BUILDING COMMON GROUND

MAX FRANK®

Expert opinion

Egcodist C R90

Behaviour of structural bearings in case of fire

6351/2021 | 06.04.2021

tested by: MPA, Braunschweig

(Translation of the original German text not checked by iBMB MPA Braunschweig)

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Materialprüfanstalt für das Bauwesen, Braunschweig

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Mitterweg 1
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Document **6351/2021**

Our ref:
Client no.:
Official in charge:
Department:
Contact:

Your ref: Hr. Michel
Your communication of: 18/09/2020

Date: 06/04/2021

Expert Opinion on the behaviour of structural bearings in conjunction with adjoining solid construction elements in the event of exposure to a fire on one or more sides in accordance with the standard temperature-time curve (STTC) according to DIN 4102-2:1977-09 and/or BS EN 1363-1:2020-05

Appendix 1

To Whom It May Concern:

In the document dated 18.09.2020, MPA Braunschweig was appointed by Max Frank GmbH & Co. KG, Leiblfing, to provide an expert opinion on the behaviour of structural bearings in conjunction with adjoining solid construction elements in the event of a fire on one or more sides in accordance with the standard temperature-time curve (STTC) according to DIN 4102-2:1977-09 and/or BS EN 1363-1:2020-05.

According to details provided by the client, the construction bearings shown in Appendix 1 must not have a negative influence on the fire resistance duration or the fire resistance class of the adjacent solid components when exposed to fire based on the standard temperature-time curve (STTC) according to DIN 4102-2: 1977-09 or DIN EN 1363-1: 2020-05.

The expert opinion is necessary because not all construction details of the structural bearings in combination with adjacent solid construction elements have been verified in terms of fire protection in accordance with the building regulations.

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Notified body (0761-CPR) - Accredited as testing laboratory, product certification body and FPC certification body for construction products

1 Basis and documents of the expert opinion

The expert opinion for the structural bearings in conjunction with adjoining solid construction elements is carried out on the basis of

[1] DIN 4102-2: 1977-09,
[2] BS EN 1363-1: 2020-05
[3] BS 4102-4: 2016-05,
[4] DIN EN 1992-1-2: 2010-12 in connection with DIN EN 1992-1-2/A1: 2019-11, DIN EN 1992-1-2/NA: 2010-12, DIN EN 1992-1-2/NA/A1: 2015-09 and DIN EN 1992-1-2/NA/A2: 2021-04,
[5] DIN EN 1996-1-2: 2011-04 in connection with DIN EN 1996-1-2/NA: 2013-06,
[6] the Concrete Fire Protection Handbook, 1st edition, Beton Verlag, and
[7] the construction drawings according to Appendix 1.

As well as these documents, the report is based on fire protection assessment findings from tests carried out on structural bearings by MPA Braunschweig.

2 Description of the construction

The description of the examined constructions is based on the details of the customer. The following descriptions concern only the most important details in respect to fire protection.

For structural and/or building physical design reasons, elastomeric bearings must be used under certain circumstance as structural bearings (linear or point bearings) between load-bearing solid components such as horizontal joints between walls and ceilings.

The Egcodist linear and point bearings are used in building construction for the elastic support or as elastic separation between components to avoid constraining forces due to movement and deformation of the components. These Egcodist bearings are used as end bearings (single-sided fire exposure) and as intermediate bearings (double-sided fire exposure) or point bearings (multiple-sided fire exposure).

They are used primarily as line bearings under steel-reinforced concrete or pre-stressed concrete elements. They are also used as ceiling support bearings above masonry walls plastered on both sides.

Essentially, they transmit mainly vertical forces. The transmission of horizontal forces is limited.

Egcodist linear and point bearings consist mainly of an interior elastomeric core (EPDM) enclosed fully in d ≥ 50 mm wide strips of mineral wool (non-combustible, melting point 1000 °C, bulk density ≥ 30 kg/m^3). The mineral wool strips are installed with a compression of s ≥ 10 mm.

The layer thickness is d ≤ 30 mm.

More details about the design of structural bearings can be found in the appendix.

3 Fire protection assessment of the structural bearings in conjunction with adjoining solid construction elements

3.1 General

Elastomeric bearings can achieve high fire resistance durations under solely vertical loads and within certain dimensions despite the building material class B2 according to DIN 4102-1 and despite burning combustion of more than 50 % in the unprotected state. Based on tests performed, the following statements (amongst others) can be made for the tested bearings [6]:

- Under horizontal loads, particularly for thick bearings, smaller fire resistance durations are to be expected.
- With application thicknesses of ≤ 30 mm, flames generally extinguish after fire exposure.

In case of a bearing that cannot be assessed in terms of fire protection on the basis of the tested bearings according to [6], it is possible to apply insulating cladding.

3.2 Fire protection assessment

Based on the data according to [6] as well as the test findings of MPA Braunschweig on structural bearings, the Egcodist linear and point bearings described in Section 2 and illustrated in Appendix 1 have no negative influence on the fire resistance duration of adjacent components in the installed conditions when subjected to a flame on one or more sides according to the standard time-temperature curve (STTC) according to DIN 4102-2: 1977-09 or. DIN EN 1363-1: 2020-05.

The condition for this is that

- the structural bearings are completely covered on both sides or all sides, according to the fire exposure, with the mineral wool fire protection insulation described in section 2,

- the structural bearings can be rated at least as "normal flammability" and
- the adjacent solid construction elements are made of reinforced or pre-stressed concrete and/or masonry plastered on both sides with the fire resistance rating "F 30", „F 60" or "F 90" in accordance with DIN 4102-2:1977-09 and/or "REI 30", "REI 60" or "REI 90" in accordance with DIN EN 13501-2.

Furthermore, in the case of statically indeterminate structures and/or structures sensitive to settlement, additional stresses due to support subsidence may have to be taken into account.

4 Specific remarks

4.1 This expert opinion does not represent a proof of usability within the German building authority approval process. This expert opinion can nevertheless be used in connection with the fire behaviour certificates of the construction elements adjoining structural bearings in the building authority approval process as a basis of proof of compatibility, because the structural bearings exert no negative influence on the fire resistance duration of the adjacent components.

It is the responsibility of the builder of the structure to provide any necessary proof in the respective building authority approval procedure.

4.2 This expert opinion applies only in terms of fire protection. Further requirements may arise from the technical building regulations applicable to the structural bearings and the respective state building regulations or the regulations for special buildings, e.g., building physics, structural design, electrical engineering, ventilation technology or similar.

4.3 The overall fire protection concept is not the subject of this expert opinion.

4.4 The above fire safety assessment is only valid if the load-bearing (load-dissipating and stiffening) elements have at least the same fire resistance duration as the assessed construction.

4.5 Modifications and additions of design details (derived from this expert opinion) are only possible after consultation with the MPA Braunschweig.

4.6 Correct execution is entirely the responsibility of the executing contractors.

4.7 The construction details shown in the appendix are binding for the construction work.

4.8 Only the most important details for the fire protection assessment were investigated. MPA Braunschweig is not investigating all the details illustrated in the appendices.

4.9 The validity of this expert opinion expires on 05.04.2026. An extension of the period of validity may be granted upon request depending on the state of the art.

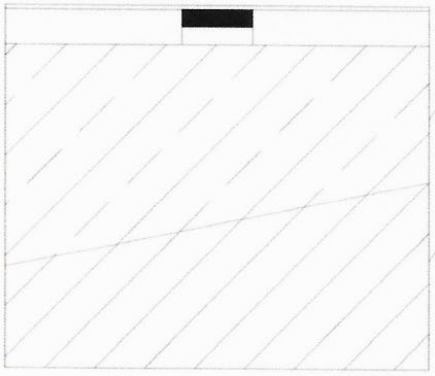
Your sincerely

p.p.
Dipl. Ing. Thorsten Mittmann
Deputy Head of Department

by order
Dipl. Ing. Sven Schmieder
Person responsible

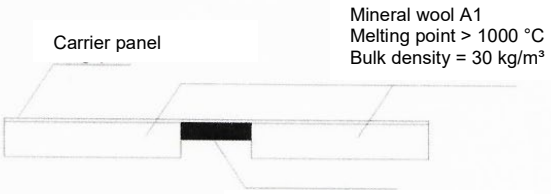
Egcodist linear bearings

Installation situation



The adjacent components must also fulfil the requirements of the fire-resistance rating F90.

Materials



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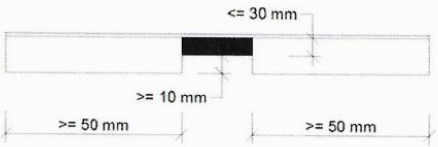
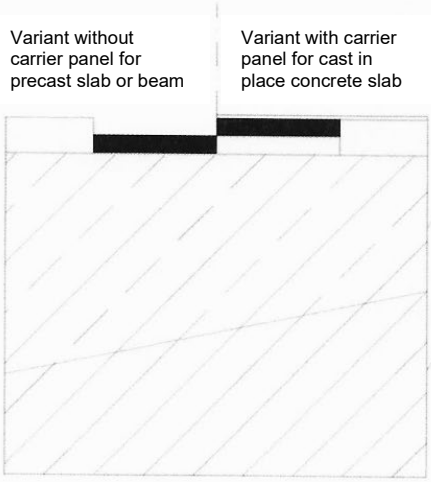


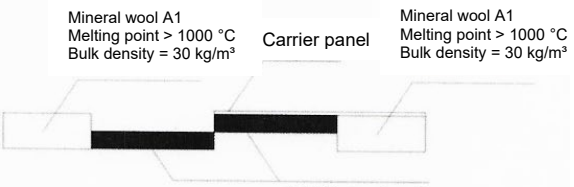
Egcodist point bearings

Installation situation



The adjacent components must also fulfil the requirements of the fire-resistance rating F90.

Materials



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