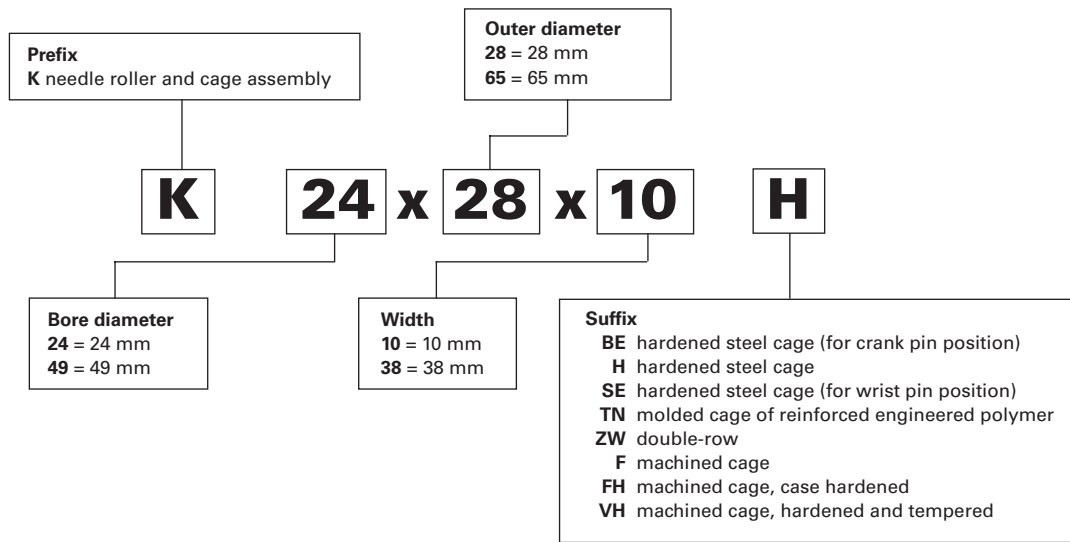
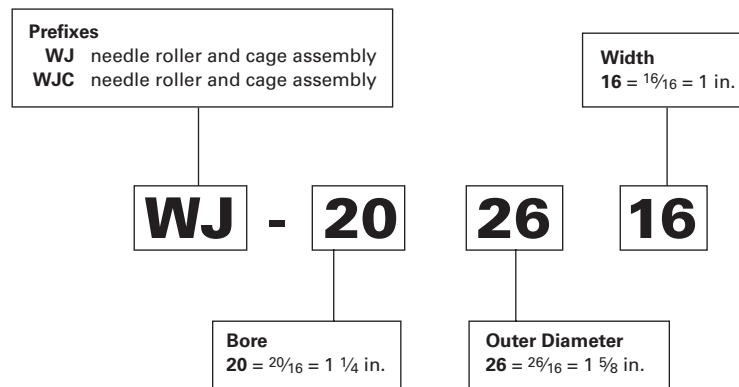




### Radial Needle Roller and Cage Assemblies – Metric Nominal Dimensions



### Radial Needle Roller and Cage Assemblies – Inch Nominal Dimensions



# ***Radial Needle Roller and Cage Assemblies***



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## RADIAL NEEDLE ROLLER AND CAGE ASSEMBLIES

### METRIC SERIES

Metric series radial needle roller and cage assemblies are available in a variety of sizes and designs. This catalog includes the most popular, standardized designs.

### REFERENCE STANDARDS ARE:

- **ISO 3030** – needle roller bearings – radial needle roller and cage assemblies – boundary dimensions and tolerances.
- **DIN 5405 Part 1** – rolling bearings – needle roller bearings – radial needle roller and cage assemblies.
- **ANSI/ABMA 18.1** – needle roller bearings – radial, metric design.

Before selecting specific metric series radial needle roller and cage assemblies, the engineering section should be reviewed.

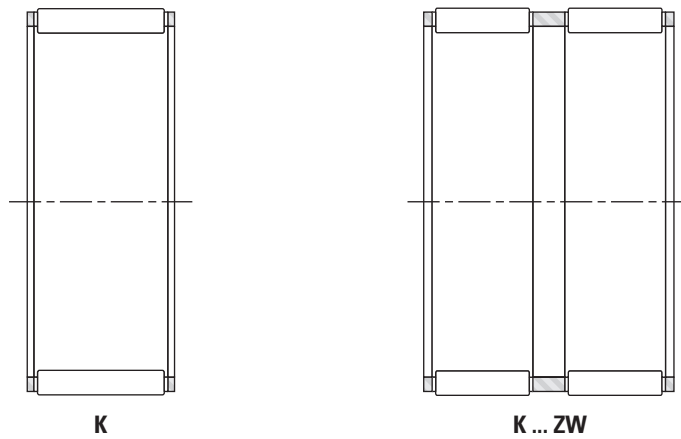


Fig. B-1. Types of Metric Series Radial Needle Roller and Cage Assemblies

Suffixes	
<b>TN</b>	molded cage of reinforced engineered polymer
<b>ZW</b>	double-row
<b>TNZW</b>	molded cage of reinforced engineered polymer – double-row
<b>H</b>	hardened steel cage
<b>F</b>	machined cage
<b>FH</b>	machined cage, case hardened
<b>FV</b>	machined cage, hardened and tempered

### CONSTRUCTION

Radial needle roller and cage assemblies have a steel cage that provides both inward and outward retention for the needle rollers. The designs provide maximum cage strength consistent with the inherent high load-ratings of needle roller bearings. Accurate guidance of the needle rollers by the cage bars allows for operation at high speeds. Needle roller and cage assemblies have either one or two rows of needle rollers.

Also listed are metric series needle roller and cage assemblies using molded, one-piece glass-reinforced engineered polymer cages (suffix TN). These operate well at temperatures up to

120° C (250° F) over extended periods. However, care should be exercised when these assemblies are lubricated with oils containing additives as service life may be reduced if the operating temperature exceeds 100° C (212° F). At such high temperatures oil can deteriorate with time and it is suggested that oil change intervals are observed.

Needle rollers with relieved ends used in these assemblies are made of high-carbon chrome steel, through-hardened, ground and lapped to close tolerances for diameter and roundness. See the engineering section for further discussion of relieved end rollers.

## DIMENSIONAL ACCURACY

### NEEDLE ROLLER GROUPS (GAGES)

Metric series radial needle roller and cage assemblies are supplied with needle roller complements subdivided into groups (gages) shown in Table B-1. This is in accordance with Grade G2 specified in ISO 3096 standard (see needle rollers, page B-357). The group limits of the needle rollers are indicated on the package. Labels of identifying colors show the group limits of the needle rollers. The needle roller and cage assemblies of one shipment usually contain needle rollers with group limits of between 0.000 to -0.002 mm (0.0000 to -0.00008 in.) and -0.005 to -0.007 mm (-0.0002 to -0.0003 in.) [colors red, blue and white]. For additional information on needle roller and cage assemblies with needle rollers of different group limits contact your representative.

**Table B-1. Needle roller group limits (Grade G2)**

Group tolerance		Marking gage	Identifying color on label or on package
mm in.	mm in.		
0.000 0.0000	-0.002 -0.00008	P0M2	Red
-0.001 -0.00004	-0.003 -0.00012	M1M3	Red
-0.002 -0.00008	-0.004 -0.0002	M2M4	Blue
-0.003 -0.00012	-0.005 -0.0002	M3M5	Blue
-0.004 -0.0002	-0.006 -0.0002	M4M6	White (gray)
-0.005 -0.0002	-0.007 -0.0003	M5M7	White (gray)
-0.006 -0.0002	-0.008 -0.0003	M6M8	Green
-0.007 -0.0003	-0.009 -0.0004	M7M9	Green
-0.008 -0.0003	-0.010 -0.0004	M8M10	Yellow
-0.009 -0.0004	-0.011 -0.0004	M9M11	Yellow

In the marking of the gages, P identifies zero (0) or plus (+), M identifies minus (-).

## MOUNTING DIMENSIONS

### DESIGN OF RACEWAYS

Radial needle roller and cage assemblies use the housing bore as the outer raceway and the shaft as the inner raceway. To realize full bearing load rating and life, the housing bore and the shaft raceways must have the correct geometric and metallurgical characteristics. The housing should be of sufficient cross section to maintain adequate roundness and running clearance under load. Additional design details for housings and shafts used as outer and inner raceways can be found in the engineering section. The only limit to precision of the radial clearance of a mounted assembly is the capability of the user to hold close tolerances on the inner and outer raceways. The suggested shaft tolerances listed in Table B-2 are based on housing bore tolerance G6 and apply to metric series radial needle roller and cage assemblies with needle rollers of group limits between P0M2 and M5M7.

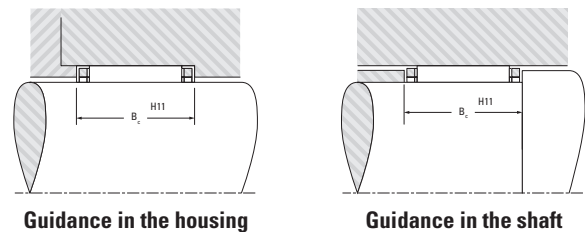
**Table B-2. Suggested shaft tolerances for housing bores machined to G6**

Nominal shaft diameter in mm	≤ 80	> 80
	Radial clearance	Shaft tolerance
Smaller than normal	j5	h5
Normal	h5	g5
Larger than normal	g6	f6

## AXIAL GUIDANCE REQUIREMENTS

Radial needle roller and cage assembly must be axially guided by shoulders or other suitable means. The end guiding surfaces should be hardened to minimize wear and must provide sufficient axial clearance to prevent end-locking of the assembly. Length tolerance H11 is suggested.

If end guidance is provided by a housing shoulder at one end and by a shaft shoulder at the other end, the shaft must be axially positioned to prevent end-locking of needle roller and cage assembly. The housing and shaft shoulder heights should be 70 percent to 90 percent of the needle roller diameter to provide proper axial guidance.



**Fig. B-2. Axial guidance requirements**

## MOUNTING IN SETS

Radial needle roller and cage assemblies that are mounted side by side must have needle rollers of the same group limits to ensure uniform load distribution.

## LUBRICATION

Oil is the preferred lubricant for most applications. In critical applications involving high speeds, ample oil flow must be provided. Where assemblies are subjected to high centrifugal forces – such as in epicyclic gearing, or inertia forces, as in the small end of a connecting rod – the contact pressure between the cage and the raceway guiding surface becomes critical. The allowable contact pressure depends on a combination of the induced force and the relative velocity between the cage and raceway and the rate of lubricant flow. Consult your representative when cages will be subjected to high induced forces.

## SPECIAL DESIGNS

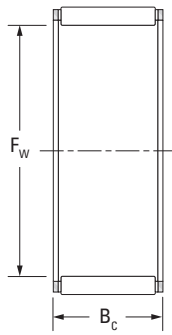
Radial needle roller and cage assemblies made to special dimensions or configurations – such as those which are split to assemble around a one-piece crankshaft – can be made available on special order. Special coated or plated cages to enhance life, under conditions of marginal lubrication and high induced forces, also can be made available.



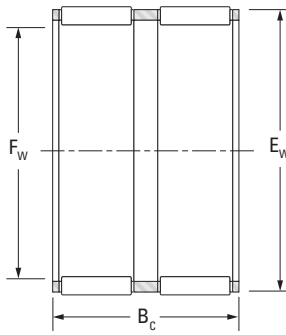
# NEEDLE ROLLER BEARINGS

## SINGLE-ROW, DOUBLE-ROW ASSEMBLIES

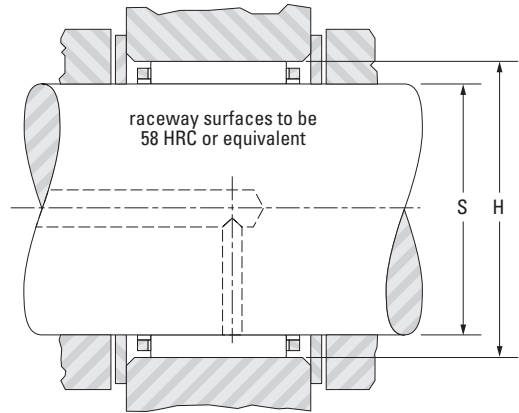
### METRIC SERIES



**K**



**KZW**



Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	Assembly Designation	C	C <sub>0</sub>	Speed Rating		C <sub>g</sub>	S		H		Wt.
							Grease	Oil		Mounting Dimension				
										Max.	Min.	Max.	Min.	
mm in.	mm in.	mm in.	mm in.		kN lbf.		min <sup>-1</sup>		mm in.	mm in.	mm in.	mm in.	kg lbs.	
3 0.1181	3 0.1181	5 0.1969	7 0.2756	K3X5x7TN	1.56 351	1.29 290	48000	74000	—	3.000 0.1181	2.996 0.1180	5.004 0.1970	5.012 0.1973	0.0002 0.0004
	3 0.1181	5 0.1969	9 0.3543	K3X5x9TN	1.74 391	1.48 333	48000	74000	—	3.000 0.1181	2.996 0.1180	5.004 0.1970	5.012 0.1973	0.0003 0.0007
4 0.1575	4 0.1575	7 0.2756	7 0.276	K4X7X7TN	1.83 411	1.32 297	34000	52000	—	4.000 0.1575	3.995 0.1573	7.014 0.2761	7.005 0.2758	0.0005 0.001
5 0.1969	5 0.1969	8 0.3150	8 0.315	K5X8X8TN	2.18 490	1.71 384	31000	47000	—	5.000 0.1969	4.995 0.1967	8.014 0.3155	8.005 0.3152	0.0007 0.002
	5 0.1969	8 0.3150	10 0.394	K5X8X10TN	3.04 683	2.63 591	31000	47000	—	5.000 0.1969	4.995 0.1967	8.014 0.3155	8.005 0.3152	0.0008 0.002
	5 0.1969	9 0.3543	13 0.512	K5X9X13TN	4.29 964	3.55 798	26000	40000	—	5.000 0.1969	4.995 0.1967	9.014 0.3549	9.005 0.3545	0.002 0.004
6 0.2362	6 0.2362	9 0.3543	8 0.315	K6X9X8	3.19 717	2.90 652	29000	44000	0.0116	6.000 0.2362	5.995 0.2360	9.014 0.3549	9.005 0.3545	0.0008 0.002
	6 0.2362	9 0.3543	8 0.315	K6X9X8TN	2.47 555	2.07 465	29000	44000	—	6.000 0.2362	5.995 0.2360	9.014 0.3549	9.005 0.3545	0.001 0.002
	6 0.2362	9 0.3543	10 0.394	K6X9X10TN	3.07 690	2.74 616	29000	44000	—	6.000 0.2362	5.995 0.2360	9.014 0.3549	9.005 0.3545	0.001 0.002
7 0.2756	7 0.2756	10 0.3937	8 0.315	K7X10X8TN	2.74 616	2.44 549	28000	42000	—	7.000 0.2756	6.994 0.2754	10.014 0.3943	10.005 0.3939	0.001 0.002
	7 0.2756	10 0.3937	10 0.394	K7X10X10TN	3.40 764	3.22 724	28000	42000	—	7.000 0.2756	6.994 0.2754	10.014 0.3943	10.005 0.3939	0.001 0.002
	7 0.2756	11 0.4331	15 0.591	K7X11X15TN	6.44 1450	6.24 1400	23000	35000	—	7.000 0.2756	6.994 0.2754	11.017 0.4337	11.006 0.4333	0.003 0.007
8 0.3150	8 0.3150	11 0.4331	8 0.315	K8X11X8FV	3.23 726	3.11 699	26000	41000	0.0132	8.000 0.3150	7.994 0.3147	11.017 0.4337	11.006 0.4333	0.002 0.004
	8 0.3150	11 0.4331	8 0.315	K8X11X8TN	2.34 526	2.05 461	26000	41000	—	8.000 0.3150	7.994 0.3147	11.017 0.4337	11.006 0.4333	0.001 0.002
	8 0.3150	11 0.4331	10 0.394	K8X11X10	4.57 1030	4.89 1100	26000	41000	0.0148	8.000 0.3150	7.994 0.3147	11.017 0.4337	11.006 0.4333	0.002 0.004
	8 0.3150	11 0.4331	10 0.394	K8X11X10FV	4.01 901	4.11 924	26000	41000	0.0142	8.000 0.3150	7.994 0.3147	11.017 0.4337	11.006 0.4333	0.002 0.004
	8 0.3150	11 0.4331	10 0.394	K8x11x10TN	3.84 864	3.91 880	26000	41000	—	8.000 0.3150	7.994 0.3147	11.006 0.4333	11.017 0.4337	0.001 0.002

Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	Assembly Designation	C	C <sub>0</sub>	Speed Rating		C <sub>g</sub>	S		H		Wt.
			-0.20 -0.008 -0.55 -0.022		Load Ratings		Grease	Oil		Mounting Dimension				
					kN	lbf.				min <sup>-1</sup>	Max.	Min.	Max.	
<b>8</b> 0.3150	<b>8</b> 0.3150	<b>11</b> 0.4331	<b>13</b> 0.512	K8x11x13TN	<b>5.18</b> 1170	<b>5.75</b> 1290	26000	41000	—	<b>8.000</b> 0.3150	<b>7.994</b> 0.3147	<b>11.006</b> 0.4333	<b>11.017</b> 0.4337	<b>0.002</b> 0.004
	<b>8</b> 0.3150	<b>11</b> 0.4331	<b>13</b> 0.512	K8X11X13H	<b>5.22</b> 1170	<b>5.78</b> 1300	26000	41000	0.0154	<b>8.000</b> 0.3150	<b>7.994</b> 0.3147	<b>11.017</b> 0.4337	<b>11.006</b> 0.4333	<b>0.003</b> 0.007
	<b>8</b> 0.3150	<b>12</b> 0.4724	<b>10</b> 0.394	K8X12X10F	<b>5.05</b> 1140	<b>4.69</b> 1050	22000	33000	0.0143	<b>8.000</b> 0.3150	<b>7.994</b> 0.3147	<b>12.017</b> 0.4731	<b>12.006</b> 0.4727	<b>0.002</b> 0.004
<b>9</b> 0.3543	<b>9</b> 0.3543	<b>12</b> 0.4724	<b>10</b> 0.394	K9X12X10FH	<b>4.27</b> 960	<b>4.60</b> 1030	26000	40000	0.0153	<b>9.000</b> 0.3543	<b>8.994</b> 0.3541	<b>12.017</b> 0.4731	<b>12.006</b> 0.4727	<b>0.003</b> 0.007
	<b>9</b> 0.3543	<b>12</b> 0.4724	<b>10</b> 0.394	K9X12X10FV	<b>4.27</b> 960	<b>4.60</b> 1030	26000	40000	0.0153	<b>9.000</b> 0.3543	<b>8.994</b> 0.3541	<b>12.017</b> 0.4731	<b>12.006</b> 0.4727	<b>0.002</b> 0.004
	<b>9</b> 0.3543	<b>12</b> 0.4724	<b>13</b> 0.512	K9X12X13F	<b>5.57</b> 1250	<b>6.47</b> 1450	26000	40000	0.0167	<b>9.000</b> 0.3543	<b>8.994</b> 0.3541	<b>12.017</b> 0.4731	<b>12.006</b> 0.4727	<b>0.003</b> 0.007
	<b>9</b> 0.3543	<b>12</b> 0.4724	<b>13</b> 0.512	K9X12X13FH	<b>5.57</b> 1250	<b>6.47</b> 1450	26000	40000	0.0167	<b>9.000</b> 0.3543	<b>8.994</b> 0.3541	<b>12.017</b> 0.4731	<b>12.006</b> 0.4727	<b>0.003</b> 0.007
	<b>9</b> 0.3543	<b>12</b> 0.4724	<b>13</b> 0.512	K9X12X13FV	<b>5.57</b> 1250	<b>6.47</b> 1450	26000	40000	0.0167	<b>9.000</b> 0.3543	<b>8.994</b> 0.3541	<b>12.017</b> 0.4731	<b>12.006</b> 0.4727	<b>0.003</b> 0.007
	<b>9</b> 0.3543	<b>13</b> 0.5118	<b>8</b> 0.315	K9X13X8H	<b>3.96</b> 890	<b>3.50</b> 787	21000	32000	0.0139	<b>9.000</b> 0.3543	<b>8.994</b> 0.3541	<b>13.017</b> 0.5125	<b>13.006</b> 0.5120	<b>0.003</b> 0.007
<b>10</b> 0.3937	<b>10</b> 0.3937	<b>13</b> 0.5118	<b>10</b> 0.394	K10X13X10	<b>5.40</b> 1210	<b>6.43</b> 1450	25000	39000	0.0174	<b>10.000</b> 0.3937	<b>9.994</b> 0.3935	<b>13.017</b> 0.5125	<b>13.006</b> 0.5120	<b>0.002</b> 0.004
	<b>10</b> 0.3937	<b>13</b> 0.5118	<b>10</b> 0.394	K10X13X10H	<b>5.40</b> 1210	<b>6.43</b> 1450	25000	39000	0.0174	<b>10.000</b> 0.3937	<b>9.994</b> 0.3935	<b>13.017</b> 0.5125	<b>13.006</b> 0.5120	<b>0.002</b> 0.004
	<b>10</b> 0.3937	<b>13</b> 0.5118	<b>10</b> 0.394	K10X13X10TN	<b>4.29</b> 964	<b>4.77</b> 1070	25000	39000	—	<b>10.000</b> 0.3937	<b>9.994</b> 0.3935	<b>13.017</b> 0.5125	<b>13.006</b> 0.5120	<b>0.002</b> 0.004
	<b>10</b> 0.3937	<b>13</b> 0.5118	<b>13</b> 0.512	K10X13X13	<b>5.90</b> 1330	<b>7.16</b> 1610	25000	39000	0.0178	<b>10.000</b> 0.3937	<b>9.994</b> 0.3935	<b>13.017</b> 0.5125	<b>13.006</b> 0.5120	<b>0.003</b> 0.007
	<b>10</b> 0.3937	<b>13</b> 0.5118	<b>16</b> 0.630	K10X13X16	<b>7.43</b> 1670	<b>9.64</b> 2170	25000	39000	0.0192	<b>10.000</b> 0.3937	<b>9.994</b> 0.3935	<b>13.017</b> 0.5125	<b>13.006</b> 0.5120	<b>0.004</b> 0.009
	<b>10</b> 0.3937	<b>14</b> 0.5512	<b>10</b> 0.394	K10X14X10H	<b>6.12</b> 1380	<b>6.29</b> 1410	20000	31000	0.0167	<b>10.000</b> 0.3937	<b>9.994</b> 0.3935	<b>14.017</b> 0.5519	<b>14.006</b> 0.5514	<b>0.003</b> 0.007
	<b>10</b> 0.3937	<b>14</b> 0.5512	<b>13</b> 0.512	K10X14X13H	<b>7.88</b> 1770	<b>8.71</b> 1960	20000	31000	0.0181	<b>10.000</b> 0.3937	<b>9.994</b> 0.3935	<b>14.017</b> 0.5519	<b>14.006</b> 0.5514	<b>0.004</b> 0.009
	<b>10</b> 0.3937	<b>16</b> 0.6299	<b>12</b> 0.472	K10X16X12F	<b>8.39</b> 1890	<b>7.47</b> 1680	15000	24000	0.0168	<b>10.000</b> 0.3937	<b>9.994</b> 0.3935	<b>16.017</b> 0.6306	<b>16.006</b> 0.6302	<b>0.006</b> 0.013
	<b>10</b> 0.3937	<b>16</b> 0.6299	<b>12</b> 0.472	K10X16X12TN	<b>7.50</b> 1690	<b>6.40</b> 1440	15000	24000	—	<b>10.000</b> 0.3937	<b>9.994</b> 0.3935	<b>16.017</b> 0.6306	<b>16.006</b> 0.6302	<b>0.005</b> 0.011
<b>12</b> 0.4724	<b>12</b> 0.4724	<b>15</b> 0.5906	<b>10</b> 0.394	K12X15X10H	<b>5.85</b> 1320	<b>7.51</b> 1690	24000	37000	0.0195	<b>12.000</b> 0.4724	<b>11.992</b> 0.4721	<b>15.017</b> 0.5912	<b>15.006</b> 0.5908	<b>0.003</b> 0.007
	<b>12</b> 0.4724	<b>15</b> 0.5906	<b>13</b> 0.512	K12X15X13H	<b>6.78</b> 1520	<b>9.03</b> 2030	24000	37000	0.0204	<b>12.000</b> 0.4724	<b>11.992</b> 0.4721	<b>15.017</b> 0.5912	<b>15.006</b> 0.5908	<b>0.004</b> 0.009
	<b>12</b> 0.4724	<b>16</b> 0.6299	<b>13</b> 0.512	K12X16X13	<b>7.49</b> 1680	<b>8.51</b> 1910	19000	30000	0.0194	<b>12.000</b> 0.4724	<b>11.992</b> 0.4721	<b>16.017</b> 0.6306	<b>16.006</b> 0.6302	<b>0.006</b> 0.013
	<b>12</b> 0.4724	<b>17</b> 0.6693	<b>13</b> 0.512	K12X17X13	<b>8.93</b> 2010	<b>9.29</b> 2090	16000	25000	0.0194	<b>12.000</b> 0.4724	<b>11.992</b> 0.4721	<b>17.017</b> 0.6700	<b>17.006</b> 0.6695	<b>0.008</b> 0.018
	<b>12</b> 0.4724	<b>18</b> 0.7087	<b>12</b> 0.472	K12X18X12H	<b>9.76</b> 2190	<b>9.40</b> 2110	14000	22000	0.0191	<b>12.000</b> 0.4724	<b>11.992</b> 0.4721	<b>18.017</b> 0.7093	<b>18.006</b> 0.7089	<b>0.009</b> 0.020
<b>13</b> 0.5118	<b>13</b> 0.5118	<b>17</b> 0.6693	<b>10</b> 0.394	K13X17X10	<b>7.22</b> 1620	<b>8.33</b> 1870	19000	29000	0.0199	<b>13.000</b> 0.5118	<b>12.992</b> 0.5115	<b>17.017</b> 0.6700	<b>17.006</b> 0.6695	<b>0.004</b> 0.009

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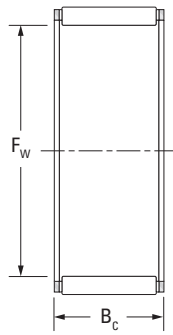


# NEEDLE ROLLER BEARINGS

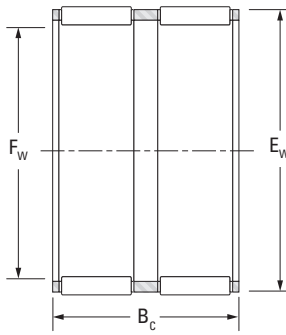
## SINGLE-ROW, DOUBLE-ROW ASSEMBLIES –

continued

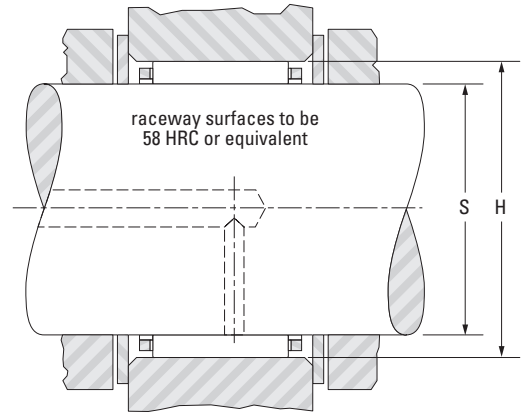
### METRIC SERIES



**K**



**KZW**



Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	Assembly Designation	C	C <sub>0</sub>	Speed Rating		C <sub>g</sub>	S		H		Wt.
							Grease	Oil		Mounting Dimension				
			mm in.		mm in.	mm in.				mm in.				
<b>13</b> 0.5118	<b>13</b> 0.5118	<b>18</b> 0.7087	<b>15</b> 0.591	K13X18X15F	<b>10.8</b> 2430	<b>12.1</b> 2720	16000	25000	0.0213	<b>13.000</b> 0.5118	<b>12.992</b> 0.5115	<b>18.017</b> 0.7093	<b>18.006</b> 0.7089	<b>0.008</b> 0.01
<b>14</b> 0.5512	<b>14</b> 0.5512	<b>18</b> 0.7087	<b>8</b> 0.315	K14X18X8	<b>5.39</b> 1210	<b>5.82</b> 1310	19000	29000	0.0188	<b>14.000</b> 0.5512	<b>13.992</b> 0.5509	<b>18.017</b> 0.7093	<b>18.006</b> 0.7089	<b>0.004</b> 0.009
	<b>14</b> 0.5512	<b>18</b> 0.7087	<b>10</b> 0.394	K14X18X10	<b>7.17</b> 1 610	<b>8.41</b> 1890	19000	29000	0.0206	<b>14.000</b> 0.5512	<b>13.992</b> 0.5509	<b>18.017</b> 0.7093	<b>18.006</b> 0.7089	<b>0.005</b> 0.011
	<b>14</b> 0.5512	<b>18</b> 0.7087	<b>13</b> 0.512	K14X18X13	<b>9.73</b> 2190	<b>12.5</b> 2810	19000	29000	0.0227	<b>14.000</b> 0.5512	<b>13.992</b> 0.5509	<b>18.017</b> 0.7093	<b>18.006</b> 0.7089	<b>0.006</b> 0.013
	<b>14</b> 0.5512	<b>18</b> 0.7087	<b>15</b> 0.591	K14X18X15	<b>10.5</b> 2360	<b>13.8</b> 3100	19000	29000	0.0233	<b>14.000</b> 0.5512	<b>13.992</b> 0.5509	<b>18.017</b> 0.7093	<b>18.006</b> 0.7089	<b>0.007</b> 0.015
	<b>14</b> 0.5512	<b>18</b> 0.7087	<b>17</b> 0.669	K14X18X17H	<b>12.4</b> 2790	<b>17.1</b> 3840	19000	29000	0.0246	<b>14.000</b> 0.5512	<b>13.992</b> 0.5509	<b>18.017</b> 0.7093	<b>18.006</b> 0.7089	<b>0.008</b> 0.018
	<b>14</b> 0.5512	<b>19</b> 0.7480	<b>13</b> 0.512	K14X19X13H	<b>10.2</b> 2290	<b>11.4</b> 2560	16000	24000	0.0217	<b>14.000</b> 0.5512	<b>13.992</b> 0.5509	<b>19.020</b> 0.7488	<b>19.007</b> 0.7483	<b>0.008</b> 0.018
	<b>14</b> 0.5512	<b>19</b> 0.7480	<b>18</b> 0.709	K14X19X18F	<b>13.2</b> 2970	<b>16.0</b> 3600	16000	24000	0.0236	<b>14.000</b> 0.5512	<b>13.992</b> 0.5509	<b>19.020</b> 0.7488	<b>19.007</b> 0.7483	<b>0.011</b> 0.024
	<b>14</b> 0.5512	<b>20</b> 0.7874	<b>12</b> 0.472	K14X20X12	<b>10.5</b> 2360	<b>10.6</b> 2380	14000	21000	0.0209	<b>14.000</b> 0.5512	<b>13.992</b> 0.5509	<b>20.020</b> 0.7882	<b>20.007</b> 0.7877	<b>0.009</b> 0.020
<b>15</b> 0.5906	<b>15</b> 0.5906	<b>18</b> 0.7087	<b>14</b> 0.551	K15X18X14TN	<b>7.92</b> 1780	<b>11.9</b> 2680	13000	23000	—	<b>15.000</b> 0.5906	<b>14.992</b> 0.5902	<b>18.017</b> 0.7093	<b>18.006</b> 0.7089	<b>0.003</b> 0.007
	<b>15</b> 0.5906	<b>18</b> 0.7087	<b>16</b> 0.630	K15X18X16F	<b>8.36</b> 1880	<b>12.6</b> 2830	13000	23000	0.0244	<b>15.000</b> 0.5906	<b>14.992</b> 0.5902	<b>18.017</b> 0.7093	<b>18.006</b> 0.7089	<b>0.005</b> 0.011
	<b>15</b> 0.5906	<b>18</b> 0.7087	<b>17</b> 0.669	K15X18X17	<b>8.08</b> 1820	<b>12.1</b> 2720	23000	36000	0.0241	<b>15.000</b> 0.5906	<b>14.992</b> 0.5902	<b>18.017</b> 0.7093	<b>18.006</b> 0.7089	<b>0.005</b> 0.011
	<b>15</b> 0.5906	<b>19</b> 0.7480	<b>10</b> 0.394	K15X19X10	<b>7.87</b> 1770	<b>9.69</b> 2180	18000	28000	0.0220	<b>15.000</b> 0.5906	<b>14.992</b> 0.5902	<b>19.020</b> 0.7488	<b>19.007</b> 0.7483	<b>0.005</b> 0.011
	<b>15</b> 0.5906	<b>19</b> 0.7480	<b>13</b> 0.512	K15X19X13	<b>9.66</b> 2170	<b>12.6</b> 2830	18000	28000	0.0235	<b>15.000</b> 0.5906	<b>14.992</b> 0.5902	<b>19.020</b> 0.7488	<b>19.007</b> 0.7483	<b>0.007</b> 0.015
	<b>15</b> 0.5906	<b>19</b> 0.7480	<b>17</b> 0.669	K15X19X17	<b>12.3</b> 2770	<b>17.2</b> 3870	18000	28000	0.0254	<b>15.000</b> 0.5906	<b>14.992</b> 0.5902	<b>19.020</b> 0.7488	<b>19.007</b> 0.7483	<b>0.009</b> 0.020
	<b>15</b> 0.5906	<b>19</b> 0.7480	<b>17</b> 0.669	K15X19X17H	<b>12.3</b> 2770	<b>17.2</b> 3870	18000	28000	0.0254	<b>15.000</b> 0.5906	<b>14.992</b> 0.5902	<b>19.020</b> 0.7488	<b>19.007</b> 0.7483	<b>0.009</b> 0.020
	<b>15</b> 0.5906	<b>19</b> 0.7480	<b>22</b> 0.866	K15X19X22ZW	<b>12.2</b> 2740	<b>17.0</b> 3820	18000	28000	0.0253	<b>15.000</b> 0.5906	<b>14.992</b> 0.5902	<b>19.020</b> 0.7488	<b>19.007</b> 0.7483	<b>0.010</b> 0.022

Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	Assembly Designation	C	C <sub>0</sub>	Speed Rating		C <sub>g</sub>	S		H		Wt.
			-0.20 -0.008 -0.55 -0.022		Load Ratings		Grease	Oil		Mounting Dimension				
					kN	lbf.				min <sup>-1</sup>	Max.	Min.	Max.	
<b>15</b> 0.5906	<b>15</b> 0.5906	<b>20</b> 0.7874	<b>13</b> 0.512	K15X20X13H	<b>9.93</b> 2230	<b>11.3</b> 2540	16000	24000	0.0222	<b>15.000</b> 0.5906	<b>14.992</b> 0.5902	<b>20.020</b> 0.7882	<b>20.007</b> 0.7877	<b>0.008</b> 0.018
	<b>15</b> 0.5906	<b>21</b> 0.8268	<b>15</b> 0.591	K15X21X15	<b>13.4</b> 3010	<b>14.8</b> 3330	14000	21000	0.0233	<b>15.000</b> 0.5906	<b>14.992</b> 0.5902	<b>21.020</b> 0.8276	<b>21.007</b> 0.8270	<b>0.013</b> 0.029
	<b>15</b> 0.5906	<b>21</b> 0.8268	<b>21</b> 0.827	K15X21X21H	<b>18.0</b> 4050	<b>21.7</b> 4880	14000	21000	0.0256	<b>15.000</b> 0.5906	<b>14.992</b> 0.5902	<b>21.020</b> 0.8276	<b>21.007</b> 0.8270	<b>0.018</b> 0.040
<b>16</b> 0.6299	<b>16</b> 0.6299	<b>20</b> 0.7874	<b>8</b> 0.315	K16X20X8F	<b>6.37</b> 1430	<b>7.51</b> 1690	18000	28000	0.0212	<b>16.000</b> 0.6299	<b>15.992</b> 0.6296	<b>20.020</b> 0.7882	<b>20.007</b> 0.7877	<b>0.005</b> 0.011
	<b>16</b> 0.6299	<b>20</b> 0.7874	<b>10</b> 0.394	K16X20X10	<b>7.82</b> 1760	<b>9.76</b> 2190	18000	28000	0.0226	<b>16.000</b> 0.6299	<b>15.992</b> 0.6296	<b>20.020</b> 0.7882	<b>20.007</b> 0.7877	<b>0.006</b> 0.013
	<b>16</b> 0.6299	<b>20</b> 0.7874	<b>10</b> 0.394	K16X20X10H	<b>7.82</b> 1760	<b>9.76</b> 2190	18000	28000	0.0226	<b>16.000</b> 0.6299	<b>15.992</b> 0.6296	<b>20.020</b> 0.7882	<b>20.007</b> 0.7877	<b>0.006</b> 0.013
	<b>16</b> 0.6299	<b>20</b> 0.7874	<b>10.6</b> 0.417	K16X20X10,6TN1	<b>6.06</b> 1360	<b>7.01</b> 1580	18000	28000	—	<b>16.000</b> 0.6299	<b>15.992</b> 0.6296	<b>20.020</b> 0.7882	<b>20.007</b> 0.7877	<b>0.003</b> 0.007
	<b>16</b> 0.6299	<b>20</b> 0.7874	<b>13</b> 0.512	K16X20X13	<b>10.1</b> 2270	<b>13.5</b> 3030	18000	28000	0.0245	<b>16.000</b> 0.6299	<b>15.992</b> 0.6296	<b>20.020</b> 0.7882	<b>20.007</b> 0.7877	<b>0.007</b> 0.015
	<b>16</b> 0.6299	<b>20</b> 0.7874	<b>14</b> 0.551	K16X20X14	<b>10.8</b> 2430	<b>14.8</b> 3330	18000	28000	0.0251	<b>16.000</b> 0.6299	<b>15.992</b> 0.6296	<b>20.020</b> 0.7882	<b>20.007</b> 0.7877	<b>0.007</b> 0.015
	<b>16</b> 0.6299	<b>20</b> 0.7874	<b>17</b> 0.669	K16X20X17F	<b>11.9</b> 2680	<b>16.8</b> 3780	18000	28000	0.0259	<b>16.000</b> 0.6299	<b>15.992</b> 0.6296	<b>20.020</b> 0.7882	<b>20.007</b> 0.7877	<b>0.009</b> 0.020
	<b>16</b> 0.6299	<b>20</b> 0.7874	<b>17</b> 0.669	K16X20X17H	<b>12.9</b> 2900	<b>18.5</b> 4160	18000	28000	0.0265	<b>16.000</b> 0.6299	<b>15.992</b> 0.6296	<b>20.020</b> 0.7882	<b>20.007</b> 0.7877	<b>0.008</b> 0.018
	<b>16</b> 0.6299	<b>20</b> 0.7874	<b>20</b> 0.787	K16X20X20	<b>13.4</b> 3010	<b>19.5</b> 4380	18000	28000	0.0269	<b>16.000</b> 0.6299	<b>15.992</b> 0.6296	<b>20.020</b> 0.7882	<b>20.007</b> 0.7877	<b>0.011</b> 0.024
	<b>16</b> 0.6299	<b>22</b> 0.8661	<b>12</b> 0.472	K16X22X12	<b>11.2</b> 2520	<b>11.9</b> 2680	19000	29000	0.0227	<b>16.000</b> 0.6299	<b>15.992</b> 0.6296	<b>22.020</b> 0.8669	<b>22.007</b> 0.8664	<b>0.010</b> 0.022
	<b>16</b> 0.6299	<b>22</b> 0.8661	<b>16</b> 0.630	K16X22X16	<b>14.9</b> 3350	<b>17.2</b> 3870	19000	29000	0.0248	<b>16.000</b> 0.6299	<b>15.992</b> 0.6296	<b>22.020</b> 0.8669	<b>22.007</b> 0.8664	<b>0.014</b> 0.031
	<b>16</b> 0.6299	<b>22</b> 0.8661	<b>16</b> 0.630	K16X22X16H	<b>14.9</b> 3350	<b>17.2</b> 3870	19000	29000	0.0248	<b>16.000</b> 0.6299	<b>15.992</b> 0.6296	<b>22.020</b> 0.8669	<b>22.007</b> 0.8664	<b>0.014</b> 0.031
	<b>16</b> 0.6299	<b>22</b> 0.8661	<b>20</b> 0.787	K16X22X20	<b>18.6</b> 4180	<b>22.9</b> 5150	19000	29000	0.0267	<b>16.000</b> 0.6299	<b>15.992</b> 0.6296	<b>22.020</b> 0.8669	<b>22.007</b> 0.8664	<b>0.017</b> 0.037
	<b>16</b> 0.6299	<b>24</b> 0.9449	<b>20</b> 0.787	K16X24X20	<b>20.2</b> 4540	<b>21.4</b> 4810	20000	30000	0.0255	<b>16.000</b> 0.6299	<b>15.992</b> 0.6296	<b>24.020</b> 0.9457	<b>24.007</b> 0.9452	<b>0.025</b> 0.055
<b>17</b> 0.6693	<b>17</b> 0.6693	<b>20</b> 0.7874	<b>10</b> 0.394	K17X20X10	<b>5.96</b> 1340	<b>8.53</b> 1920	16000	25000	0.0234	<b>17.000</b> 0.6693	<b>16.992</b> 0.6690	<b>20.020</b> 0.7882	<b>20.007</b> 0.7877	<b>0.004</b> 0.009
	<b>17</b> 0.6693	<b>21</b> 0.8268	<b>10</b> 0.394	K17X21X10	<b>8.12</b> 1830	<b>10.4</b> 2340	17000	26000	0.0236	<b>17.000</b> 0.6693	<b>16.992</b> 0.6690	<b>21.020</b> 0.8276	<b>21.007</b> 0.8270	<b>0.006</b> 0.013
	<b>17</b> 0.6693	<b>21</b> 0.8268	<b>12.8</b> 0.504	K17X21X13H	<b>10.5</b> 2360	<b>14.5</b> 3260	17000	26000	0.0256	<b>17.000</b> 0.6693	<b>16.992</b> 0.6690	<b>21.020</b> 0.8276	<b>21.007</b> 0.8270	<b>0.008</b> 0.018
	<b>17</b> 0.6693	<b>21</b> 0.8268	<b>13</b> 0.512	K17X21X13	<b>10.5</b> 2360	<b>14.5</b> 3260	17000	26000	0.0256	<b>17.000</b> 0.6693	<b>16.992</b> 0.6690	<b>21.020</b> 0.8276	<b>21.007</b> 0.8270	<b>0.008</b> 0.018
	<b>17</b> 0.6693	<b>21</b> 0.8268	<b>15</b> 0.591	K17X21X15	<b>11.4</b> 2560	<b>16.1</b> 3620	17000	26000	0.0263	<b>17.000</b> 0.6693	<b>16.992</b> 0.6690	<b>21.020</b> 0.8276	<b>21.007</b> 0.8270	<b>0.008</b> 0.018
	<b>17</b> 0.6693	<b>21</b> 0.8268	<b>17</b> 0.669	K17X21X17H	<b>13.4</b> 3010	<b>19.8</b> 4450	17000	26000	0.0277	<b>17.000</b> 0.6693	<b>16.992</b> 0.6690	<b>21.020</b> 0.8276	<b>21.007</b> 0.8270	<b>0.011</b> 0.024
	<b>17</b> 0.6693	<b>22</b> 0.8661	<b>20</b> 0.787	K17X22X20FH	<b>17.0</b> 3820	<b>23.3</b> 5240	17000	27000	0.0280	<b>17.000</b> 0.6693	<b>16.992</b> 0.6690	<b>22.020</b> 0.8669	<b>22.007</b> 0.8664	<b>0.015</b> 0.033

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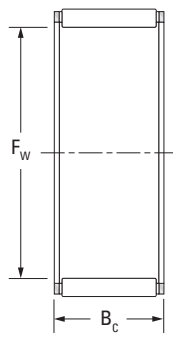


# NEEDLE ROLLER BEARINGS

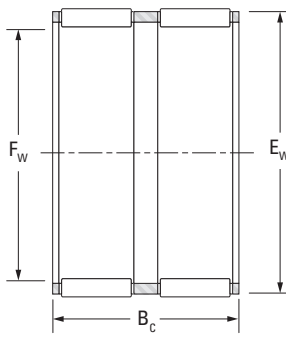
## SINGLE-ROW, DOUBLE-ROW ASSEMBLIES –

continued

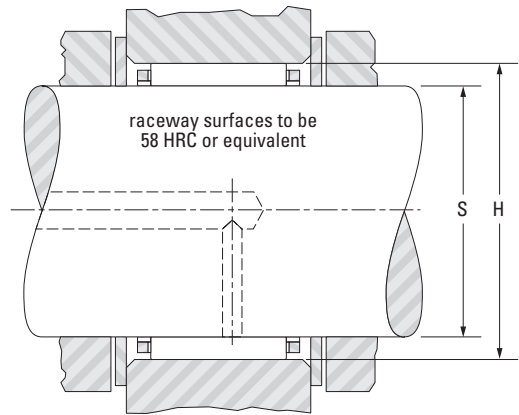
### METRIC SERIES



**K**



**KZW**



Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	Assembly Designation	C	C <sub>0</sub>	Speed Rating		C <sub>g</sub>	S		H		Wt.
							Grease	Oil		Mounting Dimension				
			mm in.		mm in.	mm in.				mm in.				
<b>17</b> 0.6693	<b>17</b> 0.6693	<b>23</b> 0.9055	<b>15</b> 0.591	K17X23X15F	<b>14.1</b> 3170	<b>16.3</b> 3660	18000	27000	0.0251	<b>17.000</b> 0.6693	<b>16.992</b> 0.6690	<b>23.020</b> 0.9063	<b>23.007</b> 0.9058	<b>0.010</b> 0.022
<b>18</b> 0.7087	<b>18</b> 0.7087	<b>22</b> 0.8661	<b>8</b> 0.315	K18X22X8F	<b>6.32</b> 1420	<b>7.70</b> 1730	16000	24000	0.0224	<b>18.000</b> 0.7087	<b>17.992</b> 0.7083	<b>22.020</b> 0.8669	<b>22.007</b> 0.8664	<b>0.005</b> 0.011
	<b>18</b> 0.7087	<b>22</b> 0.8661	<b>10</b> 0.394	K18X22X10	<b>8.41</b> 1890	<b>11.1</b> 2500	16000	24000	0.0246	<b>18.000</b> 0.7087	<b>17.992</b> 0.7083	<b>22.020</b> 0.8669	<b>22.007</b> 0.8664	<b>0.006</b> 0.013
	<b>18</b> 0.7087	<b>22</b> 0.8661	<b>10</b> 0.394	K18X22X10H	<b>8.41</b> 1890	<b>11.1</b> 2500	16000	24000	0.0246	<b>18.000</b> 0.7087	<b>17.992</b> 0.7083	<b>22.020</b> 0.8669	<b>22.007</b> 0.8664	<b>0.006</b> 0.013
	<b>18</b> 0.7087	<b>22</b> 0.8661	<b>13</b> 0.512	K18X22X13H	<b>10.8</b> 2430	<b>15.4</b> 3460	16000	24000	0.0266	<b>18.000</b> 0.7087	<b>17.992</b> 0.7083	<b>22.020</b> 0.8669	<b>22.007</b> 0.8664	<b>0.008</b> 0.018
	<b>18</b> 0.7087	<b>22</b> 0.8661	<b>14</b> 0.551	K18X22X14	<b>11.6</b> 2610	<b>16.8</b> 3780	16000	24000	0.0272	<b>18.000</b> 0.7087	<b>17.992</b> 0.7083	<b>22.020</b> 0.8669	<b>22.007</b> 0.8664	<b>0.009</b> 0.020
	<b>18</b> 0.7087	<b>22</b> 0.8661	<b>14</b> 0.551	K18X22X14FV	<b>11.3</b> 2540	<b>16.3</b> 3660	16000	24000	0.0270	<b>18.000</b> 0.7087	<b>17.992</b> 0.7083	<b>22.020</b> 0.8669	<b>22.007</b> 0.8664	<b>0.009</b> 0.020
	<b>18</b> 0.7087	<b>22</b> 0.8661	<b>17</b> 0.669	K18X22X17H	<b>13.3</b> 2990	<b>19.9</b> 4470	16000	24000	0.0284	<b>18.000</b> 0.7087	<b>17.992</b> 0.7083	<b>22.020</b> 0.8669	<b>22.007</b> 0.8664	<b>0.009</b> 0.020
	<b>18</b> 0.7087	<b>22</b> 0.8661	<b>20</b> 0.787	K18X22X20F	<b>15.0</b> 3370	<b>23.4</b> 5260	16000	24000	0.0296	<b>18.000</b> 0.7087	<b>17.992</b> 0.7083	<b>22.020</b> 0.8669	<b>22.007</b> 0.8664	<b>0.011</b> 0.024
	<b>18</b> 0.7087	<b>24</b> 0.9449	<b>12</b> 0.472	K18X24X12	<b>11.8</b> 2650	<b>13.1</b> 2940	17000	25000	0.0243	<b>18.000</b> 0.7087	<b>17.992</b> 0.7083	<b>24.020</b> 0.9457	<b>24.007</b> 0.9452	<b>0.011</b> 0.024
	<b>18</b> 0.7087	<b>24</b> 0.9449	<b>20</b> 0.787	K18X24X20H	<b>19.4</b> 4360	<b>24.9</b> 5600	16000	25000	0.0285	<b>18.000</b> 0.7087	<b>17.992</b> 0.7083	<b>24.020</b> 0.9457	<b>24.007</b> 0.9452	<b>0.019</b> 0.042
	<b>18</b> 0.7087	<b>25</b> 0.9843	<b>22</b> 0.866	K18X25X22H	<b>23.3</b> 5240	<b>28.6</b> 6430	17000	26000	0.0291	<b>18.000</b> 0.7087	<b>17.992</b> 0.7083	<b>25.020</b> 0.9850	<b>25.007</b> 0.9845	<b>0.025</b> 0.055
	<b>18</b> 0.7087	<b>26</b> 1.0236	<b>12</b> 0.472	K18X26X12FV	<b>13.8</b> 3100	<b>13.5</b> 3030	11000	17000	0.0238	<b>18.000</b> 0.7087	<b>17.992</b> 0.7083	<b>26.020</b> 1.0244	<b>26.007</b> 1.0239	<b>0.020</b> 0.044
	<b>18</b> 0.7087	<b>26</b> 1.0236	<b>20</b> 0.787	K18X26X20F	<b>21.7</b> 4880	<b>24.1</b> 5420	17000	26000	0.0275	<b>18.000</b> 0.7087	<b>17.992</b> 0.7083	<b>26.020</b> 1.0244	<b>26.007</b> 1.0239	<b>0.027</b> 0.060
<b>19</b> 0.7480	<b>19</b> 0.7480	<b>23</b> 0.9055	<b>13</b> 0.512	K19X23X13	<b>10.8</b> 2430	<b>15.5</b> 3480	15000	23000	0.0273	<b>19.000</b> 0.7480	<b>18.991</b> 0.7477	<b>23.020</b> 0.9063	<b>23.007</b> 0.9058	<b>0.008</b> 0.018
	<b>19</b> 0.7480	<b>23</b> 0.9055	<b>17</b> 0.669	K19X23X17	<b>13.4</b> 3010	<b>20.6</b> 4630	15000	23000	0.0293	<b>19.000</b> 0.7480	<b>18.991</b> 0.7477	<b>23.020</b> 0.9063	<b>23.007</b> 0.9058	<b>0.011</b> 0.024
<b>20</b> 0.7874	<b>20</b> 0.7874	<b>24</b> 0.9449	<b>8</b> 0.315	K20X24X8F	<b>7.31</b> 1640	<b>9.60</b> 2160	14000	22000	0.0248	<b>20.000</b> 0.7874	<b>19.991</b> 0.7870	<b>24.020</b> 0.9457	<b>24.007</b> 0.9452	<b>0.005</b> 0.011

Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	Assembly Designation	C	C <sub>0</sub>	Speed Rating		C <sub>g</sub>	S		H		Wt.
			-0.20 -0.008 -0.55 -0.022		Load Ratings		Grease	Oil		Mounting Dimension				
					kN	lbf.				min <sup>-1</sup>	Max.	Min.	Max.	
<b>20</b> 0.7874	<b>20</b> 0.7874	<b>24</b> 0.9449	<b>10</b> 0.394	K20X24X10	<b>8.97</b> 2020	<b>12.5</b> 2810	14000	22000	0.0265	<b>20.000</b> 0.7874	<b>19.991</b> 0.7870	<b>24.020</b> 0.9457	<b>24.007</b> 0.9452	<b>0.006</b> 0.013
	<b>20</b> 0.7874	<b>24</b> 0.9449	<b>10</b> 0.394	K20X24X10H	<b>8.97</b> 2020	<b>12.5</b> 2810	14000	22000	0.0265	<b>20.000</b> 0.7874	<b>19.991</b> 0.7870	<b>24.020</b> 0.9457	<b>24.007</b> 0.9452	<b>0.006</b> 0.013
	<b>20</b> 0.7874	<b>24</b> 0.9449	<b>12</b> 0.472	K20X24X12	<b>10.7</b> 2410	<b>15.7</b> 3530	14000	22000	0.0280	<b>20.000</b> 0.7874	<b>19.991</b> 0.7870	<b>24.020</b> 0.9457	<b>24.007</b> 0.9452	<b>0.008</b> 0.018
	<b>20</b> 0.7874	<b>24</b> 0.9449	<b>13</b> 0.512	K20X24X13	<b>11.5</b> 2590	<b>17.3</b> 3890	14000	22000	0.0287	<b>20.000</b> 0.7874	<b>19.991</b> 0.7870	<b>24.020</b> 0.9457	<b>24.007</b> 0.9452	<b>0.008</b> 0.018
	<b>20</b> 0.7874	<b>24</b> 0.9449	<b>13</b> 0.512	K20X24X13H	<b>11.5</b> 2590	<b>17.3</b> 3890	14000	22000	0.0287	<b>20.000</b> 0.7874	<b>19.991</b> 0.7870	<b>24.020</b> 0.9457	<b>24.007</b> 0.9452	<b>0.009</b> 0.020
	<b>20</b> 0.7874	<b>24</b> 0.9449	<b>14</b> 0.551	K20X24X14	<b>12.4</b> 2790	<b>18.9</b> 4250	14000	22000	0.0293	<b>20.000</b> 0.7874	<b>19.991</b> 0.7870	<b>24.020</b> 0.9457	<b>24.007</b> 0.9452	<b>0.009</b> 0.020
	<b>20</b> 0.7874	<b>24</b> 0.9449	<b>17</b> 0.669	K20X24X17H	<b>14.8</b> 3330	<b>23.7</b> 5330	14000	22000	0.0310	<b>20.000</b> 0.7874	<b>19.991</b> 0.7870	<b>24.020</b> 0.9457	<b>24.007</b> 0.9452	<b>0.011</b> 0.024
	<b>20</b> 0.7874	<b>26</b> 1.0236	<b>12</b> 0.472	K20X26X12	<b>13.0</b> 2920	<b>15.3</b> 3440	15000	23000	0.0264	<b>20.000</b> 0.7874	<b>19.991</b> 0.7870	<b>26.020</b> 1.0244	<b>26.007</b> 1.0239	<b>0.012</b> 0.026
	<b>20</b> 0.7874	<b>26</b> 1.0236	<b>13</b> 0.512	K20X26X13H	<b>13.4</b> 3010	<b>15.9</b> 3570	15000	23000	0.0267	<b>20.000</b> 0.7874	<b>19.991</b> 0.7870	<b>26.020</b> 1.0244	<b>26.007</b> 1.0239	<b>0.014</b> 0.031
	<b>20</b> 0.7874	<b>26</b> 1.0236	<b>17</b> 0.669	K20X26X17H	<b>19.3</b> 4340	<b>25.5</b> 5730	15000	23000	0.0300	<b>20.000</b> 0.7874	<b>19.991</b> 0.7870	<b>26.020</b> 1.0244	<b>26.007</b> 1.0239	<b>0.017</b> 0.037
	<b>20</b> 0.7874	<b>26</b> 1.0236	<b>20</b> 0.787	K20X26X20	<b>20.3</b> 4560	<b>27.2</b> 6110	15000	23000	0.0305	<b>20.000</b> 0.7874	<b>19.991</b> 0.7870	<b>26.020</b> 1.0244	<b>26.007</b> 1.0239	<b>0.020</b> 0.044
	<b>20</b> 0.7874	<b>28</b> 1.1024	<b>20</b> 0.787	K20X28X20H	<b>24.6</b> 5530	<b>29.0</b> 6520	15000	23000	0.0300	<b>20.000</b> 0.7874	<b>19.991</b> 0.7870	<b>28.020</b> 1.1031	<b>28.007</b> 1.1026	<b>0.028</b> 0.062
	<b>20</b> 0.7874	<b>28</b> 1.1024	<b>25</b> 0.984	K20X28X25H	<b>29.7</b> 6680	<b>37.0</b> 8320	15000	23000	0.0319	<b>20.000</b> 0.7874	<b>19.991</b> 0.7870	<b>28.020</b> 1.1031	<b>28.007</b> 1.1026	<b>0.036</b> 0.079
	<b>20</b> 0.7874	<b>30</b> 1.1811	<b>30</b> 1.181	K20X30X30H	<b>38.9</b> 8750	<b>45.8</b> 10300	16000	24000	0.0329	<b>20.000</b> 0.7874	<b>19.991</b> 0.7870	<b>30.020</b> 1.1819	<b>30.007</b> 1.1814	<b>0.055</b> 0.121
	<b>20</b> 0.7874	<b>32</b> 1.2598	<b>36</b> 1.417	K20X32X36H	<b>49.9</b> 11220	<b>57.0</b> 12810	16000	25000	0.0344	<b>20.000</b> 0.7874	<b>19.991</b> 0.7870	<b>32.025</b> 1.2608	<b>32.009</b> 1.2602	<b>0.082</b> 0.181
<b>21</b> 0.8268	<b>21</b> 0.8268	<b>25</b> 0.9843	<b>17</b> 0.669	K21X25X17F	<b>14.3</b> 3210	<b>23.1</b> 5190	14000	21000	0.0315	<b>21.000</b> 0.8268	<b>20.991</b> 0.8264	<b>25.020</b> 0.9850	<b>25.007</b> 0.9845	<b>0.012</b> 0.026
	<b>21</b> 0.8268	<b>25</b> 0.9843	<b>17</b> 0.669	K21X25X17H	<b>14.3</b> 3210	<b>23.1</b> 5190	14000	21000	0.0315	<b>21.000</b> 0.8268	<b>20.991</b> 0.8264	<b>25.020</b> 0.9850	<b>25.007</b> 0.9845	<b>0.013</b> 0.029
<b>22</b> 0.8661	<b>22</b> 0.8661	<b>26</b> 1.0236	<b>10</b> 0.394	K22X26X10H	<b>9.81</b> 2210	<b>14.5</b> 3 260	13000	20000	0.0291	<b>22.000</b> 0.8661	<b>21.991</b> 0.8658	<b>26.020</b> 1.0244	<b>26.007</b> 1.0239	<b>0.007</b> 0.015
	<b>22</b> 0.8661	<b>26</b> 1.0236	<b>13</b> 0.512	K22X26X13H	<b>11.8</b> 2650	<b>18.3</b> 4110	13000	20000	0.0303	<b>22.000</b> 0.8661	<b>21.991</b> 0.8658	<b>26.020</b> 1.0244	<b>26.007</b> 1.0239	<b>0.012</b> 0.026
	<b>22</b> 0.8661	<b>26</b> 1.0236	<b>17</b> 0.669	K22X26X17	<b>15.6</b> 3510	<b>26.3</b> 5910	13000	20000	0.0332	<b>22.000</b> 0.8661	<b>21.991</b> 0.8658	<b>26.020</b> 1.0244	<b>26.007</b> 1.0239	<b>0.015</b> 0.033
	<b>22</b> 0.8661	<b>26</b> 1.0236	<b>17</b> 0.669	K22X26X17H	<b>15.6</b> 3510	<b>26.3</b> 5910	13000	20000	0.0332	<b>22.000</b> 0.8661	<b>21.991</b> 0.8658	<b>26.020</b> 1.0244	<b>26.007</b> 1.0239	<b>0.012</b> 0.026
	<b>22</b> 0.8661	<b>26</b> 1.0236	<b>18</b> 0.709	K22X26X18H	<b>15.3</b> 3440	<b>25.5</b> 5730	13000	20000	0.0329	<b>22.000</b> 0.8661	<b>21.991</b> 0.8658	<b>26.020</b> 1.0244	<b>26.007</b> 1.0239	<b>0.017</b> 0.037
	<b>22</b> 0.8661	<b>28</b> 1.1024	<b>13</b> 0.512	K22X28X13	<b>13.9</b> 3120	<b>17.1</b> 3840	13000	20000	0.0283	<b>22.000</b> 0.8661	<b>21.991</b> 0.8658	<b>28.020</b> 1.1031	<b>28.007</b> 1.1026	<b>0.015</b> 0.033
	<b>22</b> 0.8661	<b>28</b> 1.1024	<b>17</b> 0.669	K22X28X17H	<b>18.2</b> 4090	<b>24.2</b> 5440	13000	20000	0.0308	<b>22.000</b> 0.8661	<b>21.991</b> 0.8658	<b>28.020</b> 1.1031	<b>28.007</b> 1.1026	<b>0.020</b> 0.044

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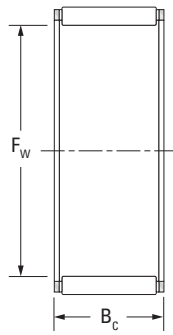


# NEEDLE ROLLER BEARINGS

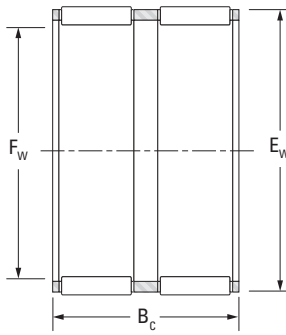
## SINGLE-ROW, DOUBLE-ROW ASSEMBLIES –

continued

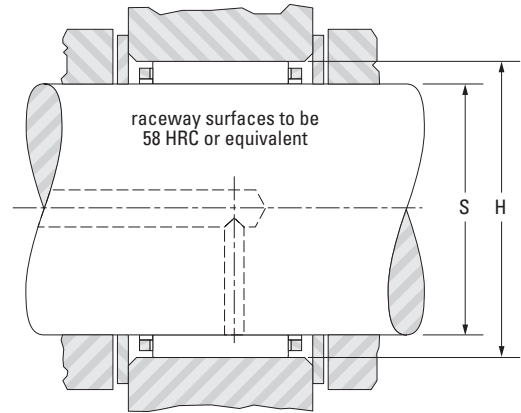
### METRIC SERIES



**K**



**KZW**



Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	Assembly Designation	C	C <sub>0</sub>	Speed Rating		C <sub>g</sub>	S		H		Wt.
							Grease	Oil		Mounting Dimension				
			mm in.		mm in.	mm in.				mm in.				
<b>22</b> 0.8661	<b>22</b> 0.8661	<b>30</b> 1.1811	<b>15</b> 0.591	K22X30X15H	<b>19.7</b> 4430	<b>22.3</b> 5010	14000	21000	0.0292	<b>22.000</b> 0.8661	<b>21.991</b> 0.8658	<b>30.020</b> 1.1819	<b>30.007</b> 1.1814	<b>0.023</b> 0.051
	<b>22</b> 0.8661	<b>30</b> 1.1811	<b>20</b> 0.787	K22X30X20FV	<b>24.4</b> 5490	<b>29.4</b> 6610	14000	21000	0.0313	<b>22.000</b> 0.8661	<b>21.991</b> 0.8658	<b>30.020</b> 1.1819	<b>30.007</b> 1.1814	<b>0.031</b> 0.068
	<b>22</b> 0.8661	<b>32</b> 1.2598	<b>24</b> 0.945	K22X32X24F	<b>33.1</b> 7440	<b>37.9</b> 8520	14000	22000	0.0326	<b>22.000</b> 0.8661	<b>21.991</b> 0.8658	<b>32.025</b> 1.2608	<b>32.009</b> 1.2602	<b>0.046</b> 0.101
	<b>22</b> 0.8661	<b>32</b> 1.2598	<b>30</b> 1.181	K22X32X30H	<b>41.8</b> 9400	<b>51.3</b> 11530	14000	22000	0.0351	<b>22.000</b> 0.8661	<b>21.991</b> 0.8658	<b>32.025</b> 1.2608	<b>32.009</b> 1.2602	<b>0.057</b> 0.126
<b>23</b> 0.9055	<b>23</b> 0.9055	<b>28</b> 1.1024	<b>24</b> 0.945	K23X28X24F	<b>22.4</b> 5040	<b>36.2</b> 8140	12000	19000	0.0355	<b>23.000</b> 0.9055	<b>22.991</b> 0.9052	<b>28.020</b> 1.1031	<b>28.007</b> 1.1026	<b>0.023</b> 0.051
	<b>23</b> 0.9055	<b>35</b> 1.3780	<b>16</b> 0.630	K23X35X16H	<b>25.9</b> 5820	<b>25.1</b> 5640	14000	21000	0.0294	<b>23.000</b> 0.9055	<b>22.991</b> 0.9052	<b>35.025</b> 1.3789	<b>35.009</b> 1.3783	<b>0.040</b> 0.088
	<b>23</b> 0.9055	<b>35</b> 1.3780	<b>16.2</b> 0.638	K23X35X16,2H	<b>29.1</b> 6540	<b>29.3</b> 6590	14000	21000	0.0306	<b>23.000</b> 0.9055	<b>22.991</b> 0.9052	<b>35.025</b> 1.3789	<b>35.009</b> 1.3783	<b>0.040</b> 0.088
<b>24</b> 0.9449	<b>24</b> 0.9449	<b>28</b> 1.1024	<b>10</b> 0.394	K24X28X10H	<b>9.67</b> 2170	<b>14.6</b> 3280	12000	18000	0.0298	<b>24.000</b> 0.9449	<b>23.991</b> 0.9445	<b>28.020</b> 1.1031	<b>28.007</b> 1.1026	<b>0.027</b> 0.060
	<b>24</b> 0.9449	<b>28</b> 1.1024	<b>13</b> 0.512	K24X28X13H	<b>12.5</b> 2810	<b>20.2</b> 4540	12000	18000	0.0323	<b>24.000</b> 0.9449	<b>23.991</b> 0.9445	<b>28.020</b> 1.1031	<b>28.007</b> 1.1026	<b>0.010</b> 0.022
	<b>24</b> 0.9449	<b>28</b> 1.1024	<b>16</b> 0.630	K24X28X16F						<b>24.000</b> 0.9449	<b>23.991</b> 0.9445	<b>28.020</b> 1.1031	<b>28.007</b> 1.1026	
	<b>24</b> 0.9449	<b>28</b> 1.1024	<b>17</b> 0.669	K24X28X17H	<b>15.4</b> 3460	<b>26.4</b> 5930	12000	18000	0.0345	<b>24.000</b> 0.9449	<b>23.991</b> 0.9445	<b>28.020</b> 1.1031	<b>28.007</b> 1.1026	<b>0.013</b> 0.029
	<b>24</b> 0.9449	<b>30</b> 1.1811	<b>10</b> 0.394	K24X30X10TN	<b>11.3</b> 2540	<b>13.5</b> 3030	12000	19000	—	<b>24.000</b> 0.9449	<b>23.991</b> 0.9445	<b>30.020</b> 1.1819	<b>30.007</b> 1.1814	<b>0.008</b> 0.018
	<b>24</b> 0.9449	<b>30</b> 1.1811	<b>17</b> 0.669	K24X30X17H	<b>19.8</b> 4450	<b>27.7</b> 6230	12000	19000	0.0331	<b>24.000</b> 0.9449	<b>23.991</b> 0.9445	<b>30.020</b> 1.1819	<b>30.007</b> 1.1814	<b>0.020</b> 0.044
	<b>24</b> 0.9449	<b>30</b> 1.1811	<b>22</b> 0.866	K24X30X22	<b>25.0</b> 5620	<b>37.3</b> 8390	12000	19000	0.0356	<b>24.000</b> 0.9449	<b>23.991</b> 0.9445	<b>30.020</b> 1.1819	<b>30.007</b> 1.1814	<b>0.024</b> 0.053
	<b>24</b> 0.9449	<b>36</b> 1.4173	<b>23</b> 0.906	K24X36X23H	<b>37.1</b> 8340	<b>40.1</b> 9010	13000	20000	0.0336	<b>24.000</b> 0.9449	<b>23.991</b> 0.9445	<b>36.025</b> 1.4183	<b>36.009</b> 1.4177	<b>0.070</b> 0.154
<b>25</b> 0.9843	<b>25</b> 0.9843	<b>29</b> 1.1417	<b>10</b> 0.394	K25X29X10H	<b>9.61</b> 2160	<b>14.6</b> 3280	11000	17000	0.0303	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>29.020</b> 1.1425	<b>29.007</b> 1.1420	<b>0.008</b> 0.018
	<b>25</b> 0.9843	<b>29</b> 1.1417	<b>13</b> 0.512	K25X29X13H	<b>12.8</b> 2880	<b>21.1</b> 4740	11000	17000	0.0332	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>29.020</b> 1.1425	<b>29.007</b> 1.1420	<b>0.010</b> 0.022

Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	Assembly Designation	C	C <sub>0</sub>	Speed Rating		C <sub>g</sub>	S		H		Wt.
							Grease	Oil		Mounting Dimension				
			-0.20 -0.008 -0.55 -0.022		Load Ratings					mm in.	mm in.	mm in.	mm in.	
<b>25</b> 0.9843	<b>25</b> 0.9843	<b>29</b> 1.1417	<b>17</b> 0.669	K25X29X17H	<b>15.1</b> 3390	<b>26.2</b> 5890	11000	17000	0.0351	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>29.020</b> 1.1425	<b>29.007</b> 1.1420	<b>0.016</b> 0.035
	<b>25</b> 0.9843	<b>30</b> 1.1811	<b>13</b> 0.512	K25X30X13	<b>14.6</b> 3280	<b>21.4</b> 4810	11000	17000	0.0323	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>30.020</b> 1.1819	<b>30.007</b> 1.1814	<b>0.012</b> 0.026
	<b>25</b> 0.9843	<b>30</b> 1.1811	<b>17</b> 0.669	K25X30X17H	<b>18.8</b> 4230	<b>29.8</b> 6700	11000	17000	0.0351	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>30.020</b> 1.1819	<b>30.007</b> 1.1814	<b>0.016</b> 0.035
	<b>25</b> 0.9843	<b>30</b> 1.1811	<b>18</b> 0.709	K25X30X18	<b>20.6</b> 4630	<b>33.4</b> 7510	11000	17000	0.0361	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>30.020</b> 1.1819	<b>30.007</b> 1.1814	<b>0.017</b> 0.037
	<b>25</b> 0.9843	<b>30</b> 1.1811	<b>20</b> 0.787	K25X30X20H	<b>21.9</b> 4920	<b>36.1</b> 8120	11000	17000	0.0368	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>30.020</b> 1.1819	<b>30.007</b> 1.1814	<b>0.019</b> 0.042
	<b>25</b> 0.9843	<b>30</b> 1.1811	<b>24</b> 0.945	K25X30X24H	<b>24.8</b> 5580	<b>42.4</b> 9530	11000	17000	0.0383	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>30.020</b> 1.1819	<b>30.007</b> 1.1814	<b>0.024</b> 0.053
	<b>25</b> 0.9843	<b>30</b> 1.1811	<b>26</b> 1.024	K25X30X26ZW	<b>23.0</b> 5170	<b>38.6</b> 8680	11000	17000	0.0374	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>30.020</b> 1.1819	<b>30.007</b> 1.1814	<b>0.027</b> 0.060
	<b>25</b> 0.9843	<b>31</b> 1.2205	<b>14</b> 0.551	K25X31X14H	<b>16.8</b> 3780	<b>22.7</b> 5100	12000	18000	0.0320	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>31.025</b> 1.2215	<b>31.009</b> 1.2208	<b>0.017</b> 0.037
	<b>25</b> 0.9843	<b>31</b> 1.2205	<b>17</b> 0.669	K25X31X17H	<b>19.7</b> 4430	<b>27.8</b> 6250	12000	18000	0.0337	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>31.025</b> 1.2215	<b>31.009</b> 1.2208	<b>0.020</b> 0.044
	<b>25</b> 0.9843	<b>31</b> 1.2205	<b>21</b> 0.827	K25X31X21	<b>25.1</b> 5640	<b>38.0</b> 8540	12000	18000	0.0364	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>31.025</b> 1.2215	<b>31.009</b> 1.2208	<b>0.026</b> 0.057
	<b>25</b> 0.9843	<b>31</b> 1.2205	<b>21</b> 0.827	K25X31X21F	<b>25.1</b> 5640	<b>38.0</b> 8540	12000	18000	0.0364	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>31.025</b> 1.2215	<b>31.009</b> 1.2208	<b>0.026</b> 0.057
	<b>25</b> 0.9843	<b>31</b> 1.2205	<b>21</b> 0.827	K25X31X21H	<b>25.1</b> 5640	<b>38.0</b> 8540	12000	18000	0.0364	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>31.025</b> 1.2215	<b>31.009</b> 1.2208	<b>0.026</b> 0.057
	<b>25</b> 0.9843	<b>31</b> 1.2205	<b>24</b> 0.945	K25X31X24F	<b>25.3</b> 5690	<b>38.5</b> 8660	12000	18000	0.0365	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>31.025</b> 1.2215	<b>31.009</b> 1.2208	<b>0.031</b> 0.068
	<b>25</b> 0.9843	<b>31</b> 1.2205	<b>24</b> 0.945	K25X31X24FH	<b>25.3</b> 5690	<b>38.5</b> 8660	12000	18000	0.0365	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>31.025</b> 1.2215	<b>31.009</b> 1.2208	<b>0.031</b> 0.068
	<b>25</b> 0.9843	<b>32</b> 1.2598	<b>16</b> 0.630	K25X32X16	<b>19.8</b> 4450	<b>25.3</b> 5690	12000	18000	0.0323	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>32.025</b> 1.2608	<b>32.009</b> 1.2602	<b>0.027</b> 0.060
	<b>25</b> 0.9843	<b>33</b> 1.2992	<b>20</b> 0.787	K25X33X20FH	<b>25.6</b> 5760	<b>32.3</b> 7260	12000	18000	0.0337	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>33.025</b> 1.3002	<b>33.009</b> 1.2996	<b>0.035</b> 0.077
	<b>25</b> 0.9843	<b>33</b> 1.2992	<b>20</b> 0.787	K25X33X20H	<b>28.8</b> 6470	<b>37.6</b> 8450	12000	18000	0.0350	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>33.025</b> 1.3002	<b>33.009</b> 1.2996	<b>0.035</b> 0.077
	<b>25</b> 0.9843	<b>33</b> 1.2992	<b>24</b> 0.945	K25X33X24H	<b>32.3</b> 7260	<b>43.5</b> 9780	12000	18000	0.0363	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>33.025</b> 1.3002	<b>33.009</b> 1.2996	<b>0.038</b> 0.084
	<b>25</b> 0.9843	<b>33</b> 1.2992	<b>25</b> 0.984	K25X33X25H	<b>33.0</b> 7420	<b>44.6</b> 10030	12000	18000	0.0365	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>33.025</b> 1.3002	<b>33.009</b> 1.2996	<b>0.041</b> 0.090
	<b>25</b> 0.9843	<b>35</b> 1.3780	<b>23.7</b> 0.933	K25X35X23,7H	<b>35.9</b> 8070	<b>42.3</b> 9510	12000	19000	0.0354	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>35.025</b> 1.3789	<b>35.009</b> 1.3783	<b>0.050</b> 0.110
	<b>25</b> 0.9843	<b>35</b> 1.3780	<b>25</b> 0.984	K25X35X25H	<b>37.8</b> 8500	<b>46.2</b> 10390	12000	19000	0.0360	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>35.025</b> 1.3789	<b>35.009</b> 1.3783	<b>0.054</b> 0.119
	<b>25</b> 0.9843	<b>35</b> 1.3780	<b>30</b> 1.181	K25X35X30H	<b>44.6</b> 10030	<b>57.2</b> 12860	12000	19000	0.0379	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>35.025</b> 1.3789	<b>35.009</b> 1.3783	<b>0.060</b> 0.132
	<b>25</b> 0.9843	<b>35</b> 1.3780	<b>36</b> 1.417	K25X35X36H	<b>52.4</b> 11780	<b>70.4</b> 15830	12000	19000	0.0399	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>35.025</b> 1.3789	<b>35.009</b> 1.3783	<b>0.074</b> 0.163
	<b>25</b> 0.9843	<b>37</b> 1.4567	<b>20</b> 0.787	K25X37X20H	<b>32.5</b> 7310	<b>34.1</b> 7670	12000	19000	0.0328	<b>25.000</b> 0.9843	<b>24.991</b> 0.9839	<b>37.025</b> 1.4577	<b>37.009</b> 1.4570	<b>0.055</b> 0.121

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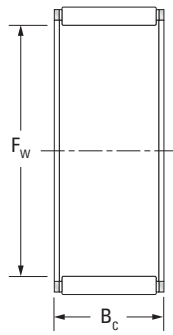


# NEEDLE ROLLER BEARINGS

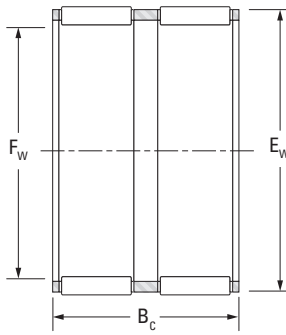
## SINGLE-ROW, DOUBLE-ROW ASSEMBLIES –

continued

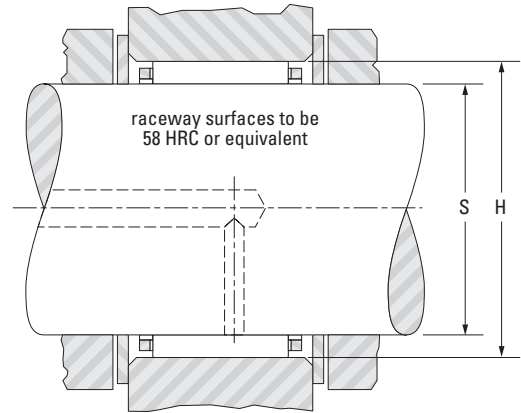
### METRIC SERIES



**K**



**KZW**



Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	Assembly Designation	C	C <sub>0</sub>	Speed Rating		C <sub>g</sub>	S		H		Wt.
							Grease	Oil		Mounting Dimension				
			mm in.		mm in.	mm in.				mm in.				
<b>26</b> 1.0236	<b>26</b> 1.0236	<b>30</b> 1.1811	<b>10</b> 0.394	K26X30X10F	<b>9.46</b> 2130	<b>14.5</b> 3260	11000	16000	0.0308	<b>26.000</b> 1.0236	<b>25.991</b> 1.0233	<b>30.020</b> 1.1819	<b>30.007</b> 1.1814	<b>0.007</b> 0.015
	<b>26</b> 1.0236	<b>30</b> 1.1811	<b>13</b> 0.512	K26X30X13	<b>12.3</b> 2770	<b>20.4</b> 4590	10000	16000	0.0335	<b>26.000</b> 1.0236	<b>25.991</b> 1.0233	<b>30.020</b> 1.1819	<b>30.007</b> 1.1814	<b>0.011</b> 0.024
	<b>26</b> 1.0236	<b>30</b> 1.1811	<b>17</b> 0.669	K26X30X17	<b>15.0</b> 3370	<b>26.3</b> 5910	10000	16000	0.0357	<b>26.000</b> 1.0236	<b>25.991</b> 1.0233	<b>30.020</b> 1.1819	<b>30.007</b> 1.1814	<b>0.014</b> 0.031
	<b>26</b> 1.0236	<b>30</b> 1.1811	<b>22</b> 0.866	K26X30X22ZW	<b>16.7</b> 3750	<b>30.2</b> 6790	10000	16000	0.0370	<b>26.000</b> 1.0236	<b>25.991</b> 1.0233	<b>30.020</b> 1.1819	<b>30.007</b> 1.1814	<b>0.018</b> 0.040
<b>28</b> 1.1024	<b>28</b> 1.1024	<b>32</b> 1.2598	<b>21</b> 0.827	K28X32X21F	<b>18.7</b> 4200	<b>35.7</b> 8030	9900	15000	0.0398	<b>28.000</b> 1.1024	<b>27.991</b> 1.1020	<b>32.025</b> 1.2608	<b>32.009</b> 1.2602	<b>0.018</b> 0.040
	<b>28</b> 1.1024	<b>33</b> 1.2992	<b>13</b> 0.512	K28X33X13F	<b>14.1</b> 3170	<b>21.4</b> 4810	10000	15000	0.0339	<b>28.000</b> 1.1024	<b>27.991</b> 1.1020	<b>33.025</b> 1.3002	<b>33.009</b> 1.2996	<b>0.015</b> 0.033
	<b>28</b> 1.1024	<b>33</b> 1.2992	<b>13</b> 0.512	K28X33X13FV	<b>14.1</b> 3170	<b>21.4</b> 4810	10000	15000	0.0339	<b>28.000</b> 1.1024	<b>27.991</b> 1.1020	<b>33.025</b> 1.3002	<b>33.009</b> 1.2996	<b>0.015</b> 0.033
	<b>28</b> 1.1024	<b>33</b> 1.2992	<b>17</b> 0.669	K28X33X17H	<b>19.8</b> 4450	<b>33.0</b> 7420	10000	15000	0.0378	<b>28.000</b> 1.1024	<b>27.991</b> 1.1020	<b>33.025</b> 1.3002	<b>33.009</b> 1.2996	<b>0.018</b> 0.040
	<b>28</b> 1.1024	<b>33</b> 1.2992	<b>27</b> 1.063	K28X33X27	<b>29.0</b> 6520	<b>53.8</b> 12090	10000	15000	0.0427	<b>28.000</b> 1.1024	<b>27.991</b> 1.1020	<b>33.025</b> 1.3002	<b>33.009</b> 1.2996	<b>0.027</b> 0.060
	<b>28</b> 1.1024	<b>34</b> 1.3386	<b>17</b> 0.669	K28X34X17	<b>21.1</b> 4740	<b>31.5</b> 7080	10000	16000	0.0364	<b>28.000</b> 1.1024	<b>27.991</b> 1.1020	<b>34.025</b> 1.3396	<b>34.009</b> 1.3389	<b>0.022</b> 0.049
	<b>28</b> 1.1024	<b>34</b> 1.3386	<b>20</b> 0.787	K28X34X20H	<b>24.4</b> 5490	<b>37.8</b> 8500	10000	16000	0.0381	<b>28.000</b> 1.1024	<b>27.991</b> 1.1020	<b>34.025</b> 1.3396	<b>34.009</b> 1.3389	<b>0.025</b> 0.055
	<b>28</b> 1.1024	<b>35</b> 1.3780	<b>15</b> 0.591	K28X35X15H	<b>19.5</b> 4380	<b>25.6</b> 5760	10000	16000	0.0339	<b>28.000</b> 1.1024	<b>27.991</b> 1.1020	<b>35.025</b> 1.3789	<b>35.009</b> 1.3783	<b>0.025</b> 0.055
	<b>28</b> 1.1024	<b>35</b> 1.3780	<b>16</b> 0.630	K28X35X16FH	<b>21.5</b> 4830	<b>29.1</b> 6540	10000	16000	0.0350	<b>28.000</b> 1.1024	<b>27.991</b> 1.1020	<b>35.025</b> 1.3789	<b>35.009</b> 1.3783	<b>0.026</b> 0.057
	<b>28</b> 1.1024	<b>35</b> 1.3780	<b>16</b> 0.630	K28X35X16H	<b>21.5</b> 4830	<b>29.1</b> 6540	10000	16000	0.0350	<b>28.000</b> 1.1024	<b>27.991</b> 1.1020	<b>35.025</b> 1.3789	<b>35.009</b> 1.3783	<b>0.026</b> 0.057
	<b>28</b> 1.1024	<b>35</b> 1.3780	<b>27</b> 1.063	K28X35X27H	<b>35.2</b> 7910	<b>54.7</b> 12300	10000	16000	0.0409	<b>28.000</b> 1.1024	<b>27.991</b> 1.1020	<b>35.025</b> 1.3789	<b>35.009</b> 1.3783	<b>0.042</b> 0.093
	<b>28</b> 1.1024	<b>36</b> 1.4173	<b>20</b> 0.787	K28X36X20FV	<b>27.8</b> 6250	<b>37.0</b> 8320	10000	16000	0.0365	<b>28.000</b> 1.1024	<b>27.991</b> 1.1020	<b>36.025</b> 1.4183	<b>36.009</b> 1.4177	<b>0.039</b> 0.086
	<b>28</b> 1.1024	<b>38</b> 1.4961	<b>25</b> 1.004	K28X38X25,5	<b>40.9</b> 9190	<b>52.7</b> 11850	11000	16000	0.0389	<b>28.000</b> 1.1024	<b>27.991</b> 1.1020	<b>38.025</b> 1.4970	<b>38.009</b> 1.4964	<b>0.059</b> 0.130

Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	Assembly Designation	C	C <sub>0</sub>	Speed Rating		C <sub>g</sub>	S		H		Wt.
							Grease	Oil		Mounting Dimension				
			-0.20 -0.008 -0.55 -0.022		Load Ratings					mm in.	mm in.	mm in.	mm in.	
<b>28</b> 1.1024	<b>28</b> 1.1024	<b>40</b> 1.5748	<b>18</b> 0.709	K28X40X18H	<b>33.6</b> 7550	<b>36.5</b> 8210	11000	17000	0.0349	<b>28.000</b> 1.1024	<b>27.991</b> 1.1020	<b>40.025</b> 1.5758	<b>40.009</b> 1.5752	<b>0.060</b> 0.132
	<b>28</b> 1.1024	<b>40</b> 1.5748	<b>25</b> 0.984	K28X40X25H	<b>45.5</b> 10230	<b>54.0</b> 12140	11000	17000	0.0384	<b>28.000</b> 1.1024	<b>27.991</b> 1.1020	<b>40.025</b> 1.5758	<b>40.009</b> 1.5752	<b>0.072</b> 0.159
	<b>28</b> 1.1024	<b>40</b> 1.5748	<b>30</b> 1.181	K28X40X30H	<b>54.3</b> 12210	<b>67.8</b> 15240	11000	17000	0.0406	<b>28.000</b> 1.1024	<b>27.991</b> 1.1020	<b>40.025</b> 1.5758	<b>40.009</b> 1.5752	<b>0.100</b> 0.220
	<b>28</b> 1.1024	<b>41</b> 1.6142	<b>25</b> 0.984	K28X41X25H	<b>49.2</b> 11060	<b>57.1</b> 12840	11000	17000	0.0386	<b>28.000</b> 1.1024	<b>27.991</b> 1.1020	<b>41.025</b> 1.6152	<b>41.009</b> 1.6145	<b>0.082</b> 0.181
<b>29</b> 1.1417	<b>29</b> 1.1417	<b>34</b> 1.3386	<b>27</b> 1.063	K29X34X27F	<b>28.9</b> 6500	<b>54.0</b> 12140	9700	15000	0.0434	<b>29.000</b> 1.1417	<b>28.991</b> 1.1414	<b>34.025</b> 1.3396	<b>34.009</b> 1.3389	<b>0.033</b> 0.073
<b>30</b> 1.1811	<b>30</b> 1.1811	<b>34</b> 1.3386	<b>13</b> 0.512	K30X34X13	<b>13.5</b> 3030	<b>24.1</b> 5420	9200	14000	0.0372	<b>30.000</b> 1.1811	<b>29.991</b> 1.1807	<b>34.025</b> 1.3396	<b>34.009</b> 1.3389	<b>0.011</b> 0.024
	<b>30</b> 1.1811	<b>35</b> 1.3780	<b>13</b> 0.512	K30X35X13H	<b>15.6</b> 3510	<b>24.9</b> 5600	9300	14000	0.0363	<b>30.000</b> 1.1811	<b>29.991</b> 1.1807	<b>35.025</b> 1.3789	<b>35.009</b> 1.3783	<b>0.017</b> 0.037
	<b>30</b> 1.1811	<b>35</b> 1.3780	<b>17</b> 0.669	K30X35X17H	<b>20.2</b> 4540	<b>34.6</b> 7780	9300	14000	0.0394	<b>30.000</b> 1.1811	<b>29.991</b> 1.1807	<b>35.025</b> 1.3789	<b>35.009</b> 1.3783	<b>0.022</b> 0.049
	<b>30</b> 1.1811	<b>35</b> 1.3780	<b>20</b> 0.787	K30X35X20H	<b>23.5</b> 5280	<b>41.9</b> 9420	9300	14000	0.0413	<b>30.000</b> 1.1811	<b>29.991</b> 1.1807	<b>35.025</b> 1.3789	<b>35.009</b> 1.3783	<b>0.023</b> 0.051
	<b>30</b> 1.1811	<b>35</b> 1.3780	<b>22.8</b> 0.898	K30X35X23F	<b>25.6</b> 5760	<b>46.8</b> 10520	9300	14000	0.0425	<b>30.000</b> 1.1811	<b>29.991</b> 1.1807	<b>35.025</b> 1.3789	<b>35.009</b> 1.3783	<b>0.028</b> 0.062
	<b>30</b> 1.1811	<b>35</b> 1.3780	<b>27</b> 1.063	K30X35X27H	<b>30.6</b> 6880	<b>59.0</b> 13260	9300	14000	0.0450	<b>30.000</b> 1.1811	<b>29.991</b> 1.1807	<b>35.025</b> 1.3789	<b>35.009</b> 1.3783	<b>0.032</b> 0.071
	<b>30</b> 1.1811	<b>35</b> 1.3780	<b>27</b> 1.063	K30X35X27HZW	<b>19.9</b> 4470	<b>33.6</b> 7550	9300	14000	0.0391	<b>30.000</b> 1.1811	<b>29.991</b> 1.1807	<b>35.025</b> 1.3789	<b>35.009</b> 1.3783	<b>0.033</b> 0.073
	<b>30</b> 1.1811	<b>36</b> 1.4173	<b>14</b> 0.551	K30X36X14	<b>18.0</b> 4050	<b>26.2</b> 5890	9500	15000	0.0358	<b>30.000</b> 1.1811	<b>29.991</b> 1.1807	<b>36.025</b> 1.4183	<b>36.009</b> 1.4177	<b>0.020</b> 0.044
	<b>30</b> 1.1811	<b>37</b> 1.4567	<b>17.8</b> 0.701	K30X37X18	<b>24.3</b> 5460	<b>34.8</b> 7820	9600	15000	0.0377	<b>30.000</b> 1.1811	<b>29.991</b> 1.1807	<b>37.025</b> 1.4577	<b>37.009</b> 1.4570	<b>0.033</b> 0.073
	<b>30</b> 1.1811	<b>37</b> 1.4567	<b>18</b> 0.709	K30X37X18FV	<b>24.3</b> 5460	<b>34.8</b> 7820	9600	15000	0.0377	<b>30.000</b> 1.1811	<b>29.991</b> 1.1807	<b>37.025</b> 1.4577	<b>37.009</b> 1.4570	<b>0.033</b> 0.073
	<b>30</b> 1.1811	<b>40</b> 1.5748	<b>30</b> 1.181	K30X40X30H	<b>49.2</b> 11060	<b>67.8</b> 15240	9900	15000	0.0426	<b>30.000</b> 1.1811	<b>29.991</b> 1.1807	<b>40.025</b> 1.5758	<b>40.009</b> 1.5752	<b>0.077</b> 0.170
	<b>30</b> 1.1811	<b>42</b> 1.6535	<b>30</b> 1.181	K30X42X30H	<b>54.2</b> 12180	<b>68.6</b> 15420	10000	16000	0.0419	<b>30.000</b> 1.1811	<b>29.991</b> 1.1807	<b>42.025</b> 1.6545	<b>42.009</b> 1.6539	<b>0.096</b> 0.212
	<b>30</b> 1.1811	<b>44</b> 1.7323	<b>26</b> 1.024	K30X44X26H	<b>52.4</b> 11780	<b>59.9</b> 13470	10000	16000	0.0399	<b>30.000</b> 1.1811	<b>29.991</b> 1.1807	<b>44.025</b> 1.7333	<b>44.009</b> 1.7326	<b>0.095</b> 0.209
<b>31</b> 1.2047	<b>31</b> 1.2047	<b>37</b> 1.4409	<b>24</b> 0.945	K30,6X36,6X24FV	<b>27.8</b> 6250	<b>46.2</b> 10390	9300	14000	0.0416	<b>30.600</b> 1.2047	<b>30.591</b> 1.2044	<b>36.625</b> 1.4419	<b>36.609</b> 1.4413	<b>0.038</b> 0.084
<b>32</b> 1.2598	<b>32</b> 1.2598	<b>36</b> 1.4173	<b>15</b> 0.591	K32X36X15F	<b>11.6</b> 2610	<b>20.2</b> 4540	8600	13000	0.0367	<b>32.000</b> 1.2598	<b>31.989</b> 1.2594	<b>36.025</b> 1.4183	<b>36.009</b> 1.4177	<b>0.015</b> 0.033
	<b>32</b> 1.2598	<b>37</b> 1.4567	<b>13</b> 0.512	K32X37X13	<b>15.2</b> 3420	<b>24.4</b> 5490	8700	13000	0.0372	<b>32.000</b> 1.2598	<b>31.989</b> 1.2594	<b>37.025</b> 1.4577	<b>37.009</b> 1.4570	<b>0.018</b> 0.040
	<b>32</b> 1.2598	<b>37</b> 1.4567	<b>17</b> 0.669	K32X37X17H	<b>20.0</b> 4500	<b>34.8</b> 7820	8700	13000	0.0406	<b>32.000</b> 1.2598	<b>31.989</b> 1.2594	<b>37.025</b> 1.4577	<b>37.009</b> 1.4570	<b>0.020</b> 0.044
	<b>32</b> 1.2598	<b>37</b> 1.4567	<b>27</b> 1.063	K32X37X27	<b>29.3</b> 6590	<b>56.8</b> 12770	8700	13000	0.0459	<b>32.000</b> 1.2598	<b>31.989</b> 1.2594	<b>37.025</b> 1.4577	<b>37.009</b> 1.4570	<b>0.035</b> 0.077
	<b>32</b> 1.2598	<b>38</b> 1.4961	<b>20</b> 0.787	K32X38X20H	<b>27.3</b> 6140	<b>45.7</b> 10270	8800	14000	0.0423	<b>32.000</b> 1.2598	<b>31.989</b> 1.2594	<b>38.025</b> 1.4970	<b>38.009</b> 1.4964	<b>0.030</b> 0.066

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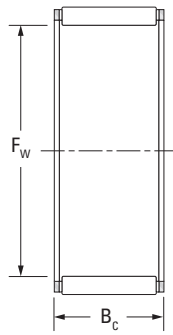


# NEEDLE ROLLER BEARINGS

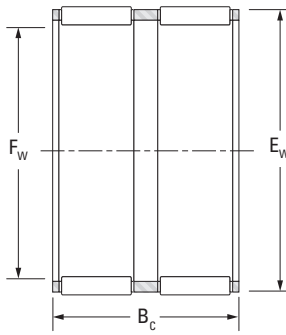
## SINGLE-ROW, DOUBLE-ROW ASSEMBLIES –

continued

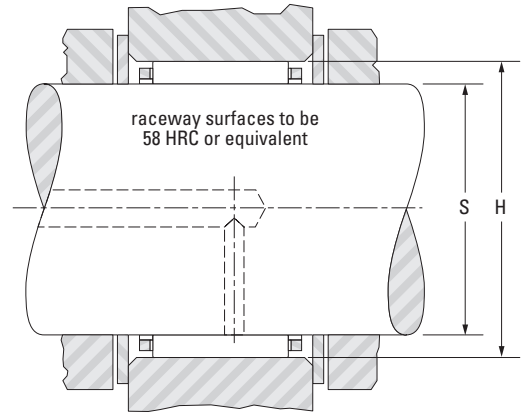
### METRIC SERIES



K



KZW



Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	Assembly Designation	C	C <sub>0</sub>	Speed Rating		C <sub>g</sub>	S		H		Wt.		
							Load Ratings			Grease	Oil	Mounting Dimension				
							kN	lbf.				min <sup>-1</sup>	Max.		Min.	Max.
mm in.	mm in.	mm in.	mm in.							mm in.	mm in.	mm in.	mm in.	kg lbs.		
32 1.2598	32 1.2598	38 1.4961	26 1.024	K32X38X26H	33.2 7460	58.8 13220	8800	14000	0.0451	32.000 1.2598	31.989 1.2594	38.025 1.4970	38.009 1.4964	0.037 0.082		
	32 1.2598	39 1.5354	16 0.630	K32X39X16H	23.0 5170	33.0 7420	8900	14000	0.0382	32.000 1.2598	31.989 1.2594	39.025 1.5364	39.009 1.5358	0.030 0.066		
	32 1.2598	39 1.5354	18 0.709	K32X39X18H	25.8 5800	38.2 8590	8900	14000	0.0397	32.000 1.2598	31.989 1.2594	39.025 1.5364	39.009 1.5358	0.033 0.073		
	32 1.2598	40 1.5748	25 0.984	K32X40X25H	37.9 8520	57.2 12860	9000	14000	0.0431	32.000 1.2598	31.989 1.2594	40.025 1.5758	40.009 1.5752	0.052 0.115		
	32 1.2598	40 1.5748	36 1.417	K32X40X36H	52.3 11760	86.4 19420	9000	14000	0.0477	32.000 1.2598	31.989 1.2594	40.025 1.5758	40.009 1.5752	0.080 0.176		
	32 1.2598	42 1.6535	42 1.654	K32X42X42H	69.2 15560	108 24280	9200	14000	0.0491	32.000 1.2598	31.989 1.2594	42.025 1.6545	42.009 1.6539	0.110 0.243		
	32 1.2598	46 1.8110	18 0.709	K32X46X18H	39.2 8810	41.9 9420	9600	15000	0.0374	32.000 1.2598	31.989 1.2594	46.025 1.8120	46.009 1.8114	0.075 0.165		
	32 1.2598	46 1.8110	32 1.260	K32X46X32H	67.0 15060	83.4 18750	9600	15000	0.0444	32.000 1.2598	31.989 1.2594	46.025 1.8120	46.009 1.8114	0.140 0.309		
	32 1.2598	46 1.8110	40 1.575	K32X46X40H	81.7 18370	108 24280	9600	15000	0.0473	32.000 1.2598	31.989 1.2594	46.025 1.8120	46.009 1.8114	0.158 0.348		
33 1.2992	33 1.2992	51 2.0079	23 0.906	K33X51X23H	55.9 12570	57.6 12950	9600	15000	0.0401	33.000 1.2992	32.989 1.2988	51.029 2.0090	51.010 2.0083	0.140 0.309		
34 1.3386	34 1.3386	38 1.4961	11 0.433	K34X38X11	12.2 2740	21.9 4920	8100	12000	0.0385	34.000 1.3386	33.989 1.3381	38.025 1.4970	38.009 1.4964	0.011 0.024		
	34 1.3386	44 1.7323	26 1.024	K34X44X26FH	42.9 9640	58.9 13240	8600	13000	0.0433	34.000 1.3386	33.989 1.3381	44.025 1.7333	44.009 1.7326	0.080 0.176		
	34 1.3386	44 1.7323	26 1.024	K34X44X26FV	42.9 9640	58.9 13240	8600	13000	0.0433	34.000 1.3386	33.989 1.3381	44.025 1.7333	44.009 1.7326	0.075 0.165		
35 1.3780	35 1.3780	40 1.5748	13 0.512	K35X40X13H	16.2 3640	27.2 6110	7900	12000	0.0398	35.000 1.3780	34.989 1.3775	40.025 1.5758	40.009 1.5752	0.018 0.040		
	35 1.3780	40 1.5748	17 0.669	K35X40X17H	22.1 4970	40.8 9170	7900	12000	0.0440	35.000 1.3780	34.989 1.3775	40.025 1.5758	40.009 1.5752	0.025 0.055		
	35 1.3780	40 1.5748	19 0.748	K35X40X19F	23.2 5220	43.2 9710	7900	12000	0.0446	35.000 1.3780	34.989 1.3775	40.025 1.5758	40.009 1.5752	0.025 0.055		
	35 1.3780	40 1.5748	19 0.748	K35X40X19H	23.2 5220	43.2 9710	7900	12000	0.0446	35.000 1.3780	34.989 1.3775	40.025 1.5758	40.009 1.5752	0.025 0.055		

Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	Assembly Designation	C	C <sub>0</sub>	Speed Rating		C <sub>g</sub>	S		H		Wt.
							Grease	Oil		Mounting Dimension				
			-0.20 -0.008 -0.55 -0.022		Load Ratings					Max.	Min.	Max.	Min.	
mm in.	mm in.	mm in.	mm in.	kN lbf.	min <sup>-1</sup>		mm in.	mm in.	mm in.	mm in.	kg lbs.			
<b>35</b> 1.3780	<b>35</b> 1.3780	<b>40</b> 1.5748	<b>25</b> 0.984	K35X40X25H	<b>28.4</b> 6380	<b>56.2</b> 12630	7900	12000	0.0476	<b>35.000</b> 1.3780	<b>34.989</b> 1.3775	<b>40.025</b> 1.5758	<b>40.009</b> 1.5752	<b>0.035</b> 0.077
	<b>35</b> 1.3780	<b>40</b> 1.5748	<b>27</b> 1.063	K35X40X27H	<b>29.8</b> 6700	<b>59.6</b> 13400	7900	12000	0.0483	<b>35.000</b> 1.3780	<b>34.989</b> 1.3775	<b>40.025</b> 1.5758	<b>40.009</b> 1.5752	<b>0.037</b> 0.082
	<b>35</b> 1.3780	<b>42</b> 1.6535	<b>16</b> 0.630	K35X42X16	<b>24.5</b> 5510	<b>36.8</b> 8270	8100	12000	0.0408	<b>35.000</b> 1.3780	<b>34.989</b> 1.3775	<b>42.025</b> 1.6545	<b>42.009</b> 1.6539	<b>0.032</b> 0.071
	<b>35</b> 1.3780	<b>42</b> 1.6535	<b>16</b> 0.630	K35X42X16AH	<b>24.5</b> 5510	<b>36.8</b> 8270	8100	12000	0.0408	<b>35.000</b> 1.3780	<b>34.989</b> 1.3775	<b>42.025</b> 1.6545	<b>42.009</b> 1.6539	<b>0.031</b> 0.068
	<b>35</b> 1.3780	<b>42</b> 1.6535	<b>18</b> 0.709	K35X42X18	<b>27.5</b> 6180	<b>42.6</b> 9580	8100	12000	0.0423	<b>35.000</b> 1.3780	<b>34.989</b> 1.3775	<b>42.025</b> 1.6545	<b>42.009</b> 1.6539	<b>0.035</b> 0.077
	<b>35</b> 1.3780	<b>42</b> 1.6535	<b>20</b> 0.787	K35X42X20H	<b>30.4</b> 6830	<b>48.5</b> 10900	8100	12000	0.0437	<b>35.000</b> 1.3780	<b>34.989</b> 1.3775	<b>42.025</b> 1.6545	<b>42.009</b> 1.6539	<b>0.037</b> 0.082
	<b>35</b> 1.3780	<b>42</b> 1.6535	<b>30</b> 1.181	K35X42X30FH	<b>40.5</b> 9100	<b>70.0</b> 15740	8100	12000	0.0479	<b>35.000</b> 1.3780	<b>34.989</b> 1.3775	<b>42.025</b> 1.6545	<b>42.009</b> 1.6539	<b>0.061</b> 0.134
	<b>35</b> 1.3780	<b>45</b> 1.7717	<b>20</b> 0.787	K35X45X20FH	<b>36.5</b> 8210	<b>49.9</b> 11220	8400	13000	0.0421	<b>35.000</b> 1.3780	<b>34.989</b> 1.3775	<b>45.025</b> 1.7726	<b>45.009</b> 1.7720	<b>0.059</b> 0.130
	<b>35</b> 1.3780	<b>45</b> 1.7717	<b>30</b> 1.181	K35X45X30F	<b>51.2</b> 11510	<b>74.5</b> 16750	8400	13000	0.0465	<b>35.000</b> 1.3780	<b>34.989</b> 1.3775	<b>45.025</b> 1.7726	<b>45.009</b> 1.7720	<b>0.100</b> 0.220
	<b>35</b> 1.3780	<b>45</b> 1.7717	<b>35</b> 1.378	K35X45X35H	<b>62.1</b> 13960	<b>95.5</b> 21470	8400	13000	0.0494	<b>35.000</b> 1.3780	<b>34.989</b> 1.3775	<b>45.025</b> 1.7726	<b>45.009</b> 1.7720	<b>0.085</b> 0.187
	<b>35</b> 1.3780	<b>45</b> 1.7717	<b>41</b> 1.614	K35X45X41	<b>70.8</b> 15920	<b>113</b> 25400	8400	13000	0.0515	<b>35.000</b> 1.3780	<b>34.989</b> 1.3775	<b>45.025</b> 1.7726	<b>45.009</b> 1.7720	<b>0.120</b> 0.265
	<b>35</b> 1.3780	<b>45</b> 1.7717	<b>49</b> 1.929	K35X45X49H	<b>82.5</b> 18550	<b>138</b> 31020	8400	13000	0.0541	<b>35.000</b> 1.3780	<b>34.989</b> 1.3775	<b>45.025</b> 1.7726	<b>45.009</b> 1.7720	<b>0.143</b> 0.315
	<b>35</b> 1.3780	<b>45</b> 1.7717	<b>49</b> 1.929	K35X45X49HZW	<b>71.8</b> 16140	<b>115</b> 25850	8400	13000	0.0518	<b>35.000</b> 1.3780	<b>34.989</b> 1.3775	<b>45.025</b> 1.7726	<b>45.009</b> 1.7720	<b>0.143</b> 0.315
	<b>35</b> 1.3780	<b>48</b> 1.8898	<b>22.8</b> 0.898	K35X48X22,8H	<b>47.6</b> 10700	<b>57.4</b> 12900	8600	13000	0.0423	<b>35.000</b> 1.3780	<b>34.989</b> 1.3775	<b>48.025</b> 1.8907	<b>48.009</b> 1.8901	<b>0.100</b> 0.220
	<b>35</b> 1.3780	<b>50</b> 1.9685	<b>40</b> 1.575	K35X50X40F	<b>79.7</b> 17920	<b>102</b> 22930	8700	13000	0.0480	<b>35.000</b> 1.3780	<b>34.989</b> 1.3775	<b>50.025</b> 1.9695	<b>50.009</b> 1.9689	<b>0.200</b> 0.441
<b>36</b> 1.4173	<b>36</b> 1.4173	<b>40</b> 1.5748	<b>29</b> 1.142	K36X40X29TN	<b>21.2</b> 4770	<b>45.2</b> 10160	7600	12000	—	<b>36.000</b> 1.4173	<b>35.989</b> 1.4169	<b>40.025</b> 1.5758	<b>40.009</b> 1.5752	<b>0.029</b> 0.064
	<b>36</b> 1.4173	<b>42</b> 1.6535	<b>16</b> 0.630	K36X42X16	<b>22.8</b> 5130	<b>37.7</b> 8480	7800	12000	0.0425	<b>36.000</b> 1.4173	<b>35.989</b> 1.4169	<b>42.025</b> 1.6545	<b>42.009</b> 1.6539	<b>0.027</b> 0.060
	<b>36</b> 1.4173	<b>44</b> 1.7323	<b>27.5</b> 1.083	K36X44X27,5H	<b>42.8</b> 9620	<b>69.2</b> 15560	7900	12000	0.0475	<b>36.000</b> 1.4173	<b>35.989</b> 1.4169	<b>44.025</b> 1.7333	<b>44.009</b> 1.7326	<b>0.064</b> 0.140
<b>37</b> 1.4567	<b>37</b> 1.4567	<b>42</b> 1.6535	<b>13</b> 0.512	K37X42X13H	<b>16.9</b> 3800	<b>29.4</b> 6610	7500	11000	0.0416	<b>37.000</b> 1.4567	<b>36.989</b> 1.4563	<b>42.025</b> 1.6545	<b>42.009</b> 1.6539	<b>0.017</b> 0.037
	<b>37</b> 1.4567	<b>42</b> 1.6535	<b>17</b> 0.669	K37X42X17H	<b>21.9</b> 4920	<b>41.0</b> 9220	7500	11000	0.0451	<b>37.000</b> 1.4567	<b>36.989</b> 1.4563	<b>42.025</b> 1.6545	<b>42.009</b> 1.6539	<b>0.025</b> 0.055
	<b>37</b> 1.4567	<b>42</b> 1.6535	<b>27</b> 1.063	K37X42X27F	<b>32.1</b> 7220	<b>66.9</b> 15040	7500	11000	0.0510	<b>37.000</b> 1.4567	<b>36.989</b> 1.4563	<b>42.025</b> 1.6545	<b>42.009</b> 1.6539	<b>0.039</b> 0.086
	<b>37</b> 1.4567	<b>44</b> 1.7323	<b>19</b> 0.748	K37X44X19H	<b>29.7</b> 6680	<b>48.0</b> 10790	7600	12000	0.0447	<b>37.000</b> 1.4567	<b>36.989</b> 1.4563	<b>44.025</b> 1.7333	<b>44.009</b> 1.7326	<b>0.039</b> 0.086
<b>38</b> 1.4961	<b>38</b> 1.4961	<b>41</b> 1.6142	<b>9</b> 0.354	K38X41X9TN	<b>5.93</b> 1330	<b>11.0</b> 2470	7100	11000	—	<b>38.000</b> 1.4961	<b>37.989</b> 1.4956	<b>41.025</b> 1.6152	<b>41.009</b> 1.6145	<b>0.004</b> 0.009
	<b>38</b> 1.4961	<b>43</b> 1.6929	<b>17</b> 0.669	K38X43X17F	<b>21.8</b> 4900	<b>41.0</b> 9220	7300	11000	0.0457	<b>38.000</b> 1.4961	<b>37.989</b> 1.4956	<b>43.025</b> 1.6939	<b>43.009</b> 1.6933	<b>0.032</b> 0.071

Continued on next page.







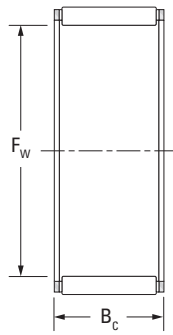
# NEEDLE ROLLER BEARINGS

## SINGLE-ROW, DOUBLE-ROW ASSEMBLIES –

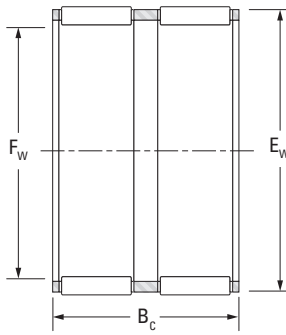
continued

### METRIC SERIES

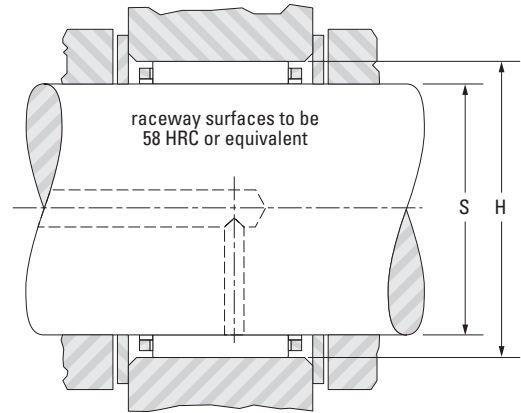
B



K



KZW



Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	Assembly Designation	C	C <sub>0</sub>	Speed Rating		C <sub>g</sub>	S		H		Wt.
							Grease	Oil		Mounting Dimension				
			mm in.		mm in.	mm in.				mm in.				
<b>38</b> 1.4961	<b>38</b> 1.4961	<b>43</b> 1.6929	<b>17</b> 0.669	K38X43X17H	<b>21.8</b> 4900	<b>41.0</b> 9220	7300	11000	0.0457	<b>38.000</b> 1.4961	<b>37.989</b> 1.4956	<b>43.025</b> 1.6939	<b>43.009</b> 1.6933	<b>0.032</b> 0.071
	<b>38</b> 1.4961	<b>43</b> 1.6929	<b>27</b> 1.063	K38X43X27	<b>31.9</b> 7170	<b>67.0</b> 15060	7300	11000	0.0516	<b>38.000</b> 1.4961	<b>37.989</b> 1.4956	<b>43.025</b> 1.6939	<b>43.009</b> 1.6933	<b>0.041</b> 0.090
	<b>38</b> 1.4961	<b>46</b> 1.8110	<b>19.8</b> 0.780	K38X46X20	<b>33.3</b> 7490	<b>51.0</b> 11470	7500	12000	0.0450	<b>38.000</b> 1.4961	<b>37.989</b> 1.4956	<b>46.025</b> 1.8120	<b>46.009</b> 1.8114	<b>0.055</b> 0.121
	<b>38</b> 1.4961	<b>46</b> 1.8110	<b>19.8</b> 0.780	K38X46X20H	<b>33.3</b> 7490	<b>51.0</b> 11470	7500	12000	0.0450	<b>38.000</b> 1.4961	<b>37.989</b> 1.4956	<b>46.025</b> 1.8120	<b>46.009</b> 1.8114	<b>0.055</b> 0.121
	<b>38</b> 1.4961	<b>46</b> 1.8110	<b>32</b> 1.260	K38X46X32FV1	<b>53.7</b> 12070	<b>94.6</b> 21270	7500	12000	0.0525	<b>38.000</b> 1.4961	<b>37.989</b> 1.4956	<b>46.025</b> 1.8120	<b>46.009</b> 1.8114	<b>0.080</b> 0.176
	<b>38</b> 1.4961	<b>46</b> 1.8110	<b>32</b> 1.260	K38X46X32H	<b>55.2</b> 12410	<b>98.1</b> 22050	7500	12000	0.0530	<b>38.000</b> 1.4961	<b>37.989</b> 1.4956	<b>46.025</b> 1.8120	<b>46.009</b> 1.8114	<b>0.090</b> 0.198
	<b>38</b> 1.4961	<b>50</b> 1.9685	<b>25</b> 0.984	K38X50X25	<b>53.0</b> 11910	<b>70.8</b> 15920	7800	12000	0.0464	<b>38.000</b> 1.4961	<b>37.989</b> 1.4956	<b>50.025</b> 1.9695	<b>50.009</b> 1.9689	<b>0.100</b> 0.220
	<b>38</b> 1.4961	<b>50</b> 1.9685	<b>33</b> 1.299	K38X50X33H	<b>68.3</b> 15350	<b>98.2</b> 22080	7800	12000	0.0504	<b>38.000</b> 1.4961	<b>37.989</b> 1.4956	<b>50.025</b> 1.9695	<b>50.009</b> 1.9689	<b>0.126</b> 0.278
	<b>38</b> 1.4961	<b>50</b> 1.9685	<b>40</b> 1.575	K38X50X40FH	<b>76.2</b> 17130	<b>113</b> 25400	7800	12000	0.0521	<b>38.000</b> 1.4961	<b>37.989</b> 1.4956	<b>50.025</b> 1.9695	<b>50.009</b> 1.9689	<b>0.170</b> 0.375
<b>40</b> 1.5748	<b>40</b> 1.5748	<b>45</b> 1.7717	<b>13</b> 0.512	K40X45X13H	<b>17.6</b> 3960	<b>31.7</b> 7130	6900	11000	0.0438	<b>40.000</b> 1.5748	<b>39.989</b> 1.5744	<b>45.025</b> 1.7726	<b>45.009</b> 1.7720	<b>0.022</b> 0.049
	<b>40</b> 1.5748	<b>45</b> 1.7717	<b>18</b> 0.709	K40X45X18H	<b>25.1</b> 5640	<b>50.4</b> 11330	6900	11000	0.0492	<b>40.000</b> 1.5748	<b>39.989</b> 1.5744	<b>45.025</b> 1.7726	<b>45.009</b> 1.7720	<b>0.031</b> 0.068
	<b>40</b> 1.5748	<b>45</b> 1.7717	<b>21</b> 0.827	K40X45X21H	<b>23.3</b> 5240	<b>45.2</b> 10160	6900	11000	0.0479	<b>40.000</b> 1.5748	<b>39.989</b> 1.5744	<b>45.025</b> 1.7726	<b>45.009</b> 1.7720	<b>0.033</b> 0.073
	<b>40</b> 1.5748	<b>45</b> 1.7717	<b>27</b> 1.063	K40X45X27H	<b>32.7</b> 7350	<b>70.2</b> 15780	6900	11000	0.0534	<b>40.000</b> 1.5748	<b>39.989</b> 1.5744	<b>45.025</b> 1.7726	<b>45.009</b> 1.7720	<b>0.040</b> 0.088
	<b>40</b> 1.5748	<b>45</b> 1.7717	<b>27</b> 1.063	K40X45X27TN	<b>33.3</b> 7490	<b>72.1</b> 16210	6900	11000	0.0538	<b>40.000</b> 1.5748	<b>39.989</b> 1.5744	<b>45.025</b> 1.7726	<b>45.009</b> 1.7720	<b>0.030</b> 0.066
	<b>40</b> 1.5748	<b>45</b> 1.7717	<b>29</b> 1.142	K40X45X29H	<b>34.7</b> 7800	<b>75.9</b> 17060	6900	11000	0.0545	<b>40.000</b> 1.5748	<b>39.989</b> 1.5744	<b>45.025</b> 1.7726	<b>45.009</b> 1.7720	<b>0.050</b> 0.110
	<b>40</b> 1.5748	<b>46</b> 1.8110	<b>17</b> 0.669	K40X46X17	<b>25.2</b> 5670	<b>44.0</b> 9890	7000	11000	0.0464	<b>40.000</b> 1.5748	<b>39.989</b> 1.5744	<b>46.025</b> 1.8120	<b>46.009</b> 1.8114	<b>0.033</b> 0.073
	<b>40</b> 1.5748	<b>47</b> 1.8504	<b>18</b> 0.709	K40X47X18	<b>28.0</b> 6290	<b>45.6</b> 10250	7000	11000	0.0456	<b>40.000</b> 1.5748	<b>39.989</b> 1.5744	<b>47.025</b> 1.8514	<b>47.009</b> 1.8507	<b>0.041</b> 0.090

Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	Assembly Designation	C	C <sub>0</sub>	Speed Rating		C <sub>g</sub>	S		H		Wt.
			-0.20 -0.008 -0.55 -0.022		Load Ratings		Grease	Oil		Mounting Dimension				
					kN lbf.	min <sup>-1</sup>				Max.	Min.	Max.	Min.	
mm in.	mm in.	mm in.	mm in.							mm in.	mm in.	mm in.	mm in.	kg lbs.
<b>40</b> 1.5748	<b>40</b> 1.5748	<b>47</b> 1.8504	<b>20</b> 0.787	K40X47X20	<b>31.1</b> 6990	<b>52.1</b> 11710	7000	11000	0.0472	<b>40.000</b> 1.5748	<b>39.989</b> 1.5744	<b>47.025</b> 1.8514	<b>47.009</b> 1.8507	<b>0.042</b> 0.093
	<b>40</b> 1.5748	<b>48</b> 1.8898	<b>20</b> 0.787	K40X48X20FV1	<b>35.5</b> 7980	<b>56.3</b> 12660	7100	11000	0.0472	<b>40.000</b> 1.5748	<b>39.989</b> 1.5744	<b>48.025</b> 1.8907	<b>48.009</b> 1.8901	<b>0.052</b> 0.115
	<b>40</b> 1.5748	<b>48</b> 1.8898	<b>20</b> 0.787	K40X48X20H	<b>35.5</b> 7980	<b>56.3</b> 12660	7100	11000	0.0472	<b>40.000</b> 1.5748	<b>39.989</b> 1.5744	<b>48.025</b> 1.8907	<b>48.009</b> 1.8901	<b>0.050</b> 0.110
	<b>40</b> 1.5748	<b>48</b> 1.8898	<b>35</b> 1.378	K40X48X35H	<b>57.3</b> 12880	<b>104</b> 23380	7100	11000	0.0550	<b>40.000</b> 1.5748	<b>39.989</b> 1.5744	<b>48.025</b> 1.8907	<b>48.009</b> 1.8901	<b>0.098</b> 0.216
	<b>40</b> 1.5748	<b>50</b> 1.9685	<b>27</b> 1.063	K40X50X27H	<b>53.0</b> 11910	<b>81.0</b> 18210	7200	11000	0.0502	<b>40.000</b> 1.5748	<b>39.989</b> 1.5744	<b>50.025</b> 1.9695	<b>50.009</b> 1.9689	<b>0.084</b> 0.185
	<b>40</b> 1.5748	<b>55</b> 2.1654	<b>45</b> 1.772	K40X55X45H	<b>103</b> 23160	<b>146</b> 32820	7500	12000	0.0554	<b>40.000</b> 1.5748	<b>39.989</b> 1.5744	<b>55.029</b> 2.1665	<b>55.010</b> 2.1657	<b>0.221</b> 0.487
	<b>40</b> 1.5748	<b>56</b> 2.2047	<b>26</b> 1.024	K40X56X26H	<b>63.7</b> 14320	<b>75.7</b> 17020	7600	12000	0.0467	<b>40.000</b> 1.5748	<b>39.989</b> 1.5744	<b>56.029</b> 2.2059	<b>56.010</b> 2.2051	<b>0.138</b> 0.304
<b>41</b> 1.6142	<b>41</b> 1.6142	<b>48</b> 1.8898	<b>31</b> 1.220	K41X48X31HZW	<b>38.0</b> 8540	<b>68.1</b> 15310	6800	11000	0.0510	<b>41.000</b> 1.6142	<b>40.989</b> 1.6137	<b>48.025</b> 1.8907	<b>48.009</b> 1.8901	<b>0.067</b> 0.148
	<b>42</b> 1.6535	<b>47</b> 1.8504	<b>13</b> 0.512	K42X47X13H	<b>18.7</b> 4200	<b>34.9</b> 7850	6500	10000	0.0459	<b>42.000</b> 1.6535	<b>41.989</b> 1.6531	<b>47.025</b> 1.8514	<b>47.009</b> 1.8507	<b>0.027</b> 0.060
	<b>42</b> 1.6535	<b>47</b> 1.8504	<b>17</b> 0.669	K42X47X17H	<b>22.8</b> 5130	<b>45.2</b> 10160	6500	10000	0.0490	<b>42.000</b> 1.6535	<b>41.989</b> 1.6531	<b>47.025</b> 1.8514	<b>47.009</b> 1.8507	<b>0.028</b> 0.062
	<b>42</b> 1.6535	<b>47</b> 1.8504	<b>27</b> 1.063	K42X47X27FH	<b>33.8</b> 7600	<b>74.7</b> 16790	6500	10000	0.0555	<b>42.000</b> 1.6535	<b>41.989</b> 1.6531	<b>47.025</b> 1.8514	<b>47.009</b> 1.8507	<b>0.041</b> 0.090
	<b>42</b> 1.6535	<b>47</b> 1.8504	<b>27</b> 1.063	K42X47X27H	<b>33.8</b> 7600	<b>74.7</b> 16790	6500	10000	0.0555	<b>42.000</b> 1.6535	<b>41.989</b> 1.6531	<b>47.025</b> 1.8514	<b>47.009</b> 1.8507	<b>0.041</b> 0.090
	<b>42</b> 1.6535	<b>48</b> 1.8898	<b>24</b> 0.945	K42X48X24F	<b>33.1</b> 7440	<b>63.9</b> 14370	6600	10000	0.0519	<b>42.000</b> 1.6535	<b>41.989</b> 1.6531	<b>48.025</b> 1.8907	<b>48.009</b> 1.8901	<b>0.046</b> 0.101
	<b>42</b> 1.6535	<b>50</b> 1.9685	<b>13</b> 0.512	K42X50X13H	<b>20.9</b> 4700	<b>28.9</b> 6500	6700	10000	0.0409	<b>42.000</b> 1.6535	<b>41.989</b> 1.6531	<b>50.025</b> 1.9695	<b>50.009</b> 1.9689	<b>0.035</b> 0.077
	<b>42</b> 1.6535	<b>50</b> 1.9685	<b>20</b> 0.787	K42X50X20H	<b>35.2</b> 7910	<b>56.6</b> 12720	6700	10000	0.0483	<b>42.000</b> 1.6535	<b>41.989</b> 1.6531	<b>50.025</b> 1.9695	<b>50.009</b> 1.9689	<b>0.054</b> 0.119
	<b>42</b> 1.6535	<b>50</b> 1.9685	<b>30</b> 1.181	K42X50X30H	<b>51.3</b> 11530	<b>91.9</b> 20660	6700	10000	0.0545	<b>42.000</b> 1.6535	<b>41.989</b> 1.6531	<b>50.025</b> 1.9695	<b>50.009</b> 1.9689	<b>0.080</b> 0.176
	<b>42</b> 1.6535	<b>54</b> 2.1260	<b>30.7</b> 1.209	K42X54X30.7H	<b>62.7</b> 14100	<b>90.1</b> 20260	7000	11000	0.0514	<b>42.000</b> 1.6535	<b>41.989</b> 1.6531	<b>54.029</b> 2.1271	<b>54.010</b> 2.1264	<b>0.140</b> 0.309
<b>43</b> 1.6929	<b>43</b> 1.6929	<b>48</b> 1.8898	<b>17</b> 0.669	K43X48X17FH	<b>23.0</b> 5170	<b>45.8</b> 10300	6400	9800	0.0496	<b>43.000</b> 1.6929	<b>42.989</b> 1.6925	<b>48.025</b> 1.8907	<b>48.009</b> 1.8901	<b>0.036</b> 0.079
	<b>43</b> 1.6929	<b>48</b> 1.8898	<b>27</b> 1.063	K43X48X27H	<b>34.8</b> 7820	<b>78.0</b> 17540	6400	9800	0.0567	<b>43.000</b> 1.6929	<b>42.989</b> 1.6925	<b>48.025</b> 1.8907	<b>48.009</b> 1.8901	<b>0.050</b> 0.110
	<b>44</b> 1.7323	<b>50</b> 1.9685	<b>22</b> 0.866	K44X50X22	<b>31.6</b> 7100	<b>60.6</b> 13620	6400	9900	0.0523	<b>44.000</b> 1.7323	<b>43.989</b> 1.7319	<b>50.025</b> 1.9695	<b>50.009</b> 1.9689	<b>0.046</b> 0.101
	<b>44</b> 1.7323	<b>50</b> 1.9685	<b>22</b> 0.866	K44X50X22H	<b>31.6</b> 7100	<b>60.6</b> 13620	6400	9900	0.0523	<b>44.000</b> 1.7323	<b>43.989</b> 1.7319	<b>50.025</b> 1.9695	<b>50.009</b> 1.9689	<b>0.046</b> 0.101
	<b>44</b> 1.7323	<b>50</b> 1.9685	<b>30</b> 1.201	K44X50X30.5HZW	<b>35.5</b> 7980	<b>70.5</b> 15850	6400	9900	0.0543	<b>44.000</b> 1.7323	<b>43.989</b> 1.7319	<b>50.025</b> 1.9695	<b>50.009</b> 1.9689	<b>0.068</b> 0.150
	<b>45</b> 1.7717	<b>50</b> 1.9685	<b>13</b> 0.512	K45X50X13H	<b>18.4</b> 4140	<b>35.1</b> 7890	6100	9400	0.0474	<b>45.000</b> 1.7717	<b>44.989</b> 1.7712	<b>50.025</b> 1.9695	<b>50.009</b> 1.9689	<b>0.022</b> 0.049
	<b>45</b> 1.7717	<b>50</b> 1.9685	<b>15</b> 0.591	K45X50X15H	<b>19.4</b> 4360	<b>37.3</b> 8390	6100	9400	0.0482	<b>45.000</b> 1.7717	<b>44.989</b> 1.7712	<b>50.025</b> 1.9695	<b>50.009</b> 1.9689	<b>0.028</b> 0.062

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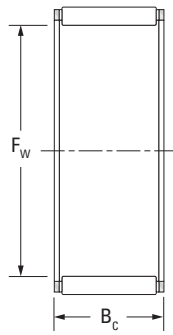


# NEEDLE ROLLER BEARINGS

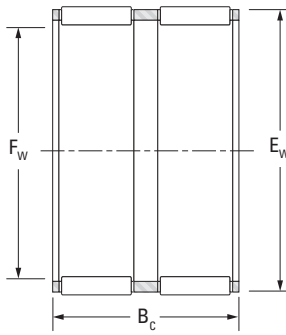
## SINGLE-ROW, DOUBLE-ROW ASSEMBLIES –

continued

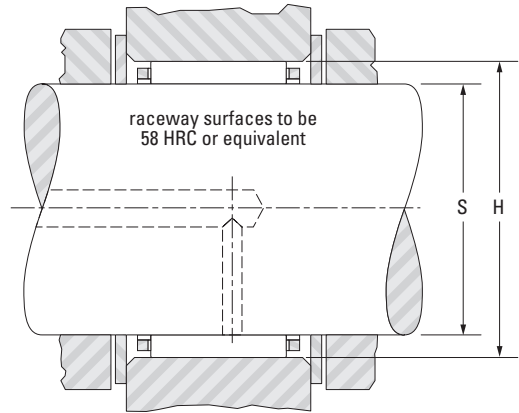
### METRIC SERIES



**K**



**KZW**



Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	Assembly Designation	C	C <sub>0</sub>	Speed Rating		C <sub>g</sub>	S		H		Wt.
							Load Ratings			Mounting Dimension				
							Grease	Oil		Max.	Min.	Max.	Min.	
mm in.	mm in.	mm in.	mm in.		kN lbf.		min <sup>-1</sup>			mm in.	mm in.	mm in.	mm in.	kg lbs.
45 1.7717	45 1.7717	50 1.9685	17 0.669	K45X50X17H	24.9 5600	51.8 11650	6100	9400	0.0523	45.000 1.7717	44.989 1.7712	50.025 1.9695	50.009 1.9689	0.030 0.066
	45 1.7717	50 1.9685	20 0.787	K45X50X20F	27.0 6070	57.4 12900	6100	9400	0.0536	45.000 1.7717	44.989 1.7712	50.025 1.9695	50.009 1.9689	0.040 0.088
	45 1.7717	50 1.9685	21 0.827	K45X50X21CH	24.6 5530	50.4 11330	6100	9400	0.0519	45.000 1.7717	44.989 1.7712	50.025 1.9695	50.009 1.9689	0.036 0.079
	45 1.7717	50 1.9685	27 1.063	K45X50X27FH	34.2 7690	77.4 17400	6100	9400	0.0577	45.000 1.7717	44.989 1.7712	50.025 1.9695	50.009 1.9689	0.043 0.095
	45 1.7717	50 1.9685	27 1.063	K45X50X27TN	31.8 7150	70.7 15890	6100	9400	—	45.000 1.7717	44.989 1.7712	50.025 1.9695	50.009 1.9689	0.048 0.106
	45 1.7717	52 2.0472	18 0.709	K45X52X18H	30.1 6770	52.0 11690	6200	9500	0.0497	45.000 1.7717	44.989 1.7712	52.029 2.0484	52.010 2.0476	0.045 0.099
	45 1.7717	52 2.0472	21 0.827	K45X52X21F	35.0 7870	63.2 14210	6200	9500	0.0521	45.000 1.7717	44.989 1.7712	52.029 2.0484	52.010 2.0476	0.055 0.121
	45 1.7717	53 2.0866	20 0.787	K45X53X20H	36.0 8090	59.5 13380	6200	9600	0.0504	45.000 1.7717	44.989 1.7712	53.029 2.0878	53.010 2.0870	0.054 0.119
	45 1.7717	53 2.0866	24.8 0.976	K45X53X25H	45.9 10320	81.5 18320	6200	9600	0.0545	45.000 1.7717	44.989 1.7712	53.029 2.0878	53.010 2.0870	0.072 0.159
	45 1.7717	53 2.0866	25 0.984	K45X53X25F	42.5 9550	73.7 16570	6200	9600	0.0531	45.000 1.7717	44.989 1.7712	53.029 2.0878	53.010 2.0870	0.075 0.165
	45 1.7717	53 2.0866	28 1.102	K45X53X28H	49.3 11080	89.2 20050	6200	9600	0.0557	45.000 1.7717	44.989 1.7712	53.029 2.0878	53.010 2.0870	0.078 0.172
	45 1.7717	55 2.1654	20 0.787	K45X55X20H	42.0 9440	62.2 13980	6400	9800	0.0494	45.000 1.7717	44.989 1.7712	55.029 2.1665	55.010 2.1657	0.074 0.163
	45 1.7717	59 2.3228	18 0.709	K45X59X18H	47.8 10750	58.9 13240	6600	10000	0.0467	45.000 1.7717	44.989 1.7712	59.029 2.3240	59.010 2.3232	0.107 0.236
	45 1.7717	59 2.3228	18 0.709	K45X59X18TN	45.7 10270	55.4 12450	6600	10000	—	45.000 1.7717	44.989 1.7712	59.029 2.3240	59.010 2.3232	0.097 0.214
	45 1.7717	59 2.3228	36 1.417	K45X59X36H	82.4 18520	118 26530	6600	10000	0.0555	45.000 1.7717	44.989 1.7712	59.029 2.3240	59.010 2.3232	0.181 0.399
	45 1.7717	60 2.3622	30 1.181	K45X60X30H	75.5 16970	101 22710	6600	10000	0.0530	45.000 1.7717	44.989 1.7712	60.029 2.3633	60.010 2.3626	0.171 0.377
	45 1.7717	60 2.3622	45 1.772	K45X60X45H	108 24280	160 35970	6600	10000	0.0594	45.000 1.7717	44.989 1.7712	60.029 2.3633	60.010 2.3626	0.280 0.617

Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	Assembly Designation	C	C <sub>0</sub>	Speed Rating		C <sub>g</sub>	S		H		Wt.
			-0.20 -0.008 -0.55 -0.022		Load Ratings		Grease	Oil		Mounting Dimension				
					kN lbf.	min <sup>-1</sup>				Max.	Min.	Max.	Min.	
mm in.	mm in.	mm in.	mm in.							mm in.	mm in.	mm in.	mm in.	kg lbs.
46 1.8110	46 1.8110	53 2.0866	36 1.417	K46X53X36HZW	48.6 10930	96.7 21740	6100	9300	0.0585	46.000 1.8110	45.989 1.8106	53.029 2.0878	53.010 2.0870	0.100 0.220
47 1.8504	47 1.8504	52 2.0472	15 0.591	K47X52X15FH	20.1 4520	39.8 8950	5800	8900	0.0499	47.000 1.8504	46.989 1.8500	52.029 2.0484	52.010 2.0476	0.030 0.066
	47 1.8504	52 2.0472	17 0.669	K47X52X17H	24.2 5440	50.4 11330	5800	8900	0.0529	47.000 1.8504	46.989 1.8500	52.029 2.0484	52.010 2.0476	0.032 0.071
	47 1.8504	52 2.0472	26.8 1.055	K47X52X27FH	35.4 7960	82.4 18520	5800	8900	0.0598	47.000 1.8504	46.989 1.8500	52.029 2.0484	52.010 2.0476	0.045 0.099
	47 1.8504	52 2.0472	27 1.063	K47X52X27H	36.6 8230	85.9 19310	5800	8900	0.0604	47.000 1.8504	46.989 1.8500	52.029 2.0484	52.010 2.0476	0.045 0.099
	47 1.8504	55 2.1654	28 1.102	K47X55X28FV1	48.9 10990	89.5 20120	6000	9200	0.0568	47.000 1.8504	46.989 1.8500	55.029 2.1665	55.010 2.1657	0.092 0.203
48 1.8898	48 1.8898	53 2.0866	17 0.669	K48X53X17H	25.7 5780	54.9 12340	5700	8700	0.0546	48.000 1.8898	47.989 1.8893	53.029 2.0878	53.010 2.0870	0.032 0.071
	48 1.8898	54 2.1260	19 0.748	K48X54X19H	30.9 6950	61.2 13760	5700	8800	0.0545	48.000 1.8898	47.989 1.8893	54.029 2.1271	54.010 2.1264	0.042 0.093
49 1.9291	49 1.9291	55 2.1654	32 1.260	K49X55X32HZW	40.2 9040	86.4 19420	5600	8600	0.0599	49.000 1.9291	48.989 1.9287	55.029 2.1665	55.010 2.1657	0.080 0.176
	49 1.9291	65 2.5591	38 1.496	K49X65X38H	100 22480	142 31920	6100	9300	0.0593	49.000 1.9291	48.989 1.9287	65.029 2.5602	65.010 2.5594	0.244 0.538
50 1.9685	50 1.9685	55 2.1654	17 0.669	K50X55X17H	25.5 5730	55.0 12360	5400	8400	0.0557	50.000 1.9685	49.989 1.9681	55.029 2.1665	55.010 2.1657	0.032 0.071
	50 1.9685	55 2.1654	20 0.787	K50X55X20H	30.2 6790	68.5 15400	5400	8400	0.0588	50.000 1.9685	49.989 1.9681	55.029 2.1665	55.010 2.1657	0.038 0.084
	50 1.9685	55 2.1654	30 1.181	K50X55X30	38.2 8590	92.4 20770	5400	8400	0.0633	50.000 1.9685	49.989 1.9681	55.029 2.1665	55.010 2.1657	0.057 0.120
	50 1.9685	55 2.1654	30 1.181	K50X55X30FV1	38.2 8590	92.4 20770	5400	8400	0.0633	50.000 1.9685	49.989 1.9681	55.029 2.1665	55.010 2.1657	0.057 0.126
	50 1.9685	56 2.2047	23 0.906	K50X56X23	35.5 7980	74.1 16660	5500	8500	0.0582	50.000 1.9685	49.989 1.9681	56.029 2.2059	56.010 2.2051	0.051 0.112
	50 1.9685	57 2.2441	18 0.709	K50X57X18FH	31.3 7040	56.4 12680	5500	8500	0.0531	50.000 1.9685	49.989 1.9681	57.029 2.2452	57.010 2.2445	0.050 0.110
	50 1.9685	58 2.2835	20 0.787	K50X58X20H	38.8 8720	67.8 15240	5600	8600	0.0545	50.000 1.9685	49.989 1.9681	58.029 2.2846	58.010 2.2839	0.065 0.143
	50 1.9685	58 2.2835	25 0.984	K50X58X25H	46.5 10450	85.6 19240	5600	8600	0.0577	50.000 1.9685	49.989 1.9681	58.029 2.2846	58.010 2.2839	0.081 0.179
	50 1.9685	58 2.2835	35 1.378	K50X58X35H	64.9 14590	131 29450	5600	8600	0.0642	50.000 1.9685	49.989 1.9681	58.029 2.2846	58.010 2.2839	0.105 0.231
	50 1.9685	62 2.4409	30 1.181	K50X62X30H	64.6 14520	98.1 22050	5800	8900	0.0565	50.000 1.9685	49.989 1.9681	62.029 2.4421	62.010 2.4413	0.136 0.300
	50 1.9685	66 2.5984	30 1.181	K50X66X30H	80.9 18190	109 24500	5900	9100	0.0559	50.000 1.9685	49.989 1.9681	66.029 2.5996	66.010 2.5988	0.192 0.423
	50 1.9685	70 2.7559	32 1.260	K50X70X32H	103 23160	129 29000	6100	9300	0.0569	50.000 1.9685	49.989 1.9681	70.029 2.7570	70.010 2.7563	0.224 0.494
52 2.0472	52 2.0472	57 2.2441	12 0.472	K52X57X12	18.4 4140	36.7 8250	5200	8000	0.0512	52.000 2.0472	51.987 2.0467	57.029 2.2452	57.010 2.2445	0.022 0.049
	52 2.0472	57 2.2441	17 0.669	K52X57X17FCH	21.4 4810	44.3 9960	5200	8000	0.0537	52.000 2.0472	51.987 2.0467	57.029 2.2452	57.010 2.2445	0.035 0.077

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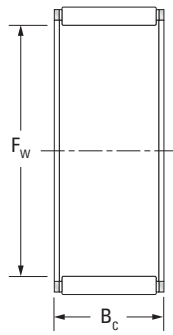


# NEEDLE ROLLER BEARINGS

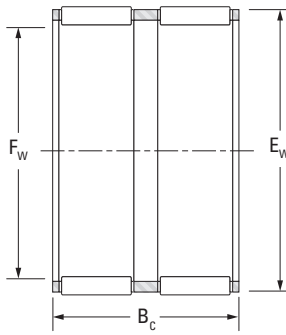
## SINGLE-ROW, DOUBLE-ROW ASSEMBLIES –

continued

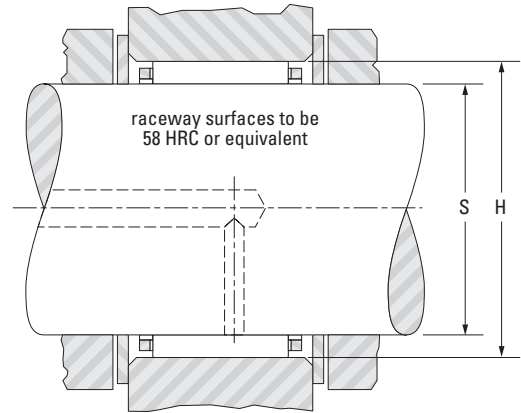
### METRIC SERIES



**K**



**KZW**



Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	Assembly Designation	C	C <sub>0</sub>	Speed Rating		C <sub>g</sub>	S		H		Wt.
							Grease	Oil		Mounting Dimension				
										Max.	Min.	Max.	Min.	
mm in.	mm in.	mm in.	mm in.		kN lbf.		min <sup>-1</sup>		mm in.	mm in.	mm in.	mm in.	kg lbs.	
52 2.0472	52 2.0472	57 2.2441	17 0.669	K52X57X17H	21.4 4810	44.3 9960	5200	8000	0.0537	52.000 2.0472	51.987 2.0467	57.029 2.2452	57.010 2.2445	0.035 0.077
	52 2.0472	60 2.3622	24 0.945	K52X60X24	47.1 10600	88.3 19900	5400	8200	0.0592	52.000 2.0472	51.987 2.0467	60.029 2.3633	60.010 2.3626	0.078 0.172
55 2.1654	55 2.1654	60 2.3622	17 0.669	K55X60X17	26.0 5850	58.3 13100	4900	7600	0.0590	55.000 2.1654	54.987 2.1648	60.029 2.3633	60.010 2.3626	0.037 0.082
	55 2.1654	60 2.3622	20 0.787	K55X60X20H	30.7 6900	72.4 16300	4900	7600	0.0622	55.000 2.1654	54.987 2.1648	60.029 2.3633	60.010 2.3626	0.042 0.093
	55 2.1654	60 2.3622	27 1.063	K55X60X27H	40.1 9010	102 22900	4900	7600	0.0677	55.000 2.1654	54.987 2.1648	60.029 2.3633	60.010 2.3626	0.055 0.121
	55 2.1654	60 2.3622	30 1.181	K55X60X30	40.6 9130	103 23200	4900	7600	0.0680	55.000 2.1654	54.987 2.1648	60.029 2.3633	60.010 2.3626	0.066 0.146
	55 2.1654	60 2.3622	30 1.181	K55X60X30FH	40.6 9130	103 23200	4900	7600	0.0680	55.000 2.1654	54.987 2.1648	60.029 2.3633	60.010 2.3626	0.068 0.150
	55 2.1654	61 2.4016	26 1.024	K55X61X26H	44.3 9960	102 22900	5000	7600	0.0657	55.000 2.1654	54.987 2.1648	61.029 2.4027	61.010 2.4020	0.063 0.139
	55 2.1654	62 2.4409	18 0.709	K55X62X18H	33.2 7460	62.8 14100	5000	7700	0.0569	55.000 2.1654	54.987 2.1648	62.029 2.4421	62.010 2.4413	0.055 0.121
	55 2.1654	63 2.4803	15 0.591	K55X63X15F	30.5 6860	51.5 11600	5000	7800	0.0531	55.000 2.1654	54.987 2.1648	63.029 2.4815	63.010 2.4807	0.054 0.119
	55 2.1654	63 2.4803	20 0.787	K55X63X20	40.3 9060	73.5 16500	5000	7800	0.0580	55.000 2.1654	54.987 2.1648	63.029 2.4815	63.010 2.4807	0.072 0.159
	55 2.1654	63 2.4803	25 0.984	K55X63X25	49.8 11200	96.5 21700	5000	7800	0.0621	55.000 2.1654	54.987 2.1648	63.029 2.4815	63.010 2.4807	0.080 0.176
	55 2.1654	63 2.4803	32 1.260	K55X63X32	62.3 14000	129 29000	5000	7800	0.0667	55.000 2.1654	54.987 2.1648	63.029 2.4815	63.010 2.4807	0.108 0.238
58 2.2835	58 2.2835	63 2.4803	17 0.669	K58X63X17F	27.0 6070	62.6 14100	4700	7200	0.0615	58.000 2.2835	57.987 2.2830	63.029 2.4815	63.010 2.4807	0.037 0.082
	58 2.2835	64 2.5197	19 0.748	K58X64X19H	32.9 7400	70.6 15900	4700	7200	0.0615	58.000 2.2835	57.987 2.2830	64.029 2.5208	64.010 2.5201	0.037 0.082
	58 2.2835	65 2.5591	18 0.709	K58X65X18H	34.3 7710	67.1 15100	4700	7300	0.0593	58.000 2.2835	57.987 2.2830	65.029 2.5602	65.010 2.5594	0.058 0.128
60 2.3622	60 2.3622	65 2.5591	20 0.787	K60X65X20H	31.9 7170	78.1 17600	4500	6900	0.0660	60.000 2.3622	59.987 2.3617	65.029 2.5602	65.010 2.5594	0.046 0.101

Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	Assembly Designation	C	C <sub>0</sub>	Speed Rating		C <sub>g</sub>	S		H		Wt.
			-0.20 -0.008 -0.55 -0.022		Load Ratings		Grease	Oil		Mounting Dimension				
					kN lbf.	mm in.				mm in.	mm in.	mm in.	mm in.	
<b>60</b> 2.3622	<b>60</b> 2.3622	<b>65</b> 2.5591	<b>26.8</b> 1.055	K60X65X27FH	<b>39.5</b> 8880	<b>103</b> 23200	4500	6900	0.0707	<b>60.000</b> 2.3622	<b>59.987</b> 2.3617	<b>65.029</b> 2.5602	<b>65.010</b> 2.5594	<b>0.059</b> 0.130
	<b>60</b> 2.3622	<b>65</b> 2.5591	<b>29.8</b> 1.173	K60X65X30FH	<b>42.9</b> 9640	<b>114</b> 25600	4500	6900	0.0726	<b>60.000</b> 2.3622	<b>59.987</b> 2.3617	<b>65.029</b> 2.5602	<b>65.010</b> 2.5594	<b>0.085</b> 0.187
	<b>60</b> 2.3622	<b>65</b> 2.5591	<b>30</b> 1.181	K60X65X30	<b>42.9</b> 9640	<b>114</b> 25600	4500	6900	0.0726	<b>60.000</b> 2.3622	<b>59.987</b> 2.3617	<b>65.029</b> 2.5602	<b>65.010</b> 2.5594	<b>0.070</b> 0.154
	<b>60</b> 2.3622	<b>68</b> 2.6772	<b>17</b> 0.669	K60X68X17F	<b>34.2</b> 7690	<b>61.4</b> 13800	4600	7100	0.0577	<b>60.000</b> 2.3622	<b>59.987</b> 2.3617	<b>68.029</b> 2.6783	<b>68.010</b> 2.6776	<b>0.066</b> 0.146
	<b>60</b> 2.3622	<b>68</b> 2.6772	<b>20</b> 0.787	K60X68X20H	<b>41.8</b> 9400	<b>79.2</b> 17800	4600	7100	0.0614	<b>60.000</b> 2.3622	<b>59.987</b> 2.3617	<b>68.029</b> 2.6783	<b>68.010</b> 2.6776	<b>0.066</b> 0.146
	<b>60</b> 2.3622	<b>68</b> 2.6772	<b>23</b> 0.906	K60X68X23F	<b>49.0</b> 11000	<b>97.2</b> 21900	4600	7100	0.0646	<b>60.000</b> 2.3622	<b>59.987</b> 2.3617	<b>68.029</b> 2.6783	<b>68.010</b> 2.6776	<b>0.089</b> 0.196
	<b>60</b> 2.3622	<b>68</b> 2.6772	<b>23</b> 0.906	K60X68X23FH	<b>49.0</b> 11000	<b>97.2</b> 21900	4600	7100	0.0646	<b>60.000</b> 2.3622	<b>59.987</b> 2.3617	<b>68.029</b> 2.6783	<b>68.010</b> 2.6776	<b>0.089</b> 0.196
	<b>60</b> 2.3622	<b>68</b> 2.6772	<b>23</b> 0.906	K60X68X23H	<b>49.0</b> 11000	<b>97.2</b> 21900	4600	7100	0.0646	<b>60.000</b> 2.3622	<b>59.987</b> 2.3617	<b>68.029</b> 2.6783	<b>68.010</b> 2.6776	<b>0.089</b> 0.196
	<b>60</b> 2.3622	<b>68</b> 2.6772	<b>25</b> 0.984	K60X68X25	<b>51.6</b> 11600	<b>104</b> 23400	4600	7100	0.0657	<b>60.000</b> 2.3622	<b>59.987</b> 2.3617	<b>68.029</b> 2.6783	<b>68.010</b> 2.6776	<b>0.091</b> 0.201
	<b>60</b> 2.3622	<b>68</b> 2.6772	<b>30</b> 1.181	K60X68X30ZW	<b>46.4</b> 10400	<b>90.1</b> 20300	4600	7100	0.0634	<b>60.000</b> 2.3622	<b>59.987</b> 2.3617	<b>68.029</b> 2.6783	<b>68.010</b> 2.6776	<b>0.119</b> 0.262
<b>63</b> 2.4803	<b>63</b> 2.4803	<b>71</b> 2.7953	<b>20</b> 0.787	K63X71X20	<b>41.4</b> 9310	<b>79.4</b> 17800	4400	6700	0.0628	<b>63.000</b> 2.4803	<b>62.987</b> 2.4798	<b>71.029</b> 2.7964	<b>71.010</b> 2.7957	<b>0.070</b> 0.154
<b>64</b> 2.5197	<b>64</b> 2.5197	<b>70</b> 2.7559	<b>16</b> 0.630	K64X70X16	<b>26.4</b> 5930	<b>55.1</b> 12400	4200	6500	0.0605	<b>64.000</b> 2.5197	<b>63.987</b> 2.5192	<b>70.029</b> 2.7570	<b>70.010</b> 2.7563	<b>0.049</b> 0.108
<b>65</b> 2.5591	<b>65</b> 2.5591	<b>70</b> 2.7559	<b>20</b> 0.787	K65X70X20CH	<b>28.6</b> 6430	<b>69.2</b> 15600	4100	6400	0.0665	<b>65.000</b> 2.5591	<b>64.987</b> 2.5585	<b>70.029</b> 2.7570	<b>70.010</b> 2.7563	<b>0.050</b> 0.110
	<b>65</b> 2.5591	<b>70</b> 2.7559	<b>20</b> 0.787	K65X70X20H	<b>31.5</b> 7080	<b>78.9</b> 17700	4100	6400	0.0687	<b>65.000</b> 2.5591	<b>64.987</b> 2.5585	<b>70.029</b> 2.7570	<b>70.010</b> 2.7563	<b>0.050</b> 0.110
	<b>65</b> 2.5591	<b>70</b> 2.7559	<b>30</b> 1.181	K65X70X30	<b>44.4</b> 9980	<b>123</b> 27700	4100	6400	0.0766	<b>65.000</b> 2.5591	<b>64.987</b> 2.5585	<b>70.029</b> 2.7570	<b>70.010</b> 2.7563	<b>0.075</b> 0.165
	<b>65</b> 2.5591	<b>73</b> 2.8740	<b>23</b> 0.906	K65X73X23H	<b>48.2</b> 10800	<b>97.7</b> 22000	4200	6500	0.0671	<b>65.000</b> 2.5591	<b>64.987</b> 2.5585	<b>73.029</b> 2.8752	<b>73.010</b> 2.8744	<b>0.091</b> 0.201
	<b>65</b> 2.5591	<b>73</b> 2.8740	<b>30</b> 1.181	K65X73X30H	<b>60.1</b> 13500	<b>129</b> 29100	4200	6500	0.0719	<b>65.000</b> 2.5591	<b>64.987</b> 2.5585	<b>73.029</b> 2.8752	<b>73.010</b> 2.8744	<b>0.116</b> 0.256
<b>68</b> 2.6772	<b>68</b> 2.6772	<b>74</b> 2.9134	<b>20</b> 0.787	K68X74X20FH	<b>37.5</b> 8430	<b>88.1</b> 19800	4000	6100	0.0699	<b>68.000</b> 2.6772	<b>67.987</b> 2.6767	<b>74.029</b> 2.9145	<b>74.010</b> 2.9138	<b>0.062</b> 0.137
	<b>68</b> 2.6772	<b>74</b> 2.9134	<b>28</b> 1.102	K68X74X28CH	<b>44.8</b> 10100	<b>110</b> 24700	4000	6100	0.0739	<b>68.000</b> 2.6772	<b>67.987</b> 2.6767	<b>74.029</b> 2.9145	<b>74.010</b> 2.9138	<b>0.082</b> 0.181
	<b>68</b> 2.6772	<b>74</b> 2.9134	<b>30</b> 1.181	K68X74X30H	<b>47.6</b> 10700	<b>119</b> 26800	4000	6100	0.0754	<b>68.000</b> 2.6772	<b>67.987</b> 2.6767	<b>74.029</b> 2.9145	<b>74.010</b> 2.9138	<b>0.098</b> 0.216
	<b>68</b> 2.6772	<b>74</b> 2.9134	<b>35</b> 1.378	K68X74X35HZW	<b>45.1</b> 10100	<b>111</b> 25000	4000	6100	0.0740	<b>68.000</b> 2.6772	<b>67.987</b> 2.6767	<b>74.029</b> 2.9145	<b>74.010</b> 2.9138	<b>0.120</b> 0.265
	<b>68</b> 2.6772	<b>76</b> 2.9921	<b>20</b> 0.787	K68X76X20	<b>43.8</b> 9850	<b>87.8</b> 19700	4000	6200	0.0667	<b>68.000</b> 2.6772	<b>67.987</b> 2.6767	<b>76.029</b> 2.9933	<b>76.010</b> 2.9925	<b>0.086</b> 0.190
	<b>68</b> 2.6772	<b>82</b> 3.2283	<b>38.5</b> 1.516	K68X82X38,5H	<b>117</b> 26300	<b>209</b> 47000	4200	6400	0.0761	<b>68.000</b> 2.6772	<b>67.987</b> 2.6767	<b>82.034</b> 3.2297	<b>82.012</b> 3.2288	<b>0.320</b> 0.705
<b>70</b> 2.7559	<b>70</b> 2.7559	<b>76</b> 2.9921	<b>20</b> 0.787	K70X76X20	<b>36.1</b> 8120	<b>84.7</b> 19000	3900	5900	0.0702	<b>70.000</b> 2.7559	<b>69.987</b> 2.7554	<b>76.029</b> 2.9933	<b>76.010</b> 2.9925	<b>0.065</b> 0.143

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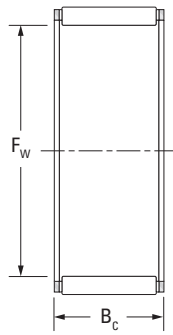


# NEEDLE ROLLER BEARINGS

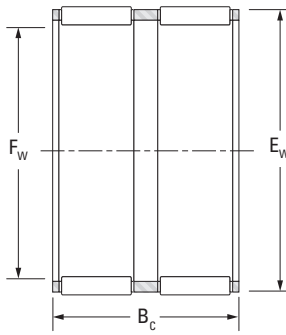
## SINGLE-ROW, DOUBLE-ROW ASSEMBLIES –

continued

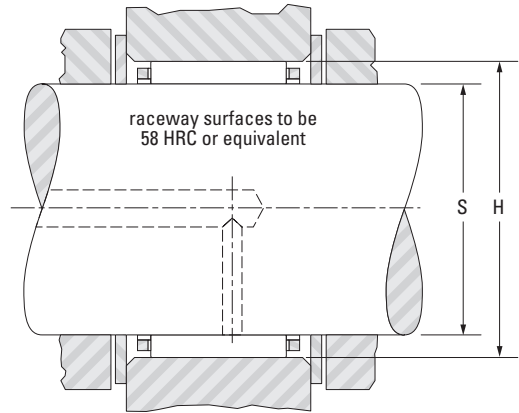
### METRIC SERIES



**K**



**KZW**



Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	Assembly Designation	C	C <sub>0</sub>	Speed Rating		C <sub>g</sub>	S		H		Wt.
							Grease	Oil		Mounting Dimension				
										Max.	Min.	Max.	Min.	
mm in.	mm in.	mm in.	mm in.		kN lbf.	min <sup>-1</sup>			mm in.	mm in.	mm in.	mm in.	kg lbs.	
70 2.7559	70 2.7559	76 2.9921	30 1.181	K70X76X30	51.6 11600	134.0 30100	3900	5900	0.0786	70.000 2.7559	69.987 2.7554	76.029 2.9933	76.010 2.9925	0.097 0.214
	70 2.7559	78 3.0709	20 0.787	K70X78X20H	43.6 9800	87.9 19800	3900	6000	0.0676	70.000 2.7559	69.987 2.7554	78.029 3.0720	78.010 3.0713	0.090 0.198
	70 2.7559	78 3.0709	23 0.906	K70X78X23F	49.8 11200	104.0 23400	3900	6000	0.0705	70.000 2.7559	69.987 2.7554	78.029 3.0720	78.010 3.0713	0.115 0.254
	70 2.7559	78 3.0709	24.8 0.976	K70X78X25F	49.8 11200	104.0 23400	3900	6000	0.0705	70.000 2.7559	69.987 2.7554	78.029 3.0720	78.010 3.0713	0.115 0.254
	70 2.7559	78 3.0709	30 1.181	K70X78X30H	62.2 14000	139.0 31200	3900	6000	0.0757	70.000 2.7559	69.987 2.7554	78.029 3.0720	78.010 3.0713	0.140 0.309
	70 2.7559	78 3.0709	46 1.811	K70X78X46ZW	78.4 17600	187.0 42000	3900	6000	0.0815	70.000 2.7559	69.987 2.7554	78.029 3.0720	78.010 3.0713	0.188 0.414
	70 2.7559	85 3.3465	40 1.575	K70X85X40F	118 26500	203 45600	4100	6300	0.0758	70.000 2.7559	69.987 2.7554	85.034 3.3478	85.012 3.3469	0.338 0.745
	70 2.7559	88 3.4646	30 1.181	K70X88X30H	115 25900	175 39300	4100	6400	0.0714	70.000 2.7559	69.987 2.7554	88.034 3.4659	88.012 3.4650	0.205 0.452
72 2.8346	72 2.8346	80 3.1496	20 0.787	K72X80X20	44.4 9980	90.7 20400	3800	5800	0.0690	72.000 2.8346	71.987 2.8341	80.029 3.1507	80.010 3.1500	0.084 0.185
73 2.8740	73 2.8740	79 3.1102	20 0.787	K73X79X20	37.0 8320	88.7 19900	3700	5700	0.0723	73.000 2.8740	72.987 2.8735	79.029 3.1114	79.010 3.1106	0.068 0.150
75 2.9528	75 2.9528	81 3.1890	20 0.787	K75X81X20F	37.4 8410	90.7 20400	3600	5500	0.0737	75.000 2.9528	74.987 2.9522	81.034 3.1903	81.012 3.1894	0.075 0.165
	75 2.9528	83 3.2677	23 0.906	K75X83X23	52.5 11800	114.0 25600	3600	5600	0.0744	75.000 2.9528	74.987 2.9522	83.034 3.2691	83.012 3.2682	0.104 0.229
	75 2.9528	83 3.2677	30 1.181	K75X83X30	60.9 13700	138 31000	3600	5600	0.0780	75.000 2.9528	74.987 2.9522	83.034 3.2691	83.012 3.2682	0.141 0.311
	75 2.9528	83 3.2677	30 1.181	K75X83X30FH	60.9 13700	138 31000	3600	5600	0.0780	75.000 2.9528	74.987 2.9522	83.034 3.2691	83.012 3.2682	0.141 0.311
80 3.1496	80 3.1496	86 3.3858	20 0.787	K80X86X20H	38.6 8680	96.7 21700	3400	5200	0.0771	80.000 3.1496	79.987 3.1491	86.034 3.3872	86.012 3.3863	0.072 0.159
	80 3.1496	88 3.4646	25 0.984	K80X88X25FV1	54.0 12100	121 27200	3400	5200	0.0778	80.000 3.1496	79.987 3.1491	88.034 3.4659	88.012 3.4650	0.134 0.295
	80 3.1496	88 3.4646	30 1.181	K80X88X30	67.5 15200	161 36200	3400	5200	0.0835	80.000 3.1496	79.987 3.1491	88.034 3.4659	88.012 3.4650	0.153 0.337

Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	Assembly Designation	C	C <sub>0</sub>	Speed Rating		C <sub>g</sub>	S		H		Wt.
			-0.20 -0.008 -0.55 -0.022		Load Ratings		Grease	Oil		Mounting Dimension				
					kN lbf.	min <sup>-1</sup>				Max.	Min.	Max.	Min.	
mm in.	mm in.	mm in.	mm in.							mm in.	mm in.	mm in.	mm in.	kg lbs.
<b>85</b> 3.3465	<b>85</b> 3.3465	<b>92</b> 3.6220	<b>20</b> 0.787	K85X92X20H	<b>39.9</b> 8970	<b>91.7</b> 20600	3200	4900	0.0763	<b>84.988</b> 3.3460	<b>84.973</b> 3.3454	<b>92.034</b> 3.6234	<b>92.012</b> 3.6225	<b>0.085</b> 0.187
	<b>85</b> 3.3465	<b>93</b> 3.6614	<b>25</b> 0.984	K85X93X25F	<b>58.8</b> 13219	<b>138</b> 31024	3200	4900	—	<b>84.988</b> 3.3460	<b>84.973</b> 3.3454	<b>93.034</b> 3.6628	<b>93.012</b> 3.6619	<b>0.000</b> 0.000
	<b>85</b> 3.3465	<b>93</b> 3.6614	<b>30</b> 1.181	K85X93X30H	<b>31024*</b> 15600	<b>3200</b> 38200	4900	4900	0.0870	<b>84.988</b> 3.3460	<b>84.973</b> 3.3454	<b>93.034</b> 3.6628	<b>93.012</b> 3.6619	<b>0.166</b> 0.366
<b>90</b> 3.5433	<b>90</b> 3.5433	<b>97</b> 3.8189	<b>20</b> 0.787	K90X97X20	<b>46.3</b> 10400	<b>114</b> 25600	3000	4600	0.0827	<b>89.988</b> 3.5428	<b>89.973</b> 3.5422	<b>97.034</b> 3.8202	<b>97.012</b> 3.8194	<b>0.095</b> 0.209
	<b>90</b> 3.5433	<b>98</b> 3.8583	<b>25</b> 0.984	K90X98X25F	<b>54.8</b> 12300	<b>128</b> 28800	3000	4600	0.0832	<b>89.988</b> 3.5428	<b>89.973</b> 3.5422	<b>98.034</b> 3.8596	<b>98.012</b> 3.8587	<b>0.134</b> 0.295
	<b>90</b> 3.5433	<b>98</b> 3.8583	<b>30</b> 1.181	K90X98X30	<b>63.6</b> 14300	<b>155</b> 34800	3000	4600	0.0873	<b>89.988</b> 3.5428	<b>89.973</b> 3.5422	<b>98.034</b> 3.8596	<b>98.012</b> 3.8587	<b>0.168</b> 0.370
<b>95</b> 3.7402	<b>95</b> 3.7402	<b>103</b> 4.0551	<b>20</b> 0.787	K95X103X20	<b>49.3</b> 11100	<b>114</b> 25600	2800	4400	0.0829	<b>94.988</b> 3.7397	<b>94.973</b> 3.7391	<b>103.034</b> 4.0565	<b>103.012</b> 4.0556	<b>0.130</b> 0.287
	<b>95</b> 3.7402	<b>103</b> 4.0551	<b>30</b> 1.181	K95X103X30F	<b>71.0</b> 16000	<b>183</b> 41100	2800	4400	0.0932	<b>94.988</b> 3.7397	<b>94.973</b> 3.7391	<b>103.034</b> 4.0565	<b>103.012</b> 4.0556	<b>0.180</b> 0.39
<b>100</b> 3.9370	<b>100</b> 3.9370	<b>108</b> 4.2520	<b>30</b> 1.181	K100X108X30	<b>72.4</b> 16300	<b>191</b> 42900	2700	4200	0.0965	<b>99.988</b> 3.9365	<b>99.973</b> 3.9359	<b>108.034</b> 4.2533	<b>108.012</b> 4.2524	<b>0.210</b> 0.463
<b>110</b> 4.3307	<b>110</b> 4.3307	<b>118</b> 4.6457	<b>24</b> 0.945	K110X118X24	<b>64.0</b> 14400	<b>168</b> 37800	2400	3800	0.0977	<b>109.988</b> 4.3302	<b>109.973</b> 4.3296	<b>118.034</b> 4.6470	<b>118.012</b> 4.6461	<b>0.165</b> 0.364
	<b>110</b> 4.3307	<b>118</b> 4.6457	<b>30</b> 1.181	K110X118X30H	<b>75.3</b> 16900	<b>207</b> 46500	2400	3800	0.1029	<b>109.988</b> 4.3302	<b>109.973</b> 4.3296	<b>118.034</b> 4.6470	<b>118.012</b> 4.6461	<b>0.200</b> 0.441
<b>120</b> 4.7244	<b>120</b> 4.7244	<b>128</b> 5.0393	<b>25</b> 0.984	K120X128X25	<b>66.4</b> 14927	<b>181.0</b> 40690	2200	3400	—	<b>119.988</b> 4.7239	<b>119.973</b> 4.7233	<b>128.039</b> 5.0409	<b>128.014</b> 5.0399	<b>0.237</b> 0.523
<b>130</b> 5.1181	<b>130</b> 5.1181	<b>137</b> 5.3937	<b>24</b> 0.945	K130X137X24	<b>64.3</b> 14455	<b>197.0</b> 44287	2100	3200	—	<b>129.986</b> 5.1176	<b>129.968</b> 5.1168	<b>137.039</b> 5.3952	<b>137.014</b> 5.3942	<b>0.211</b> 0.465
	<b>130</b> 5.1181	<b>140</b> 5.5118	<b>45</b> 1.7717	K130X140X45	<b>135.0</b> 30349	<b>397.0</b> 89249	2100	3200	—	<b>129.986</b> 5.1176	<b>129.968</b> 5.1168	<b>140.039</b> 5.5133	<b>140.014</b> 5.5124	<b>0.586</b> 1.292
<b>135</b> 5.3150	<b>135</b> 5.3150	<b>145</b> 5.7090	<b>38</b> 1.4961	K135X145X38	<b>123.0</b> 27651	<b>355.0</b> 79807	2000	3100	—	<b>134.986</b> 5.3144	<b>134.968</b> 5.3137	<b>145.039</b> 5.7102	<b>145.014</b> 5.7092	<b>0.511</b> 1.127
<b>140</b> 5.5118	<b>140</b> 5.5118	<b>150</b> 5.9055	<b>43</b> 1.6929	K140X150X43	<b>141.0</b> 31698	<b>428.0</b> 96218	1900	3000	—	<b>139.986</b> 5.5113	<b>139.968</b> 5.5106	<b>150.039</b> 5.9070	<b>150.014</b> 5.9061	<b>0.596</b> 1.314
<b>150</b> 5.9055	<b>150</b> 5.9055	<b>160</b> 6.2992	<b>43</b> 1.6929	K150X160X43	<b>144.0</b> 32372	<b>452.0</b> 101613	1800	2800	—	<b>149.986</b> 5.9050	<b>149.968</b> 5.9042	<b>160.039</b> 6.3007	<b>160.014</b> 6.3000	<b>0.636</b> 1.402
<b>160</b> 6.2992	<b>160</b> 6.2992	<b>168</b> 6.6142	<b>22</b> 0.8661	K160X168X22	<b>65.4</b> 14702	<b>196.0</b> 44062	1700	2600	—	<b>159.986</b> 6.2987	<b>159.968</b> 6.2980	<b>168.039</b> 6.6157	<b>168.014</b> 6.6147	<b>0.281</b> 0.620
<b>165</b> 6.4961	<b>165</b> 6.4961	<b>173</b> 6.8110	<b>26</b> 1.0236	K165X173X26	<b>78.8</b> 17715	<b>251.0</b> 56427	1600	2500	—	<b>164.986</b> 6.4955	<b>164.968</b> 6.4948	<b>173.039</b> 6.8126	<b>173.014</b> 6.8116	<b>0.338</b> 0.745







**RADIAL NEEDLE ROLLER AND CAGE ASSEMBLIES FOR CONNECTING ROD APPLICATIONS**

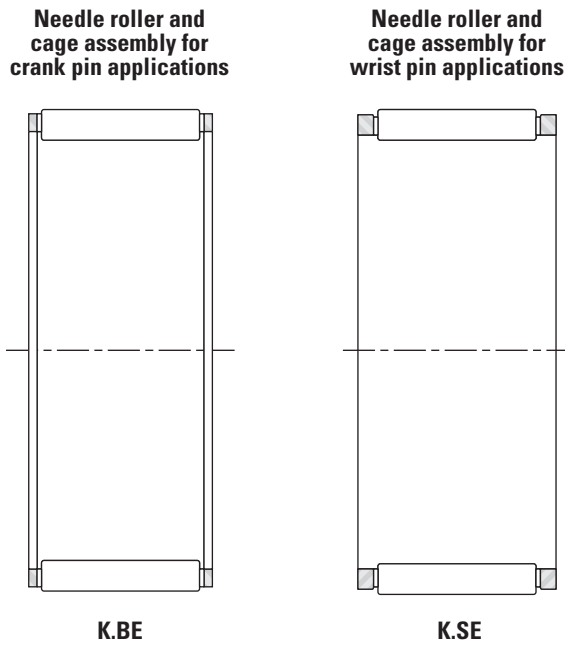
**METRIC SERIES**

**B**

Connecting rods have two bearing positions: the crank pin or big end, and the wrist pin or small end.

In the crank pin position there may be severe operating conditions due to centrifugal forces, internal forces, accelerations and high rotational speeds, requiring the use of special radial needle roller and cage assemblies.

Similarly, in the wrist pin position the reciprocating inertia loads and high oscillating speeds dictate the use of special cage designs.



**Fig. B-3. Types of metric series radial needle roller and cage assemblies**

**Suffixes**

<b>BE</b>	steel cage, heat treated, for crank pin position
<b>SE</b>	steel cage, heat treated, for wrist pin position

## CONSTRUCTION

### METRIC SERIES RADIAL NEEDLE ROLLER AND CAGE ASSEMBLIES FOR CRANK PIN POSITIONS

Needle roller and cage assemblies for use in crank pin positions have cages with a large outside cylindrical surface to ensure optimum radial guidance in the connecting rod bore. Due to the inherent low weight and strength of the heat-treated cages, the needle roller and cage assemblies are well-suited for high-speed engine applications. When necessary, silver plating and copper plating can be applied for optimum performance during operation at high speeds.

### METRIC SERIES RADIAL NEEDLE ROLLER AND CAGE ASSEMBLIES FOR WRIST PIN POSITIONS

Reciprocating inertia loads and oscillating speeds require the cages used in the wrist pin positions to be heat-treated and to guide on the wrist pin.

These cages are available in a variety of widths to allow the selection of a needle roller and cage assembly with the length of needle rollers to match the connecting rod width.

### SIZE SELECTION

In most instances, selection of a suitable size of a needle roller and cage assembly for typical connecting rod positions may be based on the cylinder displacement of the engine which in turn, dictates the crank pin and wrist pin diameters.

Suggestions, based on engine displacements, are listed in the following table.

**Table B-3. Crank pin and wrist pin diameters, determined by the cylinder displacement of the engine**

Cylinder displacement in cm <sup>3</sup>								
Cylinder	>		40	60	100	150	200	300
Displacement	≤	40	60	100	150	200	300	
Diameter								
		mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
Crank pin		<b>12/14</b> 0.4724/0.5512	<b>15/16/18</b> 0.5906/0.6299/0.7087	<b>18/20</b> 0.7087/0.7874	<b>18/20/22</b> 0.7087/0.7874/0.8661	<b>24/25/28</b> 0.9449/0.9843/1.1024	<b>28/30</b> 1.1024/1.1811	<b>35/40</b> 1.3780/1.5748
Wrist pin		<b>10/11</b> 0.3937/0.4331	<b>12/13</b> 0.4724/0.5118	<b>14/15</b> 0.5512/0.5906	<b>15/16</b> 0.5906/0.6299	<b>18</b> 0.7087	<b>20</b> 0.7874	<b>20</b> 0.7874





### CONNECTING ROD GUIDANCE ARRANGEMENTS

End guidance of a connecting rod can be provided either at the crank pin or at the wrist pin end. Connecting-rod guidance is achieved at the crank pin end using a small clearance between the crank counterweights. Guidance at the wrist pin end is controlled by a small clearance between the piston bosses.

#### CRANK PIN END GUIDANCE

With crank pin end guidance, care must be taken that an adequate amount of lubricant is supplied to the crank pin bearing and the surfaces that guide the connecting rod. For this purpose, grooves in the connecting rod end faces, or slots in the connecting rod bore aligned with the incoming lubrication path, should be provided. Occasionally, bronze or hardened steel washers may be used for end guidance of the connecting rod.

At the wrist pin end, the needle roller and cage assembly is located axially between the piston bosses. It may be both economical and effective to machine the connecting rod at the wrist pin end and at the crank pin end to the same width. It is suggested that, at the wrist

pin end, the needle roller length does not overhang the connecting rod width. Otherwise, the load rating of the needle roller and cage assembly will be reduced.

#### WRIST PIN END GUIDANCE

Wrist pin end will get the most effective axial guidance between the piston bosses. Grooves in the bottom of the piston bosses and a chamfer of small angle – on each side of the upper portion of the connecting rod small end – can improve the oil flow to the needle roller and cage assembly and its guiding surfaces.

The length of the needle roller and cage assembly and the connecting rod width at the crank pin end should be identical to ensure best possible radial piloting of cage in the bore of the connecting rod. The crank counterweights are recessed to allow proper axial alignment of the connecting rod. As a rule, it is not necessary to have an additional supply of lubricant. Only in engines with sparse lubrication should consideration be given to provide lubricating slots in the connecting rod bores as with crank pin end guidance.

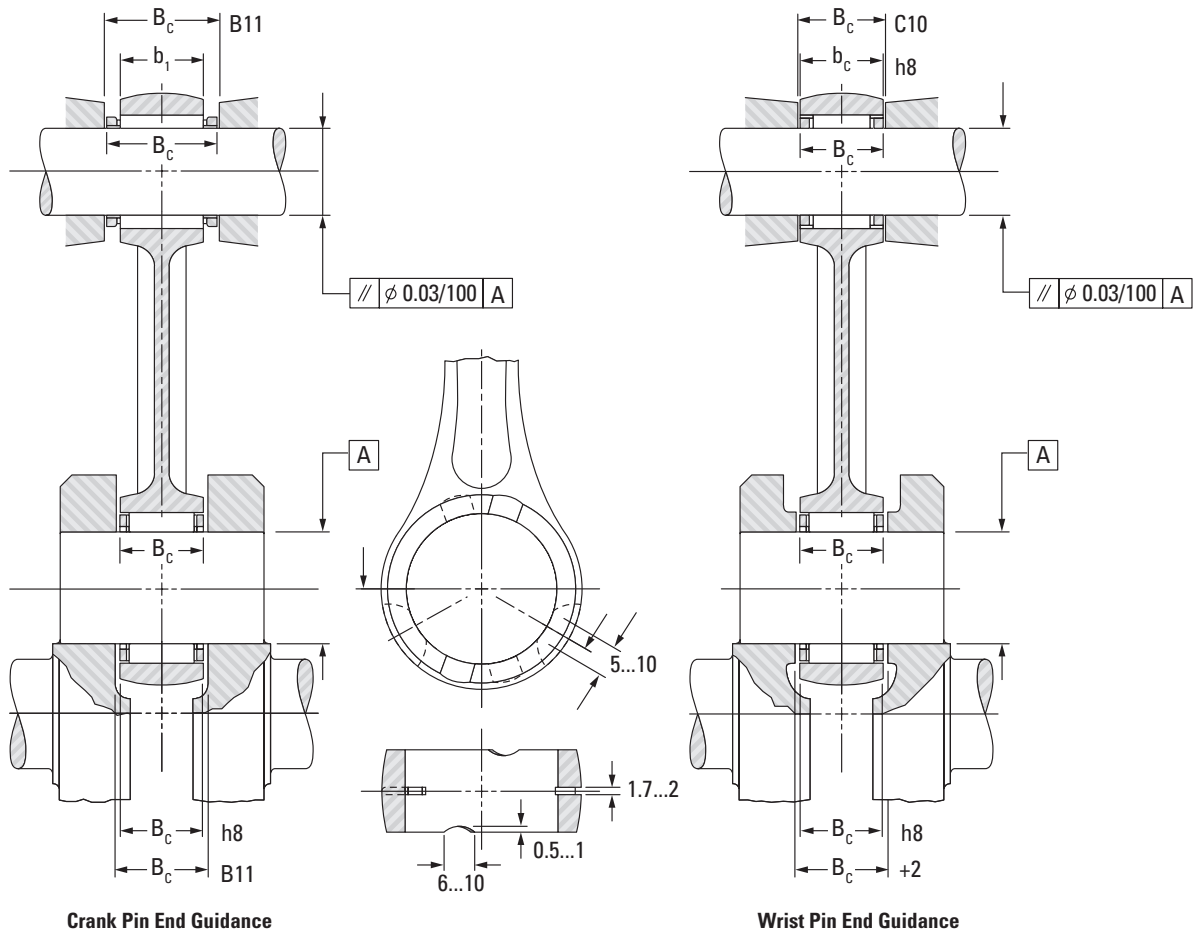


Fig. B-4. Crank pin and wrist pin end guidance

## SUITABLE MATERIALS AND HEAT TREATMENT

Connecting rod crank pin end and wrist pin end bores serve as raceways:

a case-hardening steel such as 15 CrNi 6, 17 MnCr 5 or AISI 8620.

Crank pins:

e.g., case-hardening steel 15 Cr 3, AISI 8620, AISI 1018 or through-hardening steel 100 Cr 6, AISI 52100.

Wrist pins:

e.g., case-hardening steel Ck 15, 15 Cr 3 or through-hardening steel 100 Cr 6, AISI 52100.

The effective case depth (50 HRC) of the raceways should be 0.5 mm (0.0197 in.) minimum, and the surface hardness should be 60 HRC or 700 HV minimum.

After hardening, the connecting rods must be stress-relieved.

The connecting rod raceway bores, as well as the crank pins and the wrist pins, must be precision-ground or preferably honed to a surface finish Ra not exceeding 0.16 µm.

## FORM TOLERANCES

The form tolerances for crank pins, wrist pins and connecting rod bores are listed in Table B-4.

Table B-4. Form tolerances

		Dimension in mm				
Nominal pin diameter	>	10	14	18	25	30
	≤	14	18	25	30	40
		Tolerances in µm				
Parallelism <sup>(1)</sup>	wrist pin & crank pin	1	1	2	2	3
	rod bore	2	3	3	4	4
Circularity (DIN ISO 1101)	wrist pin & crank pin	1	1	1.5	1.5	2
	rod bore	1.5	2	2	2.5	2.5

<sup>(1)</sup> The parallelism values are valid for the needle roller length  $L_w$ .

It is suggested that the parallelism of the wrist pin axis and the crank pin axis be within a tolerance zone of 0.03 mm (0.0012 in.) diameter over a distance of 100 mm (3.9370 in.).

## RADIAL CLEARANCE

### METRIC SERIES CRANK PIN BEARINGS

The high speeds of modern production engines dictate the need for crank pin bearings with a relatively large radial clearance. As an approximation, the minimum clearance can be taken as the crank pin diameter/1000. The maximum radial clearance would be a result of the sorting plan shown in Table B-5(1) on page B-32.

As shown in the example of the matching scheme, the suggested mounting diameters for the crank pin position are G6 for the connecting rod bore diameters and h5 for the crank pin diameters. Axial location of the cage is shown on the crank pin end guidance arrangement.

Racing and sport engines operate at even higher speeds than production engines, requiring 50 percent larger radial clearances in the crank pin bearings. The larger radial clearances also should be used in bores of split connecting rods to avoid the danger of distortion – resulting from the unavoidable connecting rod deformation occurring in operation. Consult your representative for advice on such applications.

### METRIC SERIES WRIST PIN BEARINGS

The radial clearance in wrist pin bearings should be held as small as possible. The minimum clearance should be aimed at 2 µm with the maximum clearance resulting from the proposed sorting plan in Table B-5(2) on page B-32. The maximum clearance should be held as close as possible to 12 µm for all wrist pin bearings based on sorting wrist pins made to a tolerance h5, small end bore diameter tolerance of K6 and needle roller grades as shown in Table B-5(2) on page B-32.





## METRIC SERIES RADIAL NEEDLE ROLLER AND CAGE ASSEMBLIES FOR CONNECTING ROD APPLICATIONS

### MATCHING SCHEME FOR A CRANK PIN BEARING ARRANGEMENT

(three diameter ranges are specified for the connecting rod and crank pin)

Example: Crank pin diameter 20 mm, tolerance h5  
 Connecting rod bore diameter 26 mm, tolerance G6  
 Needle roller and cage assembly K20x26x12BE  
 Radial clearance 20 . . . 29 μm

Table B-5(1). Radial clearance

		Connecting Rod Crank Pin End Bore Diameter 26 <sup>+20</sup> / <sub>+7</sub> Tolerances and Radial Clearances In μm							
		+12 +7 Needle Roller Tolerance		Radial Clearance	+16 +12 Needle Roller Tolerance		Radial Clearance	+20 +16 Needle Roller Tolerance	
Crank Pin Diameter	0	-7	21...29	-4	-5	20...29	-2	-3	20...29
	-3	-9		-6	-7		-4	-5	
	-3	-5	20...28	-3		21...28	-1		21...28
	-6	-7		-5			-3		
20 <sup>0</sup> / <sub>-9</sub>	-6	-4	21...29	-1	-2	20...29	0		22...29
	-9	-6		-3	-4		-2		

### MATCHING SCHEME FOR A WRIST PIN BEARING ARRANGEMENT

(three diameter ranges are specified for the connecting rod and wrist pin)

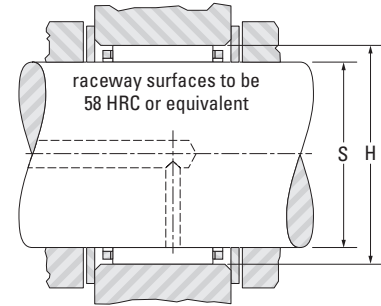
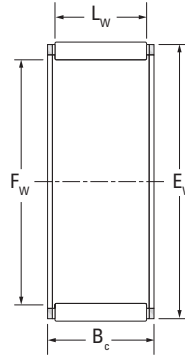
Example: Wrist pin diameter 16 mm, tolerance h5  
 Connecting rod bore diameter 20 mm, tolerance K6  
 Needle roller and cage assembly K16x20x20SE  
 Radial clearance 2 . . . 12 μm

Table B-5(2). Radial clearance

		Wrist Pin End Bore Diameter 20 <sup>+2</sup> / <sub>-11</sub> Tolerances and Radial Clearances In μm							
		-6 -11 Needle roller Tolerance		Radial Clearance	-2 -6 Needle Roller Tolerance		Radial Clearance	+2 -2 Needle Roller Tolerance	
Wrist Pin Diameter	0			-4	-5	2...11	-2	-3	2...11
	-3			-6	-7		-4	-5	
	-3	-5	2...10	-3	-4	3...12	-1	-2	3...12
	-6	-7		-5	-6		-3	-4	
16 <sup>0</sup> / <sub>-8</sub>	-6	-4	3...12	-1	-2	2...10	0		4...10
	-8	-6		-3	-4		-2		

**ASSEMBLIES FOR CRANK PIN  
END APPLICATIONS**

**METRIC SERIES**



**K.BE**

Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	L <sub>w</sub>	Assembly Designation	C	C <sub>0</sub>	C <sub>g</sub>	S		H		Wt.
									Mounting Dimensions (non-high performance engines)				
									Max.	Min.	Max.	Min.	
mm in.	mm in.	mm in.	mm in.	kg lbs.									
12 0.4724	12 0.4724	16 0.6299	10 0.394	7.8 0.307	K12X16X10BE	6.21 1400	6.70 1510	—	12.000 0.4724	11.992 0.4721	16.017 0.6306	16.006 0.6302	0.004 0.009
	12 0.4724	17 0.6693	10 0.394	7.8 0.307	K12X17X10BE	7.32 1650	7.21 1620	—	12.000 0.4724	11.992 0.4721	17.017 0.6700	17.006 0.6695	0.005 0.011
14 0.5512	14 0.5512	18 0.7087	10 0.394	7.8 0.307	K14X18X10BE	6.89 1550	7.98 1790	—	14.000 0.5512	13.992 0.5509	18.017 0.7093	18.006 0.7089	0.005 0.011
	14 0.5512	18 0.7087	10 0.394	7.8 0.307	WK14X18X10BE	6.89 1550	7.98 1790	0.0204	14.000 0.5512	13.992 0.5509	18.017 0.7093	18.006 0.7089	0.005 0.011
	14 0.5512	20 0.7874	10 0.394	7.8 0.307	K14X20X10BE	8.90 2000	8.61 1940	0.0198	14.000 0.5512	13.992 0.5509	20.020 0.7882	20.007 0.7877	0.007 0.015
	14 0.5512	20 0.7874	12 0.472	9.5 0.374	K14X20X12BE	10.50 2360	10.60 2380	0.0209	14.000 0.5512	13.992 0.5509	20.020 0.7882	20.007 0.7877	0.009 0.020
	14 0.5512	20 0.7874	12 0.472	9.5 0.374	WK14X20X12BE	10.50 2360	10.60 2380	0.0209	14.000 0.5512	13.992 0.5509	20.020 0.7882	20.007 0.7877	0.009 0.020
15 0.5984	15 0.5984	22 0.8740	12 0.472	9.0 0.354	K15,2X22,2X12BE	10.80 2430	10.30 2320	0.0211	15.200 0.5984	15.192 0.5981	22.220 0.8748	22.207 0.8743	0.012 0.026
16 0.6299	16 0.6299	21 0.8268	10 0.394	7.8 0.307	K16X21X10BE	8.17 1840	8.90 2000	0.0215	16.000 0.6299	15.992 0.6296	21.020 0.8276	21.007 0.8270	0.007 0.015
	16 0.6299	21 0.8268	10 0.394	7.8 0.307	WK16X21X10BE	8.17 1840	8.90 2000	0.0215	16.000 0.6299	15.992 0.6296	21.020 0.8276	21.007 0.8270	0.007 0.015
	16 0.6299	22 0.8661	12 0.472	9.5 0.374	K16X22X12BE	11.20 2520	11.90 2680	0.0227	16.000 0.6299	15.992 0.6296	22.020 0.8669	22.007 0.8664	0.011 0.024
18 0.7087	18 0.7087	24 0.9449	12 0.472	9.5 0.374	K18X24X12BE	11.80 2650	13.10 2940	0.0243	18.000 0.7087	17.992 0.7083	24.020 0.9457	24.007 0.9452	0.011 0.024
	18 0.7087	24 0.9449	13 0.512	9.8 0.386	K18X24X13BE	12.10 2720	13.50 3030	0.0245	18.000 0.7087	17.992 0.7083	24.020 0.9457	24.007 0.9452	0.013 0.029
	18 0.7087	24 0.9449	13 0.512	10.5 0.413	WK18X24X13BE	12.80 2880	14.60 3280	0.0250	18.000 0.7087	17.992 0.7083	24.020 0.9457	24.007 0.9452	0.011 0.024
	18 0.7087	24 0.9449	15 0.591	11.8 0.465	K18X24X15BE	13.30 2990	15.20 3420	0.0253	18.000 0.7087	17.992 0.7083	24.020 0.9457	24.007 0.9452	0.014 0.031
19 0.7480	19 0.7480	25 0.9843	15 0.591	12.5 0.492	K19X25X15BE	14.70 3300	17.60 3960	0.0268	19.000 0.7480	18.991 0.7477	25.020 0.9850	25.007 0.9845	0.014 0.031
20 0.7874	20 0.7874	26 1.0236	12 0.472	9.8 0.386	K20X26X12BE	13.30 2990	15.80 3550	0.0267	20.000 0.7874	19.991 0.7870	26.020 1.0244	26.007 1.0239	0.013 0.029

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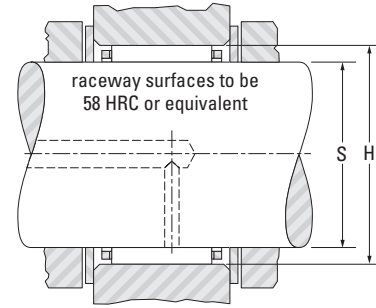
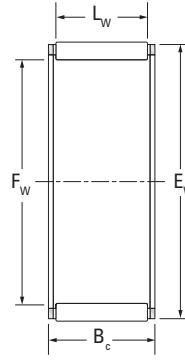


# NEEDLE ROLLER BEARINGS

## ASSEMBLIES FOR CRANK PIN END APPLICATIONS –

continued

### METRIC SERIES

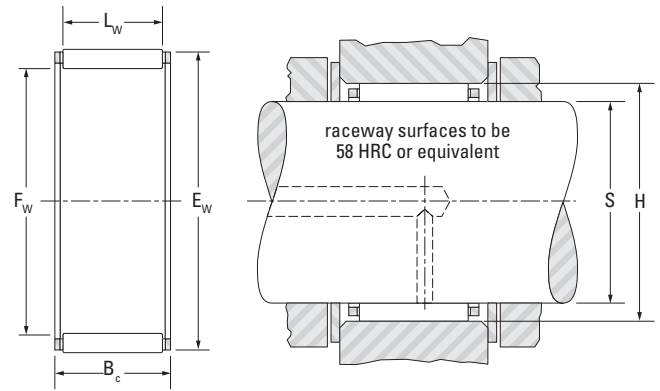


**K.BE**

Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	L <sub>w</sub>	Assembly Designation	C	C <sub>0</sub>	C <sub>g</sub>	S		H		Wt.
									Mounting Dimensions (non-high performance engines)				
			Max.	Min.		Max.	Min.		Load Ratings				
mm in.	mm in.	mm in.	mm in.	mm in.	kN lbf.	mm in.	mm in.	mm in.	mm in.	kg lbs.			
20 0.7874	20 0.7874	26 1.0236	17 0.669	13.8 0.543	K20X26X17BE	14.90 3350	18.20 4090	0.0276	20.000 0.7874	19.991 0.7870	26.020 1.0244	26.007 1.0239	0.017 0.037
21 0.8307	21 0.8307	27 1.0669	13 0.512	10.5 0.413	K21,1X27,1X13BE	14.10 3170	17.20 3870	0.0278	21.100 0.8307	21.091 0.8304	27.120 1.0677	27.107 1.0672	0.016 0.035
22 0.8661	22 0.8661	28 1.1024	13 0.512	9.8 0.386	K22X28X13BE	13.90 3120	17.10 3840	0.0283	22.000 0.8661	21.991 0.8658	28.020 1.1031	28.007 1.1026	0.015 0.033
	22 0.8661	29 1.1417	15.6 0.614	12.8 0.504	WK22X29X15,6BE	18.50 4160	22.30 5010	0.0296	22.000 0.8661	21.991 0.8658	29.020 1.1425	29.007 1.1420	0.021 0.046
	22 0.8661	29 1.1417	16 0.630	12.8 0.504	K22X29X16BE	18.50 4160	22.30 5010	0.0296	22.000 0.8661	21.991 0.8658	29.020 1.1425	29.007 1.1420	0.021 0.046
24 0.9449	24 0.9449	30 1.1811	13 0.512	9.8 0.386	K24X30X13BE	14.40 3240	18.40 4140	0.0298	24.000 0.9449	23.991 0.9445	30.020 1.1819	30.007 1.1814	0.016 0.035
	24 0.9449	30 1.1811	15 0.591	11.8 0.465	K24X30X15BE	15.30 3440	19.70 4430	0.0304	24.000 0.9449	23.991 0.9445	30.020 1.1819	30.007 1.1814	0.018 0.040
	24 0.9449	30 1.1811	17 0.669	13.8 0.543	K24X30X17BE	19.00 4270	26.30 5910	0.0326	24.000 0.9449	23.991 0.9445	30.020 1.1819	30.007 1.1814	0.021 0.040
25 0.9843	25 0.9843	31 1.2205	19.8 0.780	17.8 0.701	WK25X31X20BE	23.30 5240	34.50 7760	0.0355	25.000 0.9843	24.991 0.9839	31.025 1.2215	31.009 1.2208	0.024 0.053
	25 0.9843	32 1.2598	16 0.630	12.8 0.504	K25X32X16BE	19.20 4320	24.30 5460	0.0319	25.000 0.9843	24.991 0.9839	32.025 1.2608	32.009 1.2602	0.022 0.049
	25 0.9843	32 1.2598	24 0.945	19.8 0.780	K25X32X24BE	27.50 6180	38.50 8660	0.0358	25.000 0.9843	24.991 0.9839	32.025 1.2608	32.009 1.2602	0.035 0.077
30 1.1811	30 1.1811	37 1.4567	16 0.630	12.8 0.504	K30X37X16BE	21.60 4860	29.80 6700	0.0363	30.000 1.1811	29.991 1.1807	37.025 1.4577	37.009 1.4570	0.029 0.064
35 1.3780	35 1.3780	42 1.6535	20 0.787	16.8 0.661	K35X42X20BE	29.70 6680	47.00 10600	0.0434	35.000 1.3780	34.989 1.3775	42.025 1.6545	42.009 1.6539	0.039 0.086

**ASSEMBLIES FOR WRIST PIN  
END APPLICATIONS**

**METRIC SERIES**



**K.SE**

Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	L <sub>w</sub>	Assembly Designation	C	C <sub>0</sub>	C <sub>g</sub>	S		H		Wt.
									Mounting Dimensions (non-high performance engines)				
									Max.	Min.	Max.	Min.	
mm in.	mm in.	mm in.	mm in.	kg lbs.									
9 0.3543	9 0.3543	12 0.4724	11.5 0.453	8.4 0.331	K9X12X11,5SE	4.23 951	4.53 1020	0.0296	9.000 0.3543	8.994 0.3541	12.017 0.4731	12.006 0.4727	0.003 0.007
	9 0.3543	13 0.5118	12.5 0.492	9.8 0.386	K9X13X12,5SE	5.58 1250	5.41 1220	0.0306	9.000 0.3543	8.994 0.3541	13.017 0.5125	13.006 0.5120	0.005 0.011
10 0.3937	10 0.3937	13 0.5118	14.5 0.571	11.8 0.465	K10X13X14,5SE	5.93 1330	7.20 1620	0.0152	10.000 0.3937	9.994 0.3935	13.017 0.5125	13.006 0.5120	0.004 0.009
	10 0.3937	14 0.5512	10.0 0.394	7.0 0.276	K10X14X10SE	4.62 1040	4.36 980	0.0155	10.000 0.3937	9.994 0.3935	14.017 0.5519	14.006 0.5514	0.004 0.009
12 0.4724	12 0.4724	15 0.5906	13.0 0.512	9.8 0.386	K12X15X13SE	6.00 1350	7.72 1740	0.0179	12.000 0.4724	11.992 0.4721	15.017 0.5912	15.006 0.5908	0.004 0.009
	12 0.4724	15 0.5906	15.0 0.591	11.8 0.465	K12X15X15SE	6.97 1570	9.36 2100	0.0153	12.000 0.4724	11.992 0.4721	15.017 0.5912	15.006 0.5908	0.005 0.011
	12 0.4724	15 0.5906	17.5 0.689	12.8 0.504	K12X15X17,5SE	7.45 1670	10.2 2290	0.0196	12.000 0.4724	11.992 0.4721	15.017 0.5912	15.006 0.5908	0.006 0.013
	12 0.4724	16 0.6299	13.0 0.512	9.8 0.386	K12X16X13SE	6.03 1360	6.38 1430	0.0206	12.000 0.4724	11.992 0.4721	16.017 0.6306	16.006 0.6302	0.006 0.013
	12 0.4724	17 0.6693	13.0 0.512	9.8 0.386	K12X17X13SE	7.61 1710	7.54 1700	0.0210	12.000 0.4724	11.992 0.4721	17.017 0.6700	17.006 0.6695	0.007 0.015
	12 0.4724	17 0.6693	15.0 0.591	12.5 0.492	K12X17X15SE	9.30 2090	9.75 2190	0.0181	12.000 0.4724	11.992 0.4721	17.017 0.6700	17.006 0.6695	0.007 0.015
13 0.5118	13 0.5118	16 0.6299	14.0 0.551	9.8 0.386	K13X16X14SE	5.62 1260	7.23 1630	0.0184	13.000 0.5118	12.992 0.5115	16.017 0.6306	16.006 0.6302	0.005 0.011
	13 0.5118	17 0.6693	17.7 0.697	13.8 0.543	K13X17X17,7SE	9.80 2200	12.3 2770	0.0196	13.000 0.5118	12.992 0.5115	17.017 0.6700	17.006 0.6695	0.008 0.018
	13 0.5118	18 0.7087	15.0 0.591	12.5 0.492	K13X18X15SE	9.28 2090	9.88 2220	0.0200	13.000 0.5118	12.992 0.5115	18.017 0.7093	18.006 0.7089	0.008 0.018
14 0.5512	14 0.5512	18 0.7087	13.0 0.512	9.8 0.386	K14X18X13SE	7.39 1660	8.69 1950	0.0220	14.000 0.5512	13.992 0.5509	18.017 0.7093	18.006 0.7089	0.007 0.015
	14 0.5512	18 0.7087	17.0 0.669	11.8 0.465	K14X18X17SE	8.59 1930	10.5 2360	0.0203	14.000 0.5512	13.992 0.5509	18.017 0.7093	18.006 0.7089	0.009 0.020
	14 0.5512	18 0.7087	21.0 0.827	14.8 0.583	K14X18X21SE	10.3 2320	13.3 2990	0.0208	14.000 0.5512	13.992 0.5509	18.017 0.7093	18.006 0.7089	0.011 0.024
15 0.5906	15 0.5906	19 0.7480	17.0 0.669	11.8 0.465	K15X19X17SE	9.05 2030	11.5 2590	0.0218	15.000 0.5906	14.992 0.5902	19.020 0.7488	19.007 0.7483	0.009 0.020

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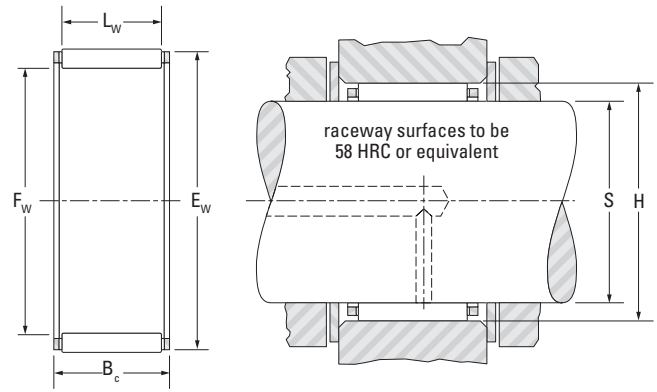




# NEEDLE ROLLER BEARINGS

## ASSEMBLIES FOR WRIST PIN END APPLICATIONS – *continued*

### METRIC SERIES



**K.BE**

Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	L <sub>w</sub>	Assembly Designation	C		C <sub>g</sub>	S		H		Wt.
						C	C <sub>0</sub>		Mounting Dimensions (non-high performance engines)				
									Max.	Min.	Max.	Min.	
<b>15</b> 0.5906	<b>15</b> 0.5906	<b>19</b> 0.7480	<b>19.5</b> 0.768	<b>15.8</b> 0.622	K15X19X19,5SE	<b>10.8</b> 2430	<b>14.3</b> 3210	<b>0.0231</b>	<b>15.000</b> 0.5906	<b>14.992</b> 0.5902	<b>19.020</b> 0.7488	<b>19.007</b> 0.7483	<b>0.010</b> 0.022
	<b>15</b> 0.5906	<b>19</b> 0.7480	<b>20.0</b> 0.787	<b>15.8</b> 0.622	K15X19X20SE	<b>10.8</b> 2430	<b>14.3</b> 3210	<b>0.0229</b>	<b>15.000</b> 0.5906	<b>14.992</b> 0.5902	<b>19.020</b> 0.7488	<b>19.007</b> 0.7483	<b>0.010</b> 0.022
<b>16</b> 0.6299	<b>16</b> 0.6299	<b>20</b> 0.7874	<b>20.0</b> 0.787	<b>15.8</b> 0.622	K16X20X20SE	<b>12.0</b> 2700	<b>16.9</b> 3800	<b>0.0242</b>	<b>16.000</b> 0.6299	<b>15.992</b> 0.6296	<b>20.020</b> 0.7882	<b>20.007</b> 0.7877	<b>0.011</b> 0.024
	<b>16</b> 0.6299	<b>20</b> 0.7874	<b>22.0</b> 0.866	<b>15.8</b> 0.622	K16X20X22SE	<b>12.0</b> 2700	<b>16.9</b> 3800	<b>0.0242</b>	<b>16.000</b> 0.6299	<b>15.992</b> 0.6296	<b>20.020</b> 0.7882	<b>20.007</b> 0.7877	<b>0.013</b> 0.029
	<b>16</b> 0.6299	<b>20</b> 0.7874	<b>23.0</b> 0.906	<b>15.8</b> 0.622	K16X20X23SE	<b>10.7</b> 2410	<b>14.5</b> 3260	<b>0.0259</b>	<b>16.000</b> 0.6299	<b>15.992</b> 0.6296	<b>20.020</b> 0.7882	<b>20.007</b> 0.7877	<b>0.013</b> 0.029
<b>18</b> 0.7087	<b>18</b> 0.7087	<b>22</b> 0.8661	<b>22.0</b> 0.866	<b>17.8</b> 0.701	K18X22X22SE	<b>14.4</b> 3240	<b>22.0</b> 4950	<b>0.0259</b>	<b>18.000</b> 0.7087	<b>17.992</b> 0.7083	<b>22.020</b> 0.8669	<b>22.007</b> 0.8664	<b>0.016</b> 0.035
	<b>18</b> 0.7087	<b>23</b> 0.9055	<b>20.0</b> 0.787	<b>15.8</b> 0.622	K18X23X20SE	<b>13.6</b> 3060	<b>17.6</b> 3960	<b>0.0249</b>	<b>18.000</b> 0.7087	<b>17.992</b> 0.7083	<b>23.020</b> 0.9063	<b>23.007</b> 0.9058	<b>0.015</b> 0.033
	<b>18</b> 0.7087	<b>23</b> 0.9055	<b>23.0</b> 0.906	<b>17.8</b> 0.701	K18X23X23SE	<b>15.9</b> 3570	<b>21.6</b> 4860	<b>0.0291</b>	<b>18.000</b> 0.7087	<b>17.992</b> 0.7083	<b>23.020</b> 0.9063	<b>23.007</b> 0.9058	<b>0.018</b> 0.040
<b>19</b> 0.7480	<b>19</b> 0.7480	<b>24</b> 0.9449	<b>25.5</b> 1.004	<b>17.8</b> 0.701	K19X24X25,5SE	<b>16.7</b> 3750	<b>23.4</b> 5260	<b>0.0268</b>	<b>19.000</b> 0.7480	<b>18.991</b> 0.7477	<b>24.020</b> 0.9457	<b>24.007</b> 0.9452	<b>0.022</b> 0.049
<b>20</b> 0.7874	<b>20</b> 0.7874	<b>24</b> 0.9449	<b>23.0</b> 0.906	<b>17.8</b> 0.701	K20X24X23SE	<b>14.8</b> 3330	<b>23.7</b> 5330	<b>0.0282</b>	<b>20.000</b> 0.7874	<b>19.991</b> 0.7870	<b>24.020</b> 0.9457	<b>24.007</b> 0.9452	<b>0.017</b> 0.037
	<b>20</b> 0.7874	<b>25</b> 0.9843	<b>22.0</b> 0.866	<b>16.8</b> 0.661	K20X25X22SE	<b>15.9</b> 3570	<b>22.2</b> 4990	<b>0.0294</b>	<b>20.000</b> 0.7874	<b>19.991</b> 0.7870	<b>25.020</b> 0.9850	<b>25.007</b> 0.9845	<b>0.020</b> 0.044
	<b>20</b> 0.7874	<b>25</b> 0.9843	<b>23.0</b> 0.906	<b>17.8</b> 0.701	K20X25X23SE	<b>17.5</b> 3930	<b>25.2</b> 5670	<b>0.0310</b>	<b>20.000</b> 0.7874	<b>19.991</b> 0.7870	<b>25.020</b> 0.9850	<b>25.007</b> 0.9845	<b>0.025</b> 0.055

## RADIAL NEEDLE ROLLER AND CAGE ASSEMBLIES

### INCH SERIES

Inch series radial needle roller and cage assemblies are available in a variety of sizes and designs. This catalog includes the most popular, standardized designs.



WJ



WJC

Fig. B-5 . Types of inch series radial needle roller and cage assemblies

There are two primary constructions of inch series needle roller and cage assemblies. WJ assemblies are heavy-duty compared to WJC assemblies due to the nature of the roller diameter.

### CONSTRUCTION

Radial needle roller and cage assemblies have a steel cage that provides both inward and outward retention for the needle rollers. The designs provide maximum cage strength consistent with the inherent high load-ratings of needle roller bearings.

Accurate guidance of the needle rollers by the cage bars allows for operation at high speeds. Needle roller and cage assemblies have either one or two rows of needle rollers.

Also available (by request) are needle roller and cage assemblies using molded, one-piece glass-reinforced engineered polymer cages. These operate well at temperatures up to 250° F (120° C) over extended periods. However, care should be exercised when bearings are lubricated with oils containing additives, as service life may be reduced if the operating temperature exceeds 212° F (100° C). At such high temperatures, oil can deteriorate with time and it is suggested that oil change intervals are observed.

Needle rollers with relieved ends – used in these assemblies are made of high carbon chrome steel through-hardened, ground and lapped to close tolerances for diameter and roundness. See the engineering section for further discussion of relieved end rollers.

### REFERENCE STANDARDS:

- **ANSI/ABMA 18.2** – needle roller bearings – radial, inch design.

Before selecting specific inch series radial needle roller and cage assemblies, the engineering section should be reviewed.

### DIMENSIONAL ACCURACY

The nominal inch assemblies, WJ and WJC, contain needle rollers manufactured to only one diameter grade. Within any one assembly, the needle rollers have a total diameter tolerance of 0.0001 in. (0.003 mm).

The limit to precision of the radial clearance of mounted needle roller and cage assemblies is the capability of the user to hold close tolerances on the inner and outer raceways.

The tolerance of the overall width of these assemblies is given in the bearing tables of this section.

### MOUNTING DIMENSIONS

The needle roller and cage assembly normally uses the shaft and housing as the inner and outer raceways. To realize full bearing load rating and life, the shaft and housing must have the correct geometric and metallurgical characteristics.

The tables of dimensions for these assemblies list the suggested diameters for the shaft when used as the inner raceway. These are consistent with ISO h5 shaft raceway tolerances. Additional design details for shafts used as inner raceways can be found in the engineering section.

Since the housing normally serves as the outer raceway, it should be of sufficient cross section to maintain adequate roundness and running clearance under load. The tables of dimensions



## NEEDLE ROLLER BEARINGS

also list the suggested diameters for the housings when used as outer raceways. These are consistent with ISO G6 housing bore tolerances. Additional design details for housings used as outer raceways can be found in the engineering section.

The suggested mounting diameter tolerances for these needle roller and cage assemblies will provide correct running clearance for most applications.

The needle roller and cage assembly must be axially located by shoulders or other suitable means. End locating surfaces should be hardened to minimize wear. For satisfactory operation, minimum axial clearance should be 0.008 in. (0.203 mm). When using type WJ assembly, fillets adjacent to the assembly must not exceed 0.03 in. (0.762 mm) radius. When it is necessary to use fillets adjacent to WJC assembly, please consult your representative for suggestions.

### LUBRICATION

Oil is the preferred lubricant for most applications. In critical applications involving high speeds, ample oil flow must be provided. Where assemblies are subjected to high centrifugal forces, such as in epicyclic gearing, or inertia forces, as in the small end of a connecting rod, the contact pressure between the cage and the raceway guiding surface becomes critical. The allowable contact pressure depends on a combination of the induced force and the relative velocity between the cage and the raceway and the rate of lubricant flow. Consult your representative when cages will be subjected to high induced forces.

### SPECIAL DESIGNS

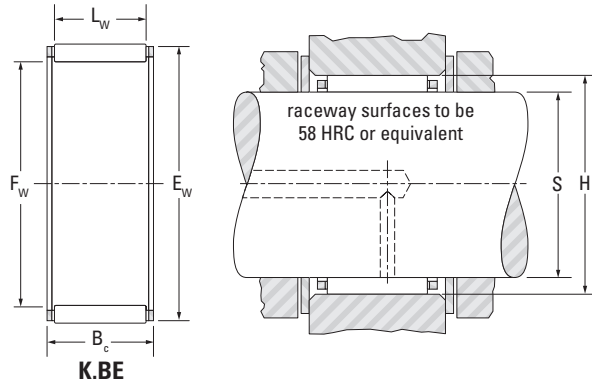
Needle roller and cage assemblies made to special dimensions or configurations, such as those that are split to assemble around a one-piece crankshaft, can be made available on special order where quantities permit. Special plated cages to enhance life under conditions of high induced forces can also be made available.

B



**SINGLE-ROW ASSEMBLIES**

**INCH SERIES**



Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	Assembly Designation	C	C <sub>0</sub>	Grease	Oil	C <sub>g</sub>	S (ISO h5)		H (ISO G6)		Wt.
										Mounting Dimensions				
										Max.	Min.	Max.	Min.	
in.	mm in.	mm in.	mm in.	mm in.	kg lbs.									
3/8	9.525 0.3750	12.700 0.5000	9.53 0.375	WJC-060806	3.87 870	4.00 900	24000	37000	0.0170	9.525 0.3750	9.520 0.3748	12.715 0.5006	12.705 0.5002	0.003 0.006
1/2	12.700 0.5000	15.875 0.6250	12.70 0.500	WJC-081008	6.23 1400	8.01 1800	23000	35000	0.0227	12.700 0.5000	12.692 0.4997	15.890 0.6256	15.880 0.6252	0.005 0.010
9/16	14.288 0.5625	17.463 0.6875	12.70 0.500	WJC-091108	6.81 1530	9.25 2080	22000	34000	0.0247	14.288 0.5625	14.280 0.5622	17.478 0.6881	17.468 0.6877	0.006 0.013
5/8	15.875 0.6250	19.050 0.7500	12.70 0.500	WJC-101208	7.03 1580	9.96 2240	18000	27000	0.0264	15.875 0.6250	15.867 0.6247	19.070 0.7508	19.058 0.7503	0.006 0.013
	15.875 0.6250	22.225 0.8750	15.88 0.625	WJ-101410	15.6 3510	17.8 3990	19000	29000	0.0280	15.875 0.6250	15.867 0.6247	22.245 0.8758	22.233 0.8753	0.012 0.027
	15.875 0.6250	22.225 0.8750	22.23 0.875	WJ-101414	21.3 4780	26.4 5940	19000	29000	0.0309	15.875 0.6250	15.867 0.6247	22.245 0.8758	22.233 0.8753	0.017 0.038
3/4	19.050 0.7500	25.400 1.0000	25.40 1.000	WJ-121616	26.8 6020	37.2 8370	16000	24000	0.0362	19.050 0.7500	19.040 0.7496	25.420 1.0008	25.408 1.0003	0.023 0.051
13/16	20.638 0.8125	26.988 1.0625	22.23 0.875	WJ-131714	25.1 5650	35.0 7880	14000	22000	0.0368	20.638 0.8125	20.627 0.8121	27.008 1.0633	26.995 1.0628	0.021 0.046
7/8	22.225 0.8750	28.575 1.1250	25.40 1.000	WJ-141816	29.2 6570	43.5 9770	13000	20000	0.0401	22.225 0.8750	22.215 0.8746	28.595 1.1258	28.583 1.1253	0.026 0.058
1	25.400 1.0000	33.338 1.3125	19.05 0.750	WJ-162112	28.1 6320	37.1 8340	12000	18000	0.0397	25.400 1.0000	25.390 0.9996	33.363 1.3135	33.348 1.3129	0.029 0.063
	25.400 1.0000	33.338 1.3125	25.40 1.000	WJ-162116	36.8 8270	52.5 11800	12000	18000	0.0432	25.400 1.0000	25.390 0.9996	33.363 1.3135	33.348 1.3129	0.038 0.084
	25.400 1.0000	33.338 1.3125	31.75 1.250	WJ-162120	44.5 10000	67.2 15100	12000	18000	0.0460	25.400 1.0000	25.390 0.9996	33.363 1.3135	33.348 1.3129	0.048 0.105
1 1/8	28.575 1.1250	38.100 1.5000	25.40 1.000	WJ-182416	42.4 9520	57.8 13000	10000	16000	0.0455	28.575 1.1250	28.565 1.1246	38.125 1.5010	38.110 1.5004	0.041 0.090
	28.575 1.1250	38.100 1.5000	31.75 1.250	WJ-182420	52 11700	74.7 16800	10000	16000	0.0485	28.575 1.1250	28.565 1.1246	38.125 1.5010	38.110 1.5004	0.065 0.143
1 1/4	31.750 1.2500	41.275 1.6250	19.05 0.750	WJ-202612	33.4 7520	43.7 9830	9300	14000	0.0443	31.750 1.2500	31.740 1.2496	41.300 1.6260	41.285 1.6254	0.043 0.094
	31.750 1.2500	41.275 1.6250	25.40 1.000	WJ-202616	44.1 9910	62.3 14000	9300	14000	0.0484	31.750 1.2500	31.740 1.2496	41.300 1.6260	41.285 1.6254	0.061 0.134
	31.750 1.2500	41.275 1.6250	31.75 1.250	WJ-202620	53.8 12100	81.0 18200	9300	14000	0.0517	31.750 1.2500	31.740 1.2496	41.300 1.6260	41.285 1.6254	0.071 0.156

Load ratings are based on a minimum raceway hardness of 58 HRC or equivalent.

Minimum axial clearance should be 0.02 mm (0.008 in.).

Continued on next page.



# NEEDLE ROLLER BEARINGS

Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>	Assembly Designation	C	C <sub>0</sub>	Grease	Oil	C <sub>g</sub>	S (ISO h5)		H (ISO G6)		Wt.
										Mounting Dimensions				
			+0 -0.38		+0 -0.015	Max.	Min.	Max.		Min.	Max.	Min.	Max.	
in.	mm in.	mm in.	mm in.	kN lbf.	min <sup>-1</sup>	mm in.	mm in.	mm in.	mm in.	kg lbs.				
1¼	31.750 1.2500	41.275 1.6250	38.10 1.500	WJ-202624	63.6 14300	99.6 22400	9300	14000	0.0544	31.750 1.2500	31.740 1.2496	41.300 1.6260	41.285 1.6254	0.085 0.188
1⅝	34.925 1.3750	44.450 1.7500	25.40 1.000	WJ-222816	45.8 10300	67.2 15100	8300	13000	0.0513	34.925 1.3750	34.915 1.3746	44.475 1.7510	44.460 1.7504	0.067 0.147
	34.925 1.3750	44.450 1.7500	31.75 1.250	WJ-222820	56.0 12600	87.2 19600	8300	13000	0.0547	34.925 1.3750	34.915 1.3746	44.475 1.7510	44.460 1.7504	0.077 0.170
1½	38.100 1.5000	47.625 1.8750	25.40 1.000	WJ-243016	47.2 10600	71.6 16100	7600	12000	0.0541	38.100 1.5000	38.090 1.4996	47.650 1.8760	47.635 1.8754	0.078 0.172
	38.100 1.5000	47.625 1.8750	31.75 1.250	WJ-243020	57.8 13000	93.0 20900	7600	12000	0.0577	38.100 1.5000	38.090 1.4996	47.650 1.8760	47.635 1.8754	0.083 0.184
	38.100 1.5000	47.625 1.8750	38.10 1.500	WJ-243024	68.1 15300	114.8 25800	7600	12000	0.0608	38.100 1.5000	38.090 1.4996	47.650 1.8760	47.635 1.8754	0.100 0.220
	38.100 1.5000	47.625 1.8750	44.45 1.750	WJ-243028	77.4 17400	135.7 30500	7600	12000	0.0634	38.100 1.5000	38.090 1.4996	47.650 1.8760	47.635 1.8754	0.134 0.295
1¾	44.450 1.7500	53.975 2.1250	19.05 0.750	WJ-283412	39.5 8870	59.6 13400	6400	9900	0.0552	44.450 1.7500	44.440 1.7496	54.003 2.1261	53.985 2.1254	0.058 0.127
	44.450 1.7500	53.975 2.1250	25.40 1.000	WJ-283416	52.0 11700	85.0 19100	6400	9900	0.0603	44.450 1.7500	44.440 1.7496	54.003 2.1261	53.985 2.1254	0.084 0.185
	44.450 1.7500	53.975 2.1250	38.10 1.500	WJ-283424	74.7 16800	136 30600	6400	9900	0.0677	44.450 1.7500	44.440 1.7496	54.003 2.1261	53.985 2.1254	0.115 0.253
2	50.800 2.0000	60.325 2.3750	19.05 0.750	WJ-323812	42.8 9610	69 15500	5600	8600	0.0606	50.800 2.0000	50.787 1.9995	60.353 2.3761	60.335 2.3754	0.065 0.143
	50.800 2.0000	60.325 2.3750	25.40 1.000	WJ-323816	56.5 12700	98 22100	5600	8600	0.0662	50.800 2.0000	50.787 1.9995	60.353 2.3761	60.335 2.3754	0.105 0.231
	50.800 2.0000	60.325 2.3750	31.75 1.250	WJ-323820	69.0 15500	127 28700	5600	8600	0.0707	50.800 2.0000	50.787 1.9995	60.353 2.3761	60.335 2.3754	0.108 0.238
	50.800 2.0000	60.325 2.3750	38.10 1.500	WJ-323824	81.0 18200	157 35300	5600	8600	0.0744	50.800 2.0000	50.787 1.9995	60.353 2.3761	60.335 2.3754	0.130 0.286
2⅛	52.388 2.0625	61.913 2.4375	25.40 1.000	WJ-333916	57.8 13000	102 23100	5400	8300	0.0678	52.388 2.0625	52.375 2.0620	61.940 2.4386	61.923 2.4379	0.099 0.218
2⅝	53.975 2.1250	63.500 2.5000	25.40 1.000	WJ-344016	52.5 11800	92.08 20700	5200	8000	0.0668	53.975 2.1250	53.962 2.1245	63.528 2.5011	63.510 2.5004	0.089 0.196
	53.975 2.1250	63.500 2.5000	38.10 1.500	WJ-344024	78.3 17600	153 34500	5200	8000	0.0759	53.975 2.1250	53.962 2.1245	63.528 2.5011	63.510 2.5004	0.137 0.302
2¾	55.563 2.1875	65.088 2.5625	19.05 .750	WJ-354112	44.5 10000	75.17 16900	5000	7800	0.0644	55.563 2.1875	55.550 2.1870	65.115 2.5636	65.098 2.5629	0.070 0.155
	55.563 2.1875	65.088 2.5625	25.40 1.000	WJ-354116	57.8 13000	107 24100	5000	7800	0.0704	55.563 2.1875	55.550 2.1870	65.115 2.5636	65.098 2.5629	0.094 0.207
2¼	57.150 2.2500	66.675 2.6250	25.40 1.000	WJ-364216	53.8 12100	96.08 21600	4900	7500	0.0693	57.150 2.2500	57.137 2.2495	66.703 2.6261	66.685 2.6254	0.096 0.212
	57.150 2.2500	66.675 2.6250	31.75 1.250	WJ-364220	67.6 15200	128 28900	4900	7500	0.0745	57.150 2.2500	57.137 2.2495	66.703 2.6261	66.685 2.6254	0.120 0.265
2⅜	60.325 2.3750	69.850 2.7500	38.10 1.500	WJ-384424	81.4 18300	167 37600	4600	7100	0.0815	60.325 2.3750	60.312 2.3745	69.878 2.7511	69.860 2.7504	0.151 0.334
2½	63.500 2.5000	73.025 2.8750	25.40 1.000	WJ-404616	55.6 12500	104 23400	4400	6700	0.0741	63.500 2.5000	63.487 2.4995	73.053 2.8761	73.035 2.8754	0.106 0.234

Load ratings are based on a minimum raceway hardness of 58 HRC or equivalent.

Minimum axial clearance should be 0.02 mm (0.008 in.).

## Radial Needle Roller and Cage Assemblies

Shaft Dia.	F <sub>w</sub>	E <sub>w</sub>	B <sub>c</sub>		Assembly Designation	C	Co	Grease	Oil	C <sub>g</sub>	S (ISO h5)		H (ISO G6)		Wt.
			+0	+0		Load Ratings		Speed Rating			Mounting Dimensions				
			-0.38	-0.015		kN	lbf.	min <sup>-1</sup>	Max.		Min.	Max.	Min.	kg	
in.	mm in.	mm in.	mm in.							mm in.	mm in.	mm in.	mm in.		
2½	<b>63.500</b> 2.5000	<b>73.025</b> 2.8750	<b>31.75</b> 1.250		WJ-404620	<b>69.8</b> 15700	<b>139</b> 31400	4400	6700	0.0797	<b>63.500</b> 2.5000	<b>63.487</b> 2.4995	<b>73.053</b> 2.8761	<b>73.035</b> 2.8754	<b>0.132</b> 0.292
	<b>63.500</b> 2.5000	<b>73.025</b> 2.8750	<b>38.10</b> 1.500		WJ-404624	<b>83.2</b> 18700	<b>173</b> 39100	4400	6700	0.0842	<b>63.500</b> 2.5000	<b>63.487</b> 2.4995	<b>73.053</b> 2.8761	<b>73.035</b> 2.8754	<b>0.179</b> 0.395
2¾	<b>69.850</b> 2.7500	<b>79.375</b> 3.1250	<b>25.40</b> 1.000		WJ-445016	<b>57.8</b> 13000	<b>112.54</b> 25300	4000	6100	0.0788	<b>69.850</b> 2.7500	<b>69.837</b> 2.7495	<b>79.403</b> 3.1261	<b>79.385</b> 3.1254	<b>0.116</b> 0.256
3	<b>76.200</b> 3.0000	<b>85.725</b> 3.3750	<b>25.40</b> 1.000		WJ-485416	<b>59.6</b> 13400	<b>120.55</b> 27100	3600	5600	0.0833	<b>76.200</b> 3.0000	<b>76.187</b> 2.9995	<b>85.761</b> 3.3764	<b>85.738</b> 3.3755	<b>0.126</b> 0.278
	<b>76.200</b> 3.0000	<b>85.725</b> 3.3750	<b>38.10</b> 1.500		WJ-485424	<b>85.4</b> 19200	<b>191.72</b> 43100	3600	5600	0.0935	<b>76.200</b> 3.0000	<b>76.187</b> 2.9995	<b>85.761</b> 3.3764	<b>85.738</b> 3.3755	<b>0.189</b> 0.416
3¼	<b>82.550</b> 3.2500	<b>92.075</b> 3.6250	<b>25.40</b> 1.000		WJ-525816	<b>61.4</b> 13800	<b>128.55</b> 28900	3300	5100	0.0878	<b>82.550</b> 3.2500	<b>82.535</b> 3.2494	<b>92.111</b> 3.6264	<b>92.088</b> 3.6255	<b>0.136</b> 0.299
	<b>82.550</b> 3.2500	<b>92.075</b> 3.6250	<b>38.10</b> 1.500		WJ-525824	<b>88.1</b> 19800	<b>204.62</b> 46000	3300	5100	0.0985	<b>82.550</b> 3.2500	<b>82.535</b> 3.2494	<b>92.111</b> 3.6264	<b>92.088</b> 3.6255	<b>0.220</b> 0.486
3½	<b>88.900</b> 3.5000	<b>98.425</b> 3.8750	<b>25.40</b> 1.000		WJ-566216	<b>63.2</b> 14200	<b>136.56</b> 30700	3100	4700	0.0922	<b>88.900</b> 3.5000	<b>88.885</b> 3.4994	<b>98.461</b> 3.8764	<b>98.438</b> 3.8755	<b>0.146</b> 0.321
	<b>88.900</b> 3.5000	<b>101.600</b> 4.0000	<b>25.40</b> 1.000		WJ-566416	<b>79.6</b> 17900	<b>150.35</b> 33800	3100	4800	0.0903	<b>88.900</b> 3.5000	<b>88.885</b> 3.4994	<b>101.636</b> 4.0014	<b>101.613</b> 4.0005	<b>0.197</b> 0.435
	<b>88.900</b> 3.5000	<b>101.600</b> 4.0000	<b>38.10</b> 1.500		WJ-566424	<b>113</b> 25600	<b>237.53</b> 53400	3100	4800	0.1011	<b>88.900</b> 3.5000	<b>88.885</b> 3.4994	<b>101.636</b> 4.0014	<b>101.613</b> 4.0005	<b>0.296</b> 0.653
4	<b>101.600</b> 4.0000	<b>114.300</b> 4.5000	<b>25.40</b> 1.000		WJ-647216	<b>83.6</b> 18800	<b>166.59</b> 37450	2700	4200	0.0983	<b>101.600</b> 4.0000	<b>101.585</b> 3.9994	<b>114.336</b> 4.5014	<b>114.313</b> 4.5005	<b>0.224</b> 0.493
	<b>101.600</b> 4.0000	<b>114.300</b> 4.5000	<b>38.10</b> 1.500		WJ-647224	<b>119</b> 26800	<b>263.33</b> 59200	2700	4200	0.1102	<b>101.600</b> 4.0000	<b>101.585</b> 3.9994	<b>114.336</b> 4.5014	<b>114.313</b> 4.5005	<b>0.335</b> 0.739
5	<b>127.000</b> 5.0000	<b>152.400</b> 6.0000	<b>38.10</b> 1.500		WJ-809624	<b>211</b> 47600	<b>365.20</b> 82100	2200	3400	0.1196	<b>127.000</b> 5.0000	<b>126.982</b> 4.9993	<b>152.438</b> 6.0015	<b>152.415</b> 6.0006	<b>1.018</b> 2.244





## NEEDLE ROLLER BEARINGS



### NOTES

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