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## Maintenance-free iglide plain bearings for the automotive industry



The manufacturing industry has witnessed the rise of plain plastic bearings during the last 20 years. Recently, the prevalence of plastic bearings in the automotive industry has also been on the rise. To succeed in automotive applications, plain bearings must have high wear resistance, require minimum maintenance and provide thermal stability.

Igus® iglide® plastic plain bearings possess these characteristics and can, in many cases, replace metal-backed PTFE bearings and roller bearings. Iglide bearings also deliver a significant cost advantage and many technical benefits. These include:

- self-lubricating, oil-free operation;
- no maintenance;
- compensation for tolerances;
- noise elimination;
- high-temperature ranges;
- resistance to corrosion; and
- excellent vibration dampening.

Iglide bearings also provide many business benefits to automotive manufacturers such as:

- high procurement savings;
- increased life cycle;
- custom-fit design; and
- extensive data and research on each bearing to reduce preliminary testing costs.

Iglide bearings can be implemented in a wide range of applications from seating systems to complex applications subject to high thermal stress in under-the-hood applications such as transmission linkages and throttle valves. Other automotive applications include:

- convertible tops;
- door hinges;
- locks, latches and mechanisms;
- shock absorbers;
- brakes;
- windshield wipers;
- steering systems;
- foot pedals;
- intake manifolds; and
- throttle bodies.

Igus has developed more than 20 different material blends, each one designed with specialized properties to fit various applications. The company performs more than 4,000 tests per year on more than 100 new and existing materials. Selection of an iglide bearing for a specific application is based on this lifetime data. If test data is not available for a particular application, it is possible to perform tests on a short-term basis. For example, igus recently developed a new bearing material for a thermo-set shaft in an automotive lighting system in just eight weeks.



### **A snug fit and the e-coat process**

Typically, one of the first considerations when designing an automotive component is cost. For example, quite often a seat system must work with a low-cost bar stock and metal stampings. However, the bearing system must possess low

clearance to ensure adequate noise reduction.

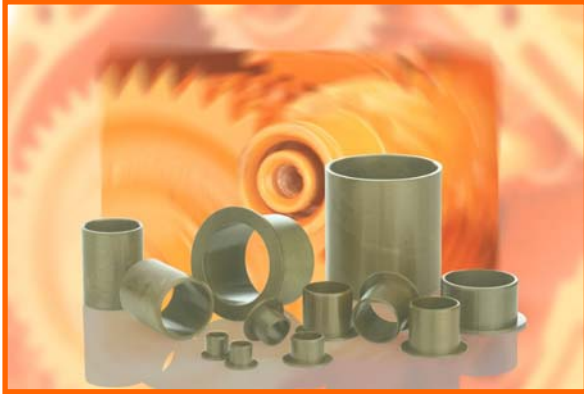
To resolve these conflicting requirements, one option is to install iglide bearings prior to the e-coat paint process, creating a transition fit between the bearing and shaft. By doing so, the bearings are calibrated after painting during the high-temperature drying process (up to 428 degrees Fahrenheit [220 degrees Celsius] for as long as 60 minutes). This results in a bearing system with ease of movement and minimum clearance. Furthermore, a large contact surface of the bearing to the shaft is achieved due to the transition fit of the shaft.

When conductive materials are required iglide RN89 is recommended. When other component connections provide a conductive path, lower-cost insulating materials such as iglide G, iglide GLW or iglide RN56 can be used. This method is extremely successful for closures, seat systems and convertible roof systems.

Additional benefits of iglide bearings include:

- high static pressures up to 140 N/mm<sup>2</sup> possible;
- quiet operation;
- minimum installation space required;
- low weight; and
- low-cost shafts.

## Corrosion Prevention



Another example demonstrates the advantages of replacing roller bearings or metal plain bearings with an iglide plastic bearing in a transmission linkage application. In this case, contact corrosion was a problem and enhanced dampening properties were desirable. Plastic materials such as

polyamides are capable of withstanding the thermal requirements, are chemical resistant and can support the load capacity, but are extremely expensive. The iglide H4 bearing from igus delivers a long-term operating temperature of 392 degrees Fahrenheit (200 degrees Celsius) and is resistant to synthetic transmission oils and fuels.

Iglide H4 also has considerable cost advantages. A major German car manufacturer performed a series of tests in which the roller bearings of a shift fork transmission were retrofitted with iglide H4 plain bearings. Although there was no significant increase in operating force, the iglide H4 delivered better dampening qualities.

For economic reasons, pedal box applications requiring rattle-free bearings usually use plain tubes or plastic bolts, which often consist of glass-fiber reinforced polyamide materials.

Both solutions possess roughly specified tolerances. However, in order to exclude noise effectively and to obtain good operational properties, a bearing system must have minimum play. The pre-tensioned iglide JVSM bearing overcomes both of these challenges. Spring elements at both ends of the sleeve bearing result in a system without play, even when not subjected to load. Iglide J also offers excellent friction and wear values even against abrasive glass-fiber reinforced PA materials.



### **The best choice for the automotive industry**

Glass-fiber reinforced PA or PPS materials can be used as shaft materials. Plastic-to-plastic bearing systems are becoming increasingly important in the automotive industry. In addition to cost, weight reduction and chemical resistance, the

cost-effective production of complex design parts is the primary reasoning for the preferred use of plastic materials.

For many years, PA materials have been tested in intake manifolds for reliability and efficiency. Today, aluminum die cast housing is frequently replaced with plastic housing, such as in the case of throttle valves. In this application iglide bearings are molded over with PA or PPS materials at approximately 644 degrees Fahrenheit (340 degrees Celsius). In addition to the tribological combination of plain bearing materials, a high thermal stability is necessary. The iglide Z bearing combines all of these properties.

It is quite evident that, in addition to the obvious benefits of requiring no lubrication, delivering higher wear resistance and cost reductions, iglide plastic bearings can offer unique advantages specific to an application. It is essential to work directly with OEMs and have a complete understanding of the application specifications as soon as possible. An innovative solution can then be developed based on decades of experience gained by igus engineers in a wide range of applications.

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