
Exterior Insulation Finish Systems And Fire Resistance Ratings

by Jesse J. Beitel



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About the Author

Jesse J. Beitel, III, is manager of certification and product services, Department of Fire Technology, Southwest Research Institute. He has been involved in the development, design and direction of numerous full-scale standard and non-standard flammability evaluations. His experience ranges from operation of a large scale burn room facility for measuring heat, smoke, and other characteristics, to fire protection surveys of off-shore drilling facilities, to the operation of high temperature test furnaces to evaluate the fire resistance of walls, doors, floors, and ceilings. He received a B.S. in chemistry from St. Mary's of Texas.

In some instances the building codes require wall systems on which Exterior Insulation Finish Systems (EIFS) are applied to have a one-hour or greater fire resistance rating.

A fire rated wall upon which an EIFS system is applied may have to be constructed as a fire-rated wall as in new construction or the EIFS may be applied over a previously rated wall system as in retrofit construction.

The major question surrounding the use of EIFS systems on fire-rated walls is generally: "Will the addition of an EIFS system degrade the fire resistance of a previously-rated wall system?"

For example, in the 1988 edition of the Uniform Building Code, Section 1712.4.B.(i), which deals with buildings of any height and the use of foam plastic insulation in or on exterior walls, states "When the wall is required to have a fire-resistive rating, data, based on tests conducted in accordance with U.B.C. Standard No. 43-1, shall be provided to substantiate that the fire-resistance rating is maintained." Somewhat similar provisions are in the other model building codes.

Also, the addition of an EIFS system to a wall will cause the wall to become unsymmetrical in its construction, and the building codes may then require that the fire rating be maintained from both the interior and the exterior sides.

In order to address these concerns, a fire test program was performed by Southwest Research Institute under the sponsorship of the Exterior Insulation Manufacturers Association.

The objective of this program was to determine if the addition of an EIFS system to a previously rated wall system would degrade the fire resistance rating of the wall system when evaluated from either the interior side or the exterior side.

To perform this program, a previously rated 1-hour fire-resistant, non-load bearing wall system was selected as the base assembly. This wall system was as described in UL Design U405 and the Gypsum Fire Resistance Manual Design WP1200. This assembly generally consisted of 3-5/8 in. X 25 gauge galvanized steel studs and steel track with the studs placed on 24-in. centers. Both sides of the stud framework were covered with a single layer of 5/8-in. Type X gypsum wallboard installed in accordance with standard procedures. The walls were 10 ft. high and 12 ft. wide.

After the basic wall assemblies were constructed, the assemblies had either a typical Class PM, type A EIFS system or a typical class PB, type A EIFS system installed on one side. The materials used in the construction of the type PB and PM assemblies were of standard manufacture, commercially available, and were installed using normal construction techniques for each type of EIFS system.

After installation, the EIFS systems were allowed to cure for 28 days prior to testing.

The fire resistance test that was used to evaluate the wall systems was the ASTM E-119 or UBC 43-1 "Standard

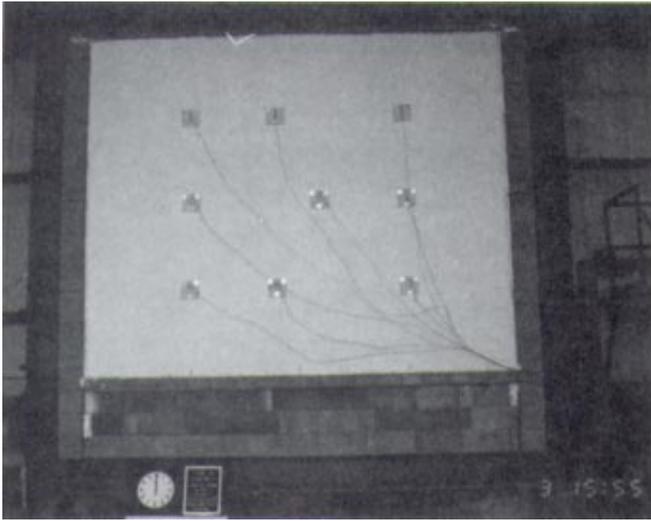


Figure 1. Test Wall prior to fire test with the gypsum wallboard face exposed to the fire (EIFS face is unexposed side).

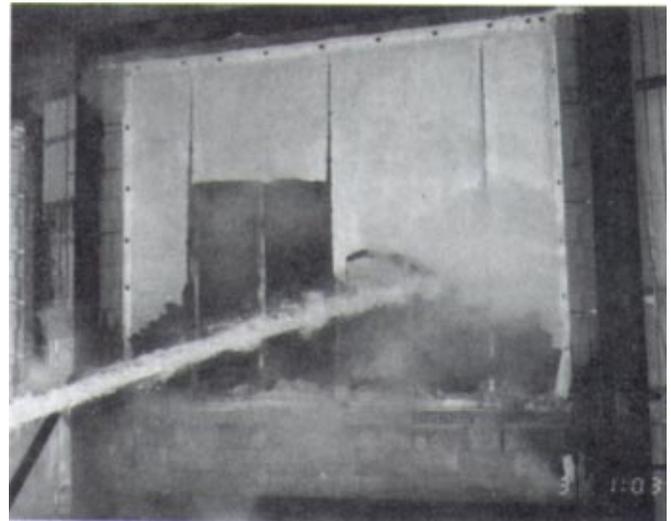


Figure 2. Test wall undergoing hose stream test immediately after the fire test.

Method of Fire Tests of Building Construction and Materials.” In general the test evaluates nonload bearing wall assemblies with respect to their capability to contain a fire as evidenced by no occurrence of burn-through, no excessive temperatures on the unexposed surface of the wall, and integrity during the hose stream portion of the test.

The conduct of this test required that the exposed side of the wall system be exposed to a standard fire with temperatures inside the furnace at 1,000 degrees F at five minutes, and at 1,700 degrees F at the end of the one-hour test period.

If the test wall assembly successfully met the fire test criteria, then the test assembly was removed from the furnace and the exposed face was tested using a water stream applied to

Table 1. Summary Of Test Results

Type of EIFS System Tested	Exposed Face Tested	Test Results Obtained
PB	Gypsum-Interior Face	Passed Fire Test
PB	Gypsum-Interior Face	Hose Stream Retest-Passed
PB	EIFS-Exterior Face	Passed Fire Test
PB	EIFS-Exterior Face	Hose Stream Retest-Passed
PM	Gypsum-Interior Face	Passed Both Fire & Hose Stream Tests
PM	EIFS-Exterior Face	Passed Fire Test
PM	EIFS-Exterior Face	Hose Stream Retest-Passed

the exposed face. Should the assembly meet the fire and hose stream criteria, then the wall system was rated accordingly.

Where necessary, a hose stream

retest was conducted on an identical sample as allowed by the test standard. Table 1 provides a summary of the tests conducted and the results obtained. The results of this test program demonstrated that both the type PB and the type PM wall assemblies attained a one-hour fire-resistance rating which was the original rating of the base wall assembly.

While this test program did not evaluate all types of fire rated wall assemblies, the specific base assembly used was intended to represent a common type of fire rated wall system and to provide a system that would be close to its fire resistance rating.

In general, therefore, it may be stated that the addition of an EIFS system to a rated wall system will not significantly add to nor detract from the fire-resistance rating of a wall assembly provided the attachment method of the EIFS system to the rated assembly is in a similar manner as that tested.

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