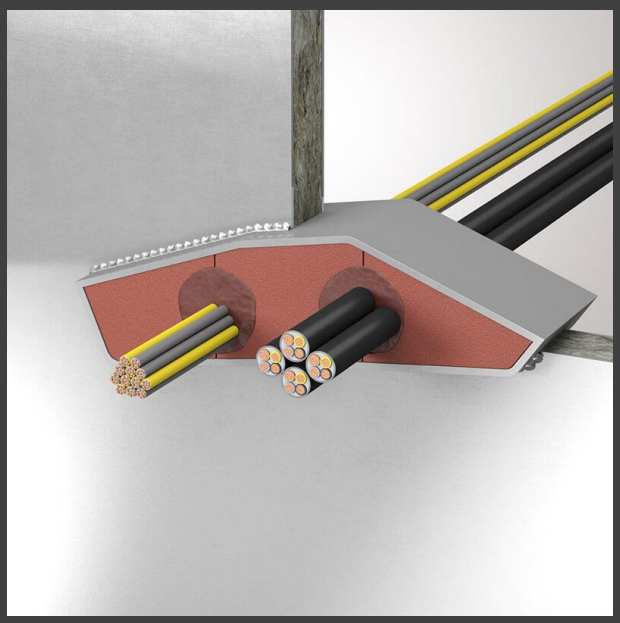
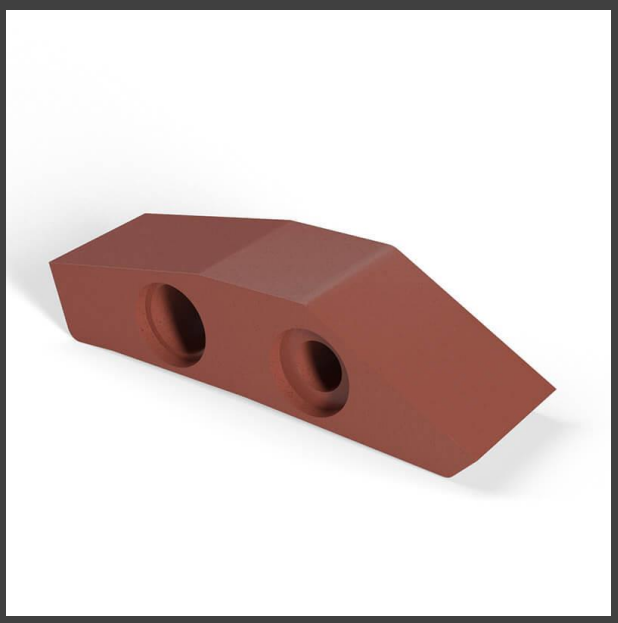
ZZ ZAPP-ZIMMERMANN
INNOVATIVE FIRE-PROTECTION SYSTEMS

FIRE PROTECTION INSULATION WALLS AND CEILINGS IN THE CAR INTERIOR WITH **ZZ® 880 FIRE PROTECTION MODULE**

TECHNICAL INFORMATION





TECHNICAL INFORMATION FOR ACHIEVING FIRE RESISTANCE OF OPENINGS

- USING **ZZ® 880 FIRE PROTECTION MODULE**

1. CONTENT AND USE

- This technical information outlines possible solutions for fire protection of services through large and irregularly shaped openings in rail vehicles using **ZZ® 880 Fire Protection Module.**
- The test results do not replace a usability certificate but can serve as a basis for evaluation or for planning usability tests.
- Application-specific boundary conditions not addressed in this technical information may impact the functionality of the penetration seal.

2. DESCRIPTION OF **ZZ® 880 FIRE PROTECTION MODULE**

- **ZZ® 880 Fire Protection Module** are individually crafted molded parts made of polyurethane foam, designed to precisely seal openings. The fire protection effect is based on halogen-free fire protection additives that expand in the event of a fire, forming an insulating layer. This significantly slows the spread of fire and smoke, enabling the rescue of people and the protection of materials.
- The penetration seal is suitable for use in rail vehicles and provides fire resistance with compartmentalizing effectiveness for 30 minutes (**E30**) and thermal insulation for up to 20 minutes (**I20**), in accordance with the **EI20** classification.
- The installation of **ZZ® 880 Fire Protection Module** is described in detail in the construction examples.

3. IMPLEMENTATION OF FIRE PROTECTION SEALS OF OPENINGS IN RAIL VEHICLES USING **ZZ® 880 FIRE PROTECTION MODULE**

Products	**ZZ® 880 Fire Protection Module** **ZZ® 385 Fire Protection Sealant** These products meet the requirements of EN 45545-2 for hazard levels HL1, HL2, and HL3, and satisfies the criteria R22 and R23.
Component	Large and irregularly shaped openings in rail vehicles. The components should meet equivalent fire protection requirements
Assembly	The component cavity must be cleaned before the installation of the **ZZ® 880 Fire Protection Module.** The customized component is inserted into the opening, cables are routed through it, and any remaining openings are filled with **ZZ® 385 Fire Protection Sealant.**
Services	Electrical cables with Ø ≤ 62,5 mm Cable bundles with Ø ≤ 20 mm (bundles with individual cable Ø ≤ 1,9 mm)
Special Notes	The implementation of fire protection upgrading of electrical cabinets with **ZZ® 880 Fire Protection Module** was carried out according to the specifications of the current test report (see attachment). The dimensions of the installations used and further details can also be found in this test report.

4. SUMMARY

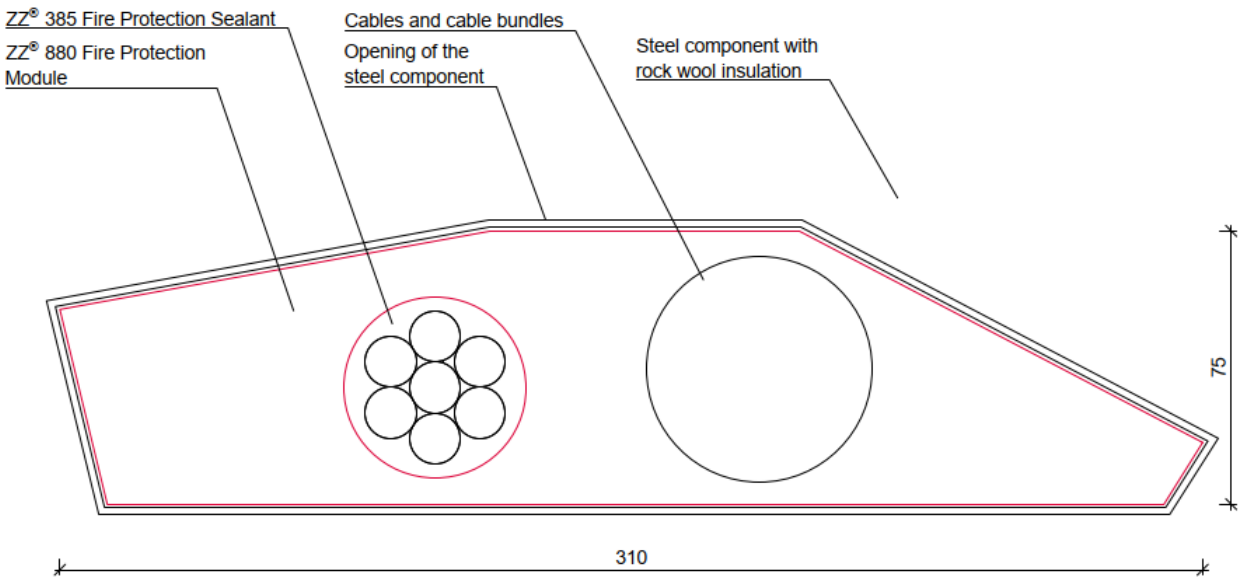
- Fire protection measures using **ZZ® 880 Fire Protection Module** in rail vehicles can be implemented after verifying the boundary conditions.
- **ZZ® 880 Fire Protection Module** achieve a fire resistance of 30 minutes compartmentalization and up to 20 minutes thermal insulation, in accordance with **EI20** classification.
- The example shown in the sealing solution (see following pages) highlights the key construction details that typically need to be considered.
- If constructions are planned that substantially deviate from the examples provided here, ZAPP-ZIMMERMANN is available to assist in the verification process.

EXAMPLE OF A PENETRATION SEAL SOLUTION FOR **ZZ® 880 FIRE PROTECTION MODULE** IN RAIL VEHICLES

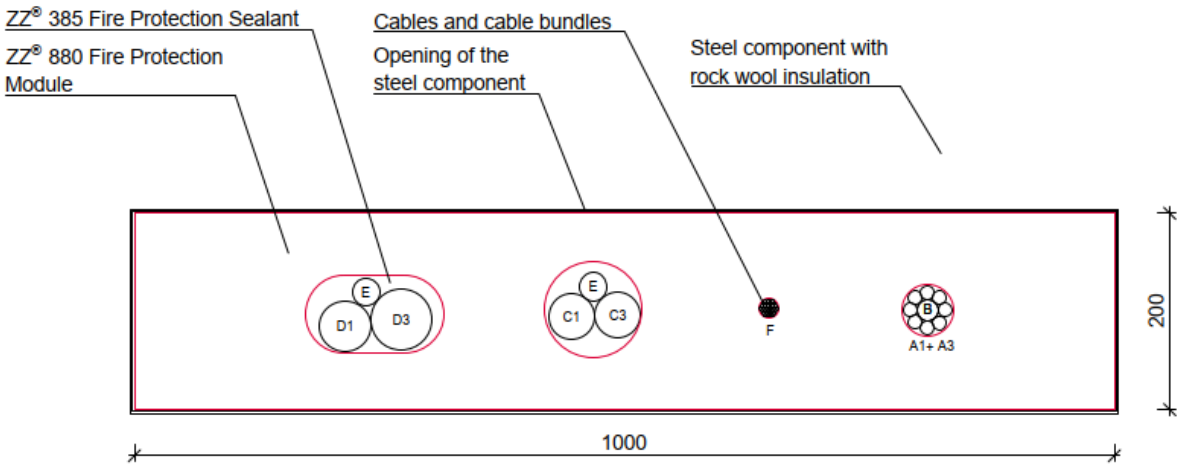
The illustrations depict the fundamental principle of penetration sealing and the installation of **ZZ® 880 Fire Protection Module.** It is important to note that a minimum thickness of insulating material must be used to achieve the fire resistance class of the surrounding component.

A 40 mm thick seal made of **ZZ® 880 Fire Protection Module** achieves a compartmentalization of 30 minutes (**E30**) and thermal insulation of 20 minutes (**I20**). Test results are available for dimensions of 1000 x 200 x 40 [mm]; larger dimensions can be tested if required.

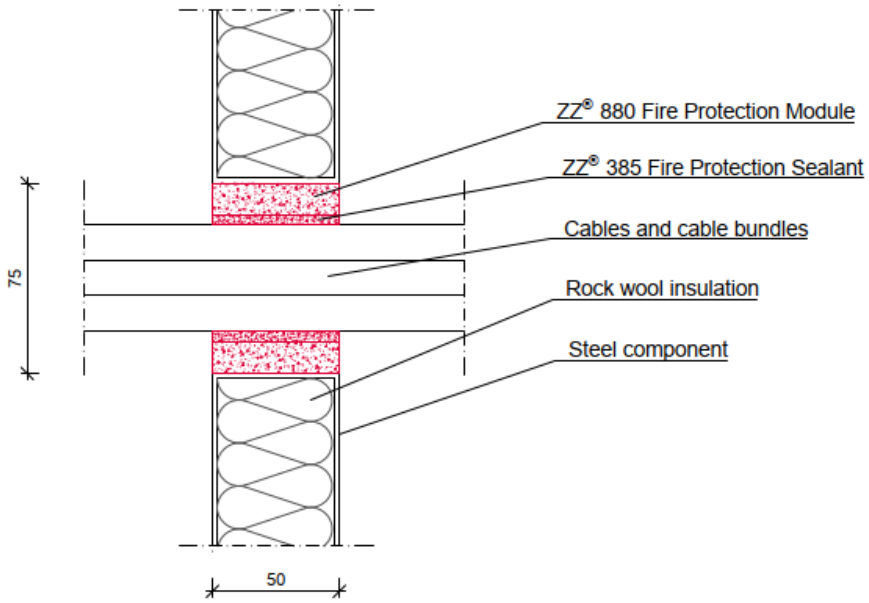
Example: Geometry



Penetration Seal – Face View



Penetration Seal – Section View



FOUNDATIONS OF THIS TECHNICAL INFORMATION

This technical information on **ZZ® 880 Fire Protection Module** in rail vehicles is based on the following documents:

- Test Report Nr. R23-0372, Currenta, issued on 27.09.2023
- R22, R23 according to EN 45545-2
  - Classification Report Nr. 17/1713, Currenta
  - Test Report Nr. 17/1669 ISO 4589-2
  - Test Report Nr. 17/1588 ISO 5659-2
  - Test Report Nr. 19/0433 ISO 5659-2
  - Test Report Nr. 17/1711 NF X 70-100-1/-2
- DIN EN 45545-3: 2013
- DIN EN 1364-1: 2015
- EN 1366-3: 2021
- Construction diagrams according to examples

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