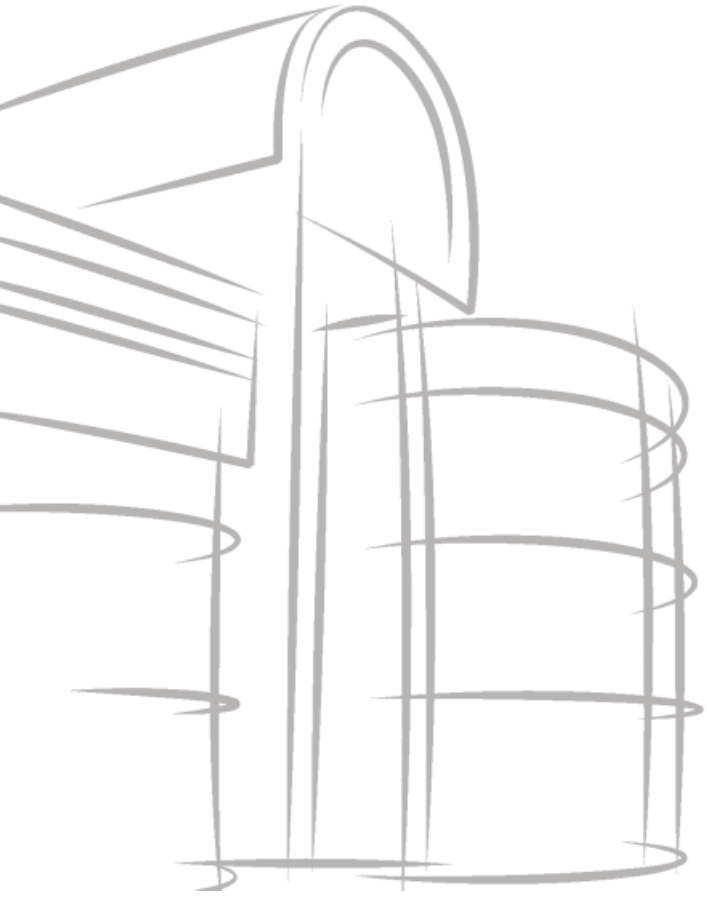
CI/SfB (41) Nh2

March 2014

boothmuirie

Architectural Cladding Systems



A EUROCLAD COMPANY

design quality innovation technology


boothmuirie
Architectural Cladding Systems

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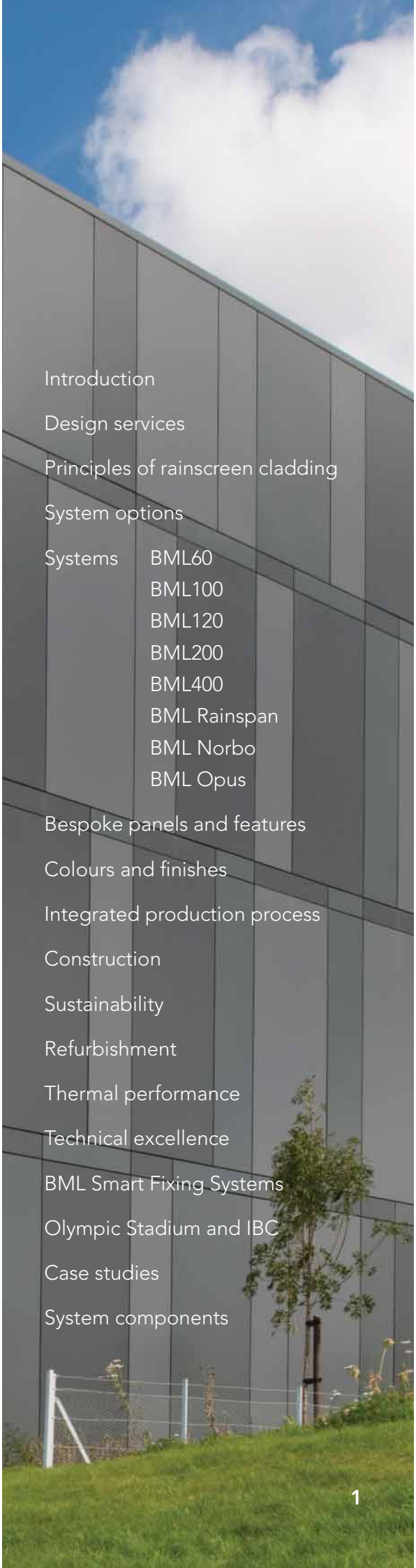
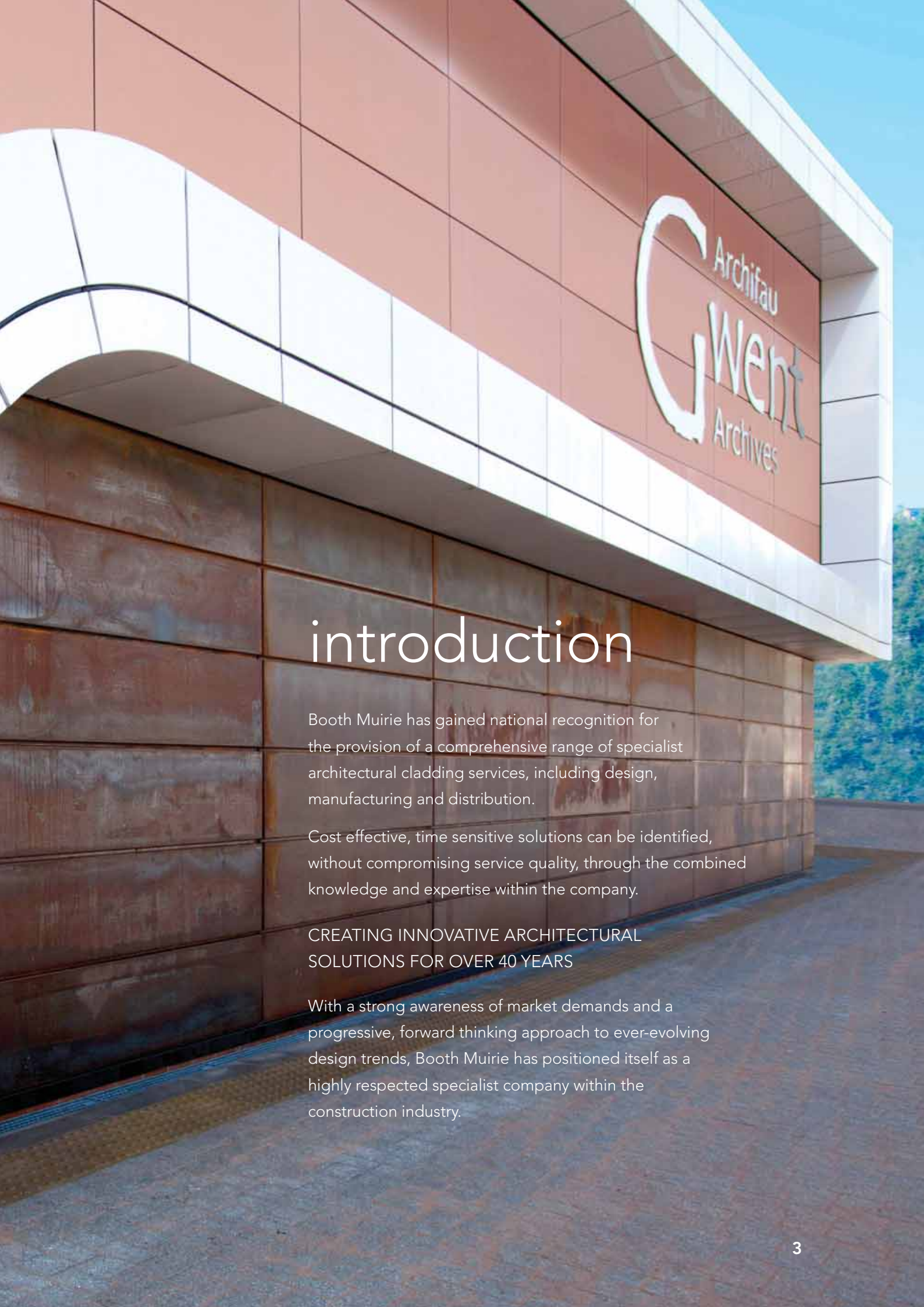


Image by Paul Zanre Photography.



introduction

Booth Muirie has gained national recognition for the provision of a comprehensive range of specialist architectural cladding services, including design, manufacturing and distribution.

Cost effective, time sensitive solutions can be identified, without compromising service quality, through the combined knowledge and expertise within the company.

CREATING INNOVATIVE ARCHITECTURAL SOLUTIONS FOR OVER 40 YEARS

With a strong awareness of market demands and a progressive, forward thinking approach to ever-evolving design trends, Booth Muirie has positioned itself as a highly respected specialist company within the construction industry.

design services

Booth Muirie has a reputation for providing raincreen cladding solutions for a comprehensive range of projects and has an exceptional architectural portfolio. Modern CAD software is utilised by a highly skilled design team to offer customers a range of drawing services. The design and manufacture of ventilated rainscreen façades, using advanced aluminium composite material (ACM) products such as ALUCOBOND® and ALPOLIC®/fr is at the heart of what Booth Muirie is all about.

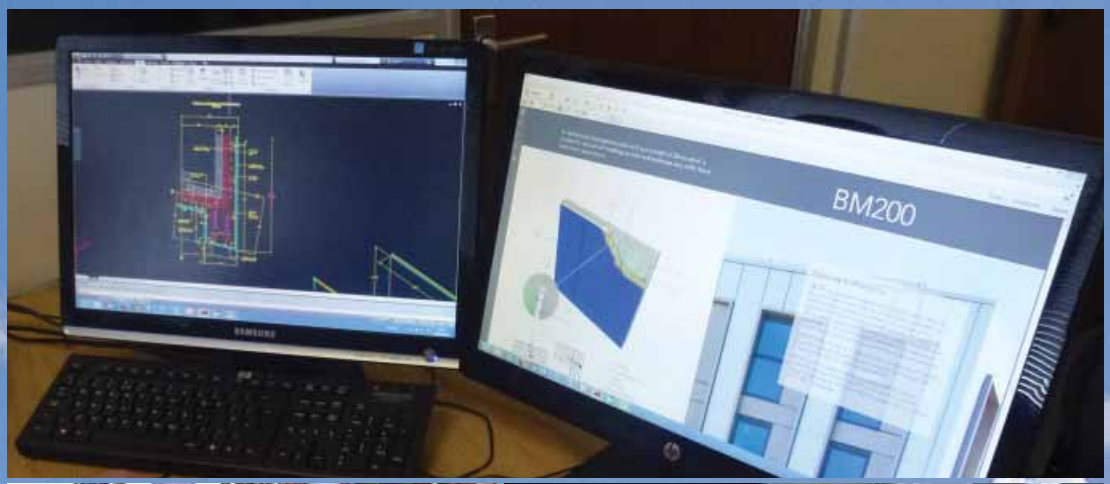
The Architectural Design Team use modern CAD software to produce creative solutions. Technically innovative cladding systems made from aluminium, coated steel, copper, zinc and stainless steel have been used on a number of prestigious projects.

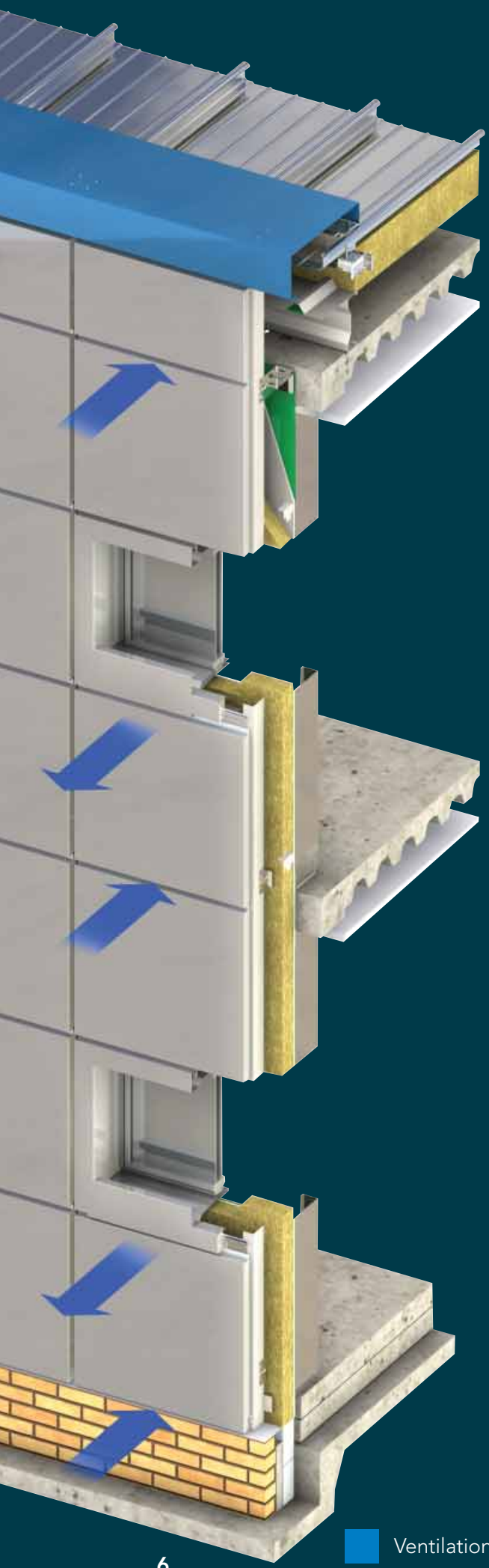
DESIGN TEAM

A Project Designer from the in-house Architectural Design Team is appointed to work closely with customers to ensure effective communication and project management. The team has worked on a comprehensive range of architectural projects, using modern CAD software to offer customers a variety of drawing services.

TECHNICAL SUPPORT

Full technical support is available on all aspects of service and products. Materials are fully compliant and tested to the relevant industry standard and manufacturing processes are certified ISO 9001.





Ventilation

Rainscreen is a cladding applied either during primary construction or as an over cladding to an existing structure. Rainscreen cladding consists of an outer weather-resistant decorative skin fixed to an underlying structure by means of a supporting grid, which maintains a ventilated and drained cavity between the façade and the structure.

Booth Muirie uses a range of metal and metal composite materials (MCM) to manufacture rainscreen cladding systems. MCMs consist of two thin skins of aluminum or other metals such as copper, zinc and stainless steel continuously bonded under tension to either side of a thermoplastic or mineral core.

Rainscreen façades are not normally sealed and a ventilation cavity of at least 25mm is allowed immediately behind the cladding panel. Insulation can be positioned within the cavity whilst openings at the top and bottom of clad areas allow for evaporation of moisture vapour and ventilation/drainage.

A ventilated rainscreen incorporating insulation will allow the building fabric to breathe without the risk of interstitial condensation or structural decay. External wall insulation used in this way is superior in performance as it eliminates the condensation risks associated with internal or cavity wall insulation. This is particularly important for refurbishment schemes. In new construction the use of back ventilated rainscreen cladding provides the designer with the opportunity to use economical single skin load bearing block work for infill walls.

principles of rainscreen cladding

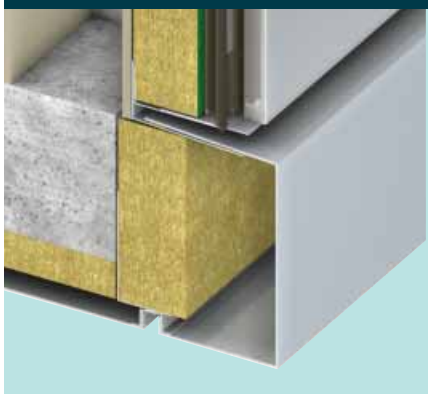
The need for complicated damp proof membrane detailing is eliminated and there will be less risk of cold bridging. The air gap provides ventilation and depending on the design of the rainscreen, in conjunction with ventilated panel joints, it may also assist in providing pressure equalisation across the outer skin.

Fully pressurised and compartmentalised (zoned) systems control airflow locally and are usually used on high performance, multi-storey developments. Where lower performance is required, for example in low rise structures, then a similar cassette panel system, although not fully pressure equalised, performs well.

The pressure equalisation concept is simple: when outside air pressure is transferred to an air space behind the exterior cladding, the air gap compartments must be small enough, the air barrier system must be airtight enough and the area of the venting through the rainscreen must be large enough to allow sufficient air to move in and out of the compartments under the applied air pressure. The strategy relies on the control of airflow within and through the wall assembly.

In theory, pressure equalisation means a zero air pressure differential at all times across the rainscreen, resulting in a complete elimination of the driving force for pressure-induced water penetration.

1. Panel to soffit transition.

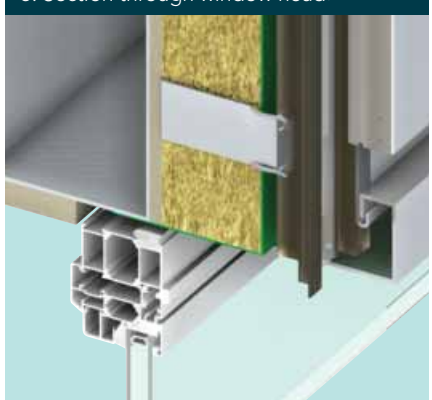


2. Curtain wall interface.

3. Section through cill.

4. Section through vertical joint.

5. Section through window head.



6. Section through corner panel.

MATERIALS

Booth Muirie offers a wide range of metals and MCMs including mill finish zinc, copper, stainless steel and Corten steel as well as painted steel, aluminium and ACM. ACM is the most popular material for rainscreens.

SUBSTRUCTURES

Booth Muirie systems are suitable for use with steel, concrete, brick, block or timber substructures. The new BML Rainspan system combines the performance of the Rainspan composite panel as a structural wall with the aesthetics of a Booth Muirie rainscreen fixed over it.

PANEL TYPES

A range of panel types is available incorporating standardised Booth Muirie systems as well as bespoke solutions. Curved and non-standard panels can be produced, offering design flexibility.

system options

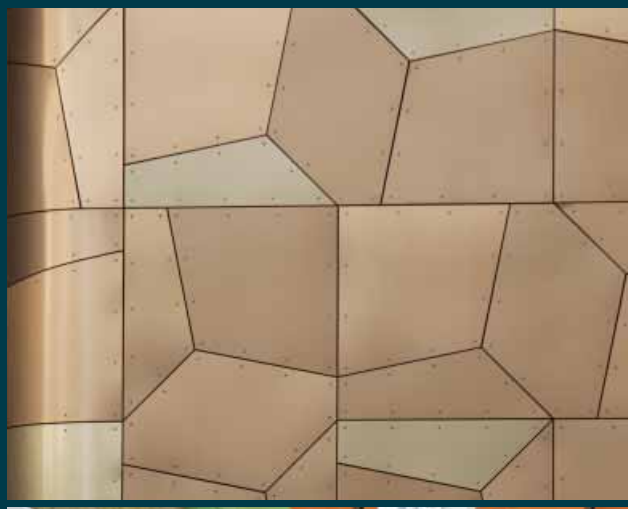
ORIENTATION

Panels can be laid horizontally, vertically, as stepped panels or even as irregular diagonals, to suit specific design requirements.

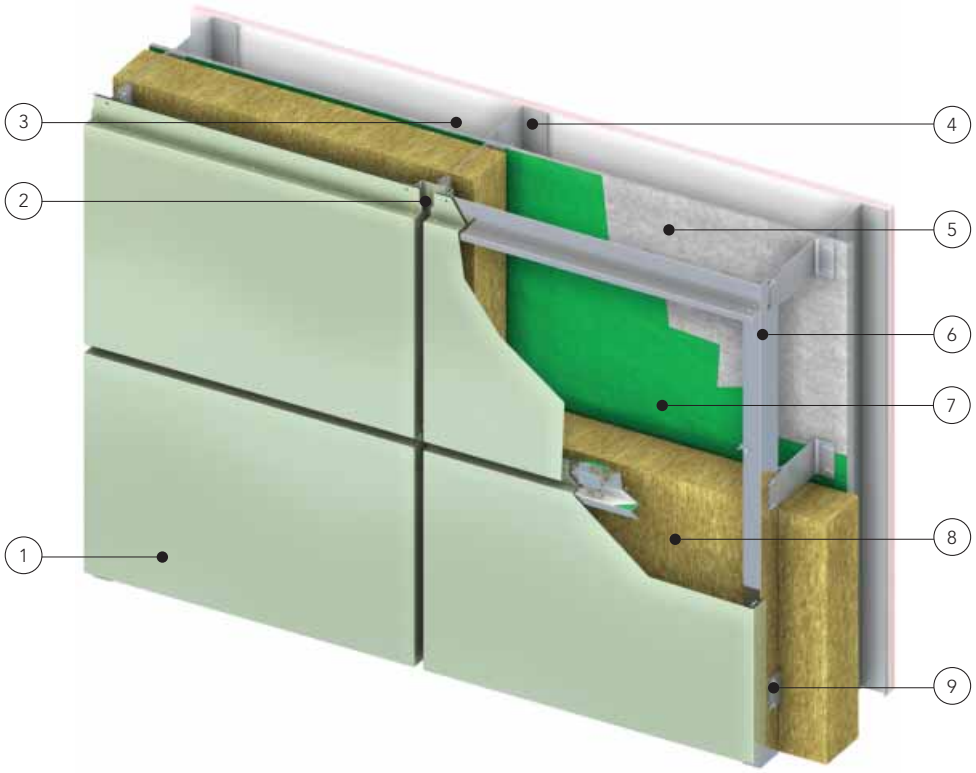
THERMAL PERFORMANCE

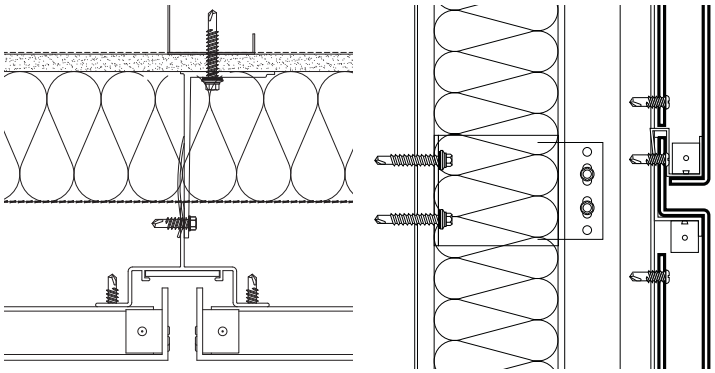
As part of Building Regulations (Part L) there are standard requirements that must be met when considering the thermal performance of a building. For non-dwelling constructions the backstop thermal performance for a wall, designated as a U-value, is 0.35W/m^2K, with notional values of 0.28W/m^2K.

A rainscreen system does not necessarily dictate the thermal performance of a wall, especially if it is used as a purely visual façade. However, where thermal performance is required Booth Muirie systems can deliver the performance specified.



An open joint rainscreen system with variable joint widths which can be used for vertical wall cladding, landscape axis and fascia applications.





Horizontal section.

Vertical section.

1. BML60 panel.
2. ECF008 vertical rail with infill.
3. 2 layers of 12.5mm plasterboard.
4. Vertical studs at maximum 1m centres.
5. 12mm cement particle board.
6. 70 x 40 angle carrier rail.
7. Water proofing layer.
8. 90mm rigid insulation board.
9. 120mm steel stud single bracket.

BML60

FEATURES AND BENEFITS

The BML60 rainscreen system enables a fast, trouble-free installation and fast-track installation which is critical to the successful completion of projects within agreed timescales.

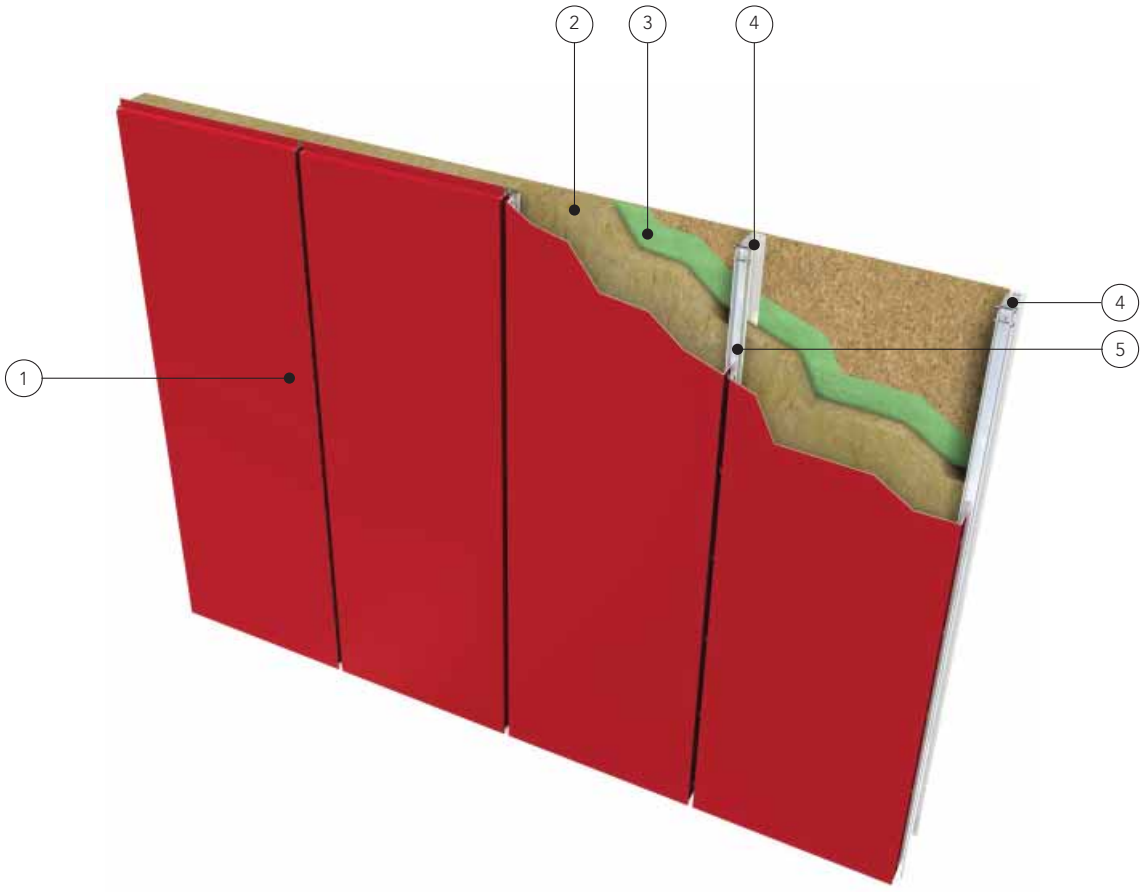
Support systems and accessories are available as part of the system, which simplifies the specification, procurement and installation of the rainscreen façade, whilst ensuring the compatibility of all components.

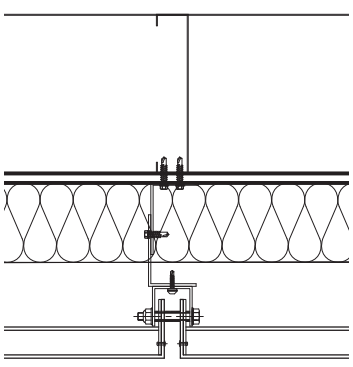
BML60 is best used for landscape style facades, consisting of panels less than 600mm high and featuring a double return; eliminating the need for panel stiffeners along its edges and providing the potential to be a very cost effective system.

It also means that the horizontal joint is the same colour as the panel. All panels can be independently removed and replaced with minimum disruption. BML60 is an open, rear-vented system but can also be installed as a sealed system by using black EPDM infill gaskets.

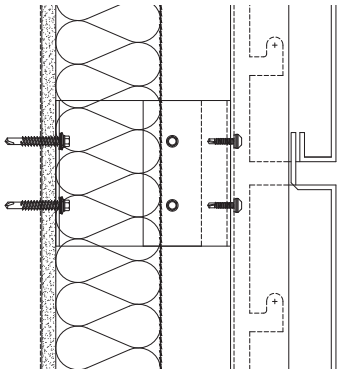
Wind load calculations can be provided with BML60 to ensure all design requirements are met. The system has been awarded certification by the Taylor Woodrow Test Centre and was tested as an integral part of a through wall solution under CWCT guidelines.

A hook-on, open joint rainscreen system with variable joint widths which can be used for vertical wall cladding, portrait axis and fascia applications.





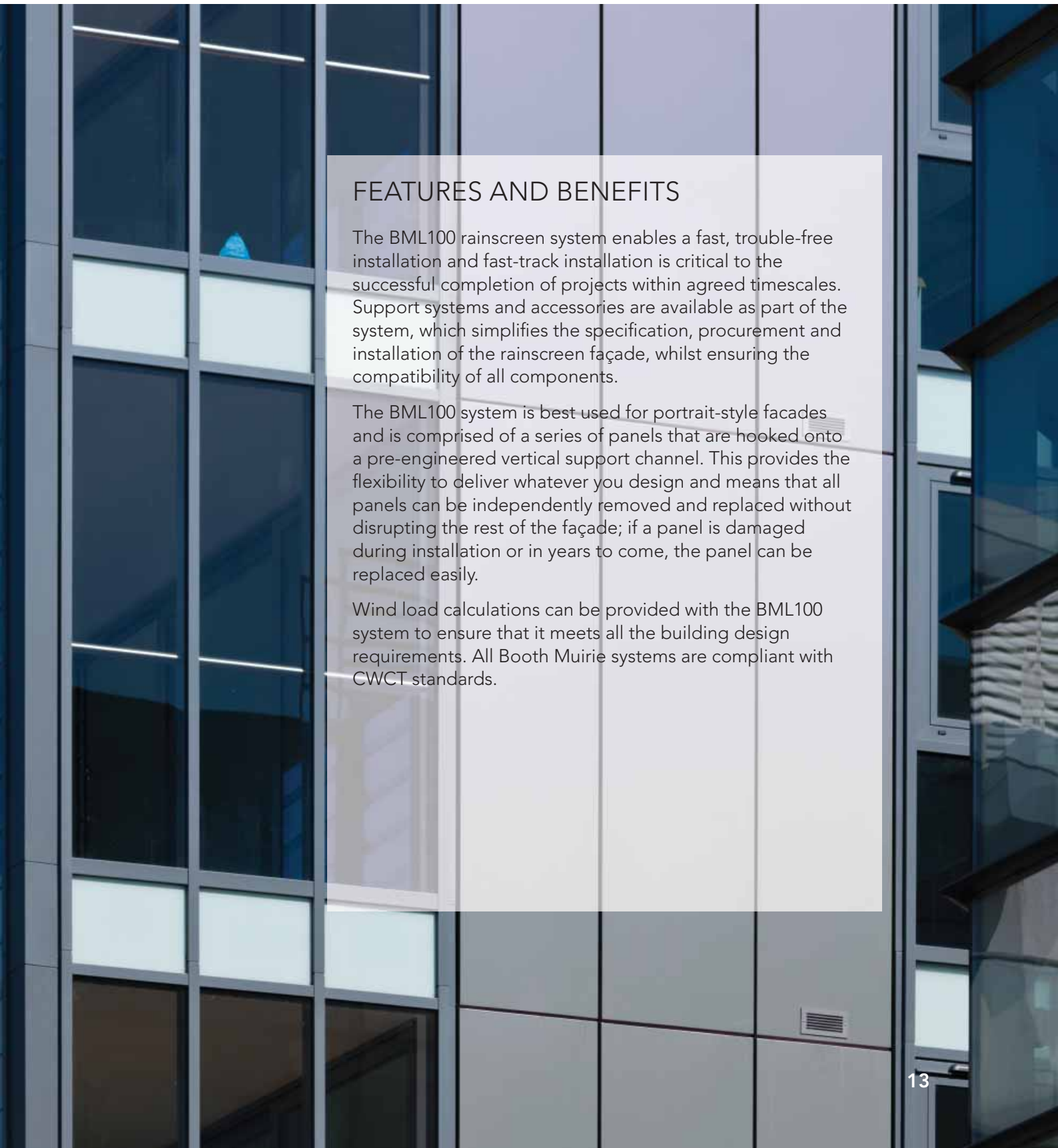
Horizontal section.



Vertical section.

1. ACM panel.
2. Insulation.
3. Breather membrane.
4. Support bracket.
5. Aluminium channel rail.

BML100



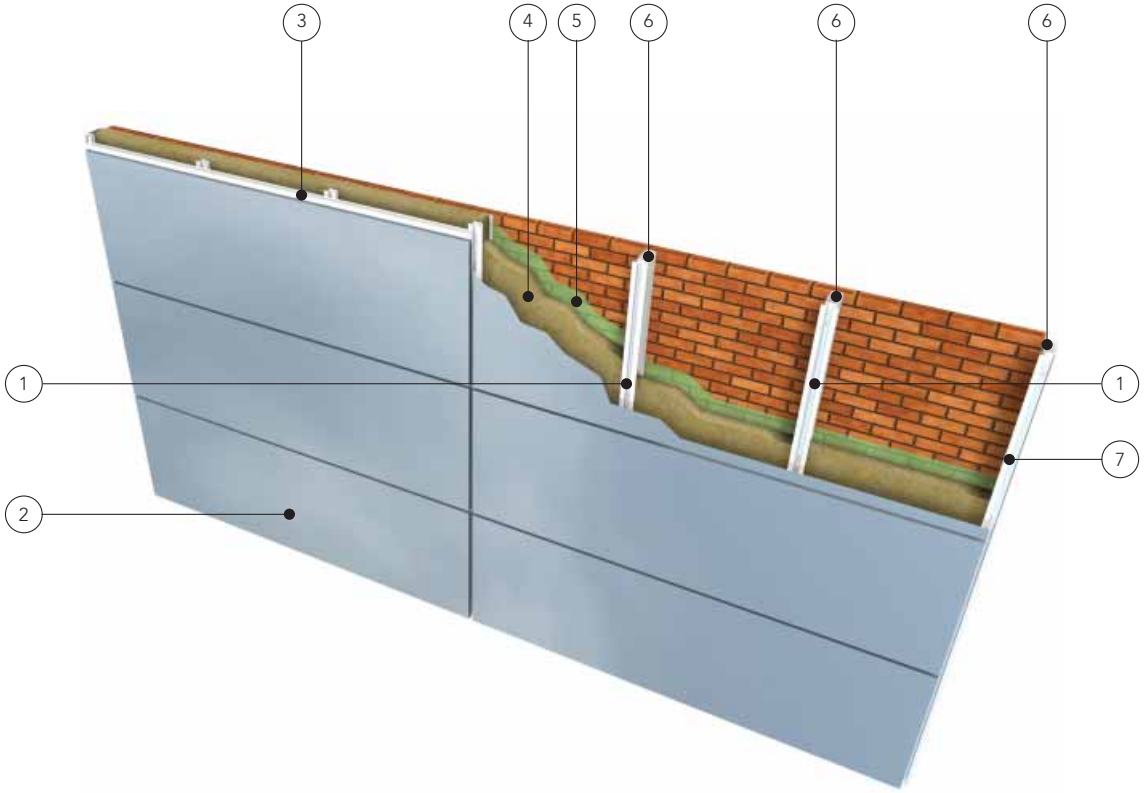
FEATURES AND BENEFITS

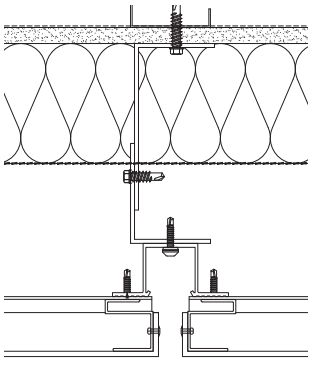
The BML100 rainscreen system enables a fast, trouble-free installation and fast-track installation is critical to the successful completion of projects within agreed timescales. Support systems and accessories are available as part of the system, which simplifies the specification, procurement and installation of the rainscreen façade, whilst ensuring the compatibility of all components.

The BML100 system is best used for portrait-style facades and is comprised of a series of panels that are hooked onto a pre-engineered vertical support channel. This provides the flexibility to deliver whatever you design and means that all panels can be independently removed and replaced without disrupting the rest of the façade; if a panel is damaged during installation or in years to come, the panel can be replaced easily.

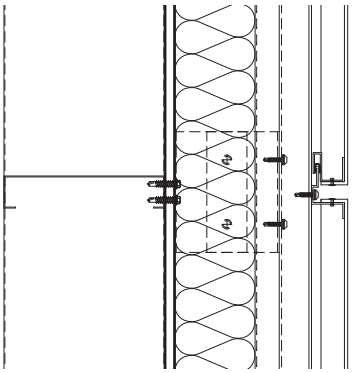
Wind load calculations can be provided with the BML100 system to ensure that it meets all the building design requirements. All Booth Muirie systems are compliant with CWCT standards.

A mechanically-fixed open joint rainscreen system with a standard 18mm horizontal joint width which is suitable for vertical wall cladding, landscape axis and soffit applications.





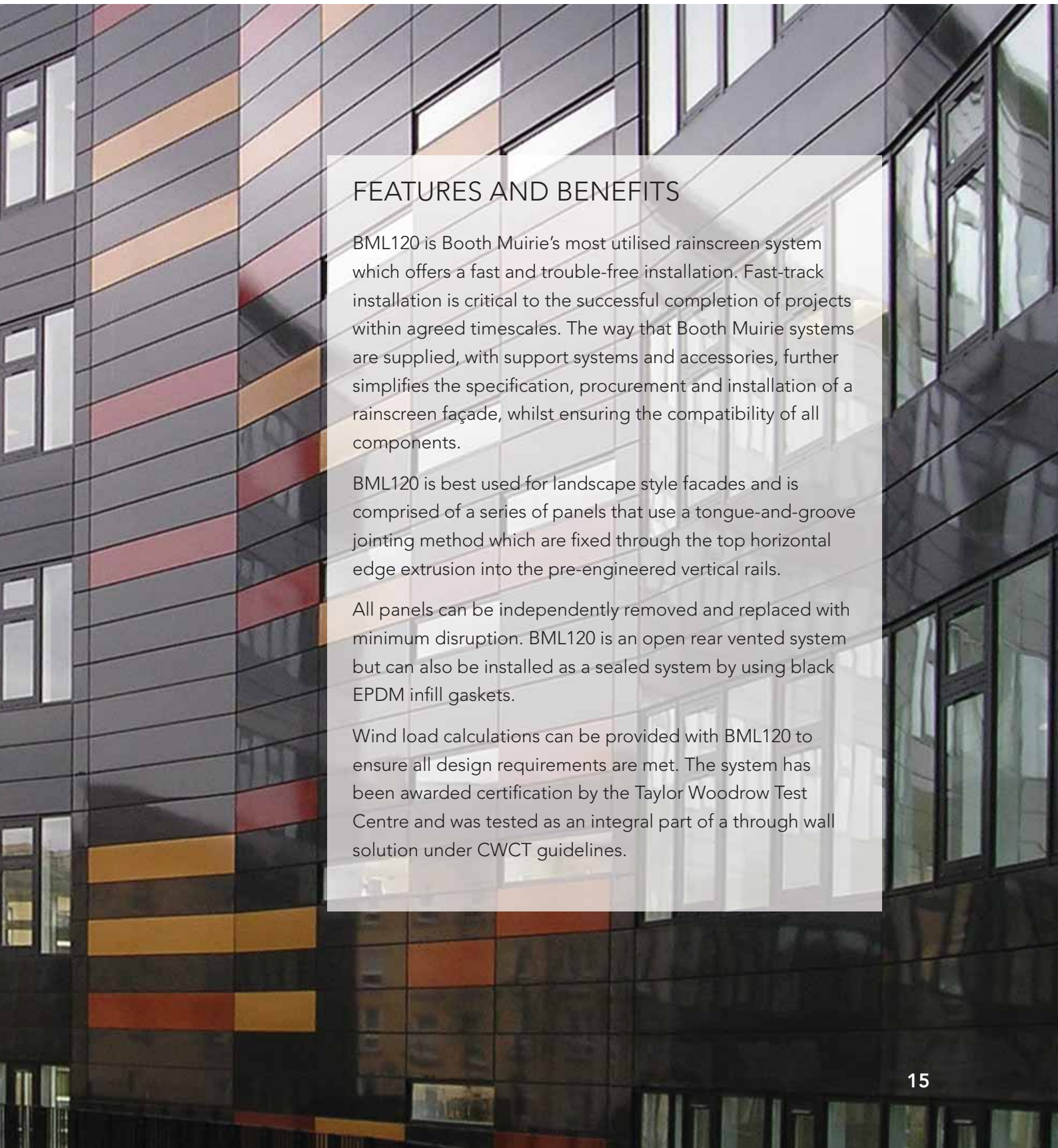
Horizontal section.



Vertical section.

1. Intermediate top hat.
2. ACM panel.
3. Horizontal aluminium extrusion.
4. Insulation.
5. Breather membrane.
6. Support bracket.
7. Aluminium top hat.

BML120



FEATURES AND BENEFITS

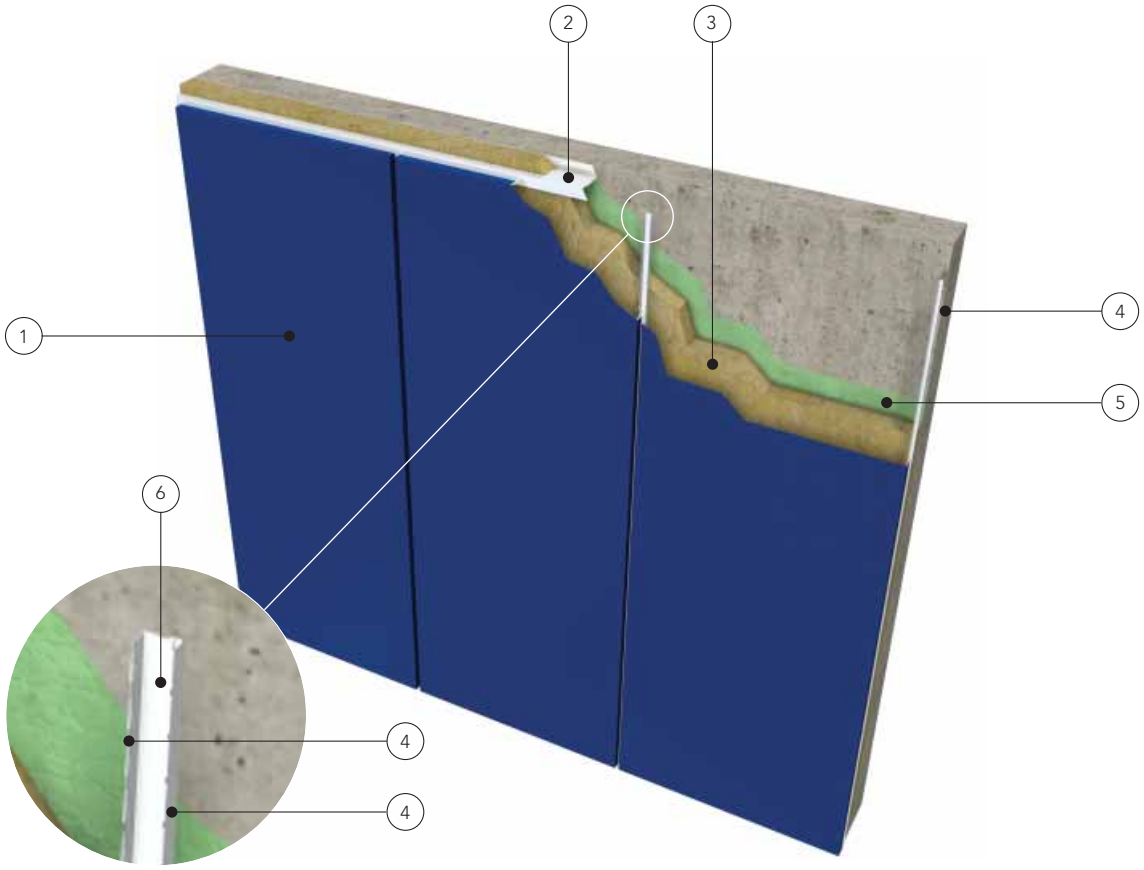
BML120 is Booth Muirie's most utilised rainscreen system which offers a fast and trouble-free installation. Fast-track installation is critical to the successful completion of projects within agreed timescales. The way that Booth Muirie systems are supplied, with support systems and accessories, further simplifies the specification, procurement and installation of a rainscreen façade, whilst ensuring the compatibility of all components.

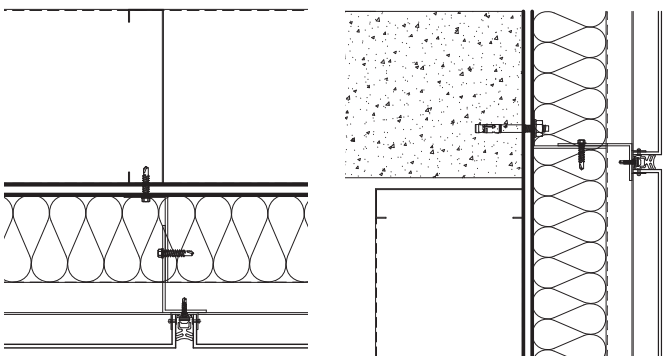
BML120 is best used for landscape style facades and is comprised of a series of panels that use a tongue-and-groove jointing method which are fixed through the top horizontal edge extrusion into the pre-engineered vertical rails.

All panels can be independently removed and replaced with minimum disruption. BML120 is an open rear vented system but can also be installed as a sealed system by using black EPDM infill gaskets.

Wind load calculations can be provided with BML120 to ensure all design requirements are met. The system has been awarded certification by the Taylor Woodrow Test Centre and was tested as an integral part of a through wall solution under CWCT guidelines.

A mechanically-fixed gasket system with a joint width of 20mm which is suitable for vertical wall cladding, portrait and landscape axis, soffit, fascia and column applications.



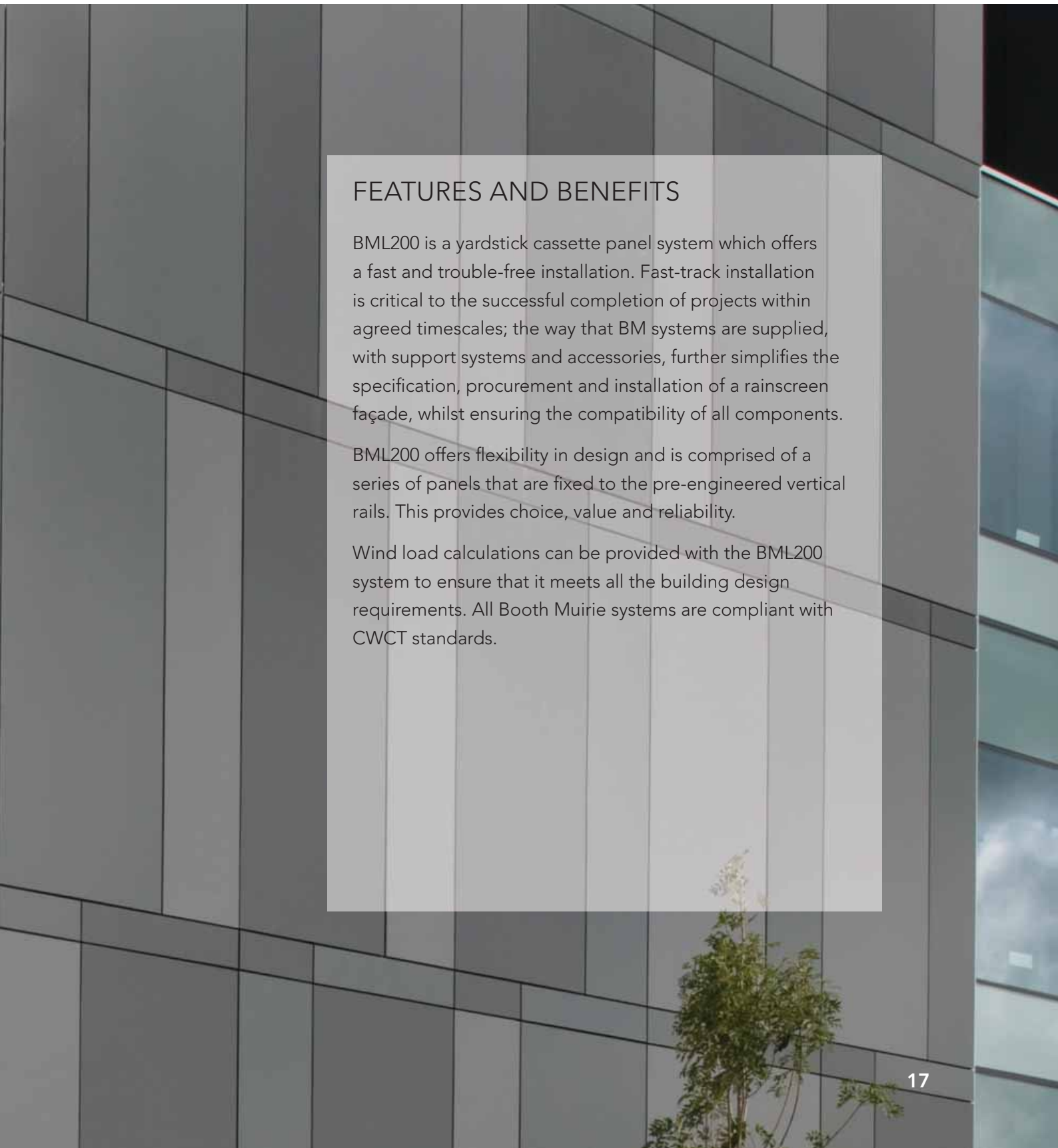


Horizontal section.

Vertical section.

1. ACM panel.
2. Horizontal support rail.
3. Insulation.
4. CS1 angle.
5. Breather membrane.
6. CS3 pressure plate.

BML200



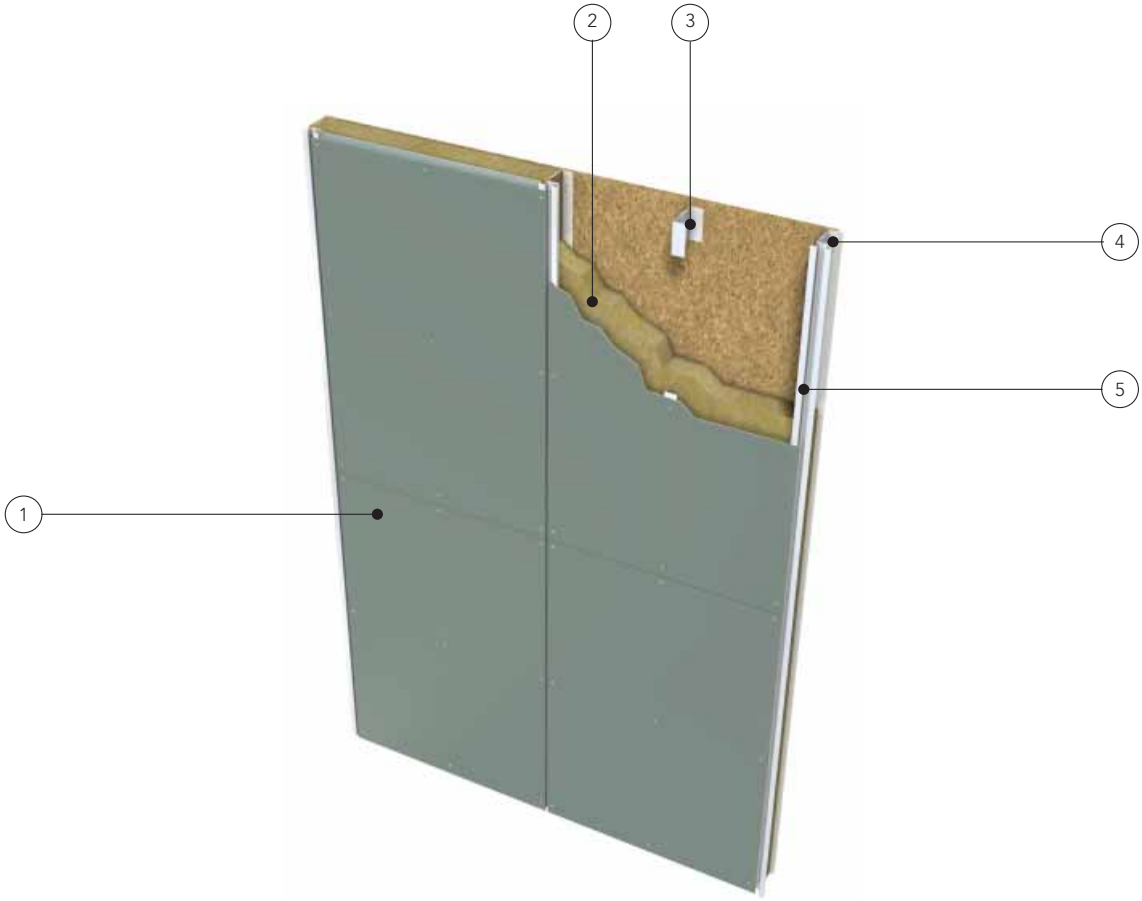
FEATURES AND BENEFITS

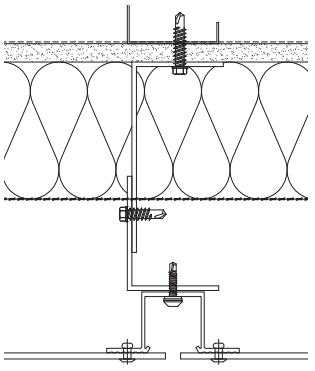
BML200 is a yardstick cassette panel system which offers a fast and trouble-free installation. Fast-track installation is critical to the successful completion of projects within agreed timescales; the way that BM systems are supplied, with support systems and accessories, further simplifies the specification, procurement and installation of a rainscreen façade, whilst ensuring the compatibility of all components.

BML200 offers flexibility in design and is comprised of a series of panels that are fixed to the pre-engineered vertical rails. This provides choice, value and reliability.

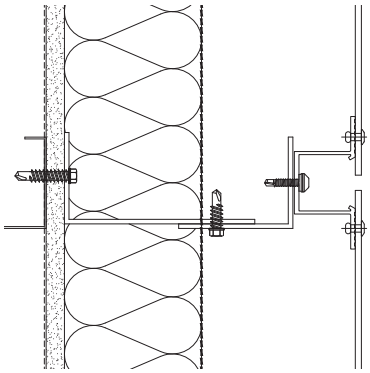
Wind load calculations can be provided with the BML200 system to ensure that it meets all the building design requirements. All Booth Muirie systems are compliant with CWCT standards.

A face pivot fixed rainscreen system with variable joint widths which is suitable for vertical wall cladding, portrait and landscape axis, soffit and fascia and column applications.





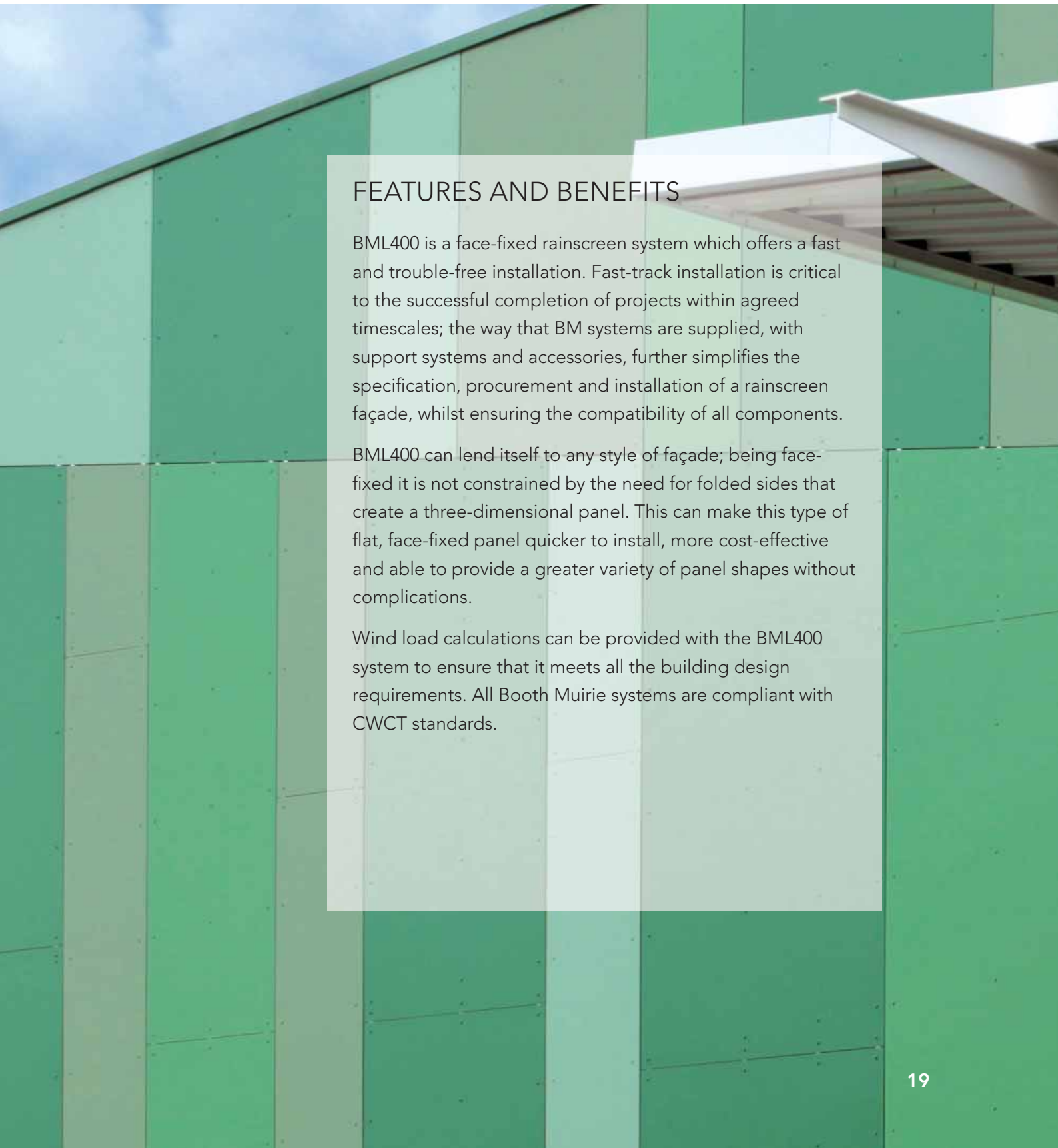
Horizontal section.



Vertical section.

1. ACM panel.
2. Insulation.
3. Intermediate support bracket.
4. Support bracket.
5. Aluminium top hat.

BML400



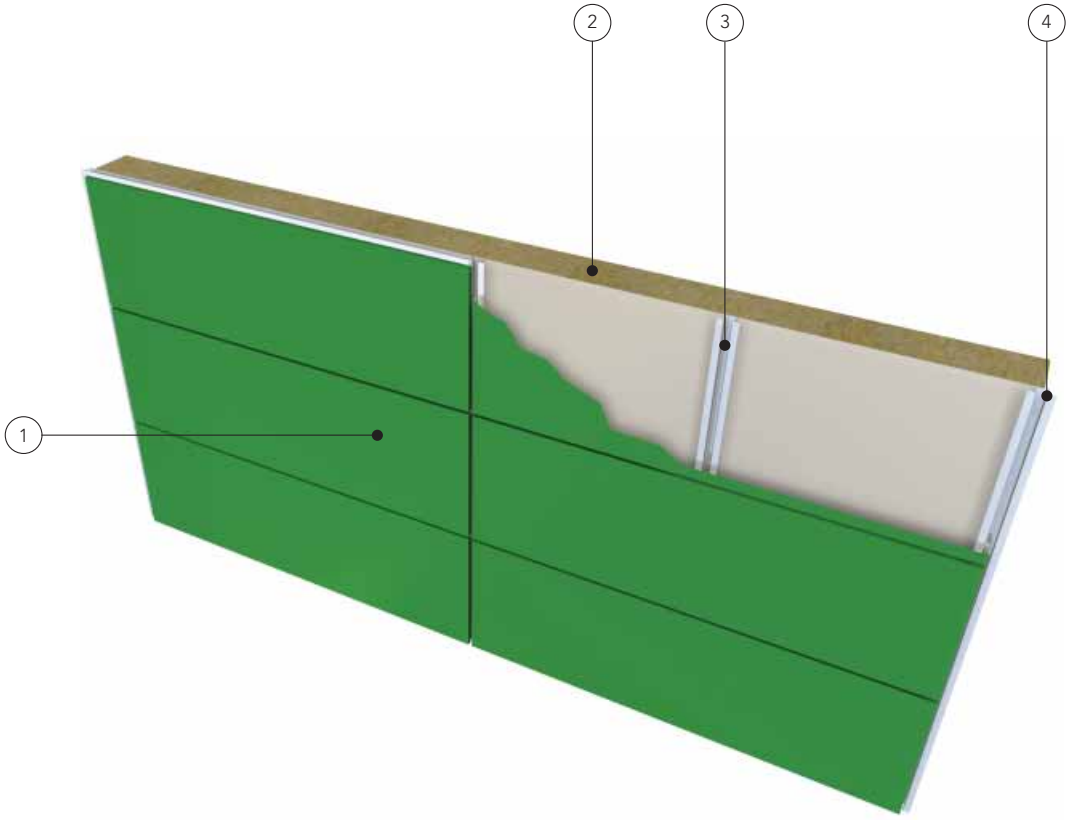
FEATURES AND BENEFITS

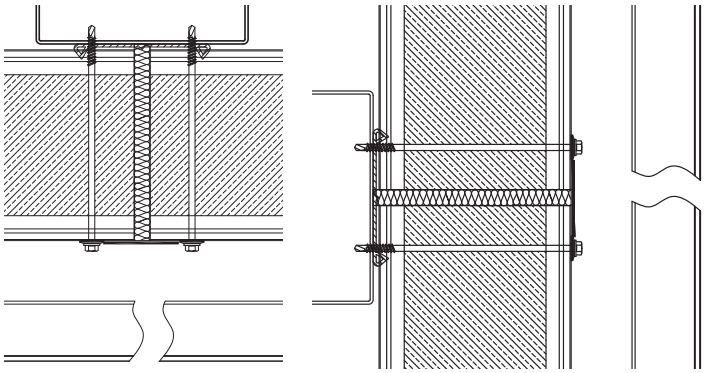
BML400 is a face-fixed rainscreen system which offers a fast and trouble-free installation. Fast-track installation is critical to the successful completion of projects within agreed timescales; the way that BM systems are supplied, with support systems and accessories, further simplifies the specification, procurement and installation of a rainscreen façade, whilst ensuring the compatibility of all components.

BML400 can lend itself to any style of façade; being face-fixed it is not constrained by the need for folded sides that create a three-dimensional panel. This can make this type of flat, face-fixed panel quicker to install, more cost-effective and able to provide a greater variety of panel shapes without complications.

Wind load calculations can be provided with the BML400 system to ensure that it meets all the building design requirements. All Booth Muirie systems are compliant with CWCT standards.

BML Rainspan is a unique system that incorporates the Rainspan composite panel as a long spanning substrate that provides thermal and structural performance with a non-combustible insulated core.



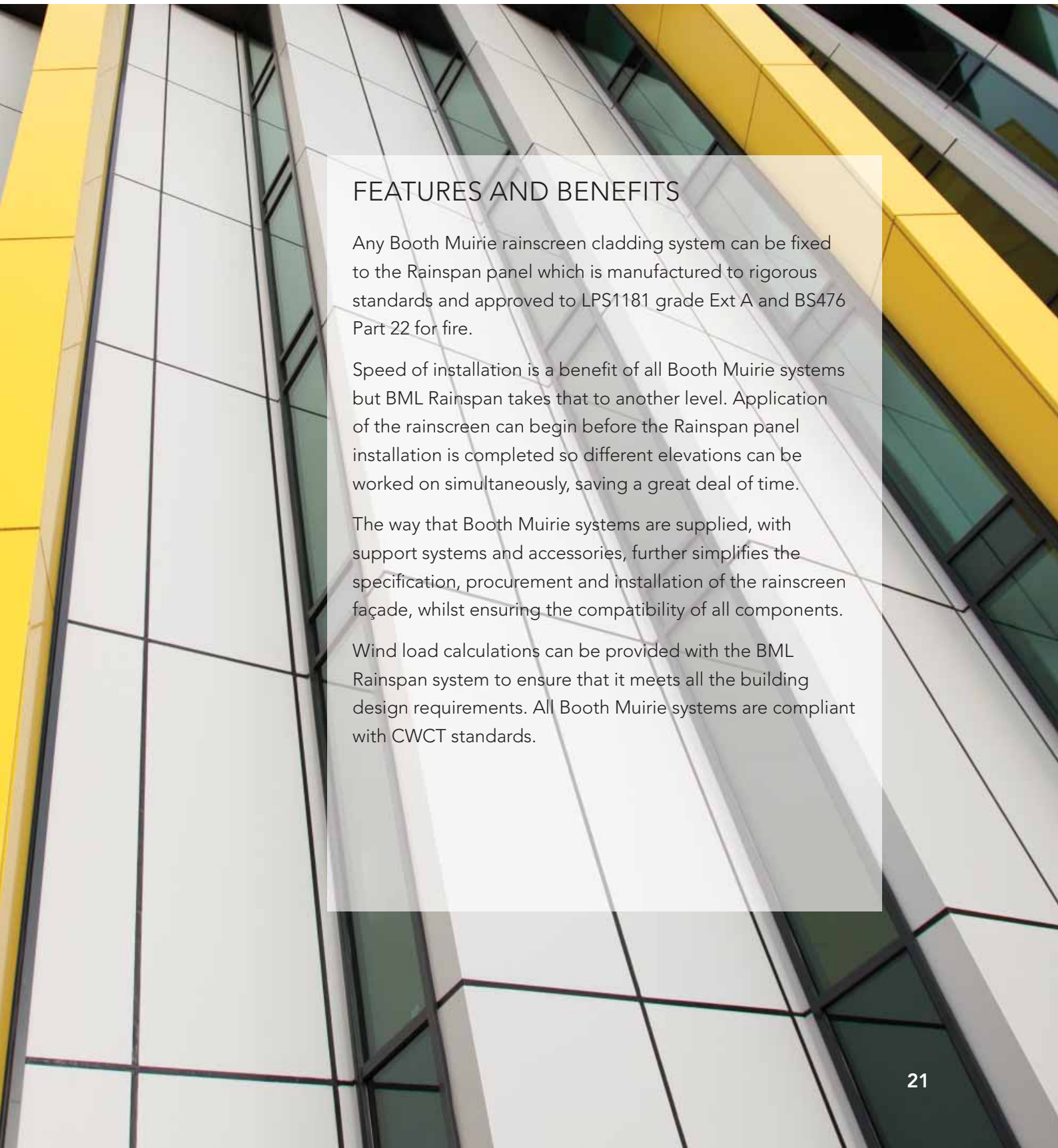


Horizontal section.

Vertical section.

1. ACM panel.
2. Rockwool insulated composite panel.
3. Intermediate top hat.
4. Aluminium top hat.

BML Rainspan



FEATURES AND BENEFITS

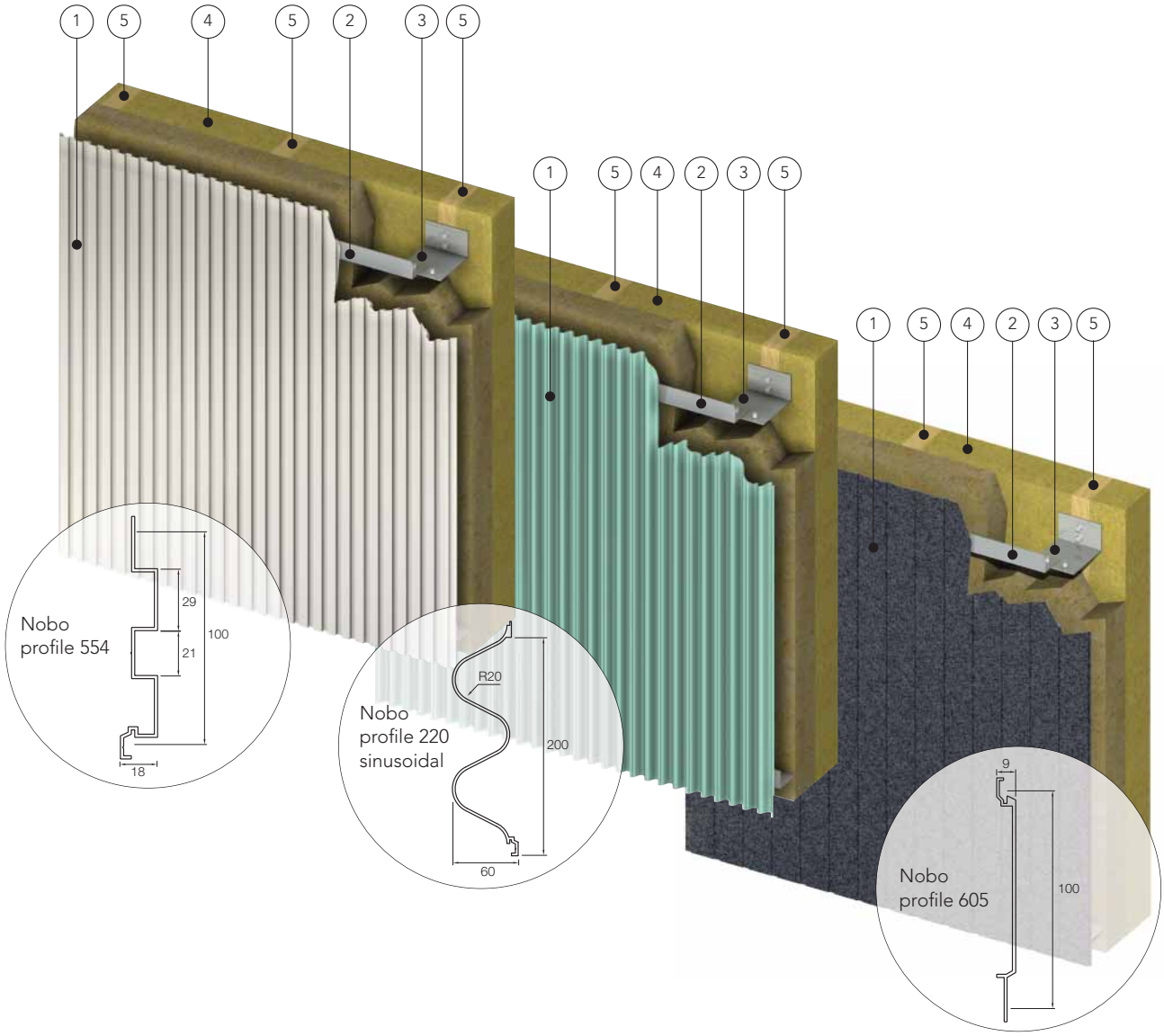
Any Booth Muirie rainscreen cladding system can be fixed to the Rainspan panel which is manufactured to rigorous standards and approved to LPS1181 grade Ext A and BS476 Part 22 for fire.

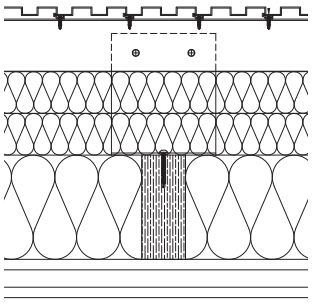
Speed of installation is a benefit of all Booth Muirie systems but BML Rainspan takes that to another level. Application of the rainscreen can begin before the Rainspan panel installation is completed so different elevations can be worked on simultaneously, saving a great deal of time.

The way that Booth Muirie systems are supplied, with support systems and accessories, further simplifies the specification, procurement and installation of the rainscreen façade, whilst ensuring the compatibility of all components.

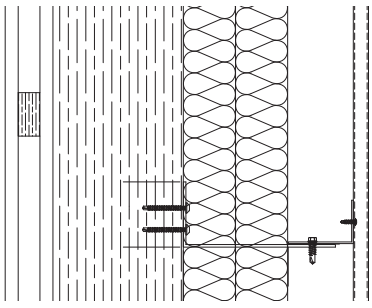
Wind load calculations can be provided with the BML Rainspan system to ensure that it meets all the building design requirements. All Booth Muirie systems are compliant with CWCT standards.

NORBO® interlocking cladding system is made up of extruded aluminium sections providing a durable facing of monolithic appearance in various colours and finishes.





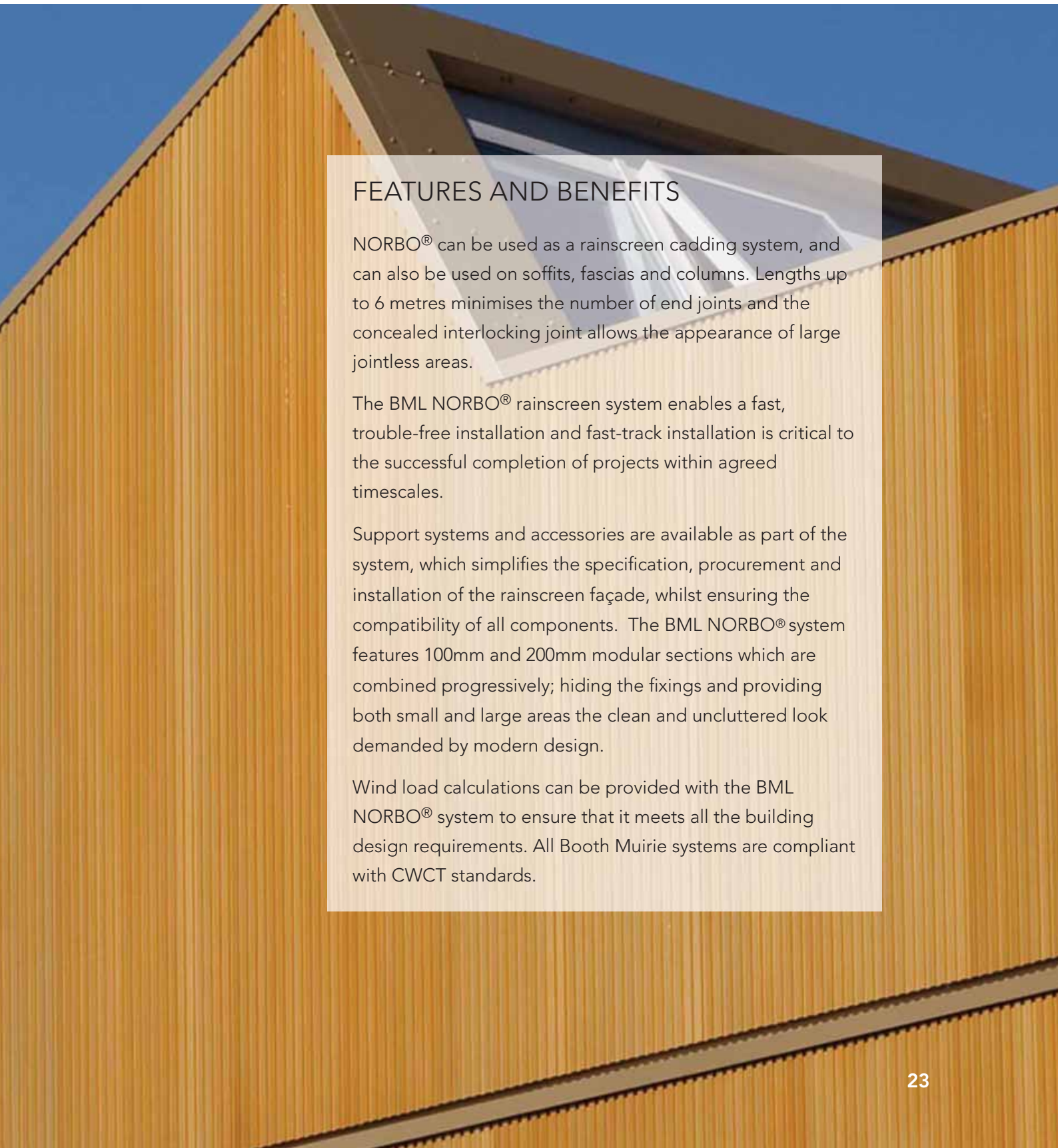
Horizontal section.



Vertical section.

1. NORBO panel
2. Aluminium support rail
3. Galv angle cleat
4. Insulation
5. Vertical timber studs.

BML Norbo



FEATURES AND BENEFITS

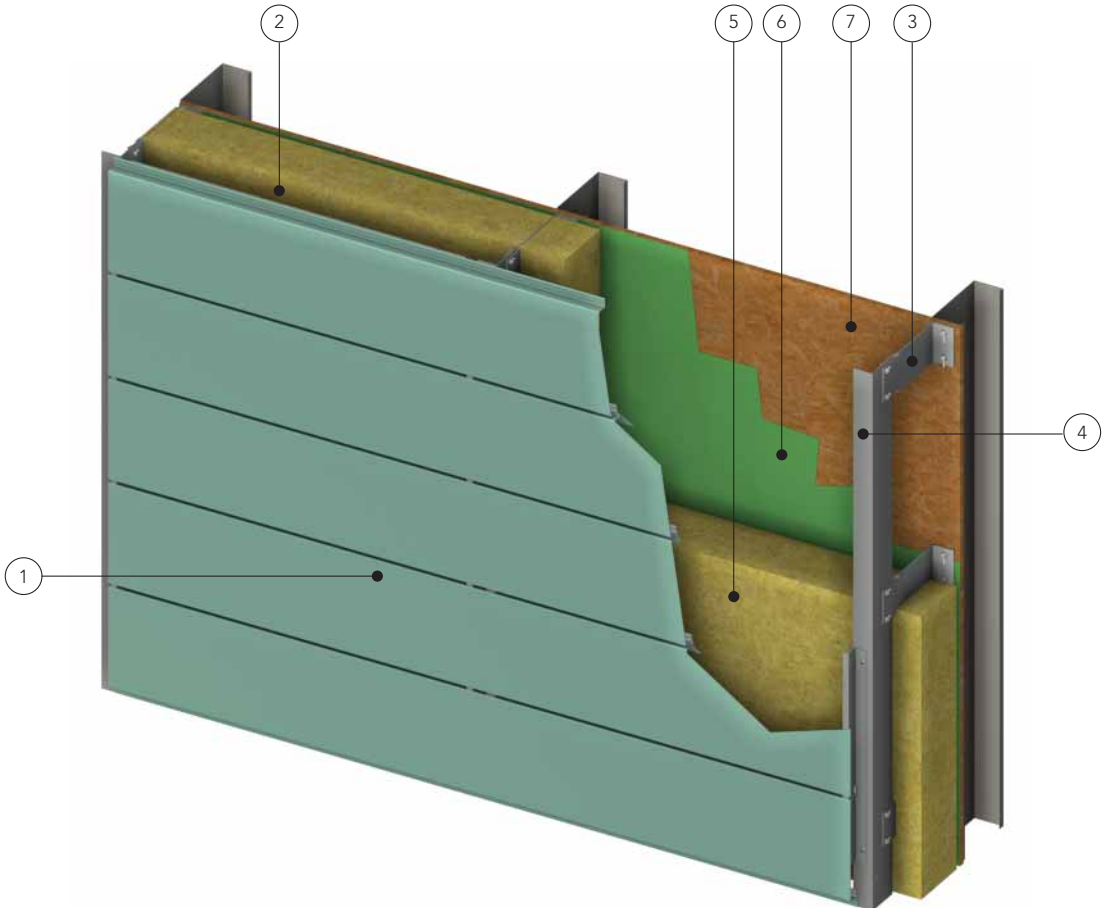
NORBO® can be used as a rainscreen cadding system, and can also be used on soffits, fascias and columns. Lengths up to 6 metres minimises the number of end joints and the concealed interlocking joint allows the appearance of large jointless areas.

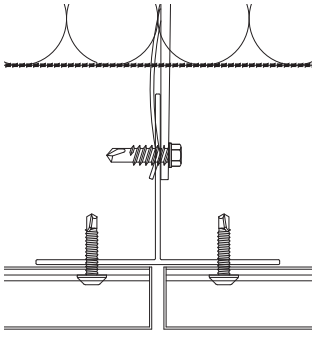
The BML NORBO® rainscreen system enables a fast, trouble-free installation and fast-track installation is critical to the successful completion of projects within agreed timescales.

Support systems and accessories are available as part of the system, which simplifies the specification, procurement and installation of the rainscreen façade, whilst ensuring the compatibility of all components. The BML NORBO® system features 100mm and 200mm modular sections which are combined progressively; hiding the fixings and providing both small and large areas the clean and uncluttered look demanded by modern design.

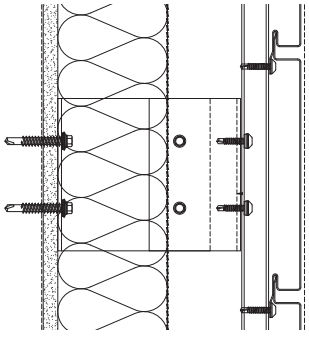
Wind load calculations can be provided with the BML NORBO® system to ensure that it meets all the building design requirements. All Booth Muirie systems are compliant with CWCT standards.

Opus is a new plank cladding product that can be installed as part of a BML Rainscreen façade and a BML Rainspan construction.





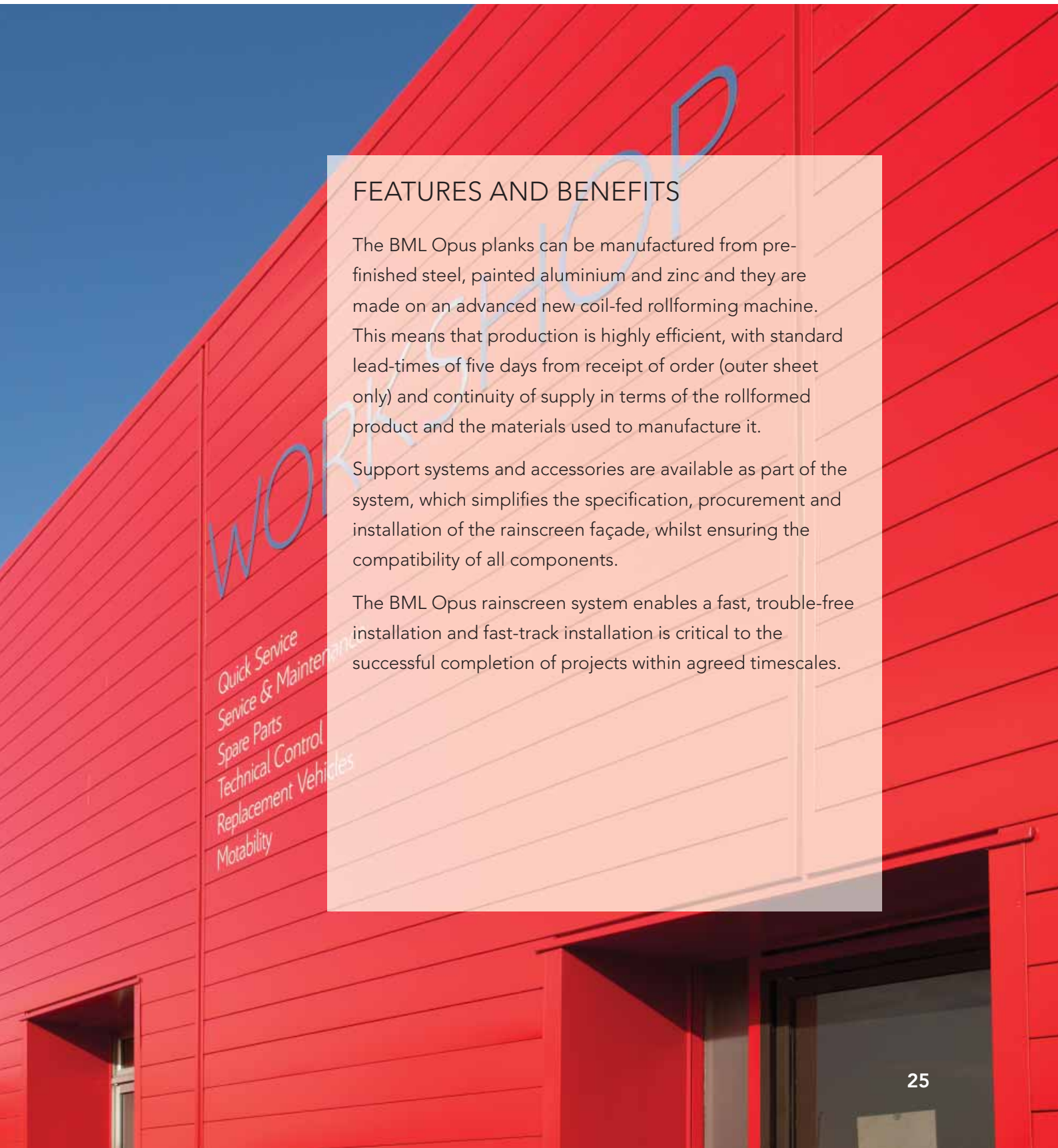
Horizontal section.



Vertical section.

1. Opus panel
2. Air gap
3. Adjustable cleat
4. Vertical track
5. Isulation
6. Vapour control layer
7. Pyroc-type board.

BML Opus



FEATURES AND BENEFITS

The BML Opus planks can be manufactured from pre-finished steel, painted aluminium and zinc and they are made on an advanced new coil-fed rollforming machine. This means that production is highly efficient, with standard lead-times of five days from receipt of order (outer sheet only) and continuity of supply in terms of the rollformed product and the materials used to manufacture it.

Support systems and accessories are available as part of the system, which simplifies the specification, procurement and installation of the rainscreen façade, whilst ensuring the compatibility of all components.

The BML Opus rainscreen system enables a fast, trouble-free installation and fast-track installation is critical to the successful completion of projects within agreed timescales.

The standard Booth Muirie products cover many requirements but there will always be a need to provide bespoke details or features. Booth Muirie takes pride in the ability to manufacture almost anything that can be drawn.

FAÇADE PANELS

Bespoke façade panels can be supplied in a wide range of metals and MCMs including mill finish zinc, copper, aluminium, stainless steel and Corten steel as well as painted steel, aluminium and ACM.

SPANDREL PANELS

Spandrel panels are used in place of glazing units in curtain wall systems where it is necessary to hide the edges of floor slabs, ceiling details, insulation, and other building elements that would ruin the aesthetic of the curtain wall if they were visible. The spandrel panel is required to match or contrast with the glazed area and offers the opportunity to enhance the visual impact of the curtain wall or glazing.

Booth Muirie can produce spandrel panels from a wide range of metals and MCMs including mill finish zinc, copper, aluminium, stainless steel and Corten steel as well as painted steel, aluminium and ACM, so that spandrels can be tailored to the colour scheme of the building.

bespoke panels and features

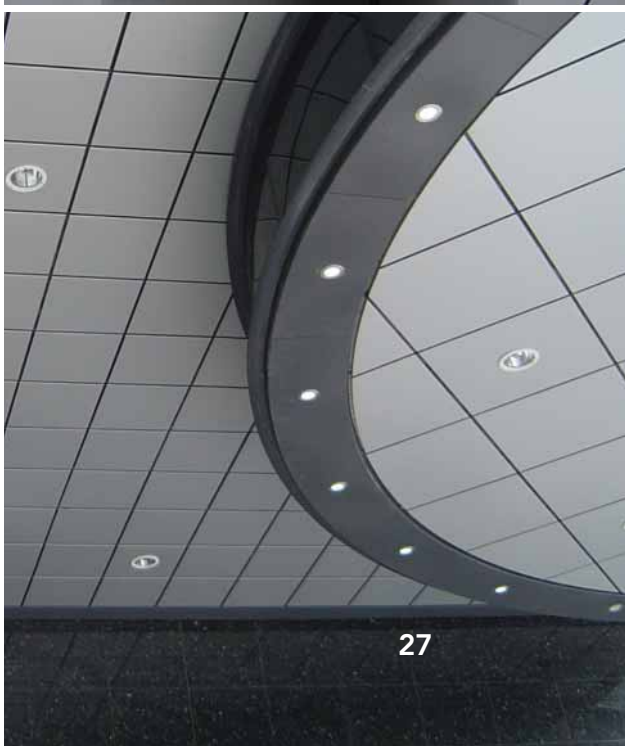
FEATURE DETAILING

Combined with façade panels, feature details offer a solution to complete all roof and wall interfaces. Bullnoses are available with constant or complex elliptical radii. Transitions and corners can benefit from a seamless marriage of verge to eaves details with highly flexible flashings, interfacing directly with the façade, bullnose and soffit systems.

Column casings are available in round, elliptical or square casings for clean details, whilst soffit panels add a quality finish to any roof cantilever or canopy. Booth Muirie products have been used to great effect for interior walls and ceilings.

Booth Muirie systems can help the designer achieve grand designs or add that special finishing touch. The accuracy of the 3D CAD modelling team ensures that everything fits as intended.

For details of the manufacturing constraints relating to any particular material please contact the office.



colours and finishes

Booth Muirie can supply ACM in a wide range of colours and finishes including stone and timber effect materials, a plethora of standard colours and a range of different types of natural metal composite materials like zinc and copper. Please contact the office for a colour chart and material swatch samples.

MATERIALS

ALPOLIC®/fr

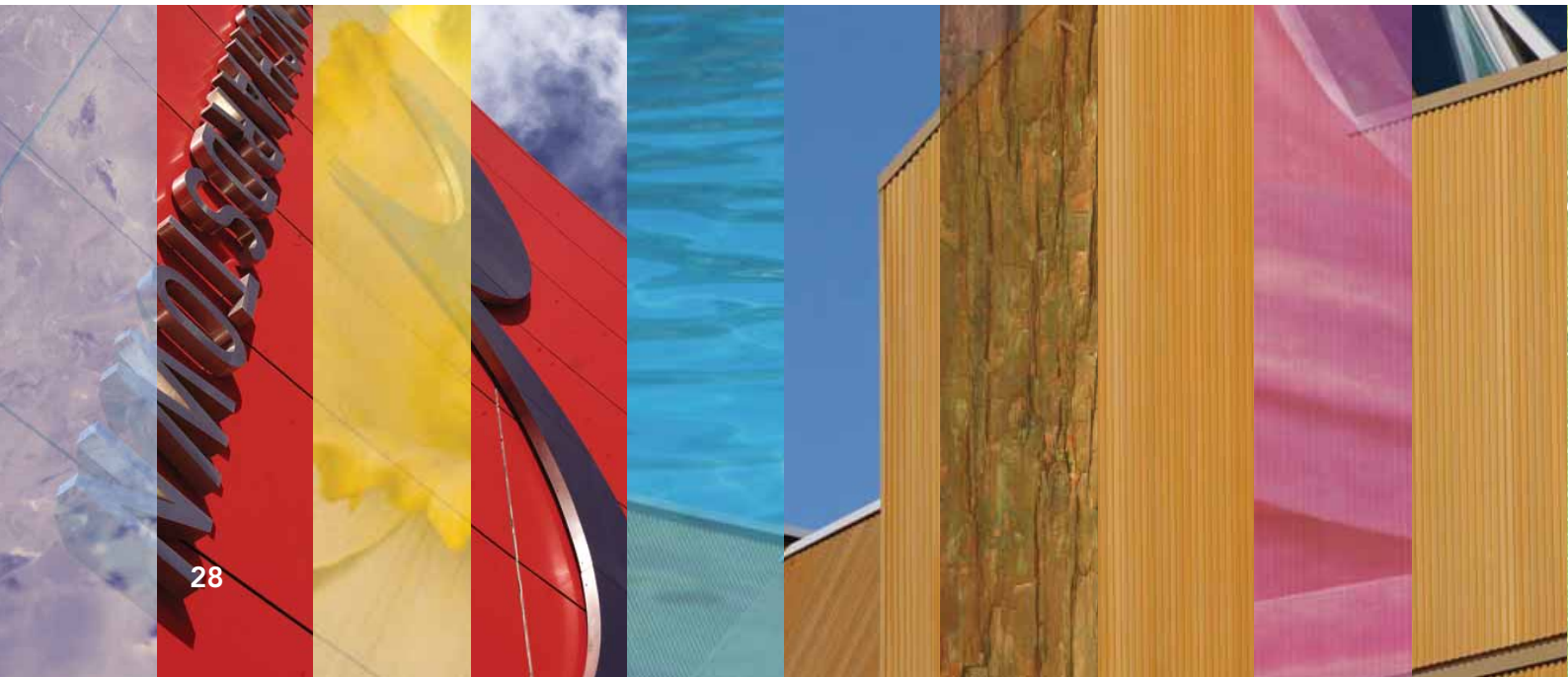
ALPOLIC®/fr is a fire-rated ACM composed of a non-combustible mineral filled core sandwiched between two skins of 0.5mm thick aluminium. Compared with solid aluminium panels, ALPOLIC®/fr is lightweight, rigid and flat. The surface finish is a coating of fluorocarbon paint which is applied using Die Coater, a continuous coil coating process which ensures uniform colour and smooth coating.

Standard material thickness is 4mm, available in 965mm, 1270mm and 1575mm widths and lengths up to 6200mm

There are four colour-types:

- Solid colours
- Metallic colours
- Sparkling colours
- NaturArt series (stone, timber, metal, and abstract).

Custom colours and material widths are also available for all finishes upon request, subject to minimum quantity.

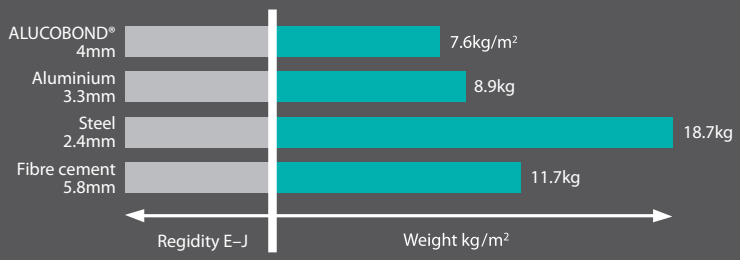


ALUCOBOND®

ALUCOBOND® offers architects and designers unlimited opportunities for creative, innovative and individual planning. The innovative concept of ALUCOBOND® and the honeycomb composite panel ALUCORE® has proved itself through many years of experience, innovative developments and first-class service. The "Original" has been the most popular ACM in the world since 1969.

ALUCOBOND® carries BBA certification and consists of two 0.5mm thick aluminium skins which sandwich a 3mm plastic core. Compared with sold aluminium and other materials ALUCOBOND® is lightweight, rigid and flat:

Standard material thickness is 4mm, available in 1000mm, 1250mm and 1500mm widths and lengths up to 6200mm.



Architecture and colour design are inseparable. Colours underline, highlight and structure the design concept, generating the emotional experience of space and architectural variety. From a wide range of colours ALUCOBOND® offers both solid, metallic and special effect colours. Customized colours are available on request.

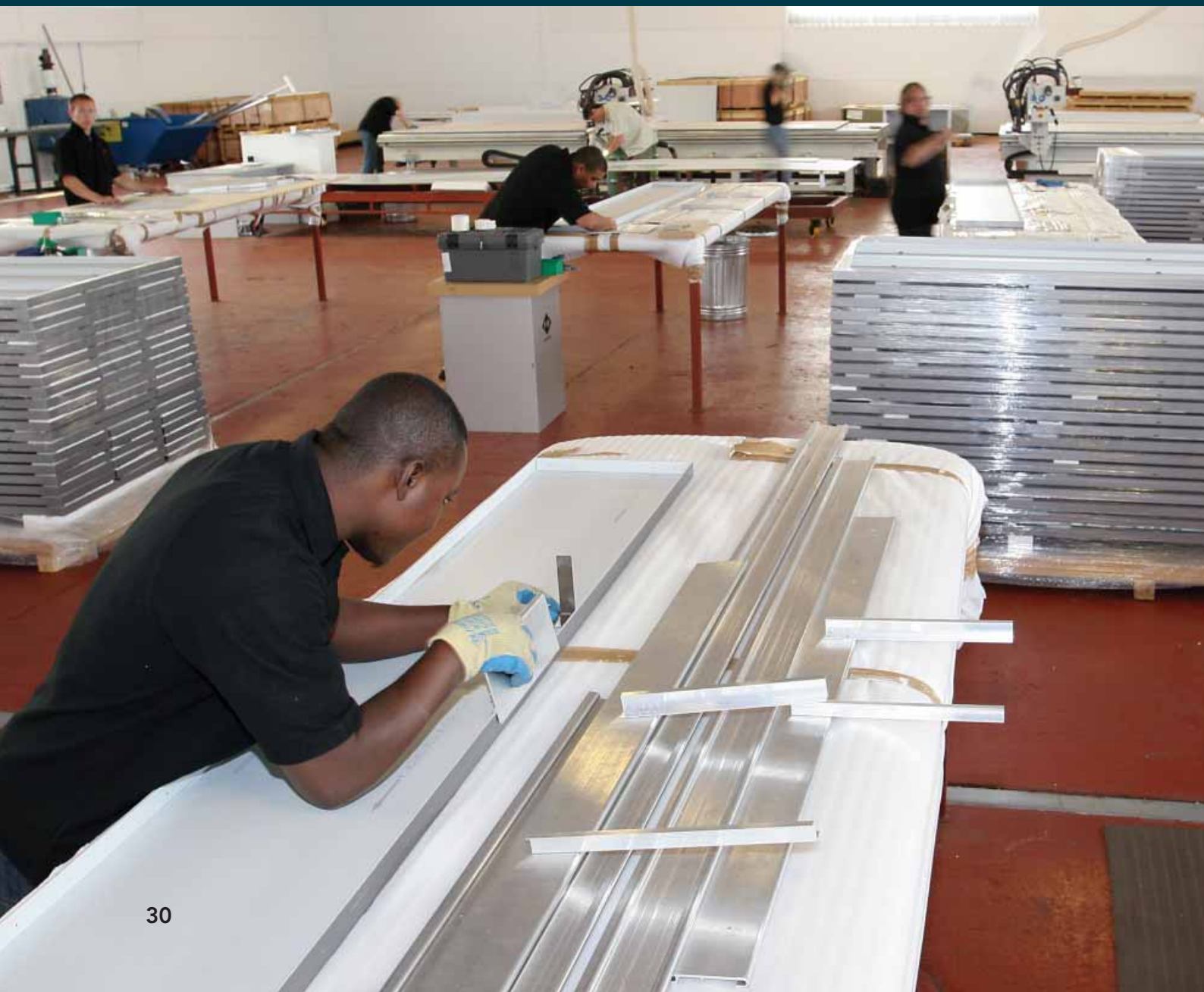
OTHER MATERIALS

As well as ALUCOBOND® and ALPOLIC®/fr, Booth Muirie can offer their rainscreen systems using a wide range of metals and MCMs including mill finish zinc, copper, pre-coated aluminium, post-coated aluminium, stainless steel and Corten steel.

integrated production process

Façade designs are drawn and modelled using sophisticated 3D design software that has emerged as a powerful design tool, enabling increasingly complex façade designs to be realised whilst ensuring the most efficient utilisation of sheet material.

By coupling these design tools with digital manufacturing techniques and computer numerically controlled (CNC) machines Booth Muirie is able to precisely realise any design. Panels are hand finished by a skilled workforce, ensuring individual inspection of each item produced.



construction

Systems that are supplied by Booth Muirie offer considerable benefits, from packaging and shipment to the finished installation:

1. PRODUCT PACKAGED FOR SHIPMENT

Products are carefully packaged to ensure that transport loads are maximised, there is no damage during transit, and manufactured goods arrive onsite clearly marked for ease of identification and installation.

2. DELIVERY TO SITE

Coordinated delivery of manufactured façade panels, engineered support systems and rainscreen ancillaries.

3. ENGINEERED SUPPORT SYSTEMS

Booth Muirie fixing system brackets are fixed to the substructure using fasteners, ready to receive the vertical cladding support rails.

4. INSULATION AND ANCILLARIES

Insulation and fire stop products added if required along with any other ancillary products.

5. PANELS AND FEATURE DETAILS INSTALLED

Booth Muirie façade panels and feature details fitted and fixed in position.

sustainability

Booth Muirie is committed to producing sustainable construction products by employing a 'cradle to cradle' approach to sustainability. The environmental impact of all materials and processes is carefully considered along with recycling and performance during the useful life of a building.

The major constituent material used by Booth Muirie is aluminium, one of the most widely recycled metals. The environmental impact of aluminium has been greatly reduced over the last century, at all stages of the supply chain. Currently, over a third of global aluminium production is from recycled material, a figure that is continually growing. Recycling aluminium takes just 5% of the energy needed to produce primary metal, resulting in a 95% reduction in greenhouse gases production.

Furthermore, due to its recyclability and the fact that it can be recycled again and again without any loss of quality, the 'bank' of processed aluminium is getting larger. Currently 75% of all aluminium produced since the 1880s is still in use for future generations to utilise as a low energy resource.

Highly efficient manufacturing processes, operated within an Environmental Management System accredited to ISO 14001, ensure material use is optimised, which helps to reduce waste. Any ACM waste that is generated during the manufacturing process is recycled. Material that is to be recycled is crushed in a bespoke compressor which results in far fewer transport loads; roughly half the amount of transport is needed for compressed material, compared to uncrushed waste. The environmental impact of haulage is not only minimised when transporting material for recycling but also when taking systems to site; systems are 'site assembled' and as such they can be delivered far more efficiently with fewer loads to carry products to site.

Site assembly also makes deconstruction much more straightforward when it comes to the end of a building's useful life. Booth Muirie systems can be disassembled and transported easily, ready to be recycled, reused or disposed of. A further benefit derived from the engineering of many Booth Muirie systems is that they allow for renewal of specific areas of a building that need regular updating or are likely to be damaged, with minimal disruption and little time or effort.

The 'cradle to cradle' attitude towards sustainability ensures that a responsible, measurable approach is taken to sustainability, with no room for intangible 'green wash'.

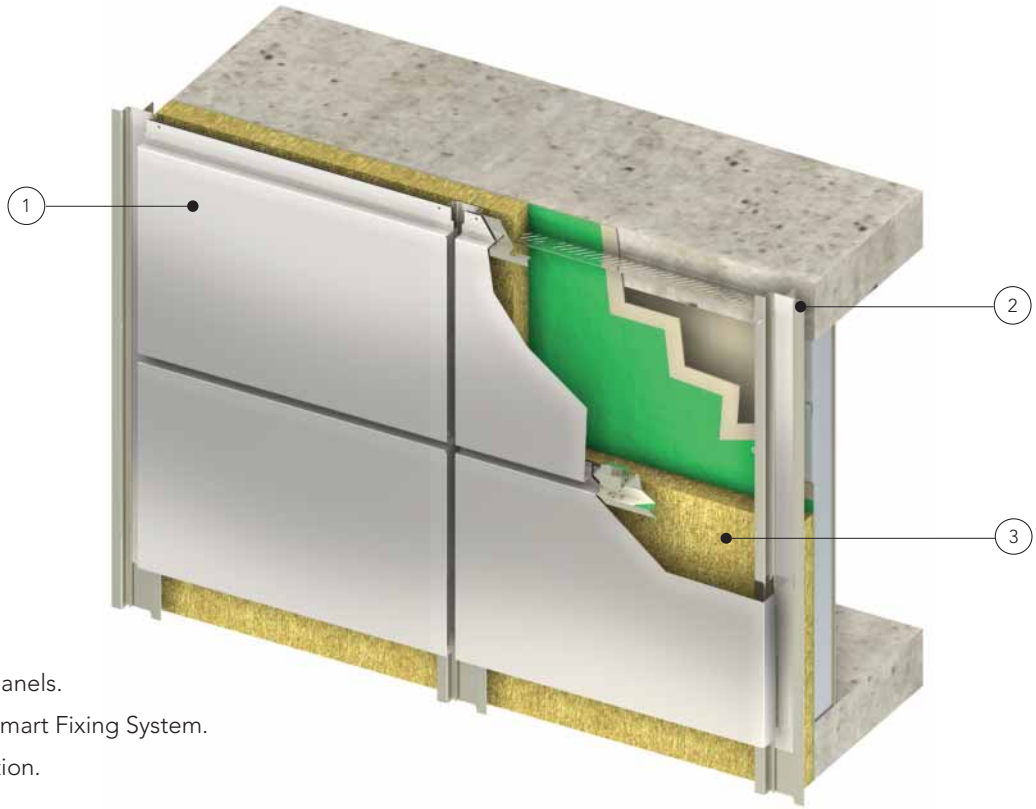
refurbishment

One of the most sustainable approaches to construction is to refurbish an existing structure. Booth Muirie systems lend themselves to refurbishment applications perfectly and can help achieve a faster, more cost effective build, giving a new lease of life to a previously undesirable building.

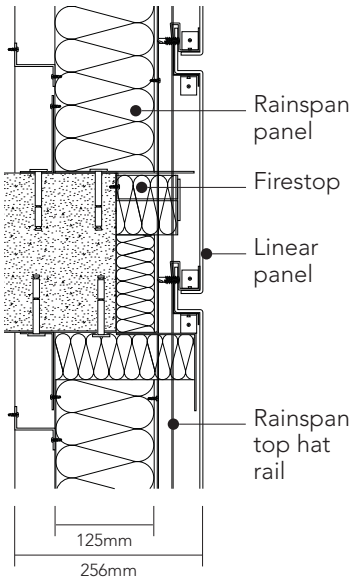
Modern methods of construction and innovative materials can transform tired and outdated buildings into attractive and inspiring spaces. Refurbishing buildings rather than demolishing and rebuilding them offers many significant benefits. Refurbishment projects generally cause less disruption to the community and can dramatically improve the aesthetics of a building and the surrounding environment. In addition to the social benefits, refurbishments can be more economical even when the complete building envelope needs replacing. The majority of the building fabric can be retained, saving a significant amount of time and money.

In addition, by reusing the functioning parts of the building, the impact on the environment is lowered with material production and transport being greatly reduced. Metal composite materials, incorporating ACM, are proving to be increasingly popular materials for use in refurbishment projects as they are light, strong and durable, and provide less of a strain on the building structure than heavier options.

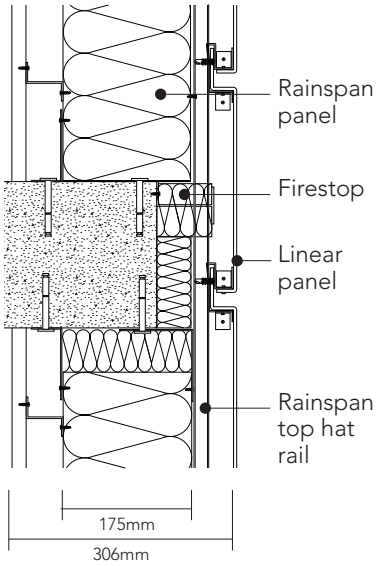
Booth Muirie supports clients to achieve good thermal performance in buildings where it is required of the rainscreen cladding.



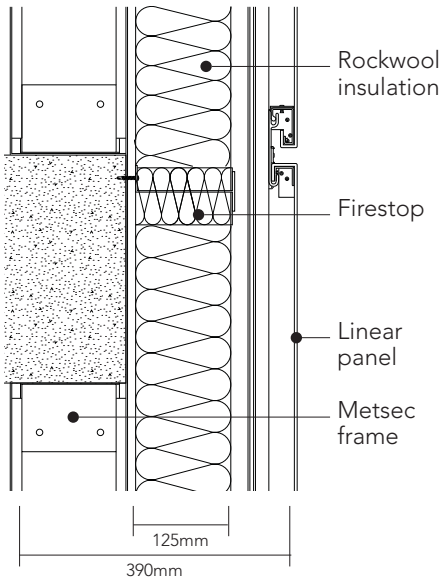
1. BML panels.
2. BML Smart Fixing System.
3. Insulation.



BML Rainspan 0.33 U-value

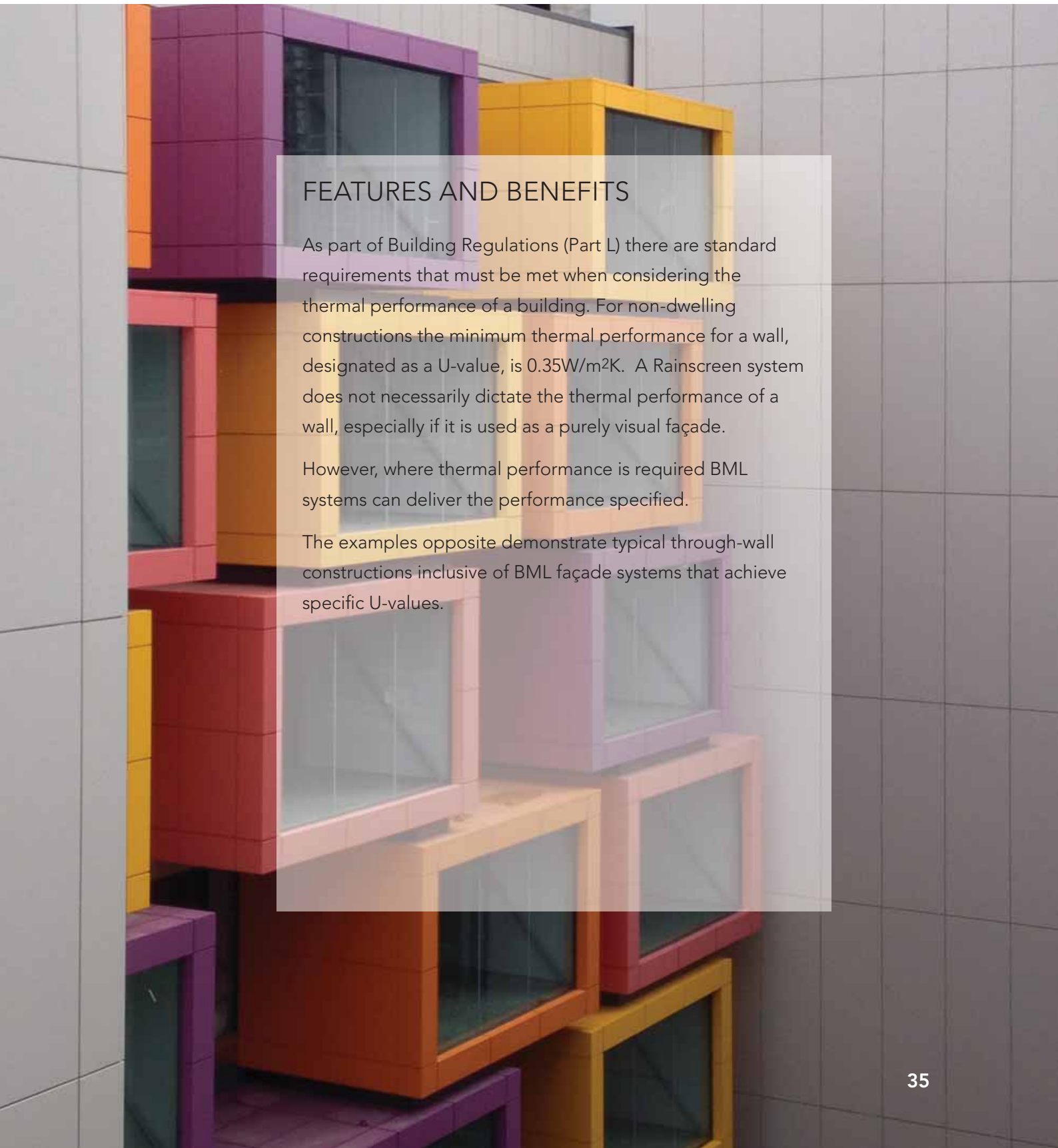


BML Rainspan 0.23 U-value



Metsec with BML 1 0.33 U-value

Thermal performance



FEATURES AND BENEFITS

As part of Building Regulations (Part L) there are standard requirements that must be met when considering the thermal performance of a building. For non-dwelling constructions the minimum thermal performance for a wall, designated as a U-value, is 0.35W/m²K. A Rainscreen system does not necessarily dictate the thermal performance of a wall, especially if it is used as a purely visual façade.

However, where thermal performance is required BML systems can deliver the performance specified.

The examples opposite demonstrate typical through-wall constructions inclusive of BML façade systems that achieve specific U-values.

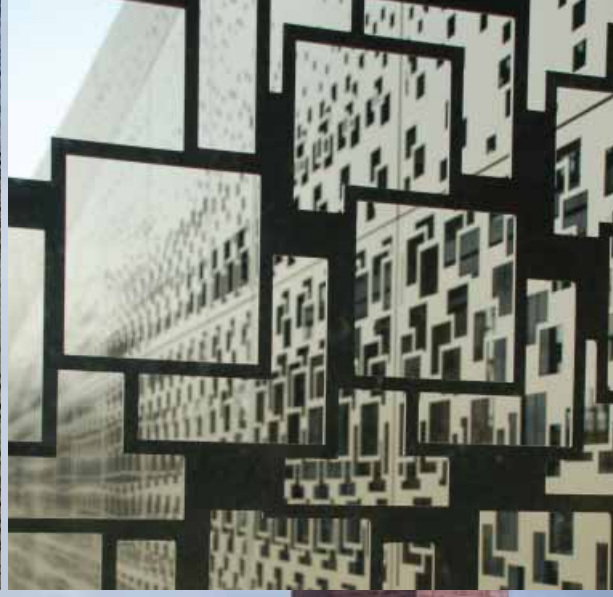
technical excellence

THE TOWN HALL HOTEL

Until recently, the future of Bethnal Green Town Hall, built in 1910, seemed doubtful as it had fallen into disrepair and no suitable developer could be identified. The Town Hall was placed on the "At Risk" register by English Heritage, however in 2007 Loh Lik Peng, a Singapore lawyer turned hotelier, began the transformation of the Town Hall into a luxury boutique hotel. The Grade II listed building required to be sympathetically restored to regain its former splendour whilst retaining as many original features as possible.

A team of world renowned Architects worked closely with Booth Muirie's Architectural Design Team to create the intricate design of the patterned aluminium veil which complements the art deco ornamentation of the Council Chamber. With over 40 years' experience in manufacturing bespoke architectural feature cladding, Booth Muirie was identified as a suitable fabricator with the expertise to produce the intricate design which required meticulous attention to detail. The panels, almost 1000 of them, were comprised of thousands of patterns, each panel individually designed and laser cut using industry-leading technology.

Joe Hulley, Booth Muirie's Project Designer who worked on the Town Hall renovation commented, "The complexity of the project was clear from the outset, however this was overcome through good lines of communication and the high level of expertise among the construction partners involved. The result is an aesthetically pleasing aluminium veil which is sympathetic to the original building."



BML SMART FIXING SYSTEMS

The critical element and basis of any rainscreen support system is the wall bracket. It dictates the layout of the façade's substructure

ENGINEERED SUPPORT SYSTEMS

A comprehensive range of engineered rainscreen support systems is available to suit all BML façade panel systems. All support systems have been designed with simplifying the installation process in mind. They generally consist of discrete wall brackets and extruded aluminium rail profiles that combine in various guises to form comprehensive and cost effective fixing systems for use with BML facade products or any other type of rainscreen.

Inconsistencies in the line and level of the substrate to which the façade is being attached are easily overcome due to the adjustable nature of the Smart Fixing System support grid. This adjustability facilitates a flawless installation of façade panels every time. All support systems are designed for rapid installation and simple alignment. Each is suitable for new build or renovation projects.

BML Smart Fixing Systems feature:

- High strength brackets suitable for a range of substrates
- Extruded aluminium rail profiles selected to suit the structural and dimensional stability requirements of any particular project.

Optimal fixing of façade systems relies on the fixing system. Fixing systems are differentiated according to visible or concealed fastening and horizontal or vertical fixing.

BML range of Smart Fixing Systems include:

- A visible fixing system with rivets
- A visible fixing system with clamps
- A concealed fixing system for use with adhesive systems
- Concealed fixing systems for façade products.

All systems are manufactured in accordance with EN12020 and EN 755. BML Smart Fixing Systems can be used to support all types of rainscreen panels including:

- BML Façade panels
- High pressure laminates
- Fibre cement panels
- Polyester powder coated aluminium
- Timber/cedar planks
- Terracotta tiles.

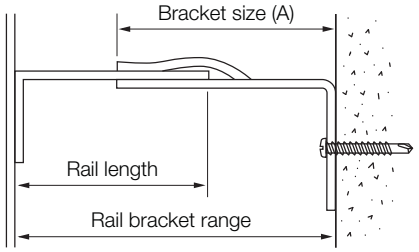
WALL BRACKET ECF-B-S

Wall bracket ECF-B-S is used for vertical fixing on solid walls and features the following benefits:

- Wind pressure is passed directly to the structural wall
- Each ECF-B-S can be used for a fixed point or a sliding point
- The ECF-B-D is mainly used as an anchor point. It has high bearing capacity through construction height and two wall mountings
- Fastener spacing of 125mm for the ECF-B-D makes it possible to more easily fasten brackets to problematic substructures
- Integrated clamp-side provides 40mm of adjustability in conjunction with L or T profiles
- Made of aluminium EN-AW 6060 T68.

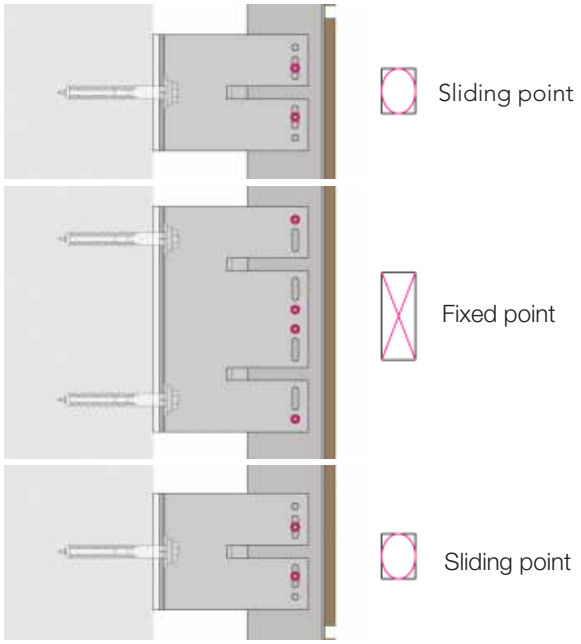
Bracket height (mm)	RAIL BRACKET RANGE	
	Rail length (mm)	
	40	70
35	44 – 58	74 – 88
50	53 – 60	74 – 93
80	83 – 101	93 – 131
115	117 – 136	127 – 166
135	137 – 156	147 – 186
150	152 – 171	162 – 201
170	172 – 191	182 – 221
185	187 – 206	197 – 236
220	222 – 241	232 – 271
255	257 – 276	267 – 306

5mm added if thermal pads are used.



SYSTEM BASICS

Fixing systems are differentiated according to visible or concealed fasteners and horizontal or vertical fitting.

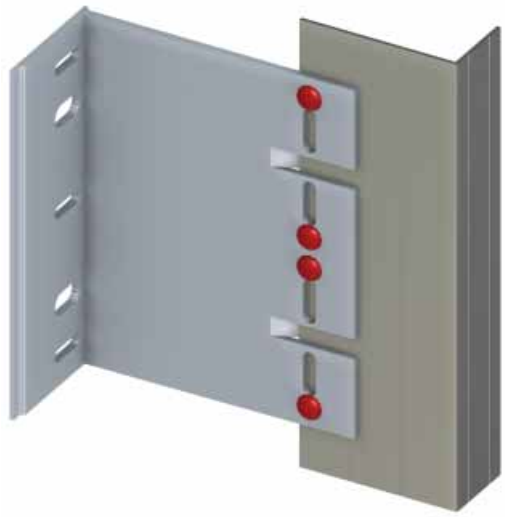


Vertical systems

Vertical systems are used for mounting on solid walls. The primary profile is mounted vertically on an ECF-B-S.

Thermal linear expansion

When mounting vertical or horizontal systems, temperature-related linear expansion of the profiles must be taken into consideration.
For this reason, the elongated holes of the wall brackets allow for thermal expansion of the section. The length of the profiles is determined by the height or panel separation.



FIXING POINTS

Fixed point

The fixed point passes the dead weight and wind loads to the load-bearing wall. The connection between the wall bracket and profile is therefore implemented immovably using the 'round holes'.

For connections of primary carrier rails, both the fixed and sliding points can also be used for fastening the rails to the brackets.

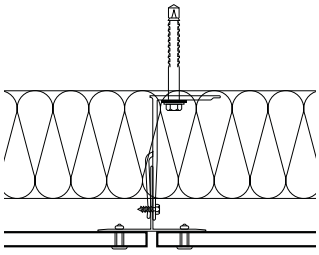
Sliding point

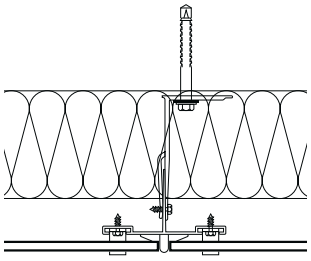
In contrast, the connection between the wall bracket and profile at a sliding point needs to allow movement therefore the elongated holes are used for such connections. As a result, the profile is not impeded in the event of length changes and there are no jammed connections. For a sliding point, only wind pressure loads are passed to the load bearing wall.

Thermal separation

In order to avoid thermal bridges and to minimise heat loss, thermal separation elements are built in between the wall bracket and the outside wall.

BML FIXING SYSTEMS





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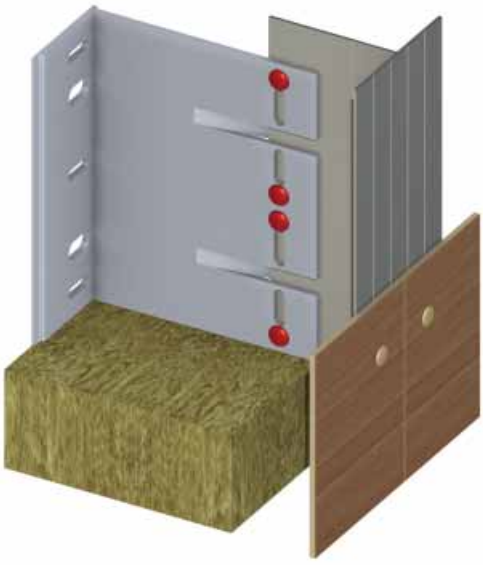

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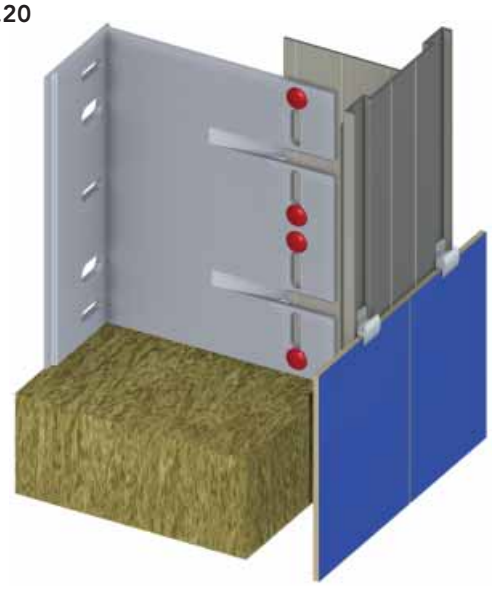


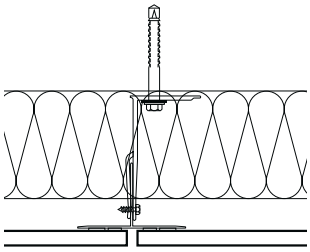
FACE FIXING SYSTEMS

Visible fixing with rivets

Façade fastening with rivets is a very economical method of installation. It can be used for metal, fibre cement and high pressure laminate façade elements.

Visible fixing with clamps

Fastening by means of clamps is used in particular for ceramic and terracotta façade elements. The clamps are available in aluminium and stainless steel and can be made to match the colour of the façade elements.



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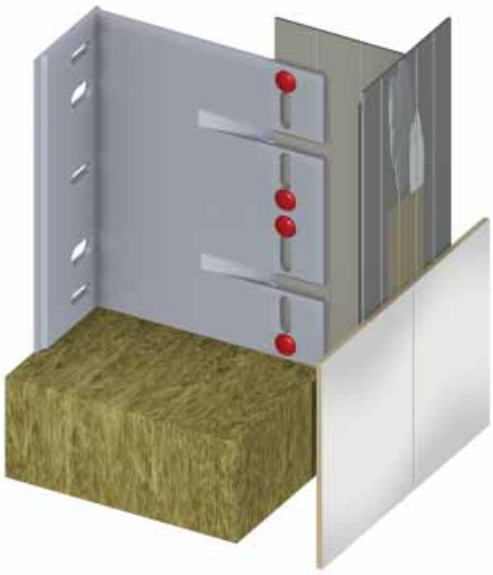


Concealed fixing with adhesive system

Gluing façade panels is an economical mounting method. The panels are assembled on the properly pre-treated profiles with permanent elastic glue and double-sided adhesive mounting tapes.

SYSTEM SUPPORT

Engineering support

BML Smart Fixing Systems simplify the complexity of façade design. The optimal fixing solution can be determined based on the substrate, panel type and materials used.

The bespoke static calculation programme ensures compliance with safety requirements and optimises the amount of fixing elements that need to be used. This results in the most efficient and effective supply of support fixings.

Installation plans are prepared and provided for clear communication of the correct rail and bracket layouts and connection methods to the installation teams.

By maintaining an open dialogue with customers, difficulties and possible improvements can be advised and suggested at the planning stage to help save costs. CAD drawings and system details can be provided as well as the appropriate templates for the specification.

Architects are advised with regard to general and specific themes of rainscreen, and customers and installation teams can be trained at our dedicated training centre or onsite.

Guarantee

All systems are manufactured in accordance with EN12020 and EN755 and are statically provable. Booth Muirie is not liable for deficiencies in the installation. Building regulations must be met.

olympic stadium and international broadcast centre

With decades of experience Booth Muirie has diverse manufacturing capabilities: in-depth engineering skills; broad materials understanding; innovative and pro-active problem solving capabilities; well-honed project management skills and an open attitude as a creative manufacturer.

This unique combination positions Booth Muirie as the ideal partner for architects and designers, picking up where Euroclad facades left off. One project which is a key example of the Euroclad group's exceptional technical ability was the manufacture of the rainscreen cladding for the Olympic stadium.

The London 2012 Games were the catalyst for transforming 2.5km^2 of land into a fully functional, exceptional Olympic Park. What was once industrial, contaminated land was rapidly transformed over a three year period. 4,500m^2 of rainscreen facades in ACM were manufactured and supplied for the iconic Olympic stadium.

The size of panels and the type of installation presented considerable technical challenges and the proposed manufacturing solutions formed part of the successful bid by specialist contractor Prater.

1. A full-size test rig was built to ensure the record breaking panels could be transported, handled onsite and fixed without problems.

2. Left to Right: Olympic Gold medallist Lynn Davies, Managing Director Phil Cook and former ODA Chairman John Armitt get a close-up view of the huge panels for the Olympic Stadium.

3. Olympic Stadium – manufacturing machinery was transformed to cope with the World's longest sheets of Alpolic material and a full size rig constructed to test handling, transport and application.

Development	Olympic Stadium
Location	London
Architect	Populous
Main contractor	Sir Robert McAlpine
Specialist contractor	Prater

The system consists of vertical hook-on panels fixed at a 40° incline, which results in the panels being closer to the steelwork at the bottom than at the top. This required the construction of a full-size test rig at Euroclad headquarters to trial the handling, transport and fixing of the system.

The panel lengths were longer than any that have ever been produced using ACM; posing significant challenges to ACM manufacturer Mitsubishi, which had to produce 7.8m long sheets; the longest ever made.

The 80,000-seat stadium cost £496m to construct and was designed and constructed by 'Team Stadium' consisting of Populous, Sir Robert McAlpine and Burro Happold, with landscape designer HED and planning consultant Savills Hepher Dixon.

Development	Big Yellow Self Storage
Location	London
Architect	Mountford Pigott
Main contractor	McLaren
Installer	Northern Cladding

Development	Audi
Location	London
Architect	Wilkinson Eyre
Main contractor	ISG Interior Exterior PLC
Installer	NMD Lead Sheet Specialists Ltd

case studies

Development	The Mall
Location	Luton
Architect	Broadway Malyan
Main contractor	Balfour Beatty
Installer	Red Architectural

Development	The Hereford Academy
Location	Hereford
Architect	Aedas
Main contractor	Willmott Dixon
Installer	Prater

system components

Booth Muirie offers a complete system with single source supply of all components, making it a quick, complete, economic and convenient solution.

FASTENERS AND FIXINGS

A range of fasteners and fixings is available from Booth Muirie to suit any application, all of which are sourced from leading international manufacturers. The choice of these components is tailored to the application, system and substrate to ensure optimal fixing, with components including:

- Insulation retaining fixings
- Panel support fixings
- System anchor fixings.

INSULATION

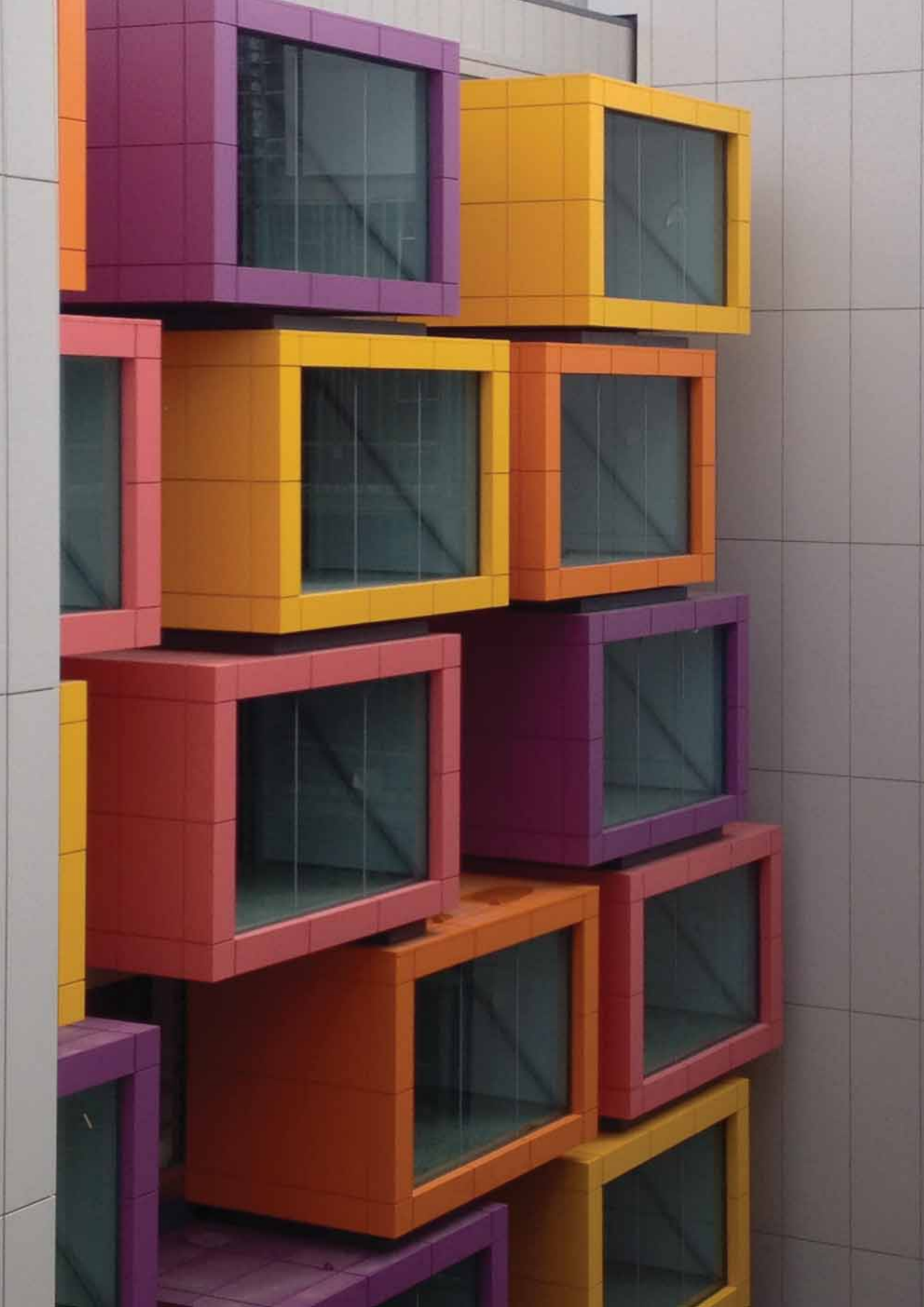
A range of insulation types is available to suit taste and requirements. Mineral wool slabs and other insulation materials are all available.

FIRE STOPS

The cavity between rainscreen façades and fire compartment walls/floors needs to be sealed with a fire stop, whilst allowing an air space for ventilation and drainage. Booth Muirie supplies fire stops from leading manufacturers to enable full compliance with building regulations.

TAPES AND SEALANTS

A range of high quality, cost effective tapes and sealants is available from Booth Muirie, all perfectly suited to specific applications.



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