

The Hose Stream Test

What is the Hose Stream Test?

The hose stream test is an integral part of many fire testing standards. ASTM E 119, ASTM E 814/UL 1479, and ASTM E 1966/UL 2079 are all standards that affect the firestopping industry. All three standards require a hose stream test.

What's the history of the Hose Stream?

In the late 1890's, cast & wrought iron were commonly used in construction. Unlike steel, they failed in a brittle manner when heated in a fire, creating a risk for firefighters who were in the wrong place at the wrong time. As a result, the hose stream was created to test the integrity of these support members (columns/beams). In 1918, the first edition of ASTM standard E 119--then numbered C19, Standard Test Method for Fire Tests of Building Construction and Materials--included a hose stream test to measure a material's integrity. Because ASTM E 119 includes the hose stream test as acceptance criteria of assemblies, it is considered applicable to fire stops as well.

What is the intent of the Hose Stream?

The hose stream serves as an indicator for two important attributes: 1) the integrity of a fire stop or assembly during fire exposure and 2) the overall reliability of the material to perform its intended function. For firestop systems it is important to obtain an indication of performance integrity. A firestop system that loses its integrity can allow the spread of fire by creating passages for flames and hot gases to propagate from one side of a rated assembly to another.

Is the Hose Stream test indicative of actual fire fighting methods?

The hose stream test is not, in any way, intended to replicate or determine the affects of fire fighting tactics on systems. While the hose stream apparatus is adapted from fire fighting equipment, its intent is to provide an impact, erosion, and cooling exposure applied in a standard manner to the tested specimen.

How does the Hose Stream affect Firestop Systems?

Firestop systems must first be subjected to a specified fire duration in accordance with the standard time/temperature curve. This could be 1, 2, 3, or 4+ hours. When ASTM E 814 was released as a standard for through-penetration firestop systems some twenty years ago, R&D testing revealed that some light systems would pass the fire endurance segment but miserably fail the hose stream test. Picture, if you will, a thin coating of firestop over insulating materials. When tested in accordance with the standard time/temperature curve, the system may pass the fire test by limiting heat transfer or passage of flame, but might be so weak at the end of the test period that the system could barely remain in place in the opening. Most ordinary or lightweight cements/mortars may also meet the fire resistance ratings desired. However, the integrity of the cement/mortar patch may be lost upon the impact of the hose stream. The hose stream test effectively screens out systems that

perform acceptably in the furnace environment but have insufficient integrity to withstand real-world fire exposure.

References

- Standard Methods of Fire Tests of Building Construction and Materials"; ASTM E 119; American Society for Testing and Materials, Philadelphia
- Babrauskas, V., and Williamson, R. B., "The Historical Basis of Fire Resistance Testing", *Fire Technology*, vol. 14, pp. 184-194, 205, and 304-316 (August & November 1978).

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