

How is Expanded Polystyrene (EPS) made?

The manufacturing of EPS is an excellent example of an efficient use of a natural resource as the transformation process uses relatively little energy. It is a low pollution and sustainable process.

The manufacturing process of expanded polystyrene does not involve the use of ozone-layer-depleting gases. Expanded polystyrene (EPS) is CFC, HFC and HCFC free.

Production Stages

- 1 Polymerization:** The production of EPS begins with the polymerization of styrene monomer. Styrene is derived from petroleum and is polymerized to form polystyrene.
- 2 Pre-expansion:** Once the polystyrene is formed, it is heated and mixed with a minute amount of pentane. Pentane has a low Global Warming Potential* (GWP) of less than five. The EU does not register pentane as a substance hazardous to human health or the environment.
- 3** The mixture is then fed into a pre-expander machine, where steam heats the polystyrene and the blowing agent vaporizes, causing the polystyrene to expand.
- 4 Aging:** The expanded beads, known as pre-expanded beads, are then transferred to an aging chamber to cool and stabilize.
- 5 Drying:** To remove any moisture, the beads are dried using hot air in a drying chamber.
- 6 Conditioning:** Once the beads are dried, they undergo further conditioning to adjust their density and improve their moulding properties.
- 7 Moulding:** The conditioned beads are then loaded into a mould, and steam is injected to further expand and fuse the beads together and take shape.
- 8 Trimming and cutting:** Once the molded EPS product is fully cooled, excess material or irregularities are trimmed or cut off to achieve the desired shape and dimensions. The trimmed and cut EPS products can undergo additional processing steps based on their intended use. This may include surface treatments, lamination, or assembly into larger structures.

There is no residual solid waste generated during its manufacture as EPS is uniquely recyclable – all manufacturing waste can be completely reprocessed in the production process.

The steam consumed in the EPS manufacturing process is condensed back to liquid water and is reused many times over in the EPS production process.

