3	34	191	1260	109	320	760	4506	2489	6,6	1,8	115	325
48x7,5°	M12	3	34	214	1540	121	390	650	8352	4254	7,8	2	195	395
48x7,5°	M12	3	34	221	1690	168	570	560	15738	7379	8,9	1,8	280	460

AXIAL ANGULAR CONTACT BALL BEARINGS



Axial angular contact ball bearings described here below and illustrated in the images were originally thought for "rotary" tables of drilling rigs, but they are also suitable for other applications.
They are characterized by a high load capacity, a great axial rigidity and by a low friction torque.
Unlike traditional axial ball bearings, they can support radial loads in addition to the axial ones and they are able to operate at higher speeds.

Single acting axial angular contact ball bearings can support axial loads only in one direction.
in the main working range of these bearings - "rotary" tables, two bearings are always used, registered with each other; the upper bearing must support all the weight of the probe when it is still, and it has a higher load capacity than the lower one

DIMENSIONS

The dimensions of these bearings are dictated mainly by "rotary" tsbles' needs and they haven't been unified.

MISALIGNMENT

Axial angular contact ball bearings aren't able to cope with any misalignment of the shaft as compared to the housing or to quadrature defects of bearing's surfaces on the shaft and on the housing.

CAGES

Distitec's axial angular contact ball bearings are made or full complement (without cage) or they have a brass cage centered on the washer for the shaft or on the housing one.

MINIMUM LOAD

When axial angular contact ball bearings operate at hgh speeds, the centrifugal forces and gyroscopic moments acting on the balls can cause them to slide on the tracks.
to avoid inconveniences, for example material carryovers, bearings must always be subject to a certain axial load.
The minimum axial load necessary to be applied to the single acting types can be evaluated with the formula:

$$F_{am} = A\ (n/1000)^2$$

In which:
F_{am} = minimum axial load, KN
A = minimum load factor, see bearings tables
N = rotation speed, revolutions/1'
The weight of the components that weigh on the bearing, together with the external forces, usually it exceeds the minimum necessary load. This type of bearing is preloaded by adjusting the washers against each other.

EQUIVALENT DYNAMIC LOAD ON THE BEARING

For single acting, axial angular contact ball bearings:

$P = Fa$ where Fa/Fr </= e
$P = Fa + XFr$ where Fa/Fr > e

X and "e" values can be found in bearings' tables.

CARICO STATICO EQUIVALENTE SUL CUSCINETTO

For single acting, axial angular contact ball bearings:
$P0 = Fa + X0Fr$

X0 values can be found in bearings' tables.

TOLERANCES

axial angular contact ball bearings indicated in the tables are made with the tolerances indicated on the bottom of the page, in which the symbols have the following meaning:

d nominal diameter of the hole
Δ_{dmp} deviation of the average hole diameter from the nominal value
D outer nominal diameter
Δ_{Dmp} deviation of the average external diameter from the nominal value
Δ_{Ts} deviation of the single height measurement from the nominal value of a single acting bearing

Axial angular contact ball bearings' tolerances

Hole's diameter/outer diameter d, D		Washer for shaft Δdmp		Height ΔTs		Housing locating washer Δdmp	
beyond	until	sup.	inf.	sup.	inf.	sup.	inf.
mm		μm		μm		μm	
315	400	0	-41	+254	-254	-	-
400	500	0	-46	+254	-254	0	-46
500	630	0	-51	+381	-381	0	-51
630	800	0	-76	+381	-381	0	-76
800	1000	0	-102	+381	-381	0	-102
1000	1250	0	-127	+381	-381	0	-127
1250	1600	0	-165	+381	-381	0	-127
1600	1800	-	-	-	-	0	-127

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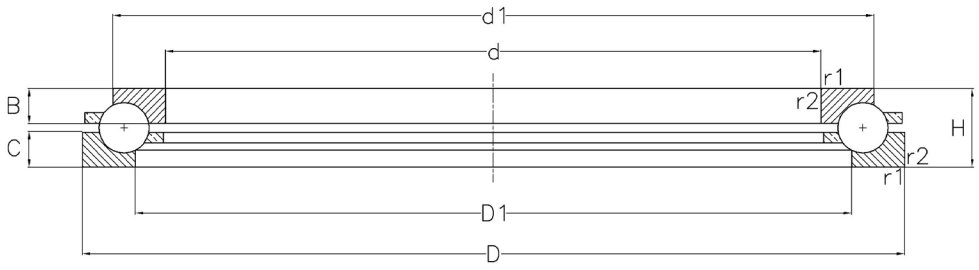
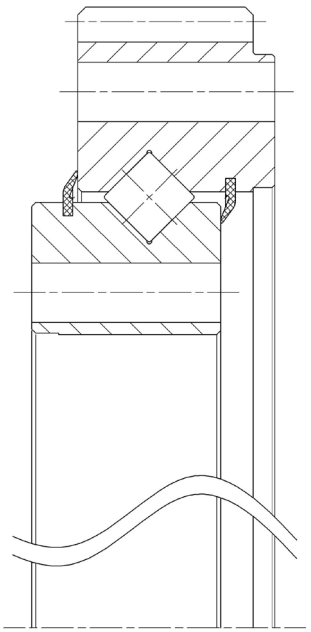


Overall dimensions			Load coefficients		Fatigue limit load	Minimum load factor	Weight	CODE	Overall dimensions					Elements for the calculation		
d mm/ inch	D	H	dyn. C KN	stat. C0 KN	Pu KN	A	Kg		d1 mm/ inch	D1	B	C	r1,2 min	e	X	X0
355,6 14	457,2 18	57,15 2,25	365	1290	27,5	5,5	22	DS.BA1B 307742	420,9 16,5709	377 14,8425	23,5	23,5	3	1,25	0,66	2,3
511,175 20,125	628,65 24,75	66,675 2,625	465	2550	40	17	35	DS.BDAB 351903	590,55 23,25	549,275 21,625	31	31	3,2x45°	1,29	0,67	2,38
514,274 23	704,85 27,75	114,3 4,5	720	3250	56	30	130	DS.BDAB 307785	622,3 24,5	571,5 22,5	51,15	50,8	6,35x45°	0,8	0,51	1,47
584,2 23	685,8 27	50,8 2	360	1700	28	9,5	27,5	DS.BA1B 307740	647,7 25,5	609,6 24	20	20	3	1,25	0,66	2,3
593,725 23,375	790,575 31,125	117,475 4,635	780	3800	61	39	155	DS.BDAB 307786	720,725 28,375	650,875 25,625	57,15	57,15	6,35x45°	0,8	0,51	1,47
641,35 25,25	793,75 31,25	88,9 3,5	680	4150	58,5	46	75	DS.BDAB 351905	746,125 29,375	708,025 27,875	42	42	6,35x45°	1,29	0,67	2,38
660,4 26	895,35 35,25	133,35 5,25	1120	7100	95	130	180	DS.BDAB 351904	790,575 31,125	727,075 28,625	62	62	6,35x45°	1,29	0,67	2,38
771,525 30,375	898,525 35,375	63,5 2,5	490	3750	48	37	54	DS.BDAB 417262	860,425 33,875	809,625 31,875	26,441	26,441	6,35x45°	2,17	0,92	3,48
806,45 31,75	1025,525 40,375	127 5	1060	6100	85	100	195	DS.BDAB 307783	933,45 36,75	873,125 34,375	61,925	61,925	6,35x45°	0,8	0,51	1,47
1022,35 40,25	1181,1 46,5	88,9 3,5	815	6800	76,5	124	160	DS.BDAB 351869	1135,475 44,625	1069,975 42,125	39,929	42,316	6,35x45°	1,49	0,73	2,74
1066,8 42	1285,875 50,625	127 5	1160	8000	100	170	315	DS.BA1B 307784	1214,552 47,817	1138,352 44,817	61,925	61,925	6,1x45°	0,8	0,51	1,47
1346,2 53	1517,65 59,75	104,775 4,125	815	7650	75	180	225	DS.BDAB 351909	1457,325 57,375	1406,525 55,375	46,609	46,609	6,1x45°	1,49	0,73	2,74
1371,6 54	1619,25 63,75	139,7 5,5	1460	15000	146	560	510	DS.BDAB 351908	1533,525 60,375	1457,325 57,375	64,008	64,008	6,1x45°	1,49	0,73	2,74

CROSSED CYLINDRICAL ROLLER AXIAL BEARINGS



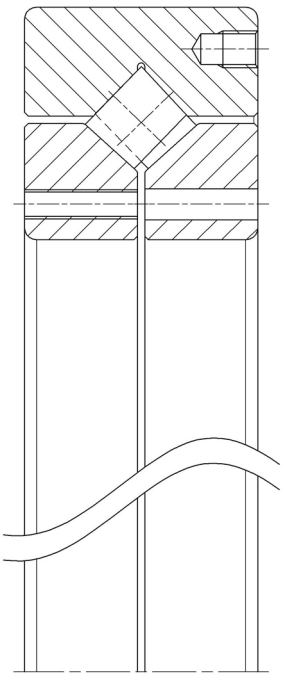
crossed cylindrical roller axial bearings have the raceways of the inner ring and of the outer ring inclined by 45° as compared to the axis.
Among the raceways, rollers are arranged alternately at 90° to each other.

crossed cylindrical roller axial bearings have several advantages from the point of view of both shape and functionality.
They allow the realization of rigid systems, able to support strong loads, without requiring much space

They have relatively big holes and they can support radial loads, axial loads and overturning moments and so, they don't require the presence of a second bearing

DISTITEC's types are made in standard and special executions.
For further information please contact our technical office.

CROSSED TAPERED ROLLER AXIAL BEARINGS



Crossed tapered roller axial bearings are tapered roller axial bearings, double effect, particularly compact.
They are made of an outer ring and an inner ring in two parts.
Rollers are arranged among the rings alternately with the axis at about 90° among them or they are kept separate by special plastic discs, that determinate the final circumferential clearance at the pitch diameter.

Thanks to the special inner geometry, friction losses in contact with the roller heads are minimal and there is low heat development.

This type of besrings are able to support also radial loads and overturning moments, beyond axial loads acting in both directions and so, they usually don't require the presence of a second bearing the compact shape and relatively large diameter simplify the application and design of adjacent parts.

The large distance between the two centers of pressure and the high preload allowed make the bearings very rigid and capable of supporting the loads caused by overturning moments well
To simplify the movement, the two inner rings are held together by internal hex head screws.

All bearings with an outer diameter beyond 420 mm have also three threaded holes on one side of the outer ring for inserting the eyebolts.
Crossed tapered roller axial bearings typical applications are workpiece tables, drilling machines and milling machines, as well as radar antennas and welding robots.

DISTITEC's types are made in standard and special executions. For further information please contact our technical office.

cylindrical roller bearings, single-row with cage are able to support strong radial bearings and operate at high speeds.
The full complement ones are able to support very high radial loads, even if the absence of the cage places an achievable speed limit on them
cylindrical roller bearings, single-row with cage are produced in several dimensions and executions; these last vary essentially with regards to the presence of edges/flanges

DIMENSIONS

The overall dimensions of standard cylindrical roller bearings (those identified by a standard designation and not by a drawing number) comply with ISO 15-1981)

MISALIGNMENT

cylindrical roller bearings, single-row capacity to allow angular misalignments of the inner ring compared to the outer ring is limited to few primes
logarithmic profile types can have the following values:
- 4 primes for bearings of the narrow series 18,19,10,2,3 and 4;
- 3 primes for bearings of the other series.

These indicative values can be applied as long as the positions of shaft's axis and of the Housing remain unchanged.
Depending on the requested load and the duration, higher misalignments are possible

TOLERANCES

Distitec's cylindrical roller bearings, single-row are usually made with tolerances according to the normal precision class.
Some of them, expecially those of the narrow series 18,19 and 10 are also available with higher precision according to classes P6, P5 or SP.
Normal tolerances ad those of classes P6 and P5 correspond to the regulation ISO 492-1986.

INNER RADIAL CLEARANCE

Distitec's standard cylindrical roller bearings are made with normal radial clearance, but a lot of them are available also with radial clearance C3.
For special application they can also be supplied with a radial clearance superior to C3 (for example C4 o C5).
Inner radial clearance of bearings identified with a drawing number is reported after the appellative.
Bearings made with tolerances SP have as standard the inner radial clearance C1, even if this doesn't appear in the appellative.
Rings of such bearings aren't interchangeable, because the clearance would result too big or too small; for this reason bearings' components are usually supplied in a single package.
the actual values of the clearance correspond, if unified, to DIN 620, part 4. They refer to a bearing not mounted and with load of zero measurement.
Values of classes from C2 to C4 included, for hole's diameters (cylindrical) from 80 to 500 mm, correspond also to ISO 5753:1991
Maximum and minimim values of class C5 are 5 um less of those specified by ISO 5753 for such class.
Symbol SPC2 indicates clearance C2 that is applied to bearings of tolerance class SP.

INNER AXIAL CLEARANCE

cylindrical roller bearings of the series NUP, NP and NJ + HJ, which can serve to bind the shaft together in two directions, have an inner axial clearance, that depends on the distance between the edges beyond the lenght of the rollers.

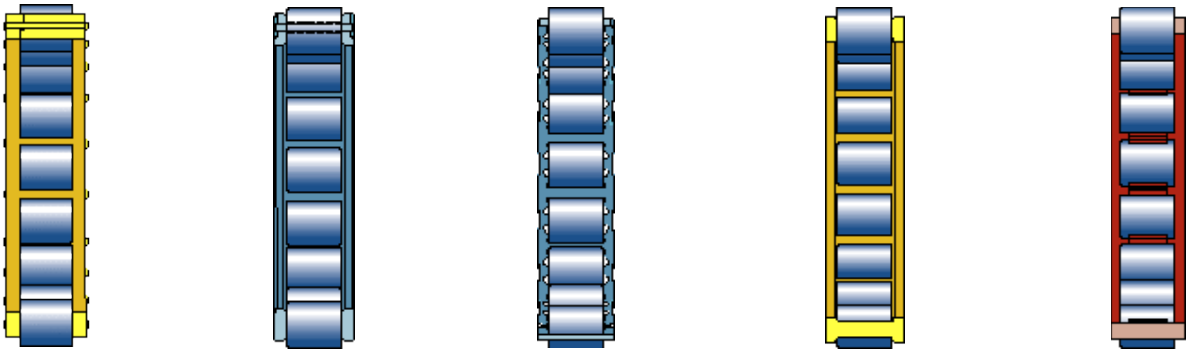
INFLUENCE OF OPERATING TEMPERATURE ON BEARING MATERIAL

DISTITEC's cylindrical roller bearings are subjected to special heat treatments.
When they have cages of sheet steel or brass, can be used at temperatures until +150° without unacceptable dimensional variations occurring.

CAGES

According to the series and dimensions Distitec's standard cylindrical roller bearings are made with cages described here below.
Nearly all types identified by a drawing number have massive cages (executions M,MA, MB or MP).
Some big bearings, and mostly heavy, have a pin cage.

FR	steel cage with pins and perforated rollers (image B)
J	cage made of sheet steel, not hardened (image C) A number that follows the J indicates a different execution or a different material, for example J1
M	massive brass cage, centered on the rollers (image A) A number that follows the M indicates a different execution or a different material, for example M1
MA	massive brass cage, centered on the outer ring
MAS	massive brass cage, centered on the outer ring, with lubrication grooves on the guiding surfaces
MB	massive brass cage, centered on the inner ring
MBS	massive brass cage, centered on the inner ring, with lubrication grooves on the guiding surfaces
MP	brass cage with slits, milled or bored centered on the inner ring (image D) or on the outer one
MPS	brass cage with slits, centered on the inner ring or outer ring, with lubrication grooves on the guiding surfaces
P	molded polyamide cage 6,6, reinforced with glass fibres
TN9	molded polyamide cage 6,6, reinforced with glass fibres, centered on rollers (image E)

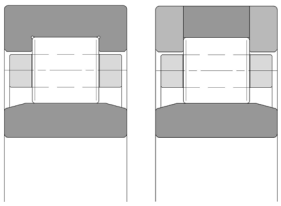


A B C D E

CYLINDRICAL ROLLER BEARINGS SINGLE-ROW - EXECUTIONS

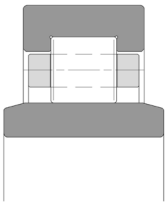
NU Execution

The outer ring has two integral edges, instead the inner ring has no edges. The axial displacement of the shaft as compared to the housing can happen in two ways/directions inside the bearing itself (see bearings' tables). Bearigs of this execution are used as free bearings, that is not of axial constraint. For construction and maintenance reasons, the two edges of the outer ring of big bearings type NU, that have a drawing number in the appellative, aren't integral, but they are made of reported rings.



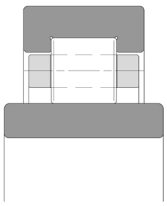
NUB Execution

As the NU execution but with the internal ring protruding from both sides.



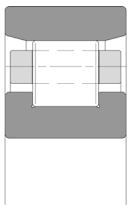
NUBZ Execution

As the NUB, but without the conical contact surfaces on the inner ring raceway.



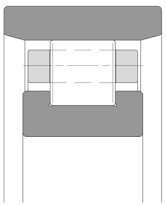
N Execution

The inner ring has two integral edges, instead the outer ring has no edges. the axial displacement of the shaft compared to the housing can happen in two ways/ directions inside the bearing itself (see bearings' tables). Bearings of this type are used as free bearings, that is not of axial constraint.



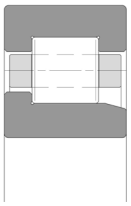
NB Execution

As the N execution but with the outer ring protruding from both sides.



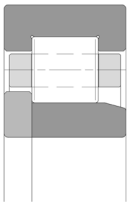
NJ Execution

The outer ring has two integral edges, instead the inner one has only one.
These bearings therefore are used to axially constrain the shaft in one direction.



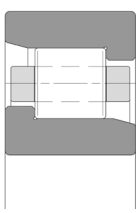
NJP Execution

As the NJ execution, but inner ring's edge isn't integral and it is made of a reported ring.



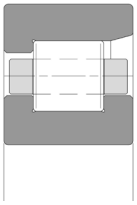
NJF Execution

Both the inner ring and the outer ring have an integral edge.
These bearings therefore are used to axially constrain the shaft in one direction.



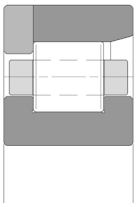
NF Execution

The inner ring has two integral edges instead the outer ring has only one.
These bearings are used then to constrain the shaft axially in one direction



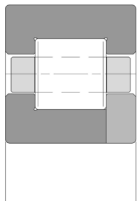
NFP Execution

as NF execution, but with the reported ring instead of the integral one on the outer ring.



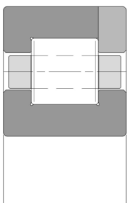
NUP Execution

The outer ring has two integral edges, instead the inner one has an integral one and the other one reported.
These bearings are used then to constrain the shaft axially in two directions.



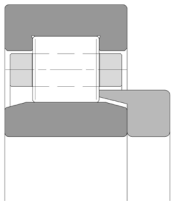
NP Execution

the inner ring has two integral edges, instead the outer ring has an integral one and the other one reported.
These bearings are used then to constrain the shaft axially in two directions.



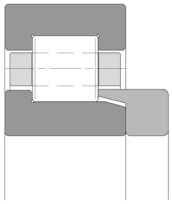
NU + HJ Execution

Bearings of execution NU can be used in combination with shoulder ring to constrain axially the shaft in one direction and they correspond to that one of execution NJ



NJ + HJ Execution

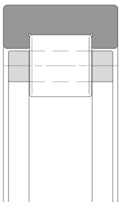
To constrain axially the shaft in two directions the combination of a bearing NJ and a shoulder ring HJ can be used.



RNU Execution

When it is possible to harden and grind the shaft, it is useful to use bearings of this execution, made of only the outer ring and cage roller assembly/group.
Because the inner ring is missing, the shaft can have a bigger diameter;
to the full advantage of its rigidity and its possibility of axial movement with respect to the housing, only limited by the track width obtainable on the ring itself.

Working this track with appropriate dimensional and shape tolerances, an arrangement with a higher rotation orecision can be obtained. RNU bearings are suppliable on request.



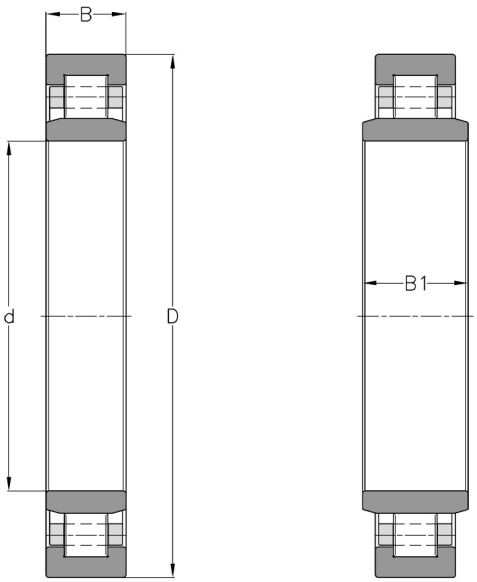
CYLINDRICAL ROLLER BEARINGS SINGLE-ROW - SUFFIXES

ASR2	annular groove and two relubrication holes in the outer ring
B20	reduced tolerance on width
CN	"Normal" inner radial clearance; it usually appears in combination with one of the following letters, tat indicate a reduced or displaced range: F reduced and displaced range, it includes the upper quarter of the original range and the first quarter of the upper original range the nearest H reduced range, it corresponds to upper half of the original range L reduced range, it corresponds to the lower half of the original range M reduced range, it corresponds to two-quarters of a half of the original range P displaced range, it includes the upper half of the original range and the lower half of the nearest original upper range The letters above are alsl used together with the classes C2,C3, C4 and C5.
CNPW33	CNP + W33
C2	Inner radial clearance lower than normal
C3	Inner radial clearance hgher than normal
C4	Inner radial clearance higher than C3
C5	Inner radial clearance higher than C4
D	Modified inner execution
E	Reinforced execution, that involves more numerous rollers and/or bigger
EC	As E, but modified contact between roller head and edge/flange
ECDM	EC+D+M
ECFR	EC+FR
ECJ	EC+J
ECKMA	EC+K+MA
ECM	EC+M
ECMA	EC+MA
ECMB	EC+MB
ECMP	EC+MP
ECNMA	EC+N+MA
ECNMP	EC+N+MP
ECNP	EC+N+P
ECP	EC+P
EGTN9	EG+TN9
EMA6	E+MA6
EMB	E+MB
ENMP	E+N+MP
FR	Pinned steel cage
HA1	Hardened inner and outer rings
HA2	Hardened outer ring
HA3	Hardened inner ring
HA4	Hardened outer ring, inner ring and rollers
HB1	Bainitic temper for inner and outer rings
HB3	Bainitic temper for inner ring molded steel cage
J	Molded steel cage
K	Conical hole, taper 1:12
K30	Conical hole, taper 1:30
M	Massive brass cage, centered in rollers
MA	Massive brass cage, centered n outer ring
MAS	As MA, but with lubrication grooves on the guide surfaces
MB	Massive brass cage, centered on the inner ring
MBS	As MB, but with lubrication grooves on the guide surfaces
MP	brass cage with slits, with punched, milled or reamed cells, centered in tge inner or outer ring

MPS	As MP, but with ubrication grooves on the guide surfaces
N	Snap ring groove on the outer ring
NR	Groove and snap ring on the outer ring
P	Molded polyamide cage 6,6, reinforced with glass fibres
P4	dimensional and rotational precision according to class 4 ISO; better than P5
P5	dimensional and rotational precision according to class 5 ISO; better than P6
P6	dimensional and rotational precision according to class 6 ISO; better than the "normal" one
P52	P5 + C2
P62	P6 + C2
P63	P6 + C3
SP	Special class of precision for machine tools; dimensional accuracy approximately according to P5, dimensional accuracy approximately according to P4, inner radial clearance C1
S1	Dimensionally stabilized bearing rings for operating temperatures up to + 200° C
S2	Dimensionally stabilized bearing rings for operating temperatures up to + 250° C
TN9	Molded polyamide cage 6,6, reinforced with glass fibres
VA..	Variants for particular applications VA301 bearings according to DIN43283 VA350 bearings for railway bushings VA701 bearings for paper machine drying cylinders and calenders; hardened inner ring, stabilized outer ring S1, massive brass cage centered on rollers
VE..	Outer or inner execution modified
VE900	Standard quote drawing
W33	Three-hole relubrication annular groove on the outer ring

the dimensions of DISTITEC's cylindrical roller bearings, single-row are standard. the size range changes according to the table here below.
Executions change acording to those described on pages 19-20.

Overall dimensions			Load coefficients	
d	D	B	C	C_0
mm			kN	
100 - 1.900	140 - 2.300	37 - 475	128 - 16.500	250 - 42.500



For any further information, please contact our technical office.

DOUBLE ROW CYLINDRICAL ROLLER BEARINGS

Double row cylindrical roller bearings have a small cross section, a high load capacity and a substantial rigidity.
They are used mainly in machine tools, in the roll stands of some rolling mills, in the calenders for plastic, in mills and in big adaptors?
Double row cylindrical roller bearings are decomposable, or rather the ring with integral edges and roller cage assembly/group can be mounted regardless of the other ring, to the full advantage of ease of installation, inspection and maintenance.
Bearings, except those of execution NNUP, allow within them, within certain limits, the axial displacements of the shaft with respect to the housing.
Double row cylindrical roller bearings can have the hole cylindrical or conical. Those of execution NN are usually supplied with a conical hole. With bearings with conical hole, it is possible to realize during assembly a certain inner radial clearance or a certain pre load.

DIMENSIONS

The overall dimensions of standard bearings are according to regulation ISO 15-1981. The diameter of the hole and the outer diameter of most bearings identified by a drawing number are compliant to the diametric series 0 of this regulation.

MISALIGNMENT

Double row cylindrical roller bearings can admit only very little angular misalignments of the inner ring compared to the outer ring.
For those cases, as in rolling mill straighteners, in which the misalignment can't be avoid, DISTITEC can supply bearings with radial clearance appropriate for the application, different for the two rows of rollers; this way, in the presence of misalignment, the load is equally divided between the two rows.

TOLERANCES

DISTITEC's standard Double row cylindrical roller bearings are usually produced with high precision required by machine tools, in particular with tolerances of the class SO; In the tables, these bearings bring the suffix SP in the appellative.
Some of them are also available with a much higher precision, according to the tolerance class UP.
Details in this regard are provided upon request

INFLUENCE OF OPERATING TEMPERATURE ON BEARING MATERIAL

DISTITEC's double row cylindrical roller bearings are subjected to a special stabilization treatment that makes possible the use at a temperature until +150 ° C, without inadmissible dimensional modifications occurring.
On demand and with an overcharge, Stabilized bearings for operating temperatures up to + 200° C are supplied (suffix in the appellative S1) or until 250 ° C (Suffix S2).

INNER CLEARANCE

Double row cylindrical roller bearings produced in class SP usually have an inner radial clearance C1, even if the relative suffix doesn't appear in the appellative. The rings of different bearings must not be interchanged with each other to prevent the clearance from taking on too big values or too little values.
For this reason, bearing's components are supplied in a single package; anyway, in case they are supplied in separated packages, all bearing's components bring the same progressive number. SP bearings can also be provided with higher inner radial clearance.
If you order bearings with clearance higher tham C1, you must indicate it in the appellative; C2 for the special class SPC2, CN for the normal class or C3;
SPC2 clearance range is different from the unified C2 one, because it is narrower and it is moved towards the lower limit of the latter.
The other standard bearings are produced with the inner clearance declared in the appellative.
Inner radial clearance values are according to ISO 5753:1991.

CAGES

DISTITEC's double row cylindrical roller bearings are equipped with several types of cages described in the section "executions". For standard bearings, the type of cage is identified by a suffix in the appellative, whose meaning is explained in the section "suffixes".
Bearings with polyamide cage 6,6, reinforced with glass fibers are usable for operating temperatures until +120 ° C. For long operating periods at temperatures higher than +120° C or lower than -40° C, it is necessary to provide bearings with a metal cage

EXECUTIONS

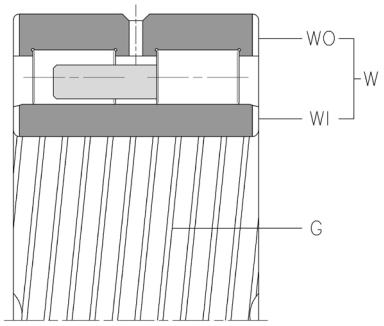
Distitec produces double row cylindrical roller bearings aminly with executions NNU, NN and NNUP, Bearings, which differ mainly regarding the configuration of the edges, can also slightly differ for constructive reasons for application or maintenance.
In case double row bearings have to be mounted with loose fit on the shaft or on the neck of the cylinders, rather than with interferance, for example to allow a rapid composition (costituizione/composizione), DISTITEC supplies types with special executions.
To mitigate the inconvenience that occurs with a loose fit of the inner ring, as this tends to rotate on its seat, damaging them and the bearing itself, these special bearings have a helical groove in the hole and/or lubrification grooves in the faces of the rings designed to allow efficient lubrication of the surfaces on which the sliding occurs. Bearings with features described above are identfied in the tables with the following letters:

G Helical groove in inner ring's hole

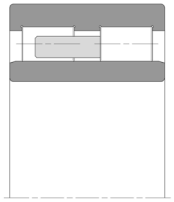
W Lubrification grooves on the faces of the rings

WI Lubrification grooves on the faces of the inner ring

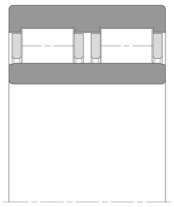
WO Lubrification grooves on the faces of the outer ring



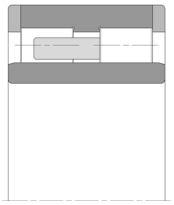
NNU Execution
Outer ring with three edges.
Massive brass cage guided on rollers, side-to-side.
With or without annular groove and/or lubrification holes on the outer ring.



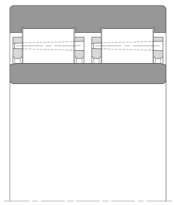
NNU.1 Execution
Outer ring with three edges.
Two massive brass cages of the type with slots guided on the rollers.
With or without annular groove and/or lubrification holes on the outer ring.



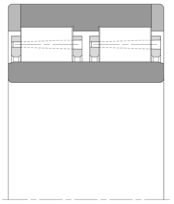
NNU.2 Execution
Outer ring with integrated central edge and two reported edges.
Massive brass cage guided on rollers, side to side.
With or without annular groove and/or lubrification holes on the outer ring.



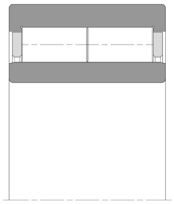
NNU.3 Execution
Outer ring with three integral edges.
Forced rollers and two steel cages with pins/studs.
With or without annular groove and/or lubrification holes on the outer ring.



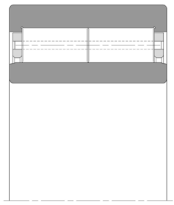
NNU.4 Execution
Outer ring with integral central edge and two reported edges.
Perforated rollers and two steel cages with pins/studs.
With or without annular groove and/or lubrification holes on the outer ring.



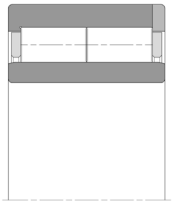
NNU.5 Execution
Outer ring with two integral edges.
Brass cage with slots.
With or without annular groove and/or lubrification holes on the outer ring.



NNU.6 Execution
Outer ring with two integral edges.
Perforated rollers with steel cage with pins/studs.
With or without annular groove and/or lubrification holes on the outer ring.

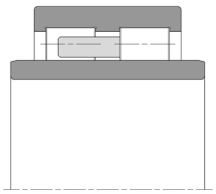


NNU.7 Execution
An integral edge on the outer ring and a reported edge.
Massive brass cage.
With or without annular groove and/or lubrification holes on the outer ring.

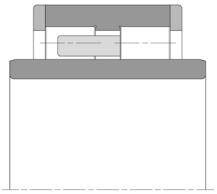


DOUBLE ROW CYLINDRICAL ROLLER BEARINGS - EXECUTIONS

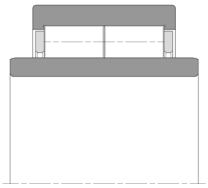
NNUB Execution
Outer ring with three integral edges. Inner ring larger.
Brass cage guided on rollers, side to side.
With or without annular groove and/or lubrification holes on the outer ring.



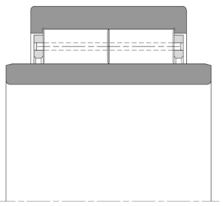
NNUB.1 Execution
Outer ring with integral central edge and two reported edges.
Inner ring larger. Brass cage guided on rollers, side to side.
With or without annular groove and/or lubrification holes on the outer ring.



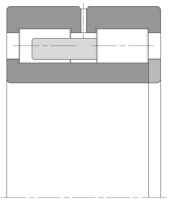
NNUB.2 Execution
Outer ring with two integral edges. Inner ring larger.
Brass cage with slots.
With or without annular groove and/or lubrification holes on the outer ring.



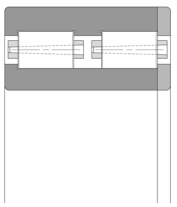
NNUB.3 Execution
Outer ring with two integral edges.
Inner ring larger.
Perforated rollers and steel cage with pins/studs.
With or without annular groove and/or lubrification holes on the outer ring.



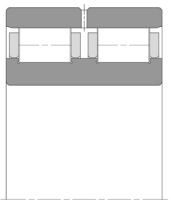
NNUP Execution
Outer ring with three integral edges.
Inner ring with an integral edge and a reported one.
Brass cage side to side guided on rollers.
Annular groove and lubrification holes on the outer ring.



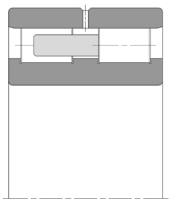
NNUP.1 Execution
Outer ring with two integral edges and a reported one.
Inner ring with an integral edge and a reported one.
Perforated rollers and two steel cages with pins/studs.



NN/TN9 Execution
Inner ring with three integral edges.
Two polyamide cages 6,6 guided on rollers (TN9.
Annular groove and lubrification holes on the outer ring



NN Execution
Inner ring with three integral edges.
Brass cage side to side, guided on rollers.
Annular groove and lubrification holes on the outer ring.



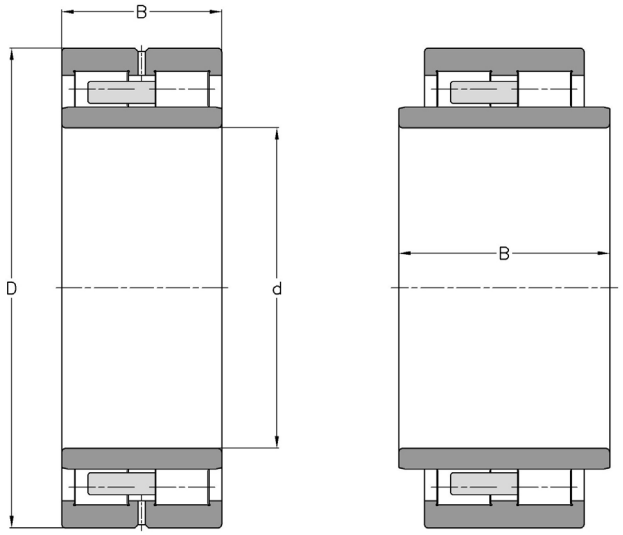
DOUBLE ROW CYLINDRICAL ROLLER BEARINGS - SUFFIXES

B	Standard current execution with brass cage side to side
BK	B + K
CN	Inner radial clearance of the "normal" class; it usually appears only in combination with one of the following letters, which indicate a reduced or shifted range: H reduced range corresponding to the upper half of the original range. The reduced range corresponding to the lower half of the original range M reduced range, corresponding to two-quarters of a half of the original range P shifted range, including the upper half of the original range and the lower half of the nearest original upper range the letters above are also used together with the classes C2, C3, C4 and C5
C1	Inner radial clearance lower than C2
C2	Inner radial clearance lower than normal
C3	Inner radial clearance higher than normal
C4	Inner radial clearance higher than C3
C5	Inner radial clearance higher than C4
DR	Group of two paired bearings
F	Massive steel cage side to side, centered on rollers
FA	Massive steel cage side to side, centered on the outer ring
FB	Massive steel cage side to side, centered on the inner ring
HA1	Hardened inner and outer rings
HA2	Hardened outer ring
HA4	Hardened outer ring, inner ring and rollers
HB1	Bainitic hardening for the outer and inner rings
HB2	Bainitic hardening for the outer ring
HB3	Bainitic hardening for the inner ring
K	Conical hole, taper 1:12
K30	Conical hole, taper 1:30
P4	Dimensional and rotational precision according to class 4 ISO; better than P5
P5	Dimensional and rotational precision according to class 5 ISO; better than P6
P6	Dimensional and rotational precision according to class 6 ISO; better than "normal"
SP	Special precision class for machine tools; approximately dimensional precision according to P5, approximately rotational precision according to P4
SPCN	SP + CN
SPC2	SP + C2
TN9	molded polyamide cage 6,6, reinforced with glass fibres
UP	Ultra precise class for tool machines; approximately dimensional precision according to P4, rotational precision better than P4
VE900	Standard quote drawing
W33	Annular groove and three lubrification holes on the outer ring
W33X	Annular groove and six lubrification holes on the outer ring

DOUBLE ROW CYLINDRICAL ROLLER BEARINGS - EXECUTIONS

the dimensions of DISTITEC's ,full complement cylindrical roller bearings, double rows, are standard.
The dimensional "range" varies according to the following table.
Executions vary according to those described on page 36.

Overall dimensions			Load coefficients	
d	D	B	C	C_0
mm			kN	
100 - 1320	140 - 1.720	37 - 475	128 - 16.500	250 - 42.500



For any further information, please contact our technical office.

Full complement cylindrical roller bearings are equipped with the maximum number of rollers possible and they usually have a reduced section height in relation to the width, which gives them a very high load capacity and allows for space-saving arrangements.
full complement cylindrical roller bearings support very high radial loads;on the other hand, the different kinematic conditions inside them do not allow the same speeds of the traditional types with cylindrical rollers with cage to be reached.

DISTITEC has in its standard assortment cylindrical roller bearings, full complement, single and double row.
On demand, bearings with three up to eight rows can be produced.

SURFACE TREATMENT

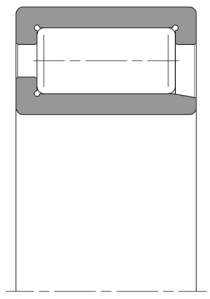
The different kinematic conditions compared to those of traditional cylindrical roller bearings with cage are due to the fact that the cylindrical surfaces of the rollers are in contact and move in the opposite direction.
Since there is greater friction than that existing between rollers and cage, in certain working conditions failure modes other than normal fatigue are noted, such as wear and carryover of material
To reduce the risk of premature failure and to increase reliability, DISTITEC also produces full complement cylindrical roller bearings equipped with rollers with treated surfaces; they are identified with the suffix B in the appellative.
Thanks to the improvements achievable in operating life and reliability, bearings with treated rollers are advisable for applications where they occur:

- high speeds (n > 0.5 times basic speed)
- light loads (for example idle rotation)
- unfavorable lubrification (K<1.5)
- strong radial or tangential accelerations

When you have extremely demanding working conditions and maximum reliability is required, DISTITEC can supply full complement cylindrical roller bearings with surface treatment also on rings.

FULL COMPLEMENT CYLINDRICAL ROLLER BEARINGS, ONE ROW

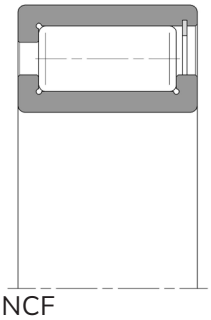
Distitec's standard full complement cylindrical roller bearings, one row are made in the executions NCF and NJG.
The most common ones are those of execution NCF; they have two integral edges on the inner ring and an integral edge on the outer one and they are then able to constrain the shaft axially in one direction. On the outer ring, on the side where there isn't the edge, a snap ring is used to hold the bearing together.


NJG

The inner axial clearance is indicated in bearings' tables and it is such as to allow small axial movements of the shaft with respect to the housing inside the bearing itself, for example "thermal effect"

All bearings of execution NJG are part of the dimensional series 23 and they are intended for heavily loaded applications, with low speeds.

Contrary to other full complement bearings, NJG types have rollers that can support themselves and therefore, together with the outer ring, it is possible to separate them from the inner ring without having to hold them back in some way; this simplify the assembly and the disassembly. NJG bearings support axial loads acting only in one direction and they can then constrain the shaft consequentially

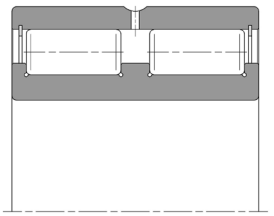

NCF

full complement cylindrical roller bearings, double rows are usually produced with four executions NNCL, NNCF, NNC and NNF which differ from each other essentially in the configuration of the edges. All are of the non-separable type and have an annular groove and holes on the outer ring to promote an efficient lubrication.
NNF bearings type have sliding seals on both sides.

EXECUTIONS

NNCL Execution

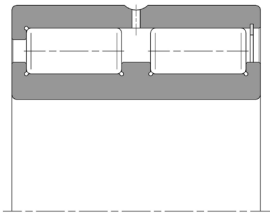
The inner ring has three integral edges, instead the outer one has no edges. Stop rings inserted on both sides of the outer ring raceway are needed to keep together the bearing.
Axial movements in both directions of the shaft with respect to the housing can occur inside the bearing itself; bearings are then suitable for non-constraining positions



NNCL

NNCF Execution

The inner ring has three integral edges, instead the outer one has only one and it allows the bearing to constrain the shaft in only one direction.



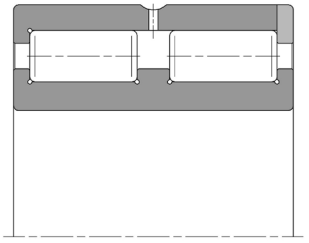
NNCF

NNC Execution

Also in this case, the inner ring has three integral edges. The outer ring has an integral edge and a reported edge that is needed to keep together the bearing.
Bearings can be used to axially constrain the shaft in both directions.

NNF Execution

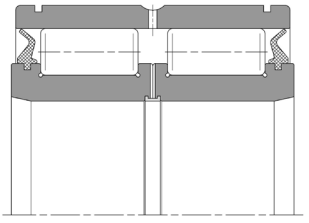
The inner ring is in two parts, held together by a retaining ring, intead the outer one has an integral central edge.
Bearings can be used to axially constrain the shaft in both directions.



NNC

Thanks to the abundant distance existing between the row of rollers, they are also suitable to support overturning moments. The outer ring is 1 mm narrower compared to the inner one and on the external diametric band it has two grooves for the anchor ring.

It is then possible to do without having spacers between the inner ring and the adjacent parts, when you want to avoid disturbing the rotation of the outer ring, for example in pulleys, or the housing can be done (or the hub) narrower than the bearing and save space



NNF

Bearings are usually produced with sliding gaskets/packings on both sides.
They are already supplied with lithium grease with anti-rust additives and with a diester type base oil, that would be suitable for functioning between -50 and +110°C.

Anyway, the allowable operating temperature for these bearings is limited to the material used for the sealing gaskets/packings at n interval between -40 and +80°C

In certain conditions these bearings don't require maintenance, but if they have to operate in presence of humidity or contaminating substances or if speeds are medium high, they must be relubricated, taking advantage of existing holes both of the inner and outer ring.
If bearings must have just one of the two packings or must have none, these can be removed easily with a screwdriver.
For applications in which the oil lubrification is required, bearings can be provided without packings and without grease, as long as the quantity of pieces requested is economically acceptable.
Otherwise packings can be removed and bearings can be washed.
With an oil lubrification it is possible to increase the basic speed of approx 30 %.

DIMENSIONS

The overall dimensions of bearings with standard designations conform to ISO 15-1981, except for series NNF 50, whose outer rings are 1 mm narrower than specified in the ISO for dimensional series 50. However, the other dimensions comply with ISO standards.

MISALIGNMENT

In double-row full complement cylindrical roller bearings, any angular misalignment of the outer ring relative to the inner ring generates overturning moments, leading to overload and reduced service life.

TOLERANCES

DISTITEC's double-row full complement cylindrical roller bearings are typically produced with standard tolerances, except for the NNC type, which has wider limits for the outer ring width (ΔCs) and the variation in the width of the same ring (VCs).
Due to the specified edge attached to the outer ring, the tolerance range for ΔCs is double the standard tolerance and is symmetrical about zero. For example, for bearings with a 100 mm bore diameter, ΔCs = ±200 µm, and the range for VCs is three times the standard tolerance.

INNER RADIAL CLEARANCE

Full complement cylindrical roller bearings, double rows are usually produced with an inner radial clearance of the normal class or the C3 one.

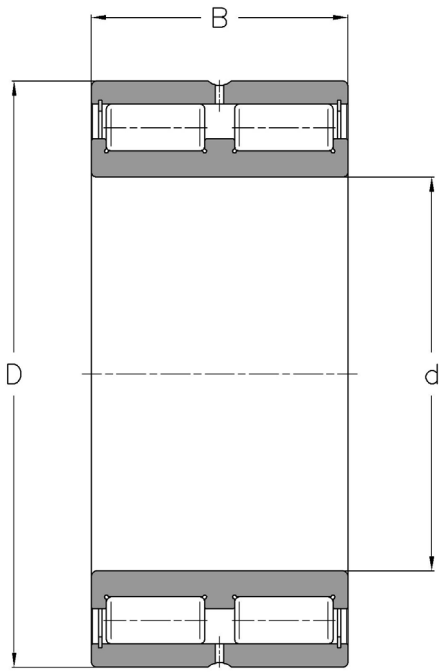
INFLUENCE OF OPERATING TEMPERATURE ON BEARING MATERIAL

DISTITEC's full complement cylindrical roller bearings, are subjected to special heat treatments and they can be used at a temperature until +150 °C without unacceptable dimensional variations occurring

DIMENSION TABLES
FULL COMPLEMENT CYLINDRICAL ROLLER BEARINGS, DOUBLE ROWS

DISTITEC's full complement cylindrical roller bearings, double rows dimensions are standard.
The dimensions/size "range" varies according to the following table.
Executions vary according to those described on page 36

Overall dimensions			Load coefficients	
d	D	B	C	C_0
mm			kN	
100 - 350	140 - 710	40 - 272	194 - 5.500	400 - 12.200



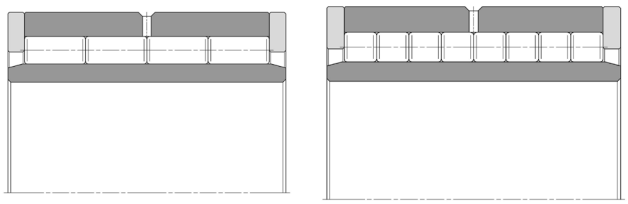
For any further informatio, please contact our technical office.

Multi-row full complement cylindrical roller bearings are mainly used on small cold rolling mills in which there are considerable rolling efforts, but speeds are limited.
Other applications are straightening machines, shears and extruders.
DISTITEC multi-row full complement cylindrical roller bearings are mainly produced with NNU execution, but they can also be provided with three up to five rows of rollers in the executions NNCL to NNC.
To encourage an efficient lubrification, all bearings have the outer ring with holes or an annular groove and holes.

Executions:

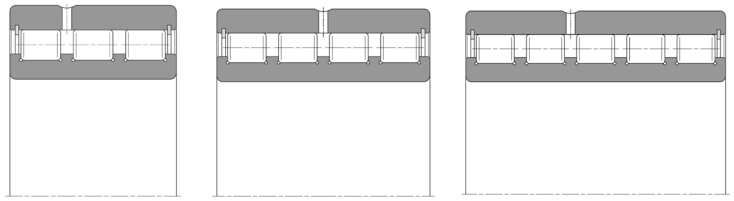
NNU Execution

NNU execution
Bearings have the outer ring with two reported edges and the inner one without edges; there could be four or eight rows of rollers.
They are dismountable and they allow inside them the axial movement of the shaft with respect to the housing in both directions and they are therefore suitable for non-constraining positions.



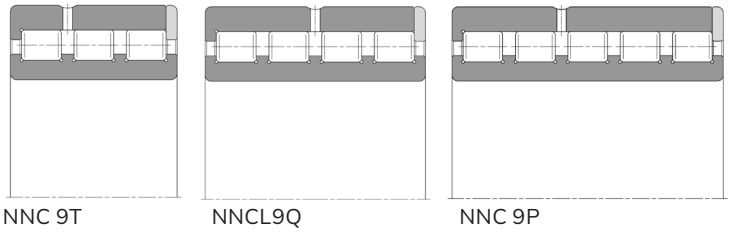
NNCL Execution

These bearings have the inner ring with four up to six edges amd the outer ring without edges.
Retaining rings on both sides of the outer ring raceway serve to hold the bearing together. They allow inside them the axial movement of the shaft with respect to the housing in both directions and they are therefore suitable for non-constraining positions.



NNC Execution

These bearings have the inner ring with four up to six edges and the outer one with an integral edge and a reported edge, which is needed to keep together the bearing. They allow the shaft to be axially constrained in both directions



Distitec's multi-row full complement cylindrical roller bearings type, of versions NNCL abd NNC can be supplied with three, four or five rows.
As there are numerous possibilities regarding dimensions, they haven't been included in the following tables; on demand, frther information concerning these bearings can be provided.

DIMENSIONS

overall dimensions of bearings of execution NNU are compliant to the dimensional series 69 or 60 according to ISO 15-1981
multi-row bearings' inner and outer diameters of the series NNCL and NNC - not indicated in the tables - are compliant to the diametric series 9 of ISO 15-1981. Number 9 in the appelatives refers to such particularity.

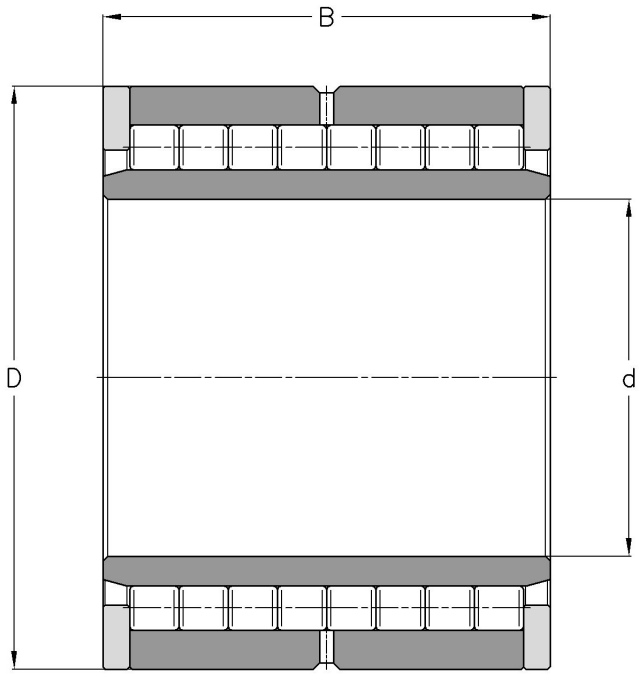
INNER RADIAL CLEARANCE

DISTITEC multi-row full complement cylindrical roller bearings are usually produced with normal tollerances and inner radial clearance C3.

DIMENSION TABLES
MULTI-ROW FULL COMPLEMENT CYLINDRICAL ROLLER BEARINGS

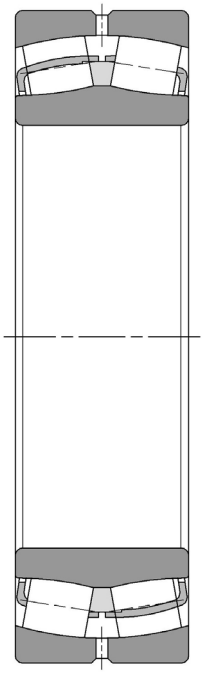
DISTITEC's multi-row full complement cylindrical roller bearings' dimensions are stadard. The dimensions/size "range" varies according to the following table.
Executions vary according to those described on page 39

Overall dimensions			Load coefficients	
d	D	B	C	C_0
mm			kN	
100 - 260	150 - 360	71 - 200	352 - 2.200	980 - 6.000



For any further information, please contact our technical office.

Spherical roller bearings have two rows of rolling components and a single spherical raceway on the outer ring.
The two raceways of the inner ring are inclined at a certain angle to the axis. Their adjustability means that they are not affected by alignment errors of the shaft as compared to the housing, nor of the inflections of theshaft itself.
Further to radial loads, they are able to support also axial loads acting in both directions.
DISTITEC's types have the standard construction shape described a little further on, that slightly varies according to the series and the dimensions.
For particular applications, for example vibrating screens or rolling mills are also produced some special variations of standard shape.



DISTITEC's spherical roller bearings (except for those identified with suffix FA in the appellation) have a a large number of symmetrical rollers, long and with a big diameter and so, they are characterized by a very high load capacity.
Their inner construction shape that slightly varies according to the series and the dimensions, as previously said, has been continuously improved over the years.
Thanks to the special geometry and the optimal degree of finishing of the raceway surfaces, bearing, in particular those of executions E, CC and CAC, have a minimal friction.
Compared to the traditional spherical roller bearings, these bearings have a lower operating temperature or they can support higher axial loads or operate at higher speeds.

DISTITEC's spherical roller bearings are available with cylindrical or conical hole. Conical hole's taper of the types of series 240,241,248 and 249 and 1:30 (suffix K30 in the appellative), instead that one of all the other types and 1:12 (suffix K).

DIMENSIONS

Bearings' overall dimensions indicated in the tables, except for those identified by a drawing number, are according to ISO 15-1981

MISALIGNMENT

In spherical roller bearings the internal shape allows the angular misalignment between the inner rinf compared to the outer one without compromising the performance.
Admissible angular misalignment approximate values indicated in the following table are applicable with loads and normal working conditions and when the misalignment has a constant position compared to the outer ring. the possibility or not of fully exploiting these values depends on the configuration of the bearing system and the type of protections used, ect. when the misalignment hasn't got a constant position compared to the outer ring, for example n those applications where vibrating and misaligned masses are present and so with a rotary bending of the shaft or in machines in which the stationary shaft is inflected, inside the bearings greater creeps occur.
Consequentially, considering bearing's friction and its relative heat development, it is advisable not to overcome a few tenths of a degree of misalignmentamong the rings.

Bearing	Admissible angular misalignment
-	Degrees
222 Series	1,5
223 Series	2
230 Series	1,5
231 Series	1,5
232 Series	2,5
238 Series	1
239 Series	1,5
240 Series	2
241 Series	2,5
248 Series	1,5
249 Series	1,5

TOLERANCES

DISTITEC's spherical roller bearings with cylindrical or conical hole are usually produced with normal tolerances, which values are compliant to ISO 492-1986

ROTATION PRECISION

In high speed applications it is usually required a higher rotation precision than usual and it is advisable, for bearings of execution C08, that have rotation orecision according to class 5 ISO.

INNER CLEARANCE

DISTITEC's spherical roller bearings are usualy produced with normal inner radial clearance.
Most of them are also available with higher clearance C3 and some types also with C4 or C2, which is a reduced clearance compared to the normal one.
DISTITEC's spherical roller bearings for vibrating applications have a clearance that, stays between the upper half of the range C3 and the lower half of C4.
On demand, it is also possible to supply bearings with conical hole for vibrating screens that have a normal inner radial clearance (Suffix CN in the appellative) or C3 or C4.
The limits of the various clearance ranges are compliant ti ISO 5753:1991

INFLUENCE OF OPERATING TEMPERATURE ON BEARING MATERIAL

DISTITEC's spherical roller bearings are usually subjected to a special heat treatment that allows its use up to +200° C for about 2500 hours or, for short periods, at higher temperatures, without inadmissible dimensional modifications occurring.
In many cases, the dimensional variations that can occur during long periods of operation at high temperatures they can also be compensated by appropriately choosing the couplings with the seats and clearances without applying special executions

OPERATING TEMPERATURE AND AXIAL CLEARANCE

Thanks to their inner construction shape, DISTITEC's spherical roller bearings have not only a lower friction than other bearings of the same type, but they are also able to support higher axial loads, including those purely axial. The operating temperature can be a limit to the tolerable axial load.

GROOVES AND LUBRIFICATION HOLES

To make the lubrication efficient, most of DISTITEC's spherical roller bearings have a annular groove and hole on one or both rings.
Bearings are identified by suffixes listed below.
With E execution there is no suffix, because the feature W33 that distinguishes bearings with annular groove and three lubrification holes on the outer ring, it is part of the executive standard.

W20 Bearing with three lubrification holes om the outer ring.
W33 bearing with annular groove and three lubrification holes on the uter ring
W513 Bearing with six lubrification holes on the inner ring and ammular groove and three lubrification holes on the outer ring.

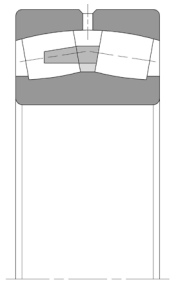
CA Execution
Bearings with symmetrical rollers, side retaining edges on the inner ring and guide element arranged between the crowns and centered on the inner ring. The massive brass cage, side to side, is in only one piece and centered on the guide element.

CAC Execution
As CA, but with refinements to the geometry and surface finish of the raceways that improve the self-guiding effect of the rollers and reduce the friction.

CAF Execution
As CA, but with massive steel cage, side to side, in just one piece.

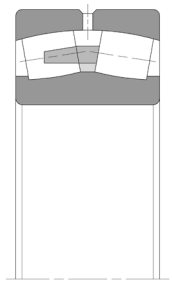
ECA Execution
As CA, but with reinforced roller group.

ECAC Execution
As CAC, but with reinforced roller group.



CA, CAC, CAF, ECA, ECAC

CAB Execution
As CA, but with perforated rollers and steel cage with pins/studs.

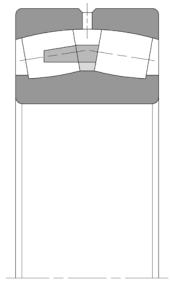


CAB

CAFA Execution
As CA, but with massive steel cage, side to side, in just one piece, centered on the outer ring.

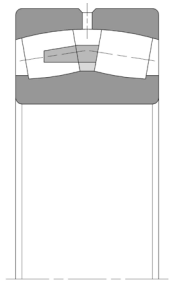
CAFB Execution
As CA, but with massive steel cage, side to side, just in one piece, centered on the inner ring.

CAMA Execution
As CA, but with the cage centered on the outer ring.



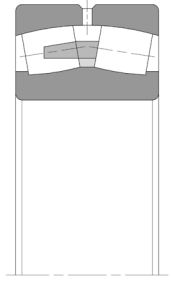
CAFA, CAFB, CAMA

CACM2 Execution
As CAC, with massive brass cage, side to side, centered on rollers.



CACM2

E Execution
Bearings with symmetrical rollers; inner ring without edges, non-integral guide element between the crowns, two slotted cages in pressed steel sheet, one per crown. Annulat groove two between lubrification holes on the outer ring.



E

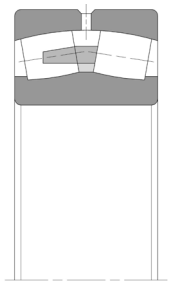
SPHERICAL ROLLER BEARINGS - EXECUTIONS - SUFFIXES

CC Execution
As CJ, but with refinements to the geometry and surface finish of the raceways that improve the self-guiding effect of the rollers and reduce the friction.

CJ Execution
Bearings with symmetrical rollers; inner ring without edges, non-integral guide element arranged between the crowns, centered on the inner ring and a cage with pressed sheet steel slots for each crown.

ECCJ Execution
As ECJ, but with reinforced roller group.

ECJ Execution
ExecutionAs CJ, but with reinforced roller group



CJ, CC, ECJ, ECCJ

PREFISSO

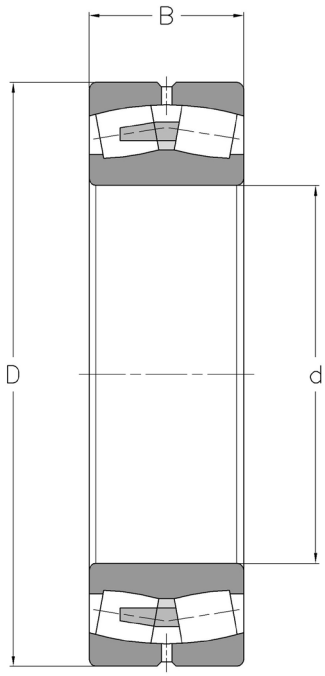
ECB	internal ring of air-fused casehardened steel

SUFFISSI

C2	Inner radial clearance lower than normal
C3	Inner radial clearance higher than normal
C4	Inner radial clearance higher than C3
C5	Inner radial clearance higher than C4
C08	Bearing with a higher rotation precision, according to class 5 ISO
C083	C08 + C3
C084	C08 + C4
HA1	Casehardened inner and outer rings
HA2	Casehardened outer ring
HA3	Casehardened inner ring
K	Conical hole, taper 1:12
K30	Conical hole, taper 1:30
R505	Railway bushings bearing
S2	Stabilized rings for working temperatures up to +250°C
S3	Stabilized rings for working temperatures up to +300° C
VE552	Outer ring with three equally spaced threaded holes on one side for attachment to a hoist
VE553	External ring with three equally spaced threaded holes on each of the two faces for attachment to a hoist
W4	Sign on one side to indicate the thickest point of the internal ring
W20	Three lubrification holes on the outer ring
W26	Three lubrification holes on the outer ring
W33	Annular groove and three lubrification holes on the outer ring
W33X	Annular groove and three lubrification holes on the outer ring
W77	W33 lubrication holes plugged
W503	W4 + W33
W513	W26 + W33
235220	casehardened inner ring, helical groove in the hole

DISTITEC's spherical roller bearings dimensions are standard . The dimensions/size "range" varies according to the following table.
Executions vary according to those described on page 44-45

Overall dimensions			Load coefficients	
d	D	B	C	C_0
mm			kN	
100 - 1.800	150 - 2.180	45 - 580	267 - 22.500	455 - 63.000



For any further information, please contact our technical office.

TAPERED ROLLER BEARINGS

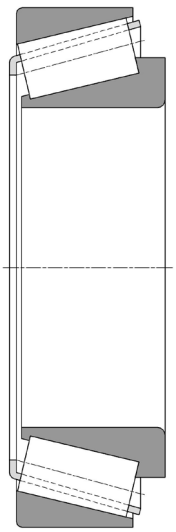
Tapered roller bearings have conical raceways on the inner and outer ring, in which the rollers roll, also conical.
Their construction shape makes them particularly suitable for holding combined loads, that is radial and axial ones. Load capacity is largely determined by the contact angle, which correponds to the inclination of outer ring's raceway. The larger this angle, the greater is the ability to withstand axial loads.
An indication of the extent of α is given by the calculation factor "E", which increases as the axial load capacity increases.
Tapered roller bearings are usually dismountable: the inner ring with the cage roller assembly forms a unit which can be mounted independently of the outer ring.
Distitec produces bearings with one, two or four crowns of tapered rollers with metric and inch dimensions.
Some single crown types are also available in matched pairs.
DISTITEC's tapered roller bearings are the result of the latest technical advances at both a design and executive level.
The sliding surfaces of the guiding edge of the inner ring and of the roller heads have been designed to facilitate the flow of lubricant and the formation of a load-bearing film.
The geometry of the contact between the rollers and the raceways has been significantly improved with the introduction of the logarithmic profile, which ensures optimal stress distribution in the bearing.
the optimal surfaces of the traceways favor the formation of the lubricated film and correct the movement of the rollers.
These are improvements that have significantly increased the quality of performance of DISTITEC's bearings of this type.

TAPERED ROLLER BEARINGS, SINGLE-ROW

DISTITEc's tapered roller bearings, single-row, are able to support loads acting only in one direction. furthermore, in presence of radial loads, an axial force is produced within them which must be counterbalanced; for this reason a tapered roller bearing, single-row, husually has to be registered in opposition with another bearing.
DISTITEC produces a large quantity of tapered roller bearings, single-row series, including the common metric types according to ISO 355. The absorption includes both bearings with a very small section for space-saving arrangements and bearings with a large contact angle for high axial loads.

DIMENSIONS

Metric bearings:
Overall dimensions of standard tapered roller bearings, single-row, listed in the tables, are according to regulation ISO 355-1977, except the types that have a J in the prefix of the appellativee, that are compliant to regulation AFBMA19.1 (1987)
Bearings in inches:
Overall dimensions of standard types are compliant to regulation AFBMA 19 (1974)



MISALIGNMENT

The capacity of tapered roller bearings, single-row to tollerate inner ring's angular misalignments compared to the outer one is limited to a few primes
DISTITEC's bearings with a logarithmic profile can admit three primes alignment errors

TOLERANCES

The cones, i.e. inner rigs, with the relative cage roller group, and the cups i.e. the outer rings, of bearings bearing the same designation are interchangeable.
Exchanging teh cones and the cups, the tolerance on overall width isn't exceeded, that is on the distance T among the supporting sides.

Metric bearings:
DISTITEC's tapered roller metric bearings, single-row, are usually made with normal tolerances; some types are also available with a higher precision, according to tolerance class P5. Bearings that have a J in the prefix of the appellative are made with tolerances CLN, which means reduced tolerances on width, but normal tolerances concerning the rest.

ΔBs values are constantly 0/- 50 µm, those of ΔCs are costantly 0/-100 µm s those of ΔTs are +100/0 µm for bearings with d up to 120 mm included, +150/0 µm with d beyond 120 up to 250 mm included and +200/0 µm with d beyond 250 mm.
Normal classes' tolerance values, CLN and P5 s are compliant to ISO 492-1986.

Bearings in inches:
DISTITEC's tapered roller bearings in inches, single-row, are usually made with normal tolerances. On request, they can be supplied with higher precision according to tolerance classes CL3 or CL0 and/or with reduced tolerances on width. Cones and cups having a tolerance that differs from the normal one on width, are identified by a suffix on the appellative (see table)
Normal tolerance values and those of classes CL3 and CL0 are according to regulation AFBMA B3.19 (1975).

Bearings' cones and cups in inches with modified tolerances on width

Suffix	Tolerance on width[1)]	
	max	min
-	mm	
/1	+0,025	0
/11	+0,025	-0,025
/2	+0,051	0
/2B	+0,076	+0,025
/22	+0,051	-0,051
/3	+0,076	0
/4B	+0,127	+0,025
/-4	0	-0,102

1) Tolerance on overall width of a complete bearing is equal to the sum of the tolerances for the cone and for the cup, for exampe for bearing HM 220149/2 HM 220110/3 the tolerance is +0.127/0 mm

INNER CLEARANCE

With a tapered roller bearing, single-row, it is possible to speak about inner clearance only after the assembly and the registration in contrast with a second bearing/another bearing, which provides for the anchoring of the system in the opposite direction.

CAGES

Distitec's tapered roller bearings have usually got a pressed steel cage except for the large inch types which have a pinned steel cage.

TAPERED ROLLER BEARINGS
SUFFIXES AND DIMENSION TABLES

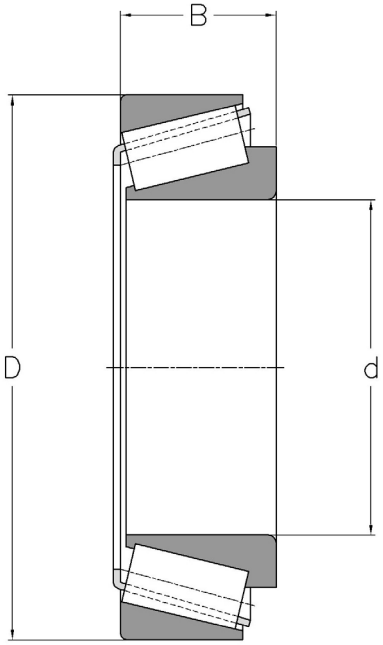
SUFFIXES

CLB	Dimensional precision according to class 4 ISO, rotation precision higher than 4 ISO
CLN	Reduced tolerances on rings' width and on the distance among supporting sides, corresponding to class 6X ISO
CL3	Precision according to ISO 578:1987, tolerance class 3 for bearings in inches
C02	Special reduced tolerance for the precision rotation of the inner ring Case hardened inner and outer rings
HA1	Case hardened outer ring
HA2	Case hardened inner ring
HA3	Case hardened rollers and inner and outer rings
HA4	Case hardened rollers
HA5	Pressed steel cage
J	A number that follows the J indicates a different execution of the cage
M	Massive brass cage
P5	Dimensional and rotation precision according to class 5 ISO (better than P6)
P6	Dimensional and rotation precision according to class 6 ISO
Q	Optimized contact geometry and surface finish
VA30	Railway axlebox bearings (boccole si dicono bushings)
X	Overall dimensions varied for adaptation to regulations ISO
XJ2	X + J2

DIMENSION TABLES

DISTITEC tapered roller bearings, single-row dimensions are standard.
The size "range" varied according to the following table.

Overall dimensions			Load coefficients	
d	D	B	C	C_0
mm/inchs			kN	
100 - 1016	145 - 1.270	21,433 -265	80,9 - 8.970	153 - 16.000
3,937 - 40	5,7087 - 50	0,8438 - 10,4331		



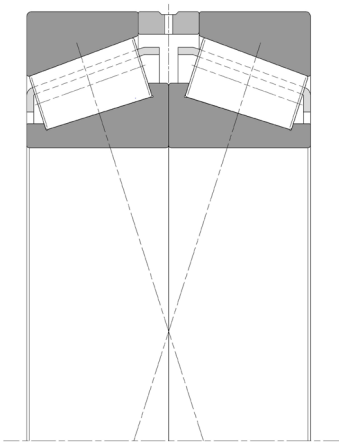
For any further information, please contact our technical office.

For applications in which the load capacity of a bearing with onw row isn't appropriate or when the shaft has to be bonded in two directions with a certain axial clearance, DISTITEC is able to supply tapered roller bearings, single-row paired, already ready for the assembly.
Paired pairs of tapered roller bearings, permit economical solutions and offer several advantages concerning the arrangement and assembly.

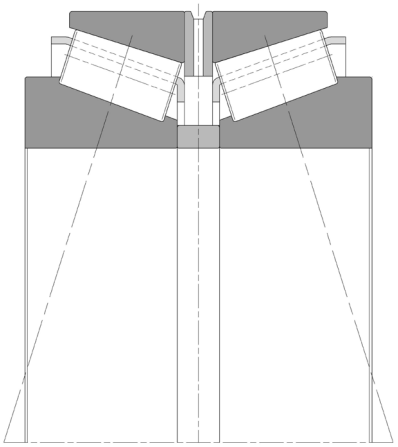
DISTITEC supplies paired pairs with a "X" or "O" arrangement.

In "X" arrangement the lines of action of the load converge towards the bearing axis and it is possible to support axial loads operating in two directions, but obviously with one bearing at a time.

In "O" arrangement (2) the lines of action of the load diverge from the bearing axis and it is possible to support axial loads operating in two directions, but also in this case with one bearing at a time.
This last arrangement gives the shaft a relatively rigid support and it also allows to withstand overturning moments.



1)



2)

TECHNICAL FEATURES

DIMENSIONS
Overall dimensions of tapered roller bearings' pairs paired,are compliant to ISO 355-1977.

MISALIGNMENT
The misalignment among inner rings amd outer rings imposed on the pairs of tapered roller bearings causes moments that add to the acting loads and reduce the duration/life.
If it is unavoidable, it is preferable to use pairs with an X arrangement as they are less rigid than the O ones.

TOLERANCES
Tapered roller bearings of pairs are usually made with normal tolerances,
in accordance to ISO 492-1986

CAGES
Bearings of pairs listed in the tables have pressed steel cages.

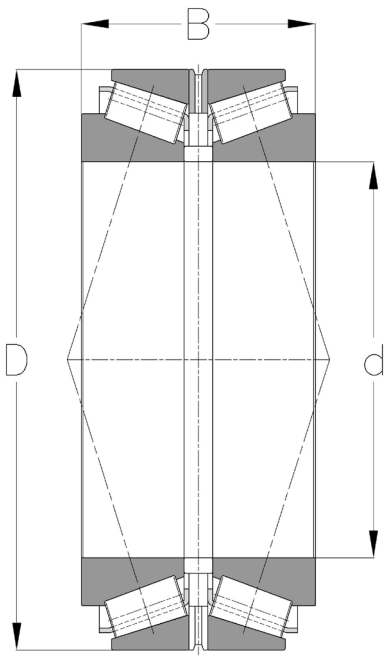
SUFFIXES

C...	Special clearance. The two or three numbers immediately following indicate the average inner axial clearance in µm
DB	Pair of matched bearings "O" arranged. The combination of numbers immediately following identifies the execution of the intermediate spacers of the group
DF	Pair of matched bearings "X" arranged. The combination of numbers immediately following identifies the execution of the intermediate spacers of the group
HA1	Case hardened inner and outer rings
HA1DF	HA1 + DF
J	Pressed steel cage. The following number indicates an execution different from the cage
M	Massive brass cage
X	Overall dimensions varied for adaptation to regulations ISO
XJ2	X + J2

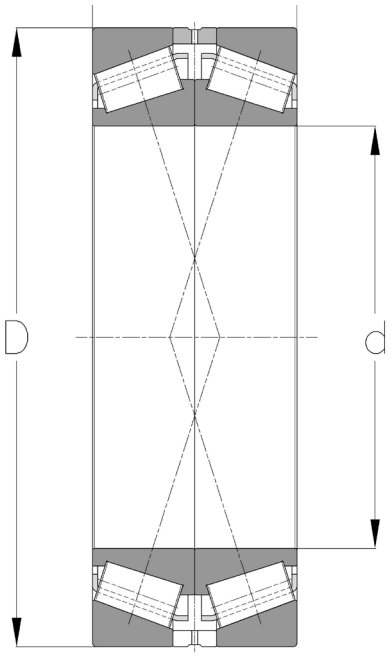
DIMENSION TABLES

DISTITEC's tapered roller bearings, single-row, paired, dimensions are standard.
The dimensions "range" varies according to the following tables.

	Overall dimensions			Load coefficients	
	d	D	B	C	C_0
		mm/inch		kN	
"O" arranged	100 - 381	145 - 482,6	56 - 307	216 - 3.740	380 - 7.350
"X" arranged	100 - 609,6	150 - 787,4	57,15 -228,6	292 - 3690	560 - 10.600



"O" arranged



"X" arranged

For any further information, please contact our technical office.

Tapered roller bearings, double rows support heavy loads and they are very rigid.
They can support combined loads (radial-axial) and they can constrain the shaft in two directions with a certain axial clearance and a certain preload.
They are aminly used in adapters, lifting devices, in rolling mills and mining machines, for example those for digging tunnels.
DISTITEC's tapered roller bearings, double rows are available in TDO and TDI configurations, in several executions.

DIMENSIONS

The dimensions of metric tapered roller types with double rows haven't been unified. Those of most inch types are according to regulation AFBMA 19-1974.

MISALIGNMENT

Angular misalignments are counterbalanced only by forces between the rollers and the raceways, which lead to overloads that lead to reductions in duration.

TOLERANCES

Distitec's tapered roller bearings, double rows are mainly produced with normal dimensional precision and with rotation precision according to tolerance class P5. Information regarding effective tolerances are given on request.

INNER RADIAL CLEARANCE

DISTITEC's tapered roller bearings, double rows, TDO configuration with a cup and two cones with intermediate spacer, have usually got an inner axial clearance, depending on the application and dimensions, that is between 150 and 2100 but, on request, they can have a specific clearance.

DISTITEC's tapered roller bearings, double rows, TDI configuration with two cups, intermediate spacer and a double cone, have a secific inner axial clearance that depends on the application, on the contact angle and dimensions but, on request, they can have a specific clearance.

INFLUENCE OF OPERATING TEMPERATURE ON BEARING MATERIAL

influence of operating temperature on bearing material DISTITEC's tapered roller bearings are subjected to a special heat treatment that allows the use up to +150° C, without causing unacceptable dimensional variations.

CAGES

Cages used for DISTITEC's tapered roller bearings, double rows, are described in the paragraph "executions".

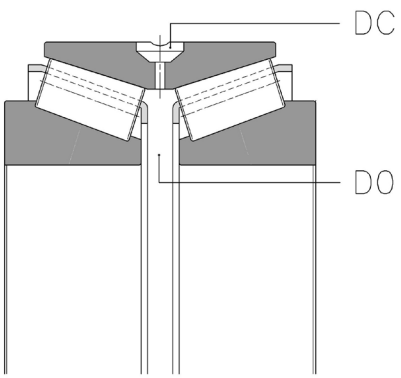
TDO CONFIGURATION

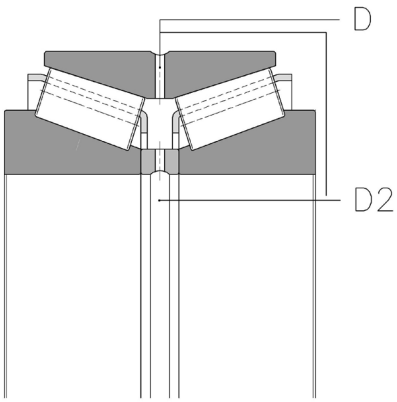
TDO configuration bearings have a double cup, which means a double outer ring, and two cones, which means two inner rings with the respective cage roller groups between which a spacer is usually placed.
They are then ready for the assembly,given that the adjustment of the clearance or preload has already been carried out during the production phase.
In these bearings, cones are "O" arranged and so the lines of action of the load diverge towards the axis, giving the bearing the ability to create relatively rigid systems, able to support great overturning moments.
Bearings can be used to constrain or not the shaft in the axial direction.
With bearings that don't have to be binding, axal movements of the shaft have to happen between their outer ring and the housing.
The types that have a blind hole on the outer ring are particularly suitable for the assembly with loose fit in the housing, as by inserting a cylindrical pin into the hole it is possible to prevent the external ring itself from rotating in its seat. To allow/permit the axial movement of these bearings in the housing, it is advisable to una a spin with a smaller diameter than the one of the blind hole.

EXECUTIONS

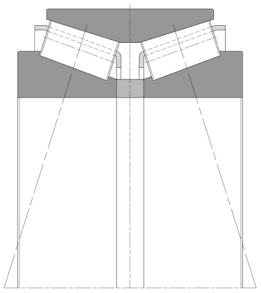
According to the application and the dimensions, DISTITEC's tapered roller bearings, double rows, TDO configuration, are produced with one of the executions described here below, that differ in terms of lubrication measures, the type of cage or intermediate spacer. Executions are identified in bearings' tables with following codes:

C	Outer ring with blind hole
D	Outer ring with annular groove and lubrification holes
D0	Outer ring with annular groove and lubrification holes, without intermediate spacer
D2	Outer ring with annular groove and lubrification holes; intermediate spacer with lubrification holes
D3	Outer ring with annular groove and lubrification holes; intermediate spacer with annular groove and lubrification holes
XD	Outer ring with lubrification holes



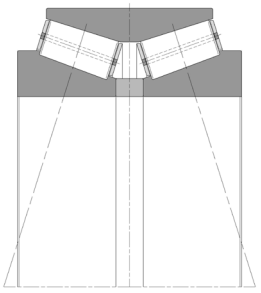


TDO Execution
Bearing with intermediate spacer and pressed steel cage.



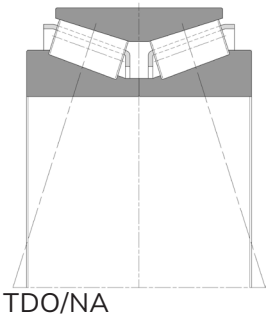
TDO

TDO.1 Execution
Bearing with intermediate spacer, perforated rollers and steel cages with studs.



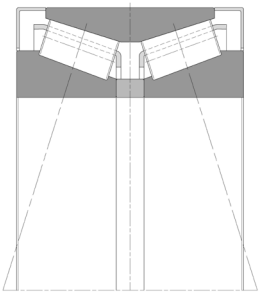
TDO.1

TDO/NA Execution
Bering with larger inner rings that touch eachother, with pressed steel cages.



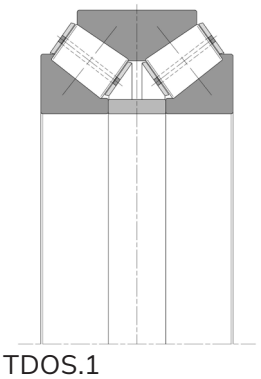
TDO/NA

TDO.Z Execution
bearing with intermediate spacer, pressed steel cages and sheet metal screens.



TDO/Z

TDOS.1 Execution
Bearing with strong contact angle and intermediate spacer, perforated rollers and steel cages with studs. For applications in which the axial load is higher than the radial one.



TDOS.1

TDI CONFIGURATION

Bearings with this configuration have a double cone, this means a double inner ring with its respective cage roller assemblies/groups, and two cups, this means two outer rings, among which, usually, there is a spacer, which is proportioned so as to obtain a certain axial clearance or a preload, and to allow a uniform distribution of the radial load.
Bearings are suitable mainly in axial binding positions and they are made by DISTITEC with cylindrical hole; some of them are also suppliable with conical hole.
Special executions are available for systems in which bearings are mounted loosely on the shaft. To largely mitigate the disadvantage resulting from the loose fit of the inner ring, which has a tendency to rotate on its seat in this way, damaging it or damaging the bearing itself, these special bearings have a helical groove in the hole and/or grooves on ring's sides, designed to allow efficient lubrication of the surfaces on which sliding occurs.
Bearings with high contact angle represent a special execution of TDI configuration. They have an axial load capacity particularly high and they are mainly used as thrust bearing in the rolling mills.
Being free mounted on the neck of the cylinders and being subjected only to an axial load, the inner ring has one or more carvings on one or both lateral sides to allow the arrest and also prevent it from rotating on its seat.
Depending on the application, bearings have or don't have the spacer between the outer rigs. They can also have a retaining collet (bussola) on outer rings.
Bearings with retaining collet better tolerate the cylinder neck deflections of those without.

DIMENSIONS

The dimensions of double-row metric types of tapered rollers have not been unified.
Those of most inch types are according to regulation AFBMA 19-1974.

MISALIGNMENT

Angular misalignments are counterbalanced only from efforts between the rollers and the raceways, which leads to overloading which leads to a reduction in duration.

TOLERANCES

DISTITEC's tapered roller bearings, double row, are mainly made with normal dimensional precision and with rotation precision according to tolerance class P5.
Information concerning effective tolerances are supplied on request.

INNER CLEARANCE

DISTITEC's tapered roller bearings, double rows, configuration TDO with a cup and two cones with intermediate spacer, they usually have an inner axial clearance that, depending on the application and dimensions, goes from 150 to 2100 ut, on request, can have a specific clearance.
DISTITEC's tapered roller bearings, double rows, TDI configuration with two cups, intermediate spacer and a double cone, have a certain inner axial clearance that depends on the application, from the contact angle and dimensions but, on request, they can have a specific axial clearance.

NOTE

The sealing gaskets/packings of TDIE execution are made of fluorine rubber and they emit dangerous vapours at temperatures higher than 300 °C
Once they are overheated, thay are still dangerous to handle also when they cooled down.
Take appropriate precautions.

INFLUENCE OF OPERATING TEMPERATURE ON BEARING MATERIAL

DISTITEC's tapered roller bearings are subjected to a special heat treatment that allows the use up to +150° C, without causing unacceptable dimensional variations.

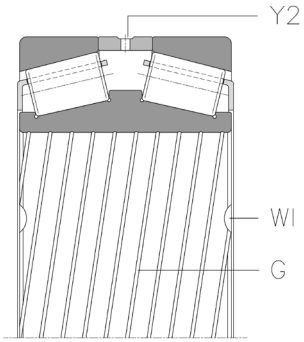
CAGES

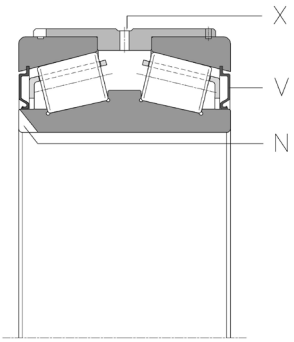
cages used for DISTITEC's tapered roller bearings, double rows are described in the paragraph "executions".

TDI CONFIGURATION - EXECUTIONS

DISTITEC produces tapered roller bearings, double rows, TDI configuration in the executions described below. The variants to the basic executions are identified by the following codes:

G	Helical groove in the hole
N	Two carvings at 180 ° on one side of the inner ring
N1	A carving on each side of the inner ring, at 180° one compared to the other
N2	Two carvings at 180° on each side of the inner ring, staggered at 90° one compared to the other
V	Bearings with radial packings/gaskets, lip seals
WI	Lubrification grooves on lateral sides of the inner ring
X	Bearing with retaining collet, with groove and lubrification holes
Y	Bearing without intermediate spacer
Y2	Intermediate spacer with groove and lubrification holes





TDI Execution
Bearing with intermediate spacer and pressed steel cage.

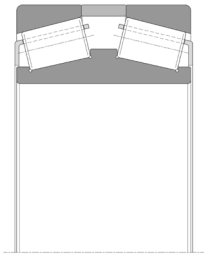
TDI.1 Execution
Bearing with intermediate spacer, perforated rollers and steel cages with studs.

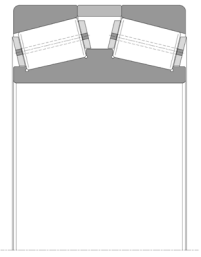
TDIE Execution
Bearing with larger inner ring on two sides, intermediate spacer and pressed steel cages. Inner ring's extentions are grinded ad they are used as a "sliding" raceway for sealing seals.

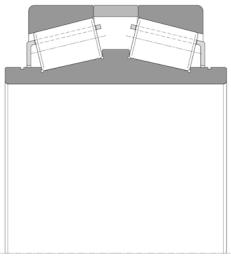
TDIT Execution
Bearing with conical hole, taper 1:12, intermediate spacer and pressed steel cages.

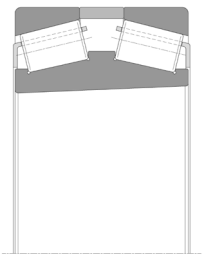
TDIS Execution
Bearing with strong contact angle, intermediate spacer and pressed steel cages.

TDIS.1 Execution
Bearing with strong contact angle, intermediate angle, perforated rollers and steel cages with studs.


TDI


TDI.1


TDIE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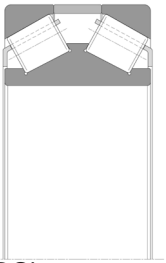
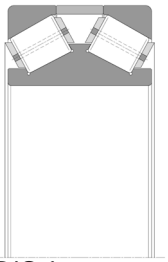

TDSI


TDIS.1

TDI CONFIGURATION - TECHNICAL FEATURES

DIMENSIONS
The dimensions of double-row metric types of tapered rollers have not been unified.
Those of most inch types are according to regulation AFBMA 19-1974.

MISALIGNMENT
Angular misalignments are counterbalanced only from efforts between the rollers and the raceways, which leads to overloading which leads to a reduction in duration.

TOLERANCES
DISTITEC's tapered roller bearings, double rows, are mainly made with normal dimensional precision and with rotation precision according to tolerance class 5. Information concerning effffective tolerances are supplied on request.

INNER CLEARANCE
DISTITEC's tapered roller bearings, double rows, TDO configuration with one cup and wo cones with intermediate spacer, usually have an inner axial clearance that, depending on the application and the dimensions, goes from 150 to 2100 but, on request, tey can have a specific clearance.
DISTITEC's tapered roller bearings, two rows, TDI configuration with two cups, intermediate spacer and a double cone, have a certain inner axial clearance tat depends on the application, on the contact angle and dimensions but, on request they can have a specific axial clearance.

NOTE
The sealing gaskets/packings of TDIE execution are made of fluorine rubber and they emit dangerous vapours at temperatures higher than 300 °C.
Once they are overheated, thay are still dangerous to handle also when they cooled down.
Take appropriate precautions.

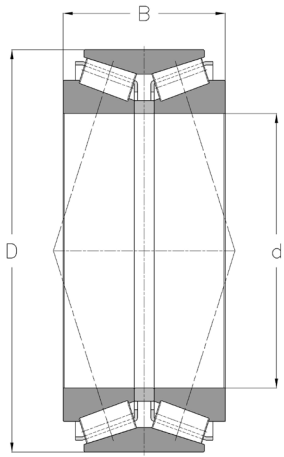
INFLUENCE OF OPERATING TEMPERATURE ON BEARING MATERIAL
DISTITEC's tapered roller bearings are subjected to a special heat treatment that allows the use up to +150° C, without causing unacceptable dimensional variations.

CAGES
cages used for DISTITEC's tapered roller bearings, double rows are described in the paragraph "executions".

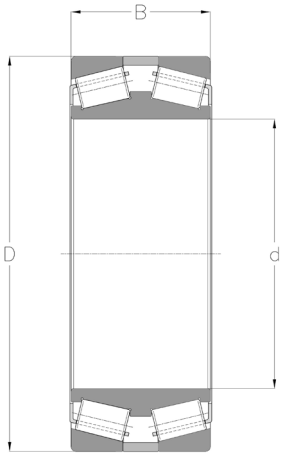
TDI CONFIGURATION - DIMENSION TABLES

DISTITEC's tapered roller bearings, double rows dimensions are standard. The dimensions/size "range" varies according to the following tables.

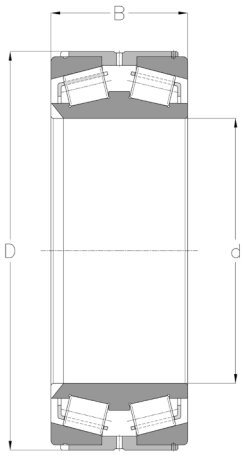
EXECUTION	Overall dimensions			Load coefficient	
	d	D	B	C	C₀
		mm		kN	
"TDI"	152,4 - 939,8 6 - 37	222,25 - 1.333,5 8,75 - 52,5	84,138 -463,55 3,3125 - 18,25	605 - 17.600	1.250 - 49.000
"TDO"	100 - 3.811 3,937 - 150	150 - 4.216,4 5,9055 - 166	49,212 -742 1,9375 - 29,2126	220 - 34.700	355 - 108.000
"TDI with strong contact angle"	300 - 800	440 - 1.100	105 - 304,8	1.010 - 7.650	2.040 - 21.600
"TDI with retaining collet"	305,07 - 520	524 - 715	150 - 220	1.720 - 2.860	3.450 - 8.300



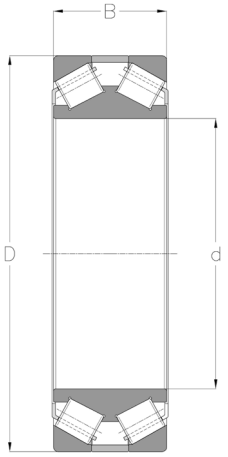
TDO



TDI



TDI (bussola)



TDI (forte angolo)

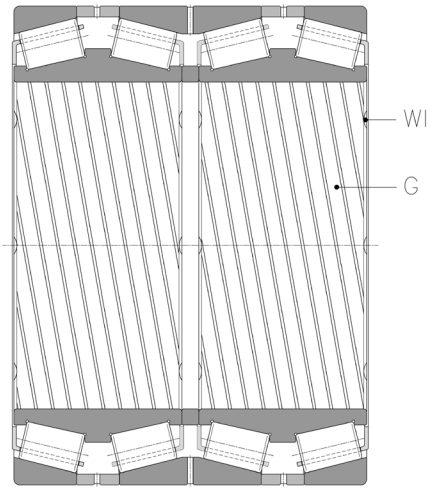
For any further information, please contact our technical office.

TAPERED ROLLER BEARINGS, FOUR ROWS

Tapered roller bearings, four rows, are used with success in rolling mills, in which rolling speeds are low or moderate. thanks to their construction shape, they are able to support axial loads present in these applications, together with radial loads and they don't usually require separate thrust bearings; the necks can therefore be relatively short and the two packings can be identical on two sides.
Given their shape, tapered roller bearings, four rows must be installed in packings as complete units. In order to allow rapid replacement of the cylinders they must therefore be mounted with loose coupling on the necks.
With such an assembly type, inner rings tend to rotate on their respective seats, which, being less hard than bearings, wear out.
To somehow alleviate this inconvenience, DISTITEC's bearings have a helical groove in the hole and/or grooves on lateral sides of the inner rings, that allow te lubrificant to reach the contact surfaces between the rings and the seat. Furthermore the grooves,once filled with grease, they can incorporate wear particles.

G	Helical groove in the hole
WI	Lubrification grooves on lateral sides of the inner ring
GWI	G + WI

The inner rings of rolling mill neck bearings in which there are high speeds or strong loads, must be forced.
To do this, and in the same time allow cylinders replacements as quickly as possible, four-row types of tapered rollers with a tapered bore are used.

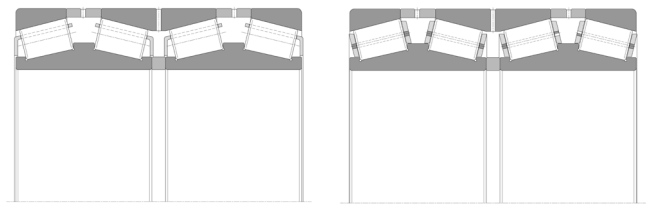


EXECUTIONS

DISTITEC's tapered roller bearings, four rows, are made with the executions described below. The difference among executions TQO and TQI is the relative arrangement in the crowns and the following number of inner and outer rings. However, TQI types are almost exclusively used.

Execution TQO

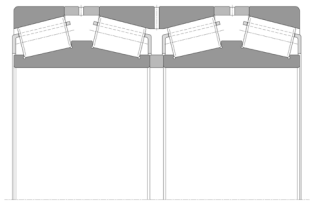
Bearings of this type have two pairs of "X" rows. They have two double cones, a double couple and two single cups or four single cups. The outer ring in four parts simplifies any bearing machining operation and reduces spare parts storage costs. Normally these bearings have pressed steel cages. Big types and those for reversionary rolling mills have instead perforated rollers and steel cages with pins/studs (execution TQO.1).



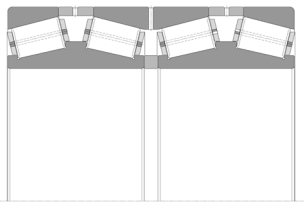
TQO TQO.1

TQOE Execution

As TQO, but with larger inner rings. The extensionsof these are grinded and they are needed as sliding raceways for sealing seals.



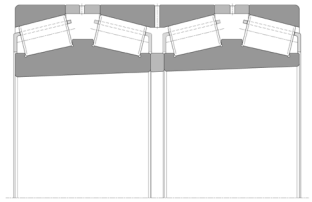
TQO



TQO.1

TQOT Execution

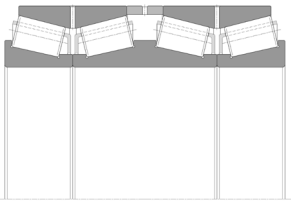
As TQO but with conical hole, taper 1:12.



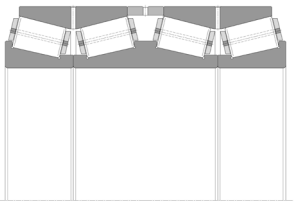
TQOT

TQI Execution

Bearings of this type have two pairs of "O" rows. They are made of a double cone and two single cones amd by two double cups or by four single cups.
The execution with four cups simplifies any bearing machining operation and reduces spare parts storage costs. Normally these bearings have pressed steel cages. Big types and those for reversionary rolling mills have instead perforated rollers and steel cages with pins/studs (execution TQO.1). TQI bearings are usually used when a big rigidity is required and considerable overturning moments must be supported; on cylinder necks, they are usually forced mounted.
They are also used on vertical cylinders of universal rolling mills; in this case outer rings are forced in the packing, instead the inner rings have a loose fit with the seat.



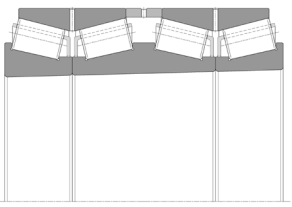
TQI



TQI.1

TQIT Execution

As TQI, but with conical hole, taper 1:12 or 1:30.

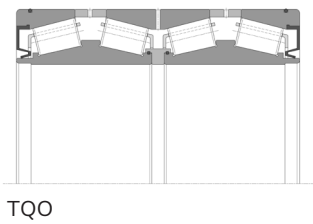


TQIT

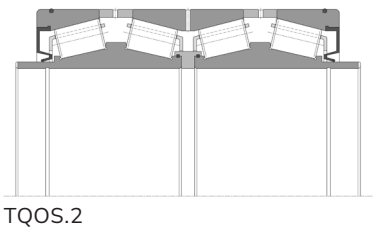
BEARINGS WITH SEALING SEALS

Most tapered roller bearings, four rows, are supplied by DISTITEC with gaskets incorporated on both sides.
They are produced in several versions, depending on dimensions and and the open starting type (that means not protected). Compared to open bearings, bearings with gaskets offer several advantages:
- longer operating times
- significantly reduced grease consumption
-longer maintenance intervals
- absence of grease loss and contamination of the emulsion fluid
- possibility of replacing pre-existing open ones, thanks to the identical overall dimensions

From the point of view of ecology and economy, bearings with seals are completely in line with modern requirements



TQO



TQOS.2

DIMENSIONS

Tapered roller bearings, four rows, overall dimensions haven't been unified by ISO. However, cones' and cups' dimensions of types in inches are compliant to regulations AFBMA 19-1974 and ANSI B3.19-1975.

TOLERANCES

Tapered roller bearings, four rows, are made with dimensional precision that corresponds to the normal tolerance class for metric yes and types in inches. The rotation precision of all bearings is according to P5 class. Metric bearings' tolerances are compliant to ISO 492-1986 (normal class and class 5), instead those of bearings in inches follow class 4 (normal) of ISO 578:1987 and AFBMA 19-1974.

INNER CLEARANCE

DISTITEC's tapered roller bearings, four rows, are supplied as units ready for the assembly, with an inner axial clearance suitable for the specific application. Components must be installed in the prescribed order and they can't be exchanged with those of other bearings.

INFLUENCE OF OPERATING TEMPERATURE ON BEARING MATERIAL

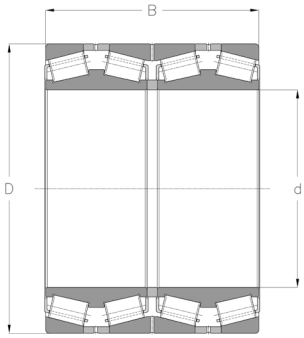
DISTITEC's tapered roller bearings are usually subjected to a special heat treatment that allows the use up to +150° C, without causing unacceptable dimensional variations.

CAGES

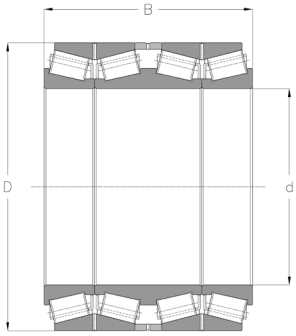
DISTITEC's tapered roller bearings, four rows have or steel cages or pressed cages or cages with pins/studs, as specified in the descriptions of the various executions.

DISTITEC's tapered roller bearings, four rows dimensions are standard. The dimensions/size "range" varies according to the following tables.

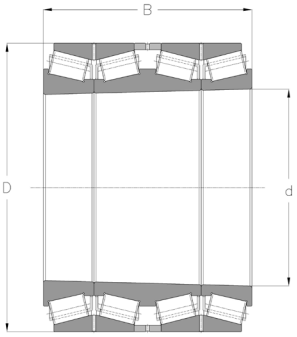
EXECUTION	Overall dimensions			Load coefficients	
	d	D	B	C	C₀
		mm		kN	
“TQO”	120,65 - 1580 4,75 - 62,2047	174,625 - 1960 5,5001 - 77,1654	139,703 - 1080 5,5625 - 42,5197	737 - 46.800	1.560 - 176.000
“TQI”	254 - 510 10 - 20,0787	358,775 - 655 14,125 - 25,7874	280,194 - 496,888 11,0313 - 19,5625	2.860 - 8.250	7.100 - 22.000
“TQTI”	170,655 - 1.004,634 6,7187 - 39,5525	225,425 - 1.308,1 8,875 - 51,5	168,275 - 933,45 6,625 - 36,75	858 - 28.100	2.200 - 81.500
“TQOS”	1521,4 - 863,6 6,0 - 34,0	244,475 - 1.169,987 9,625 - 46,0625	192,088 - 844,55 7,5625 - 33,25	1.300 - 24.600	2.160 - 73.500



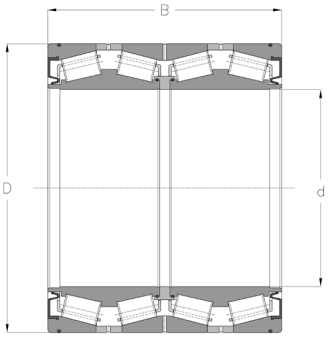
TQO



TQI



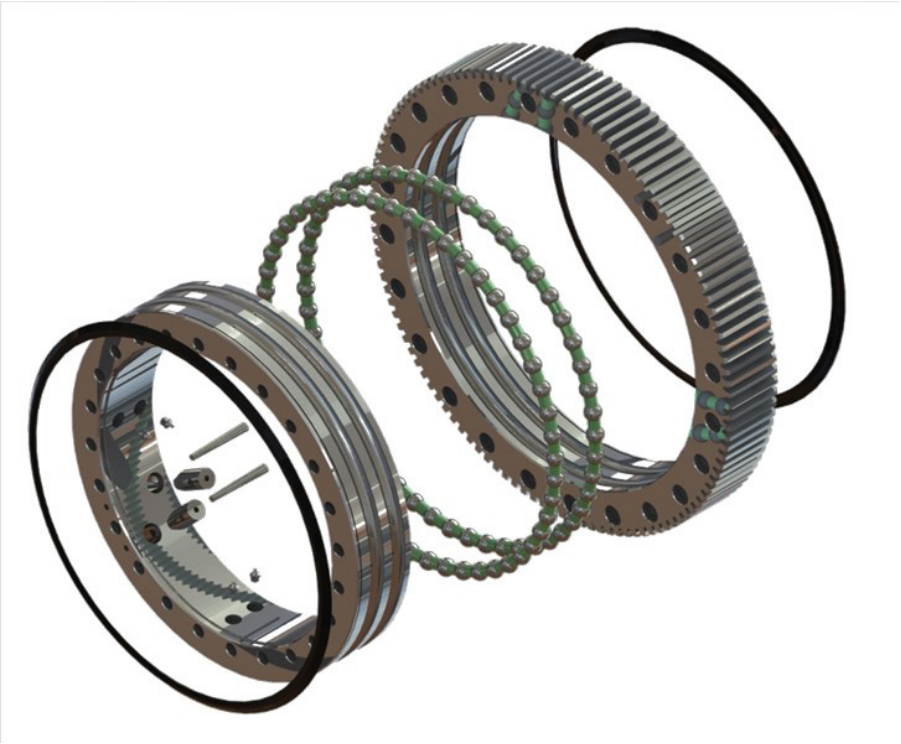
TQIT



TQOS

For any further information, please contact our technical office.

SLEWING RINGS - TECHNICAL FEATURES



1 - Outer ring
2 - Inner ring
3 - Ball
4 - Spacer
5 - Seal
6 - Filling Plug
7- Conical pin
8 - Greaser

slewing rings that DISTITEC produces have the following technical features:

Outer and inner ring mainly made in carbon steel C45 (UNI 7845) or alloy steel 42CrMo4 (UNI 7846) both first reclaimed.

The use of one material or the other is related to the mechanical requested features, including toughness and hardness but also technological factors.
42CrMo4 offers the possibility to obtain a higher depth of the hardened layer of the rolling raceways amd so, higher load capacities.
C45 (or equivalent) is the material used to make most of standard bearings with medium-small diameters, 42CrMo4 is used for medium-big diameters and for several special constructions.
Induction hardening to which rolling raceways are subject, is necessary to increase bearing's load capacity and preserve raceways from plasticization phenomena due to contact pressures with the rolling elements.
Rolling elements raceways' hardness, after this treatment, can reach 62 HRc.
The hardening depth varieswith dimensions and so loads to be supported.

ROLLING ELEMENTS

Balls, made according to regulation DIN 5401, are used for four point contact bearings intead, cylindrical rollers made according toIN 5402, for crossed roller bearings and both are made in full hardened steel 100Cr6 UNI 3097).
These bearings' hardness reaches 64 HRc.

SPACERS

They are made in materials such as NYLON or P.T.F.E. (TEFLON) with high mechanical characteristics. They are used to keep separate rolling elements avoiding the contact. Spacers may not be expected in those applications in which admissible loads of the slewing ring must be of high loads.

Seals and packings produced in nitrile elastomer NBR. This packing closes the empty that is created between one ring and the oter avoiding the entry of dirt and impurities, dust and humidity. A correct lubrification increases the efficacy of the seals.

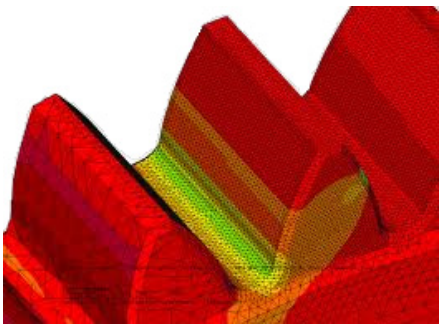
GREASE

Slewing rings produced by DISTITEC S.R.L. are supplied with an initial lubrification of the rolling raceway of the balls or rollers with specific greases, listed in the use and maintenance manual that we supplied together with the product and on which there are the correct indications for a correct periodical relubrication.

GREASERS

DISTITEC's slewing rings are supplied with specific greasers positioned in specific seats/sites built-in the diameter where there aren't teeth or where it is required by the client in case of special executions.

TEETH



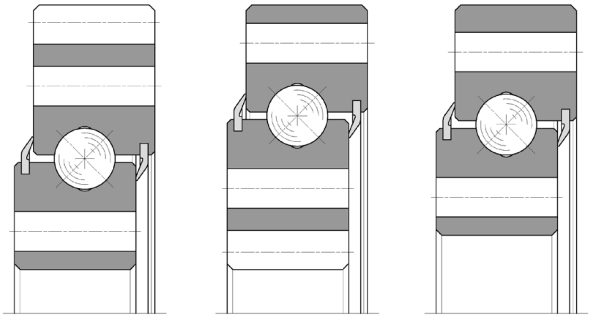
Right teeth cylindrical teeth (See photo) done respecting all technicl features of this type of teeth.
On the drawing given by DISTITEC, are indicated all parameters concerning the teeth for a correct execution of the pinion that will mesh with it.
Superficial standard hardness of the used reclaimed material reaches a maximum of 30 HRc (42CrMo4) and not alway s this hardness value can be acceptable to preserve teeth's life in some applications.

High elevation couple that produces a high frictional effort on the tooth, high rotation speeds, unfavorable environmental conditions with the presence of dust or abrasive elements, or the necessity to take slewing ring's life cycle to its
maximum achievable, causes the induction hardening treatment is done also on teeth.
The treatment can be done only on one side or on the side and bottom of tooth, according to loads and the type of application. The maximum surface hardness that can be obtained is 60 HRc.
Slweing rings are used for several applications in various industrial sectors
if it is required the rotstion on a structural part compared to another one according to a single axis, ensuring the bond between the parts.
DISTITEC produces slewing rings in several executions that correspond to most market demands. The sectors that we currently supply range from the mining one to the offshore technology one, from the steel industry to the most "traditional" handling and lifting of materials and the mechanical industry in general.
These products are made according to general regulations relating to rolling bearings and using materials and treatments suitable for good operation guaranteeing the required duration.

In this cataogue the several standard executions that DISTITEC is able to supply on request also for small quantities (single piece) are shown and also the minimum and maximum overall dimensions that we can make according to machines' capacity.

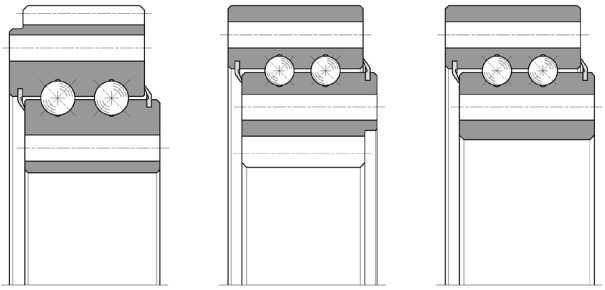
SLEWING RINGS - EXECUTIONS

SOLID SECTION SLEWING RINGS WITH A SINGLE BALL CROWN



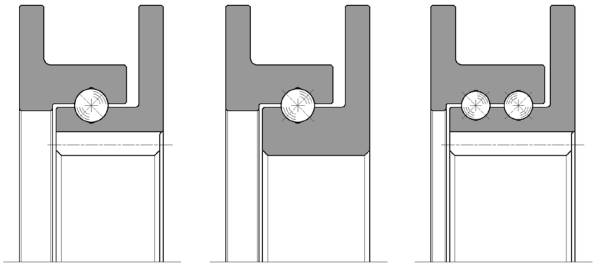
Production range	inner diameter	outer diameter	thickness	module
		mm		n°
Min value	289	456	59	5
Max value	6442	7027,2	221	16

SOLID SECTION SLEWING RINGS WITH TWO BALL CROWNS



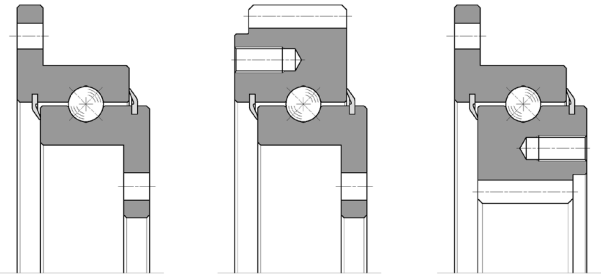
Production range	inner diameter	outer diameter	thickness	module
		mm		n°
Min value	224	432	92	5
Max value	1779	2178	156	15

SLEWING RINGS WITH PROFILED BALL SECTION



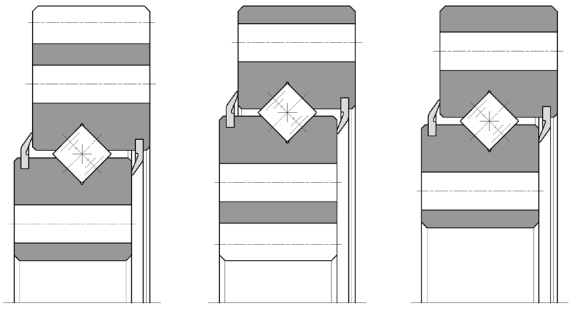
Production range	inner diameter	outer diameter	thickness	module
		mm		n°
Min value	233	401	36	5
Max value	1310	1598	90	10

SOLID - PROFILED BALL SECTION SLEWING RINGS



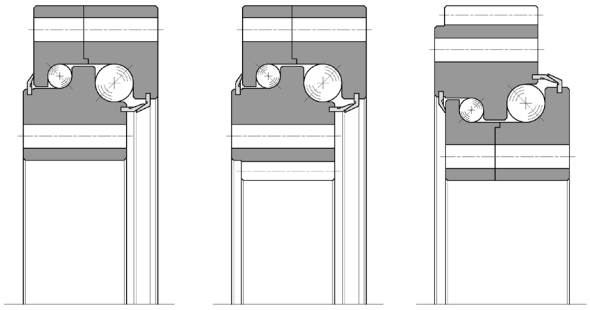
Production range	inner diameter	outer diameter	thickness	module
		mm		n°
Min value	233	401	36	5
Max value	1310	1598	90	10

RALLE DI ROTAZIONE A RULLI INCROCIATI



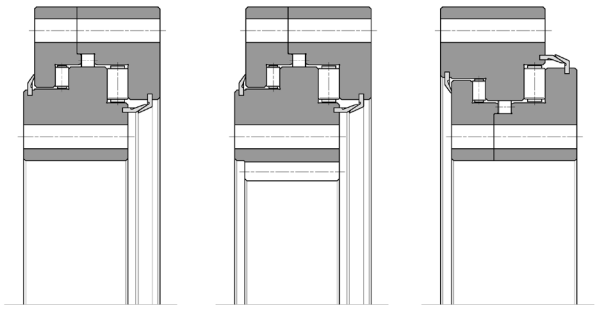
Production range	inner diameter	outer diameter	thickness	module
		mm		n°
Min value	304	475	55	4
Max value	2809	3296	130	20

RALLE DI ROTAZIONE A DUE CORONE DI SFERE



Production range	inner diameter	outer diameter	thickness	module
		mm		n°
Min value	679	863	77	6
Max value	3970	4500	187	20

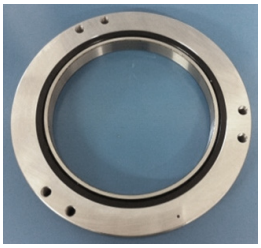
RALLE DI ROTAZIONE ASSO-RADIALI A TRE CORONE DI RULLI

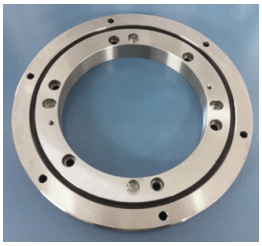


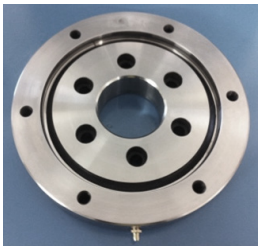
Production range	inner diameter	outer diameter	thickness	module
		mm		n°
Min value	1032	1397	132	12
Max value	6470	7147	268	24

SPECIAL EXECUTIONS

Special executions are possible thanks to the production in outsourcing tha allows to use a very wide dimensional range and able to satisfy several needs and requests concerning loads and overall dimension







TOLERANCES (P0/P6) - DIN 620 - RADIAL BEARINGS

Tolerances for radial bearings (excluding tapered rollers) of precision class P0 (µm)

Inner ring d (mm)		Δdmp		VDp Diametric series			VDmp	ΔCs		VCs	Kea
				8,9	0,1	2,3,4					
over	up to	sup.	inf.	max	max	max	max	min	max	max	max
80	120	0	-20	25	25	15	15	-200	0	25	25
120	180	0	-25	31	31	19	19	-250	0	30	30
180	250	0	-30	38	38	23	23	-300	0	30	40
250	315	0	-35	44	44	26	26	-350	0	35	50
315	400	0	-40	50	50	30	30	-400	0	40	60
400	500	0	-45	56	56	34	34	-450	0	50	65
500	630	0	-50	63	63	38	38	-500	0	60	70
630	800	0	-75	-	-	-	-	-750	0	70	80
800	1.000	0	-100	-	-	-	-	-1000	0	80	90
1.000	1.250	0	-125	-	-	-	-	-1250	0	100	100
1.250	1.600	0	-160	-	-	-	-	-1600	0	120	120
1.600	2.000	0	-200	-	-	-	-	-2000	0	140	140

Tolerances for radial bearings (excluding tapered rollers) of precision class P0 (µm)

Inner ring d (mm)		Δdmp		VDp Diametric series			VDmp	Kea
				8,9	0,1	2,3,4		
over	up to	sup.	inf.	max	max	max	max	max
80	120	0	-15	19	19	11	11	35
120	150	0	-18	23	23	14	14	40
150	180	0	-25	31	31	19	19	45
180	250	0	-30	38	38	23	23	50
250	315	0	-35	44	44	26	26	60
315	400	0	-40	50	50	30	30	70
400	500	0	-45	56	56	34	34	80
500	630	0	-50	63	63	38	38	100
630	800	0	-75	94	94	55	55	120
800	1.000	0	-100	125	125	75	75	140
1,000	1.250	0	-125	-	-	-	-	160
1.250	1.600	0	-160	-	-	-	-	190
1.600	2.000	0	-200	-	-	-	-	220
2.000	2.500	0	-250	-	-	-	-	250

Tolerances for radial bearings (excluding tapered rollers) of precision class P6 (µm)

Inner ring d (mm)		Δdmp		VDp Diametric series			VDmp	ΔCs		VCs	Kea
				8,9	0,1	2,3,4					
over	up to	sup.	inf.	max	max	max	max	min	max	max	max
80	120	0	-15	19	19	11	11	-200	0	25	13
120	180	0	-18	23	23	14	14	-250	0	30	18
180	250	0	-22	28	28	17	17	-300	0	30	20
250	315	0	-25	31	31	19	19	-350	0	35	25
315	400	0	-30	38	38	23	23	-400	0	40	30
400	500	0	-35	44	44	26	26	-450	0	45	35
500	630	0	-40	50	50	30	30	-500	0	50	40
630	800	0	-50	-	-	-	-	-750	0	55	45
800	1.000	0	-65	-	-	-	-	-1000	0	60	50
1.000	1.250	0	-80	-	-	-	-	-1250	0	70	60
1.250	1.600	0	-100	-	-	-	-	-1600	0	70	70
1.600	2.000	0	-130	-	-	-	-	-2000	0	80	80

Tolerances for radial bearings (excluding tapered rollers) of precision class P6 (µm)

Outer ring D (mm)		Δdmp		VDp Diametric series			VDmp	Kea
				8,9	0,1	2,3,4		
over	up to	sup.	inf.	max	max	max	max	max
80	120	0	-13	16	16	10	10	18
120	150	0	-15	19	19	11	11	20
150	180	0	-18	23	23	14	14	23
180	250	0	-20	25	25	15	15	25
250	315	0	-25	31	31	19	19	30
315	400	0	-28	35	35	21	21	35
400	500	0	-33	41	41	25	25	40
500	630	0	-38	48	48	29	29	50
630	800	0	-45	56	56	34	34	60
800	1.000	0	-60	75	75	45	45	75
1,000	1.250	0	-80	-	-	-	-	85
1.250	1.600	0	-100	-	-	-	-	100
1.600	2.000	0	-130	-	-	-	-	100
2.000	2.500	0	-160	-	-	-		120

TOLERANCES (P5/P4) - DIN 620 - RADIAL BEARINGS

tolerances for radial bearings (excluding tapered rollers) of precision class P5 (µm)

Inner ring d (mm)		Δdmp		VDp Diametric series 8,9	VDp Diametric series 0,1,2,3,4	VDmp	ΔCs		VCs	Kea	Sd
oltre	up to	sup.	inf.	max	max	max	min	max	max	max	max
80	120	0	-10	10	8	5	-200	0	7	6	9
120	180	0	-13	13	10	7	-250	0	8	8	10
180	250	0	-15	15	12	8	-300	0	10	10	11
250	315	0	-18	18	14	9	-350	0	13	13	13
315	400	0	-23	23	18	12	-400	0	15	15	15
400	500	0	-27	28	21	14	-450	0	18	17	18
500	630	0	-33	35	26	18	-500	0	20	19	20
630	800	0	-40	-	-	-	-750	0	26	22	26
800	1.000	0	-50	-	-	-	-1000	0	32	26	32
1.000	1.250	0	-65	-	-	-	-1250	0	38	30	38
1.250	1.600	0	-80	-	-	-	-1600	0	45	35	45
1.600	2.000	0	-100	-	-	-	-2000	0	55	40	55

Tolerances for radial bearings (excluding tapered rollers) of precision class P5 (µm)

Outer ring D (mm)		Δdmp		VDp Diametric series 8,9	VDp Diametric series 0,1,2,3,4	VDmp	VCs	Kea	Sd
oltre	up to	sup.	inf.	max	max	max	max	max	max
80	120	0	-10	10	8	5	8	10	9
120	150	0	-11	11	8	6	8	11	10
150	180	0	-13	13	10	7	8	13	10
180	250	0	-15	15	11	8	10	15	11
250	315	0	-18	18	14	9	11	18	13
315	400	0	-20	20	15	10	13	20	13
400	500	0	-23	23	17	12	15	23	15
500	630	0	-28	28	21	14	18	25	18
630	800	0	-35	35	26	18	20	30	20
800	1.000	0	-40	50	29	25	25	35	30
1.000	1.250	0	-50	-	-	-	30	50	40
1.250	1.600	0	-65	-	-	-	40	65	50

Tolerances for radial bearings (excluding tapered rollers) of precision class P4 (µm)

Inner ring d (mm)		Δdmp		VDp Diametric series 8,9	VDp Diametric series 0,1,2,3,4	VDmp	ΔCs		VCs	Kea	Sd
oltre	up to	sup.	inf.	max	max	max	min	max	max	max	max
80	120	0	-8	8	6	4	-200	0	4	5	5
120	180	0	-10	10	8	5	-250	0	5	6	6
180	250	0	-12	12	9	6	-300	0	6	8	7
250	315	0	-15	-	-	-	-350	0	7	8	7
315	400	0	-19	-	-	-	-400	0	8	10	8
400	500	0	-23	-	-	-	-450	0	9	10	9
500	630	0	-26	-	-	-	-500	0	10	12	10
630	800	0	-34	-	-	-	-750	0	15	15	15

Tolerances for radial bearings (excluding tapered rollers) of precision class P4 (µm)

Outer ring D (mm)		Δdmp		VDp Diametric series 8,9	VDp Diametric series 0,1,2,3,4	VDmp	VCs	Kea	Sd
over	up to	sup.	inf.	max	max	max	max	max	max
80	120	0	-8	8	6	4	4	6	5
120	150	0	-9	9	7	5	5	7	5
150	180	0	-10	10	8	5	5	8	5
180	250	0	-11	11	8	6	7	10	7
250	315	0	-13	13	10	7	7	11	8
315	400	0	-15	15	11	8	8	13	10
400	500	0	-20	-	-	-	9	14	10
500	630	0	-25	-	-	-	10	17	12
630	800	0	-28	-	-	-	12	20	14
800	1.000	0	-35	-	-	-	15	25	20
1.000	1.250	0	-40	-	-	-	20	30	25
1.250	1.600	0	-55	-	-	-	25	40	30

TOLERANCES (P0/P6) - DIN 620 - TAPERED ROLLERS

Tolerances for tapered roller bearings of precision class P0 (µm)

Inner ring d (mm)		Δdmp		VDp	VDmp	ΔCs		Kea	ΔTs	
over	up to	sup.	inf.	max	max	min	max	max	min	max
80	120	0	-20	20	15	-200	0	30	-200	+200
120	180	0	-25	25	19	-250	0	35	-250	+350
180	250	0	-30	30	23	-300	0	50	-250	+350
250	315	0	-35	35	26	-350	0	60	-250	+350
315	400	0	-40	40	30	-400	0	70	-400	+400
400	500	0	-45	45	-	-450	0	70	-400	+400
500	630	0	-50	50	-	-500	0	85	-500	+500
630	800	0	-75	75	-	-750	0	100	-600	+600
800	1.000	0	-100	100	-	-1000	0	120	-750	+750

Tolerances for tapered roller bearings of precision class P0 (µm)

Outer ring D (mm)		Δdmp		VDp	VDmp	Kea
over	up to	sup.	inf.	max	max	max
80	120	0	-18	18	14	35
120	150	0	-20	20	15	40
150	180	0	-25	25	19	45
180	250	0	-30	30	23	50
250	315	0	-35	35	26	60
315	400	0	-40	40	30	70
400	500	0	-45	45	34	80
500	630	0	-50	50	38	100
630	800	0	-75	75	-	120
800	1.000	0	-100	100	-	120
1,000	1.250	0	-125	125	-	120
1.250	1.600	0	-160	160	-	120

Tolerances for tapered roller bearings of precision class P6X (µm)

Inner ring d (mm)		Δdmp		VDp	VDmp	ΔCs		Kea	Δ Ts	
over	up to	sup.	inf.	max	max	min	max	max	min	max
80	120	0	-20	20	15	-50	0	30	0	+100
120	180	0	-25	25	19	-50	0	35	0	+150
180	250	0	-30	30	23	-50	0	50	0	+150
250	315	0	-35	35	26	-50	0	60	0	+200
315	400	0	-40	40	30	-50	0	70	0	+200

Tolerances for tapered roller bearings of precision class P6X (µm)

Outer ring D (mm)		Δdmp		VDp	VDmp	ΔCs		Kea
over	up to	sup.	inf.	max	max	min	max	max
80	120	0	-18	18	14	-100	0	35
120	150	0	-20	20	15	-100	0	40
150	180	0	-25	25	19	-100	0	45
180	250	0	-30	30	23	-100	0	50
250	315	0	-35	35	26	-100	0	60
315	400	0	-40	40	30	-100	0	70
400	500	0	-45	45	34	-100	0	80
500	630	0	-50	50	38	-100	0	100

TOLERANCES (P5/P4) - DIN 620 - TAPERED ROLLERS

Tolerances for tapered roller bearings of precision class P4 (µm)

Inner ring d (mm)		Δdmp		VDp	VDmp	ΔCs		Kea	Sd	ΔTs	
over	up to	sup.	inf.	max	max	min	max	max	max	min	max
80	120	0	-10	8	5	-400	0	5	5	-200	+200
120	180	0	-13	10	7	-500	0	6	6	-250	+350
180	250	0	-15	11	8	-600	0	8	7	-250	+350

Tolerances for tapered roller bearings of precision class P4 (µm)

Outer ring D (mm)		Δdmp		VDp	VDmp	Kea	SD	Sea
over	up to	sup.	inf.	max	max	max	max	max
80	120	0	-10	8	5	6	5	6
120	150	0	-11	8	6	7	5	7
150	180	0	-13	10	7	8	5	8
180	250	0	-15	11	8	10	7	10
250	315	0	-18	14	9	11	8	10
315	400	0	-20	15	10	13	10	13

Tolerances for tapered roller bearings of precision class P5 (µm)

Inner ring d (mm)		Δdmp		VDp	VDmp	ΔCs		Kea	Sd	ΔTs	
over	up to	sup.	inf.	max	max	min	max	max	max	min	max
80	120	0	-15	11	8	-400	0	8	9	-200	+200
120	180	0	-18	14	9	-500	0	11	10	-250	+350
180	250	0	-22	17	11	-600	0	13	11	-300	+350
250	315	0	-25	-	-	-	0	-	13	-350	+350
315	400	0	-30	-	-	-	0	-	15	-400	+400
400	500	0	-35	-	-	-	0	-	17	-450	+400
500	630	0	-40	-	-	-	0	-	20	-500	+500
630	800	0	-75	-	-	-	0	-	30	-750	+600

Tolerances for tapered roller bearings of precision class P5 (µm)

Outer ring D (mm)		Δdmp		VDp	VDmp	Kea	SD
over	up to	sup.	inf.	max	max	max	max
80	120	0	-13	10	7	10	9
120	150	0	-15	11	8	11	10
150	180	0	-18	14	9	13	10
180	250	0	-20	15	10	15	11
250	315	0	-25	19	13	18	13
315	400	0	-28	22	14	20	13
400	500	0	-33	-	-	23	15
500	630	0	-38	-	-	25	18
630	800	0	-45	-	-	30	20
800	1.000	0	-60	-	-	35	30

HEIGHT TOLERANCE - RADIAL CLEARANCE

BEARING'S HEIGHT - tolerances for axial roller bearings (Precision classes P0, P6, P5)

Bearing's height d (mm)		ΔTS		ΔT1S		ΔT2S		ΔT3S		ΔT4S - ISO	
over	up to	sup.	inf.	sup.	inf.	sup.	inf.	sup.	inf.	sup.	inf.
-	30	+20	-250	+100	-250	+150	-400	+300	-400	+20	-300
30	50	+20	-250	+100	-250	+150	-400	+300	-400	+20	-300
50	80	+20	-300	+100	-300	+150	-500	+300	-500	+20	-300
80	120	+25	-300	+150	-300	+200	-500	+400	-500	+25	-300
120	180	+25	-400	+150	-400	+200	-600	+400	-600	+25	-400
180	250	+30	-400	+150	-400	+250	-600	+500	-600	+30	-400
250	315	+40	-400	-	-	-	-	-	-	+40	-400
315	400	+40	-500	-	-	-	-	-	-	+40	-500
400	500	+50	-500	-	-	-	-	-	-	+50	-500
500	630	+60	-600	-	-	-	-	-	-	+60	-600
630	800	+70	-750	-	-	-	-	-	-	+70	-750
800	1000	+80	-1000	-	-	-	-	-	-	+80	-1000
1000	1250	+100	-1400	-	-	-	-	-	-	+100	-1400
1250	1600	+120	-1600	-	-	-	-	-	-	+120	-1600

Gioco radiale interno dei cuscinetti a rulli cilindrici con foro cilindrico

Hole's diameter (mm)		Inner radial clearance (µm)													
		C1		SPC2		C2		Normal		C3		C4		C5	
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
80	100	10	30	25	45	15	50	50	85	75	110	105	140	155	190
100	120	10	30	25	50	15	55	50	90	85	125	125	165	180	220
120	140	10	35	30	60	15	60	60	105	100	145	140	190	200	245
140	160	10	35	35	65	20	70	70	120	115	165	165	215	228	275
160	180	10	40	35	75	25	75	75	125	120	170	170	220	280	300
180	200	15	45	40	80	35	90	90	145	140	195	195	250	275	330
200	225	15	50	45	90	45	105	105	165	160	220	220	280	305	365
225	250	15	50	50	100	45	110	110	175	170	235	235	300	330	396
250	280	20	55	55	110	55	125	125	195	190	260	260	330	370	440
280	315	20	60	60	120	55	130	130	205	200	275	275	350	410	485
315	355	20	65	65	135	65	145	145	225	225	305	305	385	455	535
355	400	25	75	75	150	100	190	190	280	280	370	370	460	510	600
400	450	25	85	85	170	110	210	210	310	310	410	410	510	565	665
450	500	25	95	95	190	110	220	220	330	330	440	440	550	625	735
500	560	25	105	105	210	120	240	240	360	360	480	480	600	690	810
560	630	25	115	115	230	140	260	260	380	380	500	500	620	780	900
630	710	30	130	130	260	145	285	285	425	425	560	560	705	865	1.005
710	800	35	145	145	290	150	310	310	470	470	630	630	790	975	1.135
800	900	40	160	160	320	180	350	350	520	520	690	690	860	1.095	1.265
900	1.000	-	-	-	-	200	390	390	580	580	770	770	960	1.215	1.405
1.000	1.120	-	-	-	-	220	430	430	640	640	850	850	1.060	1.355	1.565
1.120	1.250	-	-	-	-	230	470	470	710	710	950	950	1.190	1.510	1.750
1.250	1.400	-	-	-	-	270	530	530	790	790	1.050	1.050	1.310	1.680	1.940
1.400	1.600	-	-	-	-	330	610	610	890	890	1.170	1.170	1.450	1.920	2.200
1.600	1.800	-	-	-	-	380	700	700	1.020	1.020	1.340	1.340	1.660	2.160	2.480
1.800	2.000	-	-	-	-	400	760	760	1.120	1.120	1.480	1.480	1.840	2.390	2.760

Inner radial clearance of cylindrical roller bearings with cylindrical hole

Hole's diameter (mm)		Inner radial clearance (µm)													
		C1		SPC2		C2		Normal		C3		C4		C5	
over	up to	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
80	100	35	55	45	70	40	75	70	105	95	130	120	155	175	210
100	120	40	60	50	80	50	90	90	130	115	155	140	180	200	240
120	140	45	70	60	90	55	100	100	145	130	175	160	205	225	270
140	160	50	75	65	100	60	110	110	160	145	195	180	230	255	305
160	180	55	85	75	110	75	125	125	175	160	210	195	245	280	330
180	200	60	90	80	120	85	140	140	195	180	235	220	275	305	360
200	225	60	95	90	135	95	155	155	215	200	260	245	305	340	400
225	250	65	100	100	150	105	170	170	235	220	285	270	335	375	440
250	280	75	11	110	165	115	185	185	255	240	310	295	365	415	485
280	315	80	120	120	180	130	205	205	280	265	340	325	400	465	560
315	355	90	135	135	200	145	225	225	305	290	370	355	435	515	595
355	400	100	150	150	225	165	255	255	345	330	420	405	495	580	670
400	450	110	170	170	255	185	285	285	385	370	470	455	555	650	750
450	500	120	190	190	285	205	315	315	425	410	520	505	615	720	830
500	560	130	210	210	315	230	350	350	470	455	575	560	680	800	920
560	630	140	230	230	345	260	380	380	500	500	620	620	740	900	1.020
630	710	160	260	260	390	290	435	435	575	565	705	695	835	1.005	1.145
710	800	180	290	290	435	325	480	485	645	630	790	775	935	1.125	1.285
800	900	200	320	320	480	370	540	540	710	700	870	860	1.030	1.265	1.435
900	1.000	-	-	355	540	410	600	600	790	780	970	960	1.150	-	-
1.000	1.120	-	-	395	600	455	665	665	875	865	1.075	1.065	1.275	-	-
1.120	1.250	-	-	400	670	490	730	730	970	960	1.200	1.200	1.440	-	-
1.250	1.400	-	-	490	740	550	810	810	1.070	1.070	1.330	1.330	1.590	-	-
1.400	1.600	-	-	560	840	640	920	920	1.200	1.200	1.480	1.480	1.760	-	-
1.600	1.800	-	-	630	950	700	1.020	1.020	1.340	1.340	1.660	1.660	1.980	-	-
1.800	2.000	-	-	700	1.060	760	1.120	1.120	1.480	1.480	1.840	1.840	2.220	-	-

AXIAL BEARINGS' TOLERANCES - DIN 620

Axial bearings' tolerances (µm) washer for shaft										
nominal hole size (mm)		Precision classes Normal, P6, P5			P4			Precision classes			
		Δdmp		Vdp	Δdmp		Vdp	Normal	P6	P5	P4
over	up to	sup.	inf.	max	sup.	inf.	max	Si max	Si max	Si max	Si max
80	120	0	-20	15	0	-15	11	15	8	4	3
120	180	0	-25	19	0	-18	14	15	9	5	4
180	250	0	-30	23	0	-22	17	20	10	5	4
250	315	0	-35	26	0	-25	19	25	13	7	5
315	400	0	-40	30	0	-30	23	30	15	7	5
400	500	0	-45	34	0	-35	26	30	18	9	6
500	630	0	-50	38	0	-40	30	35	21	11	7
630	800	0	-75	-	0	-50	-	40	25	13	8
800	1.000	0	-100	-	0	-70	-	45	30	15	8
1.000	1.250	0	-125	-	0	-100	-	50	35	18	9
1.250	1.600	0	-160	-	-	-	-	60	40	21	14
1.600	2.000	0	-200	-	-	-	-	75	50	25	17

Axial bearings' tolerances (µm) Housing locating washer										
external nominal Ø size (mm)		Precision classes Normal, P6, P5			P4			Precision classes			
		Δdmp		Vdp	Δdmp		Vdp	Normal	P6	P5	P4
over	up to	sup.	inf.	max	sup.	inf.	max	Si max	Si max	Si max	Si max
120	180	0	-25	19	0	-15	11	15	8	4	3
180	250	0	-30	23	0	-20	15	15	9	5	4
250	315	0	-35	26	0	-25	19	20	10	5	4
315	400	0	-40	30	0	-28	21	25	13	7	5
400	500	0	-45	34	0	-33	25	30	15	7	5
500	630	0	-50	38	0	-38	29	30	18	9	6
630	800	0	-75	55	0	-45	34	35	21	11	7
800	1.000	0	-100	75	0	-70	-	40	25	13	8
1.000	1.250	0	-125	-	0	-90	-	45	30	15	8
1.250	1.600	0	-160	-	0	-125	-	50	35	18	9
1.600	2.000	0	-200	-	-	-	-	60	40	21	14
2.000	2.500	0	-250	-	-	-	-	75	50	25	17

Axial bearings' tolerances: bearing's height (µm) - Washer for shaft											
Nominal hole size (mm)		Precision classes Normal, P6, P5									
		ΔTs		ΔT1s		ΔT2s		ΔT3s		ΔT4s	
over	up to	sup.	inf.	sup.	inf.	sup.	inf.	sup.	inf.	sup.	inf.
80	120	+25	-300	+150	-300	+200	-500	+400	-500	+25	-300
120	180	+25	-400	+150	-400	+200	-600	+400	-600	+25	-400
180	250	+30	-400	+150	-400	+250	-600	+500	-600	+30	-400
250	315	+40	-400	-	-	-	-	-	-	+40	-400
315	400	+40	-500	-	-	-	-	-	-	+40	-500
400	500	+50	-500	-	-	-	-	-	-	+50	-500
500	630	+60	-600	-	-	-	-	-	-	+60	-600
630	800	+70	-750	-	-	-	-	-	-	+70	-750
800	1.000	+80	-1.000	-	-	-	-	-	-	+80	-1.000
1.000	1.250	-	-	-	-	-	-	-	-	+100	-1.400
1.250	1.600	-	-	-	-	-	-	-	-	+120	-1.600

Dimensional and tolerance symbols

Simbols (DIN 620)	Description
d	Nominal hole size
Δdmp	Deviation of the average diameter of the hole from the nominal diameter
Vdp	Variation of the hole diameter in a radial plane
Vdmp	Variation in the average diameter of the hole. difference between the maximum and minimum values of the average diameters of a hole
D	Nominal size of the external diameter
ΔDmp	Deviation of the average external diameter from the nominal size
VDp	Variation of the outer diameter in a radial plane
VDmp	Variation of the average external diameter. difference between the maximum and minimum values of the average external diameters
ΔBs, ΔCs	Deviation of a single measurement of inner ring and outer ring width from the nominal size
VBs,ΔCs	Variation of the width of the inner ring and the width of the outer ring
ΔTs, ΔT1s, ΔT2s, ΔT3s,ΔT4s	Deviation of a single measurement of the total height of a thrust bearing from the nominal size
Kia	Rotational concentricity of the inner ring in the complete bearing (rotation radial precision)
Kea	Rotational concentricity of the outer ring in the complete bearing (rotation radial precision)
Si	Thickness variation of the shaft washer in axial bearings (rotation axial precision of axial bearings)
Se	Thickness variation of the housing locating washer in axial bearings (rotation axial precision of axial bearings)