The Importance of Building Codes in Construction

Building codes are in place to provide a means to safeguard life and protect the public welfare through regulating the design, construction practices, construction material quality (including fire performance), location, occupancy, and maintenance of buildings and structures. When regulating materials, many of the model building codes refer to quality standards developed by standard-setting organizations such as the American Society for Testing and Materials (ASTM). Some building codes and insurance rating organizations also rely on test information from FM Global (FM) and Underwriters Laboratories Inc. (UL).

Foam Plastic Insulation and Building Codes

Sheathing and Wall Applications for Polyiso Insulation

The ICC model building code includes a specific section pertaining to the safe use of foam plastics in construction. For the typical wall application, there are three requirements:

- Flame spread of 75 or less on the foam core, as tested in accordance with ASTM E84
- Smoke development of 450 or less on the foam core, as tested in accordance with ASTM E84
- Use of a thermal barrier, such as 1/2 inch (12.7 mm) gypsum board on the interior or occupied side of the building

ALL POLYISO INSULATION PRODUCTS PRODUCED BY PIMA MEMBERS MEET THESE REQUIREMENTS.

Special Wall Applications for Polyiso Insulation

Building codes have specific requirements for the use of foam insulation in special applications. For example, the need for a thermal barrier may be eliminated if the polyiso insulation product has performed successfully in a large scale fire test at accredited testing laboratories. Consult the polyiso insulation manufacturer for specific test results, code approvals, and recommended exposed applications.

Similarly, some polyiso insulation products have been formulated and tested for use in one and two-hour masonry and wood frame wall constructions. The standard test used to qualify time-rated assemblies is ASTM E119. Consult the polyiso insulation manufacturer and code authorities before installing the product in time-rated constructions.
Fire Tests Definitions

**ASTM E84** (Standard Test Method for Fire Tests of Building Construction and Materials) is used to determine the fire resistance of a complete assembly. For example, a wall rating is measured by constructing a 10-foot by 10-foot section of total wall system: framing, cavity insulation, sheathing, siding, and gypsum wall board. The wall section is installed vertically on a gas furnace, and the wall system is exposed to flame for the time period for which a rating is desired, i.e., one, two, three, or four hours. Failure points during time of fire exposure are as follows: flame penetration through the wall section, an unacceptable temperature increase on the unexposed side of the assembly, and structural failure or collapse of the assembly. Therefore, a one-hour fire resistance rating is taken to mean that a structure incorporating the tested wall construction will not collapse, nor transmit flame or a high temperature, while supporting a design load for at least one hour after a fire starts.

Ceiling constructions can also be tested horizontally in accordance with **ASTM E119**. The building code authorities usually designate the duration of fire resistance needed in a building. Factors affecting the duration of fire resistance include type of construction, occupancy designations, location of building, and insurance criteria.

**ASTM E119** is also known as UL 263, NFPA 251, and UBC 7-1.

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1 Underwriters Laboratories Inc. Classification Certificate D-369 for Styrofoam Brand Insulation manufactured by Dow Chemical U.S.A
Testing Laboratories
The testing and evaluation of polyiso insulation to show conformance with building code requirements is conducted by several nationally recognized testing agencies accredited by ICC or state or local code authorities.

PIMA
For more than 30 years, PIMA (Polyisocyanurate Insulation Manufacturers Association) has served as the unified voice of the rigid polyiso industry proactively advocating for safe, cost-effective, sustainable and energy-efficient construction. PIMA’s membership includes manufacturers of polyiso insulation and suppliers to the industry. The products of PIMA’s members comprise the majority of the polyiso produced in North America.

PIMA produces technical bulletins to address frequently asked questions about polyiso insulation. These publications update and inform architects, specifiers, and contractors about and build consensus on the performance characteristics of polyiso insulation. Individual companies can provide specific information about their respective polyiso products.

For more information on polyisocyanurate insulation, visit www.polyiso.org