

# BI-TRAPEZ BEARING®

Elastomeric bearing for structural members subject to predominantly static loading and impact sound insulation

# SECURELY AND PERMANENTLY BEDDED

ENHANCING LIVING COMFORT WITH CALENBERG

Premium grade rubber material and a high quality standard in our elastomeric bearings guarantee freedom from maintenance, a long service life and, consequently, absolute damage-free construction.

HOW

**KNOW**

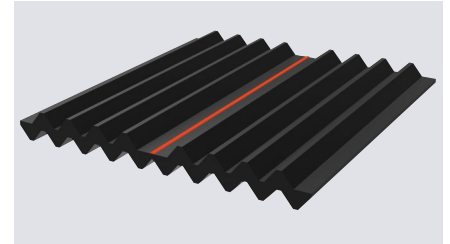


## A bearing for different applications



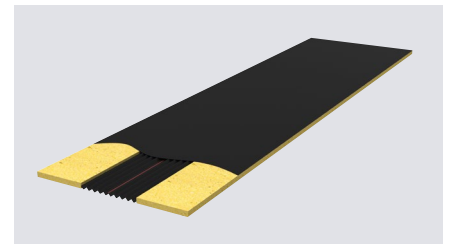
### Structural members subject to predominantly static loading

Deformations in structural components are caused by permanent loads, such as a structure's dead load, variable influences, such as wind, and constraining forces due to factors such as temperature changes, creep, component tolerances or settling. Without the use of suitable elastomeric bearings, the aforementioned impacts will cause damage to structures. Besides cracks and spalling, they can also inflict major permanent damage to adjacent components, which need to be repaired at considerable expense in terms of time and cost. The elastic effect of the structural bearings transfers forces centrally in structural connections while also compensating for deviations in plane parallelism. Elastomeric bearings systematically absorb shear deformations from non-permanent horizontal impacts.



### Elastic impact sound insulation

Impact sound is caused by walking on floors and stairways, for example. The elastic bi-Trapez Bearing® can be used as an effective impact sound insulation measure to mitigate such noise emissions. This vibration isolation system for ceilings, floors and stair structures not only provides effective impact sound insulation, but also a pleasant living and working environment. The bi-Trapez Bearing® is made of a high-grade EPDM material and does not absorb any water.



### Advantages for our customers

Noise control measures in building construction have a frequency range between 100 and 3,200 Hz. Structure-borne sound dampening values up to 1 N/mm<sup>2</sup> are achieved in the compressive stress range thanks to the soft spring characteristics.

An insulation effect of more than 90% is possible with excitation frequencies of 100 Hz. The structure-borne sound dampening is around 20 dB. Excitation frequencies of more than 100 Hz are cushioned to an even greater extent.

BI-TRAPEZ BEARING® IMPACT SOUND STOP FOR USE IN STAIRWAY CONSTRUCTION					
Bearing thickness	Bearing width	Eff. vertical load (charact. values)	Impact sound mitigation (as per DIN 52210-4) in the compressive stress range between 0.3 and 0.7 N/mm <sup>2</sup> (charact. values)	Insulation effect	Deflection
[mm]	[mm]	[kN/m]	[dB]	[%]	[mm]
10	50	15-35	23	87	2,3 - 2,8
	100	30-70	23	87	2,3 - 2,8
15	50	15-35	27	91	2,8 - 5,5
	100	30-70	27	91	2,8 - 5,5
20	100	30-70	28	93	3,8 - 7,4



## Product features

- Maintenance free
- Are permanently elastic articulating components in the case of torsion in structural element
- Provides flexible response if structural members shift
- Achieves high vibration and structure-borne sound dampening values thanks to lower compression spring stiffness within the pressure compensation phase up to a load of  $1 \text{ N/mm}^2$
- Premium grade material (EPDM)
- Mathematical proof (compressive loads, horizontal displacements and angular displacements)
- Produces lower splitting forces than homogeneous elastomeric bearings for the same load and bearing thickness. This provides greater protection against fissures in concrete
- Approved by building authorities

## The bi-Trapez Bearing®

### Product description

The Calenberg bi-Trapez Bearing® is a non-reinforced, profiled elastomeric bearing with trapezium-profiled pressure contact surfaces on both sides, resilient dependent of the format, and with controlled material grade. The main component is an ageing-resistant EPDM elastomeric material with a hardness of  $65 \pm 5 \text{ Shore A}$ .

### Use and areas of application

bi-Trapez Bearing® provides highly effective insulation against structure-borne sound and vibrations and is permanently elastic and articulating in the case of torsion in structural members. This bearing is primarily used for structural members of all types and for impact sound mitigation in stair and landing bearings.

bi-Trapez Bearing® can be used in cast-in-place concrete as an Impact Sound Stop stair component with a one-sided cover.

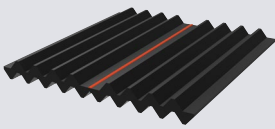
### Building authority approval

The approval for use as a construction bearing in building construction is regulated by the standard building authority certification Z-16.32-455, issued by the German Center of Competence in Civil Engineering (DIBt).

### Behaviour in fire

Fire safety report No. 3799/7357-AR by the Technical University (TU) of Braunschweig must be taken into account for fire safety requirements. The report describes minimum dimensions and other measures that fulfil the requirements specified in DIN 4102-2.

#### EXCERPT FROM THE TECHNICAL DATA

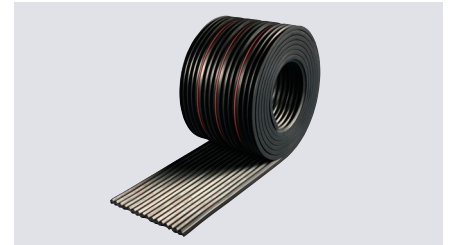
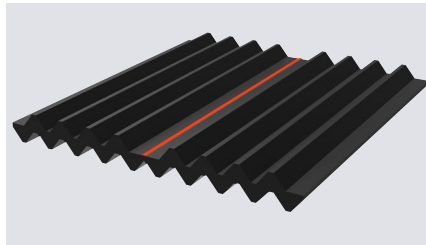
	Type of bearing	Bearing thickness [mm]	Compressive stress	Approval
	Non-reinforced, profiled elastomeric bearing for static structural members and impact noise decoupling	5*	Compressive stress Dependent on the format (max. $\sigma_{R,d} = 17,4 \text{ N/mm}^2$ )	Approval no. Z-16.32-455, issued by the DIBt Berlin
		10		
		15		
		20		

\* without building authority approval



## Delivery forms

ROLLS	
Bearing thickness [mm]	Dimensions
5	20 m x 200 mm
	20 m x 300 mm
10	10 m x 150 mm
	10 m x 200 mm
15	10 m x 150 mm
	10 m x 200 mm
20	10 m x 200 mm

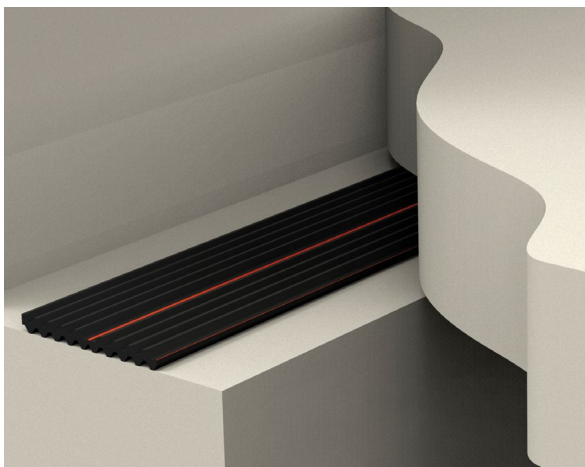


The bi-Trapez Bearing® can be assembled to exact dimensions and can be offered with additional services such as drilling. Please note that the individual bearing dimensions depend on the roll dimensions. Multi-part bearing designs are possible on a project-specific basis.

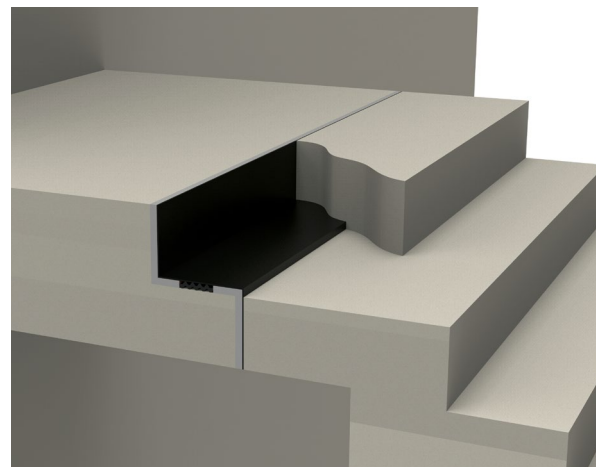
## Constructive design

In precast structures, bi-Trapez Bearing® elements are installed centrally on the bearing surface with no special constructional measures. In the case of concrete components, the distance to the component outer edge must be at least 2.5 cm and the steel reinforcement must enclose the surface of the bi-Trapez Bearing®. Chamfered component edges also need to be taken into account when calculating the edge distance.

If cast-in-place concrete is used, the gaps and joints around the bi-Trapez Bearing® must be filled and covered, so that no freshly mixed concrete can penetrate them. A rigid connection must be avoided; the bearing's spring effect must be guaranteed at all times.



The bi-Trapez Bearing® is positioned in the centre of the bearing surface in precast concrete components.

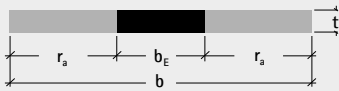


In the case of cast-in-place concrete, the bearing should be installed, so that the cover faces upwards.

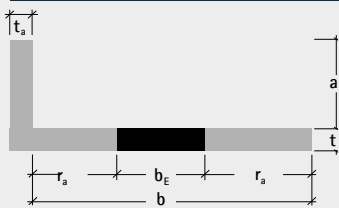


## bi-Trapez® Impact Sound Stop stair element for cast-in-place concrete applications

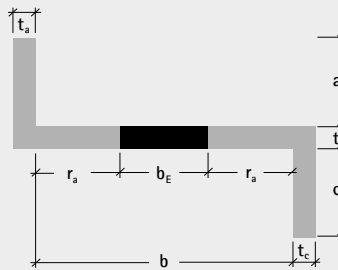
### CROSS-SECTION TYPE I



### CROSS-SECTION TYPE L



### CROSS-SECTION TYPE Z

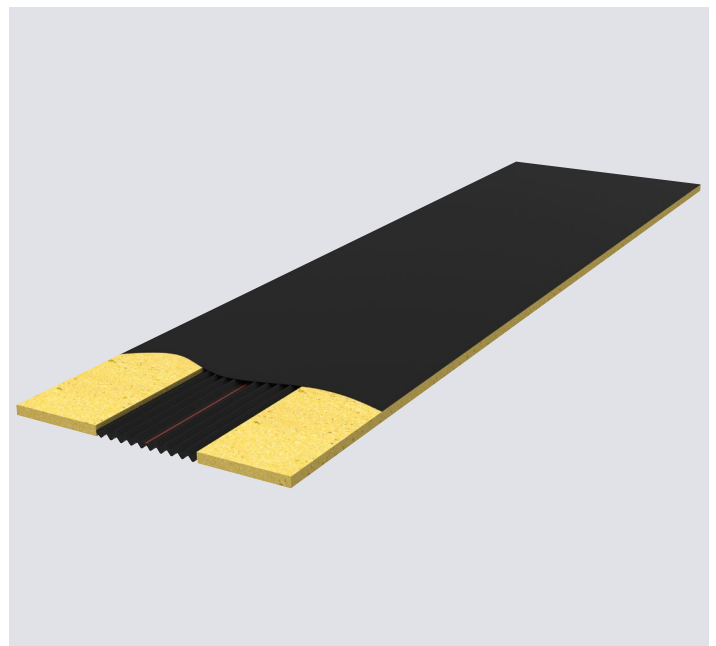


### MEASUREMENTS

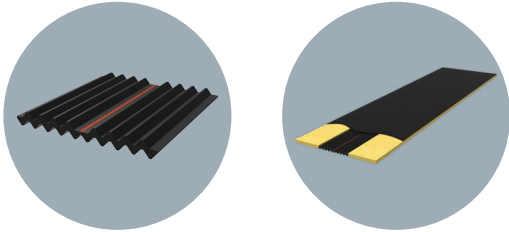
- l Overall length
- b Overall width
- t Overall thickness
- a Web length top
- c Web length bottom
- t<sub>a</sub> Web thickness top
- t<sub>c</sub> Web thickness bottom
- b<sub>E</sub> bi-Trapez Bearing® width
- r<sub>a</sub> Edge width

### IMPACT SOUND STOP STAIR ELEMENT

Bearing thickness [mm]	Bearing width [mm]	Cross-section type
10	50	I
		L
		Z
10	100	I
		L
		Z
15	50	I
		L
		Z
15	100	I
		L
		Z
20	100	I
		L
		Z

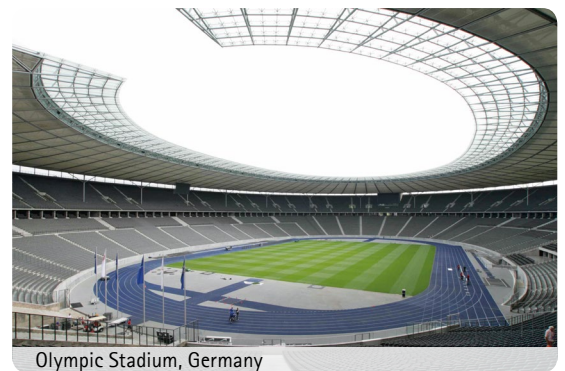


## Extract from our client reference projects



## BI-TRAPEZ BEARING® FOR STRUCTURAL MEMBERS AND IMPACT SOUND INSULATION

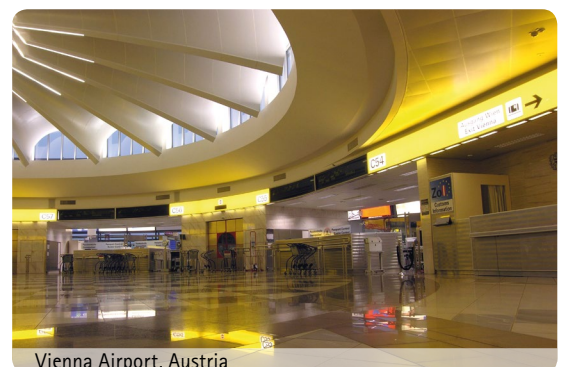
- BWM, Leipzig, Germany
- Audi, Ingolstadt, Germany
- Riem Arcaden shopping mall, Munich, Germany
- Waldspirale Hundertwasser Building, Darmstadt, Germany
- Porcelain manufacture, Meißen, Germany
- Biblis nuclear power plant, Germany
- WDR Cologne TV station – Lindenstrasse, Germany
- Congress Centrum Am Funkturm, Berlin, Germany
- Institute for Marine Science, Kiel, Germany
- Reichstag Chamber, Berlin, Germany
- Qatar Embassy Residence, Berlin, Germany
- Chinese Embassy, Bonn, Germany
- Hessen State Parliament, Wiesbaden, Germany
- Olympic Stadium, Berlin, Germany
- Signal-Iduna Stadium, Dortmund, Germany
- Bob-sleigh track, Oberhof, Germany
- Hotel de France, Jersey, UK
- University of Veterinary Medicine, Vienna, Austria
- Ice rink, Vienna, Austria
- Natural History Museum, Vienna, Austria
- Airport, Vienna, Austria
- Centre of Music, Moscow, Russia
- Bolshoi Theatre, Moscow, Russia
- Kuwait Airways, jumbo hangars, Kuwait
- Moda-NCO Housing, Riyadh, Saudi Arabia



Olympic Stadium, Germany



Qatar Embassy, Germany



Vienna Airport, Austria



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