

Other Performance Properties of Molded EPS

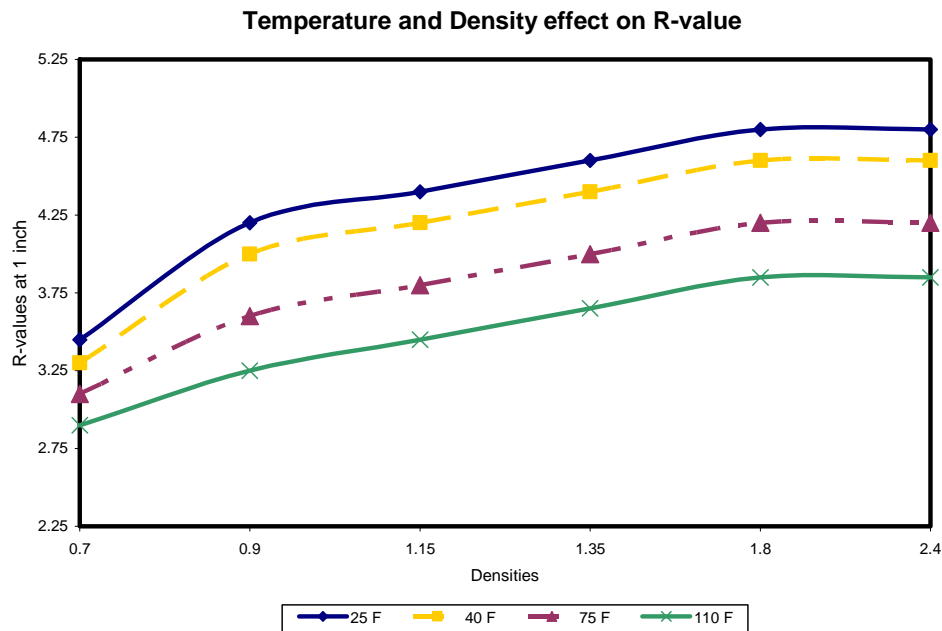
I. THERMAL STABILITY

Aging has no effect upon the insulating performance (R-value) of molded EPS. The R-value of molded EPS is permanent because the closed cell structure of the molded insulation contains only air. Various test studies including actual real life field work has been completed by Industry, Trade Associations and the National Research Council of Canada supporting this performance.

This unique characteristic of long-term energy efficiency is a key factor in establishing product specifications for building owners, specifiers and architects. While the R-value of EPS is permanent, design consideration should include material use temperature, density and thickness.

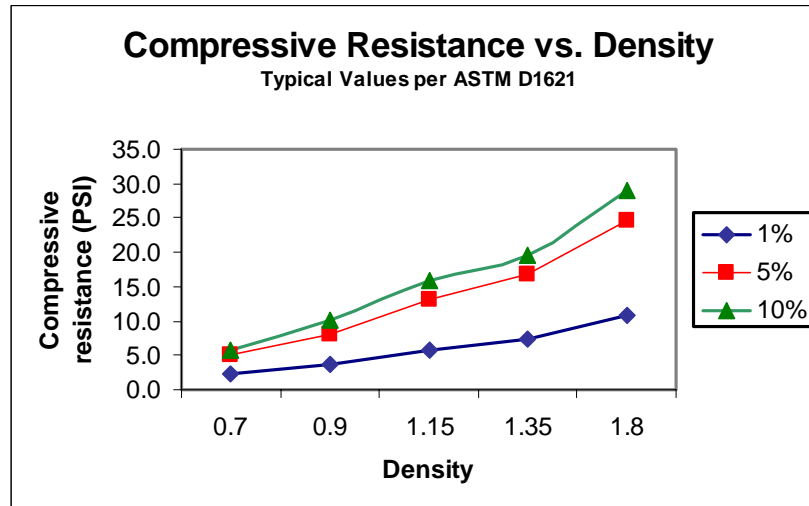
The R-value increases with

- decreasing temperatures
- increasing densities (up to about 2 PCF)
- increasing thicknesses



II. LOAD BEARING PROPERTIES: Compressive Resistance

Products molded from HUNTSMAN EPS resins can be designed to withstand extremely high loads without buckling or crushing. Compressive strength and creep define those properties used for proper design of bracing and blocking requirements. The design parameters used are dependent upon end-use requirements. Highway engineers designing and specifying EPS Billets or Blocks for Geofoam tend to specify using 5% or 1% compressive values per ASTM D6817. Permanent set is usually obtained above about 3% deformation.



III. MOISTURE

Discussion of moisture is relative to the end use the molded EPS insulation. As listed in ASTM C-578, molded EPS insulation products typically have a maximum Water Absorption value of 4 % when tested to ASTM – C-272 and a Water Vapor Permeance maximum of 5 perms per ASTM E-96. Wood for example is typically kiln dried down to a moisture content of 5 to 6 %. Given an ambient temperature of 75° F and relative humidity of 20 % wood has an equilibrium moisture content of 4.5%.

EPS insulation as a closed cell foam permits any water vapor present in wall cavities to escape without significantly affecting the insulation properties and offers a high degree of dimensional stability. Although EPS molded from Huntsman EPS has a low water vapor transmission rate, it is not considered a vapor barrier.

Of all the foam plastics used for insulation applications, EPS is among the most resistant to the adverse effects of moisture absorption.

IV. MOLD, FUNGUS, and BACTERIAL RESISTANCE

Products molded from Huntsman EPS are especially advantageous because they do not support mold, fungus and bacterial growth. Soilage of the foam, however, can supply nutrient for fungal or bacterial growth.

The EPS Molders association (EPSMA) in 2004 contracted SGS US Testing Company to conduct third-party testing of EPS rigid foam insulation in accordance with ASTM C-1338 "Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings". The results demonstrated that under laboratory controlled conditions favorable for the growth of mold, EPS scored no traces of growth over a 28 day incubation period.

V. EXPOSURE TO SUNLIGHT

Long-term extensive exposure to sunlight will cause discoloration and dusting on the surfaces of the molded EPS product. This degradation may be seen as a defect that could adversely affect the service of the molded product in some end use applications. Where surface dusting and discoloration has occurred the product may be restored to usefulness by simple Power washing. It is recommended that suitable coverings be used for long-term outdoor storage.

VI. ADHESIVES AND COATINGS

If molded EPS is to be placed in contact with materials of unknown composition, tests should be made to determine compatibility.

Products molded from Huntsman EPS are very easily bonded to many materials with adhesives and cements having non-hydrocarbon bases. Latex paints provide an excellent finish coat for EPS as well as a base coat for oil-based paints. Silk-screen printing is a common use for EPS point-of-sale displays and consumer end-use food containers.

VII. EPS INSULATION AND ROOFING

Cold setting asphalts or hot asphalts used in roofing should conform to Type C of ASTM Standard D-449. The use of asphalt emulsions is acceptable.

EPS insulation may be used over an existing coal tar pitch membrane roof (including coal tar patches and re-coatings) only if the existing roof is; **(a)** more than five years old, **(b)** physically separated from the EPS insulation by ½" wood fiberboard with taped joints, and **(c)** protected by sufficient EPS insulation to keep the surface temperature of the coal tar below 130°F.

VIII. CHEMICAL PROPERTIES

Products molded from Huntsman EPS are resistant to virtually all aqueous media including dilute acids and alkalis. In addition, they are resistant to water-soluble alcohols and silicones. They have limited resistance to paraffin oil, vegetable oils, diesel fuel and Vaseline. These substances may attack the surface of foamed materials after long-term contact, and may cause deformation.

EPS products are not resistant to organic solvents such as hydrocarbons, chlorinated hydrocarbons, ketones and esters. Anhydrous acids such as glacial acetic acid or fuming sulfuric acid destroy organics such as EPS.

If EPS is to be placed in contact with materials (or their vapors) of unknown composition, tests should be made to determine compatibility.

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