

GEOFOAM NO. 5007

SUBJECT: GEOFOAM USE ON THE INTERIOR OF BUILDINGS - CODE CONSIDERATIONS

DATE: AUGUST 2010 (REVISED JANUARY 2019)

R-Shield® Geofoam is used extensively as a geotechnical material for a wide range of applications. Examples include road widening, road elevation changes, bridge embankments, and retaining walls. The lightweight and predictable engineering properties of geofoam makes it ideal to solve lightweight fill and lateral load challenges.

In addition to civil engineering applications, geofoam is used on the interior of buildings to solve engineering challenges. An example application of Geofoam used in a building's interior space is to raise the elevation of a concrete slab, while not adding significant additional load. Geofoam provides the solution to this and many other interior applications.

Materials used on and in buildings must conform to the structural and life safety requirements of the International Building Code (IBC). When R-Shield Geofoam is used in building construction, the requirements of Chapter 26-Plastics of the IBC must be met. Although Geofoam is not specifically mentioned in Chapter 26-Plastics, Geofoam is considered a foam plastic. Thus, the requirements for foam plastics insulations applies to Geofoam.

Two key requirements for foam plastic products identified in the 2009 IBC are:

2603.2 Labeling and identification.

Packages and containers of foam plastic insulation and foam plastic insulation components delivered to the job site shall bear the label of an approved agency showing the manufacturer's name, product listing, product identification and information sufficient to determine that the end use will comply with the code requirements.

2603.3 Surface-burning characteristics.

Unless otherwise indicated in this section, foam plastic insulation and foam plastic cores of manufactured assemblies shall have a flame spread index of not more than 75 and a smoke-developed index of not more than 450 where tested in the maximum thickness intended for use in accordance with ASTM E84 or UL 723. Loose fill-type foam plastic insulation shall be tested as board stock for the flame spread and smoke-developed indexes.

IBC Sections 2603.2 and 2603.3 states that geofoam must be covered by a third party agency listing and have been tested in accordance with ASTM E84 or UL 723. In order to meet these requirements, R-Shield Geofoam is covered by an Underwriters Laboratories (UL) third party inspection listing program which provides for UL labeling and testing in compliance with ASTM E84/UL 723.

The requirements for the use of thermal barriers over foam plastics is covered by IBC Section 2603.4:

2603.4 Thermal barrier.

Except as provided for in Sections 2603.4.1 and 2603.9, foam plastic shall be separated from the interior of a building by an approved thermal barrier of 1/2-inch (12.7 mm) gypsum wallboard or equivalent thermal barrier material that will limit the average temperature rise of the unexposed surface to not more than 250°F (120°C) after 15 minutes of fire exposure, complying with the standard time-temperature curve of ASTM E 119 or UL 263. The thermal barrier shall be installed in such a manner that it will remain in place for 15 minutes based on FM 4880, UL 1040, NFPA 286 or UL 1715. Combustible concealed spaces shall comply with Section 717.

This section from the IBC makes it clear that Geofoam must be separated from the interior of the building by 1/2 in. gypsum board or a similar material.

A leading fire protection consulting firm was contracted to provide guidance on this IBC issue. The result is that the protection of the Geofoam from potential fire exposure is the primary concern.

Due to the applications of Geofoam potentially using greater thicknesses than foam plastics applied for general insulation uses, the thermal barrier protection recommendations for R-Shield Geofoam are as follows:

- 1. A minimum of 1.0-inch thick concrete, concrete masonry or brick, or**
- 2. A minimum of two layers of 5/8 inch thick, Type X gypsum wallboard, or**
- 3. Equivalent type of protection.**

These minimum protection recommendations provide more than the 15-minute thermal barrier protection and will prevent ignition of the Geofoam for a time period greater than that required by the building Code.

In further support of Geofoam interior applications subject to building code compliance, R-Shield Geofoam has been recognized in UL Evaluation Report ER40361-01. ER40361-01 recognizes both the IBC surface burning characteristics and the structural performance of R-Shield Geofoam in accordance with ASTM D6817, “Standard Specification for Rigid Cellular Polystyrene Geofoam”.