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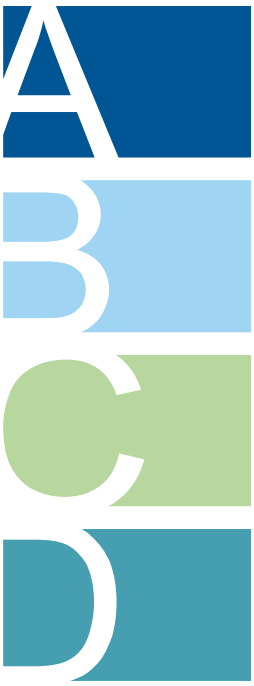

# Model Administrative Regulation Technical Building Regulations (MVV TB)

Issue 2023/1 (known as MVV TB 2022/1)

**Imprint:**

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## Preliminary remarks

### 1 Building regulations requirements

The Model Building Code (MBO)[2],[3] contains in § 85a(1) the authorisation to specify, within the framework of an administrative provision, the general requirements for structural installations, construction products and other systems and installations through Technical Building Regulations.

Article 85a(2) MBO[1] lays down detailed specifications as to which building inspection requirements can be elaborated in detail. The specifications may take the form of references to technical rules and their sources or in other ways, in particular in relation to:

- the design, dimensioning and execution of structures and their parts;
- The characteristics and performance of construction products in particular structures or their parts,
- procedures for determining the performance of a construction product which does not bear the CE mark pursuant to the Construction Products Regulation,
- Permissible and prohibited special uses for construction products,
- Definitions of classes and levels that construction products are required to satisfy for specific uses,
- Requirements for issuing the declaration of conformity for non-harmonised products,
- information on non-harmonised construction products and types requiring a general inspection certificate; and
- type, content and form of the technical documentation.

The basic principle is that only those provisions are included in the Model Administrative Order laying down Technical Building Regulations (MVV TB) as Technical Building Regulations that are essential for fulfilling the requirements of the building regulations for building structures, construction products and other installations and facilities. However, in the context of their decisions on the fulfilment of uncertain legal concepts, the building inspectorates may also rely on generally accepted rules of technology which are not Technical Building Regulations.

After consulting the parties involved, the German Institute for Structural Engineering [Deutsches Institut für Bautechnik], in agreement with the highest building supervisory authorities, publishes the Technical Building Regulations as a Model Administrative Order. Direct applicability in the respective State requires official publication of the Administrative Order.

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).

### 2 Structure and organisation of the MVV TB

**2.1** The Technical Building Regulations are divided into four parts:

A - Technical Building Regulations to be observed to meet the basic requirements for buildings Part A is broken down according to the basic requirements for structures in accordance with Annex I of the EU Construction Products Regulation (CPR) as follows:

A 1 Mechanical strength and stability,
A 2 Fire Protection,
A 3 Hygiene, health and environmental protection
A 4 Safety and accessibility in use,
A 5 - Sound insulation and
A 6 Thermal insulation

2 According to national law

3 in each case in the November 2002 version,
as last amended by decision of the Conference of Building Ministers of 27 September 2019

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

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

D - Construction products that do not require usability certification

**2.2** The main contents of the chapters in Part A are:

Chapter A 1 – Mechanical strength and stability – contains the Eurocodes on the principles of structural engineering, factors affecting structures, and dimensioning. Their application determines the characteristics and specific performance of the products used on the building structure in order to meet the building-related requirements.

Chapter A 2 - Fire Protection - elaborates the fire protection requirements for building structures or parts of building structures as contained in the Model Building Order and the model special building orders and regulations, in particular with regard to fire characteristics and fire resistance.

Chapter A 3 - Hygiene, health and environmental protection - specifies the requirements for building structures in the form of the technical rules “Requirements for building structures with regard to health protection” (ABG) and “Requirements for building structures with regard to the effects on soil and water” (ABuG).

Chapter A 4 - Safety and accessibility in use - specifies the requirements for safety in use and accessibility of building structures as a whole and in terms of components as provided for in the MBO1.

Chapter A 5 – Sound insulation – contains technical rules for fulfilling the sound insulation requirements for building structures and their parts.

Chapter A 6 – Thermal insulation – specifies the requirements for the use of a building structure and its parts in accordance with the climatic conditions in the form of technical rules.

**2.3** Section B concerns special structures and special components which, on the one hand, cannot be clearly assigned to the requirements of Part A and, on the other hand, have a different legal background.

Section B contains Technical Building Regulations to be observed for components and special structures in addition to the Technical Building Regulations included in Section A. The technical rules included there for certain special constructions and structural elements serve to specify several fundamental requirements and are not restricted to a particular material.

Chapter B 2 contains technical rules for special designs and components with regard to their design, dimensioning and execution.

Chapter B 3 relates to technical building equipment and parts of installations for storing, filling and handling water-polluting substances, which are subject to other harmonisation provisions (such as the Machinery Directive, the Low Voltage Directive or the Pressure Equipment Directive), but which, with respect to a particular use, fail to meet some of the fundamental requirements pursuant to Article 3(1) of the CPR for building structures and their parts. Usability certification is required for these products, to demonstrate fulfilment of the missing fundamental characteristics, unless it has been determined that a declaration of conformity on the missing fundamental characteristics pursuant to § 22 MBO1 based on prior inspection of the construction products by an inspection body with building supervisory recognition will be sufficient.

Chapter B 4 contains technical requirements for construction products and construction types which are subject to requirements under other legislation for which a statutory ordinance has been issued pursuant to § 85(4a) of the MBO1. These are technical requirements for fixed installations and parts of installations within storage, filling and handling systems for the handling of water-polluting substances as well as the installation, operation and maintenance of installations with construction products for waste water treatment.

**2.4** Part C - Technical Building Regulations for construction products which do not bear the CE marking and for types - specifies the details of construction products that have not been harmonised under the Construction Products Regulation (Regulation (EU) No 305/2011) and structural types that require only a general building supervisory inspection certificate, as well as the requirements for issuing a declaration of conformity for a construction product pursuant to Article 22 MBO1.

Part C therefore does not apply to construction products for which there is a harmonised standard or a European Technical Assessment (ETA) within the scope of the EU CPR.

Chapter C 2 sets out the technical rules and the requirements for the certificate of conformity for non-harmonised construction products.

Chapter C 3 lists construction products that require only a general building supervisory inspection certificate. The approved test methods and the type of certificate of conformity required are also listed here.

Chapter C 4 identifies the designs that require only a general building supervisory inspection certificate (abP). The relevant recognised test methods are listed here as well.

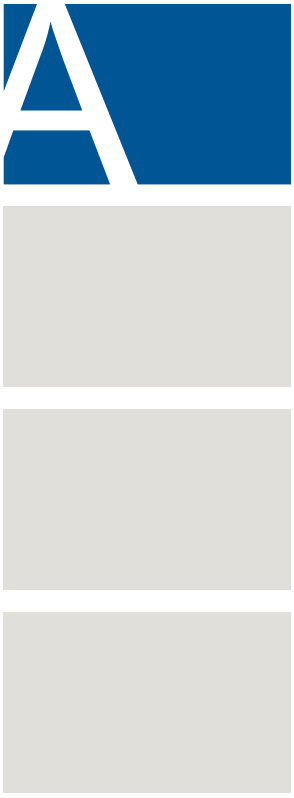
If the relevant technical rule is deviated from, a general technical approval or approval in individual cases is required for building products and a general or project-related type approval for designs.

For construction products and designs that require (only) a general building supervisory inspection certificate, there must be a relevant testing provision in force. Other technical regulations required for the general building supervisory inspection certificate to be issued may also be specified. This includes, for example, additional information on the scope of the test, test structure, test frequency.

**2.5** Part D contains the list as required pursuant to § 17(3) MBO1 containing construction products that do not require usability certification. This includes construction products for which there are technical best practices, but for which usability certification is not required, as well as construction products for which there are neither Technical Building Regulations nor technical best practices, and which are of minor importance in terms of building supervision. The list is for clarification purposes and does not claim to be exhaustive.

Chapter D 3 shows a way of dealing with harmonised specifications that exhibit gaps or are otherwise incomplete. The States are responsible for enforcement.

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



A 1 Mechanical strength and stability

A 2 Fire protection

A 3 Hygiene, health and preservation of the environment

A 4 Safety and accessibility in use

A 5 Protection against noise

A 6 Thermal insulation

# Technical Building Regulations to be observed to meet the basic 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

| Ser. No | Planning, designing and execution requirements pursuant to § 85a(2) MBO1 | Technical rules/version | Further measures pursuant to § 85a(2) MBO[1] |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| **A 1.2.1** | **Basics of structural design and impact on structural structures** | | |
| A 1.2.1.1 | Fundamentals of structural design | DIN EN 1990:2010-12:<br>DIN EN 1990/NA:2010-12 | Annex A 1.2.1/1 |
| A 1.2.1.2 | Impacts on structural structures | | |
| | Densities, self-weight, imposed loads for buildings | DIN EN 1991-1-1:2010-12<br>DIN EN 1991-1-1/NA:2010-12<br>DIN EN 1991-1-1/NA/A1:2015-05 | Annex A 1.2.1/2 |
| | Impacts of fire on load-bearing structures | DIN EN 1991-1-2:2010-12<br>DIN EN 1991-1-2 Cor. 1:2013-08<br>DIN EN 1991-1-2/NA:2015-09 | Annex A 1.2.1/3 |
| | Snow loads | DIN EN 1991-1-3:2010-12<br>DIN EN 1991-1-3/A1:2015-12<br>DIN EN 1991-1-3/NA:2019-04 | Annex A 1.2.1/4 |
| | Wind loads | DIN EN 1991-1-4:2010-12<br>DIN EN 1991-1-4/NA:2010-12 | Annex A 1.2.1/5 |
| | Exceptional impacts | DIN EN 1991-1-7:2010-12<br>DIN EN 1991-1-7/NA:2019-09 | Annex A 1.2.1/6 |
| | Effects due to cranes and machines | DIN EN 1991-3:2010-12<br>DIN EN 1991-3 Cor. 1:2013-08<br>DIN EN 1991-3/NA:2010-12 | |
| | Actions on silos and tanks containing liquids | DIN EN 1991-4:2010-12<br>DIN EN 1991-4 Cor. 1:2013-08<br>DIN EN 1991-4/NA:2010-12<br>DIN FB 140:2005-01 | Annex A 1.2.1/7 |
| A 1.2.1.3 | Components that protect against falls | ETB Guideline – Components that protect against falls, June 1985 | Annex A 1.2.1/8 |
| **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<br>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 1.2.2.2 | Execution of bored piles | DIN EN 1536:2010-12:<br>DIN SPEC 18140:2012-02 | |
| A 1.2.2.3 | Execution of displacement piles | DIN EN 12699:2001-05:<br>DIN EN 12699 Cor. 1:2010-11<br>DIN SPEC 18538:2012-02 | Annex A 1.2.2/2 |
| A 1.2.2.4 | Excavations, foundations and underpinning in the area of existing buildings | DIN 4123:2013-04 | |
| A 1.2.2.5 | Execution of ground anchors | DIN EN 1537:2014-07<br>DIN/TS 18537:2021-05 | Annex A 1.2.2/3 |
| A 1.2.2.6 | Execution of special geotechnical work (special civil engineering) - Piles with small diameters (micropiles) | DIN EN 14199:2012-01:<br>DIN SPEC 18539:2012-02 | |

1 According to national law

| Ser. No | Planning, designing and execution requirements pursuant to § 85a(2) MBO1 | Technical rules/version | Further measures pursuant to § 85a(2) MBO[1] |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| 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 12715:2000-10:<br>DIN SPEC 18187:2015-08<br>DIN EN 12716:2019-03:<br>DIN 4093:2015-11 | Annex A 1.2.2/4 |
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| A 1.2.3.1 | Design and construction of reinforced concrete and prestressed concrete supporting structures | | |
| | General rules - Rules for buildings, bridges and civil engineering structures | DIN EN 1992-1-1:2011-01<br>DIN EN 1992-1-1/A1:2015-03<br>DIN EN 1992-1-1/NA:2013-04<br>DIN EN 1992-1-1/NA/A1:2015-12 | Annexes A 1.2.3/1 and A 1.2.3/2 |
| | Structural fire design | DIN EN 1992-1-2:2010-12<br>DIN EN 1992-1-2/NA:2010-12<br>DIN EN 1992-1-2/NA/A1:2015-09 | Annex A 1.2.3/3 |
| | Concrete, reinforced and prestressed concrete structures | DIN 1045-2:2008-08<br>DIN EN 206-1:2001-07<br>DIN EN 206-1/A1:2004-10<br>DIN EN 206-1/A2:2005-09<br>DIN EN 206-9:2010-09 | Annex A 1.2.3/4 |
| | Execution of concrete structures | DIN 1045-3:2012-03<br>DIN 1045-3 Cor. 1:2013-07<br>DIN EN 13670:2011-03 | Annex A 1.2.3/4 |
| | Prefabricated parts | DIN 1045-4:2012-02 | |
| | Brick ceilings | DIN 1045-100:2017-09 | |
| A 1.2.3.2 | Protection and repair of concrete structural components | Technical Rule on the maintenance of concrete structures:2020-05 [Technische Regel (DIBt) Instandhaltung von Betonbauwerken – TR Instandhaltung]<br>Part 1 – Field of application and maintenance planning<br>Part 2 – Features of repair products or systems and rules for their use<br>DAfStb Guideline - Protection and repair of concrete structural elements:2001-10 [Schutz und Instandsetzung von Betonbauteilen]<br>Cor. 1:2002-01<br>Cor. 3:2014-09 | Annex A 1.2.3/5 |
| A 1.2.3.3 | Sprayed concrete | DIN EN 14487-1:2006-03<br>DIN EN 14487-2:2007-01<br>DIN 18551:2014-08 | |
| A 1.2.3.4 | Welding concrete steel | DIN EN ISO 17660-1:2006-12<br>DIN EN ISO 17660-1<br>Cor. 1:2007-08<br>DIN EN ISO 17660-2:2006-12<br>DIN EN ISO 17660-2<br>Cor. 1:2007-08 | Annex A 1.2.3/6 |
| A 1.2.3.5 | Application of prefabricated reinforced components of autoclaved aerated concrete | DIN 4223-101:2014-12<br>DIN 4223-102:2014-12<br>DIN 4223-103:2014-12 | Annex A 1.2.3/1 Sections 1, 2.2, 2.3, 4 |

1 According to national law

| Ser. No | Planning, designing and execution requirements pursuant to § 85a(2) MBO1 | Technical rules/version | Further measures pursuant to § 85a(2) MBO[1] |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| A 1.2.3.6 | Application in structures of prefabricated components of lightweight aggregate concrete with open structure with structural or non-structural reinforcement | DIN 4213:2015-10 | Annex A 1.2.3/1 Sections 1, 2.2, 2.3, 4 |
| A 1.2.3.7 | Subsequent rebar connections with bonded-in rebar | Design, dimensioning and execution requirements of post-installed rebar connections with mortared reinforcement bars: 2020-05 (see Annex 1) | |
| A 1.2.3.8 | Anchors in concrete with embedded or subsequently fitted fasteners | DIN EN 1992-4:2019-04<br>DIN EN 1992-4/NA:2019-04<br>and<br>planning, designing and executing requirements anchors in concrete with cemented or subsequently fitted fasteners:2021-10<br>(See Annex 2) | |
| **A 1.2.4** | **Structural works in metal and composite construction** | | |
| A 1.2.4.1 | Design of steel structures | | |
| | General rules - Rules for buildings, bridges and civil engineering structures | DIN EN 1993-1-1:2010-12<br>DIN EN 1993-1-1/A1:2014-07<br>DIN EN 1993-1-1/NA:2018-12 | Annex A 1.2.3/2 and A 1.2.4/1 |
| | Structural fire design | DIN EN 1993-1-2:2010-12<br>DIN EN 1993-1-2/NA:2010-12 | Annexes A 1.2.3/3 and A 1.2.4/9 |
| | Supplementary rules for cold-formed components and sheeting | DIN EN 1993-1-3:2010-12<br>DIN EN 1993-1-3/NA:2017-05 | Annex A 1.2.4/2 |
| | Supplementary rules for stainless steels | DIN EN 1993-1-4:2015-10<br>DIN EN 1993-1-4/A2:2021-02<br>DIN EN 1993-1-4/NA:2020-11 | |
| | Plated structural elements | DIN EN 1993-1-5:2019-10<br>DIN EN 1993-1-5<br>Corrigendum 1:2020-07<br>DIN EN 1993-1-5/NA:2018-11 | Annex A 1.2.4/10 |
| | Strength and stability of shell structures | DIN EN 1993-1-6:2010-12<br>DIN EN 1993-1-6/NA:2010-12 | |
| | Plated structural elements with transverse loading | DIN EN 1993-1-7:2010-12<br>DIN EN 1993-1-7/NA:2010-12 | |
| | Design of joints | DIN EN 1993-1-8:2010-12<br>DIN EN 1993-1-8/NA:2020-11 | Annex A 1.2.4/11 |
| | Fatigue | DIN EN 1993-1-9:2010-12<br>DIN EN 1993-1-9/NA:2010-12 | |
| | Material toughness and through-thickness properties | DIN EN 1993-1-10:2010-12<br>DIN EN 1993-1-10/NA:2016-04 | |
| | Design of composite steel structures | DIN EN 1993-1-11:2010-12<br>DIN EN 1993-1-11/NA:2010-12 | Annex A 1.2.4/3 |
| | Additional rules extending EN 1993 to steel grades up to S700 | DIN EN 1993-1-12:2010-12<br>DIN EN 1993-1-12/NA:2011-08 | |

1 According to national law

| Ser. No | Planning, designing and execution requirements pursuant to § 85a(2) MBO1 | Technical rules/version | Further measures pursuant to § 85a(2) MBO[1] |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| | Towers and masts | DIN EN 1993-3-1:2010-12<br>DIN EN 1993-3-1/NA:2015-11 | |
| | Chimneys | DIN EN 1993-3-2:2010-12<br>DIN EN 1993-3-2/NA:2017-01 | Annex A 1.2.4/4 |
| | Silos | DIN EN 1993-4-1:2017-09<br>DIN EN 1993-4-1/NA:2018-11 | |
| | Piling | DIN EN 1993-5:2010-12<br>DIN EN 1993-5/NA:2010-12 | |
| | Crane supporting structures | DIN EN 1993-6:2010-12<br>DIN EN 1993-6/NA:2017-11 | |
| | Execution of steel structures | DIN EN 1090-2:2018-09<br>DIN EN 1090-4:2018-09 | Annex A 1.2.4/5 |
| | Above ground cylindrical flat bottom tank structures | DIN EN 1993-4-2:2017-09 DIN EN 1993-4-2/NA:2018-12 | Annex A 1.2.4/8 |
| A 1.2.4.2 | Design of composite steel and concrete structures | | |
| | General rules and rules for buildings | DIN EN 1994-1-1:2010-12<br>DIN EN 1994-1-1/NA:2010-12 | Annex A 1.2.3/2 and A 1.2.4/1 |
| | Structural fire design | DIN EN 1994-1-2:2010-12<br>DIN EN 1994-1-2/A1:2014-06<br>DIN EN 1994-1-2/NA:2010-12 | Annexes A 1.2.3/3 and A 1.2.4/9 |
| A 1.2.4.3 | Design of aluminium structures | | |
| | General structural rules | DIN EN 1999-1-1:2014-03<br>DIN EN 1999-1-1/NA:2021-03 | Annex A 1.2.4/1 |
| | Structural fire design | DIN EN 1999-1-2:2010-12<br>DIN EN 1999-1-2/NA:2011-04 | Annex A 1.2.3/3 |
| | Fatigue-stressed load-bearing structures | DIN EN 1999-1-3:2011-11<br>DIN EN 1999-1-3/NA:2013-01 | |
| | Cold-formed structural sheeting | DIN EN 1999-1-4:2010-05<br>DIN EN 1999-1-4/A1:2011-11<br>DIN EN 1999-1-4/NA:2017-10 | Annex A 1.2.4/2 |
| | Shell structures | DIN EN 1999-1-5:2017-03<br>DIN EN 1999-1-5/NA:2010-12 | |
| | Execution of aluminium structures | DIN EN 1090-3:2019-07<br>DIN EN 1090-5:2017-07 | Annex A 1.2.4/6 |
| A 1.2.4.4 | ‘Oberterrestrial cylindrical flat bottom tank structures of metallic materials’ painted in MVV TB 2020/2 | | |
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| A 1.2.5.1 | Design of timber structures | | |
| | Design of timber structures | DIN EN 1995-1-1:2010-12<br>DIN EN 1995-1-1/A2:2014-07<br>DIN EN 1995-1-1/NA:2013-08 | Annex A 1.2.5/1 |
| | Structural fire design | DIN EN 1995-1-2:2010-12<br>DIN EN 1995-1-2/NA:2010-12 | Annex A 1.2.3/3 |
| | Bridges | DIN EN 1995-2:2010-12<br>DIN EN 1995-2/NA:2011-08 | Annex A 1.2.5/1 |
| | Manufacture and execution of timber structures | DIN 1052-10:2012-05 | |

1 According to national law

| Ser. No | Planning, designing and execution requirements pursuant to § 85a(2) MBO1 | Technical rules/version | Further measures pursuant to § 85a(2) MBO[1] |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| A 1.2.5.2 | Wood preservation | DIN 68800-1:2011-10<br>DIN 68800-2:2012-02 | Annex A 1.2.5/2 |
| **A 1.2.6** | **Structural works in masonry structures** | | |
| A 1.2.6.1 | Design of masonry structures | | |
| | General rules for reinforced and unreinforced masonry structures | DIN EN 1996-1-1:2013-02<br>DIN EN 1996-1-1/NA:2019-12 | Annex A 1.2.6/1 |
| | Structural fire design | DIN EN 1996-1-2:2011-04<br>DIN EN 1996-1-2/NA:2013-06 | Annex A 1.2.6/2 |
| | Design considerations, selection of materials and execution of masonry | DIN EN 1996-2:2010-12<br>DIN EN 1996-2/NA:2012-01<br>DIN EN 1996-2/NA/A1:2021-06 | |
| | Simplified calculation methods for unreinforced masonry structures | DIN EN 1996-3:2010-12<br>DIN EN 1996-3/NA:2019-12 | |
| A 1.2.6.2 | Prefabricated parts | DIN 1053-4:2018-05 | Annex A 1.2.6/3 |
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| | Terms and general principles | DIN 18008-1:2020-05 | Annex A 1.2.7/1 and A 1.2.7/2 |
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| | Glazing with punctiform supports | DIN 18008-3:2013-07 | Annex A 1.2.7/4 |
| | Additional requirements for safety barrier glazing | DIN 18008-4:2013-07 | Annex A 1.2.7/4 |
| | Additional requirements for walk-in glazing | DIN 18008-5:2013-07 | Annex A 1.2.7/4 |
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| | | DIN EN 13084-1:2007-05 | Annex A 1.2.8/1 |
| | | DIN EN 13084-2:2007-08 | |
| | | DIN EN 13084-4:2005-12 | |
| | | DIN EN 13084-6:2005-03 | Annex A 1.2.8/2 |
| | | DIN EN 13084-8:2005-08 | Annex A 1.2.8/2 |
| A 1.2.8.2 | Bell towers | DIN 4178:2005-04 | |
| A 1.2.8.3 | Greenhouses | DIN V 11535-1:1998-02 | Annex A 1.2.7/2 |
| A 1.2.8.4 | Shoring | DIN EN 12812:2008-12: | Annex A 1.2.8/3 |

1 According to national law

| Ser. No | Planning, designing and execution requirements pursuant to § 85a(2) MBO1 | Technical rules/version | Further measures pursuant to § 85a(2) MBO[1] |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| | | | and A 1.2.8/4 |
| A 1.2.8.5 | Working scaffolding | DIN EN 12811-1:2004-03 | Annex A 1.2.8/4 and A 1.2.8/5 |
| | Protective scaffolding | DIN 4420-1:2004-03 | Annex A 1.2.8/5 |
| A 1.2.8.6 | Silage silos and slurry tanks | DIN 11622-2:2015-09 | |
| A 1.2.8.7 | Wind turbines; Effect and proof of stability for tower and foundation | Guideline for Wind Turbines; influences and proofs of stability for tower and foundation, March 2015 | Annex A 1.2.8/6 |
| A 1.2.8.8 | Loam constructions for residential buildings in building classes 1 and 2 with no more than two full storeys | Clay construction rules, February 2008 | |
| A 1.2.8.9 | Stationary cylindrical single-wall and double-wall steel containers (tanks) for the surface storage of liquids fuels hazardous to water for the energy supply of heating and cooling systems for buildings | | Annex A 1.2.8/7 |
| A 1.2.8.10 | Stationary thermoplastic tanks for the surface storage of liquids fuels for the energy supply of heating and cooling systems for buildings | | Annex A 1.2.8/8 |
| **A 1.2.9** | **Structural works in seismic zones** | | |
| A 1.2.9.1 | Buildings in German earthquake areas | DIN 4149:2005-04 | Annex A 1.2.9/1 |

1 According to national law

**Annex A 1.2.1/1**

**Re DIN EN 1990 in conjunction with DIN EN 1990/NA**

The informational Annexes B, C and D do not apply.

**Annex A 1.2.1/2**

**for DIN EN 1991-1-1 in conjunction with DIN EN 1991-1-1/NA**

Re Section 6.4:
The following applies to horizontal loads for heliports on roofs:

1 A horizontal payload of $q_k$= 1.0 kN/m shall be assumed on the plane of take-off and landing areas and the surrounding safety strip at the most unfavourable location for the examined cross-section of a component.

2 Assume a horizontal load of 10 kN for rollover protection at least 10 cm high.

**Annex A 1.2.1/3**

**for DIN EN 1991-1-2 in conjunction with DIN EN 1991-1-2/NA**

When using natural fire models, please note:

1 The result of the design of the fire resistance (fire effect and detection) of structural or stiffening components based on natural fire models (section 3.3 DIN EN 1991-1-2:2010-12) requires a derogation in accordance with § 67(1) MBO[1]; it may also be authorised under § 51 MBO[1].

Note:
Fire resistance for building components is assessed in the building inspection processes on the basis of fire tests using the standard temperature-time curve (ETK) and results in fire resistance classification (DIN 4102-2:1977-09, DIN EN 13501-2:2016-12) attached to the building inspection requirements.
Building component measurements based on natural fire models take into account the actual use and characteristics of a room or building taking into consideration the existing fire protection infrastructure.
Such measurements do not fully cover the overall building inspection requirement system for fire resistance classification (building category, floor height, building type).
The applicability of natural fire models must therefore be decided in the context of a derogation under § 67 or a facilitation under § 51 MBO[1]. For this purpose, it must be stated in the building application or in the building documents why fire exposure testing based on the standard temperature-time curve is not required and it must be shown that (and why) the selected fire model is suitable for the project and how the restricted use of the system that is inevitably associated with this (e.g. due to limited fire loads) shall be assured (§ 67(1) MBO[1], § 11 (2)(1)(1)(2), MBauVorlV[1] cf. point 5).

2 To verify stability (§ 10(1) MBauVorlV[1]), the documents required to assess the effects of fire, in particular to determine thermal effects and design-relevant fire scenarios including the corresponding design fires, must also be provided (§ 1(4) MBauVorlV[1]). The required documents must be complete, comprehensible and verifiable; the thermal influences shall be determined and documented on a spatial basis. The input parameters shall be chosen representatively and conservatively; external fire effects and specific conditions of use must also be taken into account (e.g. vehicles in exhibition halls as part of the installation and dismantling phase of exhibition stands).

The test engineer/test expert[1] responsible for testing/certifying the proof of stability in accordance with § 66(3) MBO[1] shall either be a test engineer/test expert for fire protection[1] or use a test engineer/test expert for fire protection[1] experienced with such fire models to assess the fire effects. All input parameters shall be checked for completeness and correctness as part of the assessment of fire exposure; random or plausibility checks alone are insufficient.

3 For fire protection certification (§ 11 MBauVorlV[1]), the building documents must also set out how building components of the load-bearing structure designed according to natural fire models are to be combined with the

necessary (classified) space-enclosing components (such as fire walls and partition walls, ceilings, walls of required stairwells and floors) in an appropriate fire protection concept. This also includes statements on the connections of fire-protection components of different dimensions.
The requirements of MBO[1], the Model Special Building Code[1] and model guidelines for space-enclosing components[1] remain unaffected.

4 The fire resistance of the load-bearing structure is essential for effective firefighting. Before deciding on the derogation/facilitation, the competent fire protection service shall be consulted with regard to the interests of defensive fire protection; § 19 M-PPVO[1] remains unaffected.

5 The permitted type of use of the building project (e.g. office buildings) will be (spatially) set out and delimited by the (selected) input parameters (laid down by the planning permission) to determine the exposure to fire. Appropriate measures should therefore be laid down to ensure compliance with this restriction of use. This includes, in particular, appointing a fire protection officer to monitor operations and commissioning a test of the fire load assumption within one year after beginning use, as well as recurring tests (e.g. at intervals of 3-5 years), carried out by a testing engineer for fire protection[1].

The restriction of use and the measures intended to comply with it shall be laid down by appropriate ancillary provisions in the building permit. The planning permission must also specify that changes to the approved use that lead to increased exposure to fire (e.g. changed fire loads), require stability testing and, where applicable, a further planning application and approval procedure.

Note:
Buildings whose stability is designed based on natural fire models are subject to limitations on use ensured through operating measures and external inspections. The application of such models can therefore only be appropriate for certain building uses. It may be appropriate for uses with low and resistant fire loads, particularly in large spatial structures; the situation is different for rooms with variable fire loads and uses or buildings with special safety requirements (e.g. skyscrapers); in principle, the necessity of operational measures excludes an application for apartments or similar uses.

6 In relation to DIN EN 1991-1-2/NA:2015-09, Annex BB (NA.BB)
6.1 The fire load densities according to Section NA.BB.3.2, Table BB.1, Column 3, must not be undercut even when determining in individual cases according to Section NA.BB.3.3; the values refer only to the use of space typical for each type of building and not to the use of space for the entire building (cf. NA.BB.3.2 paragraph 3 for office buildings); this applies mutatis mutandis to Table BB.2.

6.2 The maximum heat release rate $Q_{max,k}$ according to section NA.BB.4, equation (BB.7) shall also be determined for rooms with more than 400 m² using first the heat release rate $Q_{max,f,k}$ for an assumed fire-load-controlled fire according to equation (BB.5) and the determination of the heat release rate $Q_{max,v,k}$ assuming a ventilation-controlled fire according to equation (BB.6). The value derived from equation (BB.7) (characteristic value $Q_{max,k}$) must always be on the safe side.

6.3 To assess the probability $p_1$ of an initial fire occurring per year and per unit, in accordance with Section NA.BB.5.1, the larger and therefore least favourable value derived from the data in accordance with Table BB.3 must be used to determine the probability $p_{fi}$ of a destructive fire occurring in accordance with equation (BB.9).

To assess the probability of a failure of the public fire service, the value $p_{2.2} = 0.5$ in accordance with Table BB.4 should be used.

6.4 To determine the conditional probability of failure $p_{f,fi}$ according to section NA.BB.5.2, the probability of failure $p_f$ for structural components shall always be taken into account in equation (BB.13) at least from the allocation to the damage result 'medium' according to Table BB.5.

For buildings used for offices or similar purposes and whose utilisation units have a gross floor area of 400 m² (see § 36(1) sentence 2(4) MBO[1]), the value 4.7 must be used for the reliability index β and the value 1.3E-6 as per Table BB.5 must be used for the related failure probability $p_f$.
Special constructions where the effects of failure or restriction of activity of a load-bearing structure may have severe consequences on life, health or natural resources (see DIN EN 1990:2010-12, Annex B), must be classified as "high" damage under Table BB.5.

1 According to national law

**Annex A 1.2.1/4**

**to DIN EN 1991-1-3 in conjunction with DIN EN 1991-1-3/A1 and DIN EN 1991-1-3/NA**

1 Reference is made to the table 'Classification of snow load zones according to administrative limits' in respect of the classification of snow load zones according to administrative limits or... [1]. The table 'Classification of snow load zones according to administrative limits' can be found at https://www.is-argebau.de or https://www.dibt.de/de/wir-bieten/technische-baubestimmungen.

2 To Section 4.3 (North-German plain):
In municipalities marked with the footnote ... in the table 'Classification of snow load zones according to administrative limits' or ... [1], the measurement situation with snow must be checked as an exceptional impact for all buildings in snow load zones 1 and 2, in addition to the permanent and temporary measurement situations. In this regard, the rated value of the snow load shall be assumed to be $s_i = 2.3\ \mu_i \cdot s_k$.

3 The NCI Annex NA.F (informative) 'Ice loads' must be borne in mind.

4 Re. Section 6.3:
Instead of the first sentence on NDP 6.3(2), the following applies: 'In Germany, the coefficient k for the shape of the overhang may be set at k = 0.4.'

**Annex A 1.2.1/5**

**for DIN EN 1991-1-4 in conjunction with DIN EN 1991-1-4/NA**

1 Re Section NA.B.3.2 Table NA.B.3, column 2:
In the case of buildings (mid-row houses) with a total height of h ≤ 10.0 m, which are substantially identical in profile on both sides and where it is (legally) ensured that the buildings are not permanently removed, the action of the wind may be demonstrated as variable effect from pressure or suction. In this connection, the least favourable value is decisive. The effect of pressure and drag may must then be applied jointly as an unusual action.

2 Reference is made to the table 'Classification of wind load zones according to state administrative limits' in respect of the classification of wind load zones according to state administrative limits or... [1]. The table "Allocation of wind zones according to administrative boundaries of the federal states" is available at https://www.is-argebau.de or https://www.dibt.de/de/wir-bieten/technische-baubestimmungen.

1 According to national law

**Annex A 1.2.1/6**

**for DIN EN 1991-1-7 in conjunction with DIN EN 1991-1-7/NA**

The informative annexes do not apply.

**Annex A 1.2.1/7**

**Re DIN EN 1991-4 in conjunction with DIN EN 1991-4/NA and DIN Expert Report 140**

1 For silo cells up to 4000 m³ container volume and slenderness ratio (cell height ratio $h_c$ to cell diameter $d_c$) $h_c/d_c < 4.0$, the rules of DIN EN 14491:2012-10 can also be used in addition to the DIN expert report 140:2005-01 provided that the weight of the relief system does not exceed the value of $m_E = 50$ kg/m².

2 The following shall be noted when applying DIN Expert Report 140:2005-01:
As long as there are no spherical explosion conditions present, when using the nomograms of DIN -Expert Report 140:2005-01 for lower silo cells with slenderness ratios of $h_c/d_c < 2.0$, the nomogram values are extrapolated using slenderness ratios of H/D=2 and H/D=4.

**Annex A 1.2.1/8**

**To the ETB Guideline 'Components that protect against falls'**

1 To Section 3.1(1):
Where greater horizontal line loads occur pursuant to DIN EN 1991-1-1:2010-12 in conjunction with DIN EN 1991-1-1/NA:2010-12, these must be taken into account.

2 To Section 3.1(4):
Instead of the sentence 'These loads must be overlaid with wind loads.' the following applies:
'These loads must be overlaid with wind loads, except for balcony and pergola railings not used as escape routes.'

3 The ETB Guideline must not be applied to glass components.

**Annex A 1.2.2/1**

1 In the absence of a generally-recognised technical best practice for the design, dimensioning and execution using the following construction products/kits with an ETA[1], proof in accordance with § 16a MBO[2] is required:

- Gabions
- Piles made of ductile cast iron pipes
- Rock and floor nails
- Small diameter (micropiles) grout piles (composite piles)
- Rock and ground anchors.

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[3] are used to build earthworks, these may be designed in accordance with the 'Recommendations for the design and calculation of embankments with geosynthetics (EBGEO)'.

3 Re ETAs for 'Construction kit for rock and ground nails, construction kits with hollow bars for self-driving nails':
Rock and floor nails may only be used on a temporary basis (≤ 2 years).
4 Re ETAs for 'Construction kit for small-diameter grout piles', 'Construction kits with hollow bars for self-driving piles': The grout piles may only be used on a temporary basis (≤ 2 years).

1 under ETAG/CUAP/EAD
2 According to national law
3 Implemented in Germany by DIN EN 13251:2016-12

**Annex A 1.2.2/2**

**Re DIN EN 12699**

Re DIN EN 12699:2001-05, Section 6.2.1 and 7.8.4 and DIN SPEC 18538:2012-02, A 6.2.1.1:
When executing piles or segment piles pursuant to EN 12794:2005+A1:2007[1] the relevant provisions and criteria pursuant to Annex A 1.2.3/1 must be observed.

- The piles and segment piles must meet the criteria for Class 1 pursuant to Table 3, EN 12794:2005+A1:2007[1].
- The load-bearing capacity of coupled piles with pile connections of classes A to C according to Table 4 of EN 12794:2005+A1:2007[1] must correspond to that of an uncoupled pile.
- Coupled piles may only be subjected to predominantly static actions.

1 Implemented in Germany by DIN EN 12794:2007-08 and DIN EN 12794/Amended version 1:2009-04.

**Annex A 1.2.2/3**

**for DIN EN 1537**

In the absence of technical best practice for the design, dimensioning and execution using permanent anchors, in particular for specific aspects of durability, proof according to §16a MBO[1] is required.

1 According to national law

**Annex A 1.2.2/4**

Re DIN EN 12716 Additional requirements for the material composition of the suspension:
Cements according to DIN EN 197-1:2011-11, and additives and admixtures according to DIN EN 206:2017-01.

**Annex A 1.2.3/1**

1 Section C 2.1 of this MVV TB regulates the requirements for construction products used in concrete, reinforced concrete, and prestressed concrete construction.

2 Prefabricated parts
2.1 For support structures made of prefabricated parts according to harmonised standards, DIN V 20000-120:2006-04 — Application of construction products in structures - Part 120: Application rules for DIN EN 13369:2004-09 – must be observed.

2.2 When using non-harmonised source materials, the Technical Rules under Section C 2.1 apply. The used concrete, reinforced steel and/or prestressed steel, and their technical specifications must be indicated.

2.3 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.

2.4 The design and structural construction of prefabricated concrete structural elements in structural works must be carried out in accordance with A 1.2.3.1.

2.5 For individual garages pursuant to EN 13978-1:2005[1], the standard DIN V 20000-125:2006-12 may also be used for the planning, design and execution. In this case, the rules of A 1.2.3.1 apply instead of DIN 1045-1:2001-07.

2.6 When using bricks according to EN 15037-3:2009+A1:2011[2] in ceiling systems, DIN 20000-129:2014-10 — Application of construction products in structures – Part 129: Rules for the application of ceramic intermediate structural elements according to DIN EN 15037-3:2011-07 – must be observed.

3 In the absence of a technical best practice for the planning, the designing and execution of structural works using prestressing methods, with the exception of the prestressing bed method for prestressing with immediate bonding according to DIN EN 1992 -1-1:2011- 01, Section 5.10, proof according to § 16a MBO[3] is required.

4 Re. DIN EN 1992-1-1:2011-01, Section 2.5:
The design of load-bearing structures on the basis of tests shall not apply.

5 The following design and construction rules must be observed for flat slabs, individual foundations and ground slabs made of reinforced concrete with double-headed anchors or lattice girders as punching shear reinforcement:

- Technical Rule (DIBt [Deutsches Institut für Bautechnik]) Design of flat slabs, individual foundations and ground slabs made of reinforced concrete with double-headed anchors as punching shear reinforcement (application document for EOTA TR 060); Version: August 2019
- Technical Rule (DIBt) Design of flat slabs, individual foundations and ground slabs made of reinforced concrete with lattice girders as punching shear reinforcement (application document for EOTA TR 058); Version: August 2019.

6 In the planning and design of structural elements made of reinforced concrete, the 'DAfStb Guideline for Steel Fibre Reinforced Concrete' (DAfStb [Deutscher Ausschuss für Stahlbeton] Richtlinie Stahlfaserbeton) (2021-06), Part 1, must also be observed.

1 Implemented in Germany by DIN EN 13978-1:2005-07.
2 Implemented in Germany by DIN EN 15037-3:2011-07.
3 According to national law

**Annex A 1.2.3/2**

The rules in General Circular - Road Construction No 22/2012 from the Federal Ministry of Transport, Building and Urban Affairs (published in the Transport Gazette 2012, volume 24, p. 995) must be applied to the planning, design and construction of bridges.

**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.

**Annex A 1.2.3/4**

1 The specifications of C 2.1.4.3 apply.

2 For determining the compressive strength of concrete in existing buildings, DIN EN 13791:2008 -05 (including national annex as amended A20:2017-02) can be used.

3 For the use of self-compacting concrete, the ‘DAfStb guideline on self-compacting concrete (DAfStb-Richtlinie Selbstverdichtender Beton, SVB-Richtlinie)’ (09-2012) shall apply.

4 The ‘DAfStb guideline on bulky concrete structural elements’ (DAfStb-Richtlinie Massige Bauteile aus Beton) (2010-04) shall apply to bulky concrete structural elements.

5 In principle, the compressive strength for classification into the required strength class according to DIN EN 206-1:2001-07, Section 4.3.1 for determining the characteristic strength according to DIN EN 206-1:2001-

07, Section 5.5.1.2 must be determined on samples aged 28 days. Conformity must be verified on samples aged 28 days within the scope of the conformity control for compressive strength in accordance with DIN EN 206-1:2001-07, Section 8.2.1. Deviation from this principle is only permitted if either

I) the DAfStb Guideline 'Solid concrete structural elements' (2010-04) can be applied and is applied or

II) the following conditions are met:

- **a.** There is a technical requirement to demonstrate compressive strength at a higher testing age. This is the case for example with some high-strength concretes, for low-joint/joint-free constructions and for structural elements with high requirements for crack width limitation.
- **b.** The use of concrete is at least subject to the rules for monitoring class 2 in accordance with DIN 1045-3:2012-03, unless higher requirements apply to the compressive strength class. If a higher test age is required, this must be confirmed by the monitoring body within the framework of monitoring the installation of concrete in accordance with DIN 1045-3:2012-03, Annex C.
- **c.** The construction company draws up a quality assurance plan which sets out, in relation to the project, how the changed test age is taken into account in terms of stripping periods, curing duration and construction process. This quality assurance plan must be submitted to the monitoring body for approval within the framework of monitoring in accordance with DIN 1045-3:2012-03, Annex C, prior to construction.
- **d.** The compressive strength of the concrete after more than 28 days must also be separately indicated on the delivery list and on the delivery note. Regardless of this rule, the manufacturer remains responsible for the agreement with the buyer as required by the standard. The effects on the construction process, in particular with regard to the curing period, durability and stripping periods, should be noted on a case-by-case basis.

6 When using reinforced concrete, the 'DAfStb Guideline for Steel Fibre Reinforced Concrete' (DAfStb-Richtlinie Stahlfaserbeton) (2021-06), Part 2 and Part 3 shall be observed.

**Annex A 1.2.3/5**

**Re Technical Rule (DIBt) Maintenance of concrete structures**

In terms of building inspections, the Technical Rule need only be applied for the maintenance of concrete components where stability is jeopardised. Stability is also deemed to be jeopardised if there is a high likelihood of such in the future.

**Annex A 1.2.3/6**

**Re DIN EN ISO 17660-1 and -2**

1 Re. Section 7:
1.1 Welded concrete steels according to DIN 488-1 and -2:2009-08 shall be used.
1.2 Structural steels according to EN 10025-1:2004[1] shall be used.
1.3 Welding materials according to EN 13479:2004[2] shall be used.

2 Re Sections 8 and 9:
DVS Guideline DVS 1708:2009-09 must be observed.

1 Implemented in Germany by DIN EN 10025-1:2005-02.
2 Implemented in Germany by DIN EN 13479:2005-03

**Annex A 1.2.4/1**

For the execution of steel structural elements or kits according to DIN EN 1993-1-1:2010-12 and DIN EN 1993- 1-1/A1:2014-07 in connection with DIN EN 1993-1-1/NA:2018-12, made of aluminium
according to DIN EN 1999-1-1:2014-03 in connection with DIN EN 1999-1-1/NA:2021-03 or of composite

structures or structural elements according to DIN EN 1994-1-1:2010-12 in connection with DIN EN 1994- 1-1/NA:2010-12, the following applies:
1 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.

2 The design of load-bearing structures on the basis of tests shall not apply. Exceptions to this are trapezoidal profiles and corrugated profiles made of steel and aluminium, whose load-bearing capacity is also determined on the basis of tests in accordance with Annex A to DIN EN 1993-1-3:2010-12 or Annex A to DIN EN 1999-1-4:2010-05 The test reports and their evaluation in accordance with Annex A to DIN EN 1993-1-3:2010-12 or Annex A to DIN EN 1999-1-4:2010-05 are part of the structural verifications.

**Annex A 1.2.4/2**

1 DIN EN 1090-4:2018-09 applies to the manufacture and design of load-bearing, cold-formed structural elements and load-bearing, cold-formed components for roof, ceiling, floor and wall applications made of steel.
The wording ‘unless otherwise specified’ in DIN EN 1090-4:2018-09 (see Table F.2 of the standard) is not applicable.
DIN 55634-1:2018-03 and DIN 55634-2:2018-03 apply to corrosion protection according to Annex E of DIN EN 1090-4:2018-09.

2 DIN EN 1090-5:2017-07 applies to the manufacture and design of load-bearing, cold-formed structural elements and load-bearing, cold-formed components for roof, ceiling, floor and wall applications made of aluminium.
The wording ‘unless otherwise specified’ in DIN EN 1090-5:2017-07 (see Table F.2 of the standard) is not applicable.

**Annex A 1.2.4/3**

The following applies to cable mesh constructions and prefabricated wire ropes of steel and stainless steel with end anchoring in accordance with ETA:

1 Depending on the material number, open spiral cables and round wire ropes made of stainless steel can be assigned to the corrosion resistance classes (CRC) specified in Table 1 in accordance with DIN EN 1993-1-4:2015-10.

**Table 1: Corrosion resistance classes**

| Material number | Corrosion resistance classes (CRC) as per DIN EN 1993-1-4:2015-10 |
|---|---|
| 1.4401 | II |
| 1.4404 | II |
| 1.4436 | III |
| 1.4462 | III |

2 Creep strains $\varepsilon_k$ must be taken into account in the design if the stress from constant effects, determined with 1.0 times characteristic values, is more than 40 % of 1.65 times the value of the limit tension stated in the relevant ETA. In this case, the values for $\varepsilon_k$ according to Table 2 must be taken into account.

**Table 2: Creep strains εk in %**

| Temperature in °C | $\varepsilon_k$ in % |
|---|---|
| 20 | $2.5 \times 10^{-2}$ |
| 40 | $3.0 \times 10^{-2}$ |
| 70 | $3.5 \times 10^{-2}$ |

**Annex A 1.2.4/4**

**for DIN EN 1993-3-2**

DIN EN 13084-1:2007-05, in conjunction with Annex A 1.2.8/1, shall also apply.

**Annex A 1.2.4/5**

**Re DIN EN 1090-2**

The Technical Rule shall be applied as follows:

1 Load-bearing steel components in the execution classes listed may only be manufactured by a manufacturer whose in-house quality control is certified by a notified body in accordance with EN 1090-1:2009+A1:2011[1].

2 The execution of welded steel components, load-bearing structures and buildings in the execution classes listed may be carried out only on the construction site by companies which possess a proof of suitability for the execution of welding work in the relevant execution classes. Alternatively, the following shall be considered as proof of suitability:

- a welding certificate in line with EN 1090-1:2009+A1:2011[1] issued or certified by a notified body, if the firm's in-house production control is certified by this body in line with EN 1090-1:2009+A1:2011[1];
- a welding certificate based on DIN EN 1090-2:2011-10 or DIN EN 1090-2:2018-09 in conjunction with EN 1090-1:2009+A1:2011[1], Table B.1 issued by an officially recognised body.

  § 3 of the Manufacturer and User Regulation [Muster-Hersteller und Anwenderverordnung][2] remains unaffected.

1 Implemented in Germany by DIN EN 1090-1:2012-02.
2 According to national law

**Annex A 1.2.4/6**

**Re. DIN EN 1090-3**

The Technical Rule shall be applied as follows:

1 Load-bearing aluminium components in the execution classes listed may only be manufactured by a manufacturer whose in-house quality control is certified by a notified body in accordance with EN 1090-1:2009+A1:2011[1].

2 The execution of welded aluminium components, load-bearing structures and buildings in the execution classes listed may be carried out only by companies which possess a proof of suitability for the execution of welding work in the relevant execution class. Alternatively, the following shall be considered as proof of suitability:

- a welding certificate in line with EN 1090-1:2009+A1:2011[1] issued or certified by a notified body, if the firm's in-house production control is certified by this body in line with EN 1090-1:2009+A1:2011[1];
- a welding certificate based on DIN EN 1090-3:2008-09 or DIN EN 1090-3:2019-07 in conjunction with EN 1090-1:2009+A1:2011[1], Table B.1 issued by an officially recognised body;

  § 3 of the Manufacturer and User Regulation [Muster-Hersteller und Anwenderverordnung][2] remains unaffected.

1 Implemented in Germany by DIN EN 1090-1:2012-02.
2 According to national law

**Annex A 1.2.4/7**

– deleted from MVV TB 2020/2 –

**Annex A 1.2.4/8**

1. Basic principles

The technical rule shall also be applied to tank constructions with a volume ≤ 100 m³.

DIN EN 1993-4-2:2017-09, Section 2.8 does not apply.

The rigid classification of the damage class of the tank structure to a calculation method according to DIN EN 1993-4-2:2017-09, Section 4.2.2 does not apply. The design method of cylindrical walls is based on the rules in DIN EN 1993-1-6:2010-12, Section 2.2 depending on the tank geometry, the boundary conditions and the shape/load pattern of the action.

The numerical values of the agents mentioned in the informative Annex B to DIN EN 1991-4:2010-12 apply. In addition, the operator shall provide nominal values for operating states and incidents as well as requirements exceeding the requirements of EN 1990, EN 1993-1-1 and EN 1993-1-6.

DIN EN 1993-4-2:2017-09, Section 7.3.2 (8) shall not apply. The constant replacement wind ambient pressure shall be determined according to DIN EN 1993-1-6:2010-12, Section D.1.3.2.

Table NA.1 from DIN EN 1993-4-2/NA:2018-12 does not apply. If the maximum filling height and the largest weights to be assumed for the liquids intended for storage cannot be exceeded, the safety factor $\gamma_F$ of the variable liquid impact may be reduced from 1.50 to 1.35. Design rules which conflict with the Eurocodes shall not apply. If requirements of DIN EN 14015 and DIN EN 14620 conflict with requirements of Eurocodes, the requirements of the Eurocode series apply. A temperature-dependent change in the characteristic material characteristics shall be taken into account from an operating temperature ≥ 50 °C. Vertical welds shall be subjected to an ultrasonic or radiation test of 100 %.

2. Evidence of earthquakes

When determining the design acceleration for the exceptional impact of an earthquake,

**1.** proceed as defined in Section A 1.2.9 of the MVV TB for tanks up to damage class 2. Unless more accurate evidence is provided, the design spectrum $S_d(T)$ shall be determined for horizontal and vertical action according to DIN 4149, clause 5.4.3, formula (6) to (9),

**2.** specify the seismic impact of a seismic site assessment for tanks of damage sequence class 3 in the limit state of load capacity.

No higher behavioural coefficient than q = 1,0 shall be applied. Excluded are raised containers in which a higher coefficient of behaviour can be justified on the basis of the characteristics of the substructure.

To determine the hydrodynamic pressures, use the load model according to DIN EN 1998-4:2007-01, Annex A.

The design of the cylindrical walls at the limit state of load capacity shall be carried out in accordance with DIN EN 1993-4-2:2017-09, taking into account the provision in Clause 1 of this Annex.

**Annex A 1.2.4/9**

In addition to DIN EN 1993-1-2 and DIN EN 1994-1-2, the emissivity of hot-dip galvanised structural elements may be determined in compliance with the DASt Directive 027:2020-11. In this case, it is necessary to ensure that no additional coatings are applied during its entire period of use and no surface-influencing changes are made. Section 6(2) of DASt Directive 027:2020-11 shall not apply.

**Annex A 1.2.4/10**

To DIN EN 1993-1-5/NA:2018-11

In DIN EN 1993-1-5/NA:2018-11, ‘DIN EN 1993-1-5:2017-07’ shall be replaced by ‘DIN EN 1993-1-5:2019-10 and DIN EN 1993-1-5 Corrigendum 1:2020-07’.

**Annex A 1.2.4/11**

To DIN EN 1993-1-8:2010-12

In the absence of a technical best practice for the planning, designing and execution of connections using injection screws, proof according to § 16a MBO [1] is required.

To DIN EN 1993-1-8/NA:2020-11, Annex NA.A

The definition of tightening procedures and/or tightening parameters through procedure tests (see Sections 5 and 9 of the DASt Directive 024:2018) is not applicable.

**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 20000-3:2015-02 | Application of construction products in structures – Part 3: Glued laminated timber and glued solid timber according to DIN EN 14080 |
| 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 20000-5:2016-06 and DIN 20000-5/A1:2021-06 | 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 20000-7:2015-08 | Application of construction products in structures – Part 7: Structural finger jointed solid timber according to DIN EN 15497 |

1a In the absence of a technical best practice for the planning, designing and execution, proof according to § 16a MBO[1] is required when using structural elements with laminated veneer lumber according to 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, especially for connections.

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 technical best practice for the planning, designing and execution when 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.

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

**Annex A 1.2.5/2**

1 DIN 68800-1:2011-10 and DIN 68800-2:2012-02 apply exclusively to the application and classification in use classes.

2 Timber structural elements on which chemical wood protection is used must be designed and executed in such manner that the agents used for chemical wood protection and its conditions of use can be identified using the BAuA [Bundesanstalt für Arbeitsschutz und Arbeitsmedizin; Federal Agency for Health and Safety at Work] or DIBt approval number.

3 Re DIN 68800-2:2012-02, Clause 5.2.1.2:
Open external wall cladding on vertical latching with permanently effective, water-repellent and UV-resistant coatings may only be carried out if, in accordance with Section 5.2.1.2(e) of the standard, the adequate UV resistance of films according to EN 13859-2:2010 [1], Section 4.3.9 has been proven. These films must be suitable for the effect of UV radiation, have a $s_d$-value ≤ 1,0 m and have class W1 resistance to water penetration.

_____
1 Implemented in Germany by DIN EN 13859-2:2010-11.

**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 On 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 $\Phi_m$ 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 For chamfered blocks pursuant to DIN 20000-402:2017-01 the chamfer width must not exceed 7 mm. When using chamfered blocks in load-bearing masonry, the design contact area width for cementing must be ≥ 115 mm, when using chamfered blocks for the facing shell of double-shell masonry it must be ≥ 90 mm. The uprising width is the stone width minus the bevel 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

**Annex A 1.2.6/2**

**for DIN EN 1996-1-2 in conjunction with DIN EN 1996-1-2/NA**

For special developments (e.g. connections, joints, etc.), the rules of application under DIN 4102-4:2016-05 must be observed, where the Eurocode does not provide any information.

**Annex A 1.2.6/3**

**Re DIN 1053-4**

When applying the technical rule, additionally DIN EN 1996-1-1/NA/A1:2014-03, DIN EN 1996-1-1/NA/A2:2015-01, DIN EN 1996-3/NA/A1:2014-03 and DIN EN 1996-3/NA/A2:2015-01 as well as Annex A 1.2.6/1 must be taken into account.

For the fire protection design of the masonry, the provisions of DIN EN 1996-1-2:2011-04 in conjunction with DIN EN 1996-1-2/NA:2013-06 apply to the corresponding non-prefabricated masonry, in addition to the classification of firewall (criterion REI-M and EI-M):

Where the masonry is not executed from room-wide façades, vertical butt joints must be inserted in the wall as follows.

In single panels a 6 mm concrete steel looped reinforcement must be positioned on-site one-third of the way up and at half wall height ⌀ – as shown in the picture – in the horizontal joints so that the loops overlap after the panels are laid in the butt joints. Due to the reinforcement rings formed in this way, a concrete bar steel of ⌀8 mm is to be inserted from above. The requirements of Section 8.2.1 of the standard must be observed. The joint must then be filled with mortar without cavities as per Section 5.3.3 of the standard.

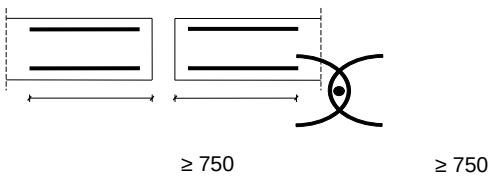


Figure: Wall-level vertical butt joints for fire walls

**Annex A 1.2.7/1**

**Re DIN 18008-1**

1 In the absence of technical best practice for the planning, design and execution of glued glass constructions using construction products with an ETA according to ETAG 002 or EAD 090035-00-0404, proof according to § 16a MBO[1] is required.

2 The requirements of DIN 18008-1:2020-05, DIN 18008-2:2020-05 and/or DIN 18008-4:2013-07 are to be observed when planning, designing and designing glass structures in windows and exterior doors.

1 According to national law

**Annex A 1.2.7/2**

**Re DIN 18008-1**

1 to Annex B.2
As an alternative to the provisions of Annex B.2, the structural requirements with regard to residual load capacity can be ensured by means of a laminated safety glass (VSG) in accordance with EN 14449:2005[1] with the following characteristics:

- the VSG shall have at least classification 2(B)2 in accordance with DIN EN 12600:2003-04
- the intermediate layer shall consist of polyvinyl butyral (PVB film) having the following characteristics:
  - Tensile strength: > 20: N/mm
  - Elongation at break > 250 %.

  (Test according to DIN EN ISO 527-3:2003-07; Test speed: 50 mm/min, test temperature: 23 °C.)
- For coated glasses, the coating must be on the side turned away from the PVB film.

2 Glass products according to EN 12150-2[3] and EN 14179-2[2] must show the fractional pattern defined in DIN EN 12150-1:2019-08 for test panes for each component size produced.

3 Glass products according to EN 1863-2[4] must have a fractional pattern from a component size of 1,000 mm x 1.500 mm, in which the area content of fragments of uncritical size is more than four-fifths of the total surface area. The test of the fracture pattern shall be carried out in accordance with DIN EN 1863-1:2012-02, section 8. Fragments of uncritical size may be considered to be all fragments to which a circle of 120 mm in diameter can be described.

1 Implemented in Germany by DIN EN 14449:2005-07
2 Implemented in Germany by DIN EN 14179-2:2005-08.
3 Implemented in Germany by DIN EN 12150-2:2005-01.
4 Implemented in Germany by DIN EN 1863-2:2005-01

**Annex A 1.2.7/3**

**Re DIN 18008-2**

1 The specifications of DIN 18008-2 for the use of VSG do not need to be applied for:

- glazed roof exits in roof rooms with a light glass surface (frame interior) of up to 0.4 m²,
- Glazing in cultivation greenhouses/commercial production greenhouses.

2 The text relating to B.2 ‘Vertical glazing’ is replaced by:
Vertical glazing, which complies with the conditions set out in Section 4.3, shall be deemed to be sufficiently rest-bearing on at least two opposite edges. The sufficient residual load capacity of the glazing structure shall not be unduly affected by drilling and cut-outs. In case of doubt, a test according to Annex B.1 of DIN 18008-1 shall be carried out. For glass balustrades type B according to DIN 18008-4 and for glazing made of laminated safety glass with the properties according to DIN 18008-1:2020-05, B.2, residual load capacity tests according to Annex B.1 of DIN 18008-1 are not required.

3 The minimum value of the reliability index of hot-bearing ESG in accordance with Section 4.3 can be achieved by a repeated biennial calibration according to E DIN EN 14179-1:2002-03 for each hot storage furnace combined with an annual review of the factory’s production control by a third-party body with sufficient experience in testing production monitoring and testing of the calibration of the hot storage furnaces. The third party may, in the presence of appropriate measuring instruments and controls by the manufacturer, set a frequency for calibration which is different from the two years.

**Annex A 1.2.7/4**

**Re DIN 18008-3, -4 and -5**

ESG-H means hot-bearing safety glass according to EN 14179-2:2005. The provisions of DIN 18008-2:2020-05, Section 4.3, second and third indents shall apply when using single pane safety glass (ESG) or hot-bearing ESG as monolithic single glass or as monolithic external panes of multi-panel insulating glass (MIG).

**Annex A 1.2.8/1**

**Re DIN EN 13084-1**

Re Section 5.2.4.1:
The effects of earthquakes are determined as per Section 1.2.9.

**Annex A 1.2.8/2**

**Re DIN EN 13084-6 and DIN EN 13084-8**

In addition, DIN EN 13084-1:2007-05 shall be used in conjunction with Annex A 1.2.8/1.

**Annex A 1.2.8/3**

**Re DIN EN 12812**

When applying this technical rule, the ‘Application guideline for falsework according to DIN EN 12812’, August 2009 edition, must be observed.

**Annex A 1.2.8/4**

Couplings in accordance with the previous notices may be used for scaffolding and protection scaffolds and for falsework if the notices are listed in the ‘List of couplings formerly subject to test marks or regulated by general building inspection approval’ published on the DIBt website; see: (https://www.dibt.de/de/bauprodukte/informationsportal-bauprodukte-und-bauarten/produktgruppen/bauprodukte-detail/bauprodukt/kupplungen).

**Annex A 1.2.8/5**

When applying the technical rules, the ‘Application guideline for working scaffolds in accordance with DIN EN 12811-1’, November 2005 edition, must be observed.

**Annex A 1.2.8/6**

**Re ‘Guideline for Wind Turbines’**

Compliance with the requirements regarding the stability of the tower and the foundations of the wind turbine can be considered satisfied if the verification procedure was performed in accordance with the Guidelines for wind turbines referred to here.
The following must be observed when applying the Technical Rule:

1 If standards refer to DIN 18800-7 or DIN V 4113-3 for the execution of steel or aluminium structures or steel or aluminium components, DIN EN 1090-2:2018-09 or DIN EN 1090-3:2019-07 shall apply.

2 Distances to transport routes and buildings, regardless of requirements pursuant to other legislation, must be observed due to the danger of dropped ice (wind turbines in operation) and falling ice (wind turbines stopped) if there may be a threat to public safety. Distances measured from the tower axis greater than 1.5 times (rotor diameter plus hub height) are in general sufficient in regions that are not particularly affected by ice. In other cases, an expert opinion is required.

3 Supplementary documents in addition to the civil engineering documents listed in Section 3(A) to (L) of the Guideline:

3.1 The expert’s opinion on the influences of neighbouring structural installations, terrain roughness and topography on the location suitability of the proposed WEA in accordance with paragraph 7.3.3 of the Guideline. With respect to the turbulence intensity, the distances to neighbouring wind turbines are to be evaluated in respect of the safety of existing and potential future wind turbines and the proposed wind turbine, where the distances set out in Paragraph 7.3.3 of the guideline are not adhered to,

3.2 An expert opinion on the functional safety of equipment through which the operation of the wind turbines can be safely ruled out when ice forms or through which ice forms can be prevented if the required distances are not maintained due to the risk of ice shedding,

3.3 The subsoil expert report set out in Section 3(H) of the Guideline to confirm that the requirements underlying the layout of the turbine on the subsoil are present at the place of installation,

3.4 Indication of the design lifetime in accordance with section 9.6.1 of the Guideline.

4 For wind turbines with a rotor sweep of less than 200 m² producing a voltage of under 1000 V AC or 1500 V DC, the following civil engineering documents listed under Section 3(A) to (L) of the Guideline are not required: the expert reports pursuant to Section 3(I), (J), (K) and (L) of the Guideline.

5 Points 3.1 to 3.4 do not apply to wind turbines up to 10 m tall, measured from the surface of the ground up to the highest point of the area swept by the rotor, and with a rotor diameter of up to 3 m.

**Annex A 1.2.8/7**

The following applies to the use of stationary cylindrical steel tanks in accordance with EN 12285-2:2005[1]:

- In flood plains, the tanks must be positioned in such manner that they cannot be reached by flood water.
- They shall not be placed in earthquake zones 1 to 3 (DIN 4149:2005-04).

1 Implemented in Germany by DIN EN 12285-2:2005-05.

**Annex A 1.2.8/8**

The following applies to the use of stationary thermoplastic tanks in accordance with EN 13341:2005+A1:2011[1]:

- In flood plains, the containers must be positioned in such a way that they cannot be reached by flood water.
- They shall not be placed in earthquake zones 1 to 3 (DIN 4149:2005-04).
- Fire protection requirements (fire duration) cannot be met by these tanks.

1 Implemented in Germany by DIN EN 13341:2011-04

**Annex A 1.2.9/1**

**Re DIN 4149**

The following must be observed when applying the Technical Rule:

1 In earthquake zone 3, roofing on roofs with more than 35° inclination, and in earthquake zones 2 and 3 the free-standing parts of the chimneys over the roofs, must be secured against the effects of earthquakes using appropriate measures to ensure that no parts can fall on adjacent public thoroughfares or on entrances to the structural works.

2 In terms of the allocation of earthquake zones and geological underground classes, refer to the map of earthquake zones and geological underground classes for xxx[1)], published by xxx[1)] or DigitalService CD-PRINT, Isener Str. 7, 84405 Dorfen. The table “Allocation of earthquake zones by administrative boundaries” can be accessed at www.is-argebau.de or https://www.dibt.de/de/wir-bieten/technische-baubestimmungen.

2a The references to DIN 1045-1:2001-07 and DIN 1052:2004-08 are replaced as follows throughout the standard text:
DIN 1045-1:2001-07 replaced by reference to DIN EN 1992-1-1:2011-01 and DIN EN 1992-1-1/A1:2015-03 in conjunction with DIN EN 1992-1-1/NA:2013-04 and DIN EN 1992-1-1/NA/A1:2015-12,
DIN 1052:2004-08 replaced by reference to DIN EN 1995-1-1:2010-12 and DIN EN 1995-1-1/A2:2014-07 in conjunction with DIN EN 1995-1-1/NA:2013-08.

3 Re. Section 5.5:
When determining the effective masses to calculate earthquake load, snow loads shall be multiplied in Equation (12) with the combination coefficient $\Psi_2 = 0.5$. These reduced snow loads must also be taken into account in the proof of stability.

4 Re. Section 6:
- In 6.2.2.4.2 (8), the reference to ‘Section (7)’ shall be replaced by the reference to ‘Section (6)’.
- The condition ‘or’ is replaced by ‘and’ in the first sentence of 6.2.4.1(5).

5 Re. Section 8:
In earthquake checks of steel and prestressed concrete constructions under this standard, DIN EN 1992-1-1:2011-01 shall apply in conjunction with DIN EN 1992-1-1/NA:2013-04.

- Paragraph 8.2(3) shall be worded as follows:
  ‘The design and structural design provisions specified in DIN EN 1992-1-1:2011-01 shall apply. Accordingly, the procedures specified for determining force variables in 5.5 and 5.6 of DIN EN 1992-1-1:2011-01 shall not

apply unless dual utilisation of plastic reserves (due to q > 1 and non-linear calculation assumptions) is excluded in the process.'

- Paragraph 8.2(5)(a) and Paragraph 8.3.2(2) shall be worded as follows:
  'In building structural elements used to mitigate the effects of earthquakes, type B500B steel with increased ductility shall be used. This may be foregone if it is ensured that the affected areas do not plasticise in the event of an earthquake, without taking into account a behaviour coefficient that reduces the calculated earthquake action (i.e. q = 1.0).'
- Paragraph 8.3.5.3(4), sentence 1 shall be worded as follows:
  'The transverse reinforcement to be provided for in case of seizure breaches shall be measured in accordance with DIN EN 1992-1-1:2011-01, Section 8.7.4.'
- Paragraph 8.4(2), sentence 2 shall be worded as follows:
  'The regulations in accordance with DIN EN 1992-1-1:2011-01, Section 9.4.1 (3) shall be taken into account here.'
- Paragraph 8.4(3), sentence 2 shall be worded as follows:
  'The minimum reinforcement grade for shear reinforcement shall be determined pursuant to DIN EN 1992-1-1:2011-01, Section 9.2.2(5) including DIN EN 1992-1-1/NA:2013-04, NDP re 9.2.2(5).'

6 Re. Section 9:

- For earthquake checks of steel structures, the references to DIN 18800-1 to 18800-4 and DIN V ENV 1993-1-1 with DASt (Deutscher Ausschuss für Stahlbau [German commission on steel construction]) Guideline 103 shall be replaced by DIN EN 1993-1-1:2010-12 and DIN EN 1993-1-1/A1:2014-07 in conjunction with DIN EN 1993-1-1/NA:2018-12 and DIN EN 1993-1-8:2010-12 in conjunction with DIN EN 1993-1-8/NA:2020-11.
- In Paragraph 9.3.4(1), the reference to DIN 18800-7 is replaced by the reference to DIN EN 1090-2:2018-09.
- Ductility classes 2 and 3 may only be used if the maximum value of the tensile yield point $f_{y,\,max}$ (see DIN 4149:2005-04, Section 9.3.1.1) and the minimum notch impact strength for the steel to be used stated in Paragraph 9.3.1.1(2) are documented in the building documents.
- Section 9.3.5.1(2)(c) shall be worded as follows:
  'c) the condition of DIN EN 1993-1-1:2010-12, 6.2.3 (3) shall be met in the case of traction-loaded structural elements at points of hole weakening ($N_{u,R,d} > N_{pl,R,d}$)".
- In Paragraph 9.3.5.4 (7), the reference to Paragraph '9.3.3.3 (10' is replaced by '9.3.5.3 (10)';
- In Paragraph 9.3.5.5 (5), formula (87) is replaced by the following:

$$\Omega_i = \frac{M_{pl,\,Verb,\,i}}{M_{sdi}}$$

- In Paragraph 9.3.5.8 (1), the reference to Sections '8 and 11' is replaced by '8 and 9'.

7 Re. Section 10:

- For the seismic qualification of timber structures under this standard, DIN EN 1995-1-1:2010-12 shall apply in conjunction with DIN EN 1995-1-1/NA:2013-08.
- Paragraph 10.1 (5) shall be worded as follows:
  '(5) In seismic zones 2 and 3, a combination of structural models of ductility classes 1 and 3 for the two main directions of the structure must not be used in the calculation.'
- Paragraph 10.3 (1) shall be worded as follows:
  '(1) The conditions of DIN EN 1995-1-1:2010-12, Section 3 in conjunction with DIN EN 1995-1-1/NA:2013-08 must be adhered to.'
- In Paragraph 10.3 (2), the paragraph marked with the 4th indent is replaced by the following:
  '– the usability of multi-layer solid wood panels and their connectors must be demonstrated;'
- In Paragraph 10.3 (3), the paragraph marked with the 2nd indent is replaced by the following:
  '- increasing the nail distance with the same load capacity in accordance with DIN EN 1995-1-1:2010-12, Section 9.2.3.2 (4) is not taken into consideration in seismic zones 2 and 3;'
- In Paragraph 10.3 (3), the paragraph marked with the 3rd indent is replaced by the following:
  '– the application of glued panels leads to classification in ductility class 1, including in the case of simultaneous use of mechanical connectors.'
- Paragraph 10.3 (6) shall be worded as follows:
  '(6) When using the equations to determine load-bearing capacity of dowel-type connectors and for shearing pursuant to DIN EN 1995-1-1/NA:2013-08, Section NCI on 8.2 to NCI at 8.7, the minimum thickness in timber materials, as permitted in DIN EN 1995-1-1/NA:2013-08 NCI NA.8.2.4 (NA.2) and NCI NA.8.2.5 (NA.4), must be adhered to in seismic zones 2 and 3.'

- Paragraph 10.3 (7) shall be added as follows:
  '(7) The load-bearing capacity of the connectors pursuant to DIN EN 1995-1-1:2010-12, Section 9.2.4.2(5) may not be increased.'

8 Re. Section 11:

Paragraphs 11.7.3 (1), 11.7.3 (2) and 11.7.3 (3) are replaced by the following (Tab. 16 is to be deleted):

'(1) The rated value $E_d$ of the decisive force variables in the earthquake measurement situation shall be determined using Equation (37). Depending on the existing boundary conditions, either the simplified or the more precise calculation methods under DIN 1053-1:1996-11 may be applied.'

'(2) When applying the simplified calculation procedure according to DIN 1053-1:1996-11, the rated load capacity $R_d$ may be determined from the permissible stresses increased by 50 %. Explicit mathematical proof of sufficient spatial stiffness may not be dispensed with.'

'(3) When applying the more precise calculation method, the rated value $E_d$ of the decisive force variables must be determined using $\gamma$times the effects pursuant to DIN 1053-1:1996-11. The decisive safety factor $\gamma$ may be reduced to 2/3 of the values set out in Section 7 of DIN 1053-1:1996-11.

The calculated strength values specified in DIN 1053-1:1996-11 are to be used as the design load-bearing capacity $R_d$.'

9 Re. Section 12:

- For the seismic qualification of foundations and support structures according to this standard, DIN 1054:2005-01 including DIN 1054 Correction 1:2005-04, DIN 1054 Correction 2:2007-04, DIN 1054 Correction 3:2008-01 and DIN 1054 Correction 4:2008-10 and DIN 1054/A1:2009-07.
- Paragraphs 12.1.1(1) and 12.1.1 (2) are worded as follows:
  '(1) Where the proof is conducted based on capacity measurement, Section 7.2.5 must be observed.'
  '(2) The detection under combinations of action referred to in Section 7.2.2 shall include:
  (a) proof of sufficient load-bearing capacity for the foundation elements under the building material rules of this standard and the relevant technical standards;
  (b) The relevant proof regarding the foundations under DIN 1054:2010-12, DIN 1054/A1:2012-08 and DIN 1054/A2:2015-11. Restrictions concerning the general applicability of verification procedures for the earthquake load case in DIN 1054 or in its accompanying calculation standards need not be observed if there are no unfavourable sold conditions (debris, loose sediment, artificial recharge, etc.).'
- Paragraph 12.1.1 (4) shall be worded as follows:
  '(4) When demonstrating slide stability, the characteristic value of earth resistance (passive earth pressure) may only be used with 30 % maximum of its nominal value.'
- Paragraph 12.2.1 (2) shall be worded as follows:
  'Earth pressure effects during earthquakes can be determined in simplified fashion by replacing the earth pressure value $k$ with $k_e = k + a_g \cdot \gamma_I \cdot \frac{S}{g}$ .'

1 According to national law

## 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 national 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 as a 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 structural installation that does not meet at least the requirement ‘normal flammability’ (lightly flammable), § 26(1) sentence 2 MBO[1] must be complied with.

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## 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 characteristics, fire-resistant structural elements must not contribute more to the fire than specified in § 26(2) MBO[1].

Where specific fire protection requirements and fire protection values of the building material class apply, coatings applied subsequently to structural elements up to a thickness of 0.5 mm remain disregarded, where the coatings are fully applied without hollow spaces 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 structural 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)

   .

   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.

**d)** Structural elements according to § 26(2) sentence 4 MBO[1], which may consist of combustible building materials and do not have cavities or filled cavities or insulating materials inside. Load-bearing and reinforcing

1 According to national law

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

**e)** 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 § 12 MBO[1], load-bearing parts of buildings must remain stable even if a fire develops over a specific period of time.

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 after A 2.1.3.1 letter (e)

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 2.1.3.3 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. Substantial falling or dripping of structural elements on the side away from the fire is not deemed to be present 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.

1 According to national law

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 element boundaries that must be space-enclosing structural elements without fire resistance (e.g. exterior wall or roof), these space-enclosing structural elements must remain stable over the time required in the event of fire exposure. 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 included 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 inspection requirements, and proof pursuant to § 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 § 16a MBO[1] is required.

Joints of the structural elements must remain closed to ensure closure of the room during the 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 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).

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).

1 According to national law

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, S ection 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 after A 2.1.3.1 letter (e)

The room closure must be ensured in case of fire according to the ETK in accordance with DIN 4102- 2:1977- 09, S ection 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).

#### 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 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).

### A 2.1.4 Load-bearing and reinforcing structural elements

Depending on the building class, the relevant requirements arise 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 letter (d) which must have a fire resistance of 90 minutes, the load-bearing capacity shall be calculated for at least 90 minutes under fire exposure using the standard temperature-time curve and
- load-bearing structural elements referred to in A 2.1.3.1 letter (d) which must have a fire resistance of 60 minutes, the load-bearing capacity shall be calculated for at least 60 minutes under fire exposure using the standard temperature-time curve.

1 According to national law

If load-bearing and reinforced parts of structural works are designed using natural fire models, Appendix A 1.2.1/3 must be observed. Natural fire models shall not be used for load-bearing structural elements which have a fire resistance of 90 minutes or 60 minutes in accordance with Section 5 of 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 letter (d), 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 arise from § 28 MBO [1].

Non-supporting outer walls are structural elements that do not remove vertical loads, other than their own weight, and are only designed for the absorption of the net weight and wind loads.

Openings in external walls of usage units to open corridors according to § 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 for the outdoor climate apply. The Technical Rule included in ser. No A 2.2.1.2 must be observed in order to meet these requirements.

By way of deviation from the specifications of Section A 2.1.3.3.4 (re. § 26 MBO[1]), for fire impact 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 time-temperature curve).

If surfaces of exterior walls and exterior wall cladding, except for substructures in accordance with § 28(3) sentence 1 Clause 2, MBO[1], must be flame-resistant overall, then the same applies to the individual structural elements 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 constructive measures must be put in place so that the protection objective according to § 26(1) sentence 1 MBO[1] is fulfilled; otherwise, the Technical Rule included in ser. No A 2.2.1.5 must be observed.

If cladding with normal flammability building materials is permitted for exterior building walls, light-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 Para. 1 sentence 2 Clause 2, MBO[1] is not applicable to exterior wall cladding if accessibility is ensured or there is risk of damage.

In the case of exterior walls with rear-ventilated cladding which have cross-storey cavities or which are carried over fire walls, other than those referred to in Section 6 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.

1 According to national law

For external wall cladding of wood or wood-based materials for buildings of building classes 4 or 5, Section 6 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 arise from § 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 § 29(5) Clause 2 and § 45 No 2 MBO[1] must be fire resistant (continuous 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 against fire 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 of the continuous 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. The observation of smoke development according to DIN 4102-5:1977-09 must have led to the finding that at most a small amount of smoke was observed (no surface smoke emission from the component surface, 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 locks in the form of a sliding, lifting or rolling door 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 for rescue purposes.

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.

1 According to national law

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 building inspection requirements, so proof pursuant to § 16a MBO[1] is required.

Partition walls made of fire-resistant glazings must satisfy the requirements for room-enclosing structural elements in case of exposure as defined in DIN 4102-13:1990-05, Section 6.1 with respect to the minimum time and further 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).

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 arise from § 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 space-enclosing 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 of DIN 4102-3:1977-09, Sections 4.2.1 to 4.2.4. The observation of smoke development according to DIN 4102-3:1977-09, Section 5.4, must have led to the finding that at most a small amount of smoke was observed (no surface smoke emission from the component surface, only single wisps of smoke, including from joints).

Walls instead of firewalls according to § 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,

1 According to national law

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. For highly fire-retardant walls, the requirements of Section A 2.1.3.1. sentence 6 letter (b) apply in addition. For walls referred to in Section A 2.1.3.3.7, the requirements of Section 5.2 of the Technical Rule published under Ser. number A 2.2.1.4 apply in addition. The observation of smoke development according to DIN 4102-3:1977-09, Section 5.4, must have led to the finding that at most a small amount of smoke was observed (no surface smoke emission from the component surface, only single wisps of smoke, including from joints).

For other walls instead of firewalls according to § 30(3) sentence 2 Numbers 2 and 3 MBO[1], the requirements according to Section A 2.1.6 shall be observed.

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.

1 According to national law

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.
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 § 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

1 According to national law

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.

Conclusion according to § 35(6) sentence 1 No. 1 MBO [1] of door openings in the walls of necessary stair rooms must be permanently fire-retardant, smoke-proof and self-closing, so that the prevention of fire propagation is not endangered and the passage of smoke in accordance with DIN 18095- 2:1991- 03 in the stair room is prevented during the period of exposure specified there; 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 included in ser. No A 2.2.1.2 must be observed.

Door openings according to § 35(6) sentence 1 No. 3 MBO [1] must have permanently sealed and self-closing accounts. 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 arise from § 36 MBO [1].

Taking into account the protection objective according to § 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 § 36(4) sentence 4 MBO[1] through constructive measures on the doors to hinder the entry of smoke over a specific period of time in case of fire in a unit or an adjoining unit. 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.

For open doors or doors closed after burn-through, the spread of fire must be inhibited 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 a 12.5 mm thick plasterboard.

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. Notwithstanding § 36(4) sentence 4 MBO[1], in order to ensure the space barrier of fire-resistant glazing, the doors of the fire-resistant glazing must be smoke-tight and self-closing and correspond to the fire resistance of the fire-resistant glazing.

Smoke protection closures within necessary hallways according to § 36(3) MBO [1] may be executed 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.

1 According to national law

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 arise from § 39 MBO [1].

To achieve the protection objectives, in the event of fire the lift shaft walls must ensure the space barrier 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 a 12.5 mm thick plasterboard) on the shaft side so that fire does not propagate in case of open landing doors or after closed doors on the surfaces of the shaft walls have been burned through.

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

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 from the MBO1, the M-GarVO and special building regulations1 based on the MBO1 for the systems and building products of the technical building equipment are specified by the technical rules listed under No A 2.2.1.8, A 2.2.1.9, A 2.2.1.10, A 2.2.1.11, A 2.2.1.12 and A 2.2.1.16. 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 of the fire alarm and the evaluation and control system for the lift. The fire control system may also be automatically activated by an automatic fire alarm system.

1 According to national law

### 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 included 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.

### 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 triggering of the fire-mode control system is also permitted 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.

1 According to national law

### 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 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 or because the properties of the building structure inhibit radio communication using fire service radio communication devices. 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 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 plastic secondary materials, the spread of fire must be prevented and effective firefighting enabled. The Technical Rule 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 § 2(4) MBO[1], the design and execution is subject to the detailed requirements of the Technical Rules under serial numbers A 2.2.2.2 to A 2.2.2.8.

Note:
Special fire protection requirements can also be made within the framework of a construction regulations derogating decision pursuant to § 67 MBO[1]or in the building permit pursuant to § 64 MBO[1] for a special construction. Where the protection objectives pursuant to § 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 national law

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

| Ser. No | 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 2.2.1** | **Planning, designing and execution** | | |
| A 2.2.1.1 | Fire service areas1 According to national law | Model Guideline on fire service areas: 2009-102 For building regulations requirements in this Technical Building Regulation, a deviation pursuant to § 85a Section 1 sentence 3 MBO is excluded; a deviation from requirements under building regulations can only be considered under § 67 MBO. § 16a Para. 2 and § 17(1) MBO are not affected. | Annex A 2.2.1.1/1 |
| A 2.2.1.2 | Construction products and designs | Building approval requirements, classification, use of construction products, use of designs: 2022-11² (See Annex 4) | |
| A 2.2.1.3 | Classified building materials and components, execution rules | DIN 4102-4:2016-05 | Annex A 2.2.1.3/1 |
| A 2.2.1.4 | Highly fire-retardant structural elements in wooden construction and fire-resistant structural elements in solid wood construction, external wall cladding made of wood and wooden materials | Model Guideline on fire protection requirements for structural elements and external wall cladding in wooden construction – M-HolzBauRL:2020-10² | |
| A 2.2.1.5 | Thermal insulation composite systems | WDVS with EPS, socket fire test method: 2016-06² (See Annex 5) | |
| A 2.2.1.6 | Rear-ventilated, external-wall cladding | Rear-ventilated external wall cladding: 2021-10 (See Annex 6) | |
| A 2.2.1.7 | 'Locking mechanisms' deleted from MVV TB 2019/1 | | |
| A 2.2.1.8 | Conduits | Model Guideline on fire protection requirements for conduits (Model Conduit Guideline – MLAR): Version of 10 February 2015, last amended by decision of the Commission for Construction Supervision of 3.9.2020[4] | |
| A 2.2.1.9 | System floors | Model Guideline on fire protection requirements pertaining to system floors (Muster-Richtlinie über brandschutztechnische Anforderungen an Systemböden [MSysBöR]): 2005-09 | |
| A 2.2.1.10 | Electrical operation rooms | Model of a regulation on the construction of operating rooms for electrical installations (EltBauVO): 2009-01[2] last amended by resolution of the Building Supervisory Commission dated 22.02.2022 | |
| A 2.2.1.11 | Ventilation systems | | |

1 According to national law
2 For building regulations requirements in this Technical Building Regulation, a deviation pursuant to § 85a Section 1 sentence 3 MBO is excluded; a deviation from requirements under building regulations can only be considered under § 67 MBO. § 16a Para. 2 and § 17(1) MBO are not affected.

| Ser. No | Planning, designing and execution requirements pursuant to § 85a(2) MBO1 | Technical rules/version | Further measures pursuant to § 85a(2) MBO[1] |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| A 2.2.1.12 | Furnaces1 According to national law, other heat generation and fuel supply systems | Model Combustion Ordinance (Muster-Feuerungsverordnung [MFeuV]): 2007-09, last amended by resolution of the Building Supervisory Commission dated 27.09.2017[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 2.2.1.13 | ‘Containment systems for extinguishing water’ deleted from MVV TB 2019/1 | | |
| A 2.2.1.14 | Storage of plastic secondary materials | Model guideline on fire protection during the storage of plastic secondary materials (Muster-Kunststofflagerrichtlinie [MKLR]): 1996-06[2] | |
| A 2.2.1.15 | Industrial construction[1] | Model guideline on structural fire protection in industrial buildings (Muster-Industriebaurichtlinie [MIndBauRL]): 2019-05[2] | |
| A 2.2.1.16 | Technical fittings for buildings | Technical Rule on Technical Building Equipment (Technische Regel Technische Gebäudeausrüstung [TR TGA]): 2022-04[4] Regulations for the fulfilment of other basic requirements for structural works must be observed. (See Annex 14) | |
| A 2.2.1.17 | Normal flammability glazing | Use of normal flammability glazing in external walls, excluding exterior wall structures with inter-storey cavities or airspaces and façades: 2022-07[2] (see Annex 18) | |
| A 2.2.2 Garages and special buildings<br>§ 85a(1) sentence 3 MBO[1] does not apply to Technical Building Regulations according to Section A 2.2.2 | | | |
| A 2.2.2.1 | Garages[1, 4] | Model of a regulation on construction and operation of garages: 2008-05[2] | |
| A 2.2.2.2 | Accommodation facilities[1, 4] | Model regulation on the building and operation of accommodation facilities: 2014-05[2] | |
| A 2.2.2.3 | Retail outlets[1, 4] | Model regulation on the construction and operation of retail outlets: 2014-07[2] | |
| A 2.2.2.4 | Meeting places[1, 4] | Model regulation on the construction and operation of meeting places: 2014-07[2] | |
| A 2.2.2.5 | Schools[1, 4] | Model guideline on Building | |

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

1 According to national law1 According to national law

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.

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

| Ser. No | Planning, designing and execution requirements pursuant to § 85a(2) MBO1 | Technical rules/version | Further measures pursuant to § 85a(2) MBO[1] |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| | | approval requirements pertaining to schools: 2009-04[2] | |
| A 2.2.2.6 | Residential accommodation for people in need of care or with disabilities[1, 4] | Model guideline on Building approval requirements for residential accommodation for people in need of care or with disabilities: 2012-05[2] | |
| A 2.2.2.7 | High-rise buildings[1, 4] | Model guideline on the building and operation of high-rise buildings: 2008-04, last modified on 2012-02[2] | |
| A 2.2.2.8 | Industrial buildings[1, 4] | Model guideline on structural fire protection in industrial buildings (Muster-Industriebaurichtlinie [MIndBauRL]): 2019-05[2] | |

**Annex A 2.2.1.1/1**

**On the guideline on fire service areas**

The following must be observed when applying the Technical Rule:

1 Re. Section 1
Access routes, installation areas and movement areas must be fortified at least in line with road building class VI (Richtlinie für Standardisierung des Oberbaues von Verkehrsflächen [Guideline on the standardisation of superstructures for road surfaces (RStO 01)]).
Instead of DIN 1055-3:2006-03, DIN EN 1991-1-1:2010-12 in conjunction with DIN EN 1991-1-1/NA:2010-12 shall apply.

2 Signs
2.1 Signs for access routes and thoroughfares are marked ‘Fire Brigade Access’, signs for installation areas or movement areas are marked ‘Fire Service Area’.
The signs for fire service areas must comply with DIN 4066:1997-07; the ‘Fire Brigade Access’ sign must have a size of at least W/H = 594/210 mm and be recognisable from the public traffic area. Fire service areas must have a clearly visible boundary at all times.

2.2 Under § 12 Section 1 Number 5 of the Highway Code (Strassenverkehrs-Ordnung [StVO]), stopping in front of or in fire service access routes is not permitted if these access routes are officially marked.
If stopping must be prohibited under StVO in the public thoroughfare in the fire service access area, the sign must be marked ‘Fire Brigade Access’ by the competent authority (official sign).
Instead of the official ‘Fire Brigade Access’ sign, the competent authority may order the installation of traffic sign 283 (stopping prohibited) under the StVO with an additional ‘Fire Brigade Access’ sign (protection area as defined in § 45(1) sentence 2 No. 5 StVO).

2.3 For the positioning of exterior wall cladding made of wood or wood-based materials for buildings of building classes 4 and 5, the requirements set out in Section 6.3 of the Technical Rule published under ser. No A 2.2.1.4 shall be observed.

**Annex A 2.2.1.3/1**

The subject of the Technical Building Regulations are only the classified building materials and types of structural elements that are required to meet the requirements according to Technical Building Regulation A 2.2.1.2.

The following must be observed when applying the Technical Rule:

Re. Section 4.2
In the case of fire protection requirements and fire protection evaluations of the building material class, subsequently applied coatings up to a thickness of 0.5 mm on structural elements are not taken into account if the coatings are applied completely to a non-combustible substrate without cavities.

Re. Section 10.5.6
Paragraph 3 shall not apply to buildings in class 4 and 5.

## A 3 Hygiene, health and preservation of the environment

### A 3.1 General information

Under § 3 and § 13 MBO[1] structural works must be positioned, erected, modified and maintained so that public health and safety – particularly life, health and natural resources – are not endangered and so that no dangers or unreasonable nuisances arise due to plant and animal pests and 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 in respect of the planning, designing and execution of structural works and parts thereof pursuant to § 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.

| Ser. No | Planning, designing and execution pursuant to § 85a(2) MBO1 | Technical rules/version | Further measures pursuant to § 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 2022-04 (See Annex 8) | |
| A 3.2.2 | Textile flooring | TR textile flooring: 2020-08 (see Annex 9) | |
| 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: 2022-04 (See Annex 10) | Annex A 3.2/4 |
| A 3.2.4 | Appraisal and restoration of building materials and components in structures contaminated with PCB | Guideline on the appraisal and restoration of building materials and components in structures contaminated with PCB, September 1994 edition, Sections 1, 2, 3, 4.1, 4.2, 5.1, 5.2, 5.4 and 6 | Annex A 3.2/1 |
| A 3.2.5 | The assessment and remediation of loosely bound asbestos products in buildings | Guideline on the appraisal and restoration of building materials and components in structures contaminated with asbestos products November 2020 edition (see Annex 16) | |
| A 3.2.6 | Ventilation of windowless kitchens, bathrooms and toilets in apartments | Building inspection guideline on the ventilation of windowless kitchens, bathrooms and toilets in apartments, April 2009 version, as last amended on 1 July 2010 | |
| A 3.2.7 | Appraisal and refurbishment of building materials and components in structures contaminated with pentachlorophenol (PCPs) | Guideline on the appraisal and restoration of building materials and components in structures contaminated with pentachlorophenol (PCP), October 1996 edition, Sections 1, 2, 3, 4, 5, 6.1 and 6.2 | |
| A 3.2.8 | ‘Limiting formaldehyde emissions when using urea formaldehyde resin in-situ foam’ deleted from MVV TB 2019/1 | | |

1 According to national law

**Annex A 3.2/1**

**Regarding the PCB Guideline**

In addition, the following shall apply:

1 To ward off possible dangers to life or health, restoration measures shall be undertaken in rooms which are used on a permanent basis if the concentration to be anticipated in the inside air – irrespective of the daily length of stay – exceeds 3000 ng PCB/m³ of air when averaged over the year. The last sentence of Section 3 of the Guideline has been removed.

2 The September 1994 version of the guideline shall otherwise apply to the full extent as long as the primary sources containing PCBs involve just PCB sources such as sealants which are not like dioxins. If, however, as regards the PCB primary sources, consideration must be given to purely or also dioxin-like PCB sources such as floor slabs, coatings and those sources of PCBs which cannot be reliably classified, the concentration of PCB 118 in the inside air also has to be determined if the total concentration of PCBs exceeds 1000 ng PCB / m³ of air. If, in this regard, the concentration in the inside air exceeds 10 ng PCB 118/m³ of air, measures designed to reduce exposure must be carried out immediately in accordance with Sections 3 and 4 of the Guideline concerned with reducing the concentration of PCBs in inside air. Where concentrations in the inside air are equal to or less than 10 ng PCB 118/m³ of air, it is recommended to at least review the ventilating characteristics, and improving them where necessary, depending on the level of contamination.

3 If structural works containing products which contain PCBs are demolished, these products must be removed from the structural work prior to demolition work starting.

*Note:*
*In addition, it should be noted that the 300 ng PCB/m³ air refurbishment guide value referred to in Section 5.3 of the Guideline is a precautionary value that cannot be precisely delimited and should therefore be achieved in order of magnitude. Measures designed to reduce the concentration of PCBs in the inside air are recommended depending on the extent to which the remediation guideline value is exceeded, while observing proportionality.*

**Annex A 3.2/2**

– deleted from MVV TB 2020/1 –

**Annex A 3.2/3**

– deleted from MVV TB 2019/1 –

**Annex A 3.2/4**

Chapter D 3 provides that further information on products according to harmonised technical specifications can be explained voluntarily and their correctness can be explained in a technical documentation.

The applications of

- DAfStb Directive “Using silicon-rich fly ash and boiler sand in concrete components in contact with soil, groundwater or precipitation” (version June 2020) 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.

## A 4 Safety and accessibility in use

### A 4.1 General information

Under § 3 MBO[1], physical structures must be positioned, erected, modified and maintained in such a way that public safety and order, in particular, human life, health and natural resources, are not endangered.

The requirements on safety in use and accessibility are implemented in particular pursuant to §§ 16 and 50 MBO[1] if physical structures as a whole and in their separate parts are designed and executed in line with the technical rules on safety and accessibility pursuant to Section A 4.2.

### A 4.2 Technical requirements in respect of the planning, designing and execution of structural works and parts thereof pursuant to § 85a(2) MBO[1]

| Ser. No | 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 4.2.1 | Building stairs | DIN 18065:2020-08 | Annex A 4.2/1 |
| **A 4.2.2** | **Barrier-free construction** | | |
| A 4.2.2.1 | Publicly accessible buildings | DIN 18040-1:2010-10 | Annex A 4.2/2 |
| A 4.2.2.2 | Apartments | DIN 18040-2:2011-09 | Annex A 4.2/3 |

1 According to national law

**Annex A 4.2/1**

**Re DIN 18065**

1 The use of stairs in residential buildings and apartments of building classes 1 and 2 is excluded from the insertion.

2 Building supervision requirements for the installation of stair lifts in stairwells of necessary stairs in existing buildings:
The retrofitting of a stairlift in a stairwell must not adversely affect the operation of the necessary stairs as part of the primary escape route and the safety of the stairs. A stairlift may be retrofitted if the following criteria are met:

1. The stairs only provide access to apartments and/or similar uses.
2. The guide construction must not be significantly less than the minimum running width of the stairs of 100 cm; a lower restriction of the clearance profile (see Figure A.8) of a maximum of 20 cm wide and a maximum of 50 cm high is acceptable if the flight of stairs (see point 3.6) or the walking area (see point 8) is not changed. It must be possible to use a handrail for its intended purpose.
3. If a stair lift is run over several storeys, at least on each storey there shall be a waiting area of sufficient size to allow an accompanying person to wait during the operation of the stair lift. This is not required if 60 cm remaining width on the stairs is ensured besides the lift in operation.
4. Unused lifts must be in park position that does not restrict the flight of stairs. In the event of a malfunction, the stair lift must be able to be moved into the parking position by hand with little effort.
5. The stairlift seat must be folded up into and out of the park position when unladen. Next to the folded up seat, there must be 60 cm remaining width on the stairs.
6. The stair lift must be protected against misuse.
7. The stairlift must consist of non-combustible materials insofar as possible.

3 In the case of a necessary staircase in an existing building, the usable minimum rail width may not be undercut by a maximum of 10 cm due to the subsequent installation of a second handrail. This exception only applies to stairs with a minimum tread width of 100 cm in accordance with DIN 18065:2020-08. Different specifications and requirements pertaining to effective width remain unaffected.

**Annex A 4.2/2**

**Re DIN 18040-1**

The insertion relates to physical structures or parts thereof that must be accessible under § 50(2) MBO[1].
The following must be observed when applying the Technical Building Regulation:

1 Section 4.3.7 is not covered by the insertion.
2 Section 4.3.6 only needs to be applied to necessary stairs.

3 At least one toilet room for users shall comply with Section 5.3.3; Section 5.3.3 sentence 1 shall not apply.

4 At least 1 % and at least one of the necessary parking spaces for users must correspond to Section 4.2.2 sentences 1 and 2.

5 At least 1 % and at least one of the visitor seats in meeting rooms with fixed rows of chairs shall comply with Section 5.2.1; they can be counted towards the places required by § 10(7) MVStättV[1] for wheelchair users.

6 Sections 4.2.1, 4.3.6 and 4.3.8 also apply to non-building primary routes.

1 According to national law

**Annex A 4.2/3**

**Re DIN 18040-2**

The insertion relates to:

- housing units that must be accessible under § 50(1) MBO[1], and
- housing units and lifts that must be accessible without steps under § 39(4) sentence 3 MBO[1].
- accommodation spaces including related sanitary facilities that must be accessible under § 11 MBeVO[1].

When applying the Technical Building Regulation, the following shall be taken into account:

1 Sections 4.3.6 and 4.4 and all requirements marked ‘R’ are not covered by the insertion.

2 For housing units under § 50(1) MBO[1], it is sufficient if a window in a living area corresponds to Section 5.3.2 sentence 2.

3 For accessibility without steps under § 39(4) MBO[1], it is sufficient if entries correspond to Section 4.3.3.2 Table 1 row 1, movement areas around doors correspond to Section 4.3.3.4 and ramps correspond to Section 4.3.7.

4 For accommodation spaces including sanitary facilities that must meet the basic requirements for accessible usable housing units, Section 5 without requirements marked ‘R’ applies.

5 For accommodation spaces which, including the associated sanitary facilities, must be barrier-free and fully accessible by wheelchair, Section 5 with the requirements marked ‘R’ shall apply. In addition, the toilet bowl shall be accessible on both sides; If there is more than one accommodation room for unrestricted wheelchair use, the access sides for the toilet bowls can be provided alternately on the right or left. An emergency call system must be provided near the toilet bowl. In derogation of Section 5.5.1, supports and/or handrails must be provided near the toilet bowl and around the area during construction – these can be assembled where necessary.

1 According to national law

## A 5 Protection against noise

### A 5.1 General information

Under § 3 and § 15(2) MBO[1] building structures must be positioned, erected, modified and maintained to have sound insulation in accordance with their use.

To meet this requirement, the technical rules for sound insulation under Section A 5.2 must be observed.

### A 5.2 Technical requirements in respect of the planning, designing and execution of structural works and parts thereof pursuant to § 85a(2) MBO[1]

| Ser. No | 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 5.2.1 | Sound insulation in buildings | DIN 4109-1:2018-01 | Annexes A 5.2/1 to A 5.2/4 |

1 According to national law

**Annex A 5.2/1**

**Re DIN 4109-1**

1 Re. Section 7.1:
Where the total rated sound insulation value $R'_{w,ges}$ must be > 50 dB, or with a reference external noise level $L_a$ > 80 dB, the requirements shall be determined for each individual case by the building inspectorate authority.

2 Re Section 8, Table 8:
The requirements in Table 8, rows 3.3, 3.4, 5.1 and 5.2 need to be satisfied only if the protected areas are living rooms or bedrooms in accordance with DIN 4109-1:2018-01, Section 3.16.

3 Re Sections 7, 8 and 9:
For building structures classified as per Table 9, rows 3 and 4, compliance with the required sound pressure level must be demonstrated by submitting measurement results. The same applies to compliance with the required sound insulation value for structural elements pursuant to Table 8 and for exterior structural elements that are subject to the requirements of Table 7.1, provided that the total evaluated sound insulation value $R'_{w,ges}$ must be ≥ 50 dB, or alternatively at a reference external noise level $L_a$ > 80 dB. These measurements must be performed in accordance with DIN 4109-4:2016-07 by building acoustics inspection bodies that are either recognised pursuant to § 24(1)(1) MBO[1] or are listed in another directory for 'recognised sound insulation inspection bodies' at the VMPA[2], the association of material testing institutions.

4 The informational Annexes A and B do not apply.

5 Re. Section 7:
Proof of airborne sound insulation of external components is required if
a) the development plan stipulates that precautions must be taken to protect the building from outside noise (§ 9(1)(24) of the Building Code, BauGB) or
b) even after the intended noise reduction measures have been taken, the 'key external noise level' (Section 4.4.5 of DIN 4109-2:2018-01) is equal to or greater than

- 61 dB(A) in living spaces in apartments, sleeping rooms, classrooms and the like, and in bedrooms in hospitals and sanatoriums
- 66 dB(A) in offices

1 According to national law
2 Verband der Materialprüfungsanstalten (VMPA) e. V. Berlin, Littenstraße 10, 10179 Berlin (www.vmpa.de)

**Annex A 5.2/2**

The sound proof is made according to DIN 4109-2:2018-01 in conjunction with DIN 4109-31:2016-07, DIN 4109-32:2016-07, DIN 4109-33:2016-07, DIN 4109-34:2016-07, DIN 4109-34/A1:2019-12, DIN 4109-35:2016-07 DIN 4109-35/A1:2019-12 and DIN 4109-36:2016-07.
For components in solid construction, Supplement 1 to DIN 4109:1989-11 may be used. If masonry made of perforated stones is used, this applies only to masonry, which meets the conditions in DIN 4109-32:2016-07, Section 4.1.4.2.1. Supplement 1 to DIN 4109:1989-11, however, may not be used as proof for solid stairs.

**Re DIN 4109-2**

The informational Annexes B, C and D do not apply.

**Re DIN 4109-36**

Informational Annex A does not apply.

**Annex A 5.2/3**

The following applies to the execution of components with insulating materials of granulated polystyrene and binder mixtures[1]:

The product may be used as a footfall sound insulation material under unheated floating screeds according to DIN 18560-2:2009-09 if the requirements of DIN 18560-2:2009-09 are met with regard to compression. In addition, either a maximum relative compression difference of 5 % must be adhered to at deformation under pressure and temperature load or the declared compression stress value must be at least 30 kPa at 10 % compression. In the latter case, dimensional stability at defined temperature and moisture conditions must be shown.

The sound insulation certificate shall be issued with the rated impact sound reduction value in accordance with DIN 4109-2:2018-01.

1 Under EAD/ETAG/CUAP

**Annex A 5.2/4**

The following applies to the execution of components with rubber fibre mats and/or polyurethane(PU) foam mats for footfall noise insulation[1]:

The construction products may be used as footfall noise insulation on solid ceilings under floating screed according to DIN 18560-2:2009-09 in accordance with the DES application area according to DIN 4108-10:2015-12 if the requirements of DIN 18560-2:2009-09 are met and the maximum relative compression difference is 5 % at deformation under pressure and temperature load. Evidence of sound insulation must be carried out with the rated value $\Delta L_w$ specified for construction design in accordance with DIN 4109-2:2018-01.

1 Under EAD/ETAG/CUAP

## A 6 Thermal insulation

### A 6.1 General information

Under § 3 and § 15(1) MBO[1] structural works must be positioned, erected, modified and maintained to have thermal insulation in accordance with their use and with 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 in respect of the planning, designing and execution of structural works and parts thereof pursuant to § 85a(2) MBO[1]

| Ser. No | 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 | | |
| | Minimum thermal insulation requirements | DIN 4108-2:2013-02 | Annex A 6.2/1 |
| | Climatic moisture protection | DIN 4108-3:2018-10 | 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 |
| A 6.2.2 | ‘Urea formaldehyde resin in-situ foam for thermal insulation’ deleted from MVV TB 2019/1 | | |

1 According to national law

**Annex A 6.2/1**

**Re DIN 4108-2**

1 The summer heat protection is carried out by the regulations of the Building Energy Act.

2 Re Section 5.2.2:
The above exceptions shall only apply to single-layered or single-layer insulation panels.

**Annex A 6.2/2**

**Re DIN 4108-3**

Section 6 does not count as a technical building regulation.

**Annex A 6.2/3**

**Re DIN 4108-4**

For insulating materials and insulating plaster with ETA[1], 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 $\gamma$ = 1.03. The conversion factors specified in the ETA are to be used to convert the humidity.

1 Under EAD/ETAG/CUAP

**Annex A 6.2/4**

- deleted from MVV TB 2023/1 -

**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 (short sign) | Boundary dimensions for length, width and thickness | Right-angled | Flatness | Tensile strength perpendicular | Compressive strength | Dimensional stability | | Water absorption with partial immersion | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | at a defined temperature | at a defined temperature and humidity conditions | brief | long term |
| | mm | mm/m | mm | kPa | kPa | % | % | [kg/m²] | [kg/m²] |
| DAD | ± 2 | ≤ 5 | ≤ 2 | - | ≥ 200 | ≤ 1.0 | ≤ 1.0 | ≤ 2.0 | ≤ 3.0 |
| DAA | ± 2 | ≤ 5 | ≤ 2 | ≥ 80 | ≥ 200 | ≤ 1.0 | ≤ 1.0 | ≤ 2.0 | ≤ 3.0 |
| DZ | ± 2 | ≤ 5 | ≤ 2 | - | - | ≤ 1.0 | ≤ 1.0 | - | - |
| DI | ± 2 | ≤ 5 | ≤ 2 | - | ≥ 150 | ≤ 1.0 | ≤ 1.0 | - | - |
| DEO | ± 2 | ≤ 5 | ≤ 2 | - | ≥ 150 | ≤ 1.0 | ≤ 1.0 | - | - |
| WI | ± 2 | ≤ 5 | ≤ 2 | - | ≥ 150 | ≤ 1.0 | ≤ 1.0 | - | - |
| WZ | ± 2 | ≤ 5 | ≤ 2 | - | - | ≤ 1.0 | ≤ 1.0 | ≤ 2.0 | ≤ 3.0 |
| WAB | ± 2 | ≤ 5 | ≤ 2 | ≥ 80 | ≥ 200 | ≤ 1.0 | ≤ 1.0 | ≤ 2.0 | ≤ 3.0 |
| WAP | ± 2 | ≤ 5 | ≤ 2 | ≥ 80 | ≥ 200 | | | ≤ 2.0 | ≤ 3.0 |
| WH | ± 2 | ≤ 5 | ≤ 2 | - | - | | | - | - |
| WTR | ± 2 | ≤ 5 | ≤ 2 | - | - | | | - | - |

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 $\gamma = 1.03$. 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 will be pressed together (e.g. fastening areas on the supporting structure), the thermal resistance of the products should not be given for the certificate.

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 $\Delta T = 10$ 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 Climatic 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 4108-3:2018-10.

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 insulating products are processed dry, they may also be used for exterior structural elements GK 0 (use class 0 according to DIN 68800-2:2012-02) with the exception of Figure A.8, layer No. 7 in cases where according to DIN 68800- 2:2012-02 insulation materials with proof of fitness for purpose for certain applications are required if the following performance is 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 national law

# Technical Building Regulations to be observed for components and special structures in addition to the Technical Building Regulations listed in Part A

B 1 General information

B 2 Technical regulations for special constructions and structural elements according to § 85a(2) MBO1

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 4 Construction products and designs subject to the requirements of other legislation for which a regulation has been enacted pursuant to § 85(4a) MBO1

1 According to national law

# Technical Building Regulations for components and special structures, which in addition to Technical Construction Regulations listed in Part A shall be complied with

## B 1 General information

This section contains the Technical Building Regulations to be observed for structural elements and special constructions. To facilitate application, the Technical Building Regulations are presented for each special construction / component, as they serve to clarify several basic requirements.

Buildings must be stable on their own over their entire period of use as a whole and in their separate parts. They must be arranged, procured and fit for use in such a way that there is no danger or unreasonable harassment.

## B 2 Technical regulations for special constructions and structural elements according to § 85a(2) MBO[1]

| Ser. No | Planning, designing and execution requirements pursuant to § 85a(2) MBO[1] | Measures/specifications pursuant to § 85a(2) MBO[1] |
|---|---|---|
| 1 | 2 | 3 |
| **B 2.1** | **Special constructions** | |
| B 2.1-1: | Temporary structures - Tents | DIN EN 13782:2015-06,<br>Annex B 2.1/1 |
| B 2.1.2 | Fairground and amusement park machinery and structures | DIN EN 13814:2005-06:<br>Annex B 2.1/2 |
| **B 2.2** | **Structural elements** | |
| **B 2.2.1** | **Structural elements for walls, roofs, ceilings and façade constructions** | |
| B 2.2.1.1 | Cladding for external walls, ventilated at rear | DIN 18516-1:2010-06<br>Annex B 2.2.1/1<br>DIN 18516-3:2021-05<br>DIN 18516-5:2021-05<br>Annex B 2.2.1/2<br>Also applicable: A 2.2.1.6 |
| B 2.2.1.2 | Load-bearing external walls made from construction kits | Annex B 2.2.1/3 |
| B 2.2.1.3 | Curtain walling | Annex B 2.2.1/4 |
| B 2.2.1.4 | Roofs, walls and ceilings made of self-supporting sandwich elements with double-sided metal layers | Annex B 2.2.1/5 |
| B 2.2.1.5 | External thermal insulation composite systems | ETICS with ETA pursuant to ETAG 004: 2019-05 (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: 2021-10<br>(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 2.2.1.10 | Components of plasterboard, plasterboard products from further processing, plasterboard with non-woven reinforcement, gypsum fibre boards and precast plasterboard panels with a cardboard honeycomb core | Annex B 2.2.1/7 |
| B 2.2.1.11 | Lightweight load-bearing steel/wood roof elements3 | Annex B 2.2.1/8 |

31 According to national law
3 Under EAD/ETAG/CUAP
31 According to national law
3 Under EAD/ETAG/CUAP

| Ser. No | Planning, designing and execution requirements pursuant to § 85a(2) MBO[1] | Measures/specifications pursuant to § 85a(2) MBO[1] |
|---|---|---|
| 1 | 2 | 3 |
| B 2.2.1.12 | Roof elements for roofing, roof light strips, prefabricated plastic light domes | Annex B 2.2.1/9 |
| **B 2.2.2** | **Sub-ceiling structures** | |
| B 2.2.2.1 | Plasterboard ceiling siding and subceilings | DIN 18168-1:2007-04 |
| B 2.2.2.2 | Suspended ceilings with fibre cement components or cement-bound building panels | Annex B 2.2.2/1 |
| **B 2.2.3** | **Components made of insulation materials for thermal and sound insulation** | |
| B 2.2.3.1 | Factory-made bulkings made of foam glass chipper | Annex B 2.2.3/1 |
| **B 2.2.4** | **Bearings** | |
| | 'Structural bearings' deleted from MVV TB 2019/1 | |
| **B 2.2.5** | **Structural elements for sealing structural works**<br>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 2.2.5.1 | Roof waterproofing made of reinforced bitumen sheets | DIN SPEC 20000-201:2018-08 Section 5.1 |
| B 2.2.5.2 | Roof seals made of plastic and elastomer sheets | DIN SPEC 20000-201:2018-08 Section 5.3 |
| B 2.2.5.3 | Building waterproofing made of plastic and elastomer damp-proof courses | DIN/TS 20000-202:2020-11 Section 5.3 |
| B 2.2.5.4 | Building waterproofing made of bitumen and damp-proof courses | DIN/TS 20000-202:2020-11 Section 5.2 |
| B 2.2.5.5 | Building waterproofing against ground moisture and water made of plastic and elastomer sheets | DIN/TS 20000-202:2020-11 Section 5.3 |
| B 2.2.5.6 | Building waterproofing against ground moisture and water made of bitumen sheets | DIN/TS 20000-202:2020-11 Section 5.2 |
| B 2.2.5.7 | Reinforced bitumen sheets for waterproofing of concrete bridges and other traffic areas | DIN/TS 20000-203:2021-03 Section 5 |
| B 2.2.5.8 | Surface waterproofing for containers and wet rooms consisting of liquid-applied waterproof products in conjunction with ceramic tiles and slab surfaces | Annex 15:2019-11, Section 2.5.1 |
| B 2.2.5.9 | Building waterproofing made of polymer-modified bitumen coatings | DIN 18533-3:2017-07, Table 2 |
| B 2.2.5.10 | Roof waterproofing systems made of substances to be applied in liquid form | Annex 15:2019-11, Section 2.2.1 |
| B 2.2.5.11 | Roof sealing systems made of mechanically secured roof sealing membrane | Roof waterproofing sheet as per DIN SPEC 20000-201:2018-08 Section 5.1 or 5.3 |
| B 2.2.5.12 | Waterproofing walls and floors in wet rooms | Annex 15:2019-11, Section 2.6.1 |
| B 2.2.5.13 | Bridge and parking deck waterproofing made of substances to be applied in liquid form | Annex 15:2019-11, Section 2.3.1 |
| B 2.2.5.14 | Roof waterproofing made of liquid and strip-type substances in conjunction | Annex 15:2019-11, Section 2.2.2 |
| B 2.2.5.15 | "Roof and building waterproofing made of waterproofing layers in conjunction with other substances" deleted from MVV TB 2020/1 | |
| B 2.2.5.16 | Waterproofing of vertical wall joints in bitumen wall waterproofing with single-component bitumen-polyurethane mixture | Annex 15: 2019-11, Section 2.2.3 |
| B 2.2.5.17 | Joint seals with coated joint plates in WU concrete structures | Annex 15:2019-11, Section 2.7.1 |
| 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)<br>Also applicable:<br>DIN EN ISO 11925-2:2011-02<br>in conjunction with Annex C 3.7 in accordance with A 2.2.1.2, Table 1.2.1 |
| B 2.2.5.19 | Building waterproofing consisting of flexible polymer- | Annex 15:2019-11, Section 2.4.1 |

| Ser. No | Planning, designing and execution requirements pursuant to § 85a(2) MBO[1] | Measures/specifications pursuant to § 85a(2) MBO[1] |
|---|---|---|
| 1 | 2 | 3 |
| | modified thick coatings | |
| B 2.2.5.20 | Joint sealing with expansion joint tapes in waterproof-concrete structures | Annex 15:2019-11, Section 2.7.2 |
| **B 2.2.6** | **Site drainage systems**<br><br>Site drainage systems must be designed so that they are stable and so that their use does not pose any hazard or unreasonable nuisance, and in particular do not leak any substances which are harmful to the health or environment. To meet the requirements on the qualify of site drainage, all characteristics contained in the hEN [harmonised technical specifications] must, under harmonised technical specifications, be stated in the declaration of performance for construction products. | |
| B 2.2.6.1 | Backwater gates for buildings | Annex B 2.2.6/1 |
| B 2.2.6.2 | Pipes and fittings of concrete, steel fibre reinforced concrete and reinforced concrete | Annex B 2.2.6/2 |
| B 2.2.6.3 | Manholes and inspection chambers of concrete, steel fibre reinforced concrete and reinforced concrete | Annex B 2.2.6/3 |
| B 2.2.6.4 | Non-alloy steel pipes and fittings for the transport of water and other aqueous liquids | Annex B 2.2.6/4 |

1 According to national law

**Annex B 2.1/1**

**Re DIN EN 13782**

The following must be observed when applying the Technical Rule:

1 Re Section 7.4.2.2:
For proof of stability of tents which, as Flying Buildings, also for locations with vb,0 >To measure 28 m/s, the gust velocity pressures according to table NA.B.3 or section NA.B.3.3 of standard DIN EN 1991-1-4/NA:2010-12 shall be applied. These may be reduced pursuant to Section 7.4.2.2. Other reductions in gust velocity pressures shall not be introduced.
The regulations of the above clauses also apply to the proof of stability of tents which, as temporary constructions, must be designed for locations in the coastal area of Wind Zone 3 (definition according to DIN EN 1991-1 4/NA:2010-12). The coastal area is a strip along the coast with a width of 5 km inland and the islands upstream of the coast.

2 Section 12 and Annexes B and D are excluded from the insertion.

**Annex B 2.1/2**

**for DIN EN 13814**

The following must be observed when applying the Technical Rule:

1.1 Section 1 shall be worded as follows:
“This standard shall apply to temporary structures according to § 76 MBO[1] e.g. carousels, swings, boats, ferris wheels, roller coasters, slides, stands, textile and membrane constructions, stalls, stages, show shops and superstructures for artistic performances in the air. It shall also apply to the design of corresponding structural works which are installed in amusement parks for an extended period, with the exception of the wind load evaluations and the foundation design. This standard does not apply to tents. Temporary structures do not include permanent platforms, building site equipment, scaffolding and transferable agricultural structures.”

1.2 For the application of the standard, the interpretation of the March 2010, which were published by the Working Committee on Flying Structures NA 005-11-15 AA (http://www.nabau.din.de).

2.1 The corresponding technical rules referred to in Part A shall apply for undated references to standards in the series ENV 1991 to ENV 1997.

2.2 In the case of references to ‘relevant European standards’ or ‘EN standards’, appropriate technical rules of the administrative provision laying down Technical Building Regulations shall apply.

3 Sections 3.1 to 3.7 are not covered by the insertion.

4.1 Re. Section 5.2:
When selecting the materials, the conditions of use specified in the Model Building Regulation and in the provisions based on this regulation (each time in accordance with Federal State law) must be heeded.

4.2 Re Section 5.3.3.1.2.2:
Vertical live loads where $q_k$ = 7.5 kN/m² shall be assumed for platforms which do not have fixed seats and their accesses and landings.

4.3 Re Section 5.3.3.4:
If Table 1 is applied, the temporary construction, which has been upgraded by the necessary protection and reinforcement measures, shall be assessed when not in use for the highest envisaged wind zone with the speed pressures specified in Table NA.B.3 or section NA.B.3.3 of the DIN EN 1991-1-4/NA:2010-12 standard. These may be reduced by a factor of 0.7. Other reductions in speed pressures shall not be taken into account.
Alternatively, proof of stability must be provided for temporary structures that are out of operation, including for installation locations with $v_{b,0}$ > 28 m/s with the peak velocity pressures specified in Table NA.B.3 or Section

NA.B.3.3 of the standard DIN EN 1991-1-4/NA:2010-12. These may be reduced by a factor of 0.7. Other reductions in gust velocity pressures shall not be introduced.

Fig. 1 is not covered by the insertion.

4.4 Re Section 5.3.6.2:
The partial load factor $\gamma_G = 1.0$ shall be used for permanent actions whose effects are advantageous.

4.5 Re Section 5.6.5.3:
Toe strap buckles in trapeze swings, including their fasteners and connections, must have a breaking load of at least 2 kN.

5 Re. Section 6:
Instead of the sections in the standard listed below which are not covered by the insertion, the requirements laid down in the Guideline on the construction and operation of temporary structures[1] shall apply.

5.1 Sections 6.1.3.2, 6.1.3.3, 6.1.4.1, 6.1.4.5 and 6.1.5.2 are not covered by the insertion.

5.2 Re Section 6.1.6.4:
In the case of swing carousels, the failure of a carrying chain, in particular, should not result in the passenger safety device (closing chain, bar, etc.) malfunctioning.

5.3 Re Section 6.2.1.2:
Rotors must have a closed cylinder wall. The floor and inside of the cylinder wall shall be executed without prominent or recessed parts. It should not be possible for either the user or spectators to reach the rim of the cylinder wall. The height-adjustable floor is to be fitted into the cylinder with a small joint and to be guided in the same direction as the cylinder rotation. The doors shall be incorporated into the cylinder wall with small joint gaps. The rotors shall be designed such that they cannot start when the doors are open.

5.4 Re Section 6.2.2.2:
The height of the fencing around open gondolas on ferris wheels in which passengers can stand up during operation must be at least 0.55 m, measured from the upper edge of the seat. It must be possible to close entry and exit points at the height of the protector by means of fixed devices. They must be capable of being secured with locks which cannot be disengaged automatically.

5.5 Re Section 6.2.3.1:
Roller coasters shall be fitted with a specification class J3 area barrier all around.

Ghost train tracks shall be fenced off to spectators as far as the entry and exit points using at least specification class J2 area barriers.

5.6 Re Section 6.2.3.5.1:
As regards ghost trains where the vehicles travel slowly (at speeds ≤ 3 m/s) and which have appropriate impact absorbers, a block system can be dispensed with.

5.7 Re Section 6.2.3.5.2:
Ghost trains with different floors must have backstops on the inclined sections. On lines on a falling gradient, provision must be made, if necessary, for brakes to control the speed and tilt protection devices.

5.8 Re Section 6.2.5.1.1:
There must be a fixed, horizontal and smooth sliding surface at least 2 m wide between the turntable and the bumper.

5.9 In Section 6.2.5.2, paragraph 1 is not covered by the insertion.

5.10 Section 6.2.6 is not covered by the insertion.

5.11 Re Section 6.2.7.5:

Shooting tables are to be fixed in such a way that they cannot be moved. The distance to individual targets no more than 0.40 m deep which are limited in terms of area (e.g. shooting gallery booths) may be reduced to up to 2.40 m.

5.12 Sections 6.4, 6.5 and 6.6 are not covered by the insertion.

6 Section 7 is not covered by the insertion.

7 Annexes A, C, E, F, H and I are not covered by the insertion.

1 According to national law

**Annex B 2.2.1/1**

**Re DIN 18516-1**

1 Re Section 7.1.1, paragraph a):
Stainless steels of corrosion resistance class II (CRC) according to DIN EN 1993-1-4:2015-10 may also be used for cladding.

2 Reference is made to the following error correction:
Re Annex A, Section A 3.1:
In (4), instead of "... according to Figure A.1.b) ...", it should read correctly "... according to Figure A.1.c) ..." and instead of "... according to Figure A.1.c) ..." it should read correctly "... according to figure A.1.d) ...".
Regarding Annex A, Figure A.4:
This should read: not 'present $F_{Q,Ed}$' but: 'present $F_Q$'; not 'prev. $F_{Z,Ed}$' but: 'present $F_Z$', not: ' permitted $F_{Q,Rd}$' but: 'permitted $F_Q$', not: ' permitted $F_{Z,Rd}$' but: ' permitted $F_Z$', not: ' max. $F_{Q,Rd}$' but: ' max. permitted $F_Q$' and not: ' max. $F_{Z,Rd}$' but: ' max. permitted $F_Z$'.

3 For exterior wall cladding, the relevant provisions of Section A 1.2 and B 2.2.1.1 shall be observed in order to comply with the requirements of Section A 1.1. The technical rules under No A 1.2.3 et seq. and B 2.2.1.1 do not extend to exterior wall cladding with façade elements (including their fasteners) that are fastened according to technical best practices and fulfil the following conditions:
a. with small-sized façade elements with an area of ≤ 0.4 m² and an intrinsic weight of ≤ 5 kg
b. with board-form façade elements with a width of ≤ 0.3 m and a substructure support distance of ≤ 0.85 m.

**Annex B 2.2.1/2**

**Re DIN 18516-5**

Re Section 5.4.2:
Equation (11) shall read as follows:

$$V_{Rk,red} = V_{Rk} \cdot \frac{d}{d + 2 \cdot z_A}$$

**Annex B 2.2.1/3**

1 Stability
For load-bearing features of building structural elements or kits in the form of calculated load-bearing values as per ETA[1], mechanical strength or complete static calculations are stated in the declaration of performance, these count as building documents.

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.

1 Under EAD/ETAG/CUAP

**Annex B 2.2.1/4**

Stability
To meet the requirement under Section A 1.1, the relevant provisions in Sections A 1.2 apply to façades manufactured with the curtain wall construction kit for structural safety analysis.

**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 EN 14509:2013[1] standard. 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:

- Interior coating layer temperature 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 halls, refrigerated warehouses), T2 shall be set in accordance with the operating temperature inside the building.

- Basecourse temperature T1 on the outside
  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 $\psi_0$ and $\psi_1$ are shown in Table E.6, the load factors $\gamma_F$ in Table E.8 of standard EN 14509:2013[1]. The material-related safety factors $\gamma_M$ are given in the table below:

| Characteristics in respect of which $\gamma_M$ 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 double-sided metal coating layers according to EN 14509:2013[1] requires classification of fire performance according to DIN EN 13501-1:2010-01 with the addition ‘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. apply to the use of kits of fully or partially glazed partitions of category IV according to ETA[1].

1 Under EAD/ETAG/CUAP

**Annex B 2.2.1/7**

1 Gypsum plasterboards under EN 520:2004+A1:2009[1] used with load-bearing (including stiffening) components must meet the provisions of DIN 18180:2014-09. Gypsum plasterboards from further processing, manufactured by the further processing of gypsum plasterboards in accordance with EN 520:2004+A1:2009[1], may only be used on load-bearing components, provided that further processing does not lead to a reduction in load capacity.

2 Thermal insulation
The thermal insulation certificate shall be issued with the rated thermal resistance value. The rated thermal resistance value is equal to the nominal value of the thermal resistance R divided by the conversion factor for the moisture content of $F_m = 1.25$.

1 Implemented in Germany by DIN EN 520:2009-12

**Annex B 2.2.1/8**

Proof of the limit state of fitness for purpose is to be carried out without starting to glue the steel profiles to the wooden components. The formation of water pockets must be excluded.
Compliance of sufficient wood protection (particularly condensation) for the roofing elements must be demonstrated pursuant to DIN 68800-2:2012-02.
**Annex B 2.2.1/9**

The relevant provisions of Section A.1.2 shall be observed to comply with the requirements of Section A 1.1. The following are excluded from compliance with the Technical Rules referred to in No A 1.2.3 et seq.:

1) Roof coverings with roof elements (including their attachments) fixed in accordance with generally accepted technical rules and meeting the following conditions:

- small-sized roof elements – except for the elements specified in points (b) and (c) – with ≤ 0.4 m² area and ≤ 5 kg intrinsic weight, or
- roof tiles and blocks (according to DIN EN 1304:2005[1] or EN 490:2011[2]) with an area of ≤ 0.4 m² and an intrinsic weight of ≤ 7 kg or
- Shaped clinkers and blocks (according to DIN EN 1304:2005[1] or EN 490:2011[2]) with an area ≤ 0.4 m² and an intrinsic weight ≤ 13 kg, or
- other roofing elements with a substructure support spacing of ≤ 1.0 m – excluding those made of glass,

2) Roof light strips made of plastic panels that meet the following conditions:

- level rooflights with roofing elements with a substructure support spacing ≤ 1.0 m, or
- upward curving roof light strips with roofing elements with a substructure support spacing in the main load-bearing direction (in the direction of the curve for single-axis curved roofing elements) ≤ 2.0 m,

3) Prefabricated plastic dome lights with a substructure support spacing in the main load-bearing direction ≤ 2.0 m.

_____
1 Implemented in Germany by DIN EN 1304:2008-07
2 Implemented in Germany by DIN EN 490:2012-01

**Annex B 2.2.2/1**

For the use of fibre cement boards according to EN 12467:2012[1] or cement-bound construction panels according to ETA[2] as indoor suspended ceilings, please observe EN 13964:2014[3] with the following limitations:

1 Anchoring in concrete, autoclaved aerated concrete, porous concrete, bricks, steel, wood or similar anchoring grounds is carried out with anchoring elements such as dowels, studs or screws, the use of which is regulated in the Technical Building Regulations.

2 Proof of the thermal insulation is to be provided with the rated 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 outlined in the ETA shall be used for conversion for the moisture.

_____
1 Implemented in Germany by DIN EN 12467:2012-12
2 Under EAD/ETAG/CUAP
3 Implemented in Germany by DIN EN 13964:2014-08

**Annex B 2.2.3/1**

For lack of a technical best practice for planning, dimensioning and execution when using factory-made bulking made of foam glass ballast under foundation plates, proof according to Article 16a MBO[1] is required.

_____
1 According to national law

**Annex B 2.2.4/1**

– deleted from MVV TB 2019/1 –
**Annex B 2.2.5/1**

– deleted from MVV TB 2020/1 –

**Annex B 2.2.5/2**

– deleted from MVV TB 2019/1 –

**Annex B 2.2.5/3**

– deleted from MVV TB 2020/1 –

**Annex B 2.2.5/4**

– deleted from MVV TB 2020/1 –

**Annex B 2.2.5/5**

– deleted from MVV TB 2020/1 –

**Annex B 2.2.5/6**

– deleted from MVV TB 2020/1 –

**Annex B 2.2.5/7**

– deleted from MVV TB 2020/1 –

**Annex B 2.2.5/8**

– deleted from MVV TB 2020/1 –

**Annex B 2.2.5/9**

– deleted from MVV TB 2020/1 –

**Annex B 2.2.5/10**

– deleted from MVV TB 2020/1 –

**Annex B 2.2.6/1**

For faecal-free waste water, type 2, 3 and 5 backwater gates must be used under EN 13564-1:2002[1]. For faecal wastewater according to EN 13564-1:2002[1] type 3 backwater gates marked ‘F’ shall be used.

1 Implemented in Germany by DIN EN 13564-1:2002-10.

**Annex B 2.2.6/2**

For the use of pipes and fittings for site drainage, the properties not listed in EN 1916:2002[1], Table 1, can be verified in accordance with DIN V 1201:2004-08.

1 Implemented in Germany by DIN EN 1916:2003-04

**Annex B 2.2.6/3**

Properties not within the scope of EN 1917:2002[1], Table 1 may be demonstrated for the use of site drainage manholes and inspection shafts pursuant to DIN V 4034-1:2004-08**.**

1 Implemented in Germany by DIN EN 1917:2003-04

**Annex B 2.2.6/4**

Pipes and fittings with corrosion protection coatings containing less than < 50 ppm benzo(a)pyrene may be used.

# Technical Building Regulations for components and special structures, which in addition to Technical Construction Regulations listed in Part A shall be complied with

## 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, usability certification is required to demonstrate the main features missing under the conditions of Article 17(1) MBO[1]. This does not apply if a different specification has been made in column 4(d). In this case, a declaration of conformity on the missing fundamental characteristics according to § 22 MBO[1] issued by the manufacturer based on a prior examination of the construction products by a testing agency recognised under building supervisory provisions.

| Ser. No | Construction product | Relevant harmonisation provisions | a: Specific purpose<br>b: Basic requirements in accordance with MBO (Model Building Code) [1]; with specification if necessary<br>c: Missing essential feature<br>d: Procedure for documentation of the missing fundamental characteristic |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| **B 3.2** | **Regulations pursuant to § 85a(2)(3) MBO** | | |
| **B 3.2.1** | **Technical Building Equipment subject to requirements under other legislation** | | |
| B 3.2.1.1 | Amalgam separator1 According to national law | 2014/35/EU<br>2014/30/EU<br>93/42/EWG<br>2006/42/EG | a: Use in building drainage<br>b: Hygiene, health, environmental protection<br>c: Sealing, prevention of return flow, odour seal and sufficient degree of separation |
| B 3.2.1.2 | Small sewage treatment plants with motor drives | 2014/35/EU<br>2014/30/EU<br>2006/42/EG | a: Use in building drainage<br>b: Hygiene, health, environmental protection<br>c: Sealing, prevention of backflow, odour seal and biological purification |
| B 3.2.1.3 | Plants to limit heavy metals in wastewater from the manufacture of ceramic products and that are fitted with motor drives | 2014/35/EU<br>2014/30/EU<br>2006/42/EG | a: Use in building drainage<br>b.1: Hygiene, health, environmental protection<br>b.2 Safety in use<br>c.1 Sealing, limitation effect<br>c.2 Functional safety of measuring, control and regulation devices |

1 According to national law1 According to national law

| Ser. No | Construction product | Relevant harmonisation provisions | a: Specific purpose<br>b: Basic requirements in accordance with MBO (Model Building Code) [1]; with specification if necessary<br>c: Missing essential feature<br>d: Procedure for documentation of the missing fundamental characteristic |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| B 3.2.1.4 | Plants to limit substances capable of being filtered, arsenic, antimony, barium, lead and other heavy metals, designed for an intake of wastewater from the construction and processing of glass and artificial mineral fibres and fitted with motor drives | 2014/35/EU<br>2014/30/EU<br>2006/42/EG | a: Use in building drainage<br>b.1: Hygiene, health, environmental protection<br>b.2 Safety in use<br>c.1 Sealing, limitation effect<br>c.2 Functional safety of measuring, control and regulation devices |
| B 3.2.1.5 | Plants for the control of hydrocarbons in mineral oil effluent fitted with motor drives1 According to national law | 2014/35/EU<br>2014/30/EU<br>2006/42/EG | a: Use in building drainage<br>b.1: Hygiene, health, environmental protection<br>b.2 Safety in use<br>c.1 Sealing, limitation effect<br>c.2 Functional safety of measuring, control and regulation devices |
| B 3.2.1.6 | Plants to limit silver content in wastewater from photographic procedures fitted with motor drives | 2014/35/EU<br>2014/30/EU<br>2006/42/EG | a: Use in building drainage<br>b.1: Hygiene, health, environmental protection<br>b.2 Safety in use<br>c.1 Sealing, limitation effect<br>c.2 Functional safety of measuring, control and regulation devices |
| B 3.2.1.7 | Plants to limit halogenated hydrocarbons in wastewater from dry cleaners fitted with motor drives | 2014/35/EU<br>2014/30/EU<br>2006/42/EG | a: Use in building drainage<br>b.1: Hygiene, health, environmental protection<br>b.2 Safety in use<br>c.1 Sealing, limitation effect<br>c.2 Functional safety of measuring, control and regulation devices |
| B 3.2.1.8 | Fire dampers for ventilation ducts that are not covered by the scope of DIN EN 15650 | 2014/35/EU<br>2014/30/EU<br>2006/42/EG | a: Use in ventilation systems<br>b: Fire protection<br>c: Sealing, surface temperature, activation device and smoke alarms |
| B 3.2.1.9 | Smoke dampers for ventilation ducts | 2014/35/EU<br>2014/30/EU<br>2006/42/EG | a: Use in ventilation systems<br>b: Fire protection<br>c: Sealing, smoke alarm and closure when ancillary power supply is interrupted |
| B 3.2.1.10 | Ventilation units with a volumetric flow rate of ≤ 1000 $m^3/h$ | 2014/35/EU<br>2014/30/EU<br>2006/42/EG<br>2009/125/EG<br>Regulation (EU) No 1253/2014<br>2010/30/EU<br>Delegated Regulation (EU) No 1254/2014 | a: Aeration and ventilation of residential and non-residential buildings<br>b.1: Fire protection<br>b.2 Hygiene, health, environmental protection<br>b.3 Energy saving and thermal insulation<br>c.1 Fire behaviour<br>c.2 Characteristic curve, minimum volume flow, sealing, air quality (filter), safety devices<br>c.3 Energy characteristics |

1 According to national law1 According to national law

| Ser. No | Construction product | Relevant harmonisation provisions | a: Specific purpose<br>b: Basic requirements in accordance with MBO (Model Building Code) [1]; with specification if necessary<br>c: Missing essential feature<br>d: Procedure for documentation of the missing fundamental characteristic |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| B 3.2.1.11 | Sealed solid-fuel furnaces with motor-operated parts | 2014/35/EU<br>2014/30/EU<br>2006/42/EG | a: Room heating<br>b.1: Hygiene, health, environmental protection<br>b.2 Safety and accessibility in use<br>c.1 Concentration of CO in the exhaust gas, required flow pressure<br>c.2 Operational reliability for this mode of operation, self-closing furnace doors, installation conditions, minimum air requirement, tightness |
| B 3.2.1.12 | Room-sealed liquid-fuel furnaces with motor-operated parts | 2014/35/EU<br>2014/30/EU<br>92/42/EWG<br>2006/42/EG | a: Room heating<br>b.1: Hygiene, health, environmental protection<br>b.2 Safety and accessibility in use<br>c.1 Concentration of CO in the exhaust gas, required flow pressure<br>c.2 Operational reliability for this mode of operation, self-closing furnace doors, installation conditions, minimum air requirement, tightness |
| B 3.2.1.13 | Quickly adjustable solid-fuel furnaces with motor-operated parts for individual rooms or groups of rooms (individual furnaces)1 According to national law | 2014/35/EU<br>2014/30/EU<br>2006/42/EG | a: Room heating<br>b.1: Hygiene, health, environmental protection<br>b.2 Safety and accessibility in use<br>c.1 Concentration of CO in the exhaust gas, required flow pressure<br>c.2 Operational reliability for this mode of operation, switch-off time, fuel dosage, installation conditions, minimum air requirement, tightness |
| B 3.2.1.14 | ‘Oil and gas-driven furnaces 4 kW to max. 400 kW’ deleted from MVV TB 2019/1 | | |
| B 3.2.1.15 | ‘Oil and gas-driven furnaces < 4 kW and > 400 kW’ deleted from MVV TB 2019/1 | | |
| B 3.2.1.16 | Assemblies for hot water generation loaded by hand with solid fuels[1] | 2014/68/EU | a: Room heating<br>b.1: Fire protection<br>b.2 Hygiene, health, environmental protection<br>b.3 Safety and accessibility in use<br>c.1 Fire safety of the furnace<br>c.2 Where necessary: Suitability for contact with drinking water, hygienic combustion<br>c.3 Safety in use of furnaces |
| B 3.2.1.17 | ‘Boilers with motorised drive for solid fuels’ deleted from MVV TB 2019/1 | | |
| B 3.2.1.18 | Stand-alone safety equipment for ensuring safe joint operation of ventilation systems and open-flue furnaces | 2014/35/EU<br>2014/30/EU | a: Ensuring safe joint operation of ventilation systems (including ambient air extraction systems such as extractor hoods or tumble dryers) and atmospheric furnaces<br>b.1: Hygiene, health, environmental protection<br>b.2 Safety and accessibility in use<br>c.1 Prevention of dangerous underpressure in the furnace installation area during furnace operation<br>c.2 Functional safety |

1 According to national law1 According to national law

| Ser. No | Construction product | Relevant harmonisation provisions | a: Specific purpose<br>b: Basic requirements in accordance with MBO (Model Building Code) [1]; with specification if necessary<br>c: Missing essential feature<br>d: Procedure for documentation of the missing fundamental characteristic |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| B 3.2.1.19 | ‘Heat pumps, electr.’ deleted from MVV TB 2019/1 | | |
| B 3.2.1.20 | ‘Non-electrically operated heat pumps (sorption or motor-driven heat pumps)’ deleted from MVV TB 2019/1 | | |
| B 3.2.1.21 | ‘Thermal solar systems, prefabricated plants and partial systems’ deleted from MVV TB 2019/1 | | |
| B 3.2.1.22 | Solar collectors with mechanically contained glass cover surfaces with a maximum individual glass surface of up to 3.0 $m^2$ for use:<br>- in roof areas with an inclination ≤ 75°1<br>According to national law<br>- in building-independent solar systems in areas not open to the public1 | 2014/68/EU | a: Energy generation for warming heating water<br>b.1: Fire protection<br>c.1 Fire performance of components when flame-retardant or non-combustible |
| B 3.2.1.23 | Solar collectors in derogation of B 3.2.1.22 | 2014/68/EU | a: Energy generation for warming heating water<br>b.1: Mechanical strength and stability<br>c.1 Depending on the installation situation, the provisions of A 1.2.7 must be met. |

1 According to national law

5 Note: When used in thoroughfares that could be endangered by falling glass parts (overhead glazing), the provisions of Section A 1.2.7 must be observed.

1

| Ser. No | Construction product | Relevant harmonisation provisions | a: Specific purpose<br>b: Basic requirements in accordance with MBO (Model Building Code) [1]; with specification if necessary<br>c: Missing essential feature<br>d: Procedure for documentation of the missing fundamental characteristic |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| B 3.2.1.24 | ‘Solar accumulators’ deleted from MVV TB 2019/1 | | |
| B 3.2.1.25 | Photovoltaic modules with mechanically held glass cover surfaces with a maximum individual module area of up to 2.0 m²for use:<br>- in the roof area with an inclination of < 75°[5]<br>- for building-independent solar systems in areas inaccessible to the public[1] | 2014/35/EU | a: Power generation for buildings<br>b: Fire protection<br>c: Fire performance of components when flame-retardant or non-combustible |
| B 3.2.1.26 | Photovoltaic modules without glass surfaces for use in the roof area | 2014/35/EU | a: Power generation for buildings<br>b: Fire protection<br>c: Fire performance of components when flame-retardant or non-combustible |
| B 3.2.1.27 | Photovoltaic modules in derogation of<br>B 3.2.1.25; or<br>B 3.2.1.26 | 2014/35/EU | a: Power generation for buildings<br>b.1: Mechanical strength and stability<br>b.2 Fire protection<br>c.1 Depending on the installation situation, the provisions of A 1.2.7 must be met.<br>c.2 Fire performance of components when flame-retardant or non-combustible |
| B 3.2.1.28 | ‘Drinking water reservoirs’ deleted from MVV TB 2019/1 | | |
| B 3.2.1.29 | ‘Combined heat and power plants, CHPs’ deleted from MVV TB 2019/1 | | |
| B 3.2.1.30 | ‘District and local heat transfer stations’ deleted from MVV TB 2019/1 | | |
| B 3.2.1.31 | Exhaust gas heat exchange<br>r1 According to national law,6 Late rally heating warm water as heat distribution medium | 2014/68/EU | a: Heat recovery for heating buildings<br>b.1: Fire protection<br>b.2 Safety and accessibility in use<br>c.1 Fire characteristics of exhaust gas heat exchanger<br>c.2 Functional reliability of the furnace with exhaust gas heat exchanger |
| B 3.2.1.32 | distribution box for electric circuit systems with functional integrity requirement in the event of fire | 2014/35/EU<br>2014/30/EU<br>2006/42/EG | a: Use in electrical circuit systems<br>b: Fire protection<br>c: Maintenance of function in case of fire |
| **B 3.2.2** | **Parts of installations for storage, filling and handling of water-endangering substances subject to requirements under other legislation** | | |
| B 3.2.2.1 | Overfill safety fuses for containers[1] | 2014/35/EU<br>2014/30/EU<br>2014/34/EU | a: Storage, filling and handling of water-polluting liquids<br>b: Hygiene, health, environmental protection<br>c: Operational reliability, visibility of alarm displays, corrosion resistance and fault indicators |

1 According to national law,1 According to national law
6 6 Laterally heating warm water as heat distribution medium

| Ser. No | Construction product | Relevant harmonisation provisions | a: Specific purpose<br>b: Basic requirements in accordance with MBO (Model Building Code) [1]; with specification if necessary<br>c: Missing essential feature<br>d: Procedure for documentation of the missing fundamental characteristic |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| B 3.2.2.2 | Leakage indicators for containers and pipes1<br>According to national law | 2014/35/EU<br>2014/30/EU<br>2014/34/EU | a: Storage, filling and handling of water-polluting liquids<br>b.1: Resistance and stability<br>b.2 Hygiene, health, environmental protection<br>c.1 Monitoring room stability<br>c.2 Suitability of the leak indicator medium, corrosion resistance, continuity and tightness of the monitoring chamber and functional safety of the leak detector |
| B 3.2.2.3 | Leak detection systems[7] | 2014/35/EU<br>2014/30/EU | a: Storage, filling and handling of water-polluting liquids<br>b: Hygiene, health, environmental protection<br>c: Operational reliability, visibility of alarm displays, corrosion resistance and fault indicators |
| B 3.2.2.4 | Containers with overpressure compared to atmospheric pressure over 0.5 bars during normal operation | 2014/68/EU | a: Storage, filling and handling of water-polluting liquids<br>b.1: Resistance and stability<br>b.2 Hygiene, health, environmental protection<br>b.3 Safety of use (only for containers used to store, fill and handle water-polluting liquids with flashpoint ≤ 55 °C)<br>c.1 Stability of the monitoring chamber (only for double-walled containers)<br>c.2 - - Leak detection (only for containers with leak detection lining and double-walled containers)<br>- - Permeation (only for underground plastic containers)<br>c.3 - Explosion resistance (only for containers without equipment with flame arrester)<br>- - Electrostatic charging (only for containers without a device to discharge electro-static charging) |

1 According to national law

7 For leak detectors or leak detection systems there is a technical specification under Regulation (EU) No 305/2011 for use in equipment for storing fuels with a flashpoint of > 55 °C used to supply heating systems in buildings. The use of construction products already on the market is unaffected.

| Ser. No | Construction product | Relevant harmonisation provisions | a: Specific purpose<br>b: Basic requirements in accordance with MBO (Model Building Code) [1]; with specification if necessary<br>c: Missing essential feature<br>d: Procedure for documentation of the missing fundamental characteristic |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| B 3.2.2.5 | Pipes, hoses, fittings, sealants, mountings for pipelines with overpressure over 0.5 bar1 According to national law compared to atmospheric pressure during normal operation | 2014/68/EU | a: Storage, filling and handling of water-polluting liquids<br>b.1: Resistance and stability<br>b.2 Hygiene, health, environmental protection<br>b.3 Safety in use (only for pipes for facilities used to store, fill and handle water-polluting liquids with flashpoint ≤ 55 °C)<br>c.1 Stability of monitoring room (only for double-walled pipes)<br>c.2 - Leakage detection (only for double-walled pipelines)<br>- - Permeation (only for underground plastic pipes)<br>c.3 Electrostatic charging (only for pipes without a device to discharge electro-static charging) |
| B 3.2.2.6 | Automatically closing nozzles | 2014/34/EU<br>2006/42/EG | a: Storage, filling and handling of water-polluting liquids<br>b: Hygiene, health, environmental protection<br>c: Functional safety<br>d: Declaration of conformity pursuant to C 3.17 |
| B 3.2.2.7 | Coupling with emergency separating function (safety breaks) for flexible pipes with overpressure compared to atmospheric pressure over 0.5 bars | 2014/68/EU | a: Storage, filling and handling of water-polluting liquids<br>b.1: Hygiene, health, environmental protection<br>b.2 Safety in use<br>c.1 Leakage rate<br>c.2 Emergency separating function |
| **B 3.2.3** | **Fire safety accessories subject to requirements under other legislation** | | |
| B 3.2.3.1 | Electrical cable systems with requirements for functional integrity in the event of fire[1] | 2014/35/EU | a: Use in electrical circuit systems<br>b: Fire protection<br>c: Functional integrity under fire exposure<br>d: Declaration of conformity pursuant to C 4.9 |

1 According to national law1 According to national law

# Technical Building Regulations for components and special structures, which in addition to Technical Construction Regulations listed in Part A shall be complied with

## 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]

Systems with construction products for the treatment of waste water or SDT installations must be sound, tight and durable, and must consist of building materials that are at most normally flammable.

| Ser. No | Description | Measures/specifications pursuant to § 85a(2) MBO[1] |
|---|---|---|
| 1 | 2 | 3 |
| **B 4.1** | **Technical requirements for fixed installations and sub-installations in storage, filling and handling plants (LAU plants) for handling substances that are hazardous to water** | |
| B 4.1.1 | - catch basins and collecting equipment as well as pre-fabricated parts for collecting basins and surfaces,<br>- Sealants for receptacles, collection tanks, collecting chambers and for surfaces,<br>- Tanks<br>- internal coatings and linings for containers and pipes,<br>- Pipes, fittings, sealants, mountings and<br>- safety equipment | Annex B 4.1/1 |
| **B 4.2** | **Technical requirements for installation, operation and maintenance of installations with construction products for waste water treatment** | |
| B 4.2.1 | Systems with construction products for the treatment of waste water with proportions of 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 national law

**Annex B 4.1/1**

For the proof of stability, at least the following impacts must be considered: Temperature, test and operating pressures or filling heights, internal and filling loads, traffic loads, impact, wind, snow, earthquakes (extraordinary load), flooding, chemical stress due to environmental influences and the storage or filling medium (water hazardous substances).

At least damage class CC2 and reliability class RC2 shall apply in accordance with Annex B of EN 1990.

Crack width control for concrete components in storage, filling and handling plants:

- uncoated components: $w_{cal} \leq 0.1$ mm
- lined or coated components: Crack width w matched with sealant performance.

For steel parts welds with sealing function, the EXC 2 execution class according to DIN EN 1090-2:2018-09 applies with additional requirements for welding and the traceability of materials.

**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 then 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 taking into account the effects of medium, time and temperature.

2 Fire protection

For structures containing 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 do not connect to non-combustible building materials, the relevant structure 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** | **Fire performance class according to EN 13501-1:2010-01 at least** |
|---|---|
| Free-standing installation | A2-s1,d0 |
| Underground installation | E-d2 |

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

**Annex B 4.2/2**

The plants must be erected and operated in such a way that light liquids do not leak onto the soil or water.

DIN 1999-100:2016-12, Section 1 excluding paragraph 2 and 3, Section 2, Section 3, Section 5 excluding point 5.4, point 5.7.2, point 5.8 and point 5.10, Section 9, Section 10, Section 11, Section 12, Annex A and Annex B shall apply.

In addition to DIN 1999-100:2016-12, Section 10, Clause 10.1, the volumes of additional installations must be deducted as part of the design of sludge traps.

For the use of the installations with construction products for the treatment of waste water containing light liquids of mineral origin, whose pollutant cargo originates mainly from premises where, during preservation removal, cleaning, maintenance, repair and recycling of vehicles and parts of vehicles, waste water containing mineral oil is regularly generated and where the waste water cannot be kept in circulation as much as possible, class I light liquid separators in accordance with EN 858-1:2002+A1:2004[1], Section 4, shall be used with coalescence device.

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

**Annex B 4.2/3**

The plants must be erected and operated in such a way that grease does not leak onto the soil or water.

DIN 4040-100:2016-12, Section 1, Section 2, Section 3, Section 4, excluding Section 4.2, Section 5 excluding point 5.4, point 5.6, point 5.7.2, point 5.8 and point 5.9, Section 8, Section 9, Section 10, Annex A, Annex B shall apply.

When choosing the nominal size, the following requirements apply in addition to DIN EN 1825-2:2002-05, Section 6:

- Volumes of additional fittings must be deducted when dimensioning sludge traps.

In conjunction with EN 1825-1:2004[1], Section 5.5.3, the following shall apply:

- The minimum surface area of the grease separator corresponds to the total water surface of the grease separator minus the surfaces of the inlet and drain compartment and the fittings. The minimum volume of the grease separator is the requisite full volume of the grease separator in water and stored grease, i.e. including the grease collection chamber but without the inlet and outlet areas. For the calculation of the minimum volume of the grease collection chamber, a density of the fat deposits collected shall be assumed to be 1.0 g/cm$^3$.

1 Implemented in Germany by DIN EN 1825-1:2004-12.

**Annex B 4.2/4**

Electric charges resulting from mechanical processes in the structure must be conducted away from the structure and equipotential bonding measures must be taken.

# Technical Building Regulations for construction products that do not bear the CE mark, and for designs

C 1 General information

C 2 Requirements for submitting a declaration of conformity for construction products pursuant to § 22 MBO1

C 3 Construction products that require only a general building supervisory inspection certificate pursuant to § 19(1) sentence 2 MBO1

C 4 Designs that require only a general building inspection test certificate pursuant to § 16a(3) MBO1

1 According to national law

# Technical Building Regulations for construction products that do not bear the CE mark, and for designs

Prerequisites for issuing a declaration of conformity for construction products and details on designs and construction products that require only a general building inspection test certificate

## C 1 General information

Construction products may only be used if during use the building structure meets building inspection requirements.

To clarify the building inspection requirements with Technical Building Regulations, compulsory technical rules have been agreed with the highest federal state building inspection authorities (see § 85a MBO[1]). These technical rules for construction products that do not bear the CE mark under the Construction Products Regulation (Regulation [EU] No. 305/2011) are set out in Chapter C 2, column 3. The manufacturer shall confirm compliance with these Technical Rules by submitting a declaration of conformity by marking the construction products with the conformity mark ('ÜZ'- in German). Pursuant to § 85a(2) Number 5 MBO[1], Chapter C 2, column 4 sets out the requirements for issuing a manufacturer's declaration of conformity (§ 22 MBO[1]):

- Manufacturer's declaration of conformity (Übereinstimmungserklärung des Herstellers [ÜH]),
- Declaration of conformity of the manufacturer after prior examination of the construction product by a recognised testing body (Übereinstimmungserklärung des Herstellers nach vorheriger Prüfung des Bauprodukts durch eine anerkannte Prüfstelle [ÜHP (MDT)]), or
- Conformity Mark Certificate by a recognised certification body (ÜZ).

The regulations previously laid down in the Building Rules List A Part 1 are continued in Chapter C 2.

Where construction products that do not bear the CE mark under the Construction Products Regulation do not have technical approval and there are no generally accepted technical standards, or where the construction product deviates significantly from a Technical Building Regulation, general building inspection approval (§ 18 MBO[1]) or approval in individual cases (§ 20 MBO[1]) is required.

This does not include construction products listed in Chapter C 3 for which there are recognised test procedures in column 2 and those which require only a general building inspection test certificate instead of general building inspection approval (§ 19 MBO[1]). Pursuant to § 85a(2) No. 5 MBO[1], column 4 sets out the requirements for issuing a manufacturer's declaration of conformity in respect of the general building inspection test certificate.

The regulations previously laid down in the Building Rules List A Part 2 are continued in Chapter C 3.

The required type of conformity for construction products is specified in Chapters C 2 and C 3.

The type of proof required under public law is decisive, even if the Technical Rule may stipulate otherwise. External monitoring provided for in a Technical Rule therefore need not be observed under public law if column 4 does not stipulate a certificate of conformity.

If tests on construction products, in particular suitability tests, initial tests or tests for obtaining test certificates or factory certificates, are provided for in the Technical Rules in accordance with Chapters C 2 and C 3, these tests must be carried out within the framework of the stipulated proof of conformity.

1 According to national law

In-house quality control is the manufacturer's continuous monitoring of production to ensure that the construction products it manufactures satisfy the provisions of the relevant Technical Rules. The quality control is carried out under DIN 18200:2021-04, Section 4.2. Moreover, the provisions contained in the technical rules governing the in-house quality control are decisive. Self-monitoring provisions apply as provisions for in-house quality control.

If construction products are not manufactured in series by companies whose operators are listed in the Register of Craftsmen, the requirements for in-house quality control under DIN 18200:202104, Section 4.2, are considered to be met if the handicraft regulations are observed.

External monitoring is carried out in accordance with DIN 18200:2021-04, Sections 4.3 and 4.4 for system A. Otherwise, the provisions of the Technical Rules are decisive for external monitoring.

Designs that deviate significantly from the Technical Building Regulations or for which there are no generally accepted technical standards in respect of planning, design and execution may only be used if there is general design approval or project-related design approval.

This excludes the designs listed in Chapter C 4 for which approved test procedures (column 2) are available and which require only a general certificate of inspection instead of a general design approval. Users must confirm compliance of the design with the general building inspection test certificate in a declaration of conformity.

The regulations previously laid down in the Building Rules List A Part 3 are continued in Chapter C 4.

Under the principle of mutual recognition, a construction product that is not the subject matter of EU-wide harmonisation and has lawfully been placed on the market in another member state of the European Union, of the European Economic Area, in Turkey or Switzerland under their national technical provisions qualifies as equivalent to a construction product under and on the basis of the requirements set out in Building Code[1], provided it is used as intended according to the other national technical provisions and meets the requirements applicable in Germany under and on the basis of the Building Code[1]. This includes requirements pertaining to the conformity assessment procedure and the conformity assessment bodies.

1 According to national law

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

The following is stipulated in accordance with § 85a(2) No. 5 MBO[1]:

| Ser. No | 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 1164-11:2003-11<br>Also applicable:<br>Annex C 2.1.1 | Mark of conformity [ÜZ] |
| C 2.1.1.2 | Cement with an increased organic content | DIN 1164-12:2005-06 | Mark of conformity [ÜZ] |
| C 2.1.1.3 | Portland-composite cement CEM II/C-M and Composite cement CEM VI | DIN EN 197-5:2021-07<br>Also applicable:<br>Annex C 2.1.8 | Mark of conformity [ÜZ] |
| **C 2.1.2** | **Concrete additives** | | |
| C 2.1.2.1 | Trass | DIN 51043:1979-08 | Mark of conformity [ÜZ] |
| **C 2.1.3** | **Rebars** | | |
| C 2.1.3.1 | Reinforcing steel bars | DIN 488-2:2009-08<br>DIN 488-6:2010-01<br>Also applicable:<br>DIN 488-1:2009-08 | Mark of conformity [ÜZ] |
| C 2.1.3.2 | Steel fabric for the reinforcement of concrete. | DIN 488-4:2009-08<br>DIN 488-6:2010-01<br>Also applicable:<br>DIN 488-1:2009-08 | Mark of conformity [ÜZ] |
| C 2.1.3.3 | Reinforcing steel in rings/reinforcing wire | DIN 488-3:2009-08<br>DIN 488-6:2010-01<br>Also applicable:<br>DIN 488-1:2009-08 | Mark of conformity [ÜZ] |
| C 2.1.3.4 | Lattice girders | DIN 488-5:2009-08<br>DIN 488-6:2010-01<br>Also applicable:<br>DIN 488-1:2009-08 | Mark of conformity [ÜZ] |
| **C 2.1.4** | **Concrete** | | |
| C 2.14.1 | Sprayed concrete | DIN EN 14487-1:2006-03<br>Also applicable:<br>DIN 18551:2014-08 | Mark of conformity [ÜZ]1 According to national law |
| C 2.1.4.2 | standardised prescribed concrete; | DIN EN 206-1:2001-07,<br>DIN EN 206-1/A1:2004-10,<br>DIN EN 206-1/A2:2005-09,<br>DIN 1045-2:2008-08<br>Also applicable:<br>DIN 1045-3:2012-03,<br>DIN EN 1008:2002-10 and<br>DAfStb Guideline – Requirements for | MDC |

1 According to national law

8 Only applies in the federal states of Bremen, Lower Saxony and Saarland (as at 30 August 2010). In the federal states where Orders concerning the requirements pertaining to manufacturers of construction products and users of designs, and those concerning the supervision of activities involving construction products and designs, have been enacted, the certificate of conformity [Übereinstimmungsnachweis (ÜZ)] is replaced by the inspection or monitoring performed by accredited centres in accordance with the Orders mentioned and the relevant standard.

| Ser. No | Construction product | Technical rules/version | Declaration of conformity |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| | | base materials for the production of concrete as per DIN EN 206-1 in conjunction with DIN 1045-2 (2019-08) | |

| Ser. No | Construction product | Technical rules/version | Declaration of conformity |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| C 2.1.4.3 | Concrete by properties, concrete by composition | DIN EN 206-1:2001-07,<br>DIN EN 206-1/A1:2004-10,<br>DIN EN 206-1/A2:2005-09,<br>DIN EN 206-9:2010-09 and<br>DIN 1045-2:2008-08<br>Also applicable:<br>DIN 1045-3:2012-03,<br>DIN EN 1008:2002-10 and<br>DAfStb Guideline – Requirements for source materials for the production of concrete as per DIN EN 206-1 in conjunction with DIN 1045-2 (08-2019) Annexes C 2.1.2 and C 2.1.3<br>Also applicable, depending on construction product:<br>DAfStb Guideline for concrete with extended processing time (slow-setting concrete) (2006-11),<br>DafStb Guideline on precautions against harmful alkali reactions in concrete (Alkali-Richtlinie [Alkali Guideline]) – AlkR- (2013-10),<br>DAfStb Guideline on concrete in accordance with DIN EN 206-1 and DIN 1045-2 with recycled aggregates in accordance with DIN EN 12620; Part 1 – RBrezG/1 – (2010-09) incl. correction 1 (2019-09),<br>DAfStb Guideline on the manufacture and use of dry concrete and dry mortar (Dry Concrete Guideline) – TrBMR – (2005-06),<br>DAfStb Guideline on self-compacting concrete – SVBR – (2012-09),<br>DAfStb Guideline on solid concrete structural elements (2010-04) and<br>DAfStb Guideline for Steel Fibre Reinforced Concrete (DAfStb-Richtlinie Stahlfaserbeton) (2021-06), Part 2 | Mark of conformity [ÜZ] |
| C 2.1.4.4 | Grout for pre-stressing tendons | DIN EN 447:1996-07:<br>Also applicable:<br>DIN EN 445:1996-07,<br>DIN EN 446:1996-07 and<br>Annexes C 2.1.4 and C 2.1.5 | Mark of conformity [ÜZ][8] Only applies in the federal states of Bremen, Lower Saxony and Saarland (as at 30 August 2010). In the federal states where Orders concerning the requirements pertaining to manufacturers of construction products and users of designs, and those concerning the supervision of activities involving construction |

8 8 Only applies in the federal states of Bremen, Lower Saxony and Saarland (as at 30 August 2010). In the federal states where Orders concerning the requirements pertaining to manufacturers of construction products and users of designs, and those concerning the supervision of activities involving construction products and designs, have been enacted, the certificate of conformity [Übereinstimmungsnachweis (ÜZ)] is replaced by the inspection or monitoring performed by accredited centres in accordance with the Orders mentioned and the relevant standard.

| Ser. No | Construction product | Technical rules/version | Declaration of conformity |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| | | | products and designs, have been enacted, the certificate of conformity [Übereinstimmungsnachweis (ÜZ)] is replaced by the inspection or monitoring performed by accredited centres in accordance with the Orders mentioned and the relevant standard. |
| C 2.1.4.5 | Grouting mortar, liquid concrete | DAfStb Guideline on the manufacture and use of cement-bound liquid concrete and grouting mortar<br>- VeBMR – (2019-07)<br>Also applicable:<br>DAfStb Guideline – Requirements for base materials for the production of concrete as per DIN EN 206-1 in conjunction with DIN 1045-2 (2019-08) | Mark of conformity [ÜZ] |
| **C 2.1.5** | **Prefabricated structural elements made of concrete and reinforced concrete, structural glass and bricks** | | |
| C 2.1.5.1 | Concrete windows | DIN 18057:2005-08<br>Also applicable:<br>Annex C 2.1.6 | Mark of conformity [ÜZ] |
| C 2.1.5.2 | Statically active roof tiles with non-prefabricated carriers | DIN 4159:2014-05 | Mark of conformity [ÜZ] |
| C 2.1.5.3 | ‘Statically inactive roof tiles with non-prefabricated carriers’ deleted from MVV TB 2019/1 | | |
| C 2.1.5.4 | Precast concrete, reinforced concrete or prestressed concrete components that do not comply with harmonised product standards | DIN 1045-4:2012-02<br>Also applicable:<br>Annex C 2.1.7 | Mark of conformity [ÜZ] also applies to non-series production |
| C 2.1.5.5 | Prefabricated brick ceilings | DIN 1045-100:2017-09<br>in conjunction with<br>DIN 1045-101:2017-09 | Mark of conformity [ÜZ] also applies to non-series production |
| C 2.1.5.6 | Steel-fibre reinforced concrete load-bearing prefabricated construction units | DAfStb Guideline for Steel Fibre Reinforced Concrete (DAfStb-Richtlinie Stahlfaserbeton) (2021-06),<br>DIN 1045-4:2012-02<br>Also applicable:<br>Annex C 2.1.7 | Mark of conformity [ÜZ] also applies to non-series production |
| **C 2.2** | **Construction products for masonry construction** | | |
| C 2.2.1 | Statically active bricks for cast slabs | DIN 4159:2014-05 | Mark of conformity [ÜZ] |
| C 2.2.2 | Façades and cast slabs | DIN 1053-4:2018-05 | Mark of |

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| | | in conjunction with DIN 1053-41:2018-05 | conformity [ÜZ] also applies to non-series production |
| C 2.2.3 | Ceramic bricks | DIN 105-4:2019-01<br>DIN 105-4/A1:2021-04<br><br>in conjunction with DIN 105-41:2019-01 | Mark of conformity [ÜZ] |
| **C 2.3** | **Construction products for timber construction:** | | |
| **C 2.3.1** | **Precast components** | | |
| C 2.3.1.1 | Glued load-bearing timber components under<br>DIN 1052-10:2012-05, Sections 6.2 to 6.5 and 6.7 excluding construction products under<br>No C 2.3.1.5 | DIN 1052-10:2012-05<br>Also applicable:<br>Annex C 2.3.1<br>Also applicable, depending on construction product:<br>DIN 4102-4:2016-05 | MDC |
| C 2.3.1.2 | Load-bearing structures of laminated beams, glued laminated timber or laminated veneer softwood timber with punched metal plate fasteners | DIN 1052:2008-12 and<br>DIN 1052/Corrigendum 1:2010-05<br>Also applicable, depending on construction product:<br>DIN 4102-4:2016-05 | Mark of conformity [ÜZ] also applies to non-serial production |
| C 2.3.1.3 | Glued laminated timber components made of glued laminated timber, unless timber, unless covered by DIN EN 14080,<br>and cross laminated timber, | DIN 1052-10:2012-05<br>Also applicable, depending on construction product:<br>DIN 4102-4:2016-05 | Mark of conformity [ÜZ] |
| C 2.3.1.4 | Non-glued wall, ceiling and roof elements lined or planked on both sides; e.g. panel elements in wooden frame houses built using the panel construction method | DIN 1052:2008-12 and<br>DIN 1052/Corrigendum 1:2010-05<br>Also applicable, mutatis mutandis:<br>Guideline on the monitoring of wall, ceiling and roof elements for wooden frame houses built using the panel construction method as per DIN 1052 Part 1 to Part 3 (1992-06)<br>Also applicable, depending on construction product:<br>DIN 4102-4:2016-05 | Mark of conformity [ÜZ] also applies to non-serial production |
| C 2.3.1.5 | Glued wall, ceiling and roof elements lined or planked on both sides, e.g. panel elements for wooden houses using the panel construction method | DIN 1052-10:2012-05<br>Also applicable, mutatis mutandis:<br>Guideline on the monitoring of wall, ceiling and roof elements for wooden frame houses built using the panel construction method as per DIN 1052 Parts 1 to 3 (1992-06)<br>Also applicable, depending on construction product:<br>DIN 4102-4:2016-05 | Mark of conformity [ÜZ] also applies to non-series production |
| **C 2.3.2** | **Fasteners** | | |
| C 2.3.2.1 | Rebars, threaded bars and steel bars with wood screw thread for timber construction | DIN 1052-10:2012-05<br>Also applicable:<br>Annex C 2.3.2 | MDC |
| C 2.3.2.2 | Brackets that do not fall within the scope of<br>DIN EN 14592 | DIN 1052-10:2012-05 | MDT |
| **C 2.3.3** | **Adhesives for load-bearing timber components** | | |

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| C 2.3.3.1 | Phenoplastics and aminoplastics of adhesive type I for glued load-bearing connections in and between timber components | DIN EN 301:2018-01,<br>Also applicable:<br>Annex C 2.3.3 | MDT |
| **C 2.4** | **Construction products for metal construction:** | | |
| **C 2.4.1** | **Construction products from unalloyed structural steels** | | |
| C 2.4.1.1 | Bright steel | DIN EN 10278:1999-12:<br>Also applicable:<br>DIN EN 10277-2:2008-06 and<br>Annexes C 2.4.1 and C 2.4.2 | MDT |
| C 2.4.1.2 | Bright equal angle square edged angle steel | DIN 59370:2008-06<br>Also applicable:<br>DIN EN 10277-2:2008-06 and<br>Annexes C 2.4.1, C 2.4.2 and C 2.4.3 | MDT |
| C 2.4.1.3 | Hot rolled seamless non-alloy steel pipes for use in tank construction | DIN 1629:1984-10<br>Also applicable:<br>Annexes C 2.4.2, C 2.4.3 and C 2.4.4 | MDT |
| C 2.4.1.4 | Cold rolled strip and sheet | DIN 1623:2009-05<br>Also applicable:<br>Annex C 2.4.2 | MDT |
| C 2.4.1.5 | Steel wire ropes | DIN 3051-4:1972-03<br>Also applicable:<br>Annex C 2.4.2 | MDT |
| C 2.4.1.6 | Hot rolled sheet piling of non alloy steels | DIN EN 10248-1:1995-08<br>Also applicable:<br>Annexes C 2.4.2 and C 2.4.3 | MDT |
| C 2.4.1.7 | Cold formed sheet piling of non alloy steels | DIN EN 10249-1:1995-08<br>Also applicable:<br>Annexes C 2.4.2 and C 2.4.3 | MDT |
| **C 2.4.2** | **Forged steel construction products** | | |
| C 2.4.2.1 | Forged steel pieces | DIN EN 10222-4:2001-12<br>DIN EN 10250-2:1999-12<br>Also applicable:<br>Annexes C 2.4.2 and C 2.4.5 | MDT |

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| 1 | 2 | 3 | 4 |
| **C 2.4.3** | **Construction products from materials for casting** | | |
| C 2.4.3.1 | Cast-steel products | DIN EN 10293:2015-04:<br>DIN 18800-1:2008-11<br>Also applicable:<br>Annex C 2.4.2 | MDT |
| **C 2.4.4** | **Stainless steel construction products** | | |
| C 2.4.4.1 | 'Stainless steel forgings for use in tank structures and steel chimneys' deleted from MVV TB 2019/1 | | |
| C 2.4.4.2 | 'Flat products, rods and wires for use in steel chimneys' deleted from MVV TB 2019/1 | | |
| C 2.4.4.3 | 'Welded rust-proof circular steel pipes for use in tank construction and steel chimneys' deleted from MVV TB 2019/1 | | |
| C 2.4.4.4 | 'Seamless circular stainless steel pipes for use in steel chimneys' deleted from MVV TB 2019/1 | | |
| C 2.4.4.5 | 'Hot or cold rolled steel heat-resistant rustproof strip and sheet, hot or cold formed rods, rolled wire and profiles of heat-resistant rustproof steel for use in steel chimneys' deleted from MVV TB 2019/1 | | |
| **C 2.4.5** | **Fasteners (rivets, screws, bolts, nuts and discs), welding additives, welding consumables** | | |
| C 2.4.5.1 | Square taper washers for U sections | DIN 434:2000-04 | MDC |
| C 2.4.5.2 | Discs (square and wedge-shaped) for I carrier | DIN 435:2000-01 | MDC |
| C 2.4.5.3 | Washers for steel structures | DIN 7989-1, -2:2001-04 | MDC |
| C 2.4.5.4 | Wedge-shaped square washers for HT-screws on I profiles | DIN 6917:1989-10 | MDC |
| C 2.4.5.5 | Wedge-shaped square washers for HT screws on U profiles | DIN 6918:1990-04 | MDC |
| C 2.4.5.6 | Steel round head rivets with diameters of ≥ 10 mm | DIN 124:2011-03<br>Also applicable:<br>Annex C 2.4.10 | Mark of conformity [ÜZ] |
| C 2.4.5.7 | Steel countersunk rivets | DIN 302:2011-03<br>Also applicable:<br>Annex C 2.4.10 | Mark of conformity [ÜZ] |
| C 2.4.5.8 | Aluminium round head rivets | DIN 660:2012-01<br>Also applicable:<br>Annex C 2.4.10 | Mark of conformity [ÜZ] |
| C 2.4.5.9 | Steel round head rivets with diameters of < 10 mm | DIN 660:2012-01<br>Also applicable:<br>Annex C 2.4.10 | Mark of conformity [ÜZ] |
| C 2.4.5.10 | T-head bolts with square neck | DIN 186:2010-09<br>Also applicable:<br>Annex C 2.4.11 | Mark of conformity [ÜZ] |
| C 2.4.5.11 | T-head bolts with double nib | DIN 188:2011-02<br>Also applicable:<br>Annex C 2.4.11 | Mark of conformity [ÜZ] |
| C 2.4.5.12 | T-head bolts | DIN 261:1987-01<br>Also applicable:<br>Annex C 2.4.11 | Mark of conformity [ÜZ] |
| C 2.4.5.13 | T-head bolts with large head | DIN 7992:2010-09<br>Also applicable:<br>Annex C 2.4.11 | Mark of conformity [ÜZ] |
| C 2.4.5.14 | Anchor plates for T-head bolts | DIN 24539-2:1985-05 | MDT |
| C 2.4.5.15 | U-bolts | DIN 3570:1968-10<br>Also applicable:<br>Annex C 2.4.11 | Mark of conformity [ÜZ] |
| C 2.4.5.16 | Eye bolts | DIN 444:1983-04<br>in conjunction with | Mark of conformity |

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| | | DIN EN 22340:1992-10:<br>Also applicable:<br>Annex C 2.4.11 | [ÜZ] |
| C 2.4.5.17 | Turnbuckles made of tubular steel or round steel | DIN 1478:2005-09 | Mark of conformity [ÜZ] |
| C 2.4.5.18 | Forged open-shape turnbuckle nuts | DIN 1480:2005-09 | Mark of conformity [ÜZ] |
| C 2.4.5.19 | Welding ends for turnbuckles | DIN 34828:2005-09 | Mark of conformity [ÜZ] |
| C 2.4.5.20 | Hexagonal turnbuckle nuts | DIN 1479:2005-09 | Mark of conformity [ÜZ] |
| C 2.4.5.21 | Hot dip galvanised sets from high-strength hex bolts with large spanner sizes<br>M 39 to M 72 | DASt Guideline 021 (2013-09)<br>Also applicable:<br>Annex C 2.4.11,<br>DIN EN 1090-2:2018-09 and<br>DIN EN ISO 10684:2011-09 | Mark of conformity [ÜZ] |
| C 2.4.5.22 | Countersunk screws with hexagon socket of strength classes 8.8 and 10.9 | DIN EN ISO 10642:2004-06<br>Also applicable:<br>Annex C 2.4.11 | Mark of conformity [ÜZ] |
| C 2.4.5.23 | Steel threaded rods of strength classes 5. 6, 8.8 and 10.9 | DIN 976-1:2016-09<br>Also applicable:<br>Annex C 2.4.11 | Mark of conformity [ÜZ] |
| **C 2.4.6** | **Anti-corrosive agents and corrosion-protected construction products (excluding mechanical bonding agents)** | | |
| C 2.4.6.1 | Steel and cast steel components with thermally sprayed layers of zinc, aluminium and their alloys | DIN EN ISO 2063-1:2019-07<br>DIN EN ISO 2063-2:2018-02 | MDT |
| C 2.4.6.2 | Hot dip load-bearing structural elements made of steel and cast steel (batch galvanising) | DASt Guideline 022 (2016-06)<br>Also applicable:<br>Annex C 2.4.13 | Mark of conformity [ÜZ] |
| **C 2.4.7** | **Prefabricated metal building components** | | |
| C 2.4.7.1 | Prefabricated load-bearing steel components not covered by DIN EN 1090-1 | DIN EN 1090-2:2018-09<br>Also applicable:<br>Annex C 2.4.14 | MDC |
| C 2.4.7.2 | Prefabricated load-bearing aluminium components not covered by DIN EN 1090-1 | DIN EN 1090-3:2019-07<br>Also applicable:<br>Annex C 2.4.15 | MDC |
| **C 2.5** | **Insulating materials for thermal and sound insulation** | | |
| C 2.5.1 | ‘Urea formaldehyde resin in-situ foam for thermal insulation’ deleted from MVV TB 2019/1 | | |
| **C 2.6** | **Doors and gates** | | |
| C 2.6.1 | Mineral fibre boards as inlays for fire protection doors | DIN 18089-1:1984-01 | Mark of conformity [ÜZ] |
| C 2.6.2 | Revolving and folding lift shaft doors for lifts in lift shafts with fire resistance class F 90 walls | DIN 18090:1997-01<br>Also applicable:<br>Annex C 2.6.1 | Mark of conformity [ÜZ] also applies to non-serial production |
| C 2.6.3 | Horizontal and vertical sliding doors for lifts in lift shafts with fire-resistant walls | DIN 18091:1993-07<br>Also applicable:<br>Annex C 2.6.1 | Mark of conformity [ÜZ] |

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| | | | also applies to non-serial production |
| C 2.6.4 | Vertical sliding doors for small goods lifts in lift shafts with fire resistance class F 90 walls | DIN 18092:1992-04<br>Also applicable:<br>Annex C 2.6.1 | Mark of conformity [ÜZ]<br>also applies to non-serial production |
| C 2.6.5 | Mortise locks for fire/smoke protection doors | DIN 18250:2003-10 | Mark of conformity [ÜZ] |
| C 2.6.6 | Door closers with a controlled closing-sequence - upper door closer with crank drive and spiral spring | DIN 18263-1:2015-04<br>Also applicable:<br>Annex C 2.6.2 | Mark of conformity [ÜZ] |
| C 2.6.7 | Door closers with controlled closing sequence – swing leaf drives with self-closing function | DIN 18263-4:2015-04 | Mark of conformity [ÜZ] |
| C 2.6.8 | Spring hinge and construction hinge for fire doors | DIN 18272:1987-08 | Mark of conformity [ÜZ] |
| C 2.6.9 | Door handles for fire/smoke protection doors | DIN 18273:1997-12 | Mark of conformity [ÜZ] |
| C 2.6.10 | Automatic sliding doors in escape routes | Guideline on automatic sliding doors in escape routes - AutSchR - (1997-12) | MDT |
| C 2.6.11 | Electrical locking systems for doors in escape routes | Guideline on electrical locking systems for doors in escape routes<br>- EltVTR – (1997-12) | MDT |
| C 2.6.12 | Interior doors are made to meet the requirements in terms of sound insulation, with the exception of fire and smoke protection barriers | Annex C 2.6.3 | MDT |
| C 2.6.13 | Automatic door systems for sliding doors in escape routes | DIN 18650-1, -2:2005-12<br>Also applicable:<br>No C 2.6.10 | MDT |
| **C 2.7** | **Bearings** | | |
| C 2.7.1 | Steel/steel sliding pairing in guide bearings and retentive structures | DIN 4141-13:2010-07<br>Also applicable:<br>Annex C 2.7.1 | Mark of conformity [ÜZ] |
| **C 2.8** | **Special constructions** | | |
| C 2.8.1 | Roller shutter boxes with thermal and sound insulation requirements | Guidelines on roller shutter boxes (RokR):(2021-09) (See annex 13) | MDT |
| C 2.8.2 | PVC-coated polyester fabric | DIN 18204-101:2018-11 | Mark of conformity [ÜZ] |
| C 2.8.3 | Textile surface structures (sheets) for hangars and tents | DIN 18204-1:2018-11 | MDT |
| C 2.8.4 | Plastic gratings as per DIN 24537-3 | Annex C 2.8.1 | - |
| **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 2.9.1 | Autoclaved aerated concrete slabs and panels not covered by the scope of EN 12602 | DIN 4166:1997-10<br>Also applicable:<br>Annex C 2.1.5 | MDC |
| C 2.9.2 | Hollow wall panels made of lightweight concrete | DIN 18148:2000-10<br>with the exception of the provisions | MDC |

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| | | concerning independent quality control inspection<br>Also applicable:<br>Annexes C 2.1.5, C 2.1.6 and C 2.9.1 | |
| C 2.9.3 | Unreinforced lightweight concrete wall panels | DIN 18162:2000-10<br>with the exception of the provisions concerning independent quality control inspection<br>Also applicable:<br>Annexes C 2.1.6 and C 2.9.2 | MDC |
| C 2.9.4 | Concrete slabs for external wall cladding ventilated at rear | DIN 18516-5:2013-09 | MDT |
| C 2.9.5 | Factory-made mineral slabs using the wet process | DIN 18177:2012-11<br>Also applicable:<br>Annex C 2.9.3 | MDC |
| C 2.9.6 | Underlays for use under laminate floors | DIN EN 16354:2019-01<br>Annex C 2.9.4 also applies | MDC |
| C 2.9/7 | Standard flammable floor coverings made of lignified materials that are not wood | DIN EN 17009:2019-06:<br>Annex C 2.9.5 also applies | MDT |
| **C 2.10** | **Construction products for building waterproofing and roof sealing** | | |
| C 2.10.1 | Naked bitumen sheets | DIN 52129:2014-11<br>Also applicable:<br>DIN 52144:2014-11 | MDC |
| C 2.10.2 | Normally flammable elastomer joint tape for sealing joints in concrete | DIN 7865-1, -2:2015-02<br>Also applicable:<br>Annex C 2.10.1 and<br>DIN 4102-1:1998-05<br>DIN EN ISO 11925-2:2011-02<br>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<br>DIN 18541-03:2021-07<br>Also applicable:<br>DIN 4102-1:1998-05<br>DIN EN ISO 11925-2:2011-02<br>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<br>Also applicable:<br>DIN 4102-1:1998-05<br>DIN EN ISO 11925-2:2011-02<br>in conjunction with Annex C 3.7 | MDC |
| C 2.10.5 | Asphalt mastic for building waterproofing | DIN EN 12970:2001-02: | MDC |
| C 2.10.6 | Spherical corrugated metal bands for structural waterproofing | DIN 18533-2:2017-07, Table 2 | MDC |
| **C 2.11** | **Glass construction products** | | |
| C 2.11.1 | Prefabricated safety barrier glazing | DIN 18008-4:2013-07 Annex B | MDC |
| C 2.11.2 | Prefabricated glazing designed to sustain human loads | DIN 18008-5:2013-07<br>with the exception of Annex A | MDC |
| **C 2.12** | **Construction products for site drainage** | | |
| **C 2.12.1** | **Pipes, pipe fittings and jointing materials for lines and ducts** | | |
| C 2.12.1.1 | Cold-processable plastic sealants for concrete drains and sewers | DIN 4062:1978-09 | Mark of conformity [ÜZ] |
| C 2.12.1.2 | Plastic piping systems made of plasticiser-free polyvinyl chloride (PVC-U) for draining waste water inside | DIN EN 1329-1:2014-07<br>in conjunction with<br>DIN CEN/TS 1329-2:2012-09 | Mark of conformity [ÜZ] |

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| | buildings | Also applicable:<br>DIN 4102-1:1998-05<br>DIN EN ISO 11925-2:2011-02<br>in conjunction with Annex C 3.7 | |
| C 2.12.1.3 | Unplasticised polyvinyl chloride pipes, fittings and pipelines for non-pressure underground sewers and piping and for devices for storing and filling slurry, liquid manure and silage effluent | DIN EN 1401-1:2009-07<br>in conjunction with<br>DIN CEN/TS 1401-2:2012-09<br>Also applicable:<br>Annex C 2.12.2 | Mark of conformity [ÜZ] |
| C 2.12.1.4 | High-density polyethylene pipes and fittings for hot water-resistant waste and soil discharge systems inside buildings | DIN EN 1519-1:2000-01<br>in conjunction with<br>DIN CEN/TS 1519-2:2012-05<br>Also applicable:<br>DIN 4102-1:1998-05<br>DIN EN ISO 11925-2:2011-02<br>in conjunction with Annex C 3.7 | Mark of conformity [ÜZ] |
| C 2.12.1.5 | High-density (PE) polyethylene pipes and fittings for sewers and -pipelines | DIN EN 12666-1:2011-11<br>in conjunction with<br>DIN CEN/TS 12666-2:2012-11 | Mark of conformity [ÜZ] |
| C 2.12.1.6 | Shafts and accessories of unplasticised polyvinylchloride (PVC-U), polypropylene (PP) and polyethylene (PE) for unpressurised underground drains and -sewers | DIN EN 13598-1:2011-02<br>in conjunction with<br>DIN CEN/TS 13598-3:2012-07 | Mark of conformity [ÜZ] |
| C 2.12.1.7 | Manholes and inspection shafts made of plasticiser-free polyvinyl chloride (PVC-U), polypropylene (PP) and polyethylene (PE) for unpressurised underground drains and -sewers | DIN EN 13598-2:2010-05<br>in conjunction with<br>DIN CEN/TS 13598-3:2012-07 | Mark of conformity [ÜZ] |
| C 2.12.1.8 | Chlorinated polyvinyl chloride plastics piping systems for discharging waste within buildings | DIN EN 1566-1:1999-12<br>in conjunction with<br>DIN CEN/TS 1566-2:2012-09<br>Also applicable:<br>Annex C 2.12.1 and<br>DIN 4102-1:1998-05<br>DIN EN ISO 11925-2:2011-02<br>in conjunction with Annex C 3.7 | Mark of conformity [ÜZ] |
| C 2.12.1.9 | Pipes and fittings made of glass-fibre reinforced polyester resin (UP-GFK) for underground sewers and drains and for storage and systems for filling liquid manure, slurry and silage effluent | DIN EN 14364:2013-05:<br>in conjunction with<br>DIN CEN/TS 14632:2012-05 | Mark of conformity [ÜZ] |
| C 2.12.1.10 | Entry and control shafts from glass fibre reinforced thermosetting plastics (GFK) based on polyester resin (UP) | DIN EN 15383:2014-02:<br>in conjunction with<br>DIN CEN/TS 14632:2012-05 | Mark of conformity [ÜZ] |
| C 2.12.1.11 | Fibre cement pipes and fittings for building drainage systems | DIN EN 12763:2000-10:<br>Also applicable:<br>Annex C 2.1.5 | Mark of conformity [ÜZ] |
| C 2.12.1.12 | Fibre cement pipes and fittings for drains | DIN EN 588-1:1996-11<br>Also applicable:<br>DIN 19850-1:1996-11 and<br>Annexes C 2.1.5 and C 2.12.3 | Mark of conformity [ÜZ] |
| C 2.12.1.13 | Fibre cement shafts for underground drains and sewers | DIN 19850-3:1990-11<br>Also applicable:<br>Annex C 2.1.6 | Mark of conformity [ÜZ] |

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| C 2.12.1.14 | Plastic piping systems made of polypropylene (PP) for draining waste water inside buildings | DIN EN 1451-1:1999-03<br>in conjunction with<br>DIN CEN/TS 1451-2:2012-05<br>Also applicable:<br>DIN 4102-1:1998-05<br>DIN EN ISO 11925-2:2011-02<br>in conjunction with Annex C 3.7 | Mark of conformity [ÜZ] |
| C 2.12.1.15 | Acrylonitrile-butadiene-styrene plastics piping systems for discharging waste within buildings | DIN EN 1455-1:1999-12<br>in conjunction with<br>DIN CEN/TS 1455-2:2012-09<br>Also applicable:<br>Annex C 2.12.1 and<br>DIN 4102-1:1998-05<br>DIN EN ISO 11925-2:2011-02<br>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<br>in conjunction with<br>DIN CEN/TS 1565-2:2012-09<br>Also applicable:<br>Annex C 2.12.1 and<br>DIN 4102-1:1998-05<br>DIN EN ISO 11925-2:2011-02<br>in conjunction with Annex C 3.7 | Mark of conformity [ÜZ] |
| C 2.12.1.17 | Unplasticised polyvinyl chloride plastics piping systems with structured-wall pipes for soil and waste discharge inside buildings | DIN EN 1453-1:2017-09<br>in conjunction with<br>DIN CEN/TS 1453-2<br>(DIN SPEC 19942):2017-06<br>Also applicable:<br>DIN 4102-1:1998-05<br>DIN EN ISO 11925-2:2011-02<br>in conjunction with Annex C 3.7 | Mark of conformity [ÜZ] |
| C 2.12.1.18 | Polypropylene waste pipes and fittings for underground drainage and sewerage | DIN EN 1852-1:2009-07<br>in conjunction with<br>DIN CEN TS 1852-2:2016-04 | Mark of conformity [ÜZ] |
| C 2.12.1.19 | Plastics piping systems made from polypropylene with mineral modifiers for discharging waste outside buildings | DIN EN 14758-1:2012-05<br>in conjunction with<br>DIN CEN/TS 14758-2<br>(DIN SPEC 19647):2016-11<br>Also applicable:<br>Annex C 2.12.4 | Mark of conformity [ÜZ] |
| C 2.12.1.20 | Plastic piping systems for non-pressurised underground drains and sewers with structured-wall made of polyvinylchloride (PVC-U), polypropylene (PP) and polyethylene (PE) – Pipes and fittings with smooth internal and external surfaces, pipe type A – | DIN EN 13476-2:2007-08<br>in conjunction with<br>DIN CEN/TS 13476-4:2013-07 | Mark of conformity [ÜZ] |
| C 2.12.1.21 | Plastic piping systems for pressure-less underground drainage and sewage with profiled walls of polyvinylchloride (PVC-U), polypropylene (PP) and polyethylene (PE) - pipes and fittings with smooth inner and profiled outer surfaces, pipe type A - | DIN EN 13476-3:2009-04<br>in conjunction with<br>DIN CEN/TS 13476-4:2013-07 | Mark of conformity [ÜZ] |
| C 2.12.1.22 | Pipes and fittings made of polyester resin moulding material for underground sewers and drains | DIN EN 14636-1:2010-04<br>Also applicable:<br>Annex C 2.12.5 | Mark of conformity [ÜZ] |
| C 2.12.1.23 | Manholes and inspection chambers of polyester resin moulding materials for non-pressure underground drainage and sewerage | DIN EN 14636-2:2010-04<br>Also applicable:<br>Annex C 2.12.5 | Mark of conformity [ÜZ] |

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|---|---|---|---|
| 1 | 2 | 3 | 4 |
| C 2.12.1.24 | Semi-finished products for close-fit-lining for the renovation of underground drain networks (open channels) | DIN EN ISO 11296-3:2011-07<br>Also applicable:<br>Annex C 2.12.6 | Mark of conformity [ÜZ] |
| C 2.12.1.25 | Semi-finished products for cured-in-situ hose lining for the renovation of underground drain networks (open channels) | DIN EN ISO 11296-4:2018-09<br>Also applicable:<br>Annex C 2.12.6 | Mark of conformity [ÜZ] |
| C 2.12.1.26 | Semi-finished products for the winding pipe lining for the renovation of underground drainage networks (open channel) | DIN EN ISO 11296-7:2013-05<br>Also applicable:<br>Annex C 2.12.6 | Mark of conformity [ÜZ] |
| C 2.12.1.27 | Semi-finished product for lining with firmly anchored plastic linings for the renovation of underground drain networks (open channels) | DIN EN 16506:2014-12:<br>Also applicable:<br>Annex C 2.12.6 | Mark of conformity [ÜZ] |
| **C 2.12.2** | **Sanitary appliances and shut-off devices** | | |
| C 2.12.2.1 | Drainage fittings for sanitary appliances | DIN EN 274-1, -2, -3:2002-05<br>with the exception of the provisions concerning independent quality control inspection | MDT |
| C 2.12.2.2 | Urinal connectors | DIN 1380:2001-05 | MDT |
| C 2.12.2.3 | Toilet connecting piece | DIN 1389:2015-12 | MDT |
| C 2.12.2.4 | Odour trap for specific purposes | DIN 19541:2004-12<br>with the exception of the provisions concerning independent quality control inspection | MDT |
| C 2.12.2.5 | Drains for buildings | DIN EN 1253-1:2015-03,<br>DIN EN 1253-2:2015-03 and<br>DIN EN 1253-4:2016-07<br>in conjunction with<br>DIN 1253-3: 2016-09, with the exception of the provisions concerning independent quality control inspection<br>Also applicable:<br>DIN 4102-1:1998-05 and<br>DIN 4102-4:2016-05<br>DIN EN ISO 11925-2:2011-02<br>in conjunction with Annex C 3.7 | MDT |
| C 2.12.2.6 | Gullies with light liquids closure | DIN EN 1253-5:2017-05<br>in conjunction with<br>DIN EN 1253-3:2016-09<br>with the exception of the provisions concerning independent quality control inspection<br>Also applicable:<br>DIN 4102-1:1998-05<br>DIN EN ISO 11925-2:2011-02<br>in conjunction with Annex C 3.7 | MDT |
| **C 2.13** | **Technical fittings for buildings** | | |
| C 2.13.1 | ‘Heat pumps[4], electr.’ deleted from MVV TB 2019/1 | | |
| C 2.13.2 | ‘Thermal solar systems, prefabricated plants and partial systems’ deleted from MVV TB 2019/1 | | |
| C 2.13.3 | ‘Solar collectors’ deleted from MVV TB 2019/1 | | |
| C 2.13.4 | ‘Solar accumulators’ deleted from MVV TB 2019/1 | | |
| C 2.13.5 | ‘Drinking water reservoirs[4], direct/indirect (electric/gas) heated and buffer reservoirs’ deleted from MVV TB 2019/1 | | |
| C 2.13.6 | Ventilation devices in accordance with DIN 4719:2009-07 | Annex C 2.6.4 | - |

| Ser. No | Construction product | Technical rules/version | Declaration of conformity |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| **C 2.14** | **Furnaces** | | |
| **C 2.14.1** | **Furnaces and combustion appliances** | | |
| C 2.14.1.1 | Oil-fired heating units with vaporising burners | DIN 4731:1989-07<br>Also applicable:<br>Annex C 2.14.1 | MDT |
| C 2.14.1.2 | Oil-fired stoves with vaporising burners | DIN 4732:1990-01<br>Also applicable:<br>Annex C 2.14.1 | MDT |
| C 2.14.1.3 | Oil-fired storage water heaters with vaporising burners | DIN 4733:1990-01<br>Also applicable:<br>Annex C 2.14.1 | MDT |
| C 2.14.1.4 | Coal-fired storage water heaters | DIN 18889:1956-11<br>Also applicable:<br>Annex C 2.14.1 | MDT |
| C 2.14.1.5 | Fireplaces fired by solid fuel - Independent supply through the room air | DIN EN 16510-1:2018-11<br>Annex C 2.14.5 | Mark of conformity [ÜZ] |
| C 2.14.1.6 | ‘Oil and gas-driven furnaces 4 kW to max. 400 kW’ deleted from MVV TB 2019/1 | | |
| C 2.14.1.7 | ‘Oil and gas-driven furnaces < 4 and > 400 kW’ deleted from MVV TB 2019/1 | | |
| C 2.14.1.8 | ‘Boilers with motorised drive for solid fuels’ deleted from MVV TB 2019/1 | | |
| C 2.14.1.9 | Boilers without motorised drive for solid fuels | DIN EN 303-5:2012-10 | MDT |
| **C 2.14.2** | **Exhaust systems** | | |
| C 2.14.2.1 | Draught regulator for house chimneys without motor drive | DIN 4795:1991-04 | MDT |
| C 2.14.2.2 | Elastomeric sealants for chimneys | DIN EN 14241-1:2013-11<br>Also applicable:<br>Annex C 2.14.4,<br>DIN 4102-1:1998-05<br>DIN EN ISO 11925-2:2011-02<br>in conjunction with Annex C 3.7 | Mark of conformity [ÜZ] |
| **C 2.15** | **Construction products for stationary installations that are used for the containment, drawing off and handling of water-polluting materials:** | | |
| C 2.15.1 | ‘Horizontal containers (tanks) made of steel, single-walled, for the underground storage of water-polluting liquids’ deleted from MVV TB 2020/1 | | |
| C 2.15.2 | ‘Horizontal containers (tanks) made of steel, double-walled, for the underground storage of water-polluting liquids’ deleted from MVV TB 2020/1 | | |
| C 2.15.3 | ‘Horizontal cylindrical single-wall and double-wall steel containers (tanks) for the surface storage of water-polluting liquids that are not liquid fuels for the energy supply of heating and cooling systems for buildings or for the storage of water-polluting fuels with density > 1.0 kg/l and/or flashpoint ≤ 55 °C for the energy supply of heating and cooling systems for buildings’ deleted from MVV TB 2019/1 | | |
| C 2.15.4 | Vertical steel containers (tanks), single-walled, with volume less than 1000 litres for the overground storage of water-polluting liquids | DIN 6623-1:2017-06<br>Also applicable:<br>Annex C 2.15.3 | Mark of conformity [ÜZ] |
| C 2.15.5 | Vertical steel tanks, double-walled, with a volume of less than 1000 litres for the overground storage of water-polluting liquids | DIN 6623-2:2017-06<br>Also applicable:<br>Annex C 2.15.3 | Mark of conformity [ÜZ] |
| C 2.1.5.6 | ‘Steel horizontal containers (tanks), single-walled, with volume of 1000 to 5000 litres for the overground storage of water-polluting liquids’ deleted from MVV TB 2019/1 | | |
| C 2.15.7 | ‘Steel horizontal containers (tanks), double-walled, with volume from 1 000 to 5 000 litres for the overground storage of water polluting liquids’ deleted from MVV TB 2019/1 | | |
| C 2.15.8 | Single-walled prefabricated containers | DIN 6625-1, -2:2013-06 | Mark of |

| Ser. No | Construction product | Technical rules/version | Declaration of conformity |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| | with flat walls and floors for the overground storage of water-polluting liquids with flashpoint > 55°C | Also applicable:<br>Annex 2.15.3 | conformity [ÜZ] |
| C 2.15.9 | ‘Single-walled shipping containers used as collection or dispensing containers that are design-approved under the traffic regulations for the carriage of dangerous goods’ deleted from MVV TB 2019/1 | | |
| C 2.15.10 | ‘Single-walled metallic shipping containers used as collection or dispensing containers that are not design-approved under the traffic regulations for the carriage of dangerous goods’ deleted from MVV TB 2019/1 | | |
| C 2.15.11 | ‘Single-walled metallic shipping containers used as fixed storage containers that are design-approved under the traffic regulations for the carriage of dangerous goods’ deleted from MVV TB 2019/1 | | |
| C 2.15.12 | Steel collecting trays and collection tanks with up to 1 000 l capacity | Directive on the requirements for steel receptacles with a capacity of up to 1000 litres – StawaR – (September 2020) (see Annex 17) | MDT |
| C 2.15.13 | Single-walled metallic pipes, related fittings, sealant, mountings for pipes in plants used for storing water-polluting liquids, except for components for oil supply systems for oil burners | TRbF 50 (2002-06), Annex A<br>Also applicable:<br>Annexes C 2.15.3, C 2.15.9 and C 2.15.10 | MDC |
| C 2.15.14 | ‘Standing prefabricated cylindrical containers of metallic materials with flat floor and fixed roof for aboveground storage of liquids or cooled gases’ painted in MVV TB 2020/2 | | |
| C 2.15.15 | Concrete formwork bricks for fermentation silos and liquid manure tanks in biogas storage and filling systems and systems for the storage of slurry, liquid manure and silage effluents containing mixtures, up to a maximum of 10% by volume of silage effluents | DIN 11622-22:2015-09<br>Also applicable:<br>Annexes C 2.1.5 and C 2.1.6 | Mark of conformity [ÜZ] |
| C 2.15.16 | Concrete used as sealant for collecting chambers and surfaces | DIN 1045-2:2008-08<br>in conjunction with<br>DIN EN 206-1:2001-07,<br>DIN EN 206-1/A1:2004-10,<br>DIN EN 206-1/A2:2005-09<br>Also applicable:<br>DIN 1045-3:2012-03 in conjunction with<br>DIN EN 13670:2011-03,<br>DAfStb Guideline for Concrete construction when handling water-endangering substances (BUmwS), Part 2 (2011-03),<br>DAfStb Guideline for Steel Fibre Reinforced Concrete (DAfStb-Richtlinie Stahlfaserbeton) (2021-06) and Appendix C 2.15.11 | Mark of conformity [ÜZ] |
| C 2.15.17 | Dome shafts and dome shaft collars made of steel | DIN 6626:2016-11 | MDT |
| C 2.15.18 | ‘Dome shaft collars made of steel for masonry dome shafts’ deleted from MVV TB 2019/1 | | |
| C 2.15.19 | Waterstops for sealing construction and movement joints in in-situ concrete sealing constructions | DAfStb Guideline for Concrete construction when handling water-endangering substances (BUmwS) (2011-03), Part 1 Sections 7.3.3 (1) to (3) and (6) to (12), Part 2 Section 3.4 (1) and (5)<br>Also applicable:<br>Annex C 2.15.12 | MDC |
| C 2.15.20 | Hoses, fittings, sealants, mountings for pipes in installations for storage, filling and handling of water-endangering | TRbF 50 (2002-06), Annex B<br>Also applicable:<br>Annex C 2.15.9 | MDC |

| Ser. No | Construction product | Technical rules/version | Declaration of conformity |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| | substances | | |
| C 2.15.21 | 'Single-walled metallic shipping containers used as collecting containers for waste oil and other waste materials that are design-approved under the traffic regulations for the carriage of dangerous goods' deleted from MVV TB 2019/1 | | |
| C 2.15.22 | Oil production units, control and safety equipment for oil supply systems for oil burners | DIN EN 12514-1:2000-05<br>Also applicable:<br>Annex C 2.15.13 | MDT |
| C 2.15.23 | Structural components, mountings, pipes, filters, oil deaerators, meters for oil supply systems for oil burners | DIN EN 12514-2:2000-05<br>Also applicable:<br>Annexes C 2.15.13 and C 2.15.14 | MDT |
| C 2.15.24 | Leak detectors for under- and overpressure systems for storing water-polluting liquids9 Excluded from this are leak detectors for equipment for storing fuels used to supply heating systems in buildings. | Annex C 2.15.15 | MDT |
| C 2.15.25 | Leak detectors for liquid systems for storing water-polluting liquids[9] | Annex C 2.15.16 | MDT |
| C 2.15.26 | Concrete as a sealant in systems for storing and filling fermentation substrates and fermentation residues of agricultural origin, as well as slurry, liquid manure and silage effluents, with a maximum proportion of 10% by volume of silage effluents | DIN 11622-2:2015-09,<br>Sections 4, 6.1, 6.2.1 and 6.2.5 | Mark of conformity [ÜZ] |
| C 2.15.27 | Reinforced concrete and prestressed prefab concrete components as part of the sealing construction in systems for storing and filling fermentation substrates and fermentation residues of agricultural origin as well as slurry, liquid manure and silage effluents, with a maximum proportion of 10% by volume of silage effluents | DIN 11622-2:2015-09,<br>Sections 4, 6.1, 6.2.1 and 6.2.5 | Mark of conformity [ÜZ] |
| C 2.15.28 | Joint plates for sealing in-situ concrete sealing constructions in systems for storing and filling fermentation substrates and fermentation residues of agricultural origin as well as slurry, liquid manure and silage effluents | DIN 11622-2:2015-09,<br>Section 6.4.1 | Mark of conformity [ÜZ] |
| C 2.15.29 | Concrete for flat bottom silos (including associated filling surfaces) in systems for storing fermented substrates of agricultural origin and silage and for discharging the silage effluents produced | DIN 11622-5:2015-09<br>Section 4(2) and (3) | Mark of conformity [ÜZ] |
| C 2.15.30 | Reinforced concrete and prestressed prefab concrete components as a part of flat bottom silos (including associated filling surfaces) in systems for storing fermented substrates of agricultural origin and silage and for discharging the silage effluents produced | DIN 11622-5:2015-09<br>Section 4(2) and (3) | Mark of conformity [ÜZ] |
| C 2.15.31 | Horizontal cylindrical single-wall and double-wall steel containers (tanks) for the above-ground storage of water-polluting liquids, except for liquid fuels for the energy supply of heating and cooling systems for buildings | Annex C 2.15.17<br>Annex C 2.15.3 also applies | Mark of conformity [ÜZ] |
| C 2.15.32 | Steel, horizontal cylindrical containers | DIN EN 12285-1:2018-12 | Mark of |

9 9 Excluded from this are leak detectors for equipment for storing fuels used to supply heating systems in buildings.

| Ser. No | Construction product | Technical rules/version | Declaration of conformity |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| | (tanks), single or double-walled, for the underground storage of water polluting liquids | Also applicable:<br>Annexes C 2.15.3 and C 2.15.18 | conformity [ÜZ] |

| Ser. No | Construction product | Technical rules/version | Declaration of conformity |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| **C 2.16** | **Scaffolding structural elements[10]** | | |
| C 2.16.1 | Adjustable steel telescopic piles with mathematically determined load-bearing capacity10 This chapter does not apply in the Free State of Bavaria | DIN EN 1065:1998-12<br>Also applicable:<br>Annex C 2.16.1 | Mark of conformity [ÜZ] |
| C 2.16.2 | System-independent steel pipes for use in falsework and working scaffolding | DIN EN 39:2001-11:<br>Also applicable:<br>Annex C 2.16.2 | MDT |
| C 2.16.3 | Lightweight scaffold spindles | DIN 4425:2017-04<br>Also applicable:<br>Annex C 2.16.2 | MDT |
| C 2.16.4 | Couplings | DIN EN 74-1:2005-12<br>Also applicable:<br>Annexes C 2.16.2 and C 2.16.4 | Mark of conformity [ÜZ] |
| C 2.16.5 | 'Welded circular pipes of non-alloy steel for use on falsework' deleted from MVV TB 2020/1 | | |
| C 2.16.6 | Timber scaffolding boards and beams for use on protective scaffolding | DIN 4420-1:2004-03<br>Also applicable:<br>Annex C 2.16.2 | MDC |
| C 2.16.7 | Pre-assembled steel, aluminium and wooden scaffolding parts | DIN EN 12812:2008-12:<br>Also applicable:<br>Annexes C 2.16.2 and C 2.16.6 | MDC |
| C 2.16.8 | 'Hot rolled seamless non-alloy steel pipes for use on falsework' deleted from MVV TB 2020/1 | | |
| C 2.16.9 | Cast steel products for use on falsework | DIN EN 10293:2015-04:<br>Also applicable:<br>Annexes C 2.4.2, C 2.16.2 and C 2.16.8 | MDT |
| C 2.16.10 | Industrially manufactured formwork beams made of wood | DIN EN 13377:2002-11:<br>in conjunction with<br>DIN 20000-2:2013-12 | Mark of conformity [ÜZ] |
| C 2.16.11 | Base plates and centre bolts | DIN EN 74-3:2007-07 and<br>DIN EN 74-3/Correction 1:2007-10<br>Also applicable:<br>Annex C 2.16.2 | MDC |
| C 2.16.12 | Special couplings | DIN EN 74-2:2009-01<br>Also applicable:<br>Annexes C 2.16.2, C 2.16.9 and C 2.16.10 | Mark of conformity [ÜZ] |
| C 2.16.13 | Adjustable aluminium telescopic piles[10] | DIN EN 16031:2012-09:<br>Also applicable:<br>Annex C 2.16.10 | Mark of conformity [ÜZ] |
| C 2.16.14 | Load-bearing structures of solid softwood timber with punched metal plate fasteners | DIN 1052:2008-12 and<br>DIN 1052/Corrigendum 1:2010-05 | Mark of conformity [ÜZ] also applies to non-serial production |
| C 2.16.15 | Prefabricated scaffolding components of steel, aluminium and wood, with the exception of basic components, access panels and coverings of consoles and passage frames | DIN EN 12811-1:2004-03<br>Also applicable:<br>Annex C 2.16.11 | Mark of conformity [ÜZ] |
| C 2.16.16 | 'Castings of non-alloy and low-grade spheroidal graphite cast iron for use on falsework' deleted from MVV TB 2020/1 | | |
| C 2.16.17 | 'Malleable castings for use on falsework' deleted from MVV TB 2020/1 | | |

10 10 This chapter does not apply in the Free State of Bavaria

**Annex C 2.1.1**

The manufacturer must specify the type and percentage of (cement) additives as per DIN 1164-11:2003-11, Section 5 to the certification body.

**Annex C 2.1.2**

In derogation of DIN 1045-2:2008-08, Annex F, Table F.2.1, concrete for bridge caps that are laden with de-icing salt may be manufactured with a maximum water/cement ratio of 0.50 in exposure class XD3. In derogation of Tables F.2.1 and F.2.2, in exposure classes XD3 and XF4, the minimum compressive strength class of the air entrained concrete after 28 days is C25/30.

For components of road bridges, tunnels and troughs, in derogation of DIN 1045-2:2008-08, Section 5.3, Tables F.2.1 and F.2.2, the minimum compressive strength class of concrete C30/37 after 28 days.

**Annex C 2.1.3**

**1 Re. DIN 1045-2:2008-08**

1.1 Section 5.1.2:
To be amended: 'Cements in accordance with EN 197-1:2011[1], DIN 1164-10:2013-03, DIN 1164-11:2003-11, DIN 1164-12:2005-06 and EN 14216:2015[2] are deemed suitable.'

1.2 Section 5.1.6:
To be added: 'For ground granulated blast furnace slag as per EN 15167-1:2006[3], its suitability as a type II additive is regarded as having been proven.'

1.3 Section 5.2.3.4:
To be added: 'The alkali reactivity class of aggregates under EN 12620:2002+A1:2008[4] under the DAfStb Alkali Guideline can be taken from the declaration of performance.'

1.4 Section 5.2.3.5:
The paragraph is replaced by: 'Regarding the use of recycled aggregates as per DIN EN 12620:2008-07, the DAfStb guideline "Concrete in accordance with DIN EN 206-1 and DIN 1045-2 with recycled aggregates in accordance with DIN EN 12620:2010-09 must be observed."'

1.5 Section 5.2.5.1:
To be added: 'Suitability of the k-value approach is regarded as having been demonstrated for ground granulated blast furnace slag.'
The following shall be added after Paragraph 8: 'Only silica fumes containing Class 1 silicon dioxide may be used.'

1.6 Section 5.2.5.2.1:
To be added: 'Regarding the application of the k-value approach to ground granulated blast furnace slag, the stipulations under DIN 1045-2:2008-08, 5.2.5.2.2 apply to fly ash accordingly. The lowering of the minimum cement content and making allowances for the water/cement ratio are not permitted for the exposure classes XF2 and XF4.
The simultaneous use of ground granulated blast furnace slag and fly ash and/or silica fume is not permitted.'

1.7 Section 5.2.5.2.2:
The following is to be added to the list of cements in Paragraph 1:
'Portland composite cements CEM II/B-M (S-LL), CEM II/B-M (V-LL) and CEM II/B-M (T-LL) with up to 20 % (mass portion) limestone'

To be added: Regarding the maximum quantity of ground granulated blast furnace slag h which may be included in the water/cement ratio, the condition h/z (ratio of ground granulated blast furnace slag to cement) $\leq$ 0.33 by mass portions can be applied in the case of all cements pursuant to point 5.2.5.2.2.

In the case of cements with the main constituent D, a quantity of ground granulated blast furnace slag in excess of h/z = 0.15 may be used.

After the 7th paragraph for the production of high sulphate resistance concrete is listed in the first indent to be added: 'Portland composite cements CEM II/B-M (S-LL), CEM II/B-M (V-LL) and CEM II/B-M (T-LL) with up to 20 % (mass portion) limestone'

The flight ash content in terms of cement and fly ash content (z+) must be at least 20 % (by mass) of these types of cement.

The provisions under 5.2.5.2.2 concerning fly ash used in the production of concrete with a high sulphate resistance may not be applied to ground granulated blast furnace slag.'

To be amended: 'NOTE: The requirements for HS cement are met for CEM I-SR 0, CEM I-SR 3, CEM III/B-SR and CEM III/C-SR under EN 197-1:2011[1].'

To be added: 'The provisions in 5.3.4 for the use of fly ash in underwater concrete do not apply for ground granulated blast furnace slag.'

1.8 Section 5.2.5.2.3:
The following is to be added to the list of cements in Paragraph 2:
'Portland composite cements CEM II/B-M (S-LL), CEM II/B-M (V-LL) and CEM II/B-M (T-LL) with up to 20 % (mass portion) limestone'

1.9 Section 5.2.5.2.4:
In the 4th paragraph, cements shall be added that may be used:
'Portland composite cements CEM II/B-M (S-LL) and CEM II/B-M (T-LL) with up to 20 % (mass portion) limestone'

1:10 Table F.3.1
Table heading:
To be amended: 'Areas of application for cements according to EN 197-1:2011[1], DIN 1164-11:2003-11, DIN 1164-12:2005-06 and for FE cements as well as CEM I-SE and CEM II-SE according to DIN 1164-11:2003-11 for the production of concrete according to DIN 1045-2:2008-08'

Footnote d:
To be amended: 'NOTE: The requirements for HS cement are met for CEM I-SR 0, CEM I-SR 3, CEM III/B-SR and CEM III/C-SR under EN 197-1:2011[1].'

1:11 to Table F.3.2

A new line and a footnote j shall be inserted before the last line: (See extract from Table F.3.2)

Extract from Table F.3.2 of DIN 1045-2:2008

| Exposure classes<br>X = valid scope of application<br>O = not applicable for manufacturing according to this standard | | | | Reinforcement corrosion | | | | | | | | | | | | Concrete attack | | | | | | | | | | | | 1. Prestressing steel compatibility |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | No corrosion/attack risk | Corrosion caused by carbonatisation | | | | Corrosion caused by chlorides | | | | | | | Frost Attack | | | | Aggressive chemical environment | | | Wear | | | | | |
| | | | | | | | | | chlorides other than seawater | | | Chlorides from sea water | | | | | | | | | | | | | | | | |
| | CEM II | B | T | X0 | XC1 | XC2 | XC3 | XC4 | XD1 | XD2 | XD3 | XS1 | XS2 | XS3 | XF1 | XF2 | XF3 | XF4 | XA1 | XA2[d] | XA3[a] | XM1 | XM2 | XM3 | |
| | | | S-LL[j];V[f]-LL[j];<br>T-LL[j] | X | X | X | X | X | X | X | X | X | X | X | X | O | O | O | X | X | X | X | X | X | X |

a, d, f, i, j see footnote in Table F.3.3

1:12 to Table F.3.3
Add footnote j:
[j] The permissible limestone content of the cements (S-LL), (V-LL) and (T-LL) is limited to 20 M.-%. Compliance with the maximum permissible limestone content shall be explained by the cement manufacturer.

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

Section 7.1.1:
To be added: 'The manufacturer must declare compliance with DIN 1164-10:2013-03 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 2.1.4**

The following must be observed when applying the Technical Rules:

**1** The prestressing tendons should be grouted with a Portland concrete grout CEM I in line with EN 197-1:2011[1] or DIN 1164-10:2013-03, water and a pressing aid in line with EN 934-4:2009[2]. The use of grouting aids must satisfy DIN V 20000-101: 2002-11. As an alternative to DIN V 20000-101:2002-11, Section 7, corrosion behaviour may also be demonstrated based on DIN EN 934-1:2008-04. The use of other grout types requires official usability certification.

**2 Re DIN EN 445:1996-07**

2.1 Section 2:
The most recent date of issue 'DIN EN 196-1:2016-11' must be cited.

2.2 Section 3.2.2.3:
The final sentence 'Two... must be performed.' shall be replaced by the following sentences: 'Three tests must be carried out; the first test shall be conducted immediately after mixing the grout and the remaining two tests shall be performed 30 minutes after mixing the grout. While the tests are being carried out, the grout must be kept in motion.'

2.3 Section 3.4.2.3:
Instead of '(see 3.4)', write '(see 3.3.3)'.

2.4 Section 3.4.3:
The word 'vessel method' shall be replaced by 'container method'. Accordingly, use of the word 'vessels' in the subsections is always taken to mean 'containers'. In the subsections, 'depth indicator' shall always be written instead of 'calliper gauge'.

2.5 Section 3.4.3.2:
Under a), the first two sentences in the first paragraph must carry the following wording: 'The initial measurement must be performed immediately after the containers have been filled with grout, while the gap between the surface of the grout and the upper edge of the container with the cover plate on the container must be read off at at least 6 points using the depth indicator or other measuring devices. The marking on the cover plate must correspond to the marking on the edge of the container (reference point).').'

Under a), the second paragraph shall be replaced by the following: 'In the case of the second measurement, the gap between the firm surface of the grout and the upper edge of the vessel must be measured at the same 6 points used for the initial measurement while using the same measuring method.'.'

Under a), '(see 3.6)' at the end shall be deleted.

2.6 Section 3.5.1.2:
“b)...” shall be replaced with the following: “b) Storage facilities pursuant to Section 4.1 of DIN EN 196-1:2016-11”.

2.7 Section 3.5.1.3.1:
The third paragraph must be supplemented as follows at the end: “Then cover the samples with a glass plate.”

**3 Re DIN EN 446: 1996-07**

3.1 Section 0:
‘Requirements for grout’ shall be replaced by ‘Requirements for grouting with grout’ and ‘Eurocode 2’ shall be replaced by ‘DIN EN 1992-1-1:2011-01 and DIN EN 1992-1-1/A1:2015-03’.

3.2 Section 3:
The definitions of the grouting procedures given in subsections 3.2 and 3.3 shall be replaced with the following:

'3.2 Re-pressing: Additional press compacting designed to remove air bubbles or water blisters by grouting in the prestressing cuts before the original grout has hardened.

3.3 Re-backfilling: Additional press compacting designed to remove air bubbles or water blisters by grouting in the prestressing cuts after the original grout has hardened.’.’

3.3 Section 4:
With regard to Section 4, it is necessary to clarify: ‘The preliminary test as per DIN EN 446:1996-07, Section 4, shall be regarded as having been satisfied from the point of view of the building inspection in relation to the materials pursuant to DIN EN 447:1996-07, Section 4, provided the latter comply with the technical rules specified in Section C 2 or, in case of significant deviations, the required usability certification is available and the proof of conformity was furnished in relation to it.’

3.4 Section 7.3:
The words ‘Press compacting and re-pressing procedures’ must replace the words ‘Pressing and re-pressing procedures‘‘.

3.5 Section 7.6:
The following shall be deleted: ‘ without curing retardant ’.

3.6 Section 7.8:
The word ‘re-grouting’ must replace all instances of the words ‘re-injection’ and ‘re-press compacting’ in both the heading and body text.

3.7 Section 7.9:
In the heading and the body of text itself, the word ‘re-pressing’ shall be replaced by the word ‘re-backfilling’ and, in the first sentence of the text, the word ‘form’ shall be replaced by the words ‘have formed’.

3.8 Section 8.1:
After the first bullet point, the word ‘consumer’ shall be replaced by ‘client’, while the second sentence after the second bullet point shall be replaced with the following: ‘The competent centre may call for additional checks.’

3.9 Section 8.4:
After ‘bleeding:’ the following shall be added: ‘...grout fluidity... the requirements"...’.

Instead of ‘grouting’ ‘order for grouting’ shall be written.

**4 Re DIN EN 447:1996-07**

4.1 Section 0:
In the second paragraph, the words “above all” before the bullet points shall be deleted.

4.2 Table 1:
Table 1 shall be replaced by the following:

| **In accordance with DIN EN 445:2008-01** | **Immediately after mixing, time (in s Time (in s)** | **30 minutes after mixing[1)] or after grouting time (in s)** | **at the outlet of the cladding tube, time (in s)** |
|---|---|---|---|
| Immersion test | ≥ 30 | ≤ 80 (200)2) | ≥ 30 |
| Funnel method | ≤ 25 (50)2) | ≤ 25 (50)2) | ≥10 |

1) The mixing time shall be measured from the point when all the necessary material quantities are to be found in the mixer.
2) As regards grouts which are prepared in certain mixers which have a high agitator speed, the limit values indicated in Table 1 above may be increased by up to 200 s in the case of the immersion test and by up to 50 s in the case of the funnel method. The mixer and these limit values must be agreed with the competent authority.

4.3 Section 4.2:
The words ‘blast furnace slag’ shall be replaced by ‘granulated blast furnace slag’ in footnote 2.

4.4 Section 4.4:
By way of deviation from section 4.4, only additives authorised for grout (grouting aids) may be used.

4.5 Section 5.2:
In the second sentence, the words ‘Sections 3.2 and 3.3’ shall be replaced by ‘Section 3.2’3.2’.

In deviation from Section 5.2, fluidity testing may only be performed in relation to grouts containing grouting aids using the immersion test as per Section 3.2.1 of DIN EN 445 since the limit values as per Table 1 relating to the discharge hopper do not apply to this grout. If, during the suitability testing of a grout containing grouting aids, the limit values relating to the discharge hopper are calibrated using the immersion test, measurements may also be conducted in accordance with Section 3.2.2 of DIN EN 445:2008-01 using the funnel method. The limit values determined must be observed instead of the values specified in Table 1 in relation to the funnel method.

4.6 Section 5.3:
Reference shall be made to ‘Section 3.3’ instead of to ‘Section 3.4’.

4.7 Section 5.4:
Reference shall be made to ‘Section 3.4’ instead of ‘Section 3.5 or 3.6’. The final sentence must be supplemented as follows: ‘Grout containing foaming agents may not exhibit any reduction in volume during the suitability test.’.’

4.8 Section 5.5:
In deviation from Section 5.5, the compressive strength of grouts containing grouting aids may only be tested using the cylinders indicated in Table 2.

4.9 Table 2:
In Table 2, the references must be altered as follows:

To ‘Section 3.5.1’ instead of to ‘Section 3.7’,
to ‘Section 3.5.2’ instead of to ‘Section 3.8’ and
In footnote 1), ‘Section 3.5.2’ instead of ‘Section 3.6’.

4.10 Section 6:
By way of deviation from Section 6, the mixing time is limited to 4 minutes.

1 Implemented in Germany by DIN EN 197-1:2011-11.
2 Implemented in Germany by DIN EN 934-4:2009-09.

**Annex C 2.1.5**

**Table: Use of cement according to EN 197-1:2011[1]**

The DIN 1164-1:1994-10 standard was replaced by European standard EN 197-1:2011[1] and the DIN 1164-10:2013-03 standard. Insofar as there is a reference to DIN 1164 (earlier editions) in the Technical Rules of the administrative provision in the Technical Building Regulations, the cements in line with EN 197-1:2011[1] can be used according to the following table. Restrictions on use in the technical rules remain unaffected.

| Ser. No | Technical rule | | Usable cement (cement type) according to EN 197-1:2011[1] |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| 1 | DIN EN 447 | 1996-07 | CEM I |
| 2 | DIN EN 588-1 | 1996-11 | In line with the application rules for exposure class XF 1 in DIN 1045-2:2008-08 |
| 3 | DIN 4166 | 1997-10 | All |
| 4 | DIN 18148 | 2000-10 | All |
| 5 | DIN 18162 | 2000-10 | |
| 6 | DIN EN 12763 | 2000-10 | As for No 2 |

1 Implemented in Germany by DIN EN 197-1:2011-11.

**Table A:** Classification of concrete properties as per DIN 1045:1988-07 on concrete as per DIN EN 206-1[2]

| Ser. No | Section DIN 1045:1988-07 | | DIN EN 206-1 or DIN 1045-2 exposure class or section |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| 1 | 6.5.5.1 | Unreinforced concrete | X0 |
| 2 | 6.5.1, 6.5.5.1 | Internal component | XC1 |
| 3 | 6.5.1, 6.5.5.1 | External component | XC4/XF1 |
| 4 | 6.5.7.2 | Waterproof concrete | DIN 1045-2, 5.5.3 |
| 5 | 6.5.7.3 | Concrete with high frost resistance | XC4/XF1 |
| 6 | 6.5.7.4 | Concrete with high frost and de-icing salt resistance | XF4 |
| 7 | 6.5.7.4 | Concrete with high frost and de-icing salt resistance, very high frost and de-icing impact | XF4 |
| 8 | 6.5.7.5 | Concrete with high resistance to low chemical attack | XA1 |
| 9 | 6.5.7.5 | Concrete with high resistance to high chemical attack | XA2 |
| 10 | 6.5.7.5 | Concrete with high resistance to very strong chemical attack | XA2 |
| 11 | 6.5.7.6 | Concrete with high wear resistance | XM1 |
| 12 | 6.5.7.7 | Concrete for use at high operating temperatures up to 250°C | DIN 1045-2, 5.3.6 |
| 13 | 6.5.7.8 | Concrete for underwater pouring (underwater concrete) | DIN 1045-2, 5.3.4 |

2 Hartz, U.: Neues Normenwerk im Betonbau [new set of standards in concrete construction], published in DIBt Mitteilungen no. 1/2001, p. 2

**Annex C 2.1.6**

Concrete admixtures may only be added to concrete if proof of their usability can be furnished pursuant to EN 934-2:2009+A1:2012[1] or in the form of a European technical approval/assessment.

1 Implemented in Germany by DIN EN 934-2:2012-08.

**Annex C 2.1.7**

For the manufacture of concrete, reinforced concrete and prestressed or reinforced concrete prefabricated components, the Technical Rules laid down in No C 2.1.4.3 shall apply to the concrete.

**Annex C 2.1.8**

Portland composite cement CEM II/C-M (S-LL) according to DIN EN 197-5 may be used for the production of concrete according to DIN EN 206-1:2001-07 +A1:2004-10+A2:2005-09 in conjunction with DIN 1045-2:2008-08 in all exposure classes except XF2 to XF4. The prestressing steel compatibility is considered to be proven.

Other Portland composite cements CEM II/C-M and compound CEM VI (CEM VI (S P), CEM VI (S-V), CEM VI (S-L) and CEM VI (S-LL)) according to DIN EN 197-5 may only be used in the production of concrete according to DIN EN 206-1:2001-07 +A1:2004-10+A2:2005-09 in conjunction with DIN 1045-2:2008-08 in the exposure classes X0 and XC2. The prestressing steel compatibility shall be considered to be demonstrated if the cement does not contain a pozzolan (P) as its main component.

**Annex C 2.2.1**

– deleted from MVV TB 2019/1 –

**Annex C 2.3.1**

Where construction products are delivered to users via retail and the delivered construction products are divided by the retailer, the parts must be distinctively marked by means of a package insert, paint application, lanyard tags, etc. All divisions must be documented.

**Annex C 2.3.2**

Where standard DIN 1052-10:2012-05 provides for several kinds of metal, the alloy, material number, steel grade or strength class for metallic fasteners must be indicated as a key feature for use in the ‘Ü-Zeichen’ conformity mark.

**Annex C 2.3.3**

Adhesives for load-bearing wooden components must meet the requirements of adhesive type I under DIN EN 301:2018-01 for use of glued wooden components in Germany and include the classification sign ‘w’ in the adhesives classification key. The open drying time may be determined in accordance with DIN 68141:2016-12, as an alternative to DIN EN 301:2018-01, Section 6.3 b. For testing under DIN EN 302-1:2013-06, DIN EN 302-2:2017-11 and DIN EN 302-4 to 302-6:2013-06 standards, the test samples must be produced using a mould pressure of at least 0.6 N/mm². This does not apply to the manufacture of test specimens with a 2 mm-thick adhesive joint in accordance with Section 5.2.2 of DIN EN 302-2:2017-11.

In addition, the Ü sign shall indicate possible application extensions (e.g. bonding of hardwood or chemically treated wood).

**Annex C 2.4.1**

The technical rules shall apply only to steel grades with the following material numbers:

1.0037, 1.0036, 1.0038, 1.0114,
1.0116, 1.0117, 1.0120, 1.0121,
1.0122, 1.0115, 1.0118, 1.0119

1.0044, 1.0143, 1.0144, 1.0145,
1.0128, 1.0140, 1.0141, 1.0142

1.0045, 1.0553, 1.0570, 1.0577,
1.0595, 1.0596, 1.0551, 1.0554,
1.0569, 1.0579, 1.0593, 1.0594

**Annex C 2.4.2**

The material number or the abbreviation must be indicated as a key feature in the Ü-Zeichen conformity mark.

Where a test certificate as per EN 10204:2004[1] is required in the Technical Building Regulations, this test certificate must be attached as an enclosure with the delivery note and furnished with the Ü-Zeichen conformity mark. They are sufficient as information on key features under the Ü-Zeichen-Verordnung [Regulation on conformity marks].

Where metal construction products are delivered to the user via retail and the delivered construction products are divided by the retailer, the parts must be distinctively marked by re-stamping, paint application, adhesive labels or lanyard tags. All divisions must be documented. This applies accordingly to metallic construction products that will be reused.

1 Implemented in Germany by DIN EN 10204:2005-01

**Annex C 2.4.3**

In case of planned deviations from the nominal dimensions of the metal profiles, the profile standard with the addition ‘special profile’ shall be indicated in the Ü-marking as a technical rule. The deviation limits and form tolerances indicated in the profile standards remain unaffected. Compliance with limit dimensions and shape tolerances shall be included in the in-house quality control.

**Annex C 2.4.4**

The technical rules only apply to steel grades with the following material numbers: 1.0254, 1.0256, 1.0421.

**Annex C 2.4.5**

The Technical Rules apply to steel grades according to DIN EN 10250-2:1999-12 with the material numbers: 1.0038, 1.0116, 1.0570 and pursuant to EN 10222-4:2017[1] with material numbers: 1.0565 and 1.0571.

1 Implemented in Germany by DIN EN 10222-4:2017-06.

**Annex C 2.4.6**

– deleted from MVV TB 2019/1 –

**Annex C 2.4.7**

– deleted from MVV TB 2019/1 –

**Annex C 2.4.8**

– deleted from MVV TB 2019/1 –

**Annex C 2.4.9**

– deleted from MVV TB 2019/1 –

**Annex C 2.4.10**
Scope and type of independent quality control testing for rivets

| **Time** | **Type of test** | **Scope of testing** |
|---|---|---|
| Initial testing | In-depth testing | Common and special properties |
| Independent quality control in year 1 | normal testing | Customary properties |
| Independent quality control from year 2 | reduced testing | Customary properties |

During independent quality control, samples shall be taken at intervals of 6 months in such a way that all product types are checked alternately.

Customary properties

| **Attribute** | **tested product** | **Nature of the scope of the test** | | |
|---|---|---|---|---|
| | | reduced | normal | in-depth |
| | | L P Pr | L P Pr | L P Pr |
| Dimensions | all | 1 x 3 x 1 | 2 x 3 x 1 | 4 x 3 x 1 |
| Shear test | all | 1 x 3 x 1 | 2 x 3 x 1 | 4 x 3 x 1 |
| Hardness testing | all | 1 x 3 x 3 | 2 x 3 x 3 | 4 x 3 x 3 |
| Head impact strength | all | 1 x 3 x 1 | 2 x 3 x 1 | 4 x 3 x 1 |

Special characteristics

| **Attribute** | **Nature of in-depth testing scope** | | |
|---|---|---|---|
| | L | P | PR |
| Layer thickness | 1 X | 3 X | 3 |
| Tensile test | 1 X | 3 X | 1 |
| Notch impact energy | 1 X | 3 X | 1 |

L = Lot
P = Sample
Pr = Testing

**Annex C 2.4.11**

Scope and type of independent quality control testing for screws and nuts

| **Time** | **Type of test** | **Scope of testing** |
|---|---|---|
| Initial testing | In-depth testing | Common and special properties |
| Independent quality control in year 1 | normal testing | Customary properties |
| Independent quality control from year 2 | reduced testing | Customary properties |

During independent quality control, samples shall be taken at intervals of 6 months in such a way that all product types are checked alternately.

Customary properties

| **Attribute** | **tested product** | **Nature of the scope of the test** | | |
|---|---|---|---|---|
| | | reduced | normal | in-depth |
| | | L P Pr | L P Pr | L P Pr |
| Dimensions | all products | 1 x 3 x 1 | 2 x 3 x 1 | 4 x 3 x 1 |
| Oblique tensile test or tensile test on the whole screw | 8.8 and 10.9 screws | 1 x 3 x 1 | 2 x 3 x 1 | 4 x 3 x 1 |
| Tensile test on the unscrewed specimen | 4.6 and 5.6 screws | 1 x 3 x 1 | 2 x 3 x 1 | 4 x 3 x 1 |
| Test force test | all nuts | 1 x 3 x 1 | 2 x 3 x 1 | 4 x 3 x 1 |
| Tightening test | 8.8 and 10.9 sets | 1 x 6 x 1 | 2 x 12 x 1 | 4 x 12 x 1 |
| Hardness HV 30 | all products | 1 x 1 x 3 | 2 x 2 x 3 | 4 x 2 x 3 |
| Hardness HV 0.3 | 8.8 and 10.9 screws | 1 x 1 x 3 | 2 x 2 x 3 | 4 x 2 x 3 |
| Cut (edge condition) | 10.9 screws | 1 x 1 x 3 | 2 x 2 x 3 | 4 x 2 x 3 |
| Layer thickness | all products | 1 x 1 x 3 | 2 x 2 x 3 | 4 x 2 x 3 |

Special characteristics

| **Attribute** | **tested product** | **Nature of in-depth testing scope** | | |
|---|---|---|---|---|
| | | L | P | PR |
| Chemical composition: | Screws and nuts | 2 x | 2 x | 1 |
| Start test | 8.8 and 10.9 screws | 4 x | 3 x | 1 |
| Notch impact energy | Screws | 4 x | 3 x | 1 |
| Crack indication | Screws and nuts | 1*) x<br>+4 x | 100 x<br>20 x | 1<br>1 |
| *) Scope of testing on disputed lots or when defects occur | | | | |

L = Lot
P = Sample
Pr = Testing

**Annex C 2.4.12**

– deleted from MVV TB 2020/1 –

**Annex C 2.4.13**

Zinc bath class 1 as per Table 8 under DASt Guideline 022:2016-06 is only permitted for hot galvanising of supporting steel and cast iron components. The simplified proof in accordance with Section 4.2.2 of DASt Guideline 022:2016-06 shall be furnished. Mathematical proof as per Annex 4 may not be used.

**Annex C 2.4.14**

**Re DIN EN 1090-2**

The Technical Rule shall be applied as follows:
1 Confirmation of conformity of steel components not covered by EN 1090-1:2009+A1:2011[1] but which have to remove payloads shall be carried out with a manufacturer's declaration of conformity on the basis of an initial test in accordance with Section 6.2 of EN 1090-1:2009+A1:2011[1] and a factory-owned production control according to Section 6.3 of EN 1090-1:2009+A1:2011[1].
2 The manufacturer shall provide the declaration of conformity by marking the construction products with the 'ÜZ' conformity mark, with reference to the designated use.
3 The manufacture of welded steel components not covered by EN 1090-1:2009+A1:2011[1] but which need to bear payloads, may be carried out only by companies which possess a proof of suitability for the execution of welding work in the relevant execution class (EXC).
Alternatively, the following shall be considered as proof of suitability:

- a welding certificate in line with EN 1090-1:2009+A1:2011[1] issued or certified by a notified body, if the firm's in-house production control is certified by this body in line with EN 1090-1:2009+A1:2011[1];
- one based on DIN EN 1090-2:2018-09 in conjunction with EN 1090-1:2009+A1:2011[1], Table B.1 issued by an officially recognised body.

For the assignment of components into the execution classes (EXC), DIN EN 1993-1-1/NA:2018-12 applies.

1 Implemented in Germany by DIN EN 1090-1:2012-02.

**Annex C 2.4.15**

**Re. DIN EN 1090-3**

The Technical Rule shall be applied as follows:

1 Confirmation of conformity of aluminium structural elements not covered by EN 1090-1:2009+A1:2011[1] but which have to remove payloads shall be carried out with a manufacturer's declaration of conformity on the basis of an initial test in accordance with Section 6.2 of EN 1090-1:2009+A1:2011[1] and in-house quality control according to Section 6.3 of EN 1090-1:2009+A1:2011[1].
2 The manufacturer shall provide the declaration of conformity by marking the construction products with the 'ÜZ' conformity mark, with reference to the designated use.
3 The manufacture of welded aluminium structural elements not covered by EN 1090-1:2009+A1:2011[1] but which need to bear payloads, may be carried out only by companies which possess a proof of suitability for the execution of welding work in the relevant execution class (EXC). Alternatively, the following shall be considered as proof of suitability:

- a welding certificate in line with EN 1090-1:2009+A1:2011[1] issued or certified by a notified body, if the firm's in-house production control is certified by this body in line with EN 1090-1:2009+A1:2011[1];
- a welding certificate based on DIN EN 1090-3:2019-07 in conjunction with EN 1090-1:2009+A1:2011[1], Table B.1 issued by an officially recognised body.

For the assignment of structural elements into the execution classes (EXC), DIN EN 1999-1-1/NA:2021-03 applies.

1 Implemented in Germany by DIN EN 1090-1:2012-02.

**Annex C 2.6.1**

When using landing doors as per

DIN 18090:1997-01
DIN 18091:1993-07
DIN 18092:1992-04

Annex 4(5.3) applies.

**Annex C 2.6.2**

Door closers as per DIN 18263-1:2015-04 may only be used as replacement parts. They are only suitable for fire and/or smoke barriers if these are single-leaf sliding doors.
**Annex C 2.6.3**

**1 General information**

The following provisions shall apply to interior doors, on which there are requirements on sound insulation. Interior doors consist of at least the structural elements door wings and frames as well as the building fittings.

Interior doors must be made of at least normally flame-resistant materials.

**2 Rated sound insulation value**

If sound-insulating properties are to be identified depending on the intended use, the rated sound insulation measure $R_w$ shall be determined according to Section 5.6 of DIN EN 14351-2:2019-01.

**3 Main features of the 'ÜZ' conformity mark**

On the -mark of conformity of an interior door that meets the requirements of Section 2, the rated sound insulation value $R_w$ must be specified as well as the combinations of door leaves with door frames to which this applies.

**Annex C 2.6.4**

Usability certification as per § 17(1) MBO[1] is required.

1 According to national law

**Annex C 2.7.1**

For guide bearings and retentive structures, EN 1337-8:2007[1] applies. The corresponding section of DIN 4141-13:2010-07 can be applied for the steel/steel sliding pairing in guide bearings and retentive structures.

1 Implemented in Germany by DIN EN 1337-8:2008-01.

**Annex C 2.8.1**

Plastic gratings which can be walked on as per DIN 24537-3: 2007-08 require a general building inspectorate approval as usability certification if the drop height exceeds 0.5 m or if the span of the grates exceeds 0.5 m.

**Annex C 2.9.1**

**Re DIN 18148:2000-10**

Re Section 1: Lightweight cavity wall panels may only be used to manufacture lightweight dividing walls pursuant to DIN 4103-1:2015-06.

**Annex C 2.9.2**

**Re DIN 18162:2000-10**

Re Section 1: Unreinforced lightweight concrete wall panels may only be used for to manufacture lightweight dividing walls pursuant to DIN 4103-1:2015-06.

**Annex C 2.9.3**

The fire performance of non-flammable and flame-retardant wet-processed factory-produced mineral panels shall be proven in line with item number C 3.9, or C 3.11.

As regards products which are in class TVOC 3 according to Table 3 and/or FH class 3 according to Table 4 and therefore cannot be used indoors, the Ü-marking shall contain the following: 'The product cannot be used indoors'

**Annex C 2.9.4**

Contrary to DIN EN 16354-2019-01, Section 4.4.15, emissions of volatile organic compounds into the indoor air are to be determined on the basis of DIN EN 16516:2020-01. The loading of the test chamber for the installation documentation shall be 0.4 $m^2/m^3$. The test should be carried out with open edges. The requirements of the ABG, Annex 8 to the MVV TB must be met.

With regard to the production of test specimens for emission measurements, the installation documents can be divided into test groups. In doing so, the following parameters must be taken into account:

- each installation document with a different formulation and/or lamination shall be checked individually;
- the thickest variant or the highest surface weight shall be taken into account.

Contrary to DIN EN 16354:2019-01, Section 4.4.11, the fire performance of underlay for use under laminate flooring must be determined and classified according to DIN 4102-1:1998-05, Section 6.2.
The test in the combustion box is to be carried out with surface and edge flame treatment. The test specimens must be conditioned in accordance with DIN EN 13238:2010-06; the same applies to selecting the carrier plate that is representative of the intended use.
If the underlay is glued to the foundation in the end application, the gluing must be taken into account during the test. The result of the test is valid only for the adhesive used in the test (order quantity ≤ that tested) in conjunction with the installation document.

The product parameters listed below may affect the fire performance of laying documents and shall be taken into account when selecting the test specimens to be tested:

Table 1: Product parameters that influence fire performance, and test specifications

| **Parameters** | **Test specifications** |
|---|---|
| Composition | Any underlay with a different chemical composition must be checked separately. |
| Thickness | If an underlay is produced with a number of different nominal thicknesses, this must be taken into account during the test. At least the smallest and largest thickness (with 2 specimens each) shall be tested; a complete test series shall be carried out for the most unfavourable conditions. The classification is determined based on the most unfavourable conditions. |
| area-related mass or density | If an underlay is produced with a number of different nominal thicknesses per unit area or densities, this must be taken into account during the test. At least the lowest and the largest mass per unit area or density (with 2 specimens each) shall be tested; a complete test series shall be carried out for the most unfavourable conditions. The classification is determined based on the most unfavourable conditions. |
| Lamination | Any lamination (films, fleece etc.) with a different chemical composition, thickness and mass or density per unit area must be taken into account in the tests. Each lamination (with 2 specimens each) shall be tested; a complete test series shall be carried out for the most unfavourable conditions. The classification is determined based on the most unfavourable conditions. |
| Surface structure | If a layer is produced with a number of different surface structures, e.g. pimples, perforations, etc., this shall be taken into account in the tests. Each surface structure (with 2 specimens each) shall be tested; a complete test series shall be carried out for the most unfavourable conditions. The classification is determined based on the most unfavourable conditions. |

**Annex C 2.9.5**

1) By way of derogation from DIN EN 17009:2019, Section 5.2.2, the emissions of volatile organic compounds into the indoor air shall be determined on the basis of DIN EN 16516:2020-10. The loading of the test chamber shall be 0.4 $m^2/m^3$.

When carrying out the test, the following shall be observed: It is necessary to distinguish between floor coverings with factory applied surface treatment and floor coverings, which are treated after installation and are therefore only then ready for use. After completion of the test piece with factory applied surface treatment, the test piece is immediately transferred to the emission test chamber. Floor coverings, which are only treated on site, are sealed in the laboratory in accordance with the technical information sheet of the surface coating agent.

The impactors shall be tested on the ground. The edges should be taped off entirely using aluminium adhesive tape. As an alternative, mechanical (rigid) back and edge sealing (e.g. Seal box according to JIS A 1901) may also be used. The back of the sample shall be fixed with aluminium adhesive tape.

The test chamber size shall be selected in sufficient size due to the heterogeneity of the products. The minimum test chamber volume should be 0.225 $m^3$.

Floor coverings made of lignified materials, which are not wood, shall not be divided into groups with regard to the production of test specimens for emission measurement. The following parameters shall be taken into account:
- each floor covering with a different formulation/layer structure shall be tested individually,
- the thickest variant or the highest surface weight shall be taken into account,
- where surface coatings are used, both with and without surface coating shall be tested;
- different manufacturing processes should be taken into account.

It is necessary to ensure that a representative sample is tested. Due to the heterogeneity, several tests may be required.

Preconditioning: Does not apply to floor coverings with factory applied surface treatment. Once the test specimen has been produced, it should immediately be placed in the emission test chamber. Floor coverings, which are surface-treated after installation, dry after the last application of the coating for 72 hours in a test chamber under test chamber conditions according to DIN EN 16516 or in a storage device in which the appropriate test chamber conditions can be set.

The “Requirements for Building Plants with regard to Health Protection” (ABG) shall be complied with.

2) As part of the factory’s production control, regular tests of samples taken from the plant shall be carried out in accordance with Annex C 2.9.5 1). Regular examinations shall be carried out at least every 5 years.

3) As part of the initial examination by a recognised body (ETP), the tests referred to in Appendix C 2.9.5 1) shall be carried out.

4) Section 6.2 according to DIN EN 17009:2019 is not applicable for tests according to C 2.9.5 1, 2) and 3).

5) The flooring must be normally flammable. The fulfilment of further requirements on fire behaviour shall be demonstrated in the context of a usability certification for construction supervision.

**Annex C 2.10.1**

**for DIN 7865-1 and DIN 7865-2**

DIN 7865-2:2015-02 applies with the exception of Section 8.1, paragraphs 2 and 4, Section 8.3 and Annex A.

The building material class must be indicated in the product identification.

**Annex C 2.12.1**

The pipes and fittings may only be bonded if the adhesive conforms to EN 14680:2006[1] or if the adhesives not covered by the scope of the above harmonised specification are subject to a usability certification for building use or a European technical assessment.

1 Implemented in Germany by DIN EN 14680:2006-12

**Annex C 2.12.2**

The use of waste pipes and fittings with a nominal ring stiffness lower than SN 4 (tested pursuant to DIN EN ISO 9969:2016-06) requires general building inspectorate approval.

**Annex C 2.12.3**

**Re DIN 588-1: 1996-11**

Re Section 4.1 General material composition
The Technical Rule applies only to products listed under type NT (asbestos-free technology).

**Annex C 2.12.4**

For multi-layer waste pipes and fittings with mineral filler content, proof of usability is required by means of general building inspectorate approvals.

**Annex C 2.12.5**

Only natural mineral aggregates and fillers pursuant to EN 12620:2002+A1:2008[1]may be added. The use of other natural mineral aggregates and fillers requires general building inspectorate approval.

1 Implemented in Germany by DIN EN 12620:2008-07.

**Annex C 2.12.6**

General building inspectorate approval is required for the final determination of the usability of construction products produced on site from semi-finished products for the renovation of underground drainage networks.

**Annex C 2.13.1**

– deleted from MVV TB 2019/1 –

**Annex C 2.13.2**

– deleted from MVV TB 2019/1 –

**Annex C 2.13.3**

– deleted from MVV TB 2019/1 –

**Annex C 2.13.4**

– deleted from MVV TB 2019/1 –

**Annex C 2.13.5**

– deleted from MVV TB 2019/1 –

**Annex C 2.14.1**

Labelling with a DIN -testing and monitoring mark with registration number is not required to meet the requirements of the Technical Rules set out under column 3 or for labelling with a conformity mark under State building regulations.

**Annex C 2.14.2**

– deleted from MVV TB 2019/1 –

**Annex C 2.14.3**

– deleted from MVV TB 2019/1 –

**Annex C 2.14.4**

Conformity of the seals must be confirmed for the manufacturing plant with a certificate of conformity based on in-house quality control according to DIN EN 14241-1:2013-11, Section 8.4, and regular external monitoring, including an initial assessment of the construction product, shall be carried out in accordance with the following provisions.

For the issuing of a certificate of conformity and external monitoring including product tests, the manufacturer of the construction product must call on a recognised certification body and recognised monitoring body. In-house production control must be carried out regularly via external monitoring in the factory, at least twice a year. For external monitoring, initial testing of the construction product must be carried out in line with Section 6 of the standard. Moreover, samples for sample testing must be taken and the material properties tested on at least five samples in line with Section 8.3 Table 8 of the standard.

Sampling and testing is always the responsibility of the approved monitoring body. The results of certification and external monitoring should be kept for at least five years.

**Appendix C 2.14.5**

The air-independent fireplaces shall conform to the type CA in accordance with Table 1 of DIN EN 16510- 1:2018-11. The leakage determined must not exceed 2 m³/h. As part of the external monitoring, which takes place once a year, the leakage test bench of the fireworks manufacturer must also be assessed with regard to its suitability.

**Annex C 2.15.1**

Flooding effects are not included in the standard.

**Annex C 2.15.2**

– deleted from MVV TB 2020/1 –

**Annex C 2.15.3**

If necessary, the sheet thicknesses (net wall thicknesses) shall be increased by corrosion allowances to account for the expected material degradation due to corrosion as a function of design lifespan, type of stored liquid and removal rate. In doing so, the above-mentioned corrosion allowances may only be disregarded if no erosion due to corrosion is expected for the specific liquid/material combination, accounting for the design lifespan and intended operating conditions. This must be proven for each specific application by an expert report from an independent material testing body.

For steel sheets of statically relevant components that are touched by the stored liquid or its vapors or condensate, compliance with the nominal sheet thicknesses must be checked at regular distances by sheet thickness measurements. Once the nominal sheet thickness has been reached, the construction products shall be taken out of service.

Special properties such as increased corrosive impact during storage of hygroscopic media and simultaneous ventilation in the ‘vapour zone’ immediately above the liquid surface, accumulation of water on the ground with media of densities <1.0 kg/l that do not mix with water, shall be considered individually.
External corrosion of construction products and their support structures due to the corrosive impact of ambient conditions at the site must be prevented through appropriate measures (such as a coating system with a duration of protection adapted to the design lifespan).

The manufacturer must be demonstrably proficient at the required procedures to ensure the construction product is properly manufactured. Proof shall be provided by means of a welding certificate for execution class EXC 2 or higher as per DIN EN 1090-2:2018-09 for steel construction products and as per DIN EN 1090-3:2019-07 for aluminium construction products. Contrary to DIN EN 1090-2:2018-09, Table 14, and DIN EN 1090-3:2019-07, Table 7, respectively, the welding supervision staff responsible for coordinating the construction product manufacturing processes must have at least the special technical skills under DIN EN ISO 14731:2006-12.

Full traceability must be ensured for the building materials used to manufacture the construction product.

The welding processes are to be qualified according to DIN EN ISO 15614-1:2017-12. Welders shall be examined in accordance with DIN EN ISO 9606-1:2017-12.

**Annex C 2.15.4**

– deleted from MVV TB 2019/1 –

**Annex C 2.15.5**

– deleted from MVV TB 2019/1 –

**Annex C 2.15.6**

– deleted from MVV TB 2019/1 –

**Annex C 2.15.7**

– deleted from MVV TB 2019/1 –

**Annex C 2.15.8**

– deleted from MVV TB 2019/1 –

**Annex C 2.15.9**

Evidence of compliance with this technical rule does not apply if pipes or hoses and related fittings, sealants and mountings meet the requirements of the Pressure Equipment Directive (PED) and have a CE mark.

**Annex C 2.15.10**

**Re TRbF 50 (2002-06), Annex A**

No 3.21 (5) of Annex A does not apply.

**Annex C 2.15.11**

**1** The DAfStb guideline ‘Concrete construction when handling water-endangering substances (BUmwS)’:2011-03 does not regulate how building components have to be transported, stored in the interim or installed so that they are then suitable for use as part of the sealing surface.

2 The provisions of the following technical regulations pertaining to water-endangering substances (TRwS):

- DWA-A 786 ‘Execution of sealing surfaces’ and
- DWA-A 781 to 784 relating to petrol stations for the fuelling of motor vehicles, track vehicles, watercraft and aircraft

must be taken into consideration.

3 The DAfStb Guideline ‘Concrete construction when handling water-endangering substances (BUmwS)’:2011-03 does not apply to the use in plants for storage and filling of slurry, liquid manure and silage effluents.

**Annex C 2.15.12**

For waterstops encased in concrete, the provisions of the DAfStb Guideline 'Concrete construction when handling water-polluting materials':2011-03, Annex B also apply: Explanatory notes re Section 7.3.3.

**Annex C 2.15.13**

The Bunsen burner test is required for hoses (contrary to the information in Section 4.5 of DIN EN 12514-1:2000-05). Components subject to compression pressure must comply with nominal pressure stage PN10. Regulation of the anti-siphon valve is excluded.

**Annex C 2.15.14**

Where the listed pipes are classified as single-walled metal pipes, related fittings and mountings for pipes for the storage of water-polluting liquids under paragraph C 2.15.13, the Technical Rule listed therein applies with the ÜH certificate of conformity.

**Annex C 2.15.15**

**1 Construction product requirements**

Leak detectors must be designed in accordance with DIN EN 13160-2:2003-09, in conjunction with EN 13160-1:2003[1].

The parts of a leak detector intended for outdoor installation must be operational within a temperature range of -20 °C to + 60 °C.
Any parts of the leak detector affected by the stored liquids or their vapours or condensate must be made of sufficiently resistant materials. Proof of material suitability must be provided through manufacturer information, publications in the scientific literature, own empirical values or relevant test result. DIN 6601:2007-04 applies to steel.

**2 Specifications for in-house quality control and initial type testing**

For in-house quality control and initial testing, EN 13160-1:2003[1], Annex ZA, Table ZA.1 and Table ZA.3 apply. During initial testing, the operating instructions according to EN 13160-1:2003[1], Section 5.7, to be examined. The other sections of Annex ZA do not apply.

**2 Marking specifications**

For conformity marking, the administrative provision in the Technical Building Regulations, Section C 2, Annex C 2.15.15 shall be indicated as the decisive Technical Rule.
Furthermore, when marking construction products, their packaging or accompanying documents, at least the type description, the year of manufacture, the material and performance of the product (pressure and temperature ranges suitable for the following media: ...) must be indicated.

**4 Specifications for installation**

The leakage detectors for underpressure and overpressure systems as part of Class I leakage detection systems may be used for the following applications:

- double-walled containers,
- double-walled pipes,
- single-walled containers with leak detection lining,
- single-walled pipes with leak detection lining,
- - single-walled containers with leak detection jacketing,
- single-walled pipes with leak detection jacketing.

1 Implemented in Germany by DIN EN 13160-1:2003-09.

**Annex C 2.15.16**

**1 Construction product requirements**

Leak detectors must be designed in accordance with DIN EN 13160-3:2003-09, in conjunction with EN 13160-1:2003[1].

The parts of a leak detector intended for outdoor installation must be operational within a temperature range of -20 °C to + 60 °C.

Any parts of the leak detector affected by the leak detection liquid, stored liquids or their vapours or condensate must be made of sufficiently resistant materials. Proof of material suitability must be provided through manufacturer information, publications in the scientific literature, own empirical values or relevant test result. DIN 6601 applies to steel.

The leak detection liquid shall comply with the 'List of leak detection liquids for monitoring rooms of double-walled containers or double-walled pipelines (December 2010 version)' published on the DIBt homepage.

**2 Specifications for in-house quality control and initial type testing**

For in-house quality control and initial testing, EN 13160-1:2003[1], Annex ZA, Table ZA.1 and Table ZA.3 apply. During initial testing, the operating instructions must also be tested pursuant to EN 13160-1:2003[1], Section 5.7. The other sections of Annex ZA do not apply.

**3 Marking specifications**

For conformity marking, the administrative provision in the Technical Building Regulations, Section C 2, Annex C 2.15.16 shall be indicated as the decisive Technical Rule.
Furthermore, when marking construction products, their packaging or accompanying documents, at least the type description, the year of manufacture, the material and performance of the product (pressure and temperature ranges suitable for the following media: ...) must be indicated.

**4 Specifications for installation**

1 Liquid system leak detectors as part of Class II leak detection systems may be used for the following applications:

- double-walled, pressure-less, overground containers,
- single-walled, pressure-less, overground containers with leak detection lining,
- single-wall, pressure-free, above-ground containers with leak-proof coating.

2 The max. volume of the monitoring chamber is 1 $m^3$.

1 Implemented in Germany by DIN EN 13160-1:2003-09.

**Annex C 2.15.17**

**1 Requirement for the construction product**

The containers shall be executed in accordance with EN 12285-2:2005[1] as tank class B or C. The height $n_1$ of the saddle may not exceed 500 mm.

**2 Specifications for in-house quality control and initial type testing**

The in-house quality control shall be carried out in accordance with DIN EN 1090-2:2018-09 on the basis of the requirements of execution class EXC 2. By way of derogation from EN 12285-2:2005[1], Section 5, the leak test of the inner container must be carried out as a routine test as follows:

After completion of all welding, the pressure or leak test of the container shall be carried out. The test shall be done with water. The test pressure to be used is the sum, increased by a safety allowance of 1.3, of the maximum permitted operating overpressure and the expected operational hydrostatic pressure of the stored fluid for the

maximum permitted density at the lowest point in the container, with a minimum of 2 bar. After the settling phase, the pressure shall be maintained for at least half an hour. The container shall be able to withstand this test pressure without measurable changes in shape and without leaking (no pressure loss from the settling phase onwards).

For multi-chamber containers, each chamber shall also be able to withstand the test overpressure associated with the relevant permitted operating pressure (the sum, increased by a safety allowance of 1.3, of the maximum permitted operating pressure and the expected operational hydrostatic pressure of the stored liquid for the maximum permitted density at the lowest point in the container).

**3 Marking specifications**

The designation of construction products shall include at least the type designation, the year of manufacture, the serial number, the materials used for manufacture, the nominal capacity of the container at the maximum permitted filling level, the filling percentage or filling level (based on the permitted maximum filling percentage) and the performance of the product (maximum permitted media density, nominal sheet thicknesses, corrosion allowances where required, pressure and temperature ranges).

**4 Specifications for installation**

In flood plains, the tanks must be positioned in such manner that they cannot be reached by flood water.
They shall not be placed in earthquake zones 1 to 3 (DIN 4149:2005-04).

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1 Implemented in Germany by DIN EN 12285-2:2005-05.

**Annex C 2.15.18**

**1** The standard DIN EN 12285-1 is also applicable to containers for storing water-polluting liquids that are intended for heating and cooling buildings. In flood plains, the tanks must be positioned in such manner that they cannot be reached by flood water. They may not be positioned in earthquake zones 1 to 3 (DIN 4149).

**2** Requirements for the construction product
The containers are to be designed according to DIN EN 12285-1:2018-12 in tank class B or tank class C. The weld seams must be welded continuously on both sides. At least steel profiles T 80 according to DIN EN 10055 or flat bars with a product width of at least 100 mm x 30 mm according to DIN EN 10058 are to be used as reinforcing rings.
Reinforcing rings by applying formula (3) from Section 4.5.3 of the standard must be used. The option of doing calculations according to Section 1, Clause 3 to prove stability under the impact of traffic loads and/or heights above ground of > 1.5 m does not apply.

**3** Specifications for in-house quality control and initial testing
In-house quality control shall be carried out in accordance with DIN EN 1090-2 on the basis of the requirements of execution class EXC 2. The inner container leak test is to be carried out as a routine test, as follows:
After completion of all welding, the pressure or leak test of the container shall be carried out. The test shall be done with water. The test pressure to be used is the sum of the maximum permitted operating overpressure and the expected operational hydrostatic pressure of the stored fluid for the maximum permitted density at the lowest point in the container, plus a safety allowance of 1.3, with a minimum of 2 bar.
After the settling phase, the pressure shall be maintained for at least half an hour. The container shall be able to withstand this test pressure without measurable changes in shape and without leaking (no pressure loss from the settling phase onwards).
For multi-chamber containers, each chamber shall also be able to withstand the test overpressure associated with the relevant permitted operating pressure (the sum, increased by a safety allowance of 1.3, of the maximum permitted operating pressure and the expected operational hydrostatic pressure of the stored liquid for the maximum permitted density at the lowest point in the container).
The tightness of the interstitial space between double-walled containers must be checked at an atmospheric pressure of 0.6 bar.

**4** Marking specifications
For the marking of construction products, at least the type designation, the year of manufacture, the production number, the materials used for manufacture, the nominal contents of the container at

permissible filling height, the permissible filling level or the permissible filling height (corresponding to the permissible filling level) and the performance of the product (maximum permissible media density, nominal sheet thicknesses, corrosion allowances where applicable, pressure and temperature ranges) shall be indicated.

**Annex C 2.16.1**

The regulations of Annex E to the standard for monitoring level M apply to the in-house quality control and external monitoring. Contrary to Table E.1, the properties of the materials and structural elements used are specified in test certificate 2.2, and the properties of the pipes with an increased yield strength are specified in the acceptance test certificate 3.1 in accordance with EN 10204:2005-01.

Mathematical proof of the load-bearing capacity of adjustable steel telescopic piles must be tested under the certification procedure. Testing may be carried out directly by the certification body itself or by a third body appointed by it.

If according to Section 9.4.2 of DIN EN 1065:1998-12 it can be shown that the characteristic load capacity for the adjustment device is at least 44.0 kN (class A) or 59.5 kN (classes B to E), a greater characteristic load capacity may be used compared to the nominal characteristic load capacity according to Section 8 of the standard, provided that this has been mathematically demonstrated for the overall support in accordance with Section 9.2 of the standard.

The approach of larger characteristic load capacities of the structural supports according to DIN EN 1065:1998-12 is not permissible than 44.0 kN (class A) or 59.5 kN (classes B to E).

**Annex C 2.16.2**

In the case of scaffolding components, the conformity mark and, in addition, the last two digits of the year of manufacture, the manufacturer and the material class shall be permanently affixed to the scaffolding component as an essential feature. If in the technical rules relating to these scaffolding construction parts a mark containing additional characteristics is required these must also be taken into account.

**Annex C 2.16.3**

– deleted from MVV TB 2020/1 –

**Annex C 2.16.4**

As regards the ÜZ certificate of conformity, the provisions under Annex B to the standard shall apply to the monitoring level M.

**Annex C 2.16.5**

– deleted from MVV TB 2020/1 –

**Annex C 2.16.6**

With the application of the technical rule, the section 'Production' of the 'Application guideline for supporting frames in accordance with DIN EN 12812', August 2009 version, as published in DIBt Mitteilungen vol. 6/2009 p. 227, is to be used.

**Annex C 2.16.7**

– deleted from MVV TB 2020/1 –

**Annex C 2.16.8**

The technical rules apply to casting materials with the following material numbers: 1.0420, 1.0446.

**Annex C 2.16.9**

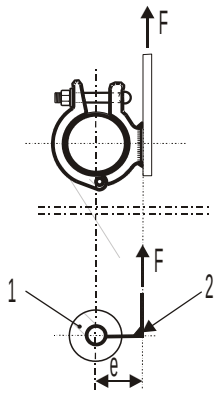
**Re DIN EN 74-2**

Re. Section 9.2.2 Slipping force $F_s$ of a semi-coupling
Measurement of the displacement $\Delta_1$ can be dispensed with.

Re Figure. 10:
The abutment shall be mounted on the opposite shoulder of the pipe.

Re Figure. 12:
The test loads ‘P’ shall be replaced by ‘2P’ and ‘P/2’ by ‘P’.

Figure. B.3 shall be replaced by the following diagram:




In the equations (B.1) to (B.4), ‘$F_{s,R,d}$’ shall be replaced by ‘$F_{f,R,d}$’.

**Annex C 2.16.10**

As regards the ÜZ certificate of conformity, the provisions under Annex A to the standard shall apply to the monitoring level M.

**Annex C 2.16.11**

For production, the ‘Application guideline for working scaffolds’[1], November 2005 version shall be observed, and for welding steel and aluminium components, Annexes A 1.2.4/3 and A 1.2.4/4 shall be observed.
Components as per Annex A, Paragraph A.1 of DIN EN 12810-1:2004-03 qualify as basic components.
Scaffolding components must be marked in accordance with federal state conformity regulations. Scaffolding parts must also be easily recognisable and durably marked with:

- the capital letter ‘Ü’,
- the manufacturer’s logo,
- the marking ‘EN 12811’;
- the last two numbers representing the year of manufacture (encoded if necessary) and
- a marking for the assignment of the scaffolding component to the assembly and use instructions[4]

.
Scaffolding parts may only be manufactured by manufacturers whose in-house quality control is regularly checked at least every five years by external monitoring. The manufacturer may itself carry out initial testing on scaffolding

components that can be assigned to a product group for which initial testing has been carried out by an accredited body for the manufacturer on at least one scaffolding component.
Welded steel or aluminium scaffolding components may only be manufactured by firms that have a welding certificate for at least execution class EXC 2 under EN 1090-1:2009+A1:2011[2] for the area of application.

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1 Published in DIBt Mitteilungen, vol. 2/2006, p. 61 et seq. Available from the DIBt.
2 Implemented in Germany by DIN EN 1090-1:2012-02.
4 The assembly and usage instructions must comply with the requirements set out in the ‘Application guideline for scaffolding according to DIN EN 12811-1’; see DIBt-Mitteilung, vol. 2/2016.

**Annex C 2.16.12**

– deleted from MVV TB 2020/1 –

**Annex C 2.16.13**

– deleted from MVV TB 2020/1 –

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

The following is stipulated in accordance with § 85a(2) No. 4 MBO[1]:

| Ser. No | Construction product | approved test procedure according to: | Declaration of conformity |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| C 3.1 | Prefabricated ventilation ducts to which requirements on fire resistance and/or sound insulation apply1 According to national law | Also applicable, depending on construction product:<br>*As regards the fire resistance time:*<br>DIN 4102-6:1977-09 and – where applicable – in conjunction with DIN V 4102-21:2002-08), or<br>DIN EN 1363-1:2012-10,<br>DIN EN 1366-1:2014-12 and – where applicable - in conjunction with<br>DIN V 4102-21:2002-08 and Annex C 3.1<br>*for sound insulation:*<br>DIN EN ISO 10140-1:2016-12<br>DIN EN ISO 10140-2, -4:2010-12,<br>DIN EN ISO 10140-5:2014-09<br>DIN EN ISO 717-1:2013-06 | MDC |
| C 3.2 | Building materials for which there are only requirements concerning behaviour in case of fire and<br>- which must be non-combustible, without combustible components,<br>- which must be normally flammable<br>Building materials under Section D 2.2 are excluded | DIN 4102-1:1998-05<br>in conjunction with<br>DIN 4102-16:2015-09 | MDC |
| C 3.3 | Building materials for which there are only requirements for fire-resistant characteristics and which must be normally flammable.<br>Building materials under Section D 2.2 are excluded. | DIN EN ISO 11925-2:2011-02<br>in conjunction with Annex C 3.7 | MDC |
| C 3.4 | Building materials for which there are only requirements concerning behaviour in case of fire and<br>- which must be non-combustible, with combustible components,<br>- which must be flame-resistant, except for floor | DIN 4102-1:1998-05<br>in conjunction with<br>DIN 4102-16:2015-09 | Mark of conformity [ÜZ] |

1 According to national law1 According to national law

| Ser. No | Construction product | approved test procedure according to: | Declaration of conformity |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| | coverings | | |
| 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 11925-2:2011-02 and DIN EN ISO 9239-1:2010-11 in conjunction with Annex C 3.8 | Mark of conformity [ÜZ] |
| C 3.6 | Cleaning hatches and soot preventers | Testing principles for cleaning hatches and soot preventers (2012-11) | MDT |
| C 3.7 | Mountings and appliances of the water installation which are subject to noise requirements | DIN EN ISO 3822-1:2009-07 DIN EN ISO 3822-2:1995-05 DIN EN ISO 3822-3:2018-04 DIN EN ISO 3822-4:1997-03 | MDT |

| Ser. No | Construction product | approved test procedure according to: | Declaration of conformity |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| C 3.8 | Coatings for concrete, plaster and screed surfaces in collecting trays and catch basins used for storing<br>- EL heating oil,<br>- unused combustion engine and motor vehicle gear oils,<br>- mixtures of saturated and unsaturated hydrocarbons with aromatics content ≤ 20 % by mass and flashpoint > 60 °C, and<br>- Oils (e.g. transformer and hydraulic oils) which may be classified as consisting of such mixtures | Principles for construction and testing (BPG) Coatings in collecting areas (2017-08) | Mark of conformity [ÜZ] |
| C 3.9 | Rivet and screw-like joints and rivet and screw-like fastenings for regulated external wall claddings | DIN 18516-1:2010-06<br>Also applicable:<br>Annex C 3.2 | MDT |
| C 3.10 | Wood-fired ovens with open or closed combustion chambers | DIN 18880-2:1991-08<br>Also applicable:<br>Annex C 3.3 | MDT |
| C 3.11 | Metal-plastic composite profiles for load-bearing frames of doors, windows, window walls and curtain walls, unless they are components of the door, window, window wall or curtain wall. | Guideline for demonstrating the stability of metal-plastic composite profiles, Section 3.2 (1986-08) | MDC |
| C 3.12 | “Surface coating materials OS 7 and OS 10 for concrete for repairs necessary to maintain the stability of concrete components” painted in MVV TB 2023/1 | | |
| C 3.13 | Adjustable telescopic steel props - Product specifications, design and assessment by calculation and tests | DIN EN 1065:1998-12<br>Additionally applies<br>Annex C 3.9 | Mark of conformity [ÜZ] |
| C 3.14 | Doors and gates used as smoke barriers excluding curtains | DIN 18095-1:1988-10<br>DIN 18095-3:1999-06 | MDC |
| C 3.15 | Accessories (unregulated) for smoke barriers, excluding single-axis door hinges and retractable floor seal | DIN 4102-18:1991-03<br>in conjunction with<br>DIN 18095-1:1988-10 | MDC |
| 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)<br>Also applicable:<br>DIN 4102-1:1998-05 or<br>DIN EN ISO 11925-2:2011-02<br>in conjunction with Annex C 3.7 | Mark of conformity [ÜZ] |

| Ser. No | Construction product | approved test procedure according to: | Declaration of conformity |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| C 3.17 | Automatically closing nozzles | DIN EN 13012:2012-09: | MDT |
| C 3.18 | Prefabricated safety barrier glazing with load-bearing capacity determined by testing | DIN 18008-4:2013-07<br>Annex A, Annex D and Annex E;<br>Also applicable:<br>Annex C 3.5 | MDC |
| C 3.19 | Point holder without ball joint with load-bearing capacity determined via testing | DIN 18008-3:2013-07<br>Appendix D | MDC |
| C 3.20 | Prefabricated passable glazing with experimentally determined load-bearing capacity | DIN 18008-5:2013-07<br>Annex A | MDC |
| C 3.21 | ‘High fire-retardant components, the supporting, stiffening and space-closing parts of wood or wood-based materials and which have fire-protective apparel of non-combustible building materials and insulation materials of non-combustible building materials’, painted in MVV TB 2020/2 | | |
| C 3.22 | Coating and enclosure systems for refurbishment of timber components contaminated with pentachlorphenol (PCP) | Test plan for refurbishment of timber components contaminated with pentachlorphenol (PCP) (2006-01) | MDT |
| C 3.23 | ‘Seamless circular pipes of non-alloy steel pursuant to EN 10216-1 for use on steel chimneys’ deleted from MVV TB 2019/1 | | |
| C 3.24 | ‘Welded circular pipes of non-alloy steel pursuant to EN 10217-1 for use on steel chimneys’ deleted from MVV TB 2019/1 | | |
| C 3.25 | ‘Materials for sealing components in contact with the ground against pressing water in transition to waterproof components’ deleted from MVV TB 2019/1 | | |
| C 3.26 | Mineral slurry seals and flexible polymer-modified thick coatings for structural waterproofing | Test principles for the issuing of general building supervisory inspection certificates for rigid and flexible mineral slurry seals as well as flexible polymer-modified thick coatings for the waterproofing of structures (PG-MDS/FPD) (2016-11) | MDT |
| C 3.27 | Products for seals in conjunction with tiles and slab surfaces<br>- for internal and exterior walls and floors that are connected with buildings, against water without hydrostatic pressure in high-load situations such as in wet rooms in the public and commercial sector<br>- for containers and basins located inside or outside, where these are connected to buildings against fill water such as with swimming pools | Test principles for the issuing of general building inspection certificates for seals in conjunction with tiles and slab surfaces<br>- Part 1: Liquid-applied seals (PG AIV-F) (2018-03),<br>- Part 2: Sheet-type seals (PG AIV-B) (2018-03),<br>- Part 3: Slab-type seals (PG AIV-P) (2018-03)<br>- Part 4: Additional tests on sealing systems in connection with wear layers (PG-AIV-N) (2021-07) | MDT |
| C 3.28 | Liquid plastics for building waterproofing | Testing principles for granting a general building supervisory inspection certificate for liquid plastics for building waterproofing (PG-FLK) (2019-07) | MDT |
| C 3.29 | Roof waterproofing with liquid plastics | Testing principles regarding the issuing of general building inspectorate test certificates for waterproofing roofs using fluid synthetic materials<br>Annex C 3.6 | MDT |
| C 3.30 | Waterproofing for joints and transitions in or on water-tight structural elements including those made of concrete, with | Testing principles regarding the issuing of general building supervisory inspection certificates for joint sealants in | MDT |

| Ser. No | Construction product | approved test procedure according to: | Declaration of conformity |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| | high resistance to water penetration in soil contact areas, which cannot be classified as C 2.10.2 or C 2.10.3 products as referred to in Chapter C 2 | concrete structural elements with a high resistance to water penetration (PG-FBB Part 1: Sealings for working joints and target crack cross Sections, transitions and connections (May 2020) Part 2: Seals for motion joints (July 2021) | |
| C 3.31 | Attachments for assembly exhaust systems, unless recorded by DIN EN 13502:2003-01, DIN EN 16475-7:2016-05 and DIN EN 14989-1:2007-05 | DIN CEN/TS 16134:2011-11 | MDC |
| C 3.32 | Prefabricated walk-on, fall-through-proof glazing in case of maintenance measures, with a load-bearing capacity determined by testing | DIN 18008-6:2018-02 Annex A | MDC |
| C 3.33 | Prefabricated glazing with experimentally determined residual load capacity | DIN 18008-1:2020-05, Annex B1 | MDC |

**Annex C 3.1**

**Ventilation ducts**

A round or four-sided rectangular ventilation duct with maximum dimensions according to DIN EN 1366-1:2014-12, Table 6, can be classified as L... according to DIN 4102-6:1977-09 if the ventilation duct with the standard dimensions according to DIN EN 1366-1:2014-12, Section 6.1 has met the requirements of DIN EN 1363-1:2012-10 over a test duration of ... minutes in conjunction with DIN EN 1366-1:2014-12, Section 11.

A ventilation duct with the nominal internal dimensions of the air-carrying cross-section of 1250 mm x 1000 mm < B x H ≤ 2500 mm x 1250 mm or a nominal inner diameter of 1000 mm < D ≤ 1250 mm can be classified as L... according to DIN 4102-6:1977-09 if

- it has been tested in accordance with DIN V 4102-21:2002-08 and, for a test duration of... minutes observed the requirements of DIN V 4102-21:2002-08, Section 5.2 and 5.3

and where in either case:

- a ventilation duct with the same design (material, material thickness, connection technology, fastening) under DIN EN 1363-1:2012-10 in conjunction with DIN EN 1366-1:2014-12 for the dimension set out in DIN EN 1366-1:2014-12, Table 2 was previously tested.

**Annex C 3.2**

The characteristic load-bearing capacity value for the joints and fastening is the 5 % quantile with 75 % confidence coefficient established each time from the test results.

**Annex C 3.3**

The test procedure according to DIN 18880-2:1991-08 and the associated DIN 18880-1:1991-08 shall be limited to the conditions relevant for the use of logs and for the operation as pizza oven. In particular these are:

- DIN 18880-1:1991-08, Section 5, excluding Section 5.7.3
- DIN 18880-2:1991-08, Section 6, excluding Section 6.3.

With regard to the installation and operating instructions, DIN 18880-2:1991-08, Section 7, and for marking and labelling, DIN 18880-2:1991-08, Section 8 shall be observed.

**Annex C 3.4**

– deleted from MVV TB 2020/1 –

**Annex C 3.5**

For test proof of load-bearing capacity of punctiform storage structures (point holders), item no. C 3.19 applies.

For double-sided linear-mounted single-pane glazing, Category A, instead of the test required under the last sentence in DIN 18008-4, A.1.9, the impact glass plate may alternatively be broken with the grains, which then must be tested by pendulum impact with a drop height of 450 mm.

**Annex C 3.6**

The test principles consist of the test procedure described in chapters 2-7 of ETAG 005 ‘Liquid-applied roof waterproofing’, parts 1 to 8, published in the Federal Gazette, volume 53 No 200a, 25 October 2001 and volume 57 No 102a, 4 June 2005. The rules of application referred to in No B 2.2.5.10 must also be observed.

**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 11925-2:2011-02 meet the requirement of DIN 4102-1:1998-05, Section 6.2.2.

Testing under DIN EN ISO 11925-2:2011-02 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 be classified according to DIN 4102-1:1998-05 if the test results according to DIN EN ISO 11925-2 meet the requirements of DIN0 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 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 3.9**

The regulations of Annex E to the standard for monitoring level M apply to the in-house quality control and external monitoring. Contrary to Table E.1, the properties of the materials and structural elements used are specified in test certificate 2.2, and the properties of the pipes with an increased yield strength are specified in the acceptance test certificate 3.1 in accordance with EN 10204:2005-01.

If according to Section 9.4.2 of DIN EN 1065:1998-12 it can be shown that the characteristic load capacity for the adjustment device is at least 44.0 kN (class A) or 59.5 kN (classes B to E), a greater characteristic load capacity may be used compared to the nominal characteristic load capacity according to Section 8 of the standard, provided that this has been demonstrated by test for the overall support in accordance with Section 9.3 of the standard.

The approach of larger characteristic load capacities of the structural supports according to DIN EN 1065:1998-12 is not permissible than 44.0 kN (class A) or 59.5 kN (classes B to E).

### 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) No. 4 MBO[1]:

| Ser. No | Design | approved test procedure according to: |
|---|---|---|
| 1 | 2 | 3 |
| C 4.1 | Designs other than those referred to in Section A 2, No A 2.2.1.4, for the construction of ceilings, roofs, subceilings, false floors, hollow flooring, columns, supports, brackets, transoms, stairs and supporting walls, which are subject to fire resistance and/or sound insulation requirements. This does not apply to parts of structural installations which are subject to further requirements if the relevant designs significantly differ from the Technical Building Regulations or if there are not generally accepted technical best practices for the relevant designs.1 According to national law | Also applicable, depending on design:<br>*As regards the fire resistance time:*<br>DIN 4102-2:1977-09 with the exception of Sections 6.2.7, 6.2.9 and 6.2.10 (for firewalls DIN 4102-3:1977-09), or<br>DIN EN 1363-1:2012-10,<br>DIN EN 1363-2:1999-10,<br>DIN EN 1364-2:1999-10,<br>DIN EN 1365-1:2013-08,<br>DIN EN 1365-2, -3:2000-02,<br>DIN EN 1365-4:1999-10,<br>DIN EN 1366-6:2005-02<br>in conjunction with Annex C 4.6<br>*for sound insulation:*<br>DIN EN ISO 10140-1:2016-12<br>DIN EN ISO 10140-2, -4:2010-12,<br>DIN EN ISO 10140-3:2015-11<br>DIN EN ISO 10140-5:2014-09<br>DIN EN ISO 717-1, -2:2013-06 and<br>DIN EN ISO 10848-1, -2, -3:2018-02 |
| C (4.2) | Designs other than those referred to in Section A 2, No A 2.2.1.4, for the construction of non-load-bearing internal partition walls, including installations (sanitary equipment), the safety from falling of which is to be proven experimentally and/or for the requirements for the duration of fire resistance and/or sound insulation, with the exception of those made of glass. The second sentence of paragraph C 4.1 applies accordingly. | Also applicable, depending on design:<br>*As regards protection against falling:*<br>DIN 4103-1:2015-06<br>The following characteristics are each to be met together with the requirements of<br>DIN 4103-1:2015-06:<br>*As regards the fire resistance time:*<br>DIN 4102-2:1977-09 apart from Sections 6.2.7 and 6.2.9 or<br>DIN EN 1363-1:2012-10,<br>DIN EN 1363-2:1999-10,<br>DIN EN 1364-1:1999-10<br>in conjunction with Annex C 4.6<br>*for sound insulation:*<br>DIN EN ISO 10140-1:2016-12<br>DIN EN ISO 10140-2, -4:2010-12,<br>DIN EN ISO 10140-5:2014-09<br>DIN EN ISO 717-1:2013-06 and<br>DIN EN ISO 10848-1, -2, -3:2018-02 |

1 According to national law1 According to national law

| Ser. No | Design | approved test procedure according to: |
|---|---|---|
| 1 | 2 | 3 |
| C 4.3 | Designs for the construction of non-load-bearing exterior walls to which requirements on fire resistance and sound insulation apply.<br>The second sentence of paragraph C 4.1 applies accordingly. | Also applicable, depending on design:<br>*As regards the fire resistance time:*<br>DIN 4102-3:1977-09 or<br>DIN EN 1363-1:2012-10,<br>DIN EN 1363-2:1999-10,<br>DIN EN 1364-1:1999-10<br>in conjunction with Annex C 4.6<br>*for sound insulation:*<br>DIN EN ISO 10140-1:2016-12<br>DIN EN ISO 10140-2, -4:2010-12,<br>DIN EN ISO 10140-5:2014-09<br>DIN EN ISO 717-1:2013-06 and<br>DIN EN ISO 10848-1, -2, -3:2018-02<br>*As regards protection against falling:*<br>ETB Guideline ‘Components that protect against falls’ (1985-06) |
| C 4.4 | Designs for the construction of ventilation ducts to which requirements on fire resistance time and/or sound insulation apply.<br>The second sentence of paragraph C 4.1 applies accordingly. | Also applicable, depending on design:<br>*As regards the fire resistance time:*<br>DIN EN 4102-6:1977-09 and – where applicable –<br>in conjunction with<br>DIN V 4102-21:2002-08), or<br>DIN EN 1363-1:2012-10,<br>DIN EN 1366-1:2014-12<br>and – where applicable –<br>in conjunction with<br>DIN V 4102-21:2002-08 and<br>Annex C 3.1 of Section C 3<br>*for sound insulation:*<br>DIN EN ISO 10140-1:2016-12<br>DIN EN ISO 10140-2, -4:2010-12,<br>DIN EN ISO 10140-5:2014-09<br>DIN EN ISO 717-1:2013-06 |
| C 4.5 | Designs for pipe bulkheads on metal pipes (heat-insulated where applicable),<br>- whose function is based on the arrangement of a pipe encasement/section insulation layout and<br>- in relation to which requirements are only laid down in terms of fire resistance time.<br>The second sentence of No C 4.1 applies accordingly. | DIN 4102-11:1985-12<br>in conjunction with<br>Annex C 4.5 and Annex C 4.1 |
| C 4.6 | Designs for pipe bulkheads on thermoplastic pipes (heat-insulated where applicable),<br>- whose function is based on the arrangement of a pipe encasement/section insulation layout,<br>- in which no insulating building materials are used, and<br>- in relation to which requirements are only laid down in terms of fire resistance time.<br>The second sentence of No C 4.1 applies accordingly. | DIN 4102-11:1985-12<br>in conjunction with<br>Annex C 4.5 and Annex C 4.1 |

| Ser. No | Design | approved test procedure according to: |
|---|---|---|
| 1 | 2 | 3 |
| C 4.7 | Designs for the manufacture of service shafts and ducts, including the closures of their inspection openings, which are subject to fire resistance and sound insulation requirements.<br>The second sentence of paragraph C 4.1 applies accordingly. | Also applicable, depending on design:<br>*As regards the fire resistance time:*<br>DIN 4102-11:1985-12 and<br>plus, as test procedures for installation shaft walls<br>DIN 4102-2:1977-09 apart from Sections 6.2.7 and 6.2.9 in conjunction with Annex C 4.6 or<br>DIN EN 1363-1:2012-10,<br>DIN EN 1363-2:1999-10,<br>DIN EN 1364-1:1999-10<br>*for sound insulation:*<br>DIN EN ISO 10140-1:2016-12<br>DIN EN ISO 10140-2, -4:2010-12,<br>DIN EN ISO 10140-5:2014-09<br>DIN EN ISO 717-1:2013-06 |
| C 4.8 | Designs for manufacture of roofing, for which there are requirements regarding resistance to spreading of fires and radiating heat.<br>The second sentence of No C 4.1 applies accordingly. | DIN 4102-7:2018-11<br>in conjunction with<br>DIN SPEC 4102-23:2018-07<br>Sections 1, 2, 3, 4 and 7; or<br>DIN CEN/TS 1187:2012-03<br>Test method 1 in conjunction with<br>DIN SPEC 4102-23:2018-07<br>Sections 1, 2, 3, 4 and 7; or<br>DIN CEN/TS 1187:2012-03<br>Test method 1 in conjunction with<br>DIN CEN/TS 16459:2014-03<br>Sections 1, 2, 3, 4 and 7 and Annex A |
| C 4.9 | Designs for manufacture of electrical cable systems, which are subjected to fire-resistance requirements.<br>The second sentence of paragraph C 4.1 applies accordingly. | DIN 4102-12:1998-11 |
| C 4.10 | Designs for the construction of smoke extraction ducts to which requirements on fire resistance and/or sound insulation apply.<br>The second sentence of paragraph C 4.1 applies accordingly. | Also applicable, depending on design:<br>*As regards the fire resistance time:*<br>DIN 4102-6:1977-09<br>DIN V 18232-6:1997-10<br>in conjunction with Annex C 4.2<br>DIN EN 1363-1:2012-10,<br>DIN EN 1366-1:2014-12<br>in conjunction with<br>DIN EN 1366-8:2004-10<br>in conjunction with Annex C 4.3<br>*for sound insulation:*<br>DIN 52210-6:2013-07 |
| C 4.11 | Designs for the construction of smoke extraction ducts to which requirements on fire resistance and/or sound insulation do not apply.<br>The second sentence of paragraph C 4.1 applies accordingly. | DIN V 18232-6:1997-10<br>in conjunction with Annex C 4.4 |
| C 4.12 | Types of safety barrier glazing with experimentally determined load capacity | DIN 18008-4:2013-07<br>Annex A, Annex D and Annex E<br>Also applicable:<br>Annex C 3.5 of Section C 3 |
| C 4.13 | Designs for walk-on glazing with load-bearing capacity determined by testing | DIN 18008-5:2013-07<br>Annex A |

| Ser. No | Design | approved test procedure according to: |
|---|---|---|
| 1 | 2 | 3 |
| C 4.14 | Polymer-modified bituminous thick coatings (PMBC) as waterproofing for transition joints on water-impermeable/watertight structural elements | Test principles for the issue of general structural inspection certificates for joint sealing in components, e.g. of concrete with high water penetration resistance in the earth-touched area (PG FBB)<br>Part 1: Sealings for working joints, target crack cross-sections, transitions and connections (May 2020) |
| C 4.15 | Designs for walk-on, fall-through-proof glazing in case of maintenance measures, with a load-bearing capacity determined by testing | DIN 18008-6:2018-02<br>Annex A |
| C 4.16 | Types of glazing with experimentally determined residual load capacity | DIN 18008-1:2020-05,<br>Annex B1 |

**Annex C 4.1**

**Re DIN 4102-11: 1985-12**

Re. Section 3.1 Verification with fire tests
By way of derogation from Section 3.1, a sample is sufficient for the fire test.

Re. Section 4.2.3 Specimens and test arrangement
In deviation from Section 4.2.3, the performance of fire tests on pneumatic tube lines and dust intake pipes at a working pressure of -0.5 bar is dispensed with.

Re Section 4.2.4.1 Fire test with minimal stress
Section 4.2.4.1 lapses.

Re Section 4.2.4.2 Fire behaviour tests involving the unit temperature time curve
By way of derogation from Section 4.2.4.2, the measuring points for determining the mean temperature increase at 10 cm and 60 cm distance from the wall or ceiling are omitted.

Re Section 4.2.4.3 Fire behaviour test involving a smouldering fire load
Section 4.2.4.3 lapses.

**Annex C 4.2**

By way of derogation from DIN V 18232-6:1997-10, leakage from the category 3 smoke extractor duct in the aforementioned standard must be determined under fire stress using the oxygen measurement method set out in DIN EN 1366-8:2004-10 for pressure levels 1 or 2 or 3 as set out therein.

**Annex C 4.3**

A smoke extractor duct can be classified as category 3 according to DIN V 18232-6:1997-10 if it has passed the tests according to DIN EN 1366-1:2014-12 (duct A at a pressure of -500 Pa) and for a test duration of ≥ 30 minutes under temperature load as per DIN EN 1363-1:2012-10 meets the requirements of DIN EN 1366-8:2004-10, Section 11.3.2, tightness; Section 11.3.3, Space barrier; Section 11.3.4, Thermal insulation and Section 11.3.5, Cross-section reduction.

**Annex C 4.4**

By way of derogation from DIN V 18232-6:1997-10, leakage from the category 2 smoke extractor duct in the aforementioned standard must be determined under fire stress using the oxygen measurement method set out in DIN EN 1366-8:2004-10 for pressure levels 1 or 2 or 3 as set out therein.

**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 with modified test conditions in accordance with DIN EN 1366-3:2009-07, Section 5: The furnace temperature was controlled in accordance with DIN EN 1363-1:1999-10, Section 5.1, with furnace thermocouples according to section 4.5.1.1 and the start of the test was carried out in accordance with DIN EN 1363-1:1999-10, Section 10.3. The pressure conditions in the fire room corresponded to DIN EN 1366-3:2009-07, Section 5.2

**Annex C 4.6**

## 1 Non-load-bearing space-enclosing dividing walls

A non-load-bearing space-enclosing dividing wall may be classified as F ... under DIN 4102-2:1977-09 if it either

- complies with the conditions under DIN 4102-2:1977-09

or

- has been tested in accordance with DIN EN 1363-1:2012-10 in conjunction with DIN EN 1364-1:1999-10 and, for a duration of... Minutes has observed the requirements of DIN EN 1363-1:2012-10, Section 11.2, Enclosing function, and Section 11.3, Thermal insulation.

For testing according to DIN EN 1363-1:2012-10 in conjunction with DIN EN 1364-1:1999-10, a fire test is required for symmetrical components.

## 2 Load-bearing space-enclosing walls

A load-bearing space-enclosing wall may be classified as F... pursuant to DIN 4102-2:1977-09 if it

- complies with the conditions under DIN 4102-2:1977-09

or

- was tested in accordance with DIN EN 1363-1:2012-10 in conjunction with DIN EN 1365-1:2013-08, for a test duration of... minutes, met the requirements of DIN EN 1363-1:2012-10, Section 11.1, Load-bearing capacity, Clause II and Section 11.2, Space barrier, and Section 11.3, Thermal insulation.

For testing according to DIN EN 1363-1:2012-10 in conjunction with DIN EN 1365-1:2013-08, a test is required for symmetrical components.

## 3 Subceilings (as stand-alone structural components)

A false ceiling as a stand-alone structural component may be classified as F... under DIN 4102-2:1977-09 if it either

- complies with the conditions under DIN 4102-2:1977-09

or

- was tested in accordance with DIN EN 1363-1:2012-10 in conjunction with DIN EN 1364-2:1999-10, and, over a test duration of ... minutes, has met the requirements of DIN EN 1364-2:1999-10, Section 11.2, Enclosing function, and Section 11.3, Thermal insulation.

For testing according to DIN EN 1363-1:2012-10 in conjunction with DIN EN 1364-2:1999-10, a stress test is required on the underside and on the topside. If classification is only to be done on one side, a stress test on this side is required.

## 4 Pillars

A column may be classified as F ... under DIN 4102-2:1977-09 if it either

- complies with the conditions under DIN 4102-2:1977-09

or

- was tested in accordance with DIN EN 1363-1:2012-10 in conjunction with DIN EN 1365-4:1999-10 and, for the test duration of ... minutes, has met the requirements of DIN EN 1363-1:2012-10, Section 11.1, Load-bearing capacity, clause II.

For testing according to DIN EN 1363-1:2012-10 in conjunction with DIN EN 1365-4:1999-10, a test is required.

**5 Fire walls**

A firewall may be classified as such under DIN 4102-2:1977-09 if it either

- complies with the conditions under DIN 4102-3:1977-09

or

- has been tested according to DIN EN 1363-1:2012-10 in conjunction with DIN EN 1365-1:2013-08 and DIN EN 1363-2:199-10, Section 7, during which it complied with the requirements under DIN EN 1363-1:2012-10, Section 11.1, Load-bearing capacity, Subsection II as well as Section 11.2, Enclosing function, and Section 11.3, Thermal insulation, for the test duration of 90 minutes.

The walls must meet these requirements without cladding. They must also be made of non-combustible materials.

For testing according to DIN EN 1363-1:2012-10 in conjunction with DIN EN 1365-1:2013-08 and DIN EN 1363-2:1999-10, Section 7, a test is required for symmetrical components.

**6 Beams/transoms**

A beam/joist may be classified as F ... under DIN 4102-2:1977-09 if it

- complies with the conditions under DIN 4102-2:1977-09

or

- was tested in accordance with DIN EN 1363-1:2012-10 in conjunction with DIN EN 1365-3:2000-02 and, for the test duration of ... minutes, met the requirements of DIN EN 1363-1:2012-10, Section 11.1, Load-bearing capacity, clause I.

For testing according to DIN EN 1363-1:2012-10 in conjunction with DIN EN 1365-3:2000-02, a test is required.

**7 Ceilings/roofs**

A ceiling/roof may be classified as F... under DIN 4102-2:1977-09 if it

- complies with the conditions under DIN 4102-2:1977-09

or

- was tested in accordance with DIN EN 1363-1:2012-10 in conjunction with DIN EN 1365-2:2000-02, and, over a test duration of ... minutes, met the requirements of DIN EN 1363-1:2012-10, Section 11.1, Load-bearing capacity, clause I and Section 11.2, Space barrier, and Section 11.3, Thermal insulation.

For testing according to DIN EN 1363-1:2012-10 in conjunction with DIN EN 1365-2:2000-02, a test is required.

**8 Service shafts and ducts**

A service shaft/duct may be classified as I... under DIN 4102-11:1985-12 if it either

- complies with the conditions under DIN

or

- being a service shaft, consists of walls that have been tested pursuant to DIN

or

- being a service shaft, consists of walls that have been tested pursuant to DIN EN 1363-1:2012-10 in conjunction with DIN EN 1364-1:1999-10 and, for a duration of ... minutes, has met the requirements of DIN EN 1363-1:2012-10, Section 11.2, Space barrier, and Section 11.3, Thermal insulation.

For testing according to DIN EN 1363-1:2012-10 in conjunction with DIN EN 1364-1:1999-10, a fire test is required for symmetrical components.

**9. False floors/hollow floors**

A false floor/hollow floor may be classified as F... under DIN 4102-2:1977-09 if it either

- meets the conditions for a horizontal space-enclosing component according to DIN 4102-2:1977-09 (under a minimum load of 1.5 kN/m² in the event of a fire)

or

- has been tested according to DIN EN 1363-1:2012-10 in conjunction with DIN EN 1366-6:2005-02 for fire loads according to the standard temperature-time curve and, over a test period of ... minutes, met the requirements under DIN EN 1363-1:2012-10, Section 11.1, Load-bearing capacity, and Section 11.2, space barrier, and Section 11.3, thermal insulation.

For testing according to DIN EN 1363-1:2012-10 in conjunction with DIN EN 1366-6:2005-02, at least one test is required. The fire test must be carried out with a minimum load of 1.5 kN/m².

For a doubledeck floor application according to Section 4.1 of the model System Floor Guideline, the assessment is based only on the supporting structure (supporting plates and stand) for the component test under DIN 4102-2:1977-09 or DIN EN 1363-1:2012-10 in conjunction with DIN EN 1366-6:2005-02, in each case with a minimum load of 1.5 kN/m² in the event of a fire. If the load-bearing capacity holds for at least 30 minutes, the evaluation ‘False floor with fire-retardant supporting structure in case of fire from below’ can be given; this must be stated on both the cover sheet and the field of application in the test certificate from the general inspection building test. No classification is carried out.

# Construction products that do not require a usability certification

D 1 General information

D 2 List according to § 85a para 4 MBO1

D 3 Technical documentation according to § 85a(2)(6) MBO1

1 According to national law

# Construction products that do not require usability certification

## D 1 General information

Under § 17(3) MBO[1], the administrative provision contains a non-exhaustive list of construction products that do not require usability certification (§ 85a(4) MBO[1]). This list provides clarification for those involved in the build.

On the one hand, the list includes construction products for which there are generally accepted technical standards and on which the building regulations also impose requirements pursuant to § 3 MBO[1], but for which usability certification is not required (formerly 'other construction products'). Usability of construction products as defined in §16b MBO[1] must therefore be materially available, but it is not necessary to prove this under building regulations. These include in particular construction products covered by other certification and approval systems (e.g. DVGW and VDE).

On the other hand, construction products for which there are neither Technical Construction Regulations nor generally accepted technology standards and which are not relevant for compliance with the requirements of § 3 MBO[1] are included. The waiver of building inspectorate usability certification identifies the minor significance of these construction products in terms of the building regulations.

## D 2 List according to § 85a para 4 MBO[1]

### D 2.1 Examples of products for which there are generally recognised rules of technology

- Barrier mountings in water supply and disposal plants
- Barrier installations in gas supply plants
- Flow monitors
- Gas installation safety equipment
- Gas hose safety lines for connection to domestic gas appliances
- Multi-layer composite pipes for internal gas installation
- Liquid gas pressure regulators
- Drinking water heaters and storage devices
- Hot water surface heating and radiator connections
- Plastic piping systems for hot water underfloor heating
- Heat transfer systems
- Sanitary equipment
  - Washbasins
  - Toilets
- Shafts for wells and percolation systems
- Percolation pipes for landfills
- Lightning protection installations
- Electrical installations such as cables, switches, sockets, etc. for general power supply under standard conditions in physical structures
- Telecommunications, TV and radio installations

1 According to national law

## D 2.2 Products for which there are no generally accepted technical rules

This list only applies to construction products and applications that are only subject to a normal flammability requirement under building inspection requirements, and not to any further fire protection requirements or requirements for sound or thermal insulation.

### D 2.2.1 Construction products relating to construction of the shell

| | |
|---|---|
| D 2.2.1.1 | Basement light wells with light well openings up to 1.50 m (clear width parallel to basement wall) x 1.0 m (clear width to basement wall) |
| D 2.2.1.2 | Drainage elements |
| D 2.2.1.3 | External wall infill including fastenings with support spacing of ≤ 1.0 m if not used to ensure the stability of a physical structure or parts thereof |
| D 2.2.1.4 | Masonry reinforcement not required to ensure masonry stability |
| D 2.2.1.5 | Auxiliary materials for structural and roof waterproofing such as primers, cover coatings, separation layers, protective layers, joint backfills and auxiliary materials for connections and barriers |
| D 2.2.1.6 | Façade sealing to protect against wind and driving rain |
| D 2.2.1.7 | Water-repellent agents against capillary absorption and transport of water with the exception of those required to maintain the stability of concrete components |
| D 2.2.1.8 | Building products for drying damp walls, excluding products that harden in direct contact with groundwater or soil |
| D 2.2.1.9 | Plywood and formwork panels as well as shuttering units as lost formwork |
| D 2.2.1.10 | Elastic bearing for stairs |
| D 2.2.1.11 | Wall and roof components, including fasteners, for single-storey structural installations with a converted space ≤ 30 $m^3$ |
| D 2.2.1.12 | Multi-layer separating layers (e.g. 'sliding film') to enable relative displacements between components for uses for which the failure or impairment of component function have no effects on the stability or sealing of the load-bearing structure in respect of the storage of water-polluting liquids. |
| D 2.2.1.13 | Construction products used for additional waterproofing measures in concrete components with high water penetration resistance, e.g. bentonite mats, fresh concrete composite sheets |
| D 2.2.1.14 | Plastic slatted floors with clearance to load-bearing floor slabs or load-bearing ceilings of ≤ 0.5 m |
| D 2.2.1.15 | Products for sealing joints, impacts and connections of vapour barrier membranes and other air tightness layers (e.g. sealing tapes, adhesive tapes) |
| D 2.2.1.16 | Separation layers between floating screeds and footfall sound insulating layers as well as separation layers between building components and building components for acoustic decoupling |
| D 2.2.1.17 | Intermediate layers to 10 mm-thick (nominal size) between two building parts which have no effect on the stability of the building and the adjacent components |
| D 2.2.1.18 | Adhesives and waterproofing compounds for fastening and protecting thermal insulation boards for external thermal insulation in the ground (perimeter insulation) and external insulation of roofs |

### D 2.2.2 Construction products relating to interior work

| | |
|---|---|
| D 2.2.2.1 | Façade elements (including their fasteners) for exterior wall cladding fixed in accordance with generally accepted technical rules<br>- with small format façade elements with an area of ≤ 0.4 $m^2$ and an intrinsic weight of ≤ 5 kg<br>- with board format façade elements with a width of ≤ 0.3 m and a substructure support spacing of ≤ 0.85 m |
| D 2.2.2.2 | Roofing elements (including fastenings) for roof cladding attached according to generally accepted technical standards<br>– with small-format elements with an area of ≤ 0.4 $m^2$ and a dead weight of ≤ 5 kg<br>- with other elements with a support spacing through the substructure of ≤ 1.0 m, except glass |
| D 2.2.2.3 | Internal doors including accessories |
| D 2.2.2.4 | Non-load-bearing and non-stiffening window and door openings, window sills, and their fastenings |
| D 2.2.2.5 | False floors and hollow floors with clearance to load-bearing ceilings of ≤ 0.5 m |
| D 2.2.2.6 | External wall cladding up to 2 cm thick |

1 According to national law

D 2.2.2.7 ‘Floorings not intended for use in human occupancy areas’ deleted from MVV TB 2019/1

D 2.2.2.8 Infill for protectors including fastenings:
- plate-shaped infills with spacing between supports of ≤ 1.0 m, excluding those made of glass
- infill span wire system attached under a load-bearing handrail or balustrade with span width of ≤ 2.0 m

D 2.2.2.9 Edge insulating strips for screed

D 2.2.2.10 Supports and aprons for bathtubs and shower trays

D 2.2.2.11 Sealants
- on floor plates with water effects of class W1-E according to DIN 18533-1
- on splashed wall sockets
- on wall and floor surfaces with water effects of class W0-I and W1-I according to DIN 18534-1
- for balconies, loggias and arcades.

D 2.2.2.12 O-ring seals for pipe openings and seals of formwork tie points for external components in contact with the ground on which no requirements are imposed in respect of fire prevention

D 2.2.2.13 Snow-catching devices that do not support loads according to DIN EN 1991-1-3:2010, Section 6.4; and
DIN EN 1991-1-3/NA:2010, NCI to 6.4 (1)

D 2.2.2.14 Construction products of mineral building materials and polymer concrete for cladding internal walls

D 2.2.2.15 Wedges and blocks for adjusting components not used for storage as defined in DIN EN 1337-1

D 2.2.2.16 Elastic expansion elements for metallic components in the roof and wall area

D 2.2.2.17 Bonding courses for gypsum plaster systems

D 2.2.2.18 Reinforcements of façade elements for external wall cladding where these are not required to ensure stability

D 2.2.2.19 Mobile partitions

D 2.2.2.20 Air-permeable fabric (dead load ≤ 1.0 kg/m$^2$), including the fastening, positioned on a substructure that is stable on its own for positioning as wind breaks on halls, as roofing on single-storey buildings and structural works or for affixing to the exterior. The substructure must be able to safely transfer the loads exerted under the assumption of an air-permeable fabric.

D 2.2.2.21 Fastenings of insulating materials on internal walls, excluding synthetic-resin adhesives

D 2.2.2.22 Adhesives and/or anchorages of indoor insulating materials attached to ceilings if the total weight of thermal insulation and coating does not exceed 15 kg/m$^2$; the use of synthetic resin-based adhesives for indoor use is excluded

D 2.2.2.23 ‘Sliding ladder with opening barrier’ deleted from MVV TB 2019/1

D 2.2.2.24 Sound absorption products fastened according to best technical practice

D 2.2.2.25 Accessories for plastering or tile work, such as mounting and finishing rails, beams and reinforcements

**D 2.2.3 Construction products for home automation**

D 2.2.3.1 Flame catalysts

D 2.2.3.2 ‘Oil wet burner’ deleted from MVV TB 2020/1

D 2.2.3.3 Ventilation ducts including accessories

D 2.2.3.4 Prefabricated installation shafts and ducts including inspection openings

D 2.2.3.5 Casings and claddings of flues to the outdoors including related substructures and cover plates and joint seals for openings from flues of non-combustible building materials as per DIN 4102-4:2016-05, Section 4

D 2.2.3.6 Subordinate accessory parts of flue systems that are not in contact with the flue gas (components for condensate drainage or rear ventilation, spacers, wall mountings, etc.)

D 2.2.3.7 Fastenings for pipe encasements

D 2.2.3.8 Latent heat accumulator elements of encapsulated calcium chloride ($CaCl_2$ x 6 $H_2O$) for underfloor heating, provided the encapsulation is suitable for purpose

D 2.2.3.9 Closures of openings for the dissipation of smoke in necessary stairwells for smoke extraction after evacuation and not for keeping escape routes free of smoke, as well as devices for opening them

| | |
|---|---|
| D 2.2.3.10 | Heating and cooling surfaces on ceilings and walls |
| D 2.2.3.11 | Radiator covers |
| D 2.2.3.12 | Components, outside buildings, for the ventilation of building and site drainage (except ventilation valves in accordance with DIN EN 12380) |
| D 2.2.3.13 | Daylight systems with cross-section areas of ≤ 0.4 $m^2$ |
| D 2.2.3.14 | Waterless urinals |
| **D 2.2.4** | **Construction products for landfills** |
| D 2.2.4.1 | Draining pipes for landfill sealing |
| D 2.2.4.2 | Drainage elements for landfill sealing |
| D 2.2.4.3 | Landfill sealing elements |
| D 2.2.4.4 | Protective layers for landfill sealing elements |
| **D 2.2.5** | **Construction products for repair** |
| D 2.2.5.1 | Construction products for repairs to construction seals and related installation components, excluding products that harden in direct contact with groundwater or the soil |
| D 2.2.5.2 | Construction products for repairs to roof waterproofing and related installation components |
| **D 2.2.6** | **Other construction products** |
| D 2.2.6.1 | Components for water basins with contents ≤ 100 $m^3$ |
| D 2.2.6.2 | Pressureless containers up to 50 $m^3$ volume and up to 3 m height for storage of rain and drinking water |
| D 2.2.6.3 | Sample and pattern encoders and spacers for paving |
| D 2.2.6.4 | Support elements for use in terrain jumps up to 1.0 m in height |
| D 2.2.6.5 | Plastic components for water slides up to 2.0 m high |
| D 2.2.6.6 | Rigid and flexible bulk solids silos up to 3 $m^3$ volume and up to 3 m height (upper edge of the silo over terrain) |
| D 2.2.6.7 | Non-accessible covers for containers under which there are no trafficked areas and which do not serve to stabilise structural facilities or their parts. The covers may be subjected to a maximum internal pressure of 50 mbar. |
| D 2.2.6.8 | Construction products for building-independent solar systems in areas not open to the public up to 3 m high |
| D 2.2.6.9 | Floating roofs and ring gap sealing systems of floating roofs in flat floor tank structures |

## D 3 Technical documentation according to § 85a(2)(6) MBO[1]

In relation to the material characteristics of a construction product covered by the harmonised technical specifications underlying CE marking, the CE mark is the only marking (Article 8(3) 1 BauPVO Otherwise, other product information may be provided voluntarily. In this case, the accuracy thereof must be shown in the technical documentation. Depending on the product, installation situation and intended use, it may be necessary to state in the technical documentation which technical rule the test was based on and any bodies that were involved. For example, it may be advisable to appoint a body qualified under Article 30 CPD unless there are applicable, accepted technical standards or a body qualified under Article 43 CPD, provided only independent third-party testing is carried out using an applicable technical rule.

1 According to national law

## Annexes

walls, excluding exterior wall structures with inter-storey cavities or airspaces and façades;

Last updated: July 2022

## Annex 1

# Requirements for planning, designing and executing retrofitted rebar connections with bonded-in rebars

Last updated: May 2020

**CONTENTS**

## 1 Scope

This Technical Rule applies to steel rebars constructed in accordance with DIN 488 or which have general building inspection approval and which are mortared in using injection systems with European Technical Assessment (ETA) based on EAD 330087 ‘Systems for post-installed rebar connections with mortar’.

The possible fields of application are shown in Annex 1, Figures 1 to 5.

## 2 Planning

Rebar connections must be designed in line with engineering practice. In compliance with the following points, verifiable design drawings must be drawn up.

- Rebar connections may only be used to transfer tension forces in the direction of the bar axis.
- The position of reinforcement set in concrete must be determined based on the planning documents and, where applicable, determined by a reinforcement detector and marked on the concrete surface.
- The concrete strength class of the anchor base must be determined based on the planning documents and, where applicable, core sampling.
- The transmission of transverse forces between existing and new concrete must be proven in accordance with DIN EN 1992-1-1:2011-01, DIN EN 1992-1-1/A1:2015-03, DIN EN 1992-1-1/NA:2013-04 and DIN EN 1992-1-1/NA/A1:2015-12. The joints for concreting must be roughened at least to the point that aggregates protrude. ‘NOTE: The design drawings shall include information such as how roughening must be carried out (e.g. in accordance with DIN EN 1992-1-1:2011-01, DIN EN 1992-1-1/A1:2015-03, DIN EN 1992-1-1/NA:2013-04 and DIN EN 1992-1-1/NA/A1:2015-12).
- Where the surface of the existing concrete is carbonated, the carbonated layer must be removed before connecting the new bar near the rebar connection with a diameter of $\phi$ + 6 cm. The depth of the concrete to be removed must at least meet the minimum concrete covering for the corresponding environmental conditions under DIN EN 1992-1-1:2011-01, DIN EN 1992-1-1/A1:2015-03, DIN EN 1992-1-1/NA: 2013-04 and DIN EN 1992-1-1/NA/A1:2015-12. This does not apply in the case of new, non-carbonated components in dry surroundings.
- General construction rules as per Annex 2
- Minimum concrete covering $c_{min}$ as per Table 1 and minimum clearance a as per Table 2
- Drilling procedure

**Table 1: Minimum concrete covering $c_{min}$ [mm] depending on drilling procedure, bar diameter and the use of a drilling aid**

| Drilling procedure | Bar diameter | Without drilling aid | With a drilling aid |
|---|---|---|---|
| Hammer drilling<br>Hollow drilling<br>Diamond drilling | $\phi$ < 25 mm | $c_{min}$ = 30 mm + 0.06 $\square_v \geq 2\ \phi$ | $c_{min}$ = 30 mm + 0.02 $\square_v \geq 2\ \phi$ |
| | $\phi \geq$ 25 mm | $c_{min}$ = 40 mm + 0.06 $\square_v \geq 2\ \phi$ | $c_{min}$ = 40 mm + 0.02 $\square_v \geq 2\ \phi$ |
| Compressed air drilling | $\phi$ < 25 mm | $c_{min}$ = 50 mm + 0.08 $\square_v$ | $c_{min}$ = 50 mm + 0.02 $\square_v$ |
| | $\phi \geq$ 25 mm | $c_{min}$ = 60 mm + 0.08 $\square_v \geq 2\ \phi$ | $c_{min}$ = 60 mm + 0.02 $\square_v \geq 2\ \phi$ |

**Table 2: minimum clearance a [mm] depending on the use of a drilling aid and bar diameter**

| Without drilling aid | With a drilling aid |
|---|---|
| a = 40 mm $\geq 4\ \phi$ | a $\geq 2\phi$ |

## 3 Design

Rebar connections must be designed in line with engineering practice. Verifiable calculations must be made taking into account the loads to be anchored.

Rebar connections must be dimensioned as per DIN EN 1992-1-1:2011-01, DIN EN 1992-1-1/A1:2015-03, DIN EN 1992-1-1/NA:2013-04 and DIN EN 1992-1-1/NA/A1:2015-12.
The bond stress calculation values $f_{bd}$ or the reduction factor for the bond stress calculation values $k_b$ are specified in the European Technical Assessment/Approval (ETA), and must be multiplied by the bond stress calculation value in accordance with DIN EN 1992-1-1:2011-01, DIN EN 1992-1-1/A1:2015-03, DIN EN 1992-1-1/NA:2013-04 and DIN EN 1992-1-1/NA/A1:2015-12.

For rebar connections with fire resistance requirements, the bond stress rated value under fire stress $f_{bd,fi}$ must be determined in accordance with the relevant ETA specifications.
The minimum anchorage length $l_{b,min}$ and the minimum overlap length $l_{0,min}$ in accordance with DIN EN 1992-1-1:2011-01, DIN EN 1992-1-1/A1:2015-03, DIN EN 1992-1-1/NA:2013-04 and DIN EN 1992-1-1/NA/A1:2015-12 must be multiplied by the factor $\alpha_{lb}$ specified in the ETA.
If the specifications of the relevant ETA are observed, proof of direct local force application in the concrete is deemed provided.

Transfer within the component of the loads to be anchored must be demonstrated.

## 4 Execution

### 4.1 General information

The rebar connections may only be executed by firms that meet the requirements of Section 5.

The rebar connections must be executed in line with the construction drawings and the installation instructions (drilling, cleaning, preparing the rebar, injecting adhesive mortar and setting rebar) of the relevant injection system manufacturer. Only the appliances provided for this purpose may be used for drilling, cleaning and injecting the mortar.

### 4.2 Execution documentation

An installation log must be drawn up for each rebar connection. The execution documentation is determined by Table 3. Installation logs must be readily available on the building site during the construction period. As for the delivery notes, they must be kept for at least 5 years by the companies after work is completed.

### 4.3 Execution monitoring

The proper preparation and execution of work must be monitored. To this end, the installation log must be checked and counter-signed. In case of deviations from the planning guidelines, the responsible planning engineer must be contacted.

**Table 3: Installation log – Tests, Requirements and Frequency**

| Line | Subject to review | Type of test: | Requirements | Frequency, time |
|---|---|---|---|---|
| | Preparation | | | |
| 1 | mortar container | Packaging instructions | Expiry date not yet passed | each delivery |
| | | Visual inspection | no conspicuous changes | ongoing |
| | | storage conditions | Manufacturer's instructions | for storage/outsourcing |
| 2 | Processing equipment | Functional check | proper working order | on commissioning and daily |
| 3 | work plan (created from the planning documents) | Manufacturing and processing instructions | Compliance with provisions | prior to work starting |
| | Processing | | | |
| 4 | weathering | Temperature (in anchor base) | Compliance with work plan and installation instructions | before filling the drill hole |
| | | Drill hole protected from water ingress | no water in drill hole | before filling the drill hole |
| 5 | Drilling | Overlap, edge distances centre distances | Compliance with work plan and installation instructions<br>No reinforcement strikes during drilling<br>Involve planners if strikes occur | each drill hole |
| 6 | Drill hole cleaning | Visual inspection and blowout check | dust-free; clean drill hole surface | each drill hole before filling |
| 7 | Rebar | condition, marking, mobility in drill hole | only rust film, embedment depth marked, mobile | each bar before filling the drill hole |
| 8 | Occupational safety | Personal safety equipment | wear suitable protective clothing, protective gloves and goggles/face protection | during operations involving injection mortar |
| 9 | Backfilling | Mortar fill mark on mixer extension tube | in line with work plan and installation instructions | each bar during setting |
| | | without cavities | no bar resilience, no mortar spraying | |
| 10 | Bonded-in rebar connections | Embedment depth | Embedment mark at drill hole mouth | each bar after setting |
| | | Backfilling | Visibly leaking mortar at drill hole mouth | |

## 5 Operating requirements

### 5.1 General information

Those persons manufacturing the rebar connection must

1 have valid proof of suitability as per Section 6,
2 have a qualified manager stated in the proof of suitability,
3 have a responsible site manager,
4 have site staff specifically trained for executing rebar connections who have certification of successful training attendance and
5 have the necessary instrumentation.

The firm must ensure that the site personnel have been trained in the manufacture of retrofitting rebar connections with bonded-in rebar.

### 5.2 Qualified manager

The qualified managers must have sufficient knowledge in reinforced concrete construction and experience in the manufacture of subsequent rebar connections with bonded-in rebar. They must have at least the qualifications necessary for reinforced concrete work independently and to manage operations in this field.
The qualified managers are competent and responsible for manufacturing rebar connections on the building site.

The tasks of qualified management include:

- Assessing construction drawings in respect of the completeness of the information for subsequently bonded-in rebar,
- Drawing up and, where applicable, testing service descriptions and assessing the operability of the rebar connections,
- Drawing up work plans (work instructions),
- Assessing the expert qualifications of site personnel,
- Evaluating the results of the installation log.

### 5.3 Responsible site manager

When manufacturing rebar connections with post-installed rebars, a responsible site manager named in the proof of suitability must check on-site that the rebar connections with post-installed rebars are manufactured in line with the provisions of this guideline.

They must ensure that the work is properly prepared and executed and must monitor the execution of the work. To this end, the installation log drawn up by the site personnel must be checked and counter-signed.

The site manager must have technical knowledge of and skills and practical experience with concrete and other materials. The site manager must either have equivalent qualifications to the qualified managers or be trained to the same degree as the site personnel.

### 5.4 Skilled site personnel

The work shall be carried out by a member of construction site personnel designated in the certificate of suitability and trained in accordance with Section 7, in particular with skilled craftsmanship and with appropriate skills and practical experience.

The tasks of skilled personnel include:

- The practical execution of drilling, cleaning, filling and fixing work according to the work plan. Any deviations must be documented in the installation log and the responsible site manager immediately informed.
- Keeping the installation log.

### 5.5 Instrumentation

For the manufacture of rebar connections with subsequent bonded-in rebars, the equipment and devices mentioned in the installation instructions of the injection system to be used must be present on the building site to enable expert execution of these works. All devices and equipment must be kept in good working order.

Devices and equipment include:

- Devices for accurate drilling (drilling aids) drillings stands for diamond core drilling devices,
- Devices for cleaning the drill holes,
- Equipment for storing the injection mortar cleanly and at the right temperature,
- Functional discharge units and mixer extension tubes,
- Compressor for oil-free compressed air of at least 6 bars.

## 6 Proof of suitability

Proof of suitability shall be issued by a recognised inspection body (see PÜZ-Verzeichnis Part IV).

If the inspection body has determined that the operating requirements under Section 5.1(2) to (4) are met, and if the company can demonstrate possession of a complete system case provided with functional equipment, it shall issue proof of suitability.

Proof of suitability is issued for a period of 3 years and is revocable. Upon request, the validity period of the proof of suitability may be extended by the inspection body for 3 years.

Before any extension, the inspection body must be provided with proof that the above-mentioned operating requirements have been met. Any change to the personnel named in the proof of suitability must be notified to the inspection body.

## 7 Training and testing of site personnel

### 7.1 General information

Site personnel must be trained as set out below. After training, a recognised inspection body must check that the personnel has sufficient knowledge (see PÜZ-Verzeichnis Part IV, Paragraph 7).

If this inspection body has determined that the training has been carried out successfully, it shall issue a certificate of successful training participation to the construction site personnel.

### 7.2 Contents of training

- Safety measures (goggles, gloves, etc.)
- Ensuring that devices function (when is a device no longer working properly)
- Drilling methods (what methods are valid for the system and how they work, what characteristics, etc.)
- Using drilling aids (when and why they may be necessary, how to use)
- Cleaning methods (what methods are valid for the system and how they work, what characteristics, etc.)
- Special installation conditions (e.g. overhead, extreme temperatures)
- Work process (hierarchy and tasks of persons involved in planning and manufacturing; Minimum work plan requirements; inspections to be carried out during and after the setting process; what to do in case of reinforcement strikes, abortive drilling or missing information or incomplete work plan; requirements and inspections of additional equipment required; storage and protection of equipment and injection mortar; Keeping the installation log. what to do if work is interrupted)

### 7.3 Contents of theoretical testing

Theoretical testing involves site personnel demonstrating in writing that there is sufficient knowledge of the training content for the system.

### 7.4 Contents of practical testing

Practical testing involves site personnel carrying out the following tasks:

- Executing complete overlapping joints near the edge $\phi$ = 12 mm, $\square_v$ = 1.0 m in reinforced concrete according to the design drawings with installation log according to the manufacturer's installation instructions (MPII)
  - with subsequent final check and self-assessment

- Bonding in a rebar $\phi$ = 12 mm in covered, transparent sight tube where $\square_v$ = 60 cm.
  - The time required to inject the mortar and insert the bar must be measured.

Practical testing involves site personnel demonstrating that there is inter alia sufficient knowledge regarding the following issues:

- Was the work plan checked for completeness in terms of all necessary information?
- Before work begins, is there sufficient understanding of the work to be carried out?
- Do the devices used meet the approval requirements and are these devices safely controlled?
- Is the drill hole in the right place?
- For drilling near edges is the guidance device safely handled?
- Does the angular deviation during drilling meet the permitted tolerances?
- Is the drill hole cleaned in line with installation instructions?
- Are the rebar anchor lengths correctly marked and mobility in the drill hole controlled?
- Are mortar containers checked for temperature and expiry date?
- Are mortar containers correctly opened and prepared for changing the container?
- Are injection devices handled according to installation instructions?
  Is the fill mark correctly attached to the mixer extension tube?
- Is the marked bar to hand before injection begins?
- Is the necessary volume of mortar discarded when a new container is opened?
- Does the mortar injection procedure meet the installation instructions for complete and cavity-free filling?
- Is the bar properly placed up to the the anchor depth marking?
- Is the mortar leaking at the drill hole mouth?
- Is the permitted processing time complied with from the start of injection until the rebar is set?
- Were defects during or after rebar connection manufacture detected and properly corrected?
- Was the installation log completely and accurately kept?

**Annex 1 – Scope of application**

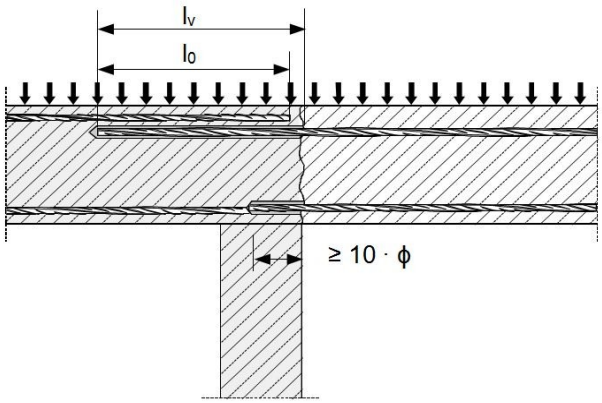



**Figure 1:** Overlapping joint with existing reinforcement of rebar connections of slabs and beams

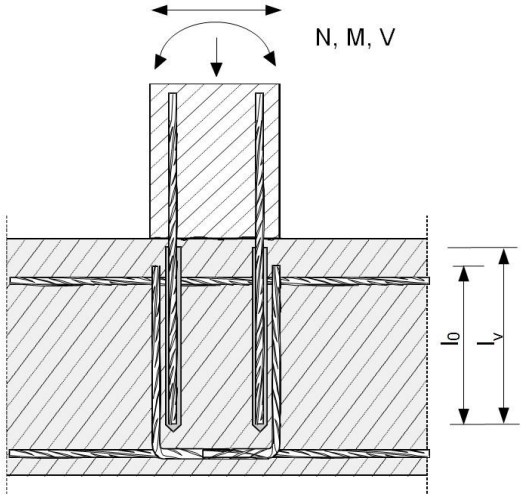



**Figure 2:** Overlapping joint with existing reinforcement of supports or walls subject to bending stress to a base. The reinforcement rods are tensile stressed.

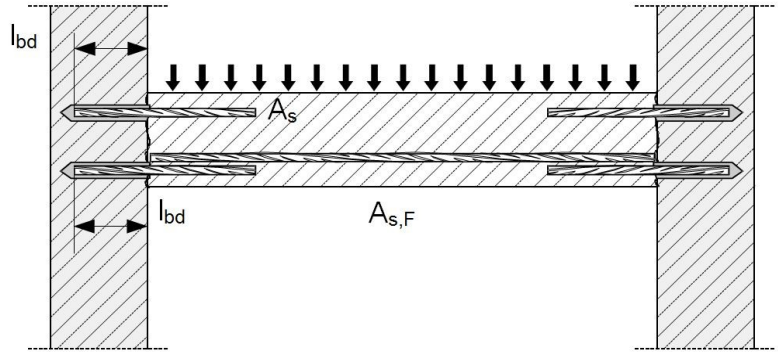



**Figure 3:** End anchorage of slabs or beams

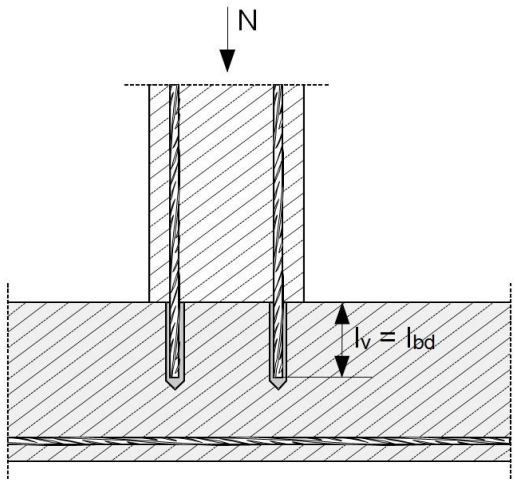



**Figure 4:** Rebar connections for structural elements predominantly subject to compressive loading

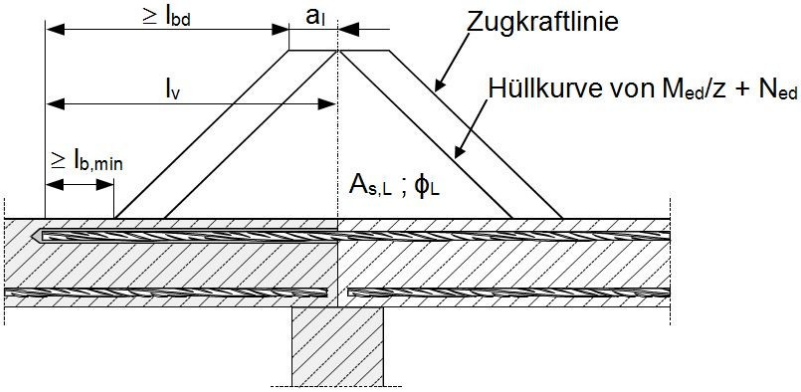



**Figure 5:** Anchoring of reinforcement to cover resistance to tension curve in construction parts subject to bending stress

Comments:

- No transverse reinforcement is shown in Figure 1 to Figure 5. The transverse reinforcement required according to DIN EN 1992-1-1:2011-01, DIN EN 1992-1-1/A1:2015-03, DIN EN 1992-1-1/NA:2013-04 and DIN EN 1992-1-1/NA/A1:2015-12 must be fitted.
- Transverse force transmission between existing and new concrete must be determined in accordance with DIN EN 1992-1-1:2011-01, DIN EN 1992-1-1/A1:2015-03, DIN EN 1992-1-1/NA:2013-04 and DIN EN 1992-1-1/NA/A1:2015-12.

**Annex 2 – General construction rules**

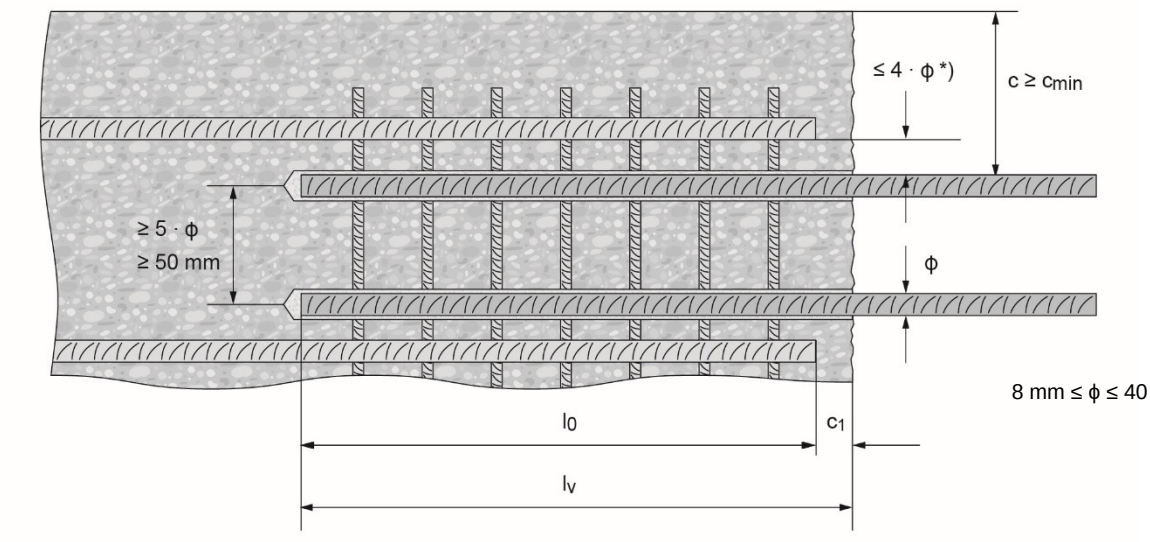



**Figure 6:** Distances between existing and subsequently installed rebars and distance to the (parallel) edge.

*) If the clear width of overlapping bars is more than 4 · ϕ, the overlap length must be increased by the difference between the existing clear bar spacing and 4 ϕ.

c Concrete surfacing for the bonded-in rebar
$c_1$ Concrete surfacing on the front of the bonded-in rebar
$c_{min}$ Minimum concrete cover according to Table 1 and DIN EN 1992-1-1:2011-01, DIN EN 1992-1-1/A1:2015-03, DIN EN 1992-1-1/NA:2013-04 und DIN EN 1992-1-1/NA/A1:2015-12
ϕ Diameter of the reinforcing steel
$L_0$ Length of the overlap joint according to DIN EN 1992-1-1:2011-01, DIN EN 1992-1-1/A1:2015-03, DIN EN 1992-1-1/NA:2013-04 and DIN EN 1992-1-1/NA/A1:2015-12
$l_v$ Depth ≥ $l_0$ + $c_1$

# Annex 2

## Planning, designing and execution requirements of anchors in concrete with cemented or subsequently fitted fasteners

Last updated: October 2021

**CONTENTS**

## 1 Scope

These technical rules apply to anchors set in concrete with fasteners that have a European Technical Assessment/Approval (ETA) according to the following technical specifications:

- EAD 330008 ‘Anchor channels’
- EAD 330012 ‘Cast-in anchor with internal threaded socket’
- EAD 330084 ‘Steel plate with head bolts’
- EAD 330232 ‘Mechanical fasteners for use in concrete’
- EAD 330284 ‘Plastic anchors for redundant non-supporting systems in concrete and masonry’
- EAD 330499 ‘Bonded fasteners for use in concrete’
- EAD 330747 ‘Fasteners for use in concrete for redundant non-structural systems’
- EAD 330924 ‘Cast-in anchor bolt of ribbed reinforcing steel’
- ETAG 020 ‘Plastic anchors’.

This Technical Rule does not apply to anchors in nuclear installations.

## 2 Planning

### 2.1 General information

The anchorages (except for with plastic dowels) must be planned in line with engineering practice under DIN EN 1992-4 and DIN EN 1992-4/NA. Anchorages with plastic anchors must be planned in accordance with the design method for plastic anchors for anchoring in concrete and masonry, August 2019 (German application document for EOTA TR 064 dated May 2018 (www.dibt.de).

Verifiable design drawings must be prepared taking into account the loads to be anchored.

The provisions of the relevant ETA must be observed. In particular these are:

- difference in cracked or uncracked concrete
- concrete strength class of anchor base
- minimum component thickness
- minimum centre and edge distances
- limit values for ambient and component temperatures.

Plastic dowel anchors with ETA: the characteristic load-bearing capacities in the ETA apply to the strength class, the drilling procedure and the anchoring depth as specified in the ETA. For greater anchoring depths, different drilling methods or if no information on the concrete strength class is available, the characteristic load-bearing capacity may be determined by construction site tests under the Technical Rule ‘Execution and evaluation of on-site tests for plastic anchors in concrete and masonry with ETA according to ETAG 020 or EAD 330284-00-0604, Last updated: September 2019’.

### 2.2 Anchors for redundant, non-structural systems

Application limits for redundant, non-structural systems:

Mechanical dowels and composite dowels: $N_1 \geq 4$; $n_2 \geq 1$ and $n_3 \leq 3.0$ kN or
$n_1 \geq 3$; $n_2 \geq 1$ and $n_3 \leq 2.0$ kN.

Plastic dowels: $N_1 \geq 4$; $n_2 \geq 1$ and $n_3 \leq 4.5$ kN or
$n_1 \geq 3$; $n_2 \geq 1$ and $n_3 \leq 3.0$ kN.

$n_1$ = Number of fastening points
$n_2$ = Number of anchors per fastening point
$n_3$ = Rated value of the effects $N_{Ed}$ (kN) of a fastening point

## 3 Design

The anchorages (except for with plastic dowel anchors) must be designed in line with engineering practice under DIN EN 1992-4 and DIN EN 1992-4/NA. For anchor channels, the design method for anchor channels, August 2020 (German application document for EOTA TR 047 dated March 2018) (www.dibt.de) and the design method for anchor channels under fatigue-relevant loading, August 2020 (German application document for EOTA TR 050 dated October 2018) (www.dibt.de) may also be used.

Anchorages with plastic dowels are to be designed in line with engineering practice in accordance with ETAG 020, Annex C or EOTA TR 064. Anchorages with plastic dowels are to be designed in accordance with the design procedure for plastic dowels in anchorages for use in concrete and masonry, August 2019 (German application document for EOTA TR 064 from May 2018) (www.dibt.de).
Verifiable calculations must be made taking into account the loads to be anchored.
The product performance required for the design (characteristic load-bearing capacity values, centre and edge distances, installation parameters) must be taken from the relevant ETA.

If applied transverse loads change their sign several times, they may have to be regarded as fatigue-related stress. Varying transverse loads with changing signs resulting from wind loads or temperature changes are usually regarded as quasi-static loads, not fatigue stresses. Further information can be found in DAfStb vol. 615, Commentary on DIN EN 1992-4, Section 8.1(2).

If the specifications of the relevant ETA are observed, proof of direct local force application in the concrete is deemed provided.

Transfer within the component of the loads to be anchored must be demonstrated.

## 4 Execution

Notes on the execution are contained in the DIBt paper ‘Notes on the installation of anchors, October 2010’ (www.dibt.de).

# Annex 3

## Requirements for planning, designing and executing anchors in masonry with subsequently fitted fasteners

Last updated: May 2020

**CONTENTS**

## 1 Scope

These technical rules apply to anchors set in concrete with fastenings that have a European Technical Assessment/Approval (ETA) according to the following technical specifications:

- EAD 330076 ‘Metal injection anchors for use in masonry’
- EAD 330284 ‘Plastic anchors for redundant non-structural systems in concrete and masonry’
- ETAG 020 ‘Plastic anchors’.

## 2 Planning

### 2.1 General information

Anchors must be designed in line with engineering practice. Verifiable design drawings must be prepared taking into account the loads to be anchored.

The provisions of the relevant ETA must be observed. In particular these are:

- Differentiation between anchoring methods
- Strength class of anchor base
- Type of butt joints and horizontal joints
- minimum component thickness
- minimum centre and edge distances
- Limit values for ambient and component temperatures.
- Drill procedure.

The characteristic load-bearing capacities in the ETA apply only to the bricks as specified in the ETA. For masonry made of other, similar stones, the characteristic load-bearing capacity may be determined by on-site testing according to the following rules:

- Injection anchor systems: ‘Execution and evaluation of on-site tests for injection anchor systems in masonry with ETA according to ETAG 029 or EAD 330076-00-0604, Last updated: September 2019’
- Plastic anchors: ‘Execution and evaluation of on-site tests for plastic anchors in concrete and masonry with ETA according to ETAG 020 or EAD 330284-00-0604, Last updated: September 2019’

### 2.2 Anchors for redundant, non-structural systems

The following application limits apply to redundant, non-structural systems:

Plastic anchors: $n_1 \geq 4$; $n_2 \geq 1$ and $n_3 \leq 4.5$ kN or
$n_1 \geq 3$; $n_2 \geq 1$ and $n_3 \leq 3.0$ kN.

$n_1$ = Number of fastening points
$N_2$ = Number of anchors per fastening point
$N_3$ = Rated value of the effects $N_{Ed}$ (kN) of a fastening point

## 3 Design

Anchors must be designed in line with engineering practice. Verifiable calculations must be made taking into account the loads to be anchored.

Depending on the type of fastening, the following design methods should be used for designing anchors:

- Design procedure for metal injection anchors for use in masonry, August 2019 (German application document for EOTA TR 054 from April 2016) (www.dibt.de) or
- Design procedure for plastic anchors for use in concrete and masonry, August 2019 (German application document for EOTA TR 064 from May 2018) (www.dibt.de).

The product performance required for the design (characteristic load-bearing capacity values, centre and edge distances, installation parameters) must be taken from the relevant ETA.

If the specifications of the relevant ETA are observed, proof of direct local force application in the masonry is deemed provided.

Transfer within the component of the loads to be anchored must be demonstrated.

## 4 Execution

Notes on the execution are contained in the DIBt paper ‘Notes on the installation of anchors, October 2010’ (www.dibt.de).

## Annex 4

# Building approval requirements, classification, use of construction products, use of designs

Last updated: 2022-11

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

To fulfill the building requirements in A 2.1.2 when using parts of structural systems in accordance with technical building regulations or in accordance with certificates of usability in accordance with § 17 MBO0, the minimum required building material classes can be found 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:<br>Limited smoke development Passed (I ≤ 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<br>limited smoke development (I[a] ≤ 400 % x min. when tested according to DIN 4102-15:1990-05) passed |
| **4** | flame-resistant[2] and low smoke development | B1 | low smoke development (I[a] ≤ 100 % x min. when tested according to DIN 4102-15:1990-05) passed |
| **5** | flame-resistant[2] and no burning droplets or particles and low smoke development | B1 | No burning droplets or particles falling<br>low smoke development (I[a] ≤ 100 % x min. when tested according to DIN 4102-15:1990-05) passed |
| **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> 1000 °C | -- | Specification: Melting point at least 1,000°C pursuant to DIN 4102-17:2017-12 |
| | [2] if required, additional 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.<br>[b] If a component is to be used for the construction installation that does not meet at least the requirement | | |

0 According to national law

| | |
|---|---|
| | "normal flammability" (lightly flammable), § 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 approval requirements and at least required fire behaviour and other features**

| | | **Minimum required performances** | | | |
|---|---|---|---|---|---|
| | **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: Glowing 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 glow 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: Glowing 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 | $E_{fl}$ | |

* When tested according to EN 13823:2020 $TSP_{600\,s} \leq 35\ m^2$; 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 13823:2020 $TSP_{600\,s} \leq 35\ m^2$; 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<br>- s1; low smoke development<br>- s2: limited smoke development |
| d (droplets) | burning droplets/particles | Requirements for burning droplets/particles<br>- d0: no burning dripping/particles<br>- 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[0], EN 13162:2012+A1:2015[0], EN 13168:2012+A1:2015[0], EN 13170:2012+A1:2015[0], EN 13171:2012+A1:2015[0], EN 13950:2014[0], EN 13964:2014[0], EN 13986:2004+A1:2015[0], EN 14064-1:2010[0], EN 14190:2014[0], EN 14303:2009+A1:2013[0], EN 15037-4:2010+A1:2013[0], EN 15498:2008[0]), specifications on smouldering performance 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 for horizontal installation

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 'seriously flammable' for the intended use.

Excluded from this is the use of these construction products under screeds on floors made of concrete.

## 2 Electrical wiring and electrical lines

### 2.1 Electrical wiring

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

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

0Implemented in Germany by DIN EN 438-7:2005-04.
0 Implemented in Germany by DIN EN 13162:2015-04.
0 Implemented in Germany by DIN EN 13168:2015-04.
0 Implemented in Germany by DIN EN 13170:2015-04.
0 Implemented in Germany by DIN EN 13171:2015-04.
0 Implemented in Germany by DIN EN 13950:2014-09.
0 Implemented in Germany by DIN EN 13964:2014-08.
0 Implemented in Germany by DIN EN 13986:2015-06.
0Implemented in Germany by DIN EN 14064-1:2010-06.
0 Implemented in Germany by DIN EN 14190:2014-09.
0 Implemented in Germany by DIN EN 14303:2013-04.
0Implemented in Germany by DIN EN 15037-4:2013-08.
0 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 ($I^a \leq 400$ % x min. when tested according to DIN 4102-15:1990-05)<br>Pass |
| 3 | flame-resistant and with low smoke development | B1 | low smoke development ($I^a \leq 100$ % x min. when tested according to DIN 4102-15:1990-05)<br>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[0].

**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

To fulfil the building requirements in A 2.1.15 and A 2.2.1.8, the minimum required functional integrity classes according to DIN 4102-12:1998-11 must be taken from Table 2.2.1 to verify the functional integrity of electrical cable systems under the influence of fire for construction types according to § 16a MBO[1].

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

| | Requirements for function retention 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 |

[0] Implemented in Germany by DIN EN 50575:2017-02.

## 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 |

### 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[0], EN 494:2012+A1:2015[0], EN 534:2006+A1:2010[0] EN 1873:2005[0], EN 13707:2004+A2:2009[0] EN 13956:2012[0], EN 14351-1:2006+A2:2016[0], EN 14783:2013[0] and EN 14963:2006[0]) 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.

**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 structural works, 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.

0 Implemented in Germany by DIN EN 492:2018-07
0 Implemented in Germany by DIN EN 494:2015-12.
0 Implemented in Germany by DIN EN 534:2010-07.
0 Implemented in Germany by DIN EN 1873:2006-03.
0 Implemented in Germany by DIN EN 13707:2009-10.
0 Implemented in Germany by DIN EN 13956:2013-03.
0 Implemented in Germany by DIN EN 14351-1:2016-12.
0 Implemented in Germany by DIN EN 14783:2013-07.
0 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,**] | In addition to the Eurocode application rule for construction types 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 (load-bearing combustible parts, non-combustible* with insulation materials and fire-protective cladding 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.[4] | ≥ 60[3] | A 2.2.1.4 |
| 6 | Highly fire-retardant and essential parts made of non-combustible materials | ≥ 60[2] | DIN 4102-4:2016-05 |
| 7 | Highly fire-retardant and made of non-combustible materials | ≥ 60[2] | DIN 4102-4:2016-05 |
| 8 | Fire-resistant (non-combustible* load-bearing and reinforced parts) | ≥ 90[2] | DIN 4102-4:2016-05 |
| 9 | Fire-resistant and made of non-combustible* building materials | ≥ 90[2] | DIN 4102-4:2016-05 |
| 10 | Fire resistance of 120 minutes and made of non-combustible* building materials | ≥ 120[2] | - |
| 11 | Structural elements referred to in A 2.1.3.1 letter (d) with fire resistance of 60 minutes and made of combustible building materials in accordance with Section 5 of the Technical Rule under ser. No A 2.2.1.4[4] | ≥ 60[3,**] | A 2.2.1.4 |
| 12 | Structural elements referred to in A 2.1.3.1 letter (d) with fire resistance of 90 minutes and made of combustible building materials in accordance with Section 5 of the Technical Rule under ser. No A 2.2.1.4[4] | ≥ 90[3,5,**] | A 2.2.1.4 |

| | 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,**] | In addition to the Eurocode application rule for construction types using certain building materials*** |
|---|---|---|---|
| | 1 | 2 | 3 |
| | A. Table contains only building supervisory requirements for structural elements, which are also represented by the Eurocodes.<br>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<br>2 Not applicable to DIN EN 1995, as requirements for the fire characteristics of load-bearing parts are not fulfilled.<br>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<br>4 As far as the design according to DIN EN 1995-1-2:2010-12 and DIN EN 1995-1-2/NA:2010-12 should take into account the fire-protective cladding according to Sections 4.2 and 5.2 of the Technical Rule in accordance with ser. No A 2.2.1.4, a type-approval according to § 16a MBO [1] is required. Excluded from this are designs for beams and columns according to DIN EN 1995-1-2:2010-12 Section 3.4.3.<br>5 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').<br>* Regarding the requirements, Table 1.1. applies.<br>** Design according to Eurocode does not account for the fire characteristics of building materials.<br>*** 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* building 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.<br>* Regarding the requirements, Table 1.1. applies.<br>** The Eurocode class does not account for the fire characteristics of building materials. Table 1.1 or 1.2 applies.<br>*** 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 approval requirements for non-bearing space-closing walls and assignment of classes (table value) according to Eurocode DIN EN 1992-1-2:2010-12 and DIN EN 1996-1/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 | 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.<br>* Regarding the requirements, Table 1.1. applies.<br>** The Eurocode class does not account for the fire characteristics of building materials. Table 1.1 or 1.2 applies.<br>*** Regarding the requirements, Table 1.1 or Table 1.2 applies. | | |

The requirement of Table 4.2.1, 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.

### 4.2.2 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* | REI 90 | DIN 4102-4:2016-05 |

| | 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 |
| | load-bearing and reinforced parts) | | |
| 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* building 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 Table contains only building supervisory requirements for structural elements, which are also represented by the Eurocodes.<br>* Regarding the requirements, Table 1.1. applies.<br>** The Eurocode class does not account for the fire characteristics of building materials. Table 1.1 or 1.2 applies.<br>*** 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- | REI 90 | DIN 4102-4:2016-05 |

| | 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 |
| | combustible* building materials | | |
| 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.<br>* Regarding the requirements, Table 1.1. applies.<br>** The Eurocode class does not account for the fire characteristics of building materials. Table 1.1 or 1.2 applies.<br>*** 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 usability certification 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 | Of flame-retardant building materials | | |
| 3 | Of flame-retardant building materials, non-flaming falling or dripping | | |
| 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 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] |

| | Building approval requirement | Minimum required classes according to DIN 4102-2:1977-09 | Abbreviation pursuant to DIN 4102-2:1977-09 |
|---|---|---|---|
| | 1 | 2 | 3 |
| **8** | Highly fire-retardant (load-bearing combustible parts, non-combustible* with insulation materials and fire-protective cladding 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[4] | Highly fire-retardant (load-bearing combustible parts, non-combustible* with insulation materials and fire-protective cladding 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 | - |
| **9** | 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] |
| **10** | Fire-resistant (non-combustible load-bearing and reinforced parts) | Fire resistance class F 90 and essential parts made of non-combustible building materials | F 90-AB[5,6] |
| **11** | Fire-resistant and made of non-combustible* building materials | Fire resistance class F 90 and made of non-combustible building materials | F 90-A[, 5,6] |
| **12** | Firewall (including fire-resistant and non-combustible building materials under additional mechanical stress) | Firewall | - |
| **13** | Wall in the type of firewalls (fire resistant and non-combustible* building materials) | Wall in the type of firewalls (fire resistant and non-combustible* building materials) | - |
| **14** | Wall instead of a firewall highly fire-retardant (load-bearing combustible parts, non-combustible* with insulation materials and fire-protective cladding 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[4] | Wall instead of a firewall highly fire-retardant (load-bearing combustible parts, non-combustible* with insulation materials and fire-protective cladding 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 | - |
| **15** | 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 | - |
| **16** | 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 | - |
| **17** | 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) |
| **18** | 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 |
| **19** | 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 | - |

| | Building approval requirement | Minimum required classes according to DIN 4102-2:1977-09 | Abbreviation pursuant to DIN 4102-2:1977-09 |
|---|---|---|---|
| | 1 | 2 | 3 |
| 20 | Structural elements referred to in A 2.1.3.1 letter (d) with fire resistance of 90 minutes and made of combustible building materials in accordance with Section 5 of the Technical Rule under ser. No A 2.2.1.4[8] | Structural elements referred to in A 2.1.3.1 letter (d) with fire resistance of 90 minutes and made of combustible building materials in accordance with Section 5 of the Technical Rule under ser. No A 2.2.1.4[7] | - |
| 21 | Structural elements referred to in A 2.1.3.1 letter (d) with fire resistance of 60 minutes and made of combustible building materials in accordance with Section 5 of the Technical Rule under ser. No A 2.2.1.4[4] | Structural elements referred to in A 2.1.3.1 letter (d) with fire resistance of 60 minutes and made of combustible building materials in accordance with Section 5 of the Technical Rule under ser. No A 2.2.1.4[7] | - |
| 22 | Structural elements referred to in A 2.1.3.1 letter (d) as a wall instead of a firewall (also under additional mechanical stress with fire resistance of 60 min and made of combustible building materials) in accordance with Section 5 of the Technical Rule under ser. No A 2.2.1.4[8] | Wall instead of a firewall (even under additional mechanical stress, fire resistance of 60 min and made of combustible building materials) in accordance with Section 5 of the Technical Rule under ser. No A 2.2.1.4[7] | - |
| | 1 W 30 is also permitted for non-load-bearing exterior walls.<br>2 Proof and classification as per Table 4.3.1.<br>3 W 60 also permitted for non-load-bearing exterior walls.<br>4 A type-approval according to § 16a MBO is required, unless construction types according to DIN 4102-4:2016-05 or according to DIN EN 1995-1-2:2010-12 and the fire-protective cladding in accordance with Section 4.2 or 5.2 of the Technical Rule according to ser. No A 2.2.1.4 are used and the connections are executed according to the Technical Rule in accordance with ser. No A 2.2.1.4.<br>5 W 90 is also permitted for non-load-bearing exterior walls.<br>6 Load-bearing structural elements must be tested under an appropriate load in accordance with DIN 4102-2:1977-09, Section 6.2.2.6.<br>7 Cladding made from non-combustible building materials is required in accordance with the Technical Rule under ser. No A 2.2.1.4, unless facilitations are made in Section 5.2. of the Technical Rule under ser. No A 2.2.1.4.<br>8 Design approval according to § 16a MBO is required.<br>* Regarding the requirements, Table 1.1. applies.<br>** 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 performance has 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, a proof pursuant to § 16a MBO1 is required.

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

**4.3.1.1 Fire resistance requirements including fire performance when using construction products in accordance with harmonised technical specifications0 for load-bearing, load-bearing and space-closing structural elements and at least required 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 flame retardant* 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 (load-bearing combustible parts, non-combustible* with insulation materials and fire-protective cladding 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[3] | R 60 Fire-protective cladding: $K_2$60 | REI 60 Fire-protective cladding: $K_2$60 | Insulation materials, fire-protective cladding: A2 – s1,d0**; Otherwise: E – d2 |
| 8 | Highly fire-retardant and made of non-combustible materials | R 60 | REI 60 | A2 – s1,d0** |
| 9 | Highly fire-retardant and of incombustible materials[4] in the main parts | R 60 | REI 60[2] | Essential parts: A2 – s1,d0**<br><br>Otherwise: E – d2 |
| 10 | Wall instead of a firewall highly fire-retardant (from non-combustible* building materials even under additional mechanical stress) | - | REI 60-M | A2 – s1,d0** |
| 11 | Wall instead of a firewall highly fire-retardant and stable in the essential parts of non-combustible* building materials even under additional mechanical stress | - | REI 60-M | Essential parts: A2 – s1,d0**<br><br>Otherwise: E – d2 |

0 Excluding structural elements according to B 2.2.1.6 made of construction products according to harmonised technical specifications.

| | Building approval requirement | Minimum required performances | | |
|---|---|---|---|---|
| | | Fire resistance | | Fire performance |
| | | without space barrier[1] | with space barrier | |
| | 1 | 2 | 3 | 4 |
| **12** | Wall instead of a fire-retardant wall (carrying parts flammable, insulating materials non-combustible* with fire-protective cladding of 60 min. made of non-combustible* building materials also under additional mechanical stress resistant) according to Section 4 of the Technical Rule according to ser. No A 2.2.1.4 [3] | - | REI 60-M<br>Fire-protective cladding: $K_2$60 | Load-bearing and reinforcing parts: E, incidentally, A2 – s1,d0** |
| **13** | Components in accordance with A 2.1.3.1, letter d with a fire resistance of 60 min. and made of combustible building materials, in accordance with Section 5 of the technical rule in accordance with No A 2.2.1.4[3], with fire-resistant cladding on the room side of 30 min. made of non-combustible* building materials in accordance with Section 5.2 of the technical rule in accordance with No A 2.2.1.4[3], and with one-sided cladding made of non-combustible* building materials in accordance with Section 35 (5) MBO in conjunction with A 2.1.12, also stable under additional mechanical stress (stairwell wall) | - | REI 60-M<br>Fire-protective cladding: $K_2$30 | fire-protective cladding, non-combustible* cladding A2 – s1,d0**;<br>Otherwise: E – d2 |
| **14** | Fire-resistant (non-combustible load-bearing and reinforced parts)[4] | R 90 | REI 90[2] | A2 – s1,d0**;<br>Otherwise E – d2 |
| **15** | Fire-resistant and made of non-combustible* building materials | R 90 | REI 90 | A2 – s1,d0** |
| **16** | Fire resistance of 120 minutes and made of non-combustible* building materials | R 120 | REI 120 | A2 – s1,d0** |
| **17** | Fire resistance of 120 minutes and made of non-combustible* building materials, stable even under additional mechanical stress | - | REI 120-M4 | A2 – s1,d0** |
| **18** | Structural elements in accordance with A 2.1.3.1 letter (d) with fire resistance of 60 min or 90 min and made of combustible building materials, in accordance with Section 5 of the Technical Rule under ser. No A 2.2.1.4[3] | R 60 or R 90 | - | E – d2 |

| | Building approval requirement | Minimum required performances | | |
|---|---|---|---|---|
| | | Fire resistance | | Fire performance |
| | | without space barrier[1] | with space barrier | |
| | 1 | 2 | 3 | 4 |
| **19** | Structural elements referred to in A 2.1.3.1 letter (d) with fire resistance of 60 min or 90 min and made of combustible building materials as defined in Section 5 of the Technical Rule under ser. No A 2.2.1.4[3], and fire-protective cladding made of non-combustible* building materials as defined in Section 5.2 of the Technical Rule under ser. No A 2.2.1.4[3] | R 60 or R 90 | REI 60 or REI 90<br>Fire-protective cladding: $K_2$30 | Fire-protective cladding:<br>A2 – s1,d0**;<br>Otherwise: E – d2 |
| **20** | Structural elements according to A 2.1.3.1 letter (d) with a fire resistance of 30 min. or 90 min. and made of combustible building materials in accordance with Section 5 of the Technical Rule under ser. No A 2.2.1.4[3], and with one-sided cladding made of non-combustible* building materials according to § 36(6) MBO in conjunction with A 2.1.12 (corridor wall) | - | REI 30 or REI 90 | Non-combustible* cladding:<br>A2 – s1,d0**;<br>Otherwise: E – d2 |
| **21** | Structural elements according to A 2.1.3.1 letter (d) with a fire resistance of 30 min. or 90 min. and made of combustible building materials in accordance with Section 5 of the Technical Rule under ser. No A 2.2.1.4[3], and fire-protective cladding made of non-combustible* building materials in accordance with Section 5.2 of the Technical Rule under ser. No A 2.2.1.4[3], and with one-sided cladding made of non-combustible* building materials according to § 36(6) MBO in conjunction with A 2.1.12 (corridor wall) | - | REI 30 or REI 90<br>Fire-protective cladding: $K_2$30 | Fire-protective cladding, non-combustible* cladding:<br>A2 – s1,d0**;<br>Otherwise: E – d2 |
| **22** | Firewall*** | - | REI 90-M | A2 – s1,d0** |
| **23** | Wall in the construction of firewalls (including under additional mechanical stress, fire-resistant and of non-combustible* building materials) | - | REI 90-M | A2 – s1,d0** |

| | Building approval requirement | Minimum required performances | | |
|---|---|---|---|---|
| | | Fire resistance | | Fire performance |
| | | without space barrier[1] | with space barrier | |
| | 1 | 2 | 3 | 4 |
| 24 | Structural elements referred to in A 2.1.3.1 letter (d) as a wall instead of a firewall (stable even under additional mechanical stress with a fire resistance of 60 min. and made of combustible building materials according to Section 5 of the Technical Rule under ser. No A 2.2.1.4[3]) with fire-protective cladding made of non-combustible building materials, according to Section 5.2 of the Technical Rule under ser. No A 2.2.1.4[3] | - | REI 60-M<br>Fire-protective cladding: $K_2$30 | Fire-protective cladding:<br>A2 – s1,d0**;<br>Otherwise: E – d2 |
| | 1 For the steel structural elements coated with reactive fire protection systems, the IncSlow specification according to DIN EN 13501-2:02-2010 must be mentioned in the declaration of performance.<br>2 pursuant to § 35(5); § 36 Para. 6 and § 39 Para. 2 MBO in conjunction with A 2.1.12<br>3 For structural elements referred to in A 2.1.3.1 letter (d) in standard buildings of building classes 4 and 5, the Technical Rule set out in ser. No A 2.2.1.4 shall apply to the design and use<br>4 A non-combustible layer continuous in the component plane: A2 — s1,d0** as defined in Table 1.2<br>* Regarding the requirements, Table 1.1. applies.<br>** Section 1.3 shall apply where necessary.<br>*** 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 a fire stress only from below | with a fire stress from bottom to top and from top to bottom | |
| | 1 | 2 | 3 | 4 |
| 1 | Of non-combustible* building materials | - | - | A2 – s1,d0** |
| 2 | Of flame-retardant building materials, non-flaming falling or dripping* | - | - | 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** |

| | Building approval requirement | Minimum required performances | | |
|---|---|---|---|---|
| | | Fire resistance of the subceiling | | Fire behaviour of the subceiling |
| | | with a fire stress only from below | with a fire stress from bottom to top and from top to bottom | |
| | 1 | 2 | 3 | 4 |
| 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.<br>** Regarding the requirements, Table 1.1 or 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 sub-ceilings is only permitted if the type of attachment to vertical and/or horizontal structural elements is apparent from the manufacturer's installation instructions in accordance with the classification report.
4. The use of 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 undercovers 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 approval requirement | Minimum required performances | |
|---|---|---|---|
| | | Fire resistance | Fire performance |
| | 1 | 2 | 3 |
| 1 | Made of normal-flammability building materials | - | E – d2 |
| 2 | Made of normal-flammability building materials with fire-resistant cladding of 30 min. of non-combustible* building materials, in accordance with Section 5.2 of the technical regulation in accordance with point A 2.2.1.4 | Fire-protective cladding: depending on use, single-sided or double-sided $K_2$ 30 | Fire-protective cladding: A2 – s1,d0**, Otherwise: E – d2 |
| 3 | Fire-retardant | EI 30 | E – d2 |
| 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 | Fire-retardant and made of non-combustible* materials | EI 30 | A2 – s1,d0** |
| 6 | highly fire-retardant (load-bearing parts combustible, insulating non-combustible materials* with fire-resistant cladding of 60 min. made of non-combustible* building materials)[2] in accordance with Section 4 of the technical rule as per No A 2.2.1.4[3] | Egg 60-fire-protective cladding: both sides $K_2$ 60 | Insulation materials and fire-protective cladding: A2 – s1,d0**, Otherwise: E – d2 |
| 7 | Highly fire-retardant and made of non-combustible materials | EI 60 | A2 – s1,d0** |
| 8 | Highly fire-retardant and made of non-combustible* materials in the main parts (non-combustible load-bearing and reinforced parts)[2,4] | EI 60 | Essential parts: A2 – s1,d0**, Otherwise: E – d2 |
| 9 | Hire-resistant (non-combustible load-bearing and reinforced parts)[2,4] | EI 90 | A2 – s1,d0**, Otherwise E – d2 |
| 10 | Fire-resistant and made of non-combustible* building materials | EI 90 | A2 – s1,d0** |
| 11 | Fire resistance of 120 minutes and made of non-combustible* building materials | EI 120 | A2 – s1,d0** |
| 12 | Structural elements according to A 2.1.3.1, letter (d) with a fire resistance of 60 min or 90 min and of flammable building materials according to Section 5 of the Technical Rule of ser. No A 2.2.1.4 [3], with fire-protective cladding of 30 min. made of non-combustible* building materials, in accordance with Section 5.2 of the Technical Rule in accordance with ser. No A 2.2.1.4 [3] | EI 60 or EI 90 Fire-protective cladding: both sides K2 30 | Fire-protective cladding, non-combustible cladding: A2 – s1,d0**; Otherwise: E – d2 |

| | Building approval requirement | Minimum required performances | |
|---|---|---|---|
| | | Fire resistance | Fire performance |
| | 1 | 2 | 3 |
| 13 | Structural elements according to A 2.1.3.1 letter (d) with a fire resistance of 30 min. or 90 min. and made of combustible building materials in accordance with Section 5 of the Technical Rule under ser. No A 2.2.1.4[3], and with one-sided cladding made of non-combustible* building materials according to § 36 Para. 6 MBO in conjunction with A 2.1.12 (corridor wall, open corridor) | EI 30 or EI 90 | Non-combustible* cladding: A2 – s1,d0**; Otherwise: E – d2 |
| 14 | Structural elements according to A 2.1.3.1 letter (d) with a fire resistance of 30 min. or 90 min. and made of combustible building materials in accordance with Section 5 of the Technical Rule under ser. No A 2.2.1.4[3], and fire-protective cladding made of non-combustible* building materials in accordance with Section 5.2 of the Technical Rule under ser. No A 2.2.1.4[3], and with one-sided cladding made of non-combustible* building materials according to § 36(6) MBO in conjunction with A 2.1.12 (corridor wall, open corridor) | Egg 30 or EI 90 fire-protective cladding: single-sided K2 30 | Fire-protective cladding, non-combustible* cladding: A2 – s1,d0**; Otherwise: E – d2 |
| | 1 pursuant to § 35(5); § 36 Para. 6 and § 39(2) MBO in conjunction with A 2.1.12 and A 2.1.13<br>2 Parts within the component to ensure stability (intrinsic weight) and suitability.<br>3 For structural elements referred to in A 2.1.3.1 letter (d) in standard buildings of building classes 4 and 5, the Technical Rule set out in ser. No A 2.2.1.4 shall apply to the design and use<br>4 A non-combustible layer continuous in the component plane: A2 — s1,d0** as defined in Table 1.2.<br>* Regarding the requirements, Table 1. applies. 1.<br>** 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 | Of flame-retardant building materials | - | C – s2,d2** |
| 3 | Of flame-retardant building materials, non-flaming falling or dripping | - | C – s2,d0** |
| 4 | Made of normal-flammability building materials | - | E – d2 |

| | Building approval requirement | Minimum required performances | |
|---|---|---|---|
| | | Fire resistance | Fire performance |
| | 1 | 2 | 3 |
| **5** | Fire-retardant | From the inside to the outside:<br>E 30 (i→o) and<br>from the outside to the inside:<br>EI 30-ef (i←o) | E – d2 |
| **6** | 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:<br>A2 – s1,d0**;<br>Otherwise: E – d2 |
| **7** | Fire-retardant with one-sided cladding made of non-combustible* building materials according to § 35(5) [1] and § 39(2) MBO in conjunction with A 2.1.12 and A 2.1.13 | From the inside to the outside:<br>E 30 (i→o) and<br>from the outside to the inside:<br>EI 30-ef (i←o) | Non-combustible* cladding:<br>A2 – s1,d0**;<br>Otherwise: E – d2 |
| **8** | Fire-retardant with a fire-protective cladding of 30 min. made of non-combustible* building materials in accordance with Section 5.2 of the Technical Rule in accordance with point A 2.2.1.4 | From the inside to the outside:<br>E 30 (i→o) and<br>from the outside to the inside:<br>EI 30-ef (i←o)<br>Fire-protective cladding: $K_2$30 | Non-combustible* cladding:<br>A2 – s1,d0**;<br>Otherwise: E – d2 |
| **9** | Fire-retardant with a fire-protective cladding of 30 min. made of non-combustible* building materials according to Section 5.2 of the Technical Rule in accordance with point A 2.2.1.4, and with one-sided cladding made of non-combustible* building materials pursuant to § 36(6) MBO in conjunction with A 2.1.12 (open passage) | EI 30<br>Fire-protective cladding: $K_2$30 | Fire-protective cladding, non-combustible* cladding:<br>A2 – s1,d0**;<br>Otherwise: E – d2 |
| **10** | Fire-retardant and made of non-combustible* materials | From the inside to the outside:<br>E 30 (i→o) and<br>from the outside to the inside:<br>EI 30-ef (i←o) | A2 – s1,d0** |
| **11** | Fire resistant (non-combustible carrying and reinforced parts not combustible*)[2,3] | From the inside to the outside:<br>EI 90 (i→o) and<br>from outside to inside:<br>EI 90-ef (i←o) | Essential parts:<br>A2 – s1,d0**,<br>Otherwise: E – d2 |
| **12** | Fire-resistant and made of non-combustible* building materials | From the inside to the outside:<br>EI 90 (i→o) and<br>from outside to inside:<br>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<br>2 Parts within the component to ensure stability (intrinsic weight) and suitability.<br>3 A non-combustible layer continuous in the component plane: A2 — s1,d0** as defined in Table 1.2.<br>* Regarding the requirements, Table 1.2. applies.<br>** 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 Barriers

### 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.

- Doors as fire protection closures in accordance with EN 16034:2014[0] in conjunction with EN 13241:2003+A2:2016[0] do not meet the requirements for electromotive opening and closing in accordance with 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[0] 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[11].

[0] Implemented in Germany by DIN EN 16034:2014-12.
[0] Implemented in Germany by DIN EN 13241:2016-12.
[0] Implemented in Germany by DIN EN 12219:2000-06

### 5.1.4 Construction products in accordance with EAD No 020029-00-1102 and EAD No 020062-00-1102 and EN 16034:2014[26] in conjunction with EN 13241:2003+A2:2016[27] for use inside buildings as fire and/or smoke barriers

**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$30<br>$S_a$<br>C<br>Continuous Function Check[2] | E – d2 |
| **2** | Highly fire-retardant, tight-sealing self-closing | $EI_2$ 60<br>$S_a$<br>C<br>Continuous function test[2] | |
| **3** | Fire resistant, tight-sealing self-closing | $EI_2$90<br>$S_a$<br>C<br>Continuous function test[2] | |
| **4** | Fire-retardant, smoke-proof, self-closing | $EI_2$30<br>$S_{200}$<br>C<br>Continuous function test[2] | |
| **5** | Highly fire-retardant, smoke-proof, self-closing | $EI_2$ 60<br>$S_{200}$<br>C<br>Continuous function test[2] | |
| **6** | Fire-resistant, smoke-proof, self-closing | $EI_2$90<br>$S_{200}$<br>C<br>Continuous function test[2] | |
| **7** | Smoke-proof and self-closing | $S_{200}$<br>C<br>Continuous function test[2] | |

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

* Table 1.1 applies to the requirements
** Regarding fire performance requirements, Table 1.2 applies. Section 1.3 shall apply where necessary.

### 5.1.5 Construction products in accordance with EN 16034:2014[26] in conjunction with EN 14351-1:2006+A2:2016[22] or EN 13241:2003+A2:2016[27] for use as fire and/or smoke protection closures in external walls of buildings

The requirements set out in Table 5.1.4 shall apply. For exterior applications, the differential climate in accordance with EN 14351-1:2006+A2:2016[22] and the deformation class in accordance with EN 12219:1999[28] must also be verified. At least classes 2(d) and 2(e) are required to comply with the building approval 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 barriers, 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[26]. 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 barriers 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/component above a construction product as a fire and/or smoke protection barrier shall be static and designed in such a way that the construction product does not receive any additional load as a barrier (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 barrier in the interior of structural works may be fitted with a suitable locking mechanism for the fire and/or smoke barrier with applicability demonstrated on this barrier 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[0] 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,
- 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[0].

0 Implemented in Germany by DIN EN 1634-1:2018-4.

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

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 MBO1, 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, sealing and self-closing | T 30 |
| **2** | Highly fire-retardant, sealing and self-closing | T 60 |
| **3** | fire-resistant and self-closing | T 90 |

#### 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, sealing and self-closing | $EI_2$30<br>C<br>Continuous function test[2] | E – d2 | Specification: Annex B2 and B3 of the EAD fulfilled |
| **2** | Highly fire-retardant, sealing and self-closing | $EI_2$ 60<br>C<br>Continuous function test[2] | E – d2 | Specification: Annex B2 and B3 of the EAD fulfilled |
| **3** | fire resistant, sealing and self-closing | $EI_2$ 90<br>C<br>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 barrier.<br>2 Continuous function testing:<br>Class 5 (200,000 cycles) for fire protection barriers in track-bound conveyor systems as planned closed barriers]<br>Class 2 (10,000 cycles) for fire-protection closures in the course of railway-bound conveyor systems as scheduled | | | |

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

#### 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.

#### 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.

#### 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.

#### 4. Maintenance and testing

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

**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.

**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) MBO[1].

Landing doors with the classification “E 30/60/90” according to EN 81-58:2018[0] for installation in fire-retardant, highly fire-retardant or fire-resistant room-sealing landing walls according to A 2.1.13 only meet the requirements according to § 39(2) sentence 2 MBO[1] if the requirements according to letters b, c and e are met and the landing doors, if several are arranged next to each other, are separated and fastened to them by components that ensure the fire resistance of the landing 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 external use, the differential climate in accordance with EN 14351-1:2006+A2:2016[21] and the deformation class in accordance with EN 12219:1999[28] must also be verified. At least classes 2(d) and 2(e) are required to comply with the building approval requirements.

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

### 5.5 Other closures as 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[26] in conjunction with EN 14351-1:2016[22] or EN 13241:2003+A2:2016[27] 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 | $S_a$<br>C<br>Continuous Function Check[1] | E – d2** |

0 Implemented in Germany by DIN EN 81-58:2018-05

| | Building approval requirement | Minimum required performances | Other feature<br>Fire performance |
|---|---|---|---|
| | **1** | **2** | **3** |
| **2** | Tight-sealing and self-closing, made of non-combustible* building materials | $S_a$<br>C<br>Continuous Function Check[1] | A 2-s1,d0** |
| | 2 Continuous function testing:<br>- Class 5 for doors (rotated wings), sliding 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<br>- min. class 2 for other sealing and self-closing closures (gates)<br>* Table 1.1 applies to the requirements<br>** 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. The use in escape and rescue routes shall only be permitted if, in the case of sliding, lifting or rolling barriers, 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 connection with construction products as sealing and self-closing closures are not covered by EN 16034:2014[26]. 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 MBO1, 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:<br>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.<br>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 12101-2:20030 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 12101-2:200332 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 12101-2:200332 is declared as being at least C – s2,d0.

**Table 7: Minimum required performances**

| | EN 12101-2:200332 | 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) |

0 Implemented in Germany by DIN EN 12101-2:2003-09.

| | | |
|---|---|---|
| **8** | 7.4.1 | WL 1 500 |
| **9** | 7.5.1 | B 300 |
| **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 MBO1, 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 |

### 8.2 Construction products for service shafts made of prefabricated fittings and accessories according to EAD 350003-00-1109

**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** |
| **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) | |
| | * Table 1.1 applies to the requirements<br>** 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

To fulfill 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 building products for fire-resistant glazing with proof of usability in accordance with § 17 MBO1 or proof of applicability of construction types in accordance with § 16a MBO1 the minimum required classes can be found 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: 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 coating on steel structural elements

In order to fulfil the structural requirements in A 2.1.4 when using reactive fire protective coatings on steel structural elements based on proofs of fitness for purpose in accordance with § 17 MBO1, the minimum required classes and designations shall be as given in Section 4.3.

In order to fulfil the building requirements in A 2.1.4 when using reactive fire protection coatings on steel structural elements for ETA according to ETAG 018-1 and -2/EAD 350402-00-1101, the minimum required performance shall be as given in Section 4.3 and the designations as given in Table 4.3.1, footnote 1.

**Provisions on application and execution**

In the absence of a technical best practice for the planning, designing and execution, the use of reactive fire protective coatings on steel structural elements pursuant to ETAG 018-1 and -2 or EAD 350402-00-1101 requires proof pursuant to § 16a MBO1.

### 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) |

| | Derivation of the abbreviation | Criterion | Scope |
|---|---|---|---|
| | 1 | 2 | 3 |
| **11** | $I_1$, $I_2$ | different thermal insulation criteria | Fire protection barriers (including conveyor system barriers) |
| **12** | i→o<br>i←o<br>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, socket fire test procedure

Last updated: June 2016

**CONTENTS**

## 1 Test stand

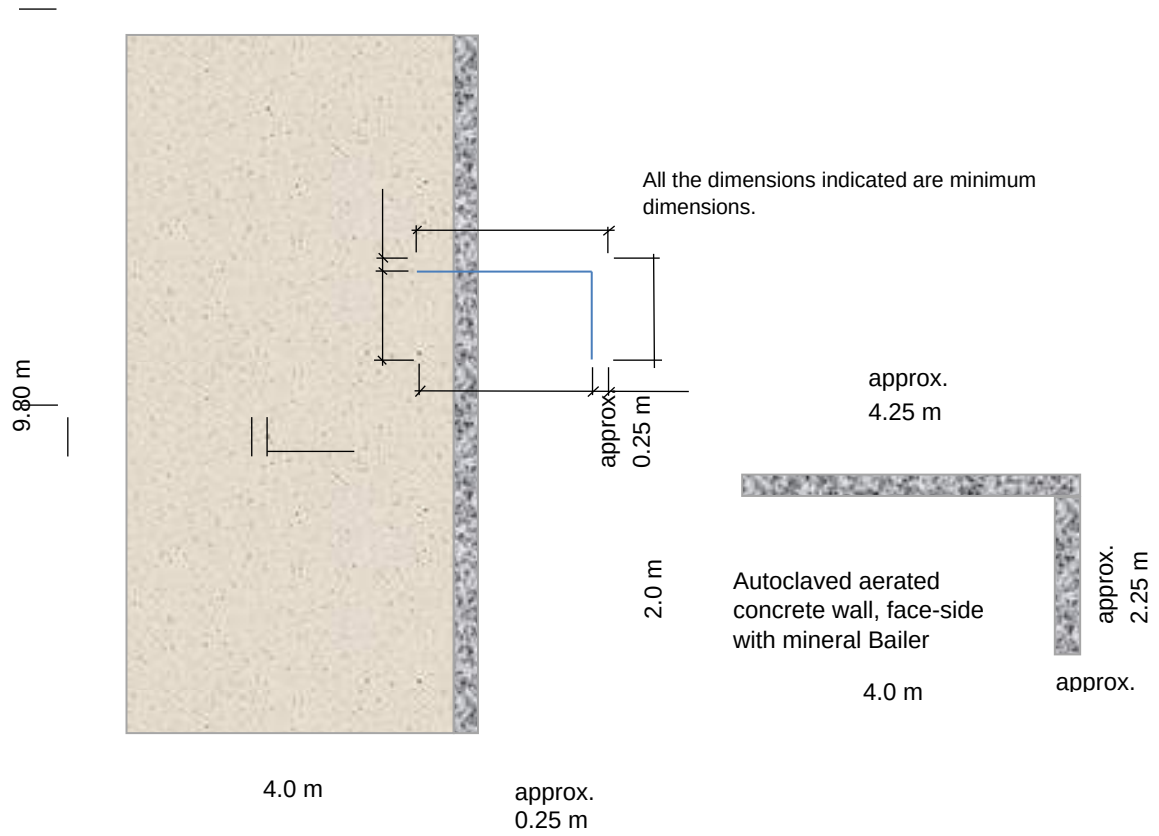
The test stand must be protected from the weather and consists of two connected walls adjoining each other at right angles. The dimensions of the test stand walls on which the test samples are assembled:

- the long side is at least 4.0-m wide,
- the short side is at least 2.0 m wide,
- the height of the test bench shall be at least 9.8 m.

The walls of the test stand must be made of aerated concrete blocks approx. 25-cm thick with bulk density ≥ 600 kg/m³, coated on the WDVS application area with mineral-based plaster.

The following figure shows the plan and layout of the test stand.

**Figure 1:**



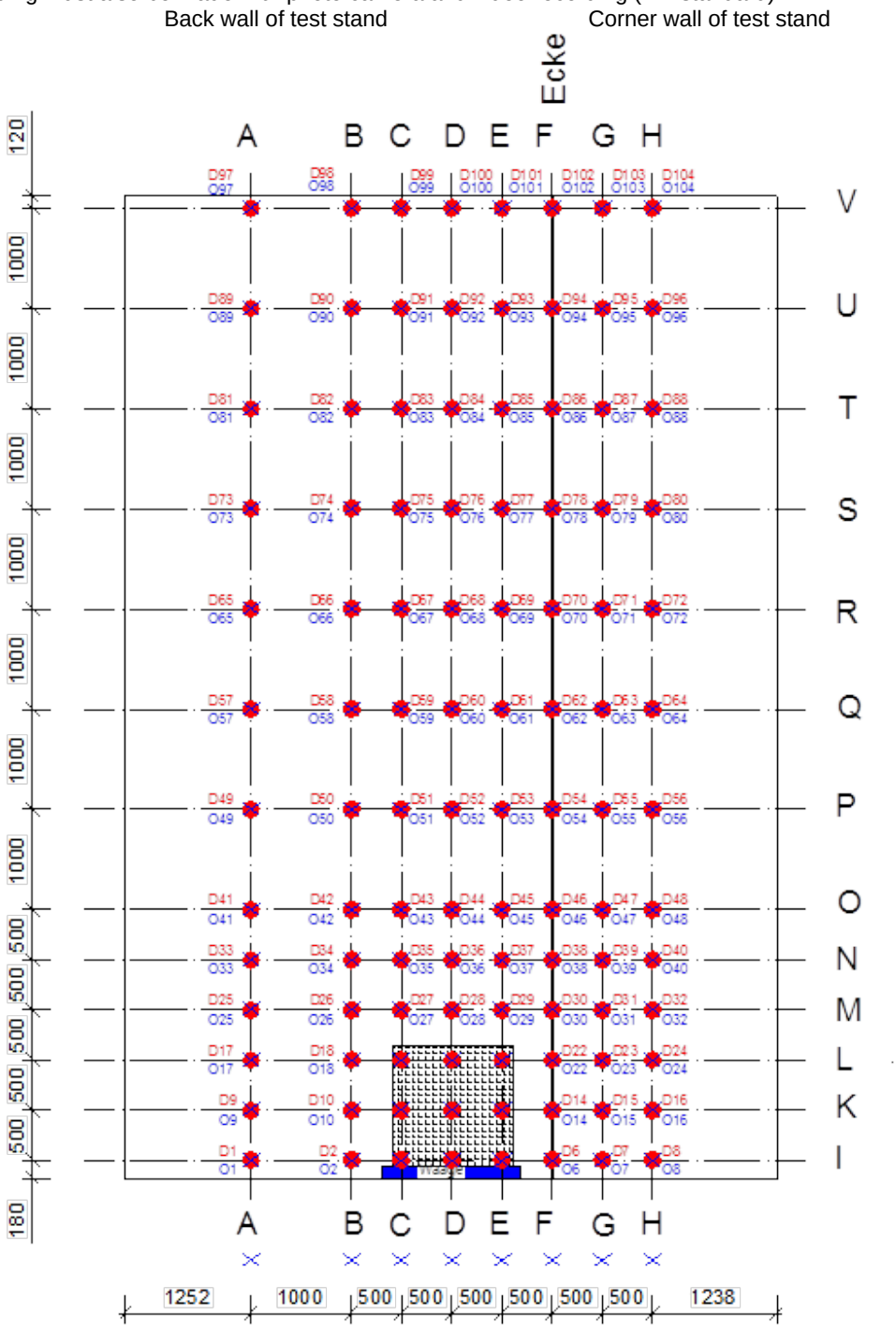

For testing thermal insulation composite systems to be applied to walls made of framework load-bearing structures (e.g. made of timber or steel) with outside panelling, separate specifications are required for the test bench.

## 2 Metrological test stand equipment

To carry out testing, the test stand and applied WDVS must be fitted with thermocouples (type K as per DIN EN 60584-1:2014-07, Ø 3 mm) pursuant to Figure 2.

**Figure 2:**

A test recording must also be made with photo camera and video recording (HD standard).




D1 to D104Measurement points in middle of insulating material (TE inserted from the reverse side of the test stand)

XO1 to O104Measuring points 20 mm in front of the surface of the applied thermal insulation composite system

XO1 to O104Measuring points 20 mm in front of the surface of the applied thermal insulation composite system

## 3 Primary fire source

A 200 kg (± 5 kg) spruce wooden brand should be used as the primary fire source in the test (raw density 475 ± 25 kg/m³) with a surface area of approx. 1.1 x 1.1m. This should be made from wooden sticks with dimensions W x H x L = 40 (± 2) x 40 (± 2) x 1100 (± 10)mm.

The wooden sticks are arranged in crosswise (90°) layers with ratio of wood: air ≈ 1: 1 stacked up, the lowest position shall be arranged parallel to the back wall. The number of wooden sticks required in the uppermost layer

of the crib should be kept as low as possible and distributed evenly so that the above-mentioned wood weight is maintained. The layers should be nailed to each other.

The wood must be stored in a normal climate in accordance with DIN EN 13238:2010-06 until the constant weight is reached and may only be removed the day before the test for the construction of the wooden brand.

The lower edge of the crib should be approximately 15 - 20 cm above the floor of the test room and the distance of the crib to the surface of the WDVS applied on the back and corner wall of the test stand should be about 10 cm. For ignition, four troughs filled with 400 ml of isopropanol (width 25 mm x length 1100 mm x height 20 mm) should be inserted over the lowest position of the wooden sticks in the crib. An open flame serves as an ignition agent.

## 4 Conditioning of the WDVS to be tested

A conditioning time of 21 days is required for the fully applied WDVS test sample on the test stand. This time may be reduced if the humidity in the plaster system is below 6 % (approximately double residual humidity) and the minimum standing time of 14 days is adhered to. Humidity can be determined on a reference sample stored in the same atmosphere.

The ambient temperature during the conditioning time must be between 10 °C and 30 °C 1 m in front of the test stand and 1 m above the floor of the test room.

## 5 Conducting the test

Before the start of the test, the ambient temperature in the test room shall be in the range between 5 °C and 30 °C 1.5 m in front of the test bench at a height of 1.5 m above the test room floor.

Charring of the test fire and test sample must take place under free ventilation conditions. The effect of wind or mechanical smoke on the test run should be avoided or kept to an acceptable minimum. This can be ensured if during testing with a vane anemometer placed in the middle directly before starting the test, flow velocity does not exceed 0.5 m/s – temporarily 1 m/s maximum – in the centre at 1 m above the top of the crib and 100 mm from the WDVS surface.
Any changes to the haul-off conditions during the test time must be documented (e.g. increased haul-off speed during mechanical, controllable smoke extraction, enlargement/reduction in ventilation- and exhaust openings during natural smoke extraction).
The test time is at least 25 minutes (direct WDVS fire impact ≥ 20 minutes must be kept). It starts with setting the wooden brand alight using the isopropanol. At the end of the test time, the crib must be extinguished so that the test samples are not affected. At this point, a monitoring period begins that should finish no earlier than 60 minutes after the test begins.

The following measurement data shall be recorded during the test:

- Temperatures in front of the surface of the thermal insulation composite system and in the middle of the insulating material plane at intervals of ≤ 10 seconds,
- maximum flame height at intervals of ≤ 2 minutes using measurement markings 0.5 m from the test bench and continuously using video recording (the entire test sample must be filmed),
- all relevant observations must constantly be recorded on the behaviour of the test sample as a result of the fire stress caused by the primary fire source (see also section 6).

After the end of the test, the type and extent of fire damage to the test sample must be determined.
The test may be ended early provided the applied WDVS is fully on fire – fire spreading to the side edges and top of the test sample – or the people present during the test are placed in serious danger.

## 6 Assessment

A test report on the performance and results of the test shall be drawn up. The test report contains:

- Name and address of the inspection body
- date and registration number of the test report
- Name and address of the client
- Test date
- Description of test procedures applied, fire load used and flame exposure time
- Description of WDVS applied and its components and the fire protection measures to be taken into account
  - Description of substrate
  - dimensions of the test sample
  - State of fire protection measures
  - Socket development executed
  - system barriers and connections
  - Name and type of WDVS components and information on proof of usability
  - Properties of WDVS components (bulk density, surface weight, order quantities or layer thickness, form and colour)
  - reaction to fire (classification) of the independent building materials used, if available
- conditioning time and conditioning conditions
- test conditions (temperature, relative humidity, air pressure, etc.)
- air flow velocity prior to the start of the test, centred at 1 m above the top edge of the wooden brand and at a distance of 100 mm from the surface of the thermal insulation composite system and time and type of changes in ventilation conditions during the test period
- detailed description of test run with all relevant observations,
  - time the test sample is subjected to fire exposure from the crib
  - time of ignition of the test sample
  - fire propagation on or in the test sample
  - flame expansion of the test fire due to pyrolysis gases
  - maximum flame height at intervals not exceeding 2 minutes
  - Flaming droplets or particles with information on time of occurrence and duration
  - time, size and duration of secondary fire on test room floor
  - falling and dropping off of non-burning parts
  - changes to test set-up, surface bulges, discolouring, etc.
  - verbal description of smoke development
- the recorded temperature sequences at the measuring points and their evaluation (e.g. in the form of isotherm representations),
- detailed description of WDVS state after the end of the test, inter alia:
  - Appearance of test sample directly after the end of the test
  - openings at the test sample surface (location and size) created during the test
  - type and extent of damage (including burnt areas of individual layers, sooting, discolouring, structural change),
  - any continued bonding between individual layers,
  - condition of fire protection measures and their fasteners
- detailed photographic documentation documenting the production of the test sample, the test run and its condition after the test.

The test results are assessed on the basis of the following aspects:

- the opening of the applied and tested WDVS
- observed expansion of flames from the primary fire source in front of the WDVS surface
- burning in the insulating materials
- spread of fire protection measures by flames in WDVS insulating materials
- spread of fire to WDVS surface
- time of any failure of fire protection measures and ensuing charring of WDVS
- overall state of the thermal insulation composite system after completion of the test.

# Annex 6

## Rear-ventilated, external-wall cladding

Last updated: October 2021

**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(7) MBO[0]. 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** The rear-ventilation gap is the air space between the cladding and the thermal insulation or between the cladding and the wall, if provision is not made for any external thermal insulation.

**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** Notwithstanding § 28(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 substructures made of wood are permitted (§ 28(3) sentence 1, half-sentence 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.

0 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. The fire barriers shall be installed between the wall and the cladding. 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 shall be integrated into the insulation material up to a depth of at least 40 mm.

For external wall coverings with a depth of the back ventilation gap > 150 mm to a maximum of 300 mm, the fire barrier must always be installed between the wall and the cladding.

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

**4.3** The total size of the openings in the horizontal fire barriers shall be limited to 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 shall be sufficiently 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 shall be anchored in the outer wall at intervals of ≤ 0.6 m. The steel sheets shall overlap the joints by at least 30 mm.

In the case of ventilated outer wall coverings with a depth of the back ventilation gap not exceeding 100 mm, horizontal fire barriers may consist of a non-combustible insulation material with a melting point > 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:
  - mechanically anchored with non-combustible fasteners in the outer wall at intervals of ≤ 0.6 m

  or
  - fully glued to the outer wall with non-combustible adhesive mortar

  or
  - clamped into an external thermal insulation of an insulating material that is stable in the event of fire with a melting point > 1 000 °C, wherein the thickness of the thermal insulation shall be at least twice as large as the depth of the back 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 outer wall openings; the cladding shall comply with the requirements of point 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 external walls with no openings,
2. if the spread of fire in the rear-ventilation gap is prevented as a result of the type of window placement (e.g. continuous hinge plates, window elements which extend over several storeys) and
3. in the case of external walls with a depth of the back ventilation gap not exceeding 150 mm and with ventilated garments, including their substructures, thermal insulation and brackets, made of non-combustible building materials, if the rear ventilation gap is dimensionally stable in the area of the adjacent friction (sided and in the fall) of apertures in the event of a fire for at least 30 minutes (e.g. by 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 locks 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.

## Annex 7

## Requirements for locking mechanisms:

Last updated: July 2017

- Annex 7 deleted from MVV TB 2019/1 –

# Annex 8

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

Last updated: April 2022

**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 legislative instruments (e.g. the REACH Regulation (EC) No 1907/2006, the Biocides Regulation (EU) No 528/2012, the POP Regulation (EC) No 850/2004, the Chemicals Prohibition Ordinance [Chemikalien-Verbotsverordnung]) and the Closed Substance Cycle 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[0] 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[0].

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.

### 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[0], floor covering constructions and their structural elements,
- Adhesives[0],
- 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[0] in a particular test.

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[0], apply to the specified parameters:

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0 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.

0 floor covering adhesives and structural adhesive bonds.

0 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 $_i$.

0 Target compounds are the substances listed in the LCI list in Annex 2 hereto.

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

- **Carcinogenic substances (category 1A and 1B)**
  No carcinogen of category 1A and 1B according to CLP Regulation (EC) No 1272/2008 may exceed the emission values listed 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).

- **$TVOC_{spez}$**
  Die $TVOC_{spez}$-values must not exceed the values 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 $(C_i / NIK_i) \leq 1$

  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.

**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 slim aligned chips (OSB) and resin-bound clamping 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 shall be determined under the same conditions as for VOC emissions (test chamber and chamber conditions as per 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.

The nitrosamine emissions shall be determined based on the analytic method for the determination of N-nitrosamines, DGUV Information 213-523 (formerly BGI/GUV-I 505-23 or ZH1/120.23).

**Table 2: Requirements for other emissions**

| Type of issue | Value after 28 days [mg/m³] | Section of ABG |
|---|---|---|
| Ammonia0 | ≤ 0.1 | 2.2.1.2 |
| Nitrosamines0 | ≤ 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 Appendix 3) according to EPA (US-Environmental Protection Agency) shall not exceed the values set out in Table 3.

Analytical demonstration of PAHs shall be done for 16 PAHs based on the method of AfPS GS 2019:01 0.

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]).

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

0 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.

0 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.

#### 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.

Analytical determination of nitrosamine (pursuant to TRGS 552) is done in line with the DIK method (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[0] | ≤ 5 | 2.2.2.1 |
| 16 PAH[10] | ≤ 50 | 2.2.2.1 |
| Nitrosamines[8] | ≤ 0.011 | 2.2.2.2 |

0 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 |
| DGUV information 213-523 | Analytical methods for the determination of N-nitrosamines |

**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 2020**

| | Substance | CAS Number | LCI [µg/m³] | Comments |
|---|---|---|---|---|
| **1** | **Aromatic hydrocarbons** | | | |
| 1-1 | Toluene | 108-88-3 | **2 900** | Adoption of EU LCI value |
| 1-2 | Ethylbenzene | 100-41-4 | **850** | Adoption of EU LCI value |
| 1-3 | Xylol, mixture of isomers o-, m- and p-xylol | 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 | **1 700** | Adoption of EU LCI value |
| 1-8 | N-propylbenzene | 103-65-1 | **950** | Adoption of EU LCI value<br>Read across of ethylbenzene |
| 1-9 | 1-propenylbenzene (ß-methylstyrene) | 637-50-3 | **1 200** | Adoption of EU LCI value<br>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<br>Read across of xylene |
| 1-14 | 1-isopropyl-2-methylbenzene (o-cymene) | 527-84-4 | **1 000** | Adoption of EU LCI value |
| 1-15 | 1-isopropyl-3-methylbenzene (m-cymene) | 535-77-3 | **1 000** | Adoption of EU LCI value |
| 1-16 | 1-isopropyl-4-methylbenzene (p-cymol) | 99-87-6 | **1 000** | Adoption of EU LCI value |
| 1-17 | 1,2,4,5-tetramethylbenzene | 95-93-2 | **250** | Adoption of EU LCI value<br>Read across of trimethylbenzene |
| 1-18 | N-butylbenzene | 104-51-8 | **1 100** | Adoption of EU LCI value<br>Read across of ethylbenzene |
| 1-19 | 1,3-diisopropylbenzene | 99-62-7 | **750** | Adoption of EU LCI value<br>Read across of xylene |
| 1-20 | 1,4-diisopropylbenzene | 100-18-5 | **750** | Adoption of EU LCI value<br>Read across of xylene |
| 1-21 | Phenyloctane and isomers | 2189-60-8 | **1 100** | Adoption of EU LCI value<br>Read across of ethylbenzene |
| 1-22 | 1-phenyldecane and isomers | 104-72-3 | **1 100** | Read across of ethylbenzene |
| 1-23 | 1-phenylundecane and isomers | 6742-54-7 | **1 100** | 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 | **1 200** | Adoption of EU LCI value |
| 1-28 | Vinyl toluene (all isomers: o-, m-, p-methylstyrenes) | 25013-15-4 | **1 200** | Adoption of EU LCI value |
| 1-29 | Other alkylbenenes, unless individual isomers shall be assessed differently | | **450** | Read across of trimethylbenzene |

| | Substance | CAS Number | LCI [µg/m³] | Comments |
|---|---|---|---|---|
| 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 | Hexane | 110-54-3 | **4 300** | Adoption of EU LCI value |
| 2-3 | Cyclohexane | 110-82-7 | **6 000** | Adoption of EU LCI value |
| 2-4 | Methylcyclohexane | 108-87-2 | **8 100** | Adoption of EU LCI value |
| 2-5 | - | | | 1) |
| 2-6 | - | | | 1) |
| 2-7 | - | | | 1) |
| 2-8 | n-heptane | 142-82-5 | **15 000** | Adoption of EU LCI value |
| 2-9 | Other saturated aliphatic hydrocarbons C6 to C8 | | **14 000** | Adoption of EU LCI value<br>Read across of 2-methylpentane |
| 2-10 | Other saturated aliphatic hydrocarbons C9 to C16 | | **6 000** | Adoption of EU LCI value |
| 2-11 | Other saturated aliphatic hydrocarbons C17 to C22 | | **1 000** | SVOC<br>Individual substances |
| 2-12 | 1-dodecene | 112-41-4 | **750** | Individual substances |
| **3** | **Terpene** | | | |
| 3-1 | 3-carene | 498-15-7 | **1 500** | Adoption of EU LCI value |
| 3-2 | α-pines | 80-56-8 | **2 500** | Adoption of EU LCI value |
| 3-3 | ß-pinene | 127-91-3 | **1 400** | Adoption of EU LCI value |
| 3-4 | Limonene | 138-86-3 | **5 000** | Adoption of EU LCI value |
| 3-5 | Terpenes, other | | **1 400** | 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 | **11 000** | Adoption of EU LCI value |
| 4-6 | 1-butanol | 71-36-3 | **3 000** | Adoption of EU LCI value |
| 4-7 | Pentanol (all isomers) | 71-41-0<br>30899-19-5<br>94624-12-1<br>6032-29-7<br>584-02-1<br>137-32-6<br>123-51-3<br>598-75-4<br>75-85-4<br>75-84-3 | **730** | Adoption of EU LCI value |
| 4-8 | 1-hexanol | 111-27-3 | **2 100** | Adoption of EU LCI value |
| 4-9 | Cyclohexanol | 108-93-0 | **2 000** | Adoption of EU LCI value |
| 4-10 | 2-ethyl-1-hexanol | 104-76-7 | **300** | Adoption of EU LCI value |

| | Substance | CAS Number | LCI [µg/m³] | Comments |
|---|---|---|---|---|
| 4-11 | 1-octanol | 111-87-5 | **1 700** | 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 | **1 600** | Individual substances |
| 4-16 | Other C7-C13 saturated N-alcohols | | **1 700** | 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 1,2-dihydroxypropane | 57-55-6 | **2 100** | Adoption of EU LCI value |
| 6-2 | Ethylene glycol (ethanediol) | 107-21-1 | **3 400** | Adoption of EU LCI value |
| 6-3 | Ethylene glycol monobutyl ether | 111-76-2 | **1 600** | Adoption of EU LCI value |
| 6-4 | Diethyleneglycol | 111-46-6 | **5 700** | Adoption of EU LCI value<br>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 | **4 800** | Read across of ethylene glycol |
| 6-8 | 1-methoxy-2-propanol | 107-98-2 | **7 900** | 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 | **3 100** | 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** | Read across from 2-methoxyethanol |
| 6-19 | 1,2-diethoxyethane | 629-14-1 | **10** | Read across of 2-ethoxyethanol |

| | Substance | CAS Number | LCI [µg/m³] | Comments |
|---|---|---|---|---|
| 6-20* | 2-methoxyethyl acetate | 110-49-6 | **150** | Adoption of EU LCI value<br>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 | **2 200** | Adoption of EU LCI value<br>Read across of ethylene glycol butyl ether |
| 6-23* | 2-(2-hexoxyethoxy)-ethanol | 112-59-4 | **400** | Adoption of EU LCI value<br>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 | **1 600** | Adoption of EU LCI value<br>Read across of acetic acid |
| 6-28 | Dipropylene glycol | 110-98-5<br>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<br>Read across 2-methoxy-1-methylethyl acetate |
| 6-30* | Dipropylene glycol mono-n-propyl ether | 29911-27-1 | **200** | Adoption of EU LCI value<br>Read across of dipropylene glycolmono-n-butyl ether |
| 6-31* | Dipropylene glycol mono-n-butyl ether | 29911-28-2<br>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 | **2 000** | Adoption of EU LCI value |
| 6-34 | Tri(propylene glycol) methyl ether | 20324-33-8<br>25498-49-1 | **1 200** | 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 diisobutyrate | 6846-50-0 | **1 300** | Adoption of EU LCI value |
| 6-38 | Ethyldiglycol | 111-90-0 | **350** | Adoption of EU LCI value |
| 6-39 | Di(propylene glycol) methyl ether | 63019-84-1<br>89399-28-0<br>111109-77-4 | **1 300** | Adoption of EU LCI value |
| 6-40 | Propylene carbonate* | 108-32-7 | **1 000** | Individual substances |
| 6-41 | Hexylene glycol<br>(2-methyl-2,4-pentanediol) | 107-41-5 | **3 500** | Adoption of EU LCI value |
| 6-42 | 3-methoxy-1-butanol | 2517-43-3 | **500** | Individual substances |
| 6-43 | 1,2-propylene glycol n-propyl ether | 1569-01-3<br>30136-13-1 | **1 400** | Individual substances |

| | Substance | CAS Number | LCI [µg/m³] | Comments |
|---|---|---|---|---|
| 6-44* | 1,2-propylene glycol n-butyl ether | 5131-66-8<br>29387-86-8<br>15821-83-7<br>63716-40-5 | **650** | Adoption of EU LCI value |
| 6-45 | Diethylene glycol-phenyl ether | 104-68-7 | **80** | Adoption of EU LCI value<br>Read across from 2-phenoxyethanol |
| 6-46 | Neopentylglykol (2.2-dimethyl-1.3-propanediol) | 126-30-7 | **1 000** | Individual substances |
| **7** | **Aldehyde** | | | |
| 7-1 | Butanal | 123-72-8 | **650** | VVOC<br>Adoption of EU LCI value |
| 7-2 | Pentanal | 110-62-3 | **800** | Adoption of EU LCI value<br>Read across by Butanal |
| 7-3 | Hexanal | 66-25-1 | **900** | Adoption of EU LCI value<br>Read across by Butanal |
| 7-4 | Heptanal | 111-71-7 | **900** | Adoption of EU LCI value<br>Read across by Butanal |
| 7-5 | 2-Ethylhexanal | 123-05-7 | **900** | Adoption of EU LCI value<br>Read across by Butanal |
| 7-6 | Octanal | 124-13-0 | **900** | Adoption of EU LCI value<br>Read across by Butanal |
| 7-7 | Nonanal | 124-19-6 | **900** | Adoption of EU LCI value<br>Read across by Butanal |
| 7-8 | Decanal | 112-31-2 | **900** | Adoption of EU LCI value<br>Read across by Butanal |
| 7-9 | 2-butenal (crotonaldehyde, mixture of cis and trans) | 4170-30-3<br>123-73-9<br>15798-64-8 | **1**[#] | Individual considerations; Adoption of the EU LCI value is still under discussion |
| 7-10 | 2-pentenal | 1576-87-0<br>764-39-6<br>31424-04-1 | **12** | Read across from 2-Butenal, but no EU mutagenicity classification<br>Adoption of the EU LCI value is still under discussion |
| 7-11 | 2-Hexenal | 16635-54-4<br>6728-26-3<br>505-57-7<br>1335-39-3<br>73543-95-0 | **14** | Read across from 2-pentenal;<br>Adoption of the EU LCI value is still under discussion |
| 7-12 | 2-heptenal | 2463-63-0<br>18829-55-5<br>29381-66-6<br>57266-86-1 | **16** | Read across from 2-pentenal;<br>Adoption of the EU LCI value is still under discussion |
| 7-13 | 2-octenal | 2363-89-5<br>25447-69-2<br>20664-46-4<br>2548-87-0 | **18** | Read across from 2-pentenal;<br>Adoption of the EU LCI value is still under discussion |
| 7-14 | 2-nonenal | 2463-53-8<br>30551-15-6<br>18829-56-6<br>60784-31-8 | **20** | Read across from 2-pentenal;<br>Adoption of the EU LCI value is still under discussion |
| 7-15 | 2-Decenal | 3913-71-1<br>2497-25-8<br>3913-81-3 | **22** | Read across from 2-pentenal;<br>Adoption of the EU LCI value is still under discussion |
| 7-16 | 2-undecenal | 2463-77-6<br>53448-07-0 | **24** | Read across from 2-pentenal;<br>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<br>Individual substances |
| 7-21* | Propane | 123-38-6 | **650** | VVOC<br>Adoption of EU LCI value |

| | Substance | CAS Number | LCI [µg/m³] | Comments |
|---|---|---|---|---|
| 7-22 | Formaldehyde | 50-00-0 | **100** | VVOC<br>Adoption of EU LCI value |
| 7-23 | Propenal | 107-02-8 | **14** | VVOC<br>Individual substances |
| **8** | **Ketone** | | | |
| 8-1 | Ethyl methyl ketone | 78-93-3 | **20 000** | Adoption of EU LCI value |
| 8-2 | 3-methyl-2-butanone | 563-80-4 | **7 000** | Adoption of EU LCI value |
| 8-3 | Methyl isobutyl ketone | 108-10-1 | **1 000** | Adoption of EU LCI value |
| 8-4 | Cyclopentanone | 120-92-3 | **900** | Adoption of EU LCI value |
| 8-5 | Cyclohexanone | 108-94-1 | **410** | Adoption of EU LCI value |
| 8-6 | 2-methylcyclopentanone | 1120-72-5 | **1 000** | Read across of Cyclopentanone |
| 8-7 | 2-methylcyclohexanon | 583-60-8 | **2 300** | Adoption of EU LCI value |
| 8-8 | Acetophenone | 98-86-2 | **490** | Adoption of EU LCI value |
| 8-9 | 1-hydroxyacetone<br>(1-hydroxy-2-propanone) | 116-09-6 | **2 100** | Adoption of EU LCI value<br>Read across of propylene glycol |
| 8-10* | Acetone | 67-64-1 | **120 000** | VVOC<br>Adoption of EU LCI value |
| **9** | **Acids** | | | |
| 9-1 | Acetic acid | 64-19-7 | **1 200** | Adoption of EU LCI value |
| 9-2 | Propionic acid | 79-09-4 | **1 500** | Adoption of EU LCI value |
| 9-3 | Isobutyric acid | 79-31-2 | **1 800** | Adoption of EU LCI value<br>Read across of propionic acid |
| 9-4 | Butyric acid | 107-92-6 | **1 800** | Adoption of EU LCI value<br>Read across of propionic acid |
| 9-5 | Pivalic acid | 75-98-9 | **2 100** | Adoption of EU LCI value<br>Read across of propionic acid |
| 9-6 | n-Valeric acid | 109-52-4 | **2 100** | Adoption of EU LCI value<br>Read across of propionic acid |
| 9-7 | n-Capronic acid | 142-62-1 | **2 100** | Adoption of EU LCI value<br>Read across of propionic acid |
| 9-8 | n-Heptanoic acid | 111-14-8 | **2 100** | Adoption of EU LCI value<br>Read across of propionic acid |
| 9-9 | n-Octanic acid | 124-07-2 | **2 100** | Adoption of EU LCI value<br>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 substances |
| **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 | **4 200** | Adoption of EU LCI value |
| 10-5 | Propyl acetate | 109-60-4 | **4 200** | 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 | **2 000** | Read across of methyl formate<br>(AGW: 120 000 µg/m³) |
| 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 | **4 800** | Adoption of EU LCI value |
| 10-11 | 1-butyl acetate | 123-86-4 | **4 800** | Adoption of EU LCI value |
| 10-12 | 2-ethylhexyl acetate | 103-09-3 | **350** | Adoption of EU LCI value<br>Read across of 2-ethyl-1-hexanol |
| 10-13 | Methylacrylate | 96-33-3 | **180** | Adoption of EU LCI value |

| | Substance | CAS Number | LCI [µg/m³] | Comments |
|---|---|---|---|---|
| 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 | **50** | Adoption of EU LCI value |
| 10-19 | Fumaric acid dibutyl ester | 105-75-9 | **50** | Adoption of EU LCI value |
| 10-20 | Succinic dimethyl ester | 106-65-0 | **50** | Adoption of EU LCI value |
| 10-21 | Glutaric acid dimethyl ester | 1119-40-0 | **50** | 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 | **2 800** | Adoption of EU LCI value |
| 10-25 | Glutaric acid diisobutyl ester | 71195-64-7 | **100** | Individual substances |
| 10-26 | Succinic acid diisobutyl ester | 925-06-4 | **100** | Individual substances |
| **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 | **1 800** | Adoption of EU LCI value |
| 12-4 | Octamethylcyclotetrasiloxane (D4) | 556-67-2 | **1 200** | 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<br>Adoption of EU LCI value |
| 12-8 | Triethyl phosphate | 78-40-0 | **80** | Individual substances |
| 12-9 | 5-chloro-2-methyl-4isothiazolin-3-on (CIT) | 26172-55-4 | **1**[#] | Adoption of EU LCI value |
| 12-10 | 2-methyl-4-isothiazolin-3-one (MIT) | 2682-20-4 | **100** | Adoption of EU LCI value |
| 12-11 | Triethylamine | 121-44-8 | **60** | Adoption of EU LCI value |
| 12-12 | Decamethylcyclopenta-siloxane (D5) | 541-02-6 | **1 500** | Read across of octamethylcyclotetrasiloxane |
| 12-13 | Dodecamethylcyclopentasiloxane (D6) | 540-97-6 | **1 200** | 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 | Tetradecamethylcycloheptasiloxane (D7) | 107-50-6 | **1 200** | 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 |

| | |
|---|---|
| * | New inclusions/amendments 2020 |
| # | LCI -value- assessment only takes place from measured emissions of 5 µg/m³. |
| VVOC | very volatile organic compounds) |
| SVOC | semi-volatile organic compounds |
| 1) | To ensure compatibility with the ADAM evaluation template, sequential numbers in the LCI list formerly used may not be re-used if substances or substance groups are discontinued or re-sorted. |

**Notes:**

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

I) The following links point to lists of substances classified as Category 1A or 1B carcinogens under EU Regulation 1272/2008, and for which testing and control under the scheme are required (version should be up to date):

- 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 'alkane hump' 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 14 000 µg/m³ applies and for aliphatic KW with the same or greater retention time as n-Nonan, the NIK value of 6 000 µg/m³ applies.
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 explanatory documents for the adopted EU LCI values are published at 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
- Chrysene
- Dibenzo(a,h)anthracene
- Indeno-(1,2,3-cd)-pyrene
- Pyrene
- Fluoranthene
- Anthracene
- Phenanthrene
- Fluorides
- Acenaphtylene
- Acenaphtene
- Naphthalene.

# Annex 9

## Textile flooring

Last updated: August 2020

**CONTENTS**

## 1 Subject matter and scope

The “Requirements for Building Plants with regard to Health Protection” (ABG) specify the general requirements for structural installations. In addition, the technical rule “Textile floor coverings” defines the product-specific requirements for the assessment of textile floor coverings with regard to health protection.

This document specifies the test conditions (test sample requirements, test chamber loading requirements, etc.) and the parameters for classifying individual products in groups and selecting the representative product for each group (worst case scenario).

This technical rule does not apply:

- to woven textile floorings with a PVC surface layer,
- for textile floor coverings containing secondary raw materials, except in the case of material-identical production waste; and
- for textile floor coverings, which are also used vertically.

## 2 Requirements

The requirements set out in Section 2 of the ABG shall be complied with. Thereafter, the ingredients, emissions of volatile organic compounds and requirements on the content must be assessed.

### 2.1 Determination and assessment of volatile organic emissions (VVOC-, VOC- and SVOC-emissions) and, if applicable, further emissions of textile floor coverings

The emission of hazardous substances shall be determined by means of test chamber tests by an expert testing body (see section 2.4) in accordance with ABG, section 2.2.1.1, and evaluated in accordance with ABG, section 2.2.1.2 and section 2.2.1.3. Test chamber tests shall be carried out for each individual product or for a representative product of a group of chemically similar individual products according to the following group formation parameters.

#### 2.1.1 Group formation parameters and selection of representative product (worst case scenario)

The grouping of textile floor coverings is carried out successively according to the following parameters (see Figure 1):

- the manufacturing process,
- the chemical base of the pile material/surface layer,
- the adhesive layers/fixing and the back base as well as
- the additional chemical equipment.

Representative of a group is the product for which the highest emissions are to be expected – usually this is the heaviest and thickest product. In doubt, select the heaviest product. If necessary, several products in a group must be tested. The values obtained are assumed to be representative of the whole group of individual products.

##### 2.1.1.1 Classification according to the manufacturing process

Individual products are first divided in line with the manufacturing process as follows: DIN EN 1307:2019-03 into:

- tufted
- woven
- needled
- etc.

divided.

##### 2.1.1.2 Classification according to the chemical basis of the pole material/use layer

After being divided according to manufacturing process, the individual products are further divided according to the chemical base of the pile material/surface layer as follows:

- Polypropylene (PP)
- Polyester (PES),
- Polyamide (PA 6 and PA 6.6, select PA 6 as worst case),

- Wool
- natural plant fibres
- etc.

more detailed. In the case of material mixtures, the chemical basis of the pole material with at least 50 % by weight is decisive for the classification.

#### 2.1.1.3 Classification according to the adhesive layer/fixing and the back base

The textile floor coverings, which were previously divided according to the manufacturing process and the pole material/use layer, are further divided into

- textile backing
- Foam backs (same chemical basis),
- Heavy coating (same chemical basis),
- etc.

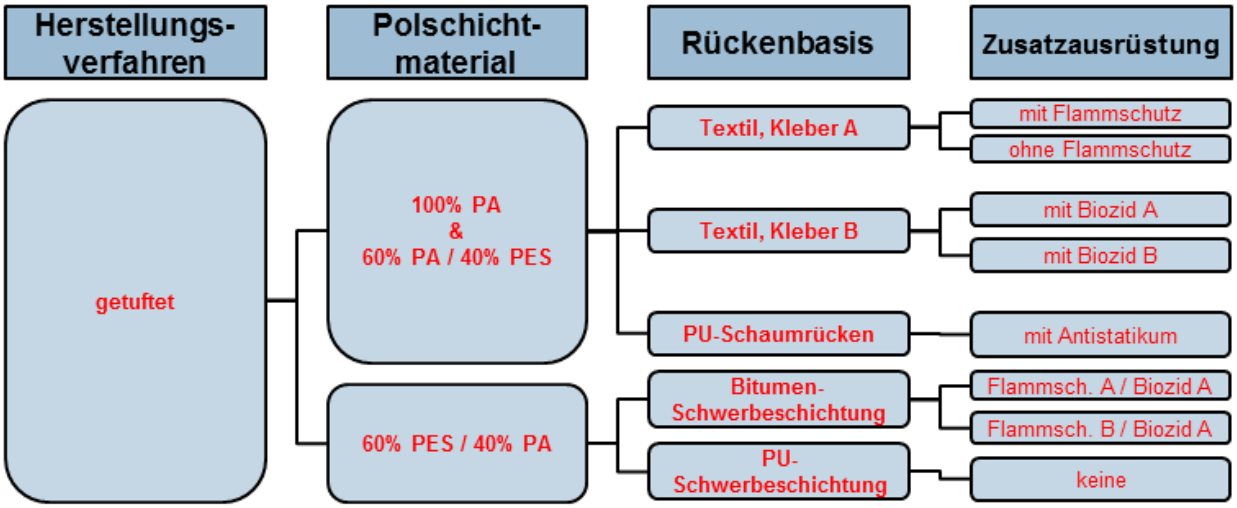
subdivided. For products with the same back, the division into the same group only takes place on the condition that the adhesive layers/solidifications are also based on the same chemical basis.

#### 2.1.1.4 Classification according to the chemical auxiliary equipment

Lastly, the textile floorings are divided in terms of additional chemical features as follows:

- with or without flame protection (with the same chemical base)
- without or with antimicrobial/fungicide/insecticide equipment (with the same chemical basis),
- with or without anti-static protection (with the same chemical base)
- etc.

final subdivided.




| | |
|---|---|
| Herstellungsverfahren | Manufacturing process |
| Polschichtmaterial | Pile layer material |
| Rückenbasis | Back base |
| Zusatzausrüstung | Additional features |
| getuftet | tufted |
| 100% PA & 60% PA 7 40% PES | 100 % PA & 60 % PA 7 40 % PES |
| 60% PES / 40% PA | 60 % PES/40 % PA |
| Textil, Kleber A | Textile, adhesive A |
| Textil, Kleber B | Textile, adhesive B |
| PU-Schaumrucken | PU foam backing |
| Bitumen-Schwerbeschichtunq | Bitumen-heavy coating |
| PU-Schwerbeschichtunq | PU Heavy Duty Coating |
| mit Flammschutz | with flame retardant |
| ohne Flammschutz | without flame protection |
| mit Biozid A | with biocide A |
| mit Biozid B | with biocidal B |
| mit Antistatikum | with anti-static agent |
| Flammsch. B/Biozid A | flame protection B/biocide B |
| keine | None |

**Figure 1:** Sample grouping

It should be noted that changes in the chemical composition or structure require a new evaluation of the products/group. This may result in new emission tests.

### 2.1.2 Sampling of the product, transport and storage of the sample

Sampling, transport and storage of the sample are carried out in accordance with DIN EN 16516:2020-10. The samples shall be taken freshly or at the earliest commercial capacity, and a sampling protocol containing all the essential data shall be prepared and attached to the sample.

It should always be kept in mind that influences such as:

- heat,
- intense light,
- excessive humidity
- detergents,
- Exhaust gases from vehicles or machinery; and
- Solvents from paints, varnishes, fuels or exhaust gases, etc.

could distort inspection results or contaminate samples.

#### 2.1.2.1 Sample size/sampling

When sampling products on rolls, one metre or at least the exposed part of the roll should be removed first. Then, 1 to 1.5 metres of the adjacent section should be taken as a sample. If possible, the sample should not exceed 2 m in width. Where required, the width of the sample should be reduced accordingly. After the sample has been taken, it should be rolled up transversely with respect to the original direction, with the lower surface of the flooring facing outwards. The sample must be secured against unrolling after retracting with brackets or cords, but not never with adhesive tapes.

A complete packaging unit shall be taken from the sampling of carpet tiles. If the size of the packaging unit makes shipment impossible, the sample should consist of four tiles (more for smaller tiles) or hard flooring elements in pairs with upper surfaces facing each other, taken from the centre of a single packaging unit. Textile tile floorings may not be rolled.

#### 2.1.2.2 Packaging

Once the sample has been obtained, it must be wrapped in aluminium foil within one hour and then packaged and sealed in a low-emission polyethylene bag. As an alternative, aluminium-coated packaging material may be used. To prevent external contamination, the package should be sealed maximally airtight with a film welding device or a low-emission adhesive tape. Different samples must also be packed separately.

#### 2.1.2.3 Transport/shipping/storage

The usual parcel and courier services can be ordered for dispatch. In transporting samples, it should be kept in mind that the sample should not be stored near any solvent-containing substances (e.g. spare drums).

### 2.1.3 Production and preparation of the test piece

The preparation of the test piece is carried out in accordance with DIN EN 16516:2020-10. By way of derogation, the test piece can also be punched. Edge sealing is not required as the effect of edges of textile floorings on emissions is negligible.

Once the test specimen has been produced, it should immediately be placed in the emission test chamber. This time is considered as the starting point of the emission test ($t_0$).

### 2.1.4 Test chamber conditions for the emission measurement of textile floor covering samples

Based on the dimensions of the reference space (DIN EN 16516:2020-10), the following loading factor is determined for a textile floor covering:

- 0.4 m²/m³ for floors.

An air exchange rate of 0.5/h and climatic conditions of 23 °C ± 1 °C and 50 % ± 5 % relative humidity are set in accordance with DIN EN 16516:2020-10. The test chamber volume must not be below 20 l.

### 2.1.5 Emission measurement of textile floor covering samples

The emissions of textile floor covering samples are measured in accordance with the provisions of ABG and DIN EN 16516:2020-10 and must be evaluated after 3 days and 28 days.

The emissions test may be terminated early 7 days after loading the test chamber if the measured values are less than 50 % of the 28-day limit set out in the ABG, and if no significant increases in the concentration of individual substances can be found in comparison to the measurements of the third day. Compliance with these criteria shall be duly substantiated by the inspection body. The 50 %- limit applies to all parameters, i.e. including the R -value.

## 2.2 Assessment of volatile organic emissions (VVOC-, VOC- and SVOC-Emissions)

The results of the emission measurements on VVOC, VOC and SVOC shall be assessed in accordance with ABG 2.2.1.1 (Table 1) and shall be reported in detail in a test report.

### 2.3 Determination of the content of polycyclic aromatic hydrocarbons (PAHs) when using bitumen-containing heavy coatings

When using bitumen-containing heavy coatings, the PAH- content is tested in the bitumen. The content of benzo[a]pyrene (BaP) as a guide substance shall not exceed the value given in Table 3 of the ABG. The analytical detection is based on the method of the AfPS GS 2019-01.

### 2.4 Requirements for the testing bodies to carry out emission tests for textile floor coverings

Inspection bodies for emissions testing must meet the following requirements:

- they must be independent, i.e. they must operate independently of the economic interests of individual manufacturers.
- Accreditation according to IISO 17025[0] for test chamber tests in accordance with DIN EN 16516:2020-10 or
- Notification in accordance with Regulation (EU) No 305/2011 of the European Parliament and of the Council (essential feature: Emission of hazardous substances, technical specification EN 16516).
- Presence of technical equipment for VOC, VVOC and SVOC-Emission test according to DIN EN 16516:2020-10.
- Presence of NICs' -substances as standards (ABG Appendix 2).
- Presence of carcinogenic carcinogens according to CLP Regulation (EC) No 1272/2008 (Carc. 1A and 1B) classified substances that can potentially be determined from textile floor coverings as standards.
- At least one participation per year in EQ tests for VOC thermodesorptions -measurements according to DIN EN 16516:2020-10. Participation in ring trials offered by BAM and IFA is recommended (see:
  - http://www.bam.de/de/fachthemen/ringversuche/
  - http://www.dguv.de/ifa/Fachinfos/Ringversuche/index.jsp).

[0] Subcontracting is prohibited.

**List of abbreviations**

| | |
|---|---|
| ABG | Health protection requirements for building structures [Anforderungen an bauliche Anlagen bezüglich des Gesundheitsschutzes]: |
| BAM | Federal Institute for Materials Research |
| BAP | Benzo(a)pyrene |
| BauPVO | Construction Products Ordinance |
| DIN | Deutsches Institut für Normung (German Institute for Standardisation) |
| EN | European Standard |
| EPA | Environmental Protection Agency |
| IFA | Institute for Occupational Safety |
| Nik | Lowest concentration of interest |
| Pak | Polycyclic aromatic hydrocarbons |
| PA 6 | Polyamide 6 (nylon) |
| PA 6.6 | Polyamide 6.6 (dederon) |
| PES | polyester |
| PP | Polypropylene |
| PVC | Polyvinyl chloride |
| R value | sum of all $R_i$ where $R_i = c_i / CLI_i$ |
| SVOC | Heavy Volatile Organic Compounds |
| $t_0$ | Start of emission measurement |
| VOC | Volatile organic compounds |
| VVOC | Easily Volatile Organic Compounds |

**List of references and standards**

| | |
|---|---|
| DIN EN 1307:2019-03 | Textile Floorings – Classification |
| DIN EN 16516:2020-10, | Construction products: Assessment of the release of dangerous substances – Determination of emissions into indoor air |
| DIN EN ISO 16000-11:2006-06 | Contamination of indoor air - Part 11: Determination of the emission of volatile organic compounds from construction products and furnishing – Sampling, storage of samples and preparation of test specimens |
| DIN EN ISO/IEC 17025:2018-03 | Conformity assessment – requirements for the operation of different types of bodies carrying out inspections (ISO/IEC 17020:2012) |

## Annex 10

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

Last updated: April 2022

**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 |
| | Timber roof structural elements | 4.2 |
| | Waterproofing | 4.3 |
| Outer wall including beams and supports | Concrete exterior wall structural elements | 5.1 |
| | structural elements for external walls made of wood | 5.2 |
| | Waterproofing | 5.3 |
| | Fire protection products for improving the fire resistance of structural elements | 5.4 |
| Surface coverings | Concrete surface coverings | 6.1 |
| | Timber surface coverings | 6.2 |
| | Surface coverings handling wastewater | 6.3 |
| Foundations including piles | Injection and grouting materials | 7.2 |
| | structural elements of concrete | 7.3 |

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 |
|---|---|---|
| | Waterproofing | 7.4 |
| Excavation seals | Injection and pressing materials made of binder suspensions or grout | 8.2 |
| | Silicon-based injection and pressing 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 leaked | 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:

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 are based on the LAWA de-minimis thresholds: LAWA: ‘Drainage of de-minimis thresholds for groundwater’, December 2004. Available from Kulturbuch-Verlag GmbH, Postfach 47 04 49, 12313 Berlin or downloadable from the LAWA website: www.lawa.de.

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 any transport pathways must be taken into account, for example with transfer functions0.

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 24 h) | $G_D \leq 4$ (after 24 h) |
| Luminescent bacteria luminescence inhibition test with V*ibrio fischeri* according to DIN EN ISO 11348-1 to DIN EN ISO 11348-3:2009-05 | $G_L \leq 8$ | $G_L \leq 8$ |
| 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 on the component/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.

0 For the release of hazardous substances from hardened concrete, see derived transfer functions in Annex II-B to the 'Principles for assessing the impact of construction products on soil and groundwater – version 2011'.

#### 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:

- 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).
- For concrete as per DIN 1045-2:2008-08, the material composition of the recycled aggregates must correspond to the delivery types under DAfStb- Guideline ‘Concrete pursuant to DIN EN 206-1 and DIN 1045-2 with recycled aggregates pursuant to DIN EN 12620:2010-09’.

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:

- 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 AVV[7]) 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 AVV0) in a proportion of up to 5 M.-% (dry mass), on the basis of dry coal, be co-burned. Biomass is understood as plant material. Waste wood or secondary material are not allowed.

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 Timber roof structural elements

Note:
Timber structural elements treated with wood preservative may only be used for roof structural elements (including windows) if the wood preservative (biocide products) meet the requirements of the Biocide Regulation (EU) No 528/2012. When using biocide products, the constraints listed in the approval under the Biocide Ordinance pursuant to Article 22(1) of the Biocide Ordinance and/or nationally applicable transitional provisions pursuant to the Ordinance on the reporting of biocidal products pursuant to the Chemicals Act (Biocide-Reporting Ordinance [ChemBiozidMeldeV]) must be met. Timber structural elements treated with preservatives to guard against biological infestation must be marked as per DIN EN 15228:2009-08, Section 6.

When using scrap timber roof structural elements, the requirements of the Scrap Timber Ordinance [Altholzverordnung] must be met.

### 4.3 Seals 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 CEN/TS 16637-2:2014-11 must not exceed a value of 47 mg/m$^2$. For MCPA, the cumulative discharge determined in accordance with DIN CEN/TS 16637-2:2014-11 shall not exceed 206 mg/m$^2$.

## 5 Requirements for exterior walls (including beams and columns)

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 external walls of concrete produced using recycled rock grains may only be installed if the recycled grain of rock meets the following requirements:

- 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

0 Ordinance on the European Waste Catalogue (EWC Ordinance) of 10 December 2001, as amended.

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).
- For concrete as per DIN 1045-2:2008-08, the material composition of the recycled aggregates must correspond to the delivery types under DAfStb- Guideline 'Concrete pursuant to DIN EN 206-1 and DIN 1045-2 with recycled aggregates pursuant to DIN EN 12620:2010-09'.

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:

- 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/TS 16637- 2:2014-11 (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/TS 16637-2:2014-11 comply with the limits set out in Table A-5 or Table A-6(Annex A) shall be omitted if structural 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 AVV7) 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/TS 16637-2:2014-11 (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/TS 16637-2:2014-11 comply with the upper limits given in Table A-5 (Annex A) is not required if direct contact between the component and soil or groundwater is excluded through constructive 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 AVV7) 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 MBO1, as well as in terms of their effects on soil and water.

#### 5.1.4 Sulphate hut 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/TS 16637-2:2014-11 (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 through constructive 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 MBO1, as well as in terms of their effects on soil and water.

### 5.2 structural elements for external walls made of wood

Note:
Timber structural elements treated with wood preservative may only be used on exterior walls (including windows and doors) if the wood preservative (biocide products) meet the requirements of the Biocide Regulation (EU) No 528/2012. When using biocide products, the constraints listed in the approval under the Biocide Ordinance pursuant to Article 22(1) of the Biocide- Ordinance and/or nationally applicable transitional provisions pursuant to the Ordinance on the reporting of biocide products pursuant to the Chemicals Act (Biocide- Reporting Ordinance [ChemBiozidMeldeV]) must be met. Timber structural elements treated with preservatives to guard against biological infestation must be marked as per DIN EN 15228:2009-08, Section 6.

When using scrap timber for exterior wall structural elements, the requirements of the Waste Wood Ordinance must be met.

### 5.3 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 MBO1, as well as in terms of their effects on soil and water.

### 5.4 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 structural elements for outdoor surface coverings made of concrete

Concrete source materials used in floorings or staircase coverings 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.

#### 6.1.1 Recycled granules of rock

Concrete surfaces manufactured using recycled aggregates may only be installed if the recycled aggregates meet the following requirements:

- 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).
- For concrete as per DIN 1045-2:2008-08, the material composition of the recycled aggregates must correspond to the delivery types under DAfStb- Guideline ‘Concrete pursuant to DIN EN 206-1 and DIN 1045-2 with recycled aggregates pursuant to DIN EN 12620:2010-09’.

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.

#### 6.1.2 Industrially manufactured aggregates

Concrete surface coverings manufactured using industrially manufactured aggregates may only be installed if the industrially manufactured aggregates meet the following requirements:

- 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) 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 AVV7) 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.

### 6.1.3 Fly ashes

Concrete surface coverings 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).

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 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 AVV7) 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 concrete surfaces, 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.

## 6.2 Floor coverings of wooden structural elements

Note:
Timber structural elements treated with wood preservative may only be used as surface coverings (including windows) if the wood preservative (biocide products) meet the requirements of the Biocide-Regulation (EU) No 528/2012. When using biocide products, the constraints listed in the approval under the Biocide Ordinance pursuant to Article 22(1) of the Biocide- Ordinance and/or nationally applicable transitional provisions pursuant to the Ordinance on the reporting of biocidal- products pursuant to the Chemicals Act (Biocide- Reporting Ordinance [ChemBiozidMeldeV]) must be met. Timber structural elements treated with protective agents to guard against biological infestation must be marked as per DIN EN 15228:2009-08, Section 6.

When using waste wood for surface coverings, the requirements of the Waste Timber Regulation must be complied with.

## 6.3 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 MBO1, 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 pressing 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 in eluate in accordance with DIN CEN/TS 16637- 2:2014-11 (for mortar or hardened concrete specimens of a model concrete) shall comply with the limits set out in Table A- 5 (Annex A).

Proof that the eluate concentrations as per DIN CEN/TS 16637-2:2014-11 of mortar or concrete (based on a model formulation) 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 AVV7) 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 MBO1, 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

Concrete foundations manufactured using recycled aggregates may only be installed if the recycled aggregates meet the following requirements:

- 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).
- For concrete as per DIN 1045-2:2008-08, the material composition of the recycled aggregates must correspond to the delivery types under DAfStb- Guideline ‘Concrete pursuant to DIN EN 206-1 and DIN 1045-2 with recycled aggregates pursuant to DIN EN 12620:2010-09’.

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

Concrete foundations manufactured using industrially manufactured aggregates may only be installed if the industrially manufactured aggregates meet the following requirements:

- 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/TS 16637- 2:2014-11 (for hardened concrete test specimens of a model concrete) shall comply with the limits set out in Table A-6(Annex A) or, for boiler sand, the upper limits of Table A- 5 (Annex A).

Proof that the concentrations of substances in the eluate in accordance with DIN CEN/TS 16637-2:2014-11 comply with the limits set out in Table A-5 or Table A-6 (Annex A) shall be omitted if direct contact with soil or groundwater is excluded by constructive measures.

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 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 AVV7) with a proportion of up to 5 M.-% (dry mass), based on dry coal, are co-burned, biomass is understood as vegetable material. Biomass is understood as vegetable 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 eluate concentrations pursuant to DIN CEN/TS 16637-2:2014-11 (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 eluate concentrations as per DIN CEN/TS 16637-2:2014-11 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 AVV7) 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 MBO1, as well as in terms of their effects on soil and water.

### 7.3.4 Sulphate hut cement and calcium aluminate sulfate cement

Concrete foundations manufactured using supersulphated cement or calcium aluminate sulphate cement may only be installed if the eluate concentrations as per DIN CEN/TS 16637-2:2014-11 (for hardened concrete test specimens of a model concrete) comply with the upper limits according to Table A-6 (Annex A).

Proof that the eluate concentrations as per DIN CEN/TS 16637-2:2014-11 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 steel seals for the production of 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 pressing materials for seals made of binder suspensions or press-in 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 eluate concentrations pursuant to DIN CEN/TS 16637-2:2014-11 (on mortar or concrete test samples from a sample mortar or concrete) must comply with the upper limits according to Table A-5 (Annex A).

When using silicon-rich fly ash in concrete or mortar, no proof of substance content and release of hazardous substances is required if the fly ash is co-incinerated from thermal power plants in which only coal and no secondary fuels, with the exception of biomass in a proportion of up to 14 M-% (dry mass), practically ash-free natural gas and municipal sewage sludge (waste code 19 08 05 according to AVV[7]) 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 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 leaked

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 MBO1, 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 containers and pipes manufactured using recycled aggregates may only be installed if the recycled aggregates meet the following requirements:

- 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).
- For concrete as per DIN 1045-2:2008-08, the material composition of the recycled aggregates must correspond to the delivery types under DAfStb- Guideline ‘Concrete pursuant to DIN EN 206-1 and DIN 1045-2 with recycled aggregates pursuant to DIN EN 12620:2010-09’.

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 containers and pipes manufactured using industrially manufactured aggregates may only be installed if the industrially manufactured aggregates meet the following requirements:

- 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 substance concentrations in the eluate in accordance with DIN CEN/TS 16637- 2:2014-11 (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/TS 16637-2:2014-11 comply with the limits set out in Table A-5 or Table A-6 (Annex A) shall be omitted if direct contact with groundwater is excluded by constructive measures.

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 AVV7) 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 in the eluate in accordance with DIN CEN/TS 16637- 2:2014-11 of solid concrete (for hardened concrete test specimens of a model concrete) produced using silicon-rich fly ash shall comply with the limits set out in Table A- 5 (Annex A).

Proof that the eluate concentrations as per DIN CEN/TS 16637-2:2014-11 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 AVV7) 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 Sulphate hut cement and calcium aluminate sulfate cement

Underground containers and pipes made of concrete produced using supersulphated cement and calcium aluminate sulphate cement may only be installed in contact with soil or groundwater if the eluate concentrations as per DIN CEN/TS 16637-2:2014-11 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 eluate concentrations as per DIN CEN/TS 16637-2:2014-11 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 EWC Ordinance*) |
| 2 | Bricks (waste code 17 01 02 as per the EWC Ordinance*) |
| 3 | Tiles, bricks, ceramic (waste code 17 01 03 as per the EWC Ordinance*) |
| 4 | Mixtures of concrete, tiles, bricks and ceramic that do not contain any hazardous substances (waste code 17 01 07 as per the EWC Ordinance*) |
| 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 EWC Ordinance*) |
| 7 | Soil and stones that do not contain dangerous substances (Waste code 17 05 04 according to AVV*) |
| 8 | Track cotter which does not contain dangerous substances (waste key 17 05 08 according to 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 | 0.1 |
| | 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**<br>6.5-10** |
| | Conductivity<br>Conductivity* | µS/cm | 3 000**<br>500** |
| Solids content | Hydrocarbons | [mg/kg] | 1 000*** |
| | $PAH_{16}$ | [mg/kg] | 25 |
| | $PCB_6$ | [mg/kg] | 1 |

* is only required for track gates. The investigation can be waived if the manufacturer has evidence from Deutsche Bahn AG that no herbicides are used on the respective section of the line.

** 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 |
|---|---|---|---|---|---|---|---|
| Eluate concentration | Arsenic (As) | µg/l | | | | 60 | 60 |
| | Lead (Pb) | µg/l | | | 100 | 200 | 200 |
| | Cadmium (Cd) | µg/l | | | | 10 | 6 |
| | Chromium, total (Cr) | µg/l | 100 | | | 150 | 60 |
| | Copper (Cu) | µg/l | | | 100 | 300 | 100 |
| | Nickel (Ni) | µg/l | | | | 150 | 70 |
| | Mercury (Hg) | µg/l | | | | | 2 |
| | Vanadium | µg/l | 250 | | | | |
| | Zinc (Zn) | µg/l | | | 200 | 600 | 600 |
| | Chloride ($Cl^-$) | mg/l | | | | | |
| | Sulphate ($SO_4^{2-}$) | mg/l | | | | | |
| | Fluoride | mg/l | 5 | | | 1 | |
| | Phenol index | µg/l | | | | 100 | |
| | DOC | µg/l | | | | 20 000 | |
| | pH value** | - | 10-13 | | 6.0-10 | 5.5-12 | 5.5-12 |
| | Conductivity** | µS/cm | 1 500 | | 700 | 1 000 | 2 000 |
| Solid content | Arsenic | [mg/kg] | 150 | 150 | 150 | 150 | 150 |
| | Lead | [mg/kg] | 700 | 700 | 700 | 700 | 700 |
| | Cadmium* | [mg/kg] | 10 | 10 | 10 | 10 | 10 |
| | Chromium, total | [mg/kg] | 600 | 600 | 600 | 600 | 600 |
| | Copper | [mg/kg] | 400 | 400 | 400 | 400 | 400 |
| | Nickel | [mg/kg] | 500 | 500 | 500 | 500 | 500 |
| | Thallium | [mg/kg] | 7 | 7 | 7 | 7 | 7 |
| | Vanadium | [mg/kg] | | 1 500 | | | |
| | Mercury | [mg/kg] | 5 | 5 | 5 | 5 | 5 |
| | Zinc | [mg/kg] | 1 500 | 1 500 | 1 500 | 1 500 | 1 500 |
| | EOX | [mg/kg] | | | | 10*** | |
| | BTX | [mg/kg] | | | | 1 | |
| | LHKW | [mg/kg] | | | | 1 | |
| | Benzo(a)pyrene | [mg/kg] | | | | 3 | |
| | Hydrocarbons | [mg/kg] | | | | 1 000 | |
| | $PAH_{16}$ | [mg/kg] | | 30 | | 20 | |
| | $PCB_6$ | [mg/kg] | | 0.5 | | | |
| | PCDD/PCDF | ng TEQ/kg**** | | 100 | | | |

* Only petroleum co-fuels or municipal sewage sludge (with waste key 19 08 05 in accordance with the Regulation on the European Waste List) may be used.

** ** The pH value and conductivity data are orientation values. In case of deviations from the material-specific reference value, the cause shall be checked.

*** Subjected to the existence of a European test standard.

**** 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] | 1 500 |
| | Zinc (Zn) | [mg/kg] | 1 500 |
| | $PAH_{16}$ | [mg/kg] | 30 |
| | $PCB_6$ | [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 | 375 |
| Lead (Pb) | mg/m² | 7.7 |
| Chromium VI (Cr) | mg/m² | 6.6 |
| Chromium, total (Cr) | mg/m² | 7.7 |
| Cyanide | mg/m² | 5.5 |
| Mercury (Hg) | mg/m² | 0.22 |
| Selenium | mg/m² | 7.7 |
| Thallium (Tl) | mg/m² | 0.88 |
| Vanadium (V) | mg/m² | 4.4* |
| Zinc (Zn) | mg/m² | 63.9 |
| * 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 | 5.5 |
| Arsenic (As) | mg/m² | 11 |
| Barium (Ba) | mg/m² | 375 |
| Lead (Pb) | mg/m² | 7.7 |
| Cadmium (Cd) | mg/m² | 0.56 |
| Chromium VI (Cr) | mg/m² | 6.6 |
| Chromium, total (Cr) | mg/m² | 7.7 |
| Cyanide | mg/m² | 5.5 |
| Cobalt (Co) | mg/m² | 8.8 |

| Parameter | Dimension | Upper limit |
|---|---|---|
| | | |
| Copper (Cu) | mg/m² | 15.4 |
| Molybdenum (Mo) | mg/m² | 38.6 |
| Nickel (Ni) | mg/m² | 15.4 |
| Mercury (Hg) | mg/m² | 0.22 |
| Selenium | mg/m² | 7.7 |
| Thallium (Tl) | mg/m² | 0.88 |
| Vanadium (V) | mg/m² | 4.4* |
| Zinc (Zn) | mg/m² | 63.9 |
| Chloride ($Cl^-$) | mg/m² | 27 5000 |
| Fluoride (F-) | mg/m² | 826 |
| Sulphate ($SO_4^{2-}$) | mg/m² | 264 500 |
| * 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

## Thermal Insulation System [WVDS] with ETA as per ETAG 004

Last updated: May 2019

**CONTENTS**

## 1 Scope

The scope refers to glued or anchored and glued thermal insulation composite systems with an ETA according to ETAG 004 with polystyrene (EPS) insulation materials according to EN 13163:2012+A1:2015[0] or mineral wool (MW) according to EN 13162:2012+A1:2015[0].

To execute the WDVS, 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.

Thermal insulation systems 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/m².
- 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/mm² 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/m².
- 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/m² |

#### 2.1.2 Thermal insulation systems with glued mineral wool (MW) lamellae (fibres perpendicular to substrate)

- The substrate (wall) has a minimum tear strength of 80 kN/m².
- The MW- lamellae are not thicker than 400 mm and have a shear modulus of at least 1.0 N/mm².
- 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/mm² horizontal surface load is discharged over the bonding onto the substrate; for thicknesses > 200 mm, at least 0.05 N/mm² 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 $w_e$:

| **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 |

0 Implemented in Germany by DIN EN 13163:2016-08.

0 Implemented in Germany by DIN EN 13162:2015-04.

- 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 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 ≤ 2 x $d_{insulating\ material}$
  - if minimum width is not reached for an area to be insulated of min W ≤ 2 x $d_{insulating\ material}$
  - 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 < $d_{insulating\ material}$ may not be executed without additional support constructions.
  The field sizes without expansion joints are

  - 9 m x 9 m or 80 $m^2$ for thick layer systems (base coat including final coat = total plaster thickness > 10 mm).
  - for thin film sections (base coat including final coat = total plaster thickness ≤ 10 mm) 50 m x 25 m.

### 2.1.3 Thermal insulation systems 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/$m^2$.
- 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 anchors being anchored 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)

$\gamma_F$ : 1.5 (safety factor for wind effects)

$\gamma_{M,U}$ : Safety factor of anchor extraction resistance from substrate (see relevant dowel -ETA)

b) Thermal insulation composite system proof:

$S_d \leq R_d$

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 Safety

For the following building inspection requirements for fire performance of exterior walls in accordance with Section A 2.1.5 in conjunction with A 2.2.1.2 of the Model Administrative Order laying down Technical Building Regulations (MVV TB), classes for specific thermal insulation composite system classes pursuant to DIN EN 13501-1:2010-01 are assigned and usage rules 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 | Class pursuant to DIN EN 13501-1: 2010-01* | Provisions relating to use |
|---|---|---|
| Thermal insulation composite system non-combustible | A1<br>A2 - s1,d0 | ☠ mineral-bonded base and final coats (bonding agent: lime and/or cement) containing ≤ 5 % organic matter in the dry matter; or<br>☠ 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 %<br>☠ PCS value of base coat ≤ 3.0 MJ/kg<br>☠ PCS value of final coat ≤ 2.6 MJ/kg |
| Insulation: non-combustible | A1<br>A2 - s1,d0 | |
| * * The requirements from Annex 4 Section 1.3 shall apply. | | |

| Building approval requirement | Class pursuant to DIN EN 13501-1: 2010-01* | Provisions relating to use |
|---|---|---|
| ETICS, flame-resistant | C-s2,d0 | - |
| Insulating material: flame-resistant | C-s2,d0 | |
| * * The requirements from Annex 4 Section 1.3 shall apply. | | |

| Building approval requirement | Class pursuant to DIN EN 13501-1: 2010-01* | Provisions relating to use |
|---|---|---|
| ETICS normally flammable | E | - |
| Insulation material: normally flammable | E | |
| * * The requirements from Annex 4 Section 1.3 shall apply. | | |

### 3.2 Thermal insulation composite system with expanded polystyrene (EPS)- insulation material according to EN 13163:2012+A1:2015[1]

| Building approval requirement | Class pursuant to DIN EN 13501-1: 2010-01 | Provisions relating to use |
|---|---|---|
| Thermal insulation composite system: | C-s2,d0 | - |

| **Building approval requirement** | **Class pursuant to DIN EN 13501-1: 2010-01** | **Provisions relating to use** |
|---|---|---|
| flame-resistant | | |
| Insulation material: flame-resistant | C-s2,d0 | Bulk density: ≤ 25 kg/m³, insulation thickness: ≤ 300 mm |
| constructive measures (fire barriers): non-combustible, dimensionally stable up to 1000 °C,<br>Raw density ≥ 60 kg/m²,<br>stable even in case of fire:<br>Transverse tensile strength ≥ 5 kPa<br>Minimum dimensions:<br>Height: ≥ 200 mm | A2-s1,d0 | **Fire protection measures against fire exposure from outside:**<br>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.),<br>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,<br>3. a fire block at the height of the ceiling of the third floor above ground level or adjacent horizontal building parts pursuant to (1), but with an axis distance of not more than 8 m to the fire barrier below. For larger distances additional fire barriers should be installed,<br>4. further fire barriers at exterior wall transitions to horizontal areas (e.g. transits, passageways, archways), provided these are in an area subject to fire stress from outdoors on the first to third floors storey.<br>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.<br>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:<br>☠ 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,<br>☠ 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<br>☠ use of a reinforcement fabric with areal density ≥ 150 g/m².<br><br>**Fire protection measures for fire exposure from external wall openings, above the fire block as per Paragraph 3:**<br>1. Insulation material thickness d > 100 mm to d ≤ 300 mm for bonded- and anchored thermal insulation composite systems<br><br>When the following are used:<br>☠ exclusively minerally or organically bound adhesive mortars (no adhesive foam)<br>☠ minerally bound base and final coat (cement/lime binder) where<br>☠ Content in organic constituents in dry mass of base and final coat ≤ 5 % each,<br>☠ Wet application amount each ≥ 2.5 kg/m2, |

| Building approval requirement | Class pursuant to DIN EN 13501-1: 2010-01 | Provisions relating to use |
|---|---|---|
| | | ☠ Total coat thickness (base and final coat) ≥ 4 mm<br>☠ organically bound base and final coat (binder: synthetic resin, silicone resin, or silicate dispersion) with<br>☠ Content in organic constituents in dry mass of base and final coat ≤ 10 % each,<br>☠ Wet quantity applied 2.5 to 8 kg/m² each,<br>☠ Total coat thickness (base and final coat) 4 to 14 mm<br>fire protection measures shall be carried out in the following areas:<br>a) Above each aperture in the lintels region, at least 300 mm laterally (left and right of the aperture) and in the area of insulated reveals,<br>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).<br>The design according to a) and b) is not required if at least every second around the building is arranged at least on every 2nd floor.<br>The insulating strips must be positioned so that a maximum distance of 0.5 m between the lower edge lintel and the upper edge fire block is maintained.<br>2. Insulating material thickness ≤ 100 mm:<br>Windows are installed flush with or behind the shell edge. |
| ETICS normally flammable | E | |
| Insulation material: normally flammable | E | |

## 4 Sound insulation

If no nominal value is indicated, the thermal insulation composite system must be used with a value of $\Delta R_w$ = -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 4108-4:2017-03.

## 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 inspectorate, 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

Last updated: October 2021

**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 shuttering blocks made of normal weight concrete and lightweight concrete in accordance with 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[1] [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 For the design and construction of a cast-in-place concrete wall of the grid type, column type or "other type" made of formwork blocks 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] the following also applies:**

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 support 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 strength development of fresh concrete must be 'Medium' to 'Fast' in accordance with DIN EN 206-1:2001-07, DIN EN 206-1/A1:2004-10 and DIN EN 206-1/A2:2005-09 [10] in conjunction with DIN 1045-2:2008-08 [11], Table 12.

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 DBV explanatory leaflet 'Betonierbarkeit von Bauteilen aus Beton und Stahlbeton' [Concreting capability of concrete and reinforced concrete structural elements] [12] – 01/2014 must be observed.

4. The walls may not deviate from the perpendicular by more than 5 mm per running metre of wall height – by more than 15 mm from wall heights of 3 m and up – and must comply with the evenness tolerance for wall surfaces under DIN 18202:2013-04, Table 3, row 6 [13].

## C Fire protection

### C1 Fire resistance

For load-bearing wall constructions that are created using 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 structure in accordance with DIN EN 1992-1-2:2010-12 [14] taking into account DIN EN 1992-1-2/NA:2010-12 [15] taking into account DIN EN 1992-1-2/NA:2010-12 [15], if the proof of stability under normal temperatures is fully possible on the basis of 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]. The scope in which an assessment of the fire resistance is possible with regard to the space barrier and insulation (EI) or load capacity, space barrier and insulation (REI) depends on the corresponding boundary conditions of the verification procedure according to DIN EN 1992-1-2:2010-12 [14] taking into account DIN EN 1992-1-2/NA:2010-12 [15].

There is no universally applicable Technical Rule for test-specific proof.

### C2 Fire performance

For non-load-bearing permanent shuttering blocks made of expanded polystyrene (EPS) insulation in accordance with EN 13163:2012+A2:2016[0] [16], the TR “ETICS with ETA in accordance with ETAG 004” (June 2016) Section 3.2[0] shall be applied mutatis mutandis with regard to the assignment of the classification in accordance with DIN EN 13501-1:2010-01 [17]to the building authority requirements.

### D Sound insulation

If formwork components are used in cases where sound insulation requirements apply, proof of sound insulation as per DIN 4109-1:2018-01 [18] and DIN 4109-32:2016-07 [19] must be provided.

### 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 formwork components, 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 [20].

As integrated thermal insulation, these are thermal insulation inserts inside the formwork 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 ≥ 100 kPa [16] shall be used.

[0] Implemented in Germany by DIN EN 13163:2017-02.

[0] When applying TR ‘Thermal insulation composite system with ETA pursuant to ETAG 004’ in respect of the fire characteristics of permanent polystyrene formwork kits, it should be borne in mind that under state building regulations, ‘flame-resistant’ is only required for the surfaces of exterior walls of buildings in building classes 4 and 5. ‘normal flammability’ is sufficient for building classes 1 to 3.

**References**


| | | |
|---|---|---|
| [1] | ETAG 009:2002-06 | Non load-bearing permanent shuttering kits/systems based on hollow blocks or panels of insulating materials and sometimes concrete. |
| [2] | DIN EN 15435:2008-10 | Precast concrete products - Normal weight and lightweight concrete shuttering blocks - Product properties and performance; German version EN 15435:2008. |
| [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<br>DIN EN 1992-1-1/A1:2015-03 | Eurocode 2: Design and construction of reinforced concrete and Design and construction of reinforced concrete and prestressed concrete supporting 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<br>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 EN 206-1:2001-07<br><br>DIN EN 206-1/A1:2004-10<br>DIN EN 206-1/A2:2005-09 | Concrete – Part 1: Specification, performance, production and conformity; German version EN 206-1:2000<br><br>Amendment A1<br>Amendment A2. |
| [11] | DIN 1045-2:2008-08 | Concrete, reinforced and prestressed concrete structures – Part 2: Concrete – Specification, performance, production, and conformity – Application rules for DIN EN 206 1. |
| [12] | DBV | Reference document The concreting ability of concrete and reinforced concrete structural elements — Planning and execution recommendations for concrete installation — 01/2014. |
| [13] | DIN 18202:2013-04 | Tolerances in building construction — Buildings. |
| [14] | DIN EN 1992-1-2:2010-12 | Design and construction of reinforced concrete and prestressed concrete supporting structures – Part 1-2: General rules – Structural fire design; German version EN 1992 1-2:2004 + AC:2008. |
| [15] | DIN EN 1992-1-2/NA:2010-12 | National Annex – Nationally determined parameters – Eurocode 2: Design and construction of reinforced concrete and prestressed concrete supporting structures – Part 1-2: General rules – Structural fire design. |
| [16] | DIN EN 13163:2017-02 | Thermal insulation products for buildings - Factory made expanded polystyrene (EPS) products - Specification; German version EN 13163:2012+A2:2016. |
| [17] | DIN EN 13501-1:2010-01 | Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests; German version EN 13501-1:2007+A1:2009. |
| [18] | DIN 4109-1:2018-01 | Sound insulation in buildings – Part 1: Minimum requirements. |
| [19] | DIN 4109-32:2016-07 | Sound insulation in buildings – Part 32: Data for verification of sound insulation (component catalogue) – Solid construction. |
| [20] | DIN 4108-4:2020-11 | Thermal insulation and energy economy in buildings – Part 4: Hygrothermal design values. |

**Appendix 1**

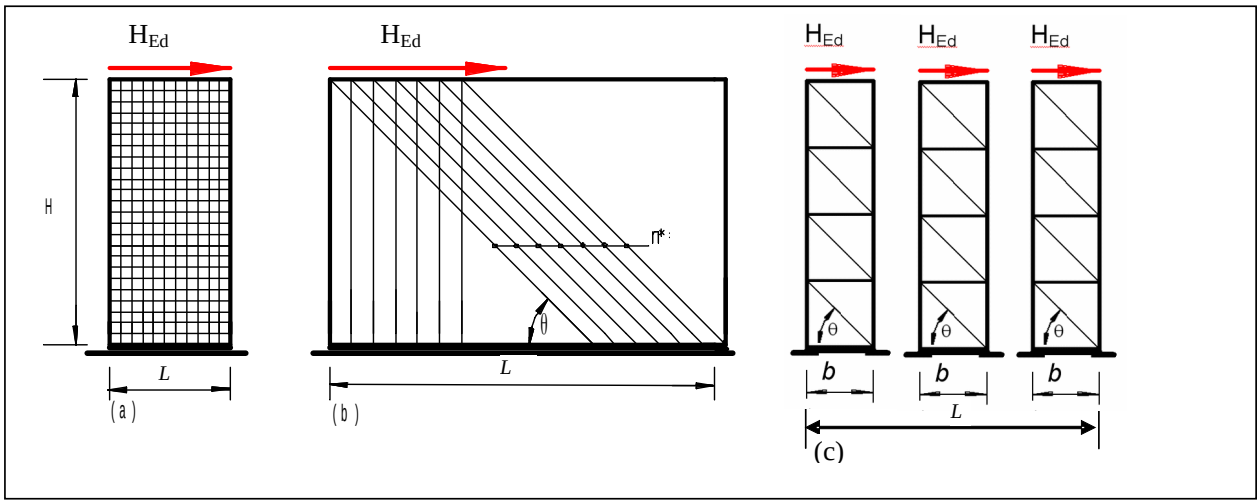
**Detection of resistance to horizontal influences ( $H_{Ed}$ ), in wall planes for walls of grid type and column type, excluding earthquakes**

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 $H_{Ed}$

The proof of horizontal forces in the longitudinal direction of the wall (shear forces) $H_{Ed}$ must be carried out 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 is I, 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 of the concrete beam $Z_r$ and a characteristic concrete tensile strength $f_{ctk;0,05}$ the following design resistance results for a wall:

$$H_{Rd,1} = \frac{4}{3}\frac{L}{h_s}\frac{Z_r}{l_r}\frac{f_{ctk;0,05}}{\gamma_{ct}} \quad (4)$$

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;

$$f_{ctk;0,05} = \eta_1 \cdot 0{,}7 \cdot 0{,}3 \cdot f_{ck}^{2/3} = \eta_1 \cdot 0{,}21 \cdot f_{ck}^{2/3} \quad [MN/m^2];$$

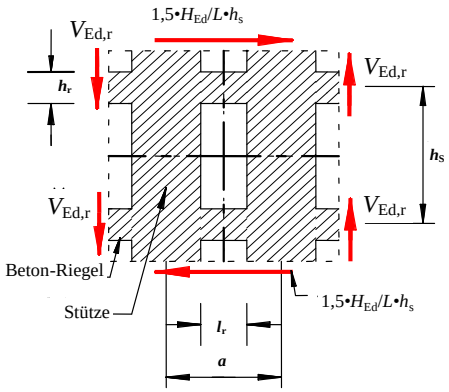
$f_{ck}$ characteristic compressive strength of concrete (cylinder);

$\gamma_{ct}$ Partial safety factor for the concrete tensile strength of in-situ concrete;

where $1{,}5$ for normal in-situ concrete;

$\eta_1$ where $1{,}0$ for in-situ concrete made of lightweight concrete

with a calculated value of the dry bulk density of $0{,}40 + 0{,}60 \cdot \rho/2200$ ρ in [kg/m³].

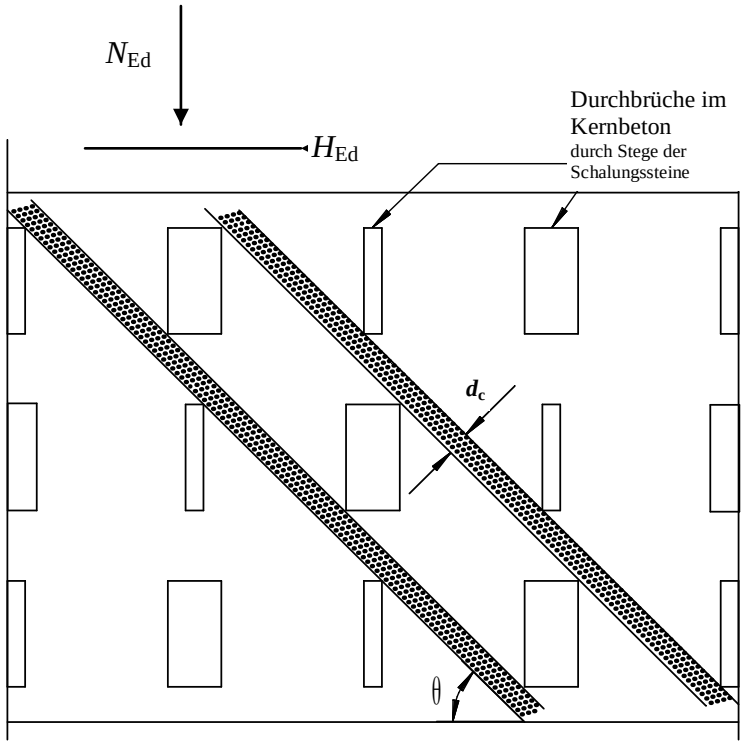



| | |
|---|---|
| Beton-Riegel | Concrete bars |
| Stütze | Support |

**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).




| | |
|---|---|
| Durchbrüche im Kembeton<br>durch Stege der Schalungssteine | Recesses in core concrete<br>using formwork block studs |

**Figure 3:** Height $d_c$ of a continuous strut

The design resistance of a strut is determined using equation (5). The angle of inclination $\theta$ for the struts is derived from Fig. 3.

The rated resistance $H_{Rd,2}$ is a result of equation (5):

$$H_{Rd,2} = n * \nu \cdot f_{cd} \cdot b_c \cdot d_c \cdot \cos\theta \leq N_{Ed} \cdot \cot\theta \qquad (5)$$

with

$H_{Rd,2}$ = Design resistance in the model with continuous struts

$n$ = Number of continuous struts in a wall

$f_{cd}$ = Design value of the compressive strength of the concrete

$\nu$ = $0{,}6 \cdot (1 - f_{ck} / 250)$ [$f_{ck}$ in MN/m²] *(corresponds to equation 6.6N in [8] or [9])*;

$b_c$ = Thickness of the struts

$d_c$ = Height of the struts (minimum 70 mm)

$\theta$ = Inclination angle of the struts $30° \leq \theta \leq 60°$

$N_{Ed}$ = 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 “re-suspended 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 re-suspended reinforcement as per beam model

$A_{sh,r}$ = Cross-section of horizontal re-suspended reinforcement

$A_{sv,r}$ = Cross-section of 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):

$$H_{Rd,3b} = n * \nu \cdot f_{cd} \cdot b_c \cdot d_c \cdot \cos\theta \quad (7)$$

where

$n * \nu$ = 1;

$\theta$ = 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 13

## Directive on roller shutters

Last updated: September 2021

**CONTENTS**

## 1 Scope

This directive applies to factory-made roller shutter boxes (including roller shutter covers), which comply with the thermal and sound insulation requirements.

The structural elements of the roller shutter boxes must consist of at least normal flammability building materials.

For factory-made roller shutter boxes with a static support function in the structure, the Technical Rule laid down in Chapter C 2 must also be observed for the relevant construction product.

## 2 Thermal insulation

### 2.1 Minimum thermal protection requirements

Requirements have been laid down for the heat transmission limit and for the surface temperature.

The roller shutter box must meet the minimum thermal insulation requirement according to DIN 4108-2:2013-02, Section 5.1.3.

This requirement is deemed to be met if the thermal transmittance $U_{sb}$ of the shutter box, calculated in accordance with section 2.2 or measured in accordance with section 2.3, is $U_{sb} \leq 0{,}85$ W/(m² · K) and the temperature factor calculated according to section 2.2 is $f_{Rsi} \geq 0{,}70$.

### 2.2 Calculation of thermal transmission coefficient $U_{sb}$ and temperature factor $f_{Rsi}$

The thermal transmission coefficient $U_{sb}$ of the roller shutter box shall be calculated two-dimensionally in accordance with DIN EN ISO 10077-2:2018-01 and rounded to two digits. The calculation is to be carried out with a blind frame with a 60 mm constructional depth, which for the purposes of this Directive is to be regarded as adiabatic. The blind frame shall be set flush with the outer side of the actual or planned window frame, irrespective of its width.

During the two-dimensional calculation, the heat flow density shall be obtained from the relevant height $b_{sb}$ in accordance with DIN EN ISO 10077-2:2018-01.

The temperature factor $f_{Rsi}$ of the roller shutter box shall be calculated two-dimensionally in accordance with DIN EN ISO 10211:2018-03 in conjunction with DIN EN ISO 10077-2:2018-01 and rounded to two decimal places. The calculation shall be made with a blind frame with a construction depth of 70 mm made of wood of thermal conductivity $\lambda = 0.13$ W/(m · K) under the boundary conditions set out in DIN 4108-2:2013-02. For the contact resistances, the boundary conditions in accordance with Addendum 2:2019-06 to DIN 4108 shall be applied. The upper structural shell connections shall be considered as adiabatic for the purposes of this Directive.

For the structural elements of the roller shutter box, the respective rated thermal conductivity values are in accordance with DIN EN ISO 10456:2010-05, DIN EN ISO 10077-2:2018-01, or DIN 4108-4:2020-11. The roller space is to be treated according to the conditions stated in Section 6.3.5 or DIN EN ISO 10077-2:2018-01.

### 2.3 Measurement of heat transfer coefficient $U_{sb}$

The thermal transmission coefficient $U_{sb}$ of the roller shutter box shall be determined in accordance with DIN EN 12412-4:2003-11.

## 3 Sound insulation

If soundproofing properties are to be demonstrated for the roller shutter box, the associated sound insulation value is to be determined as follows:

- Based on design characteristics according to DIN 4109-35:2016-07, Table 6, or
- By measuring according to DIN EN ISO 10140-1:2016-12, DIN EN ISO 10140-2 and -4:2010-12 and DIN EN ISO 10140-5:2014-09 and assessment according to DIN EN ISO 717-1:2013-06. If only a weighted standard sound level difference $D_{n,e,w}$ has been demonstrated during the measurement, this should be converted into a weighted sound insulation value using the following formula:
  $R_w = D_{n,e,w} + 10 \log(S_R/10m^2)$
  with $S_R$ area of the roller shutter box in m².

Test reports in accordance with DIN EN ISO 10140-1:2010-12, 2012-05 and 2014-09 and DIN EN ISO 10140-05:2010-12 in conjunction DIN EN ISO 717-1:2006-11 and/or DIN EN ISO 717-1:2013-06 that were created before the entry into force of this version of the Administrative Rules laying down Technical Building Regulations may continue to be used.

When calculating airborne sound insulation, the declared rated sound insulation $R_w$ can be directly placed in Equation 37 of DIN 4109-2:2018-01, Section 4.4.2.

## 4 Main features of the ‘ÜZ’ conformity mark

In the m-ark of conformity of a roller shutter box which complies with the requirements of Sections 1 and 2, the heat transfer coefficient $U_{sb}$ is to be indicated as an essential feature in roller shutter boxes with sound insulation properties in accordance with Section 3, in addition to the rated sound insulation-value ‘$R_W$ = ...’

The key features of the -mark of conformity also include the information for combining roller shutter boxes with roller shutter box covers.

For roller shutter boxes with a static support function in the structure, the regulations for marking in accordance with the relevant Technical Rule must also be observed.

## Annex 14

# Technical Rule on Technical Building Equipment (Technische Regel Technische Gebäudeausrüstung [TR TGA])

Last updated: April 2022

**CONTENTS**

# 1 Furnaces

## 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. In particular, the requirements on the storage of fuels, including with regard to the provisions of the Product Safety Act [Produktsicherheitsgesetz], must be observed.
The building inspection 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 fireplaces 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 furnaces

### 1.7.1 Essential requirements

The building inspection requirements shall be deemed to have been met if furnaces are used in accordance with this Technical Rule.

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) (on e.g. furnaces for liquid and solid fuels with motorised 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, e.g. if constructed in accordance with ‘Specialist Regulation [Fachregel] on furnace and air heating construction’, TR OL 2006, 2010 version’, or if they are solid fuel furnaces without motorised drive, with the exception of residential furnaces or
3. With building inspectorate proof of fitness for purpose.

### 1.7.2 Furnaces 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 inspection requirements, the performance of the construction products used in terms of fundamental characteristics must at least satisfy Table 1

Explanation for Table 1

| 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 1:**

| 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)** | - | - | - | - | - | - | - | - |
| **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 | L | L | L | L | L | L | L | L |

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** | | | | | | | | |
| manufacturer)[2] | | | | | | | | |
| 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<br>at partial-load heat output<br>(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 not included in Annex ZA for the construction product, or included in Annex ZA but not required under building inspection regulations

When using furnaces according to the Construction Products Regulation, except for sauna stoves according to EN 15821:2010[7], it should be kept in mind that

- 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 $R \leq 1.2$ m²K/W for solid fuel furnaces and $R \leq 0.127$ m²K/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,
- For inset appliances in furnaces, the provisions of the ‘Specialist Regulation [Fachregel] on furnace and air heating construction, TG OL 2006, 2010 version’ or the manufacturer’s specifications, e.g. pursuant to EN 13229:2001[2], shall be 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:

a. Fire resistance (pyrometric cone equivalent as a fire resistance index) > 15,
b. Thermal shock resistance ≥ 25 cycles,
c. Thermal length expansion ≤ 1.5 %,
d. 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 fuels with CE marking pursuant to the Gas Appliances Regulation or the Machinery Directive, the requirements of the 'technical rules for Gas Installations' (DVGW Guideline G 600, technical rules for Gas Installations, DVGW-TRGI, 2018 version) or the Technical Rules summarised in the 'technical rules for Liquefied Petroleum Gas' (TRF 2021), shall be observed, taking account of the Technical Rule included in the MVV TB under ser. No A 2.2.1.12. This includes the exhaust system.

For the establishment and operation of CE-marked liquid fuel fireplaces under the Machinery Directive, the Technical Rule referred to in MVV TB under ser. No A 2.2.1.12 shall be observed. In addition, the technical rules summarised in the 'Technical Rules of Oil Plants' (TRöl 2.1, Issue 12/2019) must be taken into account.

### 1.7.4 Furnaces without CE marking

For the construction and operation of on-site solid-fuel furnaces with handcrafted furnaces, the Technical Rules summarised in the 'Specialist Rules for Furnaces and Air Heating Systems' TR OL 2006, 2010 version, shall be observed together with the Technical Rule included in the MVV TB under ser. No A 2.2.1.12.

The following insulation materials may be used for on-site furnaces in accordance with the implementing provisions of the TR OL 2006, 2010 version:

- 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 shall 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.

The building inspection requirements for the design and execution of exhaust systems for the discharge of exhaust gases from furnaces fired 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 interior combustion engines shall be deemed fulfilled if the rules of DIN V 18160-1:2006-01, excluding Sections 5.2.1, 6.2, 6.5, 6.9, 6.10.1 and 6.10.2, in conjunction with DIN V 18160-1 Addendum 1:2015-11 und Addendum 2:2016-04 as well as the following provisions are complied with.

structural elements of exhaust gas systems shall be at least normal flammability in terms of their fire characteristics.
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 ≤ 2.7 $m^2K/W$ and for ceilings and roofs to be penetrated with a thermal resistance of R ≤ 5.4 $m^2K/W$. 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.

Exhaust systems shall be marked permanently and visibly, depending on the scope of application, with at least the following information:

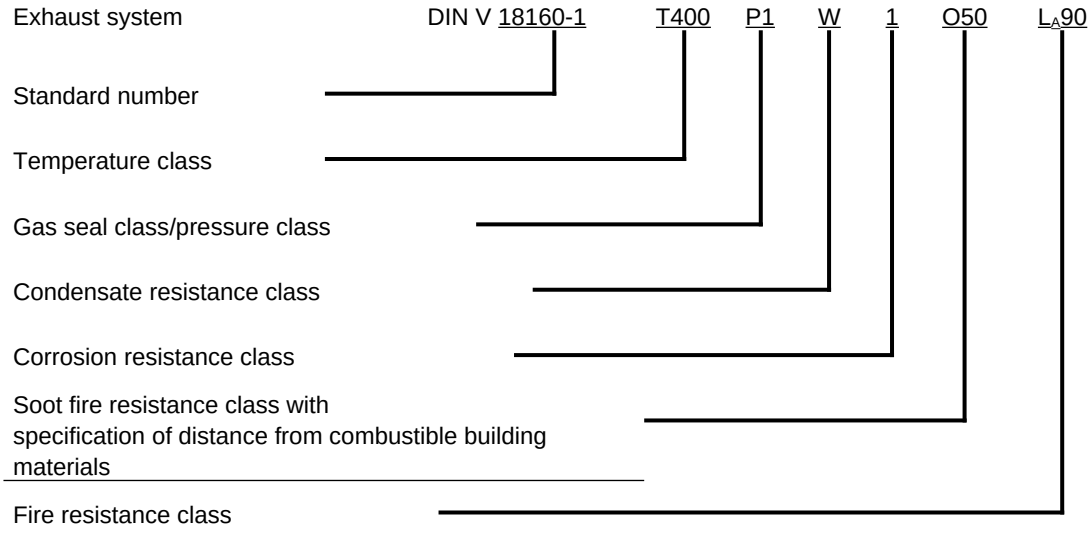
- Standard number: DIN V 18160-1:2006-01,
- The temperature class ‘Txxx’ indicates the nominal operating temperature xxx in °C up to which the executed exhaust system can be operated.
- The gas tightness/pressure class indicates the mode of operation for which the exhaust system is suitable:
  ‘N1’ and ‘N2’ for vacuum, ‘P1’ also for overpressure ≤ 200 Pa
  ‘P2’ also for overpressure ≤ 200 Pa outdoor
  ‘H1’ also for overpressure ≤ 5 000 Pa
  ‘H2’ also for overpressure ≤ 5 000 Pa outdoors.
- The condensate resistance class specifies the operating conditions for which the exhaust system is suitable:
  ‘D’ for scheduled dry operation (without lowering the dew point temperature);
  ‘W’ also for wet operation as planned.
- The corrosion resistance class specifies the fuel type for which the exhaust system is suitable:
  ‘1’ for gaseous fuels with a sulphur content ≤ 50 $mg/m^3$, such as LPG, NG L and H, and for liquid fuels with a sulphur content ≤ 50 mg/kg, ‘2’ for gaseous fuels, for liquid fuels with a sulphur content ≤ 2 000 mg/kg and for wood in open furnaces, ‘3’ for gaseous and liquid fuels, as well as for wood, coal, and peat.
- The soot fire resistance class with specifications for distance from combustible building materials: ‘Oxx’ indicates that the exhaust system is not resistant to soot fires, and is accordingly suitable only as an exhaust gas duct for gaseous and liquid fuel furnaces;
  ‘Gxx’ indicates that the exhaust system is resistant to soot fires and is therefore also suitable as a chimney for furnaces for solid fuels.
  ‘xx’ indicates the necessary minimum distance from the outer surface area of the flue to combustible structural elements, where xx is the numerical value of the minimum distance in rounded millimetres.
- The fire resistance class ‘$L_A$’ indicates the time during which an exhaust system is able to withstand external exposure to fire, and during which there will be no transfer of the fire via its surfaces to other fire compartments. The possible classes are set out 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 declared fire resistance must have been tested with thermal pretreatment according to the selected temperature class (e.g. T400). | | |

Each performance indicator shall correspond at least to the required class or to a higher class in the following order:
T600 >T450 >T400 >T300 >T250 >T200 >T160 >T140 >T120 >T100 >T080.
H > P > N; Wx > Dx; D3 > D2 > D1; W3 > W2 > W1; G > O.

Example marking of an exhaust system:




Exterior shells of exhaust systems pursuant to DIN V 18160-1:2006-01 that are designed as assembly chimneys must have performance characteristics satisfying the same or a higher performance class than that required for the proposed design. For this purpose, construction products according to EN 1858: 2008+A1:2001[0], EN 12446: 2011[0], EN 13069: 2005[0] and EN 1806:2006[0] may be used, and must be marked at least with T400 and G. If there are requirements for fire resistance during use, this must be verified in accordance with DIN 18160-60: 2014-02 by means of a proof of fitness for purpose by the building authorities. The proof may be provided for the outer shell alone or together for structures with multiple shells.

The following may also be used to manufacture outer shells from masonry:

- Bricks according to DIN EN 771-1:2015-11 in conjunction with DIN 20000-401:2017-01 or alternatively DIN 105-100:01-2012 with a wall thickness of ≥11.5 cm;
- Solid bricks (Mz) and perforated bricks type A (HLzA) in accordance with EN 771-1:2015-11 in conjunction with DIN 20000-401:2017-01 or alternatively DIN 105-100:2012-01 with wall thickness ≥ 11.5 cm and raw density of ≥ 1.2 kg/dm³;
- Perforated bricks type B (HLzB) in accordance with EN 771-1:2015-11 in conjunction with DIN 20000-401:2017-01 or alternatively DIN 105-100:2012-01 with wall thickness ≥ 24 cm and raw density ≥ 1.2 kg/dm³;
- Sand-lime bricks according to DIN EN 771-2:2015-11 in conjunction with DIN 20000-402:2017-01 with a wall thickness of≥ 11.5 cm;
- Autoclave aerated concrete components pursuant to DIN EN 771-4:2011-07 in conjunction with DIN 20000-404:2015-12 with wall thickness ≥ 10 cm;

0 Implemented in Germany by DIN EN 1858:2011-09
0 Implemented in Germany by DIN EN 12446:2011-09
0 Implemented in Germany by DIN EN 13069:2005-12
0 Implemented in Germany by DIN EN 1806:2006-10

- Hollow bricks made of lightweight concrete as per DIN 18151 with wall thickness ≥ 17.5 cm;
- Solid lightweight concrete bricks pursuant to DIN EN 771-3:2005-05 in conjunction with DIN V 20000-403:2005-06 or DIN V 18152-100:2005-10 with wall thickness ≥ 11.5 cm are deemed equivalent.

Outer shells made from the above-mentioned masonry correspond to classification T400 G50 $L_A$90.
For assembly exhaust gas systems, insulating materials pursuant to DIN EN 14303:2016-08 may be used in accordance with the relevant requirements for the proposed exhaust system together with the following provisions:

1. Insulation materials for assembly chimneys
   The insulation materials for chimneys must be able to withstand the effects of temperature caused by soot fire. Soot fire resistance cannot be demonstrated pursuant to DIN EN 14303:2016-08.
   Insulation shells made of insulating materials as per DIN EN 14303:2016-08 must be at least 3 cm thick and have thermal resistance of at least 0.4 m²K/W at 300°C.
   In the case of internal shells according to EN 1856-1:2009[0], an insulation shell can be dispensed with a thermal insulation of at least 3 cm in conjunction with the outer shells specified in DIN V 18160-1:2006-01, Section 7.2.3.
2. Insulating materials for assembly exhaust pipes
   Insulating materials according to DIN EN 14303:2016-08 may be used for assembly exhaust pipes. The upper application limit temperature of the insulating material must be higher than or equal to the required temperature class for the exhaust system.
3. Insulating materials for connectors and single-layer metallic exhaust systems
   Insulating materials that are placed directly on the surfaces of metallic exhaust systems or connectors must be non-combustible. The upper application limit temperature of the insulating material must be higher than or equal to the required temperature class for the exhaust system.

Any subsequent designs will require a type approval:

- Air-exhaust chimneys,
- Multiple-use exhaust systems for room-sealed solid-fuel furnaces,
- Chimneys operated under overpressure,
- Connectors for solid-fuel furnaces operated under overpressure, and
- Assembly exhaust systems with a higher temperature class than T400.

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 Tables 4 and 5 for the key features.

Explanation for Table 4

| Column no. | Product according to harmonised standard |
|---|---|
| 2 | EN 1457-1:2012 Clay/ceramic flue liners for operating under dry conditions[0] |
| 3 | EN 1457-2:2012 Clay/ceramic flue liners for operating under wet conditions[0] |
| 4 | EN 1806:2006 Ceramic mould components for exhaust systems[12] |
| 5 | EN 1856-1:2009 Requirements for metal chimneys - System chimney products[13] |
| 6 | EN 1856-2:2009 Metal flue liners and connecting flue pipes for chimneys[0] |
| 7 | EN 1857:2010 Concrete flue liners for chimneys[0] |
| 8 | EN 1858:2008+A1:2001 Concrete flue components[9] |
| 9 | EN 12446:2011 Chimneys - Concrete exterior wall elements[10] |
| 10 | EN 13063-1:2005+A1:2007 Soot fire-resistant system chimneys with ceramic flue liners[0] |

0 Implemented in Germany by DIN EN 1856-1:2009-09
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 EN 1856-2:2009-09
0 Implemented in Germany by DIN EN 1857:2010-08
0 Implemented in Germany by DIN EN 13063-1:2007-10

| Column no. | Product according to harmonised standard |
|---|---|
| 11 | EN 13063-2:2005+A1:2007 System chimneys with clay/ceramic flue liners0 |
| 12 | EN 13063-3:2007 Air flue system chimneys with clay/ceramic flue liners0 |
| 13 | EN 13069:2005 Ceramic outer shells for system exhaust installations11 |
| 14 | EN 14471:2013+A1:2015 System exhaust systems with plastic flue liners0 |
| 15 | EN 14989-1:2007 Appliances for room-sealed exhaust systems of gas appliances of type C60 |
| 16 | EN 14989-2:2007 Exhaust and air supply ducts for room-sealed furnaces0 |

**Table 4:**

| Essential feature | Product according to harmonised standard | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Temperature class | 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 |
| Condensate resistance class | 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 |
| Soot fire resistance class | 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 |
| Pressure class if not indicated above (for LAS) | - | - | - | - | - | - | - | K | - | - | - | K | - | - | - |
| Fire performance | - | - | - | - | - | K | K | K | - | - | - | - | K | - | - |
| Thermal resistance | 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 |
| Freeze-thaw cycle resistance | 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 |

X must be fulfilled
K Classification required
L Value for the output required
- Essential feature not included in Annex ZA for the construction product, or included in Annex ZA but not required under building inspection regulations

Explanation for Table 5

| Column no. | European Assessment Document (EAD) |
|---|---|
| 2 | CHIMNEY KIT WITH CERAMIC FLUE LINER<br>EAD 060001-00-0802 |
| 3 | Chimney kit with ceramic flue liner and with specific outer wall<br>EAD 060003-00-0802 |
| 4 | Chimney kit with ceramic flue liner, with different outer walls and possible change of outer wall<br>EAD 060008-00-0802 |

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 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

**Table 5:**

| **Essential feature** | **Construction product according to European Assessment Document (EAD)** | | |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| Temperature class | K | K | K |
| Pressure class | K | K | K |
| Condensate resistance class | K | K | K |
| Corrosion resistance class | K | K | K |
| Soot fire resistance class | K | K | K |
| Specifications for distance from combustible building materials | L | L | L |
| Pressure class unless included above (for LAS) | X | X | X |
| Thermal resistance | L | L | L |
| Flow resistance | L | L | L |
| Freeze-thaw cycle resistance | X | X | X |
| Mechanical strength and stability | L | L | L |
| X must be fulfilled<br>K Classification required<br>L Value for the output required | | | |

### 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.
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 inspection requirements, fire alarm systems must be permanently reliable in operation and 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.

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/A1:2006 Fire Detection Panels0 |
| 3 | EN 54-3:2001 + A1:202 + A2:2006 Acoustic Signal Transmitter 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 Supplies0 |
| 5 | EN 54-5:2017 +A1:2018 Heat detectors – Point detectors0 |
| 6 | EN 54-7:2018 Smoke detectors — Point-shaped detectors according to the scattered light, transmitted light or ionisation principle0 |
| 7 | EN 54-10:2002 + EN 54-10/A1:2005 Flame detector — Point-shaped 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 |
| 10 | EN 54-16:2008 Voice alarm control and indicating equipment0 |
| 11 | EN 54-17:2005 + EN 54-17:2005/AC:2007 Short-circuit insulators0 |
| 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 Visual alarm devices0 |
| 16 | EN 54-24:2008 structural elements of voice alarm systems – Loudspeakers0 |
| 17 | EN 54-25:2008 + EN 54-25:2008/AC:2012 structural elements using high-frequency connections0 |

0 In Germany implemented 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 In Germany implemented 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
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 54-1: 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 | | | | | | | | 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 |
| Section | | | | | | | | | | | | | | | | |
| 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 | | | | | | | |

| **Essential feature** | **Product according to harmonised standard** | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| Fire alarm status | X | | | | | | | | | | | | | | | |
| Fault alarm status | X | | | | | | | | X | | | | | | | |
| 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<br>(In operation) | | | | | | | X | | | | | | | | | |
| Reliability test (durability test) | | | | | | | X | | | | | | | | | |
| Voice alarm status | | | | | | | | | X | | | | | | | |
| Manual triggering of voice alarm | | | | | | | | | 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 |
| Interface to external controls | | | | | | | | | X | | | | | | | |
| 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 device | | | | | | | | | | | | | 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<br>1 if the feature is required due to the application<br>2 if the feature is applicable to the construction product | | | | | | | | | | | | | | | | |

If harmonised standards are not available for structural elements of a fire alarm system, construction products described in DIN 14675-1:2020-01 or DIN VDE 0833-2:2017-10 may also be used.

The cables and lines necessary for the connection of individual construction products may be used if they are suitable for use, sufficiently dimensioned and suitable for the intended purpose according to technical best practices. In addition, the requirements for fire performance and functional integrity under fire impact must be observed in accordance with the Technical Rule included in MVV TB under ser. No A 2.2.1.8, taking into account Section 2 of the Technical Rule included in MVV TB, ser. No A 2.2.1.2.

### 2.3 Planning, design, and execution of fire alarm systems

Fire alarm systems whose technical planning, design and execution is 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 inspection requirements unless more stringent requirements are imposed in the building supervisory 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 data must be stated in the fire protection certificate.

## 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 Alarm system construction products

In order to fulfil the building inspection requirements, alarm systems must be permanently reliable in operation 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.

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 fire characteristics and functional integrity under fire impact 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 data must be stated in the fire protection certificate.

## 4 Emergency lighting systems

### 4.1 Purpose of the installation

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 inspection rules – 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 inspection requirements, emergency lighting systems must be permanently operationally reliable.

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 those Technical Rules.

Emergency luminaires that comply with the DIN EN 60598-2-22 standard: (VDE 0711-2-22):2020-12 meet the requirements of the building authorities.

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 fire characteristics and functional integrity under fire impact 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 whose technical planning, designing and execution observes 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 inspection requirements unless more stringent requirements are imposed in the building supervisory procedure.

All necessary data must be stated 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 inspection requirements, emergency power supply systems must be permanently reliable in operation.
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 those technical rules.

Power generators with reciprocating internal combustion engines that meet the requirements of the DIN 6280 series of standards as well as central power supply systems that meet the requirements of DIN EN 50171:2001-11 (DIN VDE 0558-508) are deemed to be compliant with the building inspection 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 fire characteristics and functional integrity under fire impact 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 dual system pursuant to DIN VDE 0100-560:2013-10, Section 6.1 ‘Power sources for emergency purposes’, final indent, is not deemed to fulfil the building inspection requirements for emergency power supply systems.

All necessary data must be stated 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 data must be stated 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. In particular, the place of installation, required temperature resistance, fire resistance time, the tightness requirements, required volume flow, pressure difference, location and ambient temperatures must all be taken into account.
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[40]. These include atmospheres in exhaust air ducts or ventilation ducts in commercial kitchens.

#### 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[41], 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[40])** | | | |
|---|---|---|---|
| | **Minimum necessary** | | |
| **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 | | |

0 Implemented in Germany by DIN EN 15650:2010-09
0 According to national law

**Table 2:**

| **- Fire dampers in ventilation systems in exhaust or exhaust air ducts of commercial kitchens, which do not fall within the scope of[40] EN 15650:2010** | | | |
|---|---|---|---|
| **- Fire damper poppet valves that are not in the scope of EN 15650:2010[40]** | | | |
| | **Minimum necessary** | | |
| **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** | |
|---|---|
| | **Minimum necessary** |
| **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, K30-18017-S |
| Fire-resistant | K60-18017, K30-18017-S |

**Table 4:**

| **Essential feature** | **Fire damper in accordance with EN 15650:2010[40]** |
|---|---|
| Reference conditions for activation/response sensitivity | X |
| Response delay/response time | X |
| Operational safety (cycles) | 50 |
| Fire resistance♦ | |
| - Space barrier | 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[40]** | | | |
|---|---|---|---|
| | **Minimum required performances** | | |
| **Building inspection Requirement** | **Fire resistance** | **Fire performance** | |
| | | Housing, switch-off valve | Other structural elements |
| 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 necessary** | |
| **Building approval requirement**- | **Fire-resistance class pursuant to DIN 4102-6:1977-09 and possibly DIN V 4102-21:2002-08** | **Building material class pursuant to DIN 4102-1:1998-05** |
| Fire-retardant | L 30 | A2<br>by way of deviation from A 2.2.1.11, Section 3.2:<br>B1 |
| 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. | | |

**Table 7:**

| **Kits for fire-resistant ventilation ducts according to EAD 350142-00-1106[0]** | | |
|---|---|---|
| | **Minimum required performances** | |
| **Building approval requirement**- | **Fire resistance** | **Fire performance[1]** |
| Fire-retardant | EI 30 ($v_e h_o$ i↔o)S | A2 – s1,d0<br>by way of deviation from A 2.2.1.11, Section 3.2 C-s2, d2, otherwise |
| 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 | | |

### 6.3.3 Special provisions for use and execution

Kits for fire-resistant ventilation ducts pursuant to: EAD 350142-00-1106[42]

Under Regulation (EU) No 305/2011, the manufacturer is required to provide an installation manual based on the classification document for kits for the construction of fire-resistant ventilation ducts under the ETA and in accordance with EAD 350142-00-1106[42] consisting of fire protection plates, sealants, connectors and fasteners. It shall contain at least the following information:

0 Issue date EAD September 2017

- 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 conditions of sentence 1 in conjunction with sentence 2 of this section are not fulfilled, there is no technical best practice under ETA based on EAD 350142-00-1106 for fire-resistant ventilation duct kits0.

## 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 the dissipation of smoke, e.g. in stairwells, are not considered smoke extraction systems in the sense intended here.

### 7.2 Planning, designing and execution

Smoke extraction systems and smoke extractors shall be planned, designed and constructed in such a way that the building approval 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 inspection requirements except where deviating individual requirements apply. The design of smoke extraction systems and smoke extraction devices may be done in accordance with fire protection engineering methods. The input parameters shall be documented in the building documents.

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.

0 Application of § 16a MBO

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 MBO41.

All necessary data must be stated 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 exhaust’ 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 extraction devices. 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 factors including 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.

űIn mechanical smoke extraction systems, mechanical smoke extraction devices according to EN 12101-3: 20150 must be used. There is no defined technical best practice for the use of mechanical smoke extraction devices43.
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 extraction devices is maintained throughout the entire period of operation.

If smoke extraction dampers are also to be controlled manually in mechanical smoke extraction systems, these must be suitable for manual activation. Smoke dampers with mechanical shut-off elements according to EN 12101-845 may only be used in mechanical smoke extraction systems with the axle position of the mechanical

0 Implemented in Germany by DIN EN 12101-3:2015-12

shut-off element, which has been demonstrated 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 MBO41 or application of construction types according to § 16a MBO41. The minimum required classes shall be shown in Table 1.

**Table 1:**

| **Smoke extraction ducts pursuant to DIN V 18232-6:1997-10 in conjunction with DIN 4102-6:1977-09** | | |
|---|---|---|
| | **Minimum necessary** | |
| **Building approval requirement** | **Fire resistance class, category and compression level** | **Building material class according 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<br>Part 2: Specifications for natural smoke and heat extraction devices0 |
| 3 | EN 12101-3: 2015 Smoke and heat control<br>Part 3: Provisions for mechanical smoke and heat extractors44 |
| 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 extraction dampers0 |
| 6 | EN 12101-10:2005/AC:2007 Smoke and heat control systems<br>Part 10: Energy supply0 |

0 Implemented in Germany by DIN EN 12101-2:2003-09
0 Implemented in Germany by DIN EN 12101-7:2011-07
0 Implemented in Germany by DIN EN 12101-8:2011-08
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 discharge: (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 specified time period | | K** | | | |
| Open under snow load within a predetermined time (SL) | K | K** | | | |
| Opening at low ambient temperature within a predetermined 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**[0] | | |
|---|---|---|
| **- Fire-resistant smoke extraction ducts according to EAD 350142-00-1106**[42] | | |
| | **Minimum required performances** | |
| **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 not less than 500 Pa | | |

**Table 4:**

| **Fire-resistant smoke extraction ducts according to EN 12101-8:2011**[47] | | | |
|---|---|---|---|
| | **Minimum required performances** | | |
| **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 not less than 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 points 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.

0 Implemented in Germany by DIN EN 12101-7:2011-08

**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**[45] | | |
| 4.1 — Nominal trigger conditions/sensitivity | Possibility of manual controllability (Section 4.1.1 b) | |
| 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 — Classification of the functional safety | Yes, if additional ventilation function | |
| 7.2.1.1 - Opening under environmental conditions - Snow load,<br>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 — Fire performance of the building material | E – d2 | |

### 7.5.3 Special provisions for use and execution

Kits for fire-resistant ventilation ducts pursuant to EAD 350142-00-1106[42]

For kits for the construction of fire-resistant ventilation ducts pursuant to ETA and in accordance with EAD 350142-00-1106[42], consisting of fire protection plates, connectors, sealants and fasteners, the manufacturer is required under Regulation (EU) No 305/2011 to provide an installation manual based on the classification document. It shall contain at least the following information:

- Description of permitted four-sided duct constructions made of pipe fittings (materials, dimensions, reinforcing if any, duct routing (vertical/horizontal/inclined), associated fittings, maximum storey height and details of load transfer for vertical pipes, 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 conditions of sentence 1 in conjunction with sentence 2 of this section are not fulfilled, there is no technical best practice for ETA fire-resistant smoke extraction duct kits based on EAD 350142-00-1106[43].

## 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 flowing opposite the direction of flight and
- flows in the same direction throughout the cross-section of the doors
- 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 using flaps in the outdoor air or supply air duct, the drives must be connected or equipped with a secure energy supply.

Exhaust air and smoke extraction lines

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 pipes.

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.

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

### 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. The change in the programming state or changes to the operating and system software is a significant change in the pressure ventilation system. If the control or activation is to take place via a programmable system, a safety-technical control concept shall be created.
Energy 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 a security power supply system.

### 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[40] may be used to close the overflow opening between the vestibule and the required corridor or usage unit; 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 has passed 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-warning systems

### 9.1 Purpose of the installation

CO-warning 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-warning systems

The construction products used must be suitable for measurement, evaluation, and warning.
The CO-warning 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-warning system.

### 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 data must be stated 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 extinguishers include all types of fixed, non-automatic fire extinguishing systems (ns-FLA) and fixed automatic fire extinguishing systems (s-FLA). 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.

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 design and design of such systems shall be used.

Wall hydrants according to EN 671-10 and EN 671-20, above-ground hydrants according to EN 1438400, and underground hydrants according to EN 1433900 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.

0 Implemented in Germany by DIN EN 671-1:2012-07
0 Implemented in Germany by DIN EN 671-2:2012-07
0 Implemented in Germany by DIN EN 14384:2005-10 + DIN EN 14384 Corrigendum 1:2007-07
0 Implemented in Germany by DIN EN 14339:2005-10 + DIN EN 14339 Corrigendum 1:2007-07

Explanation for Table 1

| **Column no.** | **Product according to harmonised standard** |
|---|---|
| 2 | EN 12259-1:1999 + A1:2001 + A2:2004 + A3:2006 Part 1: Sprinklers[0] |
| 3 | EN 12259-2:1999 + A1:2001 + AC:2002 + A2:2005 Part 2: Wet alarm valve assemblies[0] |
| 4 | EN 12259-3:2000 + A1:2001 + A2:2005: Dry alarm valve assemblies[0] |
| 5 | EN 12259-4: 2000 + A1:2001 Part 4: Water motor alarms[0] |
| 6 | EN 12259-5:2002 Part 5: Water flow detectors[0] |

**Table 1:**

| **Essential feature** | **Construction products for fixed firefighting systems – structural elements 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<br>- Heat resistance,<br>- 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<br>- Ageing of non-metallic structural elements; and<br>- Fire stress | | X | X | X | |
| Nominal response conditions | | | | | X |
| Operational reliability stability<br>- Corrosion resistance<br>- Strength of non-metallic structural elements | | | | | X |
| X must be fulfilled | | | | | |

Explanation for Table 2

| **Column no.** | **Product according to harmonised standard** |
|---|---|
| 2 | EN 671-1:2012 Fixed fire extinguishing systems — Wall hydraulics — Part 1:<br>Hose reels with dimensionally stable hose[50] |
| 3 | EN 671-2:2012 Fixed fire extinguishing systems — Wall hydrants — Part 2:<br>Hose systems with lay-flat hose[51] |

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 2259-2:2001-08 + DIN EN 12259-2/A2:2006-02
0 Implemented in Germany by DIN EN 12259-1: 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

**Table 2:**

| **Essential feature** | **Construction products for fixed firefighting systems – Hose systems – 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 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

| Column no. | Product according to harmonised standard |
|---|---|
| 2 | EN 12094-1:2003 Part 1: Requirements and test methods for automatic electric control and delay devices0 |
| 3 | EN 12094-2:2003 Part 2: Requirements and test methods for automatic non-electric control and delay devices0 |
| 4 | EN 12094-3:2003 Part 3: Requirements and test methods for manual triggering and stop switches0 |
| 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 |
| 11 | EN 12094-9:2003 Part 9: Requirements and test methods for special fire detectors0 |
| 12 | EN 12094-10:2003 Part 10: Requirements and test methods for pressure gauges and pressure switches0 |
| 13 | EN 12094-11:2003 Part 11: Requirements and test methods for mechanical weighing devices0 |
| 14 | EN 12094-12:2003 Part 12: Requirements and test methods for pneumatic alarm devices0 |
| 15 | 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 firefighting systems

#### 10.4.1 General requirements

Firefighting systems shall be designed and constructed in accordance with the space-defining structure of the building structure 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 firefighting systems, systems with wall hydrants for the fire service (type F), and systems with dry extinguishing water ducts must be situated on each floor in each part of the structure where they are required under building supervisory rules.

Compliance with the requirements for qualifications (competence, training and certification) as a planner and installer in standards are not binding for the achievement of the building authority protection objectives.

The rules of the design 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[41] are not affected.

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

#### 10.4.2 Automatic firefighting systems

The design, installation, and design of sprinkler systems as automatic firefighting systems shall be undertaken in accordance with the provisions of DIN EN 12845:2020-11 (Fixed firefighting systems – Automatic sprinkler systems – Designing, installation and maintenance).

Where sprinkler systems are to be designed based on a different body of technical rules (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 inspectorate.

#### 10.4.3 Non-automatic firefighting systems

Non-automatic firefighting systems shall be dimensioned and constructed in accordance with the technical body of technical rules. The building inspection requirements are deemed fulfilled if DIN 14462:2012-09 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.

If fixed automatic firefighting systems are to be supplied together with fixed non-automatic systems from a shared water storage, then sufficient water volumes must be stored as required to fulfil both protection objectives. A failure of the water source for one extinguishing system must not impair the effectiveness and operational safety of the second extinguishing system. This is considered to be fulfilled if independent sources of extinguishing water supply the extinguishing systems.

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.

# Annex 15

## Products for waterproofing buildings – minimum required performance

Last updated: November 2019

**CONTENTS**

## 1 General information

This Annex applies to use in:

- Waterproofing used and unused roof areas
- Waterproofing traffic areas and passable surfaces
- Waterproofing areas in contact with soil
- Waterproofing against rising damp in walls
- Waterproofing wet rooms with high water loads
- Waterproofing containers against positive water pressure from the inside
- Waterproofing joints in waterproof concrete or joints at junctions to waterproof components
- Waterproofing movement joints in contact with soil
- Waterproofing directly trafficable sealing structures

Waterproofing usually consists of a multi-layer surface seal and detailed solutions for connections and barriers, junctions to watertight components, and joint seals (waterproofing system). Buildings can only be effectively protected against water ingress if the various components interact successfully. Waterproofing systems consist of system components such as foundations, reinforcements and seals for corners, joints and penetrations. System components may also be subject to requirements, in particular with regard to long service life and compatibility with adjacent materials.

The water impact classes and crack or crack-bridging classes result from the standards set out below:

- DIN 18531 Waterproofing of roofs, balconies, and walkways
- DIN 18532 Waterproofing of concrete areas trafficable by vehicles
- DIN 18533 Waterproofing of elements in contact with soil
- DIN 18534 Waterproofing for indoor applications
- DIN 18535 Waterproofing of tanks and pools
- ‘Waterproof concrete structures’ [Wasserundurchlässige Bauwerke aus Beton, Waterproofing Guideline]

The products’ intended use according to hEN or ETA must be observed.

The manufacturer’s installation instructions must be available and followed.

## 2 Minimum required performances

### 2.1 General information

Liquid products are applied for the higher value out of dry layer thickness and minimum dry layer thickness.

To be used in waterproofing systems, the products must have at least the performance specified in Section 2, depending on the intended use and the water impact.

### 2.2 Roof waterproofing

#### 2.2.1 roof hydro insulation sets for casting

This section applies to roof waterproofing kits using products with a declaration of performance based on an ETA according to ETAG 005 or EAD 030350-00-0402.

| Numbers: | Building approval requirement | Minimum required performance | | | | | |
|---|---|---|---|---|---|---|---|
| | | Non-utilised roof areas by stress class according to DIN 18531 | | | | Used roof areas | |
| | | I A | I B | II A | II B | Directly utilised | Indirectly utilised |
| 1 | Climate zone | M | M | M | M | S | M |
| 2 | Durability | W2 | W2 | W2 | W2 | W3 | W3 |
| 3 | Loading capacity P | P4 | P4 | P3 | P3 | P4 | P4 |
| 4 | Minimum surface temperature | TL 3 | TL 2 | TL 3 | TL 2 | TL 3 | TL 2 |
| 5 | Maximum surface temperature | TH 3 | TH 2 | TH 3 | TH 2 | TH 3 | TH 2 |
| 6 | Minimum layer thickness | With inclination ≥ 2 %: 1.5 millimetres<br>With inclination < 2 %: 2.0 millimetres | | | | 2.0 millimetres | 2.0 millimetres |
| 7 | Content and release of hazardous substances | No negative effects on soil and groundwater according to Annex 10 to MVV TB | | | | | |

For extensively and intensively green areas, the waterproofing must be root-resistant, or protection against root penetration must be ensured by other means.

The average layer thickness applied may not be below the required minimum layer thickness and no individual value must be more than 5 % below the minimum layer thickness.

### 2.2.2 Composite roof waterproofing kit

This section applies to roof waterproofing kits using products with a declaration of performance based on an ETA according to EAD 030065-00-0402.

| Numbers: | Building approval requirement | Minimum required performance |
|---|---|---|
| 1 | Fire performance | Class E |
| 2 | Watertightness | Pass |
| 3 | Resistance to mechanical damage | Resistant to mechanical damage (P4) |
| 4 | Fatigue-resistance | Resistant to fatigue |
| 5 | Resistance to low and high surface temperatures | Resistant to low (-20 °C) and high (+60 °C) |
| 6 | Useful life | 25 Years |
| 7 | Resistance to thermal ageing | Resistant to thermal ageing |
| 8 | Resistance to water ageing | Resistant to water ageing |
| 9 | Resistance to root penetration | Resistant to rooting (for green roofs only) |
| 10 | Effects from manufacturing conditions | no effects |

### 2.2.3 Waterproofing of connections of bitumen sheets to liquid plastics

This section applies to roof waterproofing kits using products with a declaration of performance based on an ETA according to EAD 030155-00-0402.

| Numbers: | Building approval requirement | Minimum required performance |
|---|---|---|
| 1 | Fire performance | At least Class E |
| 2 | Watertightness | Pass |
| 3 | Content and release of hazardous substances | No negative effects on soil and groundwater according to Annex 10 to MVV TB |
| 4 | Adhesive pull strength to the substrate | > 50 kPa |
| 5 | Resistance to dynamic impression | Pass at 2.0 m drop height |
| 6 | Resistance to movement in the thermal insulation layer | Pass |
| 7 | Resistance to different movement of horizontal and vertical areas | Pass |
| 8 | Resistance to slipping | + 2 mm |
| 9 | Compatibility with the vertical substrate and bitumen sheet: | > 25: N/50 mm |
| 10 | Flexibility in the cold | ≤ -35 °C |
| 11 | Resistant to root penetration | Pass (for green roofs only) |
| 12 | Resistance to thermal ageing | < 15 % Loss of performance |
| 13 | Resistance to UV ageing | < 20 % Loss of performance |
| 14 | Resistance to water ageing | < 20 % Loss of performance |

A minimum layer thickness of 1.5 mm of the hardened sealing layer shall be maintained. Where there is a slight inclination of 2 % in the sealing layer on the roof, a minimum layer thickness of 2.0 mm must be kept at connections and penetrations.

## 2.3 Waterproofing of areas trafficable by vehicles

### 2.3.1 Liquid-applied seals for concrete areas trafficable by vehicles

This section applies to bridge waterproofing using products with a declaration of performance based on an ETA according to ETAG 033 or EAD 030507-00-0107.

Extended fields of use compared with EAD:

**(i)** Traffic areas for vehicular traffic with very high load such as bridges, court cellar ceilings and access ramps for all types of vehicles.
Products in usage category (A: A.1-A.4) may be used.

**(ii)** Traffic areas for vehicular traffic with low and high load such as bridges for pedestrians and cyclists and courtyard cellar ceilings, parking levels and access ramps thereto with vehicular traffic up to 160 kN.
Products in usage category (A) or (B) may be used.

Products in usage category (B) may only be used in conjunction with a surface layer.

| Numbers: | Building approval requirement | Proof provided for test categories (P,S,T) | Minimum required performance |
|---|---|---|---|
| 1 | Adhesive pull strength to the base | P1, S0, T5 | > 1.3 MPa (baseline) |

| Numbers: | Building approval requirement | Proof provided for test categories (P,S,T) | Minimum required performance |
|---|---|---|---|
| | Exposure to heat and thermal ageing | P1, MA/LMA/CBM, T5 | > 1.3 MPa (for A.1, A.2, A.3) |
| | Freeze-thaw cycle | P1, FT, T5 | > 1.3 MPa and < 30 % waste from baseline |
| | Processing climate | $P2_{min}$, S0, T5 | > 1.3 MPa and < 30 % waste from baseline |
| | Damp concrete | P3, S0, T5 | > 1.3 MPa and < 30 % waste from baseline |
| | Construction joint | P4, S0, T5 | > 1.3 MPa and < 30 % waste from baseline |
| | Section joint | P4, S0, T5 | > 1.3 MPa and < 30 % waste from baseline |
| 2 | Crack-bridging ability | P1, MA/$LMA_{max}$/CBM, HA, T2/T1 | Pass (for A) |
| | | P1, UV, T2/T1 | Pass (for B) |
| 3 | Resistance to compaction of rolled asphalt | P1, CBM, T5 | Pass (for A.1) |
| 4 | Resistance to the effects of heat: | | |
| | Pull strength/elongation behaviour | P1, S0, T5 | ≥ 3.0 MPa / ≥ 350 % (initial value) |
| | Change in tensile strength, Change in deformation behaviour | P1, MA/$LMA_{max}$/CBM, T5 | < 30 % Deviation from baseline (for A.1, A.2, A.3) |
| 5 | Perforation-resistance | P1, S0, T5 | Pass with $I_4$ (for B) |
| 6 | Assembled system shear strength | P1, $LMA_{min}$, T5 | > 0.45: MPa (for A.1, A.2, A.3) (baseline) |
| | | P1, $LMA_{min}$, FT, T5 | > 0.45: MPa and < 20 % waste from baseline (for A.1, A.2, A.3) |
| 7 | Watertightness | P1, S0, T5 | Watertight (for A and B) |
| | | P1, UV, T5 | Watertight (for B) |
| 8 | Adhesive pull strength to the protective layer | P1, MA/$LMA_{min}$/CBM, T5 | > 0.4 MPa (for A.1, A.2, A.3) (baseline) |
| | | P1, MA/$LMA_{min}$/CBM,FT, T5 | > 0.4 MPa (for A.1, A.2, A.3) < 30 % waste from baseline |
| 9 | Slip resistance | Declared value | > 55 (for B) |
| 10 | Compatibility of materials with active substances: | P1, T5 | |
| | Water | Change in micro-hardness | > -15 IHRD |
| | Alkali | Change in mass | < 2.5 %* |
| | | Amending the | Value > -7 IHRD + Value after |
| | | Microhardness | exposure to water |
| | | Change in mass | < 0.5 %* |
| | Oil, petrol, diesel, de-icing salt Bitumen | - | Pass |
| | | Change in micro-hardness | -16 IHRD < value < 6 IHRD |
| 11 | Durability aspects: | | |
| | Pull strength/elongation behaviour | P1, S0, T5 | ≥ 3.0 MPa / ≥ 350 % (initial value) |
| | Resistance to thermal ageing | P1, HA, T5 | < 30 % Deviation from baseline (for A) |
| | Change in tensile strength, Change in elongation behaviour | | |

| Numbers: | Building approval requirement | Proof provided for test categories (P,S,T) | Minimum required performance |
|---|---|---|---|
| | Resistance to UV radiation | P1, UV, T5 | < 30 % Deviation from baseline (for B) |
| | Change in pull strength, change in elongation behaviour | | |
| | Resistance to wear and tear | Declared value | Pass (for B) |
| 12 | Usability aspects: | | |
| | Resistance to sagging | Declared value for change in mass | Pass (≤ 10.0 %) |
| | Minimum layer thickness/maximum layer thickness | Declared value | 2.0 mm/6.0 mm |

* The combined influence of water, temperature and alkali may be taken into account when determining the change in mass. must be taken into account.

### 2.4 Waterproofing of elements in contact with soil

#### 2.4.1 Flexible plastic-modified thick coatings

This section applies to seals using products with a declaration of performance based on an ETA according to EAD 030295-00-0605.

The products may be used to waterproof components in the following water exposure classes or fields of application:

- W1-E, W2.1-E (up to 3 m immersion depth)
- W4-E according to DIN 18533
- at junctions to water-impermeable (waterproof) concrete components (up to 3 m immersion depth)
- for waterproofing joints in waterproof concrete components up to a maximum immersion depth of 3 m
- for waterproofing tanks and pools in water impact class W1-B (for 5 m filling height) according to DIN 18535.

The crack-bridging classes (RÜx-E) according to DIN 18533 and the crack classes (Rx-B) according to DIN 18535 must be observed.

| | No | Building approval requirement | Minimum required performance | | |
|---|---|---|---|---|---|
| | | | **W1-E, W3-E with a minimum dry layer thickness of 3.0 mm** | **W2.1-E, W1-B with a minimum dry layer thickness of 4.0 mm** | **W4-E with a minimum dry layer thickness of 2.0 mm** |
| 1 | | Fire performance | Class E | Class E | Class E |
| 2 | | Crack-bridging ability | Method A: | Method A: | - |
| | | | For RÜ1-E/RÜ2-E: CB1[1] | For RÜ1-E/RÜ2-E: CB1 | |
| | | | For RÜ3: CB2[1] | For RÜ3:CB2 | |
| | | | | For R0-B2: - | |
| | | | | For R1-B/R2-B: CB1 | |
| | | | | For R3-B2: CB2 | |
| 3 | | Rain fastness | No water discolouration and no change in surface; test time stated | No water discolouration and no change in surface; test time stated | No water discolouration and no change in surface; test time stated |

| | No | Building approval requirement | Minimum required performance | | |
|---|---|---|---|---|---|
| | | | **W1-E, W3-E with a minimum dry layer thickness of 3.0 mm** | **W2.1-E, W1-B with a minimum dry layer thickness of 4.0 mm** | **W4-E with a minimum dry layer thickness of 2.0 mm** |
| 4 | | Resistance to water | No water discolouration and no change in surface | No water discolouration and no change in surface | No water discolouration and no change in surface |
| 5 | | Durability of the adhesive bond after water storage | No decrease in adhesive pull strength that could indicate a time-dependent failure; mean adhesive pull strength after 56 days:<br>≥ 0.5 N/mm²<br>≥ 0.2 N/mm²<br>(in case of cohesion failure) | No decrease in adhesive pull strength that could indicate a time-dependent failure;<br>mean adhesive pull strength after 56 days:<br>≥ 0.5 N/mm²<br>≥ 0.2 N/mm²<br>(in case of cohesion failure) | No decrease in adhesive pull strength that could indicate a time-dependent failure;<br>mean adhesive pull strength after 56 days:<br>≥ 0.5 N/mm²<br>≥ 0.2 N/mm²<br>(in case of cohesion failure) |
| 6 | | Water vapour permeability | Value must be stated | Value must be stated | - |
| 7 | | Watertightness | Watertight for > 24 h with a slot width of 5 mm and water pressure of 2 bar | Watertight for > 24 h with a slot width of 5 mm and water pressure of 2 bar | Watertight for > 24 h with a slot width of 5 mm and water pressure of 2 bar |
| 8 | | Compressive strength | C11 | C2A1 | C1 |
| 9 | | Watertightness when installed (junction to waterproof concrete components) | - | Only for junctions to waterproof concrete components:<br>No water penetration, no detachment at a test pressure of 0.75 bar | - |
| 10 | | Dry film thickness[2] | The average, standard deviation and consumption per mm of dry film thickness must be specified. | The average, standard deviation and consumption per mm of dry film thickness must be specified. | The average, standard deviation and consumption per mm of dry film thickness must be specified. |
| 11 | | Flexibility at low temperatures | No cracking | No cracking | No cracking |
| 12 | | Watertightness in the installed condition (“basin test”) | Only when using other components:<br>No water penetration at test pressure of 2 kPa | For W2.1-E:<br>no water penetration at test pressure 75 kPa<br>For W-1B:<br>no water penetration at test pressure 125 kPa | - |

[1] CB classes according to DIN EN 15814

[2] The waterproofing layer must always be applied at least twice.
A reinforcement insert must be provided for minimum dry layer thicknesses of ≥ 3 mm.

For use on inclined or vertical surfaces, the installation instructions must provide information on stability.

## 2.5 Waterproofing of tanks and containers

### 2.5.1 Liquid applied waterproofing for use with tiling and slabs

This section applies to seals using products with a declaration of performance according to EN 14891.

The products may be used for waterproofing wall and floor surfaces and swimming pools that are located outdoors and not connected to buildings.

## 2.6 Waterproofing of wet rooms

### 2.6.1 Waterproofing for use with tiling and slabs

This section applies to wet room waterproofing using kits with a declaration of performance based on an ETA according to ETAG 022 or EAD 030352-00-0503, EAD 030436-00-0503, EAD 030437-00-0503 and EAD 030400-00-0605.

For wet room waterproofing in the areas of application W2-I and W3-I according to DIN 18534, at least the performances stated in the table must be stated for the kits for wet room waterproofing according to EAD 030352-00-0503, EAD 030436-00-0503, EAD 030437-00-0503 and EAD 030400-00-0605.

| | No | Building approval requirement | Minimum required performance | | |
|---|---|---|---|---|---|
| | | | **EAD 030352-00-0503** | **EAD 030436-00-0503<br>EAD 030400-00-0605** | **EAD 030437-00-0503** |
| 1 | | Fire performance | Class E | Class E | Class E |
| 2 | | Content and release of hazardous substances | The content may not reach or exceed the values stated in Section 2 of Annex 8 to MVV TB. | The content may not reach or exceed the values stated in Section 2 of Annex 8 to MVV TB. | The content may not reach or exceed the values stated in Section 2 of Annex 8 to MVV TB. |
| 3 | | Water vapour permeability | Value declaration | Value declaration | Value declaration |
| 4 | | Watertightness | Watertight | Watertight | Watertight |
| 5 | | Crack-bridging ability | Proof only for crack-prone underlay: ≥ 0.4 mm | Proof for walkways bonded to the underlay and only for crack-prone underlay: ≥ 0.4 mm | Proof for thin and brittle plates bonded to the underlay and only for crack-prone underlay: ≥ 0.4 mm |
| 6 | | Adhesive pull strength | ≥ 0.5 MPa | ≥ 0.3 MPa | ≥ 0.3 MPa |
| 7 | | Scratch resistance | Proof only for systems without wearing surface: scratch-proof | Proof only for systems without wearing surface: scratch-proof | Proof only for systems without wearing surface: scratch-proof |
| 8 | | Joint bridging ability | Certificate only for underlay with seam: Rating category 2: Test passed | Certificate only for underlay with seam: Rating category 0: No testing required or rating category 2: Test passed | Certificate only for underlay with seam: Rating category 0: No testing required or rating category 2: Test passed |
| 9 | | Impermeability at joints | Proof not provided | Proof not provided | watertight |
| 10 | | Watertightness at penetrations | Rating category 2: Test passed | Rating category 2: Test passed | Rating category 2: Test passed |
| 11 | | Temperature resistance | Rating category 2: Adhesive pull strength ≥ 0.5 MPa | Change in tensile strength and elongation: ≤ 20 % | Change in flexural strength: ≤ 20 % |

| | No | Building approval requirement | Minimum required performance | | |
|---|---|---|---|---|---|
| | | | **EAD 030352-00-0503** | **EAD 030436-00-0503**<br>**EAD 030400-00-0605** | **EAD 030437-00-0503** |
| | | | Additional proof for crack-prone underlay:<br>Crack bridging ≥ 0.4 mm or for underlay with seam: Proof of joint bridging ability | | Adhesive pull strength ≥ 0.3 MPa |
| 12 | | Water resistance | Adhesive pull strength ≥ 0.5 MPa | Adhesive pull strength ≥ 0.3 MPa | Demonstrated if the requirements in lines 10 and 6 are met |
| 13 | | Alkali resistance | Adhesive pull strength ≥ 0.5 MPa | Change in tensile strength and elongation: ≤ 20 % after storage at 50°C for 16 weeks | Adhesive pull strength ≥ 0.3 MPa |
| 14 | | Reparability | Adhesive pull strength ≥ 0.5 MPa | repairable | repairable |
| 2015 | | Thickness of waterproofing layer | ≥ 2.0 mm for mineral waterproofing slurries<br>≥ 1.0 mm for reaction resin systems<br>≥ 0.5 mm for dispersions | ≥ 0.20 mm with wearing surface<br>≥ 0.70 mm without wear layer | ≥ 5 mm |
| 16 | | Processability | Processable | Processable | Proof not provided |

Polymer dispersions may only be installed on wall surfaces.

Painting systems assessed as waterproofing in accordance with EAD 030352-00-0503 (painting systems for walls without a wear layer) may not be used in water exposure classes W2-I and W3-I.

Waterproofing systems according to EAD 030400-00-0605 for which field of application B is specified in the ETA may also be used as tank/pool waterproofing as defined in DIN 18535 up to a water depth of 10 m.

## 2.7 Waterproofing of joints

### 2.7.1 Coated joint sheets

This section applies to joint waterproofing using products with a declaration of performance based on an ETA according to EAD 320002-00-0605, -01-0605 and -02-0605.

The field of application demonstrated by the ETA and the permitted water pressure are to be observed.

| Numbers: | Building approval requirement | Minimum required performance |
|---|---|---|
| 1 | Fire performance | At least Class E |
| 2 | Watertightness when installed | Field of application a), b) or c) and permitted water pressure |
| 3 | Adhesive pull strength as delivered | Value |
| 4 | Adhesive pull strength after thermal ageing | Deviation from 3 < 20 % |
| 5 | Durability | If required < 3 % |

### 2.7.2 Expanding joint tapes

This section applies to joint waterproofing using products with a declaration of performance based on an ETA according to EAD 320008-00-0605 and -01-0605.

| Numbers: | Building approval requirement | Minimum required performance |
|---|---|---|
| 1 | Fire performance | At least Class E |
| 2 | Watertightness when installed | Permitted water pressure |
| 3 | Swelling behaviour in different liquids at the time of delivery | Time-limited mass increase (time stated); no decomposition of the material or detachment |
| 4 | Reproducibility of the swelling process | Time specification for the swelling process |
| 5 | Swelling pressure | > 0.5: N/mm² |

## Annex 16

# Guideline for the assessment and remediation of loosely bound asbestos products in buildings (Asbestos Guideline)

Last updated: (November 2020)

**CONTENTS**

## 1 Scope

This guideline applies to the assessment and remediation of loosely bound asbestos products in buildings.

For the purposes of this Directive, weakly bound asbestos products are asbestos products with a gross density of less than 1000 kg/m³.

The asbestos-containing boards produced and used in buildings in former East Germany

- Inorganic fire protection panels according to TGL 22973 (trade name ‘Baufatherm’)
- Sokalit lightweight panels according to TGL 24452
- Inorganic fire protection panels (neptunite) according to TGL 29312 and TGL 37478 are loosely bound asbestos products within the meaning of this guideline, regardless of their bulk density.

## 2 Applicable regulations

When implementing the measures, the applicable occupational safety, pollution control and waste regulations must also be observed.

## 3 Evaluation

### 3.1 Need for Remediation

(1) Loosely bound asbestos products in buildings can release asbestos fibres into the indoor air due to ageing and external influences, e.g. air movements, vibrations, temperature changes and mechanical damage.

(2) More and more fibres are released into the indoor air as the structural condition of the products deteriorates. Experience has shown that even products that are still intact deteriorate over time.

(3) Asbestos fibres can be inhaled and cause serious illnesses in humans. As a health-safe concentration (threshold value) for asbestos cannot be stated, it is necessary to prevent the release of fibres into the indoor air for reasons of health protection in accordance with the remediation urgency, thereby minimising the concentration of asbestos fibres.

(4) The health risk increases in particular with the level of asbestos fibre concentration in the room, with the duration of exposure to users and with life expectancy. These influencing factors are the basis for the assessment according to Section 3.2.

### 3.2 Urgency of remediation

The urgency of remediation shall be assessed on the basis of the following criteria using the form set out in Annex 1.

- Type of asbestos use,
- Type of asbestos,
- Surface structure of the asbestos product
- Surface condition of the asbestos product,
- External impairment of the asbestos product,
- Room use,
- Material location,

The criteria are assigned to evaluation points, the sum of which results in the urgency of the reorganisation as follows:

(1) Emergency level I (≥ 80 points): Refurbishment immediately required.
To prevent health risks, uses with this rating must be remedied immediately in accordance with Section 4.
If the final restoration is not immediately possible in accordance with section 4.3, provisional measures in accordance with section 4.2 shall be taken immediately to reduce the asbestos fibre concentration in the room if it is to be used further. However, the final remediation according to Section 4.3 must begin within three years at the latest.

(2) Priority Level II (70-79 points): Reassessment needed in the medium term.

Uses with this rating are to be re-assessed at intervals of no more than two years. If a re-assessment shows urgency levels I or III, the procedure for these urgency levels must be followed.

(3) Emergency Level III ('70 points): re-assessment required in the long term.
Uses with this rating are to be re-assessed at intervals of no more than five years. If a re-assessment shows urgency levels I or II, the procedure for these urgency levels must be followed.

Buildings that have already been evaluated on the basis of an earlier version of the Asbestos Directive must be re-evaluated only during the reassessment in accordance with Section 3.2, No.s 2 and 3.

(4) Individual evaluation:
The following uses cannot be assessed using the form; they shall be subjected to an individual assessment:

- fire dampers containing asbestos;
- asbestos-containing fire doors in which the asbestos products are tightly enclosed from the sheet metal body, with the exception of necessary openings for opening and closing;
- seals containing asbestos between flanges in technical systems.

The useful life of REACH Regulation No 1907/2006 must be observed in Annex XVII, entry No 6. Subject to specific provisions on EU law, it can generally be assumed that the end of the useful life has been reached, in particular where:

- the component is or should no longer be used according to its intended installation prior to the application of the ban on asbestos use under the Ordinance on Hazardous Materials (GefStoffV, from 1.11.1993); or
- the component in its current state in the existing installation situation poses dangers, e.g. due to wear-related fibre release, the risk of breakthroughs in roofs, the risk of breaking and falling in wall, roof or ceiling parts (non-conclusive list).

General requirements for structural installations and the use of construction products for a reasonable period of time and for proper maintenance shall be taken into account.

## 4 Remediation

### 4.1 Basic principles

The following principles apply to the remediation of weakly bound asbestos products:

1. Remediation measures must be planned as a self-contained project from the start of work up to the disposal of the waste in accordance with the applicable regulations. It should also be borne in mind that the asbestos product remediation may compromise required structural properties of the components – e.g. fire performance and fire resistance.

2. Only companies that are familiar with the work, the dangers involved and the necessary protective measures and who have the necessary machines and equipment are to be contracted.

3. Protective measures during the remediation (see Section 4.4) are always necessary.

### 4.2 Provisional measures

#### 4.2.1 General information

If asbestos products cannot be immediately remediated with the assessment “Urgency Level I” (according to Section 3.2 No 1) and if the space is still to be used, the potential risk of increased fibre release must be minimised by appropriate measures to the extent that further use of the space is possible without concrete health hazards. Preliminary measures may be both operational and structural.

Preliminary measures are only permitted if it is possible to rule out an uncontrollable intermittent release of fibres into the indoor air while such measures are in place and afterwards.

Preliminary measures must be planned, executed and fully functional until the final refurbishment.

Compliance with and the effectiveness of these measures must be checked regularly.
In the event of maintenance or repair work and/or structural measures, influences on low-weighted asbestos products cannot be excluded, such work shall require protective measures in accordance with Section 4.4 and, mutatis mutandis, measures in accordance with Section 4.5.

#### 4.2.2 Operational measures

Operational measures may include the following:
- Avoiding effects on the asbestos product that cause fibres to be released, e.g. through maintenance, cleaning or repair work, vibrations or strong air movements. If work that can lead to fibre release is unavoidable, it must be ensured that fibres cannot get into the indoor air.
- Changing the use of space, e.g. reducing the useful life.
- Regular wet cleaning of rooms, facilities and equipment.
- Decommissioning or adapted operation of indoor air installations, e.g. by reducing the air velocity, increasing the relative humidity in the room or improving their separation performance.

#### 4.2.3 Constructional measures

Structural measures may include:
- Coating of the asbestos product (only in the case of plates),
- Dust-proof separation of the asbestos product from the room,
- Repairing damage to the asbestos product,
- Sealing joints in components containing asbestos.

Where fibre releases are unavoidable during these operations, it must be ensured that fibres cannot enter the room air.

#### 4.2.4 Monitoring of the success of provisional measures

The success of the preliminary measures must be demonstrated by measurements:
- one measurement immediately after the preliminary measures and
- about half-yearly measurements under the same conditions until the final remediation.

See Section 5 for the measurement and assessment procedures.

### 4.3 Final measures (renovation procedures)

#### 4.3.1 Overview

A distinction is made between the following procedures for permanent remediation:
- Removal (method 1)
- Spatial separation (method 3).

Note: Coating (method 2) shall not be used.

#### 4.3.2 Removal (method 1)

In this method:
- remove suctionable asbestos products (e.g. spray asbestos) from the substrate in a wet state and suction directly into a dust-tight container;
- non-vacuumable asbestos products (e.g. sheets) must generally be removed when wet with as little destruction as possible and packed in dust-proof containers.

#### 4.3.3 Coatings (method 2)

This method is not applicable.

#### 4.3.4 Spatial separation (method 3).

In this method, additional components are used to create dust-proof separation between the asbestos product and the room. It is particularly important to ensure that connections and joints remain permanently dust-tight.

### 4.4 Protective measures during refurbishment

#### 4.4.1 Basic principles

1. The measures are designed to protect both individuals inside and outside the area where the refurbishment work is being carried out (work area)0.

2. Asbestos fibres from the work area must not get into spaces outside of the work area.

3. Air from the working area may only be controlled to the outside air and released via mechanical ventilation systems0.

#### 4.4.2 Measures to protect persons outside the field of work

The following measures for protecting people outside the work area satisfy the principles of Section 4.4.1:

1. The working area shall be kept as small as possible.

2. If the chosen remediation method does not preclude fibre release with certainty, except for low exposure work according to TRGS 519 (issue January 2014) No 2.8, having regard to TRGS 519 No 14.4 in the case of tested working methods in accordance with TRGS 519, amendments to 2019, point 15.1. Paragraph 7– the working area is sealed off dust-proof.

3. If the foreclosure cannot be carried out dust-proof, the working area must be kept constantly under sufficiently effective vacuum during the refurbishment work. Proof of the negative pressure must be shown.

4. Where the work area has to be sealed off, links to the work area must be established using lock systems. Lock systems can only be dispensed with under conditions specified in TRGS 519 (Version: January 2014), Point 14.4 (4).

5. If the asbestos is absorbed (see section 4.3.2), the entire suction system shall be under negative pressure from the suction point, via the container and the filters to the pump during the suction work. The air suctioned in the process must be discharged into the atmosphere via suitable filters.

### 4.5 Final work

After finishing the remediation process in accordance with Section 4.3, the following completion work is required in the stated order:

1. Remediation processes with a closed work area

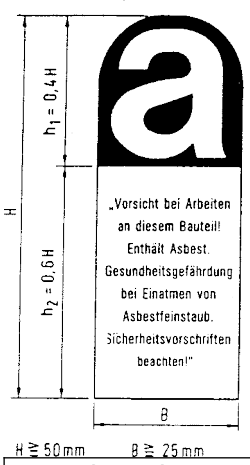
- Cleaning all surfaces in the sealed-off area (e.g. by vacuuming);
- Visual control that visible asbestos fibres are no longer present;
- Bind the residual fibres which are no longer visible on all surfaces which are difficult to clean in the sealed area;
- Measure the concentration of asbestos fibres in accordance with Section 5, except for use simulation, before decomposition of foreclosure, provided that such a measurement is determined in TRGS 519;
- Removal of foreclosure;
- Post-cleaning;
- Success control according to section 5.

2. Remediation processes without a closed work area

- Cleaning followed by an air change in accordance with TRGS 519.

3. Asbestos products that have been remediated according to method 3 (see Section 4.3) must be labelled according to Fig. 1:

0 To protect people within the work area, the relevant occupational health and safety regulations apply.
0 To protect the outside air, the provisions of the Act on the Protection against Harmful Environmental Impacts from Air Pollution, Noise, Vibrations and Similar Processes (Federal Immission Control Act - BImSchG) and the provisions based on this Act apply in their current version.




| | |
|---|---|
| “Caution when working on this component!<br>Contain asbestos.<br>Health hazard for inhalation of asbestos fine dust.<br>Comply with safety regulations!’ | “Caution when working on this component!<br>Contain asbestos.<br>Health hazard for inhalation of asbestos fine dust.<br>Comply with safety regulations!’ |

Figure 1 Labelling

### 4.6 Waste treatment

Disposal is regulated in accordance with the relevant statutory provisions.

## 5. Reviewing the success of the remediation

### 5.1 General information

The success of the refurbishment in accordance with Section 4.3 and the effectiveness of provisional measures under Section 4.2 shall be demonstrated by measurements of the concentration of asbestos fibres in ambient air in accordance with Directive VDI 3492 (issue June 2013). The testing laboratories must keep the evaluated samples and the associated logs for each measurement for at least 6 months.

### 5.2 Measurement strategy for the success control of remedial measures

#### 5.2.1 Measurement

Measurements to verify the success of the refurbishment shall be carried out after completion of the refurbishment work, including the measures referred to in Section 4.5, but before re-use of the premises.
A check on the success of the refurbishment according to section 4.3. by measuring the concentration of asbestos fibres in ambient air is not necessary in the case of remediation processes which do not require foreclosure of the work area under this Directive.

#### 5.2.2 Measurement location

Measurements of the asbestos fibre content in the indoor air of the remediated room are to be taken at locations in the room where people predominantly spend time or where a high asbestos fibre concentration is suspected.

#### 5.2.3 Measurement conditions, usage simulation

Since the measurements must be taken before the room is used again, the simulation of normal operation in accordance with guideline VDI 3492 must be carried out.

### 5.3 Assessment of the ambient air hygienic situation

#### 5.3.1 Success control of remediation

The verification of the success of remediation shall demonstrate that the following two conditions are met:

1. The asbestos fibre concentration with fibre lengths L ≥ 5 µm, fibre diameters D < 3 µm and a ratio of fibre length to fibre diameter L:D > 3:1 is calculated from the number of fibres observed on the filter. Each measurement must be less than 500 F/m³.
2. The upper limit of the 95 % confidence interval of the asbestos fiber concentration calculated from the number of asbestos fibers with a fiber length L ≥ 5 µm, a fiber diameter D < 3 µm and a ratio of fiber length to fiber diameter L:D > 3:1 according to the Poisson distribution must be below 1000 F/m³.

### 5.3.2 Monitoring of the success of provisional measures

When reviewing the success of the preliminary measures according to Section 4.2.4 and if there is any evidence for protecting third parties during the remediation, it must be demonstrated that the asbestos fibre concentration with fibre lengths L ≥ 5 µm, fibre diameters D < 3 µm and a ratio of fibre length to fibre diameter L:D > 3:1 reaches a maximum of 1 000 F/m³.

## 5.4 Requirements for the measurement institutes

Measurements in accordance with Section 5.2 may only be carried out by institutions which ensure proper implementation of the measurement in accordance with Directive VDI 3492 (issue June 2013). The measurements must be logged in accordance with VDI 3492, Annex B.

**Annex 1**

**Assessing the urgency of a remediation**

**Form**

| | | **Asbestos products – assessment of the urgency of remediation** | | |
|---|---|---|---|---|
| | | Gebäude .....<br>Room: ..... )<br>Product: ..... | Assessment* | Number of applications |
| | **I** | **Method of use of asbestos** | | |
| 1 | | Sprayed asbestos ..... | ○ | 20 |
| 2 | | Asbestos-containing plaster ..... | ○ | 10 |
| 3 | | Light asbestos-containing plates ..... | ○ | 5, 10 or 15 |
| 4 | | Other asbestos-containing products ..... | ○ | 5, 10.15 or 20 |
| | **II** | **Type of asbestos** | | |
| 5 | | Amphibolic asbestos ..... | ○ | 2 |
| 6 | | Other asbestos ..... | ○ | 0 |
| | **III** | **Surface structure of the asbestos product** | | |
| 7 | | Loosened fibre structure ..... | ○ | 10 |
| 8 | | Solid fibre structure with or without a sufficiently dense surface coating ..... | ○ | 4 |
| 9 | | Coated, dense surface ..... | ○ | 0 |
| | **IV** | **Surface condition of the asbestos product** | | |
| 10 | | Severe damage ..... | ○ | 6 |
| 11 | | Slight damage ..... | ○ | 3 |
| 12 | | No damage ..... | ○ | 0 |
| | **V** | **External impairment of the asbestos product** | | |
| 13 | | Product is exposed to damage due to its direct accessibility (floor to reach height) ..... | ○ | 10 |
| 14 | | Work is occasionally carried out on the product ..... | ○ | 10 |
| 201<br>5 | | Product is exposed to mechanical influences ..... | ○ | 10 |
| 16 | | Product is exposed to vibrations ..... | ○ | 10 |
| 17 | | Product is exposed to strong climatic alternating stresses ..... | ○ | 10 |
| 18 | | Product is in the region of relatively significant air movements ..... | ○ | 10 |
| 19 | | There is significant air movement in the room with the asbestos-containing product ..... | ○ | 7 |
| 20 | | Abrasion may occur on the product during improper operation ..... | ○ | 3 |
| 21 | | The product is not externally impaired ..... | ○ | 0 |
| | **VI.** | **Room use** | | |
| 22 | | Room regularly used by children, adolescents and athletes ..... | ○ | 25 |
| 23 | | Room used continuously or frequently by other people ..... | ○ | 20 |
| 24 | | Room used occasionally ..... | ○ | 2015 |
| 25 | | Space rarely used ..... | ○ | 8 |
| | **VII** | **Material location** | | |
| 26 | . | Directly in the room..... | ○ | 25 |
| 27 | | In the ventilation system (closing or sheathing leaking ducts) for the room ..... | ○ | 25 |
| 28 | | Behind a suspended non-tight cover or cladding ..... | ○ | 25 |
| 29 | | Underpinning or coating outside tight ventilation ducts ..... | ○ | 0 |
| 30 | Sum of valuation points | | | |
| 31 | | Remediation required immediately (urgency level I) | ○ | ≥ 80 |
| 32 | | Re-assessment required in the medium term (urgency level II) | ○ | 70-79 |
| 33 | | Re-assessment required in the long term (urgency level III) | ○ | < 70 |

*) Please mark with a cross where applicable. If several ratings have been ticked within one group, only the highest rating may be taken into account for the total (line 30).

**Explanatory note on the application of the form**

The form “Asbestos products – assessment of the urgency of a refurbishment” should serve as a check list to assess the refurbishment needs of these products.

The table legends list seven groups with evaluation criteria (I to VII). The relevant evaluations are to be given in the penultimate column by ticking. These have scores between 0 and 25 (last column). If several ratings have been ticked within one group, only the highest rating may be taken into account for the total (line 30). These seven valuation figures are summed up in line 30 and, after classification, result in the urgency of the reorganisation (lines 31 to 33).

### I Type of asbestos use (lines 1 to 4)

Sprayed asbestos is a white-grey, grey or grey-blue, generally soft material that yields when pressed with a finger. The surface is mostly granular, even when protected with a cement paste or a coat of paint.

Plaster containing asbestos and light asbestos-containing plates are usually white grey, but also grey to grey-brown. The material is relatively soft and brittle and can be easily scratched on the surface with a fingernail.
Other asbestos-containing products such as paperboard, cords or foams are usually also white-grey to grey and have low rigidity.

For all products containing asbestos, very fine, protruding fibres can be recognised at the break points.
It is not always easy to definitively state whether a product contains asbestos, even for experts. Before remediations commence, the product suspected of containing asbestos should therefore undergo a material analysis.

In group 1, line 3 (lightweight asbestos-containing panels), panels where fibre releases cannot occur due to pumping effects or vibrations are to be given 5 points. This generally applies to small-format panels (panels measuring less than 0.4 m²) and to large-format panels that are directly attached to solid components with sufficient flexural strength either directly or via tight-grid substructures.

Large-format panels where fibre release is possible due to pumping effects or vibrations**) are to be given 10 or 15 points, depending on the intensity thereof.

In group 1, line 4 (other asbestos-containing products), the following ratings can generally be assumed:

| | | Rating |
|---|---|---|
| a) | Asbestos putty, asbestos foam, asbestos filler mass | 5 |
| b) | Asbestos cardboard | 10 |
| c) | Asbestos mesh mat, asbestos cord | 15 |
| d) | Unbound asbestos stuffing compounds | 20 |

### II Type of asbestos (lines 5 and 6)

Amphibole asbestos has less favourable dust behaviour than chrysotile. The presence of amphibolic asbestos can only be determined by means of material analysis.

### III Surface structure of the asbestos product (lines 7 to 9)

A loosened fibre structure can usually be assumed for sprayed asbestos and asbestos cord.

A solid fibre structure is given for asbestos-containing plaster, foam containing asbestos and spray asbestos with additional closed cover coating. Asbestos-containing panels can generally be assumed to have a solid fibre structure but in individual cases there may also be a loosened fibre structure, e.g. in blooms.

A plastic or plaster covering or the like can be deemed a coated, tight surface unless the covering shows any damage or leaks.

**) According to current knowledge, this applies to plates containing amphibol asbestos.

### IV Surface condition of the asbestos product (lines 10 to 12)

The degree of damage shall be classified according to the three gradations mentioned above.

### V External impairment of the asbestos product (lines 12 to 21)

An impairment exists, for example,

- if the material is directly accessible and easily damaged as a result,
- if cables are retracted in the case of foreclosures,
- if lines are fastened to or under coated ceilings, decorations are hung or suspended ceilings are open,
- when sheet metal cladding is scrubbing on the product,
- if a moving product is exposed to abrasion,
- if covered ventilation ducts are exposed to vibrations, e.g. also by the ventilation system being switched on and off,
- if coated ceilings, walls or columns are subjected to shocks or mechanical effects, e.g. by ball throwing,
- if coatings on roofs or walls are exposed to significant climatic changes, e.g. interior coating without external thermal insulation,
- if a ventilation system blows directly onto the material,
- if there is significant air movement in the room with the material.

For moving products, such as heat recovery systems, abrasion can occur in the event of improper operation or malfunction.

### VI. Room use (lines 22 to 25)

Schools, kindergartens, sports halls and indoor swimming pools are mainly used by children, adolescents and young adults. These age groups are particularly vulnerable due to the long latency of asbestos-related diseases.

Permanently or frequently used rooms include all rooms that are used regularly over a period of several hours.

Temporarily used rooms are e.g. technical rooms, storage rooms, roof rooms, cellars, other adjoining rooms.

Rooms rarely used are technical shafts, crawl spaces, etc.
The asbestos-containing plates produced in the former GDR were also used in dwellings; Rooms of apartments shall be classified in line 22.

### VII. Material location (lines 26 to 29)

All products arranged between the bare floor and the lowest ceiling (false ceiling) should be classified as being directly in the room.

Sheaths or linings of ventilation ducts or ventilation equipment must always be taken into account for all rooms ventilated by that ventilation system. If the ducts/equipment are sheathed and they can be demonstrated to be leak-proof, the ventilated rooms are not deemed impaired.

Suspended non-tight ceilings or cladding are all non-tight structures or materials.

## Annex 17

# Directive on the requirements for steel receptacles with a catch volume of up to 1000 litres (StawaR)

Last updated: September 2020

**CONTENTS**

## 1 Subject matter and scope of application

(1) This Directive deals with liquid impermeable steel trays with a catch volume of up to 1000 litres,

- in or on which containers, barrels or containers (hereinafter referred to as containers) are placed and which are intended to absorb and withhold from the containers and from the connecting piping liquids that are hazardous to water;
- which are open to the top or provided with a grating,
- the height of which is not more than 1 m; and
- the base area of which is not more than 10 m ($^2$) in relation to the individual tray (larger base areas can be obtained by assembling smaller tubs).

(2) The trays may be used if they are made of materials specified in Section 5 of this Directive and if they meet the requirements of Section 2 of this Directive.

(3) Collection trays provided for in this Directive may also be installed on shelves provided that they do not contribute to their stability.

(4) Loads from vehicles (such as forklift trucks) are excluded from the scope of the Directive.

(5) The Directive shall apply without prejudice to the provisions and reservations for verification or approval of other areas of law.

## 2 Provisions relating to the catching tray

### 2.1 Requirements for the reception tray

#### 2.1.1 Materials

(1) The steel of the trays must be resistant to water-hazardous liquids. The required resistance shall be deemed to have been proven if:

a) the liquid-material combination in DIN EN 12285-1 Annex B is positively evaluated and the boundary conditions listed therein are complied with or

b) the suitability according to DIN EN 12285-1 Annex B Appendix 1 has been demonstrated, whereby wall removal by surface corrosion may not exceed 0,5 mm/year by way of deviation from DIN EN 12285-1 Annex B Section 2.2.1; or

c) the liquid-material combination in the "BAM-List, Requirements for Tanks for the Transport of Dangerous Goods" (published by the Bundesanstalt für Materialforschung und -prüfung (BAM), Unter den Eichen 87, 12205 Berlin) is positively evaluated and the boundary conditions listed therein are respected.

(2) Receptacles made of steels that tend to corrosion under environmental influences (such as structural steels according to DIN EN 10025-2, boiler sheets according to DIN EN 10028-2), are equipped with a surface protection (e.g. coating according to DIN EN ISO 12944-1; -4; -5 galvanising according to DIN EN ISO 1461 according to the intended service life (duration of protection). Stainless steels shall be chosen according to the required corrosion resistance classes in accordance with the general approval of the building authorities Z-30.3-6.

(3) Galvanised trays shall not be used when storing the following liquids: organic and inorganic acids, soda and potash as well as other alkali hydroxides, chlorine hydrocarbons, amines, nitro compounds, acid chlorides and other chlorides, phenol, aqueous alkaline solutions, nitriles.

(4) Steel trays according to DIN EN 10025-2 or DIN EN 10028-2 must have wall thicknesses of at least 3 mm, made of stainless steel in accordance with DIN EN 10088-4 of at least 2 mm. Exemption: Trays in safety cabinets according to DIN EN 14470-1 must have a wall thickness of at least 1 mm, regardless of the type of steel.

#### 2.1.2 Construction

(1) Receptacles shall be impermeable to liquid within the meaning of § 18(2) of the AwSV.

(2) In the case of steel trays in accordance with DIN EN 10025-2 or DIN EN 10028-2, the bottom of the floor must be checked for corrosion. This can be achieved through organisational or constructive measures, e.g. by a ground distance to the mounting surface of ≥ 100 mm.

(3) Receptacles shall have a freeboard of at least 2 cm, which shall be taken into account when calculating the catch volume. In addition, in the case of trays fitted with a grating, the collection volume may only be taken into account up to the bottom edge of the grating.

(4) The trays shall have an edge (height) of at least 5 cm.

(5) Receptacles shall not have processes.

#### 2.1.3 Stability

(1) The walls and floors of the trays shall take up the loads acting on them with sufficient certainty. They may be stiffened if necessary. However, the thicknesses of the walls and floors referred to in Section 2.1.1 (4) shall be complied with at least.
(2) The stability shall be demonstrated by a calculation taking into account all relevant effects. The effect from the leakage load case must be used as an operating load case (no exceptional load case).
(3) As an alternative to the static calculation of the containers set up or placed on a grid and in the case of leakage load, the stability of load tests can be demonstrated with safety 2 in at least 3 tanks of any size. (For a larger number of different tub sizes but of the same type, some tub sizes can be selected by the test station.)
(4) The leakage load case can be simulated by sandbags placed at the most unfavourable point (determination by the test centre) with the corresponding mass (max. permitted filling volume of the tub x density of the bearing fluid x 2).
(5) The test period should be 15 minutes. The test of the load from the containers or the leakage load has been passed,

- if, after the load, the tray does not show any plastic deformation by simple means (e.g. measuring tape, measuring clock) compared to the condition before the load; and
- if the welds of the catcher are sealed after the load (testing e.g. with vacuum process, colour penetration method).

## 2.2 Manufacture and labelling

### 2.2.1 Production

(1) The requirements of the EXC2 design class according to DIN EN 1090-2 apply to the production of the catching tubs of stainless steel, the general building supervision approval no. Z-30.3-6 must be observed. In addition, the following provisions apply.
(2) The assembly of the individual parts of the catching furnaces shall be carried out by welding according to a welding instruction (WPS) in accordance with DIN EN ISO 15609.
(3) The walls penetrating screw connections below the maximum possible liquid level in the receivers are inadmissible.
(4) If the parts of the walls are produced by cold forming, no modification of the material which is harmful to the manufacture and use of the trays may occur. The bending radius shall be equal to or greater than the wall thickness when bent off of parts of the collecting tubs.
(5) The welds shall be welded throughout the cross-section. They must have no cracks and no binding defects and slag inclusions. The welds on the walls must be made as a double-sided welded butt seam without significant edge offset. Corner joints shall be made as welded throat seams on both sides, dull welded corner seams on one side or corner seams welded on both sides. Crosses should be avoided.
Exemption: In case of trays in safety cabinets according to DIN EN 14470-1, the corner seams may be welded on one side up to a wall thickness of 1.5 mm.
(6) All manual welding work may only be carried out by welders who have a valid test certificate for the required test group according to DIN EN ISO 9606-1 and for the respective welding procedure. Mechanised welding processes, for example for prefabricated parts, are permitted if their equivalence with double-sided manual welding has been demonstrated by a process review by the competent inspection body.

### 2.2.2 Labelling

Receiving trays must be marked by the manufacturer with the conformity mark (Ü-sign) according to the country's conformity mark regulations. Labelling may only be made if the conditions laid down in section 2.3 are met.
In addition, the manufacturer shall indicate clearly and indelibly the catching tubs with the following information:

- Manufacturing number,
- Year of manufacture
- Material of the tray,
- Collection volume,
- maximum density of the bearing fluid (corresponding to stability proof),
- maximum payload (according to safety proof),
- as well as the note "Use according to StawaR".

## 2.3 Proof of conformity

Confirmation of the conformity of the catching tubs with the provisions of this Directive shall be carried out for each manufacturing plant with an initial test of the catching furnaces by a recognised testing body[0] for this purpose and a declaration of conformity by the manufacturer on the basis of a factory production control.

### 2.3.1 Initial test by a recognised verifier

As part of the initial test, compliance with the requirements set out in sections 2.1 and 2.2 of the September 2020 StawaR version shall be verified and documented in a test report. In the initial test report, all types of trays and their properties to which the test report applies shall be identified. The selection of examiners is the responsibility of the recognised verifier.

### 2.3.2 Factory production control

(1) A system of in-house quality control should be set up and implemented in each production facility. In-house quality control is understood to be continuous monitoring of production which should be undertaken by the manufacturer to ensure that the construction products manufactured by it satisfy the provisions of this Appendix.
(2) The factory's own production control must be carried out in accordance with DIN EN 1090-2. Within the framework of the factory production control, the following tests shall be carried out on each of the catches:

1. Check of the marking of the steel used and the inspection of the work certificate 2.2 in accordance with DIN EN 10204 for material No 1.0038 or of the acceptance test certificate 3.1 for the other steel materials,
2. Control of dimensions,
3. Weld test (visual test) according to DIN EN 1090-2 Execution class EXC2,
4. Leakage test,
5. if applicable, check of corrosion protection according to DIN EN 1090-2 class EXC2.

The leakage test is carried out by non-destructive testing: the vacuum process according to DIN EN 1593, the colour penetration method according to DIN EN ISO 3452-1 or an equivalent method. Filling the tray with water or immersing the tray in water is not considered as an equivalent method.

## 3 Provisions relating to the establishment

(1) The conditions for the installation of the trays are set out in the water, occupational safety and construction regulations.
(2) The trays may only be placed on horizontal, flat and sufficiently fastened surfaces (e.g. asphalt, concrete) or installed on shelves (see section 1(3)). Precipitation water shall not enter the receptacle. The area around the receivers shall be fixed and shall not have a gradient to the catch tanks, so that, for example, precipitation water cannot be collected under the catching tubs.
(3) The steel grids used as floorings shall be designed and constructed for the specified payload in accordance with recognised rules of steel construction, e.g. Eurocode 3 (DIN EN 1993) or RAL-GZ 638 and be proven to be resistant to storage media in accordance with paragraph (1) of Section 2.1.1.
(4) Reception trays must be adequately protected against possible damage from the outside. Protection can, for example, be provided by:

- protected installation outside internal transport routes,
- Start-up protection,

0 see List of Testing, Monitoring and Certification Bodies according to the State Building Regulations – PÜZ Directory, published on the homepage of the German Institute for Construction Technology

- Installation in a suitable room.

(5) In the case of a surface composition of several catching tubs, an overview shall be affixed to a visible location showing the marking in accordance with Section 2.2.2 for each catching tray.
The joints between the trays shall be covered with liquid impermeability.
(6) The corrosion protection layer must not be damaged when installing steel floor trays in accordance with DIN EN 10025-2 or DIN EN 10028-2 without feet or skids.

## 4 Provisions for use, maintenance, maintenance and testing

### 4.1 Use

(1) The terms of use shall be in accordance with the evidence set out in Section 2.1.
(2) The permissible storage volume of the containers stored in or above the tray shall be determined according to the required restraint volume in accordance with § 18, (3) and (4) as well as Chapter 3, Section 3 AwSV.
(3) If catching devices are assembled on a flat surface, the permissible catch volume shall correspond to the respective catch volume of the individual collection device on which the containers are placed. If containers are placed over multiple collection devices, the maximum catch volume of the smallest catching device shall be decisive. In the case of surface composition, the collection volumes of the individual catching devices shall not be added together.
(4) The operator shall be responsible for complying with the maximum permissible storage capacity or container size described in paragraph (2) and also in paragraph (3), taking into account the catch volume marked on the tray. The volume displacement by the set containers must be observed.
(5) The base area of collecting devices shall be such that injection losses, e.g. from mechanical damage to container walls, from filling and emptying operations and drip losses are safely absorbed. Where appropriate, a safe discharge of leaks into the collection device shall be ensured by means of spray protection measures.
(6) The maximum payload of the tray and the grating must not be exceeded.
(7) Large containers and barrels may only be placed in or on their grids with suitable equipment (e.g. drum grippers) and removed from or from it.
(8) Small containers and barrels may only be stacked in accordance with traffic regulations and safety regulations, whereby a maximum stacking height of 1.5 m must not be exceeded. They must be secured against falling.
(9) In earthquake areas within earthquake zones 1 to 3 according to DIN 4149, the containers are sufficiently secure in their position in such a way that in the event of an earthquake no concentrated individual loads affect the tanks.
(10) The aggregation of different substances must provide a material compatibility. Different liquids that can react to each other must be stored in such a way that they cannot enter the same tub in the event of leakage. The material of another container shall not be attacked by the storage medium.
(11) In cases where contact corrosion is to be expected, it shall be ensured that the containers and containers have a sufficient distance from the wall of the tray.
(12) The leaking of water-hazardous substances from the container must be quickly and reliably detectable. The substances harmful to water shall be visible or indicated by a leakage probe. The installation and arrangement of the tanks in or on the receptacle shall be governed by water and labour protection regulations.
(13) Bottling vessels (e.g. cans) and storage containers must not protrude beyond the edge of the tank.

### 4.2 Maintenance, servicing

(1) The tray shall be kept free of water, precipitation and pollution.
(2) Damage to the surface protection of the tray shall be repaired immediately.
(3) If the grating is replaced, only one grating of the same type may be used with at least the same load capacity.
(4) If the tray has been repaired after damage which has significantly impaired the functioning of the tub, it shall be subjected to a leakage test again. Repair and leakage testing shall be carried out either by the manufacturer or by an establishment meeting the requirements set out in Section 2.2.1. Test methods for leakage testing see section 2.3.2 (2).

### 4.3 Tests

(1) The operator shall regularly determine whether liquid has leaked out of the tanks or, where appropriate, to check the operational readiness of the connected leakage probe, in accordance with the water regulations' and operational conditions. Leaked liquid must be immediately eliminated professionally without damage.

(2) The condition of the tray and, if applicable, of the grating shall be checked every two years, every 6 months in the case of reception tubs in safety cabinets in accordance with DIN EN 14470-1. At least in the case of steel trays in accordance with DIN EN 10025-2 or DIN EN 10028-2, the test shall also be carried out on the bottom of the floor. The result shall be recorded and submitted at the request of the competent water authority.

## 5 Catching tubs – Materials and material certificates

| Types of steel | | Material no. according to DIN EN 10027-2 | previous Designation | Verification | |
|---|---|---|---|---|---|
| Steels according to DIN EN 10025-2 | S235JR | 1.0038 | St37-2 | CE conformity marking according to DIN EN 10025-1 | Work certificate 2.2* |
| | S275J2<br>S355J2 | 1.0145<br>1.0570 | St44-3<br>St52-3 | | Acceptance test certificate 3.1 |
| Steels according to DIN EN 10028-2 | P235GH<br>P265GH<br>P295GH | 1.0345<br>1.0425<br>1.0481 | HI<br>HII<br>17Mn4 | Acceptance test certificate 3.1 | |
| Stainless steels | according to Z-30.3-6 | | | Marking according to Z-30.3-6<br>Acceptance test certificate 3.1 | |
| | according to DIN EN 10088-4 | | | | |

* according to DIN EN 10204

## 6 Cited norms and regulations

| | |
|---|---|
| DIN 4149:2005-04 | Structures in German seismic zones – Design loads, measurement and design customary in construction |
| DIN EN 1090-2: 2018-09 | Execution of steel structures and aluminium structures - Part 2: Technical requirements for steel structures |
| DIN EN 1593:1999-11 | Non-destructive test – leakage test – bladder test method |
| DIN EN 10025-1:2005-2 | Hot-rolled products made of construction steels - Part 1: General technical delivery conditions |
| DIN EN 10025-2:2019-10 | Hot-rolled products made of construction steels - Part 2: Technical Delivery Terms for non-alloy structural steels |
| DIN EN 10027-2:2015-07 | Designation Systems for Steels; Part 2: Numbering System |
| DIN EN 10028-2:2017-10 | Flat products of pressure vessel steel – Part 2: Unalloyed and alloyed steels with defined properties at elevated temperatures |
| DIN EN 10088-4:2010-01 | Stainless steels – Part 4: Technical delivery conditions for sheet metal and strip made of corrosion-resistant steels for construction |
| DIN EN 10204:2005-01, | Metallic products - Types of inspection documents |
| DIN EN 12285-1:2018-12 | Factory-made steel tanks – Part 1: Lying, cylindrical, single and double-walled tanks for the underground storage of combustible and non-flammable water-hazardous liquids not intended for heating and cooling buildings (positive liquid list) |
| DIN EN 14470-1:2004-07 | Fire Resistant Storage Cabinets – Part 1: Safety cabinets for flammable liquids |
| DIN EN ISO 1461:2009-10 | Hot dip galvanised coatings on fabricated iron and steel articles – Specifications and test methods |
| DIN EN ISO 3452-1:2014-09 | Non-destructive intrusion test – Part 1: General principles |
| DIN EN ISO 9606-1: 2017-12 | Testing of welders – melt welding – Part 1: Steels (ISO 9606-1:2012, including Cor 1:2012 and Cor 2:2013) |
| DIN EN ISO 12944-1:2019-01 | Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 1: General Introduction |
| DIN EN ISO 12944-4:2018-04 | Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 4: Types of surface and surface preparation |
| DIN EN ISO 12944-5:2018-06 | Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 5: Protective paint systems |
| DIN EN ISO 15609-1/-2/-3/-4/-5/-6:2005-01, 2001-12, 2004-10, 2009-10, 2012-03, 2013-06 | Requirement and qualification of welding processes for metallic materials – welding instruction |
| AwSV | Ordinance on Plants for the Handling of Water Dangerous Substances (AwSV) The current version applies. (at the time this StawaR was drawn up, the version of 18 April 2017 (BGBl I No. 22, p. 905) |
| RAL-GZ 638:2008-09 | Gratings – quality assurance |
| Z-30.3-6:05.03.2018 | Products, fasteners and components of stainless steel |

With regard to the standards cited in this Directive, other documents and technical requirements that refer to products or test procedures, it is hereby stated that products or test procedures that comply with the standards or other such provisions and/or technical regulations in other EU Member States and other Contracting States to the Agreement on the European Economic Area (EEA) as well as Switzerland and Turkey may also be used as long as the required level of protection is consistently provided in terms of safety, health and usability.

## Annex 18

# Use of normal flammability glazing in external walls, excluding exterior wall structures with inter-storey cavities or airspaces and façades

Last updated: July 2022

Instead of non-combustible glazing in external walls, normal flammability glazing may be used if the glazing with multi-pane insulating glass with laminated safety glass consists of single non-flammable glass (e.g. float glass, single pane safety glass) and intermediate films and the multi-pane insulating glass with laminated safety glass is at least normal flame resistant and the glazing does not contribute to a permanent flame propagation in the event of fire.

This is considered to be met by laminated safety glass with a maximum of two 0.38 mm thick polyvinyl butyral (PVB) films per liner. These composite safety glasses may also be arranged in several disk planes (e.g. as outer, middle and inner panes). The disc edges must be protected from flame by a glass holder made of non-combustible materials. If this is to be deviated from this, a proof of applicability according to § 16a MBO[0] is required.

0 According to national law

## Source of supply certification

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