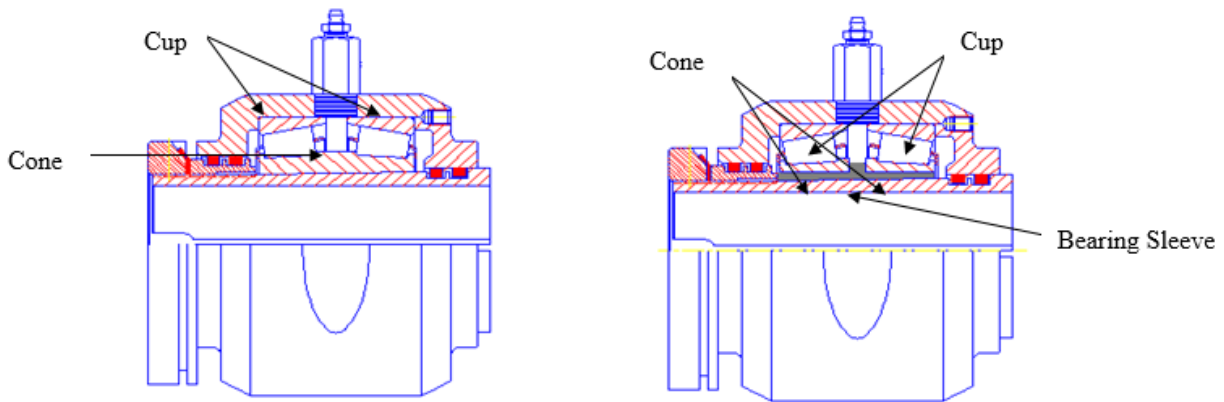


Dodge® special duty mounted bearings: upgrades

For over 80 years Dodge has offered the Special Duty Taper Roller Bearing product. Through those years the overall design has remained fairly constant. Recent external factors have limited the Special Duty's component availability and influenced the product's overall cost position. With these factors in mind, Dodge has decided to upgrade the internal design of the 1-3/8" to 5" bore product offerings.



Traditional Tapered Bore TDIT Style

New Straight Bore TS Style

The above cross sections illustrate the differences between the traditional design and the redesign. The bearing will be changing from the current TDIT style bearing to the TS style bearing. The TDIT unit used two cups and only one cone; a non-standard component for Dodge suppliers. The TS style bearing is a combination of two individual bearing units, where two cups and two cones are used.

Since the tapered roller bearings within the Special Duty are changing, the internal construction and geometry of the bearings also change. The numbers of rollers per bearing unit, roller diameter, contact angle, etc. will all differ slightly. These features influence the capacity and limits of the bearing. The dynamic capacity (the load at which 90% of a given group of bearings can meet or exceed 90 million revolutions) will vary and is shown below in **Table 1**. As shown, most of the new dynamic capacity values are similar to the traditional values; however, two sizes change more dramatically. The change of the dynamic capacity will affect the equivalent radial load values that are given in the Dodge Bearing Engineering Catalog. A supplement of the new equivalent radial load values will be available in the future, for immediate charts contact CO Engineering.



Table 1

Bore Size	Dynamic Capacity-TDIT Traditional	Dynamic Capacity-TS Redesign	Difference
1-3/8 – 1-1/2	7690	7717	0.35%
1-9/16 – 1-3/4	8260	8177	-1.00%
1-7/8 – 2	8550	8266	-3.32%
2-1/8 – 2-1/4	9290	10716	15.35%
2-3/8 – 2-1/2	13500	11010	-18.44%
2-5/8 – 3	19400	21331	9.95%
3-3/16 – 3-1/2	24900	23553	-5.41%
3-11/16 – 4	34200	35145	2.76%
4-7/16 – 4-1/2	35900	35145	-2.10%
4-15/16 – 5	48400	48171	-0.47%

Other changes affected by the redesign include the maximum speed capability as shown in **Table 2**. The increased speed capability is a beneficial improvement in the redesign and broadens the product’s realm of application possibilities.

Table 2

Bore Size	Maximum RPM-TDIT Traditional	Maximum RPM-TS Redesign	Difference
1-3/8 – 1-1/2	3250	4300	32.31%
1-9/16 – 1-3/4	2900	3700	27.59%
1-7/8 – 2	2700	3400	25.93%
2-1/8 – 2-1/4	2300	3200	39.13%
2-3/8 – 2-1/2	2180	2900	33.03%
2-5/8 – 3	1830	2500	36.61%
3-3/16 – 3-1/2	1510	2000	32.45%
3-11/16 – 4	1330	1800	35.34%
4-7/16 – 4-1/2	1120	1600	42.86%
4-15/16 – 5	1040	1400	34.62%





The geometry differences also affect the geometric factors used to calculate equivalent radial loads when thrust loads are applied to the bearing. The X, Y and e values have changed.

The Special Duty vibration frequency data will differ as well and is shown below in **Table 3**. This data includes the number of rollers, diameter of the rollers, the pitch diameter, and the contact angle.

Bore Size	No. of Rollers	Mean Dia. Of Rollers	Pitch Dia.	Contact Angle	Cup Frequency	Cone Frequency	Roller Spin Frequency	Cage Frequency
1-3/8 to 1 1/2	21	0.32	2.603	11.50	9.238	11.762	4.019	0.440
1-9/16 to 1-3/4	26	0.32	3.061	16.00	11.693	14.307	4.732	0.450
1-7/8 to 2	27	0.32	3.267	17.00	12.235	14.765	5.058	0.453
2-1/8 to 2-1/4	25	0.35	3.533	18.00	11.317	13.683	4.981	0.453
2-3/8 to 2-1/2	29	0.35	3.828	18.77	13.245	15.755	5.430	0.457
2-5/8 to 3	26	0.48	4.572	10.17	11.650	14.350	4.687	0.448
3-3/16 to 3-1/2	27	0.56	5.541	16.00	12.184	14.816	4.884	0.451
3-11/16 to 4	23	0.68	6.103	15.88	10.263	12.737	4.418	0.446
4-7/16 to 4-1/2	26	0.68	6.983	18.00	11.791	14.209	5.069	0.453
4-15/16 to 5	30	0.75	7.896	17.00	13.637	16.363	5.218	0.455

Many features will remain unchanged. For instance, neither the pillow block nor the flange dimensions will change. All exterior surfaces and components are unaffected. The seals, adapter and adapter nut will also be the same as the previous design. The internal dimensions of the unit housing have changed to accommodate the new bearing design, but the external dimensions will not be any different so that these units will continue as drop in replacements.

Dodge has implemented changes to the Special Duty bearing to accommodate a more standard product; thus, giving Dodge a more practical position of availability. The increased speed limits expand opportunities for applications outside of our current capability range. Dodge has not lost any of the quality of the Special Duty bearing and has made this change without any external visual differences to the bearings. This allows customers to continue to purchase and use the Dodge Special Duty bearing without having to modify their application in any way.

For any questions concerning the Dodge Special Duty bearing, contact Dodge C.O. Engineering at 864.284.5700 or email to brgpttechsupport@dodgeindustrial.com.

