

## **EXTERIOR FIRE-X®**

### **Class A-B-C/I-II-III Flame spread, Class A-B-C Roof Coverings, and Hourly Fire-Resistance Ratings**

Flame spread classes, roofing classes and hourly ratings are confusing terms and they sometimes get misused. The first is based on the ASTM E-84/UL 723 "Test for Surface Burning Characteristics of Building Materials." The second is based on ASTM E-108/UL 790, "Test for Fire Performance of Roofing Materials." The third is based on ASTM E-119 "Fire Tests of Building Materials."

#### **▲ Flame Spread Classes**

The UBC and BOCA codes use the I-II-III designation, and the Standard code uses A-B-C. The flame spread categories are as follows per ASTM E-84/UL 723:

- Class A or I: Flame spread 25 or less (FRTW, some FR surface coatings)
- Class B or II: Flame spread 26 to 75 (other FR surface coatings)
- Class C or III: Flame spread 76 to 200 (untreated lumber and plywood)

FRTW must have a flame spread of 25 or less in the 10-minute ASTM E-84/UL 723 test, plus the test is continued for 20 more minutes during which there must be no evidence of significant progressive combustion and the flame front may not progress more than 10.5 feet from the burner. This is far more severe than the 10-minute ASTM E-84 test used for fire retardant surface coatings and other building materials.

#### **▲ Class A-B-C Roof Coverings**

Class A, B, or C roofing systems are sometimes confused with Class A-B-C/I-II-III flame spread categories above. The tendency is to assume that Class A roof systems have a Class A flame spread, and so on, but there is no correlation.

The ASTM E-108/UL 790 roof coverings test does not produce a flame spread rating. It is a pass-fail test under which a product either passes the criteria as a Class A, B or C roof covering system or it doesn't.

It is an entirely different test from ASTM E-84/UL 723, and it includes weathering per the ASTM D-2898 "Standard Rain Test." The highest fire classification is Class A. Note that a Class C roof system is considered fire resistant while a Class C (or III) building material (as above) is not. Non-classified roof systems have no fire rating.

#### **▲ Hourly Fire Resistance Ratings**

Hourly ratings are a function of the assembly being used (wall, floor, door, ceiling, roof, etc.) and generally require use of a noncombustible membrane (e.g. gypsum, masonry). ASTM E-119 "Fire Tests of Building Construction Materials" is the test used to

determine the hourly rating of an assembly. It exposes an assembly to heat and flame on one side and tests for heat transmission, burn-through, structural integrity and ability to withstand a hose stream from a fire hose.

Flame spread classification per ASTM E-84, 30 minute duration, has no relation to a 30-minute rating or any other hourly rating (which must be determined by ASTM E-119). ASTM E-119 is not a required test for FRTW, therefore FRTW has no different hourly rating than untreated wood and it cannot be substituted for noncombustible materials such as gypsum in a rated assembly. FRTW's advantage over untreated wood and other combustible materials is the fact that it doesn't ignite or contribute to the spread of flame.