

Technical Information Sheet ED027

Best Practice for Light Steel Framing: Design & Detailing

This Technical Information Sheet forms part of a series providing best practice guidance for light steel framing, and covers essential points related to the structural design and the detailing of the light steel frame package.

Key points – General

- It is essential that the design and engineering of any light steel structure is carried out by a specialist.
- Building Information Modelling (BIM) is readily utilised in light steel framing and most projects should operate at BIM Level 2.
- Early in the process, a design team workshop should be held and attended by all relevant parties.

Key points – Overall structure

- Light steel framing is a highly engineered structural system and the design should be carried out by a suitably qualified structural engineer in accordance with national design codes and SCI design guidance.
- Light steel frames must be designed for stability under horizontal loads and for consideration of uplift forces at the foundations.
- Light steel frames must be designed for tying action to ensure structural robustness in accordance with Building Regulations.
- As part of the package, to resist heavy point loads, hot-rolled steel sections may be included within the depth of light steel walls and floors.
- Any changes that affect the loading (e.g. addition of PVs to the roof) must be communicated to the frame designer before 'design freeze'.

Key points – Floors

- Floors can be joisted light steel or composite slabs. In addition to vertical load resistance, light steel floors must be designed for strict serviceability limits to ensure user comfort during use.
- Allowable temporary construction loads should be agreed with the light steel frame designer early in the design process.
- Floor joists should, generally, be 'handed' so the flanges of adjacent C sections face in opposite directions to minimise twisting of the joists.
- Where plasterboard or resilient bars are fixed directly to the bottom flange of floor joists additional restraint, such as bridging or blocking, is generally not required for spans up to 5 m.
- Composite floors with spans greater than 3.5 m will typically require propping during construction. Props should be continued to two or three concreted floors below, depending on the load capacity of the floor.
- The span of composite deck floors should be determined by structural calculation; specific span to depth limits should be observed.
- Perforations in composite floors of greater than 150 mm diameter must be considered during the structural design. Multiple perforations in close proximity or larger openings can be accommodated in the design process by detailing of the decking and additional slab reinforcement.



Building Information Modelling (BIM) is readily utilised in light steel framing



Cross bracing designed to provide stability of light steel framing



Light steel floor joists with large stiffened web openings

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Key points – Walls

- Light steel walls on the façade must be designed for the combined effects of vertical load and lateral bending.
- Positioning of brickwork relative to the frames should include consideration of construction tolerances for verticality of brickwork, deviation in surface of insulation and verticality of light steel frame wall.
- Various cladding systems can be used with light steel framing. Cavity widths should be provided in accordance with manufacturers' instructions and as specified by warrantee providers.
- Bracing for light steel framed buildings should be provided by X bracing (crossed flat straps) or K bracing (diagonal C sections), these can be supplemented by racking or diaphragm action of boards.
- For anchorage of braced bays to the foundations, the constructed anchorage details should comply with the structurally designed solution.
- Anchorage details for braced wall panels require special consideration when light steel framing is used with beam and block ground floors.
- Where heavy items, such as wall hung boilers or kitchen units are to be attached to light steel walls, additional light steel plates or noggins can be included to strengthen the stud walls. These should be specified at the design stage.



Brickwork external cladding on light steel frame building

Best practice information sheets

The following technical information sheets are available as part of the series on Best Practice for Light Steel Framing:

- Design and Detailing (ED027)
- Pre-Start Requirements (ED028)
- Installation (ED029)
- Follow-On Trades (ED030)

Other technical information sheets

Other technical information sheets on light steel framing and modular construction are also available from SCI and the *Light Steel Forum*. This include topics such as: Applications, Residential Buildings, Housing, Infill Walls, Modular construction, Acoustic Performance, Fire Safety, Thermal Performance, Sustainability, Robustness and Durability.

Manufacturers

These companies are members of the *Light Steel Forum* and are active in the light steel and modular construction sector.

Ayrshire Metal Products Ltd. www.ayrshire.co.uk

British Gypsum Ltd. www.british-gypsum.com

BW Industries Ltd. www.bw-industries.co.uk

Fusion Building Systems www.fusionbuild.com

Kingspan Steel Building Solutions www.kingspanpanels.com/sbs

Metek UK Ltd. www.metek.co.uk

Sigmat Ltd. www.sigmat.co.uk

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