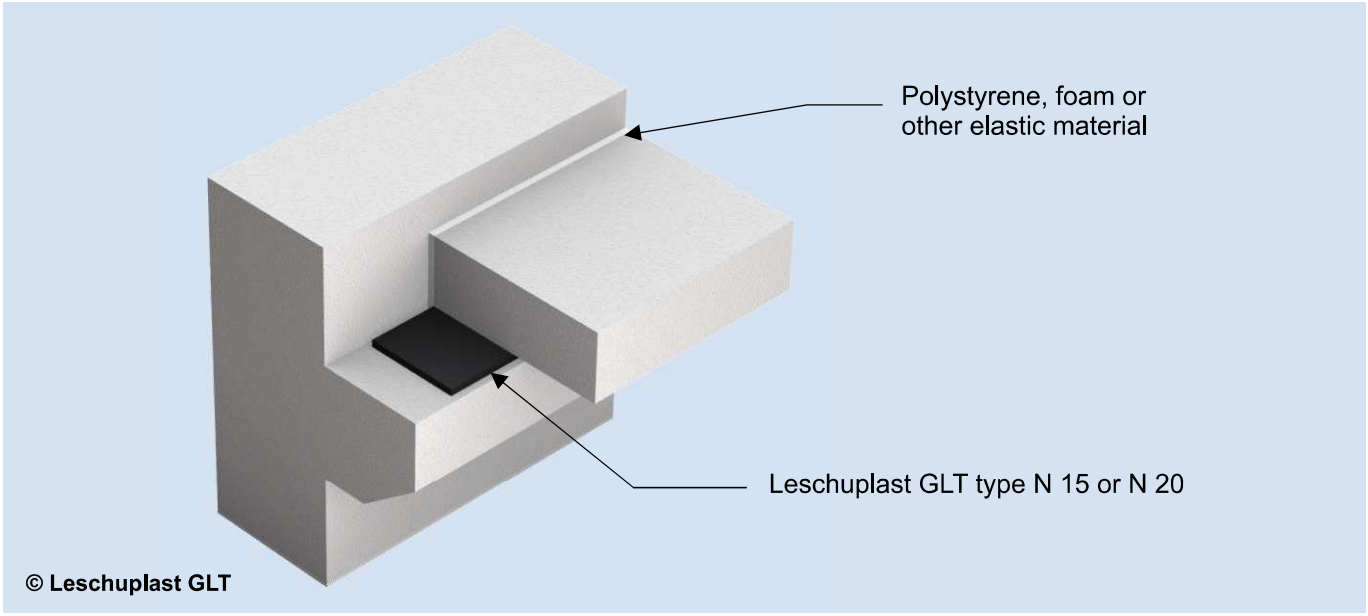
Supporting girders, beams, trusses etc.

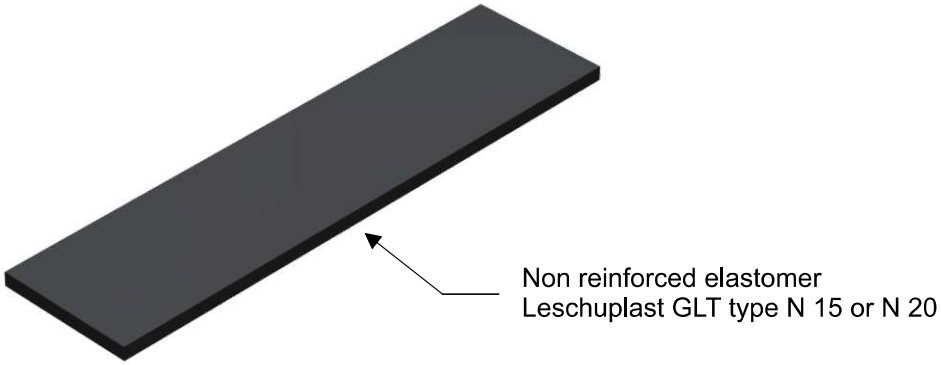


Heavy load-bearing, non reinforced elastomer bearing
N 15 and N 20.
for compressions **up to 15 N/mm² (N 15) as well as up to 20 N/mm² (N 20).**
Non reinforced elastomer bearings ensure a controlled load distribution and enable stress-free horizontal movements as well as twisting in supports. They prevent excessive load eccentricities and edge compression. At the same time, unevenness and deviations from parallelism in bedding surfaces are compensated.

- **Structural designing**

Non reinforced elastomer bearings N 15 and N 20 are produced in 5, 10, 15 and 20 mm thickness. The smaller side should be at least five times the bearing thickness. The bearing must be placed within the static reinforcement of the adjacent components present in the concrete.

- **Non-reinforced elastomer bearings should be used for predominantely static loads. For dynamic loads reinforced elastomer bearings should be used. (See page 27-35)**



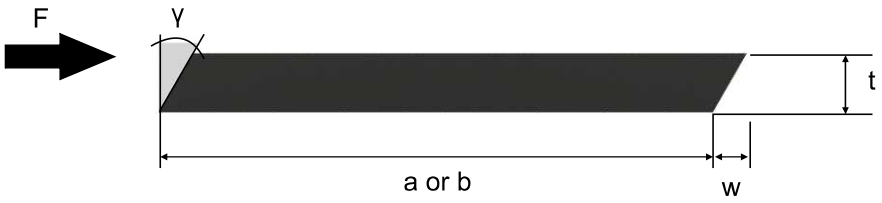
Supporting girders, beams, trusses etc.

Non reinforced elastomer bearings are only allowed to be used, if the component of continuous load is more or equal 75 %. If it is lower, or in all cases, where too high loads or a defect of the bearing could result in a lack of stability, we recommend to use steel reinforced elastomer bearings. Adjacent components should be stressed only marginally by restoring forces and -moments.

- **Stress perpendicular to the bearing plane (surface load)**

In the following design tables, the maximum linear compression was limited to approx. 20 % in order to ensure additional safety for practical irregularities.

- **Stress parallel to the bearing plane (shear deformation), anti-skid stability**



The maximum permissible deformation angle and the displacement will be dimensioned as follows:

$$\tan \gamma = 0{,}7 \times \frac{t - 2}{t}$$

$$w = t \times \tan \gamma$$

tan γ = deformation angle [-]
t = bearing thickness [mm]
w = characteristic displacement [mm]

Continuous stresses parallel to the bearing plane are not permitted. The following analysis of anti-skid stability is recommended for absorbing short-time external horizontal stresses:

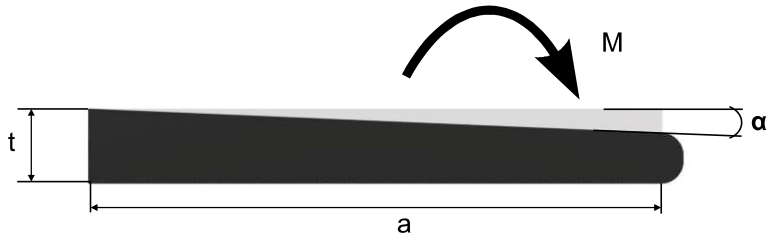
$$H_1 + H_2 \leq 0{,}05 \times F$$

$$H_2 = a \times b \times G \times \tan \gamma$$

H_1 = char. external horizontal stress [N]
H_2 = char. stress force due to deformation [N]
tan γ = deformation angle [-]
G = shear modulus (1,5 N/mm²)
F = char. surface load [N]
a,b = side length [mm]

The maximum permissible deformation angle should not be exceeded due to, short-time, external horizontal stress.
If the anti-skid stability is not given, appropriate constructive measures must be applied.

- **Torsion**



The permissible torsion due to elastic and plastic deformation of the components plus the part of unevenness and skewing bedding surface is restricted as follows :

$$\text{perm } \alpha < 0{,}2 \times \frac{t}{a} \text{ however a max. 0,03 rad}$$

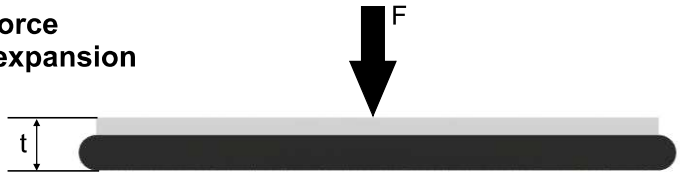
α = char. twisting angle

Excentricity due to bearing torsion is taken into account for designing of adjacent components as :

$$e = \frac{a^2}{2t} \times \alpha$$

e = excentricity

- **Lateral tensile force due to bearing expansion**



If no specific analysis is requested, calculations can be done for bearing class 2 as mentioned below:

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

Z_q = lateral tensile force [N]
F = surface load [N]
t = bearing thickness [mm]
a = smaller bearing side [mm]

Corresponding additional reinforcement is to be inserted into the concrete for absorbing lateral tensile forces.

- **Rigidity**

If more than two bearings of different format are arranged in a row under one component, then the ratio :

$$\frac{\text{max. A/t}}{\text{min. A/t}} \leq 1{,}2$$

should not be exceeded.

Otherwise an analysis of stress absorption for individual bearings must be carried out.

Specification:	non-reinfoced elastomer bearing type N 15 or N 20 for char. compressions up to 15 N/mm² (N 15) or up to 20 N/mm² (N 20), supply dim.: ... x ... x ... mm and set on a smooth, levelled and horizontal bedding surface.The surface should be clean and free from oils. Leschuplast GLT type **N 15 or N 20**

- **permissible characteristic vertical pressure load of N 15 / N 20**

total thickness 5 mm: load in kN

N15									
[mm]	50	75	100	125	150	175	200	250	300
50	38	56	75	94	113	131	150	188	225
75	56	84	113	141	169	197	225	281	338
100	75	113	150	188	225	263	300	375	450
125	94	141	188	234	281	328	375	469	563
150	113	169	225	281	338	394	450	563	675
175	131	197	263	328	394	459	525	656	788
200	150	225	300	375	450	525	600	750	900

N20									
[mm]	50	75	100	125	150	175	200	250	300
50	47	75	100	125	150	175	200	250	300
75	75	113	150	188	225	263	300	375	450
100	100	150	200	250	300	350	400	500	600
125	125	188	250	313	375	438	500	625	750
150	150	225	300	375	450	525	600	750	900
175	175	263	350	438	525	613	700	875	1050
200	200	300	400	500	600	700	800	1000	1200

The smallest side length is 50 mm.

total thickness 10 mm: load in kN

N15									
[mm]	50	75	100	125	150	175	200	250	300
50	12	25	42	52	63	73	83	104	125
75	25	59	103	141	169	197	225	281	338
100	42	103	150	188	225	263	300	375	450
125	52	141	188	234	281	328	375	469	563
150	63	169	225	281	338	394	450	563	675
175	73	197	262	315	378	459	525	656	788
200	83	225	300	375	450	525	600	750	900

N20									
[mm]	50	75	100	125	150	175	200	250	300
50	12	25	42	52	63	73	83	104	125
75	25	59	103	154	211	246	281	352	422
100	42	103	188	250	300	350	400	500	600
125	52	154	250	313	375	438	500	625	750
150	63	211	300	375	450	525	600	750	900
175	73	246	350	438	525	613	700	875	1050
200	83	281	400	500	600	700	800	1000	1200

The smallest side length is 50 mm.

total thickness 15 mm: load in kN

N15									
[mm]	75	100	125	150	175	200	250	300	350
75	26	46	69	94	109	125	156	188	219
100	46	83	129	180	236	296	370	444	519
125	69	129	203	281	328	375	469	563	656
150	94	180	281	338	394	450	563	675	788
175	109	236	328	394	459	525	656	788	919
200	125	296	375	450	525	600	750	900	1050
250	156	370	469	563	656	750	938	1125	1313

N20									
[mm]	75	100	125	150	175	200	250	300	350
75	26	46	69	94	109	125	156	188	219
100	46	83	129	180	236	296	370	444	519
125	69	129	203	291	388	493	625	750	875
150	94	180	291	422	525	600	750	900	1050
175	109	236	388	525	613	700	875	1050	1225
200	125	296	493	600	700	800	1000	1200	1400
250	156	370	625	750	875	1000	1250	1500	1750

The smallest side length is 75 mm.

total thickness 20 mm: load in kN

N15									
[mm]	100	125	150	175	200	250	300	350	400
100	47	72	101	133	167	208	250	292	333
125	72	114	163	218	277	407	488	570	651
150	101	163	237	321	413	563	675	788	900
175	133	218	321	440	525	656	788	919	1050
200	167	277	413	525	600	750	900	1050	1200
250	208	407	563	656	750	938	1125	1313	1500
300	250	488	675	788	900	1125	1350	1575	1800

N20									
[mm]	100	125	150	175	200	250	300	350	400
100	47	72	101	133	167	208	250	292	333
125	72	114	163	218	277	407	488	570	651
150	101	163	237	321	413	618	844	984	1125
175	133	218	321	440	572	869	1050	1225	1400
200	167	277	413	572	750	1000	1200	1400	1600
250	208	407	618	869	1000	1250	1500	1750	2000
300	250	488	844	1050	1200	1500	1800	2100	2400

The smallest side length is 100 mm.

Bearings with other lengths and widths are to be correspondingly interpolated. The maximum permissible surface compression for larger bearings is 15 N/mm² (N15) or 20 N/mm² (N20).