ESZ Stahl-Elast

WILFRIED BECKER GMBH
Elastomer Service Zentrale

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INFORMATION REGARDING THE USE OF BEARINGS AND TYPES OF DELIVERY

1. Purpose

The ESZ Stahl-Elast is a steel laminated bearing without surface profiling and intended for the static support of components, in particular reinforced and prestressed concrete prefab parts.
The use complies with the requirements of DIN 4141 part 3 for the bearing class 2.

2. Deformation

A mean bearing cushioning of 20 % is to be expected when subject to the maximum loads permissible (see also compression strain graphs).

3. Mating surfaces

The design data applies to the use of the bearings between reinforced concrete mating faces.

4. Temperature range in use

The bearings may be used within a temperature range of -25°C to +50°C.

5. Edge-to-edge distances

The bearings should be laid within the reinforcement, according to DIN 4141 part 15, to avoid chipped edges.

6. Tests/Quality Assurance

The ESZ bearing has a General Building Authority Test Certificate, and its production is officially externally monitored.

7. Supplied as

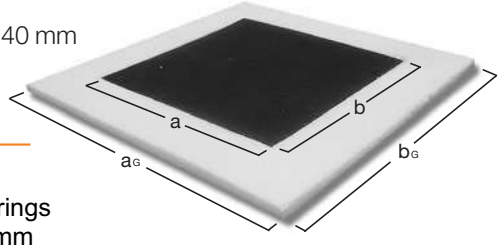
- for prefab construction
Trimmed to size for all the usual elastomer plan areas in reinforced and prestressed concrete prefab construction with holes, cut-outs, oblique cuts etc.
Bearing thicknesses: 10, 20, 30 and 40 mm.

– for in-situ concrete application
The bearing can be fabricated for in-situ concrete applications, ready for pouring with permanent formwork. This applies to all available bearing thicknesses of 10, 20, 30 and 40 mm.

8. RFP and order text

– for use as in-situ concrete point bearing
Supply and install ESZ Stahl-Elast bearings

Bearing thickness: 10/20/30/40 mm
Format of elastomer bearings: a x b mm
Format incl. blind formwork: a_G x b_G mm



– for use between prefab parts
Supply and install ESZ Stahl-Elast bearings
Bearing thickness: 10/20/30/40 mm
Format of elastomer bearings: a x b mm

9. Advantages

High loading capacity for large bearing thicknesses.
Any sizes can be supplied.

 (Subject to further technical development)

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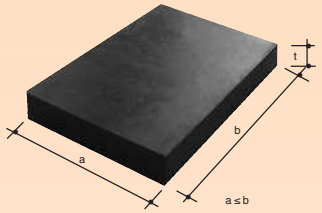
DESIGN INFORMATION

(Permissible loads from characteristic exposure)

Design table in compliance with DIN 4141, part 3 for bearing class 2
Intermediate formats can be interpolated



Dimensions a x b [mm]	Thickness t [mm]	perm. load F [kN]	perm. σ_m [N/mm²]	perm. torsion α [‰] a	b
70 x 70	10	51,4	10,5	18,0	18,0
	20	51,4	10,5	42,0	42,0
	30	51,4	10,5	66,0	66,0
	40	51,4	10,5	90,0	90,0
90 x 90	10	109,4	13,5	14,0	14,0
	20	109,4	13,5	32,7	32,7
	30	109,4	13,5	51,3	51,3
	40	109,4	13,5	70,0	70,0
100 x 100	10	150,0	15,0	12,0	12,0
	20	150,0	15,0	29,4	29,4
	30	150,0	15,0	46,2	46,2
	40	150,0	15,0	63,0	63,0
100 x 150	10	225,0	15,0	12,0	8,4
	20	225,0	15,0	29,4	19,6
	30	225,0	15,0	46,2	30,8
	40	225,0	15,0	63,0	42,0
100 x 200	10	300,0	15,0	12,0	6,3
	20	300,0	15,0	29,4	14,7
	30	300,0	15,0	46,2	23,1
	40	300,0	15,0	63,0	31,5
150 x 150	10	337,5	15,0	8,4	8,4
	20	337,5	15,0	19,6	19,6
	30	337,5	15,0	30,8	30,8
	40	337,5	15,0	42,0	42,0
150 x 200	10	450,0	15,0	8,4	6,3
	20	450,0	15,0	19,6	14,7
	30	450,0	15,0	30,8	23,1
	40	450,0	15,0	42,0	31,5
150 x 300	10	675,0	15,0	8,4	4,2
	20	675,0	15,0	19,6	9,8
	30	675,0	15,0	30,8	15,4
	40	675,0	15,0	42,0	21,0
200 x 200	10	600,0	15,0	6,3	6,3
	20	600,0	15,0	14,7	14,7
	30	600,0	15,0	23,1	23,1
	40	600,0	15,0	31,5	31,5
200 x 300	10	900,0	15,0	6,3	4,2
	20	900,0	15,0	14,7	9,8
	30	900,0	15,0	23,1	15,4
	40	900,0	15,0	31,5	21,0
300 x 300	10	1350,0	15,0	4,2	4,2
	20	1350,0	15,0	9,8	9,8
	30	1350,0	15,0	15,4	15,4
	40	1350,0	15,0	21,0	21,0
350 x 350	10	1837,5	15,0	3,6	3,6
	20	1837,5	15,0	8,4	8,4
	30	1837,5	15,0	13,2	13,2
	40	1837,5	15,0	18,0	18,0
400 x 400	10	2400,0	15,0	3,2	3,2
	20	2400,0	15,0	7,4	7,4
	30	2400,0	15,0	11,6	11,6
	40	2400,0	15,0	15,8	15,8
zul. u [± mm] Horizontal-verschiebung s. auch S. 3	10	4,2			
	20	9,8			
	30	15,4			
	40	21,0			

Designing formulae

(1) Permissible mean vertical compression stress
perm. σ_m: 15 N/mm²
Valid for bearings with side lengths a, b greater than 100 mm.

(2) Permissible horizontal bearing displacement
Perm. u = ± 0.7 x T (T = elastomer thickness)

Bearing thickness		Elastomer thickness
t = 10 mm	→	T = 6 mm
t = 20 mm	→	T = 14 mm
t = 30 mm	→	T = 22 mm
t = 40 mm	→	T = 30 mm

(A factor of 3/4 is applied for elastomer edge layers)

If the horizontal displacements are to be transmitted through elastic shear deformation alone, a compression stress of 3 N/mm² must exist.

(3) Horizontal force (restoring force as a function of the displacement)

perm. $H = c_s \times u \times A$

c_s = specific shear spring coefficient (N/mm³)
A = bearing footprint area (mm²)

t = 10 mm	→	c_s = 0,133 N/mm³
t = 20 mm	→	c_s = 0,0571 N/mm³
t = 30 mm	→	c_s = 0,036 N/mm³
t = 40 mm	→	c_s = 0,0266 N/mm³

(4) Permissible torsion angle for the bearing

perm. $\alpha = 0{,}21 \times \frac{T}{a} \times 10^3$ (‰)

T = net elastomer thickness, see Sec.(2)
a = bearing side perpendicular to the axis of rotation

(Subject to further technical development)

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BEARING STRUCTURE AND COMPRESSION STRAIN GRAPHS

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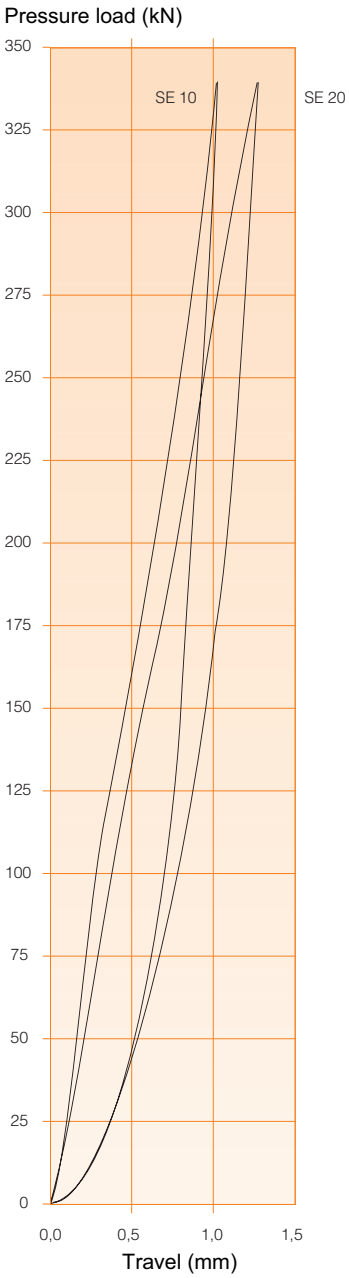
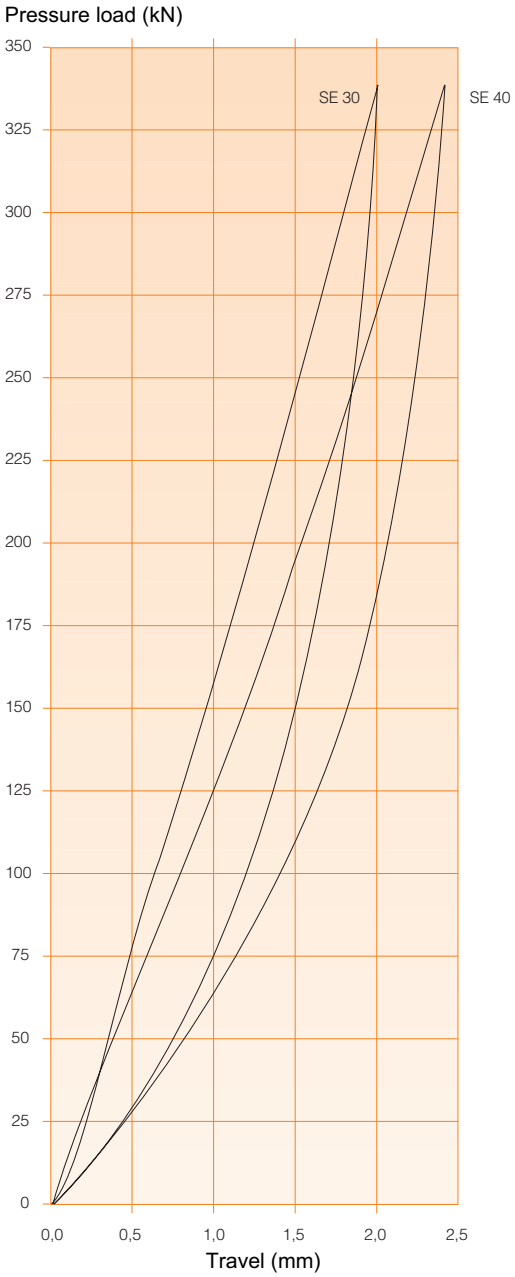
Compression strain graphs



Bearing thicknesses 10 mm (SE 10) and 20 mm (SE 20)
Bearing footprint areas: 150 x 150 mm



Bearing thicknesses 30 mm (SE 30) and 40 mm (SE 40)
Bearing footprint areas: 150 x 150 mm

Bearing structure

Bearing thickness 10 mm

Bearing thickness 20 mm

Bearing thickness 30 mm

Bearing thickness 40 mm

(Subject to further technical development)