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Changes to the administrative provision model for Technical Building Regulations (Muster-Verwaltungsvorschrift Technische Baubestimmungen [MVV TB]) - Version 2025/1*

Content:

* Notified in accordance with Directive (EU) 2015/1535 of the European Parliament and of the Council of 9 September 2015 laying down a procedure for the provision of information in the field of technical regulations and of rules on Information Society services (OJ L 241, 17.9.2015, p. 1).

A - Technical Building Regulations to be observed to meet the fundamental requirements for building structures

A 1 Mechanical strength and stability

A 1.1 General information

Under § 3 and § 12(1) of the MBO[1] each building structure must be stable as a whole, in its individual parts and on its own. The stability of other structural works and the bearing capacity of the building site of neighbouring plots may not be jeopardised. Furthermore, any effects arising during erection and use must not cause damage to any parts of the structure or facilities and equipment due to excessive deformations of the load-bearing construction.

To meet these requirements for building works, the Technical Rules under Section A 1.2 must be observed.

A 1.2 Technical requirements in respect of the planning, designing and execution of structural works and parts thereof pursuant to § 85a(2) MBO[1]

1 According to national law

Item numbers:	Planning, design and execution requirements pursuant to § 85a para 2 MBO[1]	Technical rules/Version	Further measures pursuant to § 85a(2) MBO[1]
1	2	3	4
A 1.2.2	**Structural works in earthworks and foundations**		
A 1.2.2.1	Geotechnical planning, calculation and design		
	General rules	DIN EN 1997-1:2009-09 DIN EN 1997-1/NA:2010-12	Annex A 1.2.2/1
	Subsoil - Verification of the safety of earthworks and foundations	DIN 1054:2021-04	Annex A 1.2.2/1
A 1.2.2.7	Execution of special geotechnical work (special civil engineering) - Injections, jet grouting, design of consolidated soil bodies - Produced using jet grouting, deep mixing or injection methods	DIN EN 12715:2021-01 DIN/TS 18187:2022-04 DIN EN 12716:2019-03: DIN 4093:2015-11	Annex A 1.2.2/4
A 1.2.4	**Structural works in metal and composite construction**		
A 1.2.4.1	Design of steel structures		
	Silos	DIN EN 1993-4-1:2017-09 DIN EN 1993-4-1/NA:2018-11	Annex A 1.2.4/12
A 1.2.5	**Structural works in timber construction**		
A 1.2.5.1	Design of timber structures		
	Design of timber structures	DIN EN 1995-1-1:2010-12 DIN EN 1995-1-1/A2:2014-07 DIN EN 1995-1-1/NA:2013-08	Annex A 1.2.5/1
	Structural fire design	DIN EN 1995-1-2:2010-12 DIN EN 1995-1-2/NA:2010-12	Annex A 1.2.3/3
	Bridges	DIN EN 1995-2:2010-12 DIN EN 1995-2/NA:2021-06	Annex A 1.2.5/1
A 1.2.6	**Structural installations in masonry construction**		
A 1.2.6.1	Design of masonry structures		
	General rules for reinforced and unreinforced masonry structures	DIN EN 1996-1-1:2013-02 DIN EN 1996-1-1/NA:2019-12	Annex A 1.2.6/1

1 According to national law

Annex A 1.2.2/1

1 In the absence of a generally recognised technical best practice for the planning, designing and execution using the following construction products/kits with an ETA, proof pursuant to § 16a MBO[1] is required:

- Gabions
- Piles made of ductile cast iron pipes
- Rock and floor nails
- Injection piles (composite piles) with small diameter (micropiles)
- Grouted anchors (rock and soil anchors).

Types using these construction products/kits may be applied for auxiliary devices for temporary (≤ 2 years) static securing of construction conditions without proof in accordance with § 16a MBO[1].

2 Re DIN 1054, Section A 11.5.4:
Earthworks must be permanently stable. When geosynthetics with a reinforcement function pursuant to EN 13251:2016[2] are used to build earthworks, these may be designed in accordance with the 'Recommendations for the design and calculation of embankments with geosynthetics (EBGEO)'.

1 According to federal state law
2 Implemented in Germany by DIN EN 13251:2016-12.

Annex A 1.2.3/3

Re DIN EN 1992-1-2, DIN EN 1993-1-2, DIN EN 1994-1-2, DIN EN 1995-1-2 and DIN EN 1999-1-2

For special formations (e.g. connections, joints, etc.), the rules of application according to DIN 4102-4:2016-05 must be observed, provided that the Eurocodes do not contain any information on this.

For special formations (e.g. connections, joints, etc.) within the scope of application of the Technical Rule referred to in No A 2.2.1.4, the Technical Rule pursuant to No A 2.2.1.4 applies, provided that DIN EN 1995-1-2 does not contain any information on this.

Annex A 1.2.4/12

Re DIN EN 1993-411:2017-09, Section 5.3.2.4

Using the equations for β and η in section 5.3.2.4 (15) to determine the reduction factor χ_x in the range of the referenced slenderness ratio between λ_0 and λ_p, for the calculation of the design resistance against buckling under axial compression (meridional buckling) according to section 5.3.2.4 (16), equation (5.36), the value of γ_{M1} shall not be less than $\gamma_{M1} = 1.2$.

Annex A 1.2.5/1

1 In addition to DIN EN 1995-1-1:2010-12, DIN EN 1995-1-1/A2:2014-07 and DIN EN 1995-1-1/NA:2013-08, the following application standards must also be observed in the planning, designing and execution:

DIN 20000-1:2017-06	Application of construction products in structures – Part 1: Wood based panels
DIN 20000-3:2022-02	Application of construction products in structures – Part 3: Glued laminated timber and glued solid timber according to DIN EN 14080:2013-09 Sections 4.2 and 4.11: the protective agent is specified exclusively in accordance with Regulation (EU) No. 528/2012 (Biocide Products Regulation) in conjunction with the national implementing provisions.

DIN 20000-4:2013-08	Application of construction products in structures – Part 4: Prefabricated structural members assembled with punched metal plate fasteners according to DIN EN 14250:2010-05
DIN 20000-5:2024-01	Application of construction products in structures – Part 5: Strength graded structural timber with rectangular cross section
DIN 20000-6:2015-02	Application of construction products in structures – Part 6: Dowel-type fasteners and connectors according to DIN EN 14592 and DIN EN 14545
DIN 20000-7:2022-02	Application of construction products in structures – Part 7: Structural finger jointed solid timber according to DIN EN 15497:2014-07 Sections 4.2 and 4.5: the protective agent is specified exclusively in accordance with Regulation (EU) No. 528/2012 (Biocide Products Regulation) in conjunction with the national implementing provisions.

1a In the absence of a technical best practice for the planning, designing and execution using structural elements with laminated veneer lumber in accordance with DIN EN 1995-1-1:2010-12 and DIN EN 1995-1-1/A2:2014-07 with DIN EN 1995-1-1/NA:2013-08, proof according to Section 16a MBO[1] is required, especially for joints.

2 Re DIN EN 1995-1-1/NA:2013-08, Section 3.6 ‘Adhesives’:
Wood structural elements with glued load-bearing joints may only be used if these joints have been manufactured with adhesives that are classified as type I according to DIN EN 301:2013-12 or DIN EN 15425:2008-06 in conjunction with EN 14080:2013[2], Annex B.2 or classified according to DIN EN 16254:2014-02. This does not apply to joints of elements in wood-based materials.
Sentence 1 applies correspondingly to the manufacture of glued, load-bearing joints of timber materials on site.
In the absence of a technical best practice for the planning, designing and execution, proof according to § 16a MBO[1] is required when using timber construction products and bonded joints on timber structural elements that have been manufactured using adhesives for general usage in structural adhesive bonds according to EN 15274:2015[3] or repaired with these adhesives.

3 Regarding ETAs for ‘Beams made of one to four finger-jointed timbers that are tested for tensile strength’:
When designing beams, the test load coefficient must be set to a value of $k_{pl} = 1.0$.

4 In the absence of a generally recognised technical best practice for the planning, designing and execution using kits for wood-concrete composite systems according to ETA, proof pursuant to § 16a MBO[1] is required.

5 Re. EAD 130022-00-03.04:
Solid wood and glued laminated timber with finger joints may be used in service class 1 and 2. Only ‘beam log’ type beams may be used.

6 Where load-bearing features of building structural elements or kits are specified in the form of calculated load-bearing values, mechanical strength or complete static calculations in the declaration of performance, these count as structural engineering verifications.

7 Re DIN EN 1995-2/NA:2021-06:
NCI NA.4.4.2, paragraph (NA.1) first indent, first sub-indent is replaced by the following: ‘- if suitable stainless steels in accordance with DIN EN 1993-1-4, Annex A in conjunction with DIN EN 1993-1-4/NA are used’
NCI NA.C.1, paragraph (NA.1) is replaced by the following: ‘Components which cannot be replaced or can only be replaced with considerable effort, such as main beams, must be designed as protected components. This does not apply to timbers of durability class 1 in accordance with DIN EN 350.’
NCI NA.C.1, paragraph (NA.3) is replaced by the following: ‘The upper surfaces of unprotected load-bearing components and end grain surfaces should be covered. This does not apply to plank coverings and timbers of durability of class 1 according to DIN EN 350.’

1 According to federal state law
2 Implemented in Germany by DIN EN 14080:2013-09.
3 Implemented in Germany by DIN EN 15274:2015-06.

Annex A 1.2.6/1

1 To DIN EN 1996-1-1:2013-02, section 2.5:
The design of masonry based on tests shall not be applied.

2 Re DIN EN 1996-1-1:2013-02, section 6.1.2.2:
To determine the design value for load-bearing capacity, calculate the reduction factor Φ_m in order to take account of thinness and eccentricity, in accordance with DIN EN 1996-1-1/NA:2019-12, NCI Annex NA.G.

3 In addition to DIN EN 1996-1-1:2013-02 and DIN EN 1996-1-1/NA:2019-12, the following standards must be observed:

DIN 20000-401:2017-01	Application of building products in structures - Part 401: Rules on the use of masonry bricks according to DIN EN 771-1:2015-11
DIN 20000-402:2017-01	Application of building products in structures - Part 402: Rules on the use of sand-lime bricks as per DIN EN 771-2:2015-11
DIN 20000-403:2019-11	Application of building products in structures - Part 403: Rules on the use of concrete masonry bricks as per DIN EN 771-3:2015-11
DIN 20000-404:2018-04	Application of building products in structures - Part 404: Rules on the use of aerated concrete bricks as per DIN EN 771-4: 2015-11
DIN 20000-412:2019-06	Application of building products in structures - Part 412: Rules on the use of masonry mortar as per DIN EN 998-2:2017-02
DIN 18580:2019-06	Construction site mortar

4 In the absence of a generally accepted rule of technology for the planning, design and execution of supplementary components in accordance with EN 845-1:2013+A1:2016[1], EN 845-2:2013+A1:2016[2] and EN 845-3:2013+A1:2016[3] a proof is required in accordance with § 16a MBO[4].

5 When using sand-lime bricks with chamfered edges (chamfered bricks) in accordance with DIN EN 771-2:2015-11 in load-bearing masonry, their contact width must be ≥ 115 mm, and when used in facing shells of double-leaf masonry, it must be ≥ 90 mm. The contact width is the stone width minus the chamfer width(s).

6 To DIN 20000-412, Table 3:
The values of the characteristic compressive strength of masonry according to DIN EN 1996-1-1/NA may only be applied for thin-bed masonry if the thin bed mortar according to EN 998-2 also has the following performances:

Dry raw density ≥ 1,300 kg/m³
Maximum grain size ≤ 1.0 mm
Correctability time ≥ 7 min
Processability time ≥ 4 h.

1 Implemented in Germany by DIN EN 845-1:2016-12
2 Implemented in Germany by DIN EN 845-2:2016-12
3 Implemented in Germany by DIN EN 845-3:2016-12
4 According to national law

A - Technical building regulations to be observed to meet the fundamental requirements for building structures

A 2 Fire protection

A 2.1 General health protection requirements for structural works for reasons of fire protection

Under § 3 MBO[1] in conjunction with § 14 MBO[1], buildings must be positioned, erected, converted and maintained in such manner that

- fire emergence is prevented,
- the spread of fire and smoke (fire expansion) is prevented,
- during a fire it is possible to rescue people and animals and
- effective firefighting is possible.

The provisions of § 5, 26 to 36, 39 to 42, 46 and 47 MBO[1] and the requirements in the following Sections elaborate the fire protection requirements in terms of the relevant protection objectives for structural works.

For construction products under current harmonised European specifications whose use has an impact on structural works in terms of compliance with fire protection requirements (A 2.1.1 et seq.), classifications of performance data and related usability and execution conditions are included in the Technical Rule included in ser. No A 2.2.1.2.

A 2.1.1 Requirements on the accessibility of buildings

In order to carry out extinguishing and rescue operations, provision must be made for foot and vehicle access for the fire brigade, as well as installation and movement areas on the land, in accordance with § 5 MBO[1]; the specificities of the Technical Rule referred to in number A 2.2.1.1 shall be observed.

In open carriageways and passageways through which the only escape route to public thoroughfares leads or the accessibility for the fire service is ensured, only non-combustible insulating layers are permitted on supports, walls and ceilings.

A 2.1.2 Requirements for the fire behaviour of building materials and building components

A 2.1.2.1 General information

In order to meet the basic requirements, general requirements for fire behaviour are formulated in § 26(1) MBO[1].

The Technical Rule included in ser. No A 2.2.1.2 must be observed to meet the following requirements. This also applies to the assembly of building materials.

1 According to federal state law

A 2.1.2.2 Non-combustible

When used in structural works, it must be ensured that the parts of structural works do not contribute to the fire, specifically a developing or fully developed fire. Depending on the use, there shall be no or limited ignition, the least possible smoke development, no progressive glowing and/or smouldering and no burning particles or debris; the type of structural elements, dimensional stability and melting point/melting temperature and raw density shall be taken into account.

Building materials are not combustible if they permanently comply with the criteria specified in DIN 4102-1:1998-05, Section 5.1 or 5.2 during a fire, if required, with the melting point information of at least 1 000°C pursuant to DIN 4102-17: 2017-12.

A 2.1.2.3 Flame-resistant

When used in structural works, it must be ensured that the parts of the structural works make only a limited contribution to the fire and that there is only a limited propagation during and when the fire effect is eliminated.

Depending on the use of the component, ignition shall occur only after flames have been present for a specific time, only when smoke reaches a specific temperature, only where there is a limited release of energy, a defined amount of smoke development, no self-sustained continuation of the fire, no progressive glowing and/or smouldering, and – where applicable – no burning particles or debris.

With the exception of external wall cladding and floor coverings, the fire effect referred to in Section 6.1.1(a) of DIN 4102-1:1998-05 shall be assumed to be the fire of an object in a room; in the case of external wall cladding, the fire effect referred to in Section 6.1.1(b) of DIN 4102-1:1998-05 from a wall opening (see also A 2.1.5), in the case of floor coverings, the fire effect referred to in Section 6.1.1(c) of DIN 4102-1:1998-05 is to be assumed from a fire situation in which flames reach a neighbouring room from the door opening and where horizontal flame propagation and smoke development are safe.

Building materials are deemed flame-resistant if they permanently meet the criteria specified according to DIN 4102-1:1998-05, Section 6.1 under the effects of a fire.

Parts of buildings that should not produce any falling burning particles or debris must also fulfil the criteria pursuant to DIN 4102-16:2021-01, Section 10.3.

A 2.1.2.4 Normal flammability

For use in buildings in case of exposure to an incipient fire it must be ensured that parts of buildings can only contribute to the fire to a limited extent; where applicable, no falling burning debris or particles should be produced. The fire effect shall be assumed to be the fire effect in accordance with Section 6.2.1 of DIN 4102-01:1998-05.

Building materials are deemed normal flammability if they permanently meet the criteria specified according to DIN 4102-1:1998-05, Section 6.2 under the effects of a fire.

Parts of buildings that should not produce any falling burning debris or particles must also fulfil the criteria pursuant to DIN 4102-1:1998-05, Section 6.2.6

If a component is to be used for the building that does not meet at least the requirement of ‘normal flammability’ (easily flammable), Section 26(1) sentence 2 of the MBO[1] must be complied with.

1 According to federal state law

A 2.1.3 Requirements on the fire resistance of parts of buildings

A 2.1.3.1 General information

For the fulfilment of the basic requirements in accordance with § 3 in conjunction with § 14 MBO[1], general requirements for the fire resistance of parts of buildings are set out in § 26(2) MBO[1] and a distinction is made between:

The fire resistance of structural elements is essentially based on the applicable system of building inspection requirements (building classes, height of storeys, type of building). The classifications in fire resistance classes are determined on the basis of fire tests according to the standard temperature-time curve (Einheitstemperaturzeitkurve [ETK]). Fire-resistance classes follow from the Technical Rule described under Paragraph A 2.2.1.2.

In the case of load-bearing and reinforcing structural elements of structural systems, the fire resistance refers to their stability in the event of fire. In the case of room-closing structural elements, such as walls and ceilings, the fire resistance also refers to their resistance to fire propagation (room-enclosing fire resistance — hereinafter: closing off the room).

In terms of their fire behaviour, fire-resistant structural elements must not contribute more to the fire than specified in Section 26(2) MBO[1].

For fire protection requirements and fire protection assessments of the building material class, subsequently applied coatings of up to a thickness of 0.5 mm on structural elements are not taken into account, where the coatings are fully applied without cavities on a non-combustible substrate.

Fire-resistant structural elements are divided into:

a) fire-resistant structural elements:

   Load-bearing and reinforced parts must consist of non-combustible building materials. Space-enclosing structural elements must additionally have a layer of non-combustible building materials that is continuous in the component plane.

b) Highly fire-retardant structural elements:

   Where load-bearing and reinforced parts consist of combustible building materials, they must have fire-protective cladding made from non-combustible building materials (fire protective cladding) and, where available, non-combustible insulation materials. The fire-protective cladding must prevent

   - burning of the supporting and reinforced parts,
   - the introduction of fire and smoke into wall and ceiling structural elements through joints, installations or fittings and the spread of fire within these structural elements,
   - the transmission of fire via connecting joints of space-enclosing structural elements into adjacent units or rooms and
   - any significant spread of smoke through connecting joints (see A 2.1.3.3.3)

   .

   The fire protection cladding on the outside of highly fire-retardant external wall components may be reduced in accordance with the Technical Rule pursuant to ser. No A 2.2.1.4.
   Where space-enclosing high fire-retardant structural elements in their load-bearing and reinforced parts are made of non-combustible building materials and a continuous layer of non-combustible building materials is arranged at the component level, no covering designed to protect against fire is required; they can also consist of non-combustible building materials as a whole.

c) fire-retardant structural elements:

   Load-bearing and reinforcing structural elements can be made of combustible building materials. This also applies to space-enclosing structural elements.

1 According to federal state law

d) Structural elements pursuant to Section 26(2), sentence 4, of the MBO[1], which may consist of combustible building materials and have no cavities, no filled cavities, and no insulation materials inside, unless permitted under the Technical Rule pursuant to ser. No A 2.2.1.4.

e) Structural elements pursuant to Section 26(2), sentence 4, of the MBO[1], which may consist of combustible building materials and have cavities completely filled with non-combustible insulation materials inside. These structural elements must have fire protection cladding made of non-combustible building materials. Fire protection cladding shall comply with the requirements set out in A 2.1.3.1(b).

f) Fire-resistant structural elements for 120 minutes of stability in the event of fire and room closure; load-bearing and reinforcing structural elements must be made of non-combustible building materials. This also applies to space-enclosing structural elements.

A 2.1.3.2 Requirements for stability in the event of fire

A 2.1.3.2.1 General information

To meet the requirements of Section 12 MBO[1], load-bearing parts of buildings must remain stable over a specific period of time, even when exposed to fire.

Cross-Section modifications and penetrations – including those performed subsequently – and deformations due to fire exposure must be taken into account insofar as they could have an impact on stability.

A 2.1.3.2.2 Fire-resistant

The stability must be ensured for at least 90 minutes in case of fire exposure according to the ETK in accordance with DIN 4102-2:1977-09, Section 6.2.4.

A 2.1.3.2.3 Highly fire-retardant

The stability must be ensured for at least 60 minutes in case of fire exposure according to the ETK in accordance with DIN 4102-2:1977-09, Section 6.2.4.

A 2.1.3.2.4 Fire-retardant

The stability must be ensured for at least 30 minutes in case of fire exposure according to the ETK in accordance with DIN 4102-2:1977-09, Section 6.2.4.

A 2.1.3.2.5 Fire resistance of 120 minutes according to A 2.1.3.1 letter (f)

The stability must be ensured for at least 120 minutes in case of fire exposure according to the ETK in accordance with DIN 4102-2:1977-09, Section 6.2.4.

A 2.1.3.2.6 Fire resistance of 90 minutes for structural elements according to A 2.1.3.1 letter (d)

The stability must be ensured for at least 90 minutes in case of fire exposure according to the ETK in accordance with DIN 4102-2:1977-09, Section 6.2.4.

A 2.1.3.2.7 Fire resistance of 60 minutes for structural elements according to A 2.1.3.1 letter (d)

The stability must be ensured for at least 60 minutes in case of fire exposure according to the ETK in accordance with DIN 4102-2:1977-09, Section 6.2.4.

A 2.1.3.2.8 Fire resistance of 60 or 90 minutes for structural elements according to A 2.1.3.1 letter (e)

The stability must be ensured for at least 60 or 90 minutes in case of fire exposure according to the ETK in accordance with DIN 4102-2:1977-09, Section 6.2.4.

1 According to federal state law

A 2.1.3.3 Space barrier requirements in the event of fire

A 2.1.3.3.1 General information

Parts of structural works are space-enclosing fire-resistant if they permanently prevent fire propagation for at least a specified period of time, if the space enclosure is not impaired even in the area of connections to adjacent parts of structural works and if there is no significant smoke development and if the side not exposed to fire does not show any significant smoke development or droplets of particles from structural elements. There is no significant dropping or dripping from structural elements on the side facing away from the fire if the size of such structural elements does not exceed 10 cm in length or width. Explosive spalling of these structural elements must not occur.
The same applies to closures and other closures of openings.

Unless otherwise specified, fire resistance refers to any possible direction of fire exposure (e.g. inward, outward, downward or upward).

Space-enclosing parts of the structure must each be adjacent to other parts of the structure that ensure room enclosure for at least the same amount of time.

If structural elements that must be room-closing structural elements are adjacent to structural elements without fire resistance (e.g. exterior wall or roof), these room-closing structural elements must remain stable for the required period of time when exposed to fire. Cross-sectional changes and penetrations — including retrospective nature — as well as deformations during fire exposure shall be taken into account, insofar as they may have an influence on the closure of the room.

Openings in space-enclosing parts are not permitted, unless otherwise specified in § 28 to § 32, § 35, § 36, § 39 and § 45 MBO[1].

Where light-permeable surfaces may be used as fire protection glazing in space-enclosing walls that do not prevent thermal radiation from passing through, they must prevent the spread of fire and smoke in accordance with the fire resistance period of space-enclosing walls for the minimum required period of time according to DIN 4102-13:1990-05, Section 6.1, and comply with the criteria in accordance with DIN 4102-13:1990-05. They may be created only in places where there are no concerns in terms of rescuing persons or effective firefighting. To prevent the spread of fire, openings in these fire protection glazings are not permitted. The Technical Rule referred to in ser. No. A 2.2.1.2 must be observed in order to meet these requirements. For the planning, designing and execution of fire protection glazing, there are no technical best practices with regard to the building code requirements, and proof pursuant to Section 16a MBO[1] is required.

If overflow openings are made in space-enclosing walls, the closures of such openings must be fitted with a smoke-triggered device and prevent the passage of fire and smoke according to the fire resistance of the space-enclosing walls, at least based on a standard fire as defined in DIN 4102-2:1977-09. The Technical Rule included in ser. No A 2.2.1.2 must be observed in order to meet these requirements. In the absence of a technical best practice for the planning, designing and execution using these closures, proof in accordance with Section 16a MBO[1] is required.

Joints of the structural elements must remain closed to ensure that the room is sealed during exposure to fire. This requirement can be met with non-combustible mineral building materials (such as mortar, concrete) or mineral insulating materials with a melting point of at least 1 000 °C according to DIN 4102-17:2017-12 as well as with products that securely seal the residual cross-section in case of fire exposure.

A 2.1.3.3.2 Fire-resistant

The room closure must be ensured for at least 90 minutes in case of exposure to fire according to the ETK in accordance with DIN 4102-2:1977-09, Section 6.2.4. The stability of non-load-bearing structural elements under their own weight in case of fire must be demonstrated. In the observations on smoke development according to DIN 4102-2:1977-09, Section 8.6, it must be established that at most low smoke development has been observed (no surface smoke emission from the component surface, only single wisps of smoke, including from joints).

1 According to federal state law

There is deemed to be a continuous layer in the component plane if it is placed perpendicular to the direction of fire impact over the entirety of the space-enclosing part and does not itself contribute to the fire (i.e. is non-combustible).

Structural elements of space-enclosing structural elements which are not load-bearing and reinforced parts and not to the continuous layer of the component shall be at least normal flammability.

A 2.1.3.3.3 Highly fire-retardant

The room closure must be ensured for at least 60 minutes in case of fire according to the ETK in accordance with DIN 4102-2:1977-09, Section 6.2.4. The stability of non-load-bearing structural elements under their own weight in case of fire must be demonstrated.
In the observations on smoke development according to DIN 4102-2:1977-09, Section 8.6, it must be established that at most low smoke development has been observed (no surface smoke emission from the component surface, only single wisps of smoke, including from joints).

For highly fire-retardant space-enclosing structural elements with combustible load-bearing and reinforced parts made of wood, the detailed specifications of the Technical Rule included in ser. No A 2.2.1.4 must be observed.

A 2.1.3.3.4 Fire-retardant

The room closure must be ensured in case of fire according to the ETK in accordance with DIN 4102- 2:1977- 09, Section 6.2.4., for at least 30 minutes. The stability of non-load-bearing structural elements under their own weight in case of fire must be demonstrated. In the observations on smoke development according to DIN 4102-2:1977-09, Section 8.6, it must be established that at most low smoke development has been observed (no surface smoke emission from the component surface, only single wisps of smoke, including from joints).

A 2.1.3.3.5 Fire resistance of 120 minutes according to A 2.1.3.1 letter (f)

The room closure must be ensured in case of fire according to the ETK in accordance with DIN 4102- 2:1977- 09, Section 6.2.4, for at least 120 minutes. The stability of non-load-bearing structural elements under their own weight in case of fire must be demonstrated. In the observations on smoke development according to DIN 4102-2:1977-09, Section 8.6, it must be established that at most low smoke development has been observed (no surface smoke emission from the component surface, only single wisps of smoke, including from joints).

A 2.1.3.3.6 Fire resistance of 90 minutes for structural elements according to A 2.1.3.1 letter (d)

The room closure must be ensured for at least 90 minutes in case of fire according to the ETK in accordance with DIN 4102-2:1977-09, Section 6.2.4. The stability of non-load-bearing structural elements under their own weight in case of fire must be demonstrated. In the observations on smoke development according to DIN 4102-2:1977-09, Section 8.6, it must be established that at most low smoke development has been observed (no surface smoke emission from the component surface, only single wisps of smoke, including from joints).
For room-closing structural elements, the specifications of the Technical Rule referred to in ser. No. A 2.2.1.4 must be observed.

A 2.1.3.3.7 Fire resistance of 60 minutes for structural elements according to A 2.1.3.1 letter (d)

The room closure must be ensured for at least 60 minutes in case of exposure to fire according to the ETK in accordance with DIN 4102-2:1977-09, Section 6.2.4. The stability of non-load-bearing structural elements under their own weight in case of fire must be demonstrated. In the observations on smoke development according to DIN 4102-2:1977-09, Section 8.6, it must be established that at most low smoke development has been observed (no surface smoke emission from the component surface, only single wisps of smoke, including from joints).
For room-closing structural elements, the specifications of the Technical Rule referred to in ser. No. A 2.2.1.4 must be observed.

A 2.1.3.3.8 Fire resistance of 60 or 90 minutes for structural elements according to A 2.1.3.1 letter (f)

The room closure must be ensured for at least 60 or 90 minutes in case of exposure to fire according to the ETK in accordance with DIN 4102-2:1977-09, Section 6.2.4. This shall also prove the stability of non-load-bearing structural elements under their own weight in case of fire. In case of the observation of smoke development according to DIN 4102-2:1977-09, Section 8.6, it must be established that at most a small amount of smoke was

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observed (no surface smoke emission from the surface of the structural element, only single wisps of smoke, including from joints).

For room-closing structural elements with combustible load-bearing and reinforcing parts made of wood, the detailed specifications of the Technical Rule referred to under ser. No A 2.2.1.4 must be observed.

A 2.1.4 Load-bearing and reinforcing structural elements

Depending on the building class, the relevant requirements result from § 27 MBO[1].

Parts of buildings that bear (support) loads or stiffen parts of buildings must remain stable under this load over a specific period in case of fire as per Section 2.1.3.2.

If supporting parts of the structural installation are made of concrete, steel, aluminium, wood or masonry, the Technical Rules for the design of the structure for the event of fire in A 1.2.3, A 1.2.4, A 1.2.5 and A 1.2.6 shall be observed. If stability in case of fire is demonstrated mathematically, the following applies to:

- load-bearing structural elements that must be fire-resistant, load-bearing capacity must be mathematically demonstrated for at least 90 minutes under fire exposure using the standard temperature-time curve,
- load-bearing structural elements that must be highly fire-retardant, load-bearing capacity must be mathematically demonstrated for at least 60 minutes under fire exposure using the standard temperature-time curve,
- load-bearing structural elements that must be fire-retardant, load-bearing capacity must be mathematically demonstrated for at least 30 minutes under fire exposure using the standard temperature-time curve, and
- load-bearing structural elements that must have fire resistance of 120 minutes, load-bearing capacity must be mathematically demonstrated for at least 120 minutes under fire exposure using the standard temperature-time curve
- load-bearing structural elements referred to in A 2.1.3.1 letters (d) and (e) which must have a fire resistance of 90 minutes, the load-bearing capacity must be mathematically demonstrated for at least 90 minutes under fire exposure using the standard temperature-time curve,
- load-bearing structural elements referred to in A 2.1.3.1 letters (d) and (e, which must have a fire resistance of 60 minutes, the load-bearing capacity mathematically demonstrated for at least 60 minutes under fire exposure using the standard temperature-time curve.

If load-bearing and reinforcing parts of buildings are designed using natural fire models, Annex A 1.2.1/3 must be observed. Natural fire models shall not be used for load-bearing structural elements with a fire resistance of 90 minutes or 60 minutes in accordance with the Technical Rule referred to in ser. No A.2.2.1.4.

For highly fire-retardant load-bearing and reinforcing structural elements with combustible wood parts and fire-resistant structural elements made of combustible building materials according to A 2.1.3.1(d) and (e), the specifications of the Technical Rule referred under ser. No A 2.2.1.4 shall be observed.

A component that is only used for reinforcing may also display other fire characteristics than the fire-resistant component it is reinforcing if the entire system has sufficient fire resistance.

A 2.1.5 Outer walls

Depending on the building class, the relevant requirements result from Section 28 MBO[1].

Non-load-bearing exterior walls are structural elements that do not transfer any vertical loads, other than their own weight, and are only designed to absorb dead weight and wind loads.

Openings in exterior walls of building units to open corridors according to Section 36(5) MBO[1] must have sealing doors. Openings of necessary stairwells or necessary landings adjacent to the open corridor must have smoke-tight and self-closing closures. Openings of exterior emergency stairwells on high-rise buildings towards open corridors must have smoke-tight and self-closing closures, openings in exterior walls of open corridors in high-rise buildings to utility units must have fire-retardant, smoke-tight and self-closing closures. In addition to the requirements of A 2.1.6, the requirements concerning the outdoor climate apply. The Technical Rule referred to in ser. No. A 2.2.1.2 must be observed in order to meet these requirements.

1 According to federal state law

By way of deviation from the specifications of Section A 2.1.3.3.4 (re Section 26 MBO[1]), for fire effect from the outside to the inside, failure may not occur earlier than 30 minutes in accordance with DIN 4102-3:1977-09, Section 5.3.2 (decreased standard temperature-time curve).

If surfaces of exterior walls and exterior wall claddings, except for substructures in accordance with Section 28(3) sentence 1 clause 2 MBO[1], must be flame-resistant overall, then the same applies to the individual components thereof.

For flame-resistant external wall cladding, the criteria for fire exposure according to DIN 4102-20:2017-10, Section 4.2 must be met.

Exterior wall cladding in the form of an external thermal insulation composite system (ETICS) with EPS insulation materials meets the flame-retardant requirements if stable and dimensionally stable, non-combustible constructions are arranged at existing openings in the exterior wall in the area ofthe lintels above the opening, even in the event of a fire. This can be dispensed with if horizontally arranged, stable and dimensionally stable, non-combustible constructions are arranged even in the event of fire exposure.

For exterior wall cladding designed as a thermal insulation composite system with EPS insulating materials, fire exposure from outdoors directly affecting the lower area of the façade must also be taken into account. For this purpose, suitable non-combustible constructions must be provided so that the protection objective pursuant to § 26(1), sentence (1), MBO[1] is fulfilled, or the criteria according to DIN 4102-24:2022-12 must be complied with.

If cladding with normal flammability building materials is permitted for exterior building walls, easily flammable building materials may only be used if they are permanently connected in conjunction with other building materials pursuant to § 26(1) MBO[1]. § 26 (1), sentence 2, clause 2, MBO[1] is not applicable to exterior wall cladding if accessibility is ensured or there is a risk of damage.

In the case of exterior walls with rear-ventilated cladding which have cross-storey cavities or which pass over firewalls, other than those referred to in Section 7 of the Technical Rule referred to in ser. No. A 2.2.1.4, supplementary precautions shall be taken to limit the spread of fire even if they consist of non-combustible building materials and the Technical Rule referred to in ser. No. A 2.2.1.6 shall be complied with.

For external wall cladding of wood or wood-based materials for buildings of building classes 4 or 5, Section 7 of the Technical Rule referred to in ser. No A 2.2.1.4 shall be observed.

A 2.1.6 Partition walls

Depending on the building class, the relevant requirements result from Sections 29 and 45 MBO[1].

Depending on how they are used in the building structure, in case of fire, partition walls must ensure a space barrier as per Section A 2.1.3.3 for a sufficient period of time and be stable as loadbearing partitions as per Section A 2.1.3.2. pursuant to § 29 MBO[1].

Connections including those of joints, pipe penetrations and cross-section reductions for the installation of sockets, switch boxes, line splitters etc. must not adversely affect the space barrier and, for loadbearing partitions, stability.

Doors for openings in partition walls pursuant to Section 29(5) clause 2 and Section 45 No. 2 MBO[1] must be fire resistant (permanently fire-retardant, sealing and self-closing closures). The barriers are self-closing if they have suitable closing devices that automatically close the barrier by means of mechanically stored energy. These barriers are considered doors if they are not wider and not higher than 2.50 m (see DIN 4102-18:1991-03, Section 2.3), including existing side panels and skylights. Larger closures are gates. Regarding usage in rescue routes, reference is made to the Technical Rule referred to in ser. No. A 2.2.1.2, Section 5.1.6, No. 2.

The barriers must ensure the room closure and the tightness in case of fire exposure from each side according to DIN 4102-2:1977-09, Section 6.2.4, for at least 30 minutes, they must meet the criteria according to DIN 4102-5:1977-09, Sections 5.2.2 to 5.2.8, and they must comply with the criteria for permanent function according to DIN 4102-18:1991-03. In the case of doors, the self-closing property of at least 200 000 closing operations (test cycles) is assumed; this also applies to doors in gates (sliding doors). In the case of barriers other than doors, self-closing property is assumed to be at least 10,000 closing operations. As for the observations concerning

1 According to federal state law

smoke development according to DIN 4102-5:1977-09, it must be established that at most a small amount of smoke was observed (no surface smoke emission from the surface of the structural element, only single wisps of smoke, including from joints).

These doors and gates as fire-retardant closures may consist of at least normal flammability building materials; they also include all accessories and necessary fasteners. Fire protection barriers must have adequate locks with an adequate latch bolt in case of fire to prevent opening and spread of fire if pressure changes due to fire.

The Technical Rule included in ser. No A 2.2.1.2 must be observed in order to meet these requirements.

In order for people to save themselves by means of rescue routes and for firefighters to reach the site or to rescue people, a fire protection barrier must be able to be opened manually in the form of a door in the course of these rescue routes until it is impinged by fire. These requirements also apply to fire protection closures in the form of a sliding, lifting or rolling gates for example, which have relatively long opening and closing times, using auxiliary power where necessary, meaning that an additional door must be provided for these fire protection closures on rescue routes.

These fire protection closures should be kept closed as intended. A fire-protection closure may be kept open if it is provided with a device that ensures the immediate and safe closing of the fire protection closure already in the event of smoke exposure and where necessary in the event of heat exposure, in order to ensure the closure of the partition wall.
A locking mechanism is a system consisting of devices and/or combinations thereof that can be used to disable the operation of closing devices. When the activation mechanism is triggered in case of fire, due to a malfunction or through manual operation, any locks that were kept open shall be immediately cleared for closing. A locking mechanism shall consist of at least:

- a fire alarm, in the form of a smoke and, where necessary, heat alarm,
- a signal-processing activation device,
- an energy supply connected to a power grid,
- a locking device connected to the power supply and
- a manual activation button.

In the case of locking systems on swing-wing doors, the detection of which can be removed by pulling with low force may be waived, provided that the proof of applicability permits this.

In the absence of a technical best practice for the planning, designing and execution when using locking mechanisms, a proof pursuant to § 16a MBO[1] is required.

Self-closing barriers may be opened and closed by an electric motor only if the drive systems meet the following requirements.

The drive system required for the electromotive opening and closing of locks shall be a system consisting of at least:

- a drive with signal-processing drive control,
- an energy supply in addition to the general power supply,
- a fire detector as a smoke detector or, where necessary, as a heat detector; and
- a manual activation button.

The propulsion system shall also be capable of opening the closure if necessary and to close it immediately without delay and safely in the event of a fire, fault or manual release. After closing, only manual opening shall be permitted. For the planning, design and execution of drive systems for the electromotive (powered) opening and closing of barriers, except for construction products pursuant to C 2.6.10 and C 2.6.13, there is no technical best practice with respect to the building code requirements, so proof pursuant to Section 16a MBO[1] is required.

Partition walls made of fire-resistant glazing must satisfy the requirements for room-closing structural elements in case of exposure to fire as defined in DIN 4102-13:1990-05, Section 6.1 with respect to the minimum time and the criteria pursuant to DIN 4102-13:1990-05, Sections 6.2 and 6.3.1. In the observations on smoke development according to DIN 4102-13:1990-05, Section 8.1, it must be established that at most low smoke development has been observed (no surface smoke emission from the component surface, only single wisps of smoke, including from joints).

1 According to federal state law

The Technical Rule included in ser. No A 2.2.1.2 must be observed in order to meet these requirements. To ensure that the partition wall is sealed off, the closures of necessary openings in a partition wall designed as fire protection glazing must correspond to the fire resistance period of the fire protection glazing; in addition, the aforementioned requirements for fire protection closures apply.

The requirements placed on doors and gates as fire-protection closures shall also apply, unless otherwise specified, to closures required by model regulations based on the MBO[1] or other technical construction regulations of the MVV TB. With regard to the fire resistance duration and the smoke tightness, the above-mentioned model regulations are also decisive due to the MBO[1] and the technical construction regulations of the MVV TB.

A 2.1.7 Firewalls and walls permissible in place of firewalls

Depending on the building class, the relevant requirements result from Section 30 MBO[1].

Firewalls of structural works may not contribute to the fire in accordance with § 30(3) sentence 1 MBO[1] to ensure the protection objectives. They must be made of non-combustible building materials. By way of deviation from § 28(3) MBO[1], exterior wall cladding including insulation materials and substructures according to § 30(7) sentence 3 MBO[1] must be non-combustible on building walls.
Firewalls must also be stable and room-enclosing in the event that additional mechanical loads from parts of the building structure failing in the event of fire have an effect on these walls (impact). This also applies to walls used instead of firewalls, unless otherwise specified.

Firewalls are only deemed stable and room-closing in case of fire if they meet the requirements of Sections A 2.1.3.2 and A 2.1.3.3 without additional measures as well as the criteria according to DIN 4102-3:1977-09, Sections 4.2.1 to 4.2.4. By way of derogation from DIN 4102-3:1977-09, Section 4.2.3, firewalls may also be tested without a central and eccentric load.

Walls instead of firewalls according to Section 30(3) sentence 2 No. 1 MBO1

- Highly fire-retardant walls as defined in Section A 2.1.3.3.3; or
- Walls with a fire resistance of 60 minutes according to Section A 2.1.3.3.7,

in the event of fire, they are only stable and room-enclosing if they meet the requirements of Sections A 2.1.3.2 and A 2.1.3.3 without additional measures and comply with the criteria of DIN 4102-3:1977-09, Sections 4.2.2 to 4.2.4, but only for a period of 60 minutes. By way of derogation from DIN 4102-3:1977-09, Section 4.2.3, walls may be tested in lieu of firewalls without a central and eccentric load. For highly fire-retardant walls, the requirements of Section A 2.1.3.1. sentence 6(b) apply in addition. For walls referred to in Section A 2.1.3.3.7, the requirements of the Technical Rule published under ser. No A 2.2.1.4 apply in addition.

For other walls instead of firewalls according to Section 30(3) sentence 2 No. 2 and 3 MBO[1], the requirements according to Section A 2.1.6 shall be observed.

For firewalls and walls instead of firewalls, the test according to DIN 4102-3:1977-09 shall determine the load to be applied in accordance with DIN 4102-3:1977-09, 4.2.3, 4.2.4 and 4.3.2 by application. A minimum value does not have to be complied with. In the case of walls tested without load, the impact load shall be applied so that the requirements for the wall can also be demonstrated in the area of anchorages and fixings in accordance with DIN 4102-3:1977-09, Section 4.3.3.

Claddings of firewalls within the meaning of DIN 4102-3:1977-09, paragraph 4.2.2, are generally layers applied to the wall or at a distance from the wall after the construction of the wall, which are not to be added to the fire resistance of the wall, such as external wall claddings, installation levels, sound insulation measures, wall coverings, etc. firewalls and walls in place of firewalls must comply with the requirements of DIN 4102-3:1977-09 without such cladding.

Claddings that are essential components of the wall construction and without which the wall is not room-closing, such as walls with a steel substructure and a flat cladding of non-combustible plasterboard, are not to be understood as claddings within the meaning of Section 4.2.2 of DIN 4102-3:1977-09. This may also apply to plasters on walls that are regularly finished with plaster.

For all the walls covered by this section applies that, as for the observations concerning smoke development according to DIN 4102-3:1977-09, Section 5.4, it must be established that at most a small amount of smoke was

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observed (no surface smoke emission from the surface of the structural element, only single wisps of smoke, including from joints).

Connections in other structural elements in firewalls and walls used instead of firewalls, including joints, pipe penetrations and cross-section reductions for the installation of sockets, switch boxes, line splitters, etc. must not adversely affect the space barrier or stability.

In internal firewalls and internal walls used instead of firewalls, openings are only allowed for doors, gates and closures for pipe passages and conveyor systems pursuant to § 30(8) MBO[1]; they shall be permanently sealed and self-closing in the fire resistance period corresponding to the wall and shall be limited to the number and size required for use, in order to ensure the room closure of these walls. The requirements under Section A 2.1.6 also apply.

For glazing pursuant to § 30(9) MBO[1], these requirements are fulfilled with fire-resistant glazing if during a fire pursuant to DIN 4102-13:1990-05, Section 6.1, the spread of fire and smoke and the passage of heat radiation is prevented for the minimum required time and the criteria pursuant to DIN 4102-13:1990-05 are satisfied. In the observations on smoke development according to DIN 4102-13:1990-05, Section 8.1, it must be established that at most low smoke development has been observed (no surface smoke emission from the component surface, only single wisps of smoke, including from joints).

The Technical Rule included in ser. No A 2.2.1.2 must be observed in order to meet these requirements.

A 2.1.8 Ceilings

Depending on the building class, the relevant requirements arise from § 31 MBO [1].

Ceilings between storeys must remain stable and space-enclosing for a sufficient amount of time in buildings pursuant to § 31 MBO[1] and must meet the requirements of Sections A 2.1.3.2 and A 2.1.3.3.

Connections, including joints, to other structural elements, including external walls, shall be designed in such a way as to ensure stability and room enclosure in order to prevent the spread of fire.

If openings in ceilings according to § 31 Section 4 Number 3 MBO[1] must have permanently sealing and self-closing closures (flaps, sliding panes, etc.) to ensure the fire resistance of the ceiling, then the enclosing function of the ceiling must be ensured. The requirements under Section A 2.1.6 also apply, including those concerning keeping this fire protection closure open; concerning the continuous function, 10 000 closing operations are sufficient. The Technical Rule included in ser. No A 2.2.1.2 must be observed in order to meet these requirements.

A 2.1.9 Roofs

Depending on the building class, the relevant requirements arise from § 32 MBO[1].

The roof covering as part of the building structure consists of the rainwater-draining layer (roof membrane), including parts used for thermal insulation and to protect against the penetration of moisture, parts needed to transfer load to the parts bearing the roof covering load (insulating materials, moisture barriers, underlays, battens). The roofing also includes translucent surfaces and closures of openings and their connections to the roof.

Unless otherwise permitted in § 32(3) MBO[1], roofing must withstand fire exposure for a sufficient length of time in the event of fire from the outside into the physical structure through heat radiation or burning parts from other physical structures and the spread of fire to the physical structure (hard roofing pursuant to § 32(1) MBO[1]). The roofing may be damaged only to a limited extent both vertically and horizontally and may contribute only to a limited extent to the fire process itself. The roof inclinations must be taken into account because the fire characteristics of roofs can vary according to roof inclination.

This requirement is met when non-green roofs are used that at a minimum meet the criteria set forth in DIN 4102-7:2018-11, Section 4 letters (a) to (e) during a fire as set out in DIN 4102-7:2018-11, Section 6.1 to 6.5 in consideration of Section 7.

1 According to federal state law

Green roofs are considered to be hard roofs if they meet the requirements of the Technical Rule under ser. No A 2.2.1.3.

For specific combustible translucent surfaces or barriers of openings for which there is no proof of hard roofing, use as roofing is permitted without this leading to the expectation that the prevention of fire formation or spread of fire in or on the roof is impaired if:

- the sum of the subsurfaces does not exceed 30% of the roof area,
- the subsurfaces are at a distance of at least 5 m from firewalls or directly adjacent higher buildings or parts of buildings

and the subsurfaces,

- the lighting strips are maximum 2 m wide and 20 m long, are at least 2 m from each other and from the roof edges or
- the dome lights have an area of not more than 6 m² each, are at least 1 m from each other and from the roof edges and are at least 2 m from lighting strips made of combustible building materials.

To prevent fire spreading to parts of the building structure via roof installations or superstructures such as heat extraction surfaces or smoke and heat extraction devices, these roof installations or super structures must be at a sufficient distance from combustible parts, or these parts must be non-combustible pursuant to § 32(5) MBO[1]. Heat extraction surfaces or smoke and heat extraction devices are considered roof superstructures in accordance with § 32(5) sentence 1 MBO[1].

A 2.1.10 Stairs

Depending on the building class, the relevant requirements arise from § 34 MBO [1].

The load-bearing parts of necessary stairs in buildings in accordance with § 34(4) sentence 1 MBO[1] must be able to withstand the effects as referred to in A 2.1.3.2 to enable effective firefighting operations.

A 2.1.11 Necessary stairwells

Depending on the building class, the relevant requirements arise from § 35 MBO [1].

Sufficiently long use in case of fire according to Section 35(1) sentence 2 MBO[1] means that persons present in the building continue to be able to escape until smoke has entered the necessary stairwell. If necessary, stairwells are required, they must have walls and ceilings which are sufficiently long, room-enclosing and stable, because they are also access paths for the fire brigade according to § 35 Section 4 MBO[1]. This also applies to required vestibules of emergency stairwells. Necessary stairwells shall, depending on building class, ensure stability and enclosing function in accordance with the requirements of Sections A 2.1.3.2 and A 2.1.3.3. The walls must – where necessary – satisfy the requirements of Section A 2.1.7 for interior firewalls. Unless further requirements exist, if the ceilings and walls are made of combustible building materials, a covering of non-combustible building materials of sufficient thickness is required, e.g. in the form of plasterboard with a thickness of at least 12.5 mm.

Closures according to Section 35(6) sentence 1 No. 1 MBO[1] of door openings in the walls of necessary stairwells must be permanently fire-retardant, smoke-proof and self-closing, so that the prevention of the spread of fire is not jeopardised and the passage of smoke in accordance with DIN 18095- 2:1991-03 in the stairwell is prevented during the exposure time specified therein; the room enclosure must be secured and the criteria of continuous function in accordance with DIN 4102-18:1991-03 must be fulfilled. These fire protection closures should be kept closed as intended. The requirements under Section A 2.1.6 also apply. The Technical Rule included in ser. No A 2.2.1.2 must be observed in order to meet these requirements.

Openings in the walls of necessary stairways to necessary corridors shall have permanently smoke-tight and self-closing closures (smoke protection closures) in order to prevent the passage of smoke in accordance with DIN 18095- 2:1991- 03 into the stair room during the period of exposure specified therein; the room must be securely closed. The smoke barriers must meet the criteria of DIN 18095-1:1988-12 and the criteria of the permanent function according to DIN 4102-18:1991-03. These smoke barriers should be kept closed as intended. They may be kept open if they are fitted with devices which, in the event of exposure to smoke, permanently ensure immediate and safe closing (locking mechanism); in addition, the requirements of A 2.1.6. apply. In order to fulfil the requirements for the barriers, the Technical Rule referred to in ser. No. A 2.2.1.2 must be observed.

1 According to federal state law

Door openings according to Section 35(6) sentence 1 No. 3 MBO[1] must have permanently sealed and self-closing closures. This requirement is met with structural elements (doors) that ensure sealing when smoke is present in the stairwell, provided there are no pressure differences between the stairwell and the area to be closed off beyond those due to normal climate thermal lift and the smoke has not dropped to the bottom of the door. A door is sealed if it meets the requirements of the Technical Rule referred to in Section 5.4 of ser. No A 2.2.1.2. The doors are permanently self-closing if the permanent function criteria of DIN 4102-18:1991-03 is met.

The space barriers of walls of necessary stairwells or walls of rooms between a necessary stairwell and the exit to the outside is ensured for openings to necessary corridors only if they have smoke-tight and self-closing barriers.

A 2.1.12 Required corridors and open corridors

Depending on the building class, the relevant requirements result from Section 36 MBO[1].

Taking into account the protection objective according to Section 36(1) MBO[1], the walls of required corridors should have only such door openings as are necessary for their use. The doors must close tightly as per Section 36(4) sentence 4 MBO[1] so that smoke ingress in one or an adjoining building unit is made more difficult over a certain period of time by constructive measures on the doors. This requirement is considered sufficient, because it is assumed that such non-self-closing doors will be kept closed. Doors are deemed to close tightly if the requirements for the construction of the door leaf and the seal according to Section 2.1.11 are met. Tightly closing doors may contain transparent side parts, provided that the overall width of the door component with side part is not more than 1.50 m.

If doors are open or closed after a fire has burnt through them, fire must not be allowed to spread on the ceiling and wall surfaces of the necessary corridor so as not to hamper rescue and firefighting measures. In the event that the ceilings and walls are made of combustible building materials, cladding made of non-combustible building materials of sufficient thickness is required, e.g. in the form of plasterboard with a thickness of at least 12.5 mm.

If walls of necessary corridors are to be designed as fire-resistant glazing, the requirements for fire-resistant glazing are met if a during a fire pursuant to DIN 4102-13:1990-05, Section 6.1, the spread of fire and smoke and the passage of heat radiation is prevented over the minimum period of time and the criteria pursuant to DIN 4102-13:1990-05 are satisfied. In deviation from Section 36(4) sentence 4 MBO[1], in order to ensure the room closure by fire-resistant glazing, the doors of the fire-resistant glazing must be tight and self-closing and correspond to the fire resistance of the fire-resistant glazing.

Smoke protection closures in required corridors according to Section 36(3) MBO[1] may be executed room-high and in corridor width and have fixed side panels and skylights.

In addition, the requirements of Section A 2.1.6 and A 2.1.11 apply in the case of fire and smoke protection seals, also with regard to the keeping of these smoke protection seals.
The Technical Rule included in ser. No A 2.2.1.2 must be observed in order to meet these requirements.

A 2.1.13 Shaft walls and landing doors for lifts

Depending on the building class, the relevant requirements result from Section 39 MBO[1].

In order to guarantee the protection objectives in the event of fire, the lift shaft walls must ensure the room closure for a sufficient period of time, remain stable where necessary and meet the requirements of Sections A 2.1.3.2 and A 2.1.3.3. Shaft walls made of combustible building materials shall have cladding made of non-combustible building materials of sufficient thickness (e.g. in the form of plasterboard with a thickness of at least 12.5 mm) on the shaft side to prevent the spread of fire on the surfaces of the lift shaft walls in case of open landing doors or of closed doors after the fire has burned through them.

Lift doors must essentially consist of non-combustible building materials to fulfil the protection objective according to Section 39(1) MBO[1] and the requirements of Section 39(2) sentence 2 MBO[1].

The Technical Rule included in ser. No A 2.2.1.2 must be observed in order to meet these requirements.

A 2.1.14 Service shafts and ducts, system floors and electrical service areas

1 According to federal state law

In buildings, service shafts and ducts as per § 40 MBO[1] may only pass through space-enclosing structural elements with a specified fire resistance requirement if there is no risk of the spread of fire for a sufficient period of time or if appropriate precautions have been taken to counteract it, and there are no more or larger openings than necessary. The Technical Rule included in ser. No A 2.2.1.2 must be observed in order to meet these requirements.

Where installations pass through cavities of system floors in buildings, the Technical Rule under ser. No A 2.2.1.9 must be observed; regardless of actual traffic loads, a traffic load of at least 1.5 kN/m ^{2} shall be taken into account in the design of the fire resistance period in the case of raised floors. For fire tests, a traffic load of 1.5 kN/m² must also be taken into account. The Technical Rule included in ser. No A 2.2.1.2 must be observed in order to meet these requirements.

To protect other areas from fire from electrical service areas for transformers or switchgears, the Technical Rule under ser. No A 2.2.1.10 must be observed.

A 2.1.15 Installations and construction products of technical building equipment

A 2.1.15.1 General information

The building authority requirements of the MBO[1], the model garage and parking space regulation (M-GarVO) and special building regulations[1] based on the MBO[1] for the installations and construction products of technical building equipment are specified in the Technical Rules referred to in ser. No A 2.2.1.8 to A 2.2.1.12, A 2.2.1.16 and A 2.2.2.1 to A 2.2.2.8. In order to fulfil the requirements, the Technical Rule under ser. No A 2.2.1.2 must also be observed.
Otherwise, the requirements of the following numbers A 2.1.15.2 to 2.1.15.6 must also be observed.

A 2.1.15.2 Lightning protection systems

Lightning protection systems pursuant to § 46 MBO[1] should prevent the emergence of fire in and on the building structure and prevent the endangerment of people through lightning strikes (exterior lightning protection).

Where technical safety devices and systems are present, they must protect against the effects of lightning currents and voltages on installations and on electrical and electronic parts of the other devices and systems in the building structure in case of a direct or indirect lightning strike (additional interior lightning protection).
To this end, measures must be taken against overvoltage and dangerous spark formation.

A 2.1.15.3 Fire control system for lifts

The fire control system must ensure that lifts immediately go to a storey with exits to the outside, or the next higher or lower storey that is not affected by the fire and shut down there with the doors open.

Fire control systems shall consist at least of automatic fire detectors for fire detection on each storey, the automatic alarm transmission devices for the fire alarm and the evaluation and control system for the lift. It is also permissible for the fire control system to be triggered by an automatic fire alarm system.

A 2.1.15.4 Heat extraction devices

Where heat extraction devices are required, fire propagation should be counteracted in view of a full fire in certain areas of a structural installation in order to prevent the ignition of combustible parts of the structural installation outside the actual fire area by means of combustion gases. For existing structural elements in the fire area, thermal effects must be reduced so that stability or the space barrier remains intact in case of fire. This can also support effective extinguishing work.

Requisite heat extraction devices must be chosen and used depending on their location in the building structure, the prescribed geometric dimensions, the requisite geometric opening area and the location of the building structure in respect of functionality and the effects, inter alia, wind, snow and of ambient temperatures. Electrically operated heat extraction devices require a safety power supply.

This must be shown in the fire protection certificate. Their use is subject to the Technical Rule referred to in ser. No. A 2.2.1.2 with the performance requirements specified therein. All necessary data on the position of the heat extraction devices must be stated in the fire protection certificate.

1 According to federal state law

A 2.1.15.5 Firefighter lifts

Firefighter lifts are used in particular in exceedingly high buildings to support effective firefighting operations. Firefighter lifts must remain usable by the fire brigade in case of fire.

Therefore, no other lifts may be arranged in the driving shafts of firefighter lifts. Firefighter lift shafts together with landing doors must remain safely operable for a sufficient length of time in case of fire, in accordance with A 2.1.13. Only the necessary technical equipment and systems required to operate the firefighter lift may be located in lift shafts. Firefighter lifts may only be accessible via a vestibule. The walls and ceilings of the vestibule must remain enclosed and non-combustible for a sufficient length of time in case of fire. The barriers to necessary openings in vestibules must remain enclosed and smoke-proof for a sufficient length of time. The vestibules may only be accessible via necessary corridors. To avoid the lift shafts being affected by smoke, the vestibules and lift shafts must be kept free of smoke in case of fire using pressure ventilation systems. Firefighter lifts must have automatic fire detection devices which can be used to shut down lifts outside the fire area in case of fire (fire-mode control system) and can only be started up again by the fire service (fire service circuit). The fire control system is triggered by an automatic fire alarm system.
Lifts may only be used to transport people and goods if there is no fire.

Firefighter lifts must have a power supply and remain operationally reliable for a sufficient length of time if the general power supply fails (emergency power supply).

Electrical circuit systems needed to operate firefighter lifts must be designed or separated by structural elements so that the safety systems remain operational for a sufficient length of time in the event of fire.

All necessary data must be stated in the fire protection certificate.

A 2.1.15.6 Indoor radio systems for the fire brigade

Indoor radio systems for the fire brigade are used to support effective firefighting operations. The systems are intended to support radio communications between fire service crews in the building structure and with fire service crews present immediately outside the building structure during operations, if this is not sufficiently possible due to the spatial configuration, dimensions of the building or because the properties of the building structure inhibit radio communication with the radio communication devices carried by the fire brigade. They shall consist at least of transmission, reception and transmission devices.

Indoor radio systems must have a power supply and remain operationally reliable for a sufficient length of time if the general power supply fails (emergency power supply).

Electrical circuit systems necessary for the operation of indoor radio systems for power supply must be provided or separated by structural elements in such a way that the systems remain operational in the event of fire for a sufficient period of time. The Technical Rule referred to under ser. No. A 2.2.1.8 must be observed.

All necessary data must be stated in the fire protection certificate.

A 2.1.16 Buildings used to store plastic secondary materials

Where structural works are used to store secondary plastic materials, the spread of fire must be prevented and effective firefighting enabled. The Technical Rule referred to under ser. No. A 2.2.1.14 must be observed.

A 2.1.17 Garages

To meet the basic requirements for structural works used as garages, specific requirements are defined. The Technical Rule under ser. No A 2.2.2.1 must be observed.

A 2.1.18 Requirements for special buildings

For certain special constructions according to Section 2(4) MBO[1], the design and execution is subject to the detailed requirements of the Technical Rules under ser. No. A 2.2.2.2 to A 2.2.2.8.

Note:

1 According to federal state law

Special fire protection requirements can also be stipulated as part of a deviation decision under building regulations pursuant to Section 67 MBO [1] or in the building permit pursuant to Section 64 MBO [1] for a special construction. Where the protection objectives pursuant to Section 14 MBO[1] cannot be met by following the Technical Rule under ser. No. A 2.2.1.2, the necessary technical information shall be included in the building documents.

1 According to federal state law

A 2.2 Technical requirements concerning the planning, designing and executing and technical requirements of structural elements pursuant to § 85a(2) MBO[1]

Item numbers:	Planning, design and execution requirements pursuant to § 85a(2) MBO[1]	Technical rules/version	Further measures pursuant to Section 85a(2) MBO[1]
1	2	3	4
A 2.2.1	**Planning, designing and execution**		
A 2.2.1.2	Construction products and designs	Building approval requirements, classification, use of construction products, use of designs: 2024-11[2] (See Annex 4)	
A 2.2.1.4	High fire retardant components in wood construction and fire resistant components in solid wood construction, outer wall coverings made of wood and wood materials	Model Directive on fire protection requirements for components and exterior wall coverings in wood construction – M-WoodBauRL: 2024-09[2]	Annex A 2.2.1.4/1
	- deleted from MVV TB 2025/1 -		
A 2.2.1.6	Rear-ventilated, external-wall cladding	Rear-ventilated external wall cladding: 2024-05 (See Annex 6)	
A 2.2.1.12	Combustion plants, other installations for heating and energy supply	Model Firing Regulation (MFeuV) Version: 2007-09, last amended by resolution of the Building Supervisory Commission dated 28.11.2023[2] For building inspection requirements in this Technical Building Regulation, a deviation pursuant to § 85a Section 1 sentence 3 MBO is excluded; a deviation from building inspection requirements is permitted only in accordance with § 67 MBO. § 16a Para. 2 and § 17(1) MBO are not affected.	
A 2.2.1.16	Technical fittings for buildings	Technical Rule on Technical Building Equipment (Technische Regel Technische Gebäudeausrüstung [TR TGA]): 2024-11[1] according to federal state law (See Annex 14)	

2 2 For building inspection requirements in this Technical Building Regulation, a deviation pursuant to § 85a Section 1 sentence 3 MBO is excluded; a deviation from building inspection requirements is permitted only in accordance with § 67 MBO. § 16a Para. 2 and § 17(1) MBO are not affected.

1 according to federal state law

2 For building inspection requirements in this Technical Building Regulation, a deviation pursuant to § 85a Section 1 sentence 3 MBO is excluded; a deviation from building inspection requirements is permitted only in accordance with § 67 MBO. § 16a Para. 2 and § 17(1) MBO are not affected.

4 Regulations for the fulfilment of other basic requirements for structural works must be observed.

Annex A 2.2.1.4/1

Note: The scope of application of the Technical Rule according to A 2.2.1.4 (MHolzBauRL) also includes components with reduced and without fire protection cladding according to Section 4.3 of the Technical Rule according to A 2.2.1.4.

Classification reports in accordance with Sections A 1.2 and A 1.5 of the Technical Rule according to A 2.2.1.4 shall be issued by a body notified in accordance with Article 39 in conjunction with Annex V.3 to Regulation (EU) 305/2011 for the European test standard referred to in that Technical Rule. Until 31.12.2025, classification reports based on tests in accordance with DIN EN 1365-1:2013-08 may also be issued by a testing body recognised under § 24 MBO[1] for designs in accordance with C 4.1 or C 4.1.1 of the Technical Building Regulations.

Classification reports based on previous standards shall continue to apply, provided that the assessment bases and classification criteria in those standards have not changed significantly.

DIN EN 1995-1-2:2010-12, Table 3.1 shall be used to determine the combustion rate. Combustion shall be determined in accordance with FprEN 1995-1-2:2024-08.

A - Technical building regulations to be observed to meet the fundamental requirements for building structures

A 3 Hygiene, health and preservation of the environment

A 3.1 General information

In accordance with Section 3 and Section 13 MBO[1] buildings must be positioned, erected, modified and maintained so that public safety and order – particularly life, health and natural resources – are not jeopardised and that no dangers or unreasonable nuisances arise due to plant and animal pests or other chemical, physical or biological effects.

To demonstrate compliance with these requirements, structural works must be designed and executed as a whole and in their separate parts so that the requirements pertaining to health protection and the protection of soil and water under Section A 3.2 are met.

A 3.2 Technical requirements for the planning, designing and execution of buildings and parts thereof pursuant to Section 85a(2) MBO[1]

The building requirements on reducing harmful emissions in accommodation areas pursuant to ser. No A 3.2.1 and A 3.2.2 and on ensuring external building structural elements are environmentally friendly pursuant to ser. No A 3.2.3 are set out in the regulations. They must be observed. If constructive measures (e.g. surface layers, casings) are planned for the affected areas instead, their protective effect must be demonstrated.

Item numbers:	Planning, designing and execution requirements according to § 85a(2) MBO[1]	Technical rules/version	Further measures pursuant to Section 85a(2) MBO[1]
1	2	3	4
A 3.2.1	Health protection requirements for structural works	ABG - Health protection requirements for structural works 2024-01 (see Annex 8)	
A 3.2.3	Requirement for structural works regarding effects on soil and water	ABuG - Requirements for structural works with regard to the impact on soil and water: 2024-03 (See Annex 10)	Annex A 3.2/4

1 According to national law

Annex A 3.2/4

According to Chapter D 3 further information on products according to harmonised technical specifications can be provided voluntarily and their correctness can be demonstrated in a technical documentation.

The applications of

- DAfStb Directive “Use of silicon-rich fly ash and boiler sand in concrete structural elements in contact with soil, groundwater or precipitation” (version of June 2023) and
- DIN 4226-101:2017-08 "Recycled rock grains for concrete according to DIN EN 12620 – Part 101: Types and controlled hazardous substances“ and DIN 4226-102:2017-08”Recycled rock grains for concrete according to DIN EN 12620 – Part 102: Type testing and factory production control”

provide an opportunity to meet the requirements for structural installations with regard to the effects on soil and water (ABuG) and to prepare appropriate technical documentation for this purpose. The impact on soil and water when using track ballast cannot be assessed on the basis of DIN 4226-101:2017-08.

A - Technical building regulations to be observed to meet the fundamental requirements for building structures

A 6 Thermal insulation

A 6.1 General information

In accordance with § 3 and § 15(1) MBO[1] structural works must be positioned, erected, modified and maintained so that they have thermal insulation in accordance with their use and with the climatic conditions.

To meet this requirement for structural works as a whole and in their separate parts, the Technical Rules on thermal insulation under Section A 6.2 must be observed.

A 6.2 Technical requirements for the planning, designing and execution of certain structural works and parts thereof pursuant to § 85a(2) MBO[1]

Item numbers:	Planning, designing and execution requirements pursuant to § 85a(2) MBO[1]	Technical rules/version	Further measures pursuant to § 85a(2) MBO[1]
1	2	3	4
A 6.2.1	Thermal insulation in buildings		
	Climate-related moisture protection	DIN 4108-3:2024-03	Annex A 6.2/2
	Hygrothermal design values	DIN 4108-4:2020-11	Annex A 6.2/3
	Application-related requirements for thermal insulation materials	DIN 4108-10:2021-11	Annex A 6.2/5

1 According to federal state law

Annex A 6.2/3

Re DIN 4108-4

For insulating materials and insulating plaster with ETA, the rated thermal conductivity value must be determined as follows:
On the basis of the nominal value given in the ETA, which represents 90% of production with a confidence factor of 90%, the nominal thermal conductivity value results from conversion to a moisture content at 23°C and 80% relative humidity and multiplication by the safety factor γ = 1.03. The conversion factors specified in the ETA are to be used to convert the humidity.

Annex A 6.2/5

1 In the absence of a technical best practice for technology for the planning, designing and execution of structural works using thermal insulation materials not listed in DIN 4108-10:2021-11, proof according to § 16a MBO [1] is required. This excludes the design of structural elements with insulation products in accordance with points 1.1 to 1.4 in case of compliance with the corresponding requirements:

1.1 Thermal insulation panels made of mineral material with an ETA based on EAD 040012-00-1201 and EEAS 040012-01-1201:

Application area according to DIN 4108-10, Table 1 (abbreviations)	Boundary dimensions for length, width and thickness	Right-angled	Flatness	Tensile strength perpendicular	Compressive strength	Dimensional stability[1]		Water absorption with partial immersion	
						at a defined temperature (70 °C)	at defined temperature and humidity conditions (23 °C / 90 % relative humidity)	brief	long term
	mm	mm/m	mm	kPa	kPa	%	%	[kg/m²]	[kg/m²]
DAD	± 2	≤ 5	≤ 2	-	≥ 200	≤ 1	≤ 1	≤ 2	≤ 3
DAA	± 2	≤ 5	≤ 2	≥ 80	≥ 200	≤ 1	≤ 1	≤ 2	≤ 3
DZ	± 2	≤ 5	≤ 2	-	-	≤ 1	≤ 1	-	-
DI	± 2	≤ 5	≤ 2	-	≥ 150	≤ 1	≤ 1	-	-
DEO	± 2	≤ 5	≤ 2	-	≥ 150	≤ 1	≤ 1	-	-
WI	± 2	≤ 5	≤ 2	-	≥ 150	≤ 1	≤ 1	-	-
WZ	± 2	≤ 5	≤ 2	-	-	≤ 1	≤ 1	≤ 2	≤ 3
WAB	± 2	≤ 5	≤ 2	≥ 80	≥ 200	≤ 1	≤ 1	≤ 2	≤ 3
WAP	± 2	≤ 5	≤ 2	≥ 80	≥ 200	≤ 1	≤ 1	≤ 2	≤ 3
WH	± 2	≤ 5	≤ 2	-	-	≤ 1	≤ 1	-	-
WTR	± 2	≤ 5	≤ 2	-	-	≤ 1	≤ 1	-	-
1 If the requirement for dimensional stability at 70 °C / 90 % relative humidity of ≤ 1 % is met, no requirements need to be met with regard to dimensional stability at 70 °C and dimensional stability at 23 °C / 90 % relative humidity.									

1.2 Expanded perlite insulation products (EPB) with an ETA based on EAD 040010-00-1201:

DIN 4108-10:2021-11, Table 11, applies to use, with the exception of the requirement relating to bending strength.

1.3 Granulated polystyrene and binder mixtures with an ETA based on EAD 040635-00-1201:

The product may be used as thermal insulation in line with areas of application DEO, DAD and DAA (dm) under DIN 4108-10:2021-11 if the declared compression stress value at 10 % compression is at least 100 kPa and the maximum relative compression difference is 5 % at deformation under pressure and temperature load.

1.4 Products with reflective layers for thermal insulation of the building envelope with an ETA based on EAD 040007-00-1201:

1.4.1 Application
The products may be used as non-pressurised, additional thermal insulation on the inside of heat-transferring construction structural elements corresponding to the area of application DI and WI in accordance with the DIN 4108-10:2021-11 standard.
They may only be incorporated in constructions in which they are protected against rainfall, weathering and

moisture penetration.

1.4.2 Rated value of the thermal resistance
The calculation of the thermal insulation shall be carried out with the rated value of the thermal resistance. The rated value of the thermal resistance shall be determined as follows:

The rated value of the thermal resistance is derived on the basis of the nominal value given in the ETA ('Core thermal resistance' without neighbouring airspaces) divided by the safety factor γ = 1.03. For products based on natural fibre insulation, an additional conversion to a moisture content at 23 °C and 80 % relative humidity shall be carried out using the conversion factors indicated in the ETA.

In areas where the products are compressed (e.g. fastening areas on the supporting structure), the thermal resistance of the products should not be used for the verification.

1.4.3 Thermal resistance of adjacent unventilated airspaces
For the calculation of the thermal resistance of unventilated airspaces limited by the products with a length and width of more than 10-times the thickness according to DIN EN ISO 6946:2018-03, Annex D, the following values shall be taken into account:

- Emissions grade ε for the surface of the products in accordance with ETA
- h_a in accordance with DIN EN ISO 6946:2018-03, Table D.2, where ΔT = 10 K
- h_{ro} = 5.7 W/(m² K)

Only airtight construction structures may be taken into account in which the products are installed on the inside of the structure protected from contamination and weather.

1.4.4 Climate-related moisture protection
The values given in the ETA for the products must be used for the calculation report of the climatic moisture protection in accordance with DIN 4108-3:2024-03.

2 For the execution of structural elements with insulating products made of vegetable or animal fibres in accordance with DIN 4108-10:2021-11, Tables 15 and 20:

The insulation products must be classified in class 0 in respect of resistance to mould. Alternatively, it should be demonstrated by hygrothermal simulation that there is no risk of mould infestation.

If the insulation products are processed dry, they may also be used for external components of GK 0 (use class 0 according to DIN 68800-2:2022-02) with the exception of Figure A.8, layer No 7 in cases where according to DIN 68800-2:2022-02 insulating materials with proof of usability for certain applications are required if the following performances are indicated:

- thickness when installed 25 kg/m³ to 155 kg/m³
- water vapour diffusion resistance value μ ≤ 3
- mass moisture content according to DIN EN ISO 12571:2013-12 at 23°C/80% relative humidity ≤ 0.19 kg/kg.

1 According to federal state law

B - Technical Building Regulations for components and special constructions to be observed in addition to the Technical Building Regulations listed in Part A

B 2 Technical regulations for special structures and components according to § 85a para. 2 MBO[1]

Item numbers:	Requirements for planning, design and Execution according to § 85a para 2 MBO[1]	Measures/specifications pursuant to § 85a(2) MBO[1]
1	2	3
B 2.2	**Structural elements**	
B 2.2.1	**Structural elements for walls, roofs, ceilings and façade constructions**	
B 2.2.1.2	External load-bearing walls made from kits[3]	Annex B 2.2.1/3
B 2.2.1.4	Roofs, walls and ceilings made of self-supporting sandwich elements with metal layers on both sides	Annex B 2.2.1/5
B 2.2.1.5	External thermal insulation composite systems	ETICS with ETA pursuant to ETAG 004: 2024-11 (see Annex 11)
B 2.2.1.6	In-situ concrete walls made of formwork components	Application rules for non-load-bearing permanent formwork kits/-systems and formwork components for the construction of in-situ concrete walls: 2024-05 (see Annex 12)
B 2.2.1.7	Internal partition wall kits for use as non-load-bearing walls3	Annex B 2.2.1/6
B 2.2.1.8	Construction kits for timber, metal and reinforced concrete buildings[3]	Annex B 2.2.1/3
B 2.2.1.9	Prefabricated room units for buildings[3]	Annex B 2.2.1/3
B 2.2.1.11	Lightweight load-bearing steel/wood roof elements3	Annex B 2.2.1/8
B 2.2.2	**Sub-ceiling structures**	
B 2.2.2.2	Suspended ceilings with fibre cement components or cement-bound building panels	Annex B 2.2.2/1
B 2.2.5	**Structural elements for sealing structural works** Under § 13 MBO [1], physical structures must be positioned, designed and fit for purpose so that no dangers or unreasonable inconveniences arise due to water or moisture.	
B 2.2.5.18	Structural waterproofing with adhesives and toppings of road bitumen or elastomer bitumen	DIN 18533-2:2017-07, Table 4 (EN 12591 and EN 14023) Also applicable: DIN EN ISO 11925-2:2020-07 in conjunction with Annex C 3.7 in accordance with A 2.2.1.2, Table 1.2.1

31 According to federal state law

3 with ETA

3

Annex B 2.2.1/3

1 Stability

If performances with regard to load-bearing capacity characteristics are indicated in the form of calculated values or complete static calculations within the scope of the declaration of performance, the calculations shall be included in the building documentation.

2 Thermal insulation

The design values as per DIN 4108-4:2020-11 are to be used for the thermal insulation certificate. The insulating materials used in the construction kit must meet the requirements under DIN 4108-10:2021-11 in line with the relevant area of application.

Annex B 2.2.1/5

1 Stability

Components made of sandwich panels as per EN 14509:2013[1] may not be used to brace buildings, building parts or structural works.

In the design and execution, the following shall apply: Sandwich elements shall be dimensioned and executed in accordance with Section E.2, E.3, E.5 and E.7 of the standard EN 14509:2013[1]. Sections E.4.2 and E.4.3 do not apply. The deflection limits according to EN 14509:2013[1], Section E.5.4, shall be complied with. The differences in temperature between the surface layers must be taken into account. The maximum temperature difference of the temperatures acting simultaneously in both surface courses is to be set with $\Delta T = T_1 - T_2$ as follows:

- Coating layer temperature on the inside T2
  As a rule, T2 = +20°C in winter and T2 = +25°C in summer; this applies to the proof of stability and to the proof of fitness for use.
  In special applications (e.g. air-conditioned halls such as ripening rooms, refrigerated warehouses), T2 shall be set in accordance with the operating temperature inside the building.

- Coating layer temperature on the outside T1
  In winter, T1 = -20°C shall be applied; for snow-covered roof elements, T1 is regulated by the standard. In summer, the surface course temperature T1 in accordance with the standard and for the proof of stability T1 = + 80°C (in case of direct sunlight) or T1 = + 40°C (no direct sunlight) shall be used for the proof of fitness for use.

The insulating panels shall be attached directly (visibly) by screws extending through both coating layers, the usefulness of which has been demonstrated for this purpose. The wrinkling stresses at the intermediate supports shall only apply when attaching the panels using a maximum of 3 screws per metre. Where more than 3 screws per metre are used, the wrinkling stresses shall be reduced by the factor K = (11 – n) / 8 (n = number of screws per metre).

The load-bearing capacity of the screws and the screw head deflections shall be determined in accordance with the Technical Building Regulations or the usability certification for use of the screws, with the effects and their combinations analogous to EN 14509:2013[1], Section E.5.3. When determining the actions for the fastenings, the approach of crease hinges over the inner supports (load-bearing method according to EN 14509:2013[1], E.7.2.1 and E.7.2.3) must not be applied to continuous sandwich elements (no chain of single-span elements).

The combination coefficients ψ_0 and ψ_1 are shown in Table E.6, the load factors γ_F in Table E.8 of standard EN 14509:2013[1]. The material-related safety factors γ_M are given in the table below:

Characteristics in respect of which γ_M is valid	Limit state	
	Load-bearing capacity	**Usability**
Metal coating layer yield	1.10	1.00
Creasing of a metal coating layer in the panel and at a central support (interaction with the support reaction)	2.80	1.40
Shear failure of the core	2.40	1.30
Shear failure of a profiled coating layer	1.10	1.00
Compressive failure of the core	2.40	1.30
Failure of the profiled coating layer on the central support	1.10	1.00

2 Fire safety/fire resistance
The use of self-supporting sandwich elements with metal facings on both sides in accordance with EN 14509:2013[1] requires classification of the reaction to fire with a European class and the addition of "all end uses".

The fire resistance of components (designs) is not regulated.

1 Implemented in Germany by DIN EN 14509:2013-12.

Annex B 2.2.1/6

The provisions of A 1.2.7.1 shall apply to the use of kits of fully or partially glazed partition walls of category IV.

Annex B 2.2.2/1

For kits and top layers for suspended ceilings (sub-ceilings) using fibre cement boards in accordance with EN 12467:2012[1] or cement-bound building boards with ETA, EN 13964:2014[2] shall apply, subject to the following provisions:

1 The suspended ceilings are anchored in the supporting structure using anchoring means such as dowels, bolts, or screws, the use of which is regulated in the Technical Building Regulations.

2 For cement-bonded building boards with ETA, the proof of thermal insulation must be provided using the design value of the thermal conductivity. The rated thermal conductivity value is derived from the nominal value specified in ETA[1] by converting to a moisture content at 23°C and 80% relative humidity. The conversion factors specified in the ETA shall be used for conversion.

1 Implemented in Germany by DIN EN 12467:2012-12.
2 Implemented in Germany by DIN EN 13964:2014-08.

B - Technical Building Regulations for components and special constructions to be observed in addition to the Technical Building Regulations listed in Part A

B 3 Technical building equipment and parts of systems for the storage, filling and handling of water-polluting substances that do not have the CE mark under the Construction Products Regulation

B 3.1 General information

Technical Building Equipment and parts of systems for the storage, filling and handling of water-polluting substances that do not meet specific fundamental requirements under Article 3(1) of the Construction Products Regulation for building structures and parts thereof in respect of their intended use (and are subject to further harmonised legal areas).

For these products, proof of fitness for purpose is required to demonstrate the main features missing under the conditions of Section 17(1) MBO[1]. This does not apply if there is a different specification in column 4(d). In this case, a declaration of conformity on the missing fundamental characteristics according to Section 22 MBO[1] issued by the manufacturer based on a prior examination of the construction products by a test centre recognised by building supervisory authority shall be sufficient.

B 3.2 Regulations pursuant to Section 85a(2) No. 3 MBO

Item numbers	Construction product	Relevant harmonisation provisions	a: Specific purpose b: Basic requirements in accordance with the Model Building Code (MBO)[1], if necessary with specification c: Missing essential feature d: Procedure for documentation of the missing essential feature
1	2	3	4
B 3.2.1	**Technical Building Equipment subject to requirements under other legislation**		
	- deleted from MVV TB 2025/1 -		
B 3.2.1.34	Individual ventilation units with integrated fire protection equipment (shut-off device) for ventilation systems according to DIN 18017-3:2022-05	2014/35/EU 2014/30/EU 2006/42/EC 2009/125/EC Regulation (EU) No 1253/2014 Delegated Regulation (EU) No 1254/2014	a: Aeration and ventilation of residential and non-residential buildings b.1: Fire protection c.1: Fire resistance

B - Technical Building Regulations for components and special constructions to be observed in addition to the Technical Building Regulations listed in Part A

B 4 Construction products and designs subject to the requirements of other legislation for which a regulation has been enacted pursuant to § 85(4a) MBO[1]

Installations with construction products for the treatment of waste water or installations for the storage, filling and handling of water-polluting substances must be sound, tight and durable, and must consist of building materials that are at most normally flammable.

Item numbers:	Designation	Measures/specifications pursuant to Article 85 a(2) MBO pursuant to Article 85 a(2) MBO[1]
1	2	3
B 4.2	**Technical requirements for installation, operation and maintenance of installations with construction products for waste water treatment**	
B 4.2.1	Installations with construction products for the treatment of waste water containing light liquids of mineral origin	Annexes B 4.2/1, B 4.2/2 and B 4.2/4
B 4.2.2	Installations with construction products for the retention of light liquids of mineral origin	Annexes B 4.2/1, B 4.2/2 and B 4.2/4
B 4.2.3	Installations with construction products for treating fatty waste water (separator plants for fats)	Annexes B 4.2/1 and B 4.2/3

1 According to federal state law

Annex B 4.2/1

1 Stability

Proof of load-bearing capacity and suitability for use of systems with construction products for the treatment of waste water containing light liquids and systems with construction products for the treatment of fat-containing waste water shall be provided on the basis of DIN 19901:2012-12 by type static analysis or static proof in individual cases. The following applies:

- For containers made of concrete without internal coating/lining, the penetration behaviour of fats or light liquids in the waste water into the concrete must be taken into account.
- For plastic containers, the necessary characteristic values for static calculation shall be determined by taking into account the effects of medium, time and temperature.

2 Fire protection

For installations with construction products for the treatment of waste water containing light liquids

- the containers, ceilings and components that create the connection to the inlet and outlet used for free-standing installations shall be made of non-combustible materials.
- having containers, roofings and components that establish the connection to the inlet and outlet and that are not made of non-combustible materials, the relevant installation shall be embedded in the soil at least up to the level of the maximum operating fluid level or, if there is a risk of accumulation (e.g. if an automatic closing device is fitted on the separator drain) up to the top of the shaft cover.

If construction products according to EN 858-1:2002+A1:2004[1] are used, the following fire performance must be declared:

Intended use/installation condition	**Minimum required performance***
Free-standing installation	A2-s1,d0
Underground installation	E-d2
* With regard to the building authority requirements, the provisions of Annex 4, Section 1.2 shall be observed.	

1 Implemented in Germany by DIN EN 858-1:2005-02

C - Technical Building Regulations for construction products that do not bear the CE marking and for designs

C 2 Requirements for submitting a declaration of conformity for construction products pursuant to § 22 MBO[1]

Item numbers:	Construction product	Technical rules/version	Declaration of conformity
1	2	3	4
C 2.1	**Construction products for concrete, reinforced concrete and prestressed concrete construction**		
C 2.1.1	**Binders**		
C 2.1.1.1	Fast-setting cement (FE cement) and quick-setting Portland and Portland composite cement (SE cement)	DIN 1164-2:2023-02 DIN 1164-11:2024-04 In addition, the following shall apply: Annexes C 2.1.1 and C 2.1.9	Mark of conformity [ÜZ]
C 2.1.4	**Concrete**		
C 2.1.4.3	Concrete by properties, concrete by composition	DIN 1045-2:2023-08 Also applicable: DIN 1045-3:2023-08 Annexes C 2.1.2 and C 2.1.3 Also applicable, depending on construction product: DafStb Guideline on precautions against harmful alkali reactions in concrete (Alkali-Richtlinie [Alkali Guideline]) AlkR – (2013-10), DAfStb Guideline on the manufacture and use of dry concrete and dry mortar (Dry Concrete Guideline) TrBMR – (2005-06), DAfStb Guideline on solid concrete structural elements (2010-04) and DAfStb Guideline for Steel Fibre Reinforced Concrete (DAfStb-Richtlinie Stahlfaserbeton) (2021-06), Part 2	Mark of conformity [ÜZ]
C 2.3	**Construction products for timber construction**		
C 2.3.3	**Adhesives for load-bearing timber components**		
C 2.3.3.1	Phenoplastics and aminoplastics of adhesive type I for glued load-bearing connections in and between timber components	DIN EN 301:2023-05, In addition, the following shall apply: Annex C 2.3.3	MDT
C 2.9	**Construction products for roofs and roof coverings, walls and wall coverings, as well as ceilings and ceiling linings and internal non-loadbearing dividing walls**		
C 2.9.4	Precast concrete panels for rear-ventilated external wall cladding	DIN 18516-5:2021-05	MDT
C 2.10	**Construction products for building waterproofing and roof sealing**		
C 2.10.2	Normally flammable elastomer joint tape for sealing joints in concrete	DIN 7865-1, -2:2015-02 In addition, the following shall apply: Annex C 2.10.1 and DIN 4102-1:1998-05 DIN EN ISO 11925-2:2020-07 in conjunction with Annex C 3.7	MDC
C 2.10.3	Normal flammability joint tape made of thermoplastic materials for sealing joints in in-situ concrete	DIN 18541-1, -2:2021-01 and DIN 18541-3:2021-07 Also applicable: DIN 4102-1:1998-05 DIN EN ISO 11925-2:2020-07 in conjunction with Annex C 3.7	MDC
C 2.10.4	Normally flammable adhesives and coating agents for building waterproofing with bitumen according to DIN EN 13304	DIN 18533-2:2017-07, Table 4 Also applicable: DIN 4102-1:1998-05	MDC

Item numbers:	Construction product	Technical rules/version	Declaration of conformity
1	2	3	4
		DIN EN ISO 11925-2:2020-07 in conjunction with Annex C 3.7	
C 2.12	**Construction products for site drainage**		
C 2.12.1	**Pipes, pipe fittings and jointing materials for lines and ducts**		
C 2.12.1.2	Plastic piping systems made of plasticiser-free polyvinyl chloride (PVC-U) for draining waste water inside buildings	DIN EN 1329-1:2014-07 in conjunction with DIN CEN/TS 1329-2:2012-09 Also applicable: DIN 4102-1:1998-05 DIN EN ISO 11925-2:2020-07 in conjunction with Annex C 3.7	Mark of conformity [ÜZ]
C 2.12.1.4	High-density polyethylene (HDPE) pipes and fittings for hot-water resistant waste water pipes (HT) inside buildings	DIN EN 1519-1:2023-08 in conjunction with DIN CEN/TS 1519-2:2023-08 Also applicable: DIN 4102-1:1998-05 DIN EN ISO 11925-2:2020-07 in conjunction with Annex C 3.7	Mark of conformity [ÜZ]
C 2.12.1.8	Plastic piping systems made of chlorinated polyvinyl chloride (PVC-C) for draining waste water inside buildings	DIN EN 1566-1:1999-12 in conjunction with DIN CEN/TS 1566-2:2012-09 In addition, the following shall apply: Annex C 2.12.1 and DIN 4102-1:1998-05 DIN EN ISO 11925-2:2020-07 in conjunction with Annex C 3.7	Mark of conformity [ÜZ]
C 2.12.1.9	Pipes and fittings of glass fibre reinforced polyester resin (UP-GFK) for underground sewers	DIN EN ISO 23856:2023-08 in conjunction with DIN CEN/TS 14632:2012-05	Mark of conformity [ÜZ]
C 2.12.1.14	Plastic piping systems made of polypropylene (PP) for draining waste water inside buildings	DIN EN 1451-1:2018-10 in conjunction with DIN CEN/TS 1451-2:2020-08 Also applicable: DIN 4102-1:1998-05 DIN EN ISO 11925-2:2020-07 in conjunction with Annex C 3.7	Mark of conformity [ÜZ]
C 2.12.1.15	Plastic piping systems made of acrylonitrile-butadiene styrene (ABS) for draining waste water inside buildings	DIN EN 1455-1:1999-12 in conjunction with DIN CEN/TS 1455-2:2012-09 In addition, the following shall apply: Annex C 2.12.1 and DIN 4102-1:1998-05 DIN EN ISO 11925-2:2020-07 in conjunction with Annex C 3.7	Mark of conformity [ÜZ]
C 2.12.1.16	Plastic piping systems made of styrene copolymer blends (SAN+PVC) for draining waste water inside buildings	DIN EN 1565-1:1999-12 in conjunction with DIN CEN/TS 1565-2:2012-09 Also applicable: Annex C 2.12.1 and DIN 4102-1:1998-05 DIN EN ISO 11925-2:2020-07 in conjunction with Annex C 3.7	Mark of conformity [ÜZ]
C 2.12.1.17	Plastic piping systems with pipes with profiled walls and smooth pipe surfaces made of plasticiser-free polyvinyl chloride (PVC-U) for draining waste water inside buildings	DIN EN 1453-1:2017-09 in conjunction with DIN CEN/TS 1453-2 (DIN SPEC 19942):2017-06 Also applicable: DIN 4102-1:1998-05, DIN EN ISO 11925-2:2020-07 in conjunction with Annex C 3.7	Mark of conformity [ÜZ]
C 2.12.1.18	Polypropylene waste water pipes and fittings for underground sewers and	DIN EN 1852-1:2023-07 in conjunction with	Mark of conformity

Item numbers:	Construction product	Technical rules/version	Declaration of conformity
1	2	3	4
	pipelines	DIN CEN TS 1852-2:2020-08	[ÜZ]
C 2.12.2	**Sanitary appliances and shut-off devices**		
C 2.12.2.5	Drains for buildings	DIN EN 1253-1:2015-03, DIN EN 1253-2:2015-03 and DIN EN 1253-4:2016-07 in conjunction with DIN 1253-3: 2016-09, with the exception of the provisions concerning independent quality control inspection Also applicable: DIN 4102-1:1998-05 and DIN 4102-4:2016-05 DIN EN ISO 11925-2:2020-07 in conjunction with Annex C 3.7	MDT
C 2.12.2.6	Drains with light liquids closure	DIN EN 1253-5:2017-05 in conjunction with DIN EN 1253-3:2016-09 with the exception of the provisions concerning independent quality control inspection Also applicable: DIN 4102-1:1998-05 DIN EN ISO 11925-2:2020-07 in conjunction with Annex C 3.7	MDT

Item numbers:	Construction product	Technical rules/version	Declaration of conformity
1	2	3	4
C 2.13	**Technical equipment for buildings**		
C 2.14	**Furnaces**		
C 2.14.2	**Flue gas systems**		
C 2.14.2.2	Elastomeric sealants for flue gas systems	DIN EN 14241-1:2013-11 Also applicable: Annex C 2.14.4, DIN 4102-1:1998-05, DIN EN ISO 11925-2:2020-07 in conjunction with Annex C 3.7	Mark of conformity [ÜZ]
C 2.16	**Scaffolding structural elements[10]**		
C 2.16.3	Lightweight scaffold spindles	DIN 4425:2024-02 Also applicable: Annex C 2.16.2	MDT

Annex C 2.1.1

The manufacturer shall indicate to the certification body the type and percentage of (cement) additives according to DIN 1164-11:2024-04, Section 5.

Annex C 2.1.3

1 Re DIN 1045-2: 2023-08

1.1 Contents, Tables, Table F.3
"DIN 1164-11:2023-02" is replaced by "DIN 1164-11:2024-04".

1.2 Section 2
"DIN 1164-11:2023-02" is replaced by "DIN 1164-11:2024-04".

1.3 Section 5.1.2:
Paragraph (4) is replaced by the following paragraph:
"(4) Requirements for cements are specified in Annex O (normative)."

1.4 Section 5.1.5:
Paragraph (3) is replaced by the following paragraph:
"(3) Requirements for admixtures are specified in Annex O (normative)."

1.5 Section 5.1.6:
Paragraph (9) is replaced by the following paragraph:
"(9) Requirements for additives are specified in Annex O (normative)."

1.6 Section 5.1.7:
Paragraph (2) is replaced by the following paragraph:
"(2) Requirements for fibres are specified in Annex O (normative)."

1.7 Section 5.2.3.4
Paragraph (4) is supplemented by the following sentence:
„.... The use of recycled rock granules in exposure classes XA2, XA3 and XM, as well as for prestressed concrete and light concrete shall not be permitted."

1.8 Annex F, Table F.3
"DIN 1164-11:2023-02" is replaced by "DIN 1164-11:2024-04".

1.9 Section 5.2.5.1
Paragraph (8) is replaced by the following paragraph:
"(8) Requirements for additives are specified in Annex O (normative)."

1.10 Section 5.5.4:
Paragraph (1) is replaced by the following paragraph:
"(1) Concrete with a composition of rock granules in accordance with 5.1.3, cement in accordance with 5.1.2, admixtures in accordance with 5.1.5, additives in accordance with 5.1.6, fibres in accordance with 5.1.7 or other inorganic materials in accordance with 5.1.1 with a maximum of 1 % by mass or by volume of organic constituents (whichever is the greater) may be classified as class A1 for fire behaviour in accordance with Decision 96/603/EC (as amended by Decisions 2000/605/EC and 2003/424/EC)[6] without the need for a test."
For class A1, the following footnote 6 is to be taken into account:
“6 "no contribution to fire" in accordance with Delegated Regulation (EU) 2016/364."

1.11 Annex O, Table O.1
In Table O.1, the reference to "Cement with low effective alkali content in accordance with DIN 1164-10:2013-03" is replaced by the following:
"Cement with low effective alkali content in accordance with DIN 1164-10:2023-02"

2 About the Alkali Guideline – AlkR – (2013-10)

Section 7.1.1:
To be added: "The manufacturer must declare compliance with DIN 1164-10:2023-02 for cement with low effective alkali content."

_____
1 Implemented in Germany by DIN EN 197-1:2011-11
2 Implemented in Germany by DIN EN 14216:2015-09.
3 Implemented in Germany by DIN EN 15167-1:2006-12
4 Implemented in Germany by DIN EN 12620:2008-07.

Annex C 2.1.10

- deleted from MVV TB 2025/1 -

Annex C 2.3.3

Adhesives for load-bearing wooden components must meet the requirements of adhesive type I according to DIN EN 301:2023-05 and contain the classification designation "w" in the label key of the adhesives.

The maximum waiting time under reference conditions (open drying time) may be determined according to DIN 68141:2022-08, Section 4.2.1 as an alternative to DIN EN 301:2023-05, Section 6.3 b.

For testing under the standards DIN EN 302-1:2023-05, DIN EN 302-2:2023-05 and DIN EN 302-4 to 302-6:2023-05, the bonded parts must be produced with a pressure of at least 0.6 N/mm². This does not include the production of bonded parts with thick adhesive joints in accordance with DIN EN 302-2:2023-05, Section 7.2.2.

The conformity mark ("Ü-mark") must also indicate other possible uses (e.g. bonding of hardwood or chemically treated wood).

Annex C 2.6.4

- deleted from MVV TB 2025/1 -

C - Technical Building Regulations for construction products that do not bear the CE marking and for designs

C 3 Construction products that require only a general building supervisory inspection certificate pursuant to § 19(1) sentence 2 MBO[1]

Item numbers:	Construction product	approved test procedure according to:	Declaration of conformity
1	2	3	4
C 3.3	Building materials for which there are only requirements for the reaction to fire and which must be normally flammable. Building materials under Section D 2.2 are excluded.	DIN EN ISO 11925-2:2020-07 in conjunction with Annex C 3.7	MDC
C 3.5	Floor coverings which must be flame-resistant, which are not intended for use in human occupancy areas and which do not comply with EN 13813 or EN 14041 or EN 14904 or EN 14342 or EN 15285	DIN 4102-1:1998-05 Table 1.2.1, or DIN EN ISO 11925-2:2020-07 and DIN EN ISO 9239-1:2010-11 in conjunction with Annex C 3.8	Mark of conformity [ÜZ]
C 3.16	Liquid-applied seals for sealing areas that can be driven over	Technical delivery requirements and technical test regulations concerning building materials used in the manufacture of bridge floorings on a concrete base, Part 3 (1995 version) and Technical delivery requirements and technical test regulations concerning epoxy resins for filling materials, seals and coarse fillers beneath asphalt coverings on a concrete base (1999 version) Also applicable: DIN 4102-1:1998-05 or DIN EN ISO 11925-2:2020-07 in conjunction with Annex C 3.7	Mark of conformity [ÜZ]
C 3.34	Construction products for firestops (busbar trunking systems with fire protection block) subject to fire resistance requirements	DIN 4102-9:1991-05 in conjunction with Appendix C 3.11	MDC
C 3.35	Construction products for firestops (pipes with above-ceiling bath/floor or roof drainage) subject to fire resistance requirements	DIN 4102-11:1985-12 in conjunction with Appendix C 3.11	Mark of conformity [ÜZ]

Annex C 3.7

A building material may also be classified under B2 according to DIN 4102-1:1998-05 if the test results according to DIN EN ISO 11925-2:2020-07 meet the requirement of DIN 4102-1:1998-05, Section 6.2.2.

Testing under DIN EN ISO 11925-2:2020-07 must be carried out for edge flaming (Section 7.3.3.2 of the standard) and, where failure is expected, for surface flaming (Section 7.3.3.1 of the standard). The specifications of DIN 4102-1:1998-05, Sections 6.2.5.2, 6.2.5.5 and 6.2.5.6 must be observed during testing.

Annex C 3.8

A building material may, pursuant to B1, be classified according to DIN 4102-1:1998-05 if the test results according to DIN EN ISO 11925-2:2020-07 meet the requirements of DIN 4102-1:1998-05, Section 6.2.2, and the test results according to DIN EN ISO 9239-1 meet the requirements of DIN 4102-1:1998-05, Section 6.1.2.3.

Testing under DIN EN ISO 11925-2:2020-07 must be carried out for edge flaming (Section 7.3.3.2 of the standard) and, where failure is expected, for surface flaming (Section 7.3.3.1 of the standard). The specifications of DIN 4102-1:1998-05, Sections 6.2.5.2, 6.2.5.5 and 6.2.5.6 must be observed during testing.

Appendix C 3.11

Annexes C 4.1 and C 4.5 shall apply mutatis mutandis.

C - Technical Building Regulations for construction products that do not bear the CE marking and for designs

C 4 Designs that require only a general building inspection test certificate pursuant to § 16a(3) MBO[1]

The following is stipulated in accordance with § 85a(2)(4) MBO[1]:

Item numbers:	Construction type:	approved test procedure according to:
1	2	3
C 4.1.1	Designs, other than those referred to in Chapter A 2, ser. No A 2.2.1.4 and walls instead of fire walls pursuant to § 30(3), sentence 2, point 3 of the MBO[1], for the installation of fire walls or walls instead of fire walls with additional mechanical stress, which are subject to fire resistance requirements. The second sentence of paragraph C 4.1 applies accordingly.	Also applicable, depending on design: DIN 4102-3:1977-09 or DIN EN 1363-1:2020-05, DIN EN 1363-2:1999-10 and for load-bearing walls: DIN EN 1365-1:2013-08 or for non-load-bearing walls: DIN EN 1364-1:2015-09, in conjunction with Annex C 4.6
C 4.2	Designs other than those referred to in Chapter A 2, ser. No A 2.2.1.4, for the construction of non-load-bearing internal partition walls, including installations (sanitary equipment), the fall protection of which is to be proven experimentally and/or which are subject to fire resistance and/or sound insulation requirements, with the exception of those made of glass. The second sentence of paragraph C 4.1 applies accordingly.	Also applicable, depending on design: *As regards protection against falling:* DIN 4103-1:2015-06 The following characteristics are each to be met together with the requirements of DIN 4103-1:2015-06: *As regards the fire resistance time:* DIN 4102-2:1977-09 apart from Sections 6.2.7 and 6.2.9 or DIN EN 1363-1:2020-05, DIN EN 1363-2:1999-10, DIN EN 1364-1:2015-09 in conjunction with Annex C 4.6 *for sound insulation:* DIN EN ISO 10140-1, -2, -4, -5:2021-09 DIN EN ISO 717-1:2021-05, and DIN EN ISO 10848-1, -2, -3:2018-02
C 4.17	Designs of firestops for busbar elements Sentence 2 of ser. No C 4.1 applies accordingly.	DIN 4102-9:1991-05 in conjunction with Annex C 4.5
C 4.18	Designs of firestops for pipes with above-ceiling bath/floor or roof drains Ser. No. C 4.1 sentence 2 applies accordingly.	DIN 4102-11:1985-12 in conjunction with Annex C 4.1 and Annex C 4.5

Annex C 4.5

A pipe encasement/pipe seal can be classified as R ... under DIN 4102-11:1985-12 if it complies with the conditions under DIN 4102-11:1985-12 with testing

- in accordance with DIN 4102-11:1985-12 (including Annex 4.1) has been conducted

or

- in accordance with DIN 4102-11:1985-12 but with modified test conditions in line with DIN EN 1366-3:2022-05, Section 5 has been conducted: The furnace temperature was controlled in accordance with DIN EN 1363-1:2020-05, Section 5.1 with furnace thermocouples in accordance with Section 4.5.1.1 and testing was started in accordance with DIN EN 1363-1:2020-05, Section 10.3. The pressure conditions in the fire room corresponded to DIN EN 1366-3:2022-05, Section 5.2.

A firestop of a busbar system can be classified as S... according to DIN 4102-9:1991-05, if it has complied with the conditions according to DIN 4102-9:1991-05, when the test

- has been carried out in accordance with DIN 4102-9:1991-05

or

- in accordance with DIN 4102-9:1991-05, with modified test conditions in line with DIN EN 1366-3:2022-05, Section 5: The furnace temperature was controlled in accordance with DIN EN 1363-1:2020-05, Section 5.1 with furnace thermocouples in accordance with Section 4.5.1.1 and testing was started in accordance with DIN EN 1363-1:2020-05, Section 10.3. The pressure conditions in the fire room corresponded to DIN EN 1366-3:2022-05, Section 5.2.

Annex 4.

Building inspection requirements, classification, use of construction products, use of designs

As at: November 2024

Annex 4 takes into account the hEN, EEAS and ETAGs, which were available in December 2021 and are relevant to building regulations.

CONTENTS

1 Parts of buildings that are subject to the requirements for fire characteristics and smouldering

For the fulfilment of the building requirements in A 2.1.2 when using structural works according to Technical Building Regulations or proof of usability according to § 17 MBO1, the minimum required building material classes are to be determined in Section 1.1. Unless otherwise specified in the following Sections, the minimum requirement 'normal flammability' applies to the fire characteristics of the building materials.

For the fulfilment of the building requirements in A 2.1.2 when using parts of structural works that use construction products in accordance with harmonised technical specifications, the minimum required building material performance is listed in Section 1.2.

1.1 Building approval requirements and assignment of building material classes according to DIN 4102- 1:1998- 05 and other features

Table 1.1: Building approval requirements and classification of building material classes according to DIN 4102- 1:1998- 05 including floor coverings and linear pipe insulation materials and other features

	Building approval requirements[b]	**Minimum required building material classes pursuant to DIN 4102-1:1998-05**	**Other characteristics for use:**
	1	**2**	**3**
1	non-combustible[1,2]	A 2	--
2	flame-resistant[2]	B 1	Building materials with the exception of floor coverings: limited smoke development passed ($I^a \leq 400$ % x min. when tested pursuant to DIN 4102-15:1990-05)
3	flame-resistant[2] and no burning particles or droplets	B 1	No burning droplets or particles falling Limited smoke development Passed ($I^a \leq 400$ % x min. when tested pursuant to DIN 4102-15:1990-05)
4	flame-resistant[2] and low smoke development	B1	Low smoke development Passed ($I^a \leq 100$ % x min. when tested pursuant to DIN 4102-15:1990-05)
5	flame-resistant[2] and no burning droplets or particles and low smoke development	B1	No burning droplets or particles falling Low smoke development Passed ($I^a \leq 100$ % x min. when tested pursuant to DIN 4102-15:1990-05)
6	normal flammability, no burning droplets or particles	B 2	No burning droplets or particles falling
7	normal flammability	B 2	--
	[1] if necessary, additionally melting point > 1 000 °C	--	Specification: Melting point at least 1 000 °C pursuant to DIN 4102-17:2017-12
	[2] if required, additionally raw density	--	Specification: Bulk density
	[a] The integral value I of smoke development shall be determined over time by determining the surface content by means of rectangular method under the light attenuation curve during the test according to DIN 4102-15: 1990-05 during the flame exposure period by means of the light measuring distance according to DIN 50055:1989-03 with a sampling rate of at least one measured value per 3 seconds. [b] If a component is to be used for the building that does not meet at least the requirement "normal		

1 According to national law

	flammability" (easily flammable), Section 26(1) sentence 2 MBO1 shall be complied with.

For construction products – except flooring – the tests shall include results on burning droplets or falling burning particles of the sample pursuant to DIN 4102-1:1998-05, Sections 6.1 and 6.2, and/or values for smoke development pursuant to DIN 4102-1:1998-05, Sections 6.1. These results and the values must be provided by the manufacturer with the exception of floor coverings.

1.2 Minimum required fire performance according to harmonised technical specifications

Construction products for use in buildings, including their structural elements, may be used in accordance with the harmonised technical specifications. The minimum required performance shall be taken from Table 1.2. For the use of these construction products for horizontal installation, additional 1.4 must be considered.

Table 1.2: Building authority requirements and required minimum performance regarding fire behaviour and other features

		Minimum required performance[1]			
	Building approval requirement	**Construction products excluding linear pipe insulation materials and floor coverings**	**Linear pipe insulation materials**	**Floor coverings**	**other features (excluding floor coverings)**
	1	**2**	**3**	**4**	**5**
1	non-combustible	A2 – s1,d0*	$A2_L$ – s1,d0*	$A2_{fl}$ – s1	Specification: Smouldering behaviour according to 1.3 and if necessary raw density
2	non-combustible and additionally melting point > 1 000 °C	A2 – s1,d0*	$A2_L$ – s1,d0	$A2_{fl}$ – s1	Specification: Melting point of at least 1 000 °C and smouldering behaviour according to 1.3 and if necessary raw density
3	flame-resistant and no burning droplets or particles and low smoke development	C – s1,d0**	C_L – s1,d0	-	Specification: Smouldering behaviour according to 1.3 and if necessary raw density
4	flame-resistant and no burning droplets or particles	C – s2,d0*	C_L – s2,d0	-	
5	flame-resistant and low smoke development	C – s1,d2**	C_L – s1,d2	C_{fl} – s1	
6	flame-resistant	C – s2,d2*	C_L – s2,d2	C_{fl} – s1	
7	normal flammability and no burning droplets or particles	E	E_L	-	
8	normal flammability	E – d2	E_L – d2	E_{fl}	

[1] Classes according to Delegated Regulation 2016/364 (EU) – implemented by classification according to DIN EN 13501-1:2019-05 or Commission decisions for classifications without further testing.

* When tested according to EN 13823:2023 $TSP_{600\,s} \leq 35$ m²; this information is not required for construction products whose fire behaviour according to CWFT Decisions 2003/43/EC of 17.1.2003 (Fig. L13/35), 2003/593/EC of 7.8. 2003 (OJ L201/35), 2006/673/EC of 5.10.2006 (OJ L276/77) and 2010/83/EU of 9.2.2010 (OJ L38/13) and Delegated Regulation (EU) 2017/1228 of 20 March 2017 (OJ L177/4) is classified in Class A2 — s1,d0 without testing.

** When tested according to EN 13823:2023 $TSP_{600\,s} \leq 35$ m²; this information is not required for construction products whose fire behaviour is classified in Class B-s1,d0 without testing according to CWFT Decisions 2003/43/EC of 17.1.2003 (Fig. L13/35) and 2007/348/EC of 15.5.2007 (OJ L131/21).

Explanatory notes to Table 1.2:

Derivation of the abbreviation	Criterion	Scope
s (Smoke)	Smoke development	Requirements for smoke development - s1; low smoke development - s2: limited smoke development
d (droplets)	burning droplets/particles	Requirements for burning droplets/particles - d0: no burning dripping/particles - d1, d2; burning droplets/particles
....fl (floorings)		Fire performance class for floorings
…L (linear pipe thermal insulation products)		Fire performance class for linear products for thermal insulation of pipes

1.3 Minimum required smouldering performances

For the fulfilment of the building requirements in A 2.1.2 for flame-resistant or non-combustible parts of structural works where construction products are used in accordance with the following harmonised standards (EN 438-7:2005[2], EN 13162:2012+A1:2015[3], EN 13168:2012+A1:2015[4], EN 13170:2012+A1:2015[5], EN 13171:2012+A1:2015[6], EN 13950:2014[7], EN 13964:2014[8], EN 13986:2004+A1:2015[9], EN 14064-1:2010[10], EN 14190:2014[11], EN 14303:2009+A1:2013[12], EN 15037-4:2010+A1:2013[13], EN 15498:2008[14]), specifications on smouldering performance according to according to Table 1.2 must be met. A European test method DIN EN 16733:2016-07 is available to determine the smouldering behaviour; the required indication is: ‘The test was passed: the product shows no tendency of continuous smouldering.’.

1.4 Use of building materials in case of horizontal installation below ceilings

By way of deviation from the information set out in Table 1.2, construction products made of rigid polystyrene foam (EPS, XPS) shall not be installed horizontally in accordance with harmonised product specifications and composite construction products with polystyrene hard foam insulation layers in accordance with harmonised product specifications, provided that such construction products are subject to the construction supervision requirement "low flammability" for the intended use.

2 Electrical cables and electrical cable systems

2.1 Electrical cables

2.1.1 Building authority requirements and assignment of building material classes according to DIN 4102-1:1998-05 and other characteristics

To demonstrate the reaction to fire for electrical cables in accordance with technical building regulations or usability certificates pursuant to § 17 MBO[1], the assignment to building material classes according to DIN 4102-1:1998-05 can be derived from the requirements of A 2.1.2 and other characteristics of Table 2.1.1.

2 Implemented in Germany by DIN EN 438-7:2005-04.
3 Implemented in Germany by DIN EN 13162:2015-04.
4 Implemented in Germany by DIN EN 13168:2015-04.
5 Implemented in Germany by DIN EN 13170:2015-04.
6 Implemented in Germany by DIN EN 13171:2015-04.
7 Implemented in Germany by DIN EN 13950:2014-09.
8 Implemented in Germany by DIN EN 13964:2014-08.
9 Implemented in Germany by DIN EN 13986:2015-06.
10 Implemented in Germany by DIN EN 14064-1:2010-06.
11 Implemented in Germany by DIN EN 14190:2014-09.
12 Implemented in Germany by DIN EN 14303:2013-04.
13 Implemented in Germany by DIN EN 15037-4:2013-08.
14 Implemented in Germany by DIN EN 15498:2008-08.

Table 2.1.1: Building approval requirements and assignment of building material classes according to DIN 4102- 1:1998- 05 and other features

	Building approval requirement	Minimum required building material classes pursuant to DIN 4102-1:1998-05	Other characteristics for use:
	1	**2**	**3**
1	non-combustible	A2	
2	flame-resistant	B1	limited smoke development (I^a ≤ 400 % x min. when tested pursuant to DIN 4102-15:1990-05) Pass
3	flame-resistant and with low smoke development	B1	low smoke development (I^a ≤ 100 % x min. when tested pursuant to DIN 4102-15:1990-05) Pass
4	normal flammability	B2	--
	[a] The integral value I of smoke development shall be determined over time by determining the surface content by means of rectangular method under the light attenuation curve during the test according to DIN 4102-15: 1990-05 during the flame exposure period by means of the light measuring distance according to DIN 50055:1989-03 with a sampling rate of at least one measured value per 3 seconds.		

For construction products, values on smoke development are determined during the tests according to DIN 4102-15:1990-05 Section 4.4. These values shall be specified by the manufacturer.

2.1.2 Minimum required fire performance

The minimum required performance is given in Table 2.1.2 for cables and wiring for use in structural works as defined in Section 4.1 of EN 50575:2014+A1:2016[15].

Table 2.1.2: Building approval requirements and minimum required fire performance

	Building approval requirement	Minimum required performances
	1	**2**
1	non-combustible	A_{ca}
2	flame-resistant	$B1_{ca}$ –s2
3	flame-resistant and with low smoke development	$B1_{ca}$ –s1
4	normal flammability	E_{ca}

Explanatory notes for Table 2.1.2: ...ca(cable) fire performance class of cables

2.2 Electrical cable systems

In order to fulfil the structural requirements of A 2.1.15 and A 2.2.1.8, functional integrity of electrical cable systems under fire impact for types according to § 16a MBO[1] shall be demonstrated based on the minimum required functional integrity classes pursuant to DIN 4102-12:1998-11 as given in Table 2.2.1.

Table 2.2.1: Building approval requirements and assignment of functional maintenance classes according to DIN 4102- 12:1998- 11

	Minimum requirements for functional integrity in minutes	Minimum required functional integrity classes according to DIN 4102- 12:1998-11
	1	**2**
1	30	E 30
2	60	E 60
3	90	E 90

3 Roofing

3.1 Roofing with external fire stress due to flying fire and radiant heat and classification of classes according to DIN 4102-7:2018-11

In order to fulfil the building requirements in A 2.1.9, the property of a roofing as part of the building structure under fire impact from outside against flying sparks and radiating heat (hard roofing) shall be demonstrated based on the minimum required class for a roofing deemed resistant to flying sparks and radiating heat pursuant to DIN 4102-7:2018-11 in conjunction with DIN SPEC 4102-23:2018-07, as given in Table 3.1.

Table 3.1: Building supervision requirement and classification of classes according to DIN 4102- 7:2018-11

Building approval requirement	Classes according to DIN 4102- 7:2018-11
1	**2**
External fire exposure due to sparks and radiant heat (hard roofing)	Resistant to sparks and radiant heat

15 Implemented in Germany by DIN EN 50575:2017-02.

3.2 Roofing with external fire exposure due to sparks and radiant heat when using construction products according to European harmonised specifications and minimum required performance

In order to fulfil the structural requirements in A 2.1.9, proof for hard roofing using construction products (EN 492:2012+A1:2018[16], EN 494:2012+A1:2015[17], EN 534:2006+A1:2010[18], EN 1873:2005[19], EN 13707:2004+A2:2009[20], EN 13956:2012[21], EN 14351- 1:2006+A2:2016[22], EN 14783:2013[23] and EN 14963:2006[24]) with CE- marking pursuant to Regulation (EU) No 305/2011 shall be based on the minimum required performance as given in Table 3.2.

If the CE marking specifies class $B_{ROOF}(t1)$, stress by fire from the outside according to DIN EN 13501-5:2016-12, this applies to roofing according to A 2.1.9 only if the execution of the roof corresponds to the versions in the associated classification document.

Roofing products complying with the above-mentioned product standards referred to in Commission Decision 2000/553/EC and meeting the characteristics set out in the column "Specific conditions for the presumption of conformity" of the "TABLE" in 2000/553/EC may be presumed to satisfy the requirement "$B_{ROOF}(t1)$" without further testing, if the execution of the roof covering with these products complies with generally accepted technical best practices.

Table 3.2: Building approval requirement and minimum required performance

Building approval requirement	Minimum required performance
1	2
External fire exposure due to sparks and radiant heat (hard roofing)	$B_{ROOF}(t1)$

4 Structural elements

4.1 Load-bearing structural elements

In order to meet the structural requirements in A 2.1.3 for the planning, designing and execution of load-bearing structural elements of buildings, Tables 4.1.1 and 4.1.2 shall be complied with when determining the stability in the event of fire in accordance with Eurocode.

The requirements in the tables are deemed fulfilled only if the structural elements have been designed in accordance with the Technical Building Regulations of Part A, Chapter A 1, ser. No. A 1.2.

For structural elements in accordance with national Technical Rules, the following tables list only the minimum building regulations requirements.

16 Implemented in Germany by DIN EN 492:2018-07
17 Implemented in Germany by DIN EN 494:2015-12.
18 Implemented in Germany by DIN EN 534:2010-07.
19 Implemented in Germany by DIN EN 1873:2006-03.
20 Implemented in Germany by DIN EN 13707:2009-10.
21 Implemented in Germany by DIN EN 13956:2013-03.
22 Implemented in Germany by DIN EN 14351-1:2016-12.
23 Implemented in Germany by DIN EN 14783:2013-07.
24 Implemented in Germany by DIN EN 14963:2006-12.

Table 4.1.1[A]: Building approval requirements for load-bearing structural elements, design according to Eurocode and additional application rules

	Building approval requirement	Determined duration of stability in the event of fire in min. Eurocode[1,**] under action ETK in accordance with DIN EN 1991[1,**]	Application rule to be observed in addition to the Eurocode for structural designs using certain building materials***
	1	2	3
1	Of non-combustible* building materials	Not required	DIN 4102-4:2016-05
2	Made of normal-flammability* building materials	Not required	DIN 4102-4:2016-05
3	fire retardant	≥ 30	DIN 4102-4:2016-05
4	fire retardant and made of non-combustible materials	≥ 30[2]	DIN 4102-4:2016-05
5	Highly fire-retardant (combustible load-bearing parts, non-combustible* with insulation materials and cladding with a fire resistance of 60 min. made of non-combustible* building materials) according to the Technical Rule under ser. No A 2.2.1.4	≥ 60[3]	A 2.2.1.4
6	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 60 minutes pursuant to the Technical Rule under ser. No A 2.2.1.4	≥ 60[3,**]	A 2.2.1.4
7	Structural elements in accordance with A 2.1.3.1(e), with a fire resistance of 60 minutes pursuant to the Technical Rule under ser. No A 2.2.1.4	≥ 60[3,**]	A 2.2.1.4
8	highly fire retardant and of incombustible materials in the main parts	≥ 60[2]	DIN 4102-4:2016-05
9	highly fire retardant and made of non-combustible materials	≥ 60[2]	DIN 4102-4:2016-05
10	fire-resistant (non-combustible load-bearing and stiffening parts)	≥ 90[2]	DIN 4102-4:2016-05
11	fire-resistant and made of non-combustible materials	≥ 90[2]	DIN 4102-4:2016-05
12	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 90 minutes pursuant to the Technical Rule under ser. No A 2.2.1.4	≥ 90[3,4,**]	A 2.2.1.4
13	Structural elements in accordance with A 2.1.3.1(e), with a fire resistance of 90 minutes pursuant to the Technical Rule under ser. No A 2.2.1.4	≥ 90[3,4,**]	A 2.2.1.4
14	Fire resistance of 120 minutes and made of non-combustible* building materials	≥ 120[2]	-

	Building approval requirement	Determined duration of stability in the event of fire in min. Eurocode[1,**] under action ETK in accordance with DIN EN 1991[1,**]	Application rule to be observed in addition to the Eurocode for structural designs using certain building materials***
	1	2	3
	A. The table contains only building authority requirements for structural elements, which are also represented by the Eurocodes. 1 DIN EN 1992-1-2:2010-12, DIN EN 1993-1-2:2010-12, DIN EN 1994-1-2:2010-12, DIN EN 1995-1-2:2010-12, DIN EN 1999-1-2:2010-12, DIN EN 1996-1-2:2011-04, DIN EN 1991-1-2:2010-12, Section 3.2.1 2 Not applicable to DIN EN 1995, as requirements for the fire behaviour of load-bearing parts are not fulfilled. 3 Not applicable to DIN EN 1992-1-2:2010-12, DIN EN 1993-1-2:2010-12, DIN EN 1994-1-2:2010-12, DIN EN 1999-1-2:2010-12, DIN EN 1996-1-2:2011-04 4 In connection with DIN EN 1995-1-2:2010-12 Section 6, reference is made to the possibility of DIN EN 1995-1-1/NA:2010-12, NCI NA.12 ("carpenter-style connections"). * Regarding the requirements, Table 1.1. applies. ** Design according to Eurocode does not account for the fire behaviour of building materials. *** Regarding the requirements, Table 1.1 or Table 1.2 applies.		

The requirement of Table 4.1.1, column 1, is met only if reinforcing structural elements with their connections have at least the same determined duration of stability in the event of fire.

Table 4.1.2[A]: Building approval requirements for load-bearing structural elements and classification of classes (table values) according to Eurocode DIN EN 1992- 1- 2:2010-12, DIN EN 1994-1-2:2010-12, DIN EN 1996- 1- 2/NA:2013-06 and additional application rules

	Building approval requirement	Classes according to Eurocode** DIN EN 1992-1-2:2010-12, Section 5 DIN EN 1994-1-2:2010-12, Section 4.2 DIN EN 1996-1-2/NA:2013-06, to Annex B	Application rule to be observed in addition to Eurocode for designs using certain building materials***
	1	2	3
1	Of non-combustible* building materials	Not required	DIN 4102-4:2016-05
2	Fire-retardant	R 30	DIN 4102-4:2016-05
3	Fire-retardant and made of non-combustible* materials	R 30	DIN 4102-4:2016-05
4	Highly fire-retardant and essential parts made of non-combustible materials	R 60	DIN 4102-4:2016-05
5	Highly fire-retardant and made of non-combustible materials	R 60	DIN 4102-4:2016-05
6	Fire-resistant (non-combustible* load-bearing and reinforced parts)	R 90	DIN 4102-4:2016-05
7	Fire-resistant and made of non-combustible* building materials	R 90	DIN 4102-4:2016-05
8	Fire resistance of 120 minutes and made of non-combustible* materials	R 120	DIN 4102-4:2016-05
	A Table contains only building supervisory requirements for structural elements, which are also represented by the Eurocodes. * Regarding the requirements, Table 1.1. applies. ** The Eurocode class does not account for the fire characteristics of building materials. Table 1.1 or 1.2 applies. *** Regarding the requirements, Table 1.1 or Table 1.2 applies.		

The requirements of Tables 4.1.1, column 1 and 4.1.2, column 1 are met only if the parts bearing or reinforcing the structural elements these parts have at least the same fire resistance.

4.2 Space-enclosing structural elements

In order to fulfil the building requirements in A 2.1.3 for the planning, design and execution of space-enclosing and, where applicable, load-bearing parts of structural works, Tables 4.2.1 to 4.2.3 shall be observed when designing the fire resistance according to Eurocode.
The requirements in Tables 4.2.1 to 4.2.3 are met only if the design of the structural elements has been carried out in accordance with the Technical Building Regulations of Part A, Chapter A 1, ser. No A 1.2.

For structural elements in accordance with national Technical Rules, the following tables list only the minimum building regulations requirements.

4.2.1 Non-supporting space-enclosing walls

Table 4.2.1[A]: Building authority requirements for non-load-bearing room-enclosing walls and assignment of classes (table value) according to Eurocode DIN EN 1992-1-2:2010-12 and DIN EN 1996-1-2/NA:2013-06 and additional application rules

	Building approval requirement	Classes according to Eurocode** DIN EN 1992-1-2:2010-12, Section 5 DIN EN 1996-1-2/NA:2013-06 to Annex B	Application rule to be observed in addition to Eurocode for designs using certain building materials***
	1	2	3
1	Fire-retardant	EI 30	DIN 4102-4:2016-05
2	Fire-retardant and made of non-combustible* materials	EI 30	DIN 4102-4:2016-05
3	Highly fire-retardant and essential parts made of non-combustible materials	EI 60	DIN 4102-4:2016-05
4	Highly fire-retardant and made of non-combustible materials	EI 60	DIN 4102-4:2016-05
5	Fire-resistant (non-combustible* load-bearing and reinforced parts)	EI 90	DIN 4102-4:2016-05
6	Fire-resistant and made of non-combustible* building materials	EI 90	DIN 4102-4:2016-05
7	Firewall (fire-resistant and made of non-combustible* construction materials, stable also under additional mechanical stress)	EI 90-M	DIN 4102-4:2016-05
8	Wall instead of a firewall (highly fire-retardant and made of non-combustible* building materials and stable even under additional mechanical stress)	EI 60-M	DIN 4102-4:2016-05
9	Fire resistance of 120 minutes and made of non-combustible* building materials	EI 120	DIN 4102-4:2016-05

A Table contains only building supervisory requirements for structural elements, which are also represented by the Eurocodes.
* Regarding the requirements, Table 1.1. applies.
** The Eurocode class does not account for the fire characteristics of building materials. Table 1.1 or 1.2 applies.
*** Regarding the requirements, Table 1.1 or Table 1.2 applies.

The requirement of Table 4.2.1, column 1, is only met if adjacent structural elements have at least the same fire resistance, unless Part A 2.1.3.3.1 allows a different connection for adjacent structural elements. The transitions to such structural elements must not affect the space barrier pursuant to ser. No A 2.1.3.3.

4.2.2 Load-bearing space-enclosing walls

Table 4.2.2[A]: Building approval requirements for loadbearing partitions and classification of classes (table values) according to Eurocode DIN EN 1992-1-2:2010-12 and DIN EN 1996- 1-2/NA:2013- 06 and additional application rules

	Building approval requirement	Classes according to Eurocode** DIN EN 1992-1-2:2010-12, Section 5 DIN EN 1996-1-2/NA:2013-06, to Annex B under unilateral fire stress	Application rule to be observed in addition to Eurocode for designs using certain building materials***
	1	2	3
1	Fire-retardant	REI 30	DIN 4102-4:2016-05
2	Fire-retardant and made of non-combustible* materials	REI 30	DIN 4102-4:2016-05
3	Highly fire-retardant and essential parts made of non-combustible materials	REI 60	DIN 4102-4:2016-05
4	Highly fire-retardant and made of non-combustible materials	REI 60	DIN 4102-4:2016-05
5	Fire-resistant (non-combustible* load-bearing and reinforced parts)	REI 90	DIN 4102-4:2016-05
6	Fire-resistant and made of non-combustible* building materials	REI 90	DIN 4102-4:2016-05
7	Firewall (fire-resistant and made of non-combustible materials)	REI 90 and Criterion M	DIN 4102-4:2016-05
		REI-M 90	DIN 4102-4:2016-05
8	Wall instead of a firewall (highly fire-retardant and made of non-combustible* building materials and stable even under additional mechanical stress)	REI 60 and Criterion M	DIN 4102-4:2016-05
		REI-M 60	DIN 4102-4:2016-05
9	Fire resistance of 120 minutes and made of non-combustible* materials	REI 120	DIN 4102-4:2016-05
10	Fire resistance of 120 min and made of non-combustible* building materials (stable even under additional mechanical stress)	REI 120 and Criterion M	DIN 4102-4:2016-05
		REI-M 120	DIN 4102-4:2016-05
	A The table contains only building authority requirements for structural elements, which are also represented by the Eurocodes. * Regarding the requirements, Table 1.1. applies. ** The Eurocode class does not account for the fire characteristics of building materials. Table 1.1 or 1.2 applies. *** Regarding the requirements, Table 1.1 or Table 1.2 applies.		

The requirement of Table 4.2.2, column 1, is only met if subsequent structural elements have at least the same fire resistance, unless Part A 2.1.3.3.1 allows a different connection for subsequent structural elements. The transitions to such structural elements must not affect the space barrier pursuant to ser. No A 2.1.3.3.

4.2.3 Load-bearing space-enclosing ceilings

Table 4.2.3[A]: Building approval requirements for load-bearing space-closing ceilings and classification of classes (table values) according to Eurocode and additional application rules

	Building approval requirement	Classes according to Eurocode** DIN EN 1992- 1-2:2010- 12, Section 5 or DIN EN 1994-1-2:2010-12, Section 4.3	Application rule to be observed in addition to the Eurocode for designs using certain building materials***
	1	2	3
1	Fire-retardant	REI 30	DIN 4102-4:2016-05
2	Fire-retardant and made of non-combustible* materials	REI 30	DIN 4102-4:2016-05
3	Highly fire-retardant and essential parts made of non-combustible materials	REI 60	DIN 4102-4:2016-05
4	Highly fire-retardant and made of non-combustible materials	REI 60	DIN 4102-4:2016-05
5	Fire-resistant (non-combustible* load-bearing and reinforced parts)	REI 90	DIN 4102-4:2016-05
6	Fire-resistant and made of non-combustible* building materials	REI 90	DIN 4102-4:2016-05
7	Fire resistance of 120 minutes and made of non-combustible* building materials	REI 120	DIN 4102-4:2016-05
	A Table contains only building supervisory requirements for structural elements, which are also represented by the Eurocodes. * Regarding the requirements, Table 1.1. applies. ** The Eurocode class does not account for the fire characteristics of building materials. Table 1.1 or 1.2 applies. *** Regarding the requirements, Table 1.1 or Table 1.2 applies.		

In the case of ceilings, the proof referred to in Table 4.2.3, column 2 shall also be provided for fire exposure from the top (fire from top to bottom) in accordance with the requirement in A 2.1.8.

The requirement of Table 4.2.3, column 1, is only met if subsequent structural elements have at least the same fire resistance, unless Part A 2.1.3.3.1 allows a different connection for subsequent structural elements. The transitions to such structural elements must not affect the space barrier pursuant to ser. No A 2.1.3.3.

For ceilings made of concrete, reinforced concrete, prestressed concrete or composite ceilings in accordance with the Eurocodes DIN EN 1992-1-1:2011-01 or DIN EN 1994-1-1:2010-12, which have been measured in terms of load capacity in the event of fire (criterion R), the following applies in addition to Table 4.1.1:

- For the ceilings, proof of space enclosing barrier (criteria E and I) for the duration as given in Table 4.1.1, column 2, shall be provided based on the provisions of Paragraph A 1.2.
- For ceilings, the aforementioned proof shall also be given for fire impact from above (fire from top to bottom) in accordance with the requirement in A 2.1.8.

4.2.4 Load-bearing structural elements, space-enclosing ceilings, firewalls and walls instead of firewalls, partitions, walls of necessary stairwells and corridors, walls of open corridors, exterior walls, independent subceilings, roofs, stairs, system floors

In order to fulfil the structural requirements in A 2.1.3, space-enclosing and/or load-bearing parts of buildings according to Technical Building Regulations or according to a proof of fitness for purpose in accordance with § 17 MBO1 or proof of the suitability of designs according to § 16a MBO1 shall be subject to the minimum required classes as given in Section 4.2, Table 4.2.4.

Table 4.2.4: Building approval requirements and classification of classes according to DIN 4102-2:1977-09

	Building approval requirement	Minimum required classes according to DIN 4102-2:1977-09	Abbreviation pursuant to DIN 4102-2:1977-09
	1	2	3
1	Of non-combustible* building materials	No specification of the class required. Table 1.1 applies.	
2	made of flame-retardant* building materials		
3	made of flame-retardant building materials not falling off burning or dripping off		
4	Made of normal-flammability* building materials		
5	Fire-retardant	Fire resistance class F 30	F 30-B[1]
6	Fire-retardant and made of non-combustible* materials	Fire resistance class F 30 and made of non-combustible building materials	F 30-A[1]
7	Highly fire-retardant and made of non-combustible materials	Fire resistance class F 60 and made of non-combustible building materials	F 60-A[2,3]
8	Highly fire-retardant and of incombustible materials in the main parts	Fire resistance class F 60 and essential parts made of non-combustible building materials	F 60-AB[2,3]
9	Wall instead of a firewall highly fire-retardant and made of non-combustible* building materials and stable even under additional mechanical stress	Wall instead of a firewall highly fire-retardant and made of non-combustible building materials and stable even under additional mechanical stress	-
10	Wall instead of a firewall highly fire-retardant and in the essential parts of non-combustible** building materials also under additional mechanical stress stable	Wall instead of a firewall highly fire-retardant with essential parts made of non-combustible building materials and stable even under additional mechanical stress	-
11	Highly fire-retardant (combustible load-bearing parts, non-combustible* with insulation materials and cladding with a fire resistance of 60 min. made of non-combustible* building materials) according to the Technical Rule under ser. No A 2.2.1.4	Highly fire-retardant (combustible load-bearing parts, non-combustible* with insulation materials and cladding with a fire resistance of 60 min. made of non-combustible building materials) according to the Technical Rule under ser. No A 2.2.1.4	-
12	Wall, instead of a firewall, highly fire-retardant in accordance with A 2.1.3.1(b) with a fire resistance of 60 minutes (combustible load-bearing parts, non-combustible* with insulation materials and cladding with a fire resistance of 60 min. made of non-combustible building materials) according to Section 4.2 of the Technical Rule under ser. No A 2.2.1.4	Wall instead of a firewall, highly fire-retardant (combustible load-bearing parts, non-combustible* with insulation materials and cladding with a fire resistance of 60 min. made of non-combustible building materials) according to Section 4 of the Technical Rule under ser. No A 2.2.1.4	-
13	Structural elements in accordance with A 2.1.3.1(e) with a fire resistance of 60 minutes (combustible load-bearing parts, non-combustible* insulating materials with cladding with a reduced fire resistance of 30 minutes made of non-combustible* building materials) in accordance with Sections 4.3(a) and 4.3(e) of the Technical Rule under ser. No A 2.2.1.4	Structural elements in accordance with A 2.1.3.1. (e) with a fire resistance of 60 minutes (combustible load-bearing parts, non-combustible* insulating materials with cladding with a reduced fire resistance of 30 minutes made of non-combustible* building materials) in accordance with Sections 4.3(a) and 4.3(e) of the Technical Rule under ser. No, A 2.2.1.4	-

	Building approval requirement	Minimum required classes according to DIN 4102-2:1977-09	Abbreviation pursuant to DIN 4102-2:1977-09
	1	2	3
14	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 60 minutes (combustible load-bearing parts with cladding with a fire resistance of 60 minutes made of non-combustible* building materials) in accordance with Section 4.2 of the Technical Rule under ser. No A 2.2.1.4	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 60 minutes (combustible load-bearing parts with cladding with a fire resistance of 60 minutes made of non-combustible* building materials) in accordance with Section 4.2 of the Technical Rule under ser. No A 2.2.1.4	
15	Wall instead of a firewall Structural elements in accordance with A 2.1.3.1(d), also stable under additional mechanical stress, with a fire resistance of 60 minutes (made of combustible building materials with cladding with a fire resistance of 60 minutes made of non-combustible* building materials) in accordance with Section 4.2 of the Technical Rule under ser. No A 2.2.1.4	Wall instead of a firewall Structural elements in accordance with A 2.1.3.1(d), also stable under additional mechanical stress, with a fire resistance of 60 minutes (made of combustible building materials with cladding with a fire resistance of 60 minutes made of non-combustible* building materials) in accordance with Section 4.2 of the Technical Rule under ser. No A 2.2.1.4	-
16	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 60 minutes (combustible load-bearing parts, with cladding with a reduced fire resistance of 30 min. made of non-combustible* building materials) according to Sections 4.3(b) and 4.3(e) of the Technical Rule under ser. No A 2.2.1.4	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 60 minutes (combustible load-bearing parts, with cladding with a reduced fire resistance of 30 minutes made of non-combustible* building materials) according to Sections 4.3(b) and 4.3(e) of the Technical Rule under ser. No A 2.2.1.4	-
17	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 60 or 90 minutes (combustible load-bearing parts, and with cladding with reduced fire resistance) in accordance with Section 4.3(c) of the Technical Rule under ser. No A 2.2.1.4	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 60 or 90 minutes (combustible load-bearing parts, and with cladding with reduced fire resistance) in accordance with Section 4.3(c) of the Technical Rule under ser. No A 2.2.1.4	
18	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 60 or 90 minutes (combustible load-bearing parts with cladding with reduced fire resistance and with one-sided cladding made of non-combustible* building materials in accordance with § 36(6) MBO[1] in conjunction with A 2.1.12 in accordance with Section 4.3(c) of the Technical Rule under ser. No, A 2.2.1.4 (e.g. walls of necessary corridors)	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 60 or 90 minutes (combustible load-bearing parts with room-side cladding with reduced fire resistance and with one-sided cladding made of non-combustible* building materials in accordance with § 36(6) MBO[1] in conjunction with A 2.1.12 in accordance with Section 4.3(c) of the Technical Rule under ser. No, A 2.2.1.4 (e.g. walls of necessary corridors)	-
19	fire-resistant and made of non-combustible materials	Fire resistance class F 90 and made of non-combustible materials	F 90-A[4.5]
20	fire-resistant (non-combustible load-bearing and stiffening parts)	Fire resistance class F 90 and made of non-combustible materials in the main parts	F 90-AB[4.5]
21	Firewall (including fire-resistant and non-combustible building materials under additional mechanical stress)	Firewall	-

	Building approval requirement	Minimum required classes according to DIN 4102-2:1977-09	Abbreviation pursuant to DIN 4102-2:1977-09
	1	2	3
22	Wall with the design of a firewall (fire-resistant also under additional mechanical stress and made of non-combustible* building materials)	Wall with the design of a firewall (fire-resistant also under additional mechanical stress and made of non-combustible* building materials)	-
23	Building shell walls which, from the inside out, always have the fire resistance of the load-bearing and reinforced parts of the building (however, the building structural elements must be at least fire-retardant), and, from the outside in, have the fire resistivity of the fire-resistant building structural elements	Building shell walls which, from the inside out, always have the fire resistance of the load-bearing and reinforced parts of the building (however, the building structural elements must be at least fire-retardant), and, from the outside in, have the fire resistivity of the fire-resistant building structural elements.	F 30-B (from the inside) and F90-B (from the outside)
24	Structural elements in accordance with A 2.1.3.1(e) with a fire resistance of 90 minutes (made of combustible building materials, with cladding with a fire resistance of 90 minutes made of non-combustible* building materials) in accordance with Section 4.2 of the Technical Rule under ser. No A 2.2.1.4	Structural elements in accordance with A 2.1.3.1(e) with a fire resistance of 90 minutes (made of combustible building materials, with cladding with a fire resistance of 90 minutes made of non-combustible* building materials) in accordance with Section 4.2 of the Technical Rule under ser. No A 2.2.1.4	-
25	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 90 minutes (combustible load-bearing parts with cladding with a fire resistance of 90 minutes made of non-combustible* building materials) in accordance with Section 4.2 of the Technical Rule under ser. No A 2.2.1.4	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 90 minutes (combustible load-bearing parts with cladding with a fire resistance of 90 minutes made of non-combustible* building materials) in accordance with Section 4.2 of the Technical Rule under ser. No A 2.2.1.4	-
26	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 90 minutes (combustible load-bearing parts with cladding with a reduced fire resistance of 30 minutes made of non-combustible* building materials) in accordance with Sections 4.3(b) and 4.3(e) of the Technical Rule under ser. No A 2.2.1.4	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 90 minutes (combustible load-bearing parts with cladding with a reduced fire resistance of 30 minutes made of non-combustible* building materials) in accordance with Sections 4.3(b) and 4.3(e) of the Technical Rule under ser. No A 2.2.1.4	-
27	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 90 minutes (combustible load-bearing parts with room-side cladding with reduced fire resistance of 30 min. and with one-sided cladding made of non-combustible* building materials in accordance with § 36(6) MBO[1] in conjunction with A 2.1.12 in accordance with Section 4.3(c) of the Technical Rule under ser. No, A 2.2.1.4 (e.g. walls of necessary corridors)	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 90 minutes (combustible load-bearing parts with room-side cladding with reduced fire resistance of 30 min. and with one-sided cladding made of non-combustible* building materials in accordance with § 36(6) MBO[1] in conjunction with A 2.1.12 in accordance with Section 4.3(c) of the Technical Rule under ser. No, A 2.2.1.4 (e.g. walls of necessary corridors)	

	Building approval requirement	Minimum required classes according to DIN 4102-2:1977-09	Abbreviation pursuant to DIN 4102-2:1977-09
	1	2	3
28	Structural elements in accordance with A 2.1.3.1(e) with a fire resistance of 90 minutes (combustible load-bearing parts, non-combustible* insulating materials with room-side cladding with a fire resistance of 90 min. made of non-combustible* building materials and external cladding with a reduced fire resistance of 30 min. made of non-combustible* building materials) in accordance with Section 4.2 in conjunction with Section 4.3(e) of the Technical Rule under ser. No A 2.2.1.4	Structural elements in accordance with A 2.1.3.1(e) with a fire resistance of 90 minutes (combustible load-bearing parts, non-combustible* insulating materials with room-side cladding with a fire resistance of 90 min. made of non-combustible* building materials and external cladding with a reduced fire resistance of 30 min. made of non-combustible* building materials) in accordance with Section 4.2 in conjunction with Section 4.3(e) of the Technical Rule under ser. No A 2.2.1.4	
29	Fire resistance of 120 minutes and made of non-combustible building materials	Fire resistance class F 120 and made of non-combustible building materials	F 120-A
30	Fire resistance of 120 min and made of non-combustible* building materials, stable even under additional mechanical stress	Firewall with a higher fire resistance duration of 120 min	-
	1 For non-load-bearing exterior walls, W 30 is also permitted. 2 Proof and classification as per Table 4.3.1. 3 For non-load-bearing exterior walls, W 60 is also permitted. 4 For non-load-bearing exterior walls, W 90 is also permitted. 5 Load-bearing structural elements must be tested under an appropriate load in accordance with DIN 4102-2:1977-09, Section 6.2.2.6. * Regarding the requirements, Table 1.1. applies. ** Continuous layer of non-combustible building materials in the component plane.		

The requirement of Table 4.2.4, column 1, is only met if subsequent structural elements have at least the same fire resistance, unless Part A 2.1.3.3.1 allows a different connection for subsequent structural elements. The transitions to such structural elements must not affect the space barrier, if required, under ser. No A 2.1.3.3.

4.3 Use of construction products according to harmonised technical specifications for load-bearing and/or space-enclosing structural elements

For the fulfilment of the building requirements in A 2.1.3 when using construction products in accordance with harmonised technical specifications for load-bearing and/or space-enclosing parts of structural works, the minimum required performance shall be taken from Section 4.3.

The requirements in the tables are deemed fulfilled only if the required performances have been achieved based on design or, where required, test load calculation in case of fire resistance tests in accordance with the Technical Building Regulations of Part A, Chapter A 1, ser. No A 1.2.

In accordance with A 2.1.3.3.1, the proof of fire resistance shall be demonstrated for each of the possible directions of fire exposure (e.g. from the inside to the outside and from the outside to the inside and both from the top to the bottom and from the bottom to the top) for space barrier requirements.

In the absence of a technical best practice for the planning, designing and execution when using the aforementioned construction products, proof pursuant to § 16a MBO[1] is required. This does not apply to construction products for use within the scope of the Technical Rule in accordance with ser. No A 2.2.1.4.

For structural elements according to harmonised technical specifications, the following tables list only the minimum requirements under building law.

4.3.1.1 Fire resistance requirements including fire behaviour when using construction products in accordance with harmonised technical specifications for load-bearing, load-bearing and room-closing structural elements, and required minimum performances, excluding construction products in accordance with 4.3.1.2

Table 4.3.1.1: Building approval requirements and minimum required performances

	Building approval requirement	**Minimum required performances**		
		Fire resistance		**Fire performance**
		without space barrier[1]	**with space barrier**	
	1	**2**	**3**	**4**
1	of non-combustible* building materials	-	-	A2 – s1,d0**
2	made of flame-retardant* building materials	-	-	C – s2,d2**
3	Made of normal-flammability* building materials	-	-	E – d2
4	Fire-retardant	R 30	REI 30	E – d2
5	Fire-retardant with one-sided[2] cladding made of non-combustible* building materials	-	REI 30	Non-combustible* cladding: A2 – s1,d0**; Otherwise: E – d2
6	Fire-retardant and made of non-combustible* materials	R 30	REI 30	A2 – s1,d0**
7	Highly fire-retardant and made of non-combustible materials	R 60	REI 60	A2 – s1,d0**
8	Wall instead of a firewall, highly fire-retardant (made of non-combustible* building materials and stable even under additional mechanical stress)	-	REI 60-M	A2 – s1,d0**
9	highly fire-retardant and of non-combustible materials in the essential parts (non-combustible load-bearing and reinforcing parts)[2.4]	R 60	REI 60[2]	Essential parts: A2 – s1,d0** Otherwise: E – d2

	Building approval requirement	Minimum required performances		
		Fire resistance		Fire performance
		without space barrier[1]	with space barrier	
	1	2	3	4
10	Wall instead of a firewall, highly fire-retardant and in the essential parts of non-combustible* building materials and stable even under additional mechanical stress	-	REI 60-M	Essential parts: A2 – s1,d0** Otherwise: E – d2
11	Highly fire-retardant in accordance with A 2.1.3.1(b) with a fire resistance of 60 minutes (combustible load-bearing parts, non-combustible* insulating materials, and cladding with a fire resistance of 60 minutes made of non-combustible* building materials) in accordance with Section 4.2 of the Technical Rule under ser. No A 2.2.1.4	R 60 and fire-resistant cladding: t_{ch} = 60 minutes[3]	REI 60 fire-resistant cladding: t_{ch} = 60 minutes[3]	Insulation materials, fire-protective cladding: A2 – s1,d0**; Otherwise: E – d2
12	Wall instead of a fire wall, highly fire-retardant according to A 2.1.3.1(b), stable even under additional mechanical stress, with a fire resistance of 60 minutes. (combustible load-bearing parts, non-combustible* insulating materials with cladding with a fire resistance of 60 minutes made of non-combustible* building materials) in accordance with Section 4.2 of the Technical Rule under ser. No A 2.2.1.4	-	REI 60-M and fire-resistant cladding: t_{ch} = 60 minutes[3]	insulation materials, fire-resistant cladding: A 2 – S1,d0** Otherwise: E – d2
13	Structural elements in accordance with A 2.1.3.1(e) with a fire resistance of 60 minutes (combustible load-bearing parts, non-combustible* insulating materials with cladding with a reduced fire resistance of 30 minutes made of non-combustible* building materials) in accordance with Sections 4.3(a) and 4.3(e) of the Technical Rule under ser. No A 2.2.1.4	R 60 and Fire-resistant cladding: t_{ch} = 30 minutes[3]	REI 60 and Fire-resistant cladding: t_{ch} = 30 minutes[3]	Insulation materials, fire-resistant cladding: A2 – s1,d0** Otherwise: E – d2

	Building approval requirement	Minimum required performances		
		Fire resistance		Fire performance
		without space barrier[1]	with space barrier	
	1	2	3	4
14	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 60 minutes (combustible load-bearing parts with cladding with a fire resistance of 60 minutes made of non-combustible* building materials) in accordance with Section 4.2 of the Technical Rule under ser. No A 2.2.1.4	R 60 and Fire-resistant cladding: t_{ch} = 60 minutes[3]	REI 60 and Fire-resistant cladding: t_{ch} = 60 minutes[3]	Insulation materials, fire-resistant cladding: A2 – s1,d0** Otherwise: E – d2
15	Wall instead of a firewall Structural elements in accordance with A 2.1.3.1(d), stable even under additional mechanical stress, with a fire resistance of 60 minutes (made of combustible building materials, with cladding with a fire resistance of 60 minutes made of non-combustible* building materials) in accordance with Section 4.2 of the Technical Rule under ser. No A 2.2.1.4	-	REI 60-M and fire-resistant cladding: t_{ch} = 60 minutes[3]	Fire-resistant cladding: A2 – s1,d0**; Otherwise: E – d2
16	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 60 minutes (combustible load-bearing parts with cladding with a reduced fire resistance of 30 minutes made of non-combustible* building materials) in accordance with Sections 4.3(b) and 4.3(e) of the Technical Rule under ser. No A 2.2.1.4	R 60 and fire-resistant cladding: t_{ch} = 30 minutes[3]	REI 60 Fire-resistant cladding: t_{ch} = 30 minutes[3]	Fire-resistant cladding: A2 – s1,d0**; Otherwise: E – d2
17	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 60 or 90 minutes (combustible load-bearing parts and with cladding with reduced fire resistance) in accordance with Section 4.3(c) of the Technical Rule under ser. No A 2.2.1.4	R 60 or R 90	REI 60 or REI 90	E – d2

	Building approval requirement	Minimum required performances		
		Fire resistance		Fire performance
		without space barrier[1]	with space barrier	
	1	2	3	4
18	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 60 or 90 minutes (combustible load-bearing parts with room-side cladding with reduced fire resistance and with one-sided cladding made of non-combustible* building materials in accordance with § 36(6) MBO[1] in conjunction with A 2.1.12 in accordance with Section 4.3(c) of the Technical Rule under ser. No A 2.2.1.4 (e.g. walls of necessary corridors)	-	REI 60 or REI 90	Non-combustible* cladding: A2 – s1,d0**; Otherwise: E – d2
19	Fire-resistant and made of non-combustible* building materials	R 90	REI 90	A2 – s1,d0**
20	Fire-resistant (non-combustible load-bearing and reinforced parts)[4]	R 90	REI 90[2]	A2 – s1,d0**; Otherwise E – d2
21	Firewall***	-	REI 90-M	A2 – s1,d0**
22	Wall with the design of a firewall (fire-resistant also under additional mechanical stress and made of non-combustible* building materials)	-	REI 90-M	A2 – s1,d0**
23	Structural elements in accordance with A 2.1.3.1(e) with a fire resistance of 90 minutes (made of combustible building materials, with cladding with a fire resistance of 90 minutes made of non-combustible* building materials) in accordance with Section 4.2 of the Technical Rule under ser. No A 2.2.1.4	R 90 and Fire-resistant cladding: t_{ch} = 90 minutes[3]	REI 90 and Fire-resistant cladding: t_{ch} = 90 minutes[3]	Fire-resistant cladding: A2 – s1,d0**; Otherwise: E – d2
24	Structural elements in accordance with A 2.1.3.1(e) with a fire resistance of 90 minutes (combustible load-bearing parts, non-combustible* insulating materials with room-side cladding with a fire resistance of 90 min. and external cladding with a reduced fire resistance of 30 min. made of non-combustible* building materials) in accordance with Section 4.2 in conjunction with Section 4.3(e) of the Technical Rule under ser. No A 2.2.1.4	-	REI 90 and fire-resistant cladding: t_{ch} = 90 minutes[3] (room-side) t_{ch} = 30 minutes[3] (external)	Insulation materials, fire-resistant cladding: A2 – s1,d0**; Otherwise: E – d2

	Building approval requirement	Minimum required performances		
		Fire resistance		Fire performance
		without space barrier[1]	with space barrier	
	1	2	3	4
25	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 90 minutes (combustible load-bearing parts with cladding with a fire resistance of 90 minutes made of non-combustible* building materials) in accordance with Section 4.2 of the Technical Rule under ser. No A 2.2.1.4	R 90 and Fire-resistant cladding: t_{ch} = 90 minutes[3]	REI 90 and Fire-resistant cladding: t_{ch} = 90 minutes[3]	Fire-resistant cladding: A2 – s1,d0**; Otherwise: E – d2
26	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 90 minutes (combustible load-bearing parts with cladding with a reduced fire resistance of 30 minutes made of non-combustible* building materials) in accordance with Sections 4.3(b) and 4.3(e) of the Technical Rule under ser. No A 2.2.1.4	R 90 and Fire-resistant cladding: t_{ch} = 30 minutes[3]	REI 90 and Fire-resistant cladding: t_{ch} = 30 minutes[3]	Fire-resistant cladding: A2 – s1,d0**; Otherwise: E – d2
27	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 90 minutes (combustible load-bearing parts with room-side cladding with reduced fire resistance of 30 min. and with one-sided cladding made of non-combustible* building materials in accordance with § 36(6) MBO[1] in conjunction with A 2.1.12 in accordance with Section 4.3(c) of the Technical Rule under ser. No, A 2.2.1.4 (e.g. walls of necessary corridors)		REI 90 and fire-resistant cladding: t_{ch} = 90 minutes[3]	fire-resistant cladding, non-combustible cladding: A2 – s1,d0**; Otherwise: E – d2
28	Fire resistance of 120 minutes and made of non-combustible* building materials	R 120	REI 120	A2 – s1,d0**
29	Fire resistance of 120 minutes and made of non-combustible* building materials, stable even under additional mechanical stress	-	REI 120-M[4]	A2 – s1,d0**

1 For the steel structural elements coated with reactive fire protection systems, the IncSlow specification according to DIN EN 13501-2:2023-12 must be mentioned additionally in the declaration of performance.
2 pursuant to § 35(5); § 36, (6) and § 39(2) MBO in conjunction with A 2.1.12
3 The protection period t_{ch} shall be deemed to have been complied with if fire-resistant cladding with the classification K_2 according to DIN EN 13501-2:2023-12 with the same number of minutes is used.
4 A non-combustible layer continuous in the component plane: A2 — s1,d0** as defined in Table 1.2
* Regarding the requirements, Table 1.1. applies.
** Regarding fire performance requirements, Table 1.2 applies. Section 1.3 shall apply where necessary.
*** The firewall must be made of non-combustible building materials.

The requirement of Table 4.3.1.1, column 1, is only met if subsequent structural elements have at least the same fire resistance. With regard to the fire behaviour of the construction products, Table 1.2 applies.
If the requirements of technical regulation according to ser. No A 2.2.1.4 according to Table 4.3.1.1, footnote 3, are not met, proof according to § 16a MBO1 is required in the absence of a generally accepted Technical Rule for the planning, designing and execution of the above-mentioned construction products.

4.3.1.2 Fire resistance requirements including fire performance when using construction products in accordance with DIN EN 13964:2014-08 for space-closing structural elements as non-supporting subceilings with fire stress only from bottom or bottom up and from top to bottom and at least required performance

Table 4.3.1.2: Building approval requirements and minimum required performances

	Building approval requirement	Minimum required performances		
		Fire resistance of the subceiling		Fire behaviour of the subceiling
		with fire exposure only from below	with fire exposure from bottom to top and from top to bottom	
	1	2	3	4
1	of non-combustible* building materials	-	-	A2 – s1,d0**
2	made of flame-retardant* building materials not falling off burning or dripping off	-	-	C – S2,d0**
3	Fire-retardant	From bottom to top EI 30 (a←b)	From bottom to top and from top to bottom EI 30 (a↔b)	E – d2
4	Fire-retardant and made of non-combustible* materials	From bottom to top EI 30 (a←b)	From bottom to top and from top to bottom EI 30 (a↔b)	A2 – s1,d0**
5	Highly fire-retardant and made of non-combustible*building materials	From bottom to top EI 60 (a←b)	From bottom to top and from top to bottom EI 60 (a↔b)	A2 – s1,d0**
6	Fire-resistant and made of non-combustible* building materials	From bottom to top EI 90 (a←b)	From bottom to top and from top to bottom EI 90 (a↔b)	A2 – s1,d0**
	* Regarding the requirements, Table 1.1. applies. ** Regarding the requirements, Table 1.2. applies.			

4.3.1.3 Terms of use and execution of construction products in accordance with Table 4.3.1.2

1. Use is only permitted if the structural elements adjacent to the construction product described in the manufacturer's installation manual are in compliance with the fire resistance requirements for the building structure. These structural elements must be designed so as to withstand the impacts of the use of the construction product as well as the impacts of the construction product in case of fire. The requirements of Table 4.3.1.2 are only met if subsequent, room-closing structural elements have at least the same fire resistance.
2. The requirements of Table 4.3.1.2 for sub-ceilings with fire stress only from below shall be met only if the ceiling to which this subceiling is installed meets the requirements in the case of fire action from the top (top-down fire) in accordance with the requirement in ser. No A 2.1.8.
3. The use of suspended ceilings is only permitted if the method of attachment to vertical and/or horizontal structural elements is specified in the classification report, and this is apparent from the manufacturer's installation instructions.
4. The use of suspended ceilings with installations (such as luminaries, loudspeakers, ventilation structural elements, etc.) is only permitted if this is indicated in the classification report and the installation method is apparent from the manufacturer's installation instructions.
5. The use of suspended ceilings with revision openings is only permitted if this is indicated in the classification report and the installation method for the revision opening is apparent from the manufacturer's installation instructions.

4.3.2 Requirements on fire resistance including fire performance when using construction products in accordance with harmonised technical specifications for non-supporting walls, non-supporting partitions or walls of necessary corridors, walls of open corridors and minimum required performance

Table 4.3.2: Building approval requirements and minimum required performances

	Building authority requirement	Minimum required performances	
		Fire resistance	Fire performance
	1	**2**	**3**
1	Made of normal-flammability* building materials	-	E – d2
2	Fire-retardant	EI 30	E – d2
3	Fire-retardant and made of non-combustible* materials	EI 30	A2 – s1,d0**
4	Fire-retardant with one-sided[1] cladding made of non-combustible* building materials	EI 30	Non-combustible* cladding: A2 – s1,d0**; Otherwise: E – d2
5	Highly fire-retardant and made of non-combustible materials	EI 60	A2 – s1,d0**
6	highly fire-retardant and made of non-combustible* materials in the essential parts (non-combustible load-bearing and reinforcing parts)[2,3]	EI 60	Essential parts: A2 – s1,d0**, Otherwise: E – d2
7	highly fire-retardant and made of non-combustible* building materials, stable even under additional mechanical stress	EI 60-M	A2 – s1,d0**
8	highly fire-retardant in accordance with A 2.1.3.1(b) with a fire resistance of 60 minutes (of combustible building materials, non-combustible* insulating materials with cladding with a fire resistance of 60 minutes made of non-combustible* building materials)[2] in accordance with Section 4.2 of the Technical Rule under ser. No, A 2.2.1.4	EI 60 and fire-resistant cladding: t_{ch} = 60 minutes[4]	Insulation materials and fire-protective cladding: A2 – s1,d0**, Otherwise: E – d2
9	Wall instead of a fire wall, highly fire-retardant according to A 2.1.3.1(b), stable even under additional mechanical stress, with a fire resistance of 60 minutes (made of combustible building materials, with cladding with a fire resistance of 60 minutes made of non-combustible* building materials) in accordance with Section 4.2 of the Technical Rule under ser. No A 2.2.1.4	EI 60-M and fire-resistant cladding: t_{ch} = 60 minutes[4]	Insulation materials, fire-protective cladding: A2 – s1,d0**; Otherwise: E – d2

	Building authority requirement	Minimum required performances	
		Fire resistance	Fire performance
	1	2	3
10	Structural elements in accordance with A 2.1.3.1(e) with a fire resistance of 60 minutes (made of combustible building materials, with cladding with a reduced fire resistance of 30 minutes made of non-combustible* building materials) in accordance with Section 4.3(a) of the Technical Rule under ser. No A 2.2.1.4	EI 60 and Fire-resistant cladding: t_{ch} = 30 minutes[4]	Insulation materials, fire-resistant cladding: A2 – s1,d0**; Otherwise: E – d2
11	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 60 minutes (made of combustible building materials, with cladding with a fire resistance of 60 minutes made of non-combustible* building materials) in accordance with Section 4.2 of the Technical Rule under ser. No A 2.2.1.4	EI 60 Fire-resistant cladding: t_{ch} = 60 minutes[4]	Insulation materials, Fire-resistant cladding: A2 – s1,d0**; Otherwise: E – d2
12	Wall instead of a firewall Structural elements in accordance with A 2.1.3.1(d), stable even under additional mechanical stress, with a fire resistance of 60 minutes (made of combustible building materials, with cladding with a fire resistance of 60 minutes made of non-combustible* building materials) in accordance with Section 4.2 of the Technical Rule under ser. No A 2.2.1.4	EI 60-M fire-resistant cladding: t_{ch} = 60 minutes[4]	Fire-resistant cladding: A2 – s1,d0**, Otherwise: E – d2
13	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 60 minutes (made of combustible building materials with cladding with a reduced fire resistance of 30 minutes made of non-combustible* building materials) in accordance with Section 4.3(b) of the Technical Rule under ser. No, A 2.2.1.4	EI 60 Fire-resistant cladding: t_{ch} = 30 minutes[4]	Fire-resistant cladding A2 – s1,d0**; Otherwise: E – d2
14	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 60 or 90 minutes (made of combustible building materials, with cladding with a reduced fire resistance made of non-combustible* building materials) in accordance with Section 4.3(c) of the Technical Rule under ser. No A 2.2.1.4	EI 60 or EI 90	E – d2
15	Fire-resistant and made of non-combustible* building materials	EI 90	A2 – s1,d0**

	Building authority requirement	Minimum required performances	
		Fire resistance	Fire performance
	1	**2**	**3**
16	Hire-resistant (non-combustible load-bearing and reinforced parts)[2,4]	EI 90	A2 – s1,d0**, Otherwise E – d2
17	Firewall fire-resistant and made of non-combustible* building materials, stable also under additional mechanical stress	EI 90-M	A2 – s1,d0**
18	Structural elements in accordance with A 2.1.3.1(e) with a fire resistance of 90 minutes (made of combustible building materials, with cladding with a fire resistance of 90 minutes made of non-combustible* building materials) in accordance with Section 4.2 of the Technical Rule under ser. No A 2.2.1.4	EI 90 and Fire-resistant cladding: t_{ch} = 90 minutes[4]	Fire-resistant cladding: A2 – s1,d0**; Otherwise: E – d2
19	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 90 minutes (made of combustible building materials, with cladding with a fire resistance of 90 minutes made of non-combustible* building materials) in accordance with Section 4.2 of the Technical Rule under ser. No A 2.2.1.4	EI 90 and Fire-resistant cladding: t_{ch} = 90 minutes[4]	Fire-resistant cladding: A2 – s1,d0**; Otherwise: E – d2
20	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 90 minutes (made of combustible building materials, with cladding with a reduced fire resistance of 30 minutes made of non-combustible* building materials) in accordance with Section 4.3(c) of the Technical Rule under ser. No, A 2.2.1.4	EI 90 Fire-resistant cladding: t_{ch} = 30 minutes[4]	Fire-resistant cladding: A2 – s1,d0**; Otherwise: E – d2
21	Fire resistance of 120 minutes and made of non-combustible* building materials	EI 120	A2 – s1,d0**
	1 pursuant to § 35(5); § 36, (6) and § 39(2) MBO in conjunction with A 2.1.12 and A 2.1.13 2 Parts within the structural element to ensure stability (dead weight) and suitability for use. 3 A non-combustible layer continuous in the component plane: A2 — s1,d0** as defined in Table 1.2. 4 The protection period t_{ch} shall be deemed to have been complied with if fire-resistant cladding with the classification K_2 according to DIN EN 13501-2:2023-12 with the same number of minutes is used. * Regarding the requirements, Table 1. applies. 1. ** Regarding fire behaviour requirements, Table 1.2 applies. Section 1.3 shall apply where necessary.		

The requirement of Table 4.3.2, column 1, is deemed fulfilled only if adjacent structural elements have at least the same fire resistance. The transitions to such structural elements must not affect the space barrier pursuant to ser. No A 2.1.3.3. With regard to the fire behaviour of the construction products, Table 1.2 applies.

4.3.3 Requirements for fire resistance including fire performance when using construction products according to harmonised technical specifications for non-load-bearing exterior walls (with space barrier) and minimum required performance

Table 4.3.3: Building approval requirements and minimum required performances

	Building approval requirement	Minimum required performances	
		Fire resistance	Fire performance
	1	2	3
1	of non-combustible* building materials	-	A2 – s1,d0**
2	made of flame-retardant* building materials	-	C – s2,d2**
3	made of flame-retardant building materials not falling off burning or dripping off	-	C – s2,d0**
4	Made of normal-flammability* building materials	-	E – d2
5	Fire-retardant	From the inside to the outside: EI 30 (i→o) and from outside to inside: EI 30-ef (i←o)	E – d2
6	Fire-retardant and made of non-combustible* materials	From the inside to the outside: EI 30 (i→o) and from outside to inside: EI 30-ef (i←o)	A2 – s1,d0**
7	fire retardant with one-sided cladding made of non-combustible* building materials according to § 36(6)[1] MBO in conjunction with A 2.1.12	EI 30	Non-combustible cladding: A2 – s1,d0**; Otherwise: E – d2
8	fire retardant with one-sided cladding made of non-combustible* building materials according to § 35(5) and § 39(2) MBO[1] in conjunction with A 2.1.12 and A 2.1.13	from the inside to the outside: EI 30 (i→o) and from outside to inside: EI 30-ef (i←o)	Non-combustible* cladding: A2 – s1,d0**; Otherwise: E – d2
9	fire-retarding on the outside with cladding made of non-combustible* building materials in accordance with Section 7 of the Technical Rule under ser. No A 2.2.1.4	from the inside to the outside: EI 30 (i→o) and from outside to inside: EI 30-ef (i←o)	Non-combustible* cladding: A2 – s1,d0**; Otherwise: E – d2
10	fire-retarding on the outside with cladding made of non-combustible* building materials in accordance with Section 7 of the Technical Rule under ser. No A 2.2.1.4, and with one-sided cladding made of non-combustible* building materials in accordance with § 36(6) MBO[1] in conjunction with A 2.1.12 (open corridor)	from the inside to the outside: EI 30 (i→o) and from outside to inside: EI 30-ef (i←o)	Non-combustible* cladding: A2 – s1,d0**; Otherwise: E – d2

	Building approval requirement	Minimum required performances	
		Fire resistance	Fire performance
	1	2	3
11	highly fire-retardant Structural elements in accordance with A 2.1.3.1(b) with a fire resistance of 60 minutes (made of combustible building materials, non-combustible* building materials with cladding with a fire resistance of 60 minutes made of non-combustible* building materials) in accordance with Section 4.2 of the Technical Rule under ser. No A 2.2.1.4 (e.g. § 30(6) MBO[1])	EI 60 and fire-resistant cladding: t_{ch} = 60 minutes[2]	Insulation materials and fire-protective cladding: A2 – s1,d0**, Otherwise: E – d2
12	Structural elements in accordance with A 2.1.3.1(d) with a fire resistance of 60 minutes (made of combustible building materials, with cladding with a fire resistance of 60 minutes made of non-combustible* building materials) in accordance with Section 4.2 of the Technical Rule under ser. No A 2.2.1.4 (e.g. § 30(6) MBO[1])	EI 60 and Fire-resistant cladding: t_{ch} = 60 minutes[2]	Fire-resistant cladding: A2 – s1,d0**, Otherwise: E – d2
13	Fire resistant (non-combustible carrying and reinforced parts not combustible*)[3,4]	From the inside to the outside: EI 90 (i→o) and from outside to inside: EI 90-ef (i←o)	Essential parts: A2 – s1,d0**, Otherwise: E – d2
14	Fire-resistant and made of non-combustible* building materials	From the inside to the outside: EI 90 (i→o) and from outside to inside: EI 90-ef (i←o)	A2 – s1,d0**
	1 to be cladded on both sides if stairwell wall is also the wall of the open corridor. 2 The protection period t_{ch} shall be deemed to have been complied with if fire-resistant cladding with the classification K_2 according to DIN EN 13501-2:2023-12 with the same number of minutes is used. 3 Parts within the structural element to ensure stability (dead weight) and suitability for use. 4 A non-combustible layer continuous in the component plane: A2 — s1,d0** as defined in Table 1.2. * Regarding the requirements, Table 1.2. applies. ** Regarding fire behaviour requirements, Table 1.2 applies. Section 1.3 shall apply where necessary.		

The requirement of Table 4.3.3, column 1, is deemed fulfilled only if adjacent structural elements have at least the same fire resistance. The transitions to such structural elements must not affect the space barrier as per ser. No A 2.1.3.3. With regard to the fire behaviour of the construction products, Table 1.2 applies.

5 Closures

5.1 Fire and/or smoke protection barriers as well as tight-sealing and self-closing barriers

In order to fulfil the structural requirements in A 2.1.6, A 2.1.7, A 2.1.8, A 2.1.11, A 2.1.12 and A 2.1.13 when using fire and smoke protection locks based on proofs of fitness for purpose in accordance with § 17 MBO[1], the minimum required classes and designations shall be taken from Sections 5.1.1 and 5.1.2.

For the purpose of complying with the building requirements in A 2.1.6, A 2.1.7, A 2.1.8, A 2.1.11, A 2.1.12 and A 2.1.13 for using fire and smoke protection barriers for which harmonised technical specifications exist, the minimum required performance is set out in Section 5.1.4.

- Gates as fire barriers according to EN 16034:2014[25] in conjunction with EN 13241:2003+A2:2016[26] do not meet the requirements for electromotive opening and closing according to A 2.1.6.

5.1.1 Fire and/or smoke protection barriers inside structural works according to usability certification according to § 17 MBO[1], excluding conveyor closures

Table 5.1.1: Building approval requirements and classification of classes

	Building approval requirements	Minimum required class according to proof of fitness for purpose
	1	**2**
1	Fire-retardant and self-closing tight-sealing	T 30
2	Fire-retardant and self-closing smoke-proof	T 30-RS
3	Highly fire-retardant and self-closing, tight-sealing	T 60
4	Highly fire-retardant and self-closing smoke-proof	T 60-RS
5	Fire resistant and self-closing, tight-sealing	T 90
6	Fire resistant and self-closing, smoke-proof	T 90-RS
7	Fire resistance of 120 minutes and self-closing, tight-sealing	T 120
8	Fire resistance of 120 minutes and self-closing, smoke-proof	T 120-RS
9	Smoke-proof and self-closing	RS

5.1.2 Fire and/or smoke protection closures in external walls of structural works, excluding conveyor closures

The requirements set out in Table 5.1.1 shall apply. For external use, the differential climate in accordance with EN 14351-1:2006+A2:2016[22] and the deformation classes in accordance with EN 12219:1999[27] must also be verified. At least classes 2(d) and 2(e) are required to comply with the building approval requirements.

5.1.3 Terms of use and implementation of financial statements in accordance with 5.1.1

The provisions on application and execution are part of the proof of fitness for purpose according to § 17 MBO[1].

25 Implemented in Germany by DIN EN 16034:2014-12.
26 Implemented in Germany by DIN EN 13241:2016-12.
27 Implemented in Germany by DIN EN 12219:2000-06

5.1.4 Construction products according to EEAS No 020029-00-1102 and EEAS No 020062-00-1102 and EN 16034:2014[25] in conjunction with EN 13241:2003+A2:2016[26] for use in the interior of structural works as fire and/or smoke protection seals

Table 5.1.4: Building approval requirements and at least required services and other features

	Building approval requirement	Minimum required performances	Other features
		Fire resistance and smoke-resistance for construction products as barriers[1,2]	Fire performance
	1	2	3
1	Fire-retardant, tight-sealing self-closing	$EI_2$30 S_a C Permanent Function Check[2]	E – d2
2	Highly fire-retardant, tight-sealing self-closing	EI_2 60 S_a C Permanent Function Check[2]	
3	Fire resistant, tight-sealing self-closing	$EI_2$90 S_a C Permanent Function Check[2]	
4	Fire-retardant, smoke-proof, self-closing	$EI_2$30 S_{200} C Permanent Function Check[2]	
5	Highly fire-retardant, smoke-proof, self-closing	EI_2 60 S_{200} C Permanent Function Check[2]	
6	Fire-resistant, smoke-proof, self-closing	$EI_2$90 S_{200} C Permanent Function Check[2]	
7	Smoke-proof and self-closing	S_{200} C Continuous function test[2]	

1 The minimum required performances must be verified for both sides of the closure.
2 Permanent function testing:
- Class 5 for fire protection/smoke protection doors (swing doors), wicket doors in gates, and construction products according to EN 13241:2003 + A2:2016, which are considered doors according to Section A 2.1.6
- min. class 2 for other fire/smoke closures (e.g. flaps, gates)

5.1.5 Construction products according to EN 16034:2014[25] in conjunction with EN 14351-1:2006+A2:2016[22] or EN 13241:2003+A2:2016[26] for use as fire and/or barriers in exterior walls of structural works

The requirements set out in Table 5.1.4 shall apply.

For construction products according to EN 16034:2014[25] in conjunction with EN 14351-1:2006+A2:2016[22] the differential climate according to EN 14351-1:2006+A2:2016[22] and the deformation class according to EN 12219:1999[27] must be proven in addition. At least classes 2(d) and 2(e) are required to comply with the building authority requirements.

5.1.6 Usage and implementation provisions for barriers according to 5.1.4 and 5.1.5

For the use of construction products as fire and/or smoke protection barriers, DIN 18093:2017-10 and the following conditions of use and execution shall apply:

1. Use is only permitted if the structural elements that need to be described in the manufacturer's installation instructions pursuant to DIN 18093:2017-10, Section 3.2, are in compliance with the fire resistance requirements for the structural installation. These structural elements must be designed so as to withstand the impacts of the use of the construction product as well as the impacts of the construction product in case of fire.

2. The use in escape and rescue routes shall only be permitted if, in the case of sliding, lifting or rolling closures, including those considered doors in accordance with A 2.1.6, and fire and smoke protection curtains which do not open in the direction of escape, a door that can be opened in the direction of escape is located in the immediate vicinity.

3. So-called side and/or fall flaps in conjunction with construction products as fire and/or smoke protection barriers are not covered by EN 16034:2014[25]. For the planning, designing and execution there are no technical best practices, and proof pursuant to § 16a MBO[1] is required.

4. The use of construction products as fire and/or smoke protection closures for non-floor level installation (height > 500 mm above upper edge of the finished floor of the room) is only permitted if this is tested and specified in the installation instructions.

5. The lintel/structural element above a construction product as a fire and/or smoke protection closure shall be static and designed in such a way that the construction product does not receive any additional load as a closure (except its own weight).

6. Visible instructions shall be affixed to both sides of sliding, lifting and rolling barriers, reminding that the closing area must be kept free at all times from any objects that could obstruct the closing of the barrier. Sliding, lifting and rolling barriers shall be equipped with an audio-visual warning system that announces the closing. Once initiated, the closing process may only be interrupted for personal safety purposes. The closing process must continue automatically from each opening position after the closing area has been released.

7. A fire and/or smoke protection closure inside a building may be fitted with a suitable locking mechanism for the fire and/or smoke protection closure with applicability demonstrated on this closure by type approval.

8. The indication 'released' for the 'ability to release' characteristic in the declaration of performance only means that a locking device is present, not a locking mechanism.

9. The decision to use a fire curtain may be made only on the basis of the following criteria:

- Expected air flows, e.g. through natural thermals or artificial ventilation systems, which would affect safe closing,
- the existing shape stability to collapsing or falling debris, structural elements or objects,
- smoke leakage,
- the behaviour of pressure ratios that differ from those specified in EN 1634-1:2014+A1:2018[28] and,
- the rolling-down of the curtain in case of pressure differences.

Fire curtains may only be used and installed in the dimensions for which a test has been carried out. A series of two or more fire curtains, including those separated by supporting elements, is not permitted.

10. The decision to use a smoke curtain may be made only on the basis of the following criteria:

- Expected air flows, e.g. through natural thermals or artificial ventilation systems, which would affect safe closing,

28 Implemented in Germany by DIN EN 1634-1:2018-04.

- existing dimensional stability when faced with falling debris, structural elements or objects,
- Behaviour at pressure ratios that differ from those specified in EN 1634-3:2005-01[29].

Smoke curtains may only be used and installed in the dimensions for which a test has been carried out. A series of two or more smoke curtains, including those separated by supporting elements, is not permitted.

11. Use is only permitted if the installation manual specifies that the barrier fulfils the requirements for fire impact from either side and for smoke development pursuant to A 2.1.6.
Use in escape routes is only permitted if the installation manual states that the requirements with regard to the closing devices and the possibility of manual opening according to A 2.1.6 are met.

5.2 Fire protection barriers in path-bound conveyor systems

In order to fulfil the structural requirements in A 2.1.7 and A 2.1.8 when using fire protection barriers in track-bound conveyor systems based on proofs of fitness for purpose in accordance with § 17 MBO[1], the minimum required classes and designations shall be taken from Section 5.2.1.

In order to comply with the building requirements in A 2.1.7 and A 2.1.8 when using fire protection barriers in path-bound conveyor systems for which harmonised technical specifications are available, the minimum required performance is set out in Section 5.2.2.

5.2.1 Fire protection barriers in path-bound conveyor systems classified according to DIN 4102-5:1977-05

Table 5.2.1: Building approval requirements and classification of the class according to DIN 4102-5:1977-05

	Building approval requirement	**Fire protection barrier in conveyor systems**
	1	**2**
1	fire-retardant, tight-* and self-closing	T 30
2	highly fire-retardant, tight- and self-closing	T 60
3	fire-resistant, tight*- and self-closing	T 90
* In accordance with the current state of the art, the requirement of "tight-closing" shall be deemed to have been met in the event of fire-resistant closures in connection with track-bound conveyors, even without peripheral permanent elastic sealing.		

29 Implemented in Germany by DIN EN 1634-3:2005-01.

5.2.2 Construction products as fire protection barrier in path-bound conveyor systems according to EAD 350022-01-1107

Table 5.2.2: Building approval requirements and minimum required performances

	Building approval requirement	Minimum required performance[1]		
		Fire resistance	Fire performance	Electromotive open and/or closing
	1	**2**	**3**	**4**
1	fire-retardant, tight-* and self-closing	EI_2 30 C Continuous function test[2]	E – d2	Specification: Annex B2 and B3 of the EAD fulfilled
2	highly fire-retardant, tight- and self-closing	EI_2 60 C Continuous function test[2]	E – d2	Specification: Annex B2 and B3 of the EAD fulfilled
3	fire-resistant, tight*- and self-closing	EI_2 90 C Continuous function test[2]	E – d2	Specification: Annex B2 and B3 of the EAD fulfilled
	1 The minimum required performance must be declared **for both sides** of the closure. 2 Continuous function testing: Class 5 (200,000 cycles) for fire protection closures in track-bound conveyor systems as planned closed closures Class 2 (10 000 cycles) for fire protection closures in track-bound conveyor systems as planned open closures] * In accordance with the current state of the art, the requirement of 'tight-closing' shall be deemed to have been met in the event of fire-resistant closures in connection with track-bound conveyors, even without peripheral permanent elastic sealing.			

5.2.3 Conditions of use and implementation of construction products according to 5.2.2

5.2.3.1 General information

Use is only permitted if the structural elements adjacent to the construction product described in the manufacturer's installation manual are in compliance with the fire resistance requirements for the building structure. These structural elements must be designed so as to withstand the impacts of the use of the construction product as well as the impacts of the construction product in case of fire.

The fire protection barrier in path-bound conveyor systems (hereinafter referred to conveyor system barriers) must be installed at the place of use.

Installation shall be carried out only by undertakings which have sufficient experience in this field and which have been trained and informed by the manufacturer and which can provide a confirmation from the manufacturer as proof of their expertise.

The conveyor system barrier may be provided with a suitable locking mechanism whose suitability for the relevant barrier is documented by a type approval.
If the finalisation of the conveyor system barrier is already equipped with a locking device on the manufacturer's side, it shall comply with the provisions of the type approval of the locking mechanism used.

5.2.3.2 Installation manual

The manufacturer shall provide a written German-language installation manual that is based on the classification document. It shall contain at least the following information:

- Information on the installation of the fire barrier (e.g. adjacent structural elements, permitted fasteners, number and spacing of fixing points, joints),
- Instructions for any required welding work on the structure of the fire barrier,

- Information on permissible accessories for the fire protection barrier (e.g. damping devices),
- Information on the functional interaction of all parts,
- Information on the order of working steps during installation,
- Information on setting the closing speed of the fire barrier,
- Instructions regarding the application of locking mechanisms,
- Information on interfaces for closing the conveyor system barrier,
- Information on service and maintenance.

The user shall install the conveyor system barrier in accordance with this installation manual and give the installation manual to the client together with a statement confirming correct installation.

5.2.3.3 Inspection of conveyor system barriers and conveyor systems in the closing area of the wall opening

Through suitable measures agreed with the conveyor system manufacturer, care must be taken to ensure that when the fire alarm is triggered, the conveying process is interrupted, and the goods located within the opening area of the conveyor system barrier leave this area.

5.2.3.4 Maintenance and testing

The operator shall undertake and document the necessary maintenance and tests in accordance with the installation instructions.

5.2.3.4.1 Monthly check

The conveyor system barrier must be kept permanently operational. It must be tested for operational readiness at least once a month by the operator under its own responsibility. This monthly test must be performed by a qualified technician or a specially trained person. The results must be recorded in an inspection log. The manufacturer of the conveyor system barrier must notify this requirement to the conveyor's operator in writing.

5.2.3.4.2 Annual testing and servicing

The operator is also obliged to carry out an annual inspection for smooth operation of the conveyor system barrier in conjunction with the conveyor system and the locking mechanism as well as an appropriate maintenance regardless of the time limits of the installation instructions. The annual inspection and maintenance shall be carried out by a specialist or trained person. The results must be recorded in an inspection log.

5.3 Landing doors for lifts

Lift shaft doors according to Part C, Chapter C 2, ser. No C 2.6.2 to C 2.6.4, for lifts in shaft walls pursuant to A 2.1.13 of fire resistance class F 90 are deemed to fulfil the requirements of § 39 Para. 2 sentence 2 MBO 1 only if the following application rules have been observed:

a. They are installed in solid enclosed masonry or concrete walls,
b. The lift cage is predominantly made of non-combustible building materials (this is the case if the load-bearing and reinforced parts of the lift cage are made of non-combustible building materials and the other parts of the lift cage (such as wall and ceiling cladding, flooring, ventilation and lighting covers) do not have more than 2.5 kg of combustible building materials, at least normal flammability building materials per m^2 of the interior lift cage area),
c. The doors shall be controlled in such a way that they remain open only for as long as it is necessary to enter or leave the lift cage; When closed, two doors on top of each other prevent fire from spreading from the fire storey to the storey above,
d. Where several doors are positioned side by side, the doors shall be separated by fire-resistant structural elements and attached to these structural elements, and
e. The lift shaft shall have an opening to remove smoke as per § 39(3)(1) MBO1.

Lift shaft doors with the classification "E 30/60/90" in accordance with EN 81-58:2022-08[30] for installation in fire-retardant, highly fire-retardant or fire-resistant enclosing lift shaft walls in accordance with A 2.1.13 meet the requirements of § 39(2), sentence 2, MBO1 only if the requirements of letters (b), (c) and (e) are met and if the lift shaft doors, if several are arranged next to each other, are separated by and attached to structural elements

30 Implemented in Germany by DIN EN 81-58:2022-08

which have the same fire resistance as the lift shaft wall. The fire performance of the structural elements of the lift shaft door shall be demonstrated; they must be at least normal flammability.

5.4 Sealing doors

Doors are sealed or tight-closing if they have stable door leaves and are equipped with three-sided continuous elastic seals, which, due to their shape (lip/hose seal) and the sealing path when closed, are attached to both the door frame and the door leaf after installation. Door leaves are dimensionally stable if they are closed and show deformations ≤ 4 mm relative to the door-leaf plane in the longitudinal direction (in the sense of RAL-GZ 426/1).

For outdoor use, the differential climate according to EN 14351-1:2006+A2:2016[22] and the deformation class according to EN 12219:1999[27] must also be demonstrated. At least classes 2(d) and 2(e) are required to comply with the building approval requirements.

For external use DIN 18055:2020-09 must be observed.

5.5 Other closures than doors

5.5.1 Sealing and self-closing degrees

Doors which must be sealed and self-closing as closures shall comply with the requirements of Section 5.4. The barriers are self-closing if they have suitable closing devices that automatically close the barrier by means of mechanically stored energy.

5.5.2 Construction products in accordance with EN 16034:2014[25] in conjunction with EN 14351-1:2016[22] or EN 13241:2003+A2:2016[26] and EAD No. 020029-00-1102 and EAD No. 020062-00-1102 for use as tight- and self-closing closures

Table 5.5.2: Building approval requirements and at least required services and other features

	Building approval requirement	Minimum required performances	Other feature
			Fire performance
	1	**2**	**3**
1	Tightly closing and self-closing	S_a C Continuous Function Check[1]	E – d2
2	Tight-sealing and self-closing, made of non-combustible* building materials	S_a C Continuous Function Check[1]	A 2-s1,d0**
	1 Permanent function testing: - Class 5 for doors (swing leaf closures), wicket doors in gates and construction products according to EN 13241:2003 + A2:2016, which are considered as doors in accordance with Section A 2.1.6 — min. class 2 for other tight- and self-closing closures (gates) * Regarding the requirements, Table 1.1. applies. ** Regarding fire performance requirements, Table 1.2 applies. Section 1.3 shall apply where necessary.		

5.5.3 Terms of use and execution for financial statements in accordance with 5.5.2

1. DIN 18093:2017-10 applies mutatis mutandis to the use of construction products as seal and self-closing financial statements.
2. Use in escape and rescue routes is only permitted if a door is in the immediate vicinity of sliding, lifting or roller closures. This also applies to such closures, which are regarded as doors according to A 2.1.6 and to tight- and self-closing curtains.
3. So-called side and/or fall flaps for construction products according to EN 13241:2003 + A2:2016 in conjunction with EN 16034:2014[25] as tight- and self-closing closures are not covered by EN 16034:2014[25]. For the planning, designing and execution there are no technical best practices, and proof pursuant to § 16a MBO[1] is required.

4. The use of construction products as sealing and self-closing closures for non-floor-equivalent installation (height > 500 mm above OKF of the room) is only permitted if this is tested and specified in the installation instructions.
5. The fall/component over a construction product as a sealing and self-closing finish must be statically and dimensioned in such a way that the construction product does not receive any additional load (except for its own weight).
6. Visible instructions shall be affixed to both sides of sliding, lifting and rolling barriers, reminding that the closing area must be kept free at all times from any objects that could obstruct the closing of the barrier. Sliding, lifting and rolling barriers shall be equipped with an audio-visual warning system that announces the closing. Once initiated, the closing process may only be interrupted for personal safety purposes. The closing process must continue automatically from each opening position after the closing area has been released.
7. A construction product for use as a sealing and self-closing closure may be carried out with a locking system suitable for sealing and self-closing closure inside construction installations, the applicability of which is demonstrated at this conclusion by a type-approval.
8. The indication ‘released’ for the ‘ability to release’ characteristic in the declaration of performance only means that a locking device is present, not a locking mechanism.
9. The decision to use a sealing and self-closing curtain can only be made taking into account the following criteria:
   - Expected air flows, e.g. through natural thermals or artificial ventilation systems, which would affect safe closing,
   - Existing dimensional stability when faced with falling debris, structural elements or objects.

   Sealing and self-closing curtains may only be used and installed in the dimensions for which a test has also been carried out. A sequence of two or more sealing and self-closing curtains, including one with separation by supporting elements, is not permitted.
10. Use shall be permitted only if the installation instructions indicate that the requirements for fire from both sides are complied with in the essential smoke protection feature for the closure.
    Use in escape routes is only permitted if the installation manual states that the requirements with regard to the closing devices and the possibility of manual opening according to A 2.1.6 are met.

6 Preventive measures for cable and/or pipe passages in fire-resistant structural elements

If, in order to fulfil the structural requirements in A 2.1.15 and A 2.2.1.8 for preventive measures for cable and pipe passages, proof of the suitability of designs pursuant to § 16a MBO_1, is required, the minimum required classes shall be as given in Table 6.

Table 6: Building approval requirements and classification of classes according to DIN 4102-9:1990-05 or DIN 4102- 11:1985- 12

	Building approval requirement	Minimum required classes pursuant to	
		DIN 4102-9:1990-05 for cable sealing	DIN 4102-11:1985-12 for pipe sealing[1]
	1	2	3
1	Fire-retardant	S 30	R 30
2	Highly fire-retardant	S 60	R 60
3	Fire-resistant	S 90	R 90
4	Fire resistance of 120 minutes	S 120	R 120
	1 Classification is permitted only if the fire test of the following is performed: a) Preventative measures for flammable pipe passages and pipes with a melting point < 1000 °C where the pipe ends are open inside and outside of the test furnace. If the preventive measures are intended only for drinking water, heating and cooling pipes with diameters ≤ 110 mm, the pipe may optionally be closed outside the test furnace. b) Preventive measures for passages of non-combustible pipes with a melting point ≥ 1000 °C (piping designed without connections of combustible pipes), the pipe ends used in the fire test are closed inside the test furnace and open outside (or optionally open on both sides).		

Note:
In the absence of a technical best practice for the planning, designing and execution of preventive measures for cable and/or pipe passages using construction products based on harmonised technical specifications, proof pursuant to § 16a MBO1 is required.

Simplifications under the Technical Rule included in ser. No A 2.2.1.8 are not affected.

7 Heat extraction devices in accordance with EN 12101-2:2003[31] for use in roofs in shopping streets pursuant to the Model Retail Outlet Regulation [Muster-Verkaufsstättenverordnung] and provisions on application and execution

Provisions on application and execution

A 2.1.9 must be observed in respect of position and arrangement for the use of heat extraction devices as transparent areas in roof covering if the performance requirement under Section 7.5.2 of EN 12101-2:2003[31] is not declared as being at least A2 – s1,d0; otherwise, proof must be provided pursuant to A. 2.1.9 for roof covering resistant to flying sparks and radiating heat (see Section 3, Table 3.2), or the building structure must observe the distances set out in § 32(2) MBO1. Use in transparent roof coverings that are permitted to be flame-resistant and that do not shed burning droplets is permitted if the performance requirement of Section 7.5.2 of EN 12101-2:2003[31] is declared as being at least C – s2,d0.

Table 7: Minimum required performances

	EN 12101-2:2003[31]	Minimum required performances
	1	2
1	4.1	Thermocouple pursuant to 4.1.1(a) and manual release pursuant to 4.1.1(d)
2	4.2	fulfilled
3	4.4	Specifications (m²), width ≥ 1.0 m
4	7.1.1	Re 50
5	7.1.3	Yes, if additional ventilation function
6	7.2.1.1	SL 500
7	7.3.1	T (0)
8	7.4.1	WL 1500
9	7.5.1	B 300

[31] Implemented in Germany by DIN EN 12101-2:2003-09.

	EN 12101-2:2003[31]	Minimum required performances
	1	2
10	7.5.2	E – d2

8 Service ducts and shafts, including their opening barriers

In order to fulfil the structural requirements in A 2.1.14 when using construction products for installation shafts and ducts, including their openings, proof of the suitability of designs pursuant to § 16a MBO[1], the minimum required classes shall be as given in Section 8.1.

In order to comply with the building requirements in A 2.1.14, where construction products are used as service ducts for which harmonised technical specifications are available, the minimum required performance is set out in Section 8.2.

8.1 Service ducts and -shafts, including their opening barriers

Table 8.1: Building approval requirements and classification of classes according to DIN 4102-11:1985-12

	Building approval requirement	Minimum required classes according to DIN 4102-11:1985-12
	1	2
1	Fire-retardant and made of non-combustible* building materials	I 30
2	Highly fire-retardant and made of non-combustible* building materials	I 60
3	Fire-resistant and made of non-combustible* building materials	I 90
4	Fire resistance of 120 minutes and made of non-combustible* building materials	I 120
* Regarding the requirements, Table 1.1. applies.		

8.2 Construction products for service shafts made of prefabricated fittings and accessories according to EAD 350003-01-1109

Table 8.2: Building approval requirements and minimum required performances

	Building approval requirement	Minimum required performances	
		Fire resistance	Fire performance
	1	2	3
1	Fire-retardant and made of non-combustible* materials	EI 30($v_e h_o$ i↔o)	A2 – s1, d0**; for materials foaming in the event of fire applies: E-d2
2	Highly fire-retardant and made of non-combustible materials	EI 60($v_e h_o$ i↔o)	
3	Fire-resistant and made of non-combustible* building materials	EI 90($v_e h_o$ i↔o)	
4	Fire resistance of 120 minutes	EI 120($v_e h_o$ i↔o)	
	* Regarding the requirements, Table 1.1. applies. ** Regarding fire performance requirements, Table 1.2 applies. Section 1.3 shall apply where necessary.		

8.3 Conditions of use and execution for construction products according to 8.2

If the construction product used for the service shaft is described conclusively in the ETA based on the EAD, the manufacturer shall provide a written German-language installation manual based on the classification document, which must contain at least the following information:

- description of the combination of the permitted structural elements,

- description of the installation in adjacent structural elements (including permitted fasteners and their distances),
- description of permissible execution variants.

Use is permitted only if the structural elements adjacent to the construction product that are described in the manufacturer's installation manual are in compliance with the fire resistance requirements for the building structure and the space barrier pursuant to A 2.1.3.3. is not affected.

The user shall install the construction product in accordance with this installation manual and give the installation manual to the client together with a statement confirming correct installation.

9 Fire-resistant glazing

In order to fulfil the structural requirements in A 2.1.6, A 2.1.7, A 2.1.8, A 2.1.9 and A 2.1.12 when using construction products for fire-resistant glazings with proof of fitness for purpose in accordance with § 17 MBO1 or proof of the suitability of designs according to § 16a MBO1, the minimum required classes shall be as given in Section 9.1.

In order to fulfil the building requirements in A 2.1.6, A 2.1.7, A 2.1.8, A 2.1.9 and A 2.1.12 when using construction products as fire-resistant glazings if there are harmonised technical specifications for them, the minimum required performance shall be as given in Section 9.2.

9.1 Fire-resistant glazing

Table 9.1: Building approval requirements and classification of classes according to DIN 4102-13:1990- 05

	Building approval requirement	**Minimum required classes according to DIN 4102-13:1990-05**
	1	**2**
1	Fire-retardant	F 30
2	Highly fire-retardant	F 60
3	Fire-resistant	F 90
4	Fire resistance of 120 minutes	F 120

Fire-resistant glazings that do not meet these requirements (such as G-glazing according to DIN 4102-13:1990-05) are specified under A 2.1.3.3.1.

9.2 Construction products for fire protection glazing according to ETAG 003 or EAD 210005-00-0505

To meet the building requirements in A 2.1.6, A 2.1.7, A 2.1.8, A 2.1.9 and A 2.1.12 when using construction products for fire-resistant glazings that are used as construction products for non-loadbearing interior partitions, the minimum required performances in Section 4.3 and Table 4.3.2 apply. According to A 2.1.6 or A 2.1.12, barriers to necessary openings in such dividing walls must have the same fire resistance as the non-load-bearing interior dividing wall. The minimum required performance of the barriers is set out in Section 5.1.4.

9.3 Provisions on application and execution of construction products pursuant to 9.2

If the construction product used for the dividing wall is described conclusively in the ETA, the manufacturer shall provide a written German-language installation manual based on the classification document, which must contain at least the following information:

- description of the combination of the permitted structural elements,
- description of the installation in adjacent structural elements (including permitted fasteners and their distances),
- description of permissible execution variants.

Use is permitted only if the structural elements adjacent to the construction product that are described in the manufacturer's installation manual are in compliance with the fire resistance requirements for the building structure and the space barrier pursuant to A 2.1.3.3. is not affected.

The user shall install the construction product in accordance with this installation manual and present the installation manual to the client together with a statement confirming correct installation.

10 Special fire protection products

10.1 Fire-retardant agent

10.1.1 General information

In order to fulfil the structural requirements in A 2.1.2 when using fire protective devices in based on proofs of fitness for purpose in accordance with § 17 MBO1, the minimum required classes and designations shall be as given in Section 1.1.

For the fulfilment of the building requirements in A 2.1.2 when using fire-retardant agents for which there are harmonised technical specifications, the minimum required performance shall be as given in Section 1.2.

10.1.2 Rules for use and implementation of construction products with fire-retardant agents according to harmonised technical specifications

If the construction product is described in the ETA according to ETAG 028 or EAD 350865-00-1106, the manufacturer shall provide a written installation instruction in German based on the classification document, which shall contain at least the following information:

- description of the processing of the construction product,
- description of the minimum applied quantity,
- description of the installation of building materials finished with the construction product.

fire-retardant agents are not verified for use on floorings and/or substrates subject to continuous moisture and/or UV-radiation.

10.2 Reactive fire protection coatings on load-bearing steel components

10.2.1 General information

To meet the structural requirements in A 2.1.4 in conjunction with A 2.1.3 when reactive fire protection coatings are used on steel components with proof of usability in accordance with § 17 MBO1, the minimum required classes are given in Section 4.2.4.

In order to meet the structural requirements in A 2.1.4 in conjunction with A 2.1.3 when reactive fire protection coatings are used on steel components without space closure in accordance with ETA, the minimum required performances are set out in Section 4.3, Table 4.3.1.1, column 2.

10.2.2 Provisions on application and execution

In the absence of a generally accepted rule of technology for planning, designing and execution, proof in accordance with § 16a MBO is required for the use of reactive fire protection coatings on steel components in accordance with ETA.1

10.3 Linear joint seals

Joint seals pursuant to EAD 350141-00-1106 are suitable for closing structurally defined horizontal and vertical linear joints (connection, structural and expansion joints) in or between fire-resistant space-enclosing structural elements.

Joints are not independently considered under the building regulations.
Declaration of the ‘fire resistance’ performance characteristic for joint seals as per EAD 350141-00-1106 is not a substitute for the required proof of fire resistance of the overall component including joint(s).

Appendix to Annex 4: Explanations of the classification criteria and additional information on classification in Annex 4

	Derivation of the abbreviation	**Criterion**	**Scope**
	1	**2**	**3**
1	R (Résistance [resistance])	Load-bearing capacity	for the description of fire resistance
2	E (Étanchéité [leak sealant])	Space barrier	
3	I (Isolation)	Thermal insulation (under fire exposure)	
4	W (Radiation)	Limiting radiation passage	
5	M (Mechanical)	Mechanical effect on walls (impact stress)	
6	S_a (Smoke)	Limit of smoke permeability (sealing, leakage rate), meets the requirements at ambient temperature	tightly sealing barriers
7	S_{200} ($Smoke_{max.\ leakage\ rate}$)	Limit of smoke permeability (sealing, leakage rate), meets the requirements at ambient temperature and at 200 °C	Smoke protection barriers (including for fire protection barriers as an additional requirement)
8	C... (Closing)	Self-closing property (where applicable with number of loading cycles) including permanent functionality	Smoke protection doors, fire protection barriers (including conveyor system barriers)
9	P	Maintenance of energy supply and/or signal transmission	Electrical cable systems in general
10	K_1, K_2	Fire protection assets	Wall and ceiling cladding (fire protection cladding)
11	I_1, I_2	different thermal insulation criteria	Fire protection barriers (including conveyor system barriers)
12	i→o i←o i↔o (in - out)	Direction of classified fire resistance time	Non-load-bearing external walls, service shafts/ducts, see Table 8.2
13	a↔b (above - below)	Direction of classified fire resistance time	Subceilings
14	ca (cable)	Fire performance class	Cables
15	ROOF	Fire performance	Roofing

Annex 5

ETICS with EPS, base fire test method:

As of: June 2016

– Annex 5 deleted from MVV TB 2025/1 –

Annex 6

Rear-ventilated, external-wall cladding

As of: May 2024

CONTENTS

1 Scope

In the case of rear-ventilated external wall cladding that

- has hollow or air spaces across storeys

or

- extends above firewalls,

special precautions must be taken against the spread of fire in accordance with § 28(4), in conjunction with (5), as well as in accordance with § 30 Para. 7 MBO[32]. This is considered to be fulfilled if the design of the ventilated outer wall covering is carried out in accordance with this Technical Rule.

2 Terms

2.1 Rear-ventilated external wall cladding consisting of:

- cladding elements with open or closed joints, covering elements or impacts
- substructures (e.g. load-bearing profiles and, where appropriate, wall profiles made of metal, wooden battens (load-bearing battens), counter-battens (basic battens))
- holding supports (anchoring, connecting and fastening elements)
- accessories (e.g. connecting profiles, sealing strips, thermal separating elements)
- rear-ventilation gap
- if necessary, thermal insulation with insulating material supports.

2.2 A rear-ventilation gab is the airspace between the cladding elements and the thermal insulation, or between the cladding elements and the wall, when no external thermal insulation is provided.

2.3 Fire barriers assist in limiting the spread of fire in the rear-ventilation gap for a sufficiently long period of time by interrupting or partially reducing the clear cross-section of the rear-ventilation gap.

3 Insulating materials, substructures, rear-ventilation gap

3.1 In deviation from § 28 Para. 3 sentence 1 MBO[1], the thermal insulation must be non-combustible. The insulating materials shall be attached to the substrate either mechanically or with an adhesive mortar that is flame-resistant or does not contain more than 7.5% organic structural elements. Rod-shaped timber substructures are permitted (§ 28 Para. 3 sentence 1 Clause 2 MBO[1]).

3.2 The depth of the rear ventilation gap shall not be greater than

- 50mm with a timber substructure and
- 300 mm when using a linear or selective metal substructure.

32
According to national law

4 Horizontal fire barriers

4.1 On every second floor, horizontal fire barriers shall be positioned in the rear-ventilation gap. Fire barriers shall be installed between the wall and the cladding elements. In the case of external thermal insulation, installation between the insulating material of the external thermal insulation and the cladding is sufficient with a ventilation gap depth of up to a maximum of 150 mm if the insulating material is dimensionally stable in the event of fire and has a melting point of > 1 000 °C. The fire barrier must be embedded at least 40 mm deep into the insulation material.

For external wall claddings with a depth of the rear-ventilation gap of > 150 mm up to a maximum of 300 mm, the fire barrier must always be installed between the wall and the cladding elements.

4.2 Substructures made of combustible construction materials must be completely interrupted in the area of horizontal fire barriers.

4.3 The size of the openings in the horizontal fire barriers must be limited to a total of 100 cm² per linear metre of wall. The openings may be positioned as evenly distributed individual openings or as a continuous gap.

4.4 The horizontal fire barriers must be sufficiently dimensionally stable for at least 30 minutes. This is considered to be fulfilled when the fire barriers are made of sheet steel with a thickness of d ≥ 1 mm. They must be anchored in the exterior wall at intervals of ≤ 0.6 m. The steel sheets shall overlap at the joints by at least 30 mm.

In the case of ventilated exterior wall claddings with a depth of the rear-ventilation gap not exceeding 100 mm, horizontal fire barriers may consist of a non-combustible insulation material with a melting point of > 1 000 °C which is dimensionally stable in the event of fire, if the following boundary conditions are met:

- The fire barrier shall be at least 150 mm high.
- The fixing of the fire barrier shall be carried out as follows:

  a mechanically anchored with non-combustible fasteners in the exterior wall at intervals of ≤ 0.6 m
  or
  b with non-combustible, mineral adhesive mortar fully bonded to the outer wall
  or
  c clamped into an external thermal insulation of an insulating material that is dimensionally stable in the event of fire with a melting point > 1 000 °C, where the thickness of the thermal insulation shall be at least twice as large as the depth of the rear-ventilation gap and the clamping depth of the fire barrier shall correspond to the thickness of the thermal insulation.

In the case of ventilated outer wall cladding with a depth of the back ventilation gap > 150 mm to a maximum of 300 mm, horizontal fire barriers shall be made of sheet steel (thickness d ≥ 1 mm) and shall be attached to the supporting profiles of the metal substructure above the fire barriers with steel angles. The need for any necessary measures to prevent contact corrosion when fixing fire barriers to the supporting profiles of the metal substructure is indicated.

4.5 Reveals of exterior wall openings (doors, windows) may be an integral part of fire barriers, provided that the rear-ventilation gap is closed by cladding the reveals and lintels of the exterior wall openings; the cladding shall comply with the requirements of clause 4.4, substructures and any existing thermal insulation shall be made of non-combustible building materials.

4.6 Horizontal fire barriers are not required.

1. in the case of exterior walls with no openings,
2. if the window arrangement prevents the spreading of fire in the rear-ventilation gap (e.g. horizontally continuous window strips, window elements spanning several storeys), and
3. in the case of exterior walls with a depth of the rear-ventilation gap not exceeding 150 mm and with rear-ventilated external wall cladding made of non-combustible materials, including sub-structures, thermal insulation and brackets, if the rear-ventilating gap is closed in the vicinity of the adjacent reveals of openings on 3 sides (side and below the lintel) in the event of fire for at least 30 minutes (e.g. sheet steel with a thickness of d ≥ 1 mm).

5 Vertical fire barriers

5.1 The rear ventilation gap must not be passed over fire walls. The rear ventilation gap shall be filled in at least in firewall thickness with a vertical fire barrier from an insulating material that is stable in the event of fire with a melting point of > 1.000 °C. The vertical fire barrier shall be anchored with non-combustible mechanical fasteners in the outer wall at intervals of ≤ 0.6 m or shall be fully fixed to the outer wall with a non-combustible adhesive mortar.

§ 30 Para. 7 sentence 1 MBO1 remains unaffected.

5.2 Vertical fire barriers are also required

- on building corners with a transition to outside walls without openings in accordance with Section 4.6 No 1; and
- on transitions to other exterior wall coverings.

The vertical fire locks shall be executed as described in Section 5.1. Alternatively, vertical fire barriers may also be made of sheet steel, in compliance with the requirements of Section 4.4.

Annex 8

Health protection requirements for structural works (Anlagen bezüglich des Gesundheitsschutzes [ABG])

Last updated: January 2024

CONTENTS

1 Subject matter and scope

The ABG elaborate the general requirements for structural works with regard to health protection.

Indoor air quality plays an important role in human health and well-being. Numerous scientific studies have shown that the development of respiratory and inflammatory diseases and respiratory and eye irritation, systemic damage, sensitisation/allergies as well as a number of nonspecific symptoms (unwellness, headaches, nausea, central nervous system disorders, dizziness etc.) are directly related to indoor air quality and air pollution. Among the adverse health effects, carcinogenic, mutagenic and reproductively toxic effects require special attention.

The health and hygiene requirements for structural works are derived from the health-relevant properties of the structural elements, kits and building materials used. These can contribute to indoor air pollution through emissions and cause significant health effects. These include potential emissions of volatile inorganic and organic compounds as well as particles.

Structural works, structural elements and building materials with direct or indirect contact to the interior are to be taken into account, i.e. products that are covered or covered with other products but which are not sealed off diffusion-proof. Also, the proportion of substances of zero or low volatility is important for assessments of their health impact since they may be released e.g. from the processing of the products in particulate or dust form, made available to the human body, or absorbed through direct skin contact.

2 Requirements

Other legal regulations (e.g. the REACH Regulation (EC) No. 1907/2006, the Biocidal Products Regulation (EU) No. 528/2012, the POP Regulation (EC) No. 850/2004, the Chemicals Prohibition Ordinance [Chemikalien-Verbotsverordnung]) and the Circular Economy Act (Kreislaufwirtschaftsgesetz [KrWG]) are not affected.

2.1 General requirements for construction products

Otherwise, any construction product shall not be used as a part of buildings if the individual concentration of an active substance[33] classified as Carc. (H350; H350i) of category 1A or 1B and/or muta. (H340) of category 1A or 1B in accordance with Regulation (EC) No 1272/2008 reaches or exceeds the following values:

- the specific concentration limits set out in Part 3 of Annex VI to Regulation (EC) No 1272/2008; or
- the respective general concentration limits set out in Part 3 of Annex I to Regulation (EC) No 1272/2008.

The stated requirements for structural elements of construction products or kits relating to carcinogenic and mutagenic substances do not apply if it is demonstrated that they pose no potential hazard to human health when installed[34].

33 Active use is the targeted use of substances to achieve particular product properties. Not 'actively used' substances are those which are present in the product as contaminations and/or minor constituents.

34 For example, the substance reacts completely to form another compound, is completely encapsulated or bound, or a threshold value for the most sensitive end point could be derived for the substance.

2.2 Special requirements for building products in lounges and not separate rooms

In addition to the general requirements for construction products as referred to in 2.1, the active[1] use of substances classified under the CLP Regulation (EC) No 1272/2008, in the relevant current version, as acute tox. 1, 2 or 3 (H300, H301, H310, H311, H330 or H331), repr 1A or 1B (H360, H360F, H360D, H360FD) and STOT SE 1 (H370) or STOT RE 1 (H372), in construction products that are used in human occupancy areas and in areas not structurally separate from them, shall be avoided. If this is not possible, it must be ensured that exposure of building users to health hazards is excluded.

2.2.1 Emissions

For the construction products listed below, there are requirements with respect to emissions of volatile organic compounds if they are used in human occupancy areas and in areas not structurally separate from those:

- Floor coverings[35], floor covering constructions and their structural elements,
- Adhesives[36],
- reactive fire protection coating systems on steel structural elements,
- Insulating materials (phenolic foams and UF in-situ foams),
- Decorative wall coverings and thick-layered plastic-based wall coatings,
- Ceiling coverings and ceiling constructions based on plastics,
- Wood materials in the form of slender aligned chips (OSB) and resin-bound chipboard,
- High-pressure decorative laminated sheets (HPL),
- organic fire-protection agents applied subsequently

2.2.1.1 VOC emissions

The terms used are defined as follows:

- VVOC (retention area < C6): Volatile organic compound eluted before n-hexane from a gas-chromatographic separation column defined as a 5% phenyl/95% methyl polysiloxane capillary column.
- VOC (retention range C6 to C16): volatile organic compound eluting from a gas chromatographic separation column established as 5 % phenyl/95 % methyl polysiloxane capillary column between n-hexane and including n-hexadecan.
- SVOC (retention area > C16 to C22): semi-volatile organic compound eluted between n-hexadecane and n-docosane and from a gas-chromatographic separation column defined as a 5% phenyl/95% methyl polysiloxane capillary column.
- $TVOC_{spec}$ (total volatile organic compounds): Total of the volatile organic compounds. Sum of concentrations of identified and unidentified volatile organic compounds calculated by summing up the concentrations of all substances (target compounds and non-target compounds, identified and unidentified compounds) in the air of the reference space; these are substances that elute between n-hexane and including n-hexadecan using a defined separation column, each with a concentration of 5 µg/m³. Target compounds shall be quantified substance-specifically, whereas non-target compounds, identified and unidentified compounds shall be quantified as a toluene equivalent.
- TSVOC (total concentrations of semi-volatile organic compounds): Sum of volatile organic compounds. Sum of concentrations of identified and unidentified heavy volatile organic compounds calculated by summing up the concentrations of all substances (target compounds and non-target compounds, identified and unidentified compounds) in the air of the reference space; these are substances that elute according to n-hexadecan up to and including n-docosan using a defined separation column calculated by the TIC response factor for toluene, each with a concentration of 5 µg/m³.
- R value
  total of all $R_i$values determined[37] in a particular test.

35 for example, elastic floor coverings, textile floor coverings, laminate floor coverings, surface coated/glued parquet and wooden floors, synthetic resin screeds, artificial resin-based stone, composite floor coverings, cork floor coverings, sports floors, floor coverings, surface coatings for wood floors, elastic floor coverings and cork floors.

36 floor covering adhesives and structural adhesive bonds.

37 Ratio C_i/LCI_i, in which C_i is the mass concentration in the air in the reference area and LCI_i is the LCI value of the compound $_i$.

The following requirements regarding emissions of volatile organic compounds – for the construction products listed in Section 2.2.1 – in accordance with DIN EN 16516:2020-10[38], apply to the specified parameters:

All compounds whose concentration is at least 1 µg/m³ are identified, listed with their CAS numbers and quantified by category.

- **Carcinogenic substances (categories 1A and 1B)** No category 1A and 1B carcinogen according to the CLP Regulation (EC) No 1272/2008 shall exceed the emission levels given in Table 1. Excluded from this Regulation are defined substances classified as carcinogen 1A or 1B, for which a threshold can be derived from the most sensitive endpoint, since it is no longer possible to assume carcinogenic potential. Substances for which an LCI (Lowest Concentration of Interest) value has been derived on this basis and listed in Annex 2 shall be treated in the same manner as other VOCs with LCI values (see R value).

- **$TVOC_{spec}$**
  The $TVOC_{spec}$values must not exceed the values given in Table 1.

- **TSVOC total semi-volatile organic compounds**
  The total SVOCs in the chamber air after 28 days must not exceed the concentration given in Table 1. In individual cases, LCI values are derived for SVOCs.
  The SVOCs for which NIC values have been set shall be included in the R-values (see below) and in the TVOC values and are no longer subject to the sum value SVOC of 0.1 mg/m³ after 28 days.

- **R value (evaluation of the individual substance)**
  The sum of all R_i values must not exceed the value given in Table 1.

  R = sum of all R_i = sum of all quotients (C_i / NIK_i) ≤ 1

  The evaluation shall be based on calculating $_i$ the ratio R_i for each compound, as defined in the following equation.

  $R_i = C_i / LCI_i$.

  Here C_i is the substance concentration in the chamber air.

  For a variety of internally relevant volatile organic compounds (VVOC, VOC and SVOC) NIC values are listed in Appendix 2. They are quantified in a substance-specific manner. All individual substances with a concentration of 5 µg/m³ or more shall be taken into account in the evaluation of the individual substance.

- **VOCs without assessment criteria according to LCI**
  The total of the VOC that cannot be evaluated, with a concentration of ≥ 5 µg/m³, must not exceed the value given in Table 1.

- **Volatile organic compounds (VVOC)**
  The VVOCs for which the LCI values were determined shall be mathematically included in the R value formation but are not taken into account when forming the TVOC value.

[38] Target compounds are the substances listed in the LCI list in Annex 2 hereto.

Table 1: Requirements for VOC emissions

Type of issue	Value after 3 days	Value after 28 days	Section of ABG
Carcinogen (category 1A/1B)	≤ 0.01 mg/m³	≤ 0.001 mg/m³	2.2.1.1
$TVOC_{spec}$	≤ 10 mg/m³	≤ 1.0 mg/m³	
TSVOC		≤ 0.1 mg/m³	
TVOC without NIK		≤ 0.1 mg/m³	
R value		≤ 1*	
* The requirement does not apply to wood-based materials in the form of oriented stand boards (OSB) and resin-bound particle boards.			

2.2.1.2 Ammonia emissions

In the case of parquets and wooden floors made of smoked wood, the ammonia value shall not exceed the value set out in Table 2 after 28 days.

Ammonia emissions are determined by analogy with the VOC emission test conditions.
(Test chamber and chamber conditions in accordance with DIN EN 16516:2020-10).

2.2.1.3 Requirements for nitrosamine emissions

For products referred to in Section 2.2.1, containing amounts of rubber/gum containing vulcanising agents with nitrosamine splitters and/or recycled structural elements of rubber, the nitrosamine value shall not exceed the value set out in Table 2 after 28 days.

Nitrosamine emissions are determined according to CEN/TS 17985:2023-11 "Construction products: Evaluation of the release of dangerous substances - method for the determination of N-nitrosamines in air samples obtained in accordance with EN 16516.

Table 2: Requirements for other emissions

Type of issue	Value after 28 days [mg/m³]	Section of ABG
Ammonia[39]	≤ 0.1	2.2.1.2
Nitrosamines[40]	≤ 0.0002	2.2.1.3

2.2.2 Content

2.2.2.1 PAH

For products that are delivered to the general public (consumer-related uses), the requirements in accordance with the REACH Regulation must be complied with; this also includes floor coverings and impact wall constructions for sports halls and lounges, even if these are only supplied to professional users and installed by them.

For products referred to in Section 2.2.1, even without direct contact with the building user, which contain secondary raw materials made of rubber or raw materials with the use of plasticiser oils containing PAH or soot containing PAH, the content of benzo(a)pyrene (BaP) as a guide substance and the content of 16 PAH (see Annex 3) according to the EPA (US-Environmental Protection Agency) shall not exceed the values specified in Table 3.

39 Requirements for parquets and wooden floors with proportions of smoked wood.

40 Requirement for products according to Section 2.2.1, with proportions of vulcanised or unvulcanised rubber, containing vulcanisation agents with nitrosamine releasers and/or recycled rubber structural elements.

Analytical demonstration of PAHs shall be done for 16 PAHs based on the method of AfPS GS 2019:01[41].

Excluded from this are products which are used according to their installation situation and use, related to a possible release of particulate-bound PAH into the lounge. The long-term protective effect of such constructive measures shall be ensured by:

- Use of diffusion seals as well as
- Use under an effective cover layer made of other materials, e.g. seals such as screed coverings, in combination with foils and covers with edge seals in edge areas or floor coverings used over the entire surface

This regulation does not affect existing levels for pollutants, in particular according to the Closed Substance Cycle Act (Kreislaufwirtschaftsgesetz [KrWG]) and Landfill Ordinance (Deponieverordnung [DepV]).

2.2.2.2 Nitrosamines

For products pursuant to Section 2.2.1 that contain vulcanised or unvulcanised rubber with nitrosamine release agents and/or recycled rubber, the content of nitrosamines as given in Table 3 shall not be exceeded.

The analytical detection of nitrosamines (pursuant to TRGS 552) is carried out in accordance with the method of the DIK (Deutsches Institut für Kautschuktechnologie e.V. [German Institute of Rubber Technology]), published in ‘Kautschuk Gummi Kunststoffe’, No. 6/91, pp. 514-521).

Table 3: Salary requirements

Material/material group	Content [mg/kg]	Section of ABG
B(a)P[42]	≤ 5	2.2.2.1
16 PAH[10]	≤ 50	2.2.2.1
Nitrosamines[8]	≤ 0.011	2.2.2.2

41 A European harmonised test procedure for PAHs is currently being developed. The GC method according to DIN ISO 18287:2006-05 is optionally permitted until this test procedure is published.

42 Requirements for products pursuant to Section 2.2.1, without direct contact with the building user, which contain raw materials with recycling proportions of rubber or raw materials with use of PAH-containing extender oils or PAH-containing soot.

Annex 1 – References

DIN EN 16516: 2020-10	Construction products: Assessment of release of dangerous substances - Determination of emissions into indoor air; German version EN 16516:2017
DIN ISO 18287:2006-05	Soil quality - Determination of polycyclic aromatic hydrocarbons (PAH) - Gas chromatographic method with mass spectrometric detection (GC-MS)
TRGS 552	Technical Rule for hazardous substance 'N-nitrosamines'; GMBI 2018 PP 913-934
DIK process specification	DIK (Deutsches Institut für Kautschuktechnologie e.V. [German Institute of Rubber Technology]), ‘Methods to determine N-nitrosamines in air, vulcanisates and vulcanisation vapours’, Liekefeld et. al., published in Kautschuk Gummi Kunststoffe, point 6/91, pp. 514-521).
AFPs GS 2019:01 PAH	GS specification 'Testing and evaluation of polycyclic aromatic hydrocarbons (PAHs) when awarding the GS- mark of the Committee on Product Safety (AfPS); Annex Test instruction Harmonised method for the determination of polycyclic aromatic hydrocarbons (PAHs) in polymers
CEN/TS 17985-2023:11	Construction products: Evaluation of the release of dangerous substances - Procedure for the determination of N-nitrosamines in air samples obtained in accordance with EN 16516

Annex 2 – LCI-values (target compounds)
The LCI values in force pursuant to building legislation are listed in Table 4.

Table 4: LCI values list 2022

	Substance	CAS Number	LCI [µg/m³]	Comments
1	**Aromatic hydrocarbons**			
1-1	Toluene	108-88-3	**2900**	Adoption of EU LCI value
1-2	Ethylbenzene	100-41-4	**850**	Adoption of EU LCI value
1-3	Xylene, mixture of isomers o-, m- and p-xylene	1330-20-7	**500**	Adoption of EU LCI value
1-4	p-xylene	106-42-3	**500**	Adoption of EU LCI value
1-5	m-xylene	108-38-3	**500**	Adoption of EU LCI value
1-6	o-xylene	95-47-6	**500**	Adoption of EU LCI value
1-7	Isopropylbenzene	98-82-8	**1700**	Adoption of EU LCI value
1-8	N-propylbenzene	103-65-1	**950**	Adoption of EU LCI value Read across of ethylbenzene
1-9	1-propenylbenzene (ß-methylstyrene)	637-50-3	**1200**	Adoption of EU LCI value Read across of 2-phenylpropene
1-10	1,3,5-trimethylbenzene	108-67-8	**450**	Adoption of EU LCI value
1-11	1,2,4-trimethylbenzene	95-63-6	**450**	Adoption of EU LCI value
1-12	1,2,3-trimethylbenzene	526-73-8	**450**	Adoption of EU LCI value
1-13	2-ethyltoluene	611-14-3	**550**	Adoption of EU LCI value Read across of xylene
1-14	1-isopropyl-2-methylbenzene (o-cymene)	527-84-4	**1000**	Adoption of EU LCI value
1-15	1-isopropyl-3-methylbenzene (m-cymene)	535-77-3	**1000**	Adoption of EU LCI value
1-16	1-isopropyl-4-methylbenzene (p-cymol)	99-87-6	**1000**	Adoption of EU LCI value
1-17	1,2,4,5-tetramethylbenzene	95-93-2	**250**	Adoption of EU LCI value Read across of trimethylbenzene
1-18	N-butylbenzene	104-51-8	**1100**	Adoption of EU LCI value Read across of ethylbenzene
1-19	1,3-diisopropylbenzene	99-62-7	**750**	Adoption of EU LCI value Read across of xylene
1-20	1,4-diisopropylbenzene	100-18-5	**750**	Adoption of EU LCI value Read across of xylene
1-21	Phenyloctane and isomers	2189-60-8	**1100**	Adoption of EU LCI value Read across of ethylbenzene
1-22	1-phenyldecane and isomers	104-72-3	**1100**	Read across of ethylbenzene
1-23	1-phenylundecane and isomers	6742-54-7	**1100**	Read across of ethylbenzene
1-24	4-phenylcyclohexene (4-PCH)	4994-16-5	**300**	Read across of styrene
1-25	Styrene	100-42-5	**250**	Adoption of EU LCI value
1-26	Phenylacetylene	536-74-3	**200**	Read across of styrene
1-27	2-phenylpropene (α-methylstyrene)	98-83-9	**1200**	Adoption of EU LCI value
1-28	Vinyl toluene (all isomers: o-, m-, p-methylstyrenes)	25013-15-4	**1200**	Adoption of EU LCI value
1-29	Other alkylbenenes, unless individual isomers shall be assessed differently		**450**	Read across of trimethylbenzene
1-30	Naphthalene	91-20-3	**10**	Adoption of EU LCI value
1-31	Indene	95-13-6	**450**	Adoption of EU LCI value
2	**Aliphatic hydrocarbons (n-, iso- and cyclo-)**			
2-1	3-methylpentane	96-14-0		VVOC
2-2	n-hexane	110-54-3	**4300**	Adoption of EU LCI value
2-3	Cyclohexane	110-82-7	**6000**	Adoption of EU LCI value
2-4	Methylcyclohexane	108-87-2	**8100**	Adoption of EU LCI value
2-5	-			[1)]
2-6	-			[1)]
2-7	-			[1)]

	Substance	CAS Number	LCI [µg/m³]	Comments
2-8	n-heptane	142-82-5	**15000**	Adoption of EU LCI value
2-9	Other saturated aliphatic hydrocarbons C6 to C8		**14000**	Adoption of EU LCI value Read across of 2-methylpentane
2-10	Other saturated aliphatic hydrocarbons C9 to C16		**6000**	Adoption of EU LCI value
2-11*	-			[1)]
2-12	1-dodecene	112-41-4	**750**	Individual substance analysis
3	**Terpene**			
3-1	3-carene	498-15-7	**1500**	Adoption of EU LCI value
3-2	α-pinene	80-56-8	**2500**	Adoption of EU LCI value
3-3	ß-pinene	127-91-3	**1400**	Adoption of EU LCI value
3-4	Limonene	138-86-3	**5000**	Adoption of EU LCI value
3-5	Terpenes, other		**1400**	Adoption of EU LCI value (all monoterpenes and sesquiterpenes and their oxygen derivatives belong to the group)
4	**Aliphatic mono-alcohols (n-, iso- and cyclo-) and dialcohols**			
4-1	Ethanol	64-17-5		VVOC
4-2	1-propanol	71-23-8		VVOC
4-3	2-propanol	67-63-0		VVOC
4-4	tert-butanol, 2-methyl-2-propanol	75-65-0	**620**	Adoption of EU LCI value
4-5	2-methyl-1-propanol	78-83-1	**11000**	Adoption of EU LCI value
4-6	1-butanol	71-36-3	**3000**	Adoption of EU LCI value
4-7	Pentanol (all isomers)	71-41-0 30899-19-5 94624-12-1 6032-29-7 584-02-1 137-32-6 123-51-3 598-75-4 75-85-4 75-84-3	**730**	Adoption of EU LCI value
4-8	1-hexanol	111-27-3	**2100**	Adoption of EU LCI value
4-9	Cyclohexanol	108-93-0	**2000**	Adoption of EU LCI value
4-10	2-ethyl-1-hexanol	104-76-7	**300**	Adoption of EU LCI value
4-11	1-octanol	111-87-5	**1700**	Adoption of EU LCI value
4-12	4-hydroxy-4-methylpentan-2-one (diacetone alcohol)	123-42-2	**960**	Adoption of EU LCI value
4-13	other C4-C10 saturated n- and iso alcohols			Reassessment, see 4-16 and 4-17
4-14	Other C11-C13 saturated n- and iso-alcohols			Reassessment, see 4-16 and 4-17
4-15*	1,4-cyclohexandimethanol	105-08-8	**8300**	Adoption of EU LCI value
4-16	Other C7-C13 saturated n-alcohols		**1700**	Read across of 1-octanol, except for cyclical compounds
4-17	Other C6-C13 saturated iso-alcohols		**300**	Read across of 2-ethyl-1-hexanol, except for cyclical compounds
5	**Aromatic alcohols (phenols)**			
5-1	Phenol	108-95-2	**70**	Adoption of EU LCI value
5-2	2,6-di-tert-butyl-4-methylphenol (BHT)	128-37-0	**100**	Adoption of EU LCI value
5-3	Benzyl alcohol	100-51-6	**440**	Adoption of EU LCI value
6	**Glycols, Glycol ethers, glycol esters**			
6-1	Propylene glycol	57-55-6	**2100**	Adoption of EU LCI value

	Substance	CAS Number	LCI [µg/m³]	Comments
	1,2-dihydroxypropane			
6-2	Ethylene glycol (ethanediol)	107-21-1	**3400**	Adoption of EU LCI value
6-3	Ethylene glycol monobutyl ether	111-76-2	**1600**	Adoption of EU LCI value
6-4	Diethylene glycol	111-46-6	**5700**	Adoption of EU LCI value Read across of ethylene glycol
6-5	Diethylene glycol monobutyl ether	112-34-5	**350**	Adoption of EU LCI value
6-6	2-phenoxyethanol	122-99-6	**60**	Adoption of EU LCI value
6-7	Ethylene carbonate	96-49-1	**4800**	Read across of ethylene glycol
6-8	1-methoxy-2-propanol	107-98-2	**7900**	Adoption of EU LCI value
6-9	2,2,4-trimethyl-1,3 pentandiol monobutyrate	25265-77-4	**850**	Adoption of EU LCI value
6-10	Glycolic acid butyl ester (hydroxyacetic acid butyl ester)	7397-62-8	**900**	Adoption of EU LCI value
6-11	Butyldiglycol acetate (ethanol, 2-(2-butoxyethoxy)acetate, BDGA)	124-17-4	**850**	Adoption of EU LCI value
6-12	Dipropylene glycol monomethyl ether	34590-94-8	**3100**	Adoption of EU LCI value
6-13	2-methoxyethanol	109-86-4	**100**	Adoption of EU LCI value
6-14	2-ethoxyethanol	110-80-5	**8**	EU-OEL: 8 000 µg/m³ Adoption of the EU LCI value is still under discussion
6-15	2-propoxyethanol	2807-30-9	**860**	Adoption of EU LCI value
6-16	2-methylethoxyethanol	109-59-1	**220**	Adoption of EU LCI value
6-17	2-hexoxyethanol	112-25-4	**900**	Adoption of EU LCI value
6-18*	1,2-dimethoxyethane	110-71-4	**100**	Adoption of EU LCI value
6-19*	1,2-diethoxyethane	629-14-1	**150**	Adoption of EU LCI value
6-20	2-methoxyethyl acetate	110-49-6	**150**	Adoption of EU LCI value Read across from 2-methoxyethanol
6-21	2-ethoxyethyl acetate	111-15-9	**11**	EU-OEL: 11 000 µg/m³ Adoption of the EU LCI value is still under discussion
6-22	2-butoxyethylacetate	112-07-2	**2200**	Adoption of EU LCI value Read across of ethylene glycol butyl ether
6-23	2-(2-hexoxyethoxy)-ethanol	112-59-4	**400**	Adoption of EU LCI value Read across of diethylene glycol monobutyl ether
6-24	1-methoxy-2-(2-methoxyethoxy)-ethane	111-96-6	**28**	Adoption of EU LCI value
6-25	2-methoxy-1-propanol	1589-47-5	**19**	Adoption of EU LCI value
6-26	2-methoxy-1-propyl acetate	70657-70-4	**28**	Adoption of EU LCI value
6-27	Propylene glycol diacetate	623-84-7	**1600**	Adoption of EU LCI value Read across of acetic acid
6-28	Dipropylene glycol	110-98-5 25265-71-8	**670**	Adoption of EU LCI value
6-29	Dipropylene glycol monomethyl ether acetate	88917-22-0	**950**	Adoption of EU LCI value Read across 2-methoxy-1-methylethyl acetate
6-30	Dipropylene glycol mono-n-propyl ether	29911-27-1	**200**	Adoption of EU LCI value Read across of dipropylene glycolmono-n-butyl ether
6-31	Dipropylene glycol mono-n-butyl ether	29911-28-2 35884-42-5	**250**	Adoption of EU LCI value
6-32	Dipropylene glycolmono-t-butyl ether	132739-31-2 (mixture)	**250**	Adoption of EU LCI value
6-33	1,4-butanediol	110-63-4	**2000**	Adoption of EU LCI value
6-34	Tri(propylene glycol) methyl ether	20324-33-8 25498-49-1	**1200**	Adoption of EU LCI value
6-35	Triethylene glycol dimethyl ether	112-49-2	**150**	Adoption of EU LCI value
6-36	1,2-propylene glycol dimethyl ether	7778-85-0	**25**	Read across 2-methoxy-1-propanol
6-37	2,2,4-trimethyl-1,3-pentanediol	6846-50-0	**1300**	Adoption of EU LCI value

	Substance	CAS Number	LCI [µg/m³]	Comments
	diisobutyrate			
6-38	Ethyl diglycol	111-90-0	**350**	Adoption of EU LCI value
6-39	Di(propylene glycol) methyl ether	63019-84-1 89399-28-0 111109-77-4	**1300**	Adoption of EU LCI value
6-40*	Propylene carbonate	108-32-7	**1800**	Adoption of EU LCI value
6-41	Hexylene glycol (2-methyl-2,4-pentanediol)	107-41-5	**3500**	Adoption of EU LCI value
6-42*	3-methoxy-1-butanol	2517-43-3	**1700**	Adoption of EU LCI value
6-43*	1,2-propylene glycol n-propyl ether	1569-01-3 30136-13-1	**5200**	Adoption of EU LCI value
6-44	1,2-propylene glycol n-butyl ether	5131-66-8 29387-86-8 15821-83-7 63716-40-5	**650**	Adoption of EU LCI value
6-45	Diethylene glycol-phenyl ether	104-68-7	**80**	Adoption of EU LCI value Read across from 2-phenoxyethanol
6-46*	Neopentyl glycol (2.2-dimethyl-1.3-propanediol)	126-30-7	**8700**	Adoption of EU LCI value
7	**Aldehyde**			
7-1	Butanal	123-72-8	**650**	VVOC Adoption of EU LCI value
7-2	Pentanal	110-62-3	**800**	Adoption of EU LCI value Read across by Butanal
7-3	Hexanal	66-25-1	**900**	Adoption of EU LCI value Read across by Butanal
7-4	Heptanal	111-71-7	**900**	Adoption of EU LCI value Read across by Butanal
7-5	2-ethylhexanal	123-05-7	**900**	Adoption of EU LCI value Read across by Butanal
7-6	Octanal	124-13-0	**900**	Adoption of EU LCI value Read across by Butanal
7-7	Nonanal	124-19-6	**900**	Adoption of EU LCI value Read across by Butanal
7-8	Decanal	112-31-2	**900**	Adoption of EU LCI value Read across by Butanal
7-9	2-butenal (crotonaldehyde, cis-trans mixture)	4170-30-3 123-73-9 15798-64-8	**1**□	Individual considerations; Adoption of the EU LCI value is still under discussion
7-10	2-pentenal	1576-87-0 764-39-6 31424-04-1	**12**	Read across from 2-Butenal, but no EU mutagenicity classification Adoption of the EU LCI value is still under discussion
7-11	2-hexenal	16635-54-4 6728-26-3 505-57-7 1335-39-3 73543-95-0	**14**	Read across from 2-pentenal; Adoption of the EU LCI value is still under discussion
7-12	2-heptenal	2463-63-0 18829-55-5 29381-66-6 57266-86-1	**16**	Read across from 2-pentenal; Adoption of the EU LCI value is still under discussion
7-13	2-octenal	2363-89-5 25447-69-2 20664-46-4 2548-87-0	**18**	Read across from 2-pentenal; Adoption of the EU LCI value is still under discussion
7-14	2-nonenal	2463-53-8 30551-15-6 18829-56-6 60784-31-8	**20**	Read across from 2-pentenal; Adoption of the EU LCI value is still under discussion
7-15	2-decenal	3913-71-1 2497-25-8 3913-81-3	**22**	Read across from 2-pentenal; Adoption of the EU LCI value is still under discussion

□# Only from a measured emission of 5 µg/m³ will an assessment be carried out as part of the LCI-value concept.

	Substance	CAS Number	LCI [µg/m³]	Comments
7-16	2-undecenal	2463-77-6 53448-07-0	**24**	Read across from 2-pentenal; Adoption of the EU LCI value is still under discussion
7-17	Furfural	98-01-1	**10**	Adoption of EU LCI value
7-18	Glutaraldehyde	111-30-8	**1**[#]	Adoption of EU LCI value
7-19	Benzaldehyde	100-52-7	**90**	WEEL (AIHA): 8 800 µg/m³
7-20*	Acetaldehyde	75-07-0	**300**	VVOC Adoption of EU LCI value
7-21	Propane	123-38-6	**650**	VVOC Adoption of EU LCI value
7-22	Formaldehyde	50-00-0	**100**	VVOC Adoption of EU LCI value
7-23	Propenal	107-02-8	**14**	VVOC Individual substances
8	**Ketone**			
8-1	Ethyl methyl ketone	78-93-3	**20000**	Adoption of EU LCI value
8-2	3-methyl-2-butanone	563-80-4	**7000**	Adoption of EU LCI value
8-3	Methyl isobutyl ketone	108-10-1	**1000**	Adoption of EU LCI value
8-4*	Cyclopentanone	120-92-3	**1200**	Adoption of EU LCI value
8-5*	Cyclohexanone	108-94-1	**1400**	Adoption of EU LCI value
8-6*	2-methylcyclopentanone	1120-72-5	**1400**	Adoption of EU LCI value Read across of Cyclopentanone
8-7	2-methylcyclohexanone	583-60-8	**2300**	Adoption of EU LCI value
8-8	Acetophenone	98-86-2	**490**	Adoption of EU LCI value
8-9	1-hydroxyacetone (1-hydroxy-2-propanone)	116-09-6	**2100**	Adoption of EU LCI value Read across of propylene glycol
8-10	Acetone	67-64-1	**120000**	VVOC Adoption of EU LCI value
9	**Acids**			
9-1	Acetic acid	64-19-7	**1200**	Adoption of EU LCI value
9-2	Propionic acid	79-09-4	**1500**	Adoption of EU LCI value
9-3	Isobutyric acid	79-31-2	**1800**	Adoption of EU LCI value Read across of propionic acid
9-4	Butyric acid	107-92-6	**1800**	Adoption of EU LCI value Read across of propionic acid
9-5	Pivalic acid	75-98-9	**2100**	Adoption of EU LCI value Read across of propionic acid
9-6	n-valeric acid	109-52-4	**2100**	Adoption of EU LCI value Read across of propionic acid
9-7	n-capronic acid	142-62-1	**2100**	Adoption of EU LCI value Read across of propionic acid
9-8	n-heptanoic acid	111-14-8	**2100**	Adoption of EU LCI value Read across of propionic acid
9-9	n-octanic acid	124-07-2	**2100**	Adoption of EU LCI value Read across of propionic acid
9-10	2-ethylhexanic acid	149-57-5	**150**	Adoption of EU LCI value
9-11	Neodecanoic acid	26896-20-8	**750**	Individual substance analysis
10	**Ester and lactone**			
10-1	Methyl acetate	79-20-9		VVOC
10-2	Ethyl acetate	141-78-6		VVOC
10-3	Vinyl acetate	108-05-4		VVOC
10-4	Isopropyl acetate	108-21-4	**4200**	Adoption of EU LCI value
10-5	Propyl acetate	109-60-4	**4200**	Adoption of EU LCI value
10-6	2-methoxy-1-methylethyl acetate	108-65-6	**650**	Adoption of EU LCI value
10-7*	n-butyl formate	592-84-7	**4900**	Adoption of EU LCI value Read across from methyl formate
10-8	Methyl methacrylate	80-62-6	**750**	Adoption of EU LCI value
10-9	Other methacrylates		**750**	Read across of methyl methacrylate
10-10	Isobutyl acetate	110-19-0	**4800**	Adoption of EU LCI value
10-11	1-butyl acetate	123-86-4	**4800**	Adoption of EU LCI value

	Substance	CAS Number	LCI [µg/m³]	Comments
10-12	2-ethylhexyl acetate	103-09-3	**350**	Adoption of EU LCI value Read across of 2-ethyl-1-hexanol
10-13	Methyl acrylate	96-33-3	**180**	Adoption of EU LCI value
10-14	Ethyl acrylate	140-88-5	**200**	Adoption of EU LCI value
10-15	n-butyl acrylate	141-32-2	**110**	Adoption of EU LCI value
10-16	2-ethylhexyl acrylate	103-11-7	**380**	Adoption of EU LCI value
10-17	Other acrylates (acrylic acid esters)		**110**	Adoption of EU LCI value
10-18*	Adipic acid diethyl ester	627-93-0	**25**	Individual substance analysis
10-19	Fumaric acid dibutyl ester	105-75-9	**50**	Adoption of EU LCI value
10-20*	Succinic acid dimethyl ester	106-65-0	**20**	Adoption of EU LCI value
10-21*	Glutaric acid dimethyl ester	1119-40-0	**25**	Adoption of EU LCI value
10-22	Hexanediol diacrylate	13048-33-4	**10**	Adoption of EU LCI value
10-23	Maleic dibutyl ester	105-76-0	**50**	Adoption of EU LCI value
10-24	Butyrolactone	96-48-0	**2800**	Adoption of EU LCI value
10-25*	Glutaric acid diisobutyl ester	71195-64-7	**35**	Adoption of EU LCI value Read across from glutaric acid dimethylester
10-26*	Succinic acid diisobutyl ester	925-06-4	**35**	Adoption of EU LCI value Read across from succinic acid dimethylester
10-27*	(5-ethyl-1,3-dioxan-5-yl)methyl acrylate	66492-51-1	**80**	Individual substance analysis
11	**Chlorinated hydrocarbons**			
	Not used at present			
12	**Other**			
12-1	1,4-dioxane	123-91-1	**400**	Adoption of EU LCI value
12-2	Caprolactam	105-60-2	**300**	Adoption of EU LCI value
12-3	N-methyl-2-pyrrolidone	872-50-4	**1800**	Adoption of EU LCI value
12-4	Octamethylcyclotetrasiloxane (D 4)	556-67-2	**1200**	Adoption of EU LCI value
12-5	Methenamine, Hexamethylentetramine (formaldehyde releaser)	100-97-0	**30**	Adoption of EU LCI value
12-6	2-butanonoxime	96-29-7	**15**	Adoption of EU LCI value
12-7	Tributyl phosphate	126-73-8	**300**	SVOC Adoption of EU LCI value
12-8	Triethyl phosphate	78-40-0	**80**	Individual substance analysis
12-9	5-chloro-2-methyl-4isothiazolin-3-one (CIT)	26172-55-4	**1**[#]	Adoption of EU LCI value
12-10	2-methyl-4-isothiazolin-3-one (MI T)	2682-20-4	**100**	Adoption of EU LCI value
12-11	Triethylamine	121-44-8	**60**	Adoption of EU LCI value
12-12	Decamethylcyclopentasiloxane (D5)	541-02-6	**1500**	Read across of octamethylcyclotetrasiloxane
12-13	Dodecamethylcyclohexasiloxane (D6)	540-97-6	**1200**	Read across of octamethylcyclotetrasiloxane
12-14	Tetrahydrofuran	109-99-9	**500**	Adoption of EU LCI value
12-15	Dimethylformamide	68-12-2	**15**	AGW: 15 000 µg/m³
12-16	Tetradecamethylcycloheptasilox ane (D7)	107-50-6	**1200**	Read across of octamethylcyclotetrasiloxane
12-17	N-ethyl-2-pyrrolidone	2687-91-4	**400**	Adoption of EU LCI value
12-18	N-butyl-2-pyrrolidone	3470-98-2	**500**	Individual substance assessment
12-19*	5-ethyl-1,3-dioxane-5-methanol	5187-23-5	**850**	Individual substance assessment

* New inclusions/amendments 2022

[#] Only from a measured emission of 5 µg/m³ will an assessment be carried out as part of the LCI-value concept.

VVOC very volatile organic compounds

SVOC semi-volatile organic compounds

1) In order to maintain compatibility in the evaluation, previously documented sequential numbers of the LCI list can no longer be resubmitted in the event of removal or re-sorting of substances or groups of substances.

Notes:

I) Note on current lists of carcinogenic substances (EU category 1):

The following links contain lists of substances classified as carcinogenic category 1A and 1B in accordance with EU Regulation 1272/2008 and the testing and limitation of which is required in the scheme of the Committee for Health Evaluation of Construction Products (AgBB) (to be kept up-to-date – availability of the following links last tested on 23.9.2022):

- IFA, Institute for Occupational Safety and Health of the German Social Accident Insurance (Deutsche Gesetzliche Unfallversicherung [DGUV])
  http://www.dguv.de/ifa/fachinfos/kmr-liste/index.jsp
- ECHA, European Chemicals Agency
  http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database

Analysis of carbonyl compounds:

For the following carbonyl compounds, in accordance with DIN EN 16516, the procedure described in DIN ISO 16000-3 shall be used: Formaldehyde, acetaldehyde, propane, butanal, acetone. Propenal shall be determined in accordance with ISO 16000-3.

III) Analysis of VVOC:

For the determination of the VVOC formaldehyde, acetaldehyde, propane and acetone, the procedure described in DIN ISO 16000-3 shall be used. Propenal shall be determined in accordance with ISO 16000-3. For the other VVOCs listed in the NIK list, an appropriate test procedure must be used and demonstrated according to the current state of standardisation (see also DIN EN 16516, Annex C).

IV) Analysis of groups of substances saturated aliphatic hydrocarbons (NIK 2-9/2-10):

The subdivision of the group of substances required by the different NIK values takes place when an “alkanbuckel” occurs in the gas chromatogram at the retention time of n-nonan, i.e. for aliphatic KW with a smaller retention time such as n-Nonan, the NIK value of 14000 µg/m³ applies to aliphatic KW with the same or greater retention time as n-nonan.
The retention time of n-nonane should also be used to classify individual peaks of saturated aliphatic hydrocarbons which cannot be identified more accurately.

V) Published explanatory documents for the adopted EU LCI values

The justification documents for the adopted EU LCI values are published under https://ec.europa.eu/growth/sectors/construction/eu-lci/documents-glossary_en.

Appendix 3

List of 16 PAHs designated by the US Federal Environmental Protection Agency as lead substances for PAH analytics:

- Benzo(a)pyrene
- Benzo(a)anthracene
- Benzo(b)fluoranthene
- Benzo-(k)-fluoranthene
- Benzo-(g,h,i)-perylene
- Chrysen
- Dibenzo(a,h)anthracene
- Indeno-(1,2,3-cd)-pyrene
- Pyrene
- Fluoranthene
- Anthracene
- Phenanthrene
- Fluorides
- Acenaphtylene
- Acenaphtene
- Naphthalene.

Annex 10

Requirements for structural works regarding effects on soil and water (Anforderungen an bauliche Anlagen bezüglich der Auswirkungen auf Boden und Gewässer [ABuG])

As of: March 2024

CONTENTS

1 Subject matter and scope

In § 3, the MBO[1] specifies that installations must be placed, erected, modified and maintained so as to not endanger public safety and order, in particular life, health and natural resources.

To meet the requirements set out in the MBO[0], for structural works or structural elements thereof installed in the soil or groundwater or subject to precipitation, it must be ensured that the structural elements used do not cause any harmful soil changes or groundwater pollution.

This document sets out the general requirements for structural works in respect of their effects on soil and water.

buildings whose structural elements and construction products used therein that are installed in soil and groundwater or are subject to precipitation are of particular significance because of their effects on soil and water. On contact with water, substances can be washed out of them and enter the groundwater, seawater, surface water and/or the soil that could adversely affect the quality thereof and thereby contribute to endangering natural resources.

Structural works, their structural elements and the construction products used in them must therefore meet environmental protection requirements with respect to their constituents and the release of hazardous substances[0]. In particular, an assessment of the release of inorganic and organic substances is relevant. The installation situation must also be taken into account (direct or indirect contact with the soil and groundwater). Where constructive measures exclude the release of hazardous substances, no proof need be provided regarding the release of hazardous substances.

According to § 1 Federal -Soil Protection Act (BBodSchG), impacts on the soil, in this case due to structural works or parts of structural works, are to be avoided as far as possible by adverse effects on its natural functions as well as its function as an archive of natural and cultural history.

The provisions of the ABuG do not affect the competent water authorities' right to reserve the granting of permission, particularly in water protection areas.

Table 1 lists the structural elements in contact with the soil, groundwater or precipitation for which environmental protection requirements under the MBO[1] must currently be fulfilled (environmentally relevant structural elements).

Table 1: Environmentally relevant structural elements (structural elements in contact with the soil, groundwater or precipitation)

Structural elements		**For requirement, see Section**
Roof	Concrete roof structural elements	4.1
	Waterproofing	4.2
Outer wall including beams and supports	Concrete exterior wall structural elements	5.1
	Waterproofing	5.2
	Fire protection products for improving the fire resistance of structural elements	5.3
Surface coverings		
	Surface coverings handling wastewater	6.1
Foundations including piles	Injection and grouting materials	7.2
	Structural elements of concrete	7.3
	Waterproofing	7.4
Excavation seals	Injection and pressing materials made of binder suspensions or grout	8.2

0 According to national law

0 The term 'hazardous substances' is used in the Construction Products Regulation and refers to substances that are relevant to construction products and are restricted or prohibited by EU and/or Member State provisions due to the risk of harmful effects.

Structural elements		For requirement, see Section
	Silicon-based injection and grouting materials	8.3
Granular fillings	Foam glass gravel used to backfill foundation slabs	9.1
	Filter materials for the treatment of precipitation wastewater to be infiltrated	9.2
Underground pipes and containers	Underground concrete containers and pipes	10.1
	Sewer rehabilitation products	10.2

2 Requirements for ingredients

The legal regulations for substances such as REACH Regulation (EC) No. 1907/2006, the Biocidal Regulation (EU) No 528/2012, the POP Regulation (EC) No. 850/2004, the Chemicals Prohibition Ordinance and the Closed Substance Cycle Act (Kreislaufwirtschaftsgesetz [KrWG]) apply.

In addition, any component of a construction product or kit may not be used as part of a building installation if the individual concentration of an active substance[0] which is carcinogenic (H350; Of category 1A or 1B, mutagen (H340) of category 1A or 1B and/or toxic to reproduction (H360, H360F, H360D, H360FD) of category 1A or 1B in accordance with Regulation (EC) No 1272/2008, has reached or exceeds:

- the specific concentration limits set out in Part 3 of Annex VI to Regulation (EC) No 1272/2008; or
- the respective concentrations set out in Part 3 of Annex I to Regulation (EC) No 1272/2008, unless a specific concentration limit is specified in Part 3 of Annex VI to Regulation (EC) No 1272/2008.

The above requirements for structural elements of construction products or kits with regard to carcinogenic, mutagenic and reprotoxic substances do not apply if it can be shown that they pose no potential hazard to soil or water when installed[0].

Note:
The active[3] use of substances that must be marked H400, H410, H411, H300, H301, H310, H311, H341, H351, H361, H370 and H372 pursuant to the CLP- Regulation (EU) No 1272/2008, as amended, shall be avoided. If the use of a component cannot be avoided, it must not pose a risk when installed.

3 Requirements on the release of hazardous substances

The concentration of hazardous substances released from construction installations may:

- Change the chemical composition of bodies of water to only a negligible extent,
- Have no relevant eco-toxicological effects on bodies of water and
- Not adversely affect or overload the natural soil function, in particular the function of the soil as a decomposition, neutralisation and regeneration medium for material impacts by virtue of its filtering, buffering and substance conversion properties (filter and buffer function), and in particular for groundwater protection purposes.

This is deemed to have been satisfied if for example the de-minimis thresholds[0] and the requirements listed below in this section are met.

Note:
Eluate concentrations determined in laboratory tests are generally not directly comparable with the specification values at the place of assessment under real conditions. The installation situation and, where appropriate, transport paths, e.g. with transmission functions[0], are to be taken into account.

0 Active use is the targeted use of substances to achieve particular product properties. Not ‘actively used’ substances are those which are present in the product as contaminations and/or minor constituents.

0 For example, the substance reacts completely to form another compound, is completely encapsulated or bound, or a threshold value for the most sensitive end point could be derived for the substance and is adhered to.

0 The test values for the release of hazardous substances listed in ABuG (Effects on soil and water) are based on the de-minimis thresholds of the LAWA (Working Group of the Federal States on Water Issues): LAWA: "Derivation of de minimis thresholds for groundwater," updated and revised summary 2016. Download from the LAWA homepage: www.lawa.de.

0 For the release of hazardous substances from solid concrete, see derived transfer functions in "Description of the model calculation for concrete", version June 2023

The release of hazardous substances from structural works may not cause any lasting changes to electric conductivity or the pH- or any other changes in water such as discolouration, turbidity, foaming or smell.

If the requirement values (Annex A) for the release of hazardous substances from a specific component/construction product are complied with – insofar as these are explicitly specified – these requirements are deemed to have been met.

Where organic substances are released from buildings for which no test values exist, the requirements as per Table 2 must also be met.

Table 2: Requirements for environmentally relevant structural elements of organic materials in respect of the biological effects in groundwater

Parameter	Test during the reaction of the materials*	Testing of fully cured materials*
TOC	Indication in mg/l	Indication in mg/l
Algae test with *Desmodesmus subspicatus* or *Pseudokirchneriella subcapitata* according to DIN EN ISO 8692:2012-06	$G_A^{**} \leq 8$	$G_A \leq 4$
Daphnia test with *Daphnia magna Straus* according to DIN EN ISO 6341:2013-01	$G_D \leq 8$ (after 48 h)	$G_D \leq 4$ (after 48 h)
Light bacteria luminescence inhibition test with V*ibrio fischeri* in accordance with DIN EN ISO 11348-1 to DIN EN ISO 11348-3:2023-12	$G_L \leq 8$	$G_L \leq 8$
Luminescent cell proliferation inhibition test with *Photobacterium phosphoreum* according to DIN 38412-37:1999-04, if $G_L > 8$	$G_{LW} \leq 2$	$G_{LW} \leq 2$
Fish egg test with *Danio rerio* according to DIN EN ISO 15088:2009-06	$G_{EI} \leq 6$	$G_{EI} \leq 6$
umu-test on mutagenic potential according to ISO 13829:2000-03	$G_{EU} \leq 1.5$	$G_{EU} \leq 1.5$
Biodegradability where TOC > 10 mg/l	‘readily biodegradable’ as per OECD 301:1992-07	‘readily biodegradable’ as per OECD 301:1992-07

* The requirements relate to elution testing of the relevant structural element/construction product.

** Under the test specifications, inhibition of cell reproduction of green algae of 5 % or more is classified as a toxic effect. The thinning level necessary for less than 5 % inhibition of the original eluate (thinning level G_A) is determined. The other G- values are defined analogously.

4 Requirements for roof structural elements

No proof is required in respect of the release of hazardous substances for small-scale structural elements such as fastenings, lightning conductors.

4.1 Concrete roof structural elements

Concrete source materials used in roof structural elements must meet the requirements set out in the following Sections.

In the case of the exclusive use of natural rock granules, no evidence of the substance content and the release of dangerous substances shall be provided.

Construction products manufactured using display glass may not be used.

4.1.1 Recycled granules of rock

Concrete roof structural elements manufactured using recycled aggregates may only be installed if the recycled roof structural elements meet the following requirements: 0

0 The requirements also apply to the use in cement.

- Only waste generated during construction activities (e.g. dismantling, demolition, conversion, expansion, new construction and maintenance of buildings and civil engineering, roads, paths, aerodromes and other traffic areas) may be used for the production of recycled rock granulation and were previously used as natural or artificial mineral building materials in bound or unbound form in civil engineering. The waste must correspond to the waste types mentioned in Table A-1 (Annex A). Before rebuilding, dismantling or demolishing a building, it shall first be determined by viewing and analysing existing documents whether a pollutant load of the resulting material is to be expected. If a pollutant load could exist beyond the scope of parameters listed in Table A- 2 (Annex A), the material shall be assessed separately under waste legislation. Contaminated building materials and structural elements must be separated during the dismantling of a building and sent to an orderly disposal. This applies in particular to fire debris, structural elements with insulation and paints based on pitch, interior walls of industrial chimneys, substances containing asbestos and PCBs-, parts of buildings contaminated with pollutants from gas works, filling stations, electroplating plants and chemical industry production facilities.
- Eluate concentrations under DIN EN 12457-4:2003-01 in recycled aggregates must comply with the upper limits according to Table A-2 (Annex A).
- Concentrations of solid matter in recycled aggregates must comply with the upper limits according to Table A-2 (Annex A).

If reject batches from prefabricated concrete structural elements (including concrete residue in ready-mixed concrete construction) are used directly as recycled aggregates in the production plant, no proof is required regarding the substance content and the release of hazardous substances.

4.1.2 Industrially manufactured aggregates

Concrete roof structural elements manufactured using industrially manufactured aggregates may only be installed if the industrially manufactured aggregates meet the following requirements[7, 0]:

- Eluate concentrations under DIN EN 12457-4:2003-01 in industrially manufactured aggregates must comply with the upper limits according to Table A-3 (Annex A).
- The material content in the solid of the industrially produced grain shall comply with the upper limits set out in Table A-3 (Annex A).

In the use of crystalline blast furnace slag, metallurgical sand, melt chamber granules, expanded mica (vermiculite), expanded perlite, wind shale, expanded clay and brick sprit from unused bricks as rock grain (or rock flour) in concrete, no evidence of the substance contents and the release of dangerous substances shall be provided. For the use of sintered coal fly ash and boiler ash (boiler sand) in concrete, no evidence of substance content and release of hazardous substances shall be provided if the rock grain (or rock meal) comes from thermal power plants in which only coal and no secondary fuels, except biomass in a proportion of up to 14 M.-% (dry mass), of virtually ash-free natural gas and municipal sewage sludge (waste key 19 08 05 according to AVV0) with a proportion of up to 5 M.-% (dry mass) based on dry coal. Biomass is understood as plant material. Waste wood or secondary material are not allowed.

Industrially manufactured aggregates that are not listed in the above paragraph or in Table A-3 may not be used in concrete.

4.1.3 Fly ashes

Concrete roof structural elements manufactured using silicon-rich fly ash (generally hard coal fly ash) may only be installed if the silicon-rich fly ash meets the following requirements:

- Concentrations of solid matter in silicon-rich fly ash must comply with the upper limits of Table A-4 (Annex A).

When using silicon-rich fly ash in concrete, no evidence of substance content and release of hazardous substances shall be provided if the ash comes from such thermal power plants where only coal and no secondary fuels, with the exception of biomass in a proportion of up to 14 M.-% (dry mass), of virtually ash-free natural gas and municipal sewage sludge (waste key 19 08 05 according to AVV9) in a proportion of up to 5 M.-% (dry mass), on the basis of dry coal, are co-burned. Biomass is understood as plant material. Waste wood or secondary material are not allowed.

0 When ground boiler sand is used as a concrete additive, the requirements apply as for fly ash.
0 Regulation on the European Waste Catalogue (EWC Regulation) of 10.12.2001, as amended.

For calcium-rich fly ash (generally lignite fly ash) for roof components, there are no Technical Building Regulations or generally recognised rules of technical construction according to which their effects on soil and water can be assessed. However, they are of significance when it comes to complying with the requirements of § 3 MBO1, as well as in terms of their effects on soil and water.

4.2 Sealings for roof structural elements

Sealings for roof structural elements containing substances intended to inhibit or prevent rooting (root protectors) shall be installed only if the requirements set out in Section 2 and for the concentration of the root preservative in the eluate are met with the requirements set out in Section 3. For Mecoprop, the cumulated discharge determined according to DIN EN/TS 16637-2:2024-01 must not exceed a value of 47 mg/m^2. For MCPA, the cumulative discharge determined according to DIN EN 16637-2:2024-01 shall not exceed 206 mg/m^2.

5 Requirements for exterior walls (including beams and supports)

No proof is required in respect of the release of hazardous substances for small-scale structural elements such as fastenings.

Furthermore, for structural elements for external walls made of natural stone, glass or ceramics, no proof of the material content and release of dangerous substances is to be provided.

5.1 Concrete exterior wall structural elements

Concrete starting materials used in external wall structural elements must meet the requirements set out in the following Sections.

In the case of the exclusive use of natural rock granules, no evidence of the substance content and the release of dangerous substances shall be provided.

Construction products manufactured using display glass may not be used.

5.1.1 Recycled granules of rock

Structural elements for exterior walls of concrete produced using recycled aggregate may only be installed if the recycled aggregate meets the following requirements:7

- Only waste generated during construction activities (e.g. dismantling, demolition, conversion, expansion, new construction and maintenance of buildings and civil engineering, roads, paths, aerodromes and other traffic areas) may be used for the production of recycled aggregate and were previously used as natural or artificial mineral building materials in bound or unbound form in civil engineering. The waste must correspond to the waste types mentioned in Table A-1 (Annex A). Before rebuilding, dismantling or demolishing a building, it shall first be determined by viewing and analysing existing documents whether a pollutant load of the resulting material is to be expected. If a pollutant load could exist beyond the scope of parameters listed in Table A- 2 (Annex A), the material shall be assessed separately under waste legislation. Contaminated building materials and structural elements must be separated during the dismantling of a building and sent to an orderly disposal. This applies in particular to fire debris, structural elements with insulation and paints based on pitch, interior walls of industrial chimneys, substances containing asbestos and PCBs, parts of buildings contaminated with pollutants from gas works, filling stations, electroplating plants and chemical industry production facilities.
- Eluate concentrations under DIN EN 12457-4:2003-01 in recycled aggregates must comply with the upper limits according to Table A-2 (Annex A).
- Concentrations of solid matter in recycled aggregates must comply with the upper limits according to Table A-2 (Annex A).

If reject batches from prefabricated concrete structural elements (including concrete residue in ready-mixed concrete construction) are used directly as recycled aggregates in the production plant, no proof is required regarding the substance content and the release of hazardous substances.

5.1.2 Industrially manufactured aggregates

Concrete exterior wall structural elements manufactured using industrially manufactured aggregates may only be installed if the industrially manufactured aggregates meet the following requirements:[7, 8]

- Eluate concentrations under DIN EN 12457-4:2003-01 in industrially manufactured aggregates must comply with the upper limits according to Table A-3 (Annex A).
- The material content in the solid of the industrially produced grain shall comply with the upper limits set out in Table A-3 (Annex A).

For exterior walls of concrete produced using industrially produced rock granules, where used in contact with soil or groundwater, the concentrations of substances in eluate in accordance with DIN CEN/EN 16637-2:2024-01 (for hardened concrete test specimens of a model concrete) must comply with the limits set out in Table A- 6 (Annex A) or, in the case of boiler ash, the ceilings set out in Table A- 5 (Annex A).

Proof that the concentrations of substances in the eluate in accordance with DIN CEN/EN 16637-2:2024-01 comply with the limits set out in Table A-5 or Table A-6 (Annex A) shall be omitted if construction measures prevent direct contact of the component with soil or groundwater.

In the use of crystalline blast furnace slag, metallurgical sand, melt chamber granules, expanded mica (vermiculite), expanded perlite, wind shale, expanded clay and brick sprit from unused bricks as rock grain (or rock flour) in concrete, no evidence of the substance contents and the release of dangerous substances shall be provided. For the use of sintered coal fly ash and boiler ash (boiler sand) in concrete, no evidence of substance content and release of hazardous substances shall be provided if the rock grain (or rock meal) comes from thermal power plants in which only coal and no secondary fuels, except biomass in a proportion of up to 14 M.-% (dry mass), of virtually ash-free natural gas and municipal sewage sludge (waste key 19 08 05 according to AVV[9]) with a proportion of up to 5 M.-% (dry mass) based on dry coal. Biomass is understood as plant material. Waste wood or secondary material are not allowed.

Industrially manufactured aggregates that are not listed in the above paragraph or in Table A-3 may not be used in concrete.

5.1.3 Fly ashes

structural elements for external walls of concrete produced using silicon-rich fly ash (typically hard coal ash) shall not be installed unless the silicon-rich fly ash meets the following requirement:

Concentrations of solid matter in silicon-rich fly ash must comply with the upper limits of Table A-4 (Annex A).

For exterior walls made of concrete produced using silicon-rich fly ash and used in contact with soil and groundwater, the eluate concentrations as per DIN CEN/EN 16637-2:2024-01 (for hardened concrete test specimens of a model concrete) must comply with the upper limits given in Table A-5 (Annex A).

Proof that the eluate concentrations as per DIN CEN/EN 16637-2:2024-01 comply with the upper limits given in Table A-5 (Annex A) is not required if direct contact between the structural element and soil or groundwater is excluded by means of construction measures.

In the case of the use of silicon-rich fly ash in concrete, no evidence of substance content and release of hazardous substances shall be provided if the ash originates from thermal power plants in which only coal and no secondary fuels, except biomass in a proportion of up to 14 M.-% (dry mass), of virtually ash-free natural gas and municipal sewage sludge (waste key 19 08 05 according to AVV[9]) are used in a proportion of up to 5 M.-% (dry mass) based on dry coal. Biomass is understood as plant material. Waste wood or secondary material are not allowed.

For calcium-rich fly ash (generally lignite fly ash) for concrete exterior wall structural elements, there are no Technical Building Regulations or generally recognised rules of technical construction according to which their effects on soil and water can be assessed. However, they are of significance when it comes to complying with the requirements of § 3 MBO[1], as well as in terms of their effects on soil and water.

5.1.4 Supersulphated cement and calcium aluminate sulfate cement

Structural elements for concrete exterior walls manufactured using supersulphated cement or calcium aluminate sulphate cement may only be installed in contact with soil and groundwater if the eluate concentrations as per DIN CEN/EN 16637-2:2024-01 (for hardened concrete test specimens of a model concrete) comply with the upper limits according to Table A-6 (Annex A).

Proof of compliance with these requirements is not required if direct contact of the component with soil or groundwater is prevented by means of construction measures.

5.1.5 Concrete admixtures for external concrete walls

Concrete admixtures used in concrete for exterior walls in contact with soil or groundwater and for which there are no Technical Building Regulations or technical best practice are of significance for complying with the requirements of § 3 MBO[1], as well as in terms of their effects on soil and water.

5.2 Seals for external walls

There are no Technical Building Regulations or technical best practice for assessing the impact on soil and water of curtain injections as subsequent waterproofing for buildings. However, they are of significance when it comes to complying with the requirements of § 3 MBO[1], as well as in terms of their effects on soil and water.

5.3 Fire protection products for improving the fire resistance of structural elements

Reactive fire protection coatings, fire-protection plaster cladding and line-shaped joint sealing shall comply with the requirements of Section 2 concerning the content of hazardous substances. Hazardous substances contained in the product must be declared.

6 Requirements for surface coverings outdoors

No proof is required in respect of the release of hazardous substances for small-scale structural elements such as fastenings.

6.1 Surface coverings handling wastewater

There are no Technical Building Regulations or technical best practices for assessing the impact on soil and water of water-permeable coverings for motor vehicle- traffic areas used for treating wastewater for subsequent percolation. However, they are of significance when it comes to complying with the requirements of § 3 MBO[1], as well as in terms of their effects on soil and water.

7 Requirements for foundations including piles

7.1 General information

No recycled or industrially produced grains of rock shall be used in injections and pressing materials used for foundations and piles directly in groundwater.

7.2 Injection and grouting materials for foundations including piles

7.2.1 Fly ash

Foundations including piles made of binder suspension, grout (cement mortar) or concrete manufactured using silicon-rich fly ash (generally hard coal fly ash) may only be installed if the silicon-rich fly ash meets the following requirements:

- Concentrations of solid matter in silicon-rich fly ash must comply with the upper limits given in Table A-4 (Annex A).
- The concentrations of substances in eluate in accordance with DIN CEN/EN 16637-2:2024-01 (for mortar or hardened concrete specimens of a model concrete) shall comply with the upper limits set out in Table A-5 (Annex A).

Proof that the concentrations of substances in eluate as per DIN CEN/EN 16637-2:2024-01 of mortar or concrete manufactured using silicon-rich fly ash comply with the upper limits according to Table A-5 (Annex A) is not required if construction measures are used to prevent direct contact with soil and/or groundwater.

In the case of the use of silicon-rich fly ash in concrete or mortar, no evidence of the substance content and release of hazardous substances shall be provided if the ash originates from thermal power plants in which only coal and no secondary fuels, excluding biomass in a proportion of up to 14 M.-% (dry mass), of virtually ash-free natural gas and municipal sewage sludge (waste key 19 08 05 according to AVV[9]) are used in a proportion of up to 5 M.-% (dry mass) in relation to dry coal. Biomass is understood as plant material. Waste wood or secondary material are not allowed.

For calcium-rich fly ash (generally lignite fly ash) for foundations including piles made of binder suspensions, grout (cement mortar) or concrete, there are no Technical Building Regulations or generally recognised rules of technical construction according to which their effects on soil and water can be assessed. However, they are of significance when it comes to complying with the requirements of § 3 MBO[1], as well as in terms of their effects on soil and water.

7.3 Foundations of concrete

Concrete feedstocks used in foundations having contact with groundwater or soil shall comply with the requirements set out in the following Sections.

In the case of the exclusive use of natural rock granules, no evidence of the substance content and the release of dangerous substances shall be provided.

7.3.1 Recycled granules of rock

Foundations made of concrete manufactured using recycled aggregate may only be installed if the recycled aggregate meets the following requirements:[7]

- Only waste generated during construction activities (e.g. dismantling, demolition, conversion, expansion, new construction and maintenance of buildings and civil engineering, roads, paths, aerodromes and other traffic areas) may be used for the production of recycled rock granulation and were previously used as natural or artificial mineral building materials in bound or unbound form in civil engineering. The waste must correspond to the waste types mentioned in Table A-1 (Annex A). Before rebuilding, dismantling or demolishing a building, it shall first be determined by viewing and analysing existing documents whether a pollutant load of the resulting material is to be expected. If a pollutant load could exist beyond the scope of parameters listed in Table A- 2 (Annex A), the material shall be assessed separately under waste legislation. Contaminated building materials and structural elements must be separated during the dismantling of a building and sent to an orderly disposal. This applies in particular to fire debris, structural elements with insulation and paints based on pitch, interior walls of industrial chimneys, substances containing asbestos and PCBs-, parts of buildings contaminated with pollutants from gas works, filling stations, electroplating plants and chemical industry production facilities.
- Eluate concentrations under DIN EN 12457-4:2003-01 in recycled aggregates must comply with the upper limits according to Table A-2 (Annex A).
- Concentrations of solid matter in recycled aggregates must comply with the upper limits according to Table A-2 (Annex A).

If reject batches from prefabricated concrete structural elements (including concrete residue in ready-mixed concrete construction) are used directly as recycled aggregates in the production plant, no proof is required regarding the substance content and the release of hazardous substances.

7.3.2 Industrially manufactured aggregates

Foundations made of concrete manufactured using industrially manufactured aggregates may only be installed if the industrially manufactured aggregates meet the following requirements:[7, 8]

- Eluate concentrations under DIN EN 12457-4:2003-01 in industrially manufactured aggregates must comply with the upper limits according to Table A-3 (Annex A).
- The material content in the solid of the industrially produced grain shall comply with the upper limits set out in Table A-3 (Annex A).
- The concentrations of substances in the eluate in accordance with DIN CEN/EN 16637-2:2024-01 (for hardened concrete test specimens of a model concrete) shall comply with the upper limits set out in Table A-6(Annex A) or, for boiler sand, the upper limits according to Table A-5 (Annex A).

Proof that the concentrations of substances in the eluate in accordance with DIN CEN/EN 16637-2:2024-01 comply with the upper limits set out in Table A-5 or Table A-6 (Annex A) shall be omitted if construction measures prevent direct contact with soil or groundwater.

In the use of crystalline blast furnace slag, metallurgical sand, melt chamber granules, expanded mica (vermiculite), expanded perlite, wind shale, expanded clay and brick sprit from unused bricks as rock grain (or rock flour) in concrete, no evidence of the substance contents and the release of dangerous substances shall be provided. For the use of sintered coal fly ash and boiler ash (boiler sand) as a rock grain (or rock meal) in concrete, no evidence of the substance content and release of hazardous substances shall be provided if the sintered coal fly ash and the boiler ash originate from such thermal power plants where only coal and no secondary fuels, excluding biomass in a proportion of up to 14 M.-% (dry mass), of virtually ash-free natural gas and municipal sewage sludge (waste key 19 08 05 according to AVV[9]) with a proportion of up to 5 M.-% (dry mass) based on dry coal. Biomass is understood as plant material. Waste wood or secondary material are not allowed.

Industrially manufactured aggregates that are not listed in the above paragraph or in Table A-3 may not be used in concrete.

7.3.3 Fly ashes

Concrete foundations manufactured using silicon-rich fly ash (generally hard coal fly ash) may only be installed if the fly ash meets the following requirements:

- Concentrations of solid matter in silicon-rich fly ash must comply with the upper limits given in Table A-4 (Annex A).
- The concentrations of substances in the eluate pursuant to DIN CEN/EN 16637-2:2024-01 (for hardened concrete test specimens of a model concrete) must comply with the upper limits according to Table A-5 (Annex A).

Proof that the concentrations of substances in the eluate as per DIN CEN/EN 16637-2:2024-01 comply with the upper limits given in Table A-5 (Annex A) is not required if construction measures are used to prevent direct contact with soil or groundwater.

In the case of the use of silicon-rich fly ash in concrete, no evidence of the substance content and release of hazardous substances shall be provided if the ash originates from thermal power plants in which only coal and no secondary fuels, except biomass in a fraction of 14 M.-% (dry mass), of virtually ash-free natural gas and municipal sewage sludge (waste key 19 08 05 according to AVV[9]) are used in a proportion of up to 5 M.-% (dry mass) based on dry coal. Biomass is understood as plant material. Waste wood or secondary material are not allowed.

For calcium-rich fly ash (generally lignite fly ash) for concrete foundations, there are no Technical Building Regulations or generally recognised rules of technical construction according to which their effects on soil and water can be assessed. However, they are of significance when it comes to complying with the requirements of § 3 MBO[1], as well as in terms of their effects on soil and water.

7.3.4 Supersulphated cement and calcium aluminate sulfate cement

Foundations made of concrete manufactured using supersulphated cement or calcium aluminate sulphate cement may only be installed if the concentrations of substances in the eluate as per DIN CEN/EN 16637-2:2024-01 (for hardened concrete test specimens of a model concrete) comply with the upper limits according to Table A-6 (Annex A).

Proof that the concentrations of substances in the eluate as per DIN CEN/EN 16637-2:2024-01 comply with the upper limits given in Table A-6 (Annex A) is not required if construction measures are used to prevent direct contact with soil or groundwater.

7.3.5 Concrete admixtures

Concrete admixtures used for concrete foundations and for which there are no Technical Building Regulations or technical best practice are of significance for complying with the requirements of § 3 MBO[1], as well as in terms of their impact on soil and water.

7.4 Seals for foundations

There are no Technical Building Regulations or technical best practice for assessing the impact on soil and water of curtain injections as subsequent waterproofing for buildings. However, they are of significance when it comes to complying with the requirements of § 3 MBO[1], as well as in terms of their effects on soil and water.

8 Requirements for base seals for construction pits

8.1 General information

No recycled or industrially manufactured aggregates may be used in injection materials made of binder suspension or grout (cement mortar) installed directly in groundwater.

8.2 Injection and grouting materials for base seals made of binder suspensions or grouting mortars

8.2.1 Fly ash for cement-bound sole seals

Injection materials made of binder suspension or grout (cement mortar) manufactured using silicon-rich fly ash (generally hard coal fly ash) may only be installed if the silicon-rich fly ash meets the following requirements:

- Concentrations of solid matter in silicon-rich fly ash must comply with the upper limits of Table A-4 (Annex A).
- The concentrations of substances in the eluate pursuant to DIN CEN/EN 16637-2:2024-01 (for mortar or concrete test specimens of a model mortar or concrete) must comply with the upper limits according to Table A-5 (Annex A).

In the case of the use of silicon-rich fly ash in concrete or mortar, no evidence of the substance content and release of hazardous substances shall be provided if the ash originates from thermal power plants in which only coal and no secondary fuels, excluding biomass in a proportion of up to 14 M.-% (dry mass), of virtually ash-free natural gas and municipal sewage sludge (waste key 19 08 05 according to AVV[9]) are used in a proportion of up to 5 M.-% (dry mass) in relation to dry coal. Biomass is understood as plant material. Waste wood or secondary material are not allowed.

For calcium-rich fly ash (generally lignite fly ash) for injection materials made of binder suspensions or press-in mortars (cement mortar), there are no Technical Building Regulations or generally recognised rules of technical construction according to which their effects on soil and water can be assessed. However, they are of significance when it comes to complying with the requirements of § 3 MBO[1], as well as in terms of their effects on soil and water.

8.3 Injection and pressing materials for silicate-based sole sealing

There are no Technical Building Regulations or technical best practice for assessing the impact on soil and water of injection and pressing materials for silicon-based sealing bases. However, they are of significance when it comes to complying with the requirements of § 3 MBO[1], as well as in terms of their effects on soil and water.

9 Requirements for backfill

9.1 Foam glass chippers as fillings under foundation plates

Backfill made of foam glass gravel may be installed under foundation slabs if the foam glass gravel meets the following requirements, and the backfill is installed above the saturated soil zone and above the groundwater capillary fringe (generally 30 cm above the highest measured groundwater level):

- Eluate concentrations as per DIN EN 12457-4:2003-01 in the glass powder manufactured from foam glass gravel must comply with the upper limits according to Table A-7 (Annex A).
- The content of the material in the solid of glass flour from which foam glass chips are produced shall comply with the upper limits set out in Table A-7 (Annex A).

Construction products manufactured using display glass may not be used.

9.2 Filter materials for the treatment of precipitation wastewater to be infiltrated

For filter materials flowing through by precipitation water, there are no Technical Building Regulations or generally accepted technical rules according to which their effects on soil and water can be assessed. However, they are of significance when it comes to complying with the requirements of § 3 MBO[1], as well as in terms of their effects on soil and water.

10 Requirements for underground containers and pipes

10.1 Underground concrete containers and pipes

Concrete exit materials used in underground containers and pipes having contact with groundwater or soil shall comply with the requirements set out in the following Sections.

In the case of the exclusive use of natural rock granules, no evidence of the substance content and the release of dangerous substances shall be provided.

Construction products manufactured using display glass may not be used.

10.1.1 Recycled granules of rock

Underground concrete containers and pipes manufactured using recycled aggregates may only be installed if the recycled aggregates meet the following requirements:[7]

- Only waste generated during construction activities (e.g. dismantling, demolition, conversion, expansion, new construction and maintenance of buildings and civil engineering, roads, paths, aerodromes and other traffic areas) may be used for the production of recycled rock granulation and were previously used as natural or artificial mineral building materials in bound or unbound form in civil engineering. The waste must correspond to the waste types mentioned in Table A-1 (Annex A). Before rebuilding, dismantling or demolishing a building, it shall first be determined by viewing and analysing existing documents whether a pollutant load of the resulting material is to be expected. If a pollutant load could exist beyond the scope of parameters listed in Table A- 2 (Annex A), the material shall be assessed separately under waste legislation. Contaminated building materials and structural elements must be separated during the dismantling of a building and sent to an orderly disposal. This applies in particular to fire debris, structural elements with insulation and paints based on pitch, interior walls of industrial chimneys, substances containing asbestos and PCBs, parts of buildings contaminated with pollutants from gas works, filling stations, electroplating plants and chemical industry production facilities.
- Eluate concentrations under DIN EN 12457-4:2003-01 in recycled aggregates must comply with the upper limits according to Table A-2 (Annex A).
- Concentrations of solid matter in recycled aggregates must comply with the upper limits according to Table A-2 (Annex A).

If reject batches from prefabricated concrete structural elements (including concrete residue in ready-mixed concrete construction) are used directly as recycled aggregates in the production plant, no proof is required regarding the substance content and the release of hazardous substances.

10.1.2 Industrially manufactured aggregates

Underground concrete containers and pipes manufactured using industrially manufactured aggregates may only be installed if the industrially manufactured aggregates meet the following requirements:[7, 8]

- Eluate concentrations under DIN EN 12457-4:2003-01 in industrially manufactured aggregates must comply with the upper limits according to Table A-3 (Annex A).
- Concentrations of solid matter in industrially manufactured aggregates must comply with the upper limits given in Table A-3 (Annex A).

The following applies to structural elements for underground concrete containers and pipes in contact with groundwater:

- The concentrations of substances in the eluate in accordance with DIN CEN/EN 16637-2:2024-01 (for hardened concrete test specimens of a model concrete) shall comply with the upper limits set out in Table A-6 (Annex A) or, for boiler ash, the upper limit set out in Table A-5 (Annex A).

Proof that the concentrations of substances in the eluate in accordance with DIN CEN/EN 16637-2:2024-01 comply with the upper limits set out in Table A-5 or Table A-6 (Annex A) shall be omitted if construction measures prevent direct contact with groundwater.

In the use of crystalline blast furnace slag, metallurgical sand, melt chamber granules, expanded mica (vermiculite), expanded perlite, wind shale, expanded clay and brick sprit from unused bricks as rock grain (or rock flour) in concrete, no evidence of the substance contents and the release of dangerous substances shall be provided. For the use of sintered coal fly ash and boiler ash (boiler sand) as a rock grain (or rock meal) in concrete, no evidence of the substance content and release of hazardous substances shall be provided if the sintered coal fly ash and the boiler ash originate from such thermal power plants where only coal and no secondary fuels, excluding biomass in a proportion of up to 14 M.-% (dry mass), of virtually ash-free natural gas and municipal sewage sludge (waste key 19 08 05 according to AVV[9]) with a proportion of up to 5 M.-% (dry mass) based on dry coal. Biomass is understood as plant material. Waste wood or secondary material are not allowed.

Industrially manufactured aggregates that are not listed in the above paragraph or in Table A-3 may not be used in concrete.

10.1.3 Fly ashes

Underground containers and concrete pipes produced using silicon-rich fly ash (typically hard coal ash) shall not be installed unless the silicon-rich fly ash complies with the following requirements:

- Concentrations of solid matter in silicon-rich fly ash must comply with the upper limits of Table A-4 (Annex A).

The following applies to structural elements for underground concrete containers and pipes in contact with groundwater:

- The concentrations of substances in the eluate in accordance with DIN CEN/EN 16637-2:2024-01 of hardened concrete (for hardened concrete test specimens of a model concrete) manufactured using silicon-rich fly ash shall comply with the upper limits set out in Table A-5 (Annex A).

Proof that the concentrations of substances in the eluate as per DIN CEN/EN 16637-2:2024-01 comply with the upper limits given in Table A-5 (Annex A) is not required if construction measures are used to prevent direct contact with groundwater.

In the case of the use of silicon-rich fly ash in concrete, no evidence of substance content and release of hazardous substances shall be provided if the ash originates from thermal power plants in which only coal and no secondary fuels, except biomass in a proportion of up to 14 M.-% (dry mass), of virtually ash-free natural gas and municipal sewage sludge (waste key 19 08 05 according to AVV[9]) are used in a proportion of up to 5 M.-% (dry mass) based on dry coal. Biomass is understood as plant material. Waste wood or secondary material are not allowed.

For calcium-rich fly ash (generally lignite fly ash) for underground tanks and pipes, there are no Technical Building Regulations or generally recognised rules of technical construction according to which their effects on soil and

water can be assessed. However, they are of significance when it comes to complying with the requirements of § 3 MBO1, as well as in terms of their effects on soil and water.

10.1.4 Supersulphated cement and calcium aluminate sulfate cement

Underground containers and pipes made of concrete manufactured using supersulphated cement and calcium aluminate sulphate cement may only be installed in contact with soil or groundwater if the concentrations of substances in the eluate as per DIN CEN/EN 16637-2:2024-01 for hardened concrete (based on model concrete specimens) manufactured using supersulphated cement or calcium aluminate sulphate cement comply with the upper limits according to Table A-6 (Annex A).

Proof that the concentrations of substances in the eluate as per DIN CEN/EN 16637-2:2024-01 comply with the upper limits given in Table A-6 (Annex A) is not required if construction measures are used to prevent direct contact with soil or groundwater.

10.1.5 Concrete admixtures

Concrete admixtures used in concrete underground containers and pipes in contact with soil or groundwater and for which there are no Technical Building Regulations or technical best practice are of significance for complying with the requirements of § 3 MBO1, as well as in terms of their impact on soil and water.

10.2 Sewer rehabilitation products

For sewer rehabilitation there are no Technical Building Regulations or generally accepted rules of technology according to which their effects on soil and water can be assessed. However, they are of significance when it comes to complying with the requirements of § 3 MBO1, as well as in terms of their effects on soil and water.

Annex A – Maximums

Table A-1: Permitted source materials in a rubble waste treatment facility for manufacturing recycled aggregates

1	Concrete (waste code 17 01 01 as per the list of wastes regulation (AVV*))
2	Bricks (waste code 17 01 02 as per the list of wastes regulation (AVV*))
3	Tiles, bricks, ceramic (waste code 17 01 03 as per the list of wastes regulation (AVV*))
4	Mixtures of concrete, tiles, bricks and ceramic that do not contain any hazardous substances (waste code 17 01 07 as per the list of wastes regulation (AVV*))
5	Bitumen mixes except for those under 17 03 01 (waste code 17 03 02 as per the EWC Ordinance*) (here: Asphalt, tar-free)
6	Concrete waste but without concrete sludge (waste code 10 13 14 as per the list of wastes regulation (AVV*))
7	Soil and stones that do not contain dangerous substances (waste code 17 05 04 as per the list of wastes regulation (AVV*))
8	Track ballast which does not contain dangerous substances (waste code 17 05 08 as per the list of wastes regulation (AVV*))
* Ordinance on the European Waste Catalogue (EWC Ordinance) of 10 December 2001, as amended.	

Table A-2: Upper limits for eluate concentrations and solids content in recycled aggregates

	Parameter	Dimension	Upper limit
Eluate concentration	Arsenic (As)	µg/l	50
	Lead (Pb)	µg/l	100
	Cadmium (Cd)	µg/l	5
	Chromium, total (Cr)	µg/l	100
	Copper (Cu)	µg/l	200
	Nickel (Ni)	µg/l	100
	Mercury (Hg)	µg/l	2
	Zinc (Zn)	µg/l	400
	Chloride (Cl^-)	mg/l	150
	Sulphate (SO_4^{2-})	mg/l	600
	Phenol index	µg/l	100
	Atrazine*	µg/l	0.1
	Bromacil*	µg/l	0.1
	Diuron*	µg/l	0.1
	Glyphosate*	µg/l	0.1
	AMPA*	µg/l	1
	Simazine*	µg/l	0.1
	Dimefurone*	µg/l	0.1
	Flazasulfuron*	µg/l	0.1
	Flumioxazine*	µg/l	0.1
	Ethidimuron*	µg/l	0.1
	Thiazafluron*	µg/l	0.1
	newly authorised active substances*	µg/l	0.1
	pH value pH value*	-	7.0-12** 6.5-10**
	Conductivity Conductivity*	µS/cm	3 000** 500**
Solids content	Hydrocarbons	[mg/kg]	1 000***
	PAH_{16}	[mg/kg]	20
	PCB_6	[mg/kg]	1

* is only required for track ballast and railway sleepers made of concrete. The test may be dispensed with if the manufacturer has evidence from the route operator that no herbicides are used on the relevant section of the route.

** Exceedances are not a criterion for exclusion if the concrete proportion in the material being investigated is at least 60% by mass-.

*** Exceedances that are attributable to asphalt proportions are not a criterion for exclusion.

Table A-3: Upper limits for eluate concentrations and solids content in industrially manufactured aggregates

	Parameter	Dimension	Steelworks slag (SWS)	Bottom ash from coal-fired power plants with co-combustion*	Slag from copper production (CUS/CUG)	Foundry sand (foundry sand residuals, GRS)	Aggregate from broken glass scrap	Brown coal fly ash (BFA)
Eluate concentration	Arsenic (As)	µg/l				60	60	100
	Lead (Pb)	µg/l			100	200	200	200
	Cadmium (Cd)	µg/l				10	6	10
	Chromium, total (Cr)	µg/l	100			150	60	300
	Copper (Cu)	µg/l			100	300	100	100
	Molybdenum*	µg/l						300
	Nickel (Ni)	µg/l				150	70	70
	Mercury (Hg)	µg/l					2	2
	Vanadium	µg/l	250					
	Zinc (Zn)	µg/l			200	600	600	600
	Chloride (Cl^-)	mg/l						50
	Sulphate (SO_4^{2-})	mg/l						1000
	Fluoride	mg/l	5			1		
	Phenol index	µg/l				100		
	DOC	µg/l				20000		
	pH value**	-	10-13		6.0-10	5.5-12	5.5-12	10-13
	Conductivity**	µS/cm	1500		700	1000	2000	5000
Solid content	Arsenic	[mg/kg]	150	150	150	150	150	150
	Lead	[mg/kg]	700	700	700	700	700	700
	Cadmium*	[mg/kg]	10	10	10	10	10	10
	Chromium, total	[mg/kg]	600	600	600	600	600	600
	Copper	[mg/kg]	400	400	400	400	400	400
	Nickel	[mg/kg]	500	500	500	500	500	500
	Thallium	[mg/kg]	7	7	7	7	7	7
	Vanadium	[mg/kg]		1500				1500
	Mercury	[mg/kg]	5	5	5	5	5	5
	Zinc	[mg/kg]	1500	1500	1500	1500	1500	1500
	EOX	[mg/kg]				10***		
	BTX	[mg/kg]				1		
	LHKW	[mg/kg]				1		
	Benzo(a)pyrene	[mg/kg]				3		
	Hydrocarbons	[mg/kg]				1000		
	PAH_{16}	[mg/kg]				20		20
	PCB_6	[mg/kg]		0.5				0.5
	PCDD/PCDF	ng TEQ/kg****		100				100

* Only petroleum coke, municipal sewage sludge (with waste code 19 08 05 under the European List of Waste Regulation), biomass or virtually ash-free natural gas may be used as co-incineration materials.

** The pH value and conductivity data are orientation values. In case of deviations from the material-specific reference value, the cause shall be checked.

*** Suspended until a European test standard is available.

**** * TEQ = WHO-TEF toxicity equivalent.

Table A-4: Upper limits for the solids content of silicon-rich fly ash for use in concrete

	Parameter	Dimension	Upper limit
Solid content	Arsenic (As)	[mg/kg]	150
	Lead (Pb)	[mg/kg]	700
	Cadmium (Cd)	[mg/kg]	10
	Chromium, total (Cr)	[mg/kg]	600
	Copper (Cu)	[mg/kg]	400
	Nickel (Ni)	[mg/kg]	500
	Mercury	[mg/kg]	5
	Thallium (Tl)	[mg/kg]	7
	Vanadium (V)	[mg/kg]	1500
	Zinc (Zn)	[mg/kg]	1500
	PCB_6	[mg/kg]	0.5
	PCDD/PCDF	ng TEQ/kg*	100
* * TEQ = WHO-TEF toxicity equivalent.			

Table A-5: Upper limits for the release of substances in the eluate of hardened concrete (model concrete) using silicon-rich fly ash or boiler sand

Parameter	Dimension	Upper limit
Barium (Ba)	mg/m²	979
Lead (Pb)	mg/m²	6.7
Chromium, total (Cr)	mg/m²	19
Cyanide, easily released (CN)	mg/m²	56*
Cyanide, total (CN^-)	mg/m²	280*
Mercury (Hg)	mg/m²	0.56
Selenium	mg/m²	17
Thallium (Tl)	mg/m²	1.1
Vanadium (V)	mg/m²	22*
Zinc (Zn)	mg/m²	336
* Currently suspended		

Table A-6: Upper limits for the release of substances in the eluate of hardened concrete (model concrete) using sulphate metallurgy cement, calcium aluminate sulphate cement or other industrially produced rock grains (excluding boiler sand)

Parameter	Dimension	Upper limit
Antimony (Sb)	mg/m²	28
Arsenic (As)	mg/m²	18
Barium (Ba)	mg/m²	979
Lead (Pb)	mg/m²	6.7
Cadmium (Cd)	mg/m²	1.7
Chromium, total (Cr)	mg/m²	19
Cyanide, easily released (CN)	mg/m²	56*
Cyanide, total (CN^-)	mg/m²	280*
Cobalt (Co)	mg/m²	11
Copper (Cu)	mg/m²	30

Parameter	Dimension	Upper limit
Molybdenum (Mo)	mg/m²	196
Nickel (Ni)	mg/m²	39
Mercury (Hg)	mg/m²	0.56
Selenium	mg/m²	17
Thallium (Tl)	mg/m²	1.1
Vanadium (V)	mg/m²	22*
Zinc (Zn)	mg/m²	336
Chloride (Cl^-)	mg/m²	85000
Fluoride (F-)	mg/m²	300
Sulphate (SO_4^{2-})	mg/m²	85000
* Currently suspended		

Table A-7: Upper limits for eluate concentrations and solids of glass powder, for the manufacture of foam glass chips for filling

	Parameter	Dimension	Upper limit
Eluate concentration	Arsenic (As)	µg/l	20
	Lead (Pb)	µg/l	80
	Cadmium (Cd)	µg/l	3
	Chromium, total (Cr)	µg/l	25
	Copper (Cu)	µg/l	60
	Nickel (Ni)	µg/l	20
	Mercury (Hg)	µg/l	1
	Zinc (Zn)	µg/l	200
Solid content	Arsenic (As)	[mg/kg]	45
	Lead (Pb)	[mg/kg]	210
	Cadmium (Cd)	[mg/kg]	3
	Chromium, total (Cr)	[mg/kg]	180
	Copper (Cu)	[mg/kg]	120
	Nickel (Ni)	[mg/kg]	150
	Mercury (Hg)	[mg/kg]	1.5
	Zinc (Zn)	[mg/kg]	450

Annex 11

External Thermal Insulation Composite Systems (ETICS) with plaster layer with ETA

As of: November 2024

CONTENTS

1 Scope

The scope refers to glued or doweled and glued external thermal insulation composite systems (ETICS) with a plaster layer with an ETA according to ETAG 004 or according to EAD 040083-1-0404 with insulation materials made of polystyrene (EPS) according to EN 13163:2012+A1:2015[0] or mineral wool (MW) according to EN 13162:2012+A1:2015[0].

For the execution of the ETICS, DIN 55699:2017-08 must be observed unless otherwise specified below.

2 Stability and fitness for purpose

2.1 General conditions

The substrate on which the thermal insulation system is to be attached are masonry or concrete walls with or without plaster or with bonded ceramic coverings.

ETICS may be used under the following framework conditions:

2.1.1 Thermal insulation composite systems with glued polystyrene (EPS)- panels

- The substrate (wall) has a minimum tear strength of 80 kN/m^2.
- The thickness of the EPS panels is not greater than 400 mm.
- The tear strength of the EPS panels/adhesive mortar and EPS -panels/base coating shall be at least 80 kN/m².
- The EPS- panels are glued in such a way that at least 0.03 N/mm^2 of the horizontal surface load is discharged over the bonding onto the substrate.
- For insulating materials more than 200 mm thick, the total applied quantity of base coat and final coat is no more than 22 kg/m^2.
- The base coat reinforcement is a textile glass scrim.
- Wind pressure w_e (wind suction load) does not exceed the following values, depending on transverse tensile strength:

EPS panels (tensile strength perpendicular to panel)		**Wind pressure w_e (wind suction load)**
Mean value according to insulating material standard	≥ TR 100	-1.1 kN/m^2

2.1.2 ETICS with glued mineral wool (MW) lamellae (fibres perpendicular to substrate)

- The substrate (wall) has a minimum tear strength of 80 kN/m^2.
- The MW- lamellae are not thicker than 400 mm and have a shear modulus of at least 1.0 N/mm^2.
- The tear strength of the MW -lamellae/adhesive mortar and MW -lamellae/flush mounting is at least 80 kN/m².
- The MW -lamellae are bonded in such a way that at least 0.03 N/mm^2 horizontal surface load is discharged over the bonding onto the substrate; for thicknesses > 200 mm, at least 0.05 N/mm^2 horizontal surface load is discharged over the bonding onto the substrate.
- For insulating materials more than 200 mm thick, the total applied quantity of base coat and final coat is no more than 22 kg/m² and the strength of the MW -lamellae is ≥ TR 100.
- The base coat reinforcement is a -textile glass scrim.
- Even with sufficient tear resistance of the wall surface, the MW -lamellae are fixed with additional dowels depending on the wind pressure w_e:

0 Implemented in Germany by DIN EN 13163:2016-08.
0 Implemented in Germany by DIN EN 13162:2015-04.

MW- lamellae with tensile strength in the direction of fibres ≥ TR 80				
Plastering system			**Wind suction load w_e [kN/m²]**	**Minimum number of anchors [Anchors/m²]**
Thickness (mm)		**Weight per surface [kg/m²]**		
any			< -0.8	0
≤ 10	and	≤ 10	-0.8 to-1.1	3
> 10	or	> 10	-0.8 to-1.1	5

- The MW- lamellae are fastened with dowels with ETA according to ETAG 014 or EAD 330196-01-0604 (dowel plate diameter ≥ 60 mm; plate stiffness ≥ 0.3 kN/mm; load-bearing capacity of the dowel plate ≥ 1.0 kN). The anchors are installed flush with the insulating material (anchor plate lies on the insulating material). Anchors with a plate diameter < 140 mm are placed through the reinforcement fabric. Dowels with a plate diameter ≥ 140 mm may be placed under the reinforcement fabric.
- MW- lamellae with insulation material thickness of > 200 mm are executed as follows:
  Adequate mounting safety is ensured by appropriate support measures. The insulation panels are laid in a lattice structure. On building corners only full-length insulation panels are placed insofar as the geometrical framework conditions allow this.

  In the following areas, the insulation panels are fixed with 3 dowels/insulating panels or 2.5 dowels/m:

  - if minimum height is not reached for an area to be insulated of min. $H \leq 2 \times d_{\text{insulating material}}$
  - if minimum width is not reached for an area to be insulated of min. $W \leq 2 \times d_{\text{insulating material}}$
  - the last upper uninterrupted insulating panel position (upper building shell),
  - on the side building shell, in a strip of up to 2 m in width, at least one vertical anchoring series must be placed with 2.5 anchors.

  A vertical drop of min $H < d_{\text{insulating material}}$ may not be executed without additional support constructions.
  The field sizes without expansion joints are

  - 9 m x 9 m or 80 m² for thick layer systems (base coat including final coat = total plaster thickness > 10 mm).
  - for thin film sections (base coat including topcoat/finishing coat = total plaster thickness ≤ 10 mm) 50 m x 25 m.

2.1.3 ETICS with polystyrene (EPS) panels or with mineral wool (MW) panels (fibres parallel to substrate) or with mineral wool (MW) lamellae (fibres perpendicular to substrate), mechanically attached with anchors and additionally glued

- The thickness of the insulation material complies with the following values:

	EPS panels	MW lamellae	MW panels
Insulating material thickness [mm]	≤ 400	≤ 200	≤ 340

- For insulating materials more than 200 mm thick, the total applied quantity of base coat and final coat is no more than 22 kg/m².
- The base coat reinforcement is a -textile glass scrim.
- The insulation material is fastened with dowels with ETA according to ETAG 014 or according to EAD 330196-01-0604 (dowel plate diameter ≥ 60 mm; Plate stiffness ≥ 0.3 kN/mm; load-bearing capacity of the dowel plate ≥ 1.0 kN). The anchors are installed flush with the insulating material (anchor plate lies on the insulating material).

The following proofs as per a) to c) are kept:

a) Proof of the anchoring of the dowels in the substrate (wall):

$$S_d \leq N_{Rd}$$

where

$$S_d = \gamma_F \cdot W_e$$
$$N_{Rd} = N_{Rk} / \gamma_{M,U}$$

where

S_d	:	Design value of wind suction load
N_{Rd}	:	Rated value of the load capacity of the dowel
W_e	:	Effects of wind
N_{Rk}	:	characteristic tensile load capacity of the dowel (in accordance with the Annex for the relevant dowel -ETA)
γ_F	:	1.5 (safety factor for wind effects)
$\gamma_{M,U}$	:	Safety factor of anchor extraction resistance from substrate (see relevant dowel -ETA)

b) Proof of the ETICS:

$$S_d \leq R_d$$

where

S_d = Design value of wind suction load

$$R_d = \frac{R_{\text{Fläche}} \cdot n_{\text{Fläche}} + R_{\text{Fuge}} \cdot n_{\text{Fuge}}}{\gamma_{M,S}}$$

where

R_d	:	Design value of thermal insulation system resistance
R_{joint}, R_{area}	:	The failure load (minimum value) resulting from the thermal insulation composite system in the area or not in the area of the panel joints (see respective thermal insulation composite system ETA)
n_{joint}, n_{area}	:	Number of dowels (per m^2) to be placed in the area or not in the area of the plate joints.
$\gamma_{M,S}$	:	4.0

c) Proof of insulating material in case of dowelling under the reinforcement fabric:

$$S_d \leq R_d$$

where

S_d = (see preceding section)
$R_d = N_{Rk} / \gamma_{M,D}$

where

N_{Rk}	:	Design value of thermal insulation system resistance (slabs: Tensile strength perpendicular to the plate plane, lamellae: tensile strength in the direction of fibres)
$\gamma_{M,D}$	:	5.0

The larger anchor number is decisive, with at least 4 anchors/m² installed.
For MW-panels > 200 mm thick, at least 6 dowels/m² are present.

3 Fire protection

For the following building authority requirements for the fire behaviour of external walls in accordance with Chapter A 2.1.5 in conjunction with A 2.2.1.2 of the Model Administrative Provision Technical Building Regulations (MVV TB), the minimum required performance is assigned for certain ETICS and rules of use are specified.

3.1 Thermal insulation composite system with mineral wool (MW)-insulation material according to EN 13162:2012+A1:2015 [2]

Building approval requirement	Minimum required performance*	**Provisions relating to use**
Thermal insulation composite system non-combustible	A1 A2 - s1,d0	☠ mineral-bonded base and final coats (bonding agent: lime and/or cement) containing ≤ 5 % organic matter in the dry matter; or ☠ Organically bonded base and final coats (bonding agent: synthetic or silicone resin or silicate dispersion) with total plaster thickness (base coat and final coat) ≤ 10 mm, organic components content (dry-mass) of base coat and final coat both ≤ 10 % ☠ PCS value of base coat ≤ 3.0 MJ/kg ☠ PCS value of final coat ≤ 2.6 MJ/kg
Insulation: non-combustible	A1 A2 - s1,d0	
* With regard to the building authority requirements, the provisions of Annex 4, Section 1.2 shall be observed.		

Building approval requirement	Minimum required performance*	**Provisions relating to use**
ETICS, flame-retardant	C-s2,d0	-
Insulating material: flame-resistant	C-s2,d0	
* With regard to the building authority requirements, the provisions of Annex 4, Section 1.2 shall be observed.		

Building approval requirement	Minimum required performance*	**Provisions relating to use**
ETICS normally flammable	E	-
Insulation material: normally flammable	E	
* With regard to the building authority requirements, the provisions of Annex 4, Section 1.2 shall be observed.		

3.2 Thermal insulation composite system with expanded polystyrene (EPS)- insulation material according to EN 13163:2012+A1:2015[1]

Building approval requirement	Minimum required performance*	**Provisions relating to use**
Thermal insulation composite system: flame-retardant	C-s2,d0	-
Insulation material: flame-retardant	C-s2,d0	Bulk density: ≤ 25 kg/m³, insulation thickness: ≤ 300 mm
construction measures (fire blocks): non-combustible, dimensionally stable up to 1 000 °C, Raw density ≥ 60 kg/m², stable even in case of fire: Transverse tensile strength ≥ 5 kPa Minimum dimensions: Height: ≥ 200 mm	A2-s1,d0	**Fire protection measures against fire from outside:** 1. a fire block on the lower edge of the thermal insulation composite system or maximum 90 cm above ground level or adjoining horizontal building units used (e.g. rooftop parking decks, etc.), 2. a fire barrier at the ceiling of the first floor above ground level or adjacent horizontal building parts pursuant to Paragraph 1, but with an axis distance of not more than 3 m to the fire barrier below. For larger distances additional fire barriers should be installed, 3. a fire block at the height of the ceiling of the third floor above ground level or adjacent horizontal building parts pursuant to No 1, but with an axis distance of not more than 8 m to the fire block. For larger distances additional fire blocks should be installed, 4. further fire blocks at exterior wall transitions to horizontal areas (e.g. passageways, driveways, arcades), insofar as these are located in the area exposed to fire from outside on the 1st to 3rd storey. A fire block (as described above) shall furthermore be installed at most 1.0 m below adjacent combustible construction products (e.g. at the upper barrier of the thermal insulation system below a roof) within the insulation zone of the thermal insulation system. The thermal insulation system applied must meet the following requirements from the lower edge of the thermal insulation system to at least the height of the fire block as per No: ☠ Minimum thickness of the plaster system (base and final coat) 4 mm, for the execution of prefabricated, clinker-type plaster units ('brick tile'), thickness of base coat ≥ 4 mm, ☠ at building inside corners, fibreglass corner angles with areal density 280 g/m² and tear resistance > 2.3 kN/5 cm (as delivered) must be incorporated and ☠ use of a reinforcement fabric with areal density ≥ 150 g/m². **Fire protection measures for fire exposure from external wall openings, above the fire block as per Paragraph 3:** 1. Insulation material thickness d > 100 mm to d ≤ 300 mm for bonded- and anchored thermal insulation composite systems When the following are used: ☠ exclusively minerally or organically bound adhesive mortars (no adhesive foam) ☠ minerally bound base and final coat (cement/lime binder) where ☠ content of organic constituents in dry mass of base coat and topcoat ≤ 5 % each,

Building approval requirement	Minimum required performance*	**Provisions relating to use**
		☠ Wet application amount each ≥ 2.5 kg/m², ☠ Total coat thickness (base and final coat) ≥ 4 mm ☠ organically bound base and final coat (binder: synthetic resin, silicone resin, or silicate dispersion) with ☠ Content in organic constituents in dry mass of base and final coat ≤ 10 % each, ☠ Wet quantity applied 2.5 to 8 kg/m² each, ☠ Total coat thickness (base and final coat) 4 to 14 mm fire protection measures shall be carried out in the following areas: a) Above each aperture in the area of the lintels, at least 300 mm laterally protruding (left and right of the aperture) and in the area of insulated reveals, b) When installing roller shutters or blinds directly above openings, or when mounting windows in the insulation plane, these must be enclosed on three sides – above and on both sides – with material at least 200 mm high and wide – as described under (a). The design according to a) and b) is not required if a horizontal fire block around the building is arranged at least on every 2nd floor. The insulating block must be positioned so that a maximum distance of 0.5 m between the lower edge of the lintel and the upper edge of the fire block is maintained. 2. Insulating material thickness ≤ 100 mm: Windows are installed flush with or behind the shell edge.
ETICS normally flammable	E	
Insulation material: normally flammable	E	
* With regard to the building authority requirements, the provisions of Annex 4, Section 1.2 shall be observed.		

4 Sound insulation

If no nominal value is indicated, the thermal insulation composite system must be used with a value of ΔR_w = -6 dB when demonstrating sound insulation.

5 Thermal insulation

Mathematical proof of thermal insulation must be carried out with the rated values for thermal conductivity as per DIN 4108-4:2020-11.

6 Certificate for installation of thermal insulation composite system

The contractor who installs the thermal insulation composite system on site must issue, for each construction project, a certificate certifying that the construction products (components) which they have installed comply with the provisions of the European Technical Approval or the European Technical Assessment and the applicable installation instructions and comply with the provisions of this technical rule; the relevant classifications and properties shall be indicated therein. This certificate must be issued to the property owner to forward onto the relevant building authority, where required.

Annex 12

Application rules for non-load-bearing permanent formwork kits/systems and formwork components for the construction of in-situ concrete walls

As of: May 2024

CONTENTS

Foreword

This Technical Rule applies to the use or application of construction products or construction kits regulated in the following technical specifications:

I) Non-load-bearing permanent formwork components as per ETA built on the basis of ETAG 009 [1],

II) Non-load-bearing permanent formwork components made of normal concrete and lightweight concrete as per EN 15435:2008[0] [2],

III) Non-load-bearing permanent formwork components of made of wood-chip concrete as per EN 15498:2008[0] [3].

The above-mentioned construction products or construction kits must be formed jointly so that they form a non-load-bearing permanent formwork system to enable the construction of in-situ concrete walls. The formwork components or formwork kits/systems as per I), II), and III) – hereinafter referred to as formwork components – remain part of the wall after the concrete core is concreted.

A Special definitions

Geometrical formation of load-bearing concrete core:
The geometric formation of the load-bearing concrete core is defined by the (non-load-bearing) formwork components and their arrangement. The concrete structure may be reinforced.
The concrete core thickness is defined as the smallest thickness above wall height of the geometric formation of the load-bearing concrete core.

Types depending on the geometrical formation of the concrete core:

1. Disc-like type
The load-bearing core concrete of the disc-like type is a concrete wall that is only interrupted in individual places by spacers. The spacers are generally regularly arranged. Total spacer cross-sectional areas must be no more than 1 % of the wall area.

2. Lattice type
The load-bearing core concrete of the lattice type consists of concrete supports, which are connected by horizontal concrete bars. The supports and bars occur due to the concreting in of the cavities in the formwork components. Vertical supports run over the entire height of the wall, without interruptions or reduction in the cross-sectional area.

3. Column type
The load-bearing core concrete of the column type consists of regularly arranged concrete supports without horizontal concrete bars or with concrete bars that have no mathematically load-bearing connection to the concrete supports. The supports occur due to the concreting in of the cavities in the formwork components. Vertical supports run over the entire height of the wall, without interruptions or reduction in the cross-sectional area.

4. Other types
All types that are not defined above.

B Stability and fitness for purpose

B1 Design, construction, and execution

The design, construction, and execution of in-situ concrete walls with permanent formwork systems as per the above-mentioned technical specifications in line with A 1.2.3.1 of MVV TB.
Formwork components must be laid dry.
Exterior walls built with formwork components must be protected against environmental impact by plaster or cladding.
To ensure that the reinforcing steel bars are connected, the formwork components may not be taken into account with the concrete surfacing.

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[0] Implemented in Germany by DIN EN 15435:2008-10.
[0] Implemented in Germany by DIN EN 15498:2008-08.

For formwork kits/systems according to ETA based on ETAG 009 [1], the statements regarding the resistance to formwork pressure and/or the statements regarding the maximum permissible filling height shall be taken from the ETA. For formwork components as per EN 15435:2008[11] [2] and/or EN 15498:2008[2] [3], the resistance to formwork pressure (characteristic tensile strength of studs, characteristic bending tensile strength of walls) must be taken from the declaration of performance or the accompanying documents.

Where no maximum permitted fill level is specified, suitable static systems must be chosen to realistically determine the formwork load with the estimated loads due to fresh concrete pressure from DIN 18218:2010-01 [4]; Chapter B 2 of this Technical Rule must be observed. To prove resistance to formwork pressure, the rated values for the resistances (e.g. breaking stress of studs, bending tensile strength of walls, tearing strength of the stud from the wall, where appropriate) should be compared to the rated values for the stresses. The partial safety coefficients shall be determined in accordance with DIN EN 1990:2010-12 [5] and DIN EN 1990/NA:2010-12 [6].

B1.1 With regard to the design and construction according to DIN EN 1992-1-1:2011-01 and DIN EN 1992-1-1/A1:2015-03 [7] in conjunction with DIN EN 1992-1-1/NA:2013-04 and DIN EN 1992-1-1/NA/A1:2015-12 [8] the following shall also apply for an in-situ concrete wall made of formwork components of the grid type, column type or 'other type':

1. Only predominantly stationary effects are permitted. The design and construction of supporting structures in earthquake circumstances are not covered by this Technical Rule.
2. The thinness of the wall or the concrete core supports may not exceed the value $\lambda = 85$.
3. Higher in-situ concrete strength classes than C30/37 or LC30/33 may not be taken into account in calculations.

B1.2 For proof of resistance to horizontal influences (H_{Ed}) in the wall plane for walls of the grid type and column type, the following also applies:

- The walls may be dimensioned in accordance with Annex 1 if the cross-section of the horizontal concrete bars between the vertical supports is at least 100 cm², the smallest thickness of which is at least three times the largest grain diameter and at least four such bars are placed per m wall height. If this condition is not met, the design models as per Annex 1 may not be used. In this case, static proof of resistance to horizontal effects at the wall plane must be provided as if they were adjacent supports. The definition of stud recesses can be found in ETA or EN 15435:2008[1], Section 3.1.10 [2] and EN 15498:2008[2], Figure 3.b [3].
- For loadbearing partitions of grid and column types, the length of the cross-section, in any direction, of the uninterrupted pillars shall be at least 120 mm over the entire wall height. This prohibits formwork components which do not fulfil this condition in their final state from being used for loadbearing partitions.
- The stability of non-loadbearing partitions with dimensions smaller than 120 mm in the direction of a cross-section must be demonstrated as per DIN 4103-1:2015-06 [9].
- Annex 1 of this Technical Rule applies to the design of grid-type walls at wall plane under shear loading.
- In case of stresses perpendicular to the plane of the wall, a wall of the grid or column type must always be two-sided, i.e. such walls may normally be used only in structures where the ceilings have a disk-like effect.
- The following reinforcements may be placed:
  - no more than two bars in each concrete bar for grid type systems
  - in each support of the grid type or column type systems, one vertical bar or a set of vertical bars combined into a mesh for each side of the concrete cross-section, or a reinforcement basket for the entire concrete cross-Section.
- For planning and execution, the following applies:
  - The horizontal dimension of the vertical reinforcement meshes and cages, including spacers, shall be less than the corresponding minimum dimensions of the concrete core.
- For concrete coverings, DIN EN 1992-1-1:2011-01 and DIN EN 1992-1-1/A1:2015-03 [7] in conjunction with DIN EN 1992-1-1/NA:2013-04 and DIN EN 1992-1-1/NA/A1:2015-12 [8] apply.
- The provisions of DIN EN 1992-1-1:2011-01 and DIN EN 1992-1-1/A1:2015-03 [7] in conjunction with DIN EN 1992-1-1/NA:2013-04 and DIN EN 1992-1-1/NA/A1:2015-12 [8] apply to the distance between the rebars.
- If more than one concrete bar is placed on one side of the concrete cross-section of the supports, they shall be joined to a mesh (e.g. by welded or bonded crossbars).
- Vertical reinforcement may only be calculated statically if it complies with the corresponding reinforcement and design rules for normal force and/or bend-stressed beams or supports according to DIN EN 1992 1 1:2011-01 and DIN EN 1992-1-1/A1:2015-03 [7] in conjunction with DIN EN 1992-1-1/NA:2013-04 and DIN EN 1992-1-1/NA/A1:2015-12 [8].

B2 In addition to DIN EN 1992-1-1:2011-01 and DIN EN 1992-1-1/A1:2015-03 [7] in conjunction with DIN EN 1992-1-1/NA:2013-04 and DIN EN 1992-1-1/NA/A1:2015-12 [8], the following applies:

1. The minimum flow class to be maintained and the maximum aggregate grain size for the fresh concrete used must correspond to the information in the following Table 1 for all systems (including ‘disc-type’ systems.

Table 1:

		Minimum size of the filling range	Largest grain of the aggregate	Flow class
		1	2	3
1		< 120 mm	≤ 16 mm	F5
2		120 to 140 mm	≤ 16 mm	≥ F3
3		≥ 140 mm	≤ 32 mm	≥ F2

The maximum flow class must not exceed F5.

Fresh concrete at the lower end of flow class F3 and below must be compacted by means of vibration.

Fresh concrete at the upper end of flow class F3 and above must be compacted by means of raking.

The changes in the strength of the fresh concrete must be ‘medium’ to ‘fast’ in accordance with DIN 1045-2:2023-08 [10], Table 19.

2. Horizontal work joints shall preferably be arranged at the level of the storey ceilings. Where work stoppages cannot be avoided, vertical reinforcing steel bars (iron plugs) must be placed as follows in the construction joints:

- The iron plugs must be offset against each other and the distance between them must not be greater than 500 mm.
- The total cross-section must be at least 1/2000 of the cross-section area of the concrete core to be connected, but at least two reinforcing steel bars B500 Ø 8 mm (or equivalent) must be positioned per metre of wall length.
- The iron plugs must each reach at least 200 mm into the concrete layers to be connected.

3. The concrete may be allowed to fall freely up to a height of 2 m; beyond this the concrete must be held together by pouring pipes or concreting hoses with a maximum diameter of 100 mm and conducted to shortly before the installation site. Material cones should be avoided due to the short filling point intervals.
There must be enough space in the reinforcement for pouring pipes or concreting hoses. The leaflet of the DBV (German Concrete and Construction Engineering Association) "Concreteability of components" – 11/2023 [11] must be observed.

4. After concreting, the walls must not deviate from the vertical by more than 5 mm per linear metre of wall height, but from a wall height of 3 m a maximum of 15 mm in total, and must comply with the evenness tolerances for wall surfaces in accordance with DIN 18202:2013-04, Table 3, line 6 [12].

C Fire protection

C1 Fire resistance

For load-bearing wall constructions built with the aforementioned shuttering blocks or shuttering kits/systems, the fire resistance with regard to stability (load-bearing capacity criterion R) for the generally internal, load-bearing concrete construction can be determined in accordance with ser. No A 1.2.3.1, provided that the proof of stability at normal temperatures is based on DIN EN 1992-1-1:2011-01 and DIN EN 1992-1-1/A1:2015-03 [7] taking into account DIN EN 1992-1-1/NA:2013-04 and DIN EN 1992-1-1/NA/A1:2015-12 [8] is fully possible. The extent to which it is possible to assess the resistance to fire with regard to room closure and insulation (EI) or load capacity, room closure and insulation (REI) depends on the relevant boundary conditions of demonstration in accordance with ser. No A 1.2.3.1.

There is no universally applicable Technical Rule for test-specific proof.

C2 Fire performance

For non-load-bearing permanent formwork components made of expanded polystyrene (EPS) insulation according to EN 13163:2012+A2:2016[0] [13], the Technical Rule "WDVS with ETA in accordance with ETAG 004" (June 2016) Section 3.2 shall apply mutatis mutandis with regard to the assignment of the minimum required performance concerning the reaction to fire of building materials to the building authority requirements.[0]

D Sound insulation

If shuttering blocks are used in cases subject to sound protection requirements, the Technical Rules on sound protection set out in Section A 5.2 of the MVV TB shall be used to demonstrate compliance with the requirement.

E Thermal insulation

The nominal value of the thermal resistance of the formwork block, as indicated in the above technical specifications in [1], [2] and [3], shall be converted into a rated value for proof of thermal insulation. The rated value is the nominal value divided by the safety factor = 1.2.

For shuttering blocks, proof of thermal insulation may alternatively be provided using the thermal conductivity rated values for individual structural elements as per DIN 4108-4:2020-11 [14].

As integrated thermal insulation, these are thermal insulation inserts inside the shuttering block, which are directly exposed to fresh concrete pressure, only insulating materials whose compressive stress at 10 % compression is at least equal to the level of ≥ 100 kPa [13] shall be used.

[0] Implemented in Germany by DIN EN 13163:2017-02.

[0] When applying the Technical Rule "External Thermal Insulation Composite Systems (ETICS) with plaster layer with ETA according to ETAG 004 or according to EAD 040083-01-0404" with regard to the reaction to fire of permanent polystyrene formwork kits, it should be noted that according to the building regulations of the federal states, "flame-retardant" is only required for the surfaces of external walls of buildings according to building classes 4 and 5. ‘normal flammability’ is sufficient for building classes 1 to 3.

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[3]	DIN EN 15498:2008-08	Precast concrete products - Wood-chip concrete shuttering blocks - Product properties and performance; German version EN 15498:2008.
[4]	DIN 18218:2010-01	Pressure of fresh concrete on vertical formwork.
[5]	DIN EN 1990:2010-12	Eurocode: Basis of structural design; German version EN 1990:2002+A1:2005+A1:2005/AC:2010.
[6]	DIN EN 1990/NA:2010-12	National Annex – Nationally determined parameters – Eurocode: Basis of structural design.
[7]	DIN EN 1992-1-1:2011-01 DIN EN 1992-1-1/A1:2015-03	Eurocode 2: Design of concrete structures – Part 1-1: General rules - Rules for buildings, bridges and civil engineering structures; German version EN 1992 1 1:2004 + AC:2010.
[8]	DIN EN 1992-1-1/NA DIN EN 1992-1-1/NA/A1:2015-12	national annex: 2013-04 - National Annex – Nationally National Annex – Nationally Determined parameters - Eurocode 2: Design and construction of reinforced concrete and prestressed concrete supporting structures – Part 1-1: General rules and rules for buildings.
[9]	DIN 4103-1:2015-06	Internal non-loadbearing partitions – Part 1: Requirements and verification.
[10]	DIN 1045-2:2023-08	Concrete, reinforced and prestressed concrete structures – Part 2: Concrete
[11]	DBV leaflet Concreteability of components 11/2023.	
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DIN EN 15435:2008-10 Precast concrete products - Formwork blocks of normal and lightweight concrete - Product properties and performance characteristics; German version EN 15435:2008. (No date).

DIN EN 15498:2008-08 Precast concrete products - Wood-chip formwork blocks - Product characteristics and performance characteristics; German version EN 15498:2008. (No date).

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Appendix 1

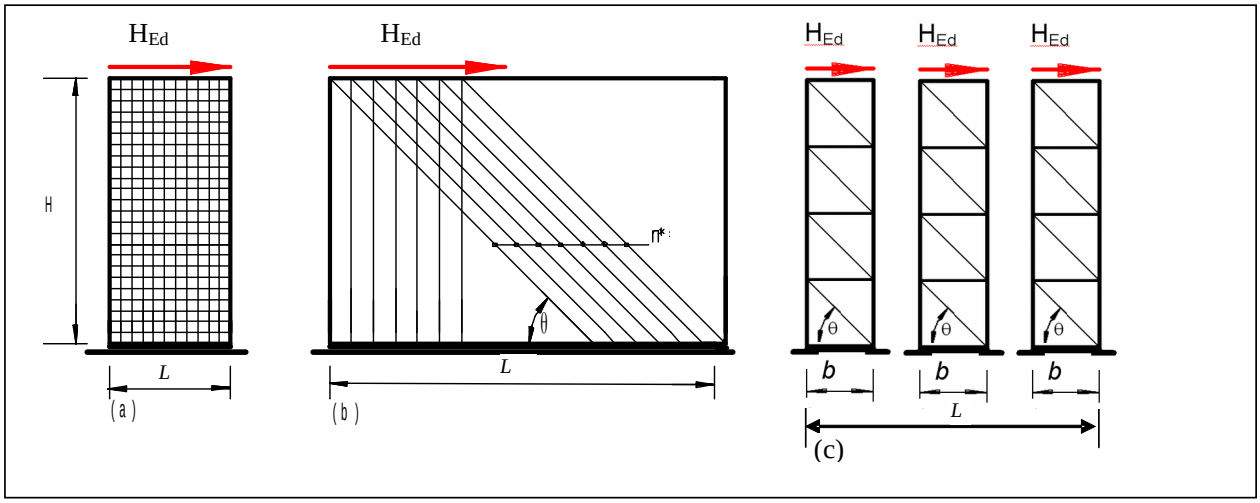
Detection of resistance to horizontal influences (H_{Ed}), in wall planes for walls of grid type and column type, excluding earthquakes

Design resistance is determined by choosing a relevant model (see (a), (b) or (c) below and the concrete used (normal or porous concrete). When determining the relevant influences, DIN EN 1992-1-1:2011-01 and DIN EN 1992-1-1/A1:2015-03 [7] in conjunction with DIN EN 1992-1-1/NA:2013-04 and DIN EN 1992-1-1/NA/A1:2015-12 [8] shall be taken into account.

Partial safety coefficients for 'extraordinary design situations' must be chosen in line with those for 'constant and temporary design situations'.

Three static models as per Fig. 1 may be applied:

- **a)** Frame model (unreinforced concrete)
- **b)** Model with continuous struts (unreinforced concrete)
- **c)** Beam model (reinforced concrete)



a) Frame model b) Model with continuous struts c) Beam model

Figure 1: Static models for horizontal shear forces H_{Ed}

Proof of horizontal forces along the wall (shear forces) H_{Ed} must be provided as follows:

$H_{Ed} \leq H_{Rd,i}$ where i = 1 to 3 (design resistance of the following individual models)

Under the combined effect of horizontal and vertical loads the concrete supports must remain as isI, i.e. no tensile stress should occur, otherwise the planners must place vertical reinforcement in the supports to cover the tensile strength.

Proof $H_{Ed} \leq H_{Rd,i}$ of the static models suggested may be provided using the following approaches:

A Frame model

The design resistance $H_{Rd,1}$ of the frame model depends on the tensile strength of the concrete bars. Assuming parabolic shear flow distribution along the length of the wall *L* under the beam theory and zero-point moment in the middle of the concrete bar, the load-bearing capacity of a concrete bar is reached if the tensile strength exceeds the tensile strength of the concrete due to maximum bending moment at the bar/support intersection. The maximum value of the shear stress H'_{Ed} is obtained from equation (1):

$$\max H'_{Ed} = \frac{3}{2}\frac{H_{Ed}}{L} \quad (1)$$

and thus leads to a maximum shear force $\max V_{Ed,r}$ in a concrete bar of

$$\max V_{Ed,r} = \max H'_{Ed}\, h_s = \frac{3}{2}\frac{H_{Ed}}{L} h_s \quad (2)$$

The maximum related bending moment $\max M_{Ed,r}$ in a concrete bar is (3)

$$\max M_{Ed,r} = \max V_{Ed,r}\frac{l_r}{2} = \frac{3}{4}\frac{H_{Ed}}{L} h_s\, l_r$$

With a specified section modulus Z_r of the concrete bar and a characteristic concrete tensile strength, $f_{ctk;0,05}$ the design resistance for a wall is as follows:

$$H_{Rd,1} = \frac{4}{3}\frac{L}{h_s}\frac{Z_r}{l_r}\frac{f_{ctk;0,05}}{\gamma_{ct}} \quad (4)$$

In equation (4), the following descriptions (see Figure 2) apply:

$H_{Rd,1}$ rated shear strength according to the frame model;

L wall length;

h_s distance between concrete bar centres;

l_r clear length of concrete bar;

Z_r modulus of resistance of concrete bar;

$f_{ctk;0,05}$ characteristic tensile strength of concrete;

$$f_{ctk;0,05} = \eta_1 \cdot 0{,}7 \cdot 0{,}3 \cdot f_{ck}^{2/3} = \eta_1 \cdot 0{,}21 \cdot f_{ck}^{2/3} \quad [MN/m^2];$$

f_{ck} characteristic compressive strength of concrete (cylinder);

γ_{ct} where 1,5 partial safety coefficient for tensile strength of in-situ concrete;

η_1 where 1,0 for normal in-situ concrete;

$0{,}40+0{,}60 \cdot \rho/2200$ for in-situ concrete made of lightweight concrete with a calculated value of the dry bulk density of ρ in [kg/m³].

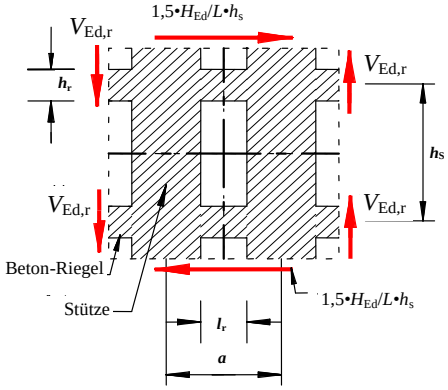


Figure 2: Designations

B Model with continuous diagonal struts

The design resistance $H_{Rd,2}$ of the model with continuous struts depends on the strength *n* of struts running continuously through the wall from one storey to the next (see Fig. 1 and 3).

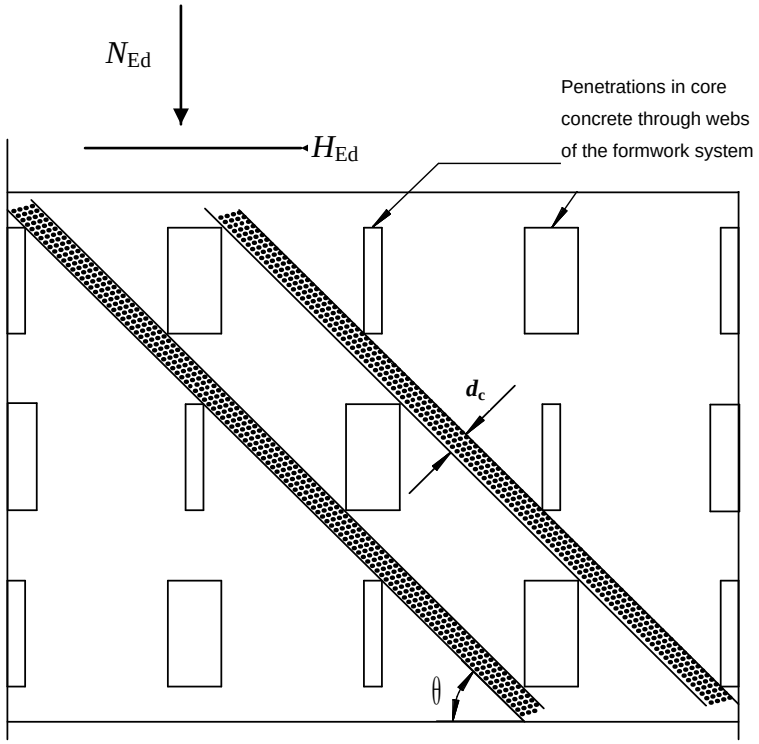


Figure 3: Height d_c of a continuous strut

The design resistance of a strut is determined using equation (5). The angle of inclination θ for the struts is derived from Fig. 3.

The rated resistance $H_{Rd,2}$ is a result of equation (5):

$$H_{Rd,2} = n * \nu \cdot f_{cd} \cdot b_c \cdot d_c \cdot \cos\theta \leq N_{Ed} \cdot \cot\theta \quad (5)$$

where

$H_{Rd,2}$ = design resistance according to the model with continuous struts;

n = number of continuous struts in a wall;

f_{cd} = Design value of the compressive strength of the concrete

ν = 0.6 · (1 - f_{ck}/250) [f_{ck} in MN/m²]*;(equivalent to 6.6N in [8] and [9])*

b_c = thickness of the strut;

d_c = height of the strut (minimum 70 mm)

θ = inclination angle of the struts 30° ≤ θ ≤ 60°;

N_{Ed} = Rated value of the acting normal force.

C Beam model

Design resistance $H_{Rd,3}$ under the beam model can be determined using same design rules as for reinforced concrete beams. The concrete diagonal strut does not run over the entire storey but within the concrete support. The diagonal concrete strut is hung back with the help of the reinforcement. This “supplementary reinforcement” is formed using horizontal reinforcing steel bars running within the concrete bar of the support/bar system. Sufficient final anchoring of the horizontal rods – e.g. by looping the reinforcement – must be ensured in accordance with DIN EN 1992-1-1:2011-01 and DIN EN 1992-1-1/A1:2015-03 [7] in conjunction with DIN EN 1992-1-1/NA:2013-04 and DIN EN 1992-1-1/NA/A1:2015-12 [8], Section 8.

The design resistance $H_{Rd,3a}$ of re-suspended reinforcement is derived from equation (6):

$$H_{Rd,3a} = \min\left(A_{sh,r} \cdot f_{yd}; A_{sv,r} \cdot f_{yd} \cdot \frac{H}{b}\right) \quad (6)$$

where

$H_{Rd,3a}$ = design resistance of the supplementary reinforcement as per beam model

$A_{sh,r}$ = cross-section of the horizontal supplementary reinforcement;

$A_{sv,r}$ = cross-section of the vertical concrete bar reinforcement;

b = width of the considered concrete support;

f_{yd} = Rated value of steel strength of re-suspended reinforcement.

The design resistance $H_{Rd,3b}$ of the diagonal strut is based on analogy to (5) from equation (7):

$$H_{Rd,3b} = n * ¿ v \cdot f_{cd} \cdot b_c \cdot d_c \cdot \cos\theta \quad (7)$$

where

$n * ¿¿$ = 1;

θ = Inclination angle of the strut $30° \leq \theta \leq 60°$

The design resistance $H_{Rd,3}$ of the bar model as shown in Figure 1c) results from equation (8):

$$H_{Rd,3} = \min\left(H_{Rd,3a}; H_{Rd,3b}\right) \quad (8)$$

Annex 14

Technical Rule on Technical Building Equipment (Technische Regel Technische Gebäudeausrüstung [TR TGA])

Last updated: November 2024

CONTENTS

1 Combustion plants

1.1 Purpose of the installation

Combustion plants consist of fixed furnaces and exhaust systems. Combustion plants generate heat by burning liquid, gaseous, or solid fuels. Installations and facilities connected to fixed fuel supply lines via flexible lines are also considered to be fixed. Other heat-producing systems are fixed combustion engines, combined heat and power plants, fuel cells, and compressors.

1.2 Operational and fire safety-

For operational and fire safety, combustion plants must be constructed in accordance with generally accepted technical best practices and the use of suitable construction products. In doing so, the requirements of the Technical Rule included in the MVV TB under ser. No A 2.2.1.12 must be observed, including in terms of combustion air supply, placement of combustion plants, distances to combustible building materials, exhaust gas discharge, and fire resistance between storeys.

Electrically powered parts, such as motors, sensors and switches, shall be designed, insulated and protected accordingly; this also applies to influences due to moisture and cold or heat loads.

Sub-installations used for the conveyance of fuels shall be designed in such a way that fuels cannot ignite themselves in these sub-installations or in the fuel accumulators in front of them.

1.3 Setting up combustion plants

Detailed requirements for the design and permitted uses of installation areas for combustion plants are specified in the Technical Rule included in the MVV TB under ser. No A 2.2.1.12.
Boiler rooms are required according to the Technical Rule included in the MVV TB in under ser. No A 2.2.1.12 if solid fuels are used and performance limits are exceeded.

1.4 Spread of fire and safe exhaust discharge

To prevent the spread of fire and to ensure that exhaust gases are properly discharged, the provisions of the Technical Rule included in the MVV TB in ser. No A 2.2.1.12 must be observed.

1.5 Fuel supply and storage

The requirements of the Technical Rule referred to in the MVV TB under ser. No A 2.2.1.12 shall be complied with for all fuels.
The building authority requirements for the supply and connection of combustion plants for gas and liquid gas as fuels shall be considered fulfilled if the technical regulations of the German Gas and Water Specialist Association (DVGW) or the German Liquid Gas Specialist Association (DVFG) have been followed in the construction of the fuel supply system.

1.6 Essential requirements

1.6.1 Essential requirements for combustion plants

Proof that the exhaust gases from combustion plants in all intended operating conditions are discharged flawlessly into the open and that there is no dangerous overpressure compared to rooms is to be carried out on the basis of DIN EN 13384- 1:2019-09 or DIN EN 13384-2:2019-09.
Adequate combustion air supply for the operation of open-flue furnaces shall be ensured, taking account of building impermeability and in compliance with the Technical Rule included in the MVV TB under ser. No A 2.2.1.12. Operational safety of open-flue combustion plants must not be affected by the operation of ambient air extraction systems such as ventilation or warm air heating systems, extractor hoods and tumble dryer exhausts.
In room-sealed combustion plants, the required combustion air shall be supplied via air-tight ducts directly from the outside or via an air shaft, e.g. an air-exhaust system and a connecting line: it must not be taken from the installation areas of the combustion plants. Proof of sufficient combustion air supply for the operation of room-sealed combustion plants shall be carried out in accordance with DIN EN 13384-1:2019-09 or DIN EN 13384-2:2019-09 respectively.
Room-sealed solid-fuel combustion plants may only be installed in rooms, apartments, or similar unit with systems that extract air from the room if the air supply-side design is such that no negative pressure greater than 8 Pa with

respect to ambient air can be produced by the operation of the room-air extraction systems in the installation area, apartment or similar unit.
Room-sealed solid-fuel furnaces must have automatic, tight-closing doors, or other measures must be in place during operation to ensure that combustion gases cannot escape in hazardous amounts.
Due to their mode of operation, room-sealed furnaces may also be installed in service units which are permanently sealed in accordance with the state of the art and in service units equipped with mechanical ventilation systems.
For the establishment and operation of fireplaces, additional requirements may arise from other areas, such as the immission protection law, the building energy law and the sweeping and inspection regulations.

1.6.2 Essential requirements for stand-alone safety devices

In order to ensure safe overall operation of ventilation systems, including indoor air-extracting installations, such as extractor hoods or tumble dryer exhausts and open-flue furnaces, separate safety devices may be used to prevent the creation of a dangerous vacuum in the room where the furnace is installed in all operating conditions of the furnace.

Safety devices for differential pressure measurement shall be designed in such a way that the negative pressure in the storage room is 4 Pa or less compared to the external atmosphere; in the case of fireplaces for solid fuels, the design may also be carried out in such a way that the negative pressure in the connector is 4 Pa or more compared to the installation space.

Safety devices using an exhaust gas temperature sensor must be designed in such a manner that the sensor triggers differential pressure measurement, position monitoring, or other monitoring methods at a maximum exhaust gas temperature of 50°C (solid fuel furnace).
Self-contained safety devices may be used only in units wherein they can monitor the room in which the open-flue furnace is installed and connected spaces. It should be kept in mind that the open-flue furnace should not be connected to an exhaust system with multiple connections.

Secure data transmission shall be ensured. Unauthorised access to security-related functions shall be prevented.

The use of a safety device is not a substitute for professional design and execution of the air conditioning and firing systems in terms of the required combustion air supply and exhaust gas discharge with respect to the surrounding space. Self-contained safety devices may be installed only by persons with sufficient expertise. If a safety device is installed, the competent authorised chimney sweep shall be informed by the operator.

1.7 Requirements for the use of combustion plants

1.7.1 Essential requirements

The building authority requirements shall be deemed to be met if, in accordance with this Technical Rule, combustion plants

1. With CE marking pursuant to:
   - Regulation (EU) No 305/2011 (Construction Products Regulation) (on furnaces for solid and liquid fuels), in particular in accordance with Section 1.9 of this Technical Rule,
   - Regulation (EU) 2016/426 (Gas Appliances Regulation) (on furnaces for gaseous fuels),
   - Directive 2006/42/EC (Machinery Directive), from 14 January 2027: Regulation (EU) 2023/1230 (Machinery Regulation) (on e.g. combustion plants for liquid and solid fuels with motor drive),
   - Directive 2014/35/EC (Low-Voltage Directive) (on e.g. furnaces for liquid and solid fuels with combustion air controls or convection air blowers) or
   - Directive 2014/68/EU (Pressure Equipment Directive) (on hot water production assemblies),
2. without CE marking, in the case of combustion plants for solid fuels without motorised drive, except for domestic burning appliances, or
3. without CE marking, in the case of combustion plants constructed in accordance with generally accepted technical best practices, or
4. with a certificate of usability from the building authority

are used.

1.7.2 Combustion plants for solid and liquid fuels bearing the CE marking according to harmonised technical specifications based on the Construction Products Regulation

In order to fulfil the building authority requirements, the performance of the construction products used in terms of key features must at least satisfy Table 1a.

Explanatory notes to Table 1a

Column no.	Product according to harmonised standard
2	EN 13240:2001, EN 13240:2001/A2:2004 and EN 13240:2001/AC:2006 and EN 13240:2001/A2:2004/AC:2007 Room heaters fired by solid fuel – Requirements and test methods0
3	EN 13229:2001, EN 13229:2001/A1:2003, EN 13229:2001/AC:2006 and EN 13229:2001/A2:2004/AC:2007 Inset appliances including open fires fired by solid fuels – Requirements and test methods0
4	EN 12815:2001, EN 12815:2001/A1:2004 und EN12815:2001/AC:2006 und EN 12815:2001/A1:2004/AC:2007 – Residential cookers fired by solid fuel – Requirements and test methods0
5	EN 12809:2001, EN 12809:2001/A1:2004, EN 12809:2001/AC:2006/AC:2007 + EN 12809:2001/A1:2004/AC:2007 Residential independent boilers fired by solid fuel – Nominal heat output up to 50 kW– Requirements and test methods0
6	EN 15250:2007 Slow heat release appliances fired by solid fuel – Requirements and test methods0
7	EN 14785:2006 Residential space heating appliances fired by wood pellets – Requirements and test methods0
8	EN 15821:2010 Multi-firing sauna stoves fired by natural wood logs – Requirements and test methods0
9	EN 1:1998 and EN1:1998/A1:2007 Flued oil stoves with vaporising burners and chimney connection0

Table 1a

Essential feature	**Product according to harmonised standard**							
1								
Fire safety								
Distances to combustible materials	L	L	L	L	L	L	L	L
Fire hazard due burning materials falling out	X	X	X	X	X	X	X	-
Emissions from combustion products (at rated thermal output and if declared at partial load and light load)								
CO	L	L	L	L	L	L	L	K*
Release of dangerous substances	X	X	X	X	X	X	X	X
Surface temperature	X	X	X	X	X	X	X	X
Electrical safety	X	X	X	X	X	X	X	X
Cleanability	-	-	-	-	-	-	-	-
Maximum operating pressure (only applicable if the furnace is equipped with water-bearing structural elements)	L	L	L	L	L	L	L	-
Mechanical strength (capacity to support a chimney)	-	-	-	-	-	-	-	-

0 Implemented in Germany by DIN EN 13240:2005-10 + DIN EN 13240 Corrigendum 1 2008-06
0 Implemented in Germany by DIN EN 13229:2005-10 + DIN EN 13229 Corrigendum 1:2008-06
0 Implemented in Germany by DIN EN 12815:2005-09 + DIN EN 12815 Corrigendum 1:2008-06
0 Implemented in Germany by DIN EN 12809:2005-08 + DIN EN 12809 Corrigendum 1:2008-06
0 Implemented in Germany by DIN EN 15250:2007-06 + DIN EN 15250 Corrigendum 1:2015-05
0 Implemented in Germany by DIN EN 14785:2006-09 + DIN EN 14785 Corrigendum 1:2007-10
0 Implemented in Germany by DIN EN 15821:2011-01
0 Implemented in Germany by DIN EN 1:2007-12

Essential feature	**Product according to harmonised standard**							
1								
Heat output/efficiency								
Nominal space heat output	L	L	L	L	L	L	L	L
Nominal water heat output (if applicable)[1]	L	L	L	L	L	L	L	-
Partial-load room heat output (if specified by the manufacturer)[2]	L	L	L	L	L	L	L	L
Partial load water heat output (if applicable[1] and if specified[2])	L	L	L	L	L	L	L	-
Low load room heat output (if specified by the manufacturer[2])	L	L	L	L	L	L	L	-
Light-load water heat output (if applicable[1] and if specified by the manufacturer[2])	L	L	L	L	L	L	L	-
Efficiency at nominal heat output	L	L	L	L	L	L	L	K
Efficiency at partial-load heat output (if specified by the manufacturer[2])	L	L	L	L	L	L	L	-
Exhaust gas temperature at nominal thermal output and partial-load thermal output (if specified)	L	L	L	L	L	L	L	L
Durability	-	-	-	-	-	-	-	-

1 Water thermal output – Output must be specified if the furnace has a water heat exchanger;
2 If the manufacturer provides for partial or light load operation for the furnace, the performance of this thermal output is required
This applies equally to cases with/without water heat exchangers;
X must be fulfilled
K Classification required
K* The class may contain other parameters in addition to the CO value and the specification of the efficiency.
L Value for the output required
- Essential feature for the construction product not included in Annex ZA, or included in Annex ZA but not required under building authority regulations

When using construction products in accordance with the harmonised DIN EN 16510 series of standards, performance concerning essential characteristics is required at least in accordance with Table 1b in order to meet the building authority requirements.

Explanatory notes to Table 1b

Column No	**Product according to harmonised standard**
2	EN 16510-2-1:2022 Residential solid fuel burning appliances - Roomheaters0
3	EN 16510-2-2:2022 Residential solid fuel burning appliances - Inset appliances including open fires0
4	EN 16510-2-3:2022 Residential solid fuel burning appliances - Cookers0
5	EN 16510-2-4:2022 Residential solid fuel burning appliances - Independent boilers - Nominal heat output up to 50 kW0
6	EN 16510-2-6:2022 Residential solid fuel burning appliances - Mechanically by wood pellets fed roomheaters, inset appliances and cookers0

Table 1b:

0 Implemented in Germany by DIN EN 16510-2-1:2023-02.
0 Implemented in Germany by DIN EN 16510-2-2:2023-02.
0 Implemented in Germany by DIN EN 16510-2-3:2023-02.
0 Implemented in Germany by DIN EN 16510-2-4:2023-11.
0 Implemented in Germany by DIN EN 16510-2-6:2023-02.

Essential feature	**Product according to harmonised standard**				
1	**2**	**3**	**4**	**5**	**6**
Mechanical strength and stability - load-bearing capacity	L	-	-	-	L

Essential feature	**Product according to harmonised standard**				
1	**2**	**3**	**4**	**5**	**6**
Fire protection – Protection of combustible materials					
Minimum distances to combustible materials (under the furnace, on the floor to the front, to the ceiling, to the rear wall, to the side wall, to the side wall in the radiation area, and to adjacent combustible materials)	L	L	L	L	L
Material type and thickness of thermal insulation (if applicable)	L	L	L	L	L
Hygiene, health and environmental protection - emissions from combustion products (at nominal heat output and, if indicated, at partial load)[2] Limit values pursuant to Ecodesign 2015/1185/EC					
CO	X	X	X	X	X
NO_x	X	X	X	X	X
OGC	X	X	X	X	X
PM	X	X	X	X	X
Safety and accessibility during use (at nominal heat output and, if specified, at partial load)[2]					
Temperature at the exhaust gas nozzle	L	L	L	L	L
Minimum conveying pressure	L	L	L	L	L
Exhaust mass flow	L	L	L	L	L
Data for installation on a chimney with regard to fire safety - T-Class of the chimney	L	L	L	L	L
Energy saving and thermal insulation - heat output and energy efficiency of the appliance (at nominal heat output and, if indicated, at partial load)[2]					
Nominal room heating output	L	L	L	L	L
Nominal water heat output (if applicable)[1]	L	L	L	L	L
Efficiency at nominal heat output	L	L	L	L	L
Partial-load room heating output (if specified by the manufacturer)[2]	L	L	L	L	L
Partial load water heat output (if applicable[1] and if specified[2])	L	L	L	L	L
Efficiency at partial load heat output (if specified by the manufacturer[2])	L	L	L	L	L
Seasonal room heating energy efficiency at nominal heat output	L	L	L	L	L
Energy efficiency (index and class)	L+K	L+K	L+K	L+K	L+K
Power consumption at nominal heat output, if available	L	L	L	L	L
Power consumption at partial load heat output, if available	L	L	L	L	L
Power consumption in standby mode, if available	L	L	L	L	L
Sustainable use of natural resources - Ecological sustainability	L	L	L	L	L

Essential feature	**Product according to harmonised standard**				
1	**2**	**3**	**4**	**5**	**6**
[1] Water heat output – performance indication is required if the furnace has a water heat exchanger; [2] if the manufacturer provides for partial load operation of the furnace, the performance specification of this heat output is required. This applies equally to appliances with/without water heat exchangers; X must be fulfilled K Indication in the form of device class required L Value for the output required - Essential feature for the construction product not included in Annex ZA, or included in Annex ZA but not required under building authority regulations					

When using furnaces according to the Construction Products Regulation, except for sauna stoves according to EN 15821:2010[7], it should be observed that

- in the case of burning appliances in accordance with the DIN EN 16510-2-x series of standards intended to be operated independently of the ambient air, these must comply with type CA in accordance with DIN EN 16510-1:2023-02, and the leakage determined in accordance with Section 5.9.2 of the aforementioned standard must not exceed 3 m^3/h. The documentation of the type of furnace and the overall tightness shall be provided by a type test report from a notified body. Several room-sealed furnaces may be connected to a common air-exhaust chimney if they are located within the same unit of use (i.e. within the same area of operation of the ventilation system) (multiple occupancy).
- the distance to structural elements made of combustible building materials, as specified by the CE marking, is observed, where adjacent structural elements shall have a thermal resistance, in accordance with the harmonised standard, of $R \leq 1.2$ m^2K/W for solid fuel furnaces and $R \leq 0.127$ m^2K/W for liquid fuel furnaces, unless otherwise specified in the declarations of performance with respect to the thermal resistance of the adjacent structural elements. In case of higher thermal resistances, additional measures may be required, e.g. according to DIN 18896:2014-02, Section 4.4.1,
- in the case of fireplace inserts in furnaces, the provisions of the generally recognised technical best practices are observed,
- when using slow heat release furnace appliances

  1. the nominal heat output (kW) of the furnace is specified on the basis of the total heat output (kJ) and the time until the average surface temperature is 25 % of the maximum value, and
  2 mineral structures of the furnace that come into contact with fire or exhaust gas, have the following characteristics as described in Table 2.

Table 2:

Materials	**Raw density [kg/dm³]**
Standard chamotte	1.75 to 2.2
Dense chamotte	2.3 to 4.0
Vermiculite	0.6 to 1.5
Soapstone[1]	2.8 to 3.2
Fire-proof concrete	1.9 to 2.8
[1] not for the combustion chamber	

or the durability requirements of relevant standards have been demonstrated as follows:

f. Fire resistance (pyrometric cone equivalent as a fire resistance index) > 15,
g. Thermal shock resistance ≥ 25 cycles,
h. Thermal length expansion ≤ 1.5 %,
i. permanent length expansion after exposure to temperature < 1.5 %.

1.7.3 Furnaces bearing the CE marking under harmonising rules other than the Construction Products Regulation

When using furnaces which do not bear the CE marking in accordance with the Construction Products Regulation, the following shall apply:

For the construction and operation of furnaces for gaseous or liquid fuels with CE marking, which are not carried out on the basis of the Construction Products Regulation, the generally accepted technical best practices as well as the Model Firing Regulation referred to in the MVV TB under ser. No A 2.2.1.12 must be observed. This includes the exhaust system.

1.7.4 Furnaces without CE marking

For the construction and operation of on-site fireplaces for solid fuels with handcrafted combustion chambers, the generally accepted technical best practices must be observed, taking into account the Model Firing Regulation referred to in the MVV TB under ser. No A 2.2.1.12.

The following insulation materials may be used for furnaces built on site in compliance with the implementation provisions of the generally accepted technical best practices:

- Thermal insulation products for building equipment and industrial installations - Factory made mineral wool (MW) products – pursuant to DIN EN 14303:2016-08;
- Thermal insulation products for building equipment and industrial installations – Factory made calcium silicate (CS) products – pursuant to DIN EN 14306:2016-03;
- Thermal insulation products for building equipment and industrial installations – Factory made expanded perlite (EP) and expanded vermiculite (EV) products – pursuant to DIN EN 15501:2016-03.

1.8 Requirements for the installation and safe use of exhaust systems

Exhaust systems must safely discharge the exhaust gases from furnaces to the outside. Exhaust systems such as exhaust pipes, chimneys, air-exhaust systems, air-exhaust chimneys, and connectors may be constructed either from individual structural elements (assembly exhaust system) or from kits (system exhaust system) in accordance with this section.

For the construction and operation of exhaust systems, the Model Firing Regulation referred to in the MVV TB under ser. No A 2.2.1.12 must be observed. In addition, the building authority requirements for the planning and execution of exhaust systems for the discharge of exhaust gases from furnaces operated with solid, liquid or gaseous fuels, as well as for the discharge of exhaust gases from heat pumps, combined heat and power plants, and stationary combustion engines are deemed to be met if the rules of DIN 18160-1:2023-02 and the provisions listed below have been complied with.

Structural elements of exhaust gas systems must be at least normally flammable in terms of their reaction to fire. The distance to combustible building materials specified in the marking of construction products for exhaust systems applies only to adjacent walls with a thermal resistance of $R \leq 2.7$ m²K/W and for ceilings and roofs to be penetrated with a thermal resistance of $R \leq 5.4$ m²K/W. The use of exhaust systems in buildings with wall, ceiling

and roof structures made of or with combustible building materials with higher thermal resistances is permitted only if covered by harmonised specifications or if an appropriate type approval has been granted.
Where exhaust systems extend across floors, they must be designed in such manner that in case of an indoor fire with an external fire impact on the surfaces of the exhaust system, propagation of the fire is prevented for a specified time. Such exhaust systems must therefore have sufficiently long fire resistance. This may be achieved by an appropriate choice of materials and construction for the exhaust system or by combining them with a shaft.
For applications where requirements for the fire resistance duration of the exhaust system to avoid the fire transmission from floor to floor are to be demonstrated, the fire resistance including a thermal pretreatment, according to a thermal load due to heating operation taking into account DIN 18160-60:2014-02 or DIN EN 1366-13:2019-09. To demonstrate the fire resistance according to DIN EN 1366-13:2019-09, the vertical test structure with a test specimen “B” shall be used. By way of deviation from DIN EN 1366-13:2019-09, test results with stainless steel inner tubes can only be transferred to internal pipes made of non-combustible materials.

Executed exhaust systems must be permanently and visibly marked according to the area of application. The fire resistance class shall be indicated.

The information required by the building authority regarding the fire resistance class of the exhaust systems can be found in Table 3.

Table 3:

Building approval requirement and classification according to DIN 18160-60 for exhaust systems		
Building approval requirement	**Fire resistance classes**	
Fire-retardant	L_A30*	Fire resistance time ≥ 30 minutes
Fire-resistant	L_A90*	Fire resistance time ≥ 90 minutes
* * The specified fire resistance must have been tested with thermal pre-treatment in accordance with the selected temperature class (e.g. T400).		

When using outer shells of exhaust systems according to DIN 18160-1:2023-02, which are designed as assembly chimneys and are subject to fire resistance requirements, this must be verified in accordance with DIN 18160-60:2014-02 or DIN EN 1366-13:2019-09 by means of a certificate of usability from the building authority. The proof may be provided for the outer shell alone or together for structures with multiple shells.

For free-standing exhaust systems with a height > 3 m above the highest effective support, the provisions of Section A 1.2.8.1 of MVV TB shall be observed.

In order to meet the requirements for the quality of exhaust systems, the construction products used pursuant to harmonised technical specifications must satisfy at least the performance levels given in Table 4 for the key features.

Explanatory notes to Table 4

Column No	**Product according to harmonised technical specification**
2	EN 1457-1:2012 Clay/ceramic flue liners - Flue liners operating under dry conditions0
3	EN 1457-2:2012 Clay/ceramic flue liners - Flue liners operating under wet conditions0
4	EN 1806:2006 Clay/ceramic flue blocks for single wall chimneys0
5	EN 1856-1:2009 Requirements for metal chimneys - System chimney products0
6	EN 1856-2:2009 Requirements for metal chimneys - Metal flue liners and connecting flue pipes0
7	EN 1857:2010 Chimneys - Components - Concrete flue liners0
8	EN 1858:2008+A1:2001 Chimneys - Components - Concrete flue blocks0
9	EN 12446:2011 Exhaust systems - Components - Concrete outer shells0

0 Implemented in Germany by DIN EN 1457-1:2012-04
0 Implemented in Germany by DIN EN 1457-2:2012-04
0 Implemented in Germany by DIN 1806:2006-10
0 Implemented in Germany by DIN EN 1856-1:2009-09
0 Implemented in Germany by DIN EN 1856-2:2009-09
0 Implemented in Germany by DIN EN 1857:2010-08
0 Implemented in Germany by DIN EN 1858:2011-09

Column No	Product according to harmonised technical specification
10	EN 13063-1:2005+A1:2007 Chimneys - System chimneys with clay/ceramic flue liners - Requirements and test methods for sootfire resistance0
11	EN 13063-2:2005+A1:2007 Chimneys - System chimneys with clay/ceramic flue liners - Requirements and test methods under wet conditions0
12	EN 13063-3:2007 Chimneys - System chimneys with clay/ceramic flue liners - Requirements and test methods for air flue system chimneys0
13	EN 13069:2005 Chimneys - Clay/ceramic outer walls for system chimneys0
14	EN 14471:2013+A1:2015 Chimneys - System chimneys with plastic flue liners0
15	EN 14989-1:2007 Chimneys - Requirements and test methods for metal chimneys and material independent air supply ducts for roomsealed heating applications - Vertical air/flue terminals for C6-type appliances0
16	EN 14989-2:2007 Chimneys - Requirements and test methods for metal chimneys and material independent air supply ducts for roomsealed heating applications - Flue and air supply ducts for room sealed appliances0
17	EAD (European Assessment Document)

Table 4:

Essential feature	Product according to harmonised technical specification															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Temperature class	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K*
Pressure class	K	K	K	K	K	K	K	-	K	K	K	-	K	K	K	K*
Condensate resistance class	K	K	K	K	K	K	K	-	K	K	K	-	K	K	K	K*
Corrosion resistance class	K	K	K	K	K	K	K	-	K	K	K	-	K	K	K	K*
Soot fire resistance class	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K*
Specifications for distance from combustible building materials	-	-	L	L	L	-	L	L	L	L	L	-	L	L	L	L*
Pressure class if not included above (for LAS)	-	-	-	-	-	-	-	K	-	-	-	K	-	-	-	K*
Reaction to fire	-	-	-	-	-	K	K	K	-	-	-	-	K	-	-	K*
Thermal resistance	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L*
Flow resistance	L	L	L	L	L	L	L	-	L	L	L	-	L	L	L	L*
Freeze-thaw cycle resistance	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
Mechanical strength and stability	L	L	L	L	L	L	L	L	L	L	L	L	L	X	L	L*
Fire resistance																K*

X must be fulfilled
K Classification required
L Value for the output required
- Essential feature for the construction product not included in Annex ZA, or included in Annex ZA but not required under building authority regulations
* Depending on the product and application area, the essential feature must be specified

1.9 Installation and operation of products

Detailed installation and operating instructions from the manufacturer or its representative must be available in German and must be observed.

0 Implemented in Germany by DIN EN 12446:2011-09
0 Implemented in Germany by DIN EN 13063-1:2007-10
0 Implemented in Germany by DIN EN 13063-2:2005-12
0 Implemented in Germany by DIN EN 13063-3:2007-10
0 Implemented in Germany by DIN EN 13069:2005-12
0 Implemented in Germany by DIN EN 14471:2015-03
0 Implemented in Germany by DIN EN 14989-1:2007-05
0 Implemented in Germany by DIN EN 14989-2:2008-03

The operating instructions must contain in detail the information required for commissioning, inspection, maintenance, repair and functional verification.

2 Fire alarm systems

2.1 Purpose of the installation

Fire alarm systems are hazard alarm systems. They must be used by people to call for help directly (manual release) in the event of fire hazards. Automatic fire alarm systems must detect and report fires at an early stage. The fire alarm shall be forwarded immediately by the transmission device to alert the control centre of the locally responsible fire department.
Fire detection systems are technically suitable to warn the persons threatened by the fire and to inform about the fire event.

Smoke alarms or networked smoke alarms do not constitute fire alarm systems.
Fire alarm systems cannot be taken over by fire alarm systems.
Unlike fire warning systems, fire alarm systems are technically suitable to control other systems, in particular to activate fire control systems.

2.2 Construction products of fire alarm systems

To fulfil the building authority requirements, fire alarm systems must provide permanent operational reliability and be constructed using construction products of the DIN EN 54 series of standards.
To that end, they must be sufficiently powerful and permanently reliable, have sufficient response delay, moisture, corrosion and temperature resistance as well as shock and vibration resistance.

If no harmonised standards are available for components of a fire alarm system, construction products listed in DIN 14675-1:2020-01 or DIN VDE 0833-2:2017-10, or those placed on the market based on other standards as construction products that do not require proof of usability, may also be used.

The cables and lines necessary for the connection of individual construction products may be used if they are fit for use, sufficiently dimensioned, and suitable for the intended purpose. In addition, the requirements for the reaction to fire and functional integrity under exposure to fire in accordance with the Technical Rule included in the MVV TB under ser. No A 2.2.1.8 must be observed, taking into account Section 2 of the Technical Rule included in the MVV TB under ser. No A 2.2.1.2.

In order to fulfil the building inspection requirements, the performance of the construction products used in terms of key features must at least satisfy Table 1.

Explanation for Table 1

Column no.	Product according to harmonised standard
2	EN 54-2:1997 + EN 54-2:1997/A1 2006 Fire alarm control panels0
3	EN 54-3:2001 + A1:2002 + A2:2006 Fire alarm devices - Sounders 0
4	En 54-4:1997 + EN 54-4:1997/AC:1999 + EN 54-4:1997/A1:2002 + EN 54-4:1997/A2:2006 Power supply equipment0
5	EN 54-5:2017 +A1:2018 Heat detectors – Point hear detectors0
6	EN 54-7:2018 Smoke detectors - Point smoke detectors that operate using scattered light, transmitted light or ionization0
7	EN 54-10:2002 + EN 54-10/A1:2005 Flame detectors; Point detectors0
8	EN 54-11:2001 + EN 54-11/A1:2005 Manual call points0
9	EN 54-12:2015 Smoke detectors – Line detectors using an optical beam0

0 Implemented in Germany by DIN EN 54-2:1997-12 in conjunction with DIN EN 54-2/A1:2007-01
0 Implemented in Germany by DIN EN 54-3:2006-08
0 Implemented in Germany by DIN EN 54-4:1997-12 in conjunction with DIN EN 54-4/A1:2003-03 + DIN EN 54-4/A2:2007-01
0 Implemented in Germany by DIN EN 54-5:2018-10
0 Implemented in Germany by DIN EN 54-7:2018-10
0 Implemented in Germany by DIN EN 54-10:2002-05 + DIN EN 54-10/A1:2006-03
0 Implemented in Germany by DIN EN 54-11:2001-10 + DIN EN -54-11/A1:2006-03
0 In Germany implemented by DIN EN 54-12:2015-10 in conjunction with DIN EN 54-12 Corrigendum 1:2018-08

Column no.	Product according to harmonised standard
10	EN 54-16:2008 Voice alarm control and indicating equipment0
11	EN 54-17:2005 + EN 54-17:2005/AC:2007 Short-circuit isolators0
12	EN 54-18:2005 + EN 54-18:2005/AC:2007 Input/output devices0
13	En 54-20:2006 + EN 54-20:2006/AC:2008 Aspirating smoke detectors0
14	EN 54-21:2006 Alarm transmission and fault warning routing equipment0
15	EN 54-23:2010 Fire alarm devices - Visual alarm devices0
16	EN 54-24:2008 Components of voice alarm systems – Loudspeakers0
17	EN 54-25:2008 + EN 54-25:2008/AC:2012 structural elements using high-frequency connections0

0 Implemented in Germany by DIN EN 54-16:2008-06
0 Implemented in Germany by DIN EN 54-17:2006-03
0 Implemented in Germany by DIN EN 54-18:2006-03 and DIN EN 54-18 Corrigendum 1: 2007-05
0 Implemented in Germany by DIN EN 54-20:2009-02
0 Implemented in Germany by DIN EN 54-21:2006-08
0 Implemented in Germany by DIN EN 54-23:2010-06
0 Implemented in Germany by DIN EN 54-24:2008-06
0 Implemented in Germany by DIN EN 54-25:2009-02 and DIN EN 54-25 Corrigendum 1:2012-09

Table 1:

Essential feature	**Product according to harmonised standard**															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Performance in case of fire																
General requirements	X		X						X				X			
General requirements for displays	X								X							
Fire alarm status	X															
Functions			X										X			
Materials, manufacture and execution			X										X			
Sound level		X														
Frequency and sound form		X														
Spread between samples		X		X	X	X		X		X		X			X	
Function testing		X									X					
Location of heat-sensitive elements				X												
Directional dependence				X	X	X										
Static response temperature				X												
Response times at typical application temperature				X												
Response times at 25° C				X												
Response times at high ambient temperature				X												
Additional check for detectors with category S [1]				X												
Additional check for detectors with category index R [1]				X												
Response to slowly developing fires					X							X				
Repeatability/repeat precision					X	X		X				X				
Air movement					X											
Glare					X											
Fire sensitivity					X	X		X				X				
Classification						X										
Glare test (in operation)						X										
Alarm status							X									
Alarm status displays							X									
Safety aspects							X									
Protection from unintentional triggering							X									
Suitability for use test							X									
Verification of function							X									
Dependence on length of the optical measuring Section								X								

Essential feature	**Product according to harmonised standard**															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Scattered light								X								
Voice alarm status									X							
Manual triggering of voice alarm									X							
Emergency microphone									X							
Signal-to-noise ratio									X							
Frequency response of the voice alarm system without microphone									X							
Frequency response of the voice alarm system with microphone									X							
Signalling range														X		
Change in light emission														X		
Smallest & largest effective light intensity														X		
Light colour														X		
Light pattern over time and flash frequency														X		
Tolerance for misalignment of the beam								X								
Synchronisation														X		
Frequency response limits															X	
Nominal impedance															X	
Horizontal and vertical beam angle															X	
Maximum sound level															X	
Response delay																
Reception and processing of fire alarms	X								X							
Output for forwarding the fire alarm state	X															
Dependence of the fire alarm state on more than one alarm signal	X															
Rapid changes in light attenuation								X								
Delay in the transition to the voice alarm state									X							
Output to alarm systems									X							
Emergency microphone									X							
Operational reliability																
General requirements	X		X						X	X			X			X
General requirements for displays	X								X							
Operational readiness state	X								X							
Fire alarm status	X															
Fault alarm status	X								X							

Essential feature	**Product according to harmonised standard**															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Shutdown status	X															
Requirements for execution	X								X				X			
Additional requirements for the execution of software-controlled fire alarm systems	X															
Labelling	X		X										X	X		
Functions			X										X			
Materials, manufacture and execution			X													
Documentation.			X			X	X					X				X
Service life		X														
Structure		X														
Labelling and data		X											X		X	X
Life span test		X														
Individual alarm display				X	X	X		X				X				
Connection of auxiliary devices				X	X	X		X				X				
Monitoring detachable detectors [2]				X	X	X		X								
Manufacturer comparisons				X		X		X				X		X		
Setting the response behaviour on site				X[2]		X		X				X		X		
Additional requirements for software-controlled detectors [2]				X	X	X		X				X				
Protection from the penetration of foreign bodies					X			X								
Reset device							X									
Testing device							X									
Shape, dimensions, and colours							X									
Symbols and labelling							X									
Environmental category							X									
Additional requirements for software-controlled handheld fire detectors [2]							X									
Inspection of the testing device (In operation)							X									
Reliability test (durability test)							X									
Voice alarm status									X							
Manual triggering of voice alarm									X							
Interface to external controls									X							

Essential feature	**Product according to harmonised standard**															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Additional requirements for the execution of software-controlled voice alarm systems									X							
Mechanical strength of the pipeline												X				
Hardware structural elements and additional sensor units in the suction system												X				
Air flow monitoring												X				
Power supply												X				
Duration of operation														X		
Preventive measures for outdoor cables														X		
Flammability of materials														X		
Access														X		
Requirements for software-controlled devices														X		
Durability															X	
Construction															X	
Nominal noise power (durability)															X	
Housing protection															X	
Distance loss immunity																X
Identification of the RF-connected component																X
Performance characteristics of the receiver																X
Immunity from interference																X
Loss of communication																X
Antenna																X
Power supply equipment													X			X
Requirements for environmental assessment																X
Distance loss immunity testing																X
Testing to identifying the HF-connected structural elements																X
Testing the performance characteristics of the receiver																X
Verification of compatibility with other users of the frequency band																X

Essential feature	**Product according to harmonised standard**															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Testing detection of loss of communication on a connection																X
Testing the aerial																X[2)]
Test plan for component testing																X
Review of the service life of the autonomous energy source																X
Testing fault alarm for the weak energy supply status																X[2)]
Testing polarity reversal																X[2)]
Repeatability test																X
Permanence of operational reliability, moisture resistance, corrosion resistance, shock and vibration resistance, temperature resistance																
Cold in operation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Vibration, sinusoidal (in operation)	X		X													
Vibration, sinusoidal (durability test)	X		X													
EMC immunity (in operation)	X	X[2)]	X	X	X	X	X[2)]	X	X	X	X	X	X			X
Supply voltage fluctuations (in operation)	X								X				X			
Moist heat, constant (in operation)	X		X		X			X	X			X	X			X[2)]
Moist heat, constant (durability test)	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Shock (in operation)			X	X	X	X	X	X	X	X	X	X	X	X	X	X
Dry heat (in operation)		X			X	X	X	X		X	X	X		X	X	X[2)]
Dry heat (durability test)		X[1)]					X[1)]							X[1)]	X[1)]	X[2)]
Moist heat, cyclic (in operation)		X		X		X	X			X	X			X	X	X[2)]
Moist heat, cyclic (durability test)		X[1)]					X[1)]				X			X[1)]	X[1)]	
Sulphur dioxide corrosion (durability test)		X		X	X	X	X	X		X	X	X		X	X	X[2)]
Impact (in operation)		X		X	X	X				X	X	X		X	X	X[2)]
Oscillation, sinusoidal (in operation)		X		X	X	X	X		X	X	X	X	X	X	X	X
Oscillation, sinusoid (durability test)		X		X	X	X	X	X	X	X	X	X	X	X	X	X
Production by housing		X					X[1)]							X		
Fluctuations in supply parameters				X	X	X	X	X		X	X	X				

Essential feature	**Product according to harmonised standard**															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Shocks (in operation)							X									
Output power									X							
Transmission power																
General requirements													X			
Requirements for functions													X			
X must be fulfilled 1 if the feature is required due to the application 2 if the feature is applicable to the construction product																

2.3 Planning, design, and execution of fire alarm systems

Fire alarm systems, the technical planning, design and execution of which are carried out in accordance with DIN 14675-1:2020-01 in conjunction with DIN VDE 0833-1:2014-10 and -2:2017-10, are deemed to fulfil the building authority requirements unless more stringent requirements are imposed in the building authority procedure.

Fire alarm systems must be supplied with electricity for a sufficiently long time even in the event of a failure of the general power supply and remain functional.

The rules of planning, design and execution standards on maintenance are not part of this Technical Rule.

All necessary information for planning, design, and execution must be presented in the building documentation, and if necessary, in the fire protection certificate. This presentation also includes, for example, information on whether and which other safety or technical building installations and equipment the fire alarm system should control.

3 Alarm systems

3.1 Purpose of the installation

Alarm systems are hazard alerting systems. In the event of danger, they must alert and cause persons to leave the danger area by disseminating an emergency signal and/or a voice instruction. An alarm system shall consist of at least one control panel, an energy supply, trigger or control devices, signalling devices, and the connecting transmission path.
Voice alarms must be given at least in German language and be sufficiently comprehensible.
Alarm systems include electro-acoustic alarm systems in particular for issuing instructions, such as voice alarm systems or emergency warning systems. Alarm systems can also be executed as fire alarm systems with alarm function.

Tasks of alarm systems cannot be taken over by fire warning systems.

3.2 Construction products of alarm systems

In order to fulfil the building authority requirements, alarm systems must provide permanent operational reliability and be constructed using construction products that are sufficiently powerful and permanently reliable in case of an alarm and have sufficient response delay, resistance to moisture, corrosion, and temperature, and shock and vibration resistance.

If construction products according to DIN EN 54 Parts 3, 4, 16, 17, 23, and 24 are used for fire alarm systems for the construction of alarm systems, the performance of key features shall be determined and declared at least in accordance with Table 1 of Section 2.2 Fire alarm systems of this Technical Rule.

Where harmonised standards are not available for components of an alarm system, construction products listed in the design and dimensioning standards referred to in Section 3.3 or placed on the market on the basis of standards other than those for construction products, which do not require proof of usability, may also be used.

The cables and lines necessary for the connection of individual construction products may be used if they are fit for use, sufficiently dimensioned, and suitable for the intended purpose. In addition, the requirements for the reaction to fire and functional integrity under exposure to fire in accordance with the Technical Rule included in the MVV TB under ser. No A 2.2.1.8 must be observed, taking into account Section 2 of the Technical Rule included in the MVV TB under ser. No A 2.2.1.2.

3.3 Design, design, and execution of alarm systems

Alarm systems whose technical planning, designing, and execution observe the standards

- DIN 14675-1:2020-01 in conjunction with DIN VDE 0833-1:2014-10 and DIN VDE 0833-2:2017-10,
- DIN 14675-1:2020-01 in conjunction with DIN VDE 0833-1:2014-10, DIN VDE 0833-2:2017-10 and DIN VDE 0833-4:2014-10 or
- DIN EN 50849 (DIN VDE 0828-1):2017-11

if the building regulations requirements are met, if there are no further requirements in the building supervision procedure or if further requirements arise for reasons of accessibility according to the Technical Rule referred to in the MVV TB under ser. No A 4.2.2.1. The rules of planning, design and execution standards on maintenance are not part of this Technical Rule.

In the case of alarm systems with acoustic signal transmitters, the switch off of the signals must also be possible in the immediate vicinity of the first contact point for the fire brigade or the assisting point.
An alarm system with voice alarm requires a voice alarm control system. The voice alarm system may be a separate unit or physically integrated with the fire alarm system. Fire alarm and voice alarm control may be located at the same location, including the structural elements required for their operation.

Alarm systems must be supplied with power for a sufficiently long time even in the event of a failure of the general power supply and remain operational.

All necessary information for planning, design, and execution must be presented in the building documentation, and if necessary, in the fire protection certificate.

4 Emergency lighting systems

4.1 Purpose of the system

Emergency lighting systems are electrical systems, including associated wiring, with a power supply and more than one light, that illuminate rooms, escape routes or emergency signs even in case of power failure of the general lighting for as long as is needed to enable persons to safely leave the rooms or the building and – if required under building authority regulations – to reach public traffic areas, as well as to safely complete work operations where appropriate.

4.2 Construction products of emergency lighting systems

In order to comply with the building authority requirements, emergency lighting systems must provide permanent operational reliability.

Construction products for emergency lighting systems must comply with the product requirements of European standards or, if only national technical rules such as DIN or DIN VDE standards are in place, with these technical rules.

Emergency luminaires that comply with the DIN EN 60598-2-22 standard: (VDE 0711-2-22):2020-12 or the standard DIN EN IEC 60598-2-22 (VDE 0711-2-22):2023-07 meet the building authority requirements.

The cables and lines necessary for the connection of individual construction products may be used if they are fit for use, sufficiently dimensioned, and suitable for the intended purpose. In addition, the requirements for the reaction to fire and functional integrity under exposure to fire in accordance with the Technical Rule included in the MVV TB under ser. No A 2.2.1.8 must be observed, taking into account Section 2 of the Technical Rule included in the MVV TB under ser. No A 2.2.1.2.

4.3 Planning, design, and execution of emergency lighting systems

Emergency lighting systems, the technical planning, designing and execution of which observe the DIN VDE 0100 series of standards (with the exception of Parts 801 et seq. of each standard), DIN V VDE V 0108-100-1:2018-12 and DIN EN 1838:2019-11 as well as Section 5 "Emergency power supply systems" of this Technical Rule, are deemed to comply with the building authority requirements unless more stringent requirements are imposed in the building authority procedure.

All necessary information for planning, design, and execution must be presented in the building documentation, and if necessary, in the fire protection certificate.

5 Emergency power supply systems

5.1 Purpose of the installation

Emergency power supply systems are electrical installations which, in the event of a failure of the general power supply, maintain the operation of the safety installations for a certain period of time. Emergency power supply systems include the power source (voltage source or energy storage), the required switching and auxiliary equipment, and the associated wiring up to the terminals of the safety equipment to be supplied with power.

Backup systems that are needed for operational reasons, are not considered to be emergency power supply systems in the building supervisory sense.

5.2 Construction products of emergency power supply systems

In order to fulfil the building authority requirements, emergency power supply systems must provide permanent operational reliability.
Construction products for emergency power supply systems must comply with the product requirements of European standards or, if only national technical rules such as DIN or DIN VDE-standards are in place, with these technical rules.

Generator sets with reciprocating internal combustion engines that meet the requirements of the DIN 6280 series of standards and central power supply systems that meet the requirements of DIN EN 50171 (VDE 0558)-508):2022-10 meet the building authority requirements.

The cables and lines necessary for the connection of individual construction products may be used if they are fit for use, sufficiently dimensioned, and suitable for the intended purpose. In addition, the requirements for the reaction to fire and functional integrity under exposure to fire in accordance with the Technical Rule included in the MVV TB under ser. No A 2.2.1.8 must be observed, taking into account Section 2 of the Technical Rule included in the MVV TB under ser. No A 2.2.1.2.

5.3 Planning, design and execution of the emergency power supply systems

Emergency power supply systems whose technical planning, design and execution observes the DIN VDE 0100 series of standards (with the exception of Parts 801 ff of each standard), or the DIN VDE 0101 series of standards in the case of systems with a nominal voltage over 1000 V, are deemed to be compliant with the building inspection requirements unless more stringent requirements are imposed in the building supervisory procedure.

Emergency power supply systems shall be designed in such a way that, in the event of overload or short circuit, only the affected section is switched off, while the rest of the system remains in operation (selectiveness). Proof of selective fault switch-off may be provided with suitable engineering (calculation) methods.

The power source shall be designed such that it can maintain the power supply to the safety equipment for the required period of time. When designing the power source, its performance and start-up behaviour as well as the non-linearity of the consumers must be taken into account.

A separate supply from the supply network in accordance with DIN VDE 0100-560 (VDE 0100-560):2022-10, Section 6.1 "Electricity sources for safety purposes", last indent does not meet the building authority requirements for an emergency power supply system.

All necessary information for planning, design, and execution must be presented in the building documentation, and if necessary, in the fire protection certificate.

6 Ventilation systems

6.1 Purpose of the installation

Ventilation systems are used for the ventilation of rooms. The systems may be natural or mechanical ventilation systems. Mechanical systems include air-conditioning systems, climate control systems, and air heating systems.

Ventilation systems serve to meet the building inspection requirements for the adequate and effective ventilation of rooms.

6.2 Planning, designing and execution

Ventilation systems shall be planned, designed and executed in such a way that the building inspection requirements are met. The Technical Rules included in the MVV TB under serial numbers A 2.2.1.11 and A 3.2.6 must be observed.
Building inspection requirements may also be elaborated as technical best practices that have not been enacted in building supervisory rules.

Ventilation systems are to be designed in such a way that there is no risk of hygienic pollution of the room air.

Adequate ventilation of human occupancy areas requires a mechanical ventilation system if it cannot be ensured with natural ventilation.

If overflow openings are provided in room-closing walls for ventilation reasons, the regulations on overflow openings according to MVV TB, Section A 2.1.3.3.1 shall be observed.

In the case of fire dampers, proper closing must be checked after first installation in order to prevent damage during installation.

All necessary information for planning, design, and execution must be presented in the building documentation, and if necessary, in the fire protection certificate.

6.3 Construction products and designs

6.3.1 General provisions

Construction products and designs of ventilation systems shall be selected and used in accordance with technical and hygienic requirements.

Where harmonised standards are not available for components of a ventilation system, construction products listed in design and dimensioning standards or placed on the market on the basis of other standards as construction products that do not require proof of usability may also be used.

In particular, the installation position, the required temperature resistance, the fire resistance duration, the requirements for tightness, the required volume flow, the pressure difference, the location, and the ambient temperatures must be taken into account for the fire protection properties.
Fire dampers according to EN 15650:2010[0] with mechanical shut-off element may only be used in ventilation systems with the axle position of the mechanical shut-off element, which has been demonstrated by the fire resistance test specified in the above harmonised standard. The nominal trigger temperature of the thermal triggering device of the fire dampers must not exceed 72°C, or 95°C in the supply air for warm air ventilation systems.

Fire dampers used in atmospheres that may have a damaging or corrosive effect on them due to planned or unplanned chemical reactions are not in the scope of EN 15650:2010[45]. These include atmospheres in exhaust air ducts or ventilation ducts in commercial kitchens.

0 Implemented in Germany by DIN EN 15650:2010-09

6.3.2 Performance required to meet the building requirements

When using construction products with proof of fitness for purpose in accordance with § 17 MBO[0] or when using designs pursuant to § 16a MBO[46], the minimum classes shall be as given in Tables 1 to 3 and 6.

When using construction products for ventilation systems for which there are harmonised technical specifications pursuant to Regulation (EU) No 305/2011, the performance of key features shall be at least as given in Table 4 in conjunction with Table 5 and Table 7.

Table 1:

Fire dampers in suspended ceilings (not in the scope of EN 15650:2010[45])			
	Minimum required performance		
Building inspection Requirement	**Fire resistance class according to DIN 4102-6:1977-09 and additional designation according to proof of fitness for purpose**	**Building material class pursuant to DIN 4102-1:1998-05**	
		Housing, switch-off valve	Other structural elements
Fire-retardant	K 30 U	A2	B2
Highly fire-retardant	K 60 U		
Fire-resistant	K 90 U		

Table 2:

- Fire dampers in ventilation systems that do not fall within the scope of EN 15650:2010[45], e.g. in exhaust or discharge air ducts of commercial kitchens			
- Fire protection valves not falling within the scope of EN 15650:2010[45]			
	Minimum required performance		
Building inspection Requirement	**Fire resistance class according to DIN 4102-6:1977-09**	**Building material class pursuant to DIN 4102-1:1998-05**	
		Housing, switch-off valve	Other structural elements
Fire-retardant	K 30	A2	B2
Highly fire-retardant	K 60		
Fire-resistant	K 90		

Table 3:

Shut-off devices and fire protection systems in ventilation systems in accordance with the Technical Rule referred to in MVV TB under ser. No 2.2.1.11, Section 7.2, and Individual ventilation units with integrated fire protection equipment (shut-off device) for ventilation systems in accordance with DIN 18017-3:2022-05 pursuant to ser. No B 3.2.1.34	
	Minimum required performance
Building approval requirement	**Fire resistance class according to DIN 4102-6:1977-09 and additional designation according to proof of fitness for use**
Fire-retardant	K30-18017, K30-18017 S
Highly fire-retardant	K60-18017, K60-18017 S
Fire-resistant	K90-18017, K90-18017 S

0 according to national law

Table 4:

Essential feature	**Fire dampers in accordance with EN 15650:2010[45]**
Reference conditions for activation/response sensitivity	X
Response delay/response time	X
Operational safety (cycles)	50
Fire resistance♦	
- Room enclosure	K
- Thermal insulation	K
- Smoke leakage	K
- Mechanical strength (with respect to E)	X
- Retention of cross-section (with regard to E)	X
Durability	
- of the response delay	X
- of operational safety	L

X must be fulfilled
K Classification required
L Performance required as a value (In the case of fire dampers with only temperature sensitive probes (without motor) the durability is demonstrated with the 50 cycles of operational safety).
♦ see Table 5

Table 5:

Fire dampers in accordance with EN 15650:2010[45]			
	Minimum required performance		
Building authority requirement	**Fire resistance**	**Reaction to fire**	
		Housing, Switch-off valve	remaining components
Fire-retardant	EI 30 ($v_e h_o$ i↔o) S	A 2-s1, d0	E-d2
Highly fire-retardant	EI 60 ($v_e h_o$ i↔o) S		
Fire-resistant	EI 90 ($v_e h_o$ i↔o) S		
Fire resistance of 120 minutes	EI 120 ($v_e h_o$ i↔o) S		

Table 6:

Fire resistant ventilation ducts		
	Minimum required performance	
Building authority requirement-	**Fire resistance class according to DIN 4102-6:1977-09 and if applicable, DIN V 4102-21:2002-08**	**Building material class according to DIN 4102-1:1998-05**
fire-retarding	L 30	A2
Highly fire-retardant	L 60	A2
Fire-resistant	L 90	
Fire resistance of 120 minutes	L 120	
For fire-resistant ventilation ducts that require a general building supervisory inspection certificate, see also Sections C 3.1 and C 4.4 of the MVV TB. For fire-resistant ventilation ducts, the inner shell (corresponding to the air-carrying duct) in accordance with A 2.2.1.11, Section 3.2.1, sentence 1, No 3, may consist of flame-retardant building materials; Sentence 3 of the Technical Rule pursuant to A 2.2.1.11, Section 3.2.1 remains unaffected.		

Table 7:

Kits for fire-resistant ventilation ducts according to EAD		
	Minimum required performance	
Building approval requirement-	**Fire resistance**	**Fire performance**[1]
Fire-retardant	EI 30 ($v_e h_o$ i↔o) S	A2 – s1, d0
Highly fire-retardant	EI 60 ($v_e h_o$ i↔o) S	A2 – s1, d0
Fire-resistant	EI 90 ($v_e h_o$ i↔o) S	A2 – s1, d0
Fire resistance of 120 minutes	EI 120 ($v_e h_o$ i↔o) S	A2 – s1, d0
1 Inside and outside For fire-resistant ventilation ducts, the inner shell (corresponding to the air-carrying duct) in accordance with A 2.2.1.11, Section 3.2.1, sentence 1, No 3 may consist of flame-retardant building materials (C-s2, d2); Sentence 3 of the Technical Rule according to A 2.2.1.11, Section 3.2.1 remains unaffected.		

6.3.3 Special provisions for use and execution

6.3.3.1 Kits for fire-resistant ventilation ducts according to EAD

In accordance with Regulation (EU) No 305/2011, the manufacturer shall provide installation instructions based on the classification document for kits for the construction of fire-resistant ventilation ducts based on an EAD, consisting of fire protection panels, sealants, connectors, and fasteners. It shall contain at least the following information:

- Description of permitted four-sided duct constructions made of pipe fittings (materials, dimensions, reinforcing if any, pipe routing (vertical/horizontal/inclined), associated fittings, maximum storey height and load transfer for vertical ducts, suspensions, fasteners),
- Permitted operating pressure range,
- Type and minimum thickness of structural elements (wall/ceiling) that may be passed through by the ducts,
- Principles for the production of duct fittings from the fire protection plates and the connectors and sealants (e.g. glue, clamps, screws, reinforcing if any, including fasteners) with information about the joining method,
- Principles for the assembly of fittings into ducts and their installation, with information about the construction products to be used (e.g. suspensions, trusses, cladding of suspensions/trusses if any, compensators, permitted fasteners), joining method, necessary spacing, and any permitted later coatings,
- Execution and sealing of component passages as well as inspection opening closures,
- Notes on design and execution of the attachment,
- Processing instructions (e.g. with regard to permitted tools, sequence of operations in the production of the fitting, and joining them to make a duct),
- If applicable, instructions for transport and storage of fire protection plates,
- Instructions for maintenance.

Use is only permitted if the structural elements adjacent to the construction product described in the manufacturer's installation manual are in compliance with the fire resistance requirements for the building structure.

In accordance with this installation manual, the user must install the ventilation ducts into the ventilation system, hand over the installation instructions to the client and produce an installation confirmation for proper installation, which is also to be handed over.

If the requirements under sentence 1 in conjunction with sentence 2 of this section are not met, there is no generally accepted technical best practice for kits for the construction of fire-resistant ventilation ducts on the basis of an EAD0, so that pursuant to Section 16a of the MBO46 a general component type-approval is required.

6.3.3.2 Kits with fire dampers in accordance with EAD

The performance of the fire damper shall be specified in accordance with Table 5; Annex 4 shall apply to the other performances to be specified. The fire resistance of the kit must be at least equal to that of the integrated fire damper.

0 Application of § 16a MBO

7 Smoke extraction systems and smoke extractors

7.1 Purpose of smoke extraction systems and smoke extractors

Smoke extraction systems and smoke extractors are used to extract smoke in order to simultaneously support the fire brigade's effective firefighting operations.

Smoke extraction systems and smoke extractors are required in accordance with special building regulations and special building guidelines. Smoke extraction systems and smoke extractors are also required if they are mandated in a building supervisory procedure.

If several smoke extraction devices have to work together in order to comply with the building regulation requirements, these devices form a system.

Closures of openings for smoke evacuation, e.g. in the stairwell or lift shaft, are not smoke extraction systems in the sense required here.

7.2 Planning, design and execution

Smoke extraction systems and smoke extractors shall be planned, designed and constructed in such a way that the building authority requirements are met on the basis of the special building regulations, special building guidelines, and fire protection certificates.

Smoke extraction systems that are constructed in accordance with the relevant provisions of the DIN 18232 series of standards as well as according to this Technical Rule are also deemed to fulfil the building authority requirements except where deviating individual requirements apply. The regulations on normative requirements for the qualification and suitability of service providers who plan, design, execute, and maintain such systems are not part of this Technical Rule and therefore do not constitute a building authority requirement. The design of smoke extraction systems and smoke extractors may be carried out in accordance with engineering methods of fire protection and structural stability. The input parameters for the design and selection of construction products shall be documented in the building documentation.

When designing the smoke extraction systems and the smoke extractors, the boundary conditions that may affect the operation, such as snow loads and inflow conditions, in particular due to roof structures, such as PV systems, must also be taken into account.

In the case of smoke extraction systems and smoke extractors, the supply air required for smoke extraction must be traceable. When a mechanical smoke extraction system starts up or opens the required supply air openings, the supply air systems must start up automatically. Where manual supply air openings are permitted, they shall be easily accessible and can be easily opened and remain open.

At no time must the door opening forces for doors in escape routes be greater than 100 N due to the operation of the smoke extraction system.

For the use of smoke extractors in roofing, A 2.1.9 shall be complied with in terms of location and arrangement as translucent surfaces if the performance according to Section 7.5.2 of DIN EN 12101-2:2003-09 is not declared to be at least A2 – s1, d0; otherwise, the proof shall be provided in accordance with MVV TB, A 2.1.9 for roofing resistant to flying sparks and radiant heat (see Section 3, Table 3.2) or the structural installation shall respect the distances referred to in Section 32(2) of the MBO[46].

All necessary information for planning, design, and execution must be presented in the building documentation, and if necessary, in the fire protection certificate.

7.3 Triggering – manual/automatic

Fire detectors shall be used to automatically trigger mechanical smoke extraction systems, which detect the expected fire characteristics. Fire detectors according to the DIN EN 54 series of standards can be used for this purpose.

Naturally acting smoke extraction systems and smoke extractors must be able to be automatically triggered by hand.

Switches or manual devices for triggering smoke extraction systems shall be placed in a position accessible at any time at a height of between 1.2 m and 1.6 m above the ground. The switches or manual triggering devices must be marked with a clearly legible "Smoke extraction" sign. The sign may be placed on the switch or housing or in the immediate vicinity thereof and must be durably attached. The colour of the switches or manual triggers shall not be red.

7.4 Ventilation openings

Openings that serve to supply the additional air necessary for smoke extraction must be marked with a clearly legible sign that reads "Supply air opening for smoke extraction system".

7.5 Construction products and designs

7.5.1 General provisions

Smoke extraction systems shall consist of at least the operating and triggering devices as well as the respective smoke extractors. Mechanical smoke extraction systems may additionally comprise the smoke extraction ducts including necessary smoke control dampers.

Construction products for smoke extraction systems and smoke extractors shall be selected and used in accordance with the place of installation, required temperature resistance, required volume flow, pressure difference, required aerodynamically effective or geometric opening area, and location in terms of functional integrity and the effects of, among other things, wind, snow, and ambient temperatures.

The manufacturer’s detailed installation instructions and instructions for use must be provided in writing by the manufacturer in German for each installation location. The manufacturer shall provide detailed descriptions in the operating manual of the installation, inspection, repair, maintenance, and verification of functionality of the construction product. For construction products according to harmonised technical specifications, the installation manual must comply with the provisions of the classification reports.

The manufacturer’s installation and use instructions for the construction products to be used shall be taken into account and handed over to the customer.

In mechanical smoke extraction systems, mechanical smoke extraction devices according to EN 12101-3: 2015[0] must be used. There is no generally accepted technical best practice for the application of mechanical smoke extractors[47], so that pursuant to Section 16a of the MBO[46] a general component type-approval is required.

Construction products such as windows and doors may be used to ensure the after-flow of supply air if it is ensured that the required free cross-section of smoke extraction systems and smoke extractors is maintained throughout the entire period of operation.

If smoke control dampers in mechanical smoke extraction systems are also to be controlled manually, they must be suitable for manual activation. Smoke control dampers with mechanical shut-off elements according to EN 12101-8:2011[0] may only be used in mechanical smoke extraction systems with the axis position of the mechanical shut-off element that has been verified in accordance with the fire resistance test on both sides specified in the above-mentioned harmonised standard.

Smoke extraction ducts must not themselves contribute to the spread of fire and smoke in the structure. They must be non-combustible, temperature-resistant, and smoke-proof. Their dimensional stability (cross-section stability) and mechanical strength must be such that the envisaged amount of smoke can be dissipated. Smoke extraction ducts must be placed and designed in such manner that they do not contribute to the spread of fire by increasing the temperature at the outside of the ducts.

7.5.2 Performance required to meet the building requirements

If construction products are used with proof of usability in accordance with § 17 MBO[46] or application of construction types according to § 16a MBO[46]. The minimum required classes shall be shown in Table 1.

0 Implemented in Germany by DIN EN 12101-3:2015-12
0 Implemented in Germany by DIN EN 12101-8:2011-08

Table 1:

Smoke extraction ducts pursuant to DIN V 18232-6:1997-10 in conjunction with DIN 4102-6:1977-09		
	Minimum required performance	
Building authority requirement	**Fire resistance class, category and pressure rating**	**Reaction to fire Building material class pursuant to DIN 4102-1:1998-05**
Fire-retardant	L 30, category 3, and pressure level 1/2/3*	A2
Highly fire-retardant	L 60, category 3, and pressure level 1/2/3*	
Fire-resistant	L 90, category 3, and pressure level 1/2/3*	
* Depending on intended use, but at least pressure rating 1		

When using construction products for mechanical smoke extraction systems for which there are harmonised technical specifications pursuant to Regulation (EU) No 305/2011, the performance of key features shall be at least as given in Table 2 in conjunction with Table 3 and Table 4.

Explanation for Table 2

Column no.	**Product according to harmonised standard**
2	EN 12101-2:2003 Smoke and heat control systems Part 2: Specifications for natural smoke and heat extraction devices0
3	EN 12101-3: 2015 Smoke and heat control Part 3: Provisions for mechanical smoke and heat extractors48
4	EN 12101-7:2011 Smoke and heat control systems – Part 7: Smoke duct sections0
5	EN 12101-8:2011 Smoke and heat control systems – Part 8: Smoke control dampers49
6	EN 12101-10:2005/AC:2007 Smoke and heat control systems Part 10: Energy supply0

0 Implemented in Germany by DIN EN 12101-2:2003-09
0 Implemented in Germany by DIN EN 12101-7:2011-08
0 Implemented in Germany by DIN EN 12101-10:2006-01 and DIN EN 12101-10/ Corrigendum 1: 2009-07

Table 2:

Essential feature	**Product according to harmonised standard**				
1	2	3	4	5	6
Nominal trigger conditions/sensitivity	X				
Functional safety (Re)	K				
Wind load (WL)	K				
Aerodynamically effective opening surface[#] (Aa)	L				
Performance under fire conditions	K				
Fire performance of building materials	K				
Operational reliability					
Application categories		K*			
Motor power		K			
Effectiveness of smoke/ hot gas dissipation: (similar to effectiveness of smoke and heat dissipation)	X				
Maintaining gas volume and pressure during the smoke and hot gas discharge test		L			
Fire-resistance		K			
Ability to open under ambient conditions					
Opening under wind load within a given time		K**			
Opening under snow load within a given time (SL)	K	K**			
Opening at low ambient temperature within a given time (T)	K				
Reference conditions for activation/response sensitivity				X	
Operational safety				K	X
Fire resistance♦, ♦♦					
Space barrier			K	K	
Thermal insulation			K***	K***	
Smoke-proof			K	K	
Mechanical dimensional stability (under E)			X	X	
Retention of cross-section (under E)			X	X	
Response delay/response time	X	X*		X, K	X
Performance parameters under fire conditions					X
Durability of operational reliability		K			
Durability					
Of response delay				X	
Of operational safety				X	

X must be fulfilled
X* Must be fulfilled if K** is required
L Value for the output required
K Classification required
K* Specification of application categories required
K** Classification required depending on use
K*** Specification only for smoke extraction ducts or smoke dampers for multiple Sections
Not required if used in pressure ventilation systems according to Section 8
♦ - For smoke extraction ducts made of smoke extraction fittings according to EN 12101-7:2011, see Table 3
♦ ♦ - For smoke dampers according to EN 12101-8:2011, see Table 4

Table 3:

- Fire-resistant smoke extraction ducts according to EN 12101-7:2011[51]		
- Fire-resistant smoke extraction ducts according to EAD		
	Minimum required performance	
Building approval requirement	**Fire resistance**	**Fire performance**
Fire-retardant	EI 30 (v_e – h_o) S_{xx}[1] multi	A 2-s1, d0
Highly fire-retardant	EI 60 (v_e – h_o) S_{xx}[1] multi	
Fire-resistant	EI 90 (v_e – h_o) S_{xx}[1] multi	
Fire resistance of 120 minutes	EI 120 (v_e – h_o) S_{xx}[1] multi	
1 depending on the intended use, but minimum 500 Pa		

Table 4:

Fire-resistant smoke extraction ducts according to EN 12101-8:2011[49]			
	Minimum required performance		
Building approval requirement	**Fire resistance**	**Fire performance**	
		Damper blade, housing	**Other structural elements**
Fire-retardant	EI 30 (v_e[1] - h_o[2], i↔o) S_{xx}[3] C_{xx}[4] MA/AA[5] multi	A 2-s1, d0,	E-d2
Highly fire-retardant	EI 60 (v_e[1] - h_o[2], i↔o) S_{xx}[3] C_{xx}[4] MA/AA[5] multi		
Fire-resistant	EI 90 (v_e[1] - h_o[2], i↔o) S_{xx}[3] C_{xx}[4] MA/AA[5] multi		
Fire resistance of 120 minutes	EI 120 (v_e[1] - h_o[2], i↔o) S_{xx}[3] C_{xx}[4] MA/AA[5] multi		
1 depending on the intended use: v_{ew}, v_{edw}, v_{ed} (v_{ed} only in conjunction with v_{ew}) 2 depending on the intended use: h_{ow}, h_{odw}, h_{od}(h_{od} only in conjunction with h_{ow}) 3 depending on the intended use, but minimum 500 Pa 4 depending on the intended use: C_{300} or C_{10000} 5 depending on the use (see Section 7.5.1 and/or Section 8.2)			

If construction products are to be used in structural works according to Table 2, column 2, in accordance with the Technical Rules referred to in MVV TB under ser. No A 2.2.2.3, A 2.2.2.4 and A 2.2.1.15, the performance of key features according to the intended use and taking into account Section 7.2 shall be determined in order to meet the building requirements. At a minimum, performance is required on key features as listed in Table 5.

Table 5:

At least necessary services for smoke extraction equipment for use in necessary stairwells of sales and assembly sites and in smoke extraction systems	
EN 12101-2:2003[50]	
4.1 - Nominal trigger conditions/sensitivity	must be fulfilled, with at least one of the automatic triggering elements specified in Section 4.1.1(b) or (c) in addition to the possibility of manual controllability
6 - Aerodynamically effective opening area	Indication (m^2)
7.1.1 - Functional safety	Re 50
7.1.2 - Response delay (response time)	≤ 60 s
7.1.3 - Functional safety	Yes, if additional ventilation function
7.2.1.1 - Opening under environmental conditions - Snow load, except installation inclination ≥ 60°	SL 500
7.3.1 - Opening under environmental conditions - low ambient temperature	T (-05)
7.4.1 - Functional safety - wind load	WL 1500
7.5.1 - Thermal resistance classification	B 300
7.5.2 - Performance behaviour Reaction to fire of the construction products	E – d2

Where no harmonised standards are available for components of a smoke extraction system, construction products listed in the design and dimensioning standards referred to in Section 7.2, or placed on the market on the basis of standards other than construction products that do not require proof of usability, may also be used.

7.5.3 Special provisions for use and execution

Kits for fire-resistant smoke extraction ducts according to EAD

In accordance with Regulation (EU) No 305/2011, the manufacturer shall provide installation instructions based on the classification document for kits for the construction of fire-resistant smoke extraction ducts based on an EAD, consisting of fire protection panels, sealants, connectors, and fasteners. It shall contain at least the following information:

- Description of permitted four-sided duct constructions made of duct fittings (materials, dimensions, reinforcing if any, duct routing (vertical/horizontal/inclined), associated fittings, maximum storey height and details of load transfer for vertical ducts, inspection openings, suspensions, fasteners),
- Permitted operating pressure range,
- Type and minimum thickness of structural elements (wall/ceiling) that may be passed through by the ducts,
- Principles for the production of pipe fittings from the fire protection plates and the connectors and sealants (e.g. glue, clamps, screws, reinforcing if any, including fasteners) with information about the joining method,
- Principles for the assembly of fittings into ducts and their installation, with information about the construction products to be used (e.g. suspensions, trusses, cladding of suspensions/trusses if any, compensators, permitted fasteners), joining method, necessary spacing, and any permitted later coatings,
- Execution and sealing of component passages as well as inspection opening closures,
- Notes on design and execution of the attachment,
- Processing instructions (e.g. with regard to permitted tools, sequence of operations in the production of the fitting, and joining them to make a duct),
- If applicable, instructions for transport and storage of fire protection plates,
- Instructions for maintenance.

If the requirements of sentence 1 in conjunction with sentence 2 of this section are not met, there is no generally accepted technical best practice for kits for the construction of fire-resistant smoke extraction ducts in accordance with the EAD[47], so that pursuant to Section 16a of the MBO[46] a general component type-approval is required.

8 Pressure ventilation systems

8.1 Purpose of the installations

Pressure ventilation systems are used to keep escape routes that require special protection under building supervisory rules as well as elevator shafts of firefighting lifts smoke-free so that persons can reach safety and effective firefighting is also supported.

The entry of smoke into internal safety staircases and firefighting lift shafts and their respective vestibules must be prevented by means of pressure ventilation systems. In addition, pressure ventilation systems may be required in certain individual escape routes according to a fire safety certificate or fire protection concept.

8.2 Planning, designing and execution

Pressure ventilation systems must ensure a continuous flow of air via the air path for external air intake, as well as overflow and outflow openings if relevant.

Pressure ventilation systems for safety staircases shall be dimensioned and constructed in such a way that the air volume flow

- in the case of open doors from the stairway to the ground floor affected by the fire at an average speed of at least 2.0 m/s in relation to the free door cross-section against the direction of escape,
- flows in the same direction throughout the cross-section of the doors; and
- is discharged in a suitable manner on the floor where the fire occurs.

By way of deviation, the air volume flow through the open door of the front compartment of a firefighting elevator shall flow at an average speed of at least 0.75 m/s.

The operation of the pressure ventilation system must not result in doors in escape routes no longer being able to be opened due to high pressure differences. The maximum door opening force is 100 N. It must not be exceeded at the doors of the landing, even if one of the two doors is open.

After opening and closing doors to the emergency stairwell or landing, the setpoint must be restored within 3 seconds.

The requirements for throughput speeds through the open entrance doors and the door opening forces on closed anteroom doors also apply to foreseeable adverse weather conditions.

Switching off the pressure ventilation systems by smoke extraction devices is not permitted.

If there is only one internal emergency stairwell, operational replacement devices must take over their function if the devices required to maintain the overpressure fail.

Switchgear assemblies, control units, regulating units and ventilators of the pressure ventilation system must be installed in such manner that the pressure ventilation system is effective for a sufficiently long time.

External air intake
The external air intake required for a pressure ventilation system shall be so arranged that no smoke can be sucked in, and it is at least 2.5 m away from windows, other external wall openings and external walls with combustible building materials and exterior wall cladding.

Outdoor and supply air ducts
These pipes must be trained in terms of fire resistance and fire behaviour in accordance with the fire protection requirements for ventilation systems. Fire and smoke dampers shall not be used in these ducts.

When dampers are used in the outside air or supply air ducting, the drives must be connected or equipped with a secure power supply.

Exhaust air and smoke extraction ducts
These pipes must be trained in terms of fire resistance and fire behaviour in accordance with the fire protection requirements for smoke extraction systems. Smoke dampers and fans may be used in these ducts.

Overflow openings
It must be possible to flush air through the landings of emergency stairwells even when the doors are closed. This may be achieved with overflow openings**.**

The closure of the overflow opening between the landing and stairwell is not subject to any requirements in terms of fire resistance: it is sufficient to have one flap that closes in case of air flow in the direction of the stairwell.

The closure of the overflow opening between the landing and the firefighting lift shaft is not subject to any requirements with regard to fire resistance; a motorised or other device-driven flap is sufficient.

In the wall between the landing and necessary corridor or unit, the closure of the overflow opening must have the same fire resistance time as the wall.

Closures must not be controlled via a smoke-triggered device. Flaps that are kept open or driven by motor or other devices must be connected to a secure energy supply.

Outflow openings
Outlets and outflow openings shall be placed such that the effectiveness of the pressure ventilation system is ensured even in adverse weather conditions.

Windows in the façade of the fire-affected storey may be used as outflow openings. These shall be arranged per outflow area on opposite façades.

If outflow takes place via a shaft, smoke dampers must be integrated in the shaft wall.

Exhaust air openings (outlets) of ducts from which combustion gases may escape into the ambient air must be situated or designed in accordance with the fire protection requirements for ventilation systems. MVV TB Section A 2.2, ser. No A 2.2.1.11, Section 5.1.2 No. 1). Fire dampers shall not be used.

Power supply
Pressure ventilation systems required by the building authority must be supplied with sufficient power and remain functional, even in the event of a failure of the general power supply; this is considered to be fulfilled when connected to an emergency power supply system.

Necessary information in the fire protection concept
All necessary information on planning, design, and execution must be presented in the building documentation, if necessary in the fire protection certificate, particularly if and how the activation or triggering is to take place via a programmable system.

8.3 Triggering

The pressure ventilation systems must be triggered automatically in case of fire.
Where automatic fire alarm systems are required or available, they must trigger the pressure ventilation systems.
In the absence of a fire alarm system, the triggering shall be carried out at least by means of appropriate triggering devices controlled by smoke detectors positioned in the area of access to the safety staircase (excluding vestibules) and to the firefighting front compartment and in the area of the necessary discharge openings. Smoke detectors pursuant to the DIN EN 54 series of standards are suitable for detection.

If pressure ventilation systems are also to be triggered by hand, switches shall be used, which shall be positioned between 1.2 m and 1.6 m above the ground. The switches shall be marked with a clearly legible sign that reads ‘Pressure ventilation system’. The sign may be placed on the switch or housing or in the immediate vicinity thereof and must be durably attached. The colour of switches shall not be red.

Necessary outflow outlets should only be controlled automatically.

The pressure ventilation system must reach its full functionality and effectiveness within 120 seconds after triggering.

When controlling or triggering via a programmable system, its programming status must also be documented.

8.4 Construction products and types of pressure ventilation systems

Pressure ventilation systems consist of construction products and structural elements (e.g. fan, outflow elements) necessary for the function of the pressure ventilation system. Doors and windows may be used for outflow.

Construction products for pressure ventilation systems shall be selected and used in accordance with the place of installation, required temperature resistance, required volume flow, pressure difference, and location in terms of functional integrity and the effects of factors including wind, snow and ambient temperatures.

In order to meet the building authority requirements, the building products to be used in accordance with harmonised technical specifications require services for key features at least in accordance with Section 6, Tables 4, 5 and 7 and Section 7, Tables 2 to 5. Otherwise, Section 6, Table 6 applies.

Supply air fans may be operated with frequency converters. Repair switches on fans must be monitored or secured against unauthorised actuation. The sound pressure level in the stairwell as produced by the pressure ventilation system must not exceed 85 dB(A) at a distance of 5 m from the air outlet. For fire lifts, a maximum sound pressure level of 80 dB(A) generated by the pressure ventilation system is allowed at 0.5 m distance from the microphone in the car, in the fire department access level and at the tableau for emergencies and tests.

A fire damper without cable connection in accordance with EN 15650[45] may be used to close the overflow opening between the vestibule and the necessary corridor or usage unit; the classification EI 90 (v_e i↔o)-S in accordance with DIN EN 13501-3:2010-02 is sufficient. Fire dampers with a mechanical switch-off element may be used in pressure ventilation systems only with the axis position of the mechanical switch-off element that was verified by the fire resistance test according to DIN EN 1366-2:1999-10. The nominal triggering temperature of the thermal actuator of the fire dampers must not exceed 72 °C.

9 CO alarm systems

9.1 Purpose of the system

CO alarm systems are hazard detection systems. They serve to warn persons as soon as dangerous amounts of carbon monoxide (CO) are reached in garages.

9.2 Construction products of CO alarm systems

The construction products used must be suitable for measurement, evaluation, and alarm.
A CO alarm system includes all construction products (such as intake points, measuring points, ducts, transmission equipment, backup power supply, control unit, visual and audible signalling devices, etc.) that are needed to maintain the operation of the CO alarm system.

Construction products for CO alarm systems must comply with the product requirements of European standards or, if only national technical rules such as DIN or DIN VDE standards are in place, with these technical rules.

9.3 Planning, designing and execution of CO-warning systems

CO-warning systems shall be planned, designed and executed in such a way that the CO content is reliably recorded in all garage areas and an alarm is sounded when the CO content in the air exceeds 250 ppm. Technical best practices shall be followed unless stated otherwise below. In systems that fulfil additional functions, the CO-warning system component must allow independent operation and testing.

The CO measuring points shall be positioned at a height of approximately 1.50 m above the floor and shall be arranged in such a way as to reliably detect areas for which increased CO concentrations are to be expected.

Co-warning systems must be supplied with electricity for a sufficiently long time even in the event of a failure of the general power supply and remain functional. The signalling must remain activated for as long as the CO concentration exceeds the limit.

All necessary information for planning, design, and execution must be presented in the building documentation, and if necessary, in the fire protection certificate.

10 Fire extinguishing systems

10.1 Purpose of the installation

Automatic fire extinguishing systems detect a fire event at an early stage and generally serve to contain/limit the fire source or directly extinguish the fire event. Manual, non-automatic systems such as hydrant systems with wet or dry risers support effective firefighting work. Both types of systems serve primarily to rescue humans and animals but can also be efficient in reducing fire, material and environmental damage.

Fire-extinguishing systems include all types of stationary, non-automatic fire-extinguishing systems as well as stationary, automatic fire-extinguishing systems. The extinguishing agent may be water or any other substance capable of controlling the spread of fire or of extinguishing it.

Non-automatic fire extinguishing systems consist of a network of ducts (including dry and wet risers) as well as withdrawal points, wall hydrants for the fire department (F type), or outdoor hydrants. Automatic fire extinguishing systems are fixed firefighting systems. The extinguishing agent is water, e.g. in sprinkler-, spraying, or mist extinguishing systems. Systems using other types of extinguishing agents may also be used. This can be e.g. installations with foam, CO_2, nitrogen, inert gases, halogenated hydrocarbons or powder extinguishing agents, as well as water extinguishing plants containing foaming agents.

10.2 Construction products of fire extinguishers

In fire extinguishing systems, only those construction products (products, building materials, structural elements and systems, as well as kits pursuant to § 2 No. 2 of Regulation [EU] No 305/2011) may be installed and operated that are necessary and suitable for the operation of the systems. Other construction products, e.g. safety devices for drinking water, must not affect the effectiveness of the fire extinguishing system. They must also not affect the operation of the fire extinguishing systems.
Construction products that may come into contact with drinking water or that are connected to the drinking water mains must be suitable for such use.

As construction products for sprinkler and spray water extinguishing systems, the construction products of the standard series DIN EN 12259 may be used, for extinguishing systems with gaseous extinguishing agents, the construction products of the standard series DIN EN 12094 may be used. Where harmonised standards are not available for components of a fire-extinguishing system, construction products listed in the design and dimensioning standards referred to in Section 10.4, or placed on the market on the basis of standards other than construction products that do not require proof of usability, may also be used.

For other extinguishing systems, including with other extinguishing agents, e.g. foam-based extinguishing agents, the construction products as specified in the standards for the planning and design of such systems shall be used.

Wall hydrants in accordance with EN 671-1:2012 and EN 671-2:2012, above-ground hydrants in accordance with EN 14384:2005 and underground hydrants in accordance with EN 14339:2005 may be used for non-automatic fire extinguishing systems.

10.3 Required performance of construction products for fire extinguishers

Construction products must be sufficiently powerful and permanently reliable; have sufficient response delay and resistance to moisture, corrosion and temperature; and shock and vibration resistance. The construction products must be hydraulically suitable for the particular application and have sufficient pressure resistance as well as permanent ease of operation.

The choice of products, taking into account the intended use, must be based on the information on the key features and properties.

In order to fulfil the building inspection requirements, the performance of the construction products used in terms of key features must at least satisfy the following Tables 1 to 3.

Explanation for Table 1

No Column	**Product according to harmonised standard**
2	EN 12259-1:1999 + A1:2001 + A2:2004 + A3:2006 Part 1: Sprinklers0
3	EN 12259-2:1999 + A1:2001 + AC:2002 + A2:2005 Part 2: Wet alarm valve assemblies0
4	EN 12259-3:2000 + A1:2001 + A2:2005: Dry alarm valve assemblies0
5	EN 12259-4: 2000 + A1:2001 Part 4: Water motor alarms0
6	EN 12259-5:2002 Part 5: Water flow detectors0

Table 1:

Essential feature	**Construction products for fixed fire extinguishing systems – Components for sprinkler and spray water systems according to harmonised standard**				
1	2	3	4	5	6
Nominal trigger conditions	X				
Extinguishing agent distribution	X				
Response delay (response time)	X	X	X	X	X
Reliability	X				
Durability - Heat resistance, - Temperature shock resistance	X				
Corrosion resistance	X				
Operational reliability		X	X	X	X
Performance in case of fire		X	X	X	
Response delay – Durability		X	X	X	
Operational reliability – Durability - Ageing of non-metallic components, and - Fire stress		X	X	X	
Nominal response conditions					X
Operational reliability stability - Corrosion resistance - Strength of non-metallic structural elements					X
X must be fulfilled					

Explanation for Table 2

0 Implemented in Germany by DIN EN 12259-1:2006-03 and DIN EN 12259-1 Corrigendum 1: 2007-01
0 Implemented in Germany by DIN EN 12259-2:2001-08 + DIN EN 12259-2/A2:2006-02
0 Implemented in Germany by DIN EN 12259-3:2001-08 and DIN EN 12259-3 Corrigendum 1: 2008-06
0 Implemented in Germany by DIN EN 12259-4:2001-08
0 Implemented in Germany by DIN EN 12259-5:2002-12

No Column	Product according to harmonised standard
2	EN 671-1:2012 Fixed firefighting systems - Hose systems -– Part 1: Hose reels with semi-rigid hose[53]
3	EN 671-2:2012 Fixed firefighting systems – Hose systems – Part 2: Hose systems with lay-flat hose[54]

Table 2:

Essential feature	Construction products for fixed fire extinguishing systems – Wall hydrants – pursuant to harmonised standard	
1	2	3
Distribution of extinguishing agent with:		
Hose inner diameter	X	X
Minimum flow rate	X	X
Effective throwing range	X	X
Spraying jet operation	X	X
Functional safety/operational reliability		
Reel – Construction	X	
Reel – Turning	X	
Reel – Swivelling	X	
Reel – Resistance to shock	X	
Reel – Resistance to loads	X	
Hose – General	X	X
Lockable jet pipe – General	X	X
Lockable jet pipe – Resistance to impact	X	X
Lockable jet pipe – Torque for operation	X	X
Shut-off valve on the water connection		X
Shut-off valve on the water connection – General	X	
Shut-off valve on the water connection – Manually operated shut-off valve	X	
Shut-off valve on the water connection – Automatic shut-off valve	X	
Hydraulic properties – Strength under internal pressure load	X	
Hydraulic properties – Compressive strength	X	
Hydraulic properties – Resistance to internal pressure		X
Hydraulic properties – safety of the couplings		X
Ease of unrolling the hose		
Reel – Unwinding force	X	
Reel – Dynamic braking	X	
Hose – Maximum length	X	
Hose retention device, type 1		X
Hose retention device, type 1 and type 3		X
Durability of functional safety/operational reliability		
Resistance to corrosion of coated parts	X	X
Corrosion resistance of water-impacted parts	X	X
Ageing test for plastic parts	X	X
X must be fulfilled		

Explanation for Table 3

No Column	**Product according to harmonised standard**
2	EN 12094-1:2003 Part 1: Requirements and test methods for electrical automatic control and delay devices0
3	EN 12094-2:2003 Part 2: Requirements and test methods for non-electrical automatic control and delay devices0
4	EN 12094-3:2003 Part 3: Requirements and test methods for manual triggering and stop devices0
5	EN 12094-4:2004 Part 4: Requirements and test methods for container valve assemblies and their actuators0
6	EN 12094-5:2006 Part 5: Requirements and test methods for high and low pressure selector valves and their actuators0
7	EN 12094-6:2006 Part 6: Requirements and test methods for non-electric disabling devices0
8	EN 12094-7:2000 + A1:2005 Part 7: Requirements and test methods for nozzles for CO_2 systems0
9	EN 12094-8:2006 Part 8: Requirements and test methods for connectors0
10	EN 12094-9:2003 Part 9: Requirements and test methods for special fire detectors0
11	EN 12094-10:2003 Part 10: Requirements and test methods for pressure gauges and pressure switches0
12	EN 12094-11:2003 Part 11: Requirements and test methods for mechanical weighing devices0
13	EN 12094-12:2003 Part 12: Requirements and test methods for pneumatic alarm devices0
14	EN 12094-13:2001/AC:2002 Part 13: Requirements and test methods for check valves and non-return valves0

0 Implemented in Germany by DIN EN 12094-1:2003-07 and DIN EN 12094-1 Corrigendum 1: 2006-09
0 Implemented in Germany by DIN EN 12094-2:2003-09
0 Implemented in Germany by DIN EN 12094-3:2003-07
0 Implemented in Germany by DIN EN 12094-4:2004-10
0 Implemented in Germany by DIN EN 12094-5:2006-07
0 Implemented in Germany by DIN EN 12094-6:2006-07
0 Implemented in Germany by DIN EN 12094-7:2005-04
0 Implemented in Germany by DIN EN 12094-8:2006-07
0 Implemented in Germany by DIN EN 12094-9:2003-07
0 Implemented in Germany by DIN EN 12094-10:2003-09
0 Implemented in Germany by DIN EN 12094-11:2003-07
0 Implemented in Germany by DIN EN 12094-12:2003-07
0 Implemented in Germany by DIN EN 12094-13:2001-06 + Corrigendum 1 to DIN EN 12094-13:2002-06

Table 3:

Essential Feature	**Construction product for gas extinguishing systems according to harmonised standard**												
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Response delay (response time)	X	X		X		X			X				
Operational safety													X
Operational reliability	X	X	X	X	X			X	X		X	X	
Stability of operational reliability against corrosion		X							X				X
Stability of operational reliability; Swinging									X				X
Durability of operational reliability against corrosion			X								X		
Durability of operational reliability					X	X		X				X	
Performance in case of fire	X	X	X	X				X					
Durability	X			X									
Extinguishing agent distribution					X		X						X
Nominal triggering conditions/sensitivity									X				
Nominal response conditions – Response sensitivity – Pressure switch										X			
Nominal response conditions – Response sensitivity – Pressure gauges										X			
Operational reliability – Pressure switch										X			
Operational reliability – Pressure gauges										X			
Stability of operational reliability of pressure measurement devices against corrosion										X			
Stability of operational reliability of pressure switches against corrosion										X			
X must be fulfilled													

10.4 Planning and design of automatic and non-automatic fire extinguishing systems

10.4.1 General requirements

Fire extinguishing systems shall be designed and constructed in accordance with the space-defining structure of the building and existing building materials and combustible materials, their distribution and position within the room and their combustion characteristics and – with respect to the fire detection and triggering devices, suitable extinguishing agents, quantities of extinguishing agents, and required operational ranges for the extinguishing agents – in accordance with the rules applicable in each individual case. Where necessary, pump systems shall be constructed to increase the pressure.

Automatic fire extinguishing systems, systems with wall hydrants for the fire brigade (type F), and systems with dry extinguishing water pipes must be located in the parts of the structure where this is required by the building authority.

Compliance with the requirements for qualifications (competence, training and certification) as a planner and installer in standards is not binding for the achievement of the building authority protection objectives.

The rules of the planning and design standards with regard to maintenance are not part of this building authority Technical Rule. The requirements with regard to maintenance in accordance with § 3 MBO[46] are not affected.

Fire extinguishing systems must, if required by building regulations, be supplied with electricity for a sufficient period of time and remain functional even in the event of a failure of the general power supply.

All necessary information for planning, design, and execution must be presented in the building documentation, and if necessary, in the fire protection certificate.

10.4.2 Automatic fire extinguishing systems

The planning, installation, and design of sprinkler systems as automatic fire extinguishing systems shall be undertaken in accordance with the provisions of DIN EN 12845:2020-11 (Fixed firefighting systems – Automatic sprinkler systems – Design, installation and maintenance).

Where sprinkler systems are to be designed based on different technical regulations (e.g. CEA 4001, FM Global Data Sheets, VdS CEA 4001), this must be stated in the fire protection certificate.

If a sprinkler system cannot or should not be used, the fire protection certificate shall specify the technology to be used and the regulation to be applied to it. With regard to the selected extinguishing agents, the necessary protective measures, e.g. in the case of gas extinguishing systems according to the standard series DIN EN 15004, should be noted.

Combining or cross-referencing different or competing regulations or individual provisions thereof is not permitted.

When a required automatic fire extinguishing system is triggered, a fire alarm must automatically sound via a suitable fire alarm device at the local fire service control centre, unless otherwise stipulated by the building authority.

10.4.3 Non-automatic fire extinguishing systems

Non-automatic fire extinguishing systems shall be dimensioned and constructed in accordance with the technical regulations. The building inspection requirements are deemed fulfilled if DIN 14462:2023-07 is observed.

10.5 Water supply

If the extinguishing water supply is to be provided through a direct connection of the extinguishing systems to the general drinking water supply, the relevant requirements of water legislation must be observed. If extinguishing water cannot be supplied from the drinking water mains, the necessary extinguishing water must be stored in suitable containers (tanks, ponds, etc). The entire installation of the extinguishing system through which the extinguishing water flows must be suitable for the water used; this must be checked before the extinguishing system is implemented.

Fixed automatic and fixed non-automatic extinguishing systems may be supplied from a common extinguishing water source if the water volumes required for both protection objectives are stored. The failure of the water source for one extinguishing system shall not impair the effectiveness and operational safety of the second extinguishing system. This is considered fulfilled if independent extinguishing water sources supply the extinguishing systems (e.g. as a double water supply in accordance with DIN EN 12845:2020-11 paragraph 9.6.3).
In case of a non-direct connection to the general drinking water supply, at least one storage tank and a technical device for transporting the extinguishing water are required, taking into account and observing the appropriate design criteria.

10.6 Protection of persons

Automatic extinguishing systems that use technical gases for firefighting purposes or light foam as an extinguishing agent may only trigger their extinguishing process after detection of a fire when users have been alerted and have had sufficient time to leave the affected area (room/protected area). This does not affect the forwarding of the fire alarm.

10.7 Storage room

The main structural elements of the fire extinguishing system, such as the pump system and its switching cabinet, pressure maintenance systems/devices with fittings, alarm valves, auxiliary generators and main gate valves, controls and alerting devices, must be installed in a separate room (fire extinguishing room). In case of non-centrally located alarm valves/sprinkler sub-centres, structural separation is not required if unauthorised access is prevented through suitable measures, e.g. wire mesh, and the area concerned is a sprinkler-protected area.
Access to the firefighting room must be quick and safe at all times, including in the event of fire.

10.8 Installation and operation

Simultaneous decommissioning of non-automatic and automatic fire extinguishing systems is not permitted.