ZAPP-
ZIMMERMANN

INNOVATIVE FIRE-PROTECTION SYSTEMS

System ZZ-Fire protection silicone NE ETA-12/0118

INSTALLATION MANUAL

ZZ ZAPP-ZIMMERMANN

Inhalt/ Content

System ZZ-Fire protection silicone NE

for firestop joint seals up to EI 180

System ZZ-Fire protection silicone NE restores the fire resistance classification in areas of joints in walls and floors.

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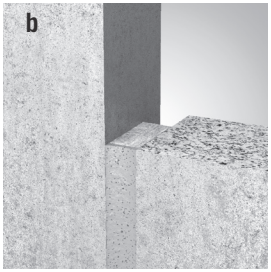
System ZZ-Fire protection silicone NE ETA-12/0118

ZZ-Fire protection silicone NE is used to seal construction joints in rigid walls and rigid floors to satisfy the requirements in accordance with ISO 11600 and the requirements for the fire resistance class up to EI 180 in accordance with ETA-12/0118.



a. System ZZ-Fire protection silicone NE on two sides with PE round cord as backfill

b. System ZZ-Fire protection silicone NE on one side with mineral wool as backfill

Specially suited for: Expansion and movement joints, construction joints in accordance with ISO 11600 and firestop joints up to EI 180 (up to 25 % lateral expansion and 25 % shear)

Fundamentals

/ For execution of the firestop joint seal, System ZZ-Fire protection silicone NE, the European technical approval ETA-12/0118 issued by the Austrian Institute for Building Technology (Österreichisches Institut für Bautechnik) is authoritative.
/ All technical specifications, such as permissible joint widths, wall types/floor types, fire resistance classes, etc. are provided in the approval.
/ It must be ensured that the stability of the adjacent component is not impaired through installation of the firestop joint seal even in the event of fire. The information specified in the usability certification of the component must be complied with.
/ All applicable directives and technical rules of other trades must be complied with.
/ In accordance with ETAG 026-3, the firestop joint seal can be assigned to use category X. This means that ZZ-Fire protection silicone NE can be used in outdoor areas as well as indoor areas.

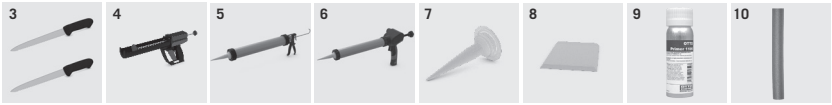
Permissible install locations of the firestop joint seal

Components	Construction type	Classification of the component	Minimum component density
Rigid wall	Aerated concrete, concrete, reinforced concrete, masonry	The component must be classified for the required fire resistance class in accordance with EN 13501-2	450 kg/m³
Rigid floor	Aerated concrete, concrete, reinforced concrete		450 kg/m³

System components

Designation	Art. no.	PU
1. ZZ-Fire protection silicone NE, 310 ml	B15H00-0001	20
2. ZZ-Fire protection silicone NE tubular bag, 580 ml	B15H00-0002	20

Accessories



Designation	Art. no.	PU
3. Knife with serrated blade, narrow & magnetic blade guard	B16H00-0042	1
3. Knife with serrated blade, wide & magnetic blade guard	B16H00-0043	1
4. Professional dispensing gun, 310 ml	B16H00-0024	1
5. EconoMax dispensing gun (310 ml cartridge & 580 ml tubular bag)	B16H00-0052	1
6. PowerMax dispensing gun (310 ml cartridge & 580 ml tubular bag)	B16H00-0053	1
7. Spare nozzle for tubular bag dispensing gun	B99H00-0160	1
8. Smoothing trowel	B99H00-0161	1
9. OTTO Primer 1105, 250 ml	B99H00-0108	1
10. OTTO PE round cord B2	*see variants*	1

Variants	L [m]	Art. no.	PU
10. OTTO PE round cord B2 Ø 6	100	B99H00-0098	1
10. OTTO PE round cord B2 Ø 8	100	B99H00-0099	1
10. OTTO PE round cord B2 Ø 10	100	B99H00-0100	1
10. OTTO PE round cord B2 Ø 13	100	B99H00-0101	1
10. OTTO PE round cord B2 Ø 15	100	B99H00-0102	1
10. OTTO PE round cord B2 Ø 20	50	B99H00-0103	1
10. OTTO PE round cord B2 Ø 25	50	B99H00-0104	1
10. OTTO PE round cord B2 Ø 30	25	B99H00-0105	1
10. OTTO PE round cord B2 Ø 40	1	B99H00-0106	20

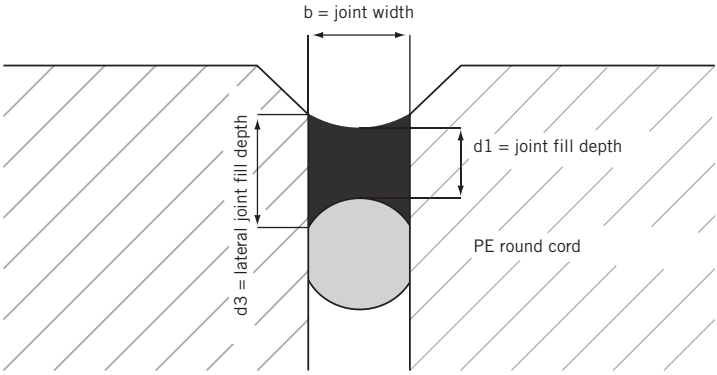
General instructions

ZZ-Fire protection silicone NE is a joint sealant that is suitable for sealing construction joints, and simultaneously is approved as a product for firestop joints through a European Technical Approval. ZZ-Fire protection silicone NE is not suitable for sealing joints that get high mechanical vertical pressure stress, e.g. through in situ water or high traffic loads.

The following verifications and classifications are available for ZZ-Fire protection silicone NE:

/ DIN EN ISO 11600-F-20LM und DIN EN ISO 11600-F-12,5E (Building construction – Jointing products)
/ Approved construction product in accordance with European Technical Approval ETA-12/0118 for production of fire-resistant linear joint seals, classification of firestop joints up to a fire resistance class of EI 180 in accordance with DIN EN 13501-2
/ Emissions-assessed construction product in accordance with General Technical Approval Z-200.3-27
/ Reaction to fire in accordance with DIN 4102-B1
/ Reaction to fire in accordance with DIN EN 13501-1, Class E
/ Use category X (outdoor use) in accordance with ETAG 026-3

Correctly dimensioning and producing joints



Collectively the following rules should be complied with as a rule of thumb for proper dimensioning of the joint:

Joint fill depth d1 = 0.5 * joint width b
Minimum fill depth d1 ≥ 6 mm
Maximum joint fill depth d1 ≤ 15 mm

If the selected fill depth of the sealant is insufficient, its mechanical stability is reduced. If possible, expansion joints should not be narrower than 10 mm. The thickness of the joint sealant should be greater on the joint flank than it is in the middle of the joint. Thus the forces that occur in the event of expansion, can be introduced into the joint flank over a larger contact surface. Therefore adhesion cracks on the joint flank are prevented.

Lateral joint fill depth d3 = 2/3 * joint width b

(Source: German Sealant Manufacturers Association)
(Industrieverband Dichtstoffe e.V.)

Movement capacity of the sealant

The movement capacity of the sealant is limited to specific values in accordance with DIN EN ISO 11600 and ETA-12/0118. The movement capacity is defined as an absolute amount, starting from the tension free zero position.

Example:
A movement capacity of 20 % permits movements of the joint of +/– 10 % or – 5 % (compression) and + 15 % (expansion).

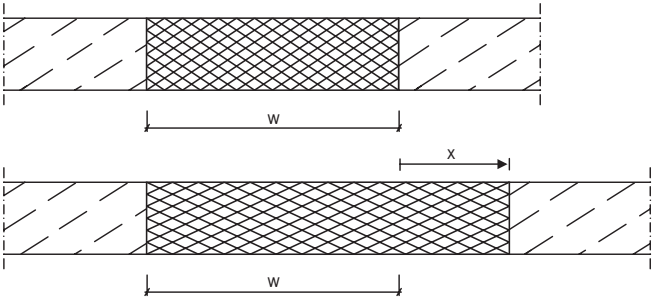
It must be ensured that the substrate on which the silicone should adhere, has sufficient load-bearing capacity and can absorb the forces that can occur with expansion movements and shear movements. The surface of the joint flanks must be free of dust, sand, grease, oil, (e.g. formwork oil), cement laitance and paint residues.

To improve the adhesion of ZZ-Fire protection silicone NE on mineral materials, (e.g. concrete, aerated concrete) and on absorbent materials (e.g. gypsum, fibre cement), the joint flanks must be pre-treated with a primer (e.g. Otto Primer 1105). Thorough preparation of the joint flanks is important particularly in the case of high mechanical stress of the joint seal in the form of lateral movements and shear movements.

Calculation of the permissible lateral displacement of two joint flanks

Formula:

$$x = \frac{mc + 100}{100} * w - w$$



Example: Joint width 40 mm, movement capacity System ZZ-Fire protection silicone NE mc = 25 %

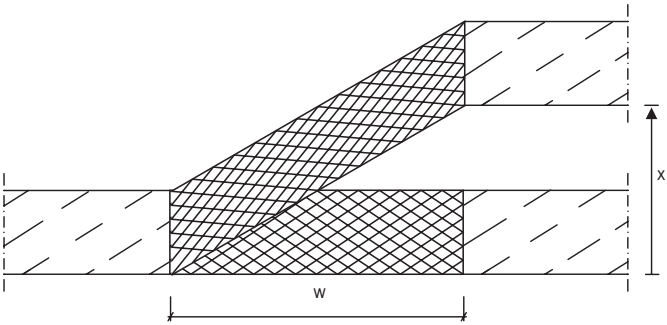
$$x = \frac{25 + 100}{100} * 40 - 40 = 10 \text{ mm}$$

x = Permissible lateral displacement (expansion/compression) of two joint flanks [mm]
w = Nominal joint width [mm]
mc = Movement capacity (lateral expansion) of the joint seal [%]

Calculation of the permissible vertical displacement of two joint flanks

Formula:

$$x = w \sqrt{\frac{mc}{100} * \left(2 + \frac{mc}{100}\right)}$$



Example: Joint width 40 mm, movement capacity System ZZ-Fire protection silicone NE mc = 25 %

$$x = 40 * \sqrt{\frac{25}{100} * \left(2 + \frac{25}{100}\right)} = 30 \text{ mm}$$

x = Permissible vertical displacement (shear) of two joint flanks [mm]
w = Nominal joint width [mm]
mc = Movement capacity (shear) of the joint seal [%]

Application classes

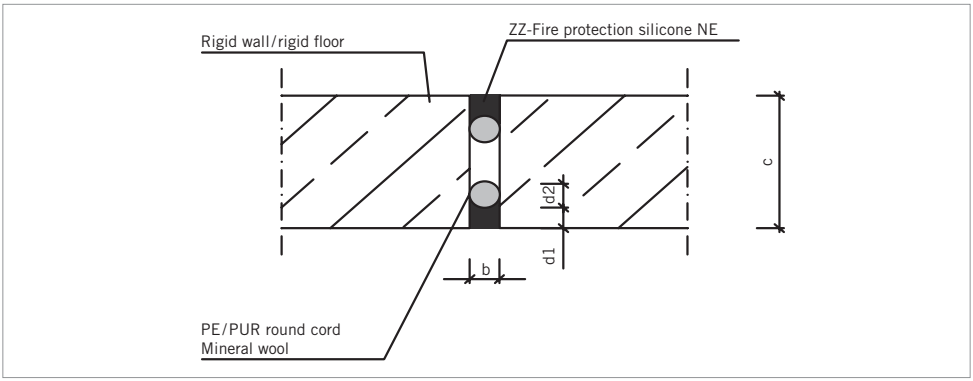
System ZZ-Fire protection silicone NE can be used in rigid walls and floors.
It offers a variety of application possibilities for safe sealing of component joints. The various application classes are described below. An overview is provided in the table on page 33.

Application class 1: Fulfillment of the requirements in accordance with DIN EN ISO 11600-F-20LM

/ Backfill with a PE/PUR round cord
/ Movement capacity 20 %
/ Type of movement: Lateral expansion or shear
/ Fill depth as specified in “Correctly dimensioning and producing joints” (see above)

Application class 2: Fulfillment of the requirements in accordance with DIN EN ISO 11600 with verified fire resistance classification in accordance with ETA-12/0118

Application class 2A: *Fulfillment of the requirements in accordance with DIN EN ISO 11600-F-12,5E and fire resistance classification up to EI 120 in accordance with ETA-12/0118*

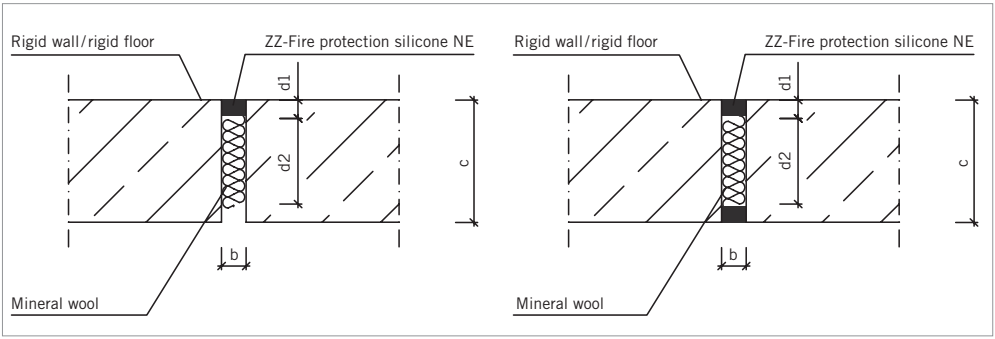


/ Backfill with a PE/PUR round cord
/ Movement capacity 12.5 %, maximum values around tension-free zero position +7.5 % and –7.5 %
/ Type of movement: Lateral expansion or shear
/ Joint widths up to 40 mm
/ Fill depth as specified in “Correctly dimensioning and producing joints” (see above)
/ Component thickness from 150 mm
/ Joint seal on both sides

Joint width b [mm]	Component thickness c [mm]	Joint depth d1 [mm]	Minimum thickness backfill d2 [mm]	Fire resistance classification
5 to 40	150	$d1 = 0.5 * b$ <u>and</u> $6 \leq d1 \leq 15$	≥ b	up to EI 90-V-X-F-W 5 to 40 up to EI 90-H-X-F-W 5 to 40

EI 90	Compliance with the criterion for integrity and temperature insulation over a period of at least 90 minutes
V/H	Vertical or horizontal (adjacent to floors) joint in walls or horizontal joint in floors
X	Movement capacity, maximum values around tension-free zero position +7.5 % or –7.5 %
F	Produced on site
W 5 to 40	Range of the joint widths in mm

Application class 2B: *Fulfillment of the requirements in accordance with DIN EN ISO 11600-F-20LM and fire resistance classification up to EI 120 in accordance with ETA-12/0118*



/ Backfill with mineral wool (density ≥ 40 kg/m³, thickness ≥ 100 mm, melting point > 1000 °C)
/ Movement capacity 20 %
/ Type of movement: Lateral expansion or shear
/ Joint widths up to 40 mm
/ Fill depth as specified in "Correctly dimensioning and producing joints"
/ Component thickness from 150 mm
/ Joint seal on both sides or one side

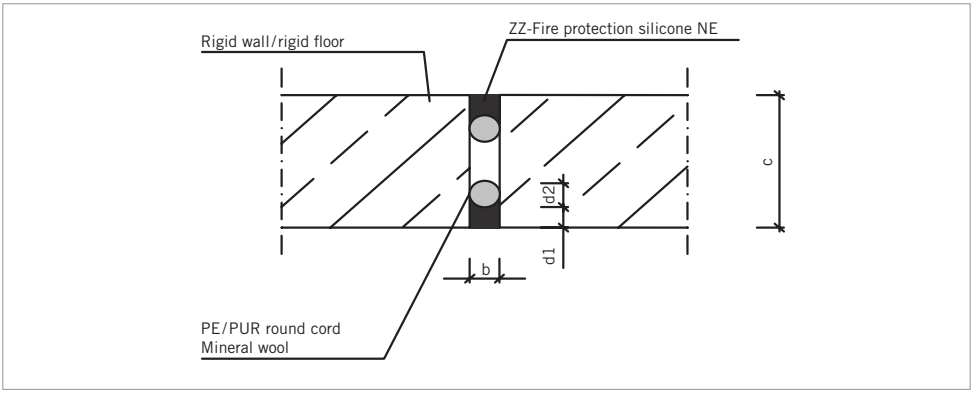
Notes:
/ The mineral wool that has to be pushed into the joint must consist of a strip that has been cut to size with overdimensions appropriate for the expansion.
/ To improve durability, a plastic foil can be inserted between ZZ-Fire protection silicone NE and the mineral wool.
/ If movement regularly occurs, execution on both sides is recommended, or in floors execution as joint seal on the underside of the floor is recommended.

Joint width b [mm]	Component thickness c [mm]	Joint depth d1 [mm]	Minimum thickness backfill d2 [mm]	Fire resistance classification
5 to 40	150	d1 = 0.5 * b and 6 ≤ d1 ≤ 15	≥ 100	up to EI 120-V-M020-F-W 5 to 40 up to EI 120-H-M020-F-W 5 to 40

EI 120	Compliance with the criterion for integrity and temperature insulation over a period of at least 120 minutes
V/H	Vertical or horizontal (adjacent to floors) joint in walls or horizontal joint in floors
M020	Movement capacity 20 %
F	Produced on site
W 5 to 40	Range of the joint widths in mm

Application class 3: Firestop joints in accordance with ETA-12/0118 with minimal movement capacity

Application class 3A: *Fire resistance classification up to EI 90 in accordance with ETA-12/0118*



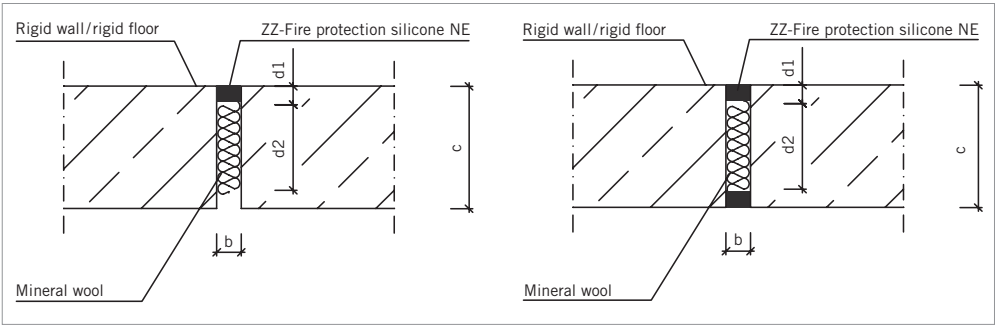
/ Backfill with a PE/PUR round cord
/ Movement capacity 15 %, maximum values around tension-free zero position + 7.5 % and – 7.5 %
/ Type of movement: Lateral expansion or shear
/ Joint widths up to 40 mm
/ Minimum fill depth 5 mm
/ Component thickness from 150 mm
/ Joint seal on both sides

Notes:
If movement regularly occurs, we recommend selecting the fill depth as specified in the section, "Correctly dimensioning and producting joints" (see above).

Joint width b [mm]	Component thickness c [mm]	Joint depth d1 [mm]	Minimum thickness backfill d2 [mm]	Fire resistance classification
5 to 40	150	d1 ≥ 5 mm	≥ b	up to EI 90-V-X-F-W 5 to 40 up to EI 90-H-X-F-W 5 to 40

EI 90	Compliance with the criterion for integrity and temperature insulation over a period of at least 90 minutes
V/H	Vertical or horizontal (adjacent to floors) joint in walls or horizontal joint in floors
X	Movement capacity, maximum values around tension-free zero position + 7.5 % or – 7.5 %
F	Produced on site
W 5 to 40	Range of the joint widths in mm

Application class 3B: *Fire resistance classification up to EI 180 in accordance with ETA-12/0118*



/ Backfill with mineral wool (density ≥ 40 kg/m³, thickness ≥ 90 mm, melting point > 1000 °C)
/ Movement capacity 15 %, maximum values around tension-free zero position +7.5 % and –7.5 %
/ Type of movement: Lateral expansion or shear
/ Joint widths up to 40 mm
/ Minimum fill depth 5 mm
/ Component thickness from 100 mm (rigid walls) or 150 mm (rigid floors)
/ Joint seal on both sides or one side

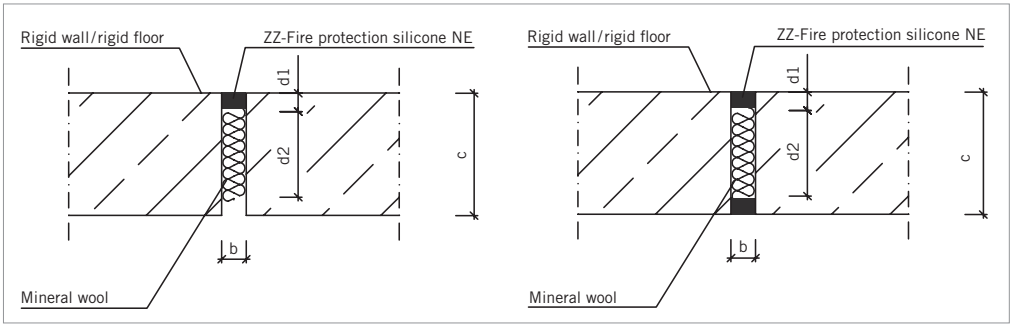
Notes

/ The mineral wool that has to be pushed into the joint must consist of a strip that has been cut to size with overdimensions appropriate for the expansion.
/ To improve durability, a plastic foil can be inserted between ZZ-Fire protection silicone NE and the mineral wool.
/ If movement regularly occurs, we recommend selecting the fill depth as specified in the section, “Correctly dimensioning and producting joints” (see above). In addition, execution on both sides is recommended, or in floors execution as joint seal on the underside of the floor is recommended.

Joint width b [mm]	Component thickness c [mm]	Joint depth d1 [mm]	Minimum thickness backfill d2 [mm]	Fire resistance classification
Wall: 5 to 40	100	≥ 5	≥ 90	up to EI 180-V-X-F-W 5 to 40 up to EI 180-H-X-F-W 5 to 40
Floor: 5 to 40	150	≥ 5	≥ 90	up to EI 120-H-X-F-W 5 to 40

EI 120/ EI 180	Compliance with the criterion for integrity and temperature insulation over a period of at least 120/180 minutes
V/H	Vertical or horizontal (adjacent to floors) joint in walls or horizontal joint in floors
X	Movement capacity, maximum values around tension-free zero position +7.5 % or –7.5 %
F	Produced on site
W 5 to 40	Range of the joint widths in mm

Application class 4: Firestop joints in accordance with ETA-12/0118 with high movement capacity



/ Backfill with mineral wool (density ≥ 40 kg/m³, thickness ≥ 100 mm, melting point > 1000 °C)
/ Movement capacity 25 %
/ Type of movement: Lateral expansion or shear
/ Joint widths up to 40 mm
/ Minimum fill depth 5 mm
/ Component thickness from 150 mm
/ Joint seal on both sides or one side

Notes

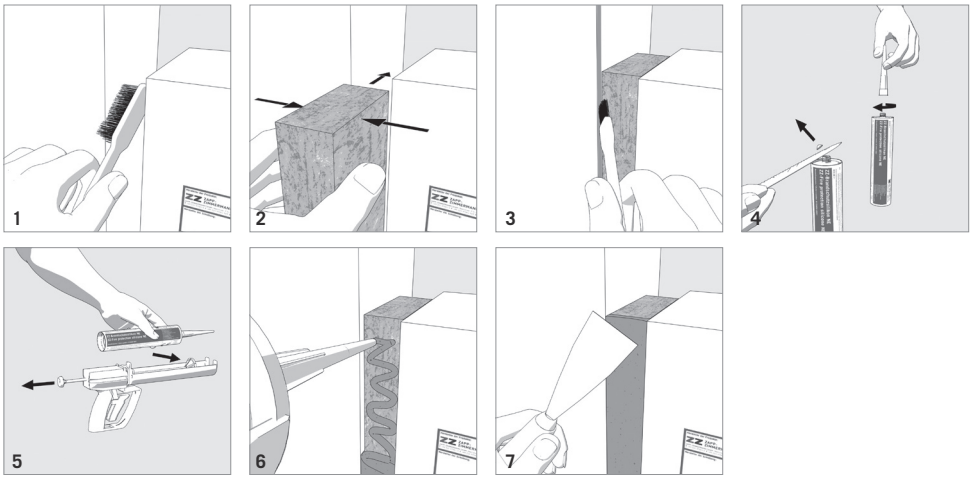
/ The mineral wool that has to be pushed into the joint must consist of a strip that has been cut to size with overdimensions appropriate for the expansion.
/ To improve durability, a plastic foil can be inserted between ZZ-Fire protection silicone NE and the mineral wool.
/ If movement regularly occurs, we recommend selecting the fill depth as specified in the section, “Correctly dimensioning and producing joints” (see above). In addition, execution on both sides is recommended, or in floors execution as joint seal on the underside of the floor is recommended.

Joint width b [mm]	Component thickness c [mm]	Joint depth d1 [mm]	Minimum thickness backfill d2 [mm]	Fire resistance classification
5 to 40	150	≥ 5	≥ 100	up to EI 120-V-M025-F-W 5 to 40 up to EI 120-H-M025-F-W 5 to 40

EI 120	Compliance with the criterion for integrity and temperature insulation over a period of at least 120 minutes
V/H	Vertical or horizontal (adjacent to floors) joint in walls or horizontal joint in floors
M025	Movement capacity 25 %
F	Produced on site
W 5 to 40	Range of the joint widths in mm

Overview of application classes

Construction joint	Firestop joints		
Application class 1 **Construction joint in accordance with DIN EN ISO 11600** **Movement capacity 20 %**	**Application class 2** **DIN EN ISO 11600 + ETA-12/0118** **Movement capacity up to 20 %**	**Application class 3** **ETA-12/0118** **Movement capacity 15 %**	**Application class 4** **ETA-12/0118** **Movement capacity 25 %**
1: DIN EN ISO 11600-F-20LM / Backfill with PE round cord / Movement capacity 20 % / Type of movement: Lateral expansion or shear / Fill depth as specified in "Correctly dimensioning and producing joints"	**2A: DIN EN ISO 11600-F-12, 5E + EI 120** / Backfill with PE round cord / Movement capacity 12.5 %, maximum values around tension-free zero position +7.5 % and –7.5 % / Type of movement: Lateral expansion or shear / Joint widths up to 40 mm / Fill depth as specified in "Correctly dimensioning and producing joints" (see above) / Component thickness from 150 mm / Joint seal on both sides	**3A: EI 90** / Backfill with PE round cord / Movement capacity 15 %, maximum values around tension-free zero position +7.5 % and –7.5 % / Type of movement: Lateral expansion or shear / Joint width up to 40 mm / Minimum fill depth 5 mm / Component thickness from 150 mm / Joint seal on both sides	**4: EI 120** / Backfill with mineral wool (density ≥ 40 kg/m³, thickness ≥ 100 mm) / Movement capacity 25 % / Type of movement: Lateral expansion or shear / Joint widths up to 40 mm / Minimum fill depth 5 mm / Component thickness from 150 mm / Joint seal on both sides or one side
	2B: DIN EN ISO 11600-F-20LM + EI 120 / Backfill with mineral wool (density ≥ 40 kg/m³, thickness ≥ 100 mm) / Movement capacity 20 % / Type of movement: Lateral expansion or shear / Joint widths up to 40 mm / Fill depth as specified in "Correctly dimensioning and producing joints" / Component thickness from 150 mm / Joint seal on both sides or one side	**3B: EI 180 (walls)/EI 120 (floors)** / Backfill with mineral wool (density ≥ 40 kg/m³, thickness ≥ 90 mm) / Movement capacity 15 %, maximum values around tension-free zero position +7.5 % and –7.5 % / Type of movement: Lateral expansion or shear / Joint widths up to 40 mm / Minimum fill depth 5 mm / Component thickness from 100 mm (rigid walls) or 150 mm (rigid floors) / Joint seal on both sides or one side	



Installation steps

The approval, ETA-12/0118 and the respective national regulations are authoritative for execution of the firestop joint seal. It has to be taken into account that depending on the application class (see above) it can be necessary to seal the joint on both sides of the component.

1. Before use, ensure that the materials in the contact area are compatible with the sealant. Before installation clean the joint flanks. Surfaces on which ZZ-Fire protection silicone NE is applied should be free of dust, sand, grease, oil, (e.g. formwork oil), cement laitance and paint residues. In addition it must be ensured that the substrate has sufficient load-bearing capacity. Material that is located in the joint can remain, with the prerequisite that the minimal thickness of ZZ-Fire protection silicone NE, as well as the required backfill material can be inserted.
2. The suitable backfill material must be selected and used. A sufficient fill depth must be kept free for ZZ-Fire protection silicone NE. If using mineral wool as backfill, the mineral wool that has to be pushed into the joint must consist of a strip that has been cut to size with over-dimensions appropriate for the expansion.

3. On mineral and absorbent substrates, and in the case of high mechanical stress of the joint, bonding is improved with aid of a primer (Otto Primer 1105). The primer must be uniformly applied to the joint flanks with a brush. The flash-off time specified by the manufacturer must be complied with.
4. Hold the cartridge vertically, cut off the tip with a sharp knife, and screw on the nozzle. The nozzle can be shortened as needed.
5. Insert the cartridge into the intended dispensing gun.
6. ZZ-Fire protection silicone NE must be filled in uniformly into the joint, starting from the backfill. For wide joints, the sealant should first be filled in on the joint flanks, then the joint can be filled upwards.
7. A good contact with the joint flanks must be established through pressing on and smoothing, e.g. with a smoothing trowel. The joint must be smoothed within the skin-forming time of the sealant. A smoothing agent that is compatible with the joint seal may be used.

   Good aeration is recommended during the processing and hardening phase.

Calculation scheme: Running meter per cartridge, each 310 ml (one side)

Joint depth [mm]	Joint width [mm]											
	5	6	7	8	10	12	15	20	25	30	35	40
5	12.4	10.3	8.8	7.7	6.2	5.1	4.1	3.1	2.4	2.0	1.7	1.5
6	10.3	8.6	17.3	6.4	5.1	4.3	3.4	2.5	2.0	1.7	1.4	1.2
7	8.8	7.3	6.3	5.5	4.4	3.6	2.9	2.2	1.7	1.4	1.2	1.1
8	7.7	6.4	5.5	4.6	3.8	3.2	2.5	1.9	1.5	1.2	1.1	0.9
10	6.2	5.1	4.4	3.8	3.1	2.5	2.0	1.5	1.2	1.0	0.8	0.7
12	5.1	4.3	3.6	3.2	2.5	2.1	1.7	1.2	1.0	0.8	0.7	0.6
15	4.1	3.4	2.9	2.5	2.0	1.7	1.3	1.0	0.8	0.6	0.5	0.5

This calculation scheme does not take any fluctuations of the joint geometry into account or any material loss that occurs when smoothing the joint. Consequently, we always recommend that you plan with material requirements that are higher than shown in the calculation.

System ZZ-Fire protection silicone NE ETA-12/0118

Product data – ZZ-Fire protection silicone NE

Description:	Elastic RTV-1 silicone (room-temperature cross-linkage, 1-component, oxime system) with halogen-free fire protection additives
Reaction to fire in accordance with DIN EN 13501-1:	Class E
Reaction to fire in accordance with DIN 4102:	DIN 4102-B1 in accordance with AbP P-BWU03-I-16.5.352 (In combination with solid mineral substrates in joints with a width of ≤ 40 mm and a joint depth ≤ 15 mm)
Implementation areas:	ZZ-Fire protection silicone NE can be used as / Firestop joint seal up to a fire resistance class EI 180, and as / Cable penetration seal up to a fire resistance class EI 120 (see ETA-13/0123)
Approvals/certificates:	/ European Technical Approval ETA-12/0118, OIB / EC Certificate of Conformity 0761-CPD-0265, MPA Braunschweig / Emissions-assessed construction product in accordance with DIBt principles in accordance with Approval Z-200.3-27, DIBt / Satisfies the requirements specified in DIN EN ISO 11600 Type F Class 20 LM / European Technical Approval ETA-13/0123, OIB (cable penetration seal) / EC Certificate of Conformity 0761-CPD-0302, MPA Braunschweig / Emissions-assessed construction product in accordance with DIBt principles in accordance with Approval Z-200.2-48, DIBt
Colour:	Cement grey
Content:	310 ml (cartridge) 580 ml (tubular bag)
Transport/storage:	5 °C to 30 °C (dry, in original containers)
Application temperature:	5 °C to 30 °C
Skin-forming time:	Approx. 10 minutes (at 23 °C and 50 % rel. humidity)
Vulcanisation/hardening:	Approx. 2 mm in 24 hours (at 23 °C/50 % rel. humidity)
Viscosity:	Pasty, non-sag
Bulk density:	1000 kg/m³ to 1300 kg/m³
Safety notices:	Contains a mixture of butanone oxime silanes and butanone oxime. Can cause allergic reactions. Safety data sheet available on request.

Supplemental national requirements

Germany

/ After the tasks have been concluded a written confirmation of conformance must be given to the client.

Testing the fire safety properties under environmental influences

Permissible ambient conditions:

In accordance with ETAG 026-2 or ETAG 026-3:	Use category X Products for use in outdoor areas, as well as indoor areas.

Declaration of Performance

Link to the Declaration of Performance

System component	Link
ZZ-Fire protection silicone NE	www.z-z.eu/dop-12-07

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Bilder/ Images
ZAPP-ZIMMERMANN GmbH

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Irrtümer und technische Änderungen sind vorbehalten. Modifications and errors excepted.

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