

Reinforced EPS Core Panel System



Figure 01: Reinforced EPS core panel walls and slab



Figure 02: Corner detail in EPS Core Panel System

Overview

Expanded Polystyrene Core Panel System is a factory produced panel system for the construction of low rise buildings upto G+3 and as filler walls in high rise RCC and steel frame buildings.

In this technique a core of undulated polystyrene is covered with interconnected zinc coated welded wire mesh on both sided reinforcement and shotcrete concrete. The panels are finished on site by pouring concrete (double panel, floors and stairs) and spraying concrete to realise the following different elements of the system:

- Vertical Structural Walls
- Horizontal Structural elements
- Cladding elements

CATEGORY	ATTRIBUTE	INPUT	SOURCE
Resource Efficiency	Embodied energy	1036.3 MJ/m ² ;	Calculations from material specifications.
	CO₂ emissions	16.44 kgCO ₂ /m ² (excluding transportation)	Source: Schnell Homes; India Construction Materials Database of Embodied energy and Global Warming Potential
	Critical Resource Use	27.7	Source: Calculations based on criticality index (0-100)
	Current Recycled content	Nil: No use of any recycled material/ industrial waste in production and construction	
	Future reusability	Low	Source: BMTPC technology profile for Reinforced EPS Core panel System
	Water use during construction and manufacturing	226 L/m ²	Source: Calculation based on technical specifications for EPS core panel, Schnell Homes
Operational performance	Durability	Medium. No deficiency effects are to be expected from EPS fills for a normal life cycle of 100 years	Source: BMTPC technology profile for Reinforced EPS Core panel System

	Ease and frequency of maintenance	Low ease of maintenance	Source: <i>BMTPC technology profile for Reinforced EPS Core panel System</i>
	Impact on cooling or heating loads	Cooling energy (kWh/m ² /y) savings under different climatic zones Composite: 19.78 (39%) Warm & humid: 15.89 (35%) Hot & dry: 14.11 (30%) Temperate: 5.73 (38%) Heating energy savings in cold climate: 6.41 (15%)	Source: Based on simulations. Values in savings from base case: 225mm solid burnt clay brick with 12.5mm plaster on both sides.
	Noise transmission	Variable, dependent on density and thickness of EPS core. 37dB transmission on average.	Source: <i>Compendium of prospective Emerging Technologies for Mass Housing, Second Edition, BMTPC, April 2017</i>
	Thermal mass (absorption, storage and release of heat)	182.8 kg/m ² for wall using 8cm EPS core of 15 kg/m ³ density. Different densities available: 15/20/25/30/35 Kg/m ³	Calculated from material specifications Source: <i>BMTPC Manual on Reinforced EPS Core panel System</i>
	Thermal performance (flow of heat)	0.58 W/m ² K for a standard 180mm panel, EPS core 100mm, with 40mm shortcrete on both sides	Source: <i>BMTPC PACS Manual on Reinforced EPS Core panel System</i>
User Experience	Familiarity with the material	Low	Source: <i>BMTPC Manual on Reinforced EPS Core panel System</i>
	Modification ability	Low: Special tools required for modification. Can be used as Vertical/ horizontal structural or cladding element	Source: <i>BMTPC Manual on Reinforced EPS Core panel System</i>
Economic impact	Cost of construction	INR 1892/m ² ; Cost of panel: INR 850/m ²	Source: BOQ for a G+3 construction from Schnell Homes; JSPL Angul quotation.
	Skill requirement	High (72%). 1:1 (unskilled: skilled) for plastering, 1:2 for wall & floor panels)	Source: <i>BMTPC Manual on Reinforced EPS Core panel System</i>
	Supply chain	Medium	Source: <i>BMTPC Manual on Reinforced EPS Core panel System</i>
	Duration of construction	0.8m ² /day	Source: <i>A comparative study of construction using concrewall pre-cast sandwich composite panel RC moment frame with brick infill, Kaira Sneha & T.P. Tezeswi, 2016</i>
	Job creation	0.21 man-days/m ²	Source: Estimate for a G+3 housing, Schnell Homes.