

TEST REPORT



Intertek

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EVALUATION CENTER
16015 Shady Falls Road
Elmendorf, TX 78112
Phone: (210) 635-8100
Fax: (210) 635-8101
www.intertek.com

RENDERED TO

Unience Co., Ltd.
S08 8-floor, Garden 5 Tool
Munjeong 2-dong, Songpa-gu
Seoul, Korea

PRODUCT EVALUATED: Alfrex ACM Panels
EVALUATION PROPERTY: Flame Spread

Report of Testing Alfrex ACM Panels for compliance with the applicable requirements of the following criteria: CAN/ULC S134, Standard Method of Fire Tests of Exterior Wall Assemblies, 2013.

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2 Introduction

Intertek Testing Services NA, Inc. (Intertek) has conducted testing for the Unience Co., Ltd., on Alfrex ACM Panels, to evaluate resistance to flame propagation. Testing was conducted in accordance with the applicable requirements and following the standard methods of **CAN/ULC S134, Standard Method of Fire Tests of Exterior Wall Assemblies, 2013**. This evaluation took place on August 25, 2016.

3 Test Samples

3.1. SAMPLE SELECTION

Samples were randomly selected on July 6, 2016 by Intertek Representative Roy Lee at the Unience Co., Ltd. 46, Gwahaksaneop1-ro, Oksan-myeon, Cheongwon-gun, Chungcheongbuk-do, Korea manufacturing facility. The Samples (Intertek Sample ID No.SAT1608191428-001) were received at the Evaluation Center on August 19, 2016. The subject test specimen is a traceable sample selected from the manufacturer's facility. Intertek selected the specimen and has verified the composition, manufacturing techniques and quality assurance procedures.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The assembly consisted of a total of 16, 4 mm thick Alfrex ACM Panels. At the interior corners of each panel TIC 7040 Gray Fire Stop Silicone Sealant was installed prior to installation of the panel onto the test frame. Each panel was secured to the test frame through the 15.875 mm (5/8 in.) Type-X gypsum using concrete fasteners. The nominal joint width between panels was 15 mm and the joint was also filled with the TIC 7040 Gray Fire Stop Silicone Sealant. Galvanized steel flashing that was 1.69 mm thick (16 GA) was secured around the window opening of the test assembly and insulated with nominal 25 mm thick ceramic fiber insulation to protect the Alfrex ACM Panels installed around the window as required by the standard. Detailed drawings of the assembly are presented in Appendix A.

4 Testing and Evaluation Methods

4.1. INSTRUMENTATION

Three water cooled heat flow transducers (two 0-100 kW/m² and one 0-200 kW/m²) were installed through the test specimen and the front wall of the test chamber 3.5 m above the top of the window opening; one within 0.2 m ± 0.05 m horizontally of the center line of the opening and one on each side and within 0.5 ± 0.1 m horizontally from the first. The transducers were installed so that their sensing faces were flush with the outer face of the test specimen. Twenty-four GA (0.51 mm), Type K bare beaded thermocouples were used to monitor temperature of the specimen and were located on the vertical center line above the opening, at 1.5 ± 0.05 m, 2.5 ± 0.05 m, 3.5 ± 0.05 m, 4.5 ± 0.05 m, 5.5 ± 0.05 m. At each of these levels, one thermocouple was installed on the outer face of the test specimen and one on the outer face of each representative layer within the specimen. The output of the transducers and thermocouples were monitored by a National Instruments CDAQ-9188 Data Acquisition Unit. The data acquisition system was programmed to scan and save data every 5 seconds. Following the test, the files were imported into MS Excel for tabular and graphical display. Thermocouple and radiometer locations are located in Appendix A, the test data can be found in Appendix B.

4.2. TEST STANDARD

Testing was conducted in accordance with the applicable requirements, and following the standard methods, of **CAN/ULC S134, Standard Method of Fire Tests of Exterior Wall Assemblies, 2013**.

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS

The test was initiated on August 25, 2016. Paul Chung, Won-Ho Oh, Jong-Seok Park, and Seung-Yi Yang from Unience Co., Ltd., were present to witness the test. The ambient temperature at the time of the test was 29 °C and the humidity was 70 % R.H.

Observations made during the test are listed below:

Time (min:sec)	Observation(s)
0:00	Test Start: 10:25 AM
2:30	Room flames increasing
3:00	Smoke out of room, flames in room increasing
4:00	Room flames increasing
5:00	Flame tips at 2 m
5:15	Smoke and room flames increasing
6:05	One exhaust fan turned on
6:30	Flame tips at 2.5 m
7:00	Panels above window beginning to warp
8:18	Dripping from window
8:45	Center joint flaming
9:02	Aluminum pooling on floor
9:23	Panel flaming above window; 2 nd exhaust fan turned on
10:00	Base of flame at 1 m; flame tips at 3 m
11:00	Base of flame at 2 m; Opening visible on top of window approx. 1.5 m wide
12:00	Flame tips at 4.5 m; melting and pooling on floor
12:30	Base of flame at 3 m
14:00	Flame tips between 4 and 4.5 m
15:00	Base of flame at 3.5 m
16:30	Dripping increasing
17:30	Third fan turned on
18:45	Base of flame at 4 m
20:00	Ramp-down of propane begins; Base of flame decreasing
22:00	Room burner flames decreasing
23:00	No flaming visible
25:00	Gas off; No flaming on sample; Observation period begins
26:18	Flame started at the 4m mark
26:48	Light flaming at the 4 m mark stopped
30:00	No flames visible; Smoke visible from 2.5 and 4 m marks
45:00	No visible changes
55:00	No visible changes
60:00	End of observation period; Test terminated

The two central panels directly over the window were consumed significantly up to the 3 m mark above the window with the gypsum of the test wall being completely exposed. The panel above the 3 m height showed a fair bit of consumption up to roughly 4 m. The panels that were installed into the wall above the 4 m mark were heavily charred and warped.

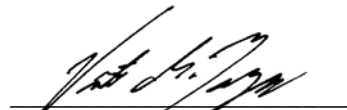
6 Conclusion

Intertek Testing Services NA, Inc. (Intertek) has conducted testing for the Unience Co., Ltd., on Alfrex ACM Panels, to evaluate resistance to flame propagation. Testing was conducted in accordance with the applicable requirements and following the standard methods of **CAN/ULC S134, Standard Method of Fire Tests of Exterior Wall Assemblies, 2013**. This evaluation took place on August 25, 2016.

Based on the results of this test, the heat flux 3.5 m above the opening remained below the allowable average limit of 35 kW/m² throughout the test and observation period. Visual flame spread on the wall surface did not exceed 5 m above the window. The Unience Co., Ltd. Alfrex ACM Panels met the conditions of acceptance outlined in **CAN/ULC S134, Standard Method of Fire Tests of Exterior Wall Assemblies, 2013**.

INTERTEK TESTING SERVICES NA, INC.

Tested by:




Victor M. Burgos
Senior Project Engineer, Fire Resistance

Reported by:



Jan-Michael Cabrera
Project Engineer, Fire Resistance

Reviewed by:



Herbert W. Stansberry II
Engineering Supervisor