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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 10 MM MGO BOARD

**REPORT NUMBER**
180516006SHF-BP-1

**TEST DATE**
05/18/18

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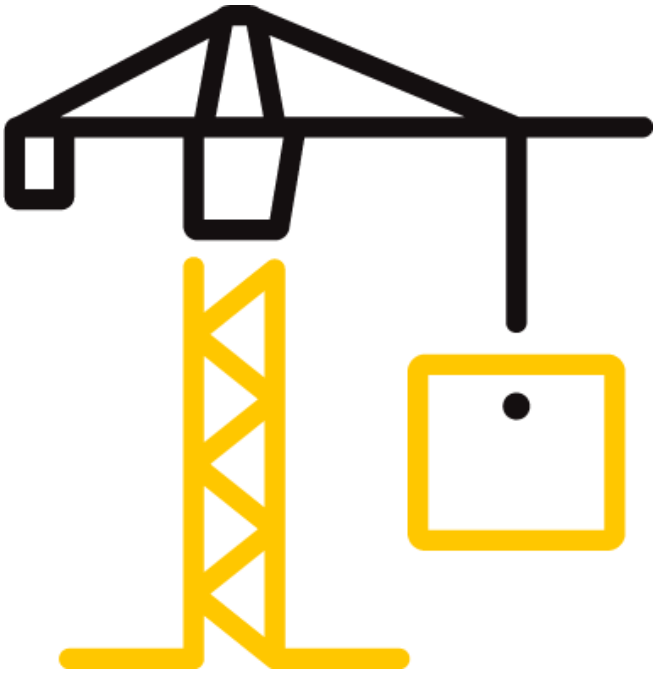

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Issue Date: 05/23/18

Intertek Report No.: 180516006SHF-BP-1

## REPORT ISSUED TO

**MAGNESIUM OXIDE BOARD CORPORATION PTY LTD**
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Moffat Beach Queensland
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## 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 10 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 |

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## SECTION 2
## SUMMARY OF TEST RESULTS

**Product Name:** ResCom Wall system
**Series/Model:** 10 mm MgO board

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

| PERFORMANCE CRITERIA | RESULTS |
|---|---|
| Integrity | 120 minutes |
| Insulation | 55 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

10mm 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:** 95mm
**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,<br>Grade of steel: Q195 | Shanghai Woming Industrial Co., Ltd. |
| 2 | Steel stud | 45mm x 75mm x 0.5mm,<br>Grade of steel: Q195 | Shanghai Woming Industrial Co., Ltd. |
| 3 | Rock wool | Thickness: 75mm<br>Density: 140 kg/m$^3$ | FUDA Rockwool Co., Ltd |
| 4 | 10mm ResCom Board | 10mmx1200mmx2400mm | Magnesium Oxide Board Corporation Pty Ltd |
| 5 | Screws | 3.5*35mm | 嘉兴金尚精工五金有限公司<br>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 S180516006SHF-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 10 mm MgO board for certification is maintained on Intertek file.

The wall assembly was constructed using 75mm wide steel stud, filling with rock wool and clad with 10mm MgO board.

The 35x75mm top track, bottom track and 45x75mm edge studs were fastened to the test supporting wall opening with shooting nails. 45x75mm studs was fastened 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 applied with fireproof powder coating between the studs. 75mm rock wool with a density of 140 kg/$m^3$ is filled in the stud cavities. A layer of 10 mm MgO board is clad on both sides of the studs with smooth side outward by screws.

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.

## 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

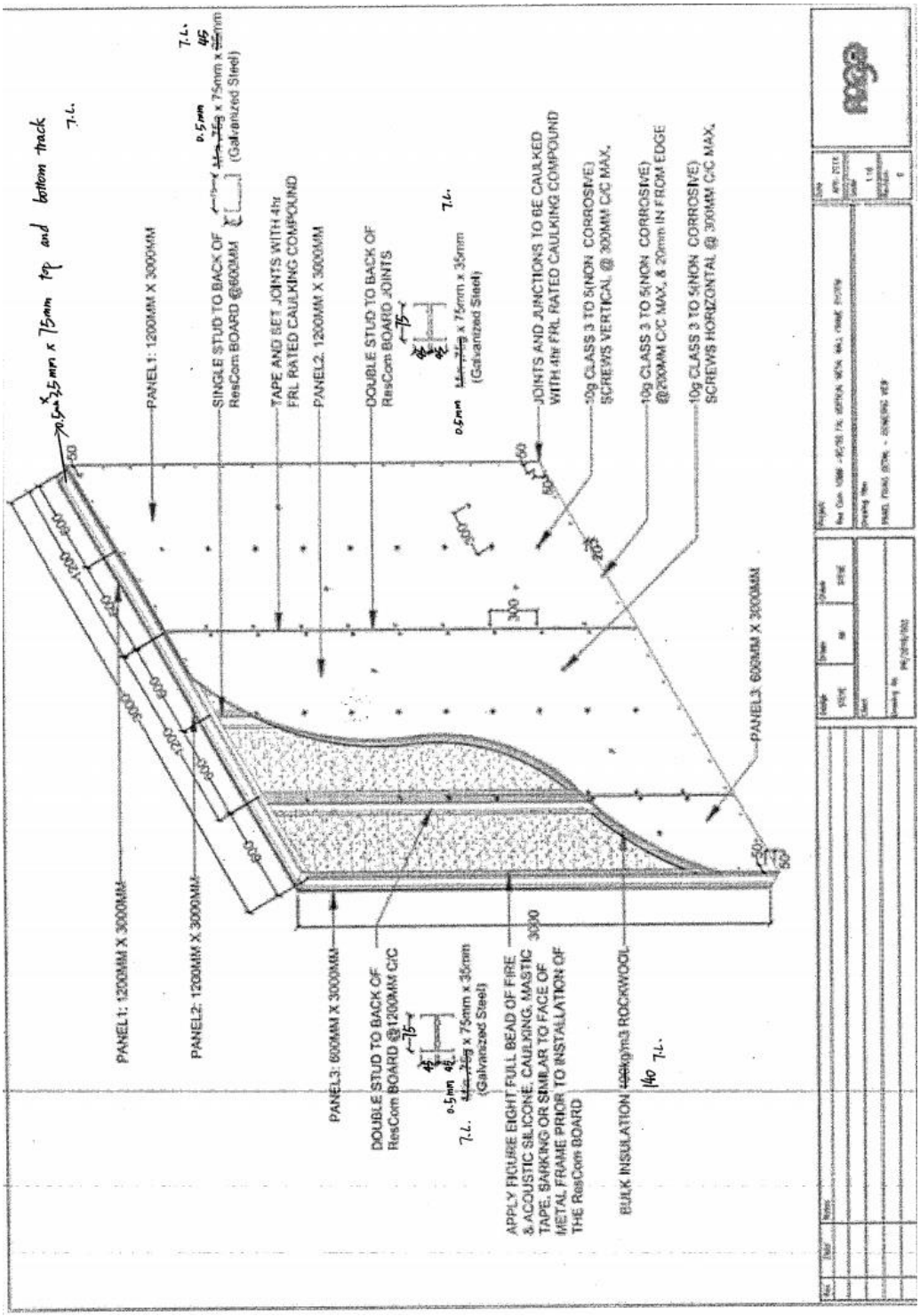
Transmission of heat through the assembly during the fire resistance test of 55 minutes did not raise the average temperature on the unexposed surface by more than 140°C above its initial value, and did not raise the maximum temperature on the unexposed surface by more than 180°C above the initial mean unexposed face temperature.

After exposed to the fire for a period of 55 minutes, the maximum temperature rise of T7 on unexposed surface increased by more than 180°C, insulation failure was deemed to occur.

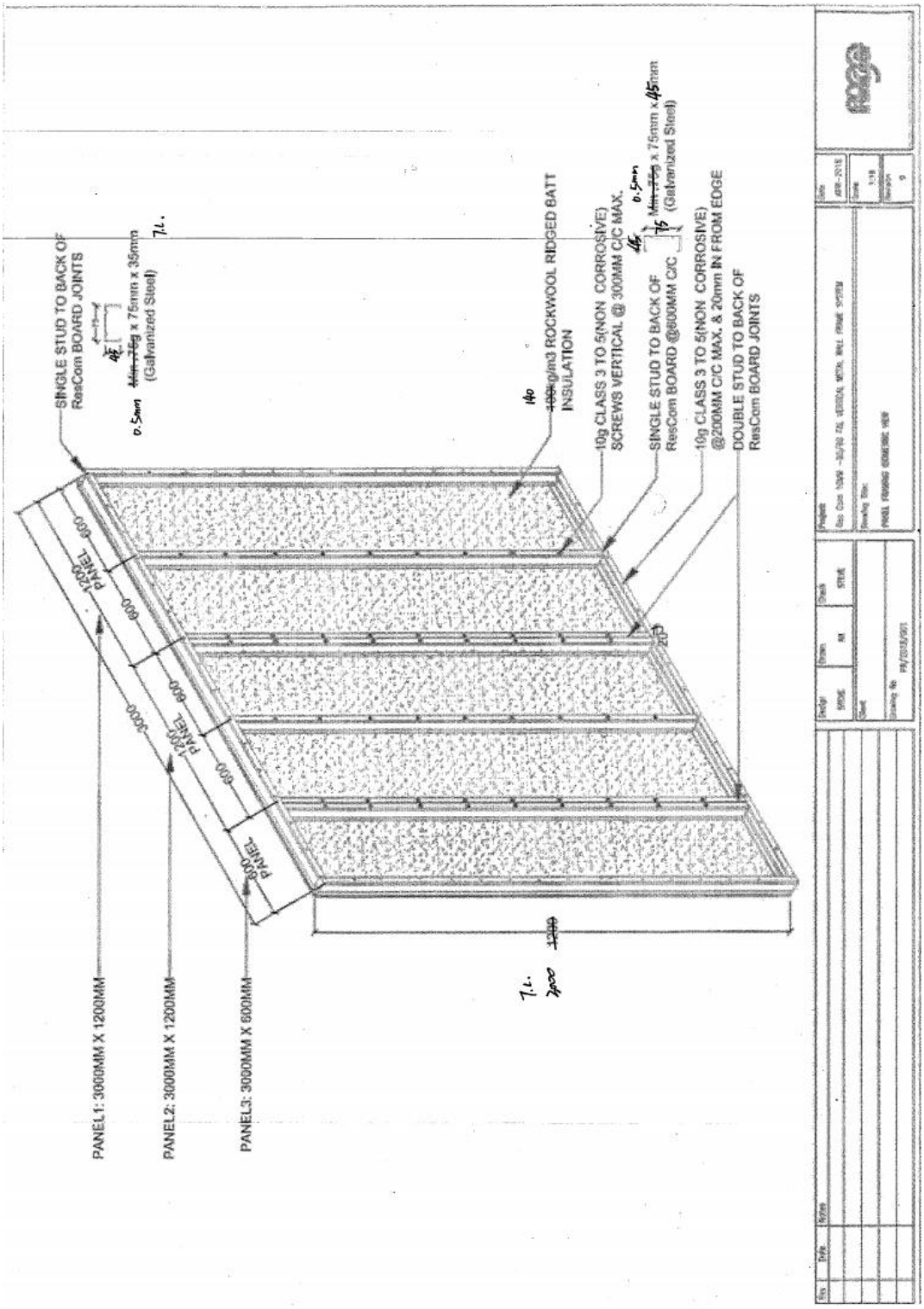
The assembly therefore met the criteria of the test standards for insulation performance of 55 minutes.

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

## SECTION 6
## TEST SAMPLE DRAWINGS



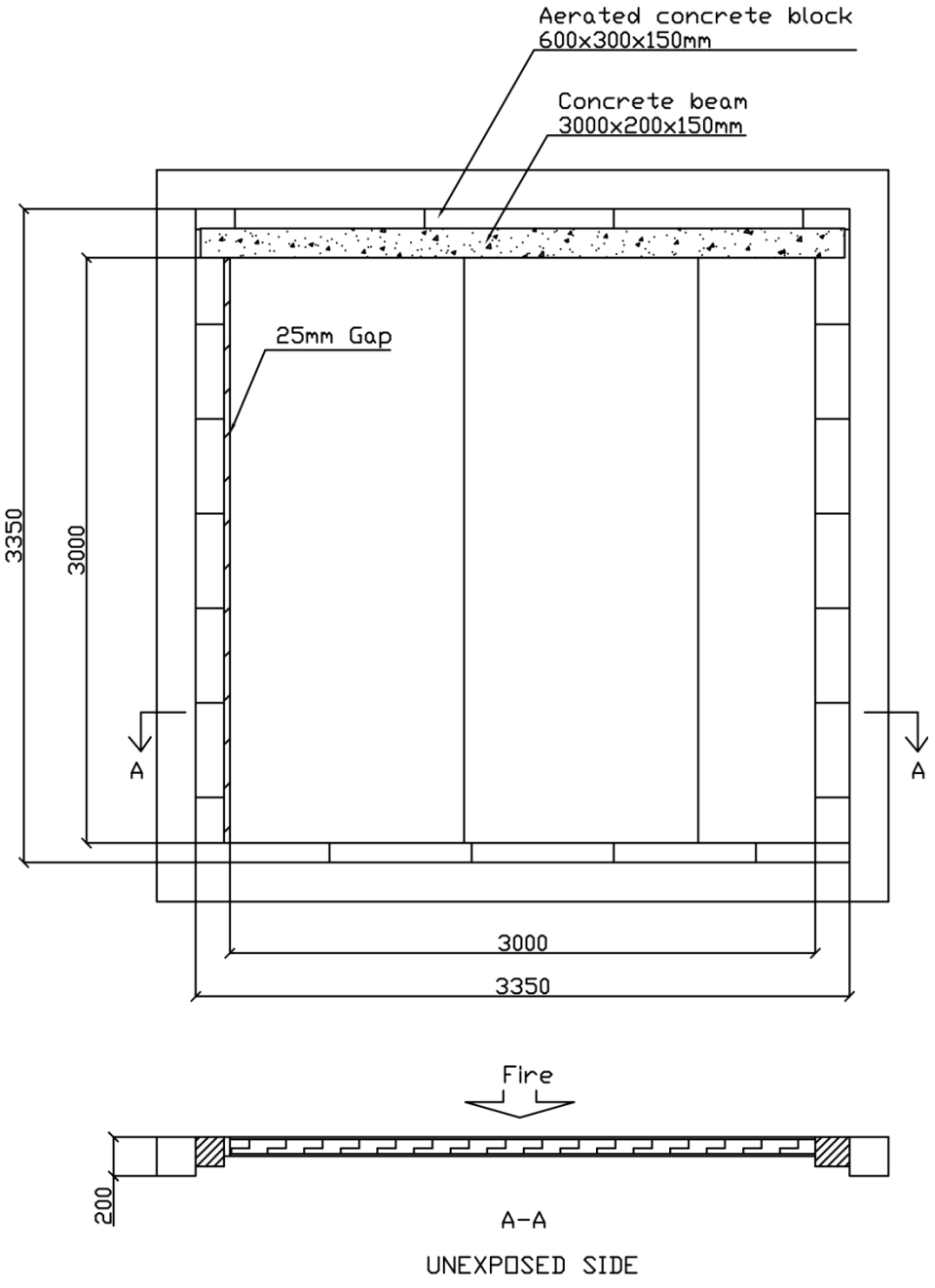

Drawing of ResCom Wall System



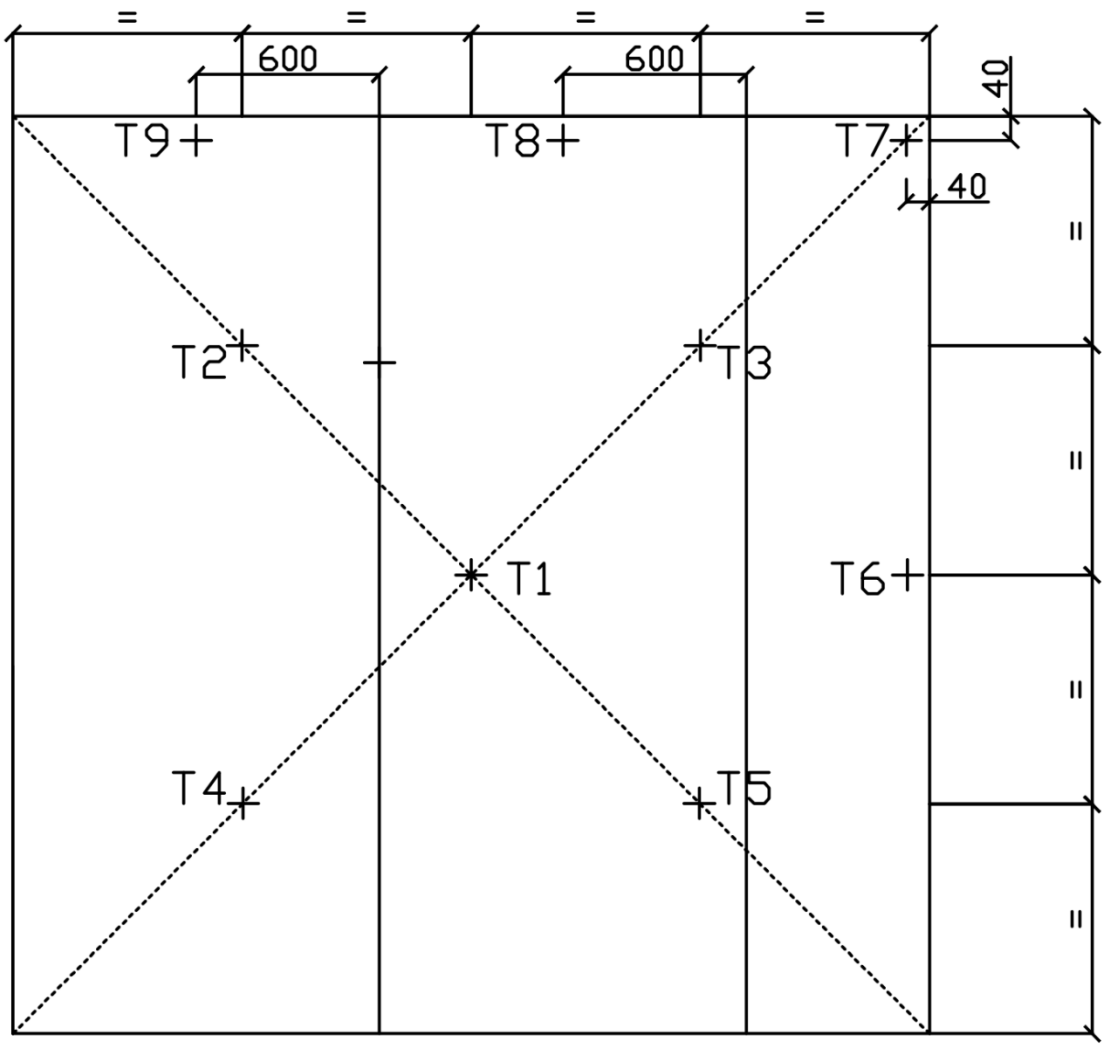

Drawing of ResCom Wall System

## SECTION 7

**TEST WALL CONSTRUCTION**



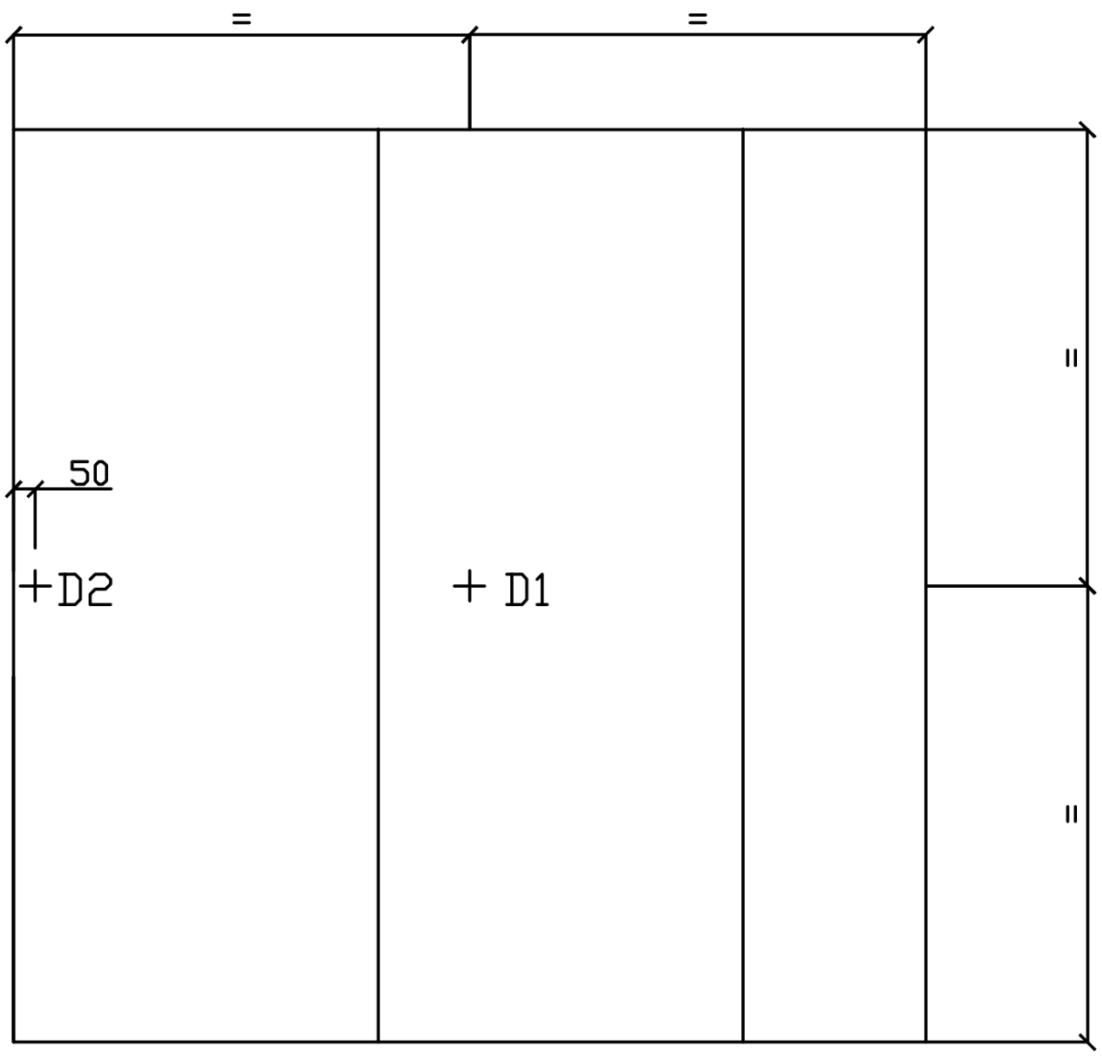
## SECTION 8
## TEST MEASUREMENT DATA




**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.




**UNEXPOSED SIDE**

**POSITON FOR MEASUREMENT OF HORZITONAL DEFLECTION**

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## 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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**Test Observations:**

| Time | | All observations are from the unexposed face unless noted otherwise. |
|---|---|---|
| Mins | Secs | |
| 00 | 00 | Test starts. |
| 04 | 33 | Smoke issues from top edge of wall system. |
| 25 | 00 | No significant change. |
| 27 | 53 | Light smoke issues from bottom edge of wall system. Crack on fire compound on panel joints is observed. |
| 31 | 58 | Light smoke issues from panel joints. |
| 55 | 01 | Discoloration on joints is observed. |
| 59 | 30 | A cotton pad is applied on 3/4 height of left joint, the pad is charred but not ignited. |
| 84 | 20 | A cotton pad is applied on 1/2 height of left joint, the pad is not ignited. |
| 87 | 33 | A cotton pad is applied on 1/3 height of right joint, the pad is not ignited. |
| 98 | 50 | 6mm gauge can not be inserted into right joint. |
| 113 | 03 | A cotton pad is applied on 1/3 height of right joint, the pad is charred but not ignited. |
| 118 | 31 | A cotton pad is applied on 1/4 height of right joint, the pad is not ignited. |
| 119 | 02 | 6mm gauge can be inserted into furnace but can not move for 150mm. |
| 120 | 00 | Test is discontinued. |

Note: The use of cotton pad was discontinued when the unexposed face of the construction indicated a temperature of 300°C in the vicinity of the gap being evaluated.

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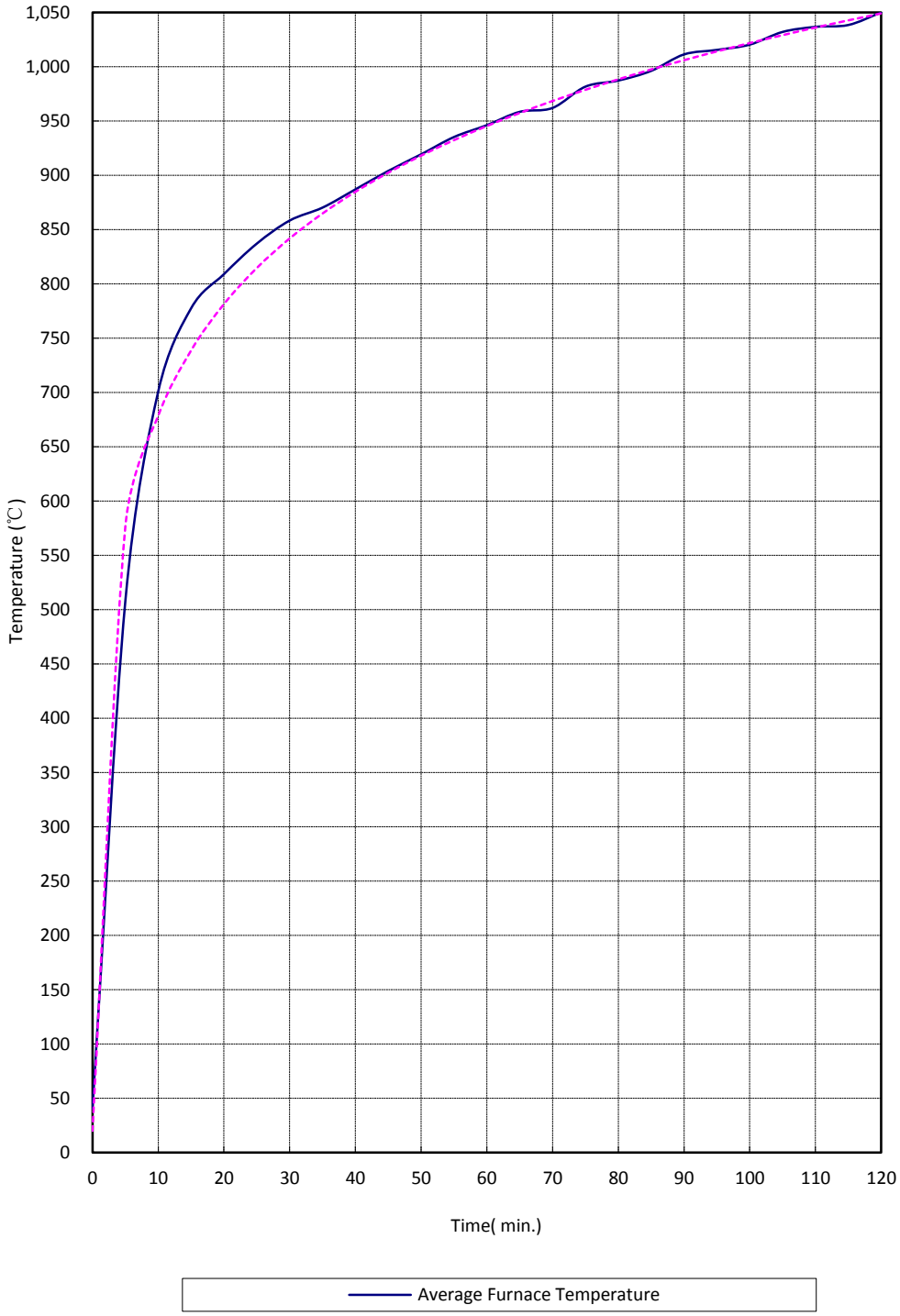
**Temperature Data:**

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

| Time Mins | Specified Furnace Temperature/ °C | Furnace Mean Temperature/ °C |
|---|---|---|
| 0 | 20 | 40 |
| 5 | 576 | 508 |
| 10 | 678 | 701 |
| 15 | 739 | 777 |
| 20 | 781 | 809 |
| 25 | 815 | 837 |
| 30 | 842 | 858 |
| 35 | 865 | 870 |
| 40 | 885 | 887 |
| 45 | 902 | 904 |
| 50 | 918 | 919 |
| 55 | 932 | 935 |
| 60 | 945 | 946 |
| 65 | 957 | 958 |
| 70 | 968 | 962 |
| 75 | 979 | 982 |
| 80 | 988 | 987 |
| 85 | 997 | 996 |
| 90 | 1006 | 1011 |
| 95 | 1014 | 1015 |
| 100 | 1022 | 1020 |
| 105 | 1029 | 1032 |
| 110 | 1036 | 1037 |
| 115 | 1043 | 1038 |
| 120 | 1049 | 1050 |

**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 | 30 | 31 | 31 | 30 | 29 | 30 |
| 4 | 30 | 31 | 31 | 30 | 27 | 30 |
| 8 | 31 | 46 | 31 | 30 | 0 | 28 |
| 12 | 42 | 84 | 41 | 38 | 86 | 58 |
| 16 | 53 | 86 | 53 | 50 | 59 | 60 |
| 20 | 59 | 85 | 78 | 59 | 64 | 69 |
| 24 | 61 | 82 | 79 | 63 | 67 | 71 |
| 28 | 60 | 78 | 73 | 64 | 66 | 68 |
| 32 | 59 | 73 | 68 | 63 | 64 | 65 |
| 36 | 57 | 68 | 64 | 62 | 62 | 63 |
| 40 | 56 | 66 | 61 | 61 | 60 | 61 |
| 44 | 55 | 69 | 59 | 60 | 59 | 60 |
| 48 | 54 | 71 | 58 | 60 | 58 | 60 |
| 52 | 55 | 71 | 58 | 61 | 58 | 61 |
| 56 | 56 | 72 | 59 | 62 | 60 | 62 |
| 60 | 59 | 78 | 62 | 65 | 62 | 65 |
| 64 | 63 | 93 | 66 | 67 | 65 | 71 |
| 68 | 67 | 111 | 70 | 70 | 68 | 77 |
| 72 | 72 | 117 | 74 | 72 | 71 | 81 |
| 76 | 77 | 120 | 78 | 74 | 74 | 85 |
| 80 | 84 | 124 | 83 | 76 | 79 | 89 |
| 84 | 92 | 130 | 90 | 77 | 84 | 95 |
| 88 | 99 | 140 | 101 | 77 | 90 | 101 |
| 92 | 107 | 157 | 108 | 78 | 96 | 109 |
| 96 | 114 | 198 | 115 | 78 | 100 | 121 |
| 100 | 118 | 267 | 120 | 80 | 105 | 138 |
| 104 | 121 | 314 | 130 | 86 | 109 | 152 |
| 108 | 124 | 319 | 136 | 93 | 113 | 157 |
| 112 | 125 | 311 | 137 | 100 | 116 | 158 |
| 116 | 127 | 297 | 147 | 106 | 118 | 159 |
| 120 | 128 | 282 | 153 | 110 | 120 | 159 |

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**Unexposed surface temperatures**

| Time Mins | T6 (°C) | T7 (°C) | T8 (°C) | T9 (°C) | Environment temperature (°C) |
|---|---|---|---|---|---|
| 0 | 29 | 29 | 29 | 28 | 29 |
| 4 | 29 | 31 | 30 | 28 | 29 |
| 8 | 52 | 61 | 79 | 28 | 30 |
| 12 | 87 | 85 | 92 | 46 | 30 |
| 16 | 88 | 94 | 99 | 107 | 30 |
| 20 | 90 | 111 | 115 | 118 | 30 |
| 24 | 98 | 125 | 124 | 126 | 30 |
| 28 | 106 | 132 | 133 | 132 | 31 |
| 32 | 114 | 139 | 148 | 138 | 31 |
| 36 | 122 | 147 | 162 | 145 | 31 |
| 40 | 130 | 156 | 205 | 154 | 31 |
| 44 | 138 | 168 | 260 | 164 | 31 |
| 48 | 147 | 180 | 312 | 174 | 31 |
| 52 | 158 | 198 | 326 | 186 | 31 |
| 53 | 162 | 203 | 327 | 188 | 31 |
| 54 | 166 | 209 | 328 | 191 | 31 |
| 55 | 170 | 212 | 329 | 192 | 31 |
| 60 | 204 | 230 | 332 | 204 | 31 |
| 64 | 232 | 250 | 335 | 216 | 31 |
| 68 | 254 | 270 | 341 | 235 | 31 |
| 72 | 285 | 287 | 345 | 259 | 32 |
| 76 | 306 | 298 | 348 | 283 | 32 |
| 80 | 311 | 306 | 351 | 300 | 32 |
| 84 | 315 | 313 | 354 | 309 | 32 |
| 88 | 318 | / | 358 | 317 | 32 |
| 92 | 321 | / | 361 | 322 | 32 |
| 96 | 324 | / | 367 | 326 | 32 |
| 100 | 328 | / | 375 | 330 | 32 |
| 104 | 331 | / | 382 | 337 | 32 |
| 108 | 334 | / | 387 | 344 | 32 |
| 112 | 337 | / | 390 | 354 | 32 |
| 116 | 337 | / | 396 | 368 | 32 |
| 120 | 334 | / | 403 | 381 | 33 |

Note: 1. T8 is not considered for being heated directly by gas.
2. T7 falls down at 86 min.

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**Horizontal Deflection (Positive values indicate movement into the furnace)**

| Time Mins | D1 (mm) | D2 (mm) |
|---|---|---|
| 0 | 0 | 0 |
| 10 | 41 | 38 |
| 20 | 55 | 40 |
| 30 | 80 | 44 |
| 40 | 95 | 45 |
| 50 | 103 | 47 |
| 70 | 115 | 50 |
| 80 | 125 | 50 |
| 105 | 130 | 50 |

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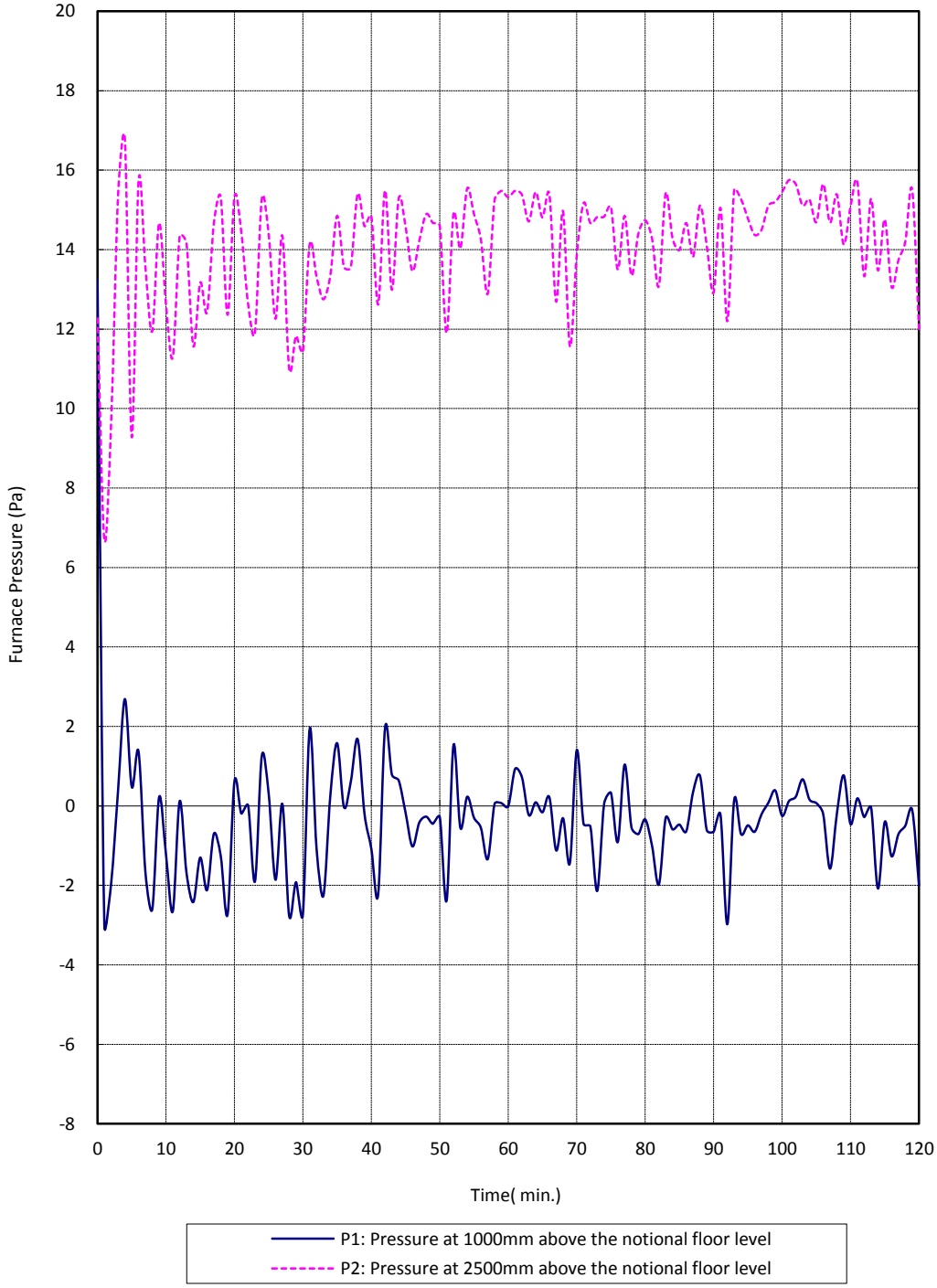
**Furnace pressure**



## 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 31 Minutes**

**Photo No. 4**
**Unexposed Side after 102 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 |