

## Closed-Cell Polyethylene Foam (PE Foam)

A polymer foam is a two-phase system that contains statistically distributed gas bubbles in the polymer matrix. These products have a lot of benefits including low density, good heat and sound insulation, and excellent energy absorption (impact resistance). Therefore, they are used in a wide variety of application.

The volume of the global foam market reached 113 billion dollars in 2019, and the yearly increase is about 4%.

Polymers foams differ on their type of structure, average cell size, porosity or density.

There is an increasing demand for crosslinked polyolefin foams in market sectors such as: construction, packaging, buoyancy, automotive, medical, including the new and growing field of leisure and sports items.

There are several commercial technologies currently used to produce crosslinked polyethylene-based foams. All these methods are characterized by three steps: sheet formation, crosslinking and foaming. Fig 1 shows a schematic diagram of the main steps for each technology.

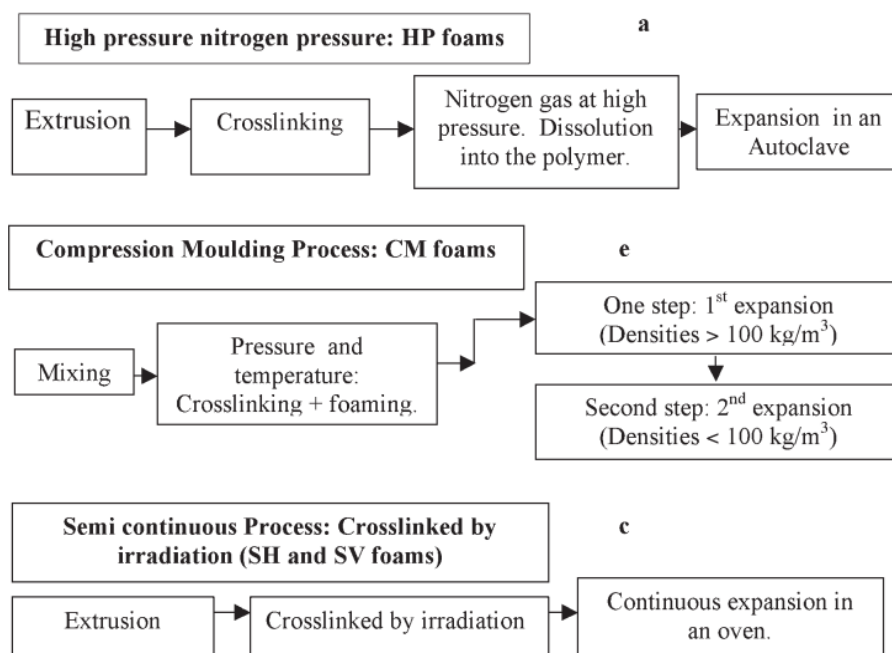


Figure 1- Schematic diagram of the three production technologies of crosslinked closed cell polyolefin foams

**In the case of the client manufacturing, the production is carried out using High pressure nitrogen pressure [a] technology.** In this process, the polymer is compounded with a peroxide curing agent and extruded into a continuous sheet, which is passed through a hot oven to activates crosslinking. After, the sheet cools and cut into slabs.

In the second stage the sheets are placed in an autoclave where they are subjected to high pressure of nitrogen gas at temperatures above the polymer softening point. The nitrogen gas diffuses into the slabs causing nucleation of cells.

In the third stage. and after cooling, the slabs are placed under low pressure in a second autoclave and heated above the polymer melting point. Release of the pressure then results in full expansion, turning the slab into a large foam sheet.

[Article : The Effect of Processing on the Structure and Properties of Crosslinked Closed Cell Polyethylene Foams ]