



# Compact Fire Shutters Substrate Guide



**SECURITYDIRECT**  
ROLLER SHUTTERS • INDUSTRIAL DOORS • STEEL DOORS • SECURITY GRILLES

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# 1. Introduction

The **substrate**, or **supporting construction**, is one of the most critical factors in determining the compliance and performance of a fire shutter system.

Fire shutters are tested as part of a complete assembly — including the wall, fixings, and shutter components — and **the fire resistance rating only applies when the shutter is installed into the same type of substrate as tested and certified.**

Installing a shutter into a different or untested substrate can **invalidate its certification, CE/UKCA marking, and compliance with Building Regulations.**

To maintain conformity:

- Only substrates specifically covered in the manufacturer's test evidence or Extended Application (ExAp) report are permitted.
- Any variations or deviations from the tested and certified arrangements must be formally approved in writing by the project Fire Officer or Building Control authority. Without this approval, the installation is classed as non-compliant under the Construction Products Regulation (CPR) and BS EN standards.



Fire shutters also place significant static and dynamic loads on the supporting structure.

The **approximate weight of a fire shutter is 25 kg per square metre**, and this load must be supported safely under both normal and fire conditions.

It is the responsibility of the buyer to confirm that the supporting wall or frame can bear the imposed load of the shutter assembly — including the barrel, endplates, guides, and canopy — without deflection or compromise to the fire barrier's integrity.

This guide outlines the approved substrates for fire-rated roller shutters, including:

- Masonry / Concrete (Rigid Structures)
- Protected Structural Steel
- Timber Stud Partition (Flexible Structures)
- Servo Hatch / Timber Stud Wall with Dwarf Wall

Each section details **the test evidence, construction requirements, limitations, and buyers responsibilities.**

## 2. Masonry and Concrete (Rigid Structures)

### 2.1. Description

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Rigid substrates include masonry, brick, concrete, or block walls and form the standard supporting construction for most fire shutter installations.

These materials provide inherent load-bearing strength and fire resistance, making them ideal for high-integrity applications.

### 2.2. Structural Requirements

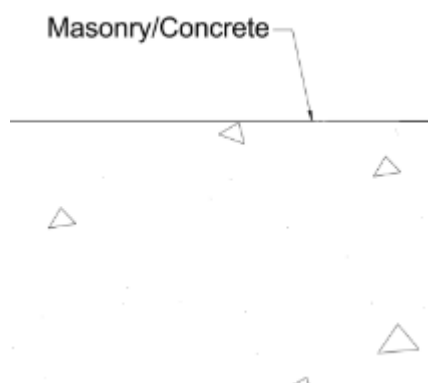
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- Minimum Density: 1600 kg/m<sup>3</sup>
- Minimum Thickness: 102.5 mm
- Fire Rating: Equal to or greater than the shutter's fire rating (up to E240)
- Permitted Sizes: Up to 10,000 mm (width) × 7,000 mm (height)

### 2.3. Fire Boarding

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The fire shutter can be fixed directly to masonry or concrete substrates without the need for additional fire boarding, as these are classified as solid, non-combustible structures in accordance with the test certification.



## 3. Protected Structural Steelwork

Reference: BS EN 15269-10: Rule J.2.1 – Modified Supporting Construction

### 3.1. Description

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Fire shutters may be installed to structural steel if it has been adequately fire-protected using certified systems.

This configuration allows integration within steel-framed buildings, but strict compliance with EN 13381 (Parts 4 or 8) is required.

### 3.2. Structural Requirements

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- Structural Steel Section Factor ( $A/V$ ): Must be  $<230 \text{ m}^{-1}$ . This calculation must be undertaken with the assumption that the steel work is exposed to fire on all four sides. This rule applies to both vertical and horizontal steel sections of the support frame.
- In Fire Engineering, the sectional factor of an unprotected hot rolled open section, hot finished/formed hollow section or fabricated girder is defined as the heated perimeter ( $H_p$ ) which is the length of the steel in contact with the fire per unit length, divided by the cross-sectional area of the steel section ( $A$ ), measured in units of  $\text{m}^{-1}$ .

Using Promat's 'The Passive Fire Protection Handbook: Chapter 3 – Structural Steel' as an example, it is possible to check the sectional factor to ensure the structural steel section would be compliant and suitable for the installation of a fire-resistant roller shutter.

Table 3s Rectangular Hollow Sections (RHS)				Section factor A/V (Hp/A)		
Dimensions to EN 10210 S355J2H						
Designation						
Size D x B	Wall thickness t	Mass	Area of section A	3 sides	3 sides	4 sides
mm	mm	kg/m	cm <sup>2</sup>	m <sup>-1</sup>	m <sup>-1</sup>	m <sup>-1</sup>
120 x 60	3.6	9.66	12.3	245	195	300
	4.0	10.7	13.6	220	180	265
	5.0	13.1	16.7	180	145	215
	6.3	16.2	20.7	145	120	175
	8.0	20.1	25.6	120	95	140
	10.0	24.3	30.9	100	80	120

The example above demonstrates that only a 120 mm x 60 mm rectangular hollow section (RHS) with a thickness of 5 mm, 6.3 mm, 8 mm or 10 mm would be suitable as the calculated sectional factor is less than the stated 230m<sup>-1</sup> as required within Extended Application Rule J.2.1.

### 3.3. Approved Fire Protection Methods

The Fire Protection System must be shown by test to EN 13381 to maintain the steel temperature 400°C or less to retain strength and minimise the effects of thermal expansion in the steel section.

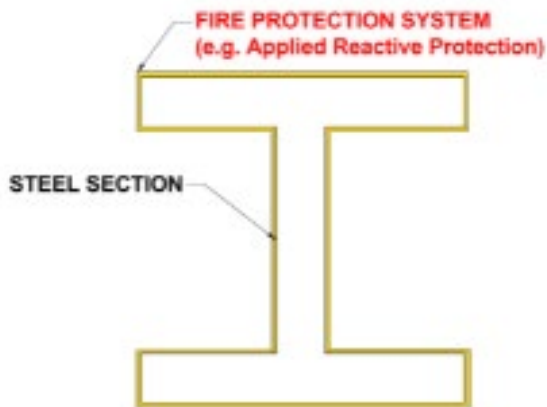
#### Applied Passive Protection (EN 13381-4)

The Fire Protection System must be shown by test to EN 13381 to maintain the steel temperature 400°C or less to retain strength and minimise the effects of thermal expansion in the steel section.



### Applied Reactive Protection (EN13381-8)

The Fire Protection System must be shown by test to EN 13381 to maintain the steel temperature 400°C or less to retain strength and minimise the effects of thermal expansion in the steel section.



## 3.4. Non-Compliant Conditions

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Unprotected structural steel is not acceptable and will invalidate certification.

Liaise with the fire engineer or steelwork manufacturer for the required encasement thickness and board type.

## 4. Timber Stud Partition (Flexible Structure) - Doorways

Test Reference: WF 429933 – “Flame Armour” installed on fire-rated timber stud wall

Fire Rating: Up to 90 minutes (E90) integrity performance

### 4.1. Description

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Flexible substrates are typically C16 timber stud walls lined with fire-rated plasterboard and insulated with mineral wool.

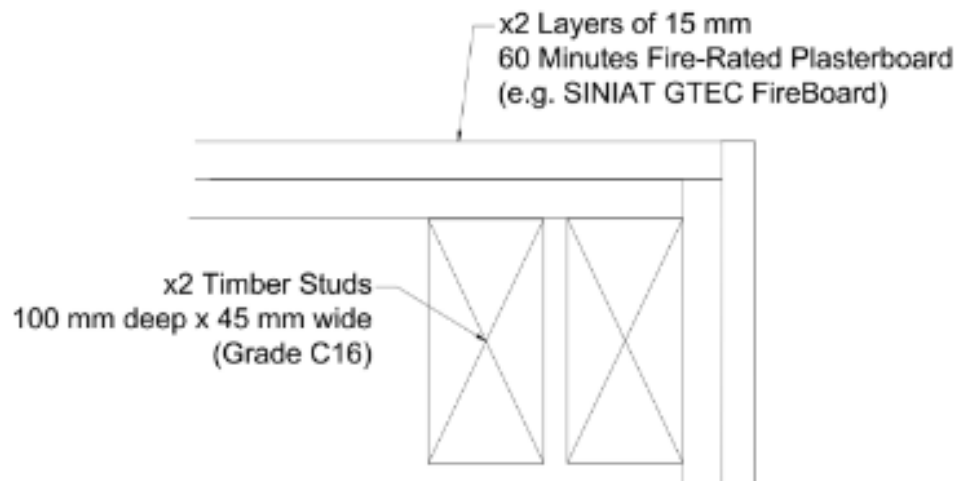
This configuration provides a certified fire barrier for internal partitions where masonry is not practical.

### 4.2. Structural Requirements - Doorways

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In accordance with Test Report No. 429933 & Extended Application Report No. 416673, the Flame Armour™ product can be installed into a timber stud partition.

This substrate type has shown by direct test evidence that the product will be able to achieve 90 minutes Integrity performance (Classified as E90 in accordance with BS EN 13501-2).





## 5. Served Hatch/ Timber Stud with Dwarf Wall

Test Reference: WF 552862 – “Flame Armour+” product

Fire Rating: Up to 120 minutes (E120) integrity performance

### 5.1. Description

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Purpose-designed for served hatch or countertop applications, where the shutter closes to a countertop above floor level.

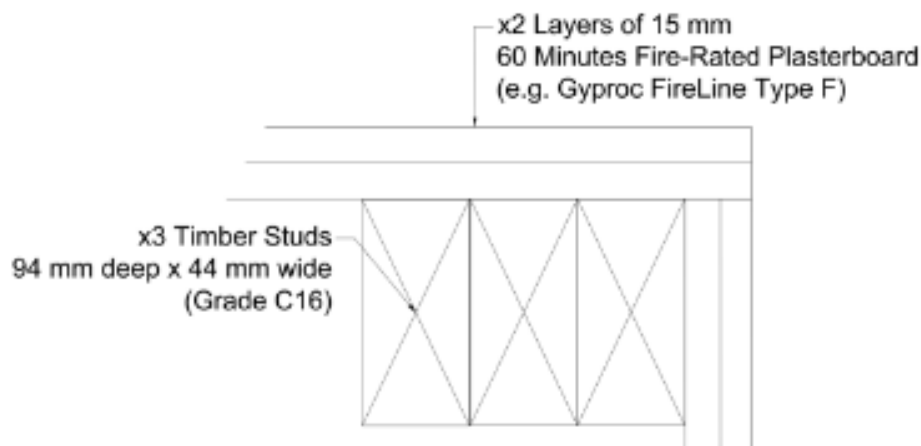
This configuration is outside standard EN 15269-10 scope but is covered by direct test evidence.

### 5.2. Structural Requirements - Served

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In accordance with Test Report No. 552862, the Fire Shutter can be installed into a timber stud partition (served hatch).

This substrate type has shown by direct test evidence that the product will be able to achieve 120 minutes Integrity performance (Classified as E120 in accordance with BS EN 13501-2).





## 6. Non Permitted Substrates

The following supporting constructions are not approved under the manufacturer's Extended Application or any applicable standard:

- ✗ Standard (non-fire-rated) plasterboard
- ✗ Metal stud partitions
- ✗ Insulated panel walls
- ✗ Plastic-lined or whitewall partitions
- ✗ Unprotected structural steel sections

## 7. Floor and Cill Substrates

### 7.1. Importance of the Landing Surface

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The performance of a fire shutter depends not only on the supporting wall or structure but also on the substrate it closes onto.

During fire testing, the bottom rail of the shutter must form an effective seal against the floor or landing surface, maintaining integrity and preventing the passage of flames and hot gases.

An untested or inappropriate landing substrate can invalidate the test certification and compromise compartmentation performance.

### 7.2. Standard Tested Floor Type

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In accordance with BS EN 1634-1:2014 + A1:2018 and the procedures carried out at Warrington Fire, fire shutters are normally tested closing down onto a rigid masonry or concrete floor.

This represents the “standard tested configuration” and is the only configuration covered within the typical Extended Application (ExAp) for most manufacturers.

As such, installations where the shutter closes onto tiles, timber, carpet, or non-fire-rated finishes fall outside of the tested scope and must be referred to Building Control or the project Fire Officer for written approval before installation proceeds.

### 7.3. Other Approved Landing Substrates

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At Security Direct, additional testing has been undertaken to extend the range of certified landing substrates beyond the standard masonry floor.

This ensures greater flexibility for architectural and interior design requirements while maintaining full compliance.

Our approved and tested landing substrates include:

#### Concrete Floor / Masonry Floor

- Standard tested substrate under BS EN 1634-1.
- Provides up to 240 minutes integrity performance.

## Steel Cill Angle

Certified for use where the shutter closes onto a steel angle threshold or structural cill.

Commonly used in industrial and commercial doorways where reinforcement or raised thresholds are required.

## A1 and A2 Fire-Rated Finishes

Approved for installations where the shutter closes onto flooring materials rated A1 (non-combustible) or A2 (limited combustibility) in accordance with EN 13501-1.

These include fire-rated tile systems, screeded finishes, and steel plate coverings with certified resistance equal to or greater than the shutter's classification.

## 7.4. Installation Guidance

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- The landing substrate must be level, rigid, and continuous across the full width of the opening.
- Any soft floor finishes (vinyl, timber, carpet, or resin) must be cut back to expose the certified landing material beneath.
- The bottom rail of the shutter must land directly onto the tested and approved substrate, without gaps or compressible materials that could affect the fire seal.
- The fire resistance of the landing substrate must match or exceed that of the shutter (e.g., E60, E120, or E240).
- If a non-standard finish or floor construction is proposed, written approval must be obtained from the Fire Officer or Building Control before installation.