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The Situation

Traditionally, closed-cell spray foam (ccSPF) has been restricted to combustible construction assemblies, with some limited applications within non-combustible construction. All of the applications, combustible and non-combustible, require that the ccSPF be protected by a thermal barrier capable of providing a minimum of twenty-minutes of thermal protection. Given the limitations of traditionally applied thermal barriers, the building code requirements precluded the use of ccSPF within wall and ceiling systems that require fire rated assemblies.

The following information is part one of a larger research project intended to address misconceptions related to the use of spray foam within combustible and non-combustible construction. The data in the tested assembly informs many applications that require protection of exposed Boreal Elite.

The ESL-1577 Research

Attached is a Canadian first document outlining the current “one-hour” fire rated test results of Genyk *Boreal Elite* when used in conjunction with IFTI *DC315*. The *Boreal Elite/DC315* assembly has been tested in accordance with CAN/ULC S101 and has met the conditions of acceptance for exterior walls in steel building applications.

The ICC-ES product-certification system includes evaluation of test reports done at accredited testing laboratories. The *Boreal Elite/DC315* system was evaluated based on tested non-loadbearing wall assemblies. The ICC Design was tested in accordance with the CAN/ULC-S101-14, Standard Methods of Fire Endurance Tests of Building Construction and Materials, ULC Standards.

ICC-ES listing Report #ESL-1577 is based on testing requirements outlined in the National Building Code of Canada – Volume 1-Division B: 3.1.7.1 and 3.1.7.2.

- From 3.1.7.1.(1) ...the rating of a material, assembly of materials or a structural member that is required to have a *fire-resistance rating*, shall be determined on the basis of the results of tests conducted in accordance with CAN/ULC S101...
- From 3.1.7.2.(1) ...the limit on the rise of temperature on the unexposed surface of an assembly as required by the tests referred to in Sentence 3.1.7.1.(1) shall not apply to an exterior wall that has a *limiting distance* of 1.2 meters or more...

The listing report addresses only conformance with the standards and code sections noted above. The approval of the product's use is the sole responsibility of the local building official.

The Genyk/IFTI Results



ICC Design No. IFRM-1577-01

ESL-1577

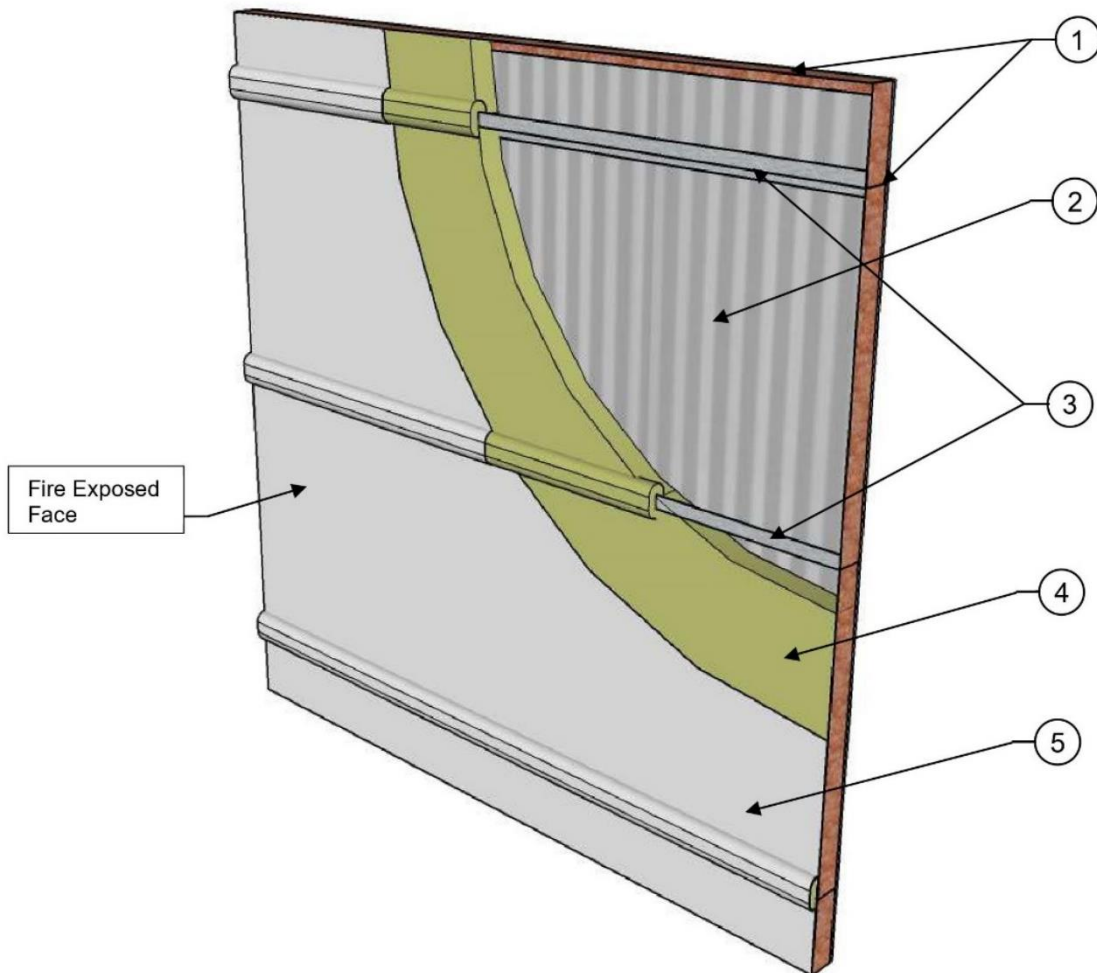
Issued April 2024

This listing is subject to renewal April 2025.

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A Subsidiary of the International Code Council®

Applicant: INTERNATIONAL FIREPROOF TECHNOLOGY INC.
Product: DC315 INTUMESCENT COATING
Code Section: Sections 3.1.7.1. and 3.1.7.2. of Volume 1-Division B of the *National Building Code of Canada*® 2020 and 2015
Assembly Rating: 45-minutes from the Fire Exposed Face (Asymmetrical Wall Assembly) where $F_{EO} = 0.019$,
 1-Hour from the Fire Exposed Face (Asymmetrical Wall Assembly) where $F_{EO} = 0.034$,
 Note: See Conditions of Listing Item 4 of [ESL-1577](#)
Load: Non-loadbearing
IFRM = Intumescent Fire-Resistive Materials



COMPONENTS OF CONSTRUCTION:

1. **Perimeter Framing Members** – Minimum 16-gauge thick steel members with minimum 101.6 mm by 50.8 mm (4-inch by 2-inch) legs are used as perimeter framing for the wall assembly. The perimeter framing members are oriented to allow for wall sheathing attachment and secured to each other using minimum two 12.7 mm (1/2-inch) long No. 8 pan head self-drilling screws at each corner.
2. **Wall Sheathing (Unexposed Face)** – Minimum 26-gauge thick and 914.4 mm (36-inch) wide commercial grade steel R-panels with 31.8 mm (1 1/4-inch) deep ribs must be installed vertically with panel seams overlapping in accordance with the manufacturer's published installation instructions. Panels must be secured to each other along the vertical overlapping seam using 25.4 mm (1-inch) long No. 12 external hex washer head self-drilling screws spaced at a maximum of 406.4 mm (16-inches) on center vertically. Panels are secured to the perimeter framing members using 25.4 mm (1-inch) long No. 12 external hex washer head self-drilling screws spaced at a maximum of 406.4 mm (16-inches) on center around the perimeter of the wall assembly. Panels must be secured to the intermediate support framing using 38.1 mm (1 1/2-inch) long No. 12-14 external hex washer head self-drilling screws spaced at a maximum of 304.8 mm (12-inches) on center horizontally along each intermediate support framing member.
3. **Intermediate Support Framing** – Intermediate wall framing members consist of minimum 16-gauge thick, 101.6 mm (4-inch) deep Z- or C-girts with 50.8 mm (2-inch) legs installed horizontally and spaced at a maximum of 1219.2 mm (48-inches) on center. The intermediate support framing members are secured to the perimeter framing members using minimum two 12.7 mm (1/2-inch) long No. 8 pan head self-drilling screws at each end.
4. **Insulation** – GENYK Boreal Nature Elite (Closed-Cell) spray-applied polyurethane foam (SPF) insulation, with a reported density of 32.04 kg/m³ (2.0 lbs./ft³), must be applied at a nominal thickness of 101.6 mm (4-inches) between the intermediate support framing members, applied directly to the fire exposed face of the wall sheathing. SPF insulation must also be applied to the intermediate support framing members at a nominal thickness of 38.1 mm (1 1/2-inch) matching the contour of the Z- or C-girts. Application must be in accordance with the manufacturer's published instructions.
5. **Intumescent Coating (Exposed Face)** – International Fireproof Technology Inc. DC315 intumescent coating must be applied over the exposed surface of the spray foam insulation at a minimum 0.61 mm (24 mils) dry film thickness (DFT) on the fire exposed face of the wall assembly. Application must be in accordance with the manufacturer's published instructions.

Associated Fire-Rating Research

Genyk has confirmed several systems to assist with combustible design considerations. First, *Boreal Elite* was tested in accordance with the requirements of the National Building Code – 3.2.3.8.(2) – Protection of Exterior Face. The wall assembly containing *Boreal Elite* ccSPF with steel face met the requirements of NBC Article 3.2.3.8.(2) when exposed to the time temperature curve of CAN/ULC S101 for fifteen-minutes duration. The test was conducted with the steel face orientated towards the exterior.

In conjunction with the CAN/ULC S101 steel face test, at the request of Genyk, QAI Laboratories similarly tested *Boreal Elite* ccSPF with cement board and a stucco finish. This assembly also met the requirements of NBC Article 3.2.3.8.(2).

Finally, QAI Laboratories ran CAN/ULC S101 testing with *Boreal Elite* and a steel facing using thicker gauge steel on the exterior cladding, corrugated steel skin in lieu of the flat steel skins originally tested and using a range of *Boreal Elite* thicknesses up to a maximum of what was used in previous tests.

All tests were run with the exterior face of the assembly exposed to the fire. In all cases, *Boreal Elite* ccSPF and the various facings met the temperature curve requirements of CAN/ULC S101 for fifteen-minute duration.

Conclusions

Genyk, in conjunction with International Fireproof Technology Inc. and QAI Laboratories has demonstrated that *Boreal Elite* ccSPF will meet various requirements of the National Building Code.

1. The ICC-ES Listing – ESL-1577 confirms compliance with the requirements of NBC 3.1.7.1 and 3.1.7.2. At twenty-four dry mils, *Boreal Elite* and *DC315* provide the necessary protection to provide a one-hour rating for compliant wall assemblies.
2. *Boreal Elite* has successfully demonstrated compliance with the requirements of NBC 3.2.3.8.(2) Protection of Exterior Face – fifteen-minute Stay-In-Place test.
3. Genyk has tested *Boreal Elite* at various thicknesses and with various construction assemblies to show compliance with 3.2.3.8.

Genyk is committed to further fire-rating testing. The goal is to provide design professionals, building officials and spray foam partners with confirmation that *Boreal Elite* ccSPF can be compliantly installed in various construction assemblies – some designs never before recognized as spray foam suitable.

Appendix A – CAN/ULC S101 – NBC 3.2.3.8 Compliant Assemblies

Genyk had QAI Laboratories test *Boreal Elite* at different thicknesses and with different exterior wall assemblies. All testing was aimed at demonstrating that *Boreal Elite* is NBC 3.2.3.8 compliant. To that end - “it is QAI’s opinion based on the rational noted in this report the following systems will meet the requirements of NBC Article 3.2.3.8. sentence 2 when exposed to the time temperature curve of CAN/ULC S101 for 15 minutes duration.”

ASSEMBLY	FRAMING	SHEATHING	EXTERIOR INSULATION	CLADDING
1	Steel Stud	Minimum 13 (1/2 inch) exterior gypsum	≤ 102 mm (4 inches) Boreal Nature Elite medium density Spray-applied polyurethane foam insulation	≥ 24 Gauge galvanized sheet steel, with 51 mm (2 inch) joint overlap, self-drilling screws spaced at 305 mm (12 inch) on center maximum.
2	Steel Stud	Minimum 13 (1/2 inch) exterior gypsum	102 mm (4 inches) Boreal Nature Elite medium density Spray-applied polyurethane foam insulation	≥ 24 Gauge galvanized corrugated steel, with 51 mm (2 inch) joint overlap, self-drilling screws spaced at 305 mm (12 inch) on center maximum.
3	Steel Stud	Minimum 13 (1/2 inch) exterior gypsum	≤ 102 mm (4 inches) Boreal Nature Elite medium density Spray-applied polyurethane foam insulation	51 mm (1/2 inch) Cement Board with stucco finish of 4 mm thickness.

Appendix B – CAN/ULC S101 – NBC 3.2.3.8 Compliant Assemblies

The two construction assemblies testing to ensure NBC 3.2.3.8 compliance.

Thicknesses and assembly construction was altered to anticipate various construction models.

CAN/ULC S101 – Steel Faced Assembly

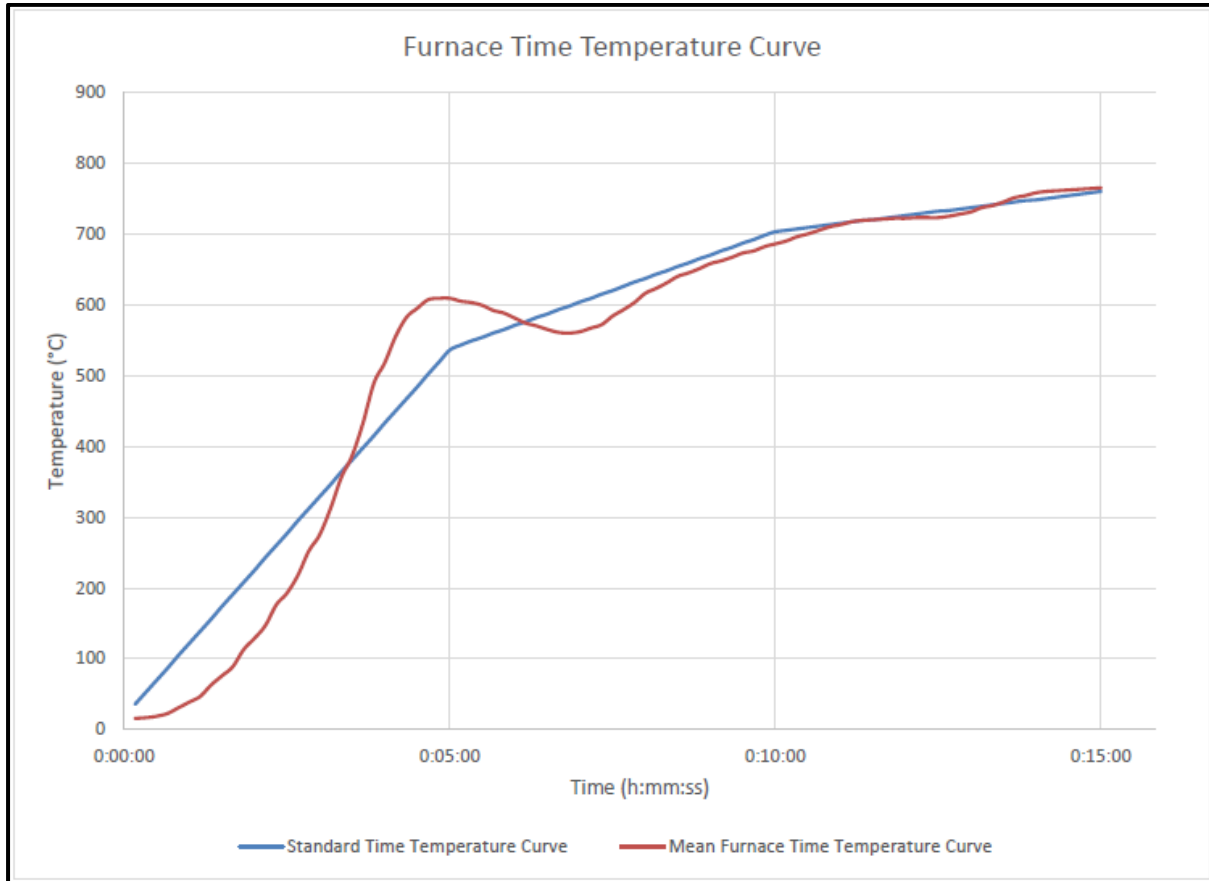
COMPONENT	DESCRIPTION – See QAI Test Report T1296-5 dated December 7, 2020	
Wall Assembly	Size:	3.05 m (10 ft.) wide by 3.05 m (10 ft.) high by 152 mm (6 in.) thickness.
	Type:	Exterior Insulated wall system.
	Framing:	25 Gauge 92 mm by 32 mm (3.625 in. by 1.25 in.) steel stud.
	Sheathing:	13 mm (0.5 in.) DenseGlass Gold fiberglass mat gypsum.
	Insulation:	102 mm (4 in.) Boreal Nature Type 2 spray-applied polyurethane foam insulation.
	Exterior Perimeter Channel:	20 Gauge galvanized steel C-channel with dimensions of 127 mm (5 in.) depth, one 38 mm (1.5 in.) leg and one 25 mm (1 in.) leg.
	Exterior Z-Bar:	20 Gauge galvanized steel Z-Bar with dimensions of 127 mm (5 in.) depth and 38 mm (1.5 in.) legs mounted horizontally spaced 406 mm (16 in.) on center.
	Exterior Panel:	24 Gauge galvanized sheet steel with 51 mm (2 in.) overlap at the joints. The sheet was fastened with self-drilling sheet metal screws spaced 305 mm (12 in.) on center.

CAN/ULC S101 – Cement Board/Stucco Faced Assembly

COMPONENT	DESCRIPTION See QAI Test Report T1296-6 dated December 7, 2020	
Wall Assembly	Size:	3.05 m (10 ft.) wide by 3.05 m (10 ft.) high by 152 mm (6 in.) thickness.
	Type:	Exterior Insulated wall system.
	Framing:	25 Gauge 92 mm by 32 mm (3.625 in. by 1.25 in.) steel stud.
	Sheathing:	13 mm (0.5 in.) DenseGlass Gold fiberglass mat gypsum.
	Insulation:	102 mm (4 in.) Boreal Nature Type 2 spray-applied polyurethane foam insulation.
	Exterior Perimeter Channel:	20 Gauge galvanized steel C-channel with dimensions of 127 mm (5 in.) depth, one 38 mm (1.5 in.) leg and one 25 mm (1 in.) leg.
	Exterior Z-Bar:	20 Gauge galvanized steel Z-Bar with dimensions of 127 mm (5 in.) depth and 38 mm (1.5 in.) legs mounted horizontally spaced 406 mm (16 in.) on center.
	Exterior Panel:	51 mm (0.5 in.) thick PermaBase cement board fastened to the perimeter C-channel and Z-bar using no. 8 by 32 mm (1.25 in.) self-drilling cement board screws spaced 305 mm (12 in.) on center. The board was mounted horizontally and included horizontal and vertical joints.
	Stucco Finish:	Base coat was applied using ADEX Drymix basecoat applied to an approx. thickness of 4 mm with ADEX standard 4.5 oz. glass fiber-reinforced mesh embedded. The finish coat was applied to coverage of approx. 0.4 m ² /kg with ADEX Elasticcoat Fine Regular.

Appendix C – Furnace Time Temperature Curve

Boreal Elite with Steel Facing



Boreal Elite with Stucco Facing

