

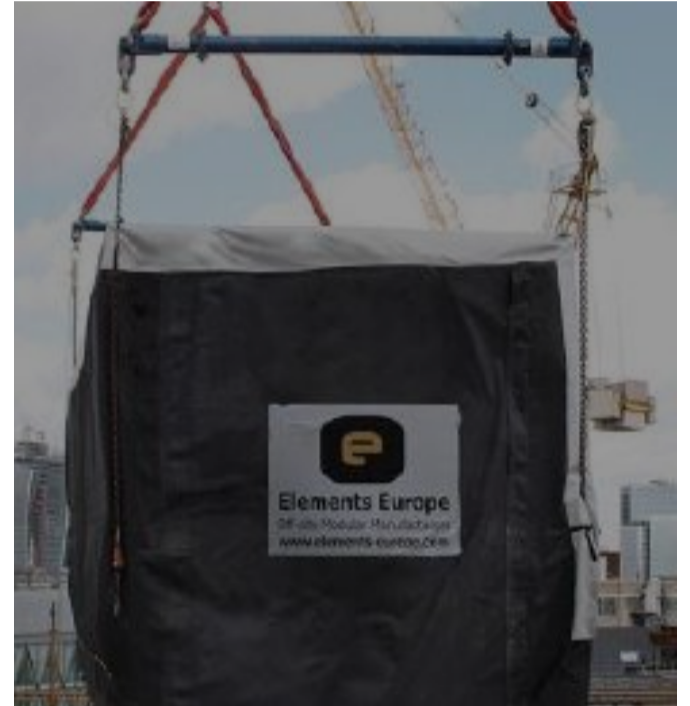
## CASE STUDY - ELEMENTS EUROPE

**Elements Europe are a large modular manufacturer located in the West Midlands, with a factory production space, which totals 200,000 sq ft.**

They provide a full solution including design, factory manufacture and site construction, acting either as main contractor or as a sub-contractor on site. The Elements Europe modular system can incorporate the installation of windows, doors, mechanical and electrical, decoration, carpets, fixed furniture and sanitary ware, all completed in the factory.

### Ground floors and Foundations

Foundations must be designed in accordance to suit ground conditions. They must be level and free from defects beneath the structural framing.



### Substructure Connection Details

The concrete for the substructure is constructed to a tolerance of  $\pm 5\text{mm}$  over 5 m, horizontally and vertically. Galvanized steel shims are added under load bearing points within the modules or on the underside of the studs within the wall panels to ensure that the gap between the bottom of the track and the foundation does not exceed the stated tolerances.

Post-drill-and-fix expanding anchors, (Hilti anchors), are used to fix holding down brackets to the foundation concrete - of a size and at centers specified by a qualified structural engineer.

The corner of each module are secured to the foundation/sub-structure using a post-drill-and-fix expanding anchor, e.g. Hilti anchor, into a suitable concrete base/slab using a minimum M16 diameter anchor bolt fixing.

### Intermediate Floors

Used in conjunction with ceiling element to create a separating floor. The overall depth of the cassette is 192 mm, made up as follows:

- floor joists at 300mm, 400mm or 600mm centres as specified by the engineer.

- floor joists are manufactured at 150mm deep which will typically be adequate for the span, however other joists may also be used. If required by the structural engineer, noggins may be introduced.
- joists are underlined with 9mm OSB.
- a layer of 150mm deep man made mineral fibre of minimum density 45 kg/m<sup>3</sup> laid between each joist, overlaid with;
- 15mm LaDura plasterboard fixed with self-drilling and tapping screws at 300mm centres with staggered joints, overlaid with;
- a particle board deck of 18mm thick, Grade P5 tongue and groove chipboard fixed with self-drilling and tapping screws at 300mm centres with “brick bond” joints all well glued;

### Ceiling Section

Used in conjunction with floor element to create a separating floor. Overall depth of cassette 142 mm (excl. membrane) made up as follows:

- ceiling joists at 300mm, 400mm or 600mm centres as specified by the engineer.
- ceiling joists are manufactured at 100mm deep which will typically be adequate for the span, however other joists may also be used. If required by the structural engineer noggins may be introduced.
- joists are overlaid with 12mm OSB.
- a layer of 100mm deep man made mineral fibre of minimum density 45 kg/m<sup>3</sup> laid between each joist, underlined with;
- 2no 15mm Megadeco plasterboard fixed with self-drilling and tapping screws at 300mm centres with staggered joints.
- joists are overlaid with 12mm OSB.

### External walls

External walls forming the outer skin of the module/inner leaf of the external wall:

- a rigid frame of perimeter tracks with studs at 600mm centres – (Reduced centres at 400mm or 300mm can be used if required by the engineered design);
- intermediate noggins generally at mid-span and at no greater than 1.5m intervals vertically;
- integral C section and diagonal cross bracing;
- studs may use any of the standard sections.
- A Vapour Control Layer will be required on the internal face of the structure
- internal lining –two layers of 15mm thick La Dura plasterboard, however board build up is selected to suit fire and acoustic performance required;
- in wet areas the internal board may be replaced with 15mm moisture resistant Type 5 fire grade plasterboard
- plasterboard fixed with self-drilling and tapping screws at 300mm centres with staggered joints all in line with board manufacturers recommendations;
- warm frame external lining system – depends on the cladding to be applied

### Party Walls

Party or separating walls are panels comprising- (back to back module walls):

- two rigid frames of C Section studs at 600mm centres (Reduced centres at 400mm or 300mm can be used if required by the engineered design); within C

Section head and base track. 20mm cavity is created between the modules.

- intermediate noggins at no greater than 1.5 m intervals vertically;
- integral C section and diagonal cross bracing;
- studs may use any of the standard sections, however 70mm deep studs are typically adequate in most applications;
- 20mm cavity closed as required with fire stops formed from manufactured mineral fibre or similar.
- each side is lined with two layers of 15mm thick, Type 5, fire resistant board, however board build up is selected to suit fire and acoustic performance required;
- in wet areas the outer board may be replaced with 15mm moisture resistant Type 5 fire grade plasterboard;
- plasterboard fixed with self-drilling and tapping screws at 300mm centres with staggered joints

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## External Finishes

The design, supply and installation of cladding does not form a part of the Elements Europe modules system. This will be the responsibility of the cladding designer. The standard detail drawings indicate likely fixing methods, opening details and cavity fire barriers. Project specific details need to be developed by the cladding designer to address these and the junction details between the different cladding types to meet the requirements of the building as designed for the specific project.

The most common cladding is a skin of masonry, either brickwork or blockwork, on site. This is tied back to the modules wall panels / structure with Stainless Steel dovetail and channel wall ties across a designed 50mm cavity. The channels are fixed through the insulation onto the steel studs to sandwich the insulation in place and provide a firm fixing back to the structural members with stainless steel fixings. A waterproof breather face is formed at the external face of the insulation to prevent the ingress of moisture from the cavity and air leakage from the building by taping the joints of the foil faced insulation in accordance with the supplier's recommendations.

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## Roof

The system includes wall and floor elements and can accommodate various roof types, to be approved on a site-by-site basis.