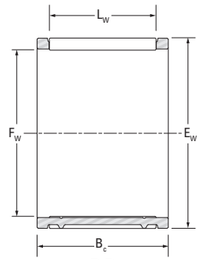
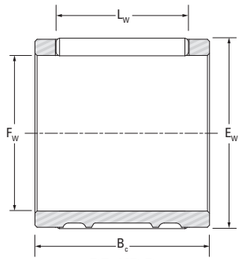
ASSEMBLIES FOR WRIST PIN END APPLICATIONS

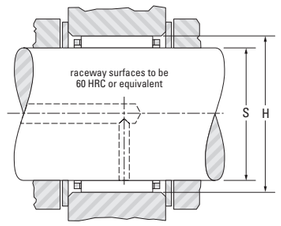
METRIC SERIES
R P, RE, UR P SERIES



R P



RE, UR P



Shaft Dia.	F_w	E_w	B_c -0.20 -0.008 -0.55 -0.022	L_w	Assembly Designation	Load Ratings Dynamic C	Load Ratings Static C_0	Fatigue Load Limit C_u	Approx. Wt.	Mounting Dimensions (non-high performance engines) S Max.	S Min.	H Max.	H Min.
mm in	mm in	mm in	mm in	mm in		kN lbf		kN	kg lbs	mm in	mm in	mm in	mm in
16 0.6299	**16**	**21**	**19.5**	**15.8**	16R2120EP-2	**13.5**	**16.9**	2.65	**0.017**				
	16	**21**	**22.5**	**16.8**	RE162123AL2	**15.4**	**20**	3.15	**0.02**				
18 0.7087	**18**	**22**	**19.65**	**13.8**	RE182220AL1	**10.9**	**15.4**	2.40	**0.015**				
	18	**22**	**22**	**15.8**	18R2222P	**12.1**	**17.6**	2.70	**0.017**				
	18	**22**	**23.6**	**17.8**	RE182224AL2	**13.3**	**20**	3.10	**0.017**				
	18	**23**	**22**	**15.8**	18R2322P	**14.2**	**18.6**	2.90	**0.021**				
	18	**23**	**23.8**	**17.8**	RE182324AL2	**16.5**	**22.7**	3.55	**0.024**				
19 0.7480	**19**	**24**	**24.8**	**18.8**	RE192425AL1	**18.3**	**26.2**	4.10	**0.026**				
20 0.7874	**20**	**24**	**13**	**9.8**	R20/13P	**9.85**	**14**	2.15	**0.01**				
	20	**25**	**13**	**9.8**	20R2513P	**11.2**	**14.1**	2.15	**0.013**				
	20	**25**	**21.8**	**16.8**	RE202522AL2	**17.6**	**25.3**	4.00	**0.024**				
	20	**25**	**23**	**18.8**	RE202523L1	**19.1**	**28.2**	4.40	**0.024**				
	20	**25**	**24**	**17.8**	RE202524L2-1	**16.3**	**23**	3.60	**0.026**				
	20	**25**	**27.8**	**21.8**	RE202528AL1	**21.7**	**33.2**	5.15	**0.03**				

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.

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.



WJ



WJC

Fig. B1-5 . 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.

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

B

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

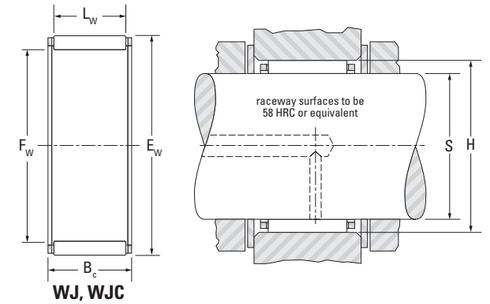
Oil is the preferred lubricant for most applications. In critical applications involving high speeds, ample oil flow must be provided. Where assemblies are subjected to high centrifugal forces, such as in epicyclic gearing, or inertia forces, as in the small end of a connecting rod, the contact pressure 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.

SINGLE-ROW ASSEMBLIES

INCH SERIES



WJ, WJC

Shaft Dia.	F_w	E_w	B_c	Assembly Designation	Load Ratings		Fatigue Load Limit C_u	Speed Ratings		Mounting Dimensions				Approx. Wt.
					Dynamic	Static				S (ISO h5)		H (ISO G6)		
			+0 -0.38 +0 -0.015		C	C_0		Grease	Oil	Max.	Min.	Max.	Min.	
in	mm in	mm in	mm in		kN lbf		kN	min^{-1}		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	0.600	24000	37000	**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	1.65	23000	35000	**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	1.40	22000	34000	**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	1.50	18000	27000	**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	2.80	19000	29000	**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	4.10	19000	29000	**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	5.80	16000	24000	**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	5.50	14000	22000	**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	6.75	13000	20000	**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	5.90	12000	18000	**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	8.20	12000	18000	**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	10.5	12000	18000	**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	9.05	10000	16000	**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	11.7	10000	16000	**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	7.05	9300	14000	**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	9.80	9300	14000	**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	12.6	9300	14000	**31.750** 1.2500	**31.740** 1.2496	**41.300** 1.6260	**41.285** 1.6254	**0.071** 0.156

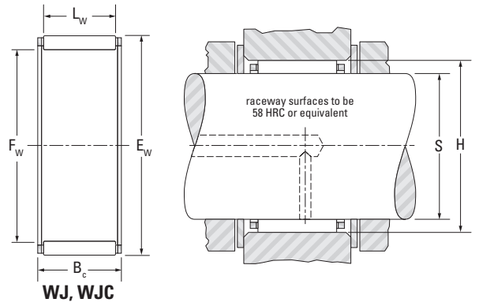
· Load ratings are based on a minimum raceway hardness of 58 HRC or equivalent.
· Minimum axial clearance should be 0.02 mm (0.008 in).

Continued on next page.

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SINGLE-ROW ASSEMBLIES

INCH SERIES



WJ, WJC

Shaft Dia.	F_w	E_w	B_c	Assembly Designation	Load Ratings		Fatigue Load Limit C_u	Speed Ratings		Mounting Dimensions				Approx. Wt.
			+0 +0 -0.38 -0.015		Dynamic	Static				S (ISO h5)		H (ISO G6)		
					C	C_0		Grease	Oil	Max.	Min.	Max.	Min.	
in	mm in	mm in	mm in		kN lbf		kN	min^{-1}		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	15.6	9300	14000	**31.750** 1.2500	**31.740** 1.2496	**41.300** 1.6260	**41.285** 1.6254	**0.085** 0.188
1⅜	**34.925** 1.3750	**44.450** 1.7500	**25.40** 1.000	WJ-222816	**45.8** 10300	**67.2** 15100	10.5	8300	13000	**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	13.6	8300	13000	**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	11.3	7600	12000	**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	14.5	7600	12000	**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	18.0	7600	12000	**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	21.2	7600	12000	**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	9.60	6400	9900	**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	13.4	6400	9900	**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	21.3	6400	9900	**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	11.1	5600	8600	**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	15.5	5600	8600	**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	20.0	5600	8600	**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	24.6	5600	8600	**50.800** 2.0000	**50.787** 1.9995	**60.353** 2.3761	**60.335** 2.3754	**0.130** 0.286
2 1/16	**52.388** 2.0625	**61.913** 2.4375	**25.40** 1.000	WJ-333916	**57.8** 13000	**102** 23100	16.2	5400	8300	**52.388** 2.0625	**52.375** 2.0620	**61.940** 2.4386	**61.923** 2.4379	**0.099** 0.218
2⅛	**53.975** 2.1250	**63.500** 2.5000	**25.40** 1.000	WJ-344016	**52.5** 11800	**92.08** 20700	14.6	5200	8000	**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	24.0	5200	8000	**53.975** 2.1250	**53.962** 2.1245	**63.528** 2.5011	**63.510** 2.5004	**0.137** 0.302
2 3/16	**55.563** 2.1875	**65.088** 2.5625	**19.05** .750	WJ-354112	**44.5** 10000	**75.17** 16900	12.2	5000	7800	**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	16.9	5000	7800	**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	15.2	4900	7500	**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	20.1	4900	7500	**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	26.1	4600	7100	**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	16.5	4400	6700	**63.500** 2.5000	**63.487** 2.4995	**73.053** 2.8761	**73.035** 2.8754	**0.106** 0.234
	63.500 2.5000	**73.025** 2.8750	**31.75** 1.250	WJ-404620	**69.8** 15700	**139** 31400	21.8	4400	6700	**63.500** 2.5000	**63.487** 2.4995	**73.053** 2.8761	**73.035** 2.8754	**0.132** 0.292
	63.500 2.5000	**73.025** 2.8750	**38.10** 1.500	WJ-404624	**83.2** 18700	**173** 39100	27.2	4400	6700	**63.500** 2.5000	**63.487** 2.4995	**73.053** 2.8761	**73.035** 2.8754	**0.179** 0.395
2¾	**69.850** 2.7500	**79.375** 3.1250	**25.40** 1.000	WJ-445016	**57.8** 13000	**112.54** 25300	17.8	4000	6100	**69.850** 2.7500	**69.837** 2.7495	**79.403** 3.1261	**79.385** 3.1254	**0.116** 0.256
3	**76.200** 3.0000	**85.725** 3.3750	**25.40** 1.000	WJ-485416	**59.6** 13400	**120.55** 27100	19.1	3600	5600	**76.200** 3.0000	**76.187** 2.9995	**85.761** 3.3764	**85.738** 3.3755	**0.126** 0.278
	76.200 3.0000	**85.725** 3.3750	**38.10** 1.500	WJ-485424	**85.4** 19200	**191.72** 43100	29.9	3600	5600	**76.200** 3.0000	**76.187** 2.9995	**85.761** 3.3764	**85.738** 3.3755	**0.189** 0.416
3¼	**82.550** 3.2500	**92.075** 3.6250	**25.40** 1.000	WJ-525816	**61.4** 13800	**128.55** 28900	20.4	3300	5100	**82.550** 3.2500	**82.535** 3.2494	**92.111** 3.6264	**92.088** 3.6255	**0.136** 0.299
	82.550 3.2500	**92.075** 3.6250	**38.10** 1.500	WJ-525824	**88.1** 19800	**204.62** 46000	31.9	3300	5100	**82.550** 3.2500	**82.535** 3.2494	**92.111** 3.6264	**92.088** 3.6255	**0.220** 0.486
3½	**88.900** 3.5000	**98.425** 3.8750	**25.40** 1.000	WJ-566216	**63.2** 14200	**136.56** 30700	21.7	3100	4700	**88.900** 3.5000	**88.885** 3.4994	**98.461** 3.8764	**98.438** 3.8755	**0.146** 0.321
	88.900 3.5000	**101.600** 4.0000	**25.40** 1.000	WJ-566416	**79.6** 17900	**150.35** 33800	23.9	3100	4800	**88.900** 3.5000	**88.885** 3.4994	**101.636** 4.0014	**101.613** 4.0005	**0.197** 0.435
	88.900 3.5000	**101.600** 4.0000	**38.10** 1.500	WJ-566424	**113** 25600	**237.53** 53400	37.4	3100	4800	**88.900** 3.5000	**88.885** 3.4994	**101.636** 4.0014	**101.613** 4.0005	**0.296** 0.653
4	**101.600** 4.0000	**114.300** 4.5000	**25.40** 1.000	WJ-647216	**83.6** 18800	**166.59** 37450	30.9	2700	4200	**101.600** 4.0000	**101.585** 3.9994	**114.336** 4.5014	**114.313** 4.5005	**0.224** 0.493
	101.600 4.0000	**114.300** 4.5000	**38.10** 1.500	WJ-647224	**119** 26800	**263.33** 59200	40.6	2700	4200	**101.600** 4.0000	**101.585** 3.9994	**114.336** 4.5014	**114.313** 4.5005	**0.335** 0.739
5	**127.000** 5.0000	**152.400** 6.0000	**38.10** 1.500	WJ-809624	**211** 47600	**365.20** 82100	51.9	2200	3400	**127.000** 5.0000	**126.982** 4.9993	**152.438** 6.0015	**152.415** 6.0006	**1.018** 2.244

· 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).