

Fire Walls & Boundary Conditions

Hadley**PURLINS** Technical
Guidance Note



PUR-HAD-XX-ZZ-TE-X-0301

Section 1:

Introduction

Hadley UltraZED™2 and Hadley UltraBEAM™2 side rail systems are suitable for inclusion within a fire resisting external wall system, provided that certain criteria are met. The performance of a fire resisting external wall relies upon the appropriate design and specification of all elements, from the cladding system to the primary steelwork and foundations. For full guidance see BCSA Technical Specification for Boundary Elevations.

Building Regulations

For portal frames in fire boundary conditions, the regulatory guidance from England, Wales and Scotland largely agrees. Two types of boundary condition are presented:

1. External walls 1000mm from the relevant boundary
2. Protected external walls >1000mm from the relevant boundary

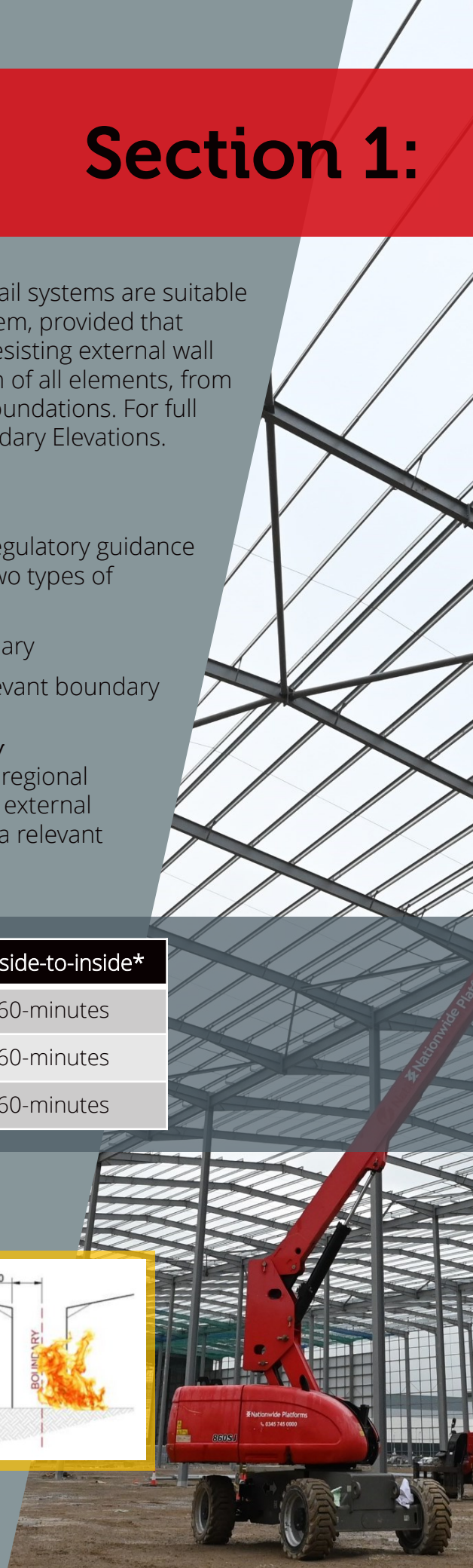
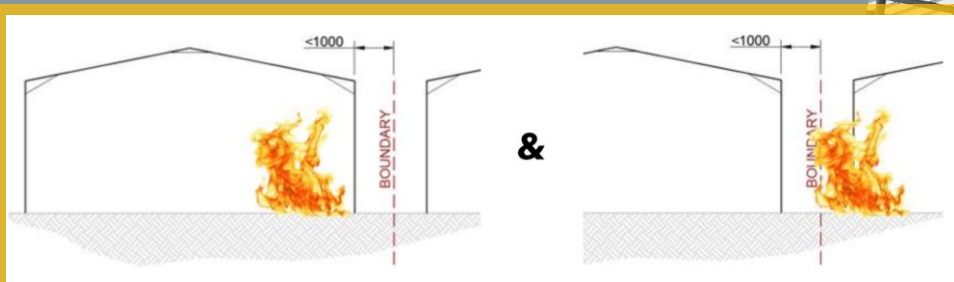
External Walls <1000mm from a relevant boundary

Subject to purpose group, project specification and regional regulations, a typical single-storey portal frame with external walls having any part a maximum of 1000mm from a relevant boundary requires the following fire resistance:

Fire resistance provisions	Inside-to-outside*	Outside-to-inside*
Loadbearing capacity (R)	60-minutes	60-minutes
Integrity (E)	60-minutes	60-minutes
Insulation (I)	60-minutes	60-minutes

* Each direction separately

Note: fire resistance periods stated are subject to project specifics and building regulations for the region



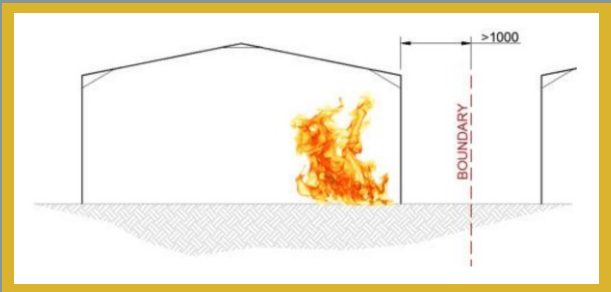
Background

Protected External Walls >1000mm from a relevant boundary

Where structures are greater than 1000mm from a relevant boundary, areas of the external wall may still require fire resistance to limit heat radiated from a fire across the boundary. The size and requirements of these ‘Protected Areas’ are determined following relevant building regulations guidance and/or BRE report BR 187. For a typical single-storey portal frame, protected external wall areas require the following fire resistance:

Fire resistance provisions	Inside-to-outside	Outside-to-inside
Loadbearing capacity (R)	60-minutes	N/A
Integrity (E)	60-minutes	N/A
Insulation (I)	60-minutes	N/A

Note: fire resistance periods stated are subject to project specifics and building regulations for the region



Fire resistance of the through-wall cladding specification is determined by tests in accordance with EN 1364-1 or similar.

Section 2: Fire Wall

Fire Wall mechanism

In the fire condition, the through-wall cladding system is considered to be hung from the fire protected capable member(s) which provide vertical support to the suspended cladding. Capable members may be required at the eaves or parapet only, or at additional intermediate positions subject to the loadbearing capabilities of the cladding system and its joints in the fire condition.

Cold-formed rails and their accessories are considered to have negligible resistance in fire and as per PD 6688-1-2 are not required to resist wind actions in the fire condition.



Cladding system Performance in fire

Since cladding systems are assumed to be hung, and therefore in tension during the fire condition, cladding systems should be tested in accordance with BS EN 1364-1 as a non-loadbearing wall. A loadbearing fire test can only apply a compressive force and is therefore inappropriate for a cladding system hung in tension.

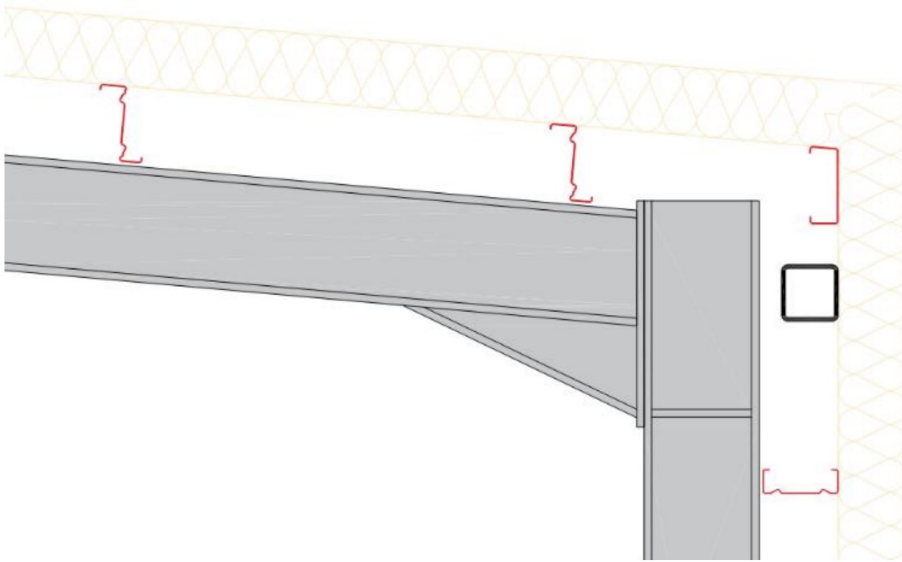
The load path within the cladding system shall be determined by the cladding manufacturer or façade designer. Cladding systems may rely on the unexposed sheet or liner, internal bracketry, or other structural element within the cladding construction where appropriate, to provide the vertical tensile resistance to the cladding self-weight in fire. The cladding system self-weight includes the cladding itself, any attachments such as signage, and the weight of the secondary steelwork which is assumed to go into catenary.

Resistance of the cladding joints and of the connection of the cladding system to the capable member(s) shall be determined by the cladding manufacturer or façade designer.

Section 3: Capable Member

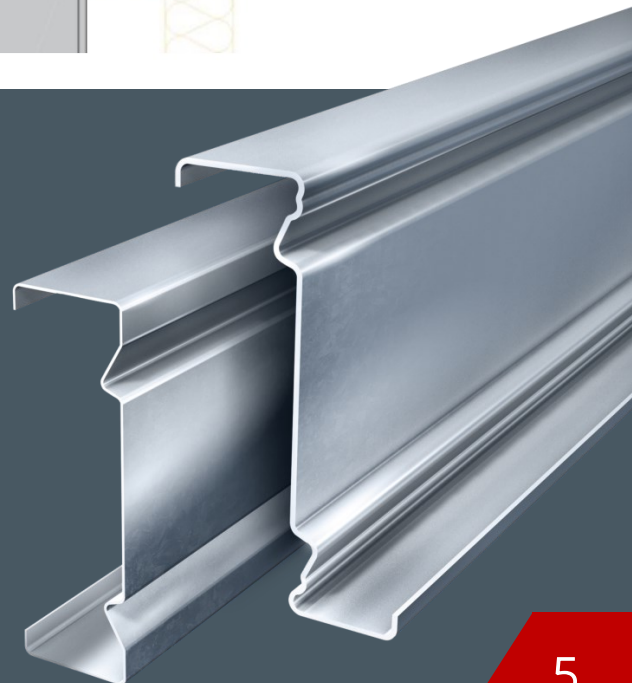
Fire Protected capable member

The capable member(s) shall be designed to resist the gravity loads applied by the through-wall self-weight (cladding and cold-formed systems). A typical capable member will be a hot-rolled steel element, where suitable fire protection for a discrete cold roll-formed eaves beam is considered impracticable. Whichever is specified, the designer must ensure that the member is suitably designed for the fire condition and that a compatible passive fire protection solution is available to achieve the required fire resistance for the selected profile and its connection to the primary frame.



Capable Members

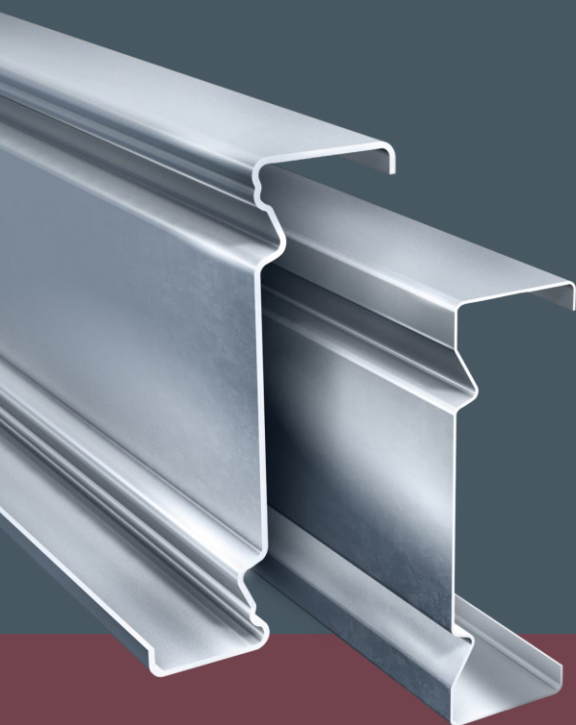
The capable member shall be positioned to provide suitable vertical support to the cladding system, whilst maintaining appropriate fixity for the surrounding elements of the wall and roof. An indicative arrangement is shown above.



Section 4: Detailing

Slotted Connections

Slotted connections shall not be used to connect Hadley rails to primary steelwork. Stability of the primary structure is critical. Where slotted connections have been used within the fire testing of specified cladding systems, the omission of these slotted connections shall be justified by others, and connections using standard clearance holes shall be used in the execution of the structure.



Note: intumescent paint is not considered suitable for fire protecting cold-formed sections.

Note: for capable members at parapet level, it may be possible to design the member based on external fire curve exposure.



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Version	Date	Prepared	App' HCT #1	App' HCT #2	Notes
1.0	06/08/2024	SH	SH	JS	Original
2.0	07/05/2025	SH	SH	JS	Update, inc. further guidance to Section 4