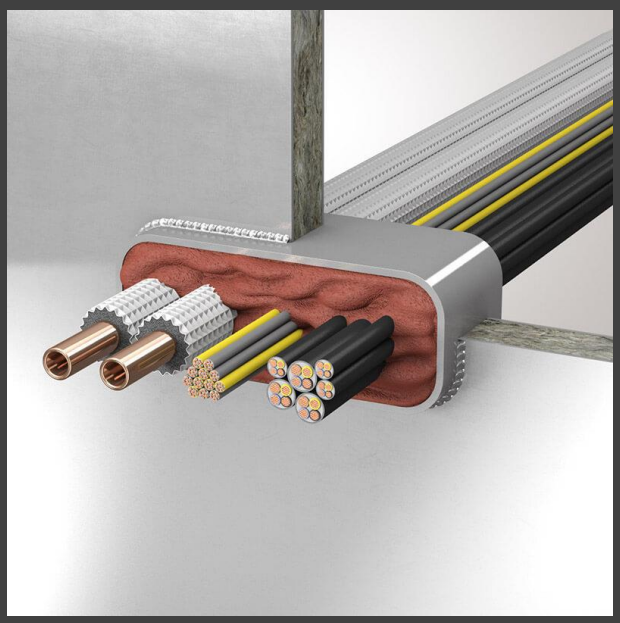
ZAPP-ZIMMERMANN
INNOVATIVE FIRE-PROTECTION SYSTEMS

FIRE PROTECTION SEALING OF OPENINGS, GAPS, JOINTS, AND RECESSES USING **ZZ® 385 FIRE PROTECTION SEALANT**

TECHNICAL INFORMATION



TECHNICAL INFORMATION FOR CREATING FIRE PROTECTION SEALING OF OPENINGS, GAPS, JOINTS, AND RECESSES IN RAIL VEHICLES.

– USING **ZZ® 385 FIRE PROTECTION SEALANT**

1. CONTENT AND USE

- This technical information outlines possible solutions for fire protection of services in rail vehicles using **ZZ® 385 Fire Protection Sealant.**
- 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® 385 FIRE PROTECTION SEALANT**

- **ZZ® 385 Fire Protection Sealant** is a self-curing, water-based polyacrylate system with fire protection properties designed for filling openings, gaps, joints, and recesses in rail vehicles. The fire protection effect is based on halogen-free fire protection additives that expand during 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® 385 Fire Protection Sealant** is described in detail in the construction examples.

3. IMPLEMENTATION OF FIRE PORTECTION SEALS FOR CABLE PENETRATIONS USING **ZZ® 385 FIRE PROTECTION SEALANT**

Products	**ZZ® 385 Fire Protection Sealant** This product meets the requirements of EN 45545-2 for hazard levels HL1, HL2, and HL3, and satisfies the criteria R22 and R23.
Suitable Components	For sealing small openings, gaps, joints, and recesses in penetrations. The components should meet equivalent fire protection requirements.
Assembly	The component recess must be cleaned before filling with **ZZ® 385 Fire Protection Sealant**. Using formwork installed on the rear side, the opening is filled with sealant. Once the material has fully cured, the formwork can be removed. The penetration seal is immediately ready for use.
Services	Electrical cables with Ø ≤ 21 mm Cable bundles with Ø ≤ 20 mm (bundles with individual cables Ø ≤ 1,9 mm)
Special Notes	The implementation of the penetration sealing for cable penetrations using **ZZ® 385 Fire Protection Sealant** was carried out in accordance with the specifications of the current test report (see attachment). The dimensions of the installations used, as well as other details, can also be found in this test report.

4. SUMMARY

- Fire protection measures using **ZZ® 385 Fire Protection Sealant** can be implemented in rail vehicles after verifying the boundary conditions.
- **ZZ® 385 Fire Protection Sealant** achieves fire-resistance with compartmentalization of 30 minutes and up to 20 minutes of thermal insulation, depending on material thickness. These values are in accordance with **EI20** classification.
- The example (see following pages) highlights the key construction details that typically need to be considered.
- Penetration seals can only be installed if the load-bearing (load-transferring and stiffening) components have at least the same fire resistance duration as the penetration seals.
- If constructions are planned that substantially deviate from the examples provided here, ZAPP-ZIMMERMANN is available to assist in the verification process.

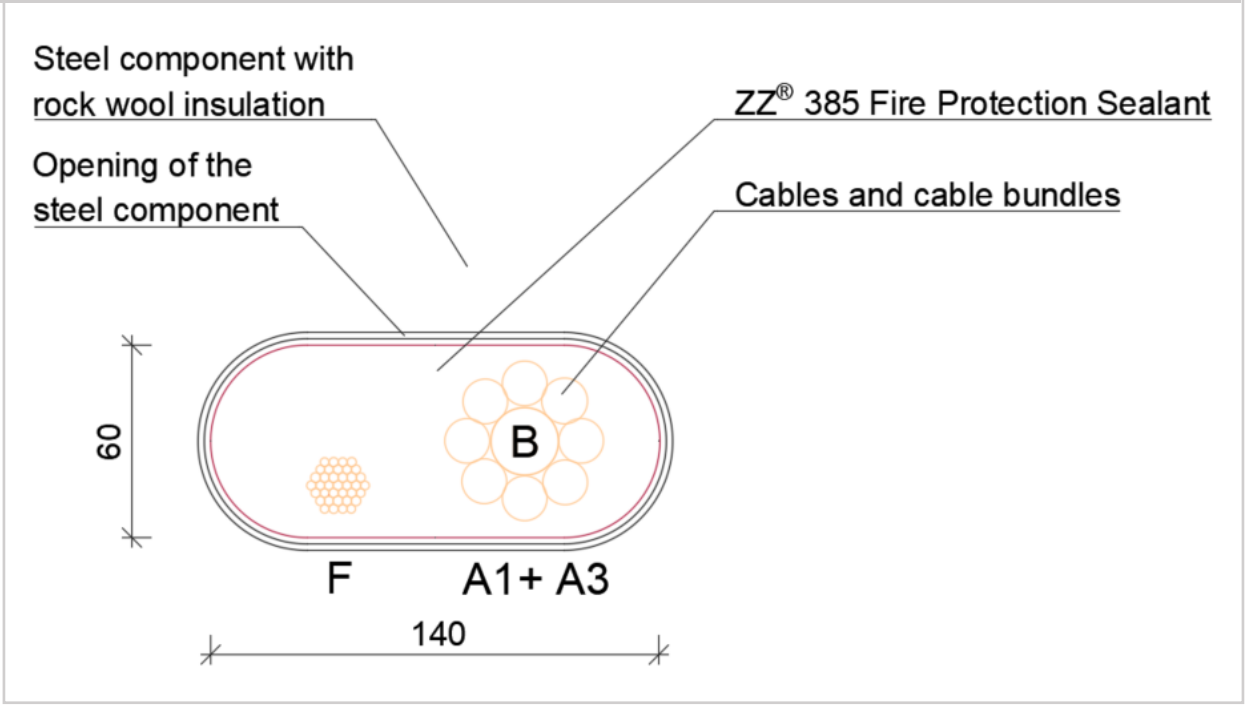
PENETRATION SEAL EXAMPLE

FOR SEALING SMALL OPENINGS, GAPS, JOINTS, AND RECESSES IN PENETRATIONS USING **ZZ® 385 FIRE PROTECTION SEALANT** IN RAIL VEHICLES

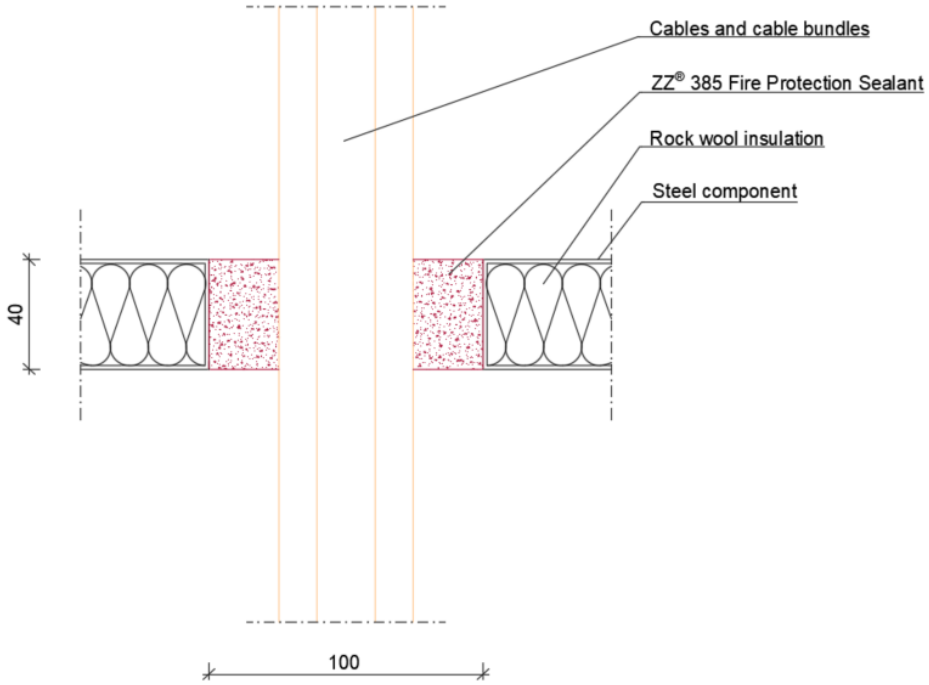
The illustrations depict the fundamental principle of penetration sealing and the installation of **ZZ® 385 Fire Protection Sealant.** It is important to note that a minimum thickness of insulating material must be used to achieve the fire resistance class of the surrounding component.

A 40 mm thick seal made of **ZZ® 385 Fire Protection Sealant** achieves a compartmentalization of 30 minutes and thermal insulation of 20 minutes, giving a rating of **EI20**.

Example Seal – Face View



Example Seal – Section View



FOUNDATIONS OF THIS TECHNICAL INFORMATION

This technical information on **ZZ® 385 Fire Protection Sealant** in rail vehicles is based on the following documents:

- Test Report Nr. R23-0372, Currenta, issued 27.09.2023
- R22, R23 according to EN 45545-2
  - Classification Report Nr. 19/0920, Currenta
  - Test Report Nr. 19/0732 ISO 5659-1, Currenta
  - Test Report Nr. 19/0919 NFX70-100, Currenta
  - Test Report Nr. 19/0612 ISO 4589-2, Currenta
- DIN EN 45545-3: 2013
- DIN EN 1364-1: 2015
- EN 1366-3: 2021
- Construction diagrams according to example

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