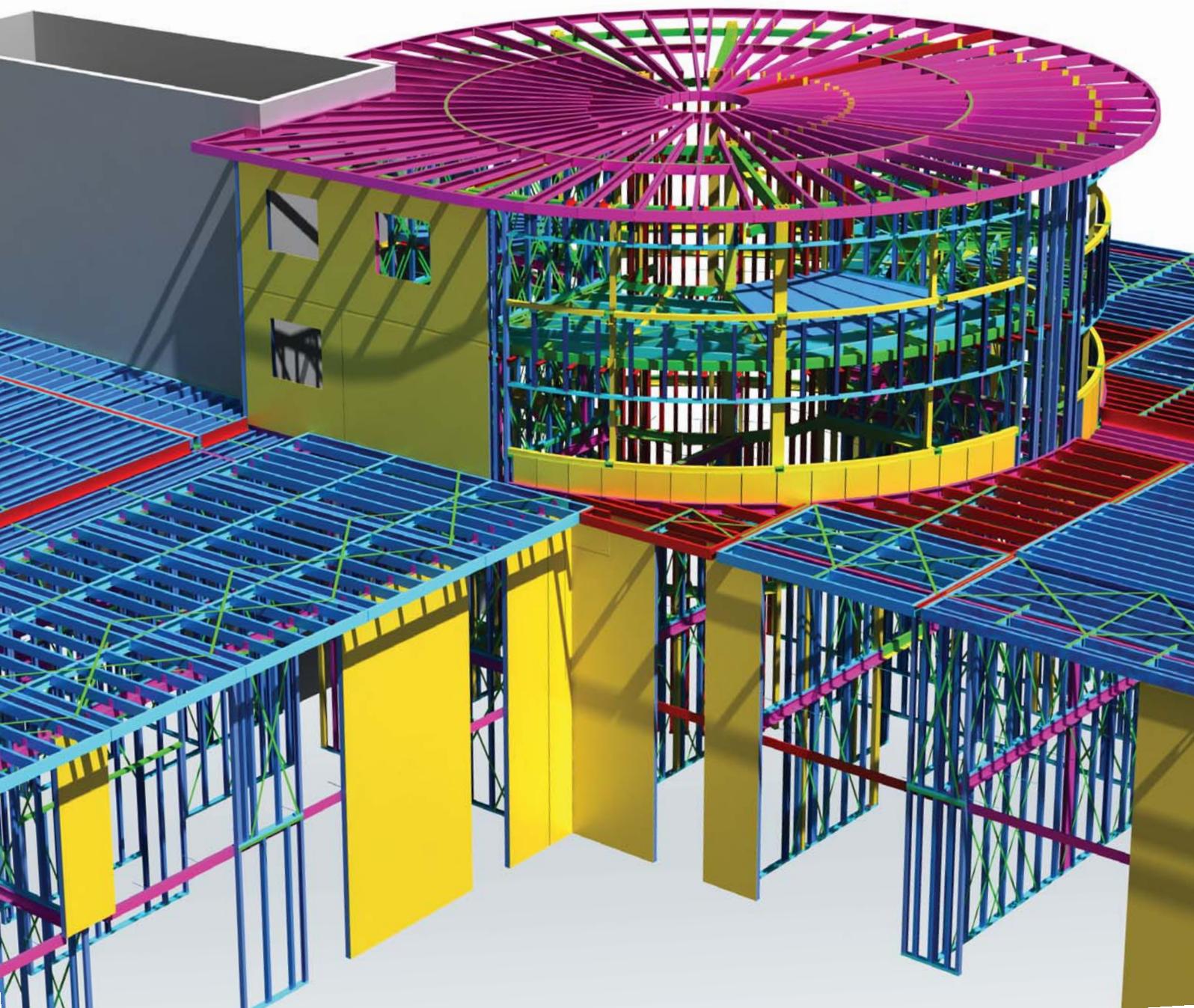


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April 2010			

KINGFRAME

Kingframe Building System | Architectural Façade Systems | Steel Framing System





Kingspan Profiles & Sections is Europe's leading manufacturer and innovator of modern methods of construction in steel, providing high performance solutions to the public, private and commercial sectors.



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Kingframe Building System (KBS)

KBS is the result of a development process led by market demand. The outcome is a rapid build, cost-effective panelised load bearing steel frame system which complements a wide variety of architectural contexts and is suitable for both low and mid-rise buildings.



Cert No. 125-07

Features

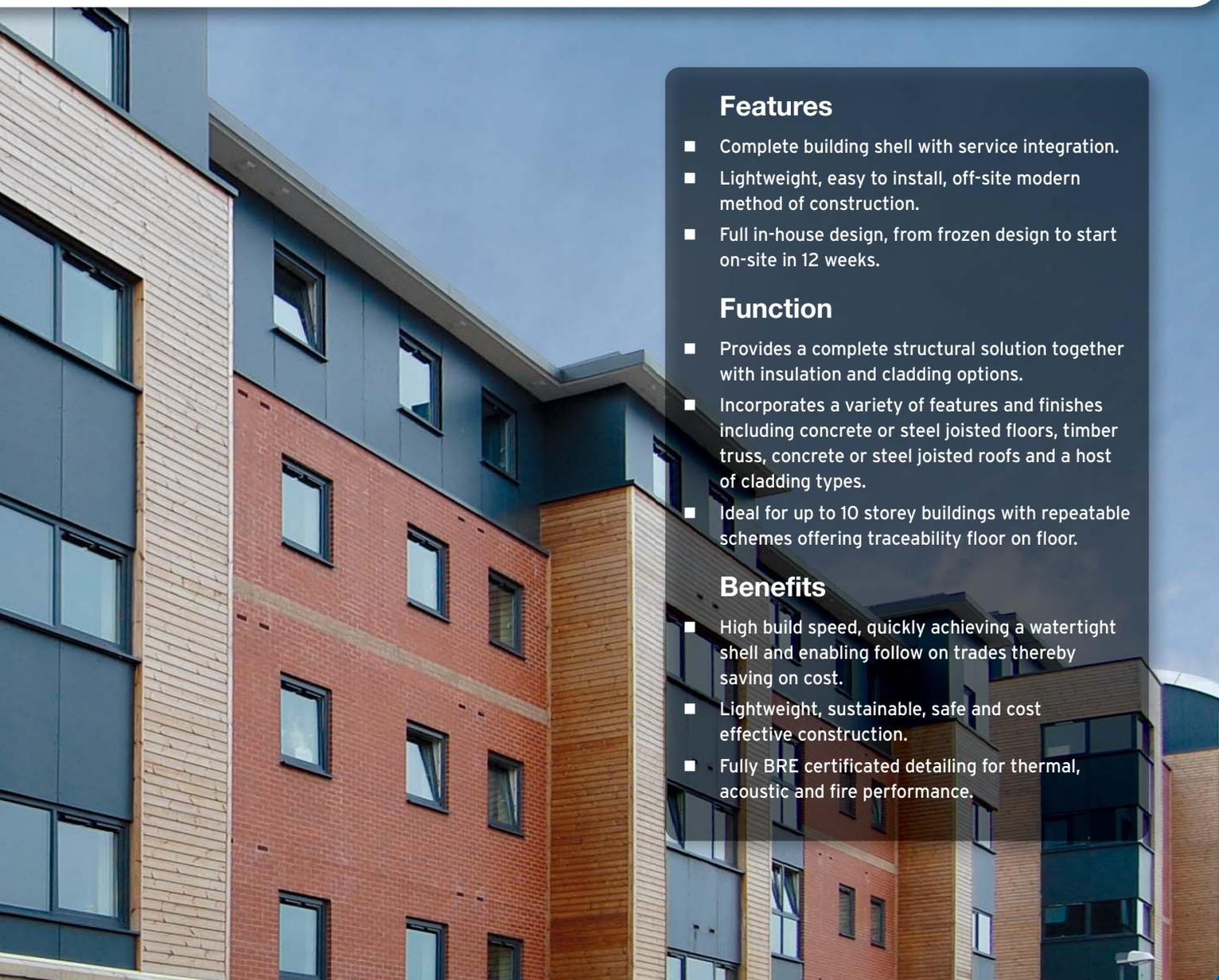
- Complete building shell with service integration.
- Lightweight, easy to install, off-site modern method of construction.
- Full in-house design, from frozen design to start on-site in 12 weeks.

Function

- Provides a complete structural solution together with insulation and cladding options.
- Incorporates a variety of features and finishes including concrete or steel joisted floors, timber truss, concrete or steel joisted roofs and a host of cladding types.
- Ideal for up to 10 storey buildings with repeatable schemes offering traceability floor on floor.

Benefits

- High build speed, quickly achieving a watertight shell and enabling follow on trades thereby saving on cost.
- Lightweight, sustainable, safe and cost effective construction.
- Fully BRE certificated detailing for thermal, acoustic and fire performance.



Business Case Kingframe Building System (KBS)

Speed of build

- Risk to the client is reduced through predictability and speed of programme which in turn offers a quicker return on investment.
- Utilising Kingspan Profiles & Sections advanced design and production techniques the Kingframe Building System can exceed a 25%^[1] reduction in overall build programme relative to traditional builds.
- Rapid dry envelope - KBS is able to achieve a watertight structure up to 45%^[2] quicker than traditional builds significantly reducing the build programme.

Sustainability

- Structural efficiency - light gauge steel offers high strength to weight ratio and therefore reduces material usage over traditional materials. Light steel joists and walls offer A and A+ ratings respectively in these areas in the BRE Green Guide (2007).
- Recyclable - Kingframe steel sections are 100% recyclable and made from high recycled content. This characteristic also reduces the waste produced by the overall project.
- Lightweight - KBS will achieve up to a 50%^[3] reduction in the overall weight of the structure relative to concrete frame reducing the requirements for foundations.
- Zero ODP and low GWP.

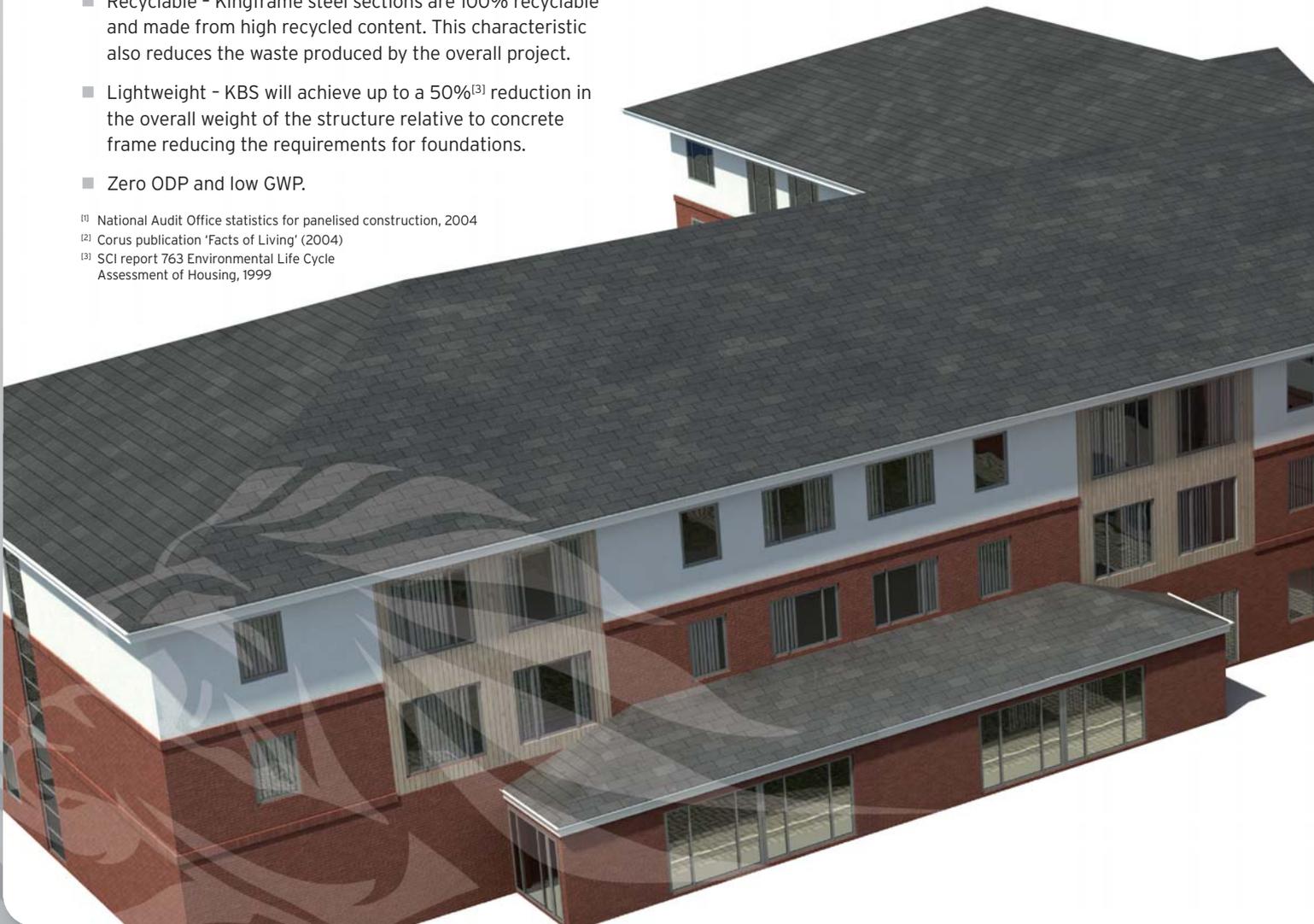
^[1] National Audit Office statistics for panelised construction, 2004

^[2] Corus publication 'Facts of Living' (2004)

^[3] SCI report 763 Environmental Life Cycle Assessment of Housing, 1999

Quality and cost

- Build cost - KBS will realise up to a 6% saving with regard to labour costs on a typical 6 storey building.
- Operational cost - building lifetime savings are achievable thanks to a highly energy efficient KBS structure.
- Tight tolerances - high dimensional accuracy of construction gives long term reliability.
- Near zero settlement - thanks to Kingframe Building System's connections it offers almost zero settlement in the frame.
- KBS's dry construction and steel section characteristics achieve near zero shrinkage. Furthermore, through a patented stud connection, KBS performs substantially better in this area relative to other light gauge steel competitors.





Speed of Build



Sustainability



Off-site Construction



Quality & Cost

Superior Airtightness
& WeathertightnessDesign Flexibility,
Aesthetic Appeal

Fully integrated for building physics and service requirements

- Full system BRE certification - offering assured thermal, acoustic and fire performance
 - U-values down to 0.11 W/m²K
 - Up to 2 hours fire rating
 - Acoustic attenuations and airtightness exceeding Building Regulation requirements
- Service integration - service holes pre-punched into studs and joists reducing fit-out times.

Off-site construction

- Improved health and safety - work is carried out under safe, warm and high quality environments utilising ISO 9001, ISO 14001, and OHSAS 18001 management systems - equating to fewer men working at height for less time.
- Cleaner site - fewer trades and less waste on-site.
- Reduced noise - improved site and surrounding environment.
- 'Just-in-time' - delivery of components as needed allows construction on tight sites, lowering costs in site management and storage facilities.

Design

- Design synergy through integration of structural frame with lift shafts, stairs, cladding and services.
- Fully 3D modelled prior to panel manufacturing, exposing potential clashes in the design office and resolving them before they become costly problems on-site.
- In house design team involved at all stages of the project to offer the most cost-effective design solution.
- Kingframe Building System can incorporate a vast array of architectural treatments and features, such as rainscreen façades, balcony systems and brise soleil.



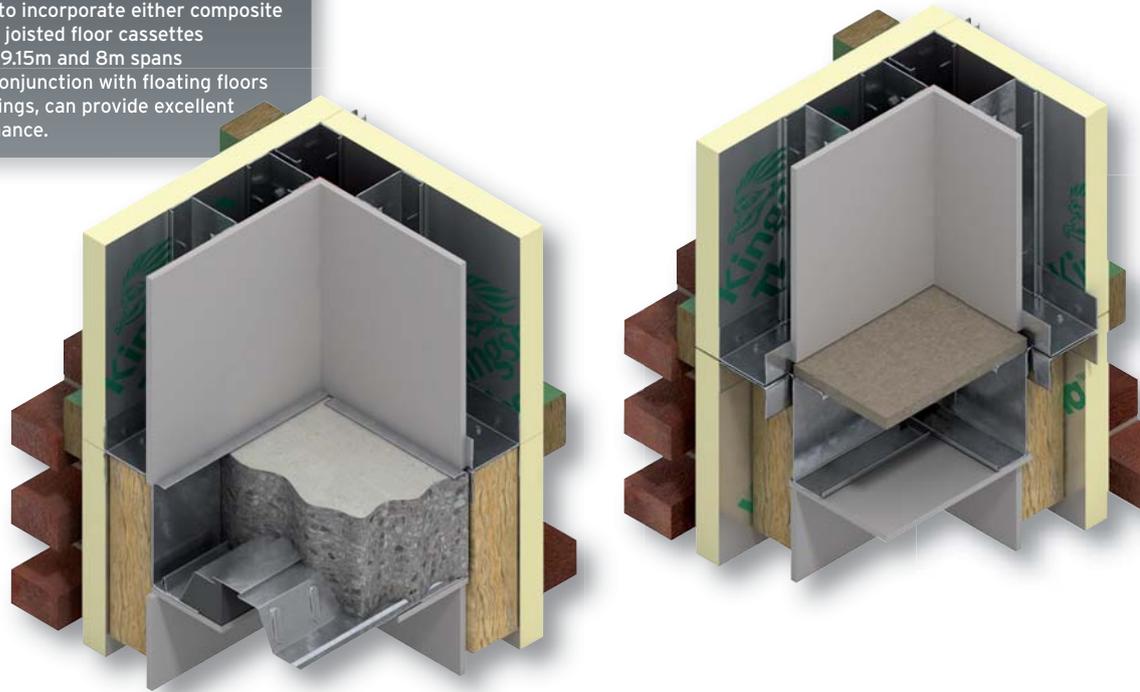
Technical Summary

SINGLE & TWIN PARTY WALLS

Purpose > KBS can incorporate either single or twin party walls, complying with Building Regulation requirements for sound transfer and fire resistance in either system. Spans up to 9.15m and wall thickness of 75, 100 and 150mm.

CONCRETE & STEEL JOISTED FLOORS

Purpose > KBS is designed to incorporate either composite concrete or steel joisted floor cassettes facilitating up to 9.15m and 8m spans respectively. In conjunction with floating floors and acoustic ceilings, can provide excellent acoustic performance.



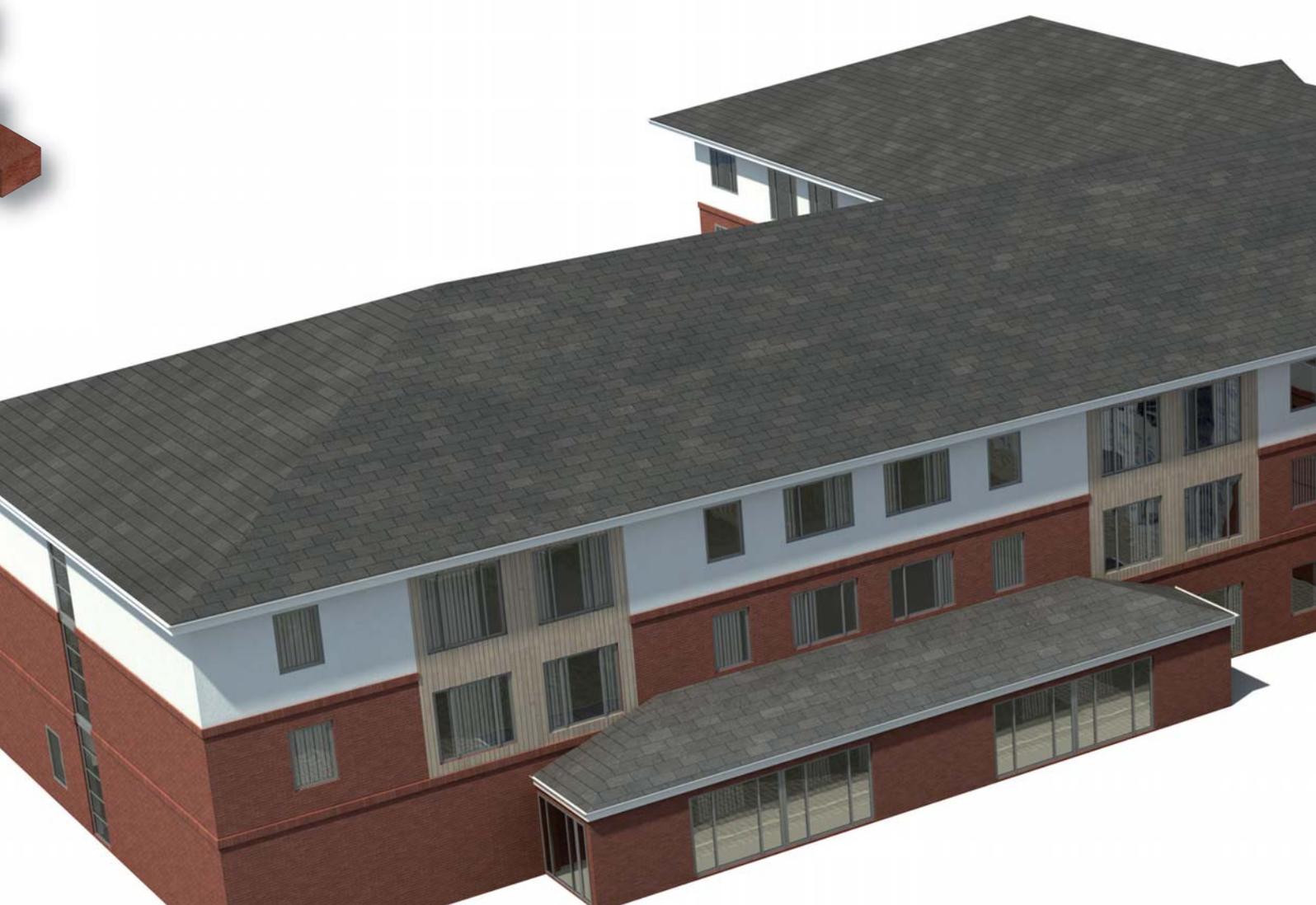
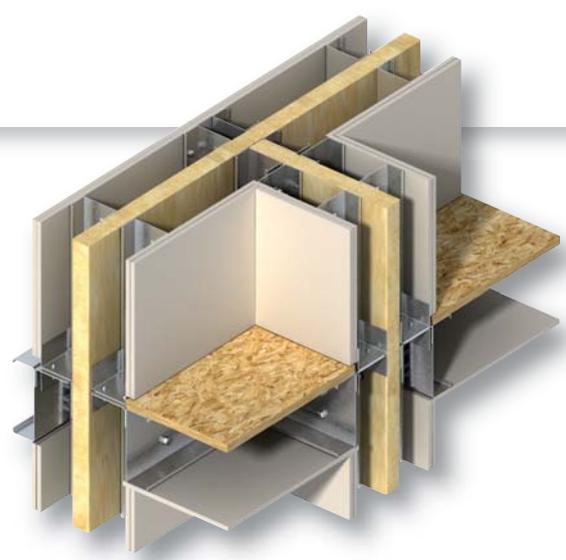
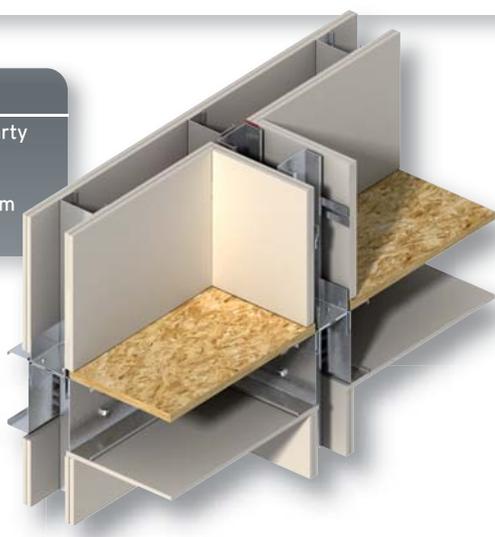
FAÇADE TYPES

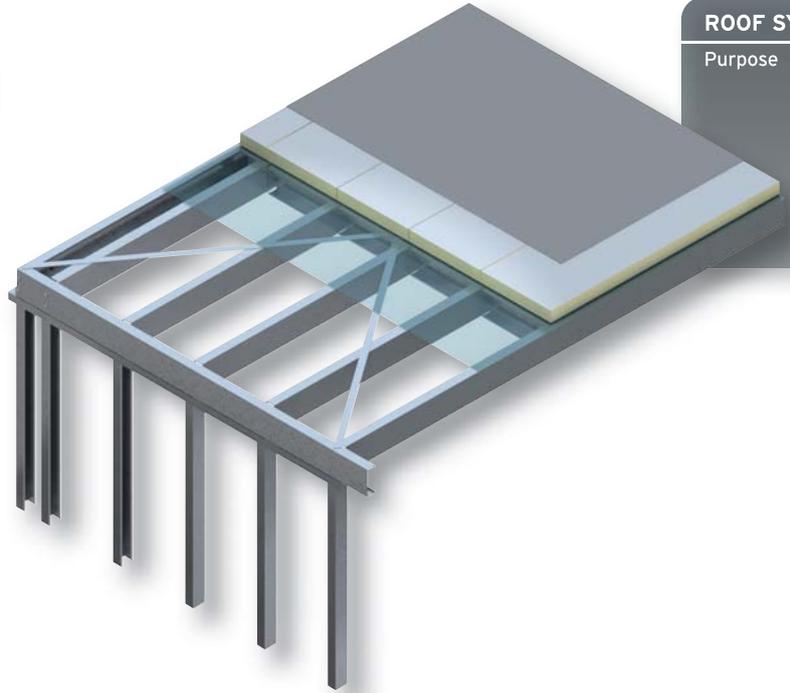
Purpose > KBS will incorporate a variation of façade types including:

- Masonry
- Brick slip
- Rainscreen façades
- Composite panels
- Insulated render
- Rendered blockwork
- GRC panels



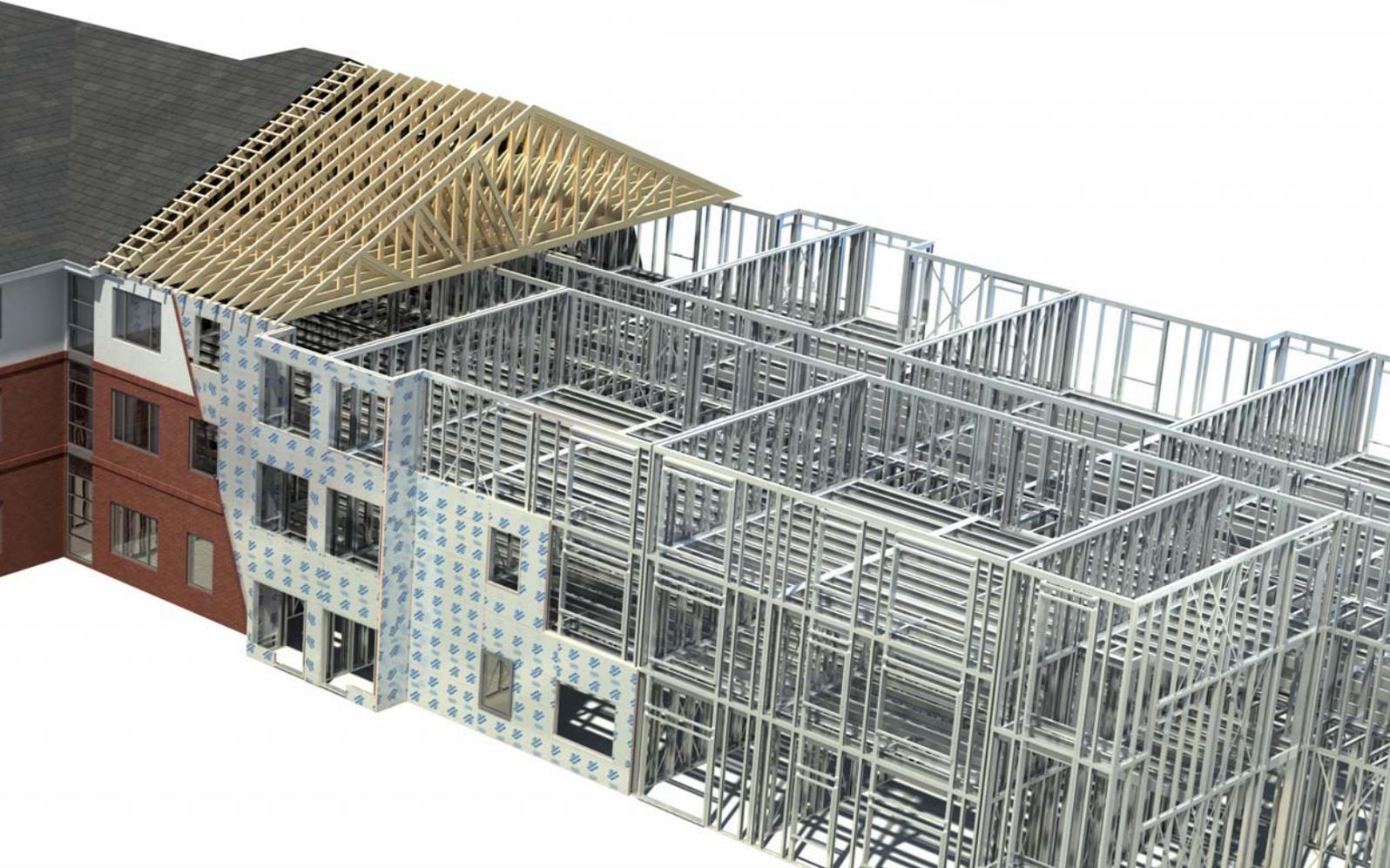
twin party
ation
fire
p to 4.5m
0mm.





ROOF SYS

Purpose >



TEMS

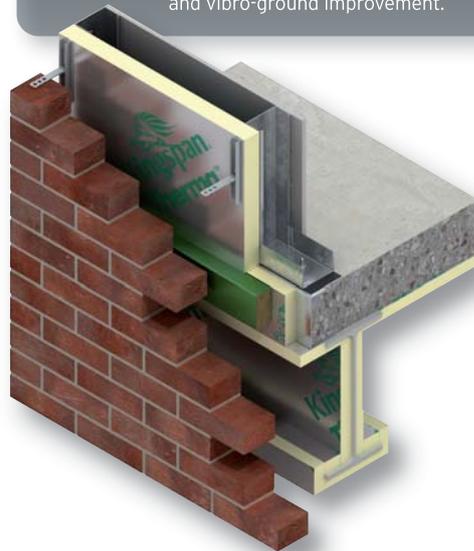
The flexibility of the KBS design allows incorporation of both timber truss and steel joisted roofs accommodating most finishes including:

- traditional slate, concrete, clay
- Kingspan Topdek
- single ply membrane
- standing seam



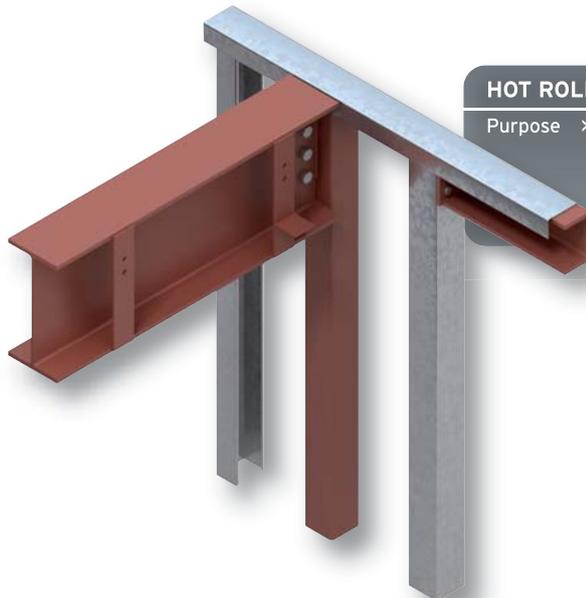
FOUNDATION & PODIA CONNECTIONS

Purpose > KBS will bear onto either concrete foundations, podium deck, raft, strip foundations, screw piles and vibro-ground improvement.



HOT ROLLED

Purpose > KBS can incorporate hot rolled steel beams and columns where necessary in order to supplement the cold rolled sections. This allows for open span areas where required and can accommodate non-continuous load paths.



Service & Support

Kingspan Profiles & Sections offers holistic design support at every stage of the project, from inception through to handover:

Estimating stage

- Our estimating department will manage your enquiry upon receipt, working in conjunction with the design office to provide an initial review for suitability.
- Upon completion of this review, we will contact you to advise of our intentions, and also to discuss the scheme initially to ensure that we provide the quotation that best suits your requirements within the boundaries of our review.
- For suitable schemes, we will provide an accurate quotation and marked-up estimating scheme drawings outlining our proposed layout.
- We will follow up our quotation to ensure that you are fully conversant with all aspects of our offer, and discuss any options or amendments you may wish.

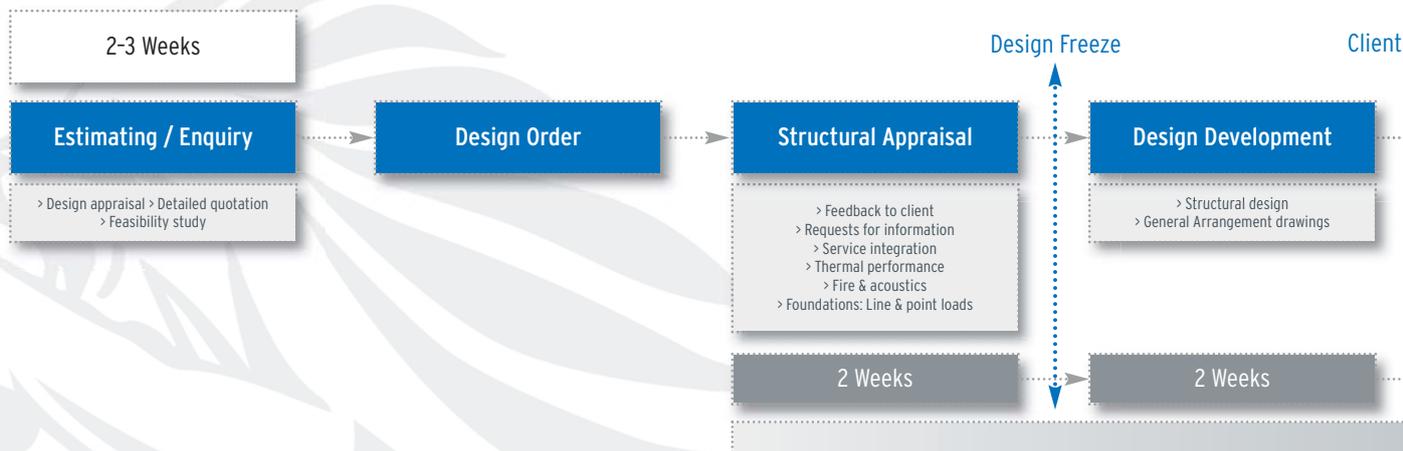
Project inception and pre-contract

- Our design office will review your architectural GA's and provide suitability guidance for the KBS system with regard to thermal, acoustic and fire performance.
- Our in-house engineering team will provide full foundation load schemes to allow foundation / podia design to be carried out prior to frame design.

Full design stage

- Our engineers will review the architect's and engineer's data to highlight any areas of concern and work with the client team to achieve an optimum design.
- From design, using the architects and engineers data, our designers will produce full GA drawings for the project and submit them for client approval. Our engineering team will also produce full calculations for the steel frame design.
- Once GA's are frozen, we will produce a BIM 3D model of the structure, detailing all sections and connections. All detailing is in accordance with our fully BRE certified system ensuring robust design.
- Our design team will review the model with the installation and client teams to ensure that it is fully understood. Site installation details and drawings are produced to aid installation.

Design Service > Critical Success Factor = Early Involvement



Production stage

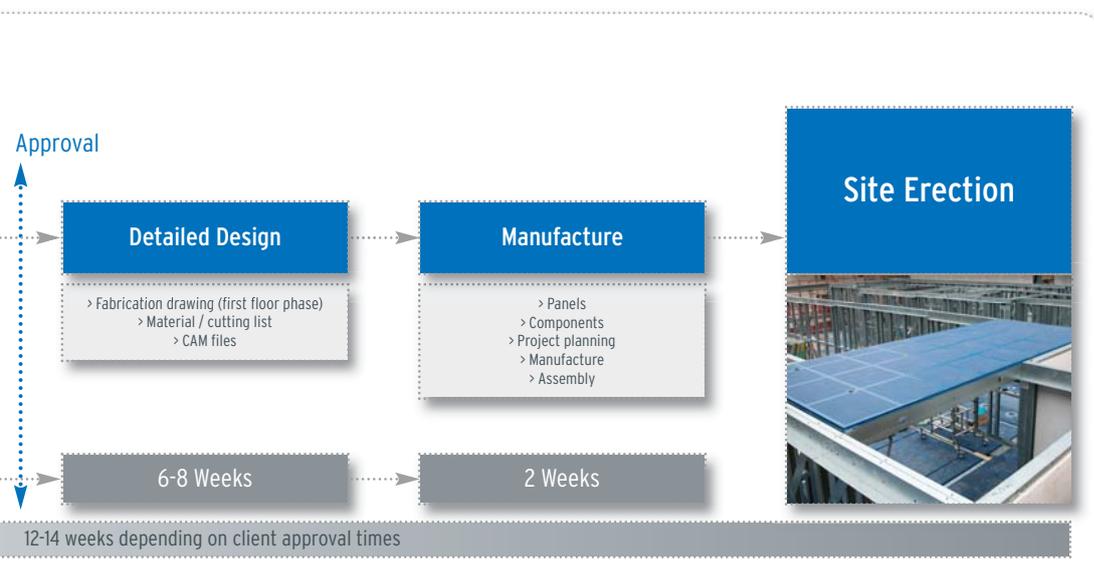
- Our approved model will be used to create CNC data for the rolling mills. The output sections will then be assembled into panels in our factory under controlled conditions, mitigating on-site working risk.
- Our customer services team liaise with the installation team to ensure correct planning of sequence and delivery to site, allowing for 'just-in-time' material supply.
- All panels are manufactured utilising a controlled management system which combines all the common elements of ISO 9001:2008 (Quality Management), ISO 14001:2004 (Environmental Management) and OHSAS 18001:2007 (Occupational Health and Safety Management) and signed-off prior to shipping to site.

Construction stage

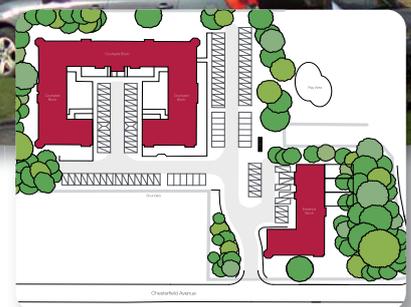
- Panels are shipped to site in order to allow the installation team to proceed without taking up valuable site storage space.
- Panels are all marked with an assembly numbers corresponding to our marking plans. These are craned into place, temporary propped, levelled and then bolted together. Floor cassette panels or composite concrete decking are installed and work then commences on the next floor.
- Our engineers attend site to ensure compliance with design and to sign-off specified areas of the build as required.

Handover stage

- A O&M Manual for the frame and components supplied by Kingspan Profiles & Sections is produced and handed over to the design team. This includes full framing calculations, drawing specifications and certification sheets.
- Feedback is encouraged from all participants of the design team to ensure the KBS system is continuously improved.



Case Study Gainsborough Court, Glasgow



Development plan

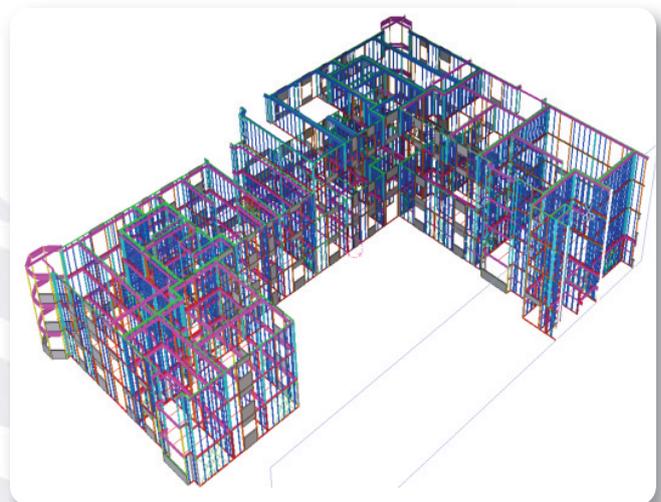
This exciting residential development in Glasgow, contracted by Mactaggart and Mickel, had restricted site access plus an established residential area and school nearby both of which could not be adversely affected during construction. It is these characteristics that motivated Gyplik Ltd to utilise the Kingframe Building System.

Project value: £7.5 million.

Project Size: 2 x Domestic private housing blocks, smaller 3 storey entrance block consisting of 3 x 3 storey townhouses and 9 x 2 bedroom apartments with a 560m² footprint and larger courtyard block 4 and 5 storey high accommodating approx 50 apartments with a 1700m² footprint.

Construction: Timber truss roof in both blocks and steel joisted floor cassettes in townhouses and composite concrete floor in all apartments.

Finishes: Traditional brickwork and rendered blockwork.



KBS 3D model

Project:	Great Western Road, Glasgow, Scotland
Client:	Mactaggart & Mickel
Architect:	Fouin and Bell
Engineer:	Wren & Bell
Main Contractor:	Mactaggart & Mickel
Installer:	Gyplik Ltd

Case Study Allerton Bywater, Leeds



KEY FEATURES

- Integration with traditional build techniques
- Future proof design

Allerton Bywater contracted by Barratt Developments, one of the UK's largest house builders, required construction with in a confined area and furthermore required all elements to follow the Lifetime Homes standard, to ensure all of Part M of the Building Regulations and the Housing Corporation Scheme Development Standards were met.

For Kingspan Profiles & Sections this meant designing a series of future-proof homes giving each townhouse the capability of installing a lift shaft or lifting hoists without having to make drastic modifications to the structure.

Project value: £4.5 million.

Project Size: 90 unit development of 2 and 3 storey town houses.

Construction: Steel joisted floor cassettes and traditional timber truss roof.

Finishes: Traditional brickwork with tiled roofs.



Balcony detail

Project:	Town houses, Allerton Bywater, Leeds
Client:	Barratt Developments
Architect:	Barratt Developments
Main Contractor:	Barratt Developments
Installer:	Kingspan

Case Study Fountain North, Edinburgh



KEY FEATURES

- RC concrete transfer structure
- Integration with Kingspan Topdek
- 6 week turnaround
- High wind pressure
- Restricted site access

KBS was chosen on the Fountain North project due to the need for a fast-track lightweight modern method of construction. The project was being built off an existing transfer structure with designated maximum loading capacity. It was imperative that the loadings of the structure did not exceed this predetermined capability.

The project was subject to a completely inflexible compressed programme due to the demand for the project to open its doors to the first influx of students in 2011. The standard design and production lead time was compressed by almost 50% to just over 6 weeks to facilitate this.

The external wall panels arrived to site fitted complete with Hardie panel enabling the external cladding contractor to insulate and apply cladding virtually as soon as panels were installed.

Project Size: 7 storey, 314 bed development of high-end dedicated student accommodation, incorporating retail and leisure facilities on ground floor (208 studies and 117 cluster bedrooms).

Construction: 2 storey RC concrete transfer structure with top 5 and 6 stories in lightweight steel frame with composite concrete floors and joisted cassette roof.

Finishes: Walls - 2600m² terracotta tile façade finish and composite panels.
Roof - Kingspan Topdek.

Project:	Fountain North Student Accommodation, Edinburgh, Scotland
Client:	IQ
Architect:	Fletcher Joseph
Main Contractor:	Watkin Jones
Installer:	PAW Structures

Case Study Meadway Extra Care Home



KEY FEATURES

- Light steel load bearing frame integrated for building services
- Open plan areas at ground floor
- Variety of façade treatments including brick, render and timber



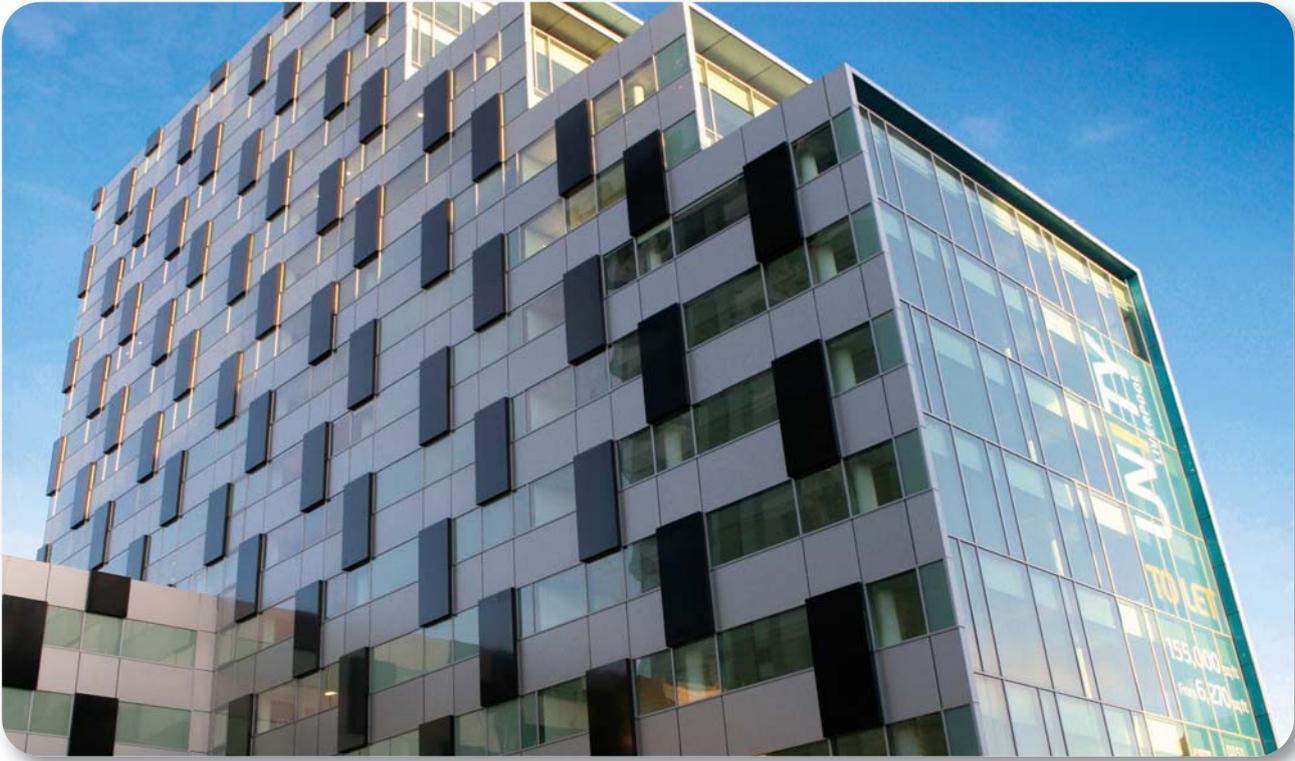
The Meadway Extra Care project designed by Calford Seadon architects and contracted by Willmott Dixon Housing is a 4 storey care home. The project required large open plan areas at ground floor, aesthetic design and a quick turnaround reducing the latent period on return on investment.

Using KBS offered Willmott Dixon Housing scope for up to a 25% reduction in overall build programme, relative to traditional builds, assisting them to meet Housing 21 expectations on delivery.

The project incorporated a complex curved timber truss roof supported off cold rolled panels. Integration of this feature required early involvement and design collaboration with the timber designers to ensure that a working design solution between the two products was achieved with minimal work required on-site. In order to realise these efficiencies the Kingspan project team worked closely with all other parties right from the pre-design stage.

The final result of the project was the supply of a load bearing structure fitted with Hardie board, 70mm Kingspan insulation and Kingspan helping hand bracket / brick tie channels ready for service integration and finishes in 13 weeks.

Project:	Meadway Extra Care Home, Meadway, Birmingham
Client:	Housing 21
Architect:	Calford Seadon Partnership
Main Contractor:	Willmott Dixon Housing
Structural Engineer:	Gemma Building & Design Services Ltd

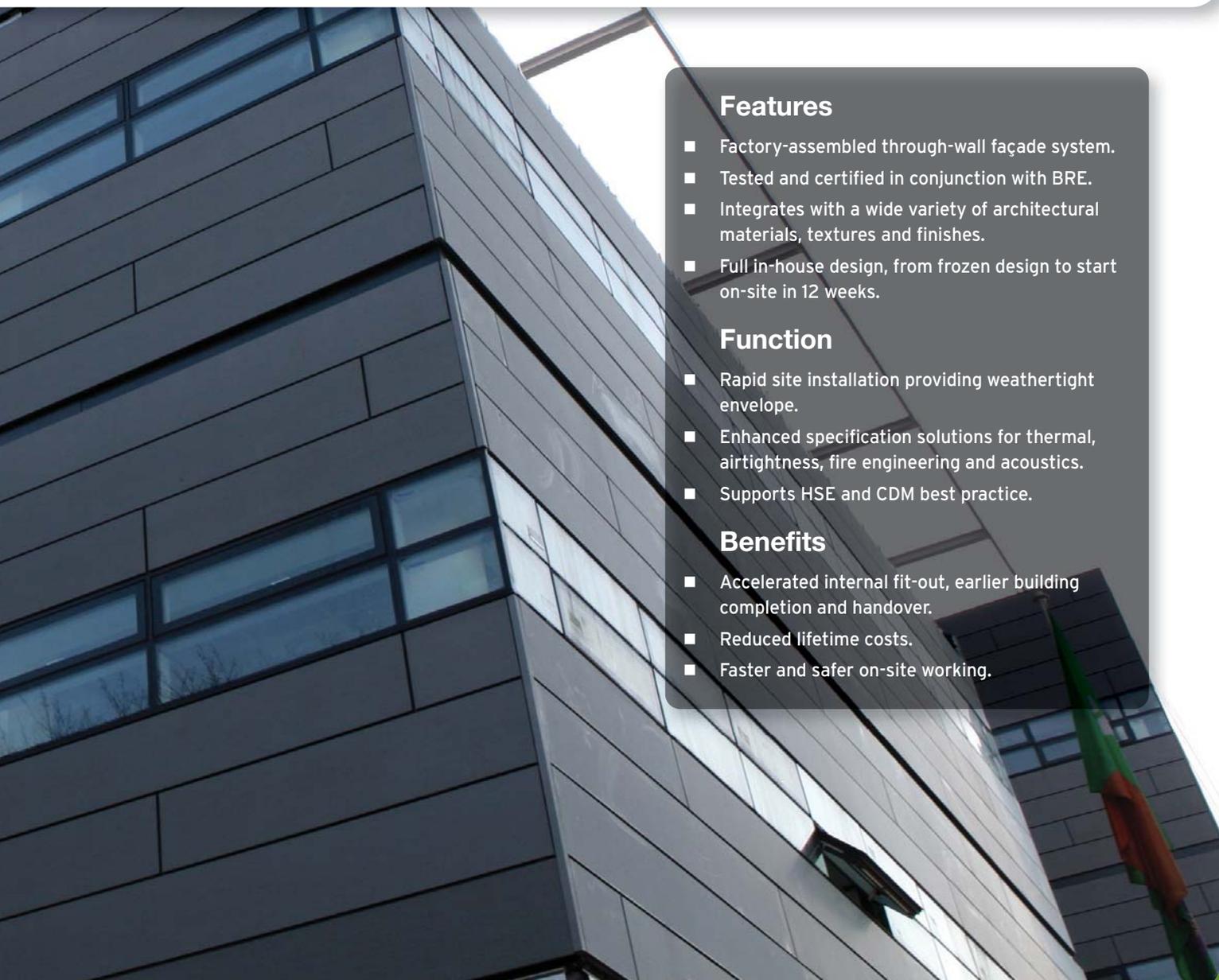


Architectural Façade Systems (AFS)

AFS has been developed to provide a vast range of façade solutions making it possible for designers to apply an imaginative and individual façade to any type of building. The system is specifically designed and engineered for rapid installation onto the main building structure whether it be steel or concrete.



Cert No. 118-06



Features

- Factory-assembled through-wall façade system.
- Tested and certified in conjunction with BRE.
- Integrates with a wide variety of architectural materials, textures and finishes.
- Full in-house design, from frozen design to start on-site in 12 weeks.

Function

- Rapid site installation providing weathertight envelope.
- Enhanced specification solutions for thermal, airtightness, fire engineering and acoustics.
- Supports HSE and CDM best practice.

Benefits

- Accelerated internal fit-out, earlier building completion and handover.
- Reduced lifetime costs.
- Faster and safer on-site working.

Business Case Architectural Façade Systems (AFS)

Speed of build

- AFS design facilitates a significant reduction in time to achieve a watertight structure over a traditional build. This characteristic allows access to follow on trades earlier in the build programme leading to lower site costs.
- Risk to the client is reduced through predictability and speed of programme which in turn offers a quicker return on investment in comparison to traditional building methods.

Design

- Frames are fully isolated from structural movement through implementation of Kingspan registered design deflection components.
- Fully 3D modelled facilitating correct fit and direct extraction of CAM data to ensure that the manufactured product is as designed.
- In-house design team involved at all stages of the project to offer the most cost-effective design solution.
- Bespoke details provided to suit project specific requirements.

Sustainability

- The system has been assessed to Arup SPeAR criteria and found to be superior to all conventional construction methods.
- The system (excluding timber rainscreen) achieves a Class A BREEAM rating when assessed to the guidance set out in the BRE Green Guide.
- Reduced transport and delivery costs as a number of components are delivered on the same load.
- All Kingspan Profiles & Section product delivered to site is used - there is no excess or waste

Safe working

- Fully audited frame handling procedures provided to reduce on-site risk when manoeuvring frames into position.
- Assessed and monitored installation methods for the system and components to mitigate against inherent installation risks.
- Reduced site operations allow for a safer installation method.





Cost Savings



Sustainability



Safe Working



Quality Assurance

Design Flexibility,
Aesthetic AppealWall Performance
& Building Physics

Quality and cost

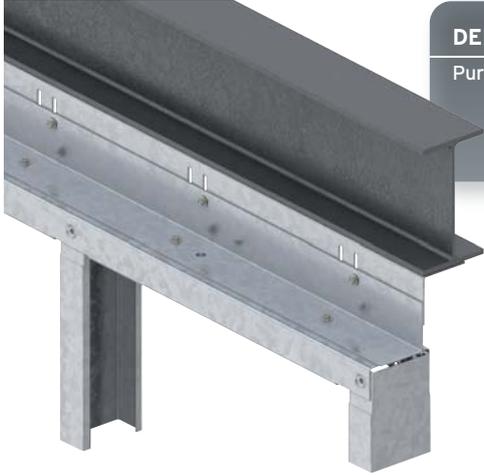
- Reduced client risk through accurate and flexible programming ensuring delivery of frames to site for the required areas / phases - 'just-in-time'.
- 100m² of clad and sealed wall achievable daily with the recessed system and 175m² daily using the face-fixed construction method.
- Controlled environment construction allows the system to qualify for BRE Certification.
- All panels are manufactured utilising a controlled management system which combines all the common elements of ISO 9001:2008 (Quality Management), ISO 14001:2004 (Environmental Management) and OHSAS 18001:2007 (Occupational Health and Safety Management) and signed-off prior to shipping to site.

Wall performance and building physics

- BRE certification covers all aspects of envelope performance including structural, fire, thermal, acoustic, weather resistance, durability and longevity.
- The system is supplied fitted with Kingspan's proven and market leading insulation materials; each is assessed for thermal performance so the values provided may be used with confidence.
- All frames are constructed using the warm frame principle to eliminate condensation risk and maximise insulation performance. There is no need for costly and unreliable vapour barriers and breather membranes.



Technical Summary



DEFLECTION HEAD DETAIL - RECESSED FRAME

Purpose > The deflection head detail for the recessed fixed system ensures the frame is isolated from live load deflection of the floor slabs facilitating stability and positioning.

DEFLECTION DETAIL - FACE-FIXED FRAME

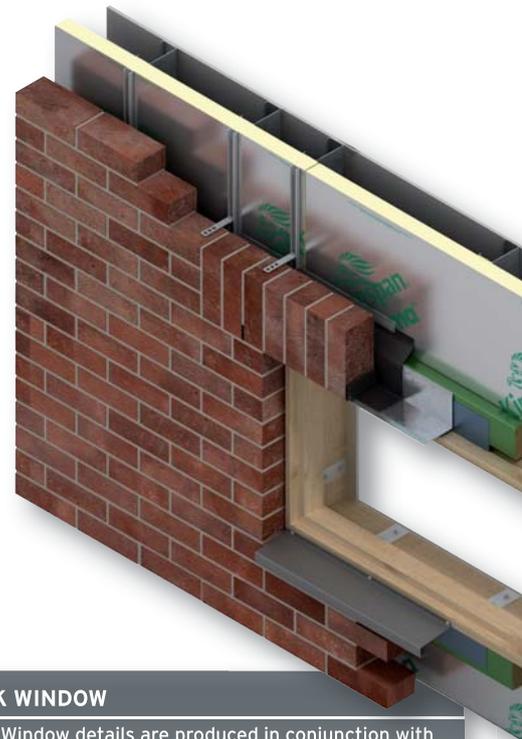
Purpose > The face-fixed system accommodates live load deflection of the floor slab by allowing the brackets to move with the slab leaving the frames in position to span between fixed points at the columns.



Face-fix Bracket



Face-fix Bracket



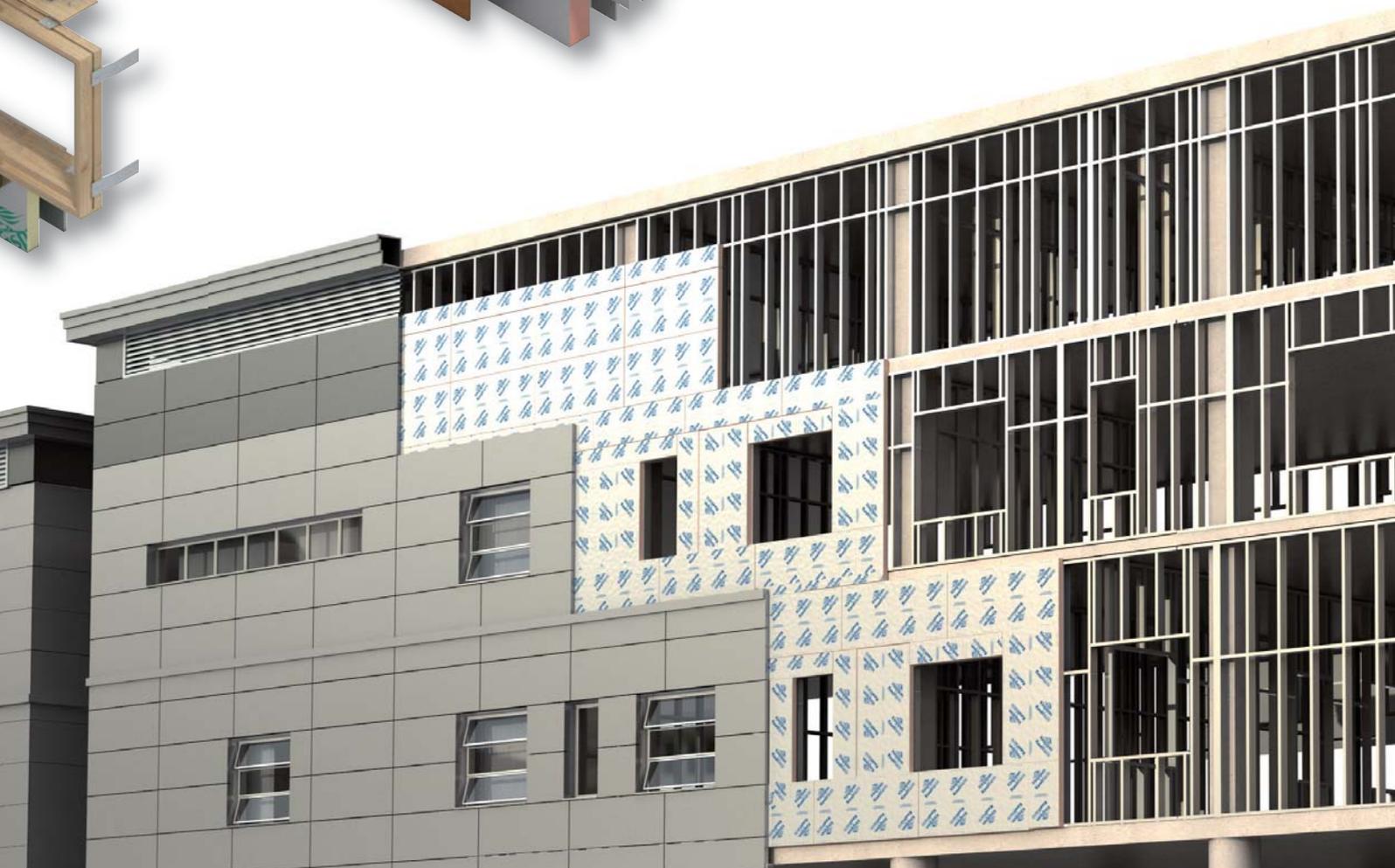
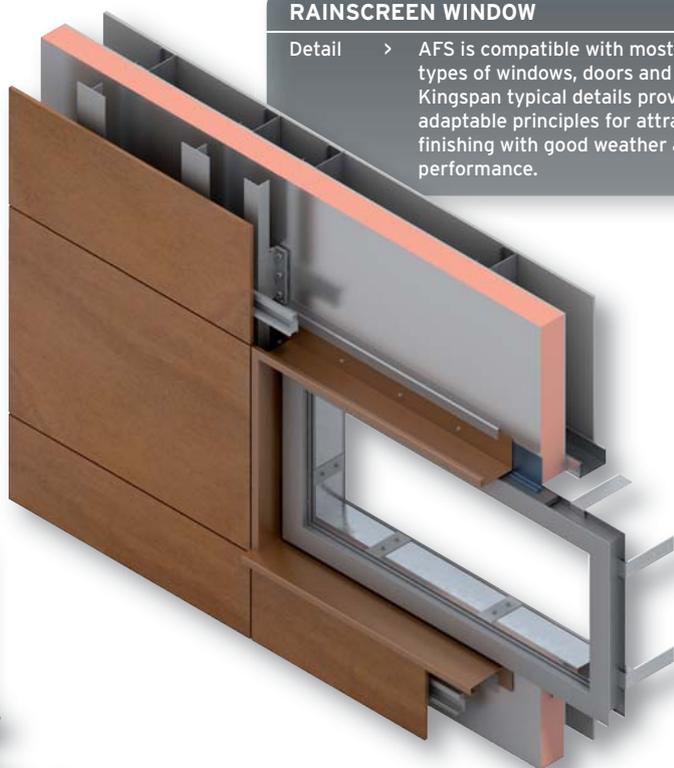
BRICKWORK WINDOW

Detail > Window details are produced in conjunction with the architect and window contractor to ensure all thermal, fire, air leakage and condensation principles have been considered and accommodated (based on typical approved details).



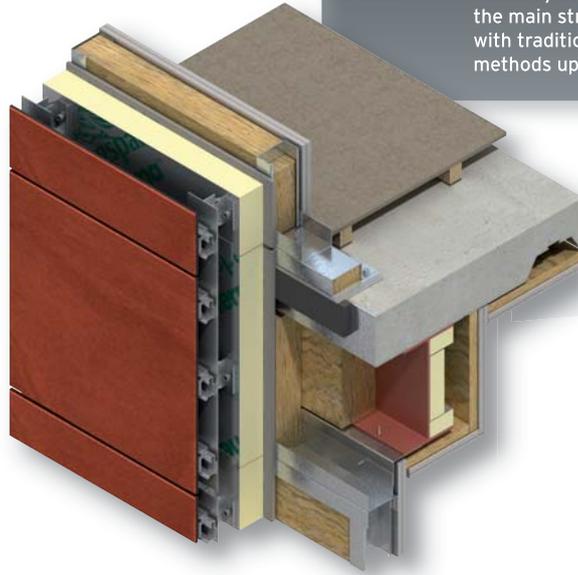
RAINSCREEN WINDOW

Detail > AFS is compatible with most industry standard types of windows, doors and curtain walling. Kingspan typical details provide robust and adaptable principles for attractive window finishing with good weather and thermal performance.



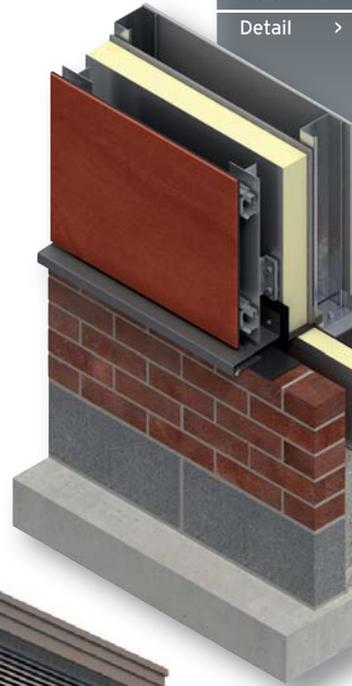
RECESSED FRAME - STEEL MAIN STRUCTURE

Detail > AFS may be recessed fixed within the confines of the main structure as shown and is compatible with traditional steel and concrete building methods up to any height.



FOUNDATI

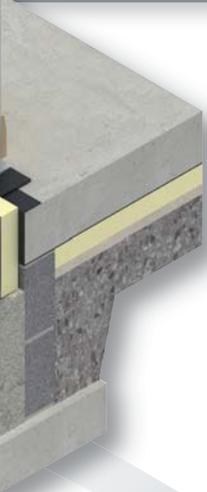
Detail >



FACE-FIXED FRAME - CONCRETE MAIN STRUCTURE

Detail > AFS may be face-fixed spanning past column and slab faces and fixed back to the main structure via pre-fitted hot rolled steel brackets. Face-fixing allows greater areas to be clad in a single lift and can eliminate costly on-site infill work around columns and slabs (this is best suited to finishes other than brick and block).

ONS
A vast array of foundation details are available, all of which maintain a warm frame construction and incorporate damp proof membranes. The system is compatible with all types of foundation design for any scale project.



Service & Support

Kingspan Profiles & Sections offers holistic design support at every stage of the project, from inception through to handover:

Estimating and pre-contract design stage

- Our estimating and pre-contract design team will work with you from project inception, producing an initial feasibility study and giving recommendations on detailing and setting out to produce the most economical solution whilst maintaining architectural intent.
- The team will provide technical advice and support on detailing issues, ensuring the building envelope will be fully compliant with the relevant performance specifications.
- The team are available for pre-quotation meetings and follow up meetings to ensure the quotation covers the clients requirements.
- A comprehensive quotation package is provided for each tender including scope of supply.

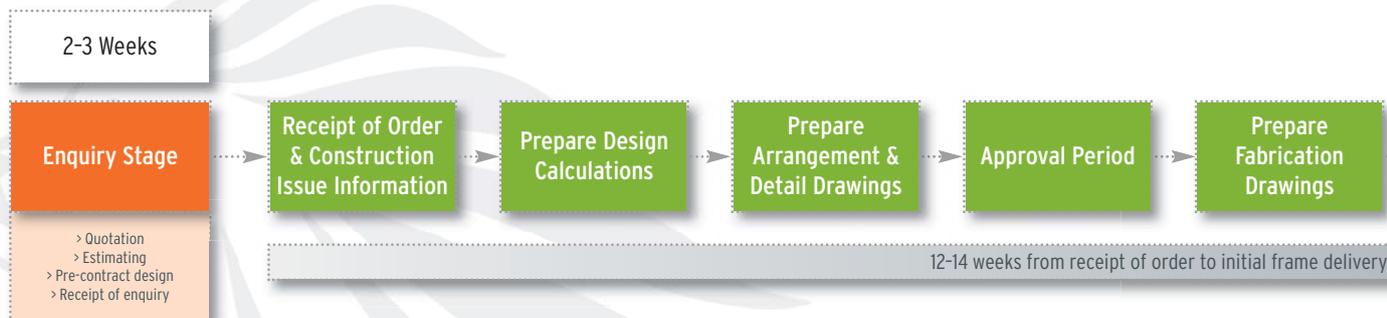
Full design stage

- Complete structural design package produced by in-house team of qualified and experienced structural engineers.
- Complete drawing package including setting out drawings for each elevation, and project specific details as required.
- Frames and studs are positioned to match the setting out of the external finish to ensure the most efficient installation of the façade.
- Building physics support throughout the contract to ensure the envelope is compliant with thermal, acoustic, fire, air permeability, vapour resistivity requirements.
- Thermal and condensation risk calculations provided for each project in accordance with BS EN ISO 6946 and BS 5250 respectively.

Production stage

- Our fully approved model will be used to create CNC data for the rolling mills. The manufactured sections will then be assembled into panels in our factory under controlled conditions, mitigating on-site working risk.
- Our customer services team liaise with the installation team to ensure correct planning of sequence and delivery to site, allowing for 'just-in-time' material supply.
- All panels are manufactured utilising a controlled management system which combines all the common elements of ISO 9001:2008 (Quality Management), ISO 14001:2004 (Environmental Management) and OHSAS 18001:2007 (Occupational Health and Safety Management) and signed-off prior to shipping to site.

Design Service > Critical Success Factor = Early Involvement

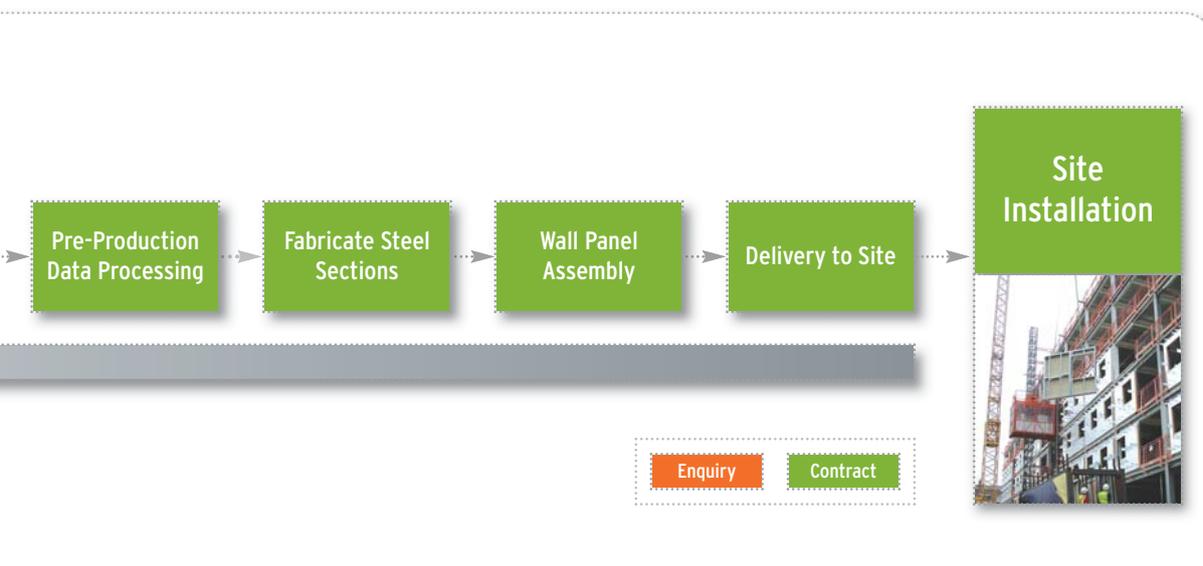


Construction stage

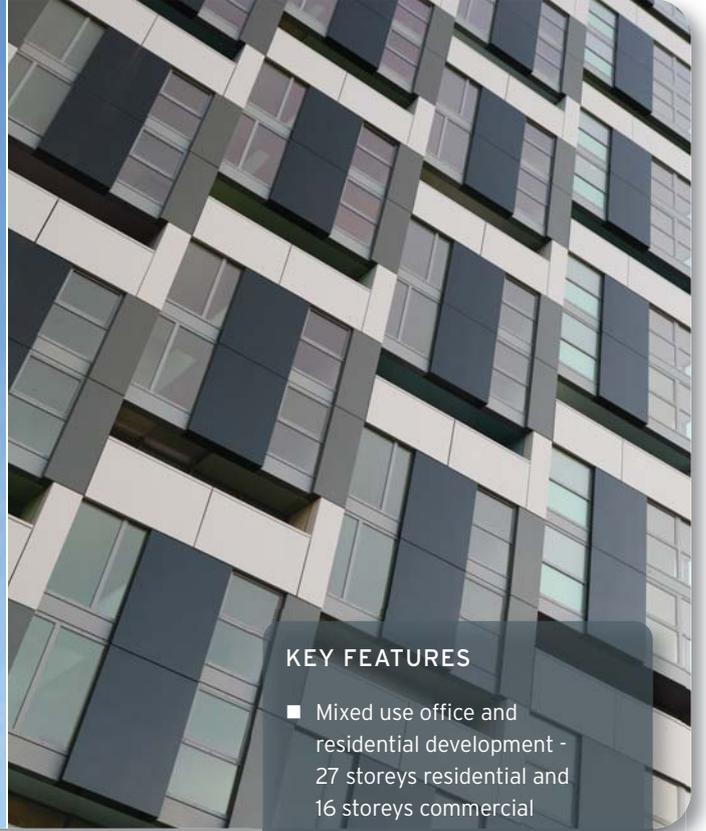
- Fully assembled panels, complete with sheathing board, insulation and bracketry as required, are delivered to site on a 'just-in-time' basis.
- The panels are installed by Kingspan recommended Installers in compliance with Kingspan's installation procedures.
- Kingspan project management carry out regular site audits to ensure installation quality.

Handover stage

- A full O&M Manual for the frame and components supplied by Kingspan Profiles & Sections is produced and handed over to the design team. This includes full framing calculations and drawings, certificates and specification sheets.
- Feedback is encouraged from all participants of the design team to ensure that any useful lessons are learned and captured.



Case Study Unity Tower



KEY FEATURES

- Mixed use office and residential development - 27 storeys residential and 16 storeys commercial
- In-situ concrete main structure
- 1543 off-site Kingframe AFS units
- Aluminium ventilated rainscreen system

Liverpool's £60million Sentinel Unity development starts to take shape on the 2008 City of Culture's waterfront, which was recently awarded World Heritage status. This stunning mixed use office and residential development, the largest of its kind outside London, presented many challenges to main contractor Laing O'Rourke. The restricted site working conditions were major factors in the selection of the Kingframe Architectural Façade System.

The development comprises a 27-storey residential building, topped by six cantilevered penthouse suites with views over the River Mersey, plus a 16-storey office complex - the first Grade A offices to be built in Liverpool.

The primary challenge to specialist façade constructors Dane Architectural Systems was the claustrophobic city location coupled with exposure to winds off the Irish Sea. These factors and others meant that traditional methods of construction were out of the question, and a new approach from the construction partners was necessary.



The residential tower, showing much of the finished glazing and rainscreen in place.

Project:	Unity Tower, Liverpool
Architect:	Allford Hall Monaghan Morris
Main Contractor:	Laing o'Rourke (Northern)
Façade Installer:	Dane Architectural Systems Ltd

Case Study St Helen's Hospital, Liverpool



KEY FEATURES

- New Diagnostics and Treatment Centre
- 25,000 m², high-specification healthcare facility
- Kingframe AFS specified for speed of construction
- Finished in brick, render, cedar cladding, terracotta and aluminium rainscreen

The construction of high-specification healthcare facilities demands nothing less than the highest standard of building solutions. The design brief for the construction of a new Diagnostics and Treatment Centre at St. Helen's Hospital reflected those demands at every level - from architects Capita Architecture, main contractor Taylor Woodrow and building envelope installer Prater.

Taylor Woodrow appointed Prater due to the company's considerable experience in providing envelope solutions for large scale projects, including installing off-site manufactured components. Prater in turn specified a Kingspan Kingframe Architectural Façade System (AFS) from Kingspan Profiles & Sections. The Kingframe 'through-wall' AFS solution has proven itself in a number of high-profile construction projects, achieving significant time and cost savings compared to conventional construction methods such as brick and block.

Project:	St. Helen's Hospital, Liverpool
Client:	New Hospitals (St. Helen's & Knowsley) Limited on behalf of St. Helen's & Knowsley Hospitals NHS Trust
Architect:	Capita Architecture
Main Contractor:	Taylor Woodrow
Engineer:	Arup
Façade Installer:	Prater



Once installed, the Kingframe AFS panels were sealed, a bracket carrier system fitted and finally terracotta tiling finished off the elevation.

Case Study East Street Mill, Leeds



KEY FEATURES

- Refurbishment and new-build of historic mill complex near City Centre
- Creating 179 studios, apartments and key worker housing
- Estimated project value £12million
- Modular solution based almost entirely on off-site construction
- Kingframe AFS for rapid completion of building envelope
- High levels of energy efficiency

Integrating modern methods of construction with some of Leeds' most historic mill buildings was the challenge for Design Group 3 Architects and Kingspan Profiles & Sections, on the City's East Street Mills site.

The project, spearheaded by Design Group 3 Architects, involved the conversion of an existing Grade II listed mill complex into 179 dwellings, including construction of an adjacent, entirely new-build wing. The aim was to provide key worker accommodation close to the city centre, together with affordable studio units for young professionals.



This view of a curved elevation shows the structure's extreme proximity to the adjacent Grade II listed mill.

Project: East Street Mills, East Street, Leeds
Architect: Design Group 3 Architects
Main Contractor: Pierse Developments
Façade Installer: William Cooper Ltd

Case Study St George's Close, Sheffield



KEY FEATURES

- 8-storey development of primarily student accommodation, with private apartments, leisure centre and retail units
- Including 963 student bedrooms, common room and management suite
- Total 1465 m², estimated project value around £15.3million
- Kingframe Architectural Façade System for rapid closure of building envelope
- Finished in a combination of composite panels (Kingspan Optimo), aluminium rainscreen and ventilated render façade

A multi-storey residential development in very tight city centre location? Unforgiving deadlines? Unpredictable autumn weather approaching? There's one simple solution: specify a Kingframe Architectural Façade System from Kingspan to close-off the building in weeks, not months, with no need for scaffolding.

That's what main contractor Ocon and installer SIAC Façades did on the St. George's Close development in central Sheffield. The project comprised 963 student bedrooms and 160 residential apartments in four, eight-storey buildings. It was a significant challenge in its own right, without the added complication of minimising disruption to closely-neighbouring houses.



Kingframe AFS at St. George's Close has been designed to support a striking combination of finishes comprising Kingspan Optimo insulated panels and ventilated render façade.

Project:	St. George's Close, Sheffield
Architect:	Acanthus WSM Architects
Main Contractor:	Ocon Construction
Façade Installer:	SIAC Façades Ltd



Steel Framing System (SFS)

SFS is a lightweight cold-rolled galvanised steel framing system for recessed and face-fixed framing that is assembled on site.



Features

- Quick and easily installed cladding support system.
- Rapidly achieves a watertight frame enabling follow-on trades.
- Full in-house design, from frozen design to start on-site in 5 weeks.

Function

- Provides a fully designed lightweight cladding frame to traditional builds.
- Allows for a variety of finishes including internal boardings and external cladding systems.
- Capable of achieving high spans and forming complex curves and features such as soffits and downstand.

Benefits

- High build speed, quickly achieving a watertight shell and enabling follow-on trades thereby saving on cost.
- Lightweight, sustainable and safe.
- Cost-effective construction.



Business Case Steel Framing System (SFS)

Speed of build

- Risk to the client is reduced through predictability and speed of programme which in turn offers a quicker return on investment in comparison to traditional building methods.
- Rapid dry envelope - SFS assists in reducing the time to achieve a watertight structure when compared to traditional building methods. This facilitates earlier access of follow-on trades which subsequently reduces the build programme.

Sustainability

- Light gauge steel offers high strength to weight ratio and therefore reduces material usage over traditional materials.
- Light steel walls offer A ratings in the BRE Green Guide (2007).
- Steel sections are 100% recyclable. This is increasingly important as the lifetime environmental impact of the buildings is increasingly scrutinised to meet tighter Government legislation.
- Light gauge steel reduces the overall weight of walling relative to blockwork minimising the requirements for foundations.

Quality and cost

- Lightweight cold-rolled steel sections are precision engineered products manufactured to tight tolerances ensuring exact performance resulting in less time spent on-site correcting errors and solving problems.
- Steel is dimensionally stable and does not suffer from shrinkage.
- Tight tolerances - high dimensional accuracy of construction gives long term reliability.
- The rapid construction characteristic of Kingframe SFS allows the client to realise significant productivity savings compared to traditional building methods.
- SFS can incorporate a vast array of architectural treatments and features and allows large spans and large structural openings without the need for windposts.
- 'Just-in-time' - delivery of components as needed allows construction on tight sites, lowering costs in site management and storage facilities.

Design

- If requested, schemes can be fully detailed prior to rolling, exposing potential clashes at the design stage thereby resolving them before they become costly problems on-site.
- If required, our in-house design team can be involved at all stages of the project to offer the most cost-effective design solution.



Steel Framing System (SFS)



Speed of Build



Sustainability



Quality & Cost

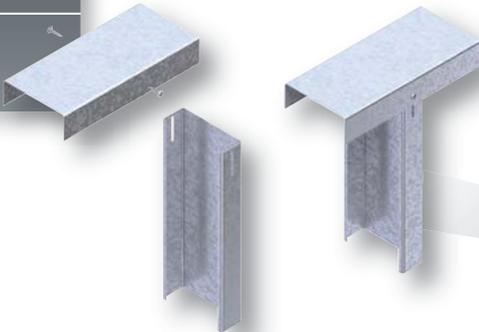


Design Flexibility,
Aesthetic Appeal

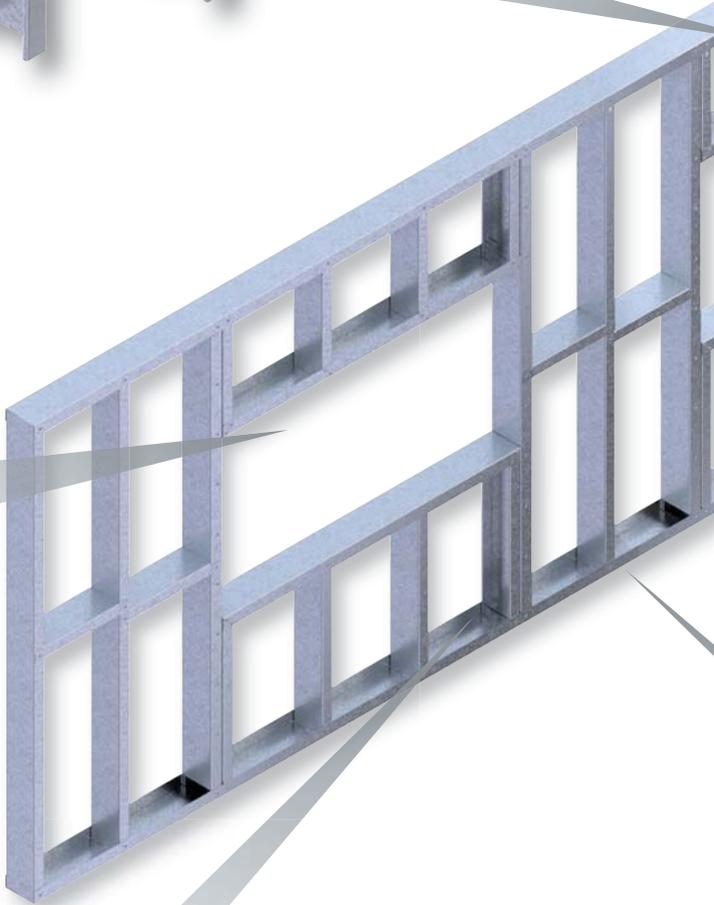


Technical Summary

SLOTTED STUD DEFLECTION HEAD DETAIL
Purpose > The SFS slotted stud detail is used to accommodate deflection of the primary structure.

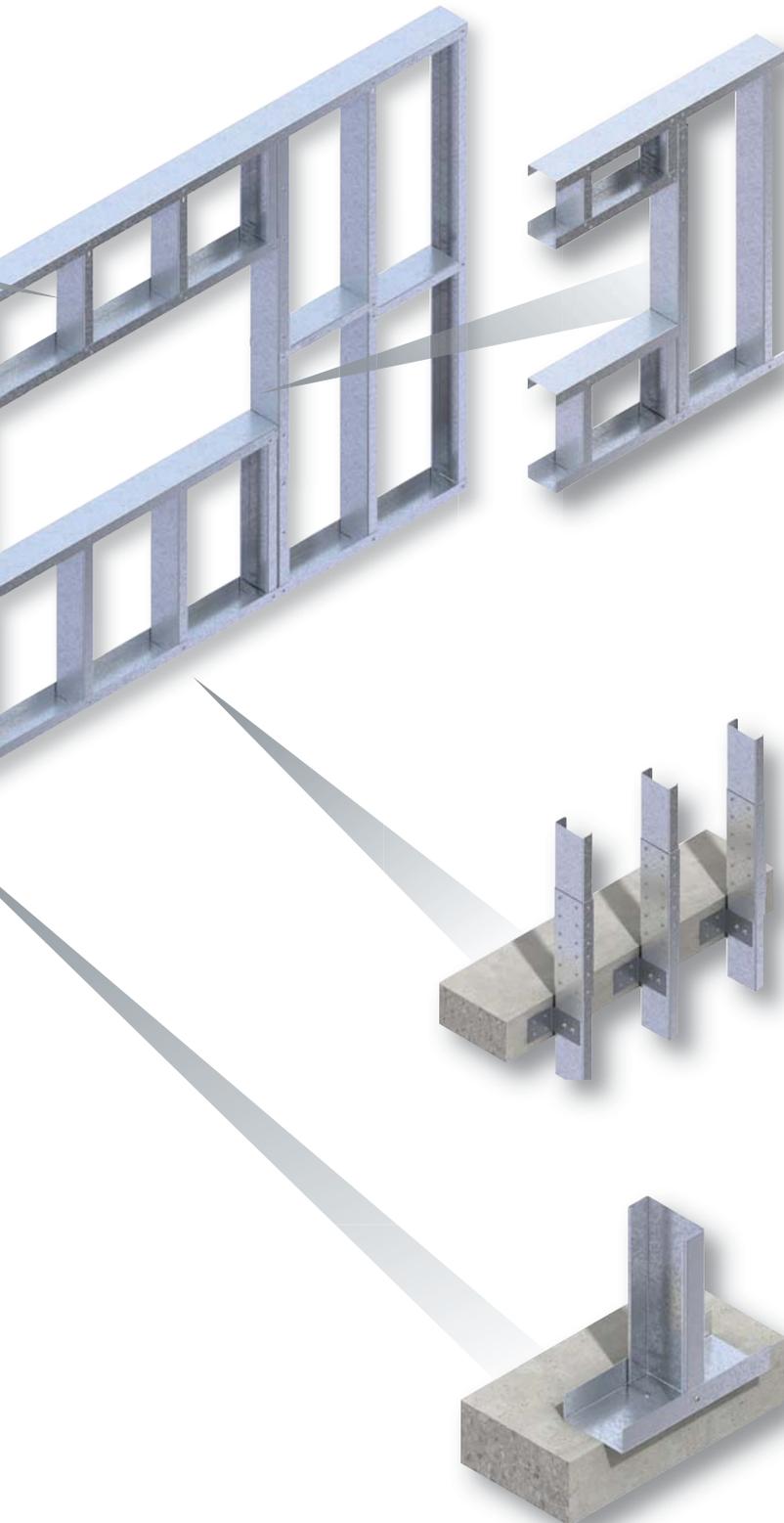


LINTEL CONSTRUCTION
Purpose > SFS can incorporate most structural openings with both narrow and wide horizontal spans.



CILL CONSTRUCTION
Purpose > SFS sections will be designed to form window cill accommodating both narrow and wide horizontal spans.





JAMB CONSTRUCTION - SINGLE SLOTTED STUD & WRAP AROUND TRACK

Purpose > SFS can be designed to incorporate tall vertical spans facilitating the use of large windows and doors in both recessed and face fixed environments.

PANEL JOINT - STUD SPLICE DETAIL

Purpose > In a face-fixed environment SFS can incorporate continuous unbroken façade facilitating various types of architectural finishes.

BASE TRACK TO CONCRETE CONNECTION

Purpose > In recessed environment SFS is fixed to the structure to ensure integrity. Minimal bearing required.

Service & Support

Depending on the characteristics of the project, Kingspan Profiles & Sections are able to offer the following levels of service and support:

Indicative design

- The service includes indicative drawings of the most common areas of the structure highlighting openings outside the scope of the cold-rolled system which would require framing in hot rolled steel.
- Standard details provided.

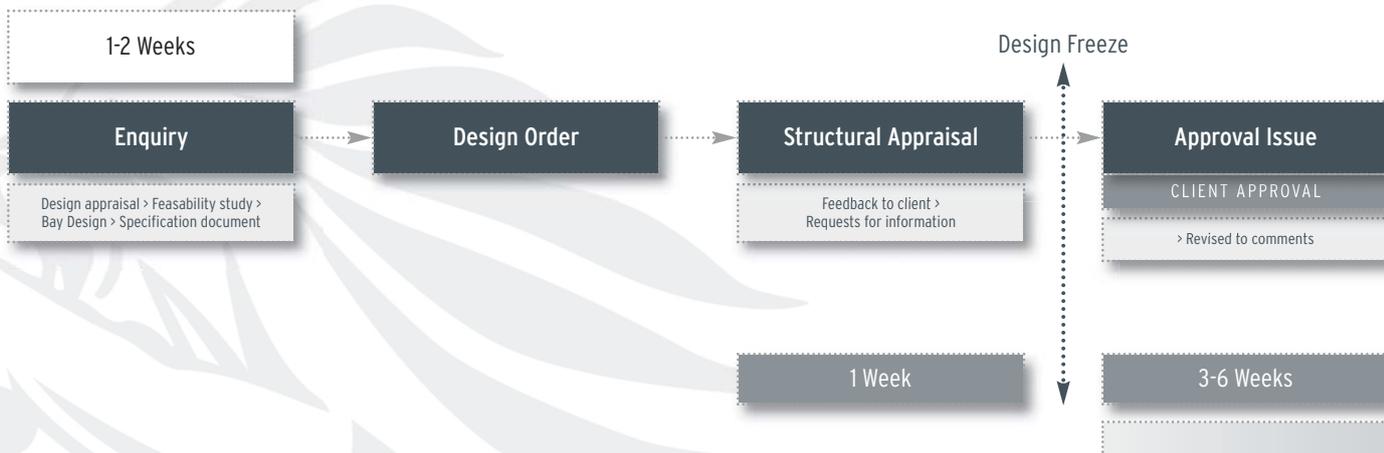
Limited design

- With our limited design service, we will conduct a review of the Architects and Structural Engineers drawings to find the most commonly repeated details across your project. We will then undertake a structural design for selected bay drawings and associated details and produce indicative drawings indicating appropriate section sizes for the various elements in the panel.
- If specifically requested the calculations for each panel can be provided.



Beswick, Manchester

Design Service > Critical Success Factor = Early Involvement

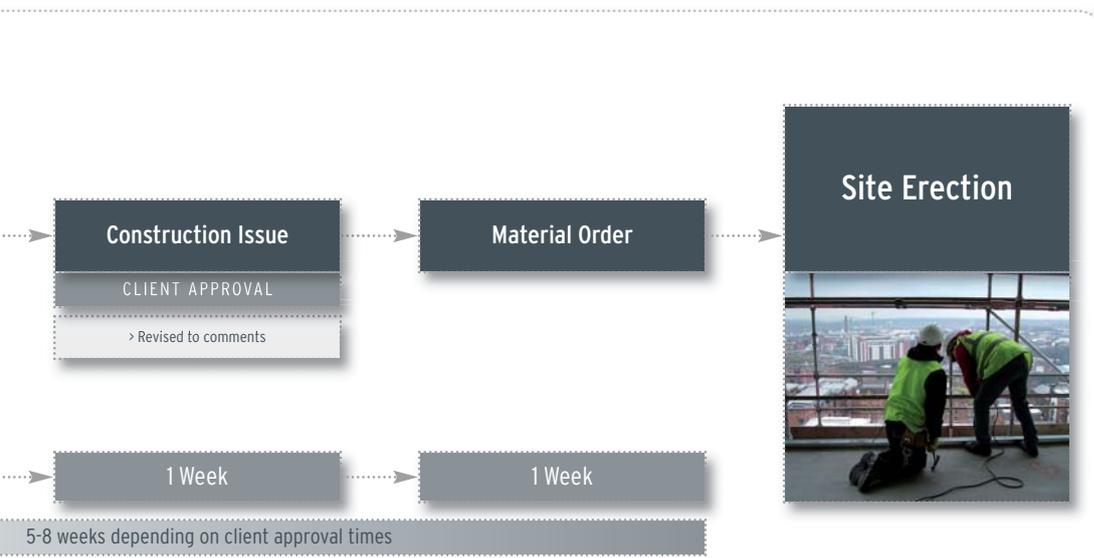


Full design service

- We look at every aspect of your project when undertaking full design and for that reason, every project is assessed on its own merits so we can offer the most efficient and cost-effective solution for you.

The following is provided:

- **Full Drawing Information**
Kingspan Profiles & Sections provides detailed plan, section and elevation drawings for the areas of SFS on the project so there is no doubt what the framing sections construction is for any given part of the building. Kingspan also ensures that its drawings are passed through the relevant approval procedures, so that installation proceeds with the assurance that it has been approved by the project architect, and that they are available for submission to the client as part of the CDM and O&M requirements.
- **Project Management Support**
Kingspan Profiles & Sections understands that you cannot accurately estimate cost for every possibility on a project and that programmes can vary due to the unpredictable nature of site. Kingspan Profiles & Sections is your representative in the design decision making process and will always serve your interests to prevent cost and the programme from over-running. Kingspan Profiles & Sections has gained significant experience whilst working on some of the country's largest and most prestigious construction projects.
- **Detailed Structural Calculations**
Where full design is required, and if specifically requested, Kingspan Profiles & Sections can provide detailed calculations to the relevant codes of practice for submission to Building Control.
- **Site Handover**
In order for a smooth transition from the design office to site Kingspan Profiles & Sections provide a project handover to the site personnel prior to site erection. This includes a review of the installation drawings indicating any areas difficult to construct, a review of both installation and technical manuals and highlighting any CDM issues and responsibilities on the project.
- **Site Inspection**
For peace of mind that the SFS has been installed correct to the Kingspan Profile & Sections Drawings we can perform a site inspection, at a nominal cost, highlighting areas which require remediation to site personnel. We will then follow up with a site report detailing the areas discussed.



Case Study Aylesbury College, Buckinghamshire



KEY FEATURES

- Projecting fin
- Ribbon windows
- Insulated render system
- Lightweight solution
- Cantilevered soffit areas

The Aylesbury College development in Buckinghamshire designed by Architects Bond Bryan posed many problems to HGB Construction and SKM Anthony Hunt Structural Engineers due to its architectural complexity. A solution was needed that was lightweight, adaptable and cost-effective.

Kingframe SFS was used to give support to the lightweight insulated render system applied to the building increasing both the projects sustainability credentials and speed of build. Additionally SFS was used in the development of the long ribbon windows giving the building good aesthetics and high levels of natural light.

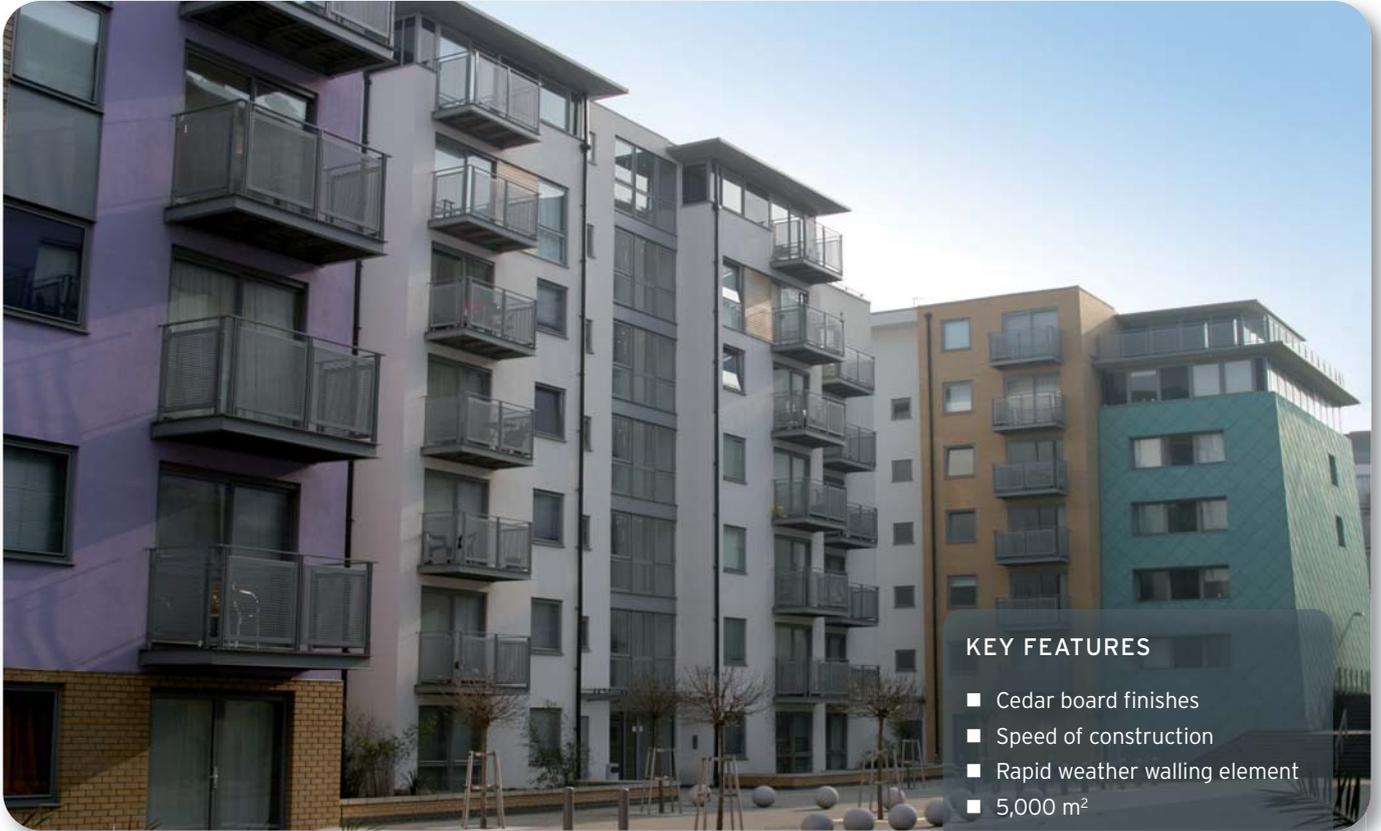
To achieve the architectural features desired by the client Kingframe SFS was also used to construct the projecting fin at the entrance to the building. This entailed a gentle curved SFS wall that was cantilevered away from the primary structure by using specially designed support plates and brackets.

Project: Aylesbury College
Architect: Bond Bryan Architects
Main Contractor: HGB Construction
Structural Engineer: SKM Anthony Hunt



The projecting fin detail during construction.

Case Study One SE1, London



KEY FEATURES

- Cedar board finishes
- Speed of construction
- Rapid weather walling element
- 5,000 m²

Kingframe SFS was chosen by St. James' Homes in the development of this exciting, and contemporary residential project. The SFS acted as the support system for an exciting array of external finishes including render, rainscreen and cedar board.

The 'fast-track' option of Kingframe SFS provided the client with a rapid weathered walling element allowing internal trades to be removed from the critical path and reduce the overall construction programme. Working with Broadway Malyan and RMA Architects, the Kingframe 100mm SFS system was specified throughout the project which also provided support to large glazing and curtain walling areas.

The two developments at Deptford, One SE1 and The California Building offer a contemporary design using contrasting render colours to lift the appearance of the entire development.



Cladding panels.

Project: One SE1 London
Architect: Broadway Malyan & RMA Architects
Main Contractor: St. James' Homes
Structural Engineer: SKM Anthony Hunt

Case Study Forth Valley Hospital, Larbert



SPECIAL REQUIREMENTS

- Exacting delivery requirements.
- Large variations of wind pressures
- Speed of construction
- Multi-block construction on large site
- Intricate framing details and design
- 20,000m² of SFS

The SFS system was the obvious choice for Forth Valley due to the demand for a fast-track, lightweight modern method of construction to meet the tight deadlines on the project. SFS was delivered to site bundled in exact lengths to suit each individual area of infill, minimising site erection time. The individual blocks comprised certain challenging aspects such as drum areas, requiring tight curved radii, free standing parapets, cantilevered frames, kink bridges and intricate framing details. Exact delivery schedules were achieved by constant liaison between Kingspan, the installers and Laing O'Rourke. The 'just-in-time', bundled deliveries were key to the build programme to avoid storage of sections on an extremely busy site and to prevent delays to programme whilst awaiting delivery of next phase of material.

Approx Project value: In excess of £500 Million.

Project Size: 18 blocks ranging between 2 and 5 stories with one central corridor almost 1/4 mile long in length. Structure is based on a 60 hectare site indicating the huge scale of the project.

Finishes: Walls feature a wide range of cladding types, including render, rainscreen and terracotta tiles.

Project details: New hospital with 860 inpatient and day beds and featuring the full range of acute hospital services, including a mental health facility and a women and children's unit. The hospital will be delivered in three phases, the first patients through the doors in the summer of 2010, with the last phase completed within a year.

Work commenced on-site in May 2007.



Project:	Forth Valley Hospital, Larbert, Scotland
Client:	NHS
Architect:	Keppie
Main Contractor:	Laing O'Rourke
Installer:	Linear Projects and Soundtex Partitions & Ceilings

Case Study The Rock, Bury



KEY FEATURES

- Large, mixed use scheme including residential, retail and leisure
- Very high span SFS
- Complex curved areas, downstands and soffits
- Varying façade treatments including brick, render, timber and insulated panels
- Over 20,000m²

The landmark development has used the Kingframe SFS extensively to provide the highly detailed external finish to all blocks.

The £350 million development brings new vitality back to a run-down area of Bury town centre thanks to the pleasing aesthetic achieved by architects BDP. Main contractor Laing O'Rourke and Mansell Finishes specified Kingframe SFS thanks to the possibilities afforded by the bespoke design services offered by the in house team and the ease and speed of on site installation.

In addition to the recessed framing provided to the residential blocks, Kingspan Profiles & Sections also designed large complex face-fixed systems with a series of made to measure bracket supports to restrain the system back to the primary steel and concrete structural frames. The Kingspan Profiles & Sections engineering and design teams worked closely with the wider project team to ensure a consistent, workable and integrated approach to the façade support systems across all blocks in the tight timescales demanded by the programme.



Construction phase

Project:	The Rock, Bury
Architect:	BDP Architects
Main Contractor:	Laing O'Rourke
Structural Engineer:	Buro Happold
Installer:	Mansells Finishes Ltd

Kingframe Certification

Product Scope and Summary of Certificate

Kingspan Profiles & Sections have developed a fully integrated management system which combines all the common elements of ISO 9001: 2008 (Quality Management), ISO 14001: 2004 (Environmental Management) and OHSAS 18001: 2007 (Occupational Health and Safety Management) into one system. This simple coherent business management system enables the organisation to successfully achieve its purpose and mission to ensure that quality, health and safety and the environment are considered in all aspects of the business process.



ISO 9001: 2008 Cert No. 659

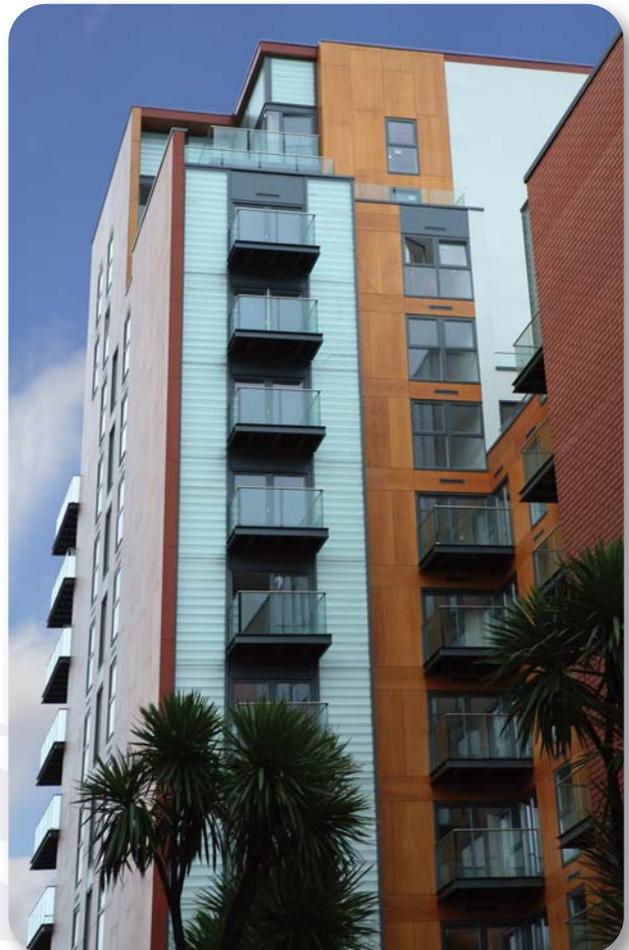
ISO 14001: 2004 Cert No. EMS 659

BS OHSAS 18001: 2007
Cert No. 659-HS

Cert No. 1137

Cert No. E 1713

Cert No. H 1148



KingPin[®] Rainscreen Support System

Continuing our progress in offering better solutions to the construction industry, Kingspan Profiles & Sections have developed a new rainscreen support system – **KingPin[®]**. (Patent applied for)

The KingPin[®] Rainscreen Support System is available only as part of the Kingframe Architectural Façade System (AFS) and Kingframe Building System (KBS), factory-fitted and delivered to site as part of the complete system. KingPin[®] can NOT be ordered separately. The benefits of the new system will combine enhanced performance with lower costs.



Thermal Performance

Thermal performance has been substantially improved by the choice of stainless steel over the more traditionally used aluminium alloy. The thermal conductivity of stainless steel is approximately eight times less than aluminium alloys of typical established systems. This thermal performance, combined with a reduced cross sectional area of support, provides a dramatic reduction in heat lost through the brackets.

The system incorporates a durable sealing gasket, offering enhanced thermal performance properties. Seal reliability not only reduces the risk of water penetration, but also enhances the air leakage performance of the system.

Structural Performance

Providing connectivity and support in a unique and novel way (patent applied for), the performance of the fasteners under conditions of wind suction has been enhanced on the thinner framing materials by the use of improved fastener technology.

Material Durability

Stainless steel is used for the brackets and clips, with a compatible aluminium alloy used for the external bars. The environmental resistance of the EPDM seal makes it compatible with the life-spans of the metal hardware.

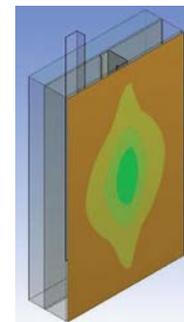
Detailing Simplicity

Detailing of the system is simple, the thickness of the insulation being the only determining factor in the parts to be installed in the factory. The horizontal spacing of the system is to coincide with the studs, vertical spacing is dependent on wind loading, and is designed by the Kingspan Profiles & Sections design team. The clip feature of the system allows up to 20mm of adjustment (nominal +/-10mm), and the nominal stooing is determined by the selection of the tees and angles used with the clips. In addition to tees and angles, there are also adaptors for timber battens. Channel sections for metal hung cassettes may bolted directly to the tubes, omitting the clips. A bracket for the direct support of timber battens is also available.

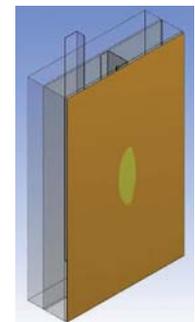
Bespoke carrier brackets for the support of feature bands and signage may also be fitted.

BENEFITS

- Complies with Building Regulations Parts L1 and L2
- Enhances thermal performance
- Minimises insulation thickness
- Reduces insulation penetrations
- Self sealing
- Total wall / façade thickness reduced
- Enhanced fire performance
- Durability up to 60 years
- Unique connectivity (patent applied for)
- Maintenance free
- More cost effective
- Easier and quicker to fit
- BRE certificated



Aluminium rainscreen brackets require holes to be cut and resealed and cause a major cold bridge.



KingPin[®] provides robust sealing combined with significantly reduced thermal loss.



Kingspan EnergiSolutions

The enormity of climate change, and its accelerating implications, continues to gain much greater exposure than at any stage in the past. With that comes a very evident shift in demand for all solutions that will contribute to an easing of these pressures over the medium to long term.

Combine this with decreasing reserves of fossil fuels, increasing reliance on distant suppliers, uncertainty of supply and spiralling energy costs, it is more important than ever before to provide energy efficient buildings.

Kingspan delivers low energy consumption buildings across all sectors of the property market with high performance insulation and renewable solutions that save up to **44%** of heating energy usage.



1. Kingspan Solar Vacuum Tubes and Photovoltaic Panels



2. Kingspan Insulated Roof Panel Systems



3. Kingspan KoolDuct Systems



4. Kingspan Hot Water Systems



5. Kingspan Raised Access Floors



6. Kingspan Insulation for Roofs, Walls and Floors



7. Kingspan Kingframe Building System



8. Kingspan Environmental





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BS OHSAS 18001: 2007
Cert No. 659-HS



Cert No. 1137



Cert No. E 1713



Cert No. H 1148



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