

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-16/0080
of 20 October 2020

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

"TENDONOL-Brandschutzmasse" (Sealing compound)
and
"TENDONOL Trockensystem" (pre-formed system)

Product family
to which the construction product belongs

Linear Joint and Gap Seals

Manufacturer

VARIO Baustoffsysteme GmbH
Dielinger Straße 47
32351 Stemwede
DEUTSCHLAND

Manufacturing plant

1¹

This European Technical Assessment
contains

14 pages including 9 pages annexes which form an
integral part of this assessment

This European Technical Assessment is
issued in accordance with Regulation (EU)
No 305/2011, on the basis of

EAD 350141-00-1106

This version replaces

ETA-16/0080 issued on 23 February 2016

¹ Address known at DIBt

The European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and shall be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may only be made with the written consent of the issuing Technical Assessment Body. Any partial reproduction shall be identified as such.

This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission in accordance with Article 25(3) of Regulation (EU) No 305/2011.

Specific Part

1 Technical description of the product

Object of this European technical assessment (ETA) are the product-variants „TENDONOL-Brandschutzmasse“ and „TENDONOL-Trockensystem“ for the execution of linear joint and gap seals.

„TENDONOL-Brandschutzmasse“(sealing compound) is a sealing compound which is used as essential element of fire protective linear joint seals.

„TENDONOL-Trockensystem“(pre-formed system) is a mat of a thickness about 4 mm, made from the sealing compound "TENDONOL-Brandschutzmasse" and reinforced with fibreglass cloth. The reinforced mat is curled into rolls or threads and will be put directly into the linear joint or gap system like the viscos sealing compound „TENDONOL-Brandschutzmasse“.

For the execution of the fire protective seal the producer's instructions should be considered.

The maximum lateral stretching capability of „TENDONOL-Brandschutzmasse“ (hardened) is 7.4 %.

Some essential properties of the products "TENDONOL-Brandschutzmasse" and "TENDONOL-Trockensystem" are listet in Annex A.

Further characteristics for the execution of the tested joint seal (backfilling material) are presented in Annex A.

Details for the design of joint seals executed by using TENDONOL-Brandschutzmasse as tested are presented in Annex B.

Detailed material specifications of the products „TENDONOL-Brandschutzmasse“ and „TENDONOL-Trockensystem“ are deposited with Deutsches Institut für Bautechnik.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The construction products „TENDONOL-Brandschutzmasse“ and „TENDONOL-Trockensystem“ will be assessed in accordance with EAD Nr. 350141-00-1106².

The products „TENDONOL-Brandschutzmasse“ and „TENDONOL-Trockensystem“ – described above – are used for sealing horizontal and vertical linear non-movement joints (structural joints as stepped joints and linear butt joints) between fire resistant rigid walls and floors with a fire-separating function.

The executed joint seal is intended to maintain or reinstate the fire resistance performance of building components with a fire-separating function where they are interrupted or separated by joints.

The permitted width of the joints depending on the design is presented in Annex B.

The joint seal is not intended for load transmission.

The performances given in section 3 are only valid if the joint seal is used in compliance with

- the specifications and conditions given in Annex B and
- the manufacturer's instructions as stated in section 5.

² Amtsblatt der EU Nr. C 435/07 vom 12. Dezember 2017; S. 159, EAD N° 350141-00-1106 „Linear joint and gap seals“

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of „TENDONOL-Brandschutzmasse“ and „TENDONOL-Trockensystem“ of at least 10 years.

The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Classes in accordance with EN 13501-1 See Annex A
Resistance to fire	Classes in accordance with EN 13501-2 See Annex B

3.2 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Depth of penetration of water under pressure	water tight up to 1 bar in accordance with EN 12390-8
Content, emission and/or release of dangerous substances	The chemical composition of the product has to be in compliance with the composition deposited with the Technical Assessment Body (DIBt). The product does not contain or release dangerous substances ³ except: <ul style="list-style-type: none"> VOC, SVOC No performance assessed. A Biocide (< 1 wt%), contained active ingredients: 2-bromo-2-nitropropane-1,3-diol; 1,2-benzisothiazol-3(2H)-one and 2-methyl-2H-isothiazol-3-one
Use scenarios regarding to BWR	I A1/I A2

3.3 Safety and accessibility in use (BWR 4)

Essential characteristic	Performance
Mechanical resistance and stability	Pursuant ETAG 026-3, tests to show evidence of impact resistance are not necessary because the joints have a maximum width of 110 mm. No performance assessed.
Resistance to impact/movement	
Adhesion	Adhesion is determined by determination of the movement capability.

3.4 General aspects

The verification of durability is part of testing the essential characteristics.

³ In accordance with the Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 (published in the Official Journal of the EU N° L 353 of 31/12/2008, p 1)

English translation prepared by DIBt

In accordance with EAD Nr. 350141-00-1106² for fire protective linear joint and gap seals executed with „TENDONOL-Brandschutzmasse“ or „TENDONOL-Trockensystem“ can be used under climatic use conditions of type X – product suitable for final use exposed to weathering/out-door use - without having to fear essential changes in the relevant fire sealing and fire stopping properties and the resulting performance. This assessment includes the use under climatic conditions of type Types Z₂, Z₁, Y₂ and Y₁.

The durability is only ensured, if the specifications on the intended use taken into account as stated in Annex B and the producer's instructions in section 5 are.

Mechanical properties

The following mechanical properties were determined in accordance with EN ISO 7389:2003:

- Resistance to stretching: > 95 % after load-release
- Resistance to 20 % compression strain: > 92 % 24 h after load-release (8 % plastic deformation)
- Stability at 50° C permanently (without loading): 100 % (no settling/plastic deformation)

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with the EAD for fire protective products and kits N° 350141-00-1106² Linear joint and gap seals, the applicable European legal act is: 1999/454/EC.

System 1 applies for the assessment and verification of constancy of performance (AVCP). (See Annex V in conjunction with Article 65 (2) of the Regulation (EU) N° 305/2011) according to the following table:

Product	Intended use	Characteristic	System
TENDONOL-Brandschutzmasse TENDONOL-Trockensystem	fire protective linear joint and gap seals	reaction to fire resistance to fire	1

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

The manufacturer shall provide installation instructions on every construction product according to this ETA containing at least the information on type, properties (minimum thickness, density) and fire resistance of the building components with a fire-separating function in which the joint system may be installed and a description of the proper installation (depending on the type of the building element, the intended fire resistance and the width of the joints).

Issued in Berlin on 20 October 2020 by Deutsches Institut für Bautechnik

Otto Fechner
Head of Section

beglaubigt:
Dr. Dierke

1 Information on the construction products

No.	Designation / specification	Description / properties
Information on "TENDONOL-Brandschutzmasse" and "TENDONOL-Trockensystem"		
1	TENDONOL-Brandschutzmasse VARIO Baustoffsysteme GmbH 32351 Stemwede 2 GERMANY	intumescent sealing compound - expansion ratio: 2,0 to 6,0 (tested at 550°C for 30 minutes with a top-load, thickness of the specimen ca. 5 mm) - expansion pressure: 0,25 N/mm ² to 0,45 N/mm ² (tested at 300 °C without lateral restriction, thickness of the specimen ca. 5 mm) - density: 1700 kg/m ³ ± 10 % Reaction to fire class in accordance with EN 13501-1: a) With backfilling in accordance with variant No. 1: Class B-s1, d0 ^{a)} b) With backfilling in accordance with variant No. 2: Class B-s1, d0 ^{a)} c) With backfilling in accordance with variant No. 3: Class E ^{a)} d) With backfilling in accordance with variant No. 4: Class E ^{b)}
2	TENDONOL-Trockensystem	intumescent mats for rolled strap - expansion ratio: 4,5 to 6,5 (tested at 550°C for 30 minutes with a top-load, thickness of the specimen ca. 4 mm) - expansion pressure 0,3 N/mm ² to 0,55 N/mm ² (tested at 300 °C without lateral restriction, thickness of the specimen ca. 5 mm) - density: 1650 kg/m ³ ± 10% - reaction to fire class E in accordance with EN 13501-1
Information on the additional components of the tested joint sealing (backfilling material)		
3	loose fill mineral wool In accordance with EN 13162 or EN 14303 (Variant 1)	Bulk density: ≥ 50 kg/m ³ (apparent density) Thickness of the backfilling: 30 to 90 mm (depth of the filling) Reaction to fire class in accordance with EN 13501-1: Class A1 oder A2-s1, d0
4	mineral wool board In accordance with EN 13162 or EN 14303 (Variant 2)	Bulk density: ≥ 80 kg/m ³ (nominal bulk density) Thickness of the backfilling: 30 mm to 90 mm Reaction to fire class in accordance with EN 13501-1: Class A1 oder A2-s1, d0
5	without backfilling material	Reaction to fire class in accordance with EN 13501-1: at least class E

"TENDONOL-Brandschutzmasse" (Sealing compound) and
"TENDONOL Trockensystem" (pre-formed system)

Properties and performance of the components
Reaction to fire
- Description of the components -

Annex A1

Assessed parameters of the joint execution:	
a)	<ul style="list-style-type: none"> – In walls / ceilings made of massive mineral construction materials or construction panels; reaction to fire class A1 or A2-s1, d0 in accordance with EN 13501-1 – Width of the joint: see Annexes B2 to B4 – Filling depth of the sealing compound: see Annexes B2 to B4
b)	<ul style="list-style-type: none"> – In walls / ceilings made of massive mineral construction materials or construction panels; reaction to fire class A1 or A2-s1, d0 in accordance with EN 13501-1 – Width of the joint: see Annex B5 – Filling depth of the sealing compound: 20 to 30 mm

"TENDONOL-Brandschutzmasse" (Sealing compound) and
"TENDONOL Trockensystem" (pre-formed system)

Performance of the joint seal

Resistance to fire

- Details to the building components and overview of the applications -

Annex A2

2 Fire resistance

2.1 Building components with a fire separating function

The joint sealing is used for sealing linear joints between the following separating building elements:

Rigid walls

- made of masonry, concrete, reinforced concrete or aerated concrete with a minimum density of 625 kg/m^3
- minimum thickness c_w 115 mm

Rigid floors

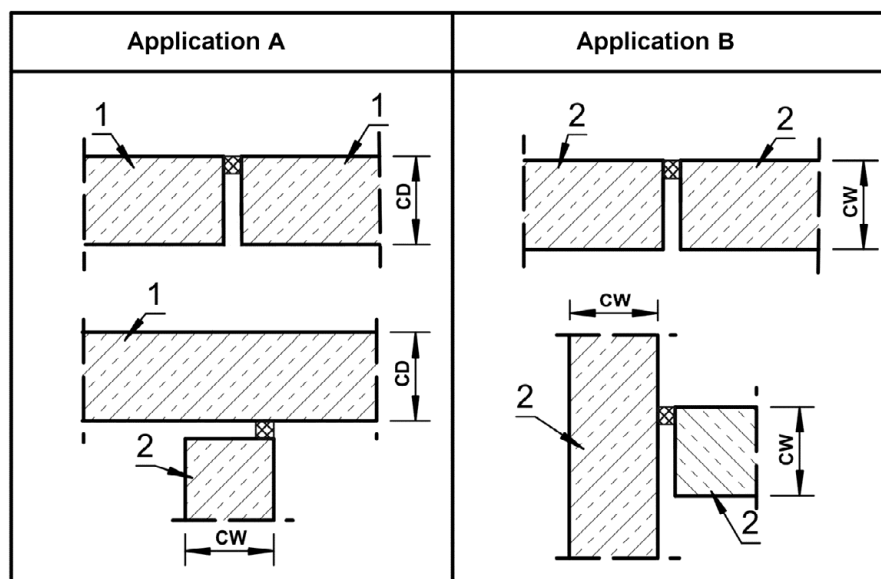
- made of concrete, reinforced concrete or aerated concrete with a minimum density of 475 kg/m^3
- minimum thickness c_D 150 mm

The separating building elements shall be classified according to EN 13501-2 for the required fire resistance period.

2.2 Application

According to the symbolic representation of table 2, the joint seal is used

- in horizontal joints between fire-resistant separating floors or between walls abutting a floor (A)
- in vertical joints between fire-resistant separating walls (B).



- ① Rigid floor
 ② Rigid wall
 c_D Minimum thickness rigid floor 150 mm
 c_W Minimum thickness rigid wall 115 mm

"TENDONOL-Brandschutzmasse" (Sealing compound) and
 "TENDONOL Trockensystem" (pre-formed system)

Performance of the joint seal
 Resistance to fire
 - Variant 1 and classification -

Annex B1

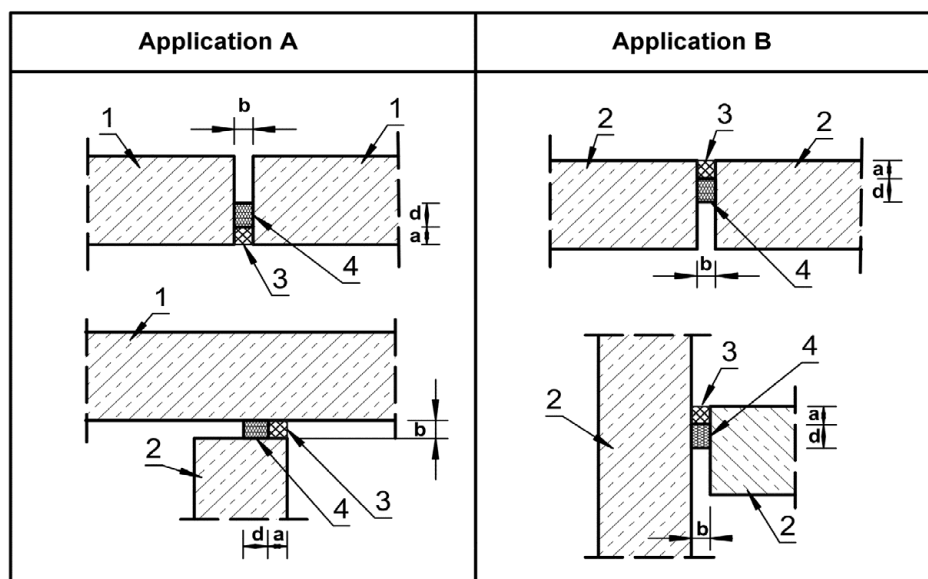
2.3 Variants of execution

2.3.1 Variant 1

- Backfilling with loose mineral wool, stuffed density $\geq 50 \text{ kg/m}^3$
- Sealing one-sided
- The arrangement (top or bottom of the floor or side of the wall) is optional.

Table 1

Application	Joint width b [mm]	Filling depth a TENDONOL® [mm]	Filling depth d backfilling [mm]	Classification
A	15 to 30	30	40	EI 120-H-X-F-W10 to 30 E 120-H-X-F-W10 to 30
B	10 to 30	10	90	EI 120-V-X-F-W10 to 30 E 120-V-X-F-W10 to 30
	50	30	30	EI 90-V-X-F-W50 E 120-V-X-F-W50
	110	30	30	EI 90-V-X-F-W110 E 120-V-X-F-W110



- ① Rigid floor
- ② Rigid wall
- ③ TENDONOL
- ④ Backfilling material

"TENDONOL-Brandschutzmasse" (Sealing compound) and
"TENDONOL Trockensystem" (pre-formed system)

Performance of the joint seal
Resistance to fire
- Variant 2 and classification -

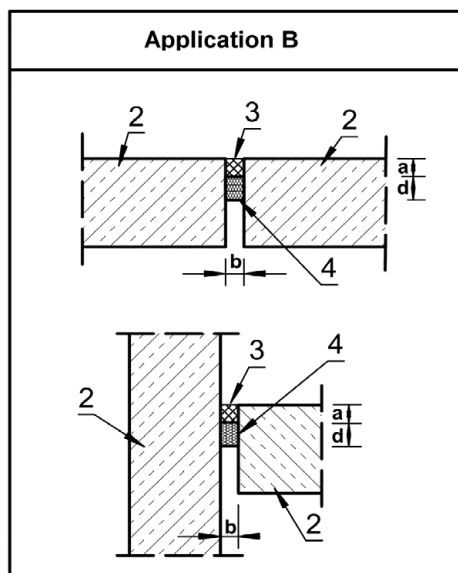
Annex B2

2.3.2 Variant 2

- Backfilling with mineral wool boards, nominal bulk density $\geq 80 \text{ kg/m}^3$
- Sealing one-sided
- The arrangement (top or bottom of the floor or side of the wall) is optional.

Table 2

Application	Joint width b [mm]	Filling depth a TENDONOL® [mm]	Filling depth d backfilling [mm]	Classification
B	20 to 40	15	90	EI 120-V-X-F-W20 to 40 E 120-V-X-F-W20 to 40
	30	30	30	EI 30-V-X-F-W30 E 120-V-X-F-W30
	31 to 50	30	30	EI 45-V-X-F-W31 to 50 E 120-V-X-F-W31 to 50
	110	30	30	EI 90-V-X-F-W110 E 120-V-X-F-W110



- ① Rigid floor
- ② Rigid wall
- ③ TENDONOL
- ④ Backfilling material

"TENDONOL-Brandschutzmasse" (Sealing compound) and
"TENDONOL Trockensystem" (pre-formed system)

Performance of the joint seal
Resistance to fire
- Variant 3 and classification -

Annex B3

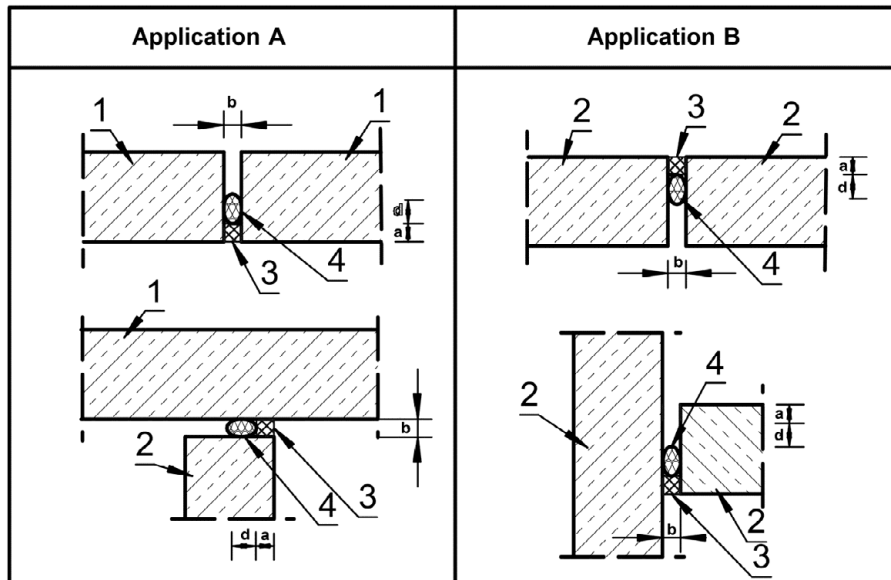
English translation prepared by DIBt

2.3.3 Variant 3

- Backfilling with PE round cord
- Sealing one-sided
- The arrangement (top or bottom of the floor or side of the wall) is optional.

Table 3

Application	Joint width b [mm]	Filling depth a TENDONOL® [mm]	Ø d backfilling [mm]	Classification
A	5	20	10	EI 120-H-X-F-W5 E 120-H-X-F-W5
	6 to 14	20	$\geq 1,4 \times b$	EI 45-H-X-F-W6 to 14 E 120-H-X-F-W6 to 14
B	10	20	20	EI 45-V-X-F-W10 E 120-V-X-F-W10
	10	30	20	EI 120-V-X-F-W10 E 120-V-X-F-W10
	11 to 14	20	$\geq 1,07 \times b$	EI 30-V-X-F-W11 to 14 E 90-V-X-F-W11 to 14
	11 to 20	30	$\geq 1,43 \times b$	EI 60-V-X-F-W11 to 20 E 120-V-X-F-W11 to 20
	21 to 30	30	$\geq 1,6 \times b$	EI 45-V-X-F-W21 to 30 E 120-V-X-F-W21 to 30
	11 to 20	40	$\geq 1,5 \times b$	EI 90-V-X-F-W11 to 20 E 120-V-X-F-W11 to 20
	21 to 30	40	$\geq 1,3 \times b$	EI 120-V-X-F-W21 to 30 E 120-V-X-F-W21 to 30



- ① Rigid floor
- ② Rigid wall
- ③ TENDONOL®
- ④ Backfilling material

"TENDONOL-Brandschutzmasse" (Sealing compound) and
"TENDONOL Trockensystem" (pre-formed system)

Performance of the joint seal
Resistance to fire
- Variant 4 and classification -

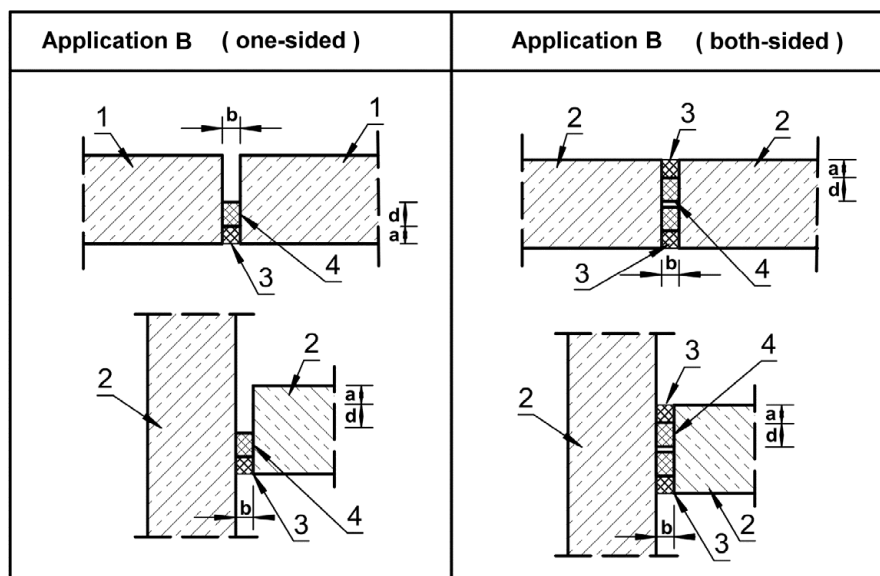
Annex B4

2.3.4 Variant 4

- Backfilling with Polystyrene
- Sealing one-sided or both-sided

Table 4

Application	Joint width b [mm]	Filling depth a TENDONOL® [mm]	Filling depth d backfilling [mm]	Classification
B	10	20 (one-sided)	30	EI 120-V-X-F-W10 E 120-V-X-F-W10
	11 to 14	20 (one-sided)	60	EI 45-V-X-F-W11 to 14 E 90-V-X-F-W11 to 14
	11 to 30	30 (one-sided)	30	EI 45-V-X-F-W11 to 30 E 120-V-X-F-W11 to 30
	30	2 x 15 (both-sided)	85	EI 120-V-X-F-W10 to 30 E 120-V-X-F-W10 to 30



- ① Rigid floor
- ② Rigid wall
- ③ TENDONOL
- ④ Backfilling material

"TENDONOL-Brandschutzmasse" (Sealing compound) and
"TENDONOL Trockensystem" (pre-formed system)

Performance of the joint seal
Resistance to fire
- Installation details of the verified joint sealing -

Annex B5

2.6 Installation of the joint seal

The joints and surfaces TENDONOL-Brandschutzmasse or TENDONOL-Trockensystem will be applied in or on have to be cleaned of loose debris or dirt. If necessary, the edges of the joints have to be pretreated with TENDONOL-Brandschutzmasse.

The backfilling material and TENDONOL-Brandschutzmasse or TENDONOL-Trockensystem are inserted into the joint. For the dimensions verified, Annexes B 2 to B 5 shall be taken into account.

Already existing rests of material inside the joint do not need to be removed provided that the minimum thickness of the sealing compound TENDONOL-Brandschutzmasse will be maintained in accordance with Annexes B 2 to B 5.

The ETA is issued under the assumption that the installation of the construction product is in accordance with the manufacturer's installation instructions.

"TENDONOL-Brandschutzmasse" (Sealing compound) and
"TENDONOL Trockensystem" (pre-formed system)

Performance of the joint seal
- Installation details of the verified joint sealing -

Annex B6

Standards

EN 13501-1:2019-05	Fire classification of construction products and building elements, part 1: Classification using data from reaction to fire tests
EN 13501-2:2016-12	Fire classification of construction products and building elements, part 2: Classification using data from fire resistance tests, excluding ventilation services
EN 1363-1:2012-10	Fire resistance tests – Part 1: General requirements
EN 1366-4:2010-08	Fire resistance tests for service installations – Part 4: Linear joint seals
EN 13823:2015-02	Reaction to fire tests for building products - Building products excluding floorings exposed to the thermal attack by a single burning item
EN ISO 11925-2:2010	Reaction to fire tests - Ignitability of products subjected to direct impingement of flame - Part 2: Single-flame source test (ISO 11925-2:2010)
EN 13162:2015-04	Thermal insulation products for buildings - Factory made mineral wool (MW) products - Specification
EN 14309:2016-03	Thermal insulation products for building equipment and industrial installations - Factory made products of expanded polystyrene (EPS) - Specification
EN 12390-8:2009-07	Testing hardened concrete - Part 8: Depth of penetration of water under pressure

Other documents

EAD 350141-00-1106	Fire Stopping and Fire Sealing Products – Linear joint and gap seals, Edition September 2017
Technical Report 024	Technical description and assessment of reactive products effective in case of fire, Edition 2019)
Technical Report 034	General BWR 3 Checklist for EADs/ETAs - Dangerous substances, Edition October 2015

"TENDONOL-Brandschutzmasse" (Sealing compound) and
"TENDONOL Trockensystem" (pre-formed system)

List of documents referred to

Annex C