

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.

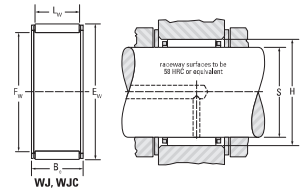
SPECIAL DESIGNS

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.

Radial Needle Roller and Cage Assemblies

SINGLE-ROW ASSEMBLIES

INCH SERIES

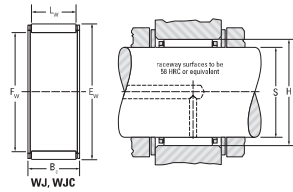


Shaft Dia.	F _w	E _w	B _c		Assembly Designation	Load Ratings			Speed Ratings		Mounting Dimensions				Approx. Wt.
			+0 -0.38 -0.015	+0 -0.015		Dynamic	Static	Fatigue Load Limit	Grease	Oil	S (ISO H6)		H (ISO G6)		
in	mm	mm	mm	mm		C	C ₀	C ₁₀			Max.	Min.	Max.	Min.	kg
3/8	9.525 0.3750	12.700 0.5000	5.63 0.221	5.63 0.221	WJ-C-266906	3.87 870	4.00 900	0.600	24000	37000	5.525 0.2175	5.525 0.2175	12.715 0.5006	12.715 0.5006	0.003
1/2	12.700 0.5000	15.875 0.6250	12.20 0.480	12.20 0.480	WJ-C-281908	6.23 1400	6.01 1800	1.65	23000	32000	12.200 0.4800	12.200 0.4800	15.890 0.6252	15.890 0.6252	0.005
5/8	14.288 0.5625	17.463 0.6875	12.20 0.480	12.20 0.480	WJ-C-291108	6.81 1500	6.25 2000	1.40	22000	34000	14.288 0.5625	14.288 0.5625	17.478 0.6877	17.468 0.6877	0.006
3/4	15.875 0.6250	19.250 0.7500	12.20 0.480	12.20 0.480	WJ-C-101208	7.23 1600	6.26 2200	1.50	18000	27000	15.875 0.6250	15.867 0.6247	19.010 0.7508	19.008 0.7503	0.006
	15.875 0.6250	22.225 0.8750	15.88 0.625	15.88 0.625	WJ-101410	15.6 3510	17.8 3900	2.80	19000	29000	15.875 0.6250	15.867 0.6247	22.245 0.8758	22.232 0.8753	0.012
	15.875 0.6250	22.225 0.8750	22.23 0.875	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	22.232 0.8753	0.013
7/8	19.050 0.7500	25.400 1.0000	25.40 1.000	25.40 1.000	WJ-121616	26.8 6020	37.2 8270	5.80	16000	24000	19.050 0.7500	19.040 0.7486	25.420 1.0008	25.400 1.0003	0.023
1 1/8	26.638 0.8125	28.988 1.0625	22.23 0.875	22.23 0.875	WJ-131714	25.1 5600	35.0 7880	5.60	14000	22000	26.638 0.8125	26.627 0.8121	27.008 1.0633	26.995 1.0628	0.021
1 1/4	22.225 0.8750	28.575 1.1250	25.40 1.000	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
1	25.400 1.0000	33.338 1.3125	19.05 0.750	19.05 0.750	WJ-162112	26.1 6320	37.1 8340	5.90	12000	18000	25.400 1.0000	25.390 0.9986	33.363 1.3135	33.348 1.3129	0.028
	25.400 1.0000	33.338 1.3125	25.40 1.000	25.40 1.000	WJ-162116	36.8 8270	52.5 11800	8.20	12000	18000	25.400 1.0000	25.390 0.9986	33.363 1.3135	33.348 1.3129	0.038
	25.400 1.0000	33.338 1.3125	31.25 1.250	31.25 1.250	WJ-162120	46.5 10000	67.2 15100	10.5	12000	18000	25.400 1.0000	25.390 0.9986	33.363 1.3135	33.348 1.3129	0.048
1 1/8	28.575 1.1250	38.100 1.5000	25.40 1.000	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
	28.575 1.1250	38.100 1.5000	31.25 1.250	31.25 1.250	WJ-182420	52 11700	74.2 16800	11.7	10000	16000	28.575 1.1250	28.565 1.1246	38.125 1.5010	38.110 1.5004	0.065
1 1/4	31.750 1.2500	41.275 1.6250	19.05 0.750	19.05 0.750	WJ-202912	33.4 7520	43.2 9820	7.05	9300	14000	31.750 1.2500	31.740 1.2486	41.200 1.6200	41.205 1.6204	0.043
	31.750 1.2500	41.275 1.6250	25.40 1.000	25.40 1.000	WJ-202916	44.1 9910	62.3 14000	9.80	9300	14000	31.750 1.2500	31.740 1.2486	41.200 1.6200	41.205 1.6204	0.061
	31.750 1.2500	41.275 1.6250	31.25 1.250	31.25 1.250	WJ-202920	53.8 12100	81.8 18200	12.6	9300	14000	31.750 1.2500	31.740 1.2486	41.200 1.6200	41.205 1.6204	0.071

*Load ratings are based on a minimum raceway hardness of 58 HRC or equivalent.
*Minimum axial clearance should be 0.02 mm (0.0008 in).

Continued on next page.

SINGLE-ROW ASSEMBLIES
INCH SERIES



Shaft Dia. in	F _w mm	E _w mm	B _c mm	Assembly Designation	Load Ratings			Speed Ratings		Mounting Dimensions				Approx. Wt. kg
					Dynamic C	Static C ₀	Fatigue Load Limit C ₁	Grease	Oil	S (ISO H8)		H (ISO G6)		
										Max.	Min.	Max.	Min.	
1 1/16	31.750 1.250	41.275 1.625	38.10 1.500	WJ-22824	63.6 1430	95.6 2640	15.6	9300	14000	31.750 1.250	31.740 1.249	41.260 1.624	41.265 1.625	0.885 0.188
1 1/8	34.265 1.350	44.450 1.750	25.40 1.000	WJ-222816	45.8 1030	67.2 1510	10.5	8300	13000	34.265 1.350	34.215 1.346	44.475 1.751	44.480 1.754	0.867 0.147
1 1/8	34.265 1.350	44.450 1.750	31.75 1.250	WJ-222820	56.0 1250	81.2 1800	13.5	8300	13000	34.265 1.350	34.215 1.346	44.475 1.751	44.480 1.754	0.871 0.170
1 1/2	38.100 1.500	47.625 1.875	25.40 1.000	WJ-243016	47.2 1060	71.8 1610	11.3	7600	12000	38.100 1.500	38.090 1.496	47.650 1.874	47.655 1.878	0.878 0.178
1 1/2	38.100 1.500	47.625 1.875	31.75 1.250	WJ-243020	57.8 1300	82.0 2000	14.5	7600	12000	38.100 1.500	38.090 1.496	47.650 1.874	47.655 1.878	0.883 0.184
1 1/2	38.100 1.500	47.625 1.875	38.10 1.500	WJ-243024	68.1 1530	114.8 2580	18.0	7600	12000	38.100 1.500	38.090 1.496	47.650 1.874	47.655 1.878	0.900 0.220
1 1/2	38.100 1.500	47.625 1.875	44.45 1.750	WJ-243028	77.4 1740	125.7 3050	21.2	7600	12000	38.100 1.500	38.090 1.496	47.650 1.874	47.655 1.878	0.925 0.205
1 3/4	44.450 1.750	53.975 2.125	19.05 0.750	WJ-283412	39.5 8870	59.6 1340	9.80	6400	9500	44.450 1.750	44.440 1.749	54.003 2.121	54.005 2.124	0.958 0.177
1 3/4	44.450 1.750	53.975 2.125	25.40 1.000	WJ-283416	52.0 11700	85.0 1910	13.4	6400	9500	44.450 1.750	44.440 1.749	54.003 2.121	54.005 2.124	0.984 0.185
1 3/4	44.450 1.750	53.975 2.125	38.10 1.500	WJ-283424	74.7 1680	136 3060	21.3	6400	9500	44.450 1.750	44.440 1.749	54.003 2.121	54.005 2.124	0.995 0.195
2	50.800 2.000	60.325 2.375	19.05 0.750	WJ-322812	42.8 9610	68 1500	11.1	5600	8600	50.800 2.000	50.787 1.995	60.331 2.371	60.335 2.374	0.865 0.143
2	50.800 2.000	60.325 2.375	25.40 1.000	WJ-322816	56.5 12700	98 2210	15.5	5600	8600	50.800 2.000	50.787 1.995	60.331 2.371	60.335 2.374	0.905 0.221
2	50.800 2.000	60.325 2.375	31.75 1.250	WJ-322820	68.0 1500	127 2870	20.0	5600	8600	50.800 2.000	50.787 1.995	60.331 2.371	60.335 2.374	0.928 0.238
2	50.800 2.000	60.325 2.375	38.10 1.500	WJ-322824	81.0 18200	157 3530	24.0	5600	8600	50.800 2.000	50.787 1.995	60.331 2.371	60.335 2.374	0.995 0.288
2 1/4	57.288 2.2625	67.913 2.675	25.40 1.000	WJ-333916	67.8 15000	102 2310	16.2	5400	8300	57.288 2.2625	57.275 2.2620	67.940 2.678	67.945 2.679	0.989 0.218
2 1/4	57.275 2.1250	63.500 2.5000	25.40 1.000	WJ-344016	52.6 11800	82.0 2070	14.8	5200	8000	57.275 2.1250	57.262 2.1245	63.528 2.5011	63.510 2.5004	0.889 0.186
2 1/4	57.275 2.1250	63.500 2.5000	38.10 1.500	WJ-344024	78.3 17500	153 3450	24.0	5200	8000	57.275 2.1250	57.262 2.1245	63.528 2.5011	63.510 2.5004	0.937 0.202

* Load ratings are based on a minimum raceway hardness of S8 HRC or equivalent.
* Minimum axial clearance should be 0.02 mm (0.0008 in).

Shaft Dia. in	F _w mm	E _w mm	B _c mm	Assembly Designation	Load Ratings		Fatigue Load Limit C ₁	Speed Ratings		Mounting Dimensions				Approx. Wt. kg
					Dynamic C	Static C ₀		Grease	Oil	S (ISO H8)		H (ISO G6)		
					kN	lbf	kN	min ⁻¹	mm	mm	mm	mm	mm	
2 1/16	55.563 2.1875	65.088 2.5625	19.05 0.750	WJ-354112	44.5 10000	75.17 16900	12.2	5000	7800	55.563 2.1875	55.550 2.1920	65.115 2.5636	65.098 2.5629	0.770 0.165
2 1/16	55.563 2.1875	65.088 2.5625	25.40 1.000	WJ-354116	57.8 12900	107 24100	16.9	5000	7800	55.563 2.1875	55.550 2.1920	65.115 2.5636	65.098 2.5629	0.884 0.207
2 1/4	57.288 2.2500	66.675 2.6250	25.40 1.000	WJ-384216	53.0 12100	96.80 21800	15.2	4900	7500	57.288 2.2500	57.275 2.2485	66.703 2.6261	66.685 2.6254	0.886 0.212
2 1/4	57.288 2.2500	66.675 2.6250	31.75 1.250	WJ-384220	67.6 15200	128 28900	20.1	4900	7500	57.288 2.2500	57.275 2.2485	66.703 2.6261	66.685 2.6254	0.920 0.205
2 1/4	60.225 2.3750	69.850 2.7500	38.10 1.500	WJ-384424	81.4 18500	167 37600	28.1	4900	7100	60.225 2.3750	60.212 2.3745	69.878 2.7511	69.860 2.7504	0.951 0.334
2 1/2	63.500 2.5000	73.025 2.8750	25.40 1.000	WJ-404616	68.0 15200	128 28900	16.5	4400	6700	63.500 2.5000	63.487 2.4985	73.053 2.8761	73.035 2.8754	0.926 0.234
2 1/2	63.500 2.5000	73.025 2.8750	31.75 1.250	WJ-404620	88.0 19700	159 35400	21.8	4400	6700	63.500 2.5000	63.487 2.4985	73.053 2.8761	73.035 2.8754	0.992 0.292
2 1/2	63.500 2.5000	73.025 2.8750	38.10 1.500	WJ-404624	103.2 18700	173 39100	27.2	4400	6700	63.500 2.5000	63.487 2.4985	73.053 2.8761	73.035 2.8754	0.995 0.395
2 3/4	68.875 2.7500	78.375 3.0875	25.40 1.000	WJ-445016	57.8 13000	112.54 25300	17.8	4000	6100	68.875 2.7500	68.837 2.7485	78.403 3.1261	78.385 3.1254	0.995 0.292
3	76.200 3.0000	85.725 3.3750	25.40 1.000	WJ-485416	58.6 13400	128.55 29100	19.1	3800	5600	76.200 3.0000	76.185 2.9995	85.761 3.3764	85.739 3.3757	0.926 0.218
3	76.200 3.0000	85.725 3.3750	38.10 1.500	WJ-485424	85.4 19100	151.72 34100	29.9	3800	5600	76.200 3.0000	76.185 2.9995	85.761 3.3764	85.739 3.3757	0.998 0.418
3 1/4	82.550 3.2500	92.075 3.6250	25.40 1.000	WJ-525816	61.0 13800	128.55 28900	20.4	3300	5100	82.550 3.2500	82.535 3.2494	92.111 3.6294	92.088 3.6287	0.936 0.208
3 1/4	82.550 3.2500	92.075 3.6250	38.10 1.500	WJ-525824	88.1 19600	151.72 34100	31.9	3300	5100	82.550 3.2500	82.535 3.2494	92.111 3.6294	92.088 3.6287	0.998 0.488
3 1/2	88.900 3.5000	98.425 4.0000	25.40 1.000	WJ-566216	63.2 14200	138.56 30700	21.7	3100	4700	88.900 3.5000	88.885 3.4984	98.461 3.8764	98.438 3.8757	0.996 0.321
3 1/2	88.900 3.5000	98.425 4.0000	38.10 1.500	WJ-566416	78.6 17600	158.35 35300	23.9	3100	4800	88.900 3.5000	88.885 3.4984	98.461 3.8764	98.438 3.8757	0.997 0.435
3 1/2	88.900 3.5000	98.425 4.0000	50.80 2.0000	WJ-566424	113.2 25600	213 53400	37.4	3100	4800	88.900 3.5000	88.885 3.4984	98.461 3.8764	98.438 3.8757	0.996 0.526
4	101.600 4.0000	114.300 4.5000	25.40 1.000	WJ-647216	83.6 18600	168.58 37450	30.9	2700	4200	101.600 4.0000	101.585 3.9994	114.336 4.5014	114.313 4.5005	0.924 0.483
4	101.600 4.0000	114.300 4.5000	38.10 1.500	WJ-647224	119 26800	203.33 52900	40.8	2700	4200	101.600 4.0000	101.585 3.9994	114.336 4.5014	114.313 4.5005	0.935 0.739
5	127.000 5.0000	154.000 6.0000	38.10 1.500	WJ-809624	211 47600	365.28 82190	51.9	2200	3400	127.000 5.0000	126.982 4.9993	154.038 6.0015	154.015 6.0008	1.018 2.244