



**FL 1712**  
For qualified personnel only!  
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# APPLICATION INFO

## PERMAGLIDE® PLAIN BEARINGS: BEARINGS IN CHAIN TENSIONERS FOR CAMSHAFT DRIVE GEARS

**SECTOR:** Automotive industry, vehicle manufacture

### PRODUCTS USED

PERMAGLIDE® plain bearing bush, type PAP ... P200/P201

PERMAGLIDE® P200 and P201 are lead-free plain bearing materials for lubricated applications.

### FUNCTION OF CHAIN TENSIONERS

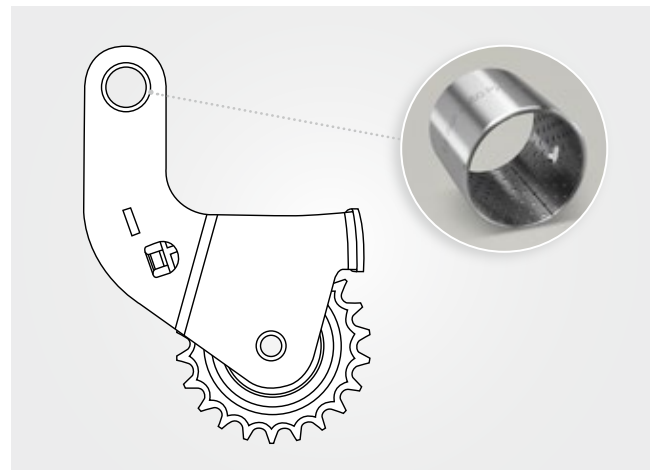
For controlling the valves in four-stroke engines, the crankshaft powers the camshafts via a chain drive. To guarantee a reliable valve train, the chain must be sufficiently pretensioned in all situations. Chain tensioners prevent unwanted “fluttering” of the chain on the loose side. This “fluttering” could lead to severe vibrations, which would increase the wear on the entire chain drive. The leading gear in the chain tensioner has a pivoting bearing via a lever. A spring presses the gear against the chain. The arrangement is selected to keep bearing reactions to a minimum.

### REQUIREMENTS FOR BEARINGS IN CHAIN TENSIONERS

The lever bearing in chain tensioners requires an exceptionally low operating bearing clearance over the entire service life to prevent the gear from tilting. This minimal clearance is achieved by finish boring the bearing when pressed in. The bearing position is subject to continuous oscillating movement during operation. The bearing is lubricated with engine oil.

### BEARING WITH PERMAGLIDE® P201 PLAIN BEARINGS

In the application, the bearing of the lever in the chain tensioner was implemented with a low-maintenance plain bearing bush made of the material PERMAGLIDE® P201.



Bearing in chain tensioners with PERMAGLIDE® plain bearing bush P200/P201

The plain bearing is pressed into the chain tensioning housing bent out of sheet metal. The press fit ensures that the plain bearing is adequately secured axially and radially. The bearing bore is then precisely finish bored to size. Then using the PERMAGLIDE® plain bearing bush, the sprocket always has optimum guidance. Thanks to the low friction value and the low load, the wear is sufficiently low that the service life corresponds to the typical usage period of a combustion engine.

**ADVANTAGES OF THE PERMAGLIDE® PLAIN BEARING  
BUSH PAP ... P200 /P201 FOR USE IN CHAIN TENSIONERS**

- Low-maintenance operation with lubrication
- High wear resistance
- Insensitive to high edge loading
- Resistant to high loads
- Lifetime lubrication possible
- Lead-free
- Complies with Directive 2011/65/EU (RoHS II)

**FURTHER ADVANTAGES OF THE PERMAGLIDE®  
P200/P201 MATERIALS**

- Very good emergency running properties
- Insensitive to impact loads
- Good damping characteristics
- High chemical resistance

**PREFERRED APPLICATIONS OF THE PERMAGLIDE®  
P200/P201 MATERIALS**

- Low-maintenance operating with lubrication, more stringent requirements
- Rotating and oscillating movements up to a sliding speed of 3.3 m/s
- Linear movements up to 6 m/s
- Temperature range –40 °C up to 110 °C

**DESCRIPTION OF MATERIAL**

PERMAGLIDE® P200 and P201 are lead-free, environmentally friendly sliding materials with a very high performance. Thanks to a special combination of bulking agents, high wear resistance is achieved while simultaneously maintaining very good emergency running behaviour. They are therefore ideally suited to low-maintenance grease or liquid-lubricated applications subject to more stringent requirements. The standard P200 version has oil distributing pockets in the sliding layer and can be supplied ready for installation with no rework necessary.

**FURTHER INFORMATION ON PERMAGLIDE®  
PLAIN BEARINGS**

PERMAGLIDE® catalogue, item no. 50003863-02