

2.6 Conclusion

Sintered bearings are used widely in instruments and general machinery, in which their self-lubricating characteristics and load-carrying ability is very desirable. When properly designed, they can be both economical and highly functional.

Their manufacturing method consists of briquetting the metal powder mixtures to the proper density. Subsequently, they are sintered for different duration subject to the temperatures. Sintered bearings are then sized to obtain the required dimensional characteristics. This is followed by inspection and impregnation with a lubricating oil.

3.0 PLASTIC AND NONMETALLIC BEARINGS

3.1 General Characteristics

Among the significant characteristics of plastic bearings, the following are noteworthy:

- Self-lubricating
- Low wear rates
- Relatively high performance rating (PV) among sleeve bearing materials
- Bearing O.D.'s compatible with standard sintered bronze sizes for upgrading existing equipment
- Kinetic and static coefficient of friction virtually the same under heavy loads
- Extremely low coefficient of friction, as shown in **Figure 3-1**
- Lightweight
- Ability to conform under load
- Resistance to chemicals

The design characteristics of plastic and nonmetallic bearings bear both similarities and differences relative to those of porous-metal bearings. This will now be described in greater detail.

3.2 Properties of Plastic and Nonmetallic Bearing Materials

Plastics (such as acetal, nylon, PTFE), carbon graphite and other nonmetallic materials have been increasingly used as self-lubricating bearings. Their composition has been refined over many years so as to obtain favorable bearing characteristics. These include low friction, corrosion resistance, ability to conform under load (plastic bearings), ability to function over wide temperature ranges and substantial load-carrying capability. Although temperature ranges, dimensional stability and load limitations of plastic bearings are in general less than for metallic bearings, plastic bearings are remarkably versatile and economical.

A summary of characteristics of representative plastic and nonmetallic materials has been given by *Machine Design* magazine (Vol. 54, #14, June 17, 1982, p. 132) with whose permission the following material is reprinted.

Phenolics: Composite materials consisting of cotton fabric, asbestos, or other fillers bonded with phenolic resin. The good compatibility of the phenolics makes them easily lubricated by various fluids.

They have replaced wood bearings and metals in such applications as propeller and rubber-shaft bearings in ships, and electrical switch-gear, rolling-mill and water-turbine bearings. In small instruments and clock motors, laminated phenolics serve as structural members as well as a bearing material. They have excellent strength and shock resistance, coupled with resistance to water, acid, and alkali solutions.