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MAGNESIUM OXIDE BOARD CORPORATION PTY LTD

TEST REPORT

SCOPE OF WORK
BS476-22 (1987) TESTING ON RESCOM WALL SYSTEM, MODEL OF 12 MM MGO BOARD

REPORT NUMBER
180516010SHF-BP-1

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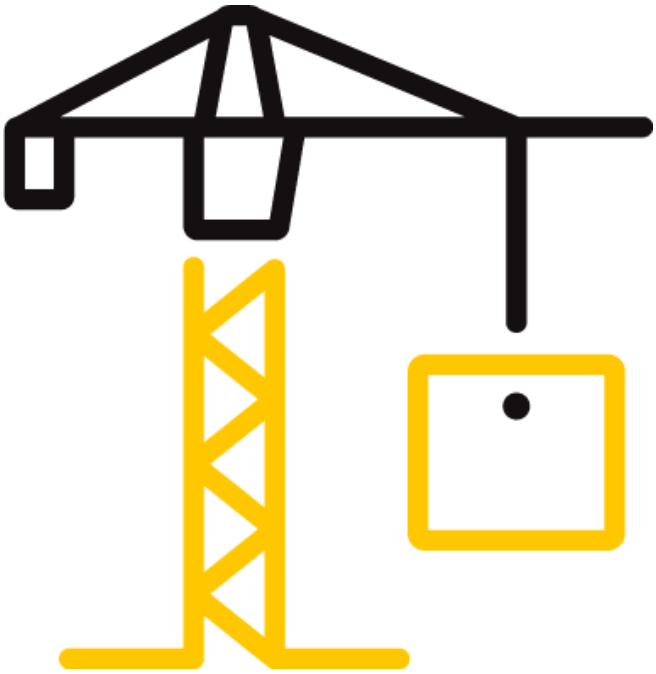

Intertek Testing Services Ltd., Shanghai
Plant 5, No. 6958 Daye Road, Fengxian District,
Shanghai, China
Tel: 021-61136116 Fax: 021-61189921
Website: www.intertek.com

Issue Date: 05/23/18

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REPORT ISSUED TO

MAGNESIUM OXIDE BOARD CORPORATION PTY LTD
3 Allen Street
Moffat Beach Queensland
Australia 4551

SECTION 1

SCOPE

Intertek has conducted an evaluation for Magnesium Oxide Board Corporation Pty Ltd to determine the fire resistance characteristics of ResCom Wall system, Model of 12 mm MgO board. This evaluation began on 05/16/18 and was completed on 05/23/18. The test was conducted on 05/18/18.

The test was conducted in accordance with BS 476-22:1987, Fire Tests on Building Materials and Structures – Part 22: Methods for Determination of the Fire Resistance of Non-loadbearing Elements of Construction, Section 5: Determination of the fire resistance of partitions.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

For INTERTEK B&C:

COMPLETED BY:	Timothy Li	**REVIEWED BY:**	Harrison Li
TITLE:	Engineer, Building & Construction	**TITLE:**	Technical Supervisor, Building & Construction
SIGNATURE:	Timothy Li	**SIGNATURE:**	Harrison Li
DATE:	05/23/18	**DATE:**	05/23/18

INTERTEK TESTING SERVICES LTD., SHANGHAI 检验检测专用章

Intertek Testing Services Ltd., Shanghai
Plant 5, No. 6958 Daye Road, Fengxian District,
Shanghai, China
Tel: 021-61136116 Fax: 021-61189921
Website: www.intertek.com

SECTION 2
SUMMARY OF TEST RESULTS

Product Name: ResCom Wall system
Series/Model: 12 mm MgO board

The test assembly satisfied the performance requirements for the following periods:

PERFORMANCE CRITERIA	RESULTS
Integrity	120 minutes
Insulation	64 minutes

The test was discontinued after a period of 120 minutes at the request of the sponsor.

SECTION 3
TEST METHOD

The specimen was evaluated in accordance with the followings:

BS 476-22:1987, *Fire Tests on Building Materials and Structures – Part 22: Methods for Determination of the Fire Resistance of Non-loadbearing Elements of Construction, Section 5: Determination of the fire resistance of partitions.*

BS 476-20:1987, *Fire Tests on Building Materials and Structures – Part 20: Method for Determination of the Fire Resistance of elements of Construction (general principles).*

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SECTION 4
MATERIAL SOURCE/INSTALLATION

12mm MgO board was randomly selected on 03/12/18 by Intertek representative Luke Lv, at the Magnesium Oxide Board Corporation Pty Ltd manufacturing facility, located at SOUTH WEST OF INTERCHANGE OF YIHE EAST ROAD AND KUNMING ROAD, NATIONAL ECONOMIC AND TECHNOLOGICAL DEVELOPMENT ZONES OF LINYI CITY, SHANDONG CHINA. Samples were received at the Evaluation Center on 04/16/18. Steel studs, rock wool, fasteners and sealant were delivered directly by the client.

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.

A description of the test assembly is given in the table below. The description of the specimen is based on information provided by the sponsor of the test. All values quoted below are nominal, unless tolerances are given.

ResCom Wall system
Size: 3000mm×3000mm
Nominal Thickness: 99mm
Manufacturer: SHANGDONG HENG YI SCIENCE&TECHNOLOGY CO., LTD
Manufacturer Address: SOUTH WEST OF INTERCHANGE OF YIHE EAST ROAD AND KUNMING ROAD, NATIONAL ECONOMIC AND TECHNOLOGICAL DEVELOPMENT ZONES OF LINYI CITY , SHANDONG CHINA

NO	ITEM NAME	SPECIFICATION	MANUFACTURER
1	Top and bottom track	35mm x 75mm x 0.5mm, Grade of steel: Q195	Shanghai Woming Industrial Co., Ltd.
2	Steel stud	45mm x 75mm x 0.5mm, Grade of steel: Q195	Shanghai Woming Industrial Co., Ltd.
3	Rock wool	Thickness: 75mm Density: 140 kg/m^3	FUDA Rockwool Co., Ltd
4	12mm ResCom Board	12mmx1200mmx2400mm	Magnesium Oxide Board Corporation Pty Ltd
5	Screws	3.5*35mm	嘉兴金尚精工五金有限公司 Jiaxing Jinshang Jingong Hardware Co.,Ltd.
6	Fireproof Mud	DR-AI-LAIB	Beijing Oriental Yuhong Waterproof Technology Co.Ltd
7	Fireproof powder coating	Silica sol, Fireproof auxiliary	Shanghai Jinshan Fireproof Coating Co., Ltd.

The sample ID number assigned by the test lab is S180516010SHF-001.

The drawings of the test sample and test wall construction can be found in Section 6 and 7 respectively.

A comprehensive description of ResCom Wall system, Model of 12 mm MgO board for certification is maintained on Intertek file.

The 35x75mm top track, bottom track and 45x75mm edge studs were fastened to the test supporting wall opening with shooting nails. 45x75mm studs was fasten to top and bottom track at a distance of 600mm. At 1200mm and 2400mm from free edge, double stud was constructed by two studs fixed back to back by screws, and with fireproof powder coating applied between the studs. Noggings were cut to 600mm and fixed on vertical studs. At the height of 1200mm and 2400mm, double noggings were constructed. 75mm rock wool with a density of 140 kg/m^3 is filled in the stud cavities. The rock wool was cut to a thickness of 50mm to insert in the studs. A layer of 12 mm MgO board is clad on both sides of the studs by screws with smooth side outward and with the long dimension perpendicular to the studs.

All tapping screws spaced about 200mm around the perimeter and 300mm in the field. The screw heads were covered with Fireproof Mud.

Joints between the boards were filled with Fireproof Mud. Fireproof powder coating was applied on joints between the boards and left, right and bottom edge of the wall system on both sides by a 250mm paint roller to paint.

The nominal dimensions of the test wall were 3 m high by 3 m wide.

Testing is carried out from one side only as the partition is entirely symmetrical.

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 maximum of 1000 mm above notional floor level. Periodic observations were made of the surfaces of the test assembly during the fire resistance test.

Wall assembly deflection relative to the supporting construction, where applicable, was monitored throughout the test. Position for measurement of deflection and unexposed temperature was presented in the drawing of Section 8.

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SECTION 5
TEST RESULTS

Integrity

The assembly withstood the fire resistance test without passage of flame or gases hot enough to ignite cotton waste for 120 minutes. No through openings or penetrations were evident at this 120 minutes fire exposure portion of the test and the door latch remained engaged to the strike. During this 120 minutes fire exposure period no significant flaming was observed on the unexposed face of the assembly.

This assembly therefore met the criteria of the test standards for integrity performance of 120 minutes.

Insulation

Transmission of heat through the assembly during the fire resistance test of 64 minutes did not raise the average temperature on the unexposed surface by more than 140°C above its initial value, and did not raise the maximum temperature on the unexposed surface by more than 180°C above the initial mean unexposed face temperature.

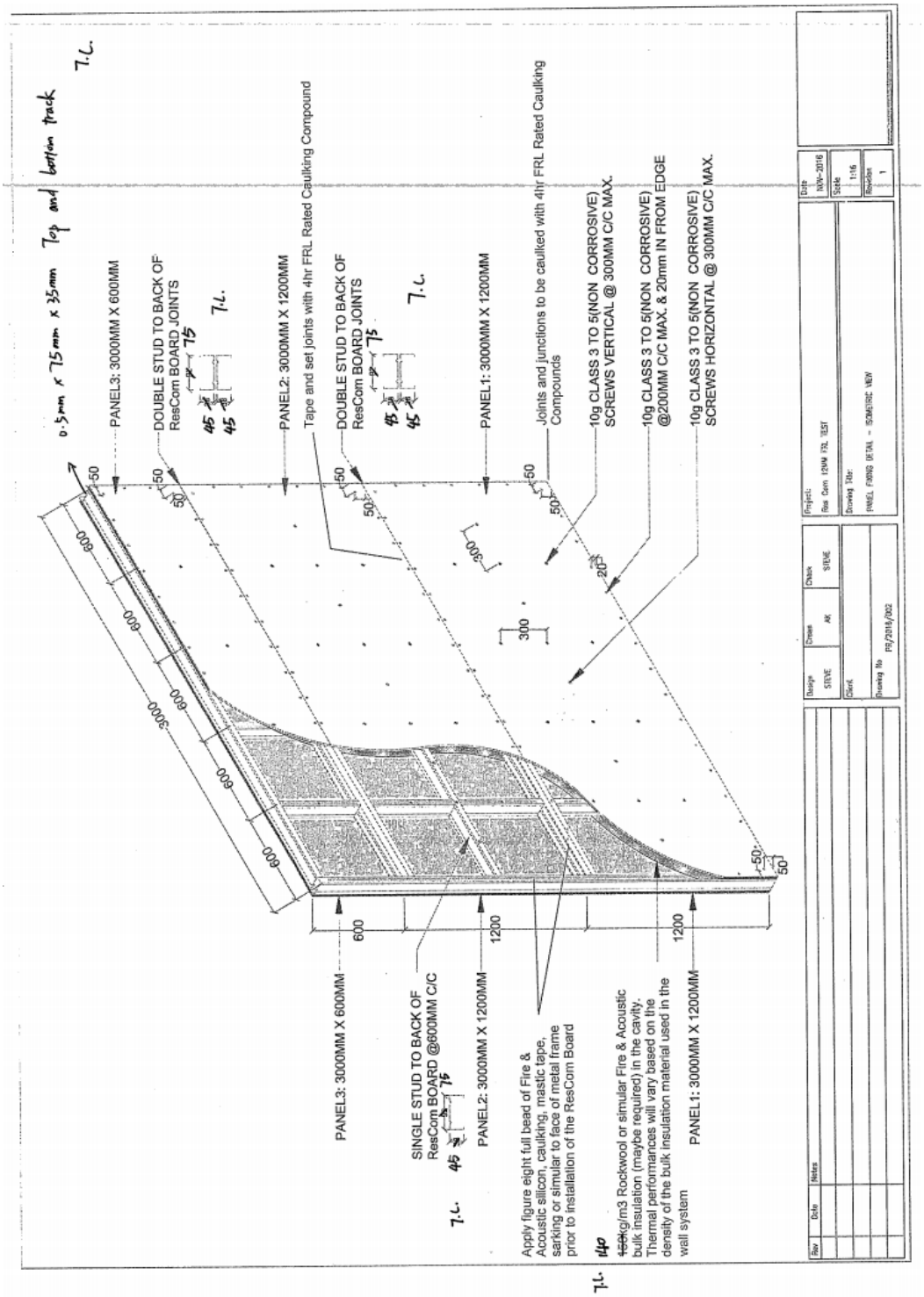
After exposed to the fire for a period of 64 minutes, the maximum temperature rise of T9 on unexposed surface increased by more than 180°C, insulation failure was deemed to occur.

The assembly therefore met the criteria of the test standards for insulation performance of 64 minutes.

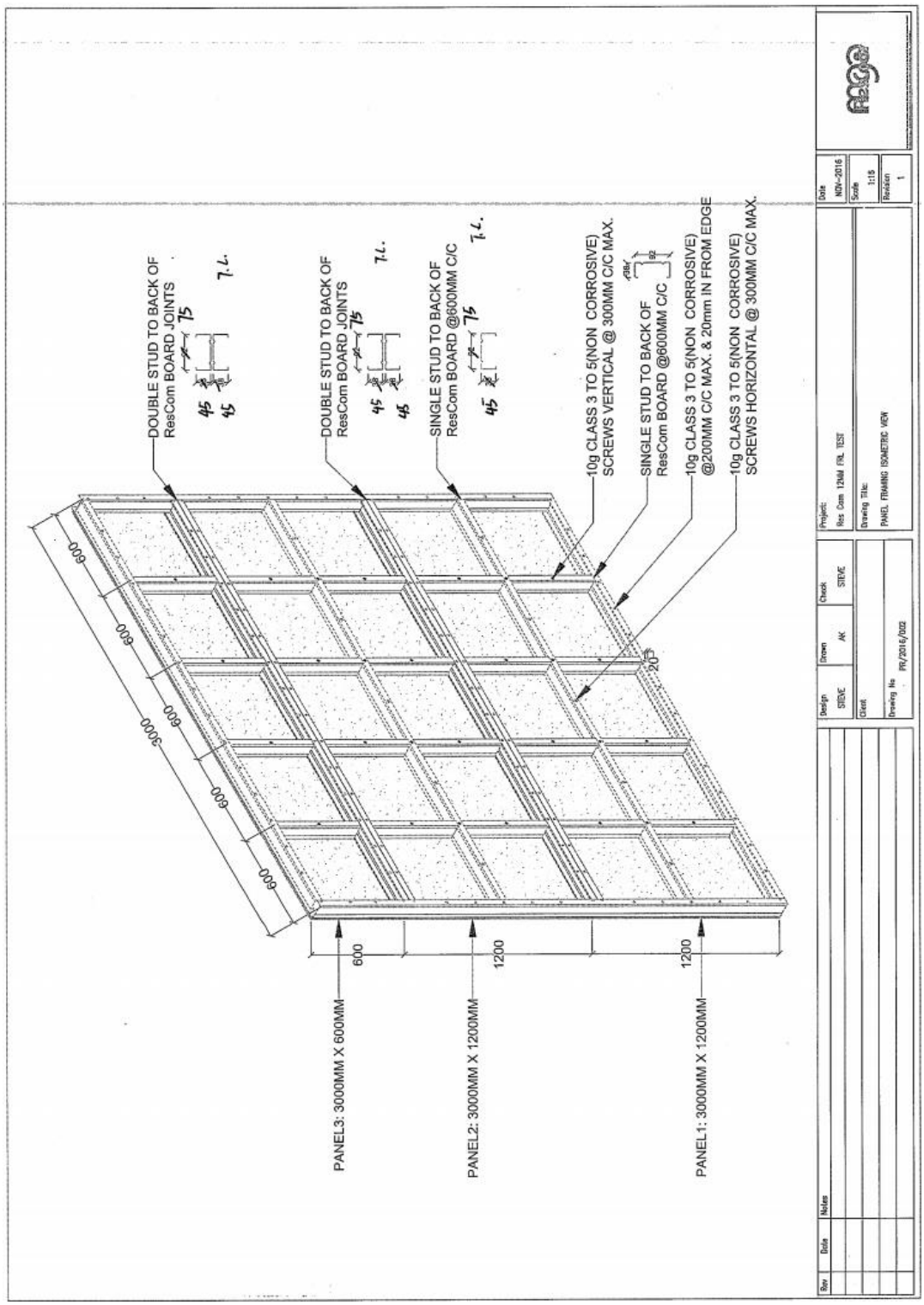
A full set of test data is included in Section 9, and photographs have been presented in Section 10.

SECTION 6

TEST SAMPLE DRAWINGS



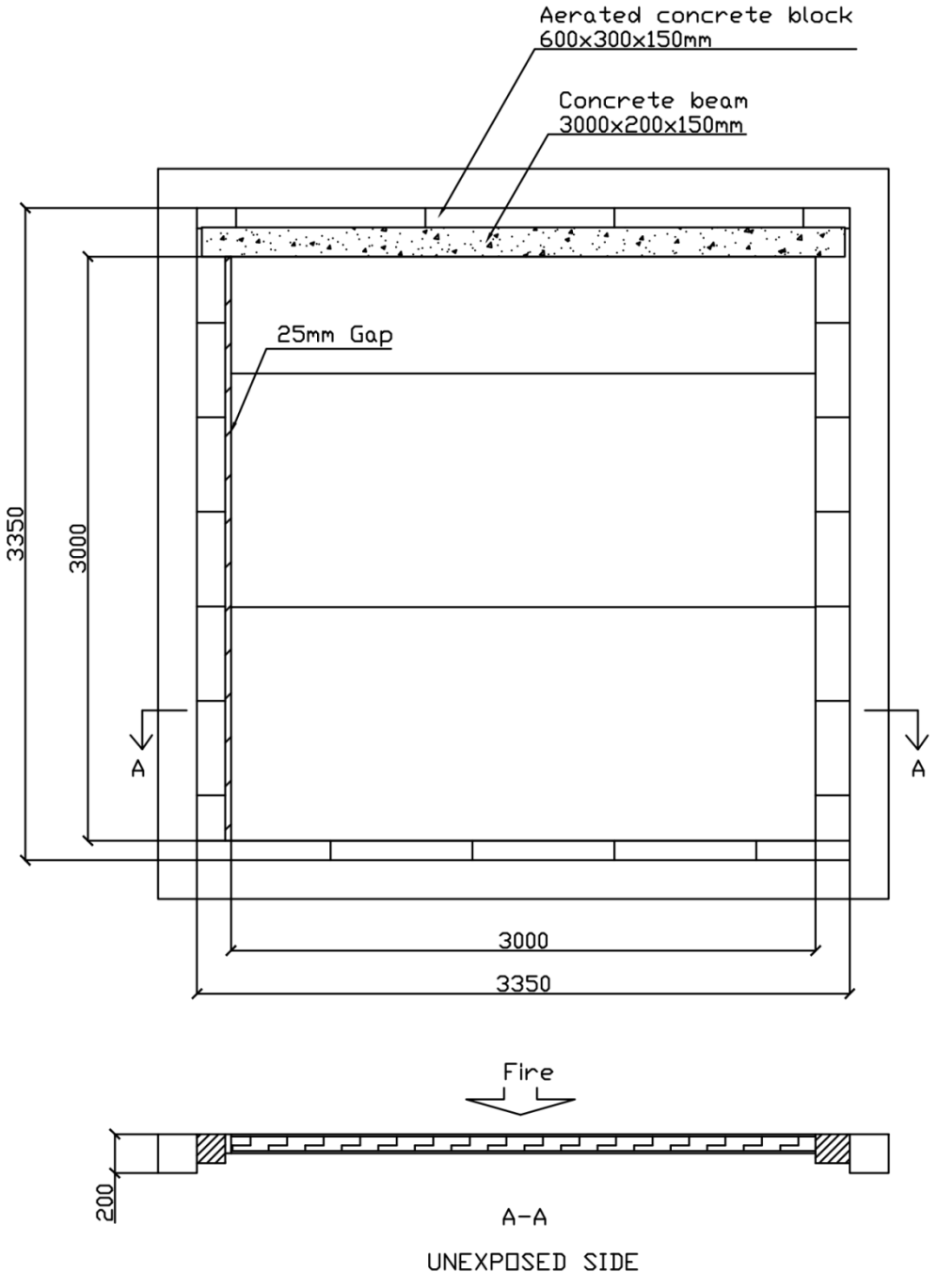
Drawing of ResCom Wall System



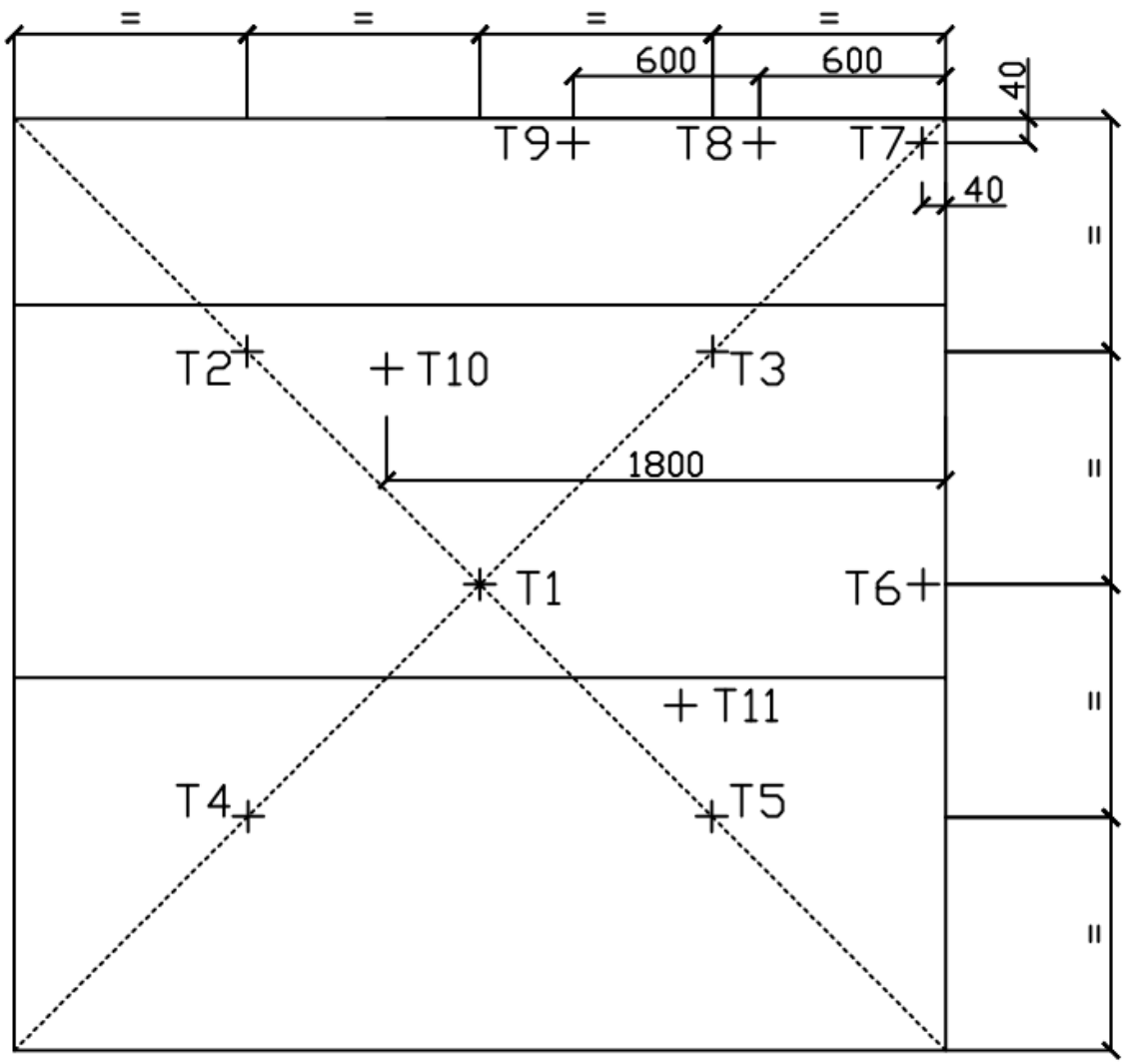
Drawing of ResCom Wall System

SECTION 7

TEST WALL CONSTRUCTION



SECTION 8
TEST MEASUREMENT DATA



UNEXPOSED SIDE

POSITON FOR MEARSUREMENT OF UNEXPOSED TEMPERATURE

Note: T6~T9 was 40mm away from edge of wall assembly to avoid the influence by fireproof mud.

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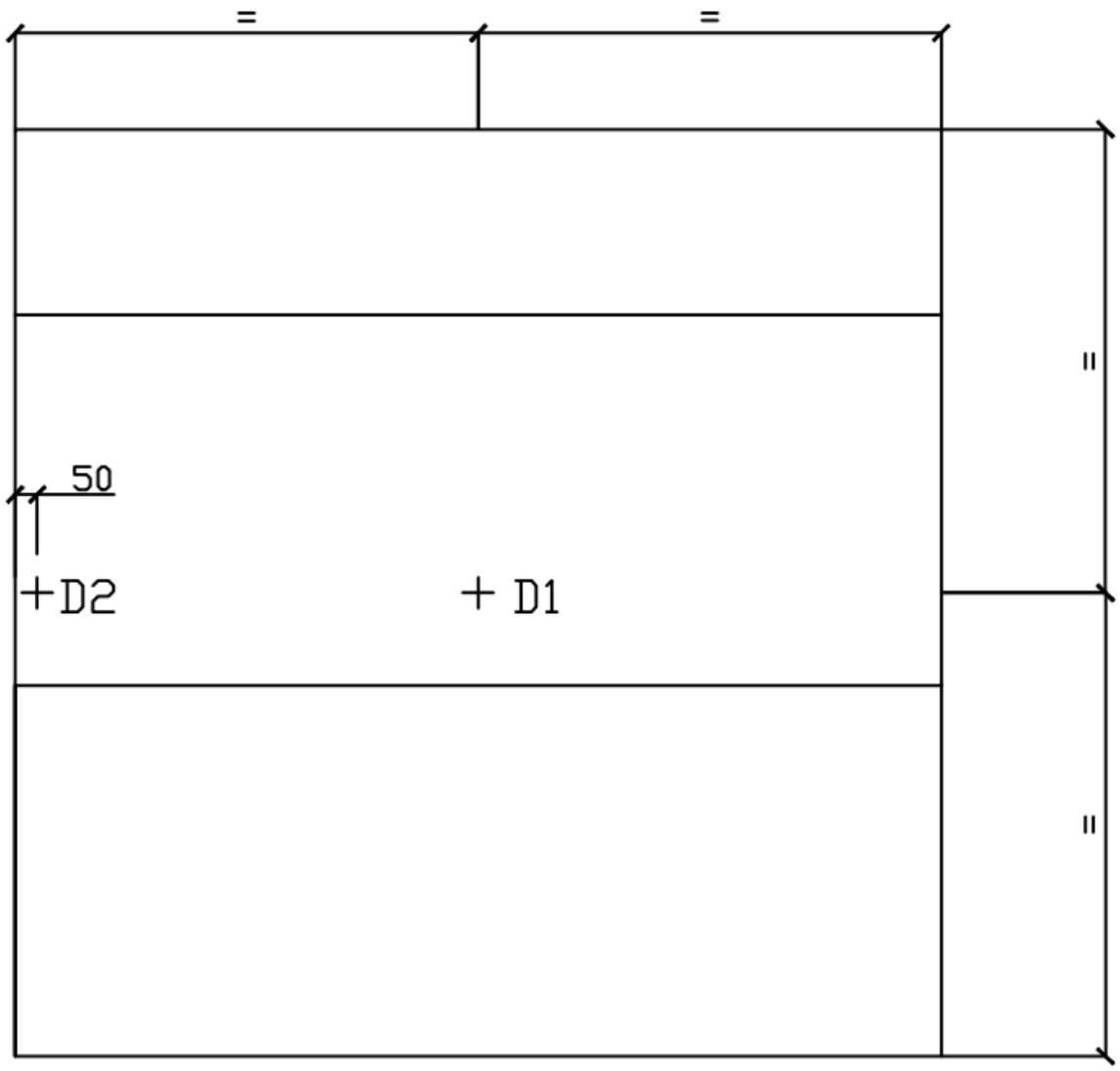

UNEXPOSED SIDE

POSITON FOR MEASUREMENT OF HORZITONAL DEFLECTION

SECTION 9
TEST DATA

Standards: BS476-22:1987 Part 22: Methods for determination of the fire resistance of non-loadbearing elements of construction
Procedure: According to BS 476-22, Section 5
Conditioning: According to BS 476-20, Section 4.6
Equipment:

ITEM	ID
Vertical furnace	SH1097
Furnace pressure gauge	SH1097-15
Test Clock	SH1042
Furnace thermocouple	SH1097-7~9
Ambient temperature gauge	SH1097-11
Unexposed thermocouple	SH1097-12~14
Clearance Measurements	SH1057-1
Displacement Measurements	SH1163

Heating Conditions: According to BS 476-20, Section 3.1
Pressure Conditions: According to BS 476-20, Section 3.2
Ambient Conditions: 5~35°C according to BS 476-20, Section 3.3
Test Specimen: According to BS 476-22, Section 6.2, 7.2, 8.2
Installation of test specimen: According to BS 476-22, Section 6.3, 7.3, 8.3
Furnace Thermocouples: According to BS 476-22, Section 6.4.3, 7.4.3, 8.4.3
Unexposed Face Thermocouples: According to BS 476-22, Section 6.4.5, 7.4.5, 8.4.5
Thermocouple Pads: Length and width 30 mm, thickness 2.0 ± 0.5 mm, dry density 900 ± 90 kg/m2, thermal conductivity of 0.13 W/(m*K) ± 10% at 100°C
Pressure Measurements: According to BS 476-22, Section 6.4.4, 7.4.4, 8.4.4
Deflection Measurements: According to BS 476-22, Section 6.4.7, 7.4.7, 8.4.7
Test Procedure: According to BS 476-22, Section 6.5, 7.5, 8.5
Performance Criteria: According to BS 476-22, Section 6.6, 7.6, 8.6 and BS 476-20 Section 10.3, 10.4
Radiation Intensity: According to BS 476-20, Section A.9.4 and C.11.2

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Plant 5, No. 6958 Daye Road, Fengxian District,
Shanghai, China
Tel: 021-61136116 Fax: 021-61189921
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Test Observations:

Time		All observations are from the unexposed face unless noted otherwise.
Mins	Secs	
00	00	Test starts.
05	43	Smoke issues from top edge of wall system.
08	50	Smoke issues from right fixed edge of wall system.
10	12	Water flows from horizontal joints.
24	17	Light smoke issues from top horizontal joints.
44	56	Less smoke issues.
64	04	A cotton pad is applied on top horizontal edge, 600mm from free edge, the pad is not ignited.
72	24	Discoloration is observed on all horizontal joints.
90	23	A cotton pad is applied on T11 position, the pad is not ignited.
90	49	A cotton pad is applied on T6 position, the pad is not ignited.
114	15	A cotton pad is applied on T10 position, the pad is not ignited.
114	43	A cotton pad is applied on second studs and lower joints of wall system, the pad is not ignited.
120	00	Test is discontinued.

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Temperature Data:

Mean furnace temperature together with temperature-time relationship specified in the standard

Time Mins	Specified Furnace Temperature/ °C	Furnace Mean Temperature/ °C
0	20	53
5	576	602
10	678	722
15	739	756
20	781	782
25	815	822
30	842	842
35	865	873
40	885	884
45	902	911
50	918	919
55	932	937
60	945	949
65	957	954
70	968	964
75	979	984
80	988	984
85	997	1003
90	1006	1013
95	1014	1020
100	1022	1027
105	1029	1028
110	1036	1033
115	1043	1044
120	1049	1048

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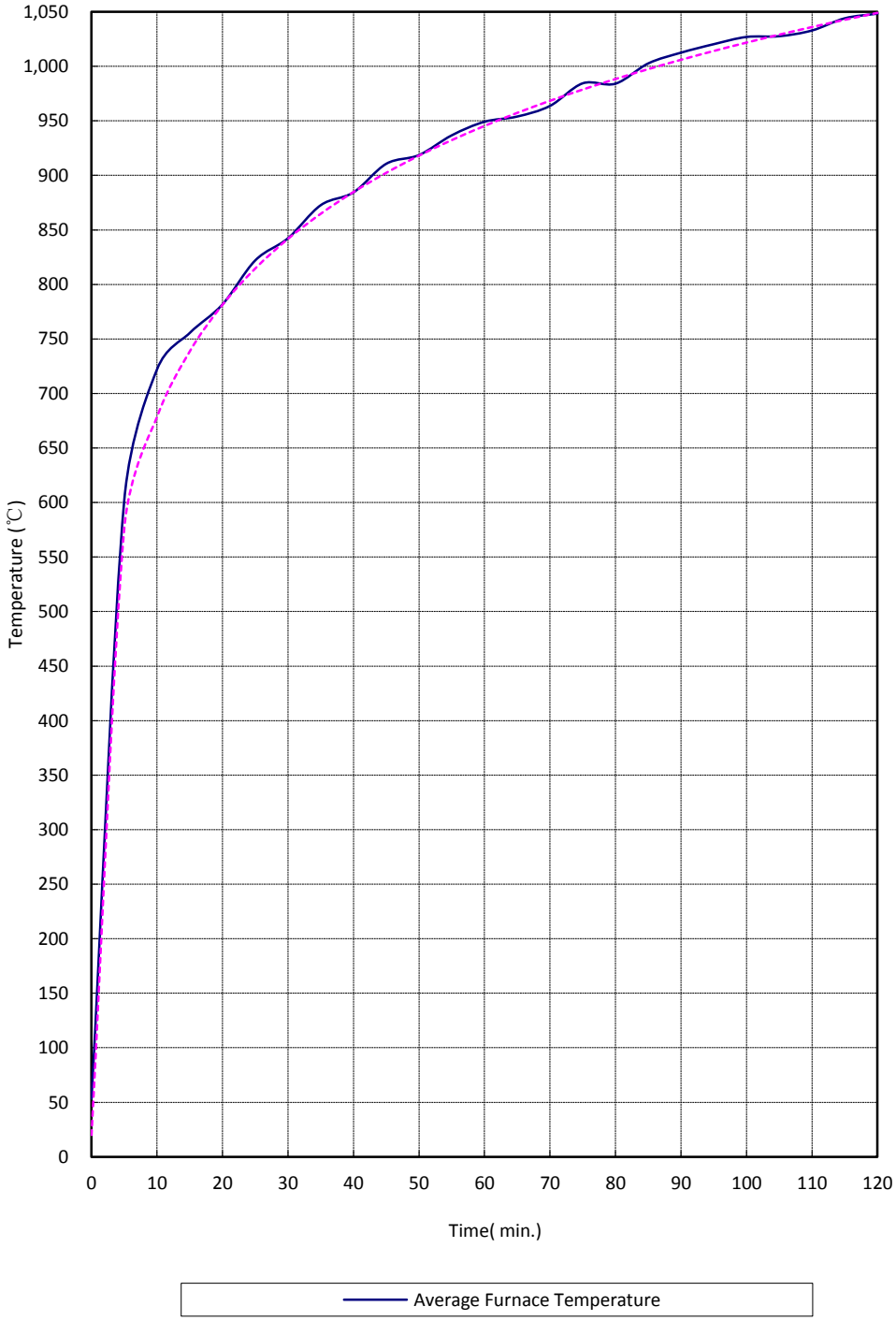
Graph for mean furnace temperature and temperature-time curve specified in the standard



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Unexposed surface temperatures

Time Mins	T1 (°C)	T2 (°C)	T3 (°C)	T4 (°C)	T5 (°C)	Mean temperature (°C)
0	29	29	29	29	29	29
4	29	29	29	29	29	29
8	29	35	29	30	30	31
12	52	76	65	53	60	61
16	74	83	81	64	77	75
20	73	84	83	68	81	78
24	73	83	83	71	82	78
28	75	79	81	72	81	78
32	72	74	76	71	77	74
36	68	69	71	68	73	70
40	65	65	68	66	71	67
44	62	62	66	63	69	65
48	60	60	65	62	68	63
52	58	60	65	60	67	62
56	58	61	65	60	67	62
60	58	63	66	60	68	63
64	59	65	67	61	69	64
68	62	69	69	62	71	67
72	64	72	70	64	74	69
76	68	76	72	67	78	72
80	72	80	75	70	82	76
84	76	83	77	72	87	79
88	80	87	81	76	92	83
92	85	92	85	79	98	88
96	90	96	89	83	103	92
100	95	100	93	86	109	96
104	100	103	97	90	113	100
108	104	106	101	93	118	104
112	108	108	104	97	121	108
116	112	111	106	100	123	110
120	114	113	107	104	124	112

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Unexposed surface temperatures

Time Mins	T6 (°C)	T7 (°C)	T8 (°C)	T9 (°C)	T10 (°C)	T11 (°C)	Environment temperature (°C)
0	29	31	30	31	31	31	26
4	29	44	33	44	31	31	26
8	33	71	66	72	65	58	26
12	58	91	83	86	84	84	26
16	77	96	83	91	87	87	26
20	84	99	87	100	90	88	26
24	87	101	92	110	103	88	26
28	90	103	102	118	115	87	26
32	95	104	103	124	122	85	26
36	100	105	104	129	125	90	26
40	105	105	105	134	127	99	26
44	108	105	108	142	130	112	26
48	111	106	119	150	133	121	26
52	114	107	129	160	136	128	26
56	117	108	138	174	139	133	26
60	120	111	148	191	142	139	26
63	122	113	154	207	146	144	26
64	122	114	157	214	148	146	26
65	123	114	160	220	149	147	26
68	125	116	172	236	152	153	26
72	128	119	196	260	156	167	26
76	131	122	226	288	161	191	26
80	135	125	248	304	168	220	26
84	139	128	267	313	177	247	26
88	143	131	283	317	186	281	26
92	148	134	293	320	198	305	26
96	152	138	301	323	210	318	26
100	157	141	307	327	225	327	26
104	162	144	312	331	244	331	26
108	167	147	316	335	263	336	26
112	172	151	319	340	278	341	26
116	177	155	323	344	289	344	26
120	181	159	327	349	297	348	26

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Horizontal Deflection (Positive values indicate movement into the furnace)

Time Mins	D1 (mm)	D2 (mm)
0	0	0
10	28	2
20	48	10
30	68	12
40	83	14
50	90	16
60	92	16
70	93	17
80	93	18
90	94	18
105	94	18

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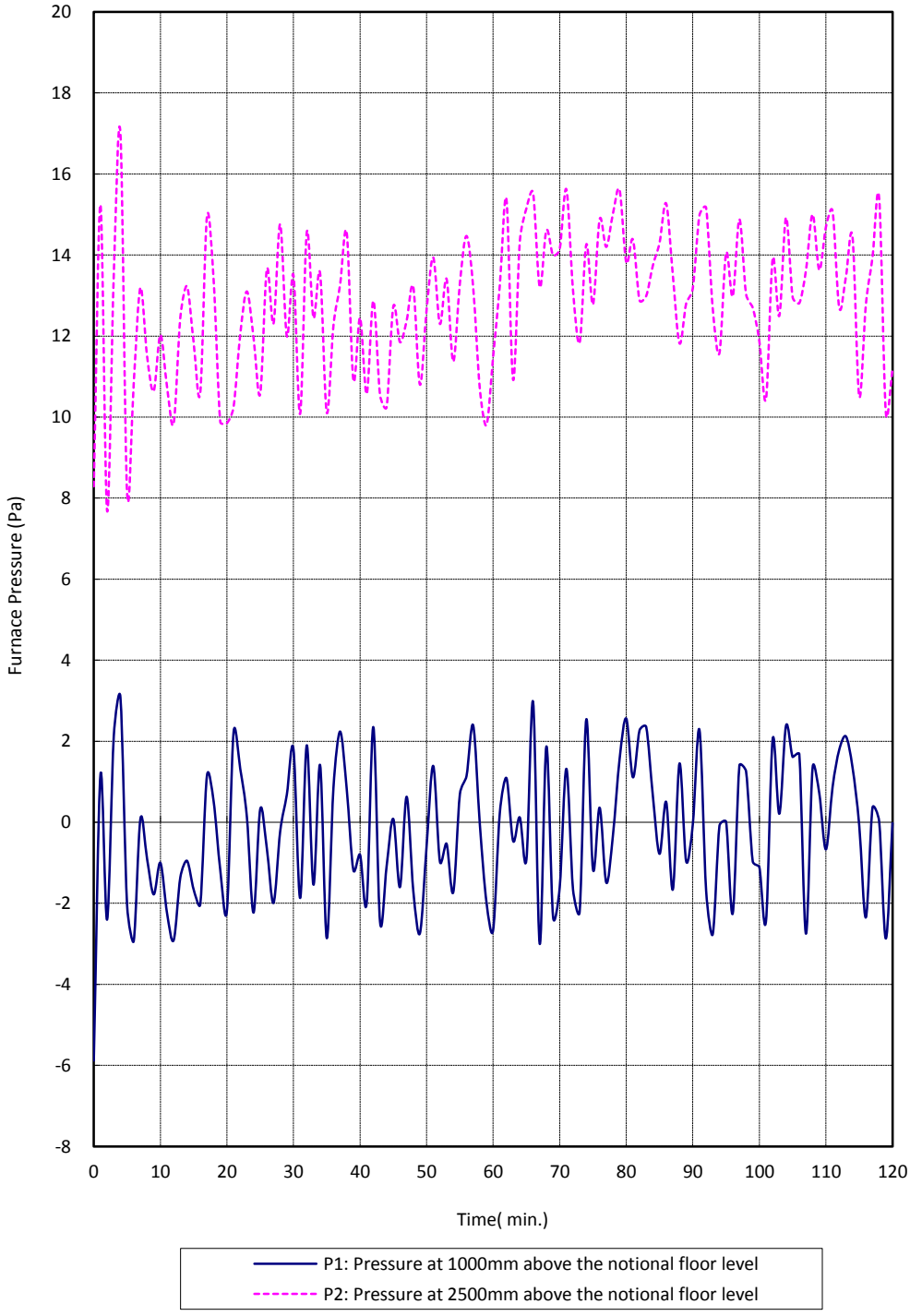
Furnace pressure



SECTION 10

PHOTOGRAPHS

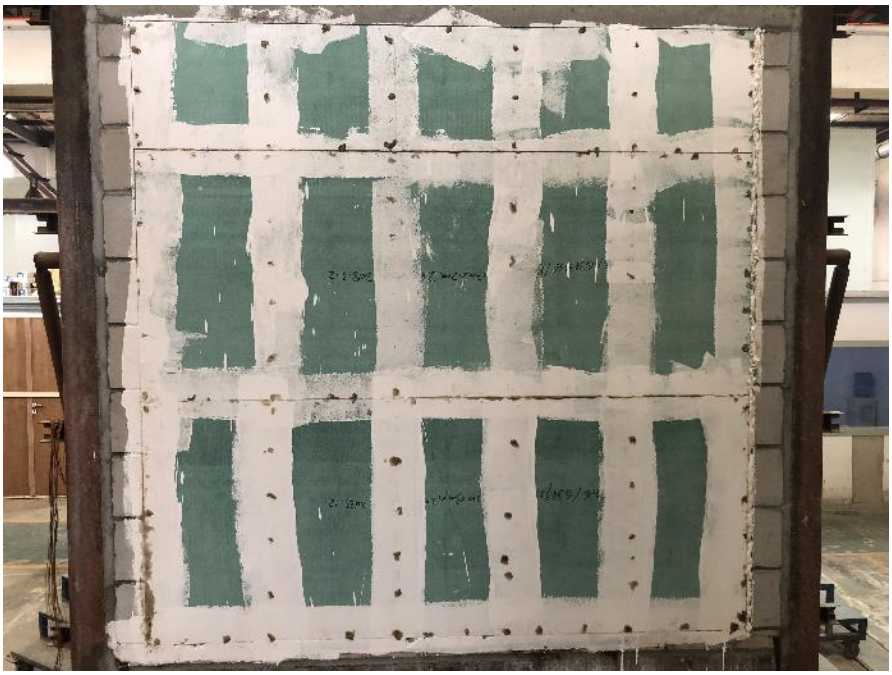


Photo No. 1
Exposed Side Prior to the Fire Test

Photo No. 2
Unexposed Side Prior to the Fire Test

Photo No. 3
Unexposed Side after 30 Minutes

Photo No. 4
Unexposed Side after 90 Minutes

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Photo No. 5
Unexposed Side after 120 Minutes

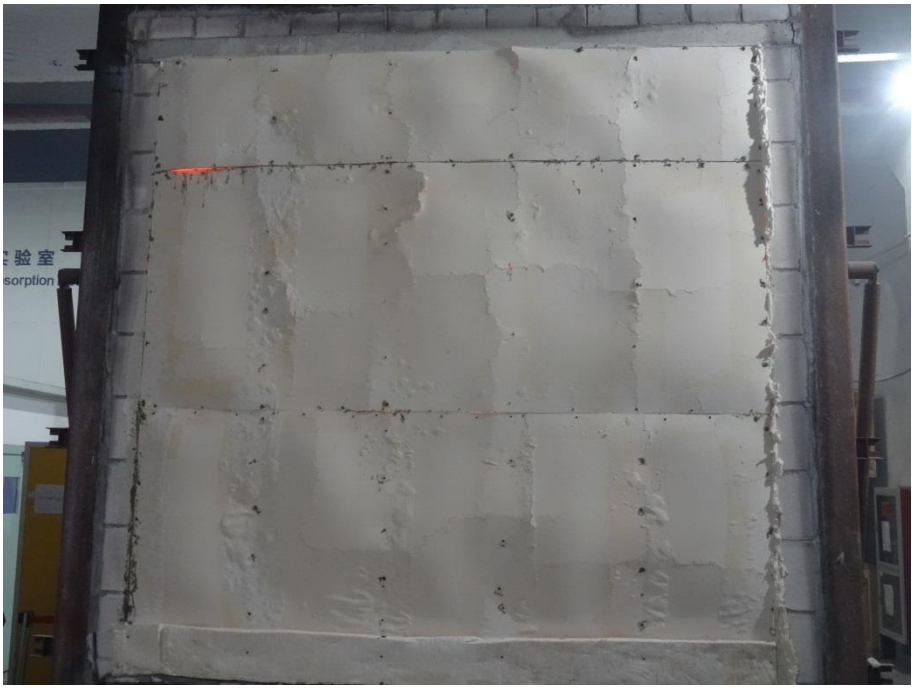

Photo No. 6
Exposed Side after 120 Minutes

SECTION 11
REVISION LOG

REVISION #	DATE	PAGES	REVISION
0	05/23/18	N/A	Original Report Issue