CALENBERG

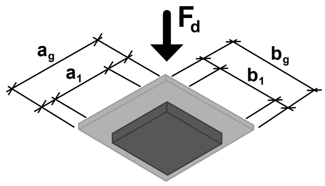
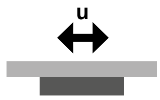
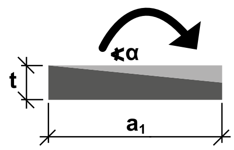
Ciparall® sliding bearing Type GFK

Elastomeric deformation sliding bearing for static structural component supports

Design values

The bearings are dimensioned according to the general building authority approval up to a compressive stress $\sigma_{R,d} = 21$ N/mm². Holes, cut-outs and the required edge distances must be taken into account according to DIN EN 1992.

TYPE OF LOAD ACTING

Design value of bearing resistance	Deformation	Bearing structure	all. rotation angle
			

FORMEL

Design value of bearing resistance	Deformation	Bearing structure	all. rotation angle
$\sigma_{R,d} \leq 21$ [N/mm²]	u = variable	t_1 = 2.6 mm sliding plate	all. $\alpha = \frac{2000}{a_1} \leq 40$ [‰] (Rectangular bearing)
Approval no. 16.22-525	coefficient of friction 0.04 at 15 N/mm² after an accumulated sliding distance of 201 m.	t_2 = 11.4 mm Elastomer body	Additional rotation acc. to technical approval: • 10 ‰ from obliquity
$A_E = a_1 \times b_1$ [mm²]		t = bearing thickness	• $\frac{625}{a_1}$ from unevenness
Evidence: $\sigma_{E,d} \leq \sigma_{R,d}$	Further values can be found in the approval.	Bearing deflection see page 2	Insert a_1 in mm

LEGEND FORMULA SYMBOL

F_d	Vertical force
A_E	Bearing area
a_1	Length of the bearing body
b_1	Width of the bearing body
a_g	Length of the sliding plate
b_g	Width of the sliding plate
$\sigma_{R,d}$	Design value of the load capacity
$\sigma_{E,d}$	Design compressive stress from load
α	Bearing rotation
u	Shear deformation of the bearing
t	Thickness of bearing

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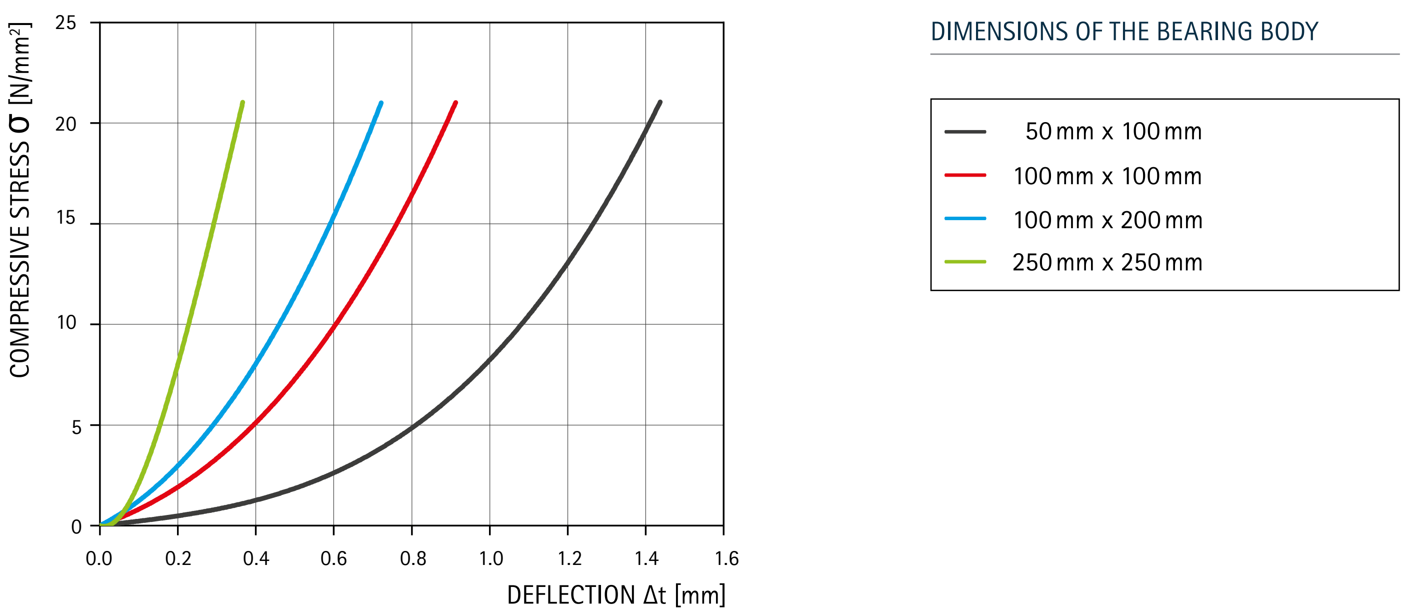
The following tables show the design value of the load capacity and the allowable angle of distortion as a function of the bearing dimensions. Intermediate values may be interpolated.

CIPARALL® SLIDING BEARING TYPE GFK		
Total bearing thickness t [mm]	14	
Bearing width a [mm]	Compressive stress $\sigma_{R,d}$ [N/mm²]	Rotation angle max. α [‰]
50	21.0	40.0
60		33.3
70		28.6
80		25.0
90		22.2
100		20.0
110		18.2
120		16.7
130		15.4
140		14.3
150		13.3
160		12.5
170		11.8
180		11.1
190		10.5
200		10.0

Use in in-situ concrete: Embedding in polystyrene
Use in fire resistance class F90 / F120: If necessary. embedding in Ciflamon fire protection panel

Load deflection curve

The following diagram shows the compression behaviour for different formats when used between concrete surfaces (precast elements).



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Design example

Given: $F_{E,d} = 330$ kN, bearing rotation $\alpha = 3.6$ ‰, horizontal deformation ± 30 mm parallel to the shorter side of the bearing body a_1

Selected dimensions of the bearing body: $a_1 = 100$ mm, $b_1 = 200$ mm

Load capacity:

$\sigma_{R,d} = 21.0$ N/mm²

$F_{R,d} = \sigma_{R,d} \times A_E = 21.0$ N/mm² x 100 mm x 200 mm = 420 kN

$F_{R,d} \geq F_{E,d}$ → Load capacity of the bearing is sufficient

Bearing distortion from component deflection: $\alpha = 3.6$ ‰

Additional twisting from obliquity: 10 ‰

Additional twisting from unevenness: 625 (mm*‰) / a (mm) = 625 / 100 = 6.25 ‰

Total rotation to be measured:

$\alpha = 3.6$ ‰ + 10 ‰ + 6.25 ‰ = 19.85 ‰

max. α = 2000 ‰ x mm / a = 2000 ‰ x mm/ 100 mm = 20 ‰

max. $\alpha \geq \alpha$ → Angle of twist for rotation is sufficient

Horizontal deformation:

± 30 mm → required sliding distance = a_1 + 2 x 30 mm = 160 mm

The sliding plate should be 10 mm larger all round due to the sliding path and bearing body dimensions

→ a_g = 160 mm + 20 mm = 180 mm

b_g = 200 mm + 20 mm = 220 mm