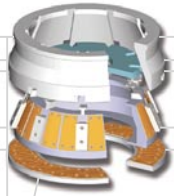


Maintenance Free Sliding Materials in the Tire Industry



Position N°1

Federal-Mogul Deva GmbH

- has been manufacturing selflubricating sliding materials for more than 100 years
- has been delivering into tire mold applications for more than 30 years
- optimized materials and manufacturing processes for the special requirements of the tire industry.

Materials

Federal-Mogul Deva manufactures a wide range of sintered selflubricating bearings where the dry lubricant is uniformly dispersed within the metallic matrix. For sliding elements in the tire industry two special DEVA materials have been established:

deva.metal® 103

The advantage of this monolithic material is the possibility to machine complex geometrical shapes without loss of the selflubricating properties over the total machined surface of the part.

deva.bm® 322

deva.bm® is a selflubricating composite sliding material consisting of a steel backing and deva.metal® sliding layer.

deva.bm® is manufactured by using a continuous hot-rolling sintering technology. This manufacturing process guarantees, unlike other sintering methods, an all-over and reliable contact of the sintering layer to the steel backing material. This increases the reliability and the service lifetime of the sliding plates significantly.

For other applications like actuating devices, radial movements and sliding bearings of clamping mechanisms, cylindrical bushes are used. The individual material selection depends on the load characteristics and the mating material used.



Applications

Segmented containers and molds

- plain sliding plates for top and bottom plates
- conical formed or machinable sliding plates for actuating rings and segments
- guiding elements (T- or dovetail guidance)

Tire heaters with segmented molds

- guide plates for axial movement of segments
- conical plates
- sliding bushes for tilting, actuating and clamping mechanisms

Other machines and mechanisms:

Federal-Mogul Deva bushes and sliding elements are used for maintenance-free operation as high-loaded radial and axial bearings in:

- tire presses
- tire building machines
- tire retreadment machines
- extruders
- hot cutting devices

Advantages

Finished machined components

- manufactured ready to use
- parts can be exchanged without additional machining in case of replacement or maintenance

Design simplification

- sintering of sliding surfaces onto guide elements
- use of standard steel grades (min. hardness of 180 HB) for mold manufacturing without hardening of the counter surfaces
- thinwalled deva.bm® flat or conical segments reduce the overall size of the molds
- improvement of the overall mold system tolerances is achievable by final machining of deva.metal® sliding segments on the actuating ring

Advantages

Economic and environmental reasons

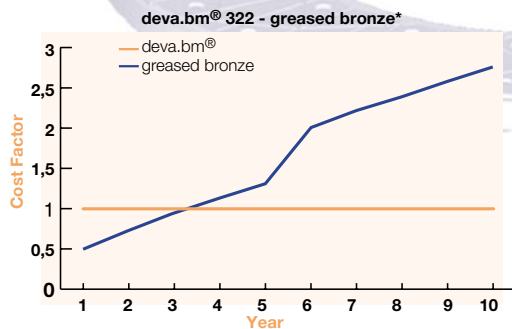
- long service life
- process optimization and control
- reduced personnel cost due to no lubrication
- zero expenditure for grease
- no lubricant contamination of products
- reduced maintenance cost
- cleaning medium free of grease contamination

Customer service and support

- system supplier of basic and repair kits for molds and containers
- just-in-time delivery of sets possible
- quality assurance on automotive level
- experienced research and development department
- worldwide sales organisation

Economical comparison

A simple comparison, based on customers experience, demonstrates the advantages of deva.bm® versus standard bronze sliding plates in tire molds



*conditions: standard bronze plates, cleaned by sand blasting, high temperature grease, working time, replacement of the bronze sliding plates after 5 years

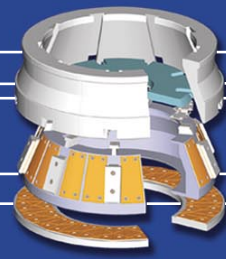
Quality Assurance

Federal-Mogul Deva is certified according to

- DIN ISO 9001:2000
- ISO TS 16949:2002
- DIN EN ISO 14001
- Other certifications (extract):
Rolls Royce
Deutscher Lloyd
Det Norske Veritas
Continental AG

For further detailed material data as well as design and installation proposals please refer to the individual material handbooks and ask for assistance.

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