CALENBERG

COMPACT BEARING S 65
Unreinforced elastomeric bearing loadable to 14 N/mm²

A LISEGA Group Company

SECURELY AND PERMANENTLY BEDDED

ENHANCING LIVING COMFORT WITH CALENBERG

Premium grade rubber material and a high quality standard in our elastomer bearings guarantee freedom from maintenance, a long service life and consequently absolute damage-free construction.

KNOW HOW

Prevention of structural damage

Permanent loads (e.g. inherent weight of the structure), variable influences (e.g. wind) and constraining forces (e.g. from temperature changes, creep, component tolerances or settlements) result in deformations of structural components. Without the use of suitable elastomeric bearings, these impacts mentioned will cause damage to structures. In addition to cracks and spalling, there can also be large-scale destruction of the adjacent components, which need to be repaired at considerable expense in terms of time and cost.

In component connections, the elastic effect of the structural bearings transfers forces centrically and at the same time compensates for plane-parallel deviations. Shear deformations from non-permanent horizontal effects are absorbed by the elastomer bearings.

Advantages for our customers

The extremely high bearing loads of the bearings enable filigree and cost-effective structural designs. Elastomer bearings do not require maintenance and do not need to be replaced if correctly dimensioned and installed. The designers also secure the material reserves in the event of unforeseen load conditions. The service life of the construction bearings is at least equal to the service life of the adjacent components. Our elastomeric bearings increase the value of the building by avoiding structural damage and eliminating renovation and maintenance costs. The static elastomeric bearings transmit forces, twists and displacements into the adjacent components permanently and damage-free.

Product features

- Simple design (shape factor based)
- Maintenance free
- Weather and ozone resistant
- Extremely durable
- Very low creep behaviour
- Premium grade material (EPDM)
- Approved by building authorities

The Compact bearing S 65

Product description
The Calenberg Compact Bearing S 65 is an unreinforced elastomeric bearing with smooth contact surfaces. The main component is an ageing resistant EPDM elastomeric material with a hardness of 65 ± 5 Shore A. The material is weather and ozone resistant.
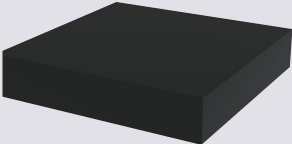
Use and areas of application
Calenberg Compact Bearings S 65 are used in all areas of construction as permanently elastic articulating connection elements. In building structures, their main use is as point bearings for providing elastic support to beams and joists, and as strip bearings under decks and walls.

Building authority approval
The approval for use as a construction bearing in building construction is regulated by the standard building authority certification Z-16.32-474, issued by the Deutsches Institut für Bautechnik.

Behaviour in fire
For fire safety requirements, the fire safety report No. 3799/7357-AR by the Technical University (TU) of Braunschweig shall be taken into account. The report describes minimum dimensions and other measures that fulfil the requirements of DIN 4102-2.

EXCERPT FROM THE TECHNICAL DATA				
	Type of bearing	Bearing thickness [mm]	Compressive stress	Approval
	Unreinforced deformation bearing	5[*]	$\sigma_{R,d} \leq 14$ N/mm^2	Approval no. Z-16.32-474, issued by the DIBt Berlin
		8[*]		
		10		
		15		
		20		
		25		
		30		

[*] without building authority approval

Delivery forms

Calenberg Compact Bearings S 65 are supplied in almost any desired dimension for the specific structure. The bearings can be provided with holes, cut-outs, slots, etc.

The bearings are embedded in polystyrene at the factory and equipped with a watertight plastic cover for in-situ concrete construction.

For fire protection requirements, a Ciflamon fire protection board with a width of at least 30 mm shall be provided if required.

STANDARD CUT-OUTS
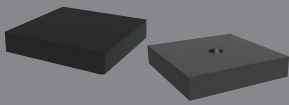
Hole

Corner notch

Slot

Rectangular notch

Slit notch

Rectangular hole

Diagonal cut

DIMENSIONS

Bearing thickness	Maximum cut size	Minimum cut size	Minimum width
5*, 8*, 10, 15, 20, 25, 30 mm	1200 mm x 1200 mm	70 mm x 70 mm für $b_1 \geq 100$ mm also $a_1 \geq 50$ mm	5 x bearing thickness

* without building authority approval

Point and strip bearings in precast construction

Point and strip bearings in in-situ construction

embedded in polystyrene or Ciflamon with cover

The bearing areas must be designed in accordance with the structural specifications and standards. The required edge distances shall be taken into account in accordance with DIN EN 1992-1-1 (2011-01). The elastomeric bearing must be located within the reinforcement in order to allow planned deformation of the bearing and to avoid spalling at the edge.

EDGE DISTANCE TOP VIEW
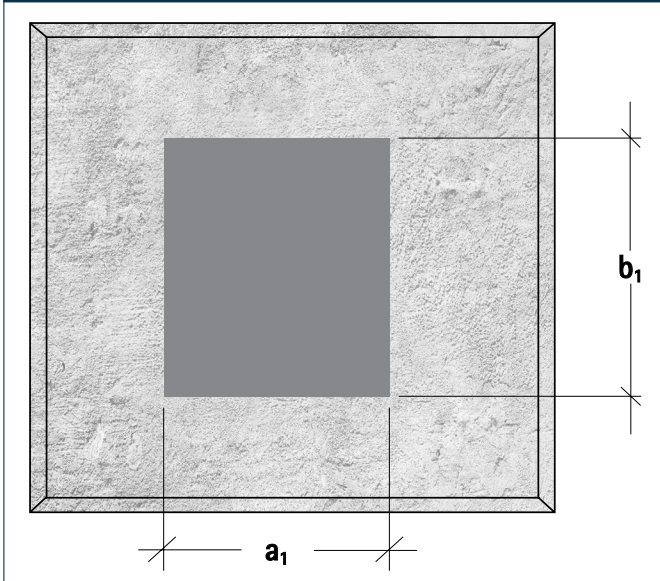
EDGE DISTANCE SIDE VIEW
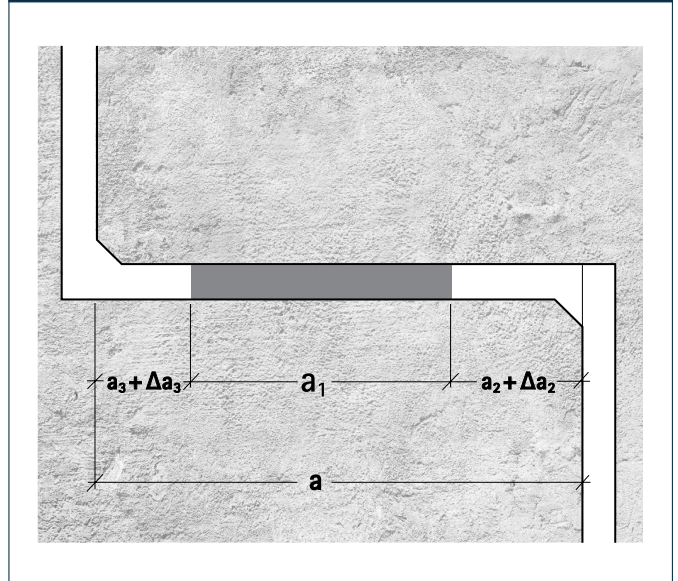
LEGEND

Values for determining the required edge distances according to DIN EN 1992-1-1

a | a_1 | a_2 | Δa_2 | a_3 | Δa_3 | b_1

Installation

Prior to installation, it must be ensured that the elastomer bearings and bearing surfaces are free of dirt, ice, snow, grease, solvents, oils or separating agents.

In in-situ concrete construction the bearing joints must be filled and covered so that no concrete slurry can penetrate them. The spring effect of the bearing must be guaranteed.

Extract from our client reference projects
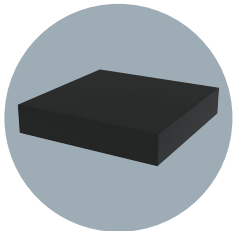
COMPACT BEARING S 65

- Amazon, Sosnowiec, Poland
- Novozymes Innovation Campus, Lyngby, Denmark
- Siemens Plant, Duisburg, Germany
- Metro Cash & Carry shopping centre, Moscow, Russia
- Main station, Berlin, Germany
- Airbus, Hamburg, Germany

Berlin main station, Germany

Airbus, Germany

COMPACT BEARING S 65
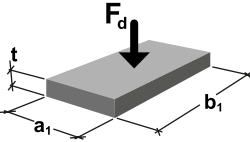Structural bearing for static structural members

Design values

The bearings are dimensioned according to the general building authority approval up to a compressive stress $\sigma_{R,d} = 14\,N/mm^2$. The design concept is based on the shape factor. 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	All. shear deformation	Deflection	Allowable rotation	Transverse tensile forces*

FORMULA

$\sigma_{R,d} =$ $4 \cdot S \le 14\ [N/mm^2]$ Shape factor S see page 2	all. $u = 0,6 \cdot (t-2)$ [mm] Horizontal force $H_d = c_{s(t)} \cdot u \cdot A_E / 20000$ [kN] A minimum compressive stress of 1 N/mm² is required to prevent the bearing from slipping. $c_{s(t)}$ values and boundary conditions, see page 9	See page 7	all. $\alpha = \dfrac{450 \cdot t}{a_1} \le 40$ [‰] (Rectangular bearing) Additional rotation acc. to technical approval: • 10 ‰ from obliquity • $\dfrac{625}{a_1}$ from unevenness see also booklet 600, DAfStb	$Z_{a,d} = 1,5 \cdot F_d \cdot t / b_1$ [kN] (perpendicular to bearing short side) $Z_{b,d} = 1,5 \cdot F_d \cdot t / a_1$ [kN] (perpendicular to bearing long side) *see also booklet 339, DAfStb

LEGEND FORMULA SYMBOLS

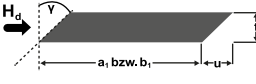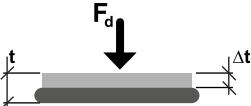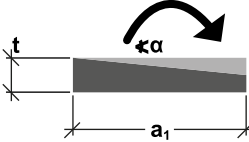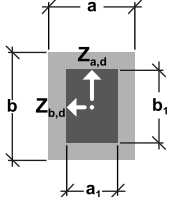|			
F_d	Vertical force	$\sigma_{R,d}$	Design value of the load capacity
H_d	Horizontal force	$\sigma_{E,d}$	Design compressive stress from load
$Z_{a,d}$, $Z_{b,d}$	Transverse tensile force	α	Bearing rotation
A_E	Bearing area	$c_{s(t)}$	Shear stiffness
S	Shape factor, Ratio of pressed bearing surface A_E to unloaded lateral surface	u	Shear deformation of the bearing
		γ	Push angle
a_1	Short side of bearing	t	Thickness of bearing
b_1	Long side of bearing	Δt	Bearing deflection
a	Component width		
b	Component length		

CALENBERG

COMPACT BEARING S 65
Structural bearing for static structural members

Design of the shape factor

For the design of unreinforced elastomeric bearings, the shape factor S is defined as the ratio of the compressed to the freely deformable surface. The shape factor S is used to calculate the permissible compressive stress as a function of the bearing dimensions.

SHAPE FACTOR FOR RECTANGULAR BEARING

Without drilled holes

$$S = \frac{b_1 \cdot a_1}{2 \cdot t \,(b_1 + a_1)}$$

With drilled holes, $n \leq 2$

$$S = \frac{a \cdot b - \frac{\pi}{4} n \cdot d^2}{2 \cdot t \,(a+b) + t \cdot \pi \cdot n \cdot d}$$
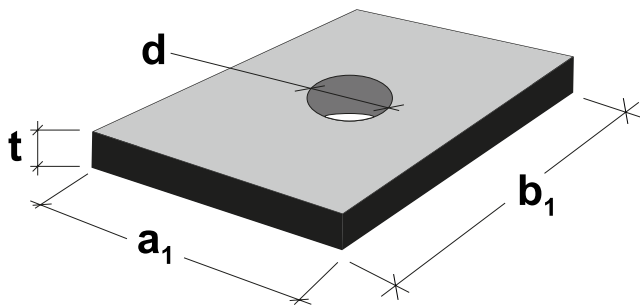
SHAPE FACTOR FOR BEARING STRIP

$$S = \frac{a_1}{2 \cdot t} \qquad b_1 \gg a_1$$

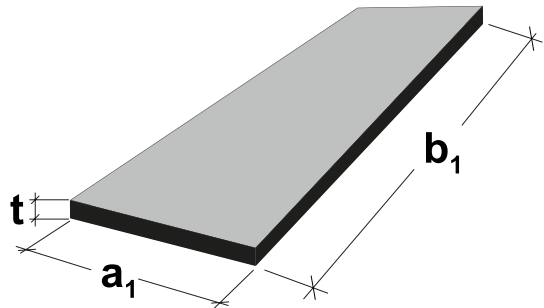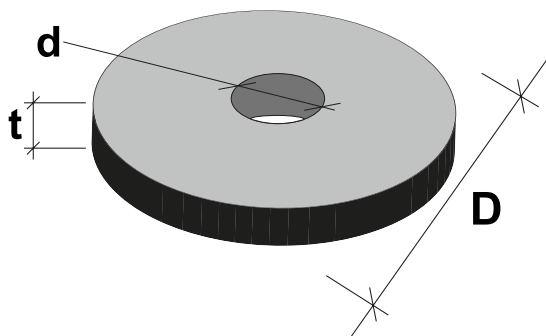### SHAPE FACTOR FOR CIRCULAR BEARING

Without drilled holes

$$S = \frac{D}{4 \cdot \sqrt{2}\ t}$$

With drilled holes

$$S = \frac{D - d}{4 \cdot \sqrt{2}\ t}$$

3

CALENBERG

COMPACT BEARING S 65
Structural bearing for static structural members

Thicknesses: 10 and 15mm

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.

Thickness [mm]	all. rotation α [‰]	Width [mm]	DESIGN VALUE OF THE LOAD CAPACITY, $\sigma_{R,d}$ [N/mm²] BEARING LENGTH [mm]																		
			70	80	90	100	110	120	130	140	150	175	200	225	250	275	300	350	400	450	500
10	40,0	50	-	-	-	6,7	6,9	7,1	7,2	7,4	7,5	7,8	8,0	8,2	8,3	8,5	8,6	8,8	8,9	9,0	9,1
	40,0	60	-	-	-	7,5	7,8	8,0	8,2	8,4	8,6	8,9	9,2	9,5	9,7	9,9	10,0	10,2	10,4	10,6	10,7
	40,0	70	7,0	7,5	7,9	8,2	8,6	8,8	9,1	9,3	9,5	10,0	10,4	10,7	10,9	11,2	11,4	11,7	11,9	12,1	12,3
	40,0	80	7,5	8,0	8,5	8,9	9,3	9,6	9,9	10,2	10,4	11,0	11,4	11,8	12,1	12,4	12,6	13,0	13,3	13,6	13,8
	40,0	90	7,9	8,5	9,0	9,5	9,9	10,3	10,6	11,0	11,3	11,9	12,4	12,9	13,2	13,6	13,8				
	40,0	100	8,2	8,9	9,5	10,0	10,5	10,9	11,3	11,7	12,0	12,7	13,3	13,8							
	40,0	110	8,6	9,3	9,9	10,5	11,0	11,5	11,9	12,3	12,7	13,5									
	37,5	120	8,8	9,6	10,3	10,9	11,5	12,0	12,5	12,9	13,3										
	34,6	130	9,1	9,9	10,6	11,3	11,9	12,5	13,0	13,5	13,9										
	32,1	140	9,3	10,2	11,0	11,7	12,3	12,9	13,5												
	30,0	150	9,5	10,4	11,3	12,0	12,7	13,3	13,9												
	28,1	160	9,7	10,7	11,5	12,3	13,0	13,7													
	25,7	175	10,0	11,0	11,9	12,7	13,5														
	22,5	200	10,4	11,4	12,4	13,3															
	18,0	250	10,9	12,1	13,2																
	15,0	300	11,4	12,6	13,8																
	12,9	350	11,7	13,0																	
	11,3	400	11,9	13,3																	
	10,0	450	12,1	13,6																	
	9,0	500	12,3	13,8																	
	8,2	550	12,4																		
	7,5	600	12,5																		

14,0

Thickness [mm]	all. rotation α [‰]	Width [mm]	DESIGN VALUE OF THE LOAD CAPACITY, $\sigma_{R,d}$ [N/mm²] BEARING LENGTH [mm]																		
			75	80	90	100	110	120	130	140	150	175	200	225	250	275	300	350	400	450	500
15	40,0	70	4,8	5,0	5,3	5,5	54,7	5,9	6,1	6,2	6,4	6,7	6,9	7,1	7,3	7,4	7,6	7,8	7,9	8,1	8,2
	40,0	80	5,2	5,3	5,6	5,9	6,2	6,4	6,6	6,8	7,0	7,3	7,6	7,9	8,1	8,3	8,4	8,7	8,9	9,1	9,2
	40,0	90	5,5	5,6	6,0	6,3	6,6	6,9	7,1	7,3	7,5	7,9	8,3	8,6	8,8	9,0	9,2	9,5	9,8	10,0	10,2
	40,0	100	5,7	5,9	6,3	6,7	7,0	7,3	7,5	7,8	8,0	8,5	8,9	9,2	9,5	9,8	10,0	10,4	10,7	10,9	11,1
	40,0	110	5,9	6,2	6,6	7,0	7,3	7,7	7,9	8,2	8,5	9,0	9,5	9,9	10,2	10,5	10,7	11,2	11,5	11,8	12,0
	40,0	120	6,2	6,4	6,9	7,3	7,7	8,0	8,3	8,6	8,9	9,5	10,0	10,4	10,8	11,1	11,4	11,9	12,3	12,6	12,9
	40,0	130	6,3	6,6	7,1	7,5	7,9	8,3	8,7	9,0	9,3	9,9	10,5	11,0	11,4	11,8	12,1	12,6	13,1	13,4	13,8
	40,0	140	6,5	6,8	7,3	7,8	8,2	8,6	9,0	9,3	9,7	10,4	11,0	11,5	12,0	12,4	12,7	13,3	13,8		
	40,0	150	6,7	7,0	7,5	8,0	8,5	8,9	9,3	9,7	10,0	10,8	11,4	12,0	12,5	12,9	13,3				
	40,0	160	6,8	7,1	7,7	8,2	8,7	9,1	9,6	10,0	10,3	11,1	11,9	12,5	13,0	13,5	13,9				
	38,6	175	7,0	7,3	7,9	8,5	9,0	9,5	9,9	10,4	10,8	11,7	12,4	13,1	13,7						
	33,8	200	7,3	7,6	8,3	8,9	9,5	10,0	10,5	11,0	11,4	12,4	13,3								
	27,0	250	7,7	8,1	8,8	9,5	10,2	10,8	11,4	12,0	12,5	13,7									
	22,5	300	8,0	8,4	9,2	10,0	10,7	11,4	12,1	12,7	13,3										
	19,3	350	8,2	8,7	9,5	10,4	11,2	11,9	12,6	13,3											
	16,9	400	8,4	8,9	9,8	10,7	11,5	12,3	13,1	13,8											
	15,0	450	8,6	9,1	10,0	10,9	11,8	12,6	13,4												
	13,5	500	8,7	9,2	10,2	11,1	12,0	12,9	13,8												
	12,3	550	8,8	9,3	10,3	11,3	12,2	13,1													
	11,3	600	8,9	9,4	10,4	11,4	12,4	13,3													

14,0

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

COMPACT BEARING S 65
Structural bearing for static structural members

Thicknesses: 20 and 25mm

Thickness [mm]	α [‰] all. rotation	Width [mm]	100	110	120	125	130	140	150	175	200	225	250	275	300	350	400	450	500
20	40,0	100	5,0	5,2	5,5	5,6	5,7	5,8	6,0	6,4	6,7	6,9	7,1	7,3	7,5	7,8	8,0	8,2	8,3
	40,0	110	5,2	5,5	5,7	5,9	6,0	6,2	6,3	6,8	7,1	7,4	7,6	7,9	8,0	8,4	8,6	8,8	9,0
	40,0	120	5,5	5,7	6,0	6,1	6,2	6,5	6,7	7,1	7,5	7,8	8,1	8,4	8,6	8,9	9,2	9,5	9,7
	40,0	130	5,7	6,0	6,2	6,4	6,5	6,7	7,0	7,5	7,9	8,2	8,6	8,8	9,1	9,5	9,8	10,1	10,3
	40,0	140	5,8	6,2	6,5	6,6	6,7	7,0	7,2	7,8	8,2	8,6	9,0	9,3	9,5	10,0	10,4	10,7	10,9
	40,0	150	6,0	6,3	6,7	6,8	7,0	7,2	7,5	8,1	8,6	9,0	9,4	9,7	10,0	10,5	10,9	11,3	11,5
	40,0	160	6,2	6,5	6,9	7,0	7,2	7,5	7,7	8,4	8,9	9,4	9,8	10,1	10,4	11,0	11,4	11,8	12,1
	40,0	175	6,4	6,8	7,1	7,3	7,5	7,8	8,1	8,8	9,3	9,8	10,3	10,7	11,1	11,7	12,2	12,6	13,0
	40,0	200	6,7	7,1	7,5	7,7	7,9	8,2	8,6	9,3	10,0	10,6	11,1	11,6	12,0	12,7	13,3	13,8	
	36,0	250	7,1	7,6	8,1	8,3	8,6	9,0	9,4	10,3	11,1	11,8	12,5	13,1	13,6				
	30,0	300	7,5	8,0	8,6	8,8	9,1	9,5	10,0	11,1	12,0	12,9	13,6						
	25,7	350	7,8	8,4	8,9	9,2	9,5	10,0	10,5	11,7	12,7	13,7							
	22,5	400	8,0	8,6	9,2	9,5	9,8	10,4	10,9	12,2	13,3								
	20,0	450	8,2	8,8	9,5	9,8	10,1	10,7	11,3	12,6	13,8								
	18,0	500	8,3	9,0	9,7	10,0	10,3	10,9	11,5	13,0									
	16,4	550	8,5	9,2	9,9	10,2	10,5	11,2	11,8	13,3									
	15,0	600	8,6	9,3	10,0	10,3	10,7	11,4	12,0	13,5									

14,0

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

Thickness [mm]	α [‰] all. rotation	Width [mm]	125	130	140	150	175	200	225	250	275	300	350	400	450	500
25	40,0	125	5,0	5,1	5,3	5,5	5,8	6,2	6,4	6,7	6,9	7,1	7,4	7,6	7,8	8,0
	40,0	130	5,1	5,2	5,4	5,6	6,0	6,3	6,6	6,8	7,1	7,3	7,6	7,8	8,1	8,3
	40,0	140	5,3	5,4	5,6	5,8	6,2	6,6	6,9	7,2	7,4	7,6	8,0	8,3	8,5	8,8
	40,0	150	5,5	5,6	5,8	6,0	6,5	6,9	7,2	7,5	7,8	8,0	8,4	8,7	9,0	9,2
	40,0	160	5,6	5,7	6,0	6,2	6,7	7,1	7,5	7,8	8,1	8,3	8,8	9,1	9,4	9,7
	40,0	175	5,8	6,0	6,2	6,5	7,0	7,5	7,9	8,2	8,6	8,8	9,3	9,7	10,1	10,4
	40,0	200	6,2	6,3	6,6	6,9	7,5	8,0	8,5	8,9	9,3	9,6	10,2	10,7	11,1	11,4
	40,0	250	6,7	6,8	7,2	7,5	8,2	8,9	9,5	10,0	10,5	10,9	11,7	12,3	12,9	13,3
	37,5	300	7,1	7,3	7,6	8,0	8,8	9,6	10,3	10,9	11,5	12,0	12,9	13,7		
	32,1	350	7,4	7,6	8,0	8,4	9,3	10,2	11,0	11,7	12,3	12,9				
	28,1	400	7,6	7,8	8,3	8,7	9,7	10,7	11,5	12,3	13,0	13,7				
	25,0	450	7,8	8,1	8,5	9,0	10,1	11,1	12,0	12,9	13,7					
	22,5	500	8,0	8,3	8,8	9,2	10,4	11,4	12,4	13,3						
	20,5	550	8,1	8,4	8,9	9,4	10,6	11,7	12,8	13,8						
	18,8	600	8,3	8,5	9,1	9,6	10,8	12,0	13,1							

14,0

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

5

COMPACT BEARING S 65
Structural bearing for static structural members

Thickness: 30mm

BEARING [mm]	α [‰]	[mm]	DESIGN VALUE OF THE LOAD CAPACITY, $\sigma_{R,d}$ [N/mm²]										
Thickness	all. rotation	Width	BEARING LENGTH [mm]										
			150	175	200	225	250	275	300	350	400	450	500
30	40,0	150	5,0	5,4	5,7	6,0	6,3	6,5	6,7	7,0	7,3	7,5	7,7
	40,0	160	5,2	5,6	5,9	6,2	6,5	6,7	7,0	7,3	7,6	7,9	8,1
	40,0	175	5,4	5,8	6,2	6,6	6,9	7,1	7,4	7,8	8,1	8,4	8,6
	40,0	200	5,7	6,2	6,7	7,1	7,4	7,7	8,0	8,5	8,9	9,2	9,5
	40,0	250	6,3	6,9	7,4	7,9	8,3	8,7	9,1	9,7	10,3	10,7	11,1
	40,0	300	6,7	7,4	8,0	8,6	9,1	9,6	10,0	10,8	11,4	12,0	12,5
	38,6	350	7,0	7,8	8,5	9,1	9,7	10,3	10,8	11,7	12,4	13,1	13,7
	33,8	400	7,3	8,1	8,9	9,6	10,3	10,9	11,4	12,4	13,3		
	30,0	450	7,5	8,4	9,2	10,0	10,7	11,4	12,0	13,1			
	27,0	500	7,7	8,6	9,5	10,3	11,1	11,8	12,5	13,7			
	24,5	550	7,9	8,9	9,8	10,6	11,5	12,2	12,9				
	22,5	600	8,0	9,0	10,0	10,9	11,8	12,6	13,3				

14,0

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

6

COMPACT BEARING S 65
Structural bearing for static structural members

Thicknesses: 10, 15, 20, 25 and 30mm

STRIP BEARINGS										
BEARING WIDTH	COMPACT BEARING S 65									
a_1	BEARING THICKNESSES									
	t = 10 mm		t = 15 mm		t = 20 mm		t = 25 mm		t = 30 mm	
	$F_{R,d}$	all. α	$F_{R,d}$	all. α	$F_{R,d}$	all. α	$F_{R,d}$	all. α	$F_{R,d}$	all. α
[mm]	[kN/m]	[‰]	[kN/m]	[‰]	[kN/m]	[‰]	[kN/m]	[‰]	[kN/m]	[‰]
50	500	40	-	-	-	-	-	-	-	-
60	720	40	-	-	-	-	-	-	-	-
70	980	40	-	-	-	-	-	-	-	-
80	1120	40	853	40	-	-	-	-	-	-
90	1260	40	1080	40	-	-	-	-	-	-
100	1400	40	1333	40	1000	40	-	-	-	-
110	1540	40	1540	40	1210	40	-	-	-	-
120	1680	37,5	1680	40	1440	40	-	-	-	-
130	1820	34,6	1820	40	1690	40	1352	40	-	-
140	1960	32,1	1960	40	1960	40	1568	40	-	-
150	2100	30,0	2100	40	2100	40	1800	40	1500	40
160	2240	28,1	2240	40	2240	40	2048	40	1707	40
170	2380	26,5	2380	39,7	2380	40	2312	40	1927	40
180	2520	25,0	2520	37,5	2520	40	2520	40	2160	40
190	2660	23,7	2660	35,5	2660	40	2660	40	2407	40
200	2800	22,5	2800	33,8	2800	40	2800	40	2667	40
210	2940	21,4	2940	32,1	2940	40	2940	40	2940	40
220	3080	20,5	3080	30,7	3080	40	3080	40	3080	40
230	3220	19,6	3220	29,3	3220	39,1	3220	40	3220	40
240	3360	18,8	3360	28,1	3360	37,5	3360	40	3360	40
250	3500	18,0	3500	27,0	3500	36,0	3500	40	3500	40

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

COMPACT BEARING S 65
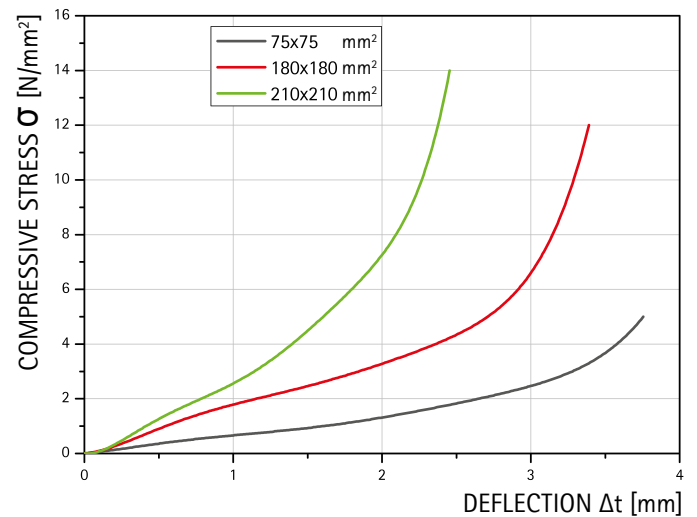## Structural bearing for static structural members

Load deflection curves

The following diagrams show the compression behaviour for different formats when used between concrete surfaces (precast elements).
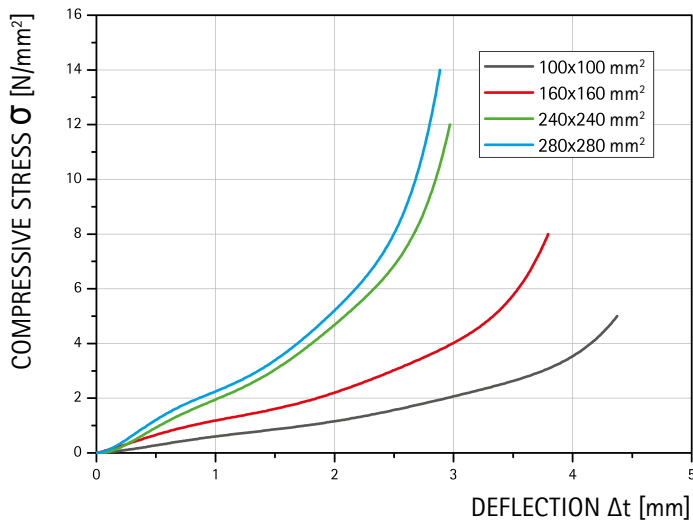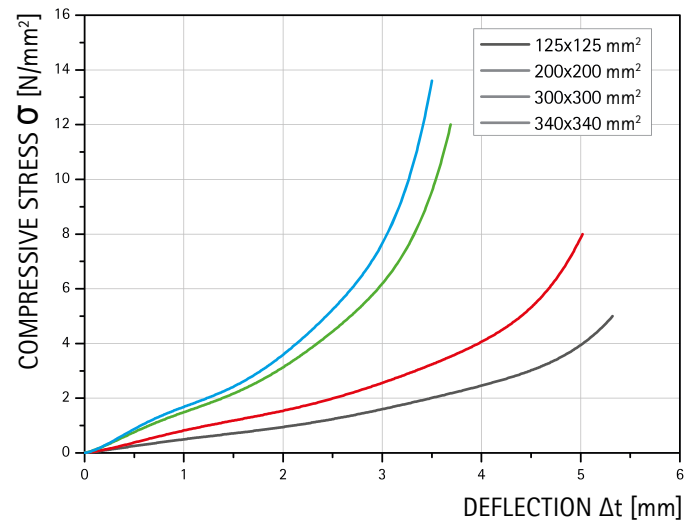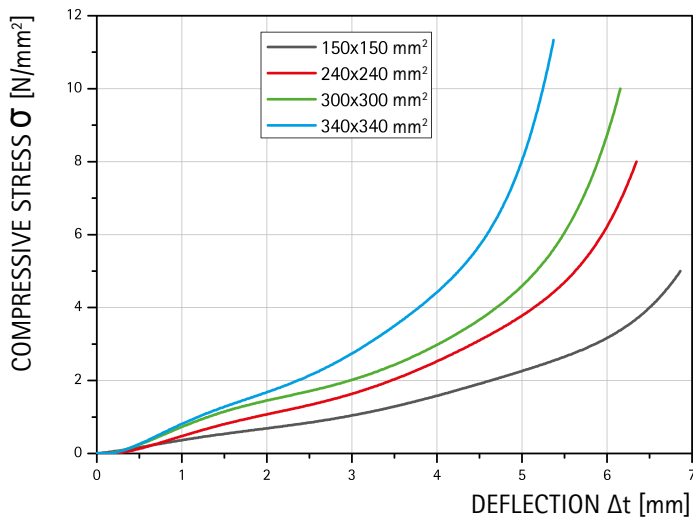
Thickness 10 mm
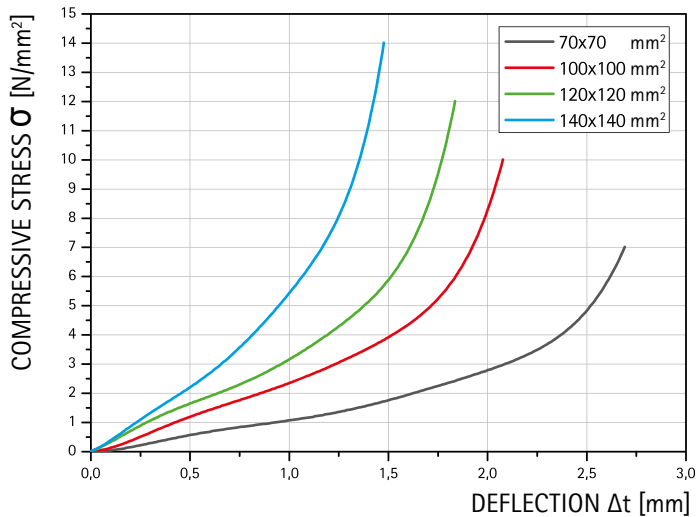
Thickness 15 mm

Thickness 20 mm

Thickness 25 mm

Thickness 30 mm

CALENBERG

COMPACT BEARING S 65
Structural bearing for static structural members

Design example

Given: $F_{E,k} = 590\,kN$ corresponding to $F_{E,d} = 1,4 \times F_{E,k} = 826\,kN^*$, bearing rotation $\alpha = 19\,‰$, horizontal deformation $u = 6,2\,mm$

Selected dimensions:	$a_1 = 160\,mm$, $b_1 = 370\,mm$, $t = 15\,mm$
Shape factor:	$S = \dfrac{160\,mm \times 370\,mm}{2 \times 15\,mm \times (160\,mm + 370\,mm)} = 3,7$

Load capacity:

$\sigma_{R,d} = 4 \times 3,7 = 14,8\,N/mm^2 > 14\,N/mm^2$

$\longrightarrow \sigma_{R,d} = 14\,N/mm^2$

$F_{R,d} = \sigma_{R,d} \times A_E = 14,0\,N/mm^2 \times 160\,mm \times 370\,mm = 828,8\,kN$

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

Bearing distortion from component deflection: $\alpha = 19\,‰$

Additional twisting from obliquity: 10‰

Additional twisting from unevenness: 625 (mm*‰) / a (mm) = 625 / 160 = 3,9‰

Total rotation to be measured:

$\alpha = 19\,‰ + 10\,‰ + 3,9\,‰ = 32,9\,‰$

max. $\alpha = 450\,‰ \times t/a = 450\,‰ \times 15\,mm / 160\,mm = 42,2\,‰ > 40\,‰$

$\longrightarrow$ all. $\alpha = 40\,‰$

all. $\alpha \geq \alpha \longrightarrow$ Angle of twist for rotation is sufficient

Horizontal deformation of structural members: $u = 6,2\,mm$

all. $u = 0,6 \times (t-2) = 7,8\,mm$

all. $u \geq u \longrightarrow$ Shear deformability of the bearing is sufficient

* Note on partial safety factor: The partial safety factor of a compressive load depends on its type. In case of permanent loads it is e.g. 1.35, in case of variable loads 1.5. Since structural bearings in building construction should only be used under predominantly permanent loads, a factor of approximately 1.4 can be used for the ratio between the total characteristic load and the total design rated load.

COMPACT BEARING S 65
Structural bearing for static structural members

CALENBERG
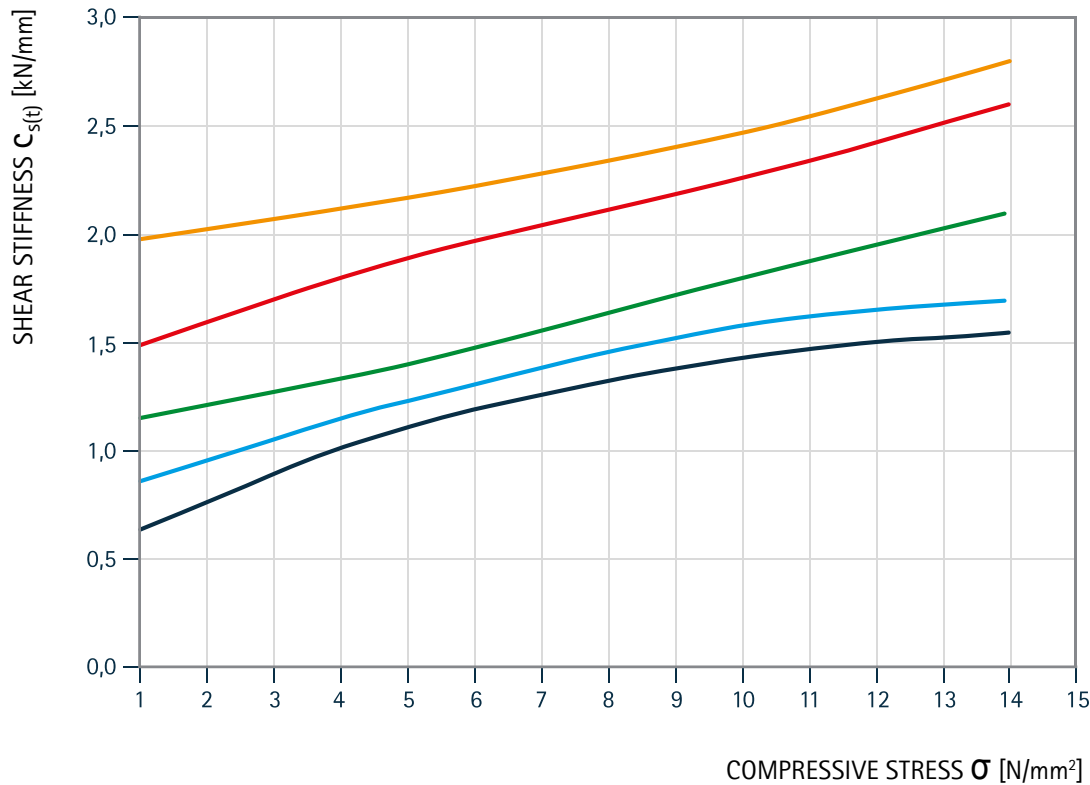
Shear stiffness

SHEAR STIFFNESS CURVE

- 10mm
- 15mm
- 20mm
- 25mm
- 30mm

DIAGRAM

For the horizontal shear deformation from uniquely acting horizontal forces, no verification is required, since uniquely slight sliding does not lead to any damaging changes in the structural layout. If the thrust deflection is to be a „pure" shear deformation, a vertical bearing compressive stress $\sigma_{E,k}$ of at least 1 N/mm² is required.

GOTTFRED PETERSEN A/S

Langelandsvej 15 · DK 5500 Middelfart
T +45 6341 1266 · F + 45 6441 1419
byg@gottfred.dk · gottfred.dk