Atlas Molded Products is a trusted source for molded polystyrene used to insulate many roof systems. Inverted Roof Systems, in which the insulation is placed above the roof membrane and then ballasted with cement pavers, stone, or vegetative layers, present particular design considerations to avoid failures. Due to their closed cell structure, polystyrene boards are the most suitable insulation for inverted roofs.

- Drainage is very important in inverted roof systems. Two layer drainage systems, where water can be drained from above the insulation layer as well as at the membrane surface, are highly recommended.
- The insulation must not be subject to periodic full immersion or permanent partial immersion in water. If after the membrane is installed, ponding of water or poor drainage is observed, this must be remedied prior to installation of the insulation layers.
- Product must be selected with sufficient compressive properties to withstand live and dead loads. Molded polystyrene is available in compressive grades up to 60 psi resistance.
- In general, insulation must be increased to account for the cooling impact of rain water that penetrates past the insulation. Use of a vapor permeable water resistant layer above the insulation is recommended. Design tables that correlate projected rain water exposure and climate may be consulted to calculate the required roof U-value and thus the amount of insulation required.
- The layers covering the insulation must provide UV protection, counter buoyancy forces from rain water under the insulation, provide wind uplift resistance, and meet fire resistance requirements.
- Filtration layers, drainage mats, and root barriers should be incorporated into green roof designs. Filtration and prevention of drain clogging by fines from stone aggregate should also be considered.
- Parapet walls and interior drainage gutters should be insulated to proper levels and heights to avoid thermal bypass issues.

Case studies of failed inverted roof systems commonly find one or more of these key design considerations poorly addressed. If the roof was not designed with inverted insulation installation in mind, use of molded polystyrene is not advised despite its superior water resistance.

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