

## Light gauge steel frame (LGSFS)



Figure 01: Erection of LGS wall frames



Figure 02: Fixing of outside CFBs

### Overview

Light Gauge Steel Framed Structure (LGSFS) are factory-made galvanized steel components, structural frame with C-section studs 2-2.7mm thick provided at 300-600 mm spacing with diagonal bracing, Wall cladding Gypsum board/ cement particle board, floor frame with steel floor joists and composite steel-concrete deck

The system has been technically validated and promoted as a cost effective roofing alternative by the BMTPC. Suitable for housing up to G+3.

CATEGORY	ATTRIBUTE	INPUT	SOURCE
Resource efficiency	Embodied energy and CO <sub>2</sub> emissions	EE: 884.8 MJ/m <sup>2</sup> CO <sub>2</sub> emissions: 110.3 kgCO <sub>2</sub> /m <sup>2</sup> (excluding transportation)	Source: Calculations based on material specifications. <u>India Construction Materials Database of Embodied energy and Global Warming Potential</u>
	Critical Resource Use	0.0	Source: Calculation based on criticality index (0-100)
	Current Recycled content	Nil	
	Future reusability	High: frame can be reused	Source: <u>BMTPC report on Light Gauge Steel Framed Structure with Infill Concrete Panel (LGSFSICP) Technology</u>
	Water use during construction and manufacturing	1798.3 L/m <sup>2</sup> for LGSFS with cement fiber board infill.	Source: Calculations based on material specifications.
Operational performance	Durability	High: If build according to IS 456	Source: <u>BMTPC report on Light Gauge Steel Framed Structure with Infill Concrete Panel (LGSFSICP) Technology</u>
	Ease and frequency of maintenance	Medium: It is assumed that no special maintenance is required	Source: <u>BMTPC report on Light Gauge Steel Framed Structure with Infill Concrete Panel (LGSFSICP) Technology</u>

		during intended working life.	
	<b>Impact on cooling or heating loads</b>	Cooling energy (kWh/m <sup>2</sup> /y) savings under different climatic zones Composite: -3.53 (-7%) Warm & humid: -0.4 (-1%) Hot & dry: -6.21 (-13%) Temperate: -2.84 (-19) Heating energy savings in cold climate: -28.1 (-66%)	Source: Based on simulations. Values in savings from base case: 225mm solid burnt clay brick with 12.5mm plaster on both sides.
	<b>Noise transmission</b>	No data available	
	<b>Thermal mass (absorption, storage and release of heat)</b>	35.6kg/m <sup>2</sup> ; Infill precast concrete panel 48 kg/m <sup>2</sup>	Source: Calculated from product specifications; Source: <u>BMTPC report on Light Gauge Steel Framed Structure with Infill Concrete Panel (LGSFSICP) Technology</u>
	<b>Thermal performance (flow of heat)</b>	3.87 W/m <sup>2</sup> K for cold formed LGS frame with 20mm thick M20 precast concrete panel, 89 mm thick lightweight concrete, 10mm plaster on external face.	Source: CARBSE Assembly U-factor calculator
<b>User Experience</b>	<b>Familiarity with the material</b>	Low	Source: Data from surveys
	<b>Modification ability</b>	Medium: New components can be attached by welding.	Source: Interview with BMTPC
<b>Economic impact</b>	<b>Cost of construction</b>	INR 15,612/m <sup>2</sup> of built up area	Source: Estimation by Everest Industries, India
	<b>Skill requirement</b>	High: Special training required to acquire skills for assembly of frames, and their erection. Workers need training on handling and installation of frames and panels.	Source: <u>BMTPC report on Light Gauge Steel Framed Structure with Infill Concrete Panel (LGSFSICP) Technology</u>
	<b>Supply chain</b>	Low	
	<b>Duration of construction</b>	0.75 m <sup>2</sup> /day i.e. 30m <sup>2</sup> in 5 days. After design engineering, 3 weeks are required for fabrication drawings.	Source: <u>BMTPC report on Light Gauge Steel Framed Structure with Infill Concrete Panel (LGSFSICP) Technology</u>
	<b>Job creation</b>	Manpower 200, largely skilled specialists	Source: <u>BMTPC report on Light Gauge Steel Framed Structure with Infill Concrete Panel (LGSFSICP) Technology</u>