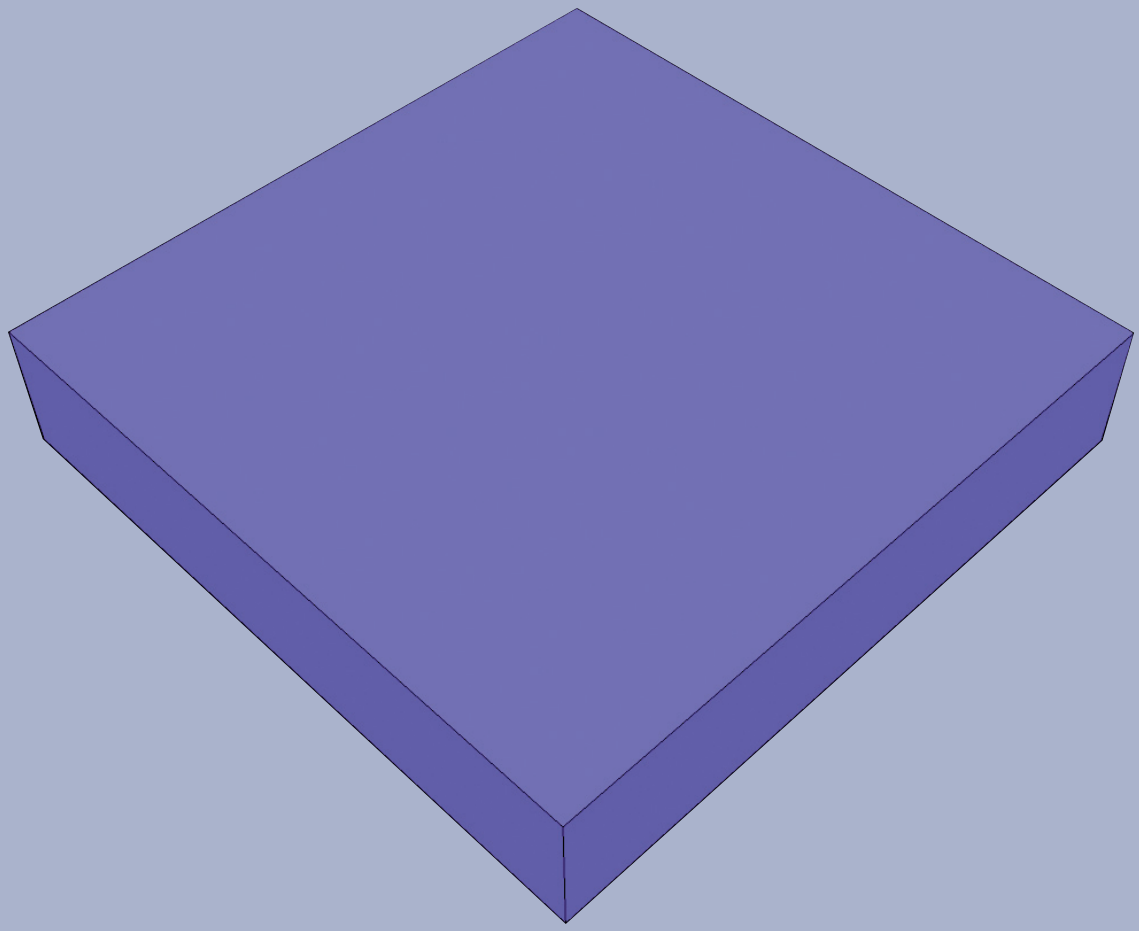
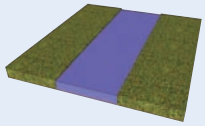
CALENBERG INGENIEURE

COMPRESSION BEARING





Unreinforced elastomeric bearing
loadable up to 5 N/mm²

Bearing design

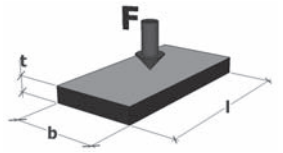
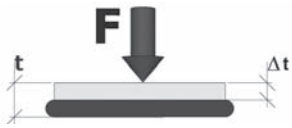
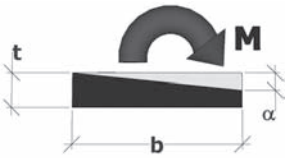
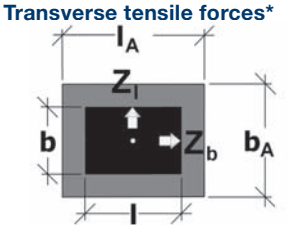
Contents

Product description

The Calenberg Compression Bearing is an unreinforced elastomeric bearing with smooth contact surfaces. The main component is an ozone-resistant elastomeric material with a hardness of 65 ± 5 Shore A.

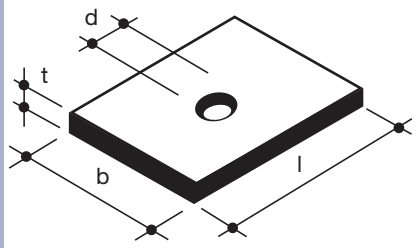
The appropriate tests have been carried out to demonstrate classification into bearing class 2 of DIN 4141 Part 3 by the Materials Testing Authority Hanover – an accredited certification authority in accordance with the State Building Regulations.

Design using characteristic values in acc. with DIN 4141, Part 3 (BC 2)

Load type	Formula
All. mean compressive stress 	All. $\sigma_m = \frac{S^2 + S + 1}{2{,}0} \leq 5$ N/mm² Shape factor S see page 3
All. shear deformation 	All. u = 0,6 · (t-2) [mm]
Deflection 	See page 6
Allowable rotation 	All. $\alpha = \frac{200 \cdot t}{b} \leq 40$ [‰]; rectangular bearing All. $\alpha = \frac{225 \cdot t}{D} \leq 40$ [‰]; circular bearing
Transverse tensile forces*  * More accurate proof in acc. with Booklet 339, DAfStb	Act. $Z_l = 1{,}5 \cdot F \cdot t \cdot l / A_E$ [kN] (towards bearing long side) Act. $Z_b = 1{,}5 \cdot F \cdot t \cdot b / A_E$ [kN] (towards bearing short side)

b, b_A, l, l_A, D, t, u in mm; A_E in mm²; H, ZS in kN; c_s in kN/mm, S without units

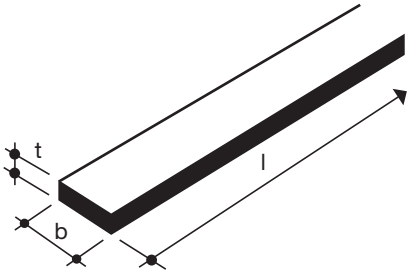
CALENBERG
INGENIEURE



Without hole: $S = \frac{l \cdot b}{2 \cdot t \, (l + b)}$

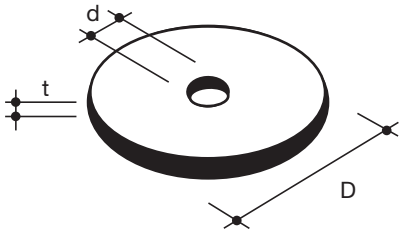
With hole: $S = \frac{4 \cdot l \cdot b - \pi \cdot d^2}{4 \cdot t \, (2 \cdot l + 2 \cdot b + \pi \cdot d)}$

Shape factor for rectangular bearing



$S = \frac{b}{2 \cdot t}$

Shape factor for bearing strip



Without hole: $S = \frac{D}{4 \cdot t}$

With hole: $S = \frac{D - d}{4 \cdot t}$

Shape factor for circular bearing

Text of tender documents

Supply Calenberg Compression Bearing, unreinforced homogeneous elastomeric bearing in accordance with DIN 4141 Part 3, bearing class 2, loadable depending on format up to a mean compressive stress of 5 N/mm², ozone-resistant up to 200 pphm, National Technical Approval Certificate No. P-852.0290-6.

a) Standard installation

Length: ..... mm
Width: ..... mm
Thickness: ..... mm
Quantity: ..... piece
Price: ..... €/piece

b) Embedded in polystyrene or Ciflamon fire protection board

Overall length: ..... mm
Overall width: ..... mm
Elastomer length: ..... mm
Elastomer width: ..... mm
Thickness: ..... mm
Quantity: ..... piece
Price: ..... €/piece

c)) Strip bearing embedded in polystyrene or Ciflamon fire protection board

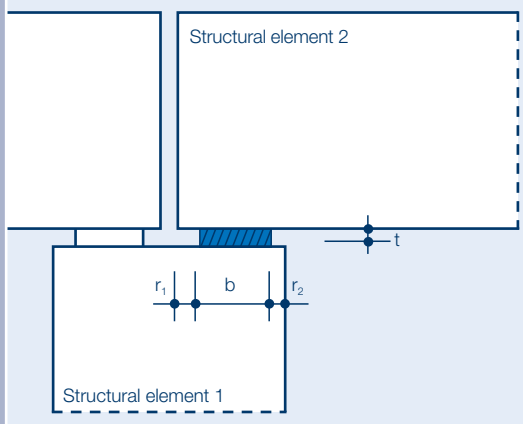
Overall width: ..... mm
Elastomer width: ..... mm
Thickness: ..... mm
Quantity: ..... m
Price: ..... €/m

Supplier:

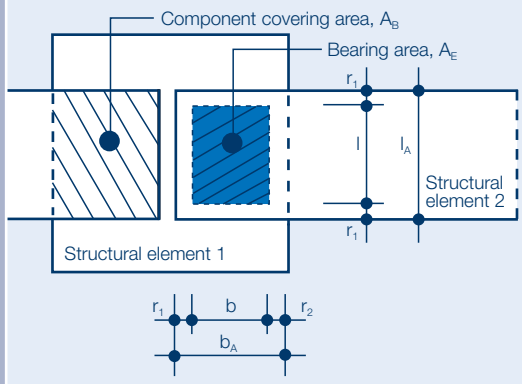
Calenberg Ingenieure GmbH
Am Knübel 2-4
D-31020 Salzhemmendorf/Germany
Phone +49(0)5153/9400-0
Fax +49(0)5153/9400-49

Shape factor

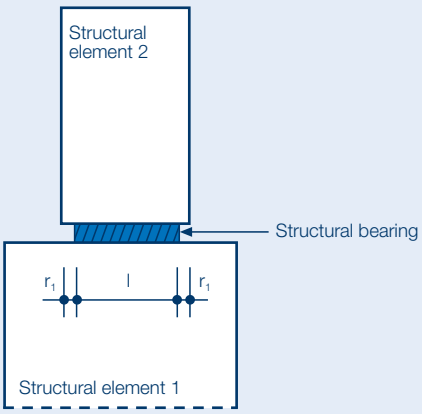
Edge distances



Side view



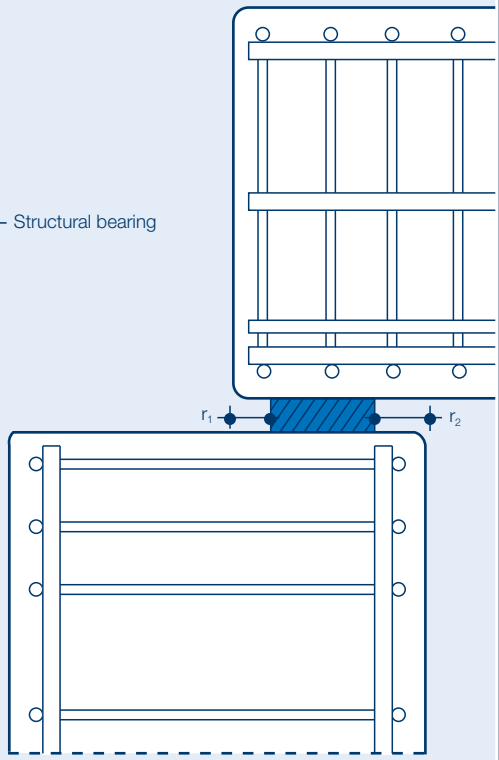
Plan view



Front view

Notation

l = Bearing length
b = Bearing width
t = Bearing thickness
l_A = Component covering length
b_A = Component covering width
r_l = Edge distance from bearing (= distance from the bearing edge to the outer edge of the structural element)



Bearing edge distance for reinforced concrete components

Maximum plan dimensions of an elastomeric bearing for reinforced concrete structures. The provisions of DIN 1045-1 and DAfStb Booklet 525 must be observed. In the case of timber or steel components, the edge distances must be at least 3 cm.

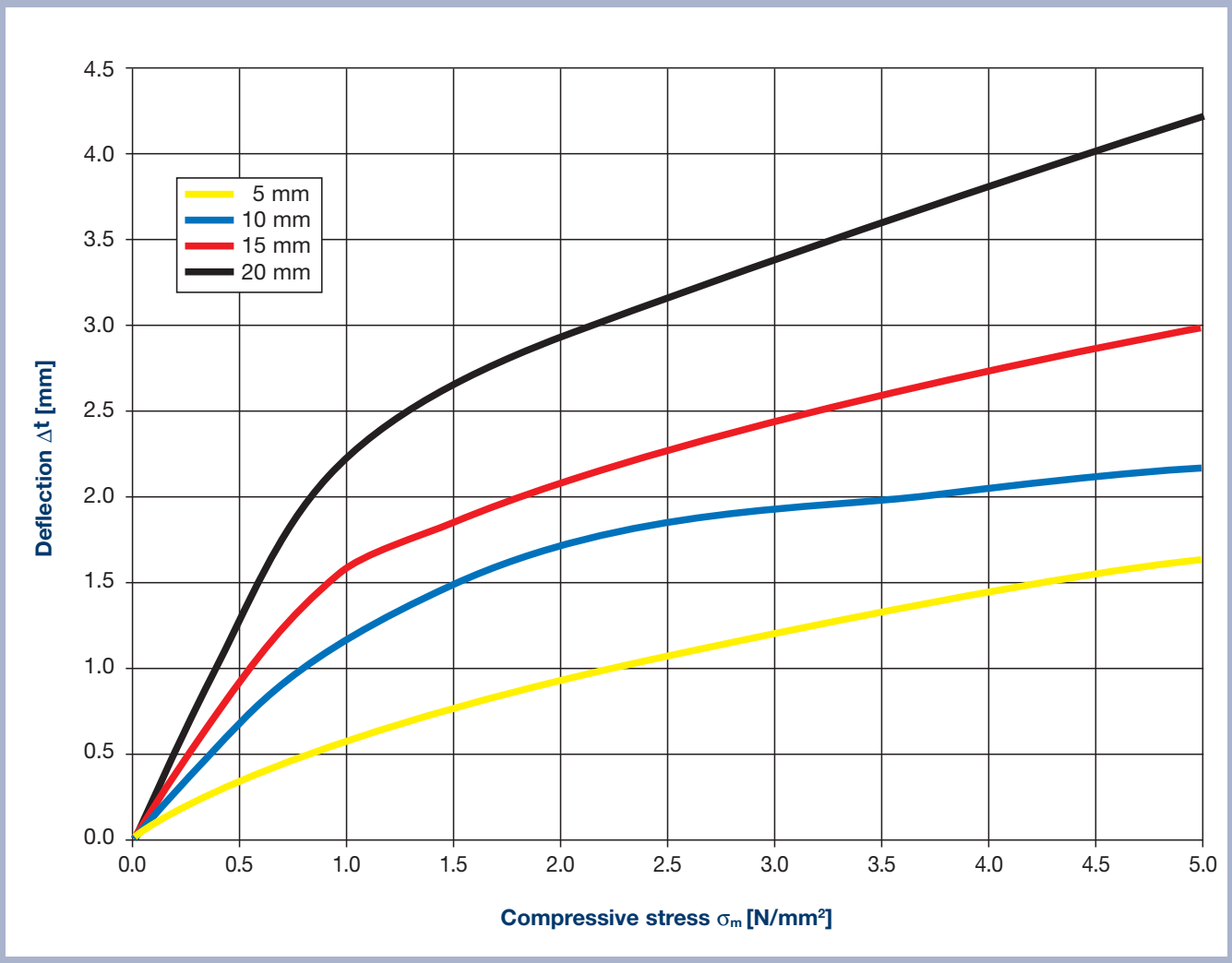
Compression Bearing; Strip bearing

Elastomer width	Bearing thickness							
	t = 5 mm		t = 10 mm		t = 15 mm		t = 20 mm	
b [mm]	All. V [kN/m]	All. α [‰]	All. V [kN/m]	All. α [‰]	All. V [kN/m]	All. α [‰]	All. V [kN/m]	All. α [‰]
25	122	40	–	–	–	–	–	–
40	200	25	–	–	–	–	–	–
50	250	20	244	40	–	–	–	–
60	300	17	300	33	–	–	–	–
70	350	14	350	29	–	–	–	–
75	375	13	375	27	366	40	–	–
80	400	13	400	25	431	38	–	–
90	450	11	450	22	450	33	–	–
100	500	10	500	20	500	30	488	40
110	550	9	550	18	550	27	622	36
120	600	8	600	17	600	25	600	33
130	650	8	650	15	650	23	650	31
140	700	7	700	14	700	21	700	29
150	750	7	750	13	750	20	750	27
160	800	6	800	13	800	19	800	25
170	850	6	850	12	850	18	850	24
180	900	6	900	11	900	17	900	22
190	950	5	950	11	950	16	950	21
200	1000	5	1000	10	1000	15	1000	20

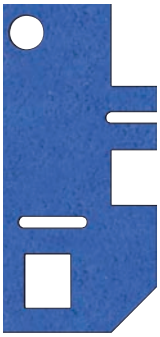
In-situ concrete installation: Embedded in polystyrene
Fire resistance classes F 90/F 120 installation: Embedded in Ciflamon fire protection board

Design table

Deflection


4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
5 mm
10 mm
15 mm
20 mm
Deflection Δt [mm]
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
Compressive stress σm [N/mm²]

Standard cut-outs



Round hole

Corner notch

Slit notch

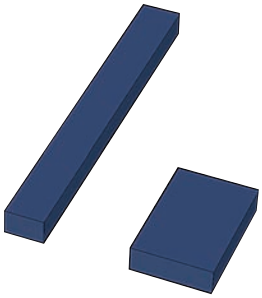
Rectangular notch

Slot

Rectangular hole

Corner chamfer

Point and strip bearings in precast construction



Point and strip bearings in in-situ construction, embedded in polystyrene or Ciflamon with cover

Calenberg Compression Bearing, standard cut-outs and delivery forms

Delivery forms

Calenberg Compression bearings are supplied cut to the plan sizes required for each structure. Holes, cut-outs, slots etc. can be provided to allow bolts or dowels to pass through the bearing.

The bearings can be embedded in polystyrene at the factory for installation in in-situ concrete structures. Where fire resistance classes F 90 or F 120 are required, the bearings are supplied embedded in a Ciflamon fire protection board at least 30 mm wide.

Dimensions

- Bearing thickness: 5, 10, 15, 20 mm
- Maximum cut size: 1200 mm x 1200 mm

Delivery forms

Test certificate

Test certificate, proof of suitability

- National Technical Approval Certificate No. P-852.0290-6 Institute for Mechanical Engineering Materials and Plastics, Technical University of Hanover, 2002
- 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.

Use and fields of application

Calenberg Compression Bearings are used in all areas of construction as permanently elastic articulating connection elements. In building structures, their main use is as point bearings for providing elastic support to beams and joists, and as strip bearings under decks and walls.

Installation

In precast construction, no special constructional measures are required where the Compression Bearing is installed centrally on the bearing surface. In the case of concrete components, the distance to the outer edge of the component must be at least 3 cm and the steel reinforcement must enclose the area of the bearing. Chamfered component edges are to be similarly treated. The provisions of DIN 1045-1 and DAfStb Booklet 525 must be observed.

In in-situ concrete construction the bearing joints must be filled and covered so that no concrete can penetrate them. A rigid connection must be avoided; the spring effect of the bearing must be guaranteed in every case.

Fire behaviour

Fire Safety Report No. 3799/7357-AR by the Technical University (TU) of Braunschweig shall be determinant for elastomeric bearings installed in situations where fire safety has to be taken into account. The report describes minimum dimensions and other measures that fulfil the requirements of DIN 4102-2: Fire Behaviour of Building Materials and Building Components, 1977-09.

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