

REPORT NUMBER: AU12094055-1
ORIGINAL ISSUE DATE: January 16, 2013

EVALUATION CENTER

Intertek Testing Services Ltd., Shanghai Jinqiao Branch
Building T52-8, No. 1201 Gui Qiao Road
Jinqiao Development Area, Pudong District
Shanghai 201206

RENDERED TO

Jiangsu Xiecheng Science And Technology Deve.Co.,Ltd
Industrial Zone, Jintu county Jiangsu,China

PRODUCT EVALUATED

A2 Fire Resistant Aluminum Composite Panel
Model: PVDF 4mm 50S

EVALUATION PROPERTY

2 Hours Fire Resistance

Report of Testing A2 Fire Resistant Aluminum Composite Panel—

PVDF 4mm 50S in a Wall Assembly for compliance with the applicable requirements of the following criteria: ASTM E119 – 12, Standard Test Methods for Fire Tests of Building Construction and Materials.

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2 Introduction

Intertek Testing Services has conducted testing for Jiangsu Xiecheng Science And Technology Deve.Co.,Ltd on A2 Fire Resistant Aluminum Composite Panel –PVDF 4mm 50S to evaluate its fire resistance characteristics. The A2 Fire Resistant Aluminum Composite Panel –PVDF 4mm 50S was evaluated in a Wall Assembly to determine the fire resistance characteristics for a 2 hours rating. Testing was conducted in accordance with ASTM E119 - 12, Standard Test Methods for Fire Tests of Building Construction and Materials. This evaluation began on December 25, 2010 and was completed on December 28, 2012.

3 Test Samples

3.1. SAMPLE SELECTION

Samples were randomly selected on November 16, 2012 by Intertek representative Star Shi, at Jiangsu Xiecheng Science And Technology Deve.Co.,Ltd manufacturing facility, located at Industrial Zone, Jintu county Jiangsu, China. Samples were received at the Evaluation Center on December 5, 2012.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

A2 Fire Resistant Aluminum Composite Panel
Nominal Thickness: 4mm
Trade name: ALMINE

A 3m x 3m non-load bearing wall assembly was constructed using 48.5mm x 100mm x 0.7mm galvanized steel studs spaced 600mm on center between 35mm x 100mm x 0.7mm galvanized steel tracks. The studs were fastened to the track on one side of the wall; the other side was fastened to the opposite side of the wall. The studs were cut nominally 6mm short at each end. In this manner, the studs were "noted". The 15mm thick gypsum board were applied to the interior side of the studs using 15mm long drywall screws spaced 200mm around the perimeter and 250 mm in the field. The stud cavity was insulated with 100mm thick mineral wool of 100 kg/m³. Each side of the wall was covered with two layers of 15mm thick, fire resistance gypsum wallboard, installed vertically. The wallboard joints were staggered so that the wall was representative of typical construction. Each side of the wall was covered with one layer of A2 Fire Resistant Aluminum Composite Panel, positioned vertically. The product was fastened to the framing using 3.5 x 45 mm drywall screws spaced at 200mm on center. The materials used in the wall assembly were listed as below:

Steel stud	48.5mm x 100mm x 0.7mm, Manufactured by Lafarge
Steel track	35mm x 100mm x 0.7mm, Manufactured by Lafarge
Gypsum board	3000mm x 1220mm x 15 mm fire resistance board, Manufactured by Lafarge
Drywall screws	3.5 x 45 mm, Manufactured by Lafarge
Mineral wool	Density: 100kg/m ³ , Manufactured by Shanghai Mineral Wool LTD.
Sealant	CP 25WB+ Fire Barrier Sealant, Manufactured by 3M

Additional construction details of the wall assembly are included in Appendix A.

4 Testing and Evaluation Methods

Testing was conducted in accordance with ASTM E119 - 12, Standard Test Methods for Fire Tests of Building Construction and Materials.

The test assembly was installed in a steel restraint frame. The restraint frame was allowed the sample to be moved in front of the furnace for the fire exposure. The nominal dimensions of the test wall were 3m high by 3m wide.

After positioning the assembly frame over the furnace opening, the burners were ignited and the timer was started. Temperatures within the furnace were monitored using thermocouples and the data was recorded. The burners were controlled to keep the furnace temperatures within the allowable limits specified in the test standards. After 5 minutes, the furnace pressure was adjusted so that the neutral plane was established at a 1016mm (40in) or more below the top of the sample. Periodic observations were made of the surfaces of the test assembly during the fire resistance test.

Immediately after the Fire Endurance Test, the assembly frame was moved into position for the Hose Stream Test. The exposed surface of the test assembly was subjected to the impact, erosion, and cooling effects of a hose stream described in the test standards.

Position for measurement of unexposed temperature was presented in the drawing of Appendix B.

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS

The wall withstood the fire endurance test without passage of flame or gases hot enough to ignite cotton waste, for 2 hours. No through openings or penetrations were evident at the conclusion of the fire exposure portion of the test. During the fire exposure period no significant flaming was observed on the unexposed face of the assembly.

Transmission of heat through the wall during the fire endurance test did not raise the average temperature on the unexposed surface more than 139°C.

The wall withstood the hose stream test without passage of water. After 2 hours of exposure, the wall assembly was removed from the furnace, and exposed, against the heated surface, to the impact, cooling and erosion effects of the hose stream test. The water pressure at base of nozzle was 207 kPa, and the distance between the nozzle and the wall surface was 6 m. The water was applied for a total period of 2 minutes 30 seconds based on a total exposed area of 9 square meters and a required duration of 1.5 seconds per square foot. No openings developed that permitted a projection of water from the stream beyond the unexposed surface during the time of the hose stream test.

A full set of test data is included in Appendix C, and photographs have been presented in Appendix D.

6 Conclusion

The A2 Fire Resistant Aluminum Composite Panel – PVDF 4mm 50S in a Wall Assembly identified in this report has been tested in accordance with ASTM E119 - 12, Standard Test Methods for Fire Tests of Building Construction and Materials, for a fire resistance rating of 2 hours under neutral furnace pressure.

The test assembly met the requirements for a 2 hours exposure period with hose stream.

The conclusions of this test report may not be used as part of the requirements for Intertek product certification. Authority to Mark must be issued for a product to become certified.

INTERTEK

Reported by:

Star Shi

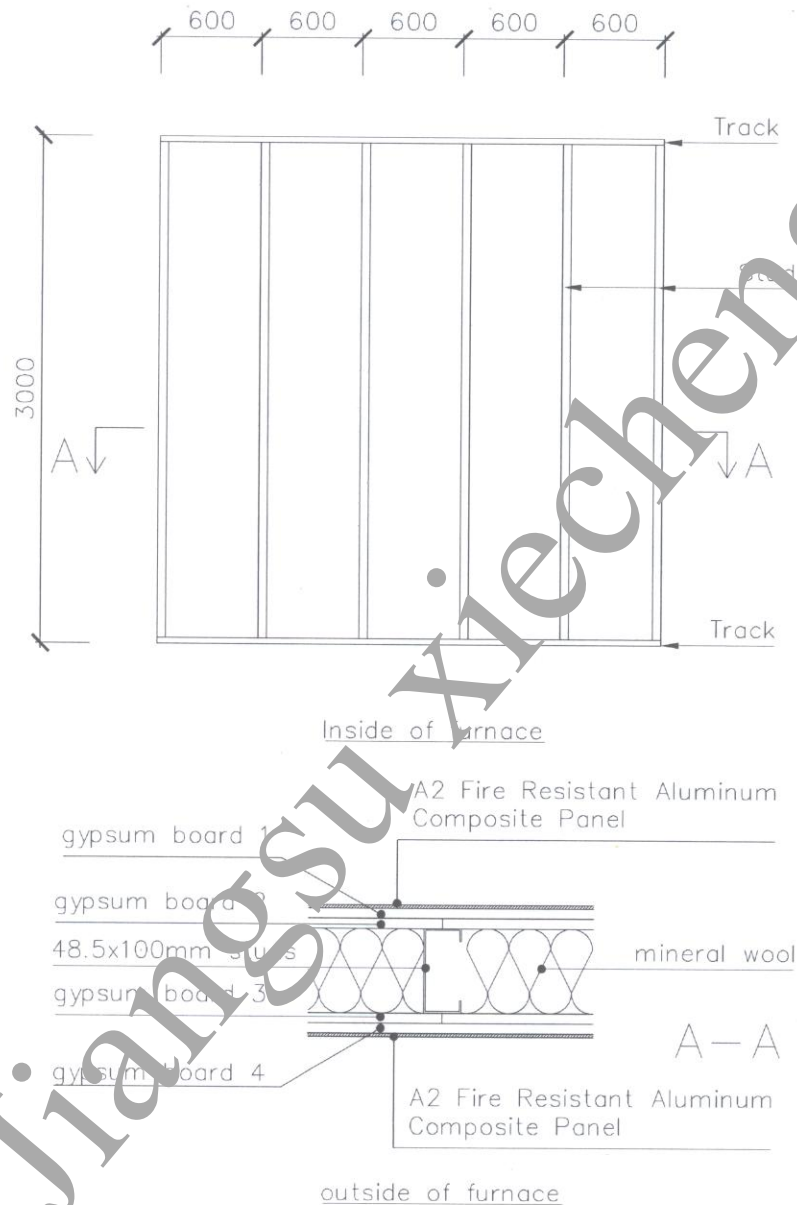
Star Shi
Engineer, Building Products

Reviewed by:

Sun Sun

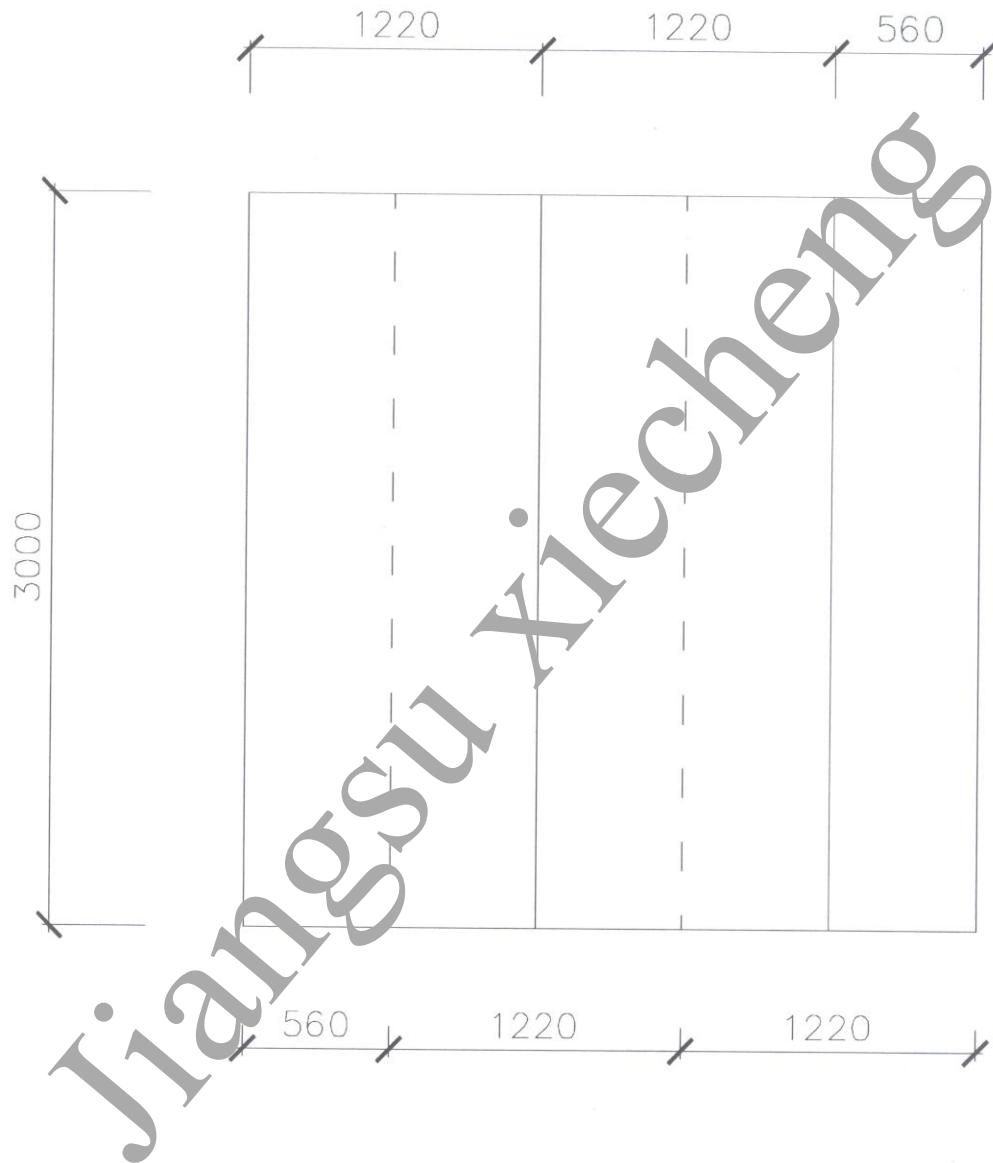
Sun Sun
Technical Supervisor, Building Products

7 Appendix A: Drawings of the Wall Assembly

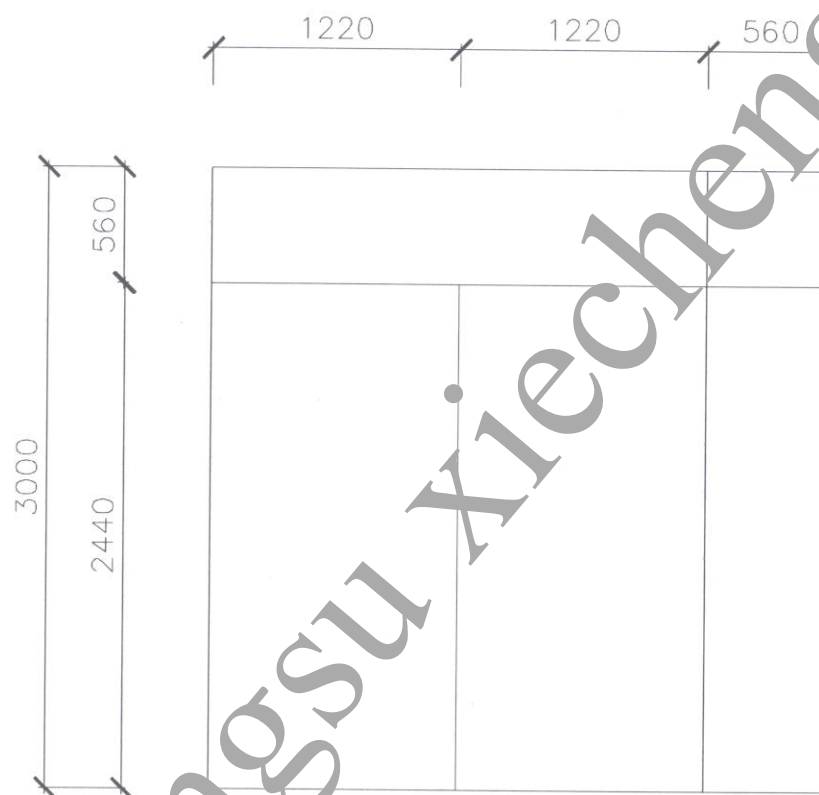


A2 Fire Resistant Aluminum Composite Panel+2 layers 15mm gypsum board
+C100 studs + mineral wool + 2 layers 15mm gypsum board + A2 Fire Resistant Aluminum
Composite Panel
Studs space = 600 mm o.c

Stud and Track Framing

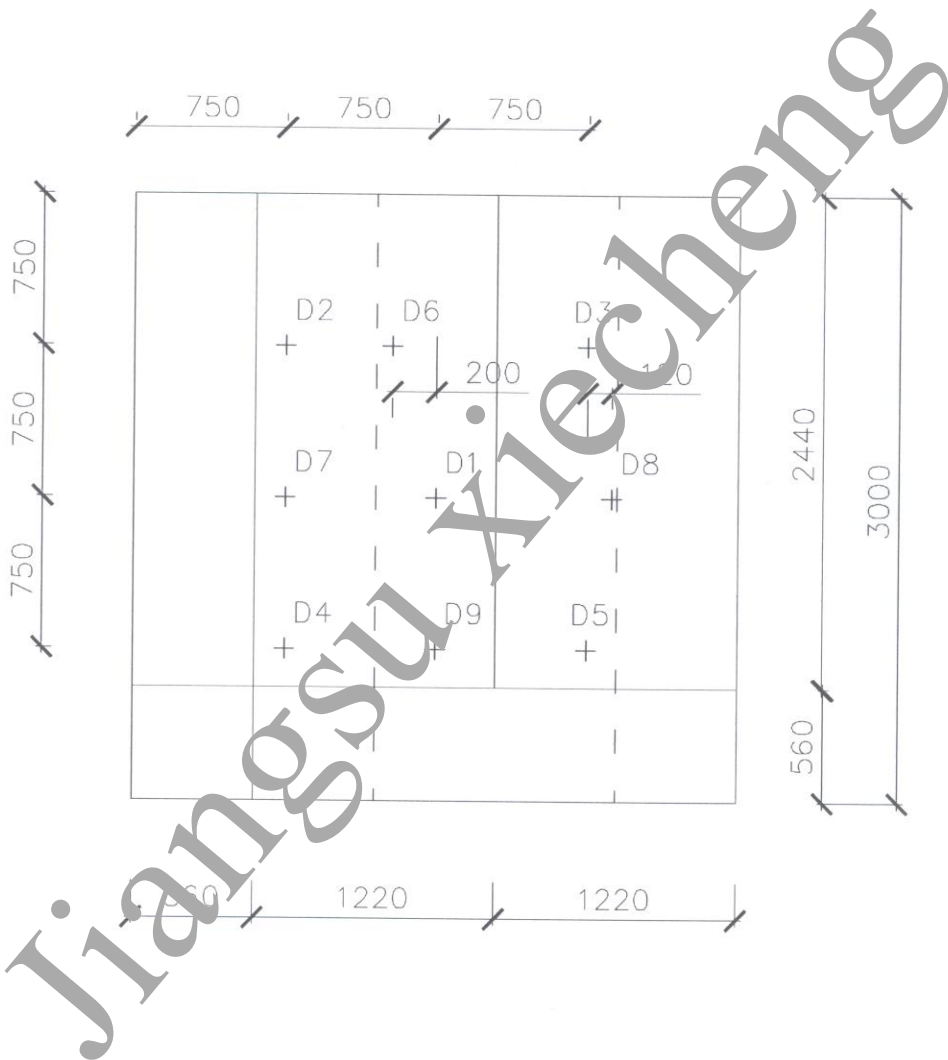


Base Wall Panel (Gypsum Board)



Face Wall Panel (A2 Fire Resistant Aluminum Composite Panel)
EXPOSED SIDE

8 Appendix B: Test Measurement Data



D6, D8 on the studs

POSITION FOR MEASUREMENT OF UNEXPOSED TEMPERATURE

9 Appendix C: Test Data

Intertek

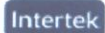
Test: Fire Resistance
Test Date: 2012-12-28
Job No: AU12094055
Client: Jiangsu Xiecheng Science And Technology Deve.Co.,Ltd
Sample: A2 Fire Resistant Aluminum Composite Panel
Sample ID: PVDF 4mm 50S
ASTM E119 - 12, Standard Test Methods for Fire Tests of Building Construction and Materials.
Standards: Building Construction and Materials.
Procedure: Nonbearing Walls and Partitions (Optional Program per 11.3)
Conditioning: 50-90°F (10-32°C) and ambient humidity
Duration: 120 minutes
Furnace
Pressure: After less than 5 minutes, 1016mm (40 in.) or more below the top of the specimen.
Equipment:

Reviewer: Sun Sun
Sun Sun

Eng/Tech: Star Shi
Star Shi

Item	ID	Cal Due Date
Full Scale Vertical Furnace	SH1097	n/a
Furnace pressure gauge	SH1097-15	2013.4.27
Test Clock	SH1042	2013.8.10
Furnace thermocouple 1-3	SH1097-1~3	2013.4.27
Ambient temperature gauge	SH1097-11	2013.4.27
Unexposed thermocouple	SH1097-12~14	2013.4.27
Clearance Measurements	SH1057-1	2013.12.13
Displacement Measurements	SH103	2013.8.18

Temperature-
Time Curve: According to ASTM E119, Section 5
Furnace
Temperatures: According to ASTM E119, Section 6
Unexposed
Temperatures: According to ASTM E119, Section 7
Thermocouple Length and width 152 ± 3 mm, thickness 9.5 ± 1.6 mm, dry weight 67 ± 24 g.
Pads: conductivity 0.053 ± 0.004 W/mK at 6°C, hardness indentation on soft face 1.9 ± 0.6 mm



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Sample ID: PVDF 4mm 50S
Standards: ASTM E119 12, Standard Test Methods for Fire Tests of Building Construction and Materials.
Procedure: Nonbearing Walls and Partitions (Optional Program per 11.3)
Report of
Results: According to ASTM E119, Section 8
Test Specimen: According to ASTM E119, Section 9
Fire Endurance: According to ASTM E119, Section 10
Hose Stream: According to ASTM E119, Section 11
Water Pressure: 207 kPa
Length: 3.0 m
Width: 3.0 m
Exposed Area: 9.0 m²
Conditioning of
Test Specimen: According to ASTM E119, Section 12
Size of
Specimen: According to ASTM E119, Section 17
Conditions of
Acceptance: According to ASTM E119, Section 18

Reviewer: Sun Sun
Sun Sun

Eng/Tech: Star Shi
Star Shi

Distance from specimen: 6 m
Duration: 150 seconds

Time	Cotton Pad Check	Performance Observations
Initial		Test started
5'00"		Little smoke released from the joists between the sample and the frame
30'00"		No visible change is observed.
60'00"		No visible change is observed.
70'00"		Obvious deflection toward the furnace is observed at the center of the wall.
90'00"		No visible change is observed.
120	No ignition	Test terminated, no openings, excessive flaming, etc
Requirement	No ignition	No openings, excessive flaming, etc

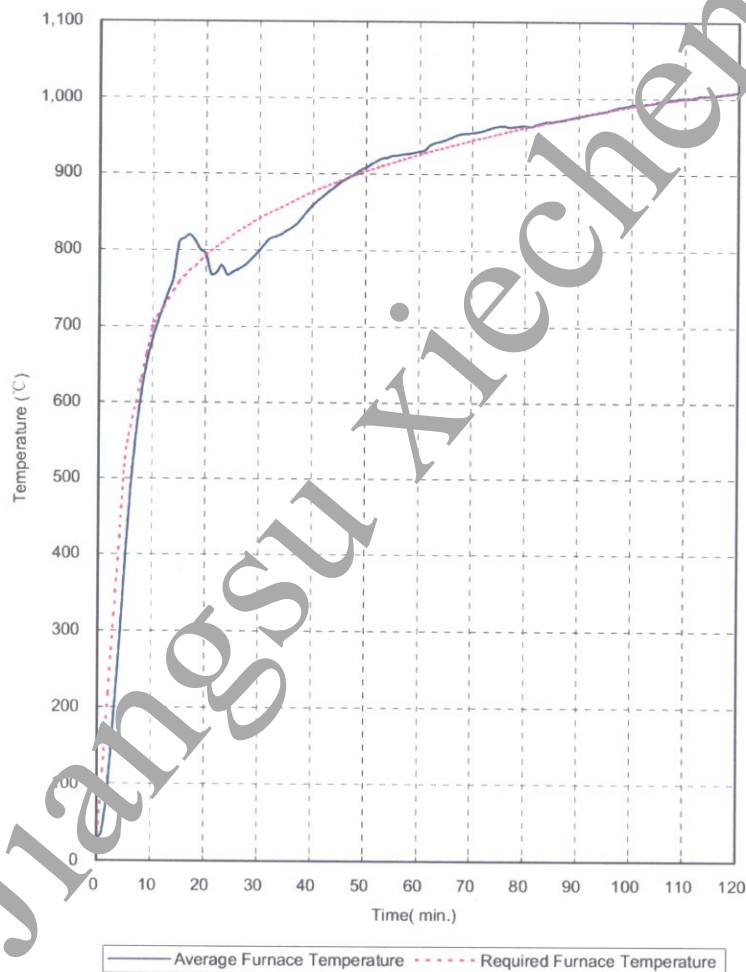
Hose Stream	---	No openings, etc
Requirement		No openings, etc

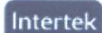


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Client: Jiangsu Xiecheng Science And Technology Deve.Co.,Ltd
Sample: A2 Fire Resistant Aluminum Composite Panel
Sample ID: PVDF 4mm 50S
Standards: ASTM E119 12, Standard Test Methods for Fire Tests of Building Construction and Materials.
Procedure: Nonbearing Walls and Partitions (Optional Program per 11.3)
Furnace
Temperatures: According to ASTM E119, Section 6

Reviewer: Sun Sun
Sun Sun

Eng/Tech: Star Shi
Star Shi





Test: Fire Resistance
Test Date: 2012-12-28
Job No: AU12094055
Client: Jiangsu Xiecheng Science And Technology Deve.Co.,Ltd
Sample: A2 Fire Resistant Aluminum Composite Panel
Sample ID: PVDF 4mm 50S
Standards: ASTM E119 12, Standard Test Methods for Fire Tests of Building Construction and Materials.
Procedure: Nonbearing Walls and Partitions (Optional Program per 11.3)
Unexposed
Temperatures: According to ASTM E119, Section 7

Reviewer: Sun Sun
Eng/Tech: Star Shi

Time	Ambient (°C)	T1 (°C)	T2 (°C)	T3 (°C)	T4 (°C)	T5 (°C)	T6 (°C)	T7 (°C)	T8 (°C)	T9 (°C)	Mean (°C)
0	8	8	8	8	8	8	8	8	8	8	8
1	8	8	8	8	8	8	8	8	8	8	8
5	8	8	8	8	8	8	8	8	8	8	8
10	9	8	8	9	8	8	9	9	9	8	8
15	9	8	8	9	8	8	9	9	9	8	8
20	9	9	9	10	8	9	10	10	10	8	9
25	9	9	9	11	9	9	10	10	10	9	10
30	9	9	10	12	9	9	11	12	11	9	10
35	9	9	10	12	9	9	12	13	12	9	11
40	9	10	13	13	12	11	16	18	19	13	14
45	9	15	16	15	13	14	23	24	26	18	18
50	9	19	19	18	17	16	28	28	27	24	22
55	9	25	24	24	23	22	31	33	33	29	27
60	9	28	29	28	27	26	34	36	35	31	30
65	9	32	34	32	27	27	38	38	38	32	33
70	9	36	37	37	33	34	42	41	45	35	38
75	10	40	42	42	38	39	46	43	47	40	42
80	10	43	45	45	41	42	50	45	51	43	45
85	10	43	45	46	42	43	53	45	55	43	46
90	10	43	46	47	43	45	57	45	59	43	48
95	10	43	46	47	43	45	57	45	60	43	48
100	10	43	47	48	43	45	59	46	61	43	48
105	10	44	47	48	44	45	62	46	64	43	49
110	10	48	48	49	45	46	63	47	65	43	50
115	10	53	51	51	47	47	67	50	68	44	53
120	10	57	51	53	48	49	69	52	71	44	55
Temp. Rise Requirement	N/A	43	45	45	40	41	61	44	63	36	47
	N/A					180					139

10 Appendix D: Test Photographs

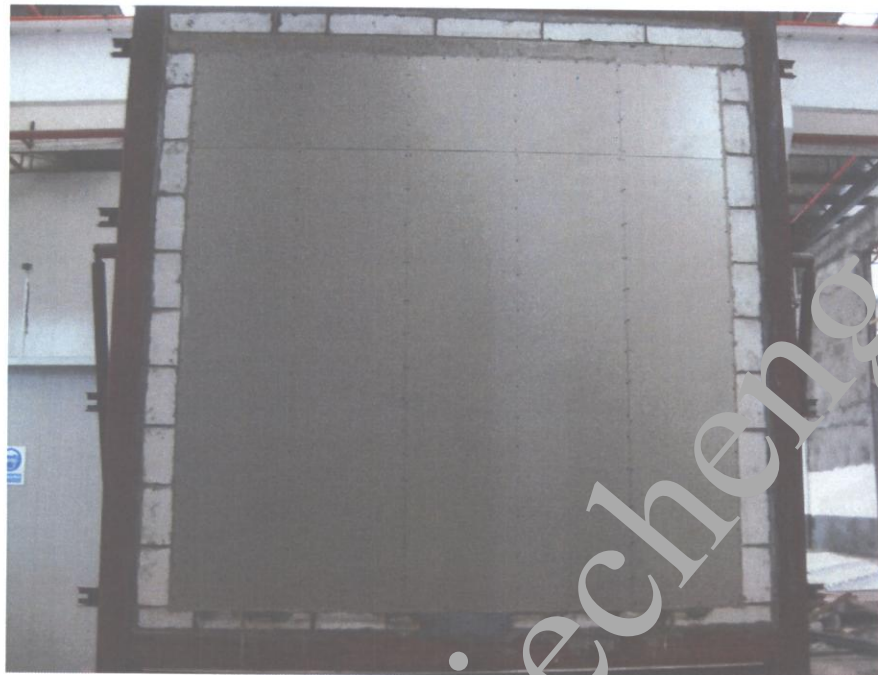


Fig. 1 - Exposed Side before the Fire Test

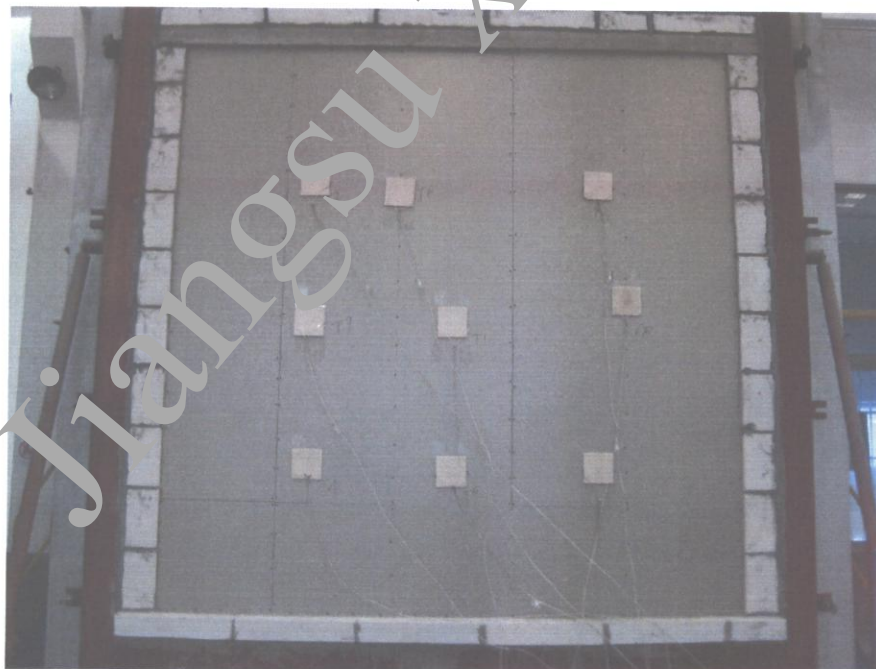


Fig. 2 - Unexposed Side before the Fire Test



Fig. 3 – Unexposed Side after 30 minutes



Fig. 4 – Unexposed Side after 60 Minutes



Fig. 5 – Unexposed Side after 90 Minutes



Fig. 6 –Unexposed Side after 120Minutes



Fig. 7 - Exposed Side after 120 Minutes



Fig. 8 – Exposed Side during Hose Stream Test



Fig. 9 – Exposed Side during Hose Stream Test



Fig. 10 - Unexposed Side after Hose Stream Test

11 Revision Page

Revision No.	Date	Changes	Author	Reviewer
0	January 16, 2013	First issue	Star Shi	Sun Sun

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Jiangsu Xiecheng