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ABSTRACT:

What is driving all the discussion about NFPA 285 and exterior walls? Energy and safety! So what is making this such a complicated issue? Think complete wall assembly and all the materials and configurations possible. The entire assembly must pass the test. Here is the background and some current options to consider.

FILING:

UniFormat™
B2010 - Exterior Walls

MasterFormat®
07 21 00 - Thermal Insulation
07 25 00 - Weather Barriers
07 27 00 - Air Barriers

KEYWORDS:

Insulation, foam plastic, polyisocyanurate, weather barrier, air barrier, permeable, vapor resistant, energy, combustible, fire resistant

REFERENCES:

International Building Code, various editions.

NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

Exterior Walls and NFPA 285

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Background

Energy codes, building codes, LEED, sustainable design (in general). They are all pushing for improved building envelope thermal performance. The overall performance is dictated by the energy required to maintain the comfort of the building occupants.

Today we rely on mechanical systems that require energy to heat and cool our buildings.

Since it's just too crass to tell everyone to turn down the thermostat and wear a sweater in the winter and dress lightly and open the windows in the summer, we need to address the issue.

Energy to maintain comfort can be reduced two primary ways by:

- Improving overall thermal resistance
- Reducing leaks

That seems to be an easy fix. Add insulation and seal joints within the building envelope.

Thermal Improvements

The codes and sustainable design requirements are making designer reconsider where the insulation is added. The answer used to be simple: fill the exterior wall stud cavity with insulation. 4" studs get 4" batt insulation. 6" studs get 6" batt insulation.

The studs (metal or wood) interrupt the insulation and do not provide the same thermal performance as the insulation. Metal studs are actually great for conducting heat through the exterior wall. Metal is a conductor - who knew? Why do you think stovetop pots and pans made of

metal and have plastic handles?

So now the codes may require continuous insulation (CI) to counter act the stud conductance. Because the studs interrupt the insulation, the only way to provide continuous insulation is to install the insulation outside of the stud space.

The prevailing wisdom has been to put the continuous insulation outboard of the stud, on the exterior face of the wall sheathing within a cavity behind the exterior building cladding.

Leak Improvements

Leaks may be stopped by relying on miles of sealant applied at every envelope material joint, transition, and penetration. Or achieve predictable improved performance by using a sheet or liquid applied air barrier membrane. Air barriers are engineered and tested for a specific performance. Sealed joints are not. When looking for proven performance the choice is obvious.

Air barriers resist air and liquid water movement, acting as a weather barrier. They may or may not resist water vapor movement. Air barriers are available in permeable and vapor-resistant formulations. The type chosen is the result of the location within the wall assembly with respect to the insulation.

There is no standard answer for the right location. Be sure to avoid a condition where moisture can condense within the exterior wall assembly, inside the weather barrier.

Materials Selections

Continuous insulation and air barriers within the exterior wall cavity must resist wind pressure and moisture to remain in place and continue to be effective. The International Building

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Materials Selections

Continuous insulation and air barriers within the exterior wall cavity must resist wind pressure and moisture to remain in place and continue to be effective. The International Building Code includes another dimension: fire resistance for building and occupant safety. Effectiveness is determined by a NFPA 285 assembly test. See Fig. 1.

The test exposes a complete exterior wall assembly to an interior fire attacking the exterior wall and a fire attacking the head of an opening in the wall. The test measures the distance of the fire effect on the exterior wall. The test was first introduced as a safety measure for EIFS as an exterior finish. Now the code requires the test for foam plastic insulation and weather barriers in the wall cavity space.

Traditional combustible materials like foam plastic insulation and asphalt based air barriers in the wall cavities do not pass the test.

Extruded polystyrene insulation manufacturers are developing details to pass the test. Some manufacturers are introducing new fire resistant products that will pass the test. And some alternative materials currently

exist that can pass the test.

Fire resistant polyisocyanurate insulation is available and can be used as a sheathing board. Fire resistant asphalt based sheet applied air barriers are available. Both fire resistant products are still combustible. Both have aluminum foil facers.

The metal facers act as a heat sink to limit the effect of the fire on the combustible materials by conducting the intense heat away from the flame source. The metal facers also act as a vapor retarder. These foil faced products are not available in a vapor permeable form.

Other Current Options: Mineral wool insulation is non-combustible and is not subject to the fire test. Liquid applied air barriers (both permeable and vapor resistant) can be made of naturally fire resistant materials.

These materials allow options for exterior wall construction.

Conclusion

The NFPA 285 test is an assembly test. It is not a material test. Individual materials do not comply with the test. When selecting exterior building wall materials ensure the resulting assembly will comply with NFPA 285.

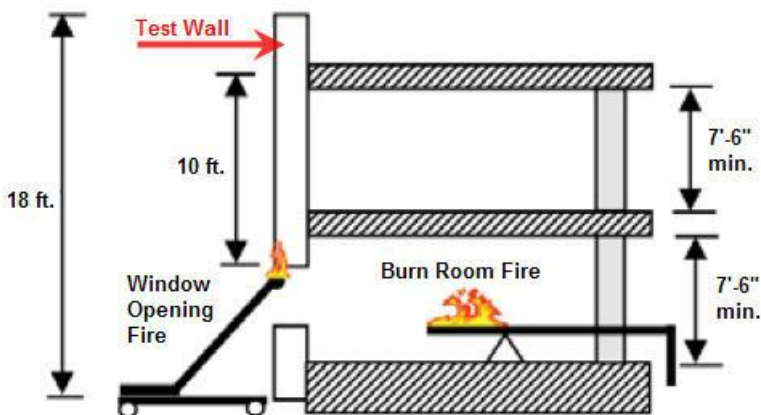
For now, there are few tested assemblies. You may rely on manufacturers that show individual components that may be combined

within a wall assembly meeting the test.

Know your code requirements. IBC 2012 and earlier editions are not the same. Under 2012, a combustible air barrier, alone, may be sufficient cause to require compliance with NFPA 285. Under 2009 and earlier, foam plastic insulation and metal composite panels determine the need to meet the test.

Additional Reading

Carlisle Coatings & Waterproofing
[Next Generation of Membrane Air Barriers White Paper](#)



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