

# Rolling Bearings



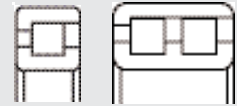
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**Double-Row Cylindrical Roller Bearings  
with Tapered Bore**



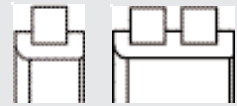
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**Full Complement  
Single and Double-Row  
Cylindrical Roller Bearings**



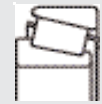
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**Full Complement Special  
Single and Double-Row  
Cylindrical Roller Bearings**



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**Single-Row Tapered  
Roller Bearings**



# Double-Row Cylindrical Roller Bearings with Tapered Bore



## Main Specifications

Double-row cylindrical roller bearings of NN30K design have two rows of cylindrical rollers guided by ribs on the inner ring. The outer ring is without ribs. The bearing cannot accommodate axial forces. Double-row cylindrical roller bearings – type NN30K are generally produced with tapered bore, taper 1:12 designated by K. On request also bearings with cylindrical bore can be supplied.

Double-row cylindrical roller bearings are characterised by their high rigidity and are used predominantly for spindle arrangements of machine tools and similar equipment.

## Main Dimensions

The main dimensions of double-row cylindrical roller bearings with tapered bore correspond to the international dimension standard ISO 15. For special purposes double-row cylindrical roller bearings type NN30K can be supplied in different dimensions.

## Designation

Designation of the standard design bearing is shown in the dimension tables. Additional designations are shown after the standard designation, for example NN3013KW33 P51NA .

## Design Variation of Bearing Rings

W33 - groove and lubrication holes in bearing outer ring surface

## Tolerance Class

P5 – higher degree of precision than P6  
P4 – higher degree of precision than P5  
SP – higher degree of precision for bearings NN30..K  
UP – higher degree of precision than SP for bearings NN30..K

## Radial Clearance

Double-row cylindrical roller bearings of NN30K design are produced with reduced radial clearance and with mutually non-interchangeable rings C1NA a C2NA.

C1 – radial clearance less than C2  
C2 – radial clearance less than C3  
NA – radial clearance of bearings with non-interchangeable rings

## Combination of Symbols

P5 + C1 = P51  
P5 + C2 = P52  
P4 + C1 = P41  
P4 + C2 = P42

## Groove and Lubrication Holes on Outer Ring

All sizes of double-row cylindrical roller bearings with tapered bore of type NN30K can be supplied with groove and lubrication holes on the outer ring (W33).

## Cage

Double-row cylindrical roller bearings of NN30K design are normally produced with a solid brass cage, which is not indicated.

## Alignment

Double-row cylindrical roller bearings of NN30K design are not suitable for arrangements where the alignment of inner and outer bearing rings is not secured.

## Radial Equivalent Dynamic Load

$$P_r = F_r$$

## Radial Equivalent Static Load

$$P_{or} = F_r$$

## Symbols

$d$	- nominal bore diameter
$d_1$	- nominal diameter of larger theoretical tapered bore diameter
$\Delta_{dmp}$	- mean cylindrical bore diameter deviation in single radial plane (for tapered bore $\Delta_{dmp}$ is valid for theoretical bore diameter)
$\Delta_{d1mp}$	- deviation of mean larger theoretical diameter of tapered bore
$V_{dp}$	- single bore diameter variation in single radial plane
$K_{ia}$	- radial run-out of assembled bearing inner ring
$S_d$	- flat seat face axial run-out of inner ring towards bore
$D$	- nominal outer diameter
$\Delta_{Dmp}$	- mean outer diameter deviation in single radial plane
$V_{Dp}$	- single outer diameter variation in single radial plane
$V_{Dmp}$	- mean outer diameter variation
$K_{ea}$	- radial run-out of assembled bearing outer ring
$S_D$	- run-out of outer cylindrical surface towards ring face
$B$	- nominal inner ring width
$\Delta_{Bs}$	- inner ring single width deviation
$V_{Bs}$	- inner ring single width variation
$C$	- nominal outer ring width
$\Delta_{Cs}$	- outer ring single width deviation
$V_{Cs}$	- outer ring single width variation

## Dimension and Running Accuracy of Double-Row Cylindrical Roller Bearings with Tapered Bore Type NN30 Tolerance Degree P5

Inner Ring											
d	over	to	$\Delta_{dmp}$		$V_{dp}$	$V_{dmp}$	$K_{ia}$	$S_d$	$\Delta_{Bs}$	min	$V_{Bs}$
			min	max	max	max	max	max	max		max
mm		$\mu\text{m}$									
18	30		0	-6	5	3	4	8	0	-120	5
30	50		0	-8	6	4	5	8	0	-120	5
50	80		0	-9	7	5	5	8	0	-150	6
80	120		0	-10	8	5	6	9	0	-200	7
120	180		0	-13	10	7	8	10	0	-250	8

Outer Ring											
D	over	to	$\Delta_{Dmp}$		$V_{Dp}$	$V_{Dmp}$	$K_{ea}$	$S_D$	$\Delta_{Cs}$	min	$V_{Cs}$
			max	min	max	max	max	max	max		max
mm		$\mu\text{m}$									
50	80		0	-9	7	5	8	8			6
80	120		0	-10	8	5	10	9			8
120	150		0	-11	8	6	11	10			8
150	180		0	-13	10	7	13	10			8
180	250		0	-15	11	8	15	11			10

$\Delta_{Cs}$  corresponds to  $\Delta_{Bs}$  of inner ring of the same bearing

## Tolerance Degree P4

Inner Ring											
d over	to	$\Delta_{dmp}$ min	max	$V_{dp}$ max	$V_{dmp}$ max	$K_{ia}$ max	$S_d$ max	$\Delta_{Bs}$ max	min	$V_{Bs}$ max	
mm		$\mu m$									
18	30	0	-5	4	2.5	3	4	0	-120	2.5	
30	50	0	-6	5	3	4	4	0	-120	3	
50	80	0	-7	5	3.5	4	5	0	-150	4	
80	120	0	-8	6	4	5	5	0	-200	4	
120	180	0	-10	8	5	6	6	0	-250	5	

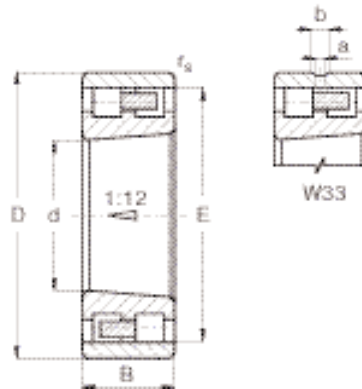
Outer Ring											
D over	to	$\Delta_{Dmp}$ max	min	$V_{Dp}$ max	$V_{Dmp}$ max	$K_{ea}$ max	$S_D$ max	$\Delta_{Cs}$ max	min	$V_{Cs}$ max	
mm		$\mu m$									
50	80	0	-7	5	3.5	5	4			3	
80	120	0	-8	6	4	6	5			4	
120	150	0	-9	7	5	7	5			5	
150	180	0	-10	8	5	8	5			5	
180	250	0	-11	8	6	10	7			7	

$\Delta_{Cs}$  corresponds to  $\Delta_{Bs}$  of inner ring of the same bearing

## Radial Clearance – Values

d over	to	C1NA		C2NA	
		min	max	min	max
mm		$\mu m$			
24	30	15	25	25	35
30	40	15	25	25	40
40	50	17	30	30	45
50	65	20	35	35	50
65	80	25	40	40	60
80	100	35	55	45	70
100	120	40	60	50	80
120	140	45	70	60	90
140	160	50	75	65	100

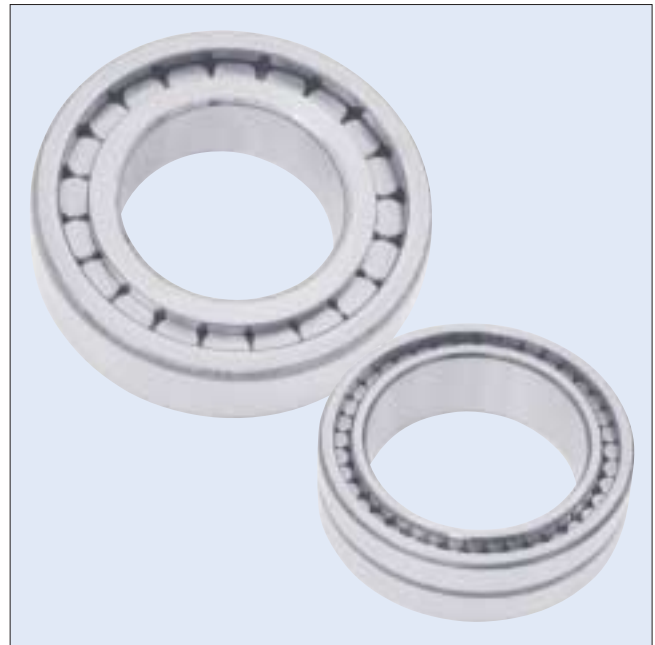
## Double-Row Cylindrical Roller Bearings with Tapered Bore d = 30 to 150 mm



Dimensions								Basic Load Rating		Limiting Speed for Lubrication with		Bearing Designation	Abutment and Fillet Dimensions					Weight kg
d	D	B	r <sub>s</sub> min	E	a	b	s <sup>1)</sup>	D <sub>r</sub>	C <sub>or</sub>	Grease	Oil		d	d <sub>a</sub>	D <sub>a</sub> min	D <sub>a</sub> max	r <sub>a</sub> max	
mm								kN		min <sup>-1</sup>		mm						
30	55	19.0	1.0	48.5	2.0	3.7	1.0	28.7	32.5	16 000	18 000	NN3006K	30	35	49	50	1.0	0.19
35	62	20.0	1.0	55.0	2.0	3.7	1.0	36.9	43.8	14 000	16 000	NN3007K	35	40	56	57	1.0	0.25
40	68	21.0	1.0	61.0	2.0	3.7	1.0	38.3	44.7	12 600	14 000	NN3008K	40	45	62	63	1.0	0.30
45	75	23.0	1.0	67.5	2.0	3.7	1.0	44.7	53.1	11 000	12 600	NN3009K	45	50	69	70	1.0	0.38
50	80	23.0	1.0	72.5	2.0	3.7	1.2	48.2	59.6	10 600	12 000	NN3010K	50	55	74	75	1.0	0.42
55	90	26.0	1.1	81.0	2.0	3.7	1.2	64.3	81.0	9 400	11 000	NN3011K	55	62	82	84	1.0	0.62
60	95	26.0	1.1	86.1	2.0	3.7	1.2	68.1	89.1	8 900	10 000	NN3012K	60	67	87	88	1.0	0.66
65	100	26.0	1.1	91.0	2.0	3.7	1.2	70.8	98.1	8 400	9 400	NN3013K	65	72	92	93	1.0	0.71
70	110	30.0	1.1	100.0	3.0	5.5	1.2	90.9	128.0	7 500	8 400	NN3014K	70	77	102	103	1.0	1.00
75	115	30.0	1.1	105.0	3.0	5.5	1.2	90.9	128.0	7 100	7 900	NN3015K	75	82	107	108	1.0	1.10
80	125	34.0	1.1	113.0	3.0	5.5	1.4	114.0	162.0	6 700	7 500	NN3016K	80	87	115	118	1.0	1.50
85	130	34.0	1.1	118.0	3.0	5.5	1.4	119.0	178.0	6 300	7 100	NN3017K	85	92	120	123	1.0	1.60
90	140	37.0	1.5	127.0	3.0	5.5	1.4	131.0	192.0	6 000	6 700	NN3018K	90	98	129	132	1.5	2.00
95	145	37.0	1.5	132.0	3.0	5.5	1.4	139.0	207.0	5 600	6 300	NN3019K	95	103	134	137	1.5	2.10
100	150	37.0	1.5	137.0	3.0	5.5	1.5	144.0	224.0	5 300	6 000	NN3020K	100	108	139	142	1.5	2.20
105	160	41.0	2.0	146.0	3.0	5.5	1.5	188.0	282.0	5 000	5 600	NN3021K	105	114	148	151	2.0	2.80
110	170	45.0	2.0	155.0	3.0	5.5	1.5	220.0	329.0	4 700	5 300	NN3022K	110	119	157	161	2.0	3.55
120	180	46.0	2.0	165.0	3.0	5.5	1.5	228.0	355.0	4 500	5 000	NN3024K	120	129	167	171	2.0	3.85
130	200	52.0	2.0	182.0	4.5	8.3	1.5	282.0	447.0	4 000	4 500	NN3026K	130	139	184	191	2.0	5.75
140	210	53.0	2.0	192.0	4.5	8.3	1.5	299.0	482.0	3 800	4 200	NN3028K	140	150	194	200	2.0	6.20
150	225	56.0	2.1	206.0	4.5	8.3	1.5	322.0	521.0	3 500	4 000	NN3030K	150	162	208	213	2.0	7.50

1) Permissible axial displacement from central position

# Full Complement Single and Double-Row Cylindrical Roller Bearings



## Main Specifications

The single and double-row cylindrical roller bearing of NVL design is non-separable. It is manufactured in type series NVL29; NVL30; NVL22 and NVL50.

It is a full complement bearing where the cylindrical rollers are guided by ribs on the inner ring. There is a guiding rib on the outer ring enabling accommodation of axial forces. A retaining ring on the opposite side of the outer ring secures the components of the bearing in the assembled position. Axial clearance of the bearing allows a certain displacement of the shaft with regard to the housing. Values of the axial displacement are shown in the tables.

The double-row cylindrical roller bearing is manufactured with a groove and lubrication holes in the outer and inner ring.

The cylindrical roller bearing through its rigidity (full number of rollers) enables a large radial load to be accommodated, nevertheless with regard to different kinematic conditions they cannot work at the same high revolutions as an ordinary cylindrical roller bearing with cage.

These bearings are used particularly where it is necessary to ensure an ability to accommodate a high load along with small spatial demands e. g. sun and planet gearboxes and other heavy mechanical equipment gearings.

## Main Dimensions

The main dimensions of single and double-row cylindrical roller bearings correspond to the international dimension standard ISO 15.

## Designation

Designation of bearings is shown in the dimension tables.

E. g. NVL3007V

## Tolerance Class

Cylindrical roller bearings are ordinarily manufactured at the normal tolerance class P0.

## Radial Clearance

Full complement bearings are ordinarily manufactured with a normal clearance – C0 (not indicated) or greater clearance C3.

## Alignment

Single and double-row cylindrical roller bearings are not suitable for arrangements where the alignment of inner and outer bearing rings is not secured.

## Radial Equivalent Dynamic Load

$$P_r = F_r$$

## Radial Equivalent Static Load

$$P_{or} = F_r$$

## Dynamic Axial Load

$$F_{ap} = \frac{k_1 C_o 10^4}{n(d + D)} - k_2 F_r$$

### Symbols

d	- nominal bore diameter
$\Delta_{dmp}$	- mean cylindrical bore diameter deviation in single radial plane
$V_{dp}$	- single bore diameter variation in single radial plane
$V_{dmp}$	- mean cylindrical bore diameter variation
$K_{ia}$	- radial run-out of assembled bearing inner ring
D	- nominal outer diameter
$\Delta_{Dmp}$	- mean outer diameter deviation in single radial plane
$V_{Dp}$	- single outer diameter variation in single radial plane
$V_{Dmp}$	- mean outer diameter variation
$K_{ea}$	- radial run-out of assembled bearing outer ring
B	- nominal inner ring width
$\Delta_{Bs}$	- inner ring single width deviation
$V_{Bs}$	- inner ring single width variation
C	- nominal outer ring width
$\Delta_{Cs}$	- outer ring single width deviation
$V_{Cs}$	- outer ring single width variation

## Dimension and Running Accuracy of Full Complement Single and Double-Row Cylindrical Roller Bearings Tolerance degree P0

Inner Ring									
d over	to	$\Delta_{dmp}$ max	min	$V_{dp}$ max	$V_{dmp}$ max	$K_{ia}$ max	$\Delta_{Bs}$ max	min	$V_{Bs}$ max
18	30	0	-10	8	8	13	0	-120	20
30	50	0	-12	9	9	15	0	-120	20
50	80	0	-15	11	11	20	0	-150	25
80	120	0	-20	15	15	25	0	-200	25

Outer Ring									
D over	to	$\Delta_{Dmp}$ max	min	$V_{Dp}$ max	$V_{Dmp}$ max	$K_{ea}$ max	$\Delta_{Cs}$ max	min	$V_{Cs}$ max
50	80	0	-13	10	10	25			
80	120	0	-15	11	11	35			
120	150	0	-18	14	14	40			
150	180	0	-25	19	19	45			

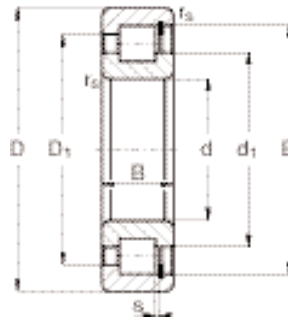
$\Delta_{Cs}$  and  $V_{Cs}$  corresponds to the inner ring of same bearing

### Radial Clearance – Values

d over	to	normal		C3	
		min	max	min	max
mm		$\mu m$			
24	30	20	45	35	60
30	40	25	50	45	70
40	50	30	60	50	80
50	65	40	70	60	90
65	80	40	75	65	100
80	100	50	85	75	110
100	120	50	90	85	125

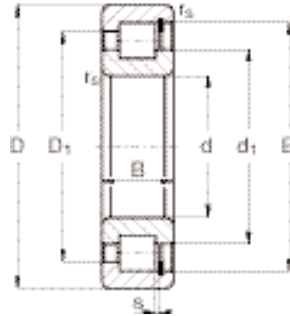


**Single Row Cylindrical Roller Bearings, Type Series NVL29, 30 and 22**  
**d = 30 to 85 mm**



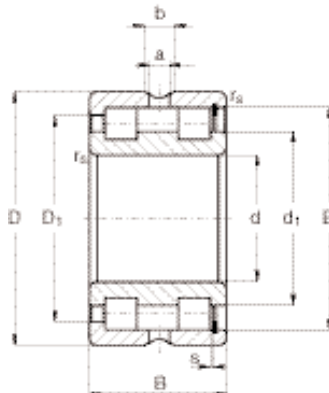
d	Dimensions							Basic Load Rating		Limiting Speed for Lubrication with		Bearing Designation	Weight
	D	B	rs	s	d <sub>1</sub>	D <sub>1</sub>	E	Dynamic C <sub>r</sub>	Static C <sub>0r</sub>	Grease	Oil		
	mm							kN		min <sup>-1</sup>			
30	55	19	1.0	2.0	40.0	45.0	49.5	40.5	43.0	6 500	7 500	NVL3006V	0.20
	62	20	1.0	1.0	42.0	50.5	55.0	63.0	65.0	5 500	7 000	NVL2206V	0.30
35	62	20	1.0	2.0	45.0	51.0	55.5	49.5	55.0	6 000	6 500	NVL3007V	0.26
	72	23	1.1	1.0	47.0	59.0	64.0	79.0	79.0	5 000	6 000	NVL2207V	0.44
40	68	21	1.0	2.0	50.5	57.5	61.5	59.0	68.0	5 000	6 000	NVL3008V	0.31
	80	23	1.1	1.0	54.0	66.0	71.0	87.0	83.0	4 400	5 500	NVL2208V	0.55
45	75	23	1.0	2.0	55.5	62.0	66.5	63.0	76.0	5 000	5 500	NVL3009V	0.40
	85	23	1.1	1.0	57.5	69.5	74.5	90.0	99.0	4 200	5 000	NVL2209V	0.59
50	80	23	1.0	2.0	59.0	67.5	72.0	79.0	96.0	4 500	5 000	NVL3010V	0.43
	90	23	1.1	1.0	64.5	76.5	81.5	97.0	113.0	3 600	4 600	NVL2210V	0.64
55	90	26	1.1	2.0	68.5	78.5	83.5	107.0	138.0	3 800	4 500	NVL3011V	0.64
	100	25	1.5	1.5	70.0	83.5	89.0	125.0	150.0	3 300	4 200	NVL2211V	0.87
60	85	16	1.0	1.0	69.0	74.5	78.5	57.0	78.0	3 500	4 500	NVL2912V	0.29
	95	26	1.1	2.0	71.5	81.5	86.5	110.0	145.0	3 600	4 200	NVL3012V	0.69
	110	28	1.5	1.5	77.0	93.0	99.0	152.0	180.0	3 100	3 800	NVL2212V	1.18
65	90	16	1.0	1.0	75.5	81.0	85.0	60.0	86.0	3 100	4 200	NVL2913V	0.31
	100	26	1.1	2.0	78.0	88.0	93.0	116.0	159.0	3 300	3 900	NVL3013V	0.73
	120	31	1.5	1.5	82.5	100.0	106.0	178.0	214.0	3 000	3 500	NVL2213V	1.57
70	100	19	1.0	1.0	81.0	87.5	92.5	79.0	114.0	3 100	3 800	NVL2914V	0.49
	110	30	1.1	3.0	81.5	95.0	100.0	137.0	176.0	3 400	3 600	NVL3014V	1.02
	125	31	1.5	1.5	87.0	105.0	111.0	184.0	227.0	2 800	3 300	NVL2214V	1.66
75	105	19	1.0	1.0	86.0	93.0	97.5	81.0	121.0	2 900	3 600	NVL2915V	0.52
	115	30	1.1	3.0	89.0	102.5	107.5	145.0	194.0	3 000	3 400	NVL3015V	1.06
	130	31	1.5	1.5	91.5	110.0	116.0	190.0	241.0	2 700	3 200	NVL2215V	1.75
80	110	19	1.0	1.0	91.0	98.0	102.0	84.0	129.0	2 700	3 400	NVL2916V	0.55
	125	34	1.1	4.0	95.0	111.0	117.0	173.0	225.0	3 000	3 200	NVL3016V	1.43
	140	33	2.0	1.5	98.5	119.0	126.0	226.0	285.0	2 500	2 900	NVL2216V	2.15
85	120	22	1.1	1.0	96.0	105.0	109.0	105.0	162.0	2 700	3 200	NVL2917V	0.81
	130	34	1.1	4.0	99.5	115.5	121.0	178.0	237.0	2 800	3 000	NVL3017V	1.51
	150	36	2.0	1.5	104.5	126.0	133.0	255.0	325.0	2 400	2 800	NVL2217V	2.74

**Single-Row Cylindrical Roller Bearings, Type Series NVL29, 30 a 22**  
**d = 90 to 100 mm**



d	Dimensions							Basic Load Rating		Limiting Speed for Lubrication with		Bearing Designation	Weight
	D	B	rs	s	d <sub>1</sub>	D <sub>1</sub>	E	Dynamic C <sub>r</sub>	Static C <sub>0r</sub>	Grease	Oil		
mm							kN		min <sup>-1</sup>		kg		
90	125	22	1.1	1.0	102.0	110.5	115.0	109	172	2 500	3 000	NVL2918V	0.84
	140	37	1.5	4.0	106.0	124.0	130.0	208	280	2 700	2 800	NVL3018V	1.97
	160	40	2.0	2.5	110.0	133.0	140.5	290	370	2 100	2 600	NVL2218V	3.48
95	130	22	1.1	1.0	106.5	117.0	122.0	118	179	2 400	2 900	NVL2919V	0.86
	170	43	2.1	2.5	122.0	147.0	155.5	340	435	2 000	2 400	NVL2219V	4.17
100	140	24	1.1	1.5	113.5	125.5	130.0	136	206	2 300	2 700	NVL2920V	1.14
	150	37	1.5	4.0	115.5	133.5	139.0	219	310	2 400	2 600	NVL3020V	2.15
	180	46	2.1	2.5	127.5	154.0	163.0	395	520	1 800	2 300	NVL2220V	5.13

**Double-Row Cylindrical Roller Bearings**  
**Type Series NVL50**  
**d = 30 to 100 mm**



d	Dimensions							Basic Load Rating		Limiting Speed for Lubrication with		Bearing Designation	Weight	
	D	B	rs	s	C	d <sub>1</sub>	D <sub>1</sub>	E	Dynamic C <sub>r</sub>	Static C <sub>0r</sub>	Grease			Oil
mm							kN		min <sup>-1</sup>		kg			
30	55	34	1.0	1.5	17.0	40.0	45.5	49.5	70	86	6 500	7 500	NVL5006V	0.35
35	62	36	1.0	1.5	18.0	45.0	51.5	55.5	85	109	5 500	6 500	NVL5007V	0.46
40	68	38	1.0	1.5	19.0	50.5	57.5	61.5	101	136	5 000	6 000	NVL5008V	0.56
45	75	40	1.0	1.5	20.0	55.5	62.5	66.5	108	151	4 700	5 500	NVL5009V	0.71
50	80	40	1.0	1.5	20.0	59.0	67.5	72.0	135	191	4 200	5 000	NVL5010V	0.76
55	90	46	1.1	1.5	23.0	68.5	78.5	83.5	184	275	3 600	4 500	NVL5011V	1.16
60	95	46	1.1	1.5	23.0	71.5	82.0	86.5	189	290	3 400	4 200	NVL5012V	1.24
65	100	46	1.1	1.5	23.0	78.0	88.0	93.0	199	320	3 100	3 900	NVL 013V	1.32
70	110	54	1.1	3.0	27.0	81.5	95.0	100.0	235	355	3 100	3 600	NVL5014V	1.85
75	115	54	1.1	3.0	27.0	89.0	103.0	107.5	248	390	2 700	3 400	NVL5015V	1.93
80	125	60	1.1	3.5	30.0	95.0	111.0	117.0	295	450	2 500	3 200	NVL5016V	2.59
85	130	60	1.1	3.5	30.0	99.5	115.5	121.0	305	475	2 400	3 000	NVL5017V	2.72
90	140	67	1.5	4.0	33.5	106.5	124.0	130.0	355	560	2 200	2 800	NVL5018V	3.62
100	150	67	1.5	4.0	33.5	116.0	133.5	139.0	375	620	2 000	2 600	NVL5020V	3.94

# Full Complement Special Single and Double-Row Cylindrical Roller Bearings



## Main Specifications

Single-row cylindrical roller bearings have one row of cylindrical rollers, which are guided by ribs on the inner ring. They are manufactured and supplied without an outer ring, which is replaced by a transit ring (for example from plastic) enabling transport of the bearing to the customer. Bearings are without a cage with the full number of cylindrical rollers. On the basis of this they have high basic radial static ( $C_{or}$ ) and basic radial dynamic ( $C_r$ ) load ratings. These bearings are suitable for use in cog-wheels and anywhere where there is little room for installing bearings with an outer ring.

## Basic Dimensions

Basic bearing dimensions depend on the customer's order and mutual consultation with the manufacturer.

## Production Options

min.  $d = 25$  mm (tolerance and deviation of shape see tables)  
 max.  $d = 110$  mm (tolerance and deviation of shape see tables)  
 min.  $B = 10$  mm (tolerance and deviation of shape see tables)

## Designation

Designation (description) of the bearing is assigned in accordance with the customer's order. Basic designation by the manufacturer is, for example RNN4010V.

## Design Difference

R – bearing without outer ring  
 V – full number of cylindrical rollers

## Tolerance Class

P0 – normal tolerance class (not indicated)  
 P6 – higher tolerance class than standard P0  
 P5 – higher tolerance class than P6  
 Single and double-row cylindrical roller bearings are ordinarily manufactured at tolerance P0.

## Diameter over Cylindrical Rollers – $d_c$

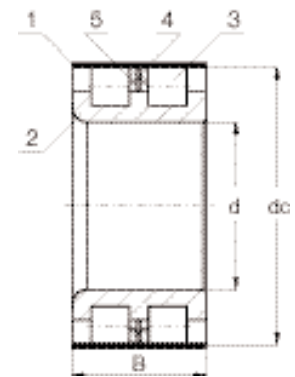
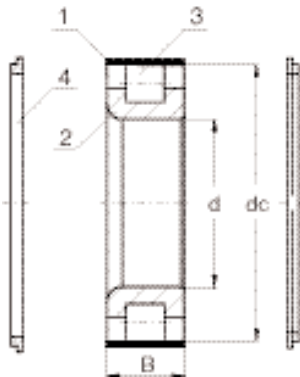
The diameter over the cylindrical rollers –  $d_c$  – can be manufactured according to the customer's requirements so as to satisfy a need for the required radial clearance in the final arrangement of semi-complete unit supplied by us.

## Symbols

$d$	– nominal bore diameter	$K_{ia}$	– radial run-out of assembled bearing inner ring
$\Delta_{dmp}$	– mean cylindrical bore diameter deviation in single radial plane	$S_d$	– flat seat face axial run-out of inner ring towards bore
$V_{dp}$	– single bore diameter variation in single radial plane	$B$	– inner ring nominal width
$V_{dmp}$	– mean bore diameter variation	$\Delta_{Bs}$	– inner ring single width deviation
		$V_{Bs}$	– inner ring single width variation

### Single-Row Cylindrical Roller Bearing

### Double-row Cylindrical Roller Bearing



- 1 – transport ring
- 2 – inner ring
- 3 – cylinder
- 4 – safety ring
- 5 – distance ring

### Dimensions and Running Accuracy of Single and Double-Row Cylindrical Roller Bearings Tolerance Degree P0

Inner Ring		$\Delta_{dmp}$		$V_{dp}$	$V_{dmp}$	$K_{ia}$	$\Delta_{Bs}$		$V_{Bs}$	
over	to	max	min	max	max	max	max	min	max	
mm		$\mu m$								
18	30	0	-10	8	8	13	0	-120	20	
30	50	0	-12	9	9	15	0	-120	20	
50	80	0	-15	11	11	20	0	-150	25	
80	120	0	-20	15	15	25	0	-200	25	

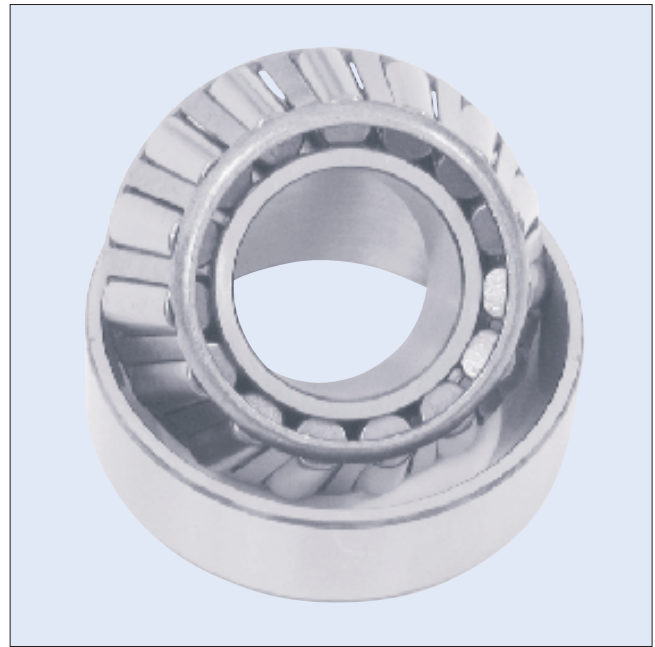
### Tolerance P6

Inner Ring		$\Delta_{dmp}$		$V_{dp}$	$V_{dmp}$	$K_{ia}$	$\Delta_{Bs}$		$V_{Bs}$	
over	to	max	min	max	max	max	max	min	max	
mm		$\mu m$								
18	30	0	-8	6	6	8	0	-120	20	
30	50	0	-10	8	8	10	0	-120	20	
50	80	0	-12	9	9	10	0	-150	25	
80	120	0	-15	11	11	13	0	-200	25	

### Tolerance P5

Inner Ring		$\Delta_{dmp}$		$V_{dp}$	$V_{dmp}$	$K_{ia}$	$S_d$	$\Delta_{Bs}$		$V_{Bs}$
over	to	max	min	max	max	max	max	max	min	max
mm		$\mu m$								
18	30	0	-6	5	3	4	8	0	-120	5
30	50	0	-8	6	4	5	8	0	-120	5
50	80	0	-9	7	5	5	8	0	-150	6
80	120	0	-10	8	5	6	9	0	-200	7

# Single-Row Tapered Roller Bearings



## Main Specifications

Single-row tapered roller bearings design series: 302, 303, 313, 320, 322, 323 a 332 are dismountable bearings. The cone of the bearing together with rolling elements and cage form one unit. Rolling elements have the form of a taper roller where its functional face is in contact with the flange of the inner ring. Bearings have a contact angle  $\alpha$  in the range  $12^\circ - 16^\circ$  or  $28^\circ - 30^\circ$  and can accommodate radial and axial load.

The range of applications of tapered roller bearings is very wide given by their ability to accommodate a high load in a "many taper rollers in one row" arrangement as well as their ability to accommodate radial and axial loads. For example: heavy gearboxes, gears, rolling machinery, hoist machines etc.

## Main Dimensions

The main dimensions of single-row tapered roller bearings with cylindrical bore correspond to the international dimension standard ISO 355.

## Designation

Designation of the standard design bearing is shown in the dimension tables. Additional designations are shown after the standard designation, for example 32018AX.

## Difference of Boundary Dimensions

X - change in boundary dimensions

## Tolerance Class

P0 - normal tolerance class (not indicated)

P6X - higher tolerance class than standard P0

P5 - higher tolerance class than P6X

Single-row tapered roller bearings are ordinarily produced at tolerance P0.

Supplies of bearings with a different tolerance class should be agreed in advance.

## Vibration Level

On request, bearings can also be supplied with reduced vibration level - C6.

## Cage

Single-row tapered roller bearings are equipped with a pressed steel cage, which is not indicated.

## Alignment

The seating surface for these bearings must be aligned only with small deviations because the ability of rings to bear misalignment is very small.

- under small load ( $F_r < 0.1 C_{Or}$ )      1' to 1,5'
- under great load ( $F_r \geq 0.1 C_{Or}$ )      2' to 4'

## Radial Equivalent Dynamic Load

$$P_r = F_r \quad F_a / F_r \leq e \quad (\text{kN})$$

$$P_r = 0.4 F_r + Y F_a \quad F_a / F_r > e \quad (\text{kN})$$

## Radial Equivalent Static Load

$$P_{Or} = 0.5 F_r + Y_0 F_a$$

## Symbols

- d – nominal bore diameter
- $\Delta_{dmp}$  – mean cylindrical bore diameter deviation in single radial plane
- $V_{dp}$  – single bore diameter variation in single radial plane
- $V_{dmp}$  – mean cylindrical bore diameter variation
- $K_{ia}$  – radial run-out of assembled bearing inner ring
- $S_d$  – flat seat face axial run-out of inner ring towards bore
- D – nominal outer diameter
- $\Delta_{Dmp}$  – mean outer diameter deviation in single radial plane
- $V_{Dp}$  – single outer diameter variation in single radial plane
- $V_{Dmp}$  – mean outer diameter variation
- $K_{ea}$  – radial run-out of assembled bearing outer ring
- $S_D$  – run-out of outer cylindrical surface towards outer ring face
- B – inner ring nominal width
- $\Delta_{Bs}$  – inner ring single width deviation
- $V_{Bs}$  – inner ring single width variation
- C – outer ring nominal width
- $\Delta_{Cs}$  – outer ring single width deviation
- $V_{Cs}$  – outer ring single width variation
- T – nominal total width of tapered roller bearing
- $\Delta_{Ts}$  – single total width deviation of tapered roller bearing

## Dimensions and Running Accuracy of Tapered Roller Bearings Tolerance Degree P0

Inner Ring (Cone) and Total Width of Bearing											
d		$\Delta_{dmp}$		$V_{dp}$	$V_{dmp}$	$K_{ia}$	$\Delta_{Bs}$	$\Delta_{Ts}$			
over	to	max	min	max	max	max	max	min	max	min	
mm		$\mu\text{m}$									
10	18	0	-12	12	9	15	0	-120	+200	0	
18	30	0	-12	12	9	18	0	-120	+200	0	
30	50	0	-12	12	9	20	0	-120	+200	0	
50	80	0	-15	15	11	25	0	-150	+200	0	
80	120	0	-20	20	15	30	0	-200	+200	-200	
120	180	0	-25	25	19	35	0	-250	+350	-250	

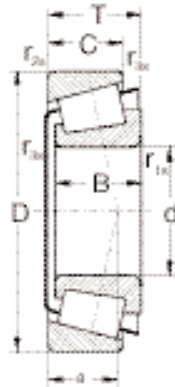
Outer Ring (Cup)											
D		$\Delta_{Dmp}$		$V_{Dp}$	$V_{Dmp}$	$K_{ea}$	$\Delta_{Cs}$				
over	to	max	min	max	max	max					
mm		$\mu\text{m}$									
18	30	0	-12	12	9	18					
30	50	0	-14	14	11	20	Corresponds to $\Delta_{Bs}$				
50	80	0	-16	16	12	25	of the same				
80	120	0	-18	18	14	35	bearing cone				
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					

## Dimensions and Running Accuracy of Tapered Roller Bearings Tolerance Degree P5

Inner Ring (Cone) and Total Width of Bearing												
d over	to	$\Delta_{dmp}$		$V_{dp}$	$V_{dmp}$	$K_{ia}$	$S_d$	$\Delta_{Bs}$		$\Delta_{Ts}$		
		max	min	max	max	max	max	max	min	max	min	
mm		$\mu\text{m}$										
10	18	0	-7	5	5	5	7	0	-200	+200	-200	
18	30	0	-8	6	5	5	8	0	-200	+200	-200	
30	50	0	-10	8	5	6	8	0	-240	+200	-200	
50	80	0	-12	9	6	7	8	0	-300	+200	-200	
80	120	0	-15	11	8	8	9	0	-400	+200	-200	
120	180	0	-18	14	9	11	10	0	-500	+350	-250	

Outer Ring (Cup)									
D over	to	$\Delta_{Dmp}$		$V_{Dp}$	$V_D$	$K_{ea}$	$S_D$	$\Delta_{Cs}$	
		max	min	max	max	max	max		
mm		$\mu\text{m}$							
18	30	0	-8	6	5	6	8		
30	50	0	-9	7	5	7	8	Corresponds to $\Delta_{Bs}$	
50	80	0	-11	8	6	8	8	of the same	
80	120	0	-13	10	7	10	9	bearing cone	
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		

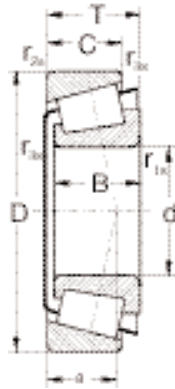
**Single-Row Tapered Roller Bearings**  
**d = 20 to 50 mm**



d	Dimensions								Basic Load Rating		Limiting Speed for Lubrication with		Bearing Designation	
	D	B	C	T	r <sub>1s</sub>	r <sub>2s</sub>	r <sub>3s</sub>	a	Dynamic C <sub>r</sub>	Static C <sub>0r</sub>	Grease	Oil	STN	ISO
	mm								kN		min <sup>-1</sup>			
20	47	14	12.0	15.25	1.0	1.0	0.3	11	25.1	26.1	8 900	12 000	30204A	T2DB020
	52	15	13.0	16.25	1.5	1.5	0.6	11	30.4	29.9	8 400	11 000	30304A	T2FB020
25	52	15	13.0	16.25	1.0	1.0	0.3	12	29.9	33.5	7 500	10 000	30205A	T3CC025
	62	17	15.0	18.25	1.5	1.5	0.6	13	43.8	42.1	6 900	9 200	30305A	T2FB025
	47	15	11.5	15.00	0.6	0.6	0.3	12	24.2	28.7	8 400	11 000	32005AX	T4CC025
	62	24	20.0	25.25	1.5	1.5	0.6	15	57.3	60.7	6 700	8 900	32305A	T2FD025
30	62	16	14.0	17.25	1.0	1.0	0.3	14	39.3	42.8	6 500	8 700	30206A	T3DB030
	72	19	16.0	20.75	1.5	1.5	0.6	15	53.1	53.1	5 600	7 500	30306A	T2FB030
	55	17	13.0	17.00	1.0	1.0	0.3	13	35.5	43.8	7 100	9 400	32006AX	T4CC030
	62	20	17.0	21.25	1.0	1.0	0.3	15	50.1	59.6	6 700	8 900	32206A	T3DC030
	72	27	23.0	28.75	1.5	1.5	0.6	20	76.4	85.8	5 600	7 500	32306A	T2FD030
35	72	17	15.0	18.25	1.5	1.5	0.6	15	46.4	51.1	5 300	7 100	30207A	T3DB035
	80	21	18.0	22.75	2.0	1.5	0.6	16	65.6	69.4	5 000	6 700	30307A	T2FB035
	62	18	14.0	18.00	1.0	1.0	0.3	15	43.0	53.1	6 300	8 400	32007AX	T4CC035
	72	23	19.0	24.25	1.5	1.5	0.6	17	64.3	76.4	5 300	7 100	32207A	T3DC035
	80	31	25.0	32.75	2.0	1.5	0.6	20	94.4	110.0	4 700	6 300	32307A	T2FE035
40	80	18	16.0	19.75	1.5	1.5	0.6	17	55.2	60.7	4 700	6 300	30208A	T3DB040
	68	19	14.5	19.00	1.0	1.0	0.3	15	48.2	64.3	5 300	7 100	32008AX	T3CD040
	80	23	19.0	24.75	1.5	1.5	0.6	18	70.8	85.5	4 700	6 300	32208A	T3DC040
	90	33	27.0	35.25	2.0	1.5	0.6	22	114.0	141.0	4 200	5 600	32308A	T2FD040
	90	33	27.0	35.25	2.0	1.5	0.6	27	104.2	136.6	4 100	5 400	32308BA	T5FD040
45	85	19	16.0	20.75	1.5	1.5	0.6	18	61.9	70.8	4 500	6 000	30209A	T3DB045
	100	25	22.0	27.25	2.0	1.5	0.6	21	107.0	118.0	4 000	5 300	30309A	T2FB045
	75	20	15.5	20.00	1.0	1.0	0.3	17	57.3	79.4	4 700	6 300	32009AX	T3CC045
	85	23	19.0	24.75	1.5	1.5	0.6	20	73.6	90.9	4 500	6 000	32209A	T3DC045
	100	36	30.0	38.25	2.0	1.5	0.6	25	144.0	181.0	3 800	5 000	32309A	T2FD045
50	90	20	17.0	21.75	1.5	1.5	0.6	20	70.8	87.4	4 200	5 600	30210A	T3DB050
	110	27	23.0	29.25	2.5	2.0	0.6	23	121.0	141.0	3 800	5 000	30310A	T2FB050
	110	27	19.0	29.25	2.5	2.0	0.6	35	102.0	114.0	3 300	4 500	31310A	T7FB050
	90	23	19.0	24.75	1.5	1.5	0.6	21	81.0	102.0	4 200	5 600	32210A	T3DC050
	110	40	33.0	42.25	2.5	2.0	0.6	27	174.0	224.0	3 300	4 500	32310A	T2FD050
	110	40	33.0	42.25	2.5	2.0	0.6	33	156.0	212.0	3 200	4 400	32310BA	T5FD050

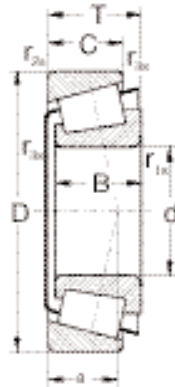


**Single-Row Tapered Roller Bearings**  
**d = 55 to 90 mm**



d	Dimensions								Basic Load Rating		Limiting Speed for Lubrication with		Bearing Designation	
	D	B	C	T	r <sub>1s</sub>	r <sub>2s</sub>	r <sub>3s</sub>	a	Dynamic C <sub>r</sub>	Static C <sub>0r</sub>	Grease	Oil	STN	ISO
	mm								kN		min <sup>-1</sup>			
55	100	21	18.0	22.75	2.0	1.5	0.6	21	81.0	96.2	3 800	5 000	30211A	T3DB055
	120	29	25.0	31.50	2.5	2.0	0.6	25	136.0	162.0	3 300	4 500	30311A	T2FB055
	100	25	21.0	26.75	2.0	1.5	0.6	22	102.0	128.0	3 800	5 000	32211A	T3DC055
	120	43	35.0	45.50	2.5	2.0	0.6	29	200.0	256.0	3 300	4 500	32311A	T2FD055
60	110	22	19.0	23.75	2.0	1.5	0.6	22	94.4	117.0	3 300	4 500	30212A	T3EB060
	95	23	17.5	23.00	1.5	1.5	0.6	21	81.0	119.0	3 800	5 000	32012AX	T4CC060
	110	28	24.0	29.75	2.0	1.5	0.6	25	126.0	162.0	3 300	4 500	32212A	T3EC060
	130	46	37.0	48.50	3.0	2.5	1.0	31	228.0	299.0	2 800	3 800	32312A	T2FD060
	130	46	37.0	48.50	3.0	2.5	1.0	39	200.0	293.0	2 500	3 300	32312B	T5FD060
65	140	33	28.0	36.00	3.0	2.5	1.0	28	185.0	220.0	2 800	3 800	30313A	T2GB065
	100	23	17.5	23.00	1.5	1.5	0.6	23	81.0	123.0	3 300	4 500	32013AX	T4CC065
	120	31	27.0	32.75	2.0	1.5	0.6	28	150.0	200.0	3 000	4 000	32213A	T3EC065
	140	48	39.0	51.00	3.0	2.5	1.0	33	261.0	331.0	2 800	3 800	32313A	T2GD065
	120	41	32.0	41.00	2.0	1.5	0.6	30	191.0	267.0	3 000	4 000	33213A	T3EE065
70	125	24	21.0	26.25	2.0	1.5	0.6	26	121.0	153.0	3 000	4 000	30214A	T3EB070
	150	35	30.0	38.00	3.0	2.5	1.0	30	211.0	251.0	2 700	3 500	30314A	T2GB070
	110	25	19.0	25.00	1.5	1.5	0.6	24	98.1	147.0	3 300	4 500	32014AX	T4CC070
	150	51	42.0	54.00	3.0	2.5	1.0	36	293.0	398.0	2 700	3 500	32314A	T2GD070
75	130	25	22.0	27.25	2.0	1.5	0.6	28	128.0	165.0	2 800	3 800	30215A	T4DB075
	160	37	31.0	40.00	3.0	2.5	1.0	32	242.0	287.0	2 500	3 300	30315A	T2GB075
	115	25	19.0	25.00	1.5	1.5	0.6	25	104.0	158.0	3 000	4 000	32015AX	T4CC075
	130	31	27.0	33.25	2.0	1.5	0.6	30	162.0	220.0	2 800	3 800	32215A	T4DC075
	130	41	31.0	41.00	2.0	1.5	0.6	32	196.0	299.0	2 800	3 800	33215A	T3EE075
80	140	26	22.0	28.25	2.5	2.0	0.6	29	144.0	178.0	2 800	3 800	30216A	T3EB080
	125	29	22.0	29.00	1.5	1.5	0.6	27	131.0	207.0	2 800	3 800	32016AX	T3CC080
	140	33	28.0	35.25	2.5	2.0	0.6	32	181.0	251.0	2 800	3 800	32216A	T3EC080
85	150	28	24.0	30.50	2.5	2.0	0.6	30	181.0	207.0	2 700	3 500	30217A	T3EB085
	130	29	22.0	29.00	1.5	1.5	0.6	28	136.0	215.0	2 800	3 800	32017AX	T4CC085
	150	36	30.0	38.50	2.5	2.0	0.6	34	212.4	290.2	2 400	3 300	32217A	T3EC085
	150	49	37.0	49.00	2.5	2.0	0.6	37	278.0	418.0	2 200	3 200	33217A	T3EE085
90	160	30	26.0	32.50	2.5	2.0	0.6	31	185.0	242.0	2 400	3 200	30218A	T3FB090
	140	32	24.0	32.00	2.0	1.5	0.6	30	150.0	228.0	2 700	3 500	32018AX	T3CC090
	160	40	34.0	42.50	2.5	2.0	0.6	37	251.0	355.0	2 400	3 200	32218A	T3FC090

**Single-Row Tapered Roller Bearings**  
**d = 95 to 120 mm**



Dimensions									Basic Load Rating		Limiting Speed for Lubrication with		Bearing Designation	
d	D	B	C	T	r <sub>1s</sub>	r <sub>2s</sub>	r <sub>3s</sub>	a	Dynamic C <sub>r</sub>	Static C <sub>0r</sub>	Grease	Oil	STN	ISO
mm									kN		min <sup>-1</sup>			
95	170	32	27.0	34.50	3.0	2.5	1.0	33	214.0	272.0	2 000	2 900	30219A	T3FB095
	170	43	37.0	45.50	3.0	2.5	1.0	38	310.0	437.0	2 700	3 500	32219A	T3FC095
100	180	34	29.0	37.00	3.0	2.5	1.0	37	266.0	346.0	2 500	3 300	30220A	T3FB100
	150	32	24.0	32.00	2.0	1.5	0.6	33	178.0	261.0	2 800	3 800	32020AX	T4CC100
	180	46	39.0	49.00	3.0	2.5	1.0	41	348.0	496.0	2 500	3 300	32220A	T3FC100
110	200	38	32.0	41.00	3.0	2.5	1.0	39	304.0	402.0	1 800	2 500	30222A	T3FB110
	200	53	46.0	56.00	3.0	2.5	1.0	46	433.0	630.0	2 200	3 000	32222A	T3FC110
120	215	40	34.0	43.50	3.0	2.5	1.0	43	339.0	452.0	1 600	2 200	30224A	T4FB120
	180	38	29.0	38.00	2.5	2.0	0.6	40	254.0	430.0	2 400	3 200	32024AX	T4DC120
	215	58	50.0	61.50	3.0	2.5	1.0	52	462.0	685.0	1 600	2 200	32224A	T4FD120

## Note