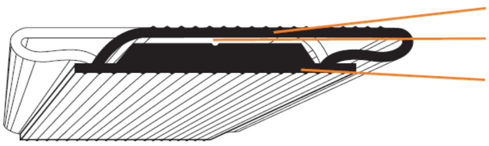


WILFRIED BECKER GMBH
Elastomer Service Zentrale

Weilerhöfe 1
41564 Kaarst-Büttgen

Telefon (0 21 31) 75 81 00
Telefax (0 21 31) 75 81 11

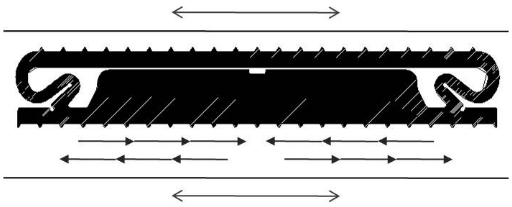
E-Mail: info@esz-becker.de
Internet: www.esz-becker.de

ESZ sliding point rubber bearing GLS-P$_{DBP}$

Unreinforced elastomer linear rubber sliding bearing with general supervisory test certificate

Load perpendicular to the plane of the bearing:
INFORMATION ABOUT TRANSVERSE TENSILE FORCES IN THE BEARING JOINT

The ESZ sliding point rubber bearing GLS-P^{DBP} is practically incompressible.
Hence, it follows that the ESZ sliding point rubber bearing GLS-P^{DBP} expands transversely to the compressive load while the volume remains constant. The bearing is hindered in this transverse expansion to a greater or lesser degree by the adjacent structural elements. (Surface friction). If the adjacent surfaces now prevent the lateral expansion of the elastomer, this must inevitably result in shear stresses in the joint, which leads to tensile stresses in the adjacent material and to compressive stresses in the rubber.
These so-called adhesive tensile stresses in the adjacent material are unwanted. They become larger with increasing elastomer thickness and must not be confused with splitting tensile stresses, which only take effect at a certain depth and occur with all forms of partial area loading. The reinforcement for the transverse tensile forces in reinforced concrete elements is to be arranged as close as possible to the bearing. Attention must still be paid to concrete coverage, however.



CALCULATION OF THE TRANSVERSE TENSILE FORCES IN THE BEARING JOINT

Bearing class 2 according to DIN 4141-3:

For simplicity's sake we assume here that the supporting force is transmitted into the adjacent structural elements distributed to a 0.3xa deep strip at the exterior edge of the bearing. The transverse tensile force resulting from the lateral expansion of the elastomer may be calculated as follows:

$$Zq = 1{,}5 \times F \times t \times a \times 10^{-5}$$

with a and t in [mm]
[DIN 4141-15 5.3 (2)].

The transversely-directed tensile forces Z_q thus determined must be verified in the adjacent structural elements: e.g. through appropriate reinforcement in the case of reinforced concrete.

<u>Design example:</u>
The determination is as follows for an ESZ sliding point rubber bearing GLS-P^{DBP} with dimensions of 150x150x10 mm and with an applied load of 15 N/mm²:
<u>Transverse direction:</u>
F= 292,5 kN
a= 130 mm (width of elastomer core)
b= 150 mm
t= 10 mm

$$Zq = 1{,}5 \times 292{,}5kN \times 10mm \times 130 \times 10^{-5}$$

$$Zq = 5{,}7\ kN$$

<u>Longitudinal direction:</u>

$$Zq = 1{,}5 \times 292{,}5kN \times 10mm \times 150 \times 10^{-5}$$

$$Zq = 6{,}582\ kN$$