



WABRO® Maintenance-free slide elements

Maintenance-free slide elements for medium and high loads at low frictional speeds

Self-lubricating slide elements provided with holes or grooves in which solid lubricant is accommodated.

During operation solid lubricant is constantly applied to the slide surface where it forms a continuous grease film which prevents metallic contact between the moving parts.

WABRO® slide elements are typically used where high loads are applied at low frictional speeds.

WABRO® slide elements are machined ready for installation in accordance with customers' specifications.

Prices and delivery times on request.

Function of WABRO® – slide elements

WABRO®-slide elements are self-lubricating maintenance-free elements for medium and high loads at low frictional speeds. They consist of a base material which is selected to suit the specific application. The base material is provided with solid lubricant in various different manners. The solid lubricant is accommodated in grooves or holes. These lubricant pockets are arranged in such a way as to ensure that there is an overlap of the slide surface in the direction of movement.

Benefits

WABRO®-slide elements offer the following benefits:

- dry solid lubrication film on the contact surfaces which is almost indestructible
- no maintenance, therefore particularly suited in places which are difficult to access
- perfect lubrication including at elevated temperatures
- constant coefficient of friction in movement and in the idling position
- very suitable for use in industrial fluids as well as in fresh water and salt water, as the solid lubricant cannot be washed out
- suitable axial and radial movement
- perfect lubrication effect, including in intermittent operation
- flame resistant.

Basis of calculation

Load on the bearing

The specific load in N/mm^2 resulting from the bearing surface projection (inner diameter x bearing length) must be determined. Based on this specific load and the engineering of the bearing the most suitable base material is selected.

Frictional speed

The frictional speed is determined in m/sec. . When appraising the permissible speed, the duty cycle must be taken into consideration.

Temperature

WABRO®-slide elements can be used at temperatures of up to 450°C .

The solid lubricant forms a stable continuous film on the two sliding surfaces and fills any existing surface roughness. The film separates the two metallic surfaces and prevents metallic contact, so that no stick-slip effect can occur. During operation, the lubricating film is constantly replenished by lubricant particles emerging from the pockets. Any impurities can be absorbed into the pockets.

select list of slide bearings

technical standard values	CuSn7ZnPb	CuSn12	CuZn40Al2	CuAl10Ni
max. p (N/mm^2)	30	50	55	65
max. v (m/s)	0,3	0,2	0,15	0,15
max. p x v ($\text{N/mm}^2 \times \text{m/s}$)	1	1,6	0,3	0,3
max. Temp. ($^\circ\text{C}$)	250	270	400	450

Those are standard values (maximum single value), of which can be deviated in individual cases if the exact operating conditions are known.

Design notes

Dimensions

In order to provide for lubrication pockets, WABRO® slide elements must have a certain minimum wall thickness. Please note the information in the following table for determining the required wall thickness:

The maximum bearing length should be 1.5 times the inner diameter, and the minimum bearing length should be 0.6 times the inner diameter. If post-calculation reveals that there is too much load on the bearing, it is recommended that the bearing length and not the inner diameter is increased.

Inner diameter	Up to 50 mm	50 - 75 mm	more than 75 mm
Wall thickness	5 mm	6,5 mm	$\frac{l - \varnothing \text{ mm}}{16} + 3 \text{ mm}$

Coefficient of friction

The coefficient of friction of WABRO® slide elements is almost identical in all permissible speed ranges. The magnitude of the coefficient of friction however depends on many factors. For design purposes it is recommended that a mean coefficient of friction of 0.1 is taken as a basis, assuming that the

surface quality of the contact material corresponds to the specified values.

This mean value can improve to 0.03 under favourable conditions (e.g. in water), whereas in the case of increased temperatures, a decrease of the coefficient of friction to 2.0 may occur.

Tolerances

Unless otherwise provided, WABRO® slide elements are supplied with r7 tolerance on the outer diameter for an H7 location hole. The associated shafts must have minus tolerances, e.g. f7. Please note that as a result of pressing in the bearing the inner diameter will be reduced.

The solid lubricant film formed on the two surfaces requires a space which is larger than that required for liquid lubrication. This is taken into account when preparing the holes for the bearings by increasing their dimensions. Recommended dimensions and their tolerance range as a function of the bearing diameter are shown in the table below.

Inner diameter (mm)	Tolerance range (µm)	
from 10 to 18	+ 50	+ 70
above 18 to 30	+ 65	+ 85
above 30 to 50	+ 80	+ 105
above 50 to 80	+ 100	+ 130
above 80 to 120	+ 120	+ 155
above 120 to 180	+ 145	+ 185
above 180	+ 170	+ 216

Contact material

In general, iron materials with a surface hardness higher than 100 HB should be used as contact materials. In the case of bearing metals with higher strength (e.g. tin bronze, copper aluminium multi-alloy bronze), the shaft surfaces should be hardened. For surface roughness $R_a = 1 \mu\text{m}$ ($R_z = 6 \mu\text{m}$)

is recommended. When used in an aggressive environment it is recommended that shafts made from higher alloyed iron materials (e.g. nickel chromium steels) are used.

Fields of application

Thanks to the properties described above, WABRO® slide elements have proved to be very suitable for the following applications:

- Mechanical engineering in general
- Rolling mill and steel mill equipment
- Rotating and pivoting devices for industrial furnaces
- Pivoting equipment in locks and weir plants
- Swivel, draw and lifting bridges
- Bearings for spill drives
- Cargo handling gear
- Cranes and hoisting gear
- Bearings for industrial furnaces
- Construction machines
- Conveyors etc.
- Slide plates as expansion bearings for bridges, pipelines, roofs of large buildings
- In press guidance and large tool guidance systems.



Prices and delivery times on request!

The above tables include guide values which may be amended in an individual case when full details of the application are known.