

# Exceeding Current Fire Testing Standards

IFTI passes multiple CAN/ULC 9705 room corner burn tests over SPF, qualifying DC315 as equivalent to generic and prescriptive barriers over SPF

BY BRAD GLAZIER

Recently, ULC published the CAN/ULC-9705 (*Full-scale Room Test for Surface Products*), which is a Canadian adoption of the first edition of the ISO 9705 test. This standard specifies a test method that simulates a fire that, under well-ventilated conditions, starts in a corner of a small room with a single open doorway. The testing protocol is similar to the U.S. IBC Codes for Alternative to Thermal Barrier Testing, but in a much more extreme fire condition. The test is conducted for 20 minutes, or until flashover occurs, at heat outputs of 100 kW for 10 minutes followed by 300 kW for another 10 minutes.

The 9705 test undoubtedly raises the bar for established fire testing standards. In seeing the opportunity to truly prove the fire protection performance of its DC315 intumescent coating, International Fireproof Technology Inc. (IFTI) recently arranged several tests to the new standard.

## TESTING FOR NBCC SECTION 9

DC315 was tested to the CAN/ULC-9705 in the most extreme case possible and still beat the time to flashover of Generic Barriers currently accepted in National Building Code of Canada (NBCC) section 9.29.4-9.29.9. Testing was set up as follows: SPF meeting the CAN/ULC S705.1 standard was



Table 1: Time to Flashover - DC315 vs. Generic Barriers

ISO 9705 TIME TO FLASHOVER TESTING RESULTS		
Generic Barriers in NBCC 9.29.4-9.29.9	Thickness mm	Time to Flashover in Secs. 100Kw / 300Kw
SPF COATED WITH DC315	0.3302 (20 mils WFT)	600 secs < DC315 > 1200 secs
Douglas Fir Plywood	12	521
Particle Board	13	242
Hardboard	6	225
Oriented Strand Board (OSB)	11	196

Table 2: : Time to Flashover - DC315 vs Generic Barriers

ISO 9705 TIME TO FLASHOVER TESTING RESULTS		
Product Accepted in NBCC 3.15.12	Thickness mm	Time to Flashover in Secs. 100Kw / 300Kw
Gypsum	16	NFO
SPF COATED WITH DC315	0.5588 (35 mils WFT)	NFO
Fire Retardant Treated Plywood	12	895

installed directly to the testing room's OSB sheathing on all three walls and ceiling (without studs), and DC315 was applied at 20-24 Mils WFT over the SPF. A total of seven tests were conducted by certified testing facilities, with results showing that DC315 surpassed the flashover times of the Generic Barriers. Table 1 shows the tested [1] flashover times of DC315 versus Generic Barriers, most of which reach flashover in less than 10 minutes.

### TESTING FOR NBCC SECTION 3

That's great for Part 9 combustible buildings, but what about Part 3 non-combustible buildings? NBCC Section 3.1.5.12 allows for the use of not less than 12.7mm (1/2") gypsum as protection of SPF; 12.7 mm was not tested to the 9705, but 16 mm (5/8") gypsum was. Results of the 100/300 KW exposures show no flashover of the 16mm gypsum within the 20-minute test time. Again, IFTF's DC315 was tested as a comparison, and at an application rate of 35 mils WFT DC315 succeeded in preventing flashover for the entire 20-minute test duration, which is the same result as the 16mm gypsum board.

(cont'd on the next page)



### WHAT DOES THIS MEAN FOR THE CANADIAN SPF INDUSTRY?

While not officially codified yet, the publishing of this test method at least provides manufacturers with a ULC-specific test method for evaluating the contribution of surface products to fire growth.

The NBCC requires SPF to be protected by a thermal barrier with the intent to delay the involvement of the foamed plastic in a fire. The term thermal barrier is not a defined term in the building code in Canada, however it is generally considered to be a product which has been tested and classified in accordance with CAN/ULC-S124 or tested to CAN/ULC-S101 as described in the building code.

It is interesting to review the original research completed at the National Research Council (NRC) by T.T. Lie [2] that was completed in the development of the thermal barrier test method, later becoming CAN/ULC-S124. This test was developed to provide a less costly method to determine the performance of the protection of foam insulation.

The thermal protection provided by the different board products was evaluated and compared using two test scenarios, a room corner test and a vertical furnace test. The 10-minute fire exposure currently required when testing to CAN/ULC-S124 is based on the results of the original room corner tests that showed products that met the 10-minute criteria would not become involved in a fire for a minimum of 15 minutes when tested in the room corner scenario.

Therefore, if there are reasons why a product cannot be tested properly to CAN/ULC-S124, clearly the room corner test is the appropriate test method to support an Alternative Solution application and demonstrate equivalent performance, given the fact that CAN/ULC-S124 criteria is based on room corner test results.

IFTI is now the first protective coating company to have run multiple ULC9705 certified tests on multiple SPF systems. This testing further supports IFTI's Alternative Solution package, which has been evaluated by multiple fire protection engineers and certified testing facilities as satisfying the intent of the code. IFTI is currently working with the Canadian Construction Materials Center (CCMC) to develop, using ULC9705, test methods and technical criteria that will be incorporated into the development of a technical guide to evaluate protective coatings over SPF. ▶

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**Sources:**

1. Janssens, M. L., M. Dietenberger, O. Grexa, and R. White, "Room/Corner Tests of Wall Linings with 100/300 kW Burner," in Proceedings of the 4th Fire and Materials Conference, pp. 53-62, November 15-16, 1995, Arlington, VA, Interscience Communications, London, England, 1995.
  2. Lie, T.T. 1975. Contribution of protected plastic foams to fire growth. Fire Study, 37.
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**DC315** prevents SPF flashover for up to 20 minutes when tested to Canada's New ULC 9705, the industry's most stringent corner room test ! The first 10 mins at 100 Kw followed by 10 mins at 300 Kw

ISO 9705 Time to Flashover Testing Results		
Product Accepted in NBCC 3.15.12		
Product Tested	Thickness mm	Time to Flashover in Secs. 100Kw/300Kw
Gypsum	16	[NFO] No Flashover
SPF COATED WITH DC315	0.5588 mm (25 mils WFT)	[NFO] No Flashover
Fire Retardent Treated Plywood	12	895
Generic Barriers in NBCC 9.29.4-9.29.9		
SPF COATED WITH DC315	0.330mm (20 mils WFT)	600secs <DC315>1200 secs
Douglas Fir Plywood	12	521
Particle Board	13	242
Hardboard	6	225
Oriented Strand Board (OSB)	11	196

100 Kw for 10 Minutes



CAN/ULCS 9705 & ISO 9705

300 Kw for 10 Minutes



CAN/ULC 9705 & ISO 9705

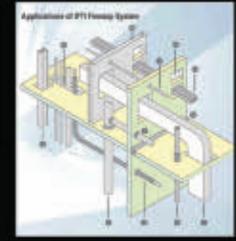
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