

EPS PANELS

Expanded polystyrene (**EPS**) is an innovative building material that is an efficient, safe and economic for the construction

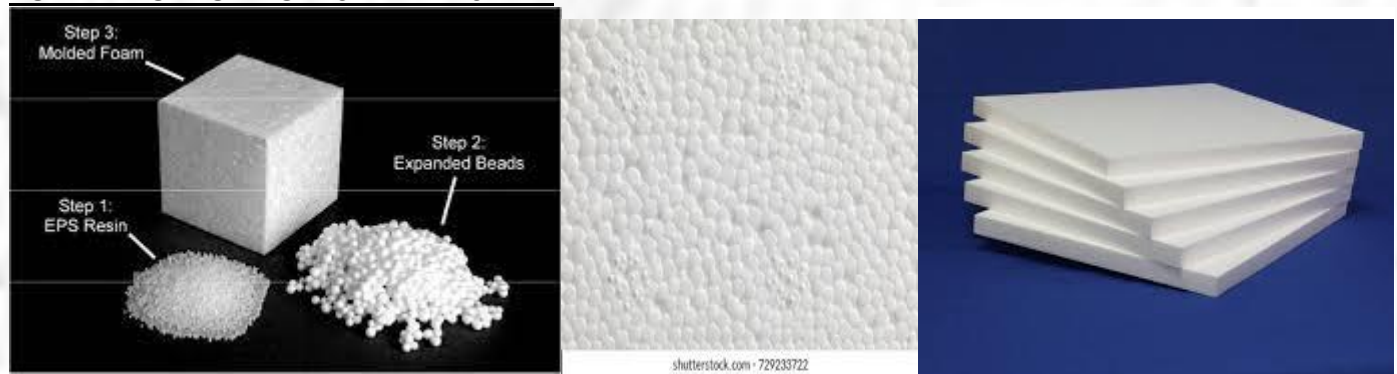
EPS panel is a 3D panel consisting of 3-dimensional welded wire space frame provided with the polystyrene insulation core. Panel is placed in position and shotcrete on both the sides.

These panels can be used both as load bearing as well as non-load bearing elements EPS panel is a versatile structural element designed for floors, walls, partitions, roof and stairs.

EPS panel after shotcrete has the following five components

- i. The outer layer of shotcrete.
- ii. Welded reinforcing mesh of high wire.
- iii. The core of expanded polystyrene sheet.
- iv. Diagonal wire (stainless or galvanized wire).
- v. The inner layer of shotcrete.

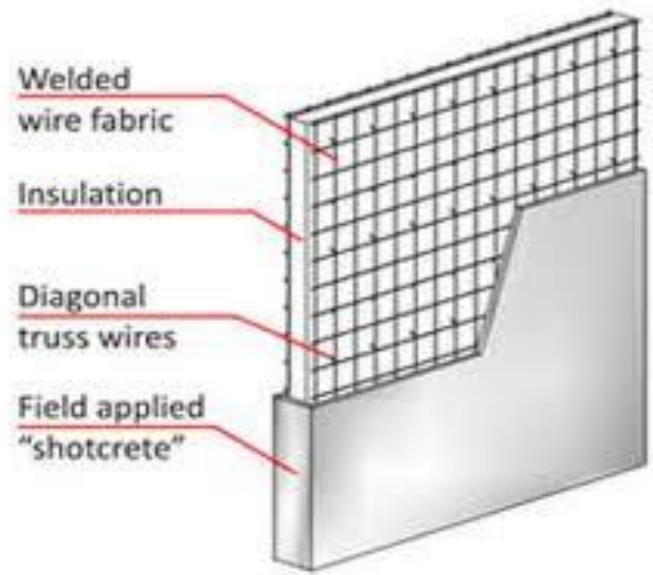
FORMATION OF POLYSTYRENE SHEET



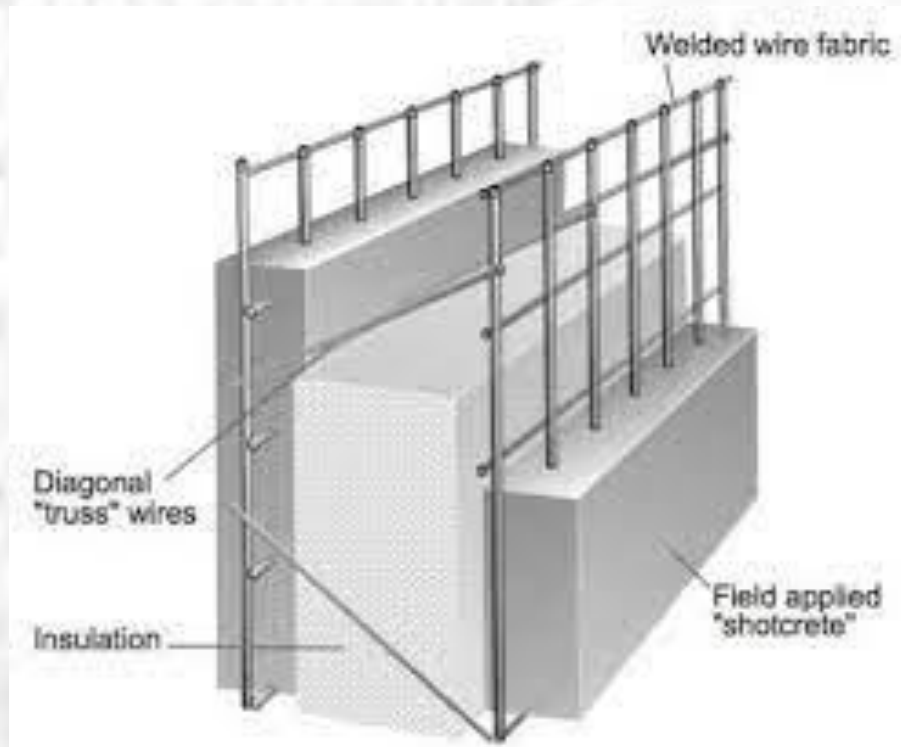
WELDED REINFORCING MESH

EPS panel includes welded reinforcing meshes of high-strength wire, diagonal wire and self-extinguishing expanded polystyrene uncoated concrete, manufactured in the factory and shotcrete is applied to the panel assembled at the construction site, which gives the bearing capacity of the structure.





The welded mesh fabric connected piercing polystyrene with truss of steel wire, welded to the welded fabric at an angle. It gives a rigidity spatial structure, and simultaneously prevents polystyrene core shifting.



Advantages of the EPS Core panel systems

- i. Reduced the cost of construction (Up to 60%)
- ii. Reduced Construction period (up to 30%)
- iii. Reduced transport cost. Light weight panels: do not requires cranes and other heavy construction equipment. (A Standard panel of size (1.2×3) m without shotcrete weighs 20 kg).
- iv. The installation does not need heavy construction equipment.
- v. Ensure high levels of thermal insulation, sound insulation, as well as sanitary and fire safety.
- vi. EPS 3-D panels allow no additional cost to erect buildings in areas with moving soil, especially heaving, subsidence, frozen ground, and remote areas.
- vii. Strength and durability - used extruded polystyrene virtually inert and does not absorb moisture, is durable and resistant to decay.
- viii. Termites and other pest cannot invade this material
- ix. The EPS Core panel system is environment friendly and aesthetically appealing

Limitations of the EPS Core Panel System:

- i. EPS Panel construction system may only be used in the construction of foundation walls supporting 4 stories or less, unless designed by a professional engineer. However, advanced systems with double and triple reinforce can span up to 22 stories
- ii. Concrete must be applied by either the “shotcrete dry” or “shotcrete wet” process in accordance with ACI 506 R-85, “Guide to Shotcrete,” by the American Concrete Institute.
- iii. Compressive strength of concrete shall not be less than 20 MPa. iv. The steel reinforcement shall have a minimum allowable stress (fy) of 415 MPa.

Companies with involved in EPS in Kenya

- i. C-max Kenya
- ii. Eps 3d panels Kenya
- iii. Nextgen Construction

Examples of built structures using EPS panels





Qwetu Wilson view is a 15-story building constructed by C-MAX building within 12 months.



This residential development took 18 days

COMMERCIAL PRODUCTION OF EPS PANELS

- ↓ **Batch pre-expander**- EPS granules are fed into batch pre-expander which expands the granules into beads of 0.93-1.05 mm.
- ↓ **Storage silos**- EPS beads are then fed into storage silos from the batch expander to cool down and allow collection of adequate amount of EPS required for block making
- ↓ **Crusher for Utilization of waste EPS**- Waste EPS sheets are recycled by crushing them back into EPS beads in a crusher and remixing it with fresh EPS stored in silos (up to 15% Mixing).
- ↓ **EPS Block Making Machine**- The mixture of fresh and recycled EPS from the storage silos are fed to block molding Machine. The machine fuses, the expanded granules into blocks by the heat supplied from steam.
- ↓ **Block cutting machine**- EPS block of size 4080 x 1230 x 1240mm can be cut into panels by passing them through the hot wires of a computerized block cutting machine.
- ↓ **Wire Straightening Machine**- The machine electro-welds the vertically falling straight wires from the top onto the horizontal drawn wires at the bottom to produce the wire mesh. **Mesh Cutting Machine** and **Mesh Bending Machine** is also need
- ↓ **Wire Mesh Welding Machine**- The machine electro-welds the vertically falling straight wires from the top onto the horizontal drawn wires at the bottom to produce the wire mesh
- ↓ **EPS Panel assembly machine**- One EPS sheet can be sandwiched between two GI wire meshes and is then fed into this machine to produce a finished EPS wall panel

REFERENCES

- Manual for Expanded Polystyrene (EPS) Core Panel System and its field Application
Sponsored by Ministry of Housing and Urban Poverty Alleviation, Government of India
- c-max.com

how time is saved while fixing electric cables and plumbing pipes

