Deutsches Institut für Bautechnik

DIBt

Public-law institution jointly founded by the federal states and the Federation

Technical authority granting approvals and permits for construction products and construction techniques

Decision

renewing the national technical approval / general construction technique permit of 19 September 2018

Date: 26 Sep 2023

Reference number: I 32-1.16.32-4/23

Number:
Z-16.32-482

Validity
from: **20 September 2023**
to: **20 September 2028**

Applicant:
ESZ Wilfried Becker GmbH
Weilerhöfe 1
41564 Kaarst

Subject of decision:
ESZ type 100

This decision renews national technical approval (*allgemeine bauaufsichtliche Zulassung*) / general construction technique permit (*allgemeine Bauartgenehmigung*) no. Z-16.32-482 of 19 September 2018, which was amended/supplemented by the decision of 8 April 2022.
The subject concerned was granted the first national technical approval on 19 September 2018.
This decision contains one page. It applies only in conjunction with the above-mentioned national technical approval / general construction technique permit and shall not be used without it.

Andreas Schult
Head of Section

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Translation authorised by DIBt

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Deutsches Institut für Bautechnik

Public-law institution jointly founded by the federal states and the Federation

Technical authority granting approvals and permits for construction products and construction techniques

Decision

amending and supplementing the national technical approval / general construction technique permit of 19 September 2018

Date:	Reference number:
8 April 2022	I 30.1-1.16.32-17/20

Number:
Z-16.32-482

Validity
from: **8 April 2022**
to: **19 September 2023**

Applicant:
ESZ Wilfried Becker GmbH
Weilerhöfe 1
41564 Kaarst

Subject of decision:
ESZ type 100

This decision amends / supplements the national technical approval (*allgemeine bauaufsichtliche Zulassung*) / general construction technique permit (*allgemeine Bauartgenehmigung*) no. Z-16.32-482 of 19 September 2018.
This decision contains six pages. It applies only in conjunction with the above-mentioned national technical approval / general construction technique permit and shall not be used without it.

Translation authorised by DIBt

I GENERAL PROVISIONS

The General Provisions of national technical approval / general construction technique permit no. Z-16.32-482 shall be replaced by the following version:

1 This decision confirms the fitness for use and application of the subject concerned within the meaning of the Building Codes of the federal states (*Landesbauordnungen*).

2 This decision does not replace the permits, approvals and certificates required by law for carrying out construction projects.

3 This decision is granted without prejudice to the rights of third parties, in particular private property rights.

4 Notwithstanding further provisions in the 'Special Provisions', copies of this decision shall be made available to the user and installer of the subject concerned. The user and installer of the subject concerned shall also be made aware that this decision must be made available at the place of use or place of application. Upon request, copies of the decision shall be provided to the authorities involved.

5 This decision shall be reproduced in full only. Partial publication requires the consent of DIBt. Texts and drawings in promotional material shall not contradict this decision. In the event of a discrepancy between the German original and this authorised translation, the German version shall prevail.

6 This decision may be revoked. The provisions contained herein may subsequently be supplemented and amended, in particular if this is required by new technical findings.

7 This decision is based on the information and documents provided by the applicant. Alterations to this basis are not covered by this decision and shall be notified to DIBt without delay.

II SPECIAL PROVISIONS

The Special Provisions of the national technical approval and the general construction technique permit no. Z-16.32-482 shall be amended and supplemented as follows:

a) Section 2.1.1 of the national technical approval / general construction technique permit shall be replaced as follows:

2.1.1 Dimensions

For the bearing dimensions, the following conditions shall be complied with:

bearing thickness: t = 10 mm, 15 mm, 20 mm, 25 mm, 30 mm

$t \leq a/5$ where t_{max} = 30 mm

$t \geq a/30$ where t_{min} = 10 mm.

For rectangular bearings in point form:

$a \geq 70$ mm, $b \geq 70$ mm.

For bearings in strip form:

t = 10 mm, $a \geq 50$ mm, $b \geq 100$ mm.

For round bearings:

$r \geq 40$ mm.

For bearings with bore holes:

smallest bearing geometry [mm]:	50 x 100 x 10 or $r \geq 40$ mm
maximum percentage of holes:	10 % of the bearing area
maximum diameter of bore hole:	D_{max} = 50 mm
maximum number of bore holes:	n = 4
minimum edge distance:	t
minimum bore hole spacing:	2 · D
type of bore hole:	round hole/slotted hole

with the nominal dimensions:

- a short side of bearing
- b long side of bearing.
- r radius of bearing.
- t thickness of unloaded bearing
- D_i diameter of bore hole i.

Regarding the dimensional tolerances to be adhered to:

length	class M4 in accordance with Table 1 of DIN ISO 3302-1:2018
width	class M4 in accordance with Table 1 of DIN ISO 3302-1:2018
thickness	class M3 in accordance with Table 1 of DIN ISO 3302-1:2018.

b) Section 3.2 of the national technical approval / general construction technique permit shall be replaced as follows:

3.2 Design

3.2.1 General

The Technical Building Rules shall apply to the design unless otherwise specified below.

The possible load case combinations shall be taken from DIN EN 1990:2010-12.

The design values of the effects of the actions (loads) E_d shall be determined from the characteristic values of the actions in consideration of the partial safety factors γ_f and the combination coefficients ψ in accordance with the Technical Building Rules.

The structural members adjacent to the bearing shall be designed such that the interaction with the structural behaviour of the bearing is taken into account. It shall be observed that loading of an elastomeric bearing leads to a load concentration. Rotation of the elastomeric bearings leads to eccentricities in the load concentration and hence to a restoring moment. The transverse tensile force arising in the adjacent structural members as a result of the strain constraint of the unreinforced elastomer bearing shall be verified and transmitted through corresponding measures.

The compressive strain of the bearing shall be taken into account as a product-specific value in the determination of the actions on the overall structure. If the contact surfaces of the adjacent structural members deviate from planar parallelism, e.g. as a result of manufacturing and installation tolerances, these deviations shall be taken into account in the design of the bearing.

3.2.2 Vertical resistance

In the ultimate limit state, the following verification shall be provided:

$$\frac{E_{\perp d}}{R_{\perp d}} \leq 1$$

where:

$E_{\perp d}$ load acting on bearing perpendicular to the bearing plane [N/mm²]

$R_{\perp d}$ design value of associated bearing resistance [N/mm²] perpendicular to bearing plane depending on shape factor S and temperature T for a compressive strain of ε = 40% in accordance with Table 1

The shape factor shall be determined depending on the geometry of the bearing, with the bore holes provided being taken into account:

shape factor for rectangular bearings: $S = \frac{a \cdot b}{2 \cdot t \cdot (a+b)}$

shape factor (modified) for round bearings: $S_{mod} = \frac{r}{\sqrt{8}\, t}$

shape factor for bearings with bore holes:

S_{hole} = contact area under compressive loading / unloaded area

where a, b, r, t, D_i in accordance with 2.1.1.

For determining the resistance to horizontal loads and rotations, round bearings shall be designed using the actual base area of the bearing.

Table 1: Bearing resistance for loads perpendicular to bearing plane for point and strip bearings

Shape factor range S (S, S_{hole} or S_{mod})	**Function for determining the design resistance [N/mm²]**
0.83 – 2.33	$R_{\perp d} = 5.3805 \cdot S - 0.6536$
2.33 – 2.50	$R_{\perp d} = 10.635 \cdot S - 12.89$
2.50 – 5.00	$R_{\perp d} = 8.4004 \cdot S - 7.3293$
> 5.00	$R_{\perp d} = 34.7$

The determination of the shape factor S_{mod} for round bearings is based in the following assumption:

For round bearings, the edge length of the inscribed square must be used for determining S_{mod}.

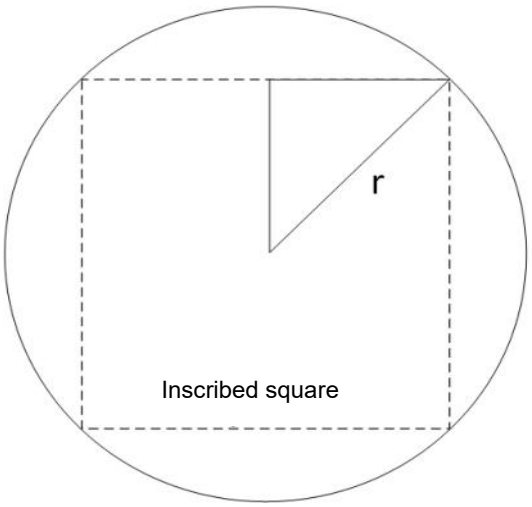

Figure 1: Area to be applied to round bearings for determining the shape factor S_{mod}

3.2.3 Rotation

If more detailed verification is not provided, the angle of rotation of the adjacent structural members shall be determined through adding of the following factors:

- obliqueness with 10 ‰
- unevenness with 625/a ‰
  with a in [mm].

If the adjacent structural members are made of steel or in-situ concrete, the unevenness may be halved.

For rotations on both perpendicular sides of the bearing, amounts for angular displacement shall be proportionally added to the respective design values.

The positional stability shall be verified.

For point bearings, the maximum twist for rotation about an axis shall be determined as follows:

$$\propto_{b,max} = \frac{450 \cdot t}{a} \leq 48\ ‰$$

where:

$\propto_{b,max}$ maximum angle of twist for rotation about the central axis parallel to side b with a, b, t in mm.

The formula shall be used analogously for determination of the maximum angle of twist about the central axis parallel to side a. Verification that edge contact with the adjacent structural members is avoided at simultaneous occurrence of the maximum compression and the maximum twist shall be provided during the structural design.

For biaxial torsional stress, the following boundary condition shall be adhered to:

$$\propto_{resultant} = \sqrt{\propto_{a,max}^2 + \propto_{b,max}^2} \leq 48\ ‰$$

3.2.4 Transverse tensile force

The transverse tensile force acting on the adjacent structural members due to the central load acting on the bearing shall be determined as follows:

For rectangular bearings:

$$Z_a = 1.5 \cdot E_{\perp d} \cdot a \cdot t$$

$$Z_b = 1.5 \cdot E_{\perp d} \cdot b \cdot t$$

where:

Z_a transverse tensile force perpendicular to the short side of the bearing a

Z_b transverse tensile force perpendicular to the long side of the bearing b

For round bearings:

$$Z = 1{,}5 \cdot E_{\perp d} \cdot 2r \cdot t$$

where:

Z transverse tensile force [N].

The bulging of the bearing depends on its size and shape. During the structural design (edge distances etc.) the bulging of the bearing shall be taken into account and requested from the manufacturer in advance.

The lateral surfaces of the bearing may not be hindered in their planned deformation.

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