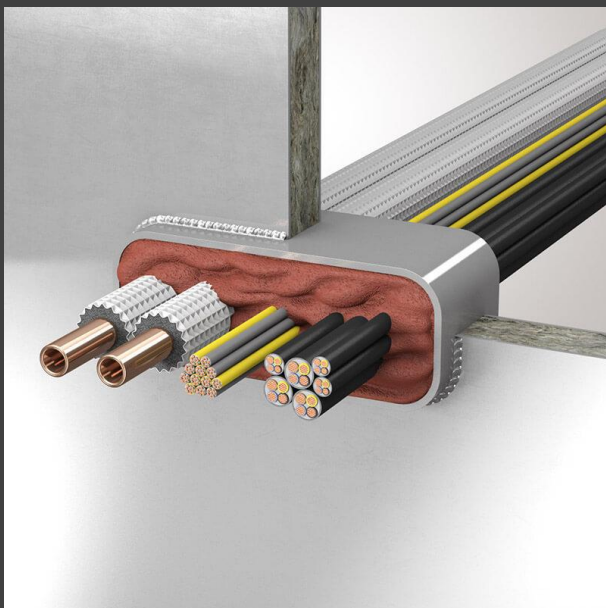


FIRE PROTECTION SEALS OF SERVICE PENETRATIONS IN RAIL VEHICLES USING **ZZ® 383 FIRE PROTECTION FOAM**

TECHNICAL INFORMATION



TECHNICAL INFORMATION ON THE IMPLEMENTATION OF FIRE PROTECTION SEALS FOR CABLE PENETRATIONS IN RAIL VEHICLES

– USING **ZZ® 383 FIRE PROTECTION FOAM**

1. CONTENT AND USE

- / This technical information outlines possible solutions for fire protection of services in rail vehicles using **ZZ® 383 Fire Protection Foam**.
- / 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® 383 FIRE PROTECTION FOAM**

- / **ZZ® 383 Fire Protection Foam** is a self-expanding polyurethane system for fire protection sealing of openings in rail vehicles. The Fire Protection Foam intumesces in the event of a fire. 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, thereby 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 30 minutes (**I30**), in accordance with the **EI30** classification.
- / The installation of **ZZ® 383 Fire Protection Foam** is described in detail in the construction examples.

3. IMPLEMENTATION OF FIRE PROTECTION SEALS OF OPENINGS IN RAIL VEHICLES USING **ZZ® 383 FIRE PROTECTION FOAM**

Products	ZZ® 383 Fire Protection Foam This product meets the requirements of EN 45545-2 for hazard levels HL1, HL2, and HL3, and satisfies the criteria R22 and R23.
Suitable Component	Cable penetrations in partition walls between passenger and staff areas of rail vehicles. The components should meet equivalent fire protection requirements.
Assembly	The component recess must be cleaned before filling with ZZ® 383 Fire Protection Foam . Using formwork installed on the rear side, the opening is filled with foam. Once the material has fully expanded, the formwork can be removed. The penetration seal is immediately ready for use.
Services	Electrical cables with $\varnothing \leq 62,5$ mm Cable bundles with $\varnothing \leq 20$ mm (bundles with individual cables $\varnothing \leq 1,9$ mm)
Special Notes	The implementation of the penetration sealing for cable penetrations using ZZ® 383 Fire Protection Foam 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® 383 Fire Protection Foam** can be implemented in rail vehicles after verifying the boundary conditions.
- / **ZZ® 383 Fire Protection Foam** achieves fire-resistance with compartmentalization of 30 minutes and up to 30 minutes of thermal insulation, depending on material thickness. These values are in accordance with **EI30** 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.

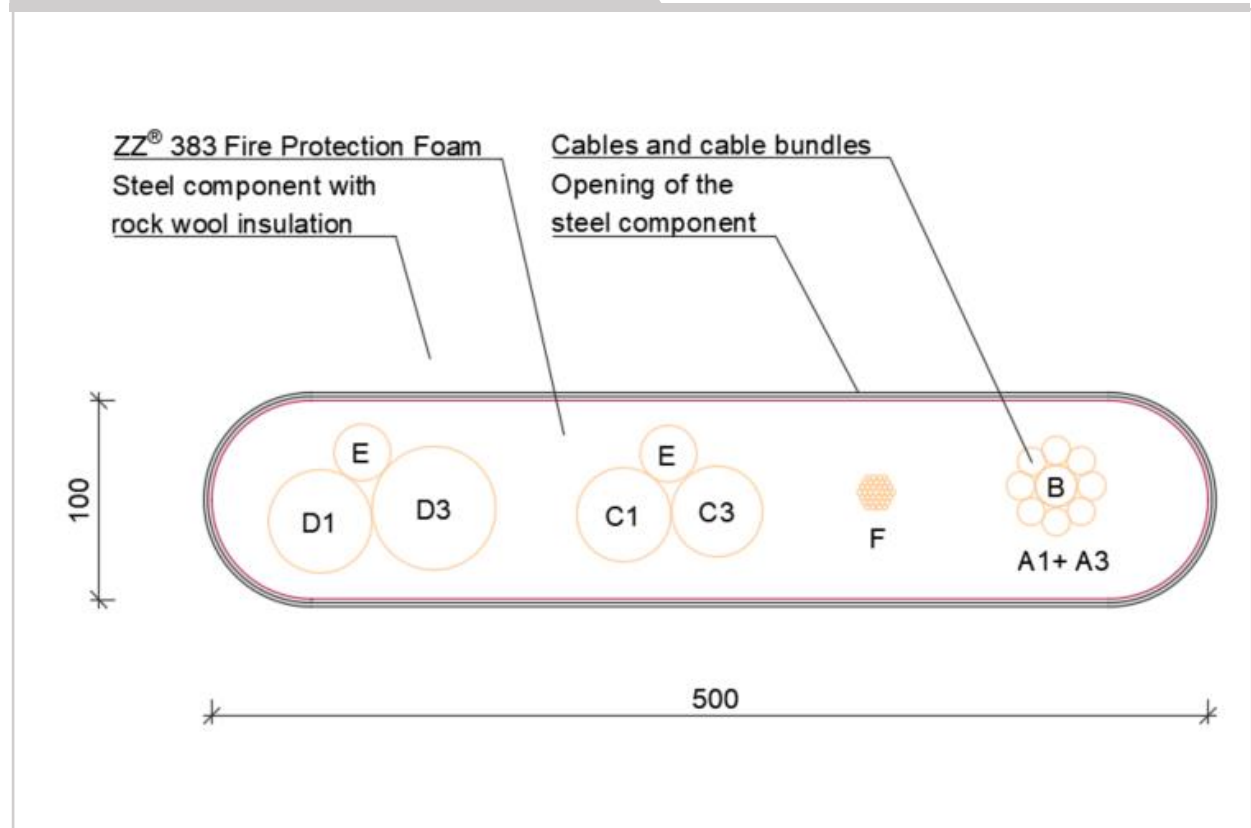
EXAMPLE PENETRATION SEAL

FOR CABLE PENETRATIONS IN RAIL VEHICLES USING **ZZ® 383 FIRE PROTECTION FOAM**

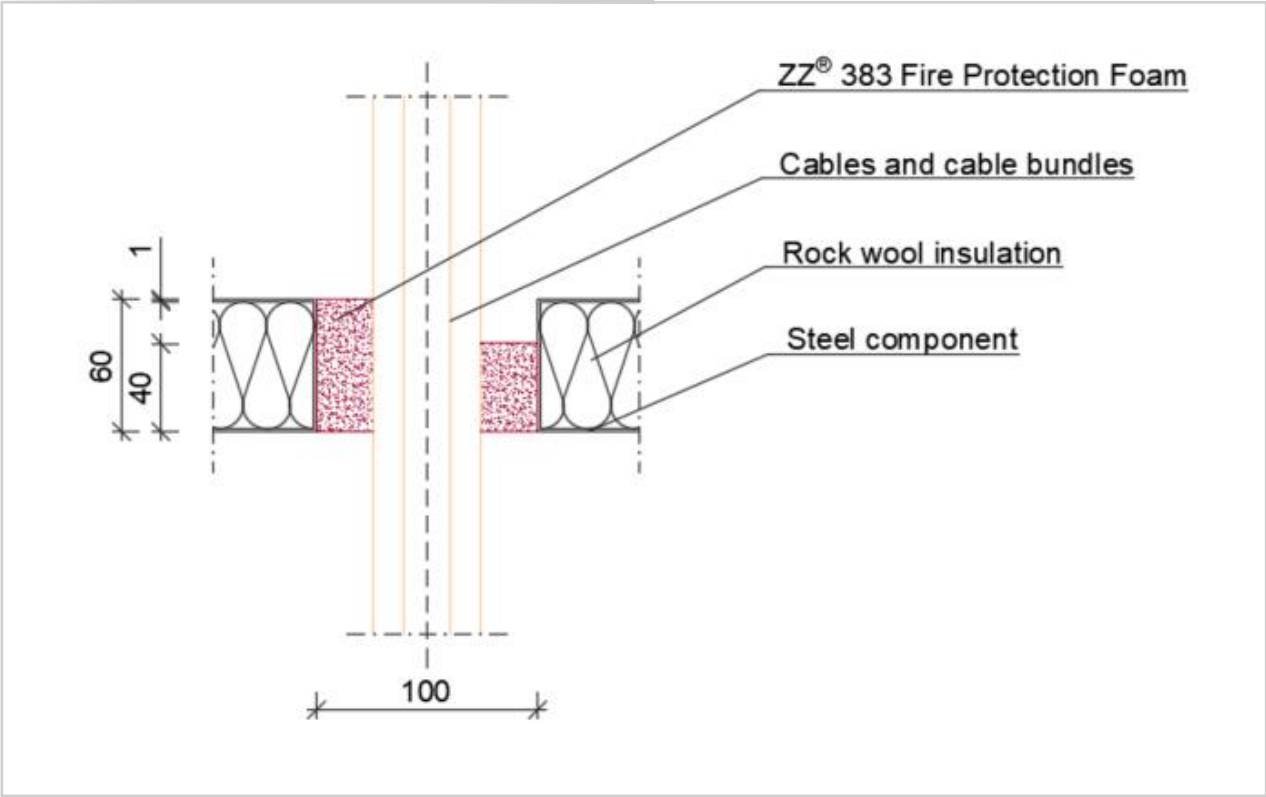
The illustrations depict the fundamental principle of penetration sealing and the installation of **ZZ® 383 Fire Protection Foam**. It is important to note that a minimum thickness of insulating material must be used to achieve the fire resistance class of the surrounding component.

A 60 mm thick seal made of **ZZ® 383 Fire Protection Foam** achieves a compartmentalization and thermal insulation of 30 minutes giving a rating of **EI30**. A 40 mm thick seal still achieves **E30** and **I20**, an overall rating of **EI20**.

Example Seal – Face View



Example Seal – Section View



FOUNDATIONS OF THIS TECHNICAL INFORMATION

This technical information on **ZZ® 383 Fire Protection Foam** 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
 - o Classification Report Nr. 18/1864, Currenta
 - o Test Report Nr. 18/1806 ISO 4589-2
 - o Test Report Nr. 18/1795 ISO 5659-2
 - o Test Report Nr. 18/1863 NF X 70-100-1/-2
- / DIN EN 45545-3: 2013
- / DIN EN 1364-1: 2015
- / EN 1366-3: 2021
- / Construction diagrams according to example

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Illustrations

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