

# Expandable Polystyrene Standards, Specifications, and Regulatory Compliance: United States

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## I. ASTM E-84 (UL-723)

The modified grades of Huntsman expandable polystyrene have been formulated to decrease the flammability from a small flame source and to comply with the flammability requirements of the nation's building codes. Thus, expanded polystyrene manufactured from Huntsman modified grades 40 and 54 have been tested in accordance with Underwriters Laboratories Procedure UL-723 (a modification of ASTM E-84, "Surface Burning Characteristics of Building Materials") also known as the Steiner Tunnel Test. The test data generated are on file and classified by Underwriters Laboratories, Inc. The Huntsman UL File No. is R-7503, found in the UL Building Materials Directory under Guide BRYX-Foam Plastics.

Molders using Huntsman modified grades of expandable polystyrene may receive authorization for use of File No. R-7503 to initiate an Underwriters Laboratories labeling, inspection and follow-up program of their own. This program provides the molder with the necessary product labels required by the nation's building codes. This "third-party" certification to the building codes may also be available from other certifying laboratories, the most notable of which is RADCO.

The flammability data for Huntsman modified expanded polystyrene generated by Underwriters Laboratories is available on the internet at [www.ul.com](http://www.ul.com).

## II. ROOFING SYSTEMS (UL Guide TGFU)

Expanded polystyrene, bearing a UL Classification and manufactured from Huntsman modified grades of expandable polystyrene, are listed as approved for use in a number of UL Class A roofing systems as specified under UL File No. R13716(N) in the UL Directory "Roofing Materials and Systems."

## III. ROOF DECK CONSTRUCTION (UL Guide TGKX)

Expanded polystyrene manufactured from Huntsman modified expandable polystyrene and bearing a UL classification may be used in roof construction design Nos. 237 and 458 (EPS /Direct Deck application). Molders may obtain specific listings from UL laboratories for use of the following roof construction design Nos.: 412, 421, 440, and 444.

#### IV. FIRE RESISTANCE ROOF/CEILING DESIGNS (UL Guide BXUV)

There are a number of roof/ceiling designs (with the prefix letter P) listed in the Underwriters Laboratories "Fire Resistance Directory" approved for use of expanded polystyrene bearing a UL classification and manufactured from Huntsman modified expandable polystyrene. The following is a list of a few roof/ceiling design numbers:

P225	P254
P230	P404
P232	P508
P235	P510
P238	P514
	P909

In this same Guide, there are a number of roof designs incorporating the use of concrete floors or structural concrete roofs. The use of classified molded expanded polystyrene, with a density of 5 pcf or less, may be placed on these systems without reducing the assembly rating.

#### V. RECOGNIZED COMPONENT



The promulgation of Component Recognition is contingent upon the establishment of UL's Follow-up Service, designed to serve as a check on the means which Huntsman exercises to determine compliance of the modified expandable polystyrene with the requirements of UL. Under the Follow-up Service, Huntsman uses the Recognized Marking on all modified expandable polystyrenes (Grades 54, 40). Representatives of UL make periodic examinations or tests of our products at the factory to determine compliance with UL's requirements.

The presence of this marking on our containers allows the UL inspector, making his periodic examination at a molder's facility, to confirm that the expandable polystyrene being used does, in fact, comply with the designated UL classification.

#### VI. UL-94 (Test for Flammability of Plastic Materials for Parts in Devices and Appliances)

This test is designed to characterize the flammability of plastic materials used for parts in devices and appliances. There are two procedures in this test protocol, one for rigid plastics and one for foamed plastics. The foam plastic test procedure refers to ASTM D 4986 or ISO/DIS 9772.3. This is a small scale Bunsen burner test wherein the sample is held in the horizontal position and the rate of flame spread, afterglow, and the ignition of a cotton ball under the test apparatus is recorded. There are three classifications obtainable:

94HBF	burning rate does not exceed 40 mm per min.
94HF-1	4 of 5 samples flame less than 2 seconds

94HF-2

4 of 5 samples flame less than 2 seconds and the cotton ball under the flame is ignited by flaming particles or drops.

Expanded polystyrene manufactured from Huntsman modified grades of expandable polystyrene have received the following UL-94 ratings:

**GRADE 54**

94HF-1 for density ranges from 1.0 to 3.5 and minimum thickness of 0.5-inches. lbs./ft<sup>3</sup>

**GRADE 40**

94 HF-1 for density ranges from 0.93 to 1.18 lbs/ft<sup>3</sup> and minimum thickness of 0.5 inches.

## V. NEW YORK STATE TOXICITY REGULATION

In the early 1980's, New York State initiated fire safety legislation in response to public concern regarding the combustion toxicity of materials used in the modern building environments. In December of 1986, the State of New York passed a regulation entitled: "Article 15 Part 1120 Combustion Toxicity Testing and Regulations for Implementing Building Materials and Finishes Fire Toxicity Data File". This regulation requires that all thermal insulation used in building construction (along with other building materials) shall be tested in accordance with the "Procedure for Evaluation of Acute Toxicity Resulting from Exposure of Mice to Thermal Decomposition Products Using a Modification of the Protocol Developed at the University of Pittsburgh".

The Society of the Plastics Industry established with the State of New York a designation for a class of products identified as "preformed cellular polystyrene thermal insulation molded or extruded". The State of New York then issued to the Society of the Plastics Industry:

Product Class Designation - SPII-002 and  
Lab Identifier Number SWRI - 871204-B03.

Generic testing was performed by the expandable polystyrene resin manufacturers (which included Huntsman) and filed with New York State under the above designation.

Requests for compliance to the New York State Toxicity Regulation may be fulfilled by referencing the Class Designation and Lab Identifier Number.

## VI. FEDERAL SPECIFICATIONS

The following table provides a general overview of federal specifications:

## FEDERAL SPECIFICATIONS

<b>Specification Number</b>	<b>Title</b>	<b>Compliance</b>
HH-I-524C October 1, 1980	Insulation Board Thermal (Polystyrene)	Obsolete as of 1983 by the GSA. All specifications should now reference the latest version of ASTM-578. Basically they are the same, and expanded polystyrene products molded from Huntsman EPS complies with both specifications.
PPP-C-850d September 3, 1976	Cushioning Material Polystyrene Expanded, Resilient (For Packaging Uses)	Parts molded from Huntsman EPS both regular and modified grades (where specified) comply with Type I - Sheet Form  Class 1 - 0.4-0.8 lbs/cu. ft. Class 2 - 0.6-0.9 lbs/cu. ft. Class 3 - 0.9-1.8 lbs/cu. ft. Class 4 - 0.8-1.2 lbs/cu. ft.
A-A-671 March 13, 1984	Cushioning Material, Expanded Polystyrene, Loose Fill Bulk	Finished product testing by manufacturer.
PPP-C-1683 December 5, 1988	Cushioning Material, Expanded Polystyrene, Loose Fill Bulk (For Packaging Application)	Finished product testing by manufacturer.
MIL-P-19644C July 10, 1970	Plastic Molding Material (Polystyrene Foam, Expanded Bead)	Parts molded from Huntsman EPS comply with:  Type I - Regular Grades Type II - Modified Grades Type III - Oil resistant (This is a GR grade, no longer available in the industry)and,  Class 1 - Natural (white) in color Class 2 - Colored specified color.  Uniformly throughout (Huntsman EPS does not comply).

<b>Specification Number</b>	<b>Title</b>	<b>Compliance</b>
MIL-P-40619B March 5, 1992	Plastic Material, Cellular Polystyrene (for Buoyancy Applications)	Parts molded from Huntsman EPS comply with:  <u>Class 1</u> - Regular Grades Grade A - Low Density 1.5 - 2.5 pcf Grade B - High Density 6.0 - 6.5 pcf <u>Class 2</u> - Modified Grades Grade A - Low Density 1.5 - 2.5 pcf Grade B - High Density 6.0 - 6.5 pcf
MIL-P-60312C December 5, 1986	Parts Molded, Plastic Foam, Polystyrene (For Use With Ammunition)	Parts molded from Huntsman EPS comply with:  Type II (Natural Unpigmented) Class 1 - Regular Class 2 - Modified Grades when coated with anti-stats.

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