COMPLIANCE OF ALTERNATIVE THERMAL BARRIERS

NFPA 286 vs UL 1715

ROOM CORNER FIRE TESTS

Current Codes require that foam plastic be separated from the interior space by a prescriptive thermal barrier. Alternative’s to the prescriptive barriers, as described in IBC Section 2620.9, IRC Section 912.6 and NFPA 101 Section 10.2.4.3.3, can be accepted provided the proposed alternative has been tested in a manner to clearly show the alternative provides AT LEAST the same level of protection as that provided by the prescriptive solutions. Under the special approvals section of the I-Codes and NFPA 101 are listed room corner test options that are intended to show this level of equivalent performance can be met, including the NFPA 286 and UL 1715 room corner fire tests. Jensen Hughes—one of the nation’s foremost fire engineering firms—found 11 major differences between the NFPA 286 and UL 1715. Making the clear recommendation that the NFPA 286 method be used to determine the flame and fire growth of materials within a compartment

The NFPA 286 fire test provides a more data-based pass/fail approach to determining fire performance in NFPA 286 and UL 1715. Results in a more thorough test that clearly shows the tested assembly fully meets the intent of the referenced Codes. Jensen Hughes concludes “the NFPA 286 provides a significantly more severe thermal environment than the UL 1715 for the determination of flame and fire growth of materials within a compartment. The ignition source, compartment geometry, and sample configuration of the NFPA 286 test facilitate a more severe thermal environment than that of the UL 1715 test. Furthermore, the NFPA 286 test provides significantly better quantitative measures in terms of heat release, flashover and smoke generation. These measurements provide the quantitative basis for the pass/fail criteria required in the codes and standards. The UL 1715 test provides information based solely on observations made during the test and/or from photographic data. Observations can be highly subjective and may not be consistent from test to test.”

1. More Severe Thermal Environment - While the compartment size is the same in both tests, the door geometry differs. As a result of this difference, a more severe thermal environment is expected in the NFPA 286 test than the UL 1715 test.
2. Stricter Flashover Requirement - NFPA 286 stipulates a maximum heat release rate of 800 kW. Since heat release rates are not measured in the UL 1715 test, flashover would be identified at the point at which flames extend out the door. Theoretical this occurs at a value of 111 MW, therefore the 800 kW criterion of the NFPA 286 test is the strictest requirement.
3. Higher Total Heat Exposure - Analysis of the ignition sources used found that the total heat delivered by the burner in NFPA 286 is 15-30% greater than that of the wood crib used in UL 1715. Consequently, the contribution of thermal energy to the room from the ignition source is greater in the NFPA 286 fire test, which can accelerate flame spread and lead to flashover sooner than the UL 1715 wood crib.
4. More Consistent Testing Environment - The wood crib ignition source inherently has variability regarding its burning behavior and heat release rate. These are not constant from test to test and consequently “hot” or “cold” crib fires can occur thus giving drastically different results between tests.
5. Greater Fuel Load - NFPA 286 requires complete coverage of the back and side walls and ceiling with the material being tested. UL 1715 requires coverage of only an 8x8 ft area of the ceiling and the same area on the back wall and one side wall adjacent to the fire source. The remaining area of the UL 1715 is completely covered with non-combustible gypsum board. The NFPA 286 test will result in increased gas temperatures leading to flashover conditions occurring sooner than in the UL 1715 test.
6. More Rigorous Flame Spread Requirements - Incorporating wood studs into the UL 1715 assembly has a drastic impact on the ability of the flame to spread across the back wall and one side wall adjacent to the fire source. It makes this test significantly harsher than the NFPA 286 test.
7. More Strenuous Environment - Spray applied foam plastic on the walls must make direct contact with the NFPA 286 burner while specified to remain 1 inch away from the wood crib in UL 1715. Spray applied materials that may be applied in a concave manner between studs will increase the distances from the ignition sources, reducing heat flux exposures and reducing the intended severity of the test exposure in the UL 1715 test.
8. Uniformity Over the Vertical Height - When a fire source is placed in direct contact with the walls as in the NFPA 286 test, the heat flux to the walls is the most severe and uniform over the vertical height. In the UL 1715 test, the wood crib is spaced 1 inch from the adjacent walls, which results in a reduced severity of exposure.
9. Quantifiable Metrics - NFPA 286 requires instrumentation to quantify and characterize the contributions of the tested materials compared to UL 1715. The inclusion of additional instrumentation in NFPA 286 allows for a quantifiable metrics to be used for test evaluation. The visual evaluation of the UL 1715 test is subjective and subject to interpretation, particularly regarding the evaluation of smoke production.
10. Requirement to Measure Smoke - There is no smoke concentration measurement nor limiting requirements in UL 1715. In the UL 1715 test, smoke generation is measured based on observations from video tape and/or photographs. When UL 1715 tests are reviewed to determine if there are “High Levels” of smoke, the review is based on the reviewer’s judgment. This then leaves the determination open to significant subjectivity. Thus, the smoke concentration cannot be effectively compared from one test to another on the lack of quantifiable data and the subjective nature of the UL 1715 assessment. It is clear that quantified smoke measurements as in NFPA 286 and its criterion in the referencing codes and standards are preferable for any standard fire performance test.
11. Defined Flashover Criteria - In comparing the pass/fail requirements of the two tests it is concluded that the NFPA 286 test is stricter as it is required to compare thermal and flame spread criteria than UL 1715. The NFPA 286 criteria is prescriptively listed in the I-Codes, UL 1715 is a visual observation of flame out the door. Considering the fact that the last 4’ of the room, towards the doorway, is covered with gypsum board in the UL 1715 test does this pass/fail even make sense?

We urge you to review the full report in order to make the determination if the coatings you are currently accepting as alternative thermal barriers have been tested in accordance with the NFPA 286 and shown to meet the full intent of the I-Codes and NFPA 101 Life Safety Code.

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Special Approvals Section

Under the special approvals section of the NFPA 286 and shown to meet the full intent of the I-Codes and NFPA 101 Life Safety Code.

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