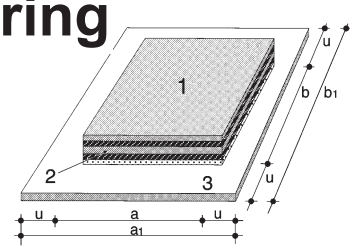
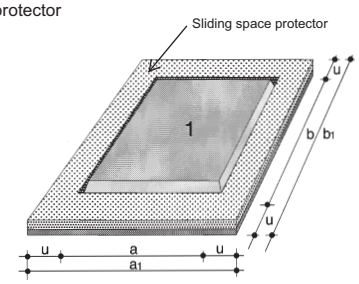
ESZ Fosta sliding bearing

1 = Elastomer compression compensation layer
2 = PTFE sliding film
3 = Sliding plate made from
- stainless steel or
- special plastic
t = Bearing thickness (Compression compensation layer with sliding
u = Sliding distance
b = Load-bearing length
a = Load-bearing width
b_1 = Length of sliding plate
a_1 = Width of sliding plate



Version type BnF
-without sliding space protector



Version type Obn
-with sliding space protector

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INFORMATION REGARDING THE USE OF BEARINGS AND TYPES OF DELIVERY

1. Purpose

The ESZ Fosta sliding bearing allows safe sliding between concrete or steel construction components under conditions of high bearing compression. Two versions are available as standard for this: for max. permissible σm = 15 N/mm2 and max. permissible σm = 25 N/mm2 (HP version). The bearing thicknesses range between 12 and 20 mm.

2. Working principle

The dimensionally stable sliding plate always remains parallel and the functions ‘compression compensation’ and ‘sliding’ are fulfilled separately.

3. Deformations

The sliding distance is freely selectable for all bearing types by the free arrangement of the sliding plate. The bearing can thus be adapted to the structural and constructive requirements. The bearing cushioning is < 20 %, even under the maximum permissible vertical load.

4. Mating surface

Standard case is reinforced concrete mating surfaces. The bearings should be laid within the reinforcement to prevent concrete spalling. In the case of steel contact surfaces, the bearing should be protected on site against slipping by the fitting of strips or purlin cleats.

5. Temperature range in use

The bearing is intended for use within a temperature range of -35° C to +70° C.

6. Fire resistance classes

A slightly modified design of the bearing complies with fire resistance class F 90-B as defined by DIN 4102.

7. Tests/Quality Assurance

The ESZ Fosta sliding bearing has a General Building Authority Test Certificate for use in accordance with DIN 4141-3, bearing class 2. Production is officially externally monitored.

8. Supplied as

- for prefab construction: Type BnF

the bearing can be placed under the structural element to be supported with no further actions.
Depending on requirements the bearing can also be installed with the sliding plate on top.

- for in-situ concrete construction: Type Obn

the bearing is delivered ready for casting with a sliding space protection body in accordance with the above system sketch. Depending on requirements this version can also be installed with the sliding plate on top.

9. Advantages

Displacement freely selectable
On-site positional security possible
Several bearing thicknesses available

(Subject to further technical development)

5.4.1/1100/08.06/SD

ESZ Fosta sliding bearing

steel-reinforced, t = 12/18 mm

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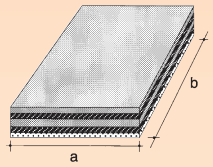
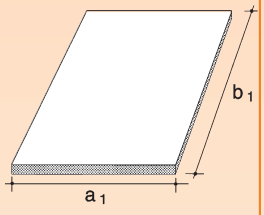
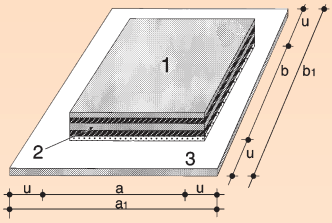
Design table

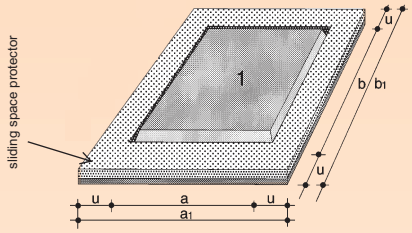
(Permissible loads from characteristic exposure)



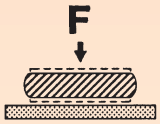
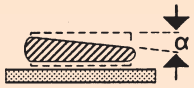




Type BnF



Type Obn with PS sliding space protector

Elastomer pressure equalisation bearing steel-reinforced	Sliding plate for sliding distance u = +/- 15 mm. Any sliding distance possible						
a × b [mm]	$a_1 \times b_1$ = a + 2u × b +2u	perm. F [kN]	perm. σ_m [N/mm²]	perm. α [‰]			
				12 mm		18 mm	
				a	b	a	b
100 × 100	130 × 130	150,0	15,0	10,0	10,0	20,0	20,0
100 × 150	130 × 180	225,0	15,0	10,0	6,6	20,0	13,3
100 × 200	130 × 230	300,0	15,0	10,0	5,0	20,0	10,0
100 × 300	130 × 330	450,0	15,0	10,0	3,3	20,0	6,6
100 × 400	130 × 430	600,0	15,0	10,0	2,5	20,0	5,0
100 × 500	130 × 530	750,0	15,0	10,0	2,0	20,0	4,0
150 × 150	180 × 180	337,5	15,0	6,6	6,6	13,3	13,3
150 × 200	180 × 230	450,0	15,0	6,6	5,0	13,3	10,0
150 × 300	180 × 330	675,0	15,0	6,6	3,3	13,3	6,6
150 × 400	180 × 430	900,0	15,0	6,6	2,5	13,3	5,0
150 × 500	180 × 530	1.125,0	15,0	6,6	2,0	13,3	4,0
200 × 200	230 × 230	600,0	15,0	5,0	5,0	10,0	10,0
200 × 300	230 × 330	900,0	15,0	5,0	3,3	10,0	6,6
200 × 400	230 × 430	1.200,0	15,0	5,0	2,5	10,0	5,0
200 × 500	230 × 530	1.500,0	15,0	5,0	2,0	10,0	4,0
300 × 300	330 × 330	1.350,0	15,0	3,3	3,3	6,6	6,6
400 × 400	430 × 430	2.400,0	15,0	2,5	2,5	5,0	5,0
500 × 500	530 × 530	3.750,0	15,0	2,0	2,0	4,0	4,0

Any intermediate dimension can be supplied. Intermediate dimension can be interpolated. Any sliding distance is possible.
Friction coefficient $\mu \leq 0.10$ ($\sigma m \geq 5 N/mm^2$ at $-20°C \leq T \leq +50°C$).
The bearing must be secured on-site against slipping through in case of compressions < 3 N/mm2 and steel contact surfaces.

RFP text:

Supply and install sliding bearings for the support of precast or in-situ concrete elements. The durability must be verified with a test over the total displacement of > 100 metres.

Bearing type:

ESZ Fosta sliding bearing, type concrete prefab parts/ in-situ concrete
Elastomer pressure equalisation bearing: a x b: mm x mm
sliding plate: a1 x b1: mm x mm
Thickness incl. sliding plate: 12/18 mm
Quantity: ___ pieces
Fire resistance classes: yes/no

(Subject to further technical development)

ESZ Fosta sliding bearing HP

steel-reinforced, t = 14/20 mm

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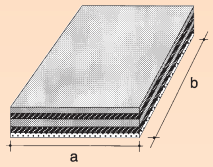
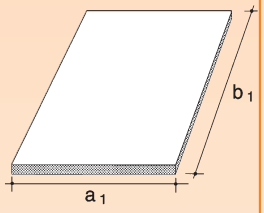
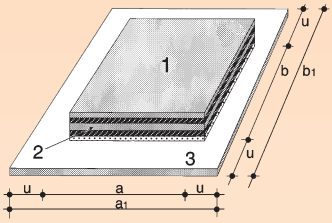
Design table

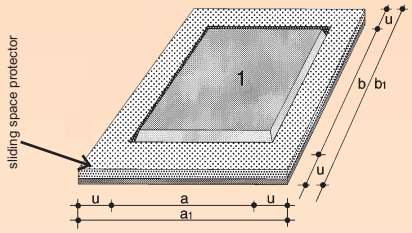
(Permissible loads from characteristic exposure)



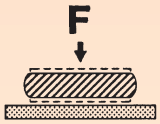
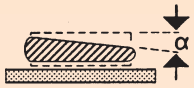




Type BnF



Type Obn with PS sliding space protector

Elastomer pressure equalisation bearing steel-reinforced	Sliding plate for sliding distance u = +/- 15 mm. Any sliding distance possible						
a × b [mm]	$a_1 \times b_1$ = a + 2u × b +2u	perm. F [kN]	perm. σ_m [N/mm²]	perm. α [‰]			
				14 mm		20 mm	
				a	b	a	b
100 × 100	130 × 130	250,0	25,0	10,0	10,0	20,0	20,0
100 × 150	130 × 180	375,0	25,0	10,0	6,6	20,0	13,3
100 × 200	130 × 230	500,0	25,0	10,0	5,0	20,0	10,0
100 × 300	130 × 330	750,0	25,0	10,0	3,3	20,0	6,6
100 × 400	130 × 430	1.000,0	25,0	10,0	2,5	20,0	5,0
100 × 500	130 × 530	1.250,0	25,0	10,0	2,0	20,0	4,0
150 × 150	180 × 180	562,5	25,0	6,6	6,6	13,3	13,3
150 × 200	180 × 230	750,0	25,0	6,6	5,0	13,3	10,0
150 × 300	180 × 330	1.125,0	25,0	6,6	3,3	13,3	6,6
150 × 400	180 × 430	1.500,0	25,0	6,6	2,5	13,3	5,0
150 × 500	180 × 530	1.875,0	25,0	6,6	2,0	13,3	4,0
200 × 200	230 × 230	1.000,0	25,0	5,0	5,0	10,0	10,0
200 × 300	230 × 330	1.500,0	25,0	5,0	3,3	10,0	6,6
200 × 400	230 × 430	2.000,0	25,0	5,0	2,5	10,0	5,0
200 × 500	230 × 530	2.500,0	25,0	5,0	2,0	10,0	4,0
300 × 300	330 × 330	2.250,0	25,0	3,3	3,3	6,6	6,6
400 × 400	430 × 430	4.000,0	25,0	2,5	2,5	5,0	5,0
500 × 500	530 × 530	6.250,0	25,0	2,0	2,0	4,0	4,0

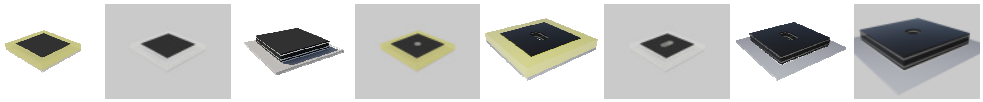
Any intermediate dimension can be supplied. Intermediate dimension can be interpolated. Any sliding distance is possible.
Friction coefficient $\mu \leq 0.10$ ($\sigma m \geq 5 N/mm^2$ at $-20°C \leq T \leq +50°C$).
The bearing must be secured on-site against slipping through in case of compressions < 3 N/mm2 and steel contact surfaces.

RFP text:

Supply and install sliding bearings for the support of precast or in-situ concrete elements. The durability must be verified with a test over the total displacement of > 100 metres.

Bearing type:

ESZ Fosta sliding bearing HP, type concrete prefab parts/ in-situ concrete
Elastomer pressure equalisation bearing: a x b: ___ mm x ___ mm
sliding plate: a1 x b1: ___ mm x ___ mm
Thickness incl. sliding plate: 14/20 mm
Quantity: ___ pieces
Fire resistance classes: yes/no
(Subject to further technical development)



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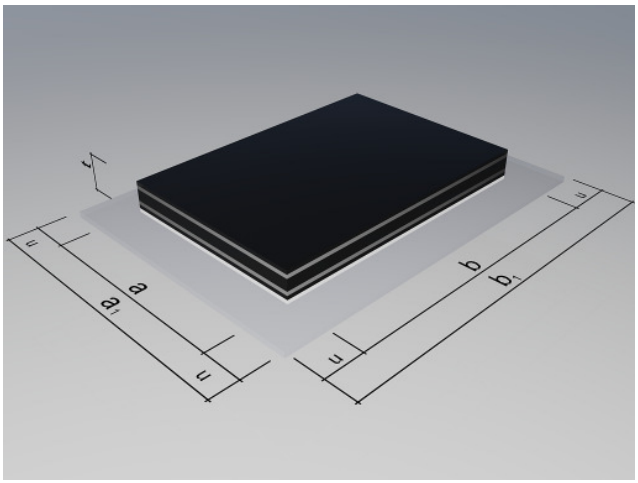
ESZ Fosta sliding bearing

Steel-reinforced sliding bearing
with supervisory certificate

INFORMATION FOR IMPLEMENTATION IN STEEL AND STEEL REINFORCED CONCRETE CONSTRUCTION

The ESZ Fosta sliding bearing and the Fosta sliding bearing HP allow safe sliding between structural elements made of concrete and/or steel with high permissible bearing compressions. The dimensionally stable sliding plates always remains parallel and the functions 'compression compensation' and 'sliding' are separated from one another. The steel reinforced elastomer compression compensation pad consists of a CR rubber in a quality in accordance with DIN EN 1337-3 and is coated with a PTFE material in accordance with DIN EN 1337-2. The sliding plate can alternatively be manufactured from a POM material or a stainless steel plate in accordance with DIN EN 1337-2. Four bearing thicknesses are available as standard:

Fosta sliding bearing with
t= 12 and 18mm ($_{perm.}$ σ = 15 N/mm²)
Fosta sliding bearing HP with t= 14 and 20mm ($_{perm.}$ σ = 25 N/mm²)



Implementation in steel construction:

When used in steel construction, both parts - the elastomer cushion and the sliding plate – should each be undisplaceably connected to the adjacent structural elements.
This additional fixing is necessary because steel has a lower static friction than concrete. Fixing examples for use with steel contact surfaces are illustrated on page 3 of this information. If there is a structural danger of the bearing slipping out, it must be fixed.

Implementation in steel reinforced concrete construction:

With steel reinforced concrete contact surfaces there is generally sufficient static friction between the cushion and the concrete surfaces, as a result of which positional security is not required. However, in the case of low compression (< 3 N/mm²), in particular in connection with low temperatures (< -20 °C), it is necessary to fix the sliding plate to the concrete element using a suitable construction adhesive.

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INFORMATION ON THE COEFFICIENTS OF FRICTION OF THE FOSTA SLIDING BEARING

The friction coefficient of a sliding bearing is not a constant variable. Apart from the properties of the contact surfaces, the friction between materials is determined by the following physical laws:

- Temperature: friction coefficients increase with decreasing temperatures

- Average compression: friction coefficients increase with decreasing average compression

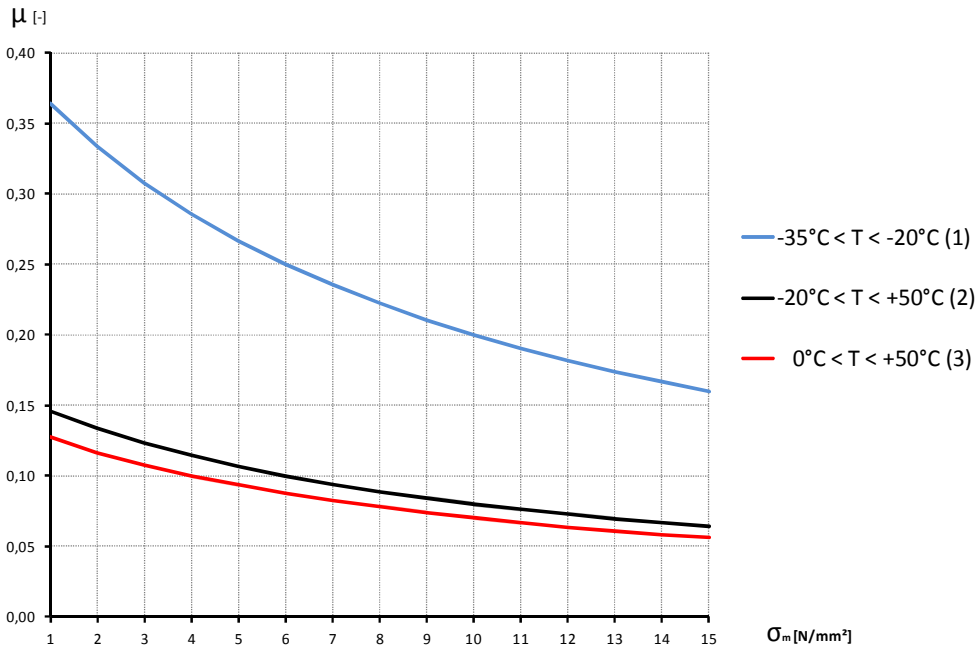
- Total displacement: friction coefficients increase due to wear of the mating faces

- Movement interruptions: high starting friction due to plastic deformation of the mating faces.

These laws are accounted for in the test program for bridge bearings in accordance with DIN EN 1337-2 2004, Appendix D. Since there are presently no standardised requirements for a test program for sliding bearings in building construction, the ESZ Fosta sliding bearing and the Fosta sliding bearing HP have been tested on the basis of the test program mentioned above:

Temperature: 0 / -10 / -20 / -35 / +35 / +21 °C
Average compression: 1/5/10/15 (25) N/mm²
Total displacement: 110 m
Movement interruptions: 1 h between the test sections.
Testing: MPA Stuttgart, order no. 946011000 - 2 and 3 as well as 9910037011-42 and 46.

Friction coefficients μ depending on T and σ_m*

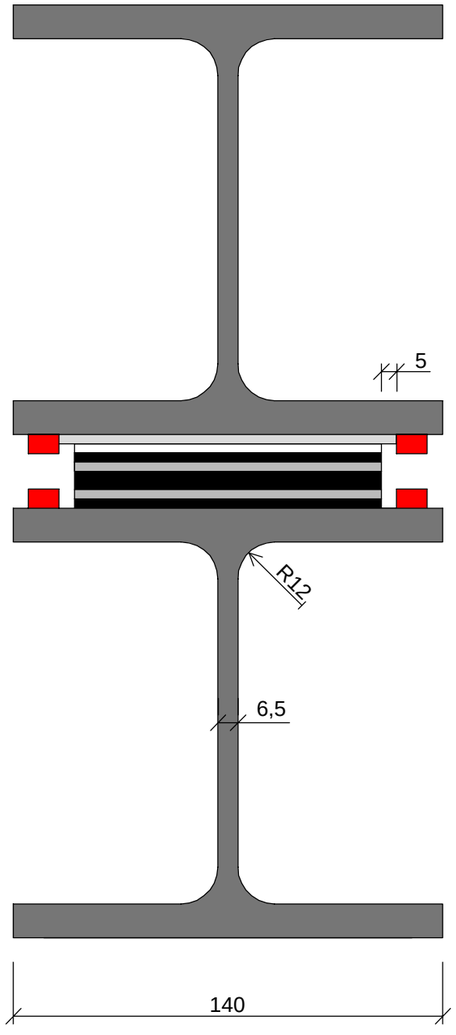


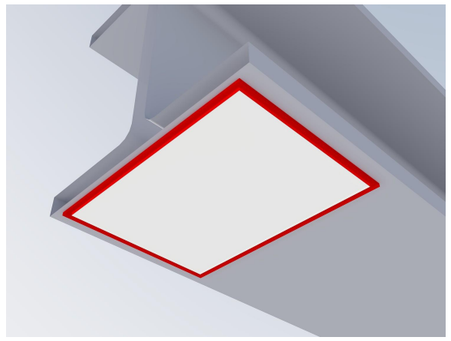
Design formulae:
(1) $4{,}0/(10 + \sigma_m)$
(2) $1{,}6/(10 + \sigma_m)$
(3) $1{,}4/(10 + \sigma_m)$

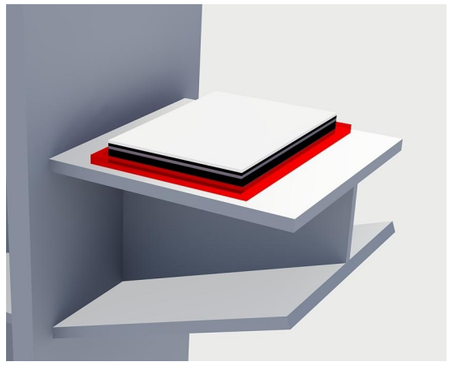
Fosta sliding bearing on steel mating faces

Scale 1:2

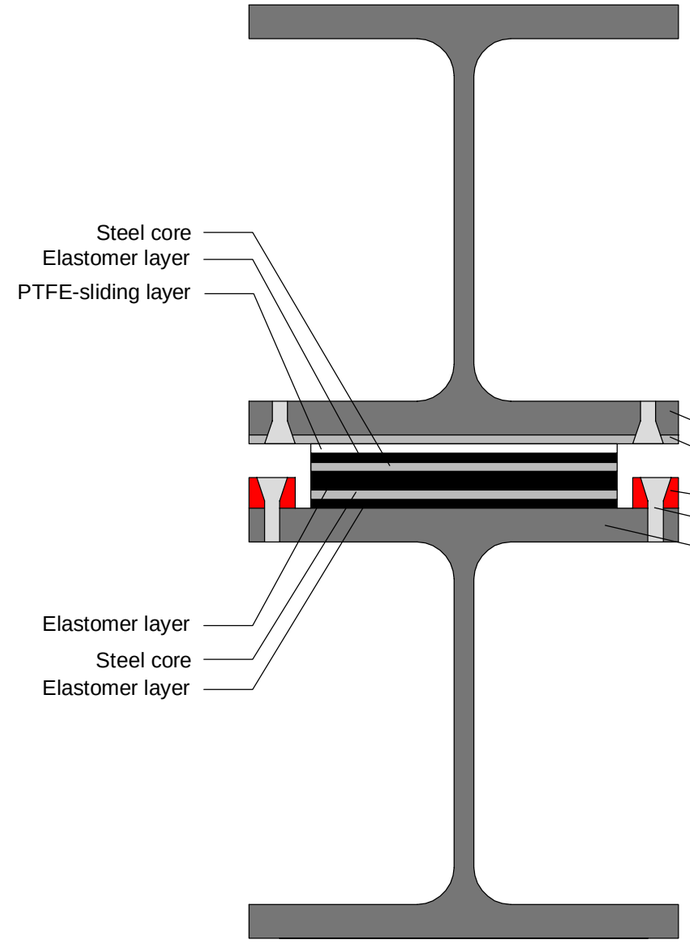
Section I







Section II



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Sketches with labels

Date: 02.08.2012