

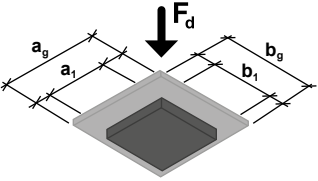
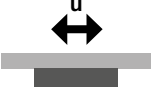

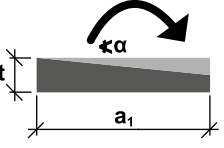
Ciparall sliding bearing type ST

Elastomer deformation sliding bearing for static component bearings

Dimensioning with design values

The bearings are dimensioned in accordance with the general building authority approval up to compressive stress of $\sigma_{R,d} = 28 \text{ N/mm}^2$. The drill holes, cut-outs and the required edge clearances must be taken into consideration in accordance with DIN EN 1992.

LOAD TYPE

Design value of the load capacity	Displacement	Bearing design	Perm. angle of rotation
			

EQUATION

$\sigma_{R,d} \leq 28 \text{ [N/mm}^2\text{]}$ Approval no. 16.22-534 $A_E = a_1 \times b_1 \text{ [mm}^2\text{]}$ Verification: $\sigma_{E,d} \leq \sigma_{R,d}$	$u = \text{variable}$ Friction coefficient 0.047 with 20 N/mm ² after an accumulated sliding distance of 198 m. Other values can be found in the approval.	Thickness $t = 11 \text{ mm}$ $t_1 = 2.6 \text{ mm}$ $t_2 = 8.4 \text{ mm}$ Thickness $t = 20 \text{ mm}$ $t_1 = 4.8 \text{ mm}$ $t_2 = 15.2 \text{ mm}$ Thickness $t = 30 \text{ mm}$ $t_1 = 4.8 \text{ mm}$ $t_2 = 25.2 \text{ mm}$ Thickness $t = 40 \text{ mm}$ $t_1 = 4.8 \text{ mm}$ $t_2 = 35.2 \text{ mm}$ For elastic deformation, see page 2	Thickness t $t = 11 \text{ mm}$: perm. $\alpha = 2000/a_1 \leq 40\text{‰}$ $t = 20 \text{ mm}$: perm. $\alpha = 3000/a_1 \leq 40\text{‰}$ $t = 30 \text{ mm}$: perm. $\alpha = 5100/a_1 \leq 40\text{‰}$ $t = 40 \text{ mm}$: perm. $\alpha = 7300/a_1 \leq 40\text{‰}$ (Rectangular bearing) To be taken into account according to the approval: <ul style="list-style-type: none"> • 10‰ from obliqueness • $\frac{625}{a_1}$ from unevenness see also booklet 600, DAfStb
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KEY TO EQUATION SYMBOLS

F_d	Vertical force	$\sigma_{R,d}$	Design value of the load capacity
A_E	Bearing area	$\sigma_{E,d}$	Design compressive stress from impact
a_1	Length of the bearing body	α	Distortion of bearing
b_1	Width of the bearing body	u	Displacement distance
a_g	Length of the sliding plate	t	Bearing thickness
b_g	Width of the sliding plate	t_1	Sliding plate
		t_2	Elastomeric body

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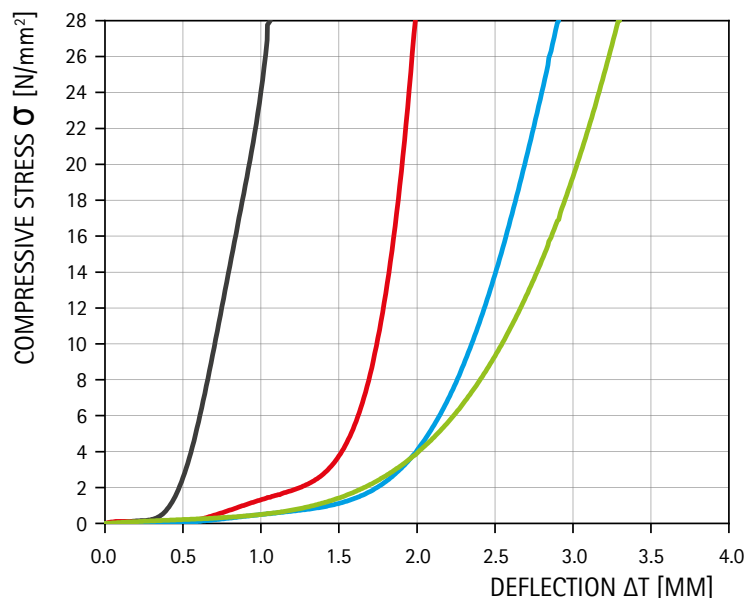
The tables below show the design value of the load capacity and the permissible angle of rotation in relation to the bearing dimensions. Intermediate values may be interpolated.

CIPARALL SLIDING BEARING TYPE ST					
Total bearing thickness t [mm]		11	20	30	40
Bearing width a [mm]	Compressive stress $\sigma_{R,d}$ [N/mm ²]	Angle of rotation max. α [‰]			
120	28.0	16.7	25.0	40.0	40.0
130		15.4	23.1	39.2	
140		14.3	21.4	36.4	
150		13.3	20.0	34.0	
160		12.5	18.8	31.9	
170		11.8	17.6	30.0	
180		11.1	16.7	28.3	
190		10.5	15.8	26.8	38.4
200		10.0	15.0	25.5	36.5
220		9.1	13.6	23.2	33.2
240		8.3	12.5	21.3	30.4
260		7.7	11.5	19.6	28.1
280		7.1	10.7	18.2	26.1
300		6.7	10.0	17.0	24.3
350		5.7	8.6	14.6	20.9
400		5.0	7.5	12.8	18.3
450		4.4	6.7	11.3	16.2
500		4.0	6.0	10.2	14.6
550		3.6	5.5	9.3	13.3
600		3.3	5.0	8.5	12.2

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

Load deflection curve

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



DIMENSIONS OF THE BEARING BODY

- 180 mm x 180 mm x 11 mm
- 180 mm x 180 mm x 20 mm
- 180 mm x 180 mm x 30 mm
- 180 mm x 180 mm x 40 mm

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Dimensioning example

Given: $F_{E,d} = 570 \text{ kN}$, bearing distortion $\alpha = 3.6 \text{ ‰}$, horizontal displacement $\pm 30 \text{ mm}$ parallel to the shorter side of the bearing body a_1

Selected bearing body dimensions: $a_1 = 120 \text{ mm}$, $b_1 = 180 \text{ mm}$, $t = 20 \text{ mm}$

Load capacity:

$$\sigma_{R,d} = 28.0 \text{ N/mm}^2$$

$$F_{R,d} = \sigma_{R,d} \times A_E = 28.0 \text{ N/mm}^2 \times 120 \text{ mm} \times 180 \text{ mm} = 604.8 \text{ kN}$$

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

Bearing rotation from component deformation: $\alpha = 3.6 \text{ ‰}$

Additional distortion from obliqueness: 10 ‰

Additional distortion from unevenness: $625 \text{ (mm} \cdot \text{‰)} / a \text{ (mm)} = 625 / 120 = 5.21 \text{ ‰}$

Total distortion to be absorbed:

$$\alpha = 3.6 \text{ ‰} + 10 \text{ ‰} + 5.21 \text{ ‰} = 18.81 \text{ ‰}$$

$$\text{max. } \alpha = 3000 \text{ ‰} \times \text{mm} / a = 3000 \text{ ‰} \times \text{mm} / 120 \text{ mm} = 25 \text{ ‰}$$

$$\text{max. } \alpha \geq \alpha \rightarrow \text{maximum distortion angle of the bearing is sufficient}$$

Horizontal displacement:

$$\pm 30 \text{ mm} \rightarrow \text{required sliding distance} = a_1 + 2 \times 30 \text{ mm} = 180 \text{ mm}$$

The sliding plate should be 10 mm bigger all round than is specified by the anticipated sliding distances and bearing body dimensions.

$$\rightarrow a_g = 180 \text{ mm} + 20 \text{ mm} = 200 \text{ mm}$$

$$b_g = 180 \text{ mm} + 20 \text{ mm} = 200 \text{ mm}$$