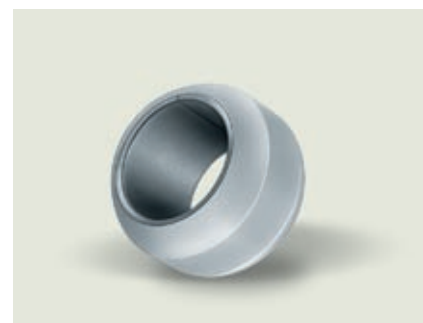


The world of metal-polymer composite plain bearings

- ① Construction machinery – e.g. joints of truck cranes, supporting joints of cable laying plows, arms of excavators
- ② Agricultural machinery – e.g. tie rods of tractor axles, steering pin bearings of automatic harvesting machinery, loading bodies of forestry vehicles
- ③ Fluid technology – e.g. hydraulic and pneumatic cylinders, gear pumps and butterfly valves
- ④ Commercial vehicles – e.g. kingpin bearings, pivot joint bearing supports of the driver's cabs on heavy vehicles, heavy vehicle bodies
- ⑤ Sports equipment – e.g. bottom brackets of exercise machines, seat posts, brakes and suspension forks of bicycles
- ⑥ Automotive – e.g. manual transmissions, shift units and actuating linkages of passenger cars, steering wheel and seat adjustment systems, hinges of car doors, hoods and convertible tops
- ⑦ Power generation – e.g. solar, wind, hydro power (dam gates)
- ⑧ Railway applications – e.g. steering, linkages, door closers



Thrust washer for supporting axial loads

Shell bush with injection molded outer tire

Bearing shell



INA Metal-Polymer Composite Plain Bearings

Durable – low-friction – economical

PGL / US-D / 201005.5 / Printed in Germany by Mandelkow

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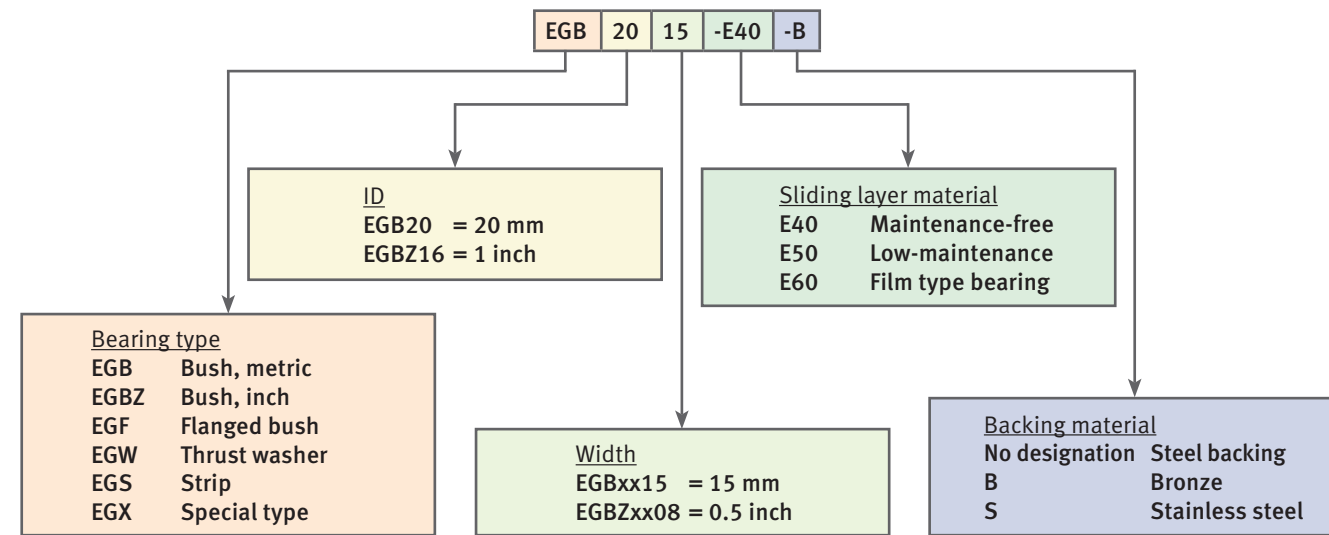
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Issued: 2010, May

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Metal-polymer composite plain bearings – An economical alternative



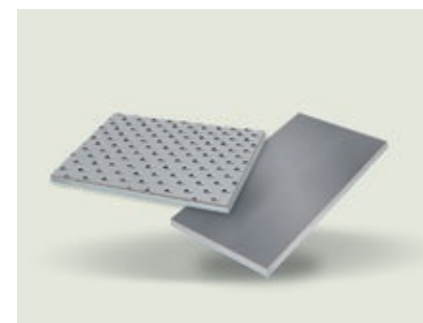
The new INA metal-polymer composite plain bearings enable economical solutions in many industrial and automotive applications. They are particularly effective with oscillating movements and achieve a rating life several times higher than that of bearings with conventional materials. In addition, all our new plain bearings are lead-free and, therefore, environmentally friendly. Different innovative materials ensure unprecedented variety. A selection of

bearings with maintenance-free and low-maintenance materials are available under the designations E40 and E50. Their structures are basically identical: A porous bronze-sintered structure is applied to a steel or bronze backing and impregnated with a special plastic compound. The solid lubricants produce a lubricant film between the sliding surfaces, which provides low-noise operation with constantly low friction values throughout the entire service life.

The bearings can also be used in water and other media due to the high moisture resistance of the material. The excellent material formability also enables customer-specific components to be designed for different rotary, linear and oscillating movements. The customer can thus select a product with optimal material characteristics for every application.



Lightweight and compact: Plain and flanged bushes for rotary and linear movements in the smallest of spaces

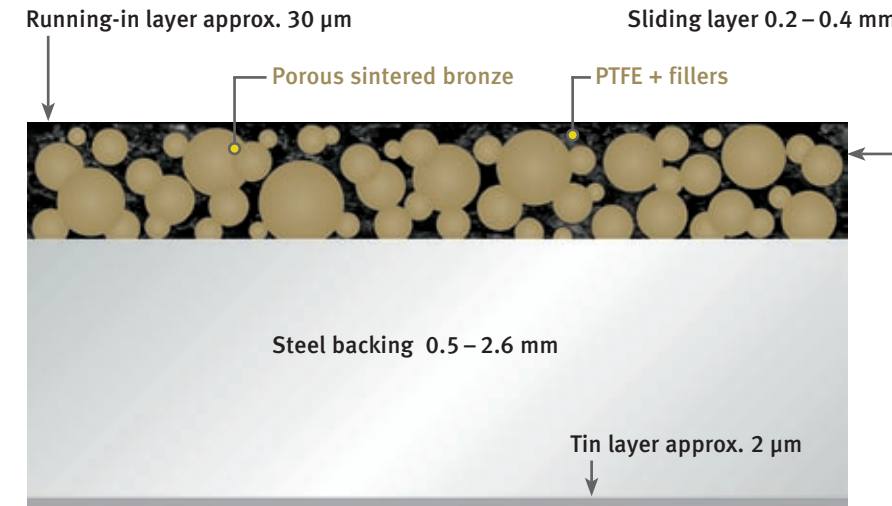


Strips E50 and E40, e.g. for linear plain guidance systems

The right material combination for every application

Maintenance-free E40

E40 is the Schaeffler Group's new lead-free sliding material for maintenance-free metal-polymer composite plain bearings. There is no lubrication requirement over the entire operating life. The sliding layer is based on polytetrafluoroethylene (PTFE) with embedded inert additives. The triple layer material comprises the steel backing, the sliding layer and the running-in layer (see graphic). The steel backing has a sintered porous tin-bronze sliding layer with pores that are filled with the dry lubricant of the running-in layer.



Layer structure of sliding material E40

Low-maintenance E50

Bearings with sliding layer E50 require initial lubrication at the start of operation. This lead-free sliding layer comprises mainly polyoxymethylene (POM), a high-molecular thermoplastic that is distinguished by low friction values as well as thermal stability. This layer also contains inert additives. The triple layer material comprises the steel backing, the intermediate layer and the sliding layer. The steel backing has a sintered porous

tin-bronze intermediate layer with pores that are filled with the sliding layer.

Maintenance-free film type bearings E60

Bearings with sliding layer E60 are maintenance-free film type bearings. They are based on a lattice structure in which a sliding layer comprising PTFE and additives is rolled and sintered. The lattice serves both as a backing and a sliding

layer. There is a sliding layer containing PTFE on both sides so that the sliding movement can take place on the inside and the outside of bushes. A further advantage of this material is its easy formability. Typical applications for film type bearings are fittings and tools as well as hinges.



Special bush with outside coating



Linear bushing with housing



Bracket guide (special part)

Benchmark results prove high performance

The new INA plain bearings are an economical alternative for applications with minimum available space and a comparatively high sliding speed.

Advantages at a glance

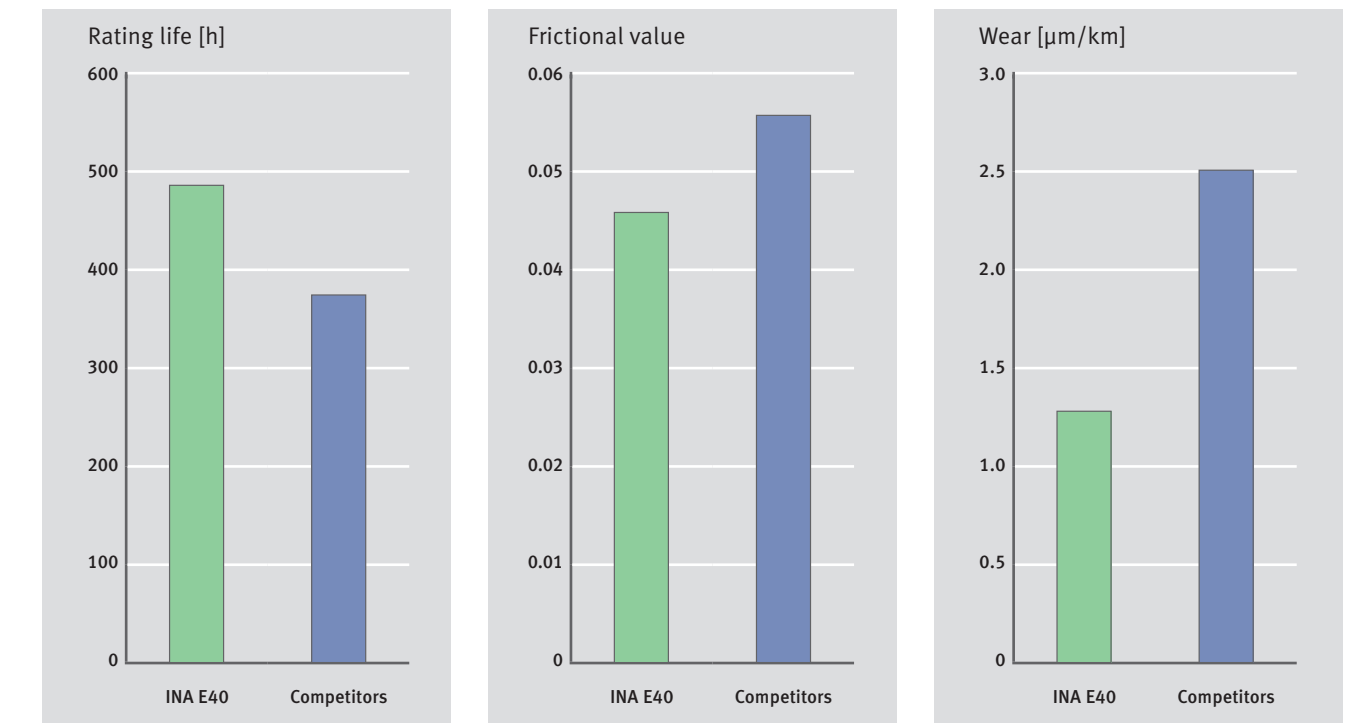
- Load carrying capacity: Up to 250 N/mm² for static loads
- Can be used in fluid applications
- Relatively high sliding speeds
- Low coefficient of friction
- High moisture resistance – can also be used in water
- Maintenance-free and low-maintenance versions
- Steel and bronze backings

		E40	E50
Max. pv	N/mm ² · m/s	1.8	3.0
Permissible specific load			
Static	N/mm ²	250	140
Rotating/oscillating	N/mm ²	140	70
Permissible sliding speed			
Dry running	m/s	2.5	–
Lubricated	m/s	–	2.5
Permissible temperature	°C	–200 .. 280	–40 .. 120

Comparison of the technical parameters of materials E40 and E50

Proven low-wear sliding characteristics: The benchmark results

The special characteristics of INA metal-polymer composite plain bearings are due to the combination of plastic and metal materials. This material compound enables low-wear sliding characteristics as well as a high load carrying capacity and thermal conductivity. A static load carrying capacity up to 250 N/mm² is achieved.



The test results are based on the following test conditions: P = 80 kN, p = 50 N/mm², β = 60°, f = 43.3 min⁻¹, v = 30.25 mm/s