

Using continuously galvanised steel for light steel frame building

By [Simon Norton](#)

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Light steel frame building (LSFB) is not the same as prefabricated or 'kit' buildings, as it is rather a building method. Another term is 'off-site' construction, due to the fact that a lot of the manufacturing takes place in factories, whereafter the components are transported and assembled on-site. LSFB consists of structured wall panels, trusses and floor joists that are assembled using cold-formed steel sections, which in turn are made from thin-gauge, high-strength, continuously galvanised steel sheet.



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Hot-dip galvanised substrate is produced on continuous zinc coating lines from either cold-rolled (thickness range 0.27mm to <2. mm) or hot-rolled (thickness 2.01mm to 3.0mm) steel substrate in coil form. It is produced to the requirements of EN 10142, EN 10147, EN 10143, ASTM A924, SANS 4998 or SANS 3575.

On the other hand, rolled zinc products such as Rheinzink and Verozinc, which include the alloying elements copper, aluminium and titanium, and conform to standard EN 988, are only suited to roofing and cladding of buildings. These products are made from near pure zinc sheet, as opposed to continuously galvanised sheet, where the molten zinc is coated onto thin steel sheeting.

Rolled zinc can be used in façades, cladding, roofing, gutters and drain pipes, as well as for ornamental applications, and even as flashing. Rolled zinc products have a long service life and can be recycled and reused. However, with LSFB structures, the material of choice is continuously galvanised steel sheet that subsequently gets shaped and formed into the elements that make up the building skeleton.



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Preventing corrosion

Zinc generally corrodes at a low rate due to the protection offered by the resilient zinc patina formed by the reaction between the metallic zinc surface, the oxygen in the air and carbon dioxide. This compact, bonded and insoluble patina layer blocks exchange between the atmosphere and the zinc. Zinc is used extensively to galvanise steel to prevent corrosion. Speak to an expert if you want to apply galvanised steel or roofing close to the sea, within 1km to 2km of the high-water mark, as care must be taken when used at the coast under very corrosive conditions.

The LSFB galvanised steel sections are joined together in the factory using rivets or self-tapping screws to form structural wall panels and roof trusses for on-site erection on foundations and floor slabs. Similar to timber frame construction, the wall frames are clad externally and internally on-site with a range of alternative cladding materials, with services such as electrical cables and plumbing piping and insulation material installed in the wall cavity itself.

LSFB offers a wide range of benefits when compared to conventional building or other framing materials in terms of quality, cost, durability and speed of construction. Reduced wastage, lower logistical costs and reduced time of construction could offer cost-savings of 20% or more compared with conventional building using bricks and mortar.

The typical life of a LSFB when using Z200 galvanised sheet will be 40-50 years due to the tenacity of the building envelope to keep out a corrosive atmosphere. In addition, LSFB complies with the design requirements of the South African National Building Regulations. This tried-and-tested building method has been deployed with great success in Australia, Europe and America for decades.



Light steel frame building differs from prefabricated or 'kit' buildings.

Quality-certified materials

Every structure is signed off by a structural engineer and only quality-certified materials are used. The frames are assembled under controlled factory conditions. In the event of poor foundation conditions, steel-framed buildings can accommodate some movement in foundations without cracking. Thermal insulation can be specified that is superior to conventional brick and mortar buildings, while professional finishes are readily achievable. Industry association SASFA acts as a quality watchdog that accredits system-competent frame erectors and builders.

In terms of cost-efficiency, the time-saving is estimated to be more than 30% compared with conventional building. In addition, the steel frame dictates a high degree of accuracy and squareness of building dimensions. A steel-framed wall clad with fibre cement or plaster board offers a mass saving of 90% compared with a double-skin brick wall. The low mass of the walls also means that lighter foundations are possible.

The LSFB building method lends itself to column foundations and suspended floors, reducing the cost of building on uneven sites. Other benefits are minimal wastage, energy-efficiency and flexibility as horizontal and vertical additions can be added easily in stages. There is also up to 4% extra floor space due to the reduced thickness of the external walls compared with double-skin or cavity brick walls. Services are installed in wall cavities without chasing of walls, which translates into earlier occupation of buildings for increased return on investment, as well as accurate cost budgets.

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