Deutsches Institut für Bautechnik

DIBt

National technical approval / General construction technique permit

Approval No.:
Z-16.8.468

Applicant:
Getzner Werkstoffe GmbH

Validity:
from: May 18, 2021
until: May 18, 2026

Controlled item:
Getzner Sylodyn®

The aforementioned item is herewith granted a general construction technique permit. This Notice consists of nine pages.

This national technical approval / general construction technique permit supersedes the national technical approval No. Z-16.8-468 dated August 4th, 2016. The subject was first granted a national technical approval on August 4th, 2016.

Translation of the original German version, not verified by the Deutsches Institut für Bautechnik.

I. GENERAL PROVISIONS

1 This Notice is evidence of the usability/applicability of the controlled item according to the federal building codes.

2 This Notice does not replace the statutory permits, approvals and certificates that are required when carrying out building projects.

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

4 Notwithstanding the further regulations set out under "Particular Provisions", copies of this Notice are to be made available to the installer/user of the controlled item. The installer/user of the controlled item is hereby also advised that a copy of this Notice must be provided at the item's place of use or installation. If requested, copies must be provided to the relevant authorities.

5 This Notice may only be reproduced in its entirety. The publication of excerpts requires the agreement of the Deutsches Institut für Bautechnik (DIBt). Text and drawings in promotional material must not contradict this Notice. Translations of this document must include the disclaimer, "Vom Deutschen Institut für Bautechnik nicht geprüfte Übersetzung der deutschen Originalfassung" (translation of the original German version, not verified by the DIBt).

6 This Notice is valid until revoked. Its provisions may be complemented or amended retrospectively, especially in the light of new technical developments.

7 This Notice is based on the statements and documents submitted by the applicant. Any changes to these underlying assumptions are not covered by this Notice and must be notified to the Deutsches Institut für Bautechnik without delay.

8 The general construction technique permit covered by this Notice is at the same time the national technical approval for the construction technique.

II. PARTICULAR PROVISIONS

1 Controlled item and area of use/application

1.1 Approved item

"Getzner Sylodyn", the approved item, is a compact, unreinforced elastomer bearing made of polyurethane (PU). It is used for the absorption of forces and deformation perpendicular to the plane of the bearing.

The bearings must be rectangular, point, strip or square in shape.

Various coloured markings are used to distinguish one type of bearing from another.

1.2 Subject of permit

This permit covers the planning, design, and implementation of elastomer bearings for building structures. The components adjoining the bearing must be made of steel, concrete or wood. The use of foils above or below the bearing is not permitted. The elastomer bearings can be used at temperatures of between -25°C and 50°C. For brief, recurring periods of less than 8 hours, the bearings may be exposed to temperatures of up to +70°C.

Although elastomer bearings can absorb shear deformation, they must not be used for the systematic absorption of permanent external shear forces.

The bearing is supplied without any holes.

An assessment of its vibration isolation properties is not covered by this approval.

2 Provisions for construction products

2.1 Properties and composition

2.1.1 Dimensions

Point and strip bearings employed in multi-layer configurations must be bonded together. Bonding is not necessary in the case of multi-layer surface bearings. Only bearings of the same type may be layered on top of each other.

The following conditions with regard to the bearing dimensions must be met:

Thickness of a bearing in a single-layer configuration/thickness of an elastomer layer:

t = 12.5 mm to 25 mm

In the case of bearings:

a_{max} = 1500 mm

In the case of point bearings:

$t \leq a/5$

For bearings whose shorter side is less than a ≤ 500 mm:

$t \geq a/30$

In the case of rectangular bearings:

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

where:

- t thickness of the unloaded bearing
- a shorter bearing side
- b longer bearing side

With regard to the tolerances to be observed:

Length Class L3 as per DIN ISO 3302-1:2016

Width Class L3 as per DIN ISO 3302-1:2016

Thickness Class EC3 as per DIN ISO 3302-1:2016

2.1.2 Materials

The physical characteristics, chemical composition and material properties of the bearing and adhesive are held by the Deutsches Institut für Bautechnik.

Evidence of the properties of the original materials and adhesive used is to be provided by means of an inspection document 3.1 as per DIN EN 10204:2005-01.

2.2 Production, transport and labelling

2.2.1 Production, transport

The bearings are to be produced by a foaming process in the form of mats or rolls and then cut to size.

Detailed information regarding the production process is held by the Deutsches Institut für Bautechnik.

The manufacturer's instructions regarding the transport and installation of the bearings must be observed.

Should any bonding have to be done on site, this must be carried out in accordance with the documentation held by the Deutsches Institut für Bautechnik. The bonding procedure is to be documented.

2.2.2 Labelling

The manufacturer is to label the delivery note accompanying the bearing with the mark of conformity ("Ü-sign") according to the applicable mark of conformity regulations. Labelling may only take place if the requirements set out in section 2.3 have been satisfied. The label must be applied to the mats or rolls produced according to section 2.2.1 permanently and continuously, with any necessary changes ("*mutatis mutandis*").

2.3 Certificate of compliance

2.3.1 General

A certificate of compliance on the basis of factory-internal production checks and regular third-party inspections, including an initial test of the bearing in accordance with the provisions set out below, must be provided by every production plant to confirm that the bearing complies with the provisions of this national technical approval/general construction technique permit.

For the purposes of issuing the certificate of compliance and carrying out the third-party inspection, including the necessary product tests, the manufacturer of the bearings must employ the services of a recognised certification body and a recognised inspection body.

The manufacturer is to make the declaration of compliance by labelling the construction products with the mark of conformity ("Ü-sign") and indicating their intended use. If this should not be possible in any particular instance, the package slip accompanying the bearing must be labelled with the mark of conformity ("Ü-sign") according to the applicable mark of conformity regulations.

For information purposes, the certification body is to provide the Deutsches Institut für Bautechnik with a copy of the certificate of compliance it issued.

The Deutsches Institut für Bautechnik must also be given a copy of the initial inspection report.

2.3.2 Factory-internal production checks

Every production plant is to establish and carry out internal production checks. By factory-internal production checks are meant the continuous monitoring by the manufacturer of the production process. This monitoring process is designed to ensure that the construction products produced by the manufacturer comply with the provisions of this national technical approval.

The factory-internal production checks must take place according to the testing plan held by the Deutsches Institut für Bautechnik.

The results of the factory-internal production checks are to be recorded and evaluated. As a minimum requirement, the records must contain the following information:

- Designation of the construction product and/or its original material and constituent parts,
- Type of check or inspection,
- Date of manufacture and testing of the construction product and/or its original material or constituent parts,
- Results of the checks and inspections and, where applicable, comparison with the requirements,
- Signature of the individual responsible for the factory-internal production checks.

The records are to be retained for at least five years. They are to be submitted on request to the Deutsches Institut für Bautechnik and the appropriate highest building authority.

If the inspection result is unsatisfactory, the manufacturer is to implement the necessary corrective actions without delay. Construction products that do not meet the requirements are to be dealt with in such a way that any possibility of mistaking them for approved products is excluded. Assuming it is technically possible and required as evidence that the deficiency has been remedied, the relevant inspection is to be repeated as soon as the corrective actions have been implemented.

2.3.3 Third-party inspection

The factory-internal production checks carried out in every bearing production plant are to be audited regularly, and at least twice a year, by a third-party inspection body. The results of the tests carried out by the manufacturer in accordance with section 2.3.2 are to be statistically evaluated.

An initial test of the bearing is to be carried out as part of the third-party inspection. In addition, samples are to be taken for random testing purposes. The sampling and testing procedures are the responsibility of the respective monitoring body.

The scope and frequency of the third-party inspection are to be found in the testing plan held by the Deutsches Institut für Bautechnik.

The results of the certification and third-party inspection are to be retained for at least five years. The certification body and/or monitoring body shall, on request, submit the results to the Deutsches Institut für Bautechnik and the appropriate highest building authority.

3 Provisions for planning, design and implementation

3.1 Planning

The planning is governed by the technical building regulations, unless stated otherwise below. Bearings can be installed in a single-layer or multi-layer configuration. The dimension constraints specified in section 2.1.1 must be observed. The bearing dimensions are to be found in the specifications provided by the structural engineer and in the installation plans.

A static calculation is to be carried out in every case to verify the structural safety of the bearings at load-bearing capacity limits for all critical dimensioning situations and load cases.

The verification concept set out in DIN EN 1990:2010-12 in conjunction with the National Annex applies. The bearings may only be used for static or quasi-static loaded components.

The type, dimensions and arrangement of the bearings are derived from the proof of stability. Once the bearings have been selected, and insofar as required by the installation situation, an installation plan is to be drawn up showing the exact position of the bearings within the structural layout.

Installation is to take place in accordance with the manufacturer's instructions.

3.2 Design

The design is governed by the technical building regulations, unless stated otherwise below.

The possible load-case combinations are to be found in DIN EN 1990.2010-12.

The design values of the effect of the actions (stresses) E_d are to be determined from the characteristic values of the actions, taking into account the partial safety factor γ_f and the combination values Ψ as set out in the technical building regulations.

The following calculations must be provided at load-bearing capacity limits

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

where:

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

$R_{\perp d}$ design value of associated load-bearing capacity of bearing [N/mm²] perpendicular to the plane of the bearing as a function of shape factor S at a linear compression of ε = 40% as per Table 1 (40% linear compression is a failure criterion)

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

where a, b, t as per section 2.1.1

Table 1: Load-bearing capacity of the bearing when subjected to a load perpendicular to the plane of the bearing

Standard type		NB	ND	NF	HRB 3000	HRB 6000[2]	HRB 12000[2]
Load-bearing capacity design value $R_{\perp d}$ [N/mm²]	Shape factor 0.5[1]	0.13	0.52	1.33	2.40	5.000	5.76
	Shape factor 1.0	0.14	0.67	2.30	4.40	9.16	12.72
	Shape factor 1.5	0.15	0.74	2.94	5.74	11.82	20.90
	Shape factor 2.0	0.15	0.79	3.48	6.88	14.23	30.28
	Shape factor 2.5	0.16	0.82	3.81	7.58	15.72	40.88
	Shape factor 3.0	0.16	0.83	4.01	8.01	16.64	52.68
	Shape factor 3.5	0.16	0.84	4.14	8.29	17.23	52.68
	Shape factor 4.0	0.16	0.85	4.23	8.47	17.62	52.68
	Shape factor 4.5	0.16	0.85	4.29	8.59	17.89	52.68
	Shape factor 5.0	0.16	0.86	4.33	8.68	18.09	52.68
	Shape factor 5.5	0.16	0.86	4.36	8.75	18.23	52.68
	Shape factor 6.0	0.16	0.86	4.38	8.80	18.33	52.68
	Shape factor ≥ 6.0	0.16	0.86	4.38	8.80	18.33	52.68

1) Bearings with shape factors $S < 0.7$ are for bonded bearings only.

2) Bonded bearings of types HRB 6000 and HRB 12000 must be reduced by 25% compared to the values shown in the table.

The interaction with the load-bearing behaviour of the bearing must be considered when designing the components adjacent to the bearing. It should be noted that putting a load on an elastomer bearing produces a load concentration. The distortion of elastomer bearings causes eccentricity in the load concentration, which generates a self-aligning torque.

When determining the effects on the structure as a whole, the linear compression of the bearing is to be considered a product-specific value. Should the contact surfaces of the adjacent components not exhibit plane-parallelism, e.g. as a result of manufacturing and installation tolerances, this must be taken into account in the design of the bearing. As long as more detailed information is not forthcoming, the rotation angle of the adjacent components must be calculated by the addition of the following factors:

- Oblique angle with 10 ‰
- Unevenness with 0.625 mm/*a* [‰]

  where

  a in [mm]

If the adjacent components are made of steel or in-situ concrete, the unevenness figure can be halved.

In the event of distortion across two sides of a bearing that are perpendicular to each other, a component representing angular distortion must be added proportionally to the respective design values.

Positional stability must be verified.

For the standard point bearings shown in Table 1a, the maximum twist for a rotation parallel to the centre line of side *b* is calculated as follows:

$$\alpha_{b,max} = \frac{500 \cdot t}{a} \leq 54\ ‰$$

where

$\alpha_{b,max}$ maximum torsion angle for a rotation parallel to the centre line of side *b*

t thickness of the unloaded bearing in mm

a shorter bearing side in mm

The formula is used analogously to calculate the maximum torsion angle parallel to the centre line of side *a*. In the structural design, evidence must be provided to show that should maximum linear compression occur at the same time as maximum torsion, contact with the edges of adjoining components will be avoided.

The following limit condition must be observed if a torsional load is applied on two axes:

$$\alpha_{Resultierende} = \sqrt{\alpha_{a,max}{}^2 + \alpha_{b,max}{}^2} \leq 54\ ‰$$

The tensile force generated in the adjoining components as a result of the fact that the reinforced elastomer bearing cannot expand is to be calculated and absorbed by means of appropriate measures.

The tensile force affecting the adjacent components as a result of the centric load applied to the bearing is calculated as follows:

$$Z_a = 1{,}5 \cdot E_{\perp d} \cdot \mathrm{a} \cdot \mathrm{t}$$

$$Z_b = 1{,}5 \cdot E_{\perp d} \cdot \mathrm{b} \cdot \mathrm{t}$$

where:

Z_a tensile force perpendicular to the shorter side of the bearing *a* [N]

Z_b tensile force perpendicular to the longer side of the bearing *b* [N]

The tensile stress calculation is only required when using bearing types Sylodyn NF, HRB 3000, HRB 6000 and HRB 12000.

The extension rate of the bearing depends on its format. It must be taken into account when designing the supporting framework (edge distances, etc.). Contact the manufacturer in advance and ask them to provide this figure.

Do not prevent the systematic deformation of the lateral surfaces of the bearing.

3.3 Implementation

The implementation is governed by the technical building regulations, unless stated otherwise below.

The bearings must be stored in a dry place and installed in a dry state. Store rolls of material upright. Store adhesive according to the manufacturer's instructions. Protect the bearings from direct sunlight. The subsoil must be smooth and level. To protect the bearing, carefully deburr the supporting surfaces. Avoid cavities in adjacent concrete surfaces. If necessary, use a bed of mortar to even out any height differences. The adjoining components must be compatible with the material used in the bearing. Ensure that the bearing and the adjoining components are not damaged by any chemical or physical effects and are kept free of contamination. The surfaces of adjacent components must be clean and free of any snow, ice, grease or separating agent. Standing water must be avoided. The manufacturer's installation instructions must be observed.

The construction company shall confirm in writing according to paras. 16a section 5, 21 section 2 MBO that the bearing has been installed in accordance with the provisions of the national technical approval covered by this Notice.

4 Provisions for use, maintenance and servicing

The bearings are to be installed such that they require no maintenance.

Andreas Schult
Head of Division

Certified