

TEST REPORT



TEST REPORT NO.: R08K26_rev.1
DATE OF ISSUE: 20 April 2010

Test Sponsors: KingTee (Hong Kong) Building Materials Industrial Company Limited
Manufacturer: Yichun KingTee Building Material Company Limited
Address of Test Sponsors: Room 1905, Nan Fung Centre, 264-298 Castle Peak Road, Tsuen Wan, Hong Kong.
Address of Manufacturer: Central Boardway, Medical Industry Park, Yuanzhou District, Yichun, P.R.C.
Identification of Test Item: Q8J03 - Insulated 'HAWK' Board Partition System
Test Method: Fire resistance test conducted in accordance with BS 476: Part 22: 1987
Date of Test: 30 October 2008
Ambient temperature at the time of testing: 29 °C

APPROVED SIGNATORY: _____

Ir Dr. Andrew So Kwok Wai, MHKIE (Fire)



DATE: 20 APR 2010

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Fire resistance test conducted in accordance with BS 476: Part 22: 1987, Section 5, insulated 'HAWK' board partition system.

1. Summary

A specimen of 3,000 mm wide by 3,000 mm high by 88 mm thick fully insulated 'HAWK' board partition system had been subjected to a test in accordance with BS 476: Part 22: 1987, Section 5, in order to determine its fire resistance performance. As requested by the sponsor, the specimen was constructed and mounted within a concrete lined specimen holder by the test sponsor and the fixing details were shown in the client's drawings (see the appendix). The specimen was symmetrical.

The specimen was comprised of one layer of 9 mm thick 'HAWK' board mounted on each side of galvanized steel frame with 75 mm thick 'CSR' rockwool was sandwiched in between the boards. The framework consisted of vertical studs, head and bottom runners (refer to client drawings). All boards were fixed to the framework by M3.5 by 25 mm long self-tapping screws at 200-250 mm nominal centres along all board edges.

The specimen satisfied the performance requirements specified in Section 5 of BS 476: Part 22: 1987, for the following periods:

Insulation: 122 Minutes
Integrity: 132 Minutes (no failure)

The test was discontinued after a period of 132 minutes.

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2. Introduction

The specimen was tested in accordance with Section 5 of BS 476: Part 22: 1987, 'Methods for determination of the fire resistance of non-loadbearing elements of construction':

This test report should be read in conjunction with the BS 476: Part 20: 1987, 'Methods for determination of the fire resistance of elements of construction (general principles)'.
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The specimen was mounted by the test sponsor. The test was led by Ir Dr. Yuen Sai-wing and was witnessed by Mr. Sze Po Tak, the representative of the test sponsor.



3. Test Specimen Construction

The specimen was installed into a concrete specimen holder to form the test construction. A description of the test construction is presented in the appendix, together with the mock up drawings for the test.

4. Location of Testing Laboratory

New & High-tech Industrial Development Zone of Dawang, Zhaoqing City, Guangdong Province, China.

5. Equipment

Equipment includes:

Nine (9) thermocouples to monitor the temperature of the furnace, which were kept at 100 mm from the face of the specimen (see Figure 1).

Fifteen (15) thermocouples to monitor for the temperature of the unexposed face of the specimen (see Figure 2).

A roving thermocouple to measure temperature on hot spots of unexposed surface.

A micro-manometer provided to monitor the furnace pressure.

Cotton pads, 6 mm and 25 mm gap gauges.

A steel ruler relative to taut wires to monitor the lateral deflection of the specimen.

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6. Test Procedures

The test was conducted in accordance with the procedures specified in Section 5 of BS 476: Part 22: 1987. The ambient temperature of the test area during the test was measured. After the first 10 minutes of the test, the furnace pressure was maintained at 0 ± 2 Pa relative to atmosphere, at 1,000 mm from the notional floor level.

The furnace was monitored by nine (9) thermocouples so that the mean furnace temperature complied with the requirements of Clause 3.1 of BS 476: Part 20: 1987.

The temperature of the unexposed face was monitored by means of fifteen (15) thermocouples fixed to the unexposed surface for monitoring both the mean and maximum temperatures (see Figure 2 for the locations and reference numbers of the thermocouples). Five (5) of them (S1-S5) were the key thermocouples for both the mean and maximum temperatures of the unexposed surface of specimen and the rest (S6-S15) were fixed to the other location of the specimen for maximum temperature of the unexposed surface of specimen. The mean and maximum temperatures were recorded.

The cotton pads and gap gauges were used, if considered appropriate, to determine compliance with the integrity criterion of the standard. The occurrence of sustained flaming on the unexposed surface was monitored to determine compliance with this criterion.

The lateral deflection of the specimen was measured by steel ruler and recorded.

7. Test Data and Information

The ambient temperature of the test area during the test was 29 °C.

The furnace was controlled so that the mean furnace temperature complied with the requirements of Clause 3.1 of BS 476: Part 20: 1987. The temperatures recorded are shown graphically in Figure 4.

The mean and maximum temperatures of the unexposed surface of the specimen are shown graphically in Figure 5.

A summary of the observations made on the general behaviour of the specimen is given in the appendix.

The deflections obtained are summarized in Table 1.

The test was discontinued after a period of 132 minutes.

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8. Results

When tested in accordance with Section 5 of BS 476: Part 22: 1987, the requirements of the standard were satisfied for the following periods:

Insulation: 122 Minutes
Integrity: 132 Minutes (no failure)

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Insulation - It is required that the mean temperature rise of the unexposed surface shall not be greater than 140 °C and that maximum temperature rise shall not be greater than 180 °C. Insulation failure also occurs simultaneously with integrity failure.

The 140 °C rise of the mean temperature of the unexposed surface did not reach during the test. The 180 °C rise of the maximum temperature of the unexposed surface was reached after a heating period of 122 minutes measured by thermocouple S7. The maximum temperature rise was 203 °C obtained at S7 (refer to figure 2) after a heating period of 132 minutes.

Integrity - It is required that there is no collapse for the specimen, no sustained flaming on the unexposed surface and no loss of impermeability.

The specimen met the integrity requirements after a heating period of 132 minutes.

9. Limitations

The results relate only to the behaviour of the specimen of the element of construction under the particular conditions of the test. They are not intended to be the sole criteria for assessing the potential fire performance of the element in use nor do they reflect the actual behaviour in fires (see Clause 12 of BS 476: Part 20: 1987). Application of the results to the specimen of different dimensions or supported other than by a concrete wall or incorporating different components shall be the subject of a design appraisal.



Appendix



Photo 1 - The unexposed face of the specimen before the test.

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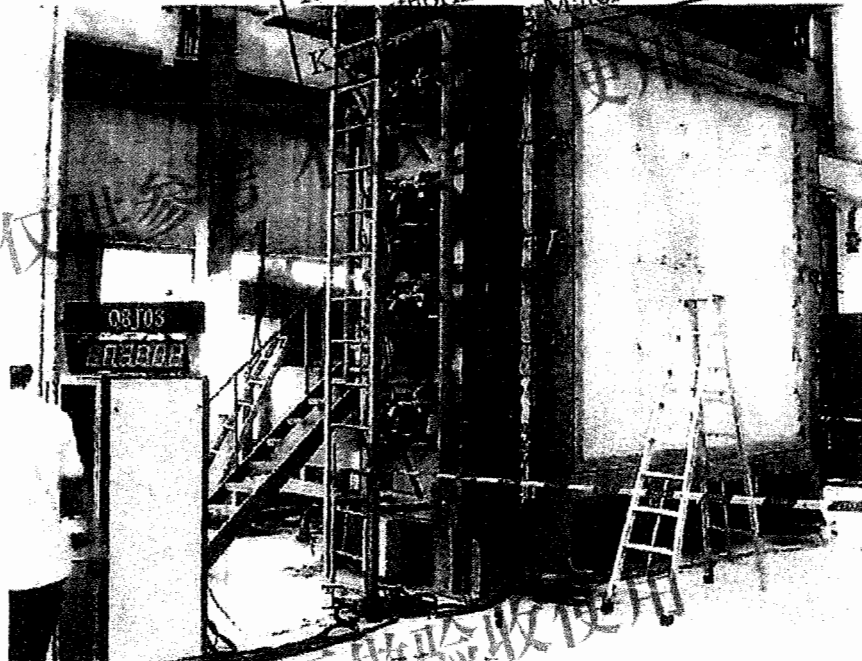


Photo 2 - The unexposed face of the specimen after the 30-minute heating period.

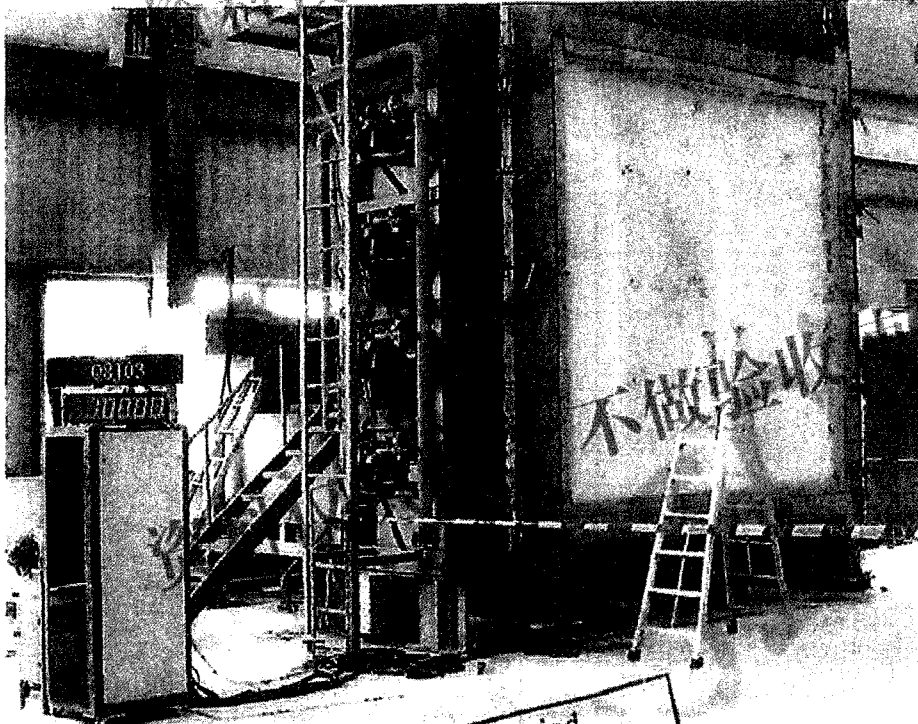


Photo 3 - The unexposed face of the specimen after the 60-minute heating period.

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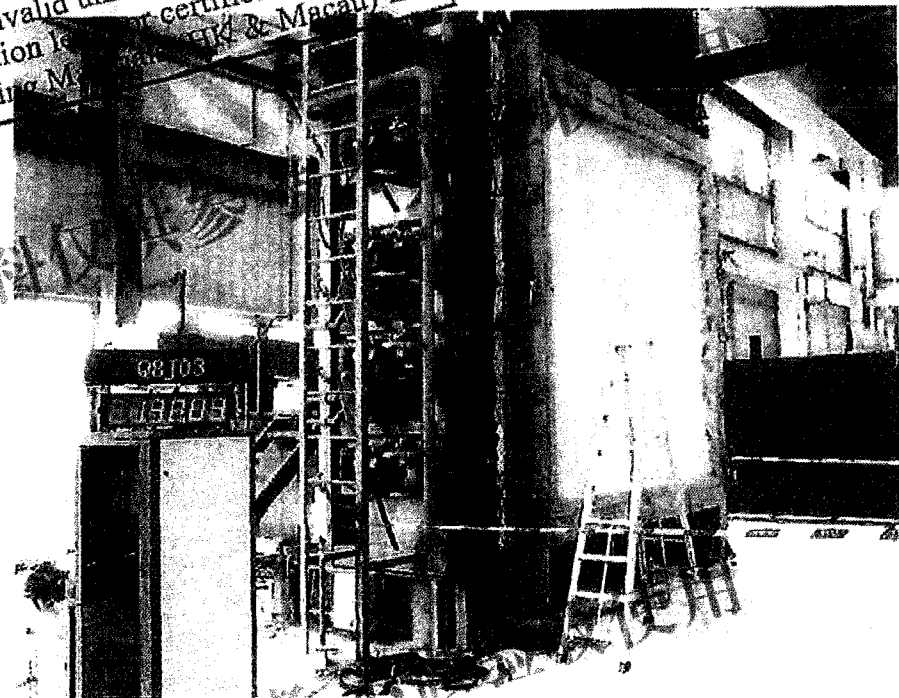


Photo 4 - The unexposed face of the specimen after the 90-minute heating period.

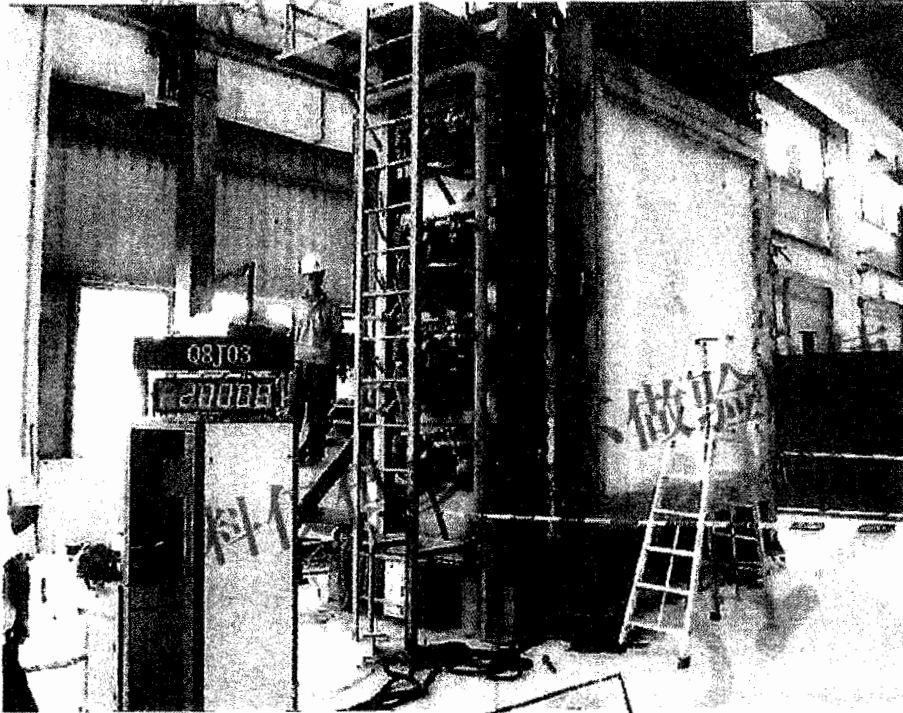


Photo 5 - The unexposed face of the specimen after the 120-minute heating period.

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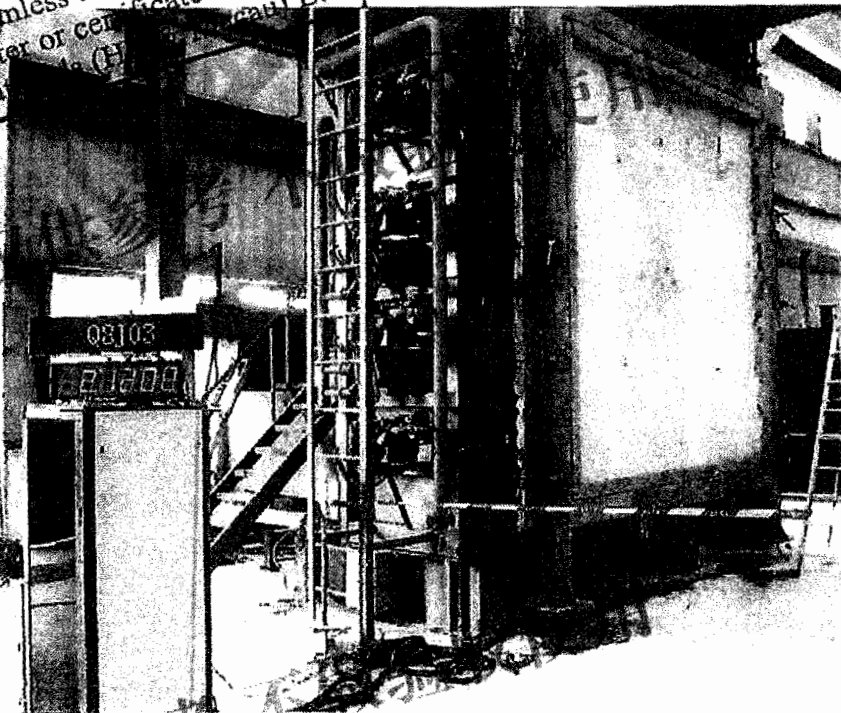


Photo 6 - The unexposed surface after the test.

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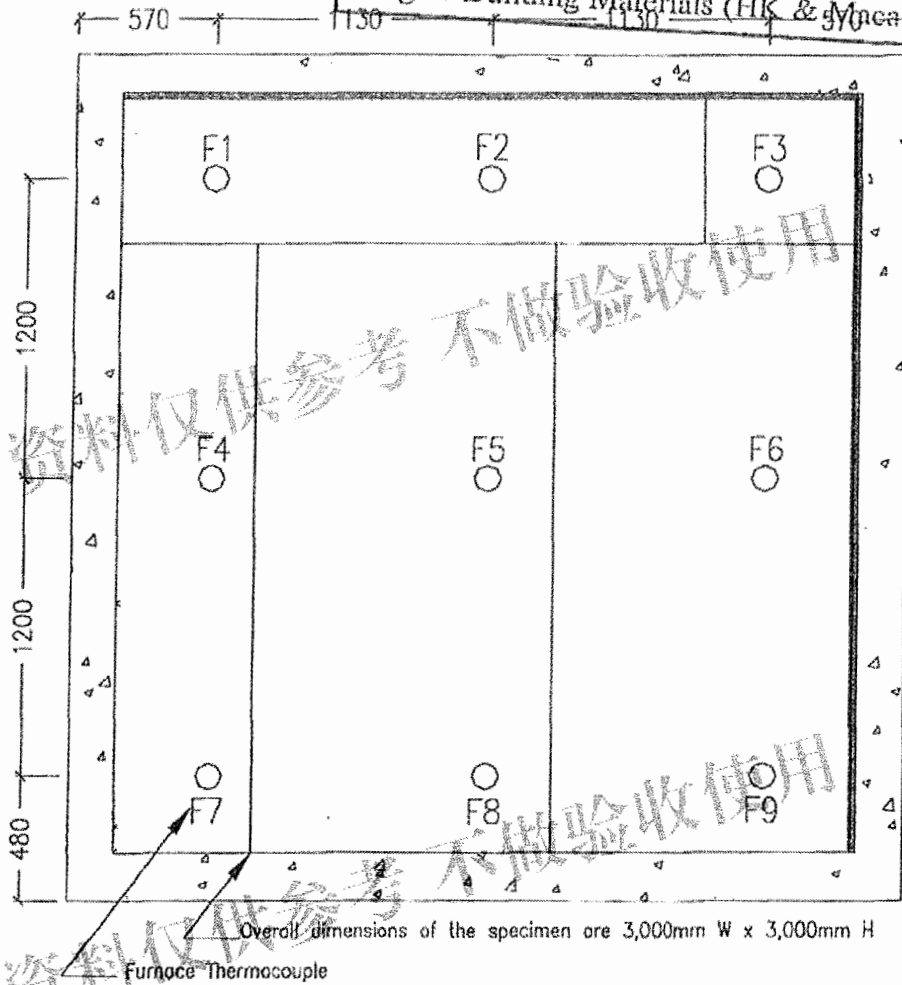


Figure 1 - Locations and reference number of furnace thermocouple



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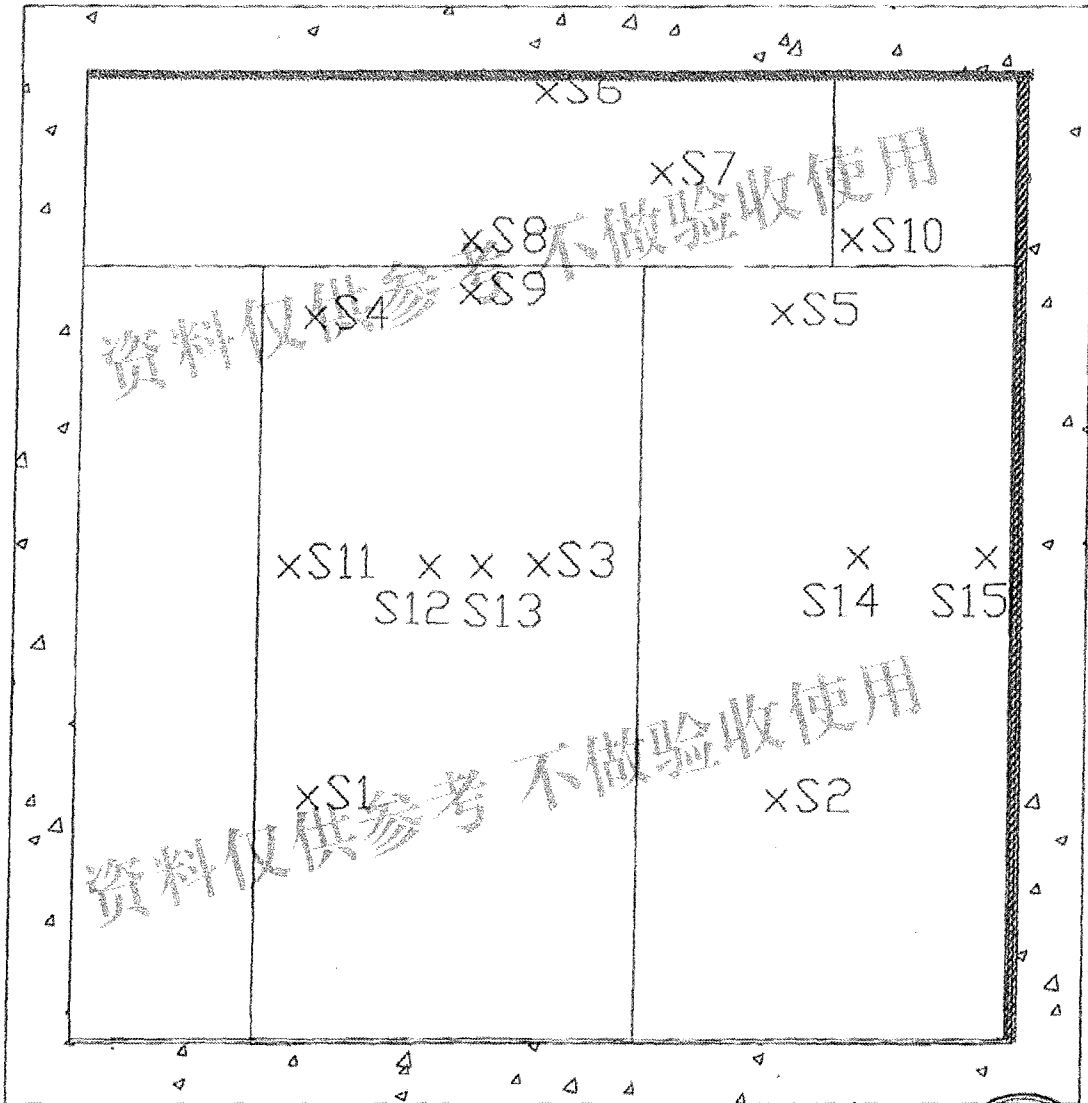


Figure 2 – Locations and reference number of thermocouples to monitor the temperature of unexposed surface of the specimen.



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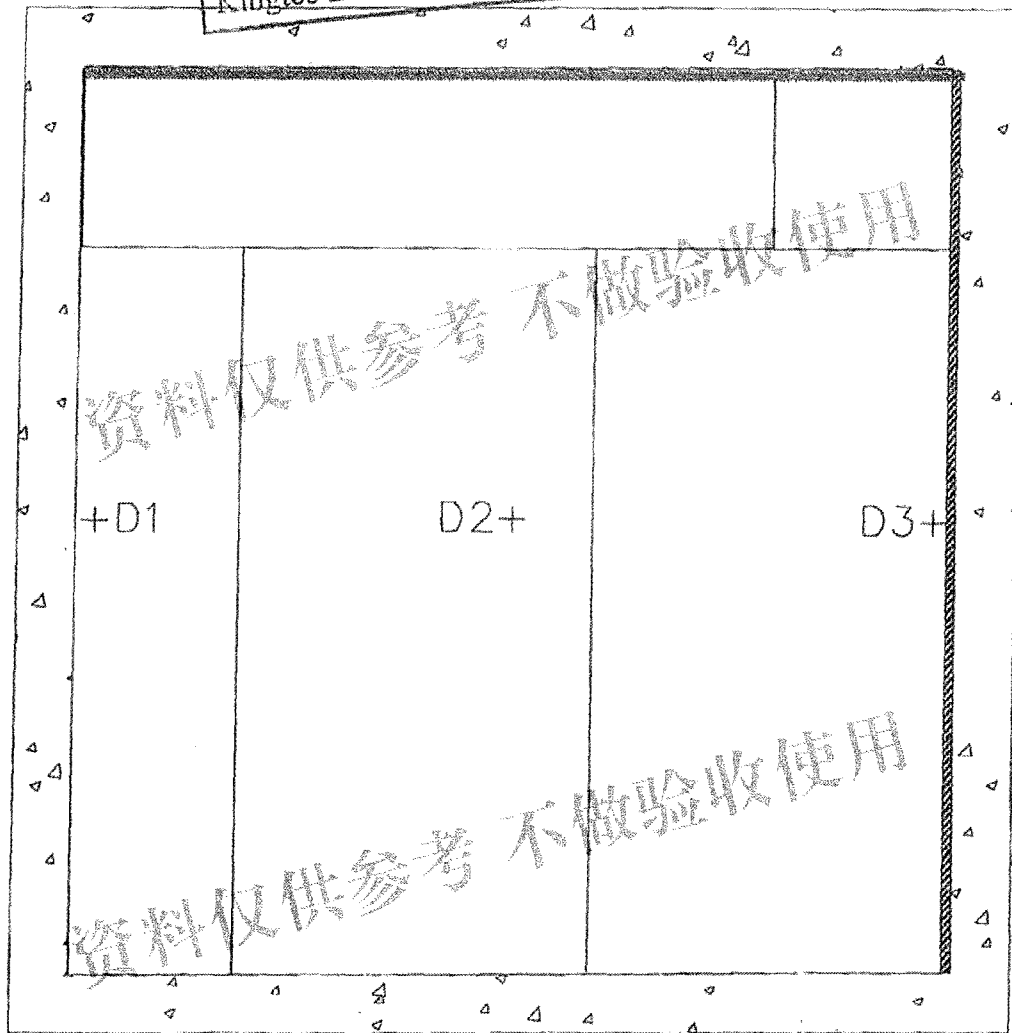


Figure 3 – Locations and reference for measuring displacement of the specimen



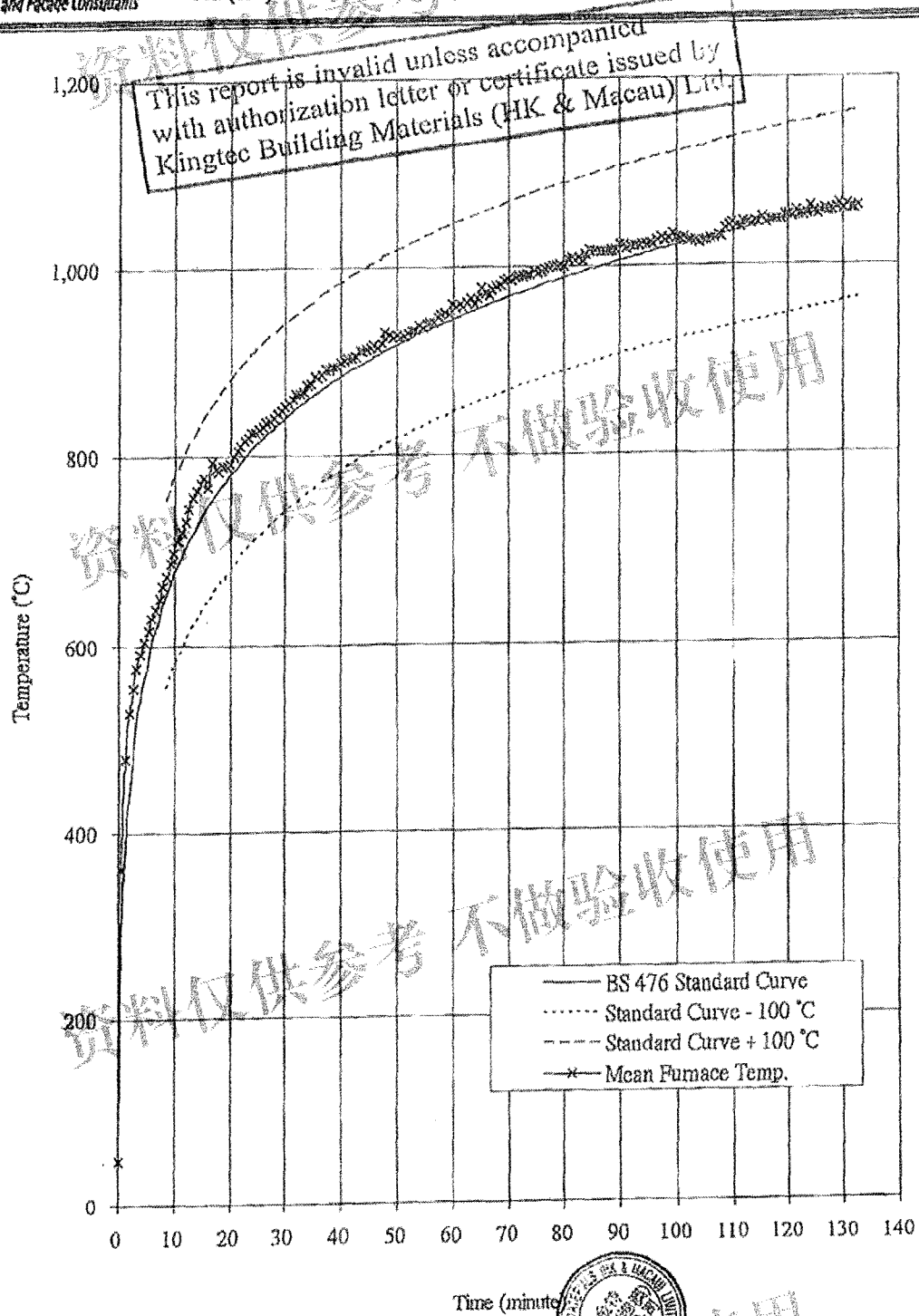


Figure 4 - Mean furnace temperatures.

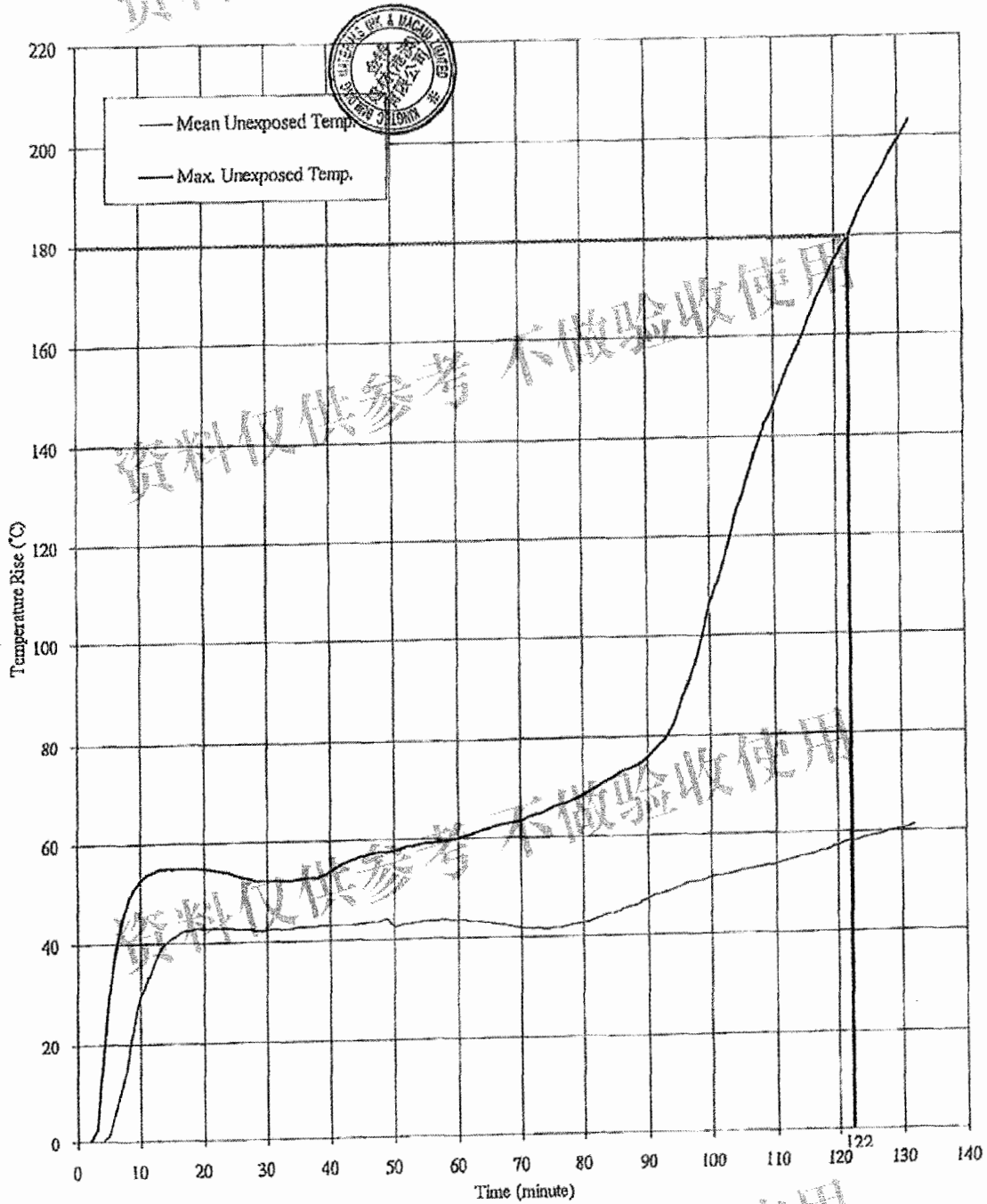


Figure 5 - Temperatures of unexposed surface

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Observation



Time (min.sec)	Exposed (E) or Unexposed (U)	Observation
00.00	-	Test started.
07.20	U	Smoke started releasing at top left corner of the specimen.
09.13	U	Water vapour was observed at top left corner of the specimen.
12.50	U	Smoke release increased from top left corner of the specimen.
20.55	U	Smoke still released from top left corner of the specimen.
27.29	U	No significant change was observed.
30.22	U	Crack marks developed on the middle portion of the specimen and deformation of the specimen was observed.
30.00	U	The specimen satisfied the integrity requirement performances.
32.29	U	Water vapour was observed at the bottom corner of the specimen.
34.27	E	Smoke release decreased from top left corner of the specimen.
38.22	U	No smoke released from the top left corner of the specimen.
60.00	U	The specimen satisfied the integrity requirement performances.
66.14	U	Further deformation on the specimen was observed.
85.23	U	Water vapour was observed at bottom right corner of the specimen.
90.00	U	The specimen satisfied the integrity requirement performances.
107.00	U	More cracks developed at the specimen.
120.00	U	The specimen satisfied the integrity requirement performances.
122.00	U	Further deformation on the specimen was observed.
132.00	U	The specimen satisfied the integrity requirement performances. The test was terminated as requested by client.

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Lateral deflections

Table 1

Lateral deflections of the specimen during the test, as viewed from the unexposed face



Time (min) \ Location	0	15	30	45	60	75	90	105	120
D1	0	-2	-2	-1	1	2	1	-2	2
D2	0	0	16	26	29	32	33	32	30
D3	0	0	2	4	5	7	6	7	29

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Positive deflections indicate movement towards the furnace (see Figure 3 for the locations). The maximum deflection occurred at D2 is 33 mm moving towards the furnace at a heating period of 90 minutes.

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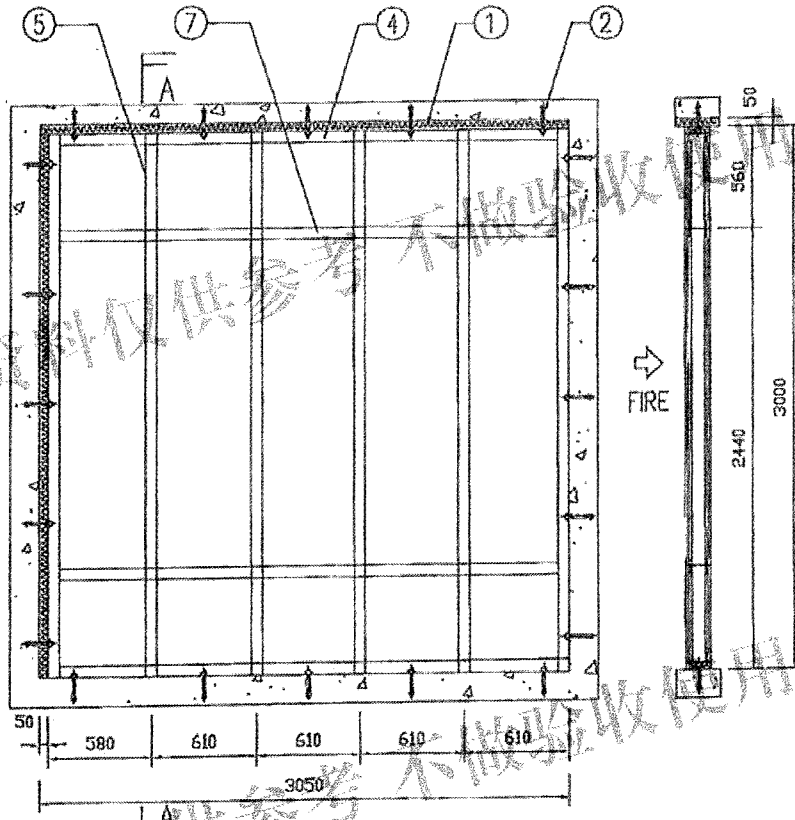
Information from client



Item	Description
1	<p>Lining</p> <p>Brand : KingTec.</p> <p>Description : 'HAWK' board.</p> <p>Thickness : 9 mm.</p> <p>Density (nominal) : 1.0-1.25g/m³ (not measured by laboratory).</p> <p>Fixing Method : Refer to client's drawing.</p>
2	<p>Steel Frame (Top and bottom channel)</p> <p>Overall dimensions : 75 mm by 40 mm.</p> <p>Thickness of channel : 0.6 mm.</p> <p>Material : Galvanized mild steel.</p> <p>Fixing method : Refer to client's drawing.</p>
3	<p>Steel Frame (Studs)</p> <p>Overall dimensions : 75 mm by 50 mm.</p> <p>Thickness of stud : 0.6 mm.</p> <p>Material : Galvanized mild steel.</p> <p>Spacing : 580 mm or 610 mm (refer to client's drawing).</p> <p>Fixing method : Refer to client's drawing.</p>
4	<p>Plaster</p> <p>Brand : 拉法基石膏膩子</p> <p>Applied location : Joints of all linings.</p>
5	<p>Rockwool</p> <p>Brand : CSR.</p> <p>Nominal thickness : 75 mm.</p> <p>Density : 100 kg/m³ (measured by laboratory)</p>

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Drawings from client



轻钢龙骨排布图

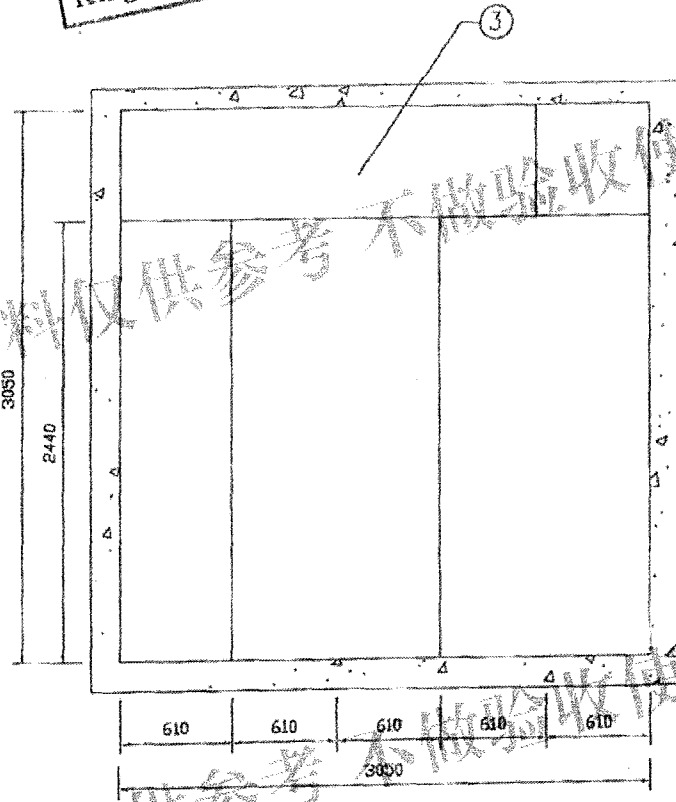
A-A

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- ① 岩棉 (100kg/m³ 75mm厚)
- ② 膨胀螺栓 (M6X100mm)
- ③ 火克板 (2440 X 1220 X 9mm)
- ④ U75X40X0.6mm龙骨
- ⑤ C75X50X0.6mm龙骨
- ⑥ 自攻螺钉 3.5X25mm 间距 200-250mm
- ⑦ 50X0.6mm镀锌铁皮条

FIGURE 1

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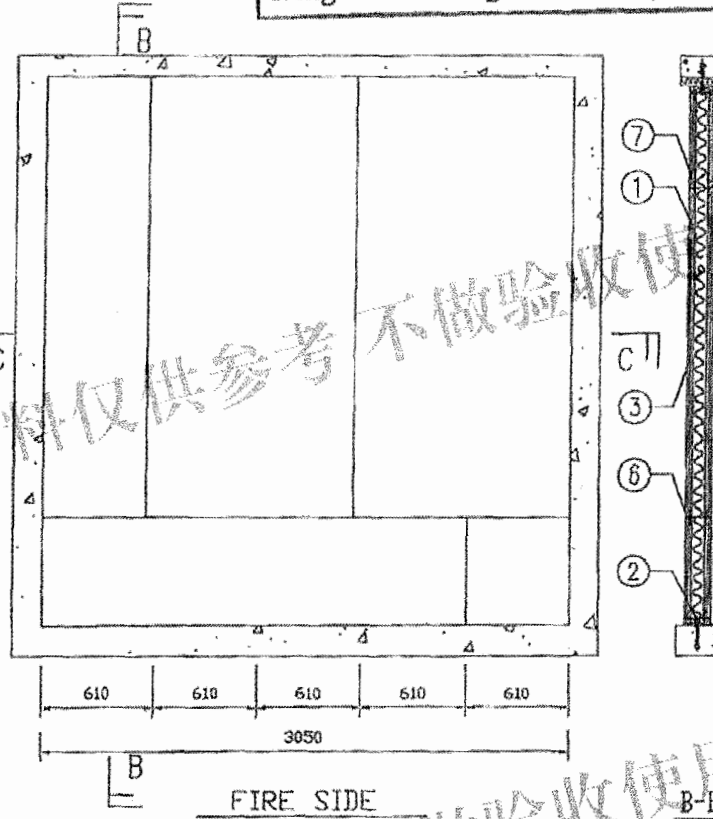
NON-FIRE SIDE

- ① 岩棉 (100kg/m³ 75mm厚)
- ② 膨胀螺栓 (M6X100mm)
- ③ 火克板 (2440 X 1220 X 9mm)
- ④ U75X40X0.6 mm龙骨
- ⑤ C75X50X0.6 mm龙骨
- ⑥ 自攻螺钉 3.5X25mm 间距200-250mm
- ⑦ 50X0.6 mm镀锌铁皮条



FIGURE

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- ③ 火克板 (2440 X 1220 X 9mm)
- ④ U75X40X0.6 mm龙骨
- ⑤ C75X50X0.6 mm龙骨
- ⑥ 自攻螺钉 3.5X25mm 间距: 200-250mm
- ⑦ 50X0.6 mm 镀锌铁皮条



- End of report -