



## Industrial Freezer Sales

A division of IDS

5311 Derry Avenue Building D Agoura Hills CA 91301

Phone (818) 597-4300 Fax (818) 597-4301

[www.freezerlink.com](http://www.freezerlink.com)

## Bushing and Plain Bearings Press or Shrink Fit

### Application | Bearings and Bushings

Press fit or **shrink fit bushing design and installation** is a common method of retaining bearings by use of interference between the bushing and the bushing hole. Bushings are available in standard sizes with both inside and outside diameter surfaces finished, and are commonly available in many sizes.

Typically, bushings are designed and manufactured **0.002 to 0.003** inch over nominal on outside diameter sizes for sizes 3 inches or less. Diameters greater than 3 inches, outside diameters are designed **0.003 to 0.005** inch over the nominal size.

Because interference material is built into the bushings, and the bushing is normally manufactured to tolerances of +/- .0002. The effective interference of the press fit is **designed and facilitated within the target hole which the bushing is installed.**

The process of press or shrink fitting the bushing into the hole causes the bearing to reduce in size due to the compressive forces applied.

**Additionally, the material which the bushing has been pressed into distorts some as well.** In general, diameter changes are equal to 70-100% of the amount of the material fit.

Unfortunately, precisely or mathematically predicting the size change due to the effective compressive forces applied during installation is not always accurate.

Typical installation compression forces and effective diameter changes may be modeled or characterized by **fabricating several test cases and measuring the range and variations of the actual fit.**

Often, bushings are designed with additional diametrical material requiring a post press fit installation machine process to accurately ream to the desired diameter.

Shrink fits are facilitated by chilling the bushing using a suitable median, such as liquid nitrogen, dry ice, or **by placing the bushing within a freezer.** Cooling down the bushing is preferred rather than heating the target housing.



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### Application | Bearings and Bushings (continued)

Normally, the bushing is of significantly less mass than the target housing, though heating the housing and simultaneously cooling the bushing is not uncommon.

**When a bushing or bearing is pressed into a housing, the force driving it should be applied equally or uniform to the end of the bearing to avoid galling, peening or damaging the bushing/bearing.** The mating surfaces of both the bushing and housing should be thoroughly cleaned and imperfections as well as burrs removed.

These units are intended for storage, **not rapid cooling**. Filling a -80 unit with warm steel can end the life of a compressor before it's time. When using our units for cooling, build up some **"Cold Mass"** in the freezer to help bring new product down to temperature more quickly, as well as to alleviate the stress on the compressor(s).

"Cold Mass" is generated by product already stored in the freezer at the desired low temperature. This can be achieved by filling the unit in thirds or quarters (depending on weight of the parts), or by filling unused space in the freezer with scrap metal or rejected parts. **Always** have more cold mass than new warm product.

*For more information, contact:*

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**[service@freezerlink.com](mailto:service@freezerlink.com)**

IDS has been known for many years as a leading supplier of industrial equipment, and has expanded their line of **IDS Brand Freezers**, suitable for a variety of industrial, medical, scientific and commercial applications.

**Our customers are Fortune 500 and small shops and cover a broad range of industries;** *3M Company, Ball Aerospace, Bell Helicopter, DuPont, Eaton, Eastman Kodak, Flextronics, Harman Becker Automotive, Harvard University, Hewlett Packard, Johnson and Johnson, Lawrence Livermore, Lockheed, Medtronic, Motorola, OSU, PUR, Rapid Processing, Raytheon, Stanford University, U of Hawaii, U of Toronto, US Army, US Air Force, US Marines, US Navy, US Coast Guard and many, many more.*

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