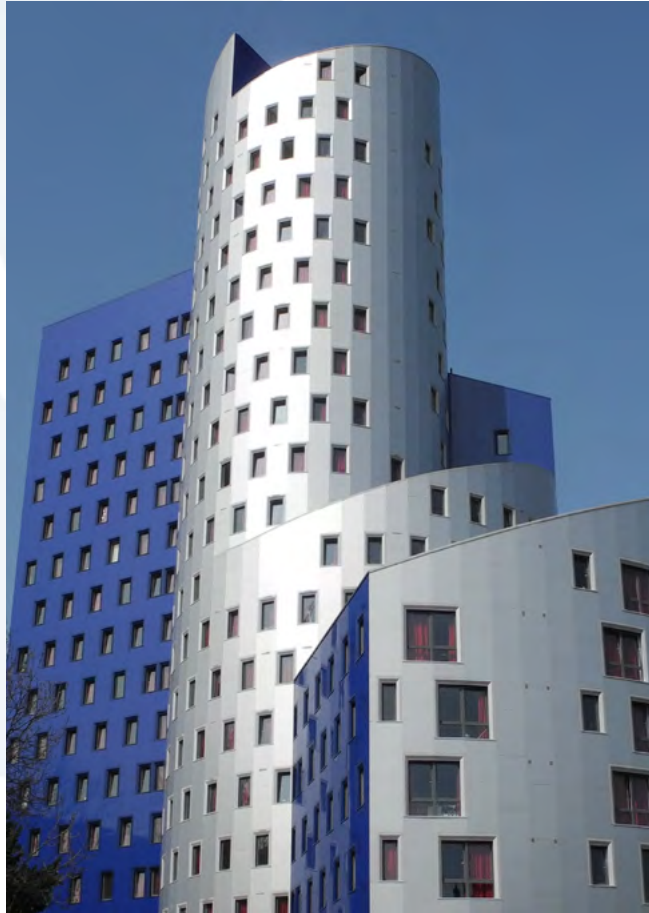




# AyrFrame™



## AyrFrame™

**AyrFrame™** is a lightweight, high strength steel modular building frame system. Over the past 25 years we have fabricated a wide variety of frames from one-off bespoke structures such as roof-top extensions and marketing suites to multi-storey hotels, student accommodation and housing blocks.

We fabricate the steel frame assemblies that go on to be fitted out by specialist firms (such as QB Technology Ltd). The chief benefit of **AyrFrame's™** is its weight, around 1.5 tonnes for a 25m<sup>2</sup> room-sized module, multiple design possibilities (curves, skewed faces, sloped ceilings) and tight tolerances that are only possible in a quality certified factory.

Structural frame strength comes from inter-locking precision steel joists and stud sections. These are then fixed into position using short fillet welds. Racking is prevented by furring runners that also serve to allow space for electrical wiring to run behind plasterboards. Additional strength is added at the fit-out stage by the addition of fire-check and OSB boarding that act as diaphragm braces.

Compared with traditional construction methods **AyrFrame™** removes many of the on site issues associated with construction and can significantly reduce project completion time, typically by about 35%, giving a faster return on investment.

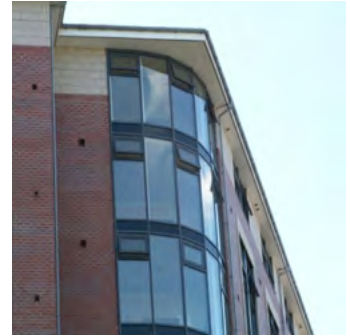
Modular construction is at its most efficient when a project is specifically designed from the outset to be modular. Designing for modular requires an understanding of module manufacturing, the **AyrFrame Design Guide** gives some insight into the design details but please contact our design team with any queries.



## Example Applications

The Building System is suitable for use in all forms of permanent construction including:

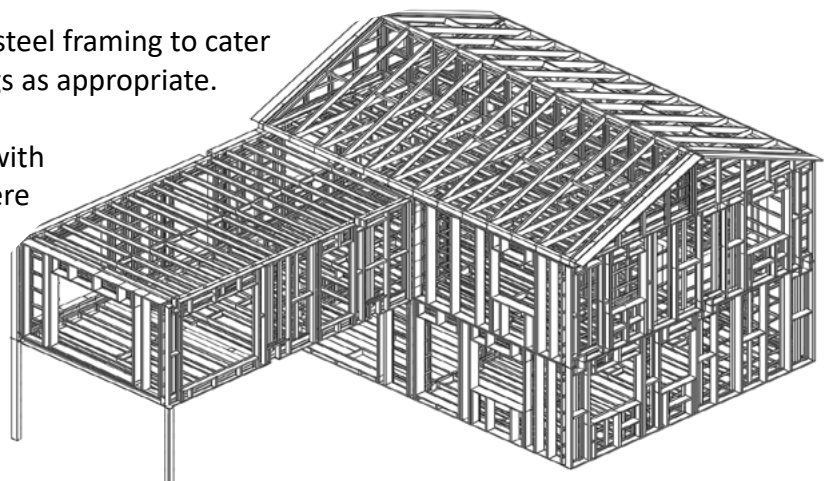
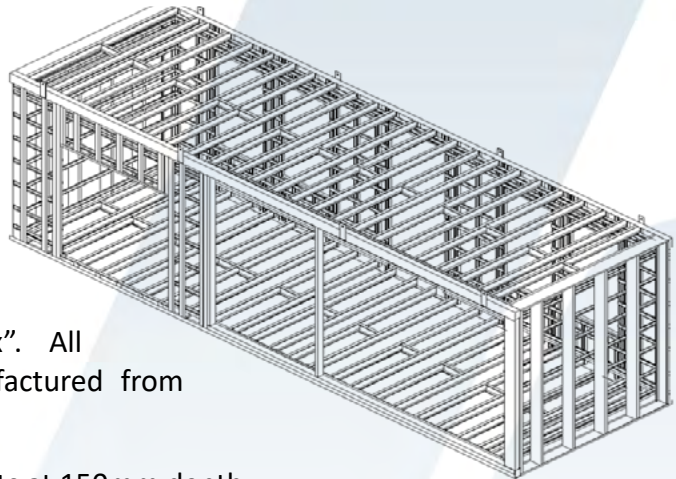
- Health Sector Buildings inc. hospitals
- Residential Housing/purpose build to rent
- Hotels and Leisure Developments
- Student Accommodation
- Offices and Commercial
- Schools and Education
- Marketing Suites
- Roof Top Extensions





## Structural Frame

- **AyrFrame™** is manufactured using rectangular ribs spaced at centres along the module length with panels at each end to complete the “box”. All standard module components are manufactured from pre-galvanised s450 grade steel material.
- Ribs typically comprise floor and ceiling joists at 150mm depth.
- Studs to the ribs are CS70 profile orientated such that the joists sit inside the “open” face of the studs (i.e. between the lips). This means the “depth” of wall stud is 44mm.
- The ribs are connected together along the length of the module using 10mm deep furring runners to the vertical studs only, producing a total structural wall thickness of 54mm. Typical construction includes 7 no. FRs equally spaced up the wall height.
- 100x38mm service slots at 610mm c/c are provided to the web of CS150 (ceiling) joists for distribution of services through the room and down into the wall construction between ribs.
- This rib configuration at 400mm c/c is suitable for modules up to approximately 3.8m width for residential applications.
- Ribs are orientated such that all the joists face the same way, except the “last” rib.
- For end panels forming external walls, 100-200mm deep studs are used dependant upon thermal performance criteria requirements and quilt/board specification. For “corridor” end panels, 44mm “deep” studs are used. Furring runners are provided to end panels.
- Along the sides of the modules, external and internal angles are provided running full length of the module and tying into the end panels.
- Apertures are provided within the steel framing to cater for door, window and duct openings as appropriate.
- All module connections are made with 2-3mm thick fillet MIG welds. Where the welding process removes the galvanising, a zinc-rich paint is applied via spray.

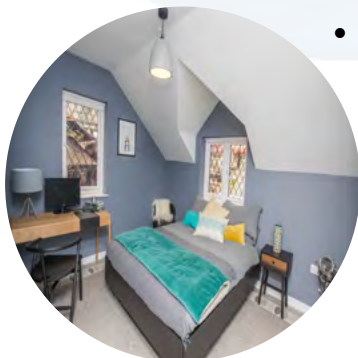


## Architectural Issues / Finishes by Others

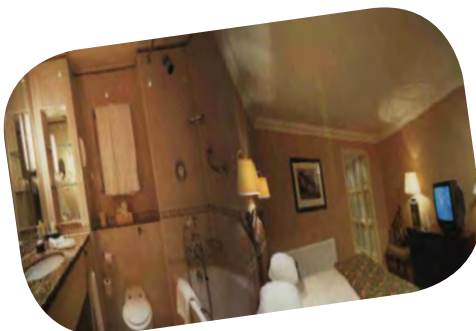


- High quality factory finished rooms (fully quality controlled and snagged in the factory).
- “Plug and Play” fully serviced rooms via risers and corridor distribution routes.
- Actual board/finishes specification is dependant upon acoustic, fire and thermal performance requirements.
- Range of typical performance values readily achievable dependant upon specification of finishes:

U values:        0.15 - 0.25 W/m<sup>2</sup>K  
 Fire resistance:        60 - 90 mins  
 Acoustic insulation:    49 - 62 dB.



- Structural floor zones typically 174-220mm inclusive of finishes.
- Low rise or high rise projects (including progressive collapse resistance) .
- Cladding may be self supporting cavity masonry tied back to the module, or a light weight cladding system supported off the modules.
- Maximum standard room width 3.7m. Wider span rooms require open sided modules joined together on site.



## Why AyrFrame?

**AyrFrame™** steel framed room modules are prefabricated from Ayrshire's range of lightweight galvanised cold rolled steel profiles. High strength steel and fully welded construction, combine to give optimum strength, stability and lightness. Exacting quality standards are applied at all stages of manufacture, through to despatch, to ensure accuracy and quality are not compromised.

**AyrFrame™** volumetric buildings can be designed as free standing structures, eliminating heavy hot rolled steel or concrete frames. In the UK, multi-rise structures up to 17 storeys high have been designed in accordance with current structural codes of practice, including progressive collapse design.

**AyrFrame™** modules have been used throughout the UK, to successfully fast track new build hotel and student accommodation projects. The ability of the system to adapt to specific site circumstances, is demonstrated by the number of hotel extensions built in the UK. Other examples include nursing homes and residential apartment blocks.

**AyrFrame™** prefabricated system build solutions will significantly reduce the construction period by typically up to 35% in comparison to traditional build methods. The overall saving in weight and speed of erection contribute to major cost savings. These include lighter foundations and early occupancy. Individual prefabricated infill floor, wall and ceiling panels can be incorporated within AyrFrame™ structures, when required.

**AyrFrame™** can be readily matched to the specific project requirements for thermal, fire and acoustic performance, by attaching suitable finishes. Fully fitted-out modules (by others) arrive on site ready to be craned into position. All plumbing and electrics can be included.

### **References**

- SCI Publication ED014 - Light Steel Module Construction (2013)*
- SCI Publication ED016 - Fire Safety of Light Gauge Steel (2013)*
- SCI Publication P302 - Modular Construction Using Light Steel Framing: Residential Buildings (2001)*
- SCI Publication P272 - Modular Construction using Light Steel Framing: An Architects Guide (1999)*
- SCI Publication P348 - Building Design using Modules (2008)*
- SCI Publication ED015 - Acoustic Performance of Light Steel Construction (2013)*
- SCI Publication ED021 - Robustness of Light Steel Construction (2014)*

## System Benefits

**Factory Level Quality**



**Shorter Construction Programme**



**High Thermal Performance**



**Excellent Acoustic Performance**



**Environmentally Friendly**



**Sustainable**



**Low Carbon Footprint**



**Low Construction Waste**



**Low Energy Use**



**Low Maintenance**



**Cost Efficient**



**BIM Level 2 compliant**





**Ayrshire Metals Limited** are a leading cold rolled steel framing manufacturer, having over 100 years' experience with three manufacturing sites across the UK. The Ayrshire group also has a subsidiary in Germany.

Coupled with a reputation on innovation, design and quality, Ayrshire is proud to have earned the trust and loyalty of countless customers by providing cost effective designs and products.

Ayrshire can trace our roots back to the late 1800's as a ship building company on the West coast of Scotland, but today Ayrshire's head office is based in Daventry and provides steel sections for the building industry in the UK and beyond.

The Ayrshire group of companies are one of the UK's leading suppliers of cold rolled products to a diverse range of markets and industries. Our long history and extensive experience actually helps us to be forward thinking, as shown by our award of innovation for our **AyrFrame™** concept. Our quality is underlined by registration to ISO 9001 and our mission is to provide 'Complete Customer Satisfaction'.

**QB.technology** together with Ayrshire Steel Framing aim to produce high-quality and innovative modular building systems.

QB Technology offer complete, end-to-end commercial and residential building services - from design and manufacture, through delivery and installation, to finishing and handover - using Modern Methods of Construction (MMC) and advanced digital tools to produce highly-engineered light gauge steel volumetric modular building systems off-site.

QB Technology's team combines decades of industry experience, including over 15 years' experience with the AyrFrame™ system, and is dedicated to meeting the highest aspirations for quality, performance and value by bringing together technology, design, and supply chain innovations.

## Contact Us

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