

the insulation was sandwiched between two plasterboards and this composite panel was used on both sides of the wall frame

instead of cavity insulation. This externally insulated LSF wall system was also tested using glass, rockwool and cellulose fibres. This paper presents the details of this experimental study and the results.

## 2. Test specimens

All the steel frames used in the full scale load bearing LSF wall models were built to a height of 2400 mm and a width of 2400 mm as shown in Fig. 1. The studs and tracks used in the test frames were fabricated from G500 galvanized steel sheets having a nominal base metal thickness of 1.15 mm. The measured yield strength and elastic modulus of 1.15 mm G500 steel were 569 MPa and 213,520 MPa, respectively, at ambient temperature. The frames consisted of four vertical studs of 90 × 40 × 15 × 1.15 mm lipped channel sections (Fig. 2(a)), spaced at 600 mm centres. They were made by attaching the studs to the top and bottom tracks made of 92 × 50 × 1.15 mm unlipped channel sections (Fig. 2(b)) using 12 mm long self-drilling wafer head screws.

Test frames were lined on both sides by single or double layers of gypsum plasterboards manufactured by Boral Plasterboard under the product name of Firestop. The plasterboards were 1200 mm in width by 2400 mm in length with a thickness of 16 mm and mass of 13 kg/m<sup>2</sup> [10]. They were installed vertically on both sides of the steel frame to build the single layer wall models. There were two vertical butt joints located over the centre line of stud flanges as shown in Fig. 1. The plasterboards were attached to the studs by 25 mm long drill point screws spaced at 200 mm centres along the plasterboard edges and

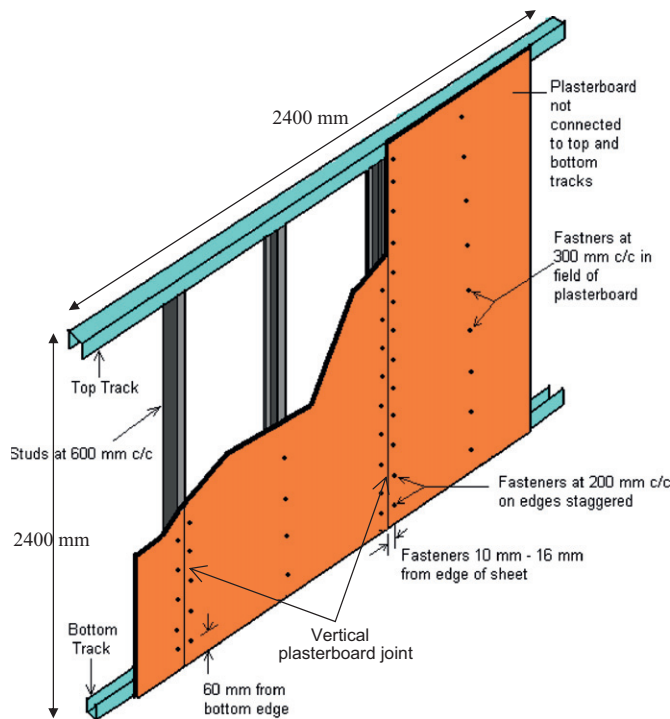


Fig. 1. LSF wall frames lined with plasterboards.

**Table 1**  
Details of LSF wall specimens.

Test Specimen	Configuration	Condition	Insulation	Load ratio	Vertical plasterboard joints
1		Ambient	None	0.2	Studs 2 and 4
2		Fire	None	0.2	Studs 2 and 4
3		Fire	None	0.2	Studs 2 and 4
4		Fire	Glass fibre (cavity insulation)	0.2	Studs 2 and 4
5		Fire	Rock fibre (cavity insulation)	0.2	Studs 2 and 4
6		Fire	Cellulose fibre (cavity insulation)	0.2	Studs 1 and 3
7		Fire	Glass fibre (external insulation)	0.2	Studs 1 and 3
8		Fire	Rock fibre (external insulation)	0.2	Studs 2 and 4
9		Fire	Cellulose fibre (external insulation)	0.2	Studs 2 and 4
10		Fire	Glass fibre (external insulation)	0.4	Studs 1 and 3
11		Fire	Rock fibre (external insulation)	0.4	Studs 2 and 4