

# M series

Constructional integration  
of fire-resistant doors in walls



## General information

**All fire-resistant doors are tested in a laboratory that offers the ability to imitate real-life situations on the basis of set standards and requirements. The fire-resistance of a door, partially, depends on the structural wall it is placed in and the installation situation.**

Naturally, not every structural situation can be tested. There are, simply, too many variables and options available. That is why the EN16034 product standard refers to direct extrapolations in the test standard EN1634, as well as the extended EN 15269-2 extrapolations for the properties of structural walls. The tested combinations between the door and the structural wall are the starting point for this.

# Types of walls

The previously mentioned standards distinguish between the rules for three types of structural walls:

## 1. Rigid supporting construction

This, for example, includes stone walls (they don't bend in fire tests).

## 2. Flexible supporting construction

This, for example, includes metal stud walls (MS) and steel profiles that are part of the fire tested wall (may bend in fire tests).

## 3. Associated supporting construction

This, for example, includes composite walls with hardwood pedestal frames.

Merford has tested various door and structural wall combinations of which the results are listed in the table below. The table shows the outcome of the fire tests in combination with the type of tested structural wall.

Fire resistance classification	EW 30	EW 60	EW 90	EW 120	EW 240	EI <sub>h</sub> 30	EI <sub>h</sub> 60	EI <sub>h</sub> 90	EI <sub>h</sub> 120	EI <sub>2</sub> 30	EI <sub>2</sub> 60	EI <sub>2</sub> 90	EI <sub>2</sub> 120
Rigid	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Flexible	✓	✓	✓	✓	✓	⚙️	⚙️	⚙️	⚙️	⚙️	⚙️	⚙️	⚙️
Associated	✓	✓	✓	✓	⚙️	✓	⚙️	⚙️	⚙️	✓	✓	⚙️	⚙️

✓ Suitable for free trade

⚙️ Project-based design that is approved by an acknowledged party

The table distinguishes between the free trade and project-based application. This is due to the standards not being developed enough yet to name all the design solutions.

— Table: application of structural walls in projects whilst adhering to the following requirements

# Wall requirements

Besides the type of wall, there are also a few requirements a wall needs to adhere to. These requirements have been listed below:

## Requirements rigid wall in free trade

- Minimum wall thickness 150 mm.
- Minimum density 550 kg/m<sup>3</sup>.

## Requirements flexible wall in free trade

- The fire resistance classification is based on flame density and heat radiation EW.
- The wall must have a fire resistance equal to or higher than the fire classification of the door.
- The steel profile is part of the tested fire resistant wall. (If the tested wall has to be adapted, for example for extra strength, it is no longer listed within the free trade category).

## Requirements associated wall in free trade

- A composite wall in the free trade category must correspond to the composite wall in which the door is tested.

In addition, the window frame comes in various designs which allows for an optimal structural connection to be achieved. We will explain the three most standardised versions in a free trade situation (there will be countless more possibilities due to the in-house manufacturing of the frames from sheet metal on a project basis).

— Table: Application of standard frames in free trade

Fire resistance classification	EW 30	EW 60	EW 90	EW 120	EW 240	EI 30	EI 60	EI 90	EI 120	EI <sub>2</sub> 30	EI <sub>2</sub> 60	EI <sub>2</sub> 90	EI <sub>2</sub> 120
Corner frame	✓	✓	✓	✓	✗	✓	✓	✗	✗	✓	✓	✗	✗
Block frame	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Window frame enclosing a wall	✓	✓	✓	✓	✗	✓	✓	✗	✗	✓	✓	✗	✗

Note: On a project basis, depending on the situation, an ✗ can be converted into a ✓

# Types of window frames

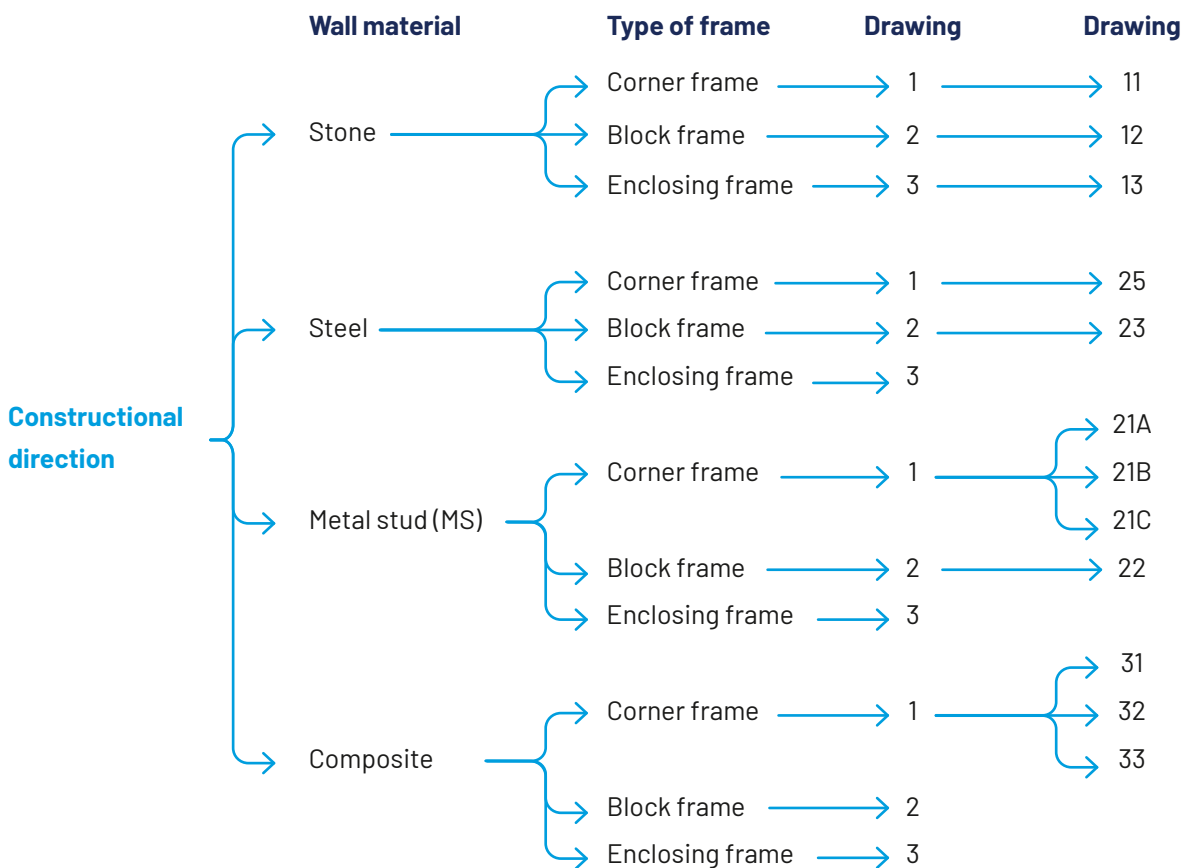
In the documentation you will find below, the characteristics of the frames are first shown in the drawings.

This is followed by some example details of the combination of the door and the structural wall.

A technical data sheet was put together for each wall:

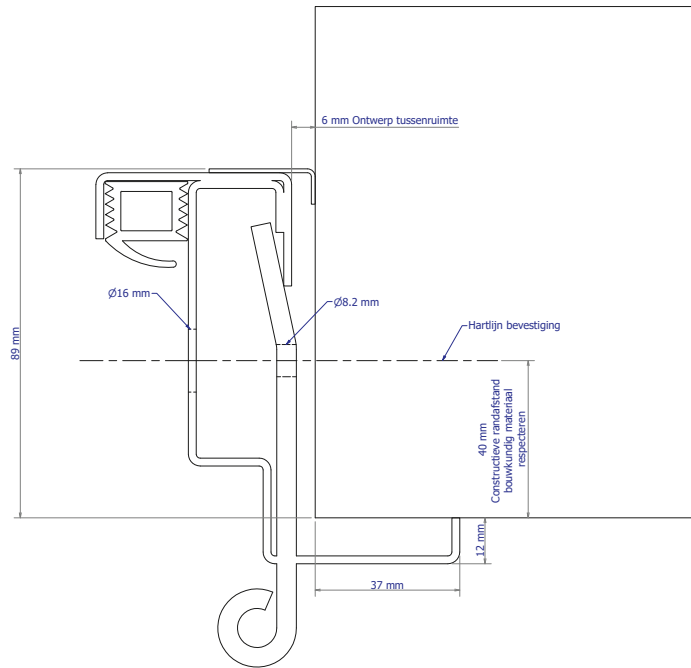
- fire-resistant M series in stone walls (rigid)
- fire-resistant M series in steel (flexible)
- fire resistant M series in wooden frame (associated)
- fire resistant M-series in MS walls (flexible)

## Flow chart drawings and impressions

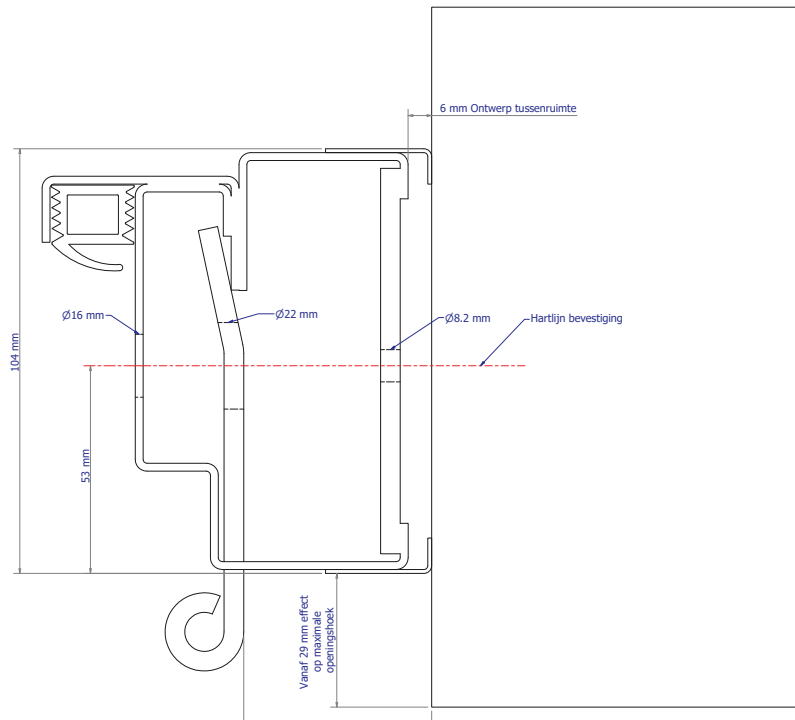


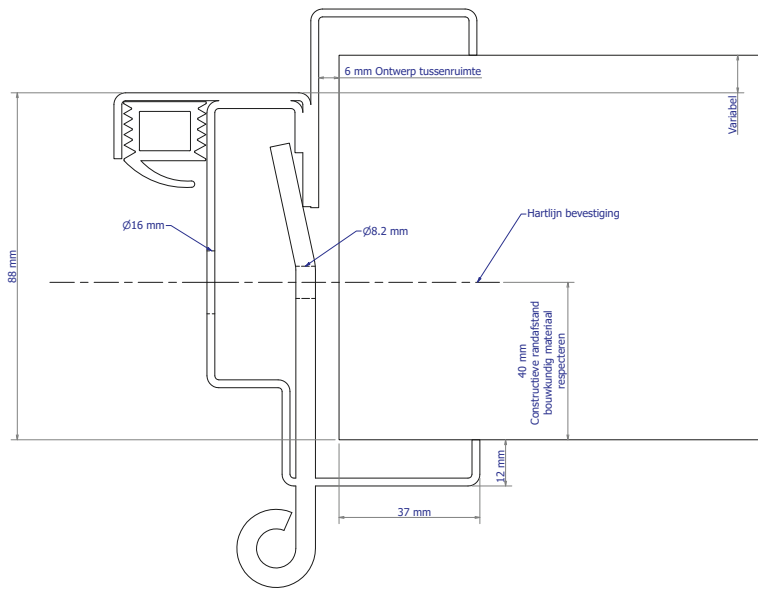
# Drawings

— Drawing 1: Corner frame



— Drawing 2: Block frame





— Drawing 3: Enclosing frame

# Stone walls

## Fire-resistant M-series in stone walls

According to the fire-resistance assessment system, stone walls fall into the rigid wall category. The Merford M series doors can be used for this application purpose.

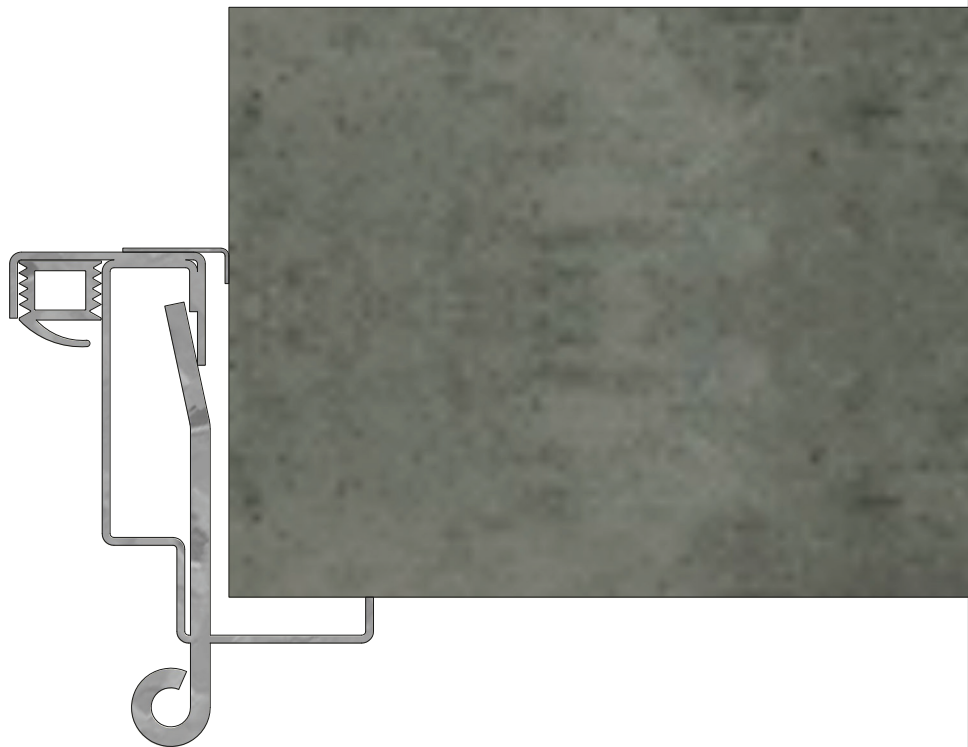
The requirements for structural fire protection are as follows:

- Minimum wall thickness 150 mm.
- Minimum density 550 kg/m<sup>3</sup>.
- Deviations are possible only in case they are approved by an authorised party.

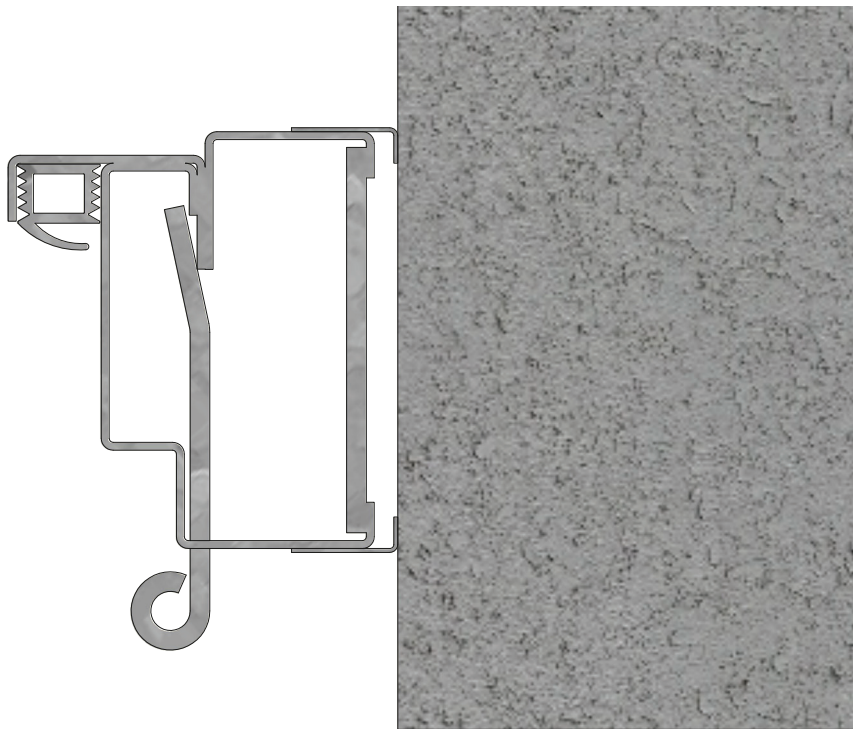
The following drawings are examples. For these to be relevant, Merford assumes all the requirements are met.

*The recommendations and data provided in this technical data sheet are as complete and correct as possible, but do not constitute a guarantee. When in doubt, please consult one of our specialists.*

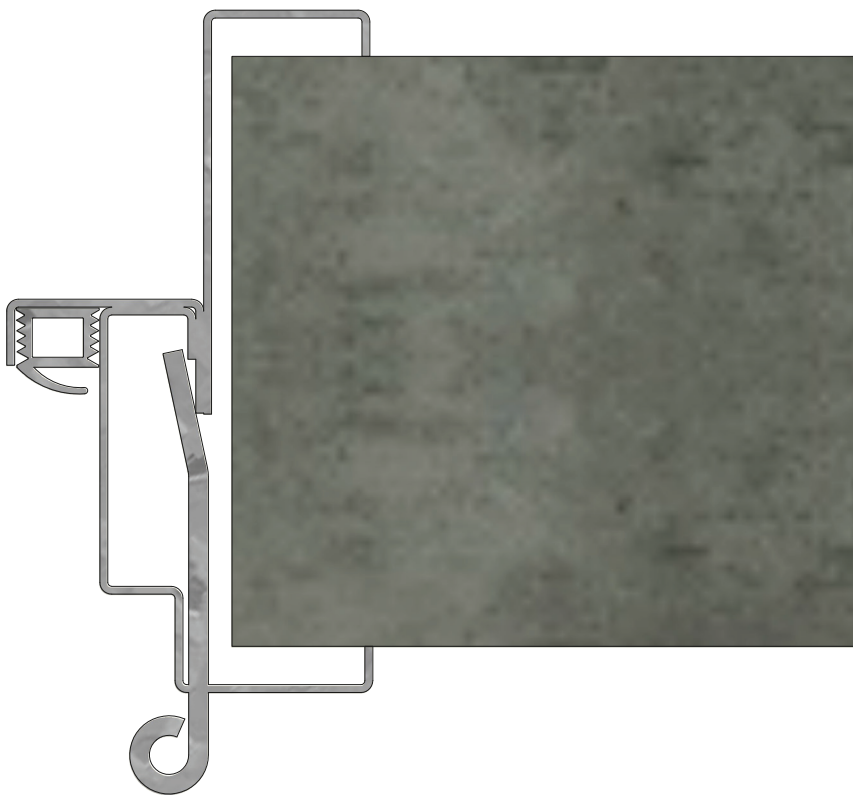
— Drawing 11: Corner frame on 150 mm concrete







— Drawing 12: Block frame on 200 mm sand-lime brick



— Enclosing frame on 150 mm concrete

# Steel walls

## Fire-resistant M-series in steel

According to the fire-resistance assessment system, steel walls fall into the flexible wall category. The Merford M series doors with an EW classification criteria can be used for this application purpose.

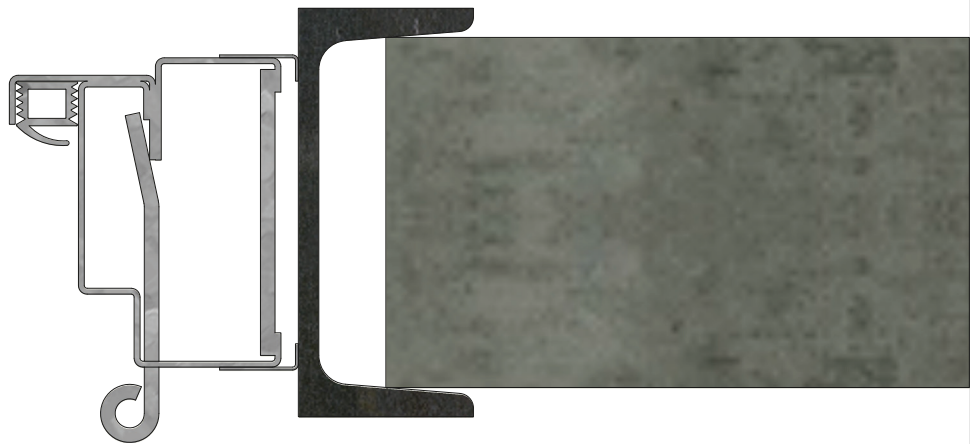
The requirements for structural fire protection are as follows:

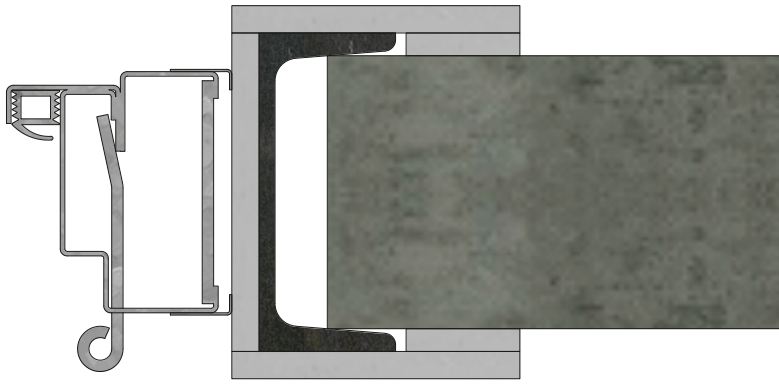
- The fire resistance classification is based on flame density and heat radiation EW.
- The wall must have a fire resistance equal to or higher than the fire classification of the door.
- The wall profile is part of the tested fire resistant wall.
- Deviations are possible only in case they are approved by an authorised party.

The following drawings are examples. For these to be relevant, Merford assumes all the requirements are met.

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— Drawing 23: Block frame on UNP





— Drawing 24: Block frame on cooled UNP



— Drawing 25: Corner frame on UNP

# Wooden frames

## Fire-resistant M-series in wooden frame

Merford has conducted fire-resistance tests on a set up with a wooden frame. The Merford M series can be used for this application purpose.

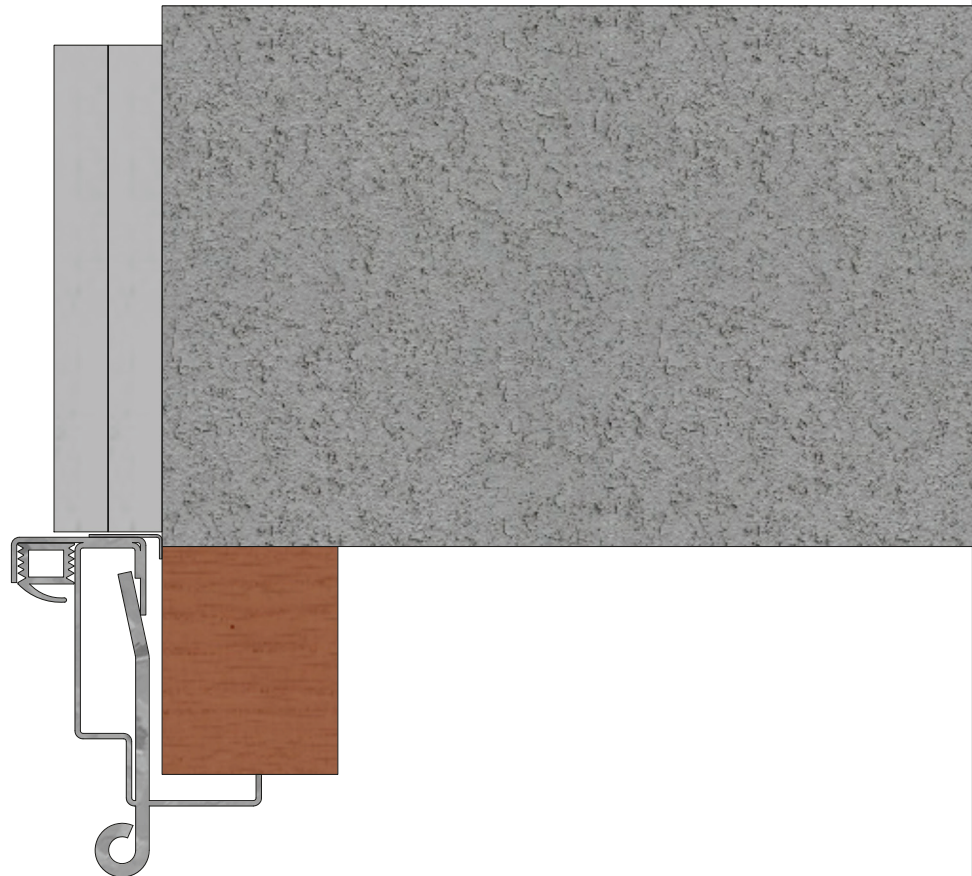
The requirements for structural fire protection are as follows:

- A composite wall must correspond to the composite wall in which the door is tested.
- Deviations are possible only in case they are approved by an authorised party.
- Calculation rules for, for example, the wood burning speed, provide variety possibilities.

The following drawings are examples. For these to be relevant, Merford assumes all the requirements are met.

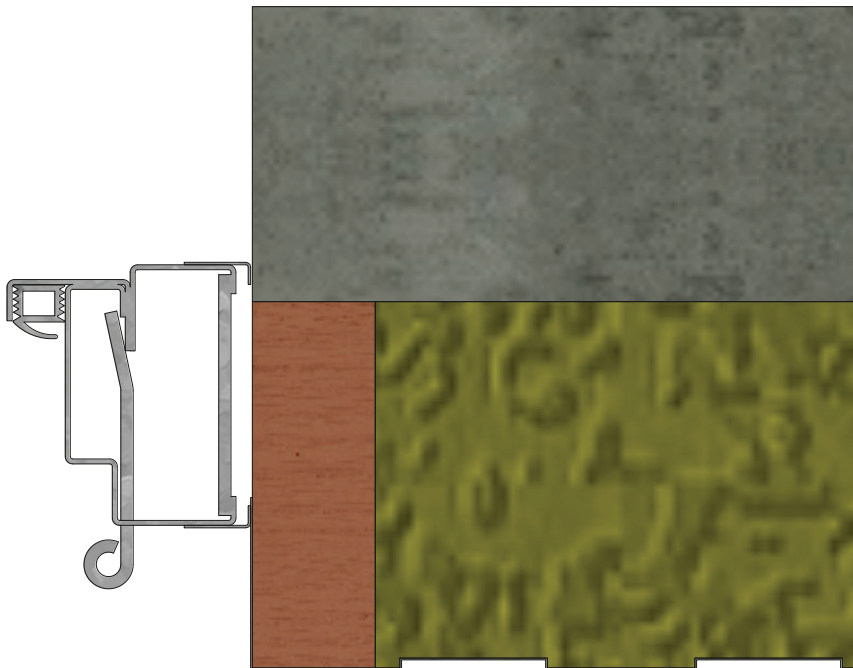
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— Drawing 31: Tested variety





— Drawing 32: Tested variety



— Drawing 33: A drawing that is yet to be assessed

## Metal Stud walls (MS)

### Fire-resistant M-series in MS walls

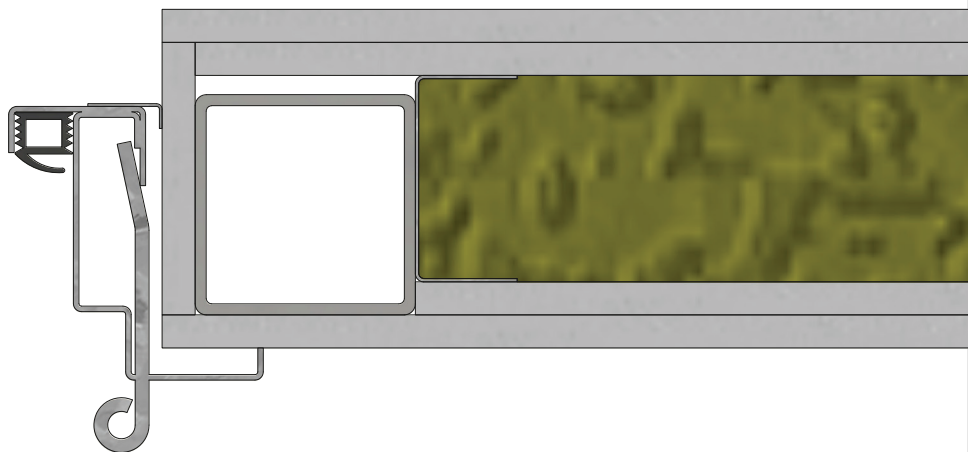
The requirements for structural fire protection are as follows:

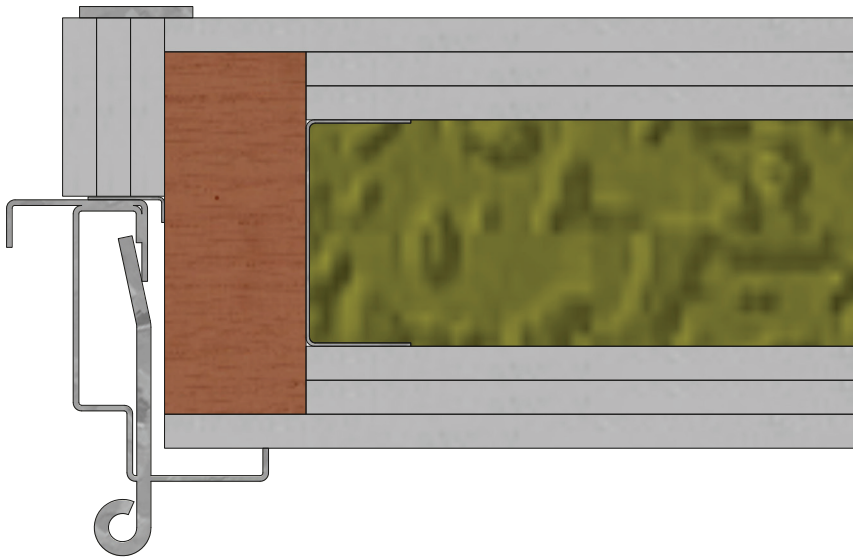
- The fire resistance classification is based on flame density and heat radiation EW.
- The wall must have a fire resistance equal to or higher than the fire classification of the door.
- Any reinforcement profile in the MS wall is part of the tested fire resistant wall.
- Deviations are possible only in case they are approved by an authorised party.

The following drawings are examples. For these to be relevant, Merford assumes all the requirements are met.

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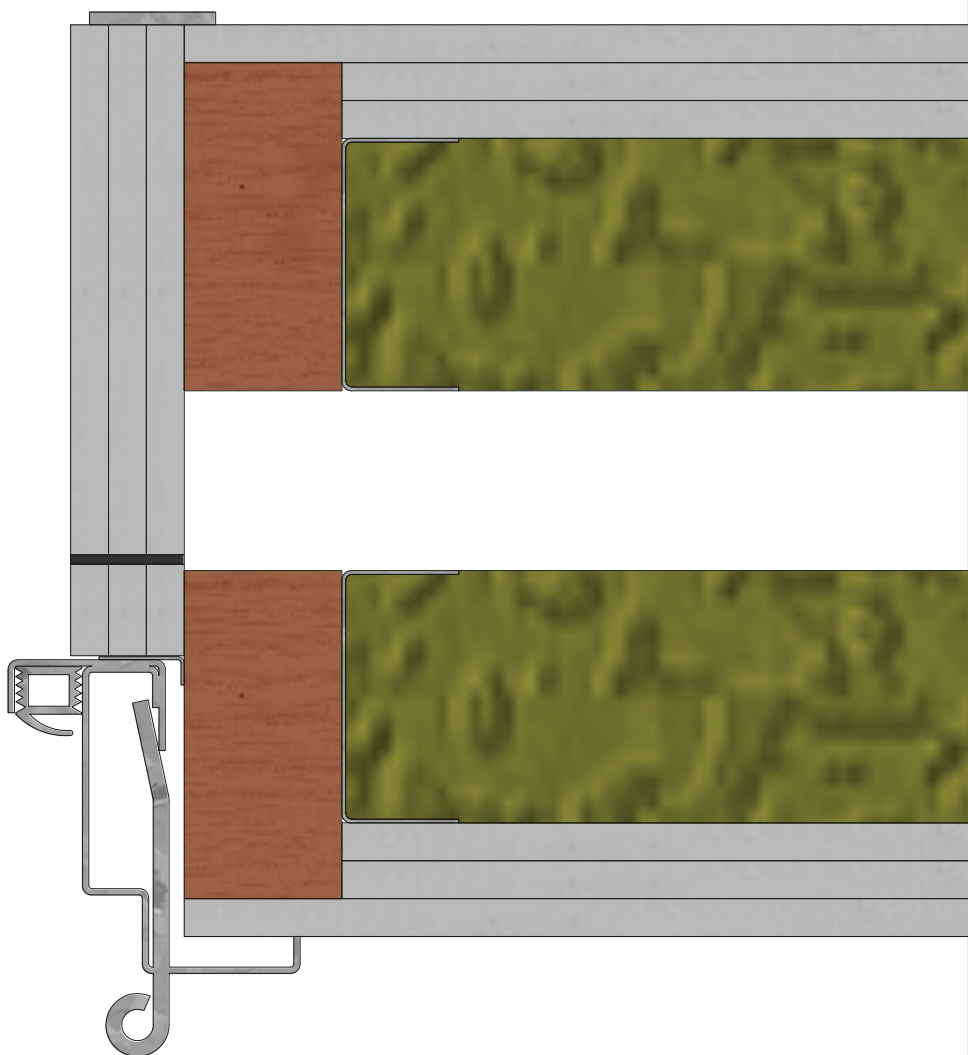
— Drawing 21: Example of corner frame on MS wall



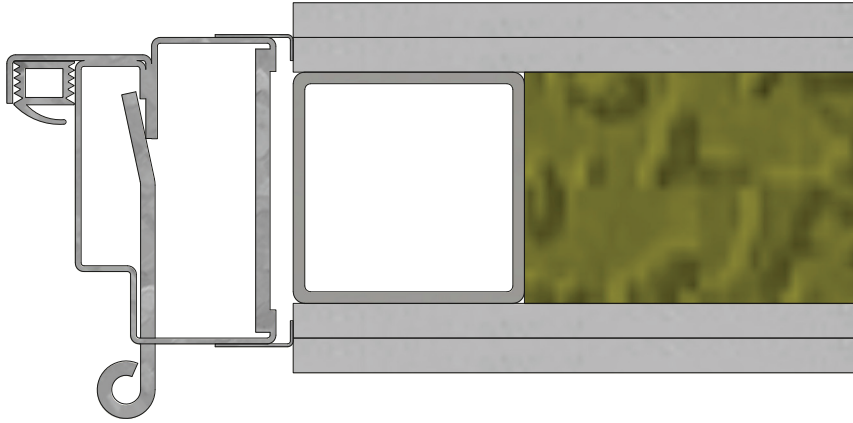


— Drawing 21B: Corner frame on MS wall

— Drawing 21C: Corner frame on double MS wall







— Drawing 22: Example of block frame on MS wall

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