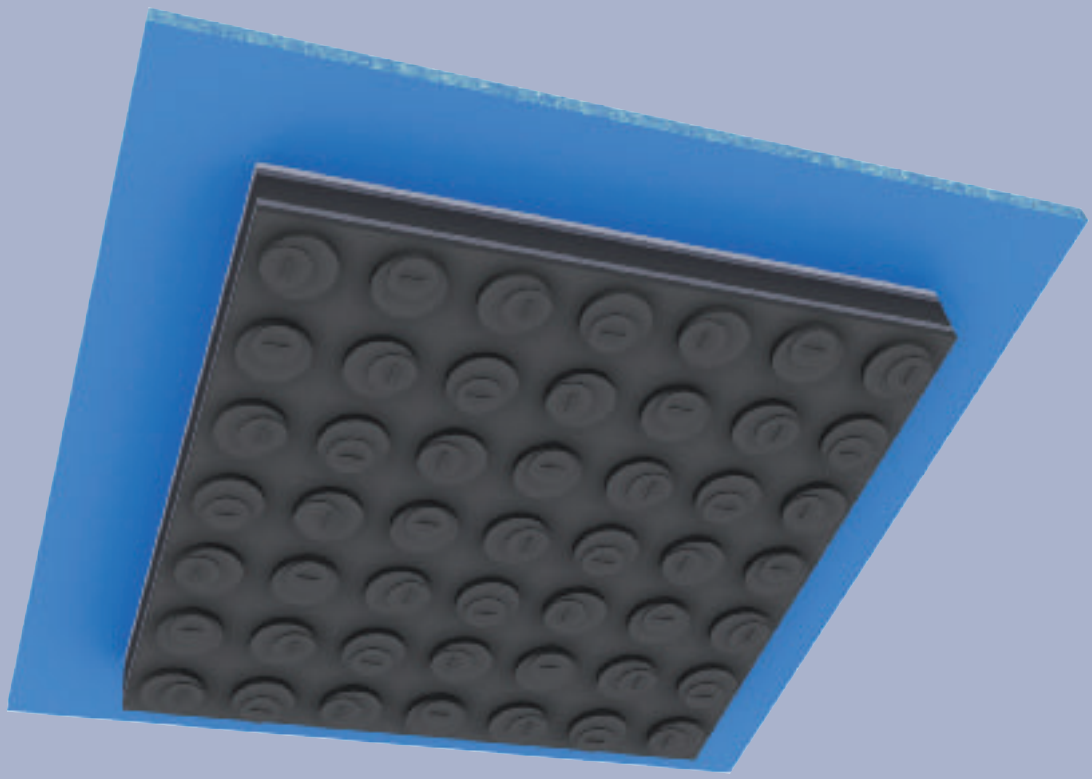
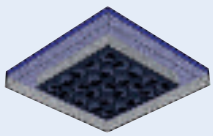
CALENBERG INGENIEURE

CIPARALL® SLIDING BEARING





Elastomeric flexible sliding bearing with transverse tensile reinforcement and dimensionally stable sliding surface, load capacity up to 15 N/mm²

Product Description

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Product Description

Calenberg Ciparall® Sliding Bearings combine sliding and deformation properties of the bearing where the sliding action is independent from the deformation. Depending on the requirement bearings of different thicknesses can be selected.

The bearings consist of:

- Rubber layers in combination with vulcanised steel plates and a low-friction PTFE layer that allows movement relative to the slide plate.
- Slide plate of glass fibre reinforced plastic (GRP)

The material of the tensile reinforcement defines the type of bearing

- Ciparall® Sliding Bearing, ST with steel reinforcement

The bearings are marked with additional designations in order to specify more clearly the specific application. For prefabricated construction the designation “BnF” (precast concrete unit) applies, for in situ construction the designation “OBn” is used, i.e. the bearings are encased with polystyrene and shrink-wrapped to prevent concrete from entering the bearing surface. If at the same time effective fire protection has to be ensured the fire resistance class has to be specified (“F 90” or “F 120”). In that case the bearings are additionally fitted with a Ciflamon-fire protection plate (see page 9). This applies to type “BnF” as well as to type “OBn”.

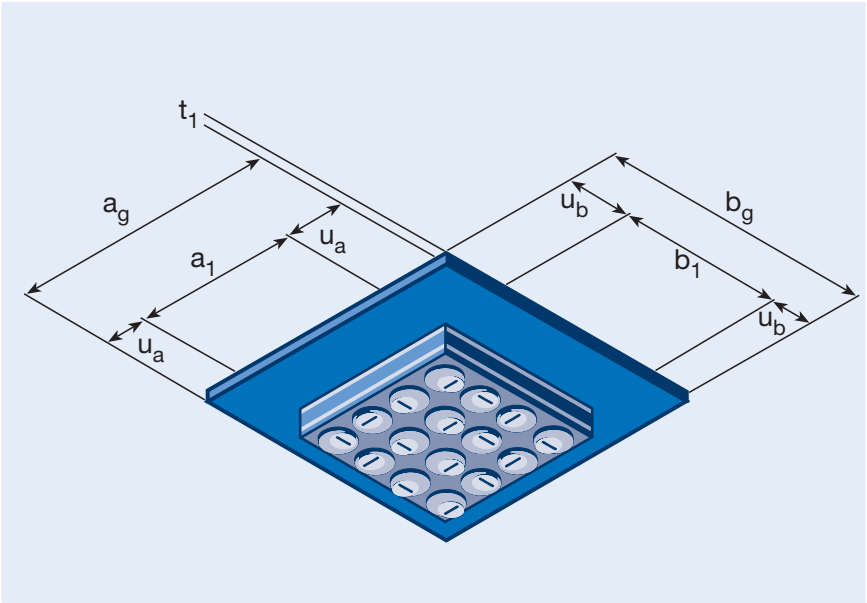
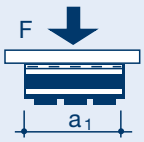


Figure 1. Designation of the individual bearing dimensions

Ciparall® Sliding Bearing ST; Thickness t = 11, 20, 30 und 40 mm

Total thickness t [mm]		11		20		30		40	
Bearing width a_1 [mm]		σ_{allow} [N/mm²]	α_{allow} [‰]	σ_{allow} [N/mm²]	α_{allow} [‰]	σ_{allow} [N/mm²]	α_{allow} [‰]	σ_{allow} [N/mm²]	α_{allow} [‰]
	50	15.0	20.0	7.5	40.0				
	60	15.0	16.7	9.0	33.3				
	70	15.0	14.3	12.0	28.6				
	80	15.0	12.5	12.0	25.0	12.0	40.0		
	90	15.0	11.1	13.5	22.2	13.5	38.9		
	100	15.0	10.0	15.0	20.0	15.0	35.0	15.0	40.0
	110	15.0	9.1	15.0	18.2	15.0	31.8	15.0	40.0
	120	15.0	8.3	15.0	16.7	15.0	29.2	15.0	40.0
	130	15.0	7.7	15.0	15.4	15.0	26.9	15.0	38.5
	140	15.0	7.1	15.0	14.3	15.0	25.0	15.0	35.7
	150	15.0	6.7	15.0	13.3	15.0	23.3	15.0	33.3
	160	15.0	6.3	15.0	12.5	15.0	21.9	15.0	31.3
	170	15.0	5.9	15.0	11.8	15.0	20.6	15.0	29.4
	180	15.0	5.6	15.0	11.1	15.0	19.4	15.0	27.8
	190	15.0	5.3	15.0	10.5	15.0	18.4	15.0	26.3
	200	15.0	5.0	15.0	10.0	15.0	17.5	15.0	25.0
	250	15.0	4.0	15.0	8.0	15.0	14.0	15.0	20.0
	300	15.0	3.3	15.0	6.7	15.0	11.7	15.0	16.7
	350	15.0	2.9	15.0	5.7	15.0	10.0	15.0	14.3
	400	15.0	2.5	15.0	5.0	15.0	8.8	15.0	12.5
	450	15.0	2.2	15.0	4.4	15.0	7.8	15.0	11.1
	500	15.0	2.0	15.0	4.0	15.0	7.0	15.0	10.0
	550	15.0	1.8	15.0	3.6	15.0	6.4	15.0	9.1
	600	15.0	1.7	15.0	3.3	15.0	5.8	15.0	8.3



Note: Bearing width $a_1 \leq$ bearing length b_1

Design Chart

Edge Distances

Reinforced Concrete Construction

The edge distances to the concrete members have to be strictly adhered to when using elastomeric bearings so as to avoid spalling. In Bulletin 525 the German Committee for Structural Concrete (DAfStb) has specified design criteria for the edge distances on the basis of DIN 1045 – Concrete, reinforced and prestressed concrete structures – Part 1: Design and construction. Please refer to Figure 3 for the denotation of the edge distances:

- a Width of support without joint
- a_1 Width of elastomeric bearing
- a_2 Distance between bearing and edge of support
- Δa_2 Tolerance on dimension of the distance between the supporting structural members
- a_3 Distance between bearing and the outer edge of the supported structural member
- Δa_3 Tolerance on dimension of the length of the supported structural member
- b_1 Length of elastomeric bearing
- $u_{a,b}$ Sliding distance in the direction of a and b

The minimum dimensions depend on the concrete quality, type of support, type of bearing and of the bearing material; they can be found in tables in the above mentioned Bulletin 525, page 119.

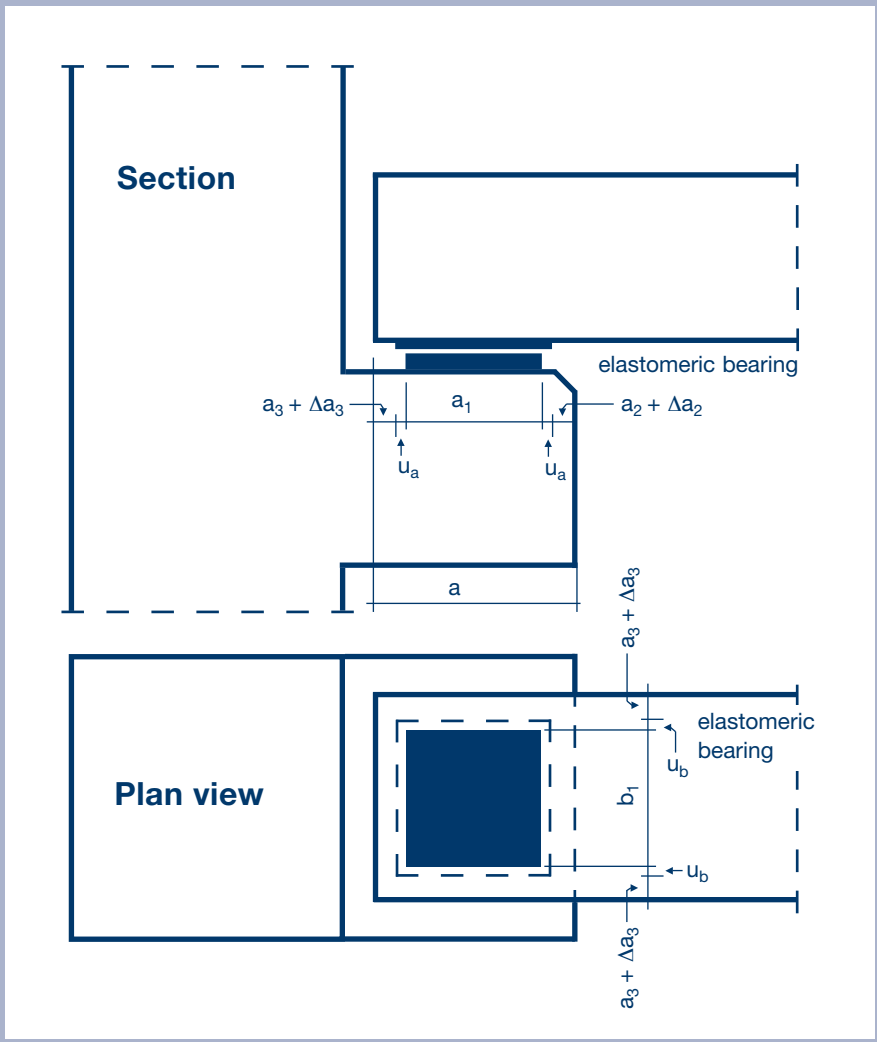


Figure 2. Edge distances for sliding bearings

Deflection

Form of Delivery, Dimensions

Ciparall® Sliding Bearings are manufactured and delivered for the specific application.

The bearings can be provided with holes, slotted holes, cut-outs, slits etc. such that dowels and bolts can pass through.

- Ciparall® Sliding Bearing ST t = 11, 20, 30, 40 mm

Application for prefabricated construction (BnF):

- Ciparall® Sliding Bearing, ST, BnF $b_1/b_g \cdot a_1/a_g \cdot t$

Application for in situ construction (OBn):

For in situ application (OBn) the bearing is provided with a protective cover

b_1 and a_1: **length and width of bearing.**
b_g and a_g: **length and width of Slide plate**
t: **total thickness**

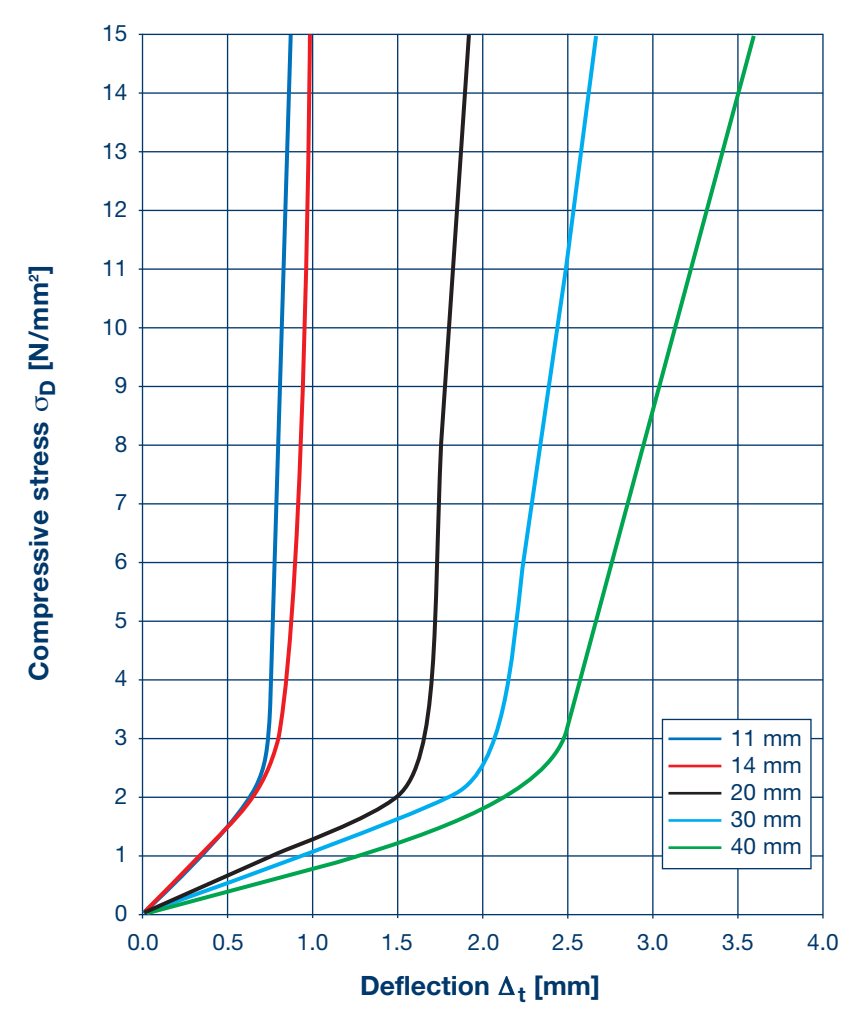


Figure 3. Ciparall® Sliding Bearing, deflection (approximately) related to bearing size 150 mm x 150 mm

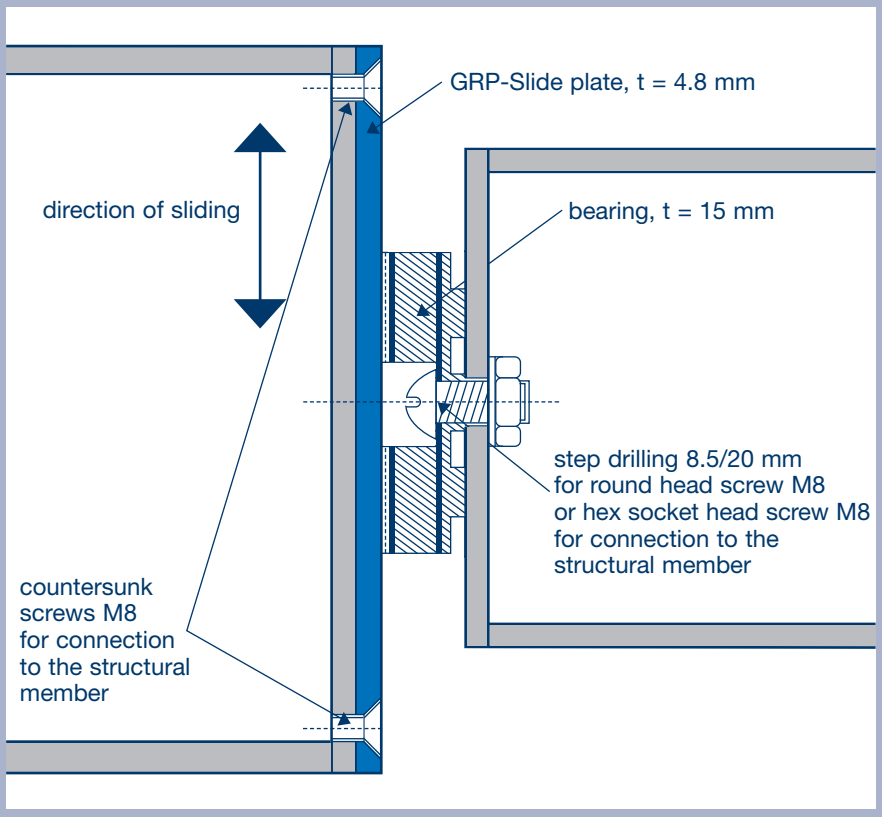


Figure 4. Example of a Ciparall® Sliding Bearing ST, t = 20 mm, vertical joint between two structural steel members and connection of the individual bearing components to the adjacent structural members

References (excerpt)

Schools, Educational Centres, Sport Facilities
- University of Applied Science, Bochum
- Electrotechnical Institute, Technical University Berlin
- Medical Department, Göttingen
- Kölnarena, Cologne
- Olympic Stadium, Berlin
- Westphalia Stadium, Dortmund
- Central Stadium, Leipzig

Industrial, Administrative, Service Buildings
- City Gallery, Augsburg
- New Town Hall, Göttingen
- Federal Printing Office, Berlin
- Pegel Tower, Goitzsche
- Federal Chancellary, Berlin
- MDR Head Office, Leipzig
- Airport Parking Garage, Leipzig
- Infineon, Dresden
- Trade Fair Hannover
- Trade Fair Frankfurt/M.
- Natural Thermal Spring, Templin
- Ostseehalle, Kiel
- Airport Hamburg, Terminal 2/3
- Warnow Park, Rostock

Abroad
- NCO-Exhibition Halls, Riyadh, Arabia
- Kinali-Sakarya-Motorway, 2. Bridge across the Bosporus
- IKEA, Warsaw
- Old Brewery, Poznan, Poland
- Scottish Parliament, Edinburgh, Scotland
- Main-Bowl-Stadium, Lagos, Nigeria

Vertical Installation

Texts of Tender Documents

Calenberg Ciparall® Sliding Bearing ST for BnF or OBn

Deliver with transverse tensile reinforcement as well as dimensionally stable sliding plane and permanently elastic flexible pad; bearing capacity up to 15 N/mm2 depending on size, general building authority test certificate No. P-852.0290-4.

Dimensions: $b_1/b_g \cdot a_1/a_g \cdot t$

Quantity ..... item

Price ..... €/item

Supplier:
Calenberg Ingenieure GmbH
Am Knübel 2-4
D-31020 Salzhemmendorf
Phone +49 (0) 51 53/94 00-0
Fax +49 (0) 51 53/94 00-49

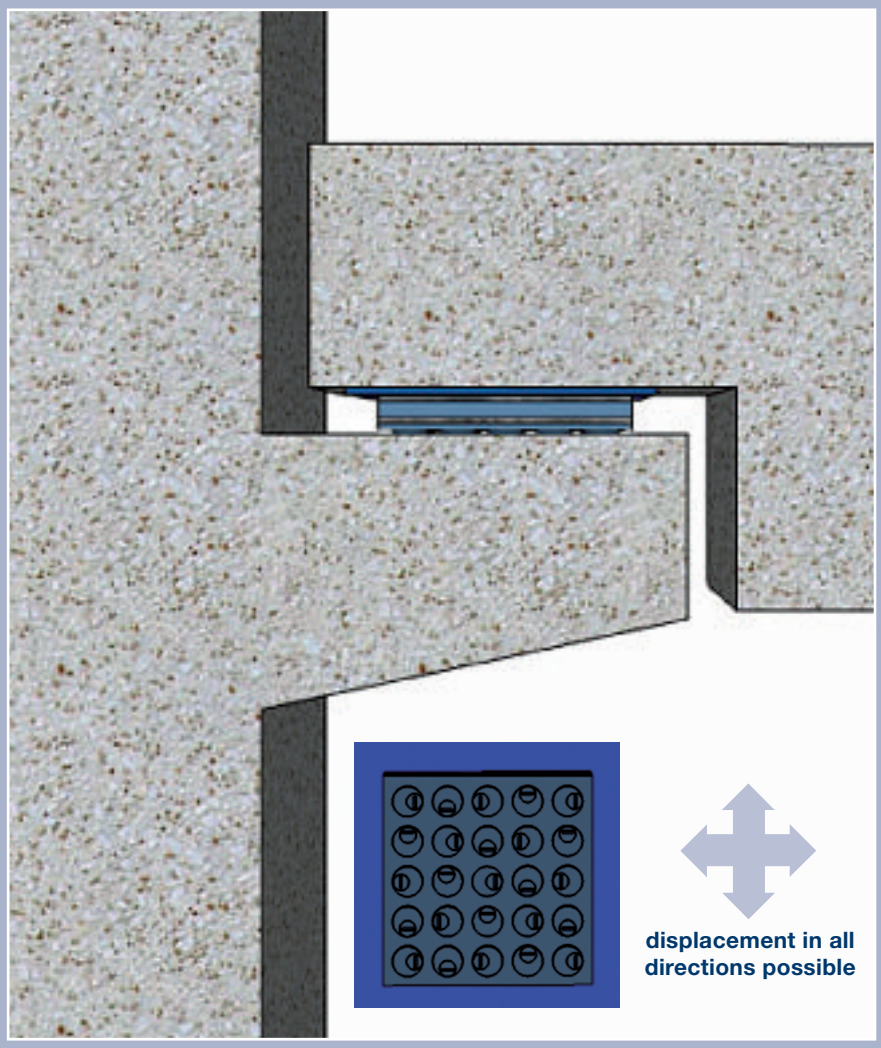


Figure 5. Installation principle, the required edge distances have to be complied with (see page 6)

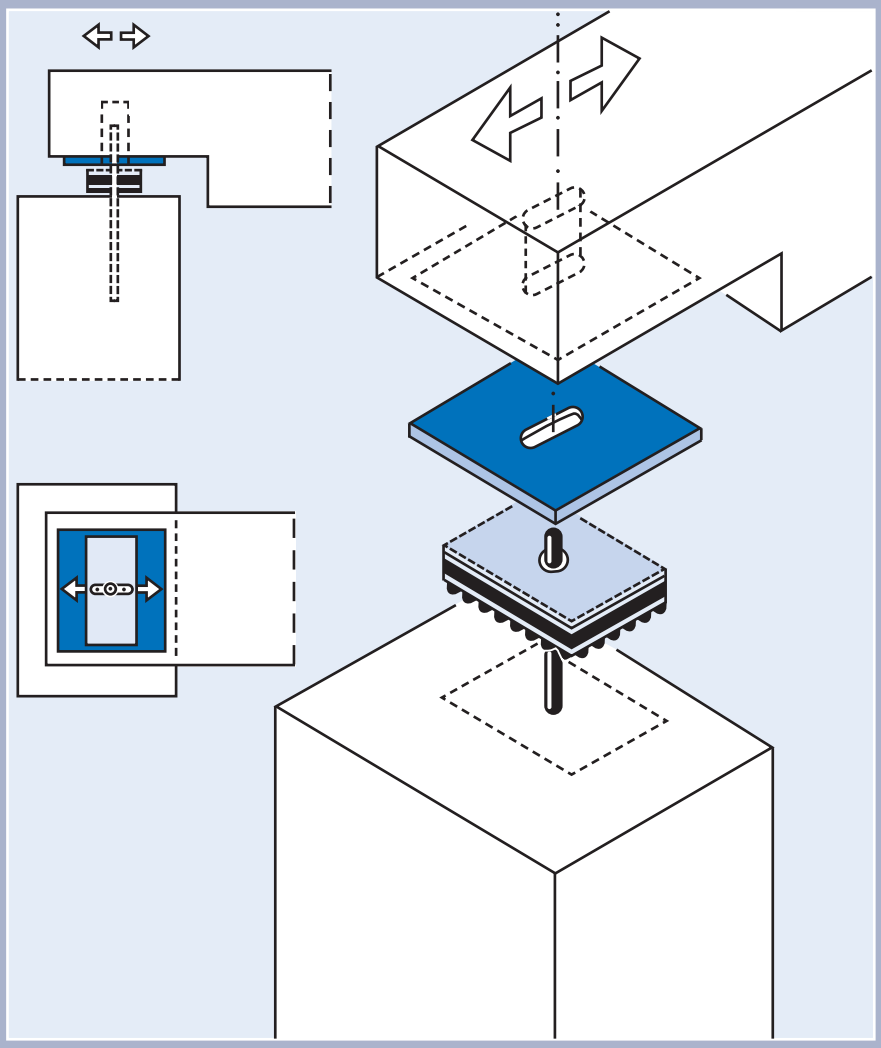


Figure 6. Installation of Ciparall® Sliding Bearing with bore hole and slotted hole

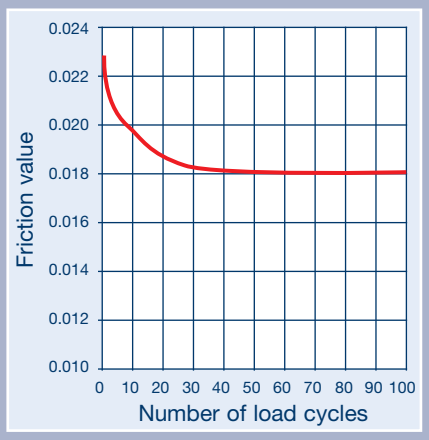


Figure 7. Friction values for Ciparall® Sliding Bearing, values as a function of load cycle number after stop times are terminated

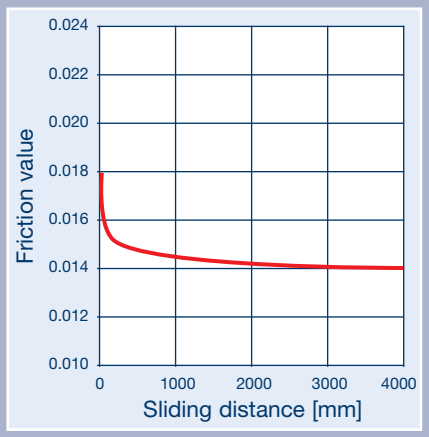


Figure 8: Sliding friction for Ciparall® Sliding Bearing, values as a function of total sliding distance after stop times are terminated

Friction Values

Test Certificates

- General building authority test certificate no. P-852.0290-4; basic investigation for classification of Ciparall® Sliding Bearings according to DIN 4141, part 3, accredited Material Testing Authority for materials in mechanical engineering and plastics, Technical University Hanover, 2003

- Fire safety assessment no. 3799/7357-AR; assessment of Calenberg elastomeric bearings regarding classification into the fire resistance class F 90 or F 120 according to DIN 4102 part 2 (issued 9/1977); accredited Material Testing Authority for Civil Engineering at the Institute for Construction Materials, Reinforced Concrete Construction and Fire protection, Technical University, Braunschweig; March 2005

Fire Bahaviour

For all applications of elastomeric bearings which have to comply with fire protection requirements the fire safety assessment no. 3799/7357-AR- of the Technical University of Braunschweig applies. It specifies minimum dimensions and other measures in accordance with the specifications of DIN 4102-2, Brandverhalten von Baustoffen und Bauteilen (Fire behaviour of construction materials and components), 1977-09.

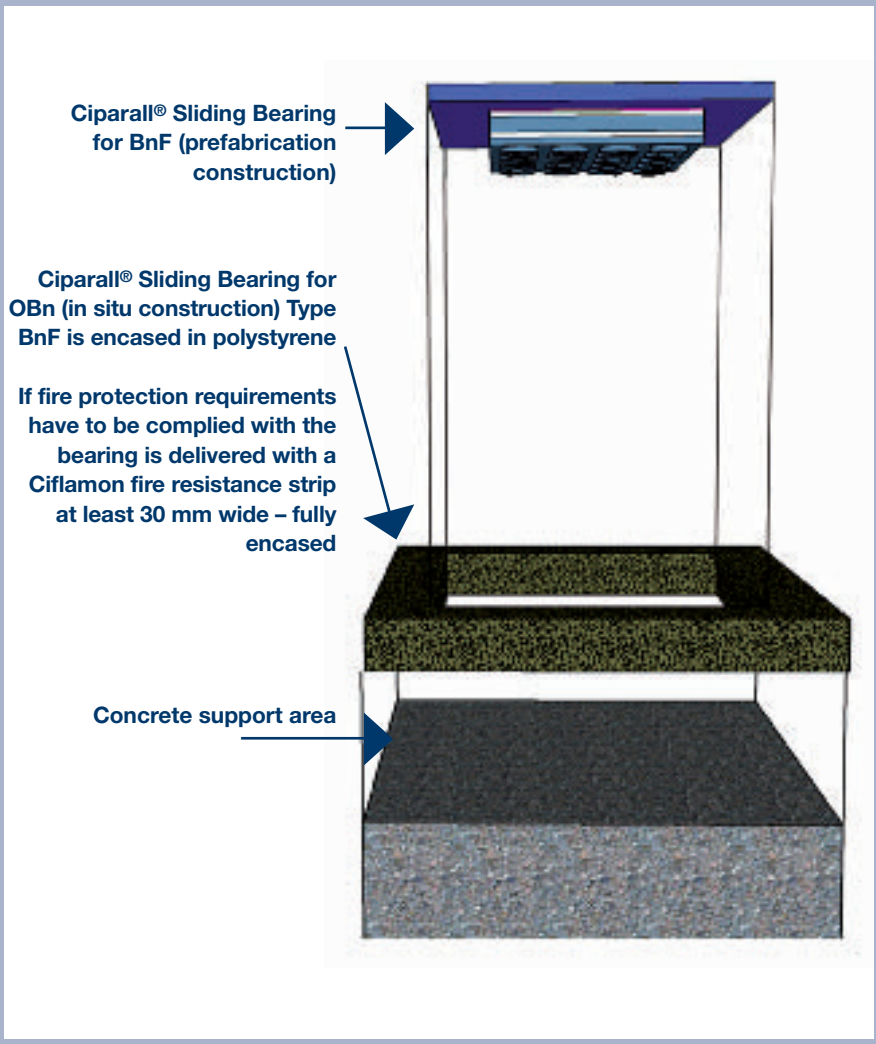


Figure 9. Installation principle of type BnF or OBn on a concrete column

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