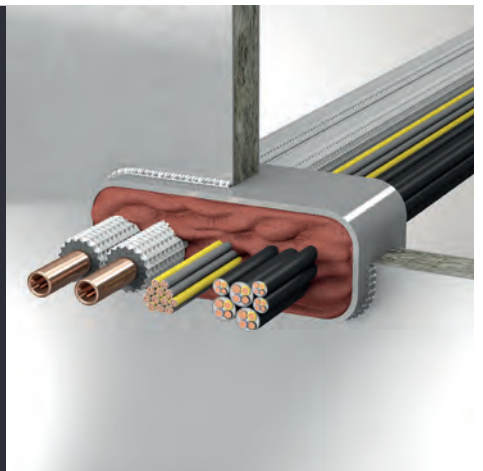
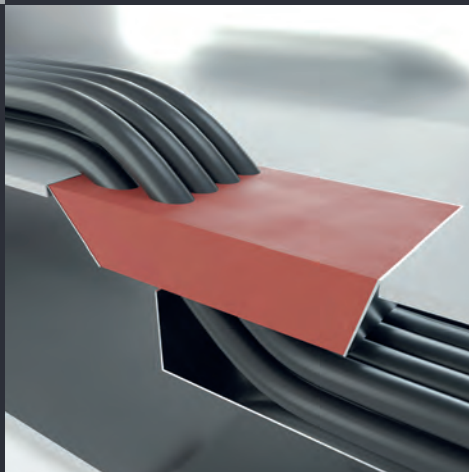


OUR RAIL PRODUCTS



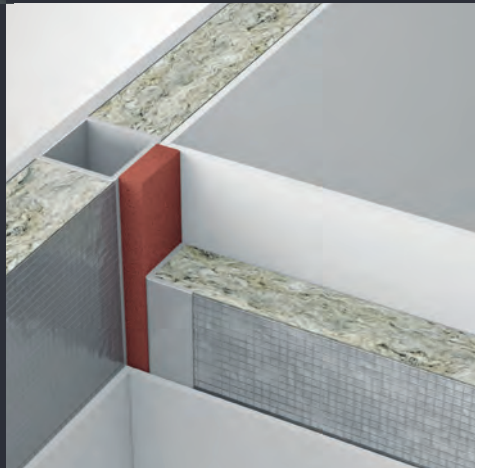
READY-TO-USE



CUT-AND-FIT



PLUG-AND-PLAY

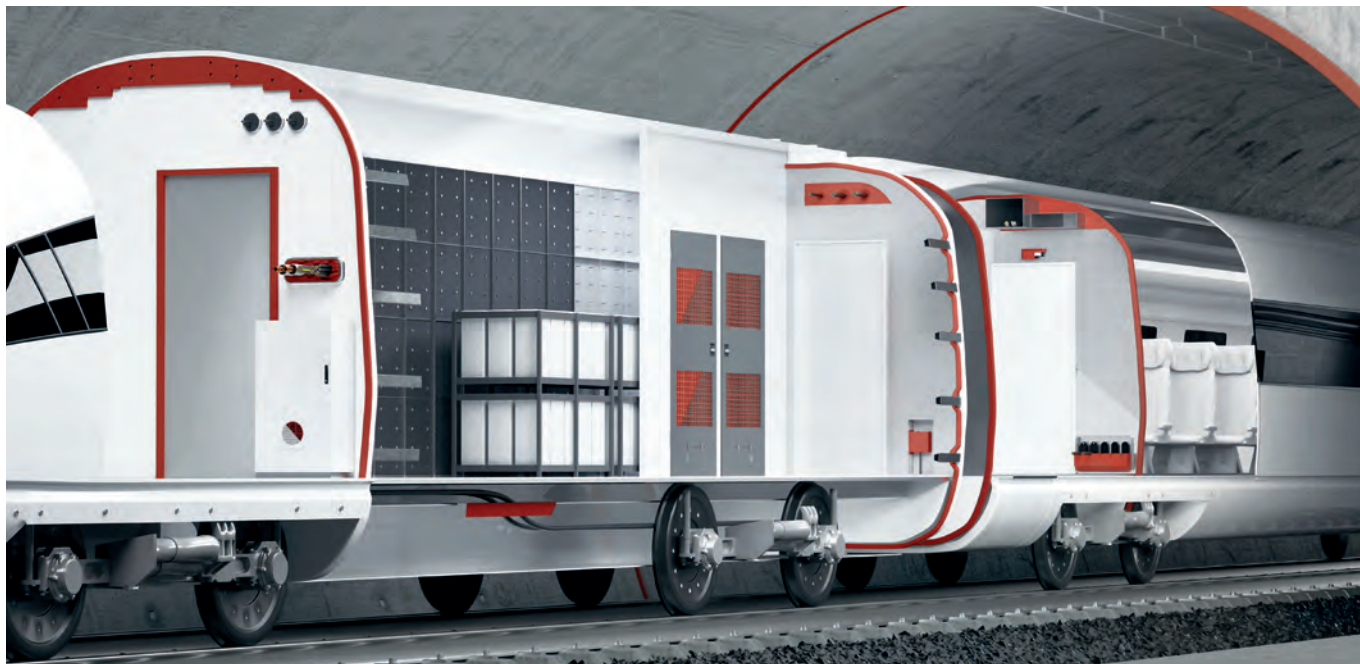


PRODUCT CATALOG RAIL  
**Innovative Fire Protection Systems**

# INHALT



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## Innovative fire protection products for railway vehicles

Railway vehicles are subject to stringent fire protection requirements, in order to ensure the safety and evacuation of people in the railway event of a fire. ZAPP-ZIMMERMANN GmbH has offered innovative fire protection systems for this application for more than 30 years. The Company specialises in the areas of cable, pipe and mixed penetration seals, as well as fire protection joint seals that are already being used in many national and international railway traffic projects.

The broad product spectrum includes the right solution for every application, ready to install and use.

Existing fire protection products can be specially adapted to the particular area of application and manufactured even in small series with consistently high quality. In addition, the 2-component fire protection foams enable fast and simple closing of component openings, even if they are irregular and hard to reach. This means that through penetration fire protection systems with suitable fire resistance classes can be created for different constructions.

ZAPP-ZIMMERMANN markets 3-dimensional moulded elements for diverse geometries used in railway vehicles: The individual through penetration fire protection systems for wall and ceiling constructions in the interior of the railway vehicles are ideal for batch production of prefabricated fire protection systems. The dimensionally accurate moulded elements ensure safe application and fast installation. Elastic fire protection joint seals guarantee smoke gas tight joints, for example in externally produced technical components or dividing walls of passenger areas to the outer shell of the railway vehicle. In addition, fire-resistant fire protection enclosures ensure the functionality of safety-related electronic components and sensor technology (such as vehicle and brake controllers as well as door controls).

All products used in railway traffic have been classified by an independent testing institute with respect to their fire protection properties and fulfil the stringent requirements of EN 45545 Part 2 for the intended area of application. For international projects, many of the products have been validated to comply with the "Standard for Fixed Guideway Transit and Passenger Rail Systems" in accordance with NFPA 130.

You can count on the expertise of competent ZAPP-ZIMMERMANN employees for individual consultation and training.



## Construction materials and components

ZAPP-ZIMMERMANN GmbH specialises in the field of intumescent construction materials.

The company works in close cooperation with Karl Zimmermann GmbH, which develops, tests and produces intumescent construction materials and products.

The term intumescence means expansion or swelling and is used in the fire protection industry for substances that increase their volume under the effect of heat. If an intumescent building material is charged with heat, a physiochemical reaction starts, which in parallel with decomposition of the construction material and formation of an insulating layer, results in an increase of the volume. For the most part, intumescent construction materials are based on organic substances.

Depending on the application area and required purpose of the construction material or component, it is possible to influence the intumescence with reference to numerous parameters:

- / Level of intumescence
- / Temperature-dependent start of intumescence
- / Direction of intumescence
- / Stability of the insulating layer
- / Expansion pressure (i.e. the force with which the intumescence develops)

This is achieved by adding specific flame-retardants and additives to the construction material. No flame retardants that contain halogen are used.

### Preliminary tests of fire barriers

The in-house testing installation of Karl Zimmermann GmbH can be used to conduct fire resistance tests for special fire barriers. This allows us to support you throughout the entire development process and to offer you the right product for your railway vehicle application.





## Certified safety



ZAPP-ZIMMERMANN GmbH is certified in accordance with DIN ISO 9001. Successful annual surveillance audits, conducted by TÜV Rheinland, demonstrate the high priority placed on quality management within the Company and our ongoing commitment to premium quality.



All ZAPP-ZIMMERMANN products used in railway traffic have been classified by an independent testing institute with respect to their fire protection properties and fulfil the stringent requirements of DIN EN 45545 Part 2 and Part 3 for the intended area of application.



For international projects, fire protection foams used by ZAPP-ZIMMERMANN have been validated to comply with the “Standard for Fixed Guideway Transit and Passenger Rail Systems” in accordance with NFPA 130.

Polyurethane fire protection foams from Karl Zimmermann GmbH have been validated to comply with the test standards ASTM E 162 and ASTM E 662 for use in railway vehicles.

### Validations of requirement sets R22/R23

Karl Zimmermann GmbH has validated compliance of all products used in railway traffic in accordance with the requirements of R22 and R23. The products are used as connecting seals, cable and pipe penetration seals and for lining wall surfaces with an area  $\leq 0.2 \text{ m}^2$ .







## PLUG- AND- PLAY

Customised pre-fabricated parts according to design specifications

1



**ZZ<sup>®</sup> 681 / ZZ<sup>®</sup> 682**  
Fire Protection Grille

⇒ Page 8

2



**ZZ<sup>®</sup> 880**  
Fire Protection  
Penetration Seal

⇒ Page 9







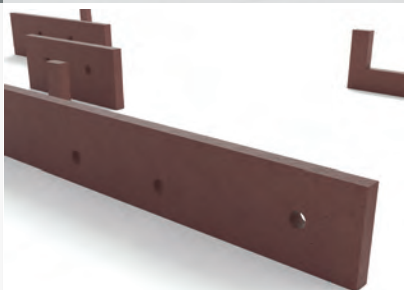
3



**ZZ® 881**  
Fire Protection  
Moulded Component

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4

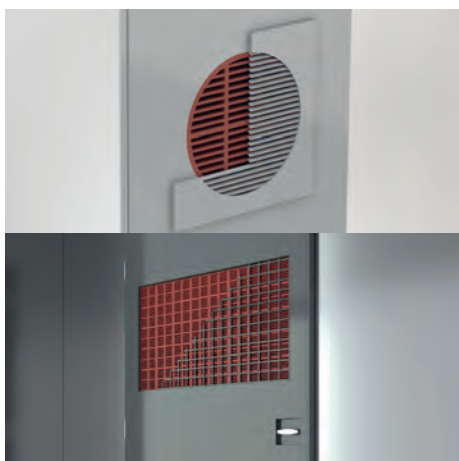


**ZZ® 882**  
Fire Protection  
Contour Cut Set

⇒ Page 11



# ZZ<sup>®</sup> 681 and 682 Fire Protection Grilles



## Type of application

Use **ZZ<sup>®</sup> 681** or **ZZ<sup>®</sup> 682 Fire Protection Grille** as maintenance-free, fire-resistant seals for openings in air circulation and heat dissipation vents in control cabinets, machine rooms, doors and ducts.

## Advantages

- ✓ Maintenance-free opening seal for round and square air vent openings in control cabinets, machine rooms, doors, and ducts for air circulation and heat dissipation

## Highlights

**Large selection** of existing diameters. Custom versions can be cut and glued to create the perfect air transfer grille for your application. The material is “intumescent”, which means that it foams in the event of a fire to completely seal the cross section.

The non-wearing reactive material eliminates the need for regular maintenance. **For large applications, such as doors or technical equipment areas, ZZ<sup>®</sup> 681 Fire Protection Grille and ZZ<sup>®</sup> 682 Fire Protection Grille can be combined. They can be inserted and fixed in openings with ZZ<sup>®</sup> 381 and ZZ<sup>®</sup> 385.**

## Components



Designation	Art. no.	PU
<b>ZZ<sup>®</sup> 681 Fire Protection Grille round</b> Ø 100 mm x 20 mm	B16N00-0263	1
<b>ZZ<sup>®</sup> 681 Fire Protection Grille round</b> Ø 125 mm x 20 mm	B16N00-0264	1
<b>ZZ<sup>®</sup> 681 Fire Protection Grille round</b> Ø 160 mm x 20 mm	B16N00-0265	1
<b>ZZ<sup>®</sup> 681 Fire Protection Grille round</b> Ø 200 mm x 20 mm	B16N00-0266	1



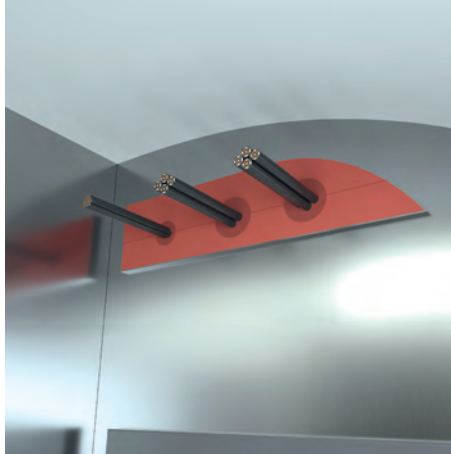
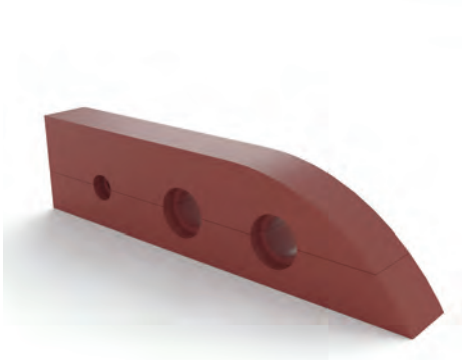
<b>ZZ<sup>®</sup> 682 Fire Protection Grille square</b> 93 mm x 93 mm x 20 mm	B16N00-0258	1
<b>ZZ<sup>®</sup> 682 Fire Protection Grille square</b> 93 mm x 186 mm x 20 mm	B16N00-0259	1
<b>ZZ<sup>®</sup> 682 Fire Protection Grille square</b> 150 mm x 150 mm x 20 mm	B16N00-0260	1
<b>ZZ<sup>®</sup> 682 Fire Protection Grille square</b> 150 mm x 200 mm x 20 mm	B16N00-0261	1
<b>ZZ<sup>®</sup> 682 Fire Protection Grille square</b> 150 mm x 300 mm x 20 mm	B16N00-0262	1

Other sizes on request





# ZZ<sup>®</sup> 880 Fire Protection Penetration Seal



## Type of application

Cable and pipe penetration seals for wall and ceiling constructions inside railway vehicles. Fire penetration seal for electrical cables, telecommunication cables and optical fibre cables and electrical installation conduits.

## Advantages

- ✓ Series production of pre-fabricated system penetration seals
- ✓ Penetration seals in train walls with complex dimensions and shapes
- ✓ Penetration seals with the requirement for retrofitting

**Fire penetration seals up to fire resistance class EI 30. The required seal thickness must be verified based on the construction.**

## Highlights

**Custom cuts** from 2-dimensional and moulded parts in 3-dimensional offer a high level of prefabrication. This facilitates the implementation of modular penetration seals manufactured in batch production. Various processes enable precise cutting of moulded components to the required size. Water jet cutting allows the creation of rounded shapes and contours with a small radius. The precisely fitting moulded parts are installed in the rail vehicle according to the 'plug and play' principle.

The openings can be adapted to the planned cross-section of the installations, so that the only additional measure is to seal the annular gap with **ZZ<sup>®</sup> 385**. Prefabricated penetration seals are easy to install and hardly susceptible to faults.



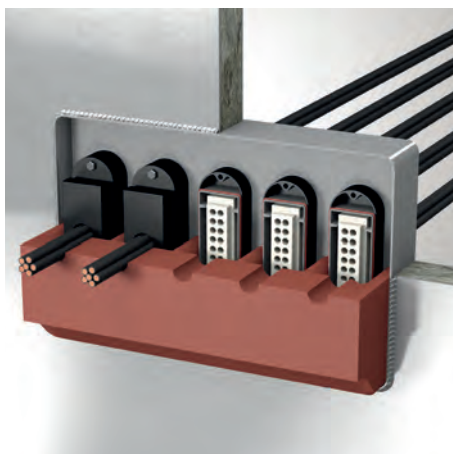
## Components



Designation	Art. no.	PU
ZZ <sup>®</sup> 880 Fire Protection Penetration Seal	on request	
ZZ <sup>®</sup> 385 Fire Protection Sealant, 310 ml	B15N00-0024	12
ZZ <sup>®</sup> 481 Fire Protection Bandage	B04N00-0011	1



# ZZ<sup>®</sup> 881 Fire Protection Moulded Component



## Type of application

Fire-resistant fire protection enclosure for ensuring the functional integrity of safety-related electronic components and sensor technology (such as vehicle controllers, brake controllers, controls for doors and emergency exits).

## Advantages

- ✓ Functional integrity of safety systems and control electronics over a period of up to 30 minutes  
**In accordance with EN 45545-5 safety-related electronic vehicle components must be designed so that in the event of a fire their functional integrity is fully ensured until the time of evacuation.**

## Highlights

**3-dimensional moulded components** can be custom-manufactured for your application. They can be prefabricated as coverings for plug-type connectors to allow installation according to the “plug and play” principle with no further adaptation. Dimensional tolerances are compensated by the elastic Fire Protection Foam.

**Factory foaming** of sensor technology ensures high quality of the coverings. The sensor technology requiring protection is enveloped with Fire Protection Foam in special 3-dimensional moulds at the production facilities.

The low reaction temperature of the fire protection foam therefore makes it possible to protect even the most sensitive sensors.

**Dimensionally accurate fire protection coverings** for electronic components protect them from heat in the event of a fire and ensure the functional integrity of the safety-related equipment. The coverings are custom-manufactured for the components requiring protection and can be simply slipped on, with no need for additional screws or gluing.

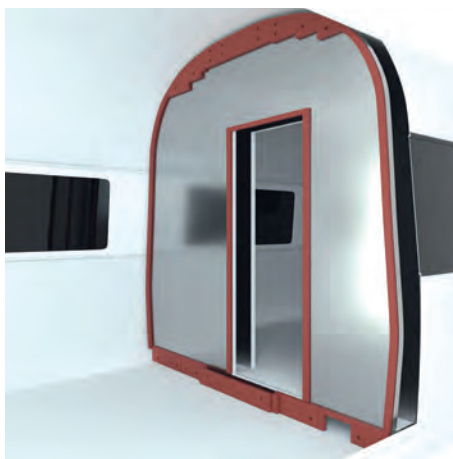
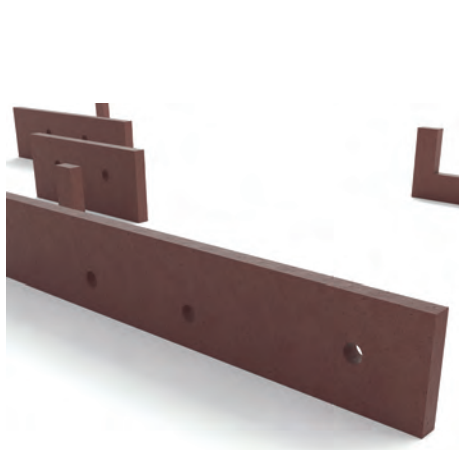
## Components



Designation	Art. no.	PU
ZZ <sup>®</sup> 881 Fire Protection Moulded Component	on request	



# ZZ<sup>®</sup> 882 Fire Protection Contour Cut Set



## Type of application

Custom made gasket sets from contour cuts for situations in which dimensional tolerances have to be compensated with flexible foam.

## Advantages

- ✓ Lining of partial areas in wall and ceiling constructions
- ✓ Fire penetration seals in system walls in train compartments

## Highlights

Double-wall separating elements between compartments can be sealed with customized sets of contour cuts made of flexible fire protection foam. Dimensional tolerances can be compensated while creating a fire-proof seal. Custom contour cuts can be manufactured with complex geometries and adapted to the particular application.

Moulded parts can be manufactured precisely and individually in the factory for the respective application. Roundings and circles with small radii are also possible to achieve the desired geometry.



## Components



Designation	Art. no.	PU
ZZ <sup>®</sup> 882 Fire Protection Contour Cut Set	on request	
ZZ <sup>®</sup> 882 Fire Protection Contour Cut	on request	







## READY- TO- USE

Fire protection  
products that adapt  
to the opening  
geometry

1



**ZZ® 380 / ZZ® 381**  
Fire Protection  
Casting Compound

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2



**ZZ® 383**  
Fire Protection Foam

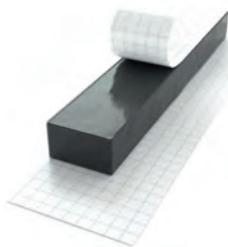
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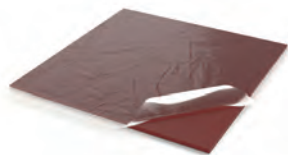
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**ZZ® 390 Fire Protection Putty**

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4



**ZZ® 391 Fire Protection Putty Pad**

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5



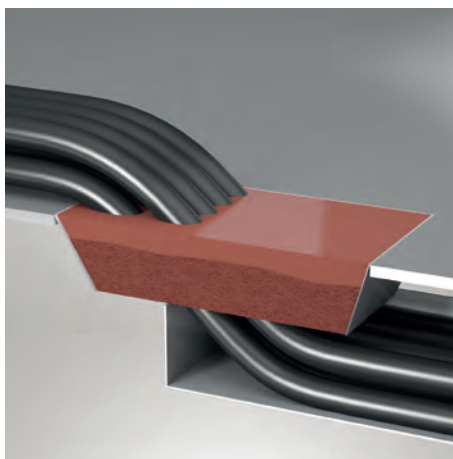
**ZZ® 395 Fire Protection Casting Compound, isocyanate-free**

⇒ Page 18



# ZZ<sup>®</sup> 380 and 381 Fire Protection Casting Compound

READY-TO-USE



## Type of application

Waterproof fire protection compound for fire protection seals up to EI 30 in penetrations through the vehicle floor. Sealing horizontal openings in the vehicle floor is fast and easy with the watertight fire protection casting compound. It is fully cured and provides a reliable seal after only 2 minutes.

## Advantages

- ✓ Waterproof sealing of horizontal openings in the vehicle floor
- ✓ Fast-curing 2-component polyurethane casting compounds in a closed cartridge system  
(After only 2 minutes the compound is fully cured and provides a reliable seal.)

## Components

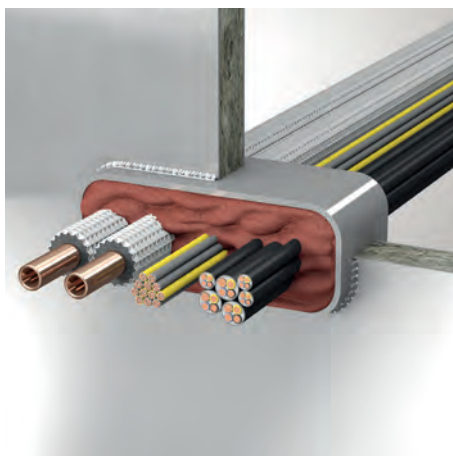


Designation	Art. no.	PU
<b>ZZ<sup>®</sup> 380-p Fire Protection Casting Compound</b> 380 ml, 6 pc. set, including 16 mixing nozzles	B15N01-0152	1
<b>ZZ<sup>®</sup> 381-f Fire Protection Casting Compound</b> 380 ml, 6 pc. set, including 12 mixing nozzles	B15N01-0153	1





# ZZ<sup>®</sup> 383 Fire Protection Foam



## Type of application

Waterproof fire protection compound for fire protection seals up to EI 30 in penetrations through the vehicle floor.

**ZZ<sup>®</sup> 383 Fire Protection Foam** can be used for the fast and easy sealing of component openings even if they are irregular or hard to reach.

## Advantages

- ✓ Fast and easy sealing of component openings
- ✓ Hard to reach and irregular openings

**Fire barrier up to fire resistance class EI 30. The required seal thickness must be verified based on the construction.**

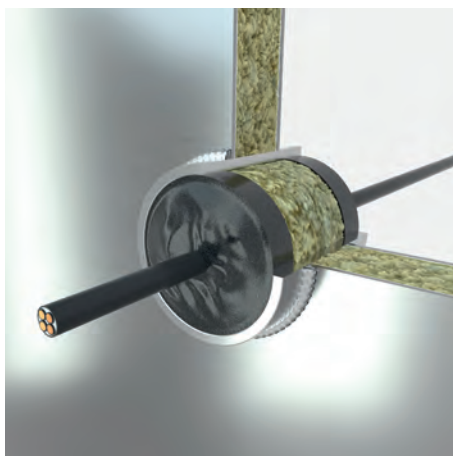
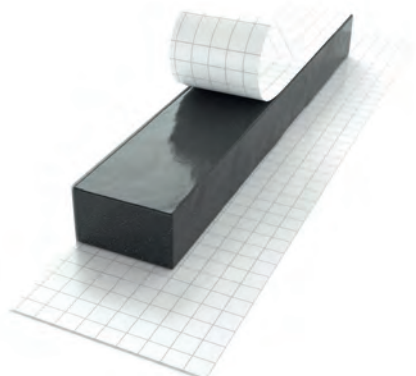
## Components



Designation	Art. no.	PU
<b>ZZ<sup>®</sup> 383 Fire Protection Foam</b> 380 ml, 6 pc. set, including 12 mixing nozzles	B15N01-0156	1
<b>ZZ<sup>®</sup> 481 Fire Protection Bandage</b> 150 mm, 5 m roll	B04N00-0011	1



# ZZ<sup>®</sup> 390 Fire Protection Putty



## Type of application

Fire penetration seal for cable penetrations and electrical sockets, enables retrofitting of fire protection and sound decoupling of existing housings and sockets that are not protected. You can seal small and irregular openings quickly with **ZZ<sup>®</sup> 390 Fire Protection Putty**. Due to its permanent flexibility and adhesion it can be inserted and shaped like modeling material, without the use of special tools.

## Advantages

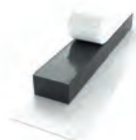
- ✓ Fast sealing of small or irregular openings with few penetrations
- ✓ Easy installation and shaping by hand without tools or additional components, similar to modeling material
- ✓ Especially suited for frequently changing configuration due to permanent flexibility

## Highlights

**ZZ<sup>®</sup> 390** is a self-adhesive sealing compound of intumescent butyl rubber that is ideal for fast and easy sealing of small and irregular openings. Due to its permanent flexibility and adhesion **ZZ<sup>®</sup> 390** can be inserted in penetration openings and shaped like modeling material, without the use of special tools.

Modification by hand is possible even after extended periods, which facilitates retrofitting. **ZZ<sup>®</sup> 390** can be used to fill the entire opening or in combination with a suitable backfill material.

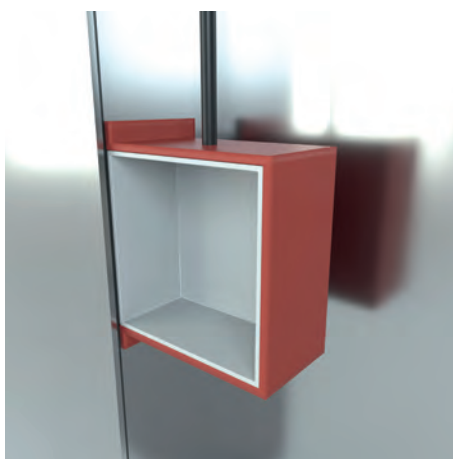
## Components



Designation	Art. no.	PU
<b>ZZ<sup>®</sup> 390 Fire Protection Putty</b> 340 mm x 44 mm x 44 mm, 8 pc. set	B04V12-0001	1



# ZZ<sup>®</sup> 391 Fire Protection Putty Pad



## Type of application

Protect electrical installation boxes or other components with a fast and simple covering made of the **ZZ<sup>®</sup> 391 Fire Protection Putty Pad**. Due to its permanent flexibility and adhesion it can be applied and shaped like modeling material, without the use of special tools.

## Advantages

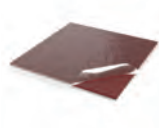
- ✓ Fast and easy upgrading of small electrical boxes and sockets with few penetrations
- ✓ Fast and uncomplicated lining of boxes or switch cabinets
- ✓ Retrofitting of sockets / switch boxes without fire resistance

## Highlights

**ZZ<sup>®</sup> 391** is a pad made of permanently elastic, self-adhesive and intumescent butyl rubber that is ideal for use as a fire penetration seal for cable penetrations and electrical sockets. The use of **ZZ<sup>®</sup> 391** enables retrofitting of fire protection and sound decoupling of existing housings and sockets that are not protected.

**ZZ<sup>®</sup> 391** does not harden and can easily be worked around cable bundles and socket housings by hand. **Modification by hand is possible even after extended periods, which facilitates retrofitting.**

## Components



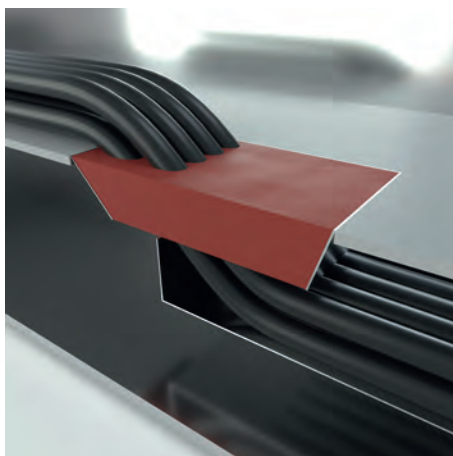
Designation	Art. no.	PU
<b>ZZ<sup>®</sup> 391 Fire Protection Putty Pad</b> 150 mm x 150 mm x 5 mm, 20 pc. set	B04V30-0001	1





# ZZ<sup>®</sup> 395 Fire Protection Casting Compound, isocyanate-free

READY-TO-USE



## Type of application

Fire protection seals in penetrations through the vehicle floor. Close horizontal openings in the vehicle floor quickly and easily with waterproof **ZZ<sup>®</sup> 395 Fire Protection Casting Compound, isocyanate-free**. It hardens completely in 3 minutes to create a reliable seal. **ZZ<sup>®</sup> 395** is characterized by increased occupational safety due to the absence of isocyanates and borates.

## Advantages

- ✓ Filling fire protection seals in the vehicle floor or ceiling, especially as a single-product solution, also in areas toward the vehicle skin
- ✓ Safer application due to reduced hazards by eliminating isocyanate and borate
- ✓ Fast progress due to short curing times
- ✓ Penetration seals in areas with requirements for waterproof and pressure-tight seals

**Fire penetration seals up to fire resistance class EI 30. The required seal thickness must be verified based on the construction.**

## Components



Designation	Art. no.	PU
<b>ZZ<sup>®</sup> 395 Fire Protection Casting Compound, isocyanate-free</b> 450 ml cartridge (2:1 side by side)	B15V09-0001	1





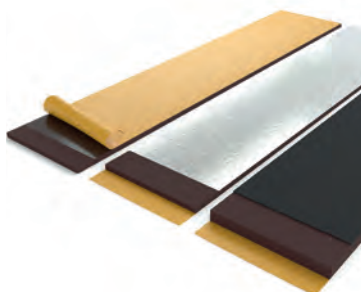




## CUT- AND- FIT

Customisable fire  
protection products

1



**ZZ® 281**  
Fire Protection Moulding

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2



**ZZ® 581**  
Fire Protection Joint Seal

⇒ Page 23







3

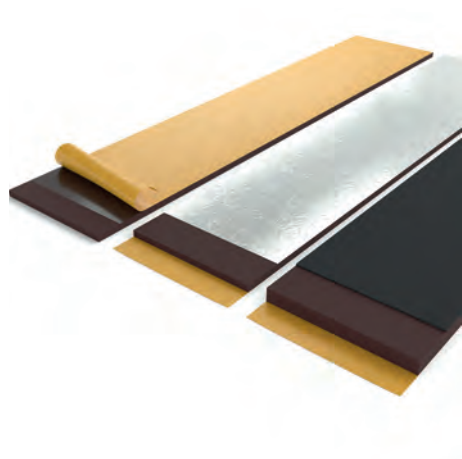


**ZZ<sup>®</sup> 582**  
Fire Protection Joint Seal

⇒ Page 24



# ZZ<sup>®</sup> 281 Fire Protection Moulding



## Type of application

Make technical cabinets generally fire resistant in combination with improved soundproofing by lining the inner walls and ceilings with elastic moulded components.

## Advantages

- ✓ Lining of technical cabinets for upgrading fire protection
- ✓ Large-surface applications in machine rooms and technical cabinets, especially on metal surfaces
- ✓ Areas with small dimensions for fire protection measures
- ✓ Areas with simultaneous requirements for soundproofing and fire protection

## Highlights

Equipment and materials installed in technical cabinets require no classification according to EN 45545 if the technical cabinet has overall fire resistance. A technical cabinet can be equipped with fire resistance by lining the inner surfaces with mats made of fire protection foam.

Depending on the equipment in the technical cabinet the moulded components can be laminated with additional materials to achieve long-term functional reliability even under difficult conditions.

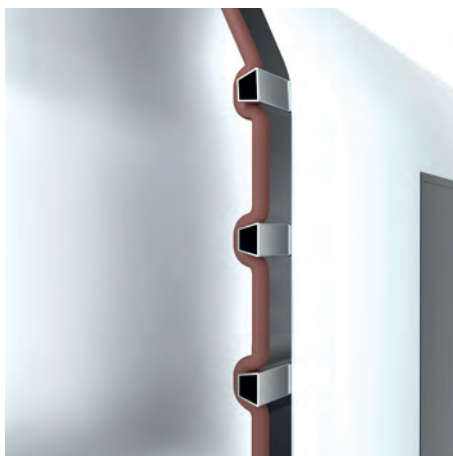
## Components



Designation	Art. no.	PU
ZZ <sup>®</sup> 281-a Fire Protection Moulding, self-adhesive	variants	
ZZ <sup>®</sup> 281-a-nbr Fire Protection Moulding with NBR laminate, self-adhesive	on request	
ZZ <sup>®</sup> 281-a-al Fire Protection Moulding with aluminum laminate, self-adhesive	on request	



# ZZ<sup>®</sup> 581 Fire Protection Joint Seal



## Type of application

Use slotted sealing strips for fast and easy creation of flue gas-tight connecting joints between rail car modules or for separating the railway vehicle from the outer shell. Compensate dimensional tolerances in third-party rail car modules in the coach body.

## Advantages

- ✓ Flue gas-tight connecting joints between rail car modules / separation of cars from the outer skin
- ✓ Compensation of dimensional tolerances in third-party rail car modules in the coach body
- ✓ Easy push-on mounting on sheet metal edges due to longitudinally slotted sealing profiles
- ✓ Sealing of abutting wall/ceiling elements of sheet metal with requirements for fire resistance

## Highlights

Slotted sealing strips can be custom manufactured for your applications. They can be used for example as a seal on the connecting areas of steel separating walls and the rail car skin. The flexibility of the material allows the sealing strips to follow the contours and compensate for dimensional tolerances of the components to ensure a reliable seal.

## Components

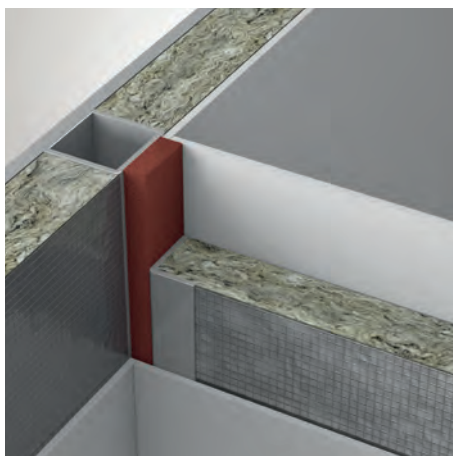


Designation	Art. no.	PU
ZZ <sup>®</sup> 581 Fire Protection Joint Seal, round	variants	
ZZ <sup>®</sup> 581 Fire Protection Joint Seal, slotted	on request	



# ZZ<sup>®</sup> 582 Fire Protection Joint Seal

CUT-AND-FIT



## Type of application

Use **ZZ<sup>®</sup> 582 Fire Protection Joint Seal** pre-cut blanks to produce flue gas-tight joints between railway vehicle modules or for separating the railway vehicle from the outer shell. Compensate for dimensional tolerances in third-party railway vehicle modules in the coach body.

## Advantages

- ✓ Flue gas-tight connecting joints between railway vehicle modules or for separation of the railway vehicle from the outer shell
- ✓ Compensation for dimensional tolerances in third-party railway vehicle modules in the coach body

## Components



Designation	Art. no.	PU
<b>ZZ<sup>®</sup> 582-10 Fire Protection Joint Seal, square</b> 10 mm x 10 mm x 1000 mm	B03N01-0331	1
<b>ZZ<sup>®</sup> 582-20 Fire Protection Joint Seal, square</b> 20 mm x 20 mm x 1000 mm	B03N01-0332	1
<b>ZZ<sup>®</sup> 582-30 Fire Protection Joint Seal, square</b> 30 mm x 30 mm x 1000 mm	B03N01-0333	1
<b>ZZ<sup>®</sup> 582-40 Fire Protection Joint Seal, square</b> 40 mm x 40 mm x 1000 mm	B03N01-0334	1
<b>ZZ<sup>®</sup> 582-50 Fire Protection Joint Seal, square</b> 50 mm x 50 mm x 1000 mm	B03N01-0335	1
<b>ZZ<sup>®</sup> 582-5 Fire Protection Joint Seal, self-adhesive</b> 5 mm x 5 mm x 1000 mm	B03N01-0366	1
<b>ZZ<sup>®</sup> 582-10 Fire Protection Joint Seal, self-adhesive</b> 10 mm x 10 mm x 1000 mm	B03N01-0367	1
<b>ZZ<sup>®</sup> 582-20 Fire Protection Joint Seal, self-adhesive</b> 20 mm x 20 mm x 1000 mm	B03N01-0368	1
<b>ZZ<sup>®</sup> 582-30 Fire Protection Joint Seal, self-adhesive</b> 30 mm x 30 mm x 1000 mm	B03N01-0369	1
<b>ZZ<sup>®</sup> 582-40 Fire Protection Joint Seal, self-adhesive</b> 40 mm x 40 mm x 1000 mm	B03N01-0370	1
<b>ZZ<sup>®</sup> 582-50 Fire Protection Joint Seal, self-adhesive</b> 50 mm x 50 mm x 1000 mm	B03N01-0371	1

Other sizes on request





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### **Images**

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**Do you have any questions?**

Please contact our technical support team

Phone: **+49 221 97061-720** or email: **support@z-z.de**

