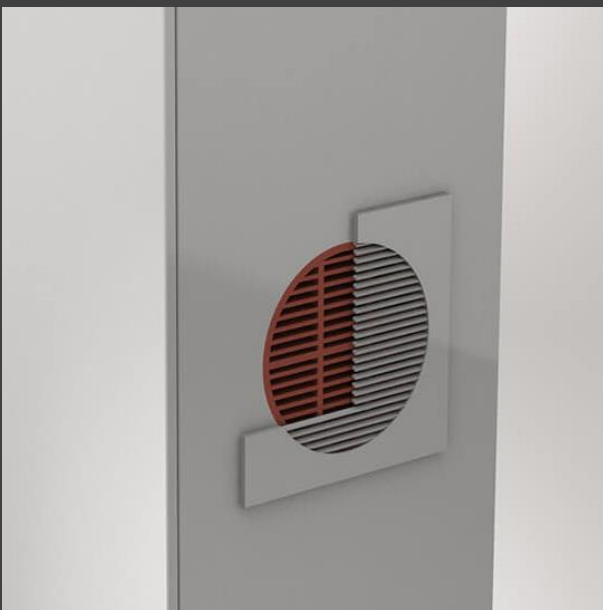


FIRE PROTECTION CLOSURE OF DOWNSTREAM OPENINGS WITH **ZZ[®] 681** FIRE PROTECTION GRILLE, ROUND AND **ZZ[®] 682** FIRE PROTECTION GRILLE, SQUARE

TECHNICAL INFORMATION



TECHNICAL INFORMATION FOR FIRE PROTECTION MEASURES IN AIRFLOW OPENINGS

– USING **ZZ® 681 FIRE PROTECTION GRILLE, ROUND AND ZZ® 682 FIRE PROTECTION GRILLE, SQUARE**

1. CONTENT AND USE

- / This technical information outlines solutions for fire protection of airflow openings in rail vehicles using **ZZ® 681** and **ZZ® 682**.
- / 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. DESCRIPTIONS OF **ZZ® 681 FIRE PROTECTION GRILLE, ROUND AND ZZ® 682 FIRE PROTECTION GRILLE, SQUARE**

- / **ZZ® 681** and **ZZ® 682** are fire protection components made of rigid polyurethane foam for airflow openings in control cabinets, engine rooms, doors, and installation ducts in rail vehicles. The material is enhanced with halogen-free fire protection additives that foam up in the event of a fire, forming insulation layers that slow the spread of flames and smoke, thereby facilitating the rescue of people and materials.
- / They are available in round (**ZZ® 681**) and rectangular (**ZZ® 682**) shapes in various dimensions.
- / 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 15 minutes (**I15**), in accordance with the **EI15** classification.
- / The assembly of the penetration seals with **ZZ® 681** and **ZZ® 682** is described in detail in the design examples.

3. IMPLEMENTATION OF FIRE PROTECTION SEALING OF AIRFLOW OPENINGS WITH **ZZ® 681 FIRE PROTECTION GRILLE, ROUND AND ZZ® 682 FIRE PROTECTION GRILLE, SQUARE**

Products	ZZ® 681 and ZZ® 682 These products meet the requirements of EN 45545-2 for hazard levels HL1, HL2, and HL3, and satisfy the criteria R22 and R23.
Suitable Components	Round ventilation openings in control cabinets, engine rooms, doors, and installation ducts in rail vehicles. Circular openings with diameters of 100, 125, 160, or 200 mm, or rectangular openings with a length of 93 or 150 mm and widths of 93, 150, 186, 200, or 300 mm can easily be protected. Both round and square openings should have a minimum depth of 30 mm. The components should meet equivalent fire protection requirements.
Assembly	The component surface must be cleaned before installing ZZ® 681 or ZZ® 682 . The Fire Protection Grille is inserted into the opening.
Special Notes	The implementation of fire protection with ZZ® 681 or ZZ® 682 is carried out in accordance with the specifications of the current test report (see attachment).

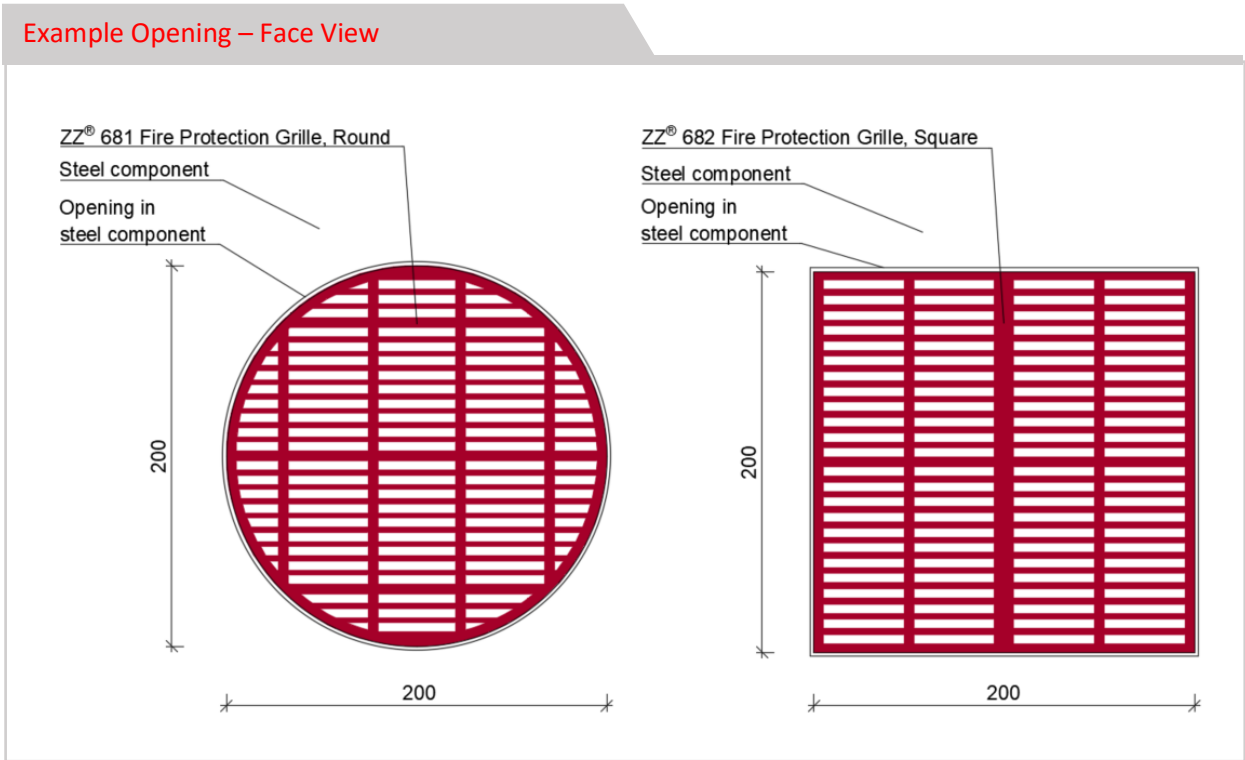
4. SUMMARY

- / Fire protection measures using **ZZ® 681** and **ZZ® 682** can be implemented in rail vehicles after verifying the boundary conditions.
- / **ZZ® 681** and **ZZ® 682** achieves fire-resistance with compartmentalization of 30 minutes and up to 15 minutes of thermal insulation, depending on material thickness. These values are in accordance with **EI15** 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.

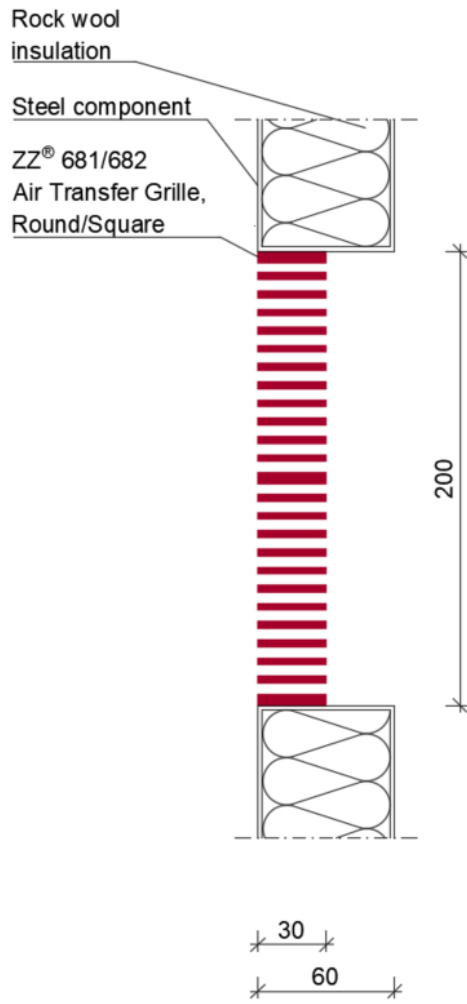
FIRE PROTECTION EXAMPLE

FOR AIRFLOW OPENINGS IN RAIL VEHICLES USING **ZZ® 681 FIRE PROTECTION GRILLE, ROUND AND ZZ® 682 FIRE PROTECTION GRILLE, SQUARE**

The illustrations depict the basic principle of installation of the **ZZ® 681** and **ZZ® 682**. In this context, the diameters of the openings must be considered, and a minimum thickness of insulation material must be used to achieve the fire resistance class.



Example Opening – Section View



FOUNDATIONS OF THIS TECHNICAL INFORMATION

This technical information on **ZZ® 681 Fire Protection Grille, round** and **ZZ® 682 Fire Protection Grille, square** in rail vehicles is based on the following documents:

- / Test Report Nr. R23-0711A Currenta, issued 23.12.2023
- / R22, R23 according to EN 45545-2
 - o Classification Report Nr. 18/1282, Currenta
 - o Test Report Nr. 18/1170 ISO 4589-2, Currenta
 - o Test Report Nr. 18/1265 ISO 5659-2, Currenta
 - o Test Report Nr. 18/1281 NF X 70-100-1/-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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