

Insulated Panels

Republic of Ireland

Technical Update: EU131

Addendum to *Kingspan Fire-Engineered Boundary Wall System - Technical Guidance for Supporting Horizontally-Laid Panels Using Counter-Rail Systems on Boundary Wall Elevations*

Tech-eXchange


Kingspan®

SUPPORTING HORIZONTALLY-LAID INSULATED PANELS USING COUNTER-RAIL (TOPHAT) SYSTEMS ON BOUNDARY WALL ELEVATIONS

DATE: DECEMBER 2025

This Technical Bulletin is an addendum to the *Kingspan Fire-Engineered Boundary Wall System - Technical Guidance*, describing an alternative engineered support arrangement for horizontally laid insulated wall panels on boundary fire walls where a counter-rail (Tophat) system is proposed. This method is not included within the core system guidance and must therefore be subject to project-specific engineering verification and approval by the design team.

Background & Context

The *Kingspan Fire-Engineered Boundary Wall System - Technical Guidance* provides guidance for the design of Kingspan insulated panel systems on boundary wall elevations. This guidance reflects current industry best practice and incorporates the requirements for a protected Capable Member at the head of the elevation, continuity of the fire load path through the cladding panels and secondary steelwork, and the principles set out in the BCSCA Technical Specification Boundary Elevations (February 2025).

For horizontally installed insulated wall panels, additional consideration is required to ensure that a continuous and verifiable vertical fire load path is maintained for the full height of the elevation. In some projects, a Tophat counter-rail system may be proposed as an engineered alternative method of support, utilising secondary steelwork to transfer panel loads to the Capable Member. As this method is not included within the standard Kingspan boundary wall system guidance, its use must be subject to project-specific structural and fire engineering assessment. This Technical Bulletin summarises the principles, limitations, and technical requirements associated with the Tophat counter-rail approach.

Responsibility for the design and verification of the secondary steelwork and fire load path rests with the party responsible for the secondary steelwork design and must be approved by the project design team.

System Description

The Tophat counter-rail system comprises horizontal secondary cladding rails fixed to the primary structure, with vertical Tophat-shaped steel profiles fixed to these rails to form continuous counter rails. Insulated wall panels are through-fixed to the vertical Tophats, allowing the panel self-weight and associated vertical loads to be transferred into the secondary steelwork.

In the fire condition, the vertical Tophat counter rails shall be designed to act in tension, supporting the full tributary vertical load from the horizontally laid panels and transferring this load to the protected Capable Member at the head of the elevation.

The Tophats shall be treated as continuous vertical tension members for the full height of the elevation.

Where Tophats are formed from multiple lengths, structural sleeve connections shall be provided and designed to maintain tensile continuity of the fire load path. All joints, sleeves, fixings, and connections forming part of the counter-rail system shall be designed to resist the applied tensile forces at elevated temperatures for the required period of fire resistance.

Discontinuous members, non-structural connections, or systems that do not provide a verifiable continuous tensile load path to the Capable Member shall not be used in boundary wall applications.

Responsibilities & Collaboration

The successful application of a Tophat counter-rail system on a boundary wall elevation relies on clear allocation of responsibilities and early collaboration between all parties involved in the design, specification, and installation of the wall system. As this method represents an engineered solution not covered within the standard Kingspan boundary wall system guidance, coordinated decision-making is essential to ensure that a continuous and verifiable fire load path is achieved. For more details see page 10, *Team Collaboration & Responsibilities*, of *Kingspan Fire-Engineered Boundary Wall System - Technical Guidance*.

The **Principal Designer** and / or Fire Engineer is responsible for confirming the overall fire strategy for the boundary wall, including the provision, specification, protection method, and limiting temperature of the Capable Member, and for ensuring that the proposed load path is consistent with the project fire strategy.

The **Contractor** is responsible for installing the counter-rail system and insulated panels in accordance with the approved design, including fixing type, spacing, alignment, and sequencing, to ensure that the intended fire load path is achieved in practice.

Kingspan Technical Services can provide guidance on panel properties, fixing arrangements, and fire performance data. Kingspan does not design, specify, or verify third-party secondary steelwork or its connections.

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Design Principles

Load Path in Fire Condition

In a fire event, where a Tophat counter-rail system is used, the fire load path shall be continuous and shall not rely on friction, nominal restraint, or non-engineered detailing. All elements forming part of the load path shall be capable of maintaining load transfer at elevated temperatures in accordance with EN 1993-1-2. Discontinuous members, unverified connections, or arrangements that do not provide a demonstrable vertical fire load path shall not be used in boundary wall applications. All fixings forming part of the system shall be considered part of the fire load path and shall be designed accordingly.

Primary Steel Member

The Capable Member shall be protected to achieve the specified fire resistance duration and shall be capable of supporting the full vertical load from the wall system, including the panel self-weight, in the fire condition. The limiting temperature of the Capable Member shall be defined as part of the structural fire design.

Load Path and Fixings

Panel spans, fixing capacities, and connection performance shall be verified by calculation for both the fire condition and the normal use (ambient) condition. Deflection limits and load redistribution effects shall be assessed to ensure that load transfer is maintained throughout the fire resistance period.

Limitations

- This method is only suitable for applications requiring up to 60 minutes fire resistance.
- The method is not suitable where vertical load paths cannot be verified by structural calculation.
- This method is not suitable where panel spans exceed tested or recommended limits for horizontal layouts.
- The size of the Tophat member may be governed by the fixing requirements of the panel to the Tophat, where increased surface area may be required to receive adequate fixings (for example, for QuadCore® AWP panel systems).
- Structural steel components shall be manufactured under a Factory Production Control (FPC) system in accordance with EN 1090.
- Fixing specifications at the Capable Member shall be maintained at splice and sleeve locations.
- Minimum and maximum edge distances for fixings shall be considered in the design specification.

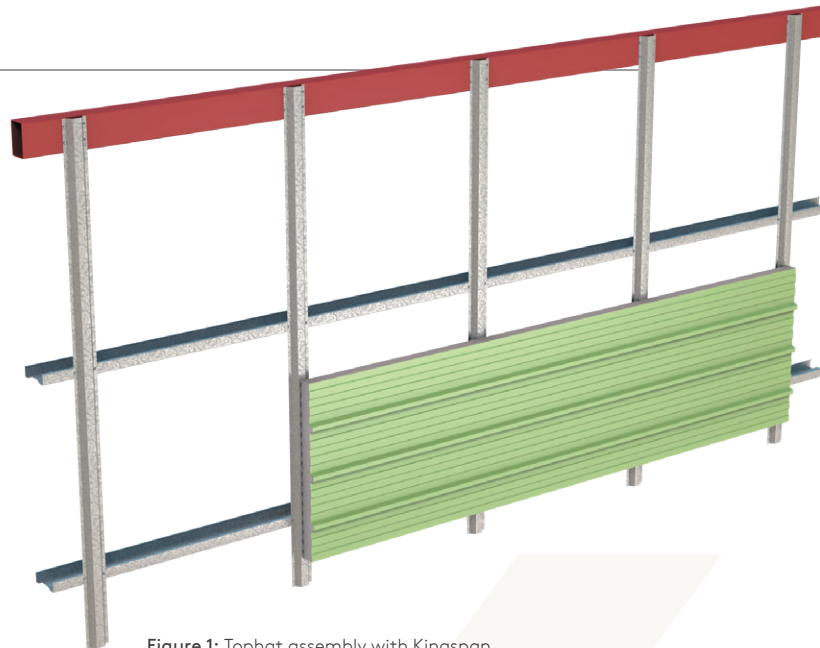


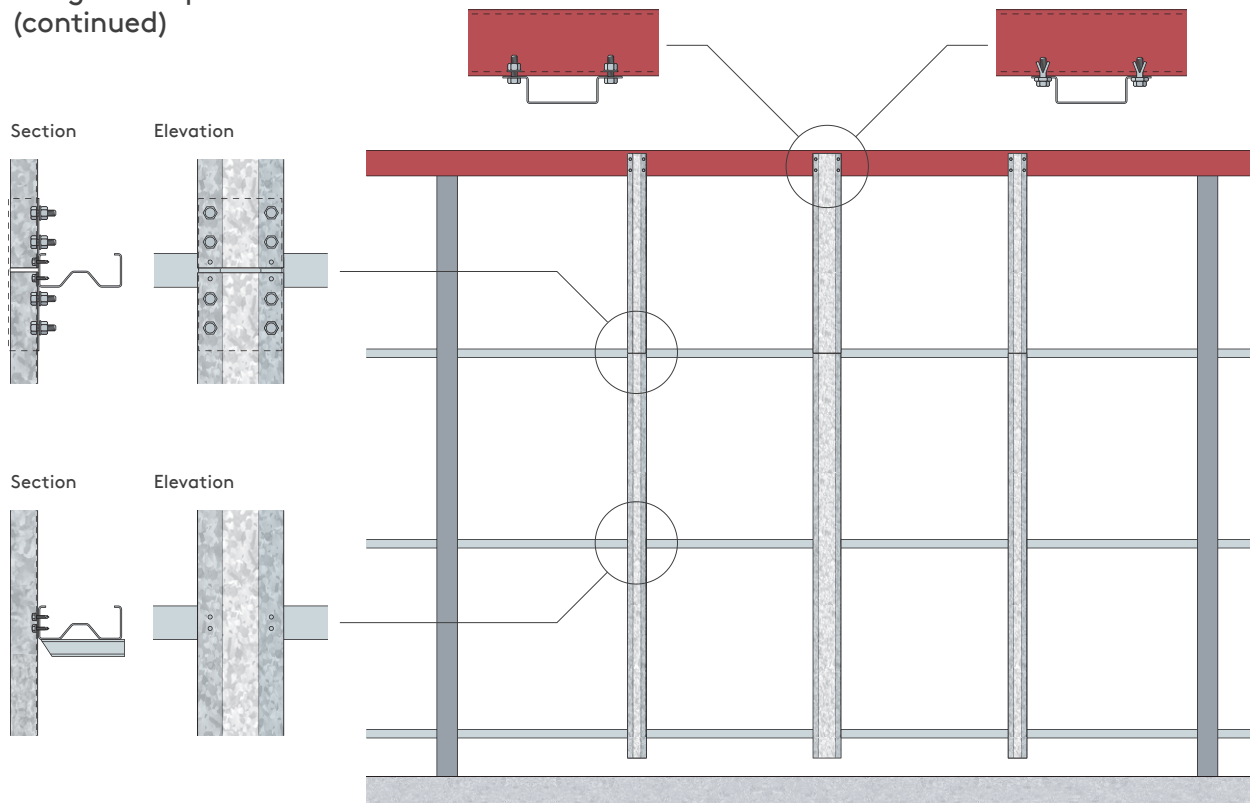
Figure 1: Tophat assembly with Kingspan QuadCore® KS1000RW Wall Panels.



Figure 2: Load path diagram with Kingspan QuadCore® AWP Wall Panels.

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Design Principles (continued)



Wall Height (m)	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0
Allowable Cladding Weight (kg/m ²) 2No. bolts per connection	19.28	16.07	13.77	12.05	10.71	9.64	8.76	–	–	–	–
Allowable Cladding Weight (kg/m ²) 4No. bolts per connection	45.79	34.34	27.47	22.89	19.62	17.17	15.26	13.74	12.49	11.45	10.57

Notes:

- 1 a) Assumed 60 minutes period of fire resistance.
b) Tophat and sleeve steel temperature equivalent to 945°C.

- 2 Centres of vertical tophat = 1.5 m c/c.

- 3 Tophat specifications:

Flange 1	50
Flange 2	50
Depth	50
Top face	95
Gauge	1.6
Steel grade	S450

- 4 Connection from to capable member: M12 8.8 grade bolts or M10 hollow-bolts.

- 5 Maximum number of sleeves = 3No.

- 6 All tophat joints to be connected with sleeves.

- a) All sleeves must be located directly over a cladding rail.
- b) Sleeves taken as same gauge, each 300 mm in length and same grade and gauge as tophat.
- c) All sleeves to be >2 m below the capable member.

- 7 Any connections between tophat and sleeve are assumed to use M12 8.8 grade bolts and self tapping screws are to tie the tophat, sleeve and horizontal rail together.

2No. bolts per connection

- a) 2 bolts from each tophat to sleeve and 2No. self tapping screws to tie the tophat into both sleeve and rail.
- b) Total number of bolts per sleeve = 4 and total number of screws per sleeve = 4.

4No. bolts per connection

- a) 4 bolts from each tophat to sleeve and 2No. self tapping screws to tie the tophat into both sleeve and rail.
- b) Total number of bolts per sleeve = 8 and total number of screws per sleeve = 4.

- 8 The design of the tophat rails should be based on the limiting requirement of:

- a) Fire scenario (see load tables).
- b) The normal use/ambient scenario, i.e. due to wind, thermal (non-fire) and dead loads.

For further guidance during the normal use / ambient scenario, please contact Kingspan Technical Services.

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