Dodge® Solidlube mounted bearings: frequently asked questions

Journal (or plain) bearings are a fairly simple design and concept. In typical journal bearing applications, the journal (shaft) rotates or oscillates inside of a stationary bearing. The bearing usually consists of a material that allows for a reduction in friction.

Dodge Solidlube bearings are a type of journal bearing used in a wide variety of applications; often in places where rolling element bearings would not be sufficient. This document consists of frequently asked questions that may assist in deciding if a Dodge Solidlube may be beneficial in certain applications.

What is Solidlube?

Solidlube is a statically self-aligning, non-galling, corrosion resistant, solid-film lubricating journal bearing used in extreme industrial applications. These include: submerged applications, high temperature applications, slow speed and limited shaft movement applications, vacuum environments, corrosive environments and wherever lubrication is critical but not readily available.

How does Solidlube work?

The Solidlube bearing consists of a carbon-graphite type bushing pressed into a cast iron insert inner-housing. This cast iron insert assembly is placed inside of a cast iron mounted bearing housing. The shaft spins inside of the carbon graphite material which acts as a solid lubricant. During operation, the solid lubricant is transferred onto the shaft providing a coating that reduces friction.

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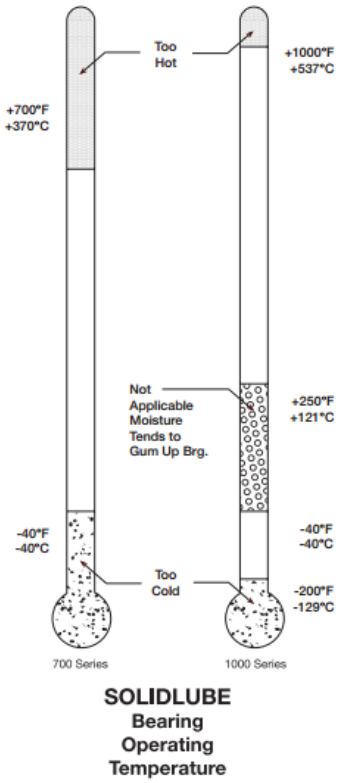
Are there grades of Dodge Solidlube?

There are 3 different grades of Solidlube bearings.



SOLIDLUBE Bearing Operating Temperature

1. **700 Series**
   - Most commonly used Solidlube bearing.
   - Acceptable in submerged applications.
   - Operating temperature range is -40°F to 700°F
2. **1000 Series**
   - Ideal for extreme temperatures
   - Operating temperature range is -200°F to -40°F and 250°F to 1000°F
   - Should not be used between -40°F to 250°F as moisture tends to gum-up the bearing.
   - Available in the same configurations as the 700 series.
3. **800 Series**
   - Different construction: bearing insert is made completely from a Solidlube material and the housing is stamped.
   - Operating temperature range is -40°F to 800°F
   - Smaller bore sizes when compared to the 700 or 1000 series.

What are the limiting factors when selecting a Solidlube bearing?

- When compared with rolling element bearings, Dodge Solidlube bearings are typically used in slower speed applications. Speed limitations are simply related to the surface speed and wear rate of the insert material. Speeds that exceed the cataloged ratings will cause the bearing to wear at a less than desirable rate.

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Are special shafts required?

Since the shaft plays an integral role in Solidlube film transfer and friction reduction, there are few things to consider.

- Shaft finish should be 10 to 20 micro-inches. A finish rougher than 20 micro-inches will lessen bearing life. A finish smoother than 10 micro-inches will not allow the optimum lubricant film to develop. Shaft tolerances should be +.000/-.002 for commercial steel shafting.
- Commercial shafting with a minimum hardness of 24 Rockwell C can be used in applications where temperatures do not exceed 700°F. However for extended bearing life, at any temperature, the shaft should be hardened to 35 Rockwell C or higher.
- When commercial shafting is exposed to a corrosive media or moisture, it will oxidize (rust). A rusty shaft will grow in the bearing and change the surface, thus eliminating clearances. In this case stainless steel shafting may be used and/or provide for regularly scheduled movement of shaft. In elevated temperatures stainless grades such as 17-4, 15-5, or 13-8 are hardenable. Shafts can be spray coated with ceramic or hard chrome, but caution should be used when using this method due to thermal expansion. This is good up to 800°F.

Should grease be used with Solidlube?

Grease, or any other type of lubricant, should not be used with Baldor-DODGE Solidlube bearings. The carbon graphite bushing material provides the lubrication for typical applications. Grease should not be used because it can trap contaminants in the bearing clearances which can increase wear.

Are Solidlube bearings able to be used in submersible applications?

Yes, 700-Series Solidlube bearings can be used in submerged applications. Abrasives and particulate contamination should still be avoided.

Are special sizes and options available?

Special sizes of Solidlube bearings, or bearings made from alternate bushing materials such as polymer, bronze, etc. for unusual operating and load conditions are available. Contact your Dodge Field Sales Engineer for inquires.

What are the load ratings?

Radial load ratings are broken down into two types of operation, normal rotation and limited movement. Load ratings are dependent on shaft size and speed, and these can be found on page B17-7 of the Bearing Engineering Catalog (CA300B – available at www.dodgeindustrial.com).

Solidlube bearings are only capable of handling limited thrust loads by utilizing shaft locating collars. Shaft collars should be located so that the total clearance between the bearing and shaft is .005 to .010 inches. For applications where thrust loads may exceed the ratings, email the Baldor-Dodge Engineering Group at usgv9brgpttchsupport@baldor.abb.com or call (864)284-5700 for assistance.

How long will the bearing last? Is there an L10 life?

The life of a Solidlube bearing is dependent on several variables including load, speed, shaft material, allowable wear, environment, and shaft surface finish. Due to the many variables and different types of wear, L10 life equations are typically not used with journal bearings.

Since the insert in a Solidlube bearing does not rotate during operation, the bearing life can be maximized by rotating the insert 180° around its horizontal axis to obtain a new bearing surface.

Also, to improve life expectancy a brief run-in, or break-in period, can be performed. The break-in period includes running the shaft inside its mated bearing with the load removed. This will allow the film of lubricant to build up on the shaft (minimizing potential start-up damage to the bearing).

Where can I find more information on Solidlube?

Additional information can be found by accessing the catalog and technical resources found www.dodgeindustrial.com or by contacting engineering support at engineering@dodgeindustrial.com or (864) 284-5700.

Are Solidlube bearings reactive with chemicals?

Solidlube bearing materials are chemical resistant and therefore can be used a multitude of environments. For details on whether Solidlube can be used in applications with certain chemicals, see the table below. Shafting, bearing insert, and bearing housing materials should also be reviewed for corrosion/chemical resistance.

Solidlube Bearing Corrosion (Chemical) Resistance

Type of Chemical	Chemical	Bearing Series	
		LM800 700	1000
Acids and Acidic Solutions	Mineral (Non-Oxidizing)	♦	♦
	Mineral (Oxidizing)	O	♦
	Inorganic Salts (Acid Forming)	♦	♦
	Organic (Strong)	♦	♦
	Organic (Weak) pH 3-7	♦	♦
	Organic Salts (Acid Forming)	♦	♦
Alkalis (Bases & Alkaline Solutions)	Mineral (Non-Oxidizing)	♦	♦
	Mineral (Oxidizing)	□	♦
	Inorganic Salts (Base Forming)	♦	♦
	Organic (Strong)	♦	♦
	Weak Organic Bases pH 7-11	♦	♦
Gases	Acid	♦	♦
	Alkaline (base)	♦	♦
	Anhydrous (dew Point below -30°F)	□	□
	Cyrogenic (Liquefied)	O	□
	Inert	♦	♦
	Oxidizing	O	□
	Reducing	♦	♦
Salts	Acid Salts	□	□
	Alkaline Sales	□	□
	Metals	♦	♦
	Neutral Salts	O	□
	Neutral Salt Solutions	♦	♦
Solvents	Aliphatic	♦	♦
	Aromatic	♦	♦
	Chlorinated, Fluorinated	♦	♦
	Oxygenated, Sulfides	♦	♦

♦ – Good. Not known interaction; compatible, □ – Questionable (depends on conditions), O – Not recommended

What types of contamination should be avoided when using Solidlube?

By design, journal bearings do not contain seals, and they should not be used in environments that contain hard particles such as sand, grit, lime or other abrasive materials. Particulate contamination can work its way between the shaft and the bearing and act as a grinding compound which will reduce the bearing life significantly.

Will impact loads affect Solidlube bearings?

Yes, impact loads can be detrimental to the carbon-graphite material, and they should be avoided.

Can improper handling damage the bearing?

Yes, the bearing material is brittle and can be easily damaged if dropped. Solidlube bearings should never be lifted by the bore.