COMPLIANCE OF ALTERNATIVE THERMAL BARRIERS

NFPA 286 *vs* UL 1715
ROOM CORNER FIRE TESTS

Testing coatings for use as alternative thermal barriers over foamed plastic represents a serious concern to fire and life safety and the methods used to test these materials needs to be understood when evaluating your choice of coating to meet building code requirements.

A 32-page engineering judgement published in November 2018 and conducted by Jensen Hughes—one of the nation's foremost fire engineering firms—found 11 major differences between the NFPA 286 and UL 1715 and makes 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 test method provides a Pass-Fail data approach to determining fire performance and thus, results in a more robust test on which to regulate combustible materials in the codes and standards. It should be noted that the UL 1715 does NOT offer a clearly defined Pass-Fail criteria. **To be precise, Jensen Hughes was very clear that the only safe path to compliance as an alternative Thermal Barrier is NFPA 286 testing.**

The NFPA 286 is known for its intense heat, prescriptive pass/fail criteria and ease of use in identifying compliant products, the NFPA 286 far exceeds the UL 1715 as a method to test coatings over spray foam. Many blur the line between NFPA 286 and UL 1715 referring to them as identical when, in fact, they are quite different in the methodology and examination of the results. These differences are why International Fireproof Technologies, Inc. (IFTI) chooses to exclusively test our DC315 to the more stringent definable Pass-Fail criteria of the NFPA 286 instead of UL 1715.

When choosing a coating to meet NFPA 101 Life Safety Codes requirements wouldn't you want to know the product has passed the most stringent Pass-Fail criteria of NFPA 286, and offers 11 major differences to support the testing? That sounds like a safe and obvious choice than accepting a test, like the UL 1715, which has little to no Pass-Criteria and is ultimately a visual judgement of one person.

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Jensen Hughes found 11 major differences between testing to the NFPA 286 and UL 1715.

1. 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. 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 as the point at which flames extend out the door. Theoretically this occurs at a value of 1.1 MW, therefore the 800 kW criterion of the NFPA 286 test is the stricter requirement.

3. 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. The wood crib ignition source inherently has variability regarding its burning behavior and heat release rate. These are not constant from test-test and consequently "hot" or "cold" crib fires can occur thus giving drastically different results between tests.

5. NFPA 286 requires complete coverage of the back and side walls and ceiling with the material being tested. UL 1715 requires coverage of only of an 8 x 8 ft area of the ceiling and the same area on the back wall and one side wall adjacent to the fire source corner the remaining area of the UL 1715 is completely covered with non-combustible gypsum board. The additional combustible material present in the NFPA 286 test will better insulate the compartment, and consequently result in increased gas temperatures leading to flashover conditions occurring sooner than in the UL 1715 test.

6. Incorporating wood studs into the UL 1715 assembly has a drastic impact on the ability of the flame to spread across the surface of the specimen, thus limiting the ability for the flame to reach the extremity of the sample – the sole pass/fail criteria of the UL 1715. While this addresses performance in assemblies that contain wood studs what about those that do not? The requirement that flame shall not spread to the ceiling during the first 5 mins of the NFPA 286 test is a difficulty not present in the UL 1715 and is not hindered by vertical wood studs.

7. 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. 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. 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. 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 based on the lack of quantitative 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. In comparing the pass/fail requirements of the two tests it is concluded that the NFPA 286 test is stricter with respect to 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?