Flame Spread & Smoke Development Testing

Technical Bulletin

5.5.1.3
September 2003

Code Requirements:

The expanded polystyrene (EPS) in an Arxx form is classified in the building codes as 'foam plastic insulation'. Both American and Canadian building codes specify testing criteria and acceptability limits for the surface burning characteristics of foam plastic insulation.

While the tests are similar and compare the flame spread and smoke development numbers to those of red oak and inorganic cement board, the tests protocols are different so the resultant index or rating numbers are different.

Testing

In America the product must be tested as per ASTM E84 standard. Testing is conducted by the Underwriters' Laboratories (UL).

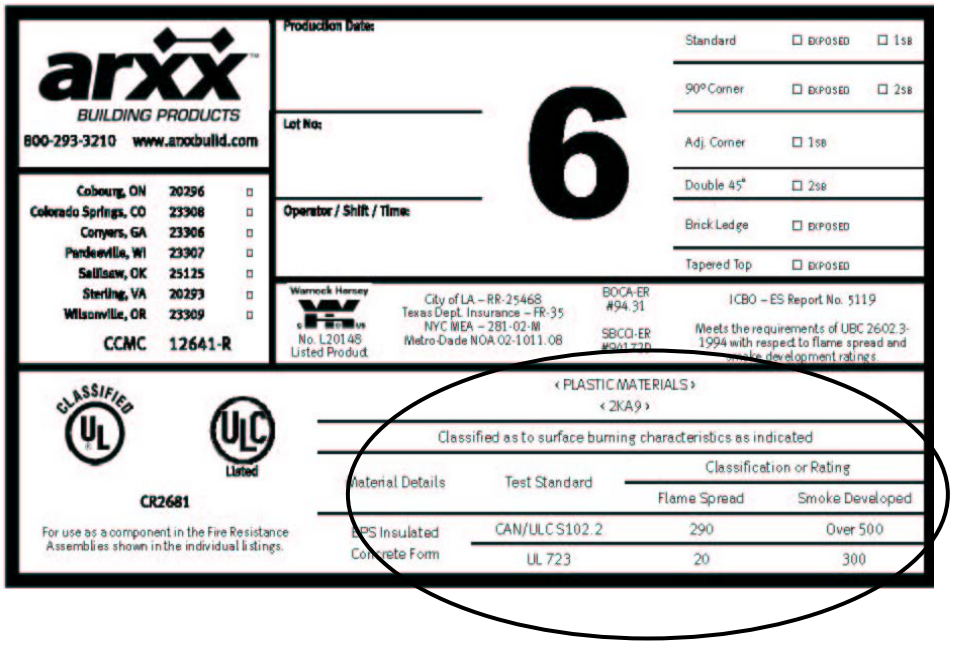
In Canada the product must be tested as per CAN/ULC-S101-M standard. Testing is conducted by Underwriters' Laboratories of Canada (ULC).

The testing results are published by both of these laboratories as per Testing Report Cards. These cards are identified on the following pages.

Posted Results

The codes require that the testing results for Flame Spread and Smoke Developed be displayed on each bundle of Arxx forms.

The following is an example of a label for the 6" form, that is placed on each bundle of Arxx forms:



arxx
BUILDING PRODUCTS

American UL Testing Report Card

The EPS in the Arxx forms is manufactured by BASF Corp. Polymers Div., Huntsman Chemical Corp.or Nova Chemical. Each of these companies conduct the required testing on the foam and the results are posted by UL as reports on a card as shown below.

The following Flame Spread and Smoke Development Testing Reports by UL, identify the characteristics of the BASF foamed plastic used in the Arxx forms, which is BASF – expanded polystyrene – 'Styropor' type BF422 or BFL422.

The density of the Arxx foam is 1.5 pcf , the tested thickness 5", which results in a **Flame Spread Index - 10** and a **Smoke Developed Index - 300**.

Underwriters Laboratories Inc.®

BRYX December 15, 1998
Foamed Plastic **R5817**
BASF CORP POLYMERS DIV (A card)
3000 CONTINENTAL DR. N, MT OLIVE NJ 07828

Foamed plastic in the form of boards.

SURFACE BURNING CHARACTERISTICS

TYPES BF-020, BF-122, BF-134, BF-222, BF-229, BF-322, BF-326, BF-327, BF-329, BF-422
TYPES BFL-020, BFL-122, BFL-134, BFL-222, BFL-322, BFL-327, BFL-422
TYPES F214, F214L, F314, F314L, F414
Density Maximum Thickness

	1.0 pcf 6 In *	1.25 pcf 6 In *	1.5 pcf 5 In *	2.0 pcf 5 In *
Flame spread	15#	5#	10#	5#
Smoke developed	125#	190#	300#	250#

* Installed in a thickness or stored in an effective thickness for the density indicated.
#Flame spread and smoke developed recorded while material remained in the original test position.
Ignition of molten residue on the furnace floor resulted in flame travel equivalent to calculated flame spread classification of 50 and smoke developed classification of over 500.

American Code Requirements:

IBC Section 2603.3 & IRC Section 318.1.1 –

'… foam plastic insulation….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.'

Material Evaluations per – ICBO, SBCCI, BOCA & ICC ES Legacy Report

'…require foam plastic insulation to have a Flame Spread Index (FSI) of not more than 25 and a Smoke Developed Index (SDI) of not more than 450 in maximum thickness as per the following Arxx evaluation reports:

- ICBO ER-5119 - Section 2.2.1
- SBCCI #94127D - Section 4.4
- BOCA No. 94-31 - Section 3.3
- NER 685 - Section 3.2

Canadian ULC Testing Report Card

The EPS in the Arxx forms is manufactured by BASF Corp. Polymers Div., Huntsman Chemical Corp.or Nova Chemical. Each of these companies, conduct the required testing on the foam and the results are posted by ULC as reports on a card as shown below.

The following Flame Spread and Smoke Development Testing Reports by ULC identify the characteristics of the BASF foam plastic used in the Arxx forms, which is BASF – expanded polystyrene – 'Styropor' type BF422.

The density of the Arxx foam is 24.0 kg/m^3, which results in a **Flame Spread Index - 140** and a **Smoke Developed Index - over 380**.

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Guide No. 40 U8.16 June 14, 1995 File CR1762

PLASTIC MATERIALS - BASF CORPORATION, Polymers Division, Mount Olive, NJ 07828-1234

Expanded polystyrene foamed plastic material in the form of boards, produced from the following "Styropor" bead types: BF122, BF214, BF314, BF321, BF322, BF326, BF327 and BF422
Classified as to surface burning characteristics in accordance with CAN/ULC-S102.2M as indicated

Materials Details		Classification or Rating	
Thickness, mm	Nom Density, kg/m^3	Flame Spread	Smoke Developed
25 min	16.0	115	430
25 min	24.0	140	over 380
25 min	32.0	140	over 325

Canadian Code Requirements:

NBC – Section 3.1.5.11

3.1.5.11.3 'Combustible insulation having a flame spread rating more than 25 but not more than 500…. Is permitted in exterior walls…'

3.1.5.11.4 'Combustible insulation having a flame spread rating more than 25 but not more than 500…. Is permitted in interior walls…'