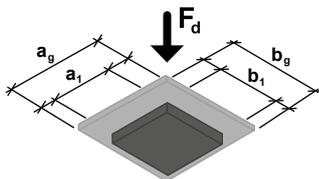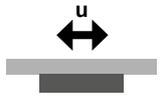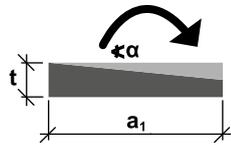**CALENBERG**

1

Ciparall sliding bearing Type GRP
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

$\sigma_{R,d} \leq 21$ [N/mm²]	u = variable	t_1 = 2.6 mm sliding plate	all. $\alpha = \dfrac{2000}{a_1} \leq 40$ [‰] (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	• $\dfrac{625}{a_1}$ 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	$\sigma_{R,d}$	Design value of the load capacity
A_E	Bearing area	$\sigma_{E,d}$	Design compressive stress from load
a_1	Length of the bearing body	α	Bearing rotation
b_1	Width of the bearing body	u	Shear deformation of the bearing
a_g	Length of the sliding plate	t	Thickness of bearing
b_g	Width of the sliding plate		

2

Ciparall sliding bearing Type GRP
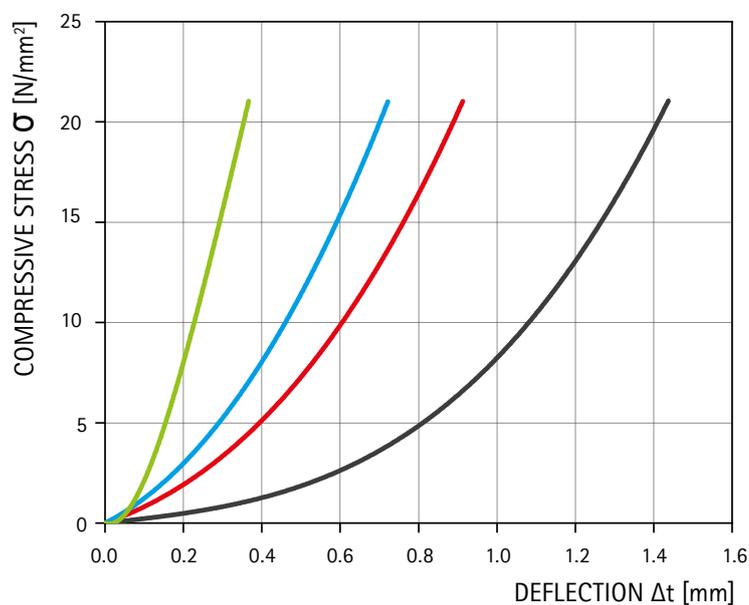Elastomeric deformation sliding bearing for static structural component supports

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		40.0
60		33.3
70		28.6
80		25.0
90		22.2
100		20.0
110		18.2
120		16.7
130	21.0	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).

DIMENSIONS OF THE BEARING BODY

— 50 mm x 100 mm
— 100 mm x 100 mm
— 100 mm x 200 mm
— 250 mm x 250 mm

Ciparall sliding bearing Type GRP
Elastomeric deformation sliding bearing for static structural component supports

Design example

Given: $F_{E,d} = 330\,kN$, bearing rotation $\alpha = 3.6\,‰$, horizontal deformation $\pm 30\,mm$ 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:

$\sigma_{R,d} = 21.0\ N/mm^2$

$F_{R,d} = \sigma_{R,d} \times A_E = 21.0\ N/mm^2 \times 100\ mm \times 200\ mm = 420\ kN$

$F_{R,d} \geq F_{E,d}$ ➝ 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. $\alpha = 2000\ ‰ \times mm / a = 2000\ ‰ \times mm / 100\ mm = 20\,‰$

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

Horizontal deformation:

$\pm 30\,mm$ ➝ required sliding distance $= a_1 + 2 \times 30\ mm = 160\ mm$

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

➝ $a_g = 160\ mm + 20\ mm = 180\ mm$

$b_g = 200\ mm + 20\ mm = 220\ mm$