

CLIENT: **QUIK-THERM INSULATION SOLUTIONS**
1680 Sargent Ave, Unit 3
Winnipeg, MB
R3H 0C2

Test Report No: T1035-4

Report Date: July 30, 2018

SAMPLE ID: 152 mm (6 inches) Quik-Therm Solar Dry Insulation with plywood strapping and horizontal fiber cement board lap siding, described as non-combustible.

SAMPLING DETAIL: The client submitted samples directly to QAI. The samples were received in good condition at QAI Burnaby.

DATE OF RECEIPT: The panels were received on July 24, 2018 in good condition.

TESTING PERIOD: July 25, 2018.

AUTHORIZATION: QAI Test Proposal Number 18MB05023R5, signed and dated on July 11, 2018, by Raymond Belanger.

TEST PROCEDURE: Testing was conducted following the time temperature curve of CAN/ULC S101 to the following requirements:

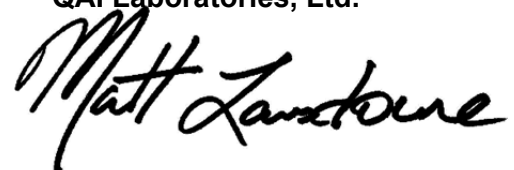
- National Building Code of Canada 2015 (NBC), Article 3.2.3.8. Protection of Exterior Building Face, Sentence 2.

TEST RESULTS: The Quik-Therm wall assembly met the requirements of Article 3.2.3.8. Sentence 2 when exposed to the time temperature curve of CAN/ULC S101 for 15 minutes duration no opening of the non-combustible fiber-cement lap siding were observed.

Prepared By

Scott Leduc, EIT
Project Manager

Signed for and on behalf of
QAI Laboratories, Ltd.



Matt Lansdowne
Director of Engineering



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Introduction:

This report documents the fire testing conducted by QAI Laboratories Ltd. for Quik-Therm Insulation Solutions of a 152 mm (6 inches) Quik-Therm Solar Dry Insulation with plywood strapping and non-combustible horizontal fiber cement board lap siding.

Testing was conducted following the time temperature curve of CAN/ULC-S101 to the requirements of the NBC Article 3.2.3.8. Sentence 2. The wall was evaluated on July 25, 2018.

Assembly Description:

Table 1: Wall Description

COMPONENT	DESCRIPTION	
Assembly	Size:	2.74 m (9 ft.) high by 3.66 m (12 ft.) wide by 346 mm (13.63 in.) thickness.
	Type:	Quik-Therm 152 mm (6 inches) thickness, composed of expanded polystyrene insulation.
Framing	Type:	SPF Grade 2 lumber.
	Size:	38 mm by 140 mm (Nominal 2 in. by 6 in.)
	Spacing:	16 in. On Center (OC)
Exterior Sheathing	Type:	Oriented Strand Board (OSB)
	Dimensions:	1.22 m (4 ft.) by 2.44 m (8 ft.) by 11 mm (0.44 in.) thick.
	Fastener Detail:	The boards were mounted horizontally and fastened using 2 in. nails spaced 152 mm (6 in.) on the perimeter and 305 mm (12 in.) in the field.
Weather Barrier	Manufacturer:	Dupont.
	Product:	Tyveck HomeWrap.
	Fastener Detail:	Mounted horizontally to the OSB using staples spaced approx. 760 mm (30 in.) along the top and bottom.
Exterior Insulation	Type:	Quik-Therm Type 2 Expanded Polystyrene with foil scrim.
	Dimensions:	1.22 m (4 ft.) by 2.44 m (8 ft.) by 152 mm (6 in.) thick.
	Manufacturer:	Quik-Therm Insulation Solutions
	Product:	Solar Dry Insulation (SDI)
	Fastener Detail:	Fastened at each stud location with 51 mm (2 in.) by 19 mm (0.75 in.) strapping and No. 12 by 254 mm (10 in.) U2 Universal Screws spaced 406 mm (16 in.) OC
Protective Cladding	Type:	Fiber Cement board lap siding, rated non-combustible.
	Size:	159 mm (6.25 in.) wide by 3.66 m (12 ft.) long by 8 mm (0.31 in.), 127 mm (5 in.) exposure.
	Manufacturer:	James Hardie
	Product:	HardiePlank Lap Siding
	Fastener Detail:	2 in. common nails at each strapping location approximately 25 mm (1 in.) from the top of the board. 3 vertical joints in the cement board siding were spaced equally across the surface of the assembly.

The wall assembly was tested with the exterior face oriented towards the fire.

Test Apparatus:

The furnace used in the test is a full-scale fire burning apparatus with interior dimensions of 3.96 m (13 ft.) in height, 3.96 m (13 ft.) in width, and 0.91 m (3 ft.) in depth.

Temperatures within the furnace were monitored using nine thermocouples (TCs). The temperatures are controlled by adjusting fuel to the furnace burners to conform to the time/temperature curve specified by the test standards. Temperature measurements are recorded by a Keithley 2750 data acquisition unit (ID# DMM1) which passes the readings to a computer for graphical display and storage.

The wall assembly was mounted in a vertical steel test frame. The test frame was then rolled up to the furnace and secured by chain and straps to the furnace opening. At the end of the test, the test frame was rolled away from the furnace so that the exposed face can be evaluated.

Two pressure taps are installed along the longitudinal center line of the test assembly. The pressure taps are each attached and monitored by Setra model 264 pressure transducers (ID# Pressure T1 and Pressure T2). The furnace pressure is controlled by adjusting a damper in the furnace exhaust stack. The furnace pressure was recorded continuously for the duration of the test.

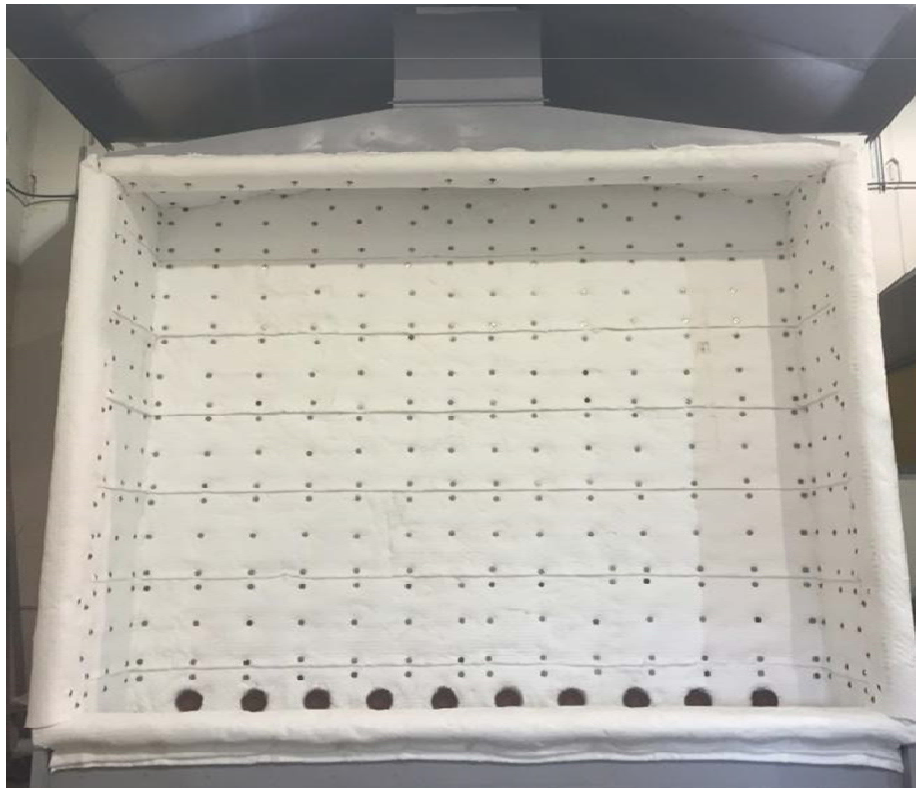


Figure 1: Full Scale Furnace

Test Conditions:

The Quik-Therm wall assembly outlined in Table 1 was constructed in a full-scale moveable steel test frame. A ceramic fiber gasket was used to maintain an air seal between the furnace and the wall assembly.

The pressure of the furnace was monitored throughout the tests.

Prior to the fire endurance test the test assembly was moved into position in front of the furnace and the pilot burners were ignited. The fire endurance test was initiated after igniting the burners. The temperature inside the furnace was controlled to follow the standard time/temperature curve within the limits described in CAN/ULC S101.

Test Requirements:

Article 3.2.3.8. Sentence 2

- a) The fire exposed area of the wall assembly shall be not less than 9.3 m² and have no dimension less than 2.75 m.
- b) The exposed surface shall include typical vertical and horizontal joints.
- c) The test shall be continued for not less than 15 min. and the standard time/temperature curve of CAN/ULC S101, "Fire Endurance Tests of Building Construction and Materials", shall be followed.
- d) The noncombustible protective material must remain in place and no through openings should develop that are visible when viewed normal to the face of the material.
- e) The noncombustible protective material should not disintegrate in a manner that would permit fire to propagate along the surface of the test assembly.

Test Results:

Observations

Table 2: Test Observations - Wall Assembly 1

Test Time (min)	Unexposed	Exposed
6:30		The board is darkening.
7:59		Light flaming across the cement board surface.
9:40		Vertical cracks forming in the board.
15:00	Test discontinued.	

After the wall was rolled away from the furnace it was observed that there were no openings in the fiber cement board siding. The joints and cracks remained tight. There were no signs of molten foam dripping and flaming on the outside of the wall structure. After extinguishing the wall and removing the cement board siding it was apparent that the foam plastic was absent from the wall. Only a small amount of plastic remained in the bottom of the cavity.

Protective Barrier

The fiber cement board siding remained in place for the duration of the test. The joints and cracks that formed in the surface of the board remained tight together. There were no visible openings in the exposed face when viewed normal. There was no structural deterioration of the fiber cement board siding.

Conclusions:

QAI performed testing following the time temperature curve of CAN/ULC S101 to the requirements of the NBC Article 3.2.3.8. Sentence 2 on the Quik-Therm assembly described in Table 1.

The Quik-Therm Insulation Solutions test assembly with 6 in. Solar Dry Insulation, plywood strapping and HardiePlank Lap siding met Article 3.2.3.8 of the NBC 2015 when exposed to 15 minutes of time temperature curve of CAN/ULC S101.

APPENDIX A

Page	Title
8	Furnace Time Temperature Curve

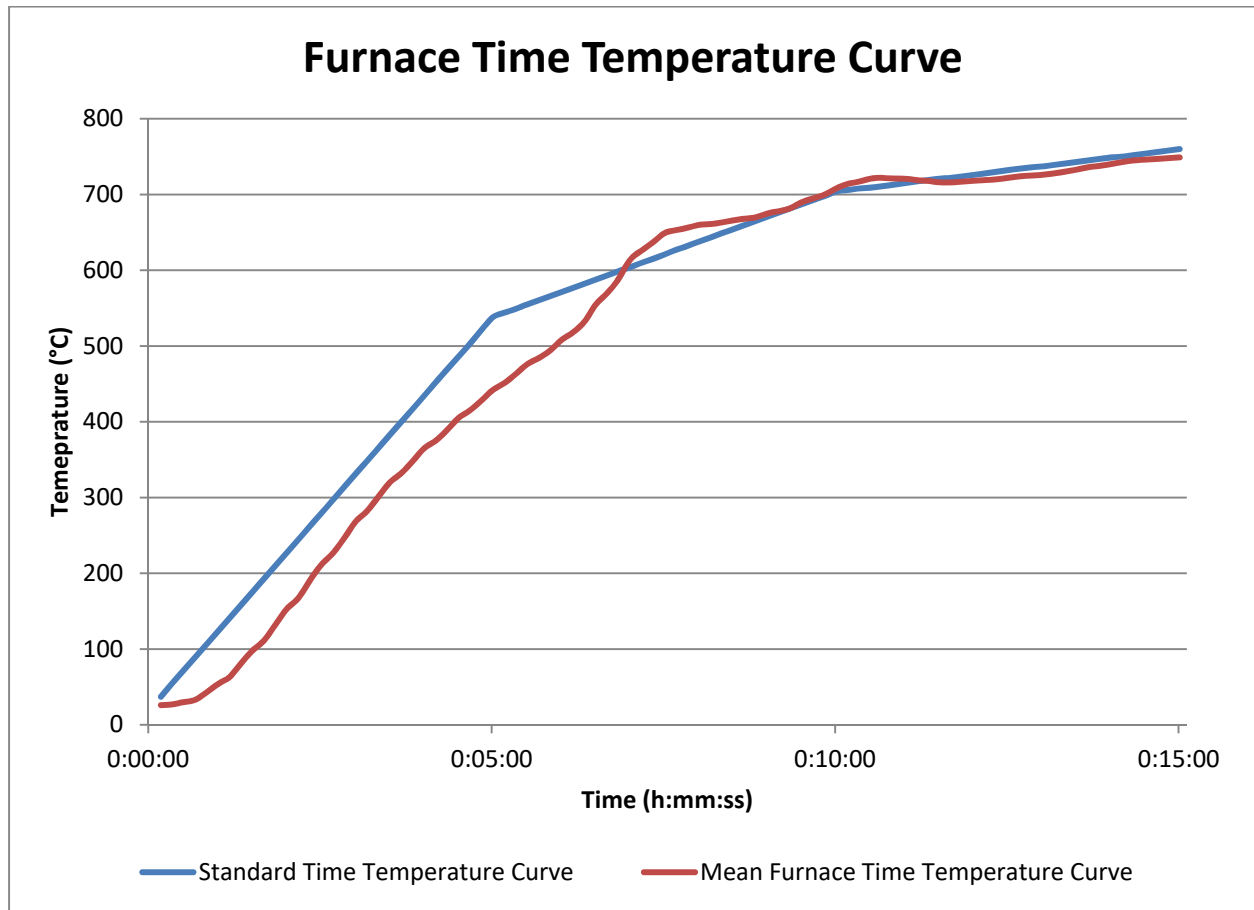


Figure 2: Furnace Time Temperature Curve

APPENDIX B

Page	Title
10-12	Sample Pictures



Figure 3: The exposed face prior to installing the Quik-Therm Solar Dry Insulation.



Figure 4: The exposed face prior to installing the cement board lap siding.

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Figure 5: The exposed face prior to the fire test.



Figure 6: The unexposed face prior to the fire test.

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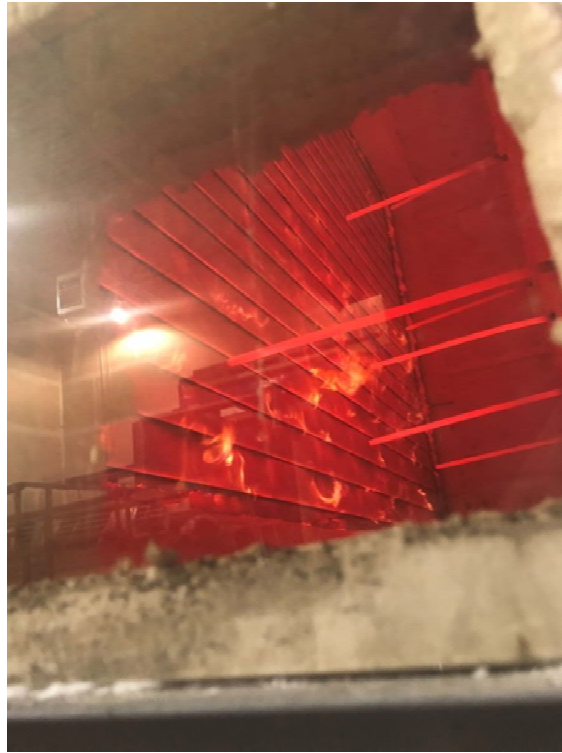


Figure 7: The exposed face at the end of the fire test.



Figure 8: Exposed face after the fire test.

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