Revised May 2026

GD 42 Cladding Industry Guidance for 'Boundary' Elevations involving Capable Members

1.0 INTRODUCTION

The Metal Cladding and Roofing Manufacturers Association (MCRMA) have produced this guidance document to complement the information contained in the British Constructional Steelwork Association (BCSA) document Technical Specification for 'boundary' elevations. In addition, it includes supplementary guidance relating to section 6.2 Cladding Manufacturer of the BCSA document.

This document is intended to provide generic guidance on details for 'Boundary' elevations involving capable members in metal wall cladding systems. The guidance should be read in conjunction with each manufacturer's own instructions which must be followed together with their specifications for specific profiles and systems.

The British Constructional Steelwork Association (BCSA) has published "Technical Specification for "boundary" Elevations" [1], which was published following a series of discussions involving representatives from the steel frame and cladding industry. The document sets out the requirements for an engineered concept, where the fire-resistant wall cladding is hung from a protected structural support (capable member). It must be noted that other engineered solutions, which put fire safety at the forefront, may be considered following detailed evaluation by those at the design, supply and installation phases

The Technical Specification came into effect on 1 July 2025.

The BCSA document sets out the following requirements from cladding manufacturers:

1. The cladding manufacturer is responsible for the fire resistance of the cladding, tested in accordance with BS EN 1364-1 [2] or BS 476-22 [3].
2. Justification of the cladding hung from the capable member in a fire, including resistance of the fixings and any necessary load paths within the cladding in the fire limit state.
3. Specifying secondary steelwork support requirements in a fire condition when cladding is installed horizontally.

In response to the release of the Technical Specification by BCSA [1], the MCRMA has produced this Guidance Document to help interpret and implement the BCSA's principles within real-world cladding systems. The guidance aims to:

- Clarify the expectations placed on cladding manufacturers and their role in the justification process.
- Provide practical insight into how cladding systems interact with capable members and other steelwork elements.
- Assist contractors in planning and coordinating boundary solutions in line with the BCSA model.

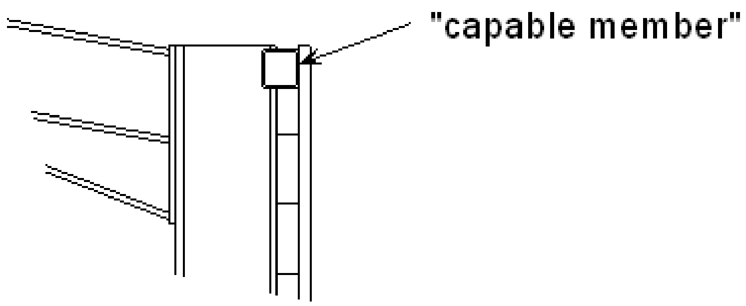
This Guidance Document seeks to promote better coordination, earlier design integration, and a shared understanding of responsibilities.

2.0 BCSA DOCUMENT OVERVIEW

The BCSA technical specification for boundary walls [1] sets out the requirements for an engineered concept, where the fire-resistant external wall cladding is hung from a "capable member".

A "capable member" typically refers to a hot-rolled, intumescent coated structural beam designed to carry the load from the hung cladding and transfer the load to the main frame.

- The capable member should be designed at elevated temperatures based on the level of protection provided to it.
- The capable member is envisaged to be at the top of a cladding system "drop", or lengths of cladding sheets/panels, calculated with connections.
- Additional, intermediate capable members may be required in tall elevations, or when cladding arrangements require them, such as interfaces between different cladding systems or vertical/horizontal installations. Note: this should be confirmed by the cladding manufacturer.



No reliance is placed on the unprotected secondary steelwork, there is no allowance for venting and the internal space is considered as a compartment with a typical required resistance period of 60 minutes and the temperature of the standard fire (specified in BS EN 1991-1-2 [4]) of 945°C.

It is not envisaged that alternative testing be completed to demonstrate the fire resistance of the cladding. Instead, it is envisaged that engineering justification is used to demonstrate that the cladding and connections have sufficient strength in the fire condition to remain supported, top hung and in tension. No load should be assumed to transfer to the base of the cladding due to the effects of thermal expansion and the near zero axial compressive buckling capacity of the sheeting at elevated temperatures.

3.0 STEELWORK PROCUREMENT

Traditionally, the steelwork has been designed and procured as a separate element to the cladding. It may be supplied as a package or under separate contracts for primary and secondary steelwork (side rails and purlins, also includes cleats, sleeves, braces, etc).

As the basis of the BCSA guidance is that cladding should hang from a capable member, the use of cleader rails is no longer viable. These should be replaced with properly designed capable members at the locations such as at gable ends or raking details.

The steelwork has historically been designed some time before the cladding system being applied to it has been considered in detail.

Depending on the cladding system chosen, additional side rails or roof purlins may have been advised in some higher loading zones, but this was relatively easy to consider at later design stages.

However, implementation of a boundary solution following the BCSA guidance requires earlier coordination, since alternative solutions place responsibilities on different parties and the specific cladding system chosen may impact the number or position of the capable member(s).

The BCSA guidance envisaged that this coordination would be by the Principal Designer based on two scenarios of steelwork package design and supply. These scenarios primarily focused on the responsibilities for the design of the main frame, capable members, their means of protection and noted limited input required from the cladding manufacturer.

The two scenarios for the steelwork package note that the cladding manufacturer is responsible for providing the system weight to the steelwork supplier (or secondary steelwork supplier), during the steelwork design. This allows the correct section to be selected based on the capacity of the capable member at elevated temperature.

A short additional section notes the responsibilities of the cladding manufacturer, stating that, in addition to providing the cladding system weight, the cladding system manufacturer (or party responsible for the cladding design) are typically responsible for:

- The fire resistance of the cladding, tested in accordance with BS EN 1364-1 [2] or BS 476-22 [3].
- The justification of the cladding hung as a vertical load from the capable member in a fire, including the resistance of the fixings and any necessary load paths within the cladding in the fire limit state.
- The specification of secondary steelwork support requirements in the fire condition when cladding is installed horizontally.

The cladding manufacturer or a designated engineer should provide justification for all of these points, as per the BCSA Technical Specification.

However, when relating this to the project specific requirements, this may result in differing limitations for different systems.

Requirements for each particular cladding system may already vary for boundary walls but critically, this may also now relate to the position and/or number of capable members required for the system concerned, based on the justification and project details.

The steel thickness of the capable member must also be known for the correct selection of fixings and their inclusion in justification and pricing.

Drawings for the proposed steelwork for each of the elevations concerned should be provided by the steelwork designer in a timely manner to allow clear collaboration and confirmation by the cladding manufacturer and cladding contractor. Additional drawings and information regarding the cladding proposed, protected areas and fire resistance requirements for the elevations will also be required.

Therefore, early coordination with the cladding manufacturer and cladding subcontractors is critical, as the cladding contractor will need to be aware of such elements in order to correctly price and install the system(s) concerned. In addition, cladding contractors may need to have input regarding the preferred length of cladding system elements for site handling purposes, achievement of design features such as colour bands or to allow effective building sequencing.

4.0 TYPICAL JUSTIFICATION CONSIDERATIONS

The maximum "drop" length of cladding system or composite panel from a single capable member should be justified.

Reduction factors should be applied to cladding connections and considered under two distinct categories:

1. Shear or Tensile Failures of Carbon Steel Fasteners:

   The reduction factor $k_{b,\theta}$ should be applied, as specified in Table 3.1 of the Non-Contradictory Complementary Information (NCCI) PN004a-GB: Strength of bolts and welds in fire situations [5].

2. Shear or Tensile Failures of Stainless Steel Fasteners:

   The reduction factor $k_{u,\theta}$ should be applied, as specified in Table C.1 of BS EN 1993-1-2:2025 [6]

3. Bearing, Pull-out or Pull-through of the fixing within the connecting material:

   The appropriate reduction factor should be applied, using $k_{y,\theta}$ from Table 3.1 BS EN 1993-1-2:2005 for hot-rolled elements or $k_{p0.2,\theta}$ from Table E.1 BS EN 1993-1-2:2005 for cold-formed elements. [7].

While the second category typically governs under ambient conditions, it is important to also assess the first category at elevated temperatures, as the $k_{b,\theta}$ reduction factor is more severe with increasing temperature.

Liner end laps or joints connecting sheets or panels which are not at the position of a protected member are fully exposed to the fire and therefore have greatly reduced strength. They must be considered in all justifications from the cladding manufacturer. The resistance of these connections and their fasteners may be justified using the references above.

The reduced tensile strength of steel faces and any bracketry should also be assessed using Equation 4.3 (BS EN 1993-1-2:2005), using $k_{y,\theta}$ from Table 3.1 for hot-rolled elements or $k_{p0.2,\theta}$ from Table E.1 for cold-formed elements (BS EN 1993-1-2:2005). [7]

The temperature at the connections with the capable member should be based on the critical temperature of the capable member (provided by the party responsible for the design of the capable member).

Unless specifically designed by the secondary steelwork supplier for the fire limit state it may be assumed that there is no strength in the exposed side rails connections.

The following limitations on sheet/panel lengths should also be considered in parallel with the above:

- Maximum sheet/panel lengths that can be manufactured.
- Additional transport charges for long sheets/panels.
- Handling limitations of sheets/panels, especially when near a boundary.
- Alignment with other building elements (side rail centres, windows, doors, feature bands, etc.).

5.0 TYPICAL ASSUMPTIONS/EXCLUSIONS THAT MAY APPLY

Periods of fire resistance should be requested on every project. However, often 60 minutes Integrity (E) and 15 minutes Insulation (I) is used, with fire resistance from inside to out.

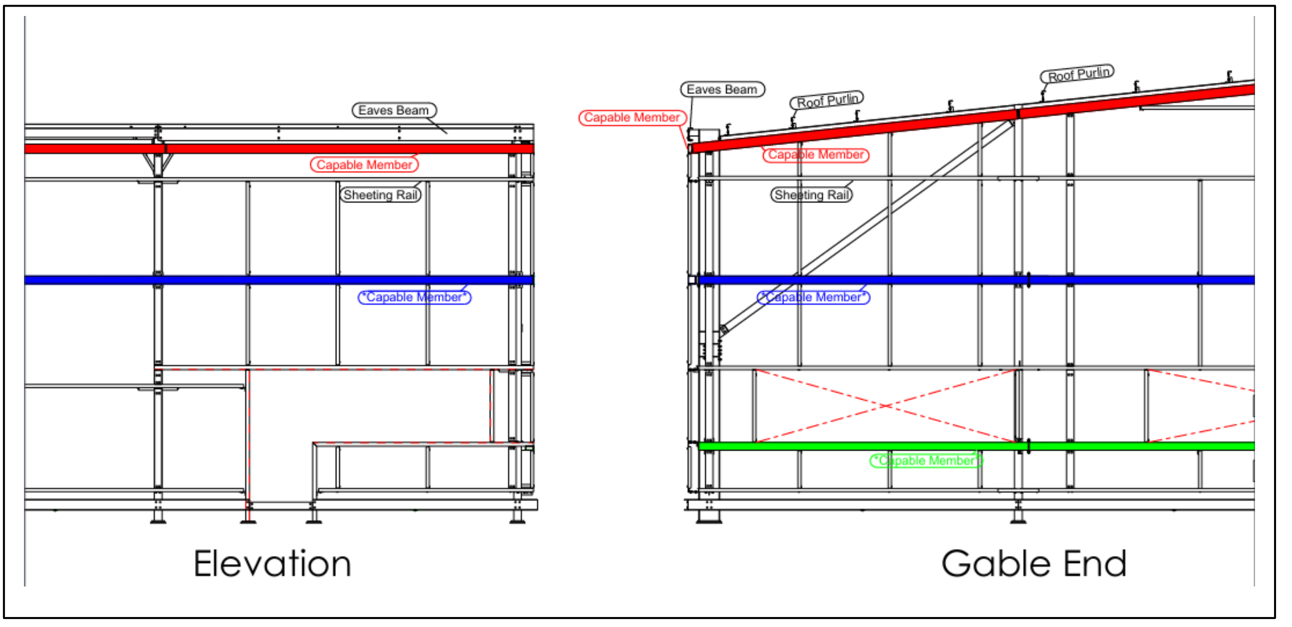
All justifications for the fire resistance of the cladding and capable member should be comparable with the fire resistance period required for the project. This is typically dictated by the Integrity (E) which often represents the most onerous resistance period.

Capable members should be specified by the steelwork contractor in accordance with BCSA requirements. The limiting temperature of the capable member(s) i.e. the temperature the capable member reaches at the required period of fire resistance, should be provided to the cladding manufacturers for their justifications. Care should be taken as the limiting temperature for the capable member may vary per project and per capable member.

The system weight as carried by the capable member is based on the cladding system specification and does not consider any additional loads such as signage or lighting, etc.

Where vertical and horizontal systems interface within the height of the elevation or there is a feature detail required, a capable member may be required, or a more detailed approach may be considered to the detailing to achieve the required connection. Detailed justification should be provided if additional capable members are not utilised.

Care and consideration should be given to parapets and gable ends. Always check with the steelwork supplier that the design is capable of supporting the cladding from the top of the parapet and/or gable end



*Additional Capable member(s) requirement based on loading requirements and cladding arrangements

NOTE Guidance on the level of passive protection and detailing is not covered in this guidance and should be requested from the passive fire protection specialist/manufacturer.

6.0 TYPICAL JUSTIFICATIONS FOR BUILT-UP SYSTEMS

The inner/liner skin of the cladding system and its fixings should typically be considered separately to the rest of the system due to its direct connection to capable member and exposure to greater temperature at unprotected side rails.

Liner end laps connecting sheets which are not at the position of a protected member are fully exposed to the fire and therefore have reduced strength (refer to reduction factors according to Section 4).

The design of the spacer system brackets and connections to the capable member(s) should also be designed for the elevated temperature.

Evaluation of the connection of the reduced temperature sheet to the spacer bar for twin skin cladding assemblies is also required. The evaluation should consider the outer sheet, spacer bar and bracket connections and assembly. The total load of this assembly will be carried via the connections at the spacer bar, through the brackets and into the capable member. The support and weight of the insulation should also be taken into consideration where applicable.

In the case of horizontally laid outer sheet, the connections between reduced temperature vertical spacer bars should additionally be evaluated and engineered to carry the load back to the capable member.

7.0 TYPICAL JUSTIFICATIONS FOR COMPOSITE PANEL SYSTEMS

For vertical panels:

- The weight of inner/liner skin of the panel and its fixings (refer to reduction factors according in Section 4) shear, bearing and tensile resistance should be considered separately to the rest of the panel system due to its typically thinner steel thickness and exposure to greater temperature.
- Liner skin end connections should be carefully considered panel joints which are not at the position of a protected member are fully exposed to the fire and therefore have reduced strength.
- The reduced temperature outer skin and insulation weight will typically be considered together and to be carried by the fixing connection to the capable member(s).

For horizonal panels:

- Vertical secondary steelwork will typically be required to provide the load path to the capable member between main frame elements.
- The weight of the inner/liner skin of the panel and its fixings (refer to reduction factors in Section 4) shear and bearing resistance should be considered separately to the rest of the panel system.
- The reduced temperature outer skin and insulation weight will be considered together and to be carried by the fixing connection to the vertical secondary steel to the capable member(s).
- Unless the vertical steel is reduced temperature, the fixings shall be designed at the full compartment temperature.

REFERENCES

[1] The British Construction Steelwork Associations Ltd, “Technical Specification for "boundary" elevations,” The British Construction Steelwork Associations Ltd, London, 2025.

[2] British Standards Institution, “BS EN 1364-1:2015 Fire resistance tests for non-loadbearing elements. Walls,” British Standards Institution, London, 2015.

[3] British Standards Institution, “BS 476-22:1987 Fire tests on building materials and structures. Methods for determination of the fire resistance of non-loadbearing elements of construction,” British Standards Institution, London, 1987.

[4] British Standards Institution, “BS EN 1991-1-2:2024 Eurocode 1 - Actions on structures - Part 1-2: Actions on structures exposed to fire,” British Standards Institution, London, 2024.

[5] The Steel Construction Institute, “NCCI: Strength of bolts and welds in fire situations - PN004a-GB,” The Steel Construction Institute, Bracknell, 2012.

[6] British Standards Institution, “BS EN 1993-1-2:2025 Eurocode 3 - Design of steel structures - Part 1-2: Structural fire design,” British Standards Institution, London, 2025.

[7] British Standards Institution, “BS EN 1993-1-2:2005 Eurocode 3: Design of steel structures - Part 1-2: General rules - Structural fire design,” British Standards Institution, London, 2005.

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Tel: 01633 895633 info@mcrma.co.uk www.mcrma.co.uk