CHINA UNION BUILDING MATERIALS

We believe that passive fire protection is a crucial element of building safety that can save lives and prevent property damage.

We're provide wide range of fireproof board for building.

KINGTEC
HAWK PAN BOARD

2-hours Fire Rated Board Partition System

WE BUILD SAFE SPACES FOR EVERYONE.

Our fireproof board complies with BS and BS EN standards.

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INTRODUCTION

Depending on its location and function within a building, a wall, ceiling and E&M enclosure may need to meet various requirements during a fire. Fire-resisting walls that partition spaces and enclose compartments must act as a barrier to prevent the spread of fire from either side. Therefore, it is essential for these walls to meet all relevant criteria: integrity, insulation, and, if applicable, load-bearing capacity; all from both sides for the specified fire resistance duration.

Fire Compartmentation

Fire-resistant partitions serve as a means of compartmentalization, effectively separating various fire hazards.

Fire safe exit passage ways

In a fire, exit routes must be fire safe and fully compartmented to prevent fire spread. It's crucial to limit thermal heat transfer in walls to ensure a safe environment for occupants escaping.

Fire resistant party walls and Ceiling

One cannot control the fire risks posed by neighbors who share a common wall delineating different properties. Fire-resistant party walls and ceiling are essential in preventing the spread of fire from one unit to an adjacent one, thereby enhancing safety for all occupants.

INTRODUCTION

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Hawk Pan calcium silicate fire board systems are fire-resistant, lightweight, clean, and easy to install, making them ideal for a variety of building projects.

These products provide exceptional thermal insulation and fire protection across numerous applications. They are particularly well-suited for internal partitions, ceilings, and electrical and mechanical enclosures, especially within drywall construction.

In addition to protecting lives and assets, Hawk Pan help conserve space and energy, reduce CO2 emissions, and enhance overall efficiency.

Designed to safeguard timber, concrete, or steel structures, these boards can also function as self-supporting elements, such as partition walls and ceilings. With their aesthetically pleasing finish, they serve as an all-in-one architectural feature that facilitates quick construction while optimizing space.

Manufactures Certification

Hawk Pan under a Quality Management System compliant with the International Standard ISO 9001:2008.

TESTING AND THIRO-PARTY CERTIFICATION

Hawk Pan calcium silicate board systems have been rigorously tested and evaluated to comply with the following standards:

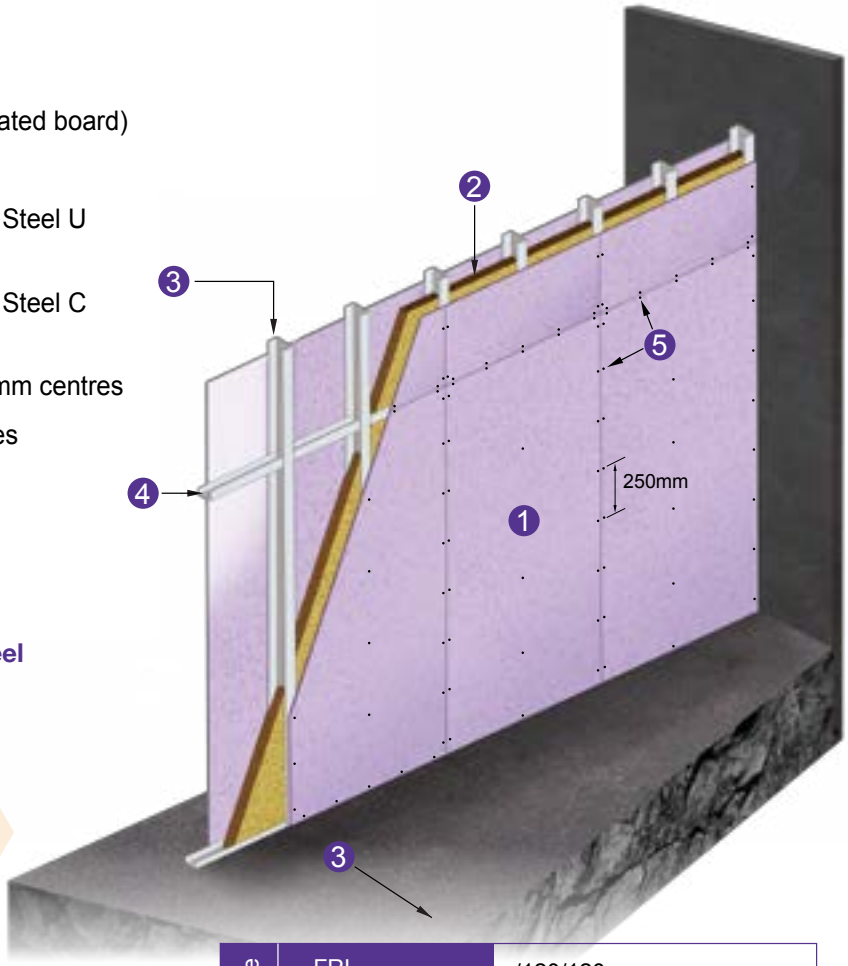
BS 476: Part 4, 6 & 7
BS 476: Part 20: 1987
BS 476: Part 22: 1987

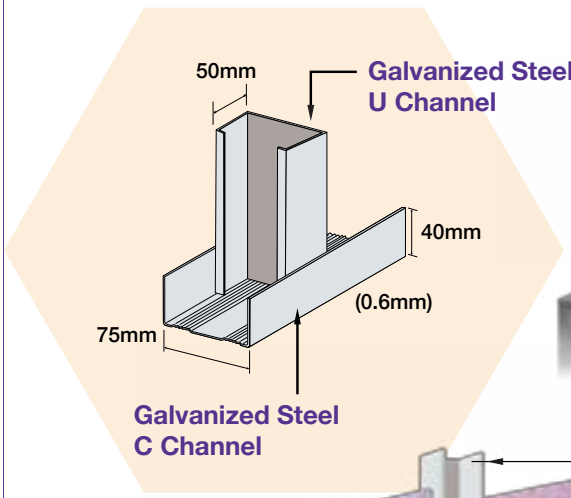
Key Benefits of Hawk Pan:

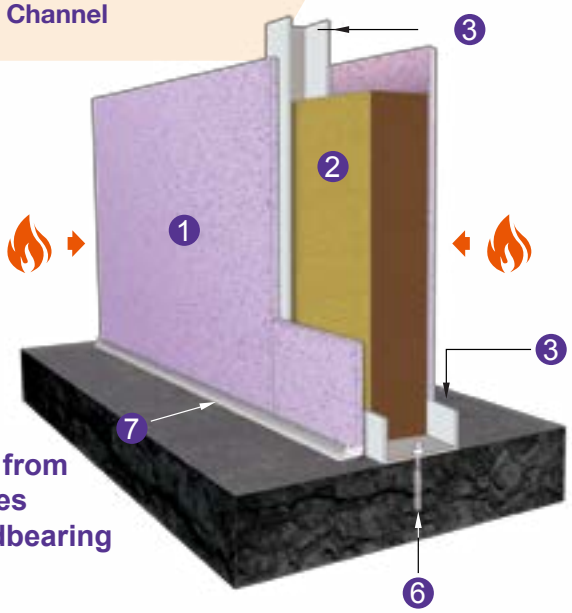
- Fire-resistant
- Extremely low thermal conductivity
- Excellent mechanical integrity
- Minimal shrinkage
- Non-combustible
- Corrosion-resistant
- Impact-resistant
- Moisture-resistant
- Low to no maintenance required
- Environmentally friendly and safe
- Compliant with international fire protection standards
- High thermal resistance and stability up to 1,100 degrees Celsius

2 - hours fire insulation and integrity with fiew on either side

1. One layer of 9mm thick HAWK PAN (fire rated board)
2. Rock wool 75mm x 100kg/m^3
3. 75mm x 50mm x 0.6mm thick Galvanized Steel U Channel at nominal 610mm
4. 75mm x 40mm x 0.6mm thick Galvanized Steel C Channel
5. Self-tapping screws M3.5 at nominal 250mm centres
6. M6 Anchor bolts at nominal 500mm centres
7. Firestop Acrylic Sealant







Fire risk from both sides Non loadbearing partition

Fire resistance	FRL	-/120/120
	Standard	BS 476: Part 20: 1987 BS 476: Part 22: 1987
	Approval	R08K26_rev.1 RED
Acousitc	Standard #STC	ASTM E90-09, ASTM E413-10 45
	Standard #RW	ISO140: Part 1&3: 1996 48 Db
	Predicted assessment	(A + A)*L 20th August 2015
Construction	Maximum height	6000mm
	Partition length	Unlimited
	Partition thickness	93mm
	Partition mass	33kg/m^2

Basic knowledge

Sound is the vibration of an object that is felt through the human auditory organ. Acoustics involves many disciplines such as natural science, psychology, and art.

The normal hearing frequency range of the human ear is 20 - 20KHz, 5OOHz and below is low frequency, 500Hz - 2000Hz is medium frequency, and 2000Hz is high frequency. The sound level is used to describe the size of the sound, which is calculated by adding the sound of each frequency. Generally, the A sound level is used. The hearing sound level range of the human ear is 0-120dB. Below 15dB is an extremely quiet environment, 25-30dB is a quiet environment, 30-35dB is a quiet environment, and above 40-50dB is a noisy environment.

Noise damages hearing, affects health, and interferes with work and normal life, so it should be controlled.

The sound insulation of a wall is an indicator of the wall's ability to isolate noise. The larger the value, the better the sound insulation effect.

2.Principle of air sound insulation

Sound is the vibration of an object that is felt through the human auditory organ. Acoustics involves many disciplines such as natural science, psychology, and art.

The normal hearing frequency range of the human ear is 20 - 20KHz, 5OOHz and below is low frequency, 500Hz - 2000Hz is medium frequency, and 2000Hz is high frequency. The sound level is used to describe the size of the sound, which is calculated by adding the sound of each frequency. Generally, the A sound level is used. The hearing sound level range of the human ear is 0-120dB. Below 15dB is an extremely quiet environment, 25-30dB is a quiet environment, 30-35dB is a quiet environment, and above 40-50dB is a noisy environment.

Noise damages hearing, affects health, and interferes with work and normal life, so it should be controlled.

The sound insulation of a wall is an indicator of the wall's ability to isolate noise. The larger the value, the better the sound insulation effect.

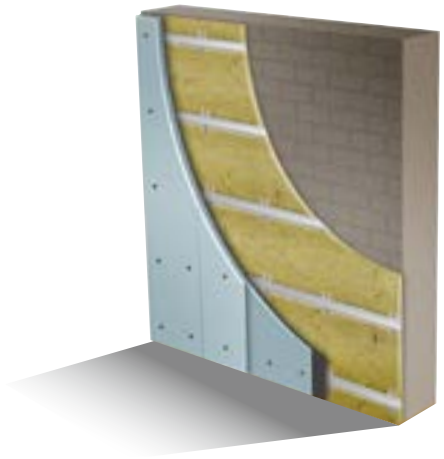
3. Inspection standards

The air sound insulation of KT partition walls complies with the "Building Sound Insulation Evaluation Standard" (GB/T19889.3-2005)

KT partition wall air sound insulation testing complies with the "Sound Insulation Measurement of Acoustic Buildings and Building Components" (GB/T19889.3-2005)

Sound insulation prediction

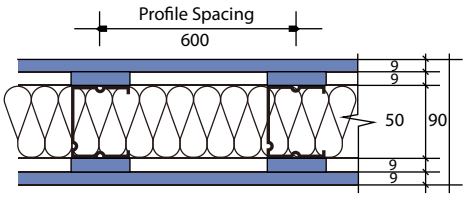
Based on the accumulation of a large number of sound insulation test databases, dry wall sound insulation prediction is carried out as a design guide. The relationship between the actual sound insulation of the wall on site and the laboratory test value is complicated by influencing factors (such as the influence of lateral sound transmission, etc.). In the design, when using laboratory test data, a margin should be left based on the actual situation.



Airborne sound insulation standards

Building Type	Partition area	Calculate sound insulation			
		Special	Level 1	Level 2	Level 3
Residential	Resident/Resident (partition wall)	-	≧50	≧45	≧40
SCHOOL	Classroom/Classroom	-	≧50	≧45	≧40
	Ward/ward	-	≧45	≧40	≧35
	Sick room/noise room	-	≧50	≧50	≧45
hospital	Operating room/ward	-	≧50	≧45	≧40
	Operating room/noise room	-	≧50	≧50	≧45
	Audiometry Room/Other Rooms	-	≧50		
Hotel	Guest Rooms/Guest Rooms	≧50	≧45	≧40	≧40
	Guest Rooms/Corridor (including door)	≧40	≧40	≧35	≧30

STC 45

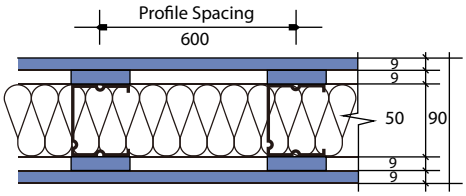


Fire-rated Partition System

The partition system was constructed in the test opening between Receiving Room and Source Room and consisted of:

Face layer : 9mm Klngtec Hawk Pan calcium silicate board (9kg/m²)
Base layer : 9mm x 50mm Klngtec Hawk Pan calcium silicate fillet (9kg/m²)
Metal Stud : 50mm Steel Stud
Acoustic Infill : 50mm Rockwool (5kg/m²)
Base layer : 9mm x 50mm Klngtec Hawk Pan calcium silicate fillet (9kg/m²)
Face layer : 9mm Kingtec Hawk Pan calcium silicate board (9kg/m²)

STC 48



Fire-rated Partition System

The partition system was constructed in the test opening between Receiving Room and Source Room and consisted of:

Face layer : 9mm Klngtec Hawk Pan calcium silicate board (9kg/m²)
Base layer : 9mm x 50mm Klngtec Hawk Pan calcium silicate fillet (9kg/m²)
Metal Stud : 50mm Steel Stud
Acoustic Infill : 50mm Rockwool (5kg/m²)
Base layer : 9mm x 50mm Klngtec Hawk Pan calcium silicate fillet (9kg/m²)
Face layer : 9mm Kingtec Hawk Pan calcium silicate board (9kg/m²)

STC 50A

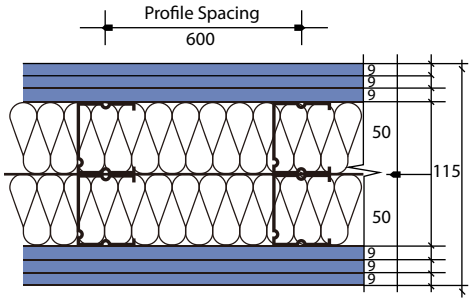


Figure 3.1: The proposed configuration of modified partition system Type A.

Type A:
The 150mm thick partition system compooeo of totally four layers of 12mm thick Kingtec Hawk Pan calcium silicate board with nominal density of 1000kg/m³, 2 x 50mm thick steel stud (at 600mm o.c.) with containing 50mm thick rockwool insulation (density: 100kg/m³).All gaps are fully caulked.

Face layer	: 12mm Klngtec Hawk Pan calcium silicate board (12kg/m²)
Base layer	: 12mm Klngtec Hawk Pan calcium silicate board (12kg/m²)
Metal Stud	: 2 x 50mm Steel Stud
Acoustic Infill	: 2 x 50mm Rockwool (5kg/m²)
Base layer	: 12mm Klngtec Hawk Pan calcium silicate board (12kg/m²)
Face layer	: 12mm Klngtec Hawk Pan calcium silicate board (12kg/m²)

STC 50B

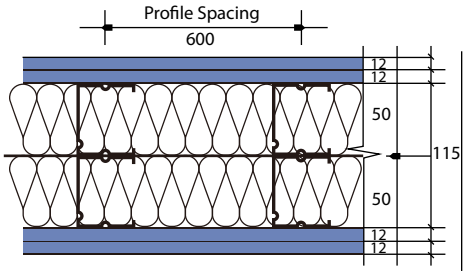
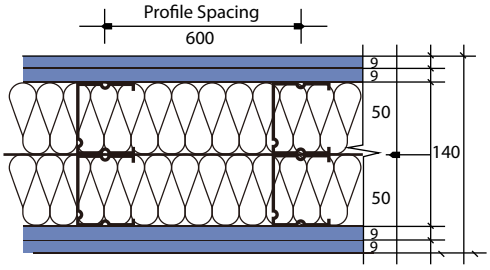


Figure 3.2: The proposed configuration of modified partition system Type B.

Type B:
The 150mm thick partition system compooeo of totally four layers of 12mm thick Kingtec Hawk Pan calcium silicate board with nominal density of 1000kg/m³, 2 x 50mm thick steel stud (at 600mm o.c.) with containing 50mm thick rockwool insulation (density: 100kg/m³).All gaps are fully caulked.

Face layer	: 12mm Klngtec Hawk Pan calcium silicate board (12kg/m²)
Base layer	: 12mm Klngtec Hawk Pan calcium silicate board (12kg/m²)
Metal Stud	: 2 x 50mm Steel Stud
Acoustic Infill	: 2 x 50mm Rockwool (5kg/m²)
Base layer	: 12mm Klngtec Hawk Pan calcium silicate board (12kg/m²)
Face layer	: 12mm Klngtec Hawk Pan calcium silicate board (12kg/m²)

STC 58

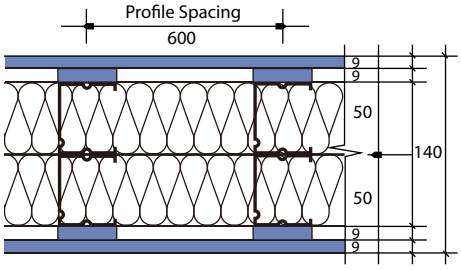


Fire-rated Partition System

The partition system was constructed in the test opening between Receiving Room and Source Room and consisted of:

Face layer	: 9mm Klngtec Hawk Pan calcium silicate board (12kg/m²)
Base layer	: 9mm Klngtec Hawk Pan calcium silicate board (12kg/m²)
Metal Stud	: 50mm Steel Stud x 2
Acoustic Infill	: 50mm Rockwool (5kg/m²) x 2
Base layer	: 9mm Klngtec Hawk Pan calcium silicate board (9kg/m²)
Face layer	: 9mm Klngtec Hawk Pan calcium silicate board (9kg/m²)

STC 59



Fire-rated Partition System

The partition system was constructed in the test opening between Receiving Room and Source Room and consisted of:

Face layer	: 9mm Klngtec Hawk Pan calcium silicate board (12kg/m²)
Base layer	: 9mm Klngtec Hawk Pan calcium silicate board (12kg/m²)
Metal Stud	: 50mm Steel Stud x 2
Acoustic Infill	: 50mm Rockwool (5kg/m²) x 2
Base layer	: 9mm Klngtec Hawk Pan calcium silicate board (9kg/m²)
Face layer	: 9mm Klngtec Hawk Pan calcium silicate board (9kg/m²)

Research Engineering Development Façade Consultants Limited
雄略幕牆顧問有限公司
Tel: (852) 2807-0930 Fax: (852) 2662-6105

HOKLAS 091

TEST REPORT

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

Test Sponsors:	**KingTec (Hong Kong) Building Materials Industrial Company Limited**
Manufacturer:	**Yichun KingTec 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: _____ DATE: 20 APR 2010

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

The test results are valid only for the conditions under which the test was conducted.

Hong Kong Accreditation Service (HKAS) has accredited this laboratory under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS directory of accreditation laboratories. The results shown in this test report were determined by this laboratory in accordance with its terms of accreditation. This report may not be reproduced except in full.

This report is invalid unless accompanied with authorization letter or certificate issued by Kingtec Building Materials (HK & Macau) Ltd.

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Tel: (852) 2807-0930 Fax: (852) 2662-6105

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.

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)'.

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.

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.

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:

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Insulation: **122** Minutes

Integrity: **132** Minutes (no failure)

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

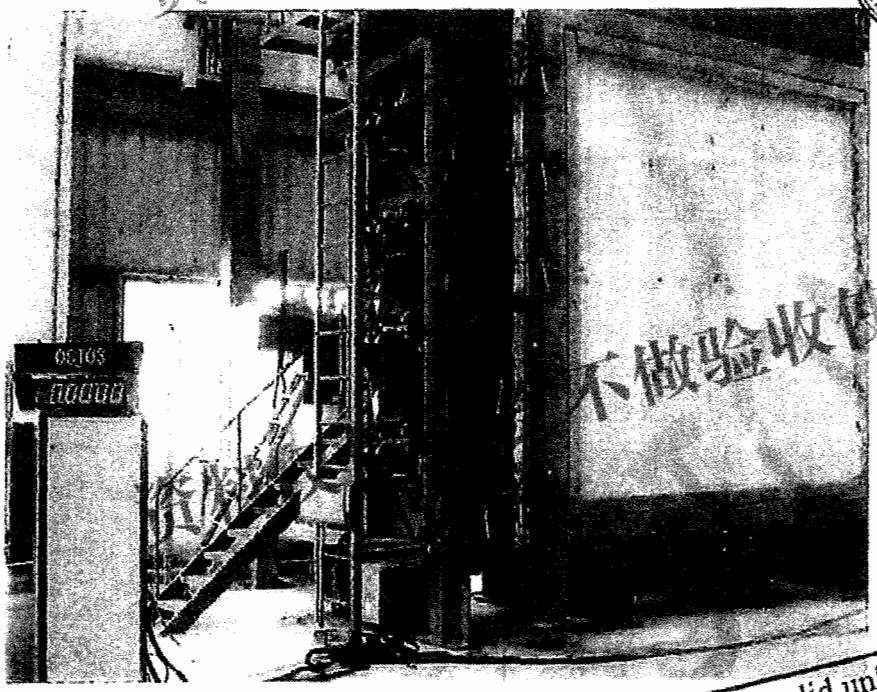


Photo 1 - The unexposed face of the specimen before the test.

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.

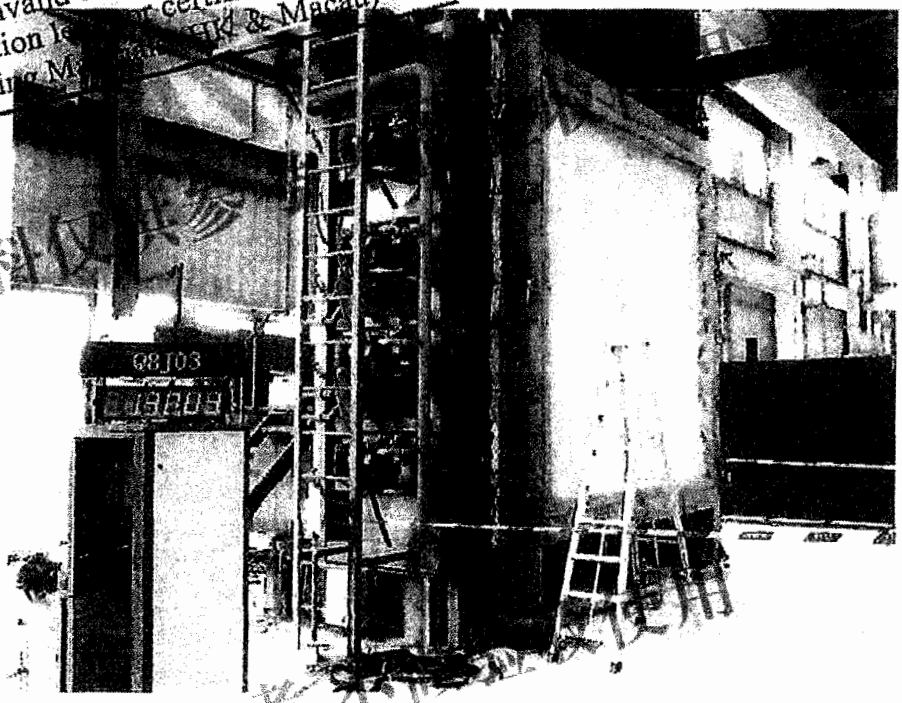


Photo 4 - The unexposed face of the specimen after the 90-minute heating period.

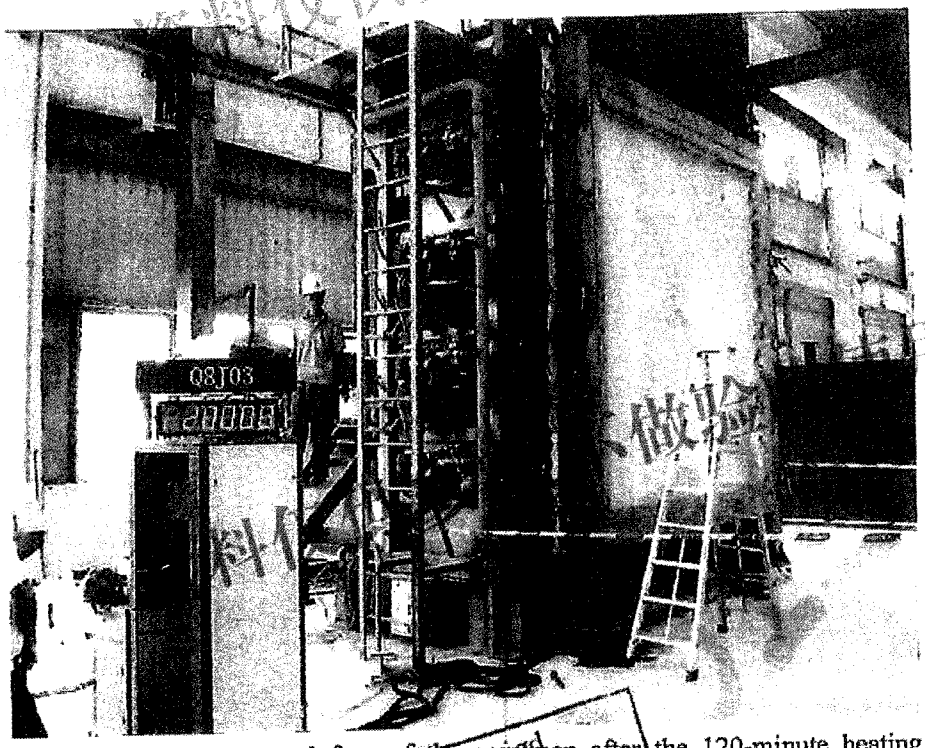


Photo 5 - The unexposed face of the specimen after the 120-minute heating period.

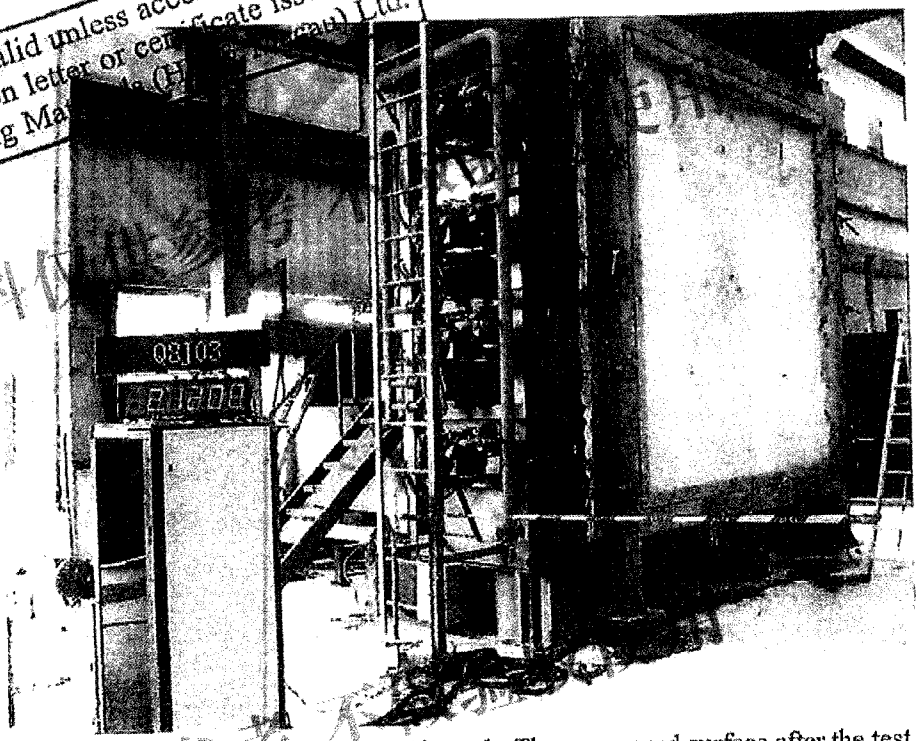


Photo 6 - The unexposed surface after the test.

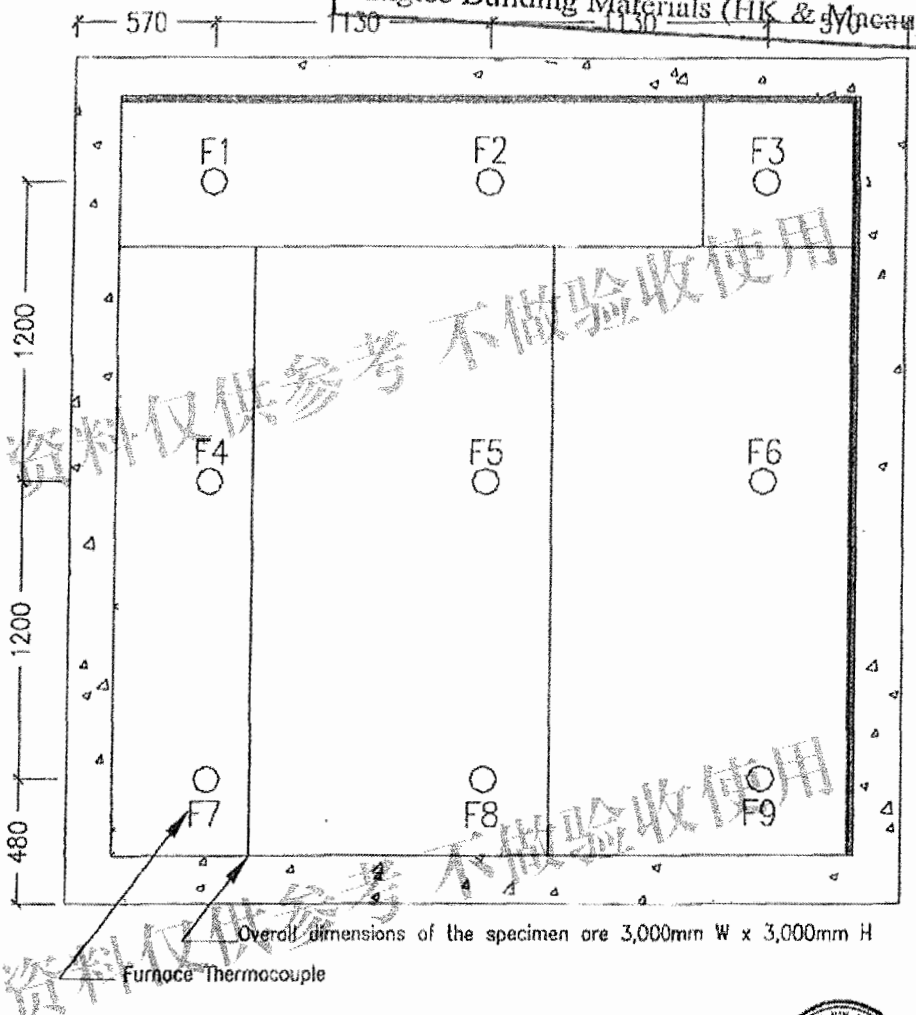


Figure 1 - Locations and reference number of furnace thermocouple

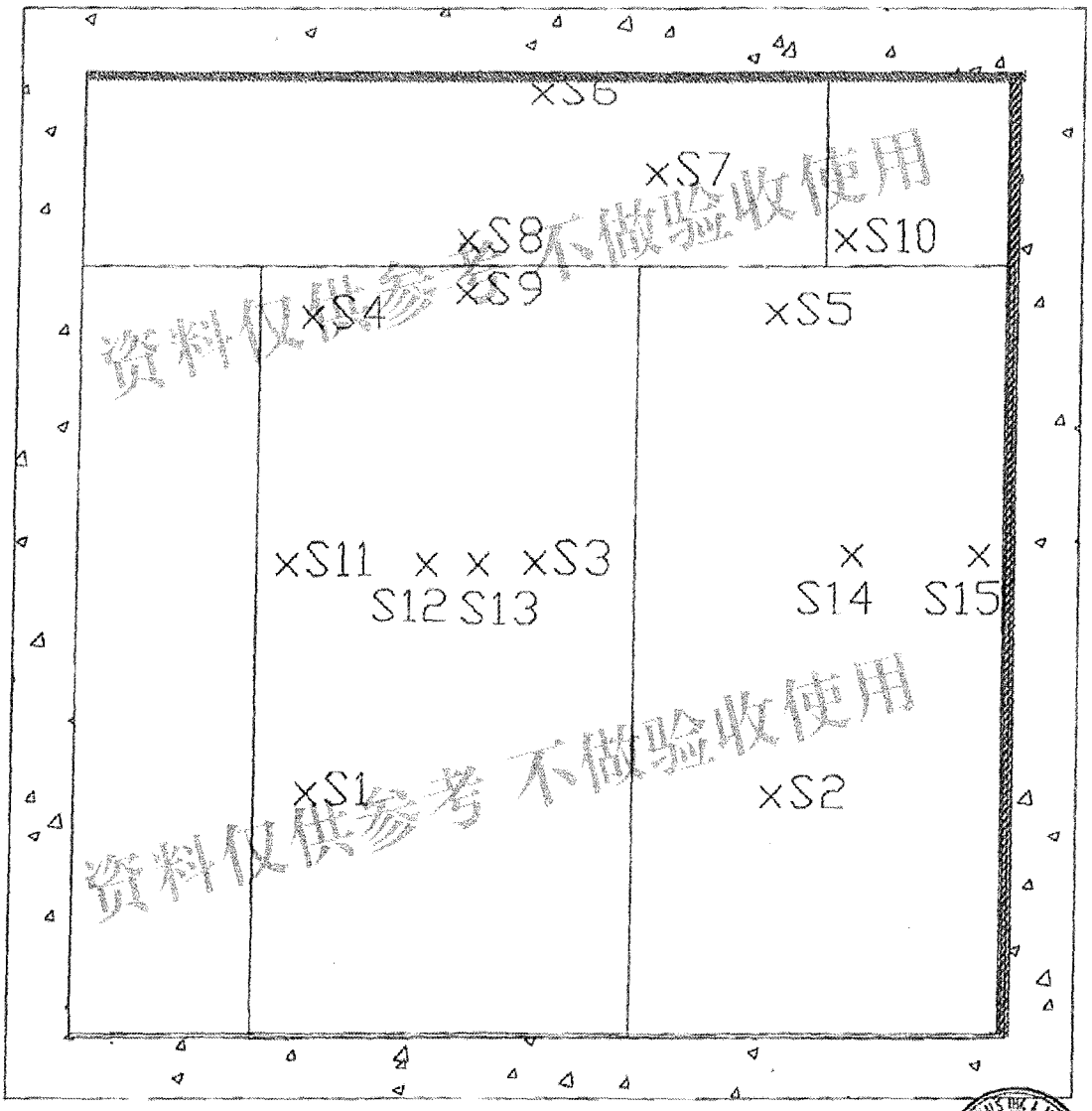


Figure 2 – Locations and reference number of thermocouples to monitor the temperature of unexposed surface of the specimen.

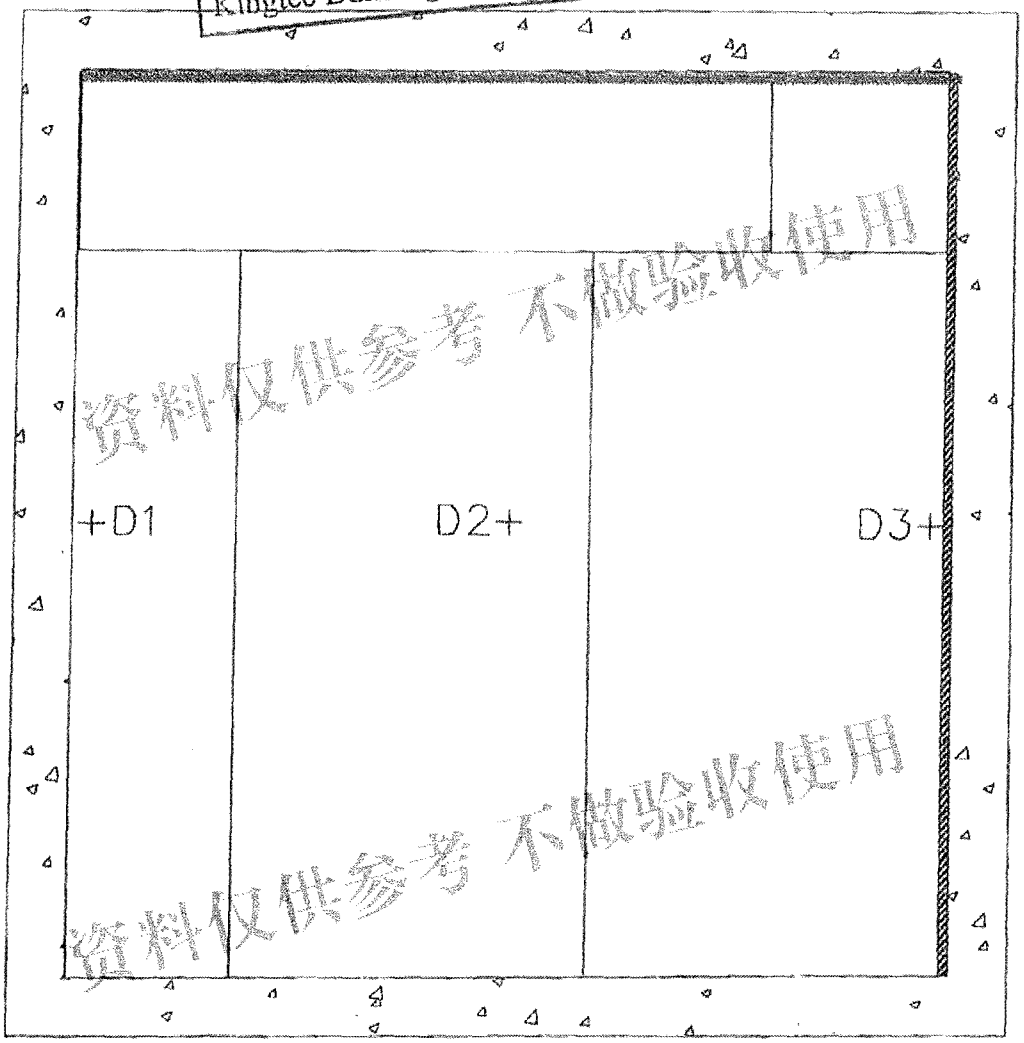


Figure 3 – Locations and reference for measuring displacement of the specimen

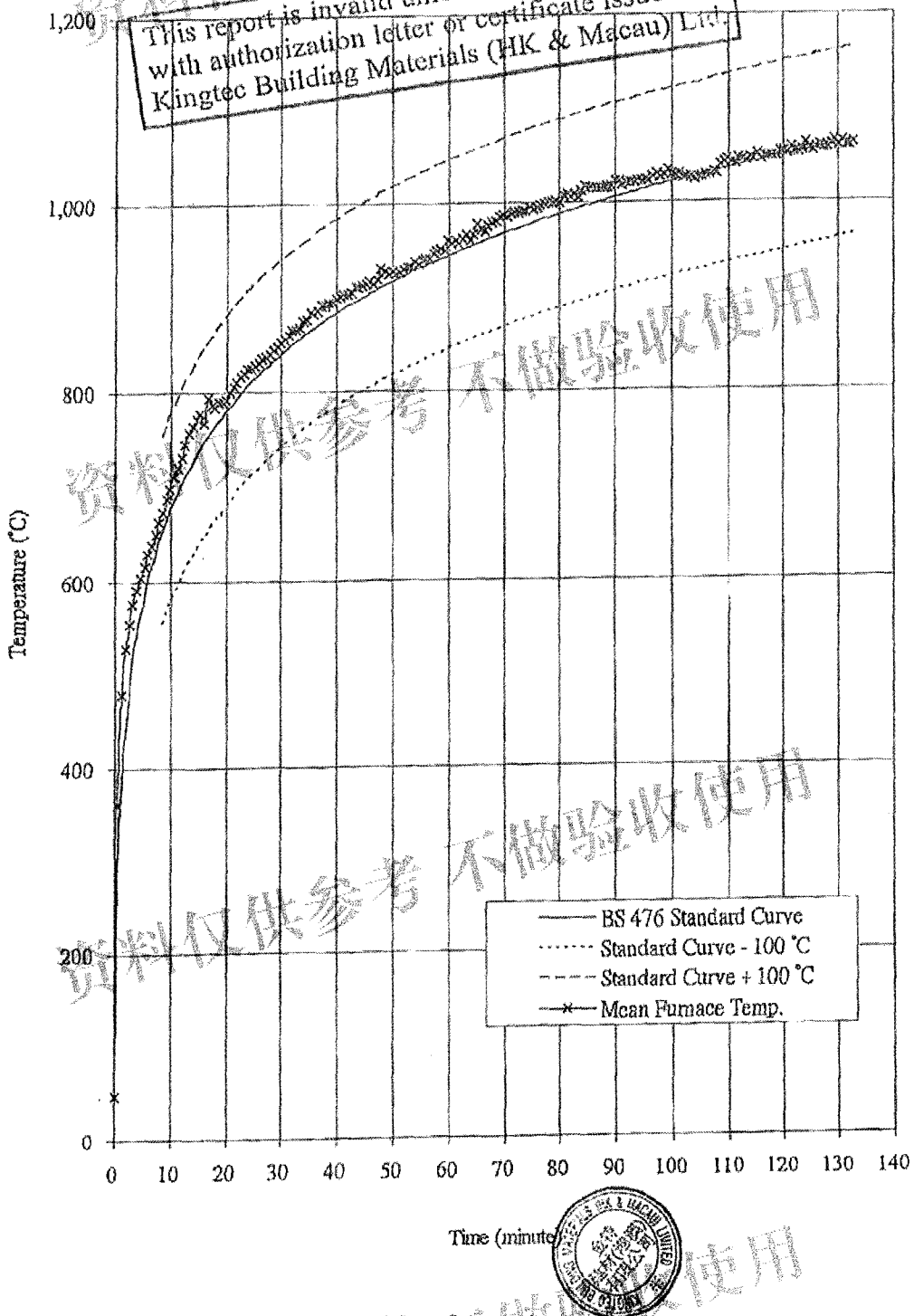


Figure 4 - Mean furnace temperatures.

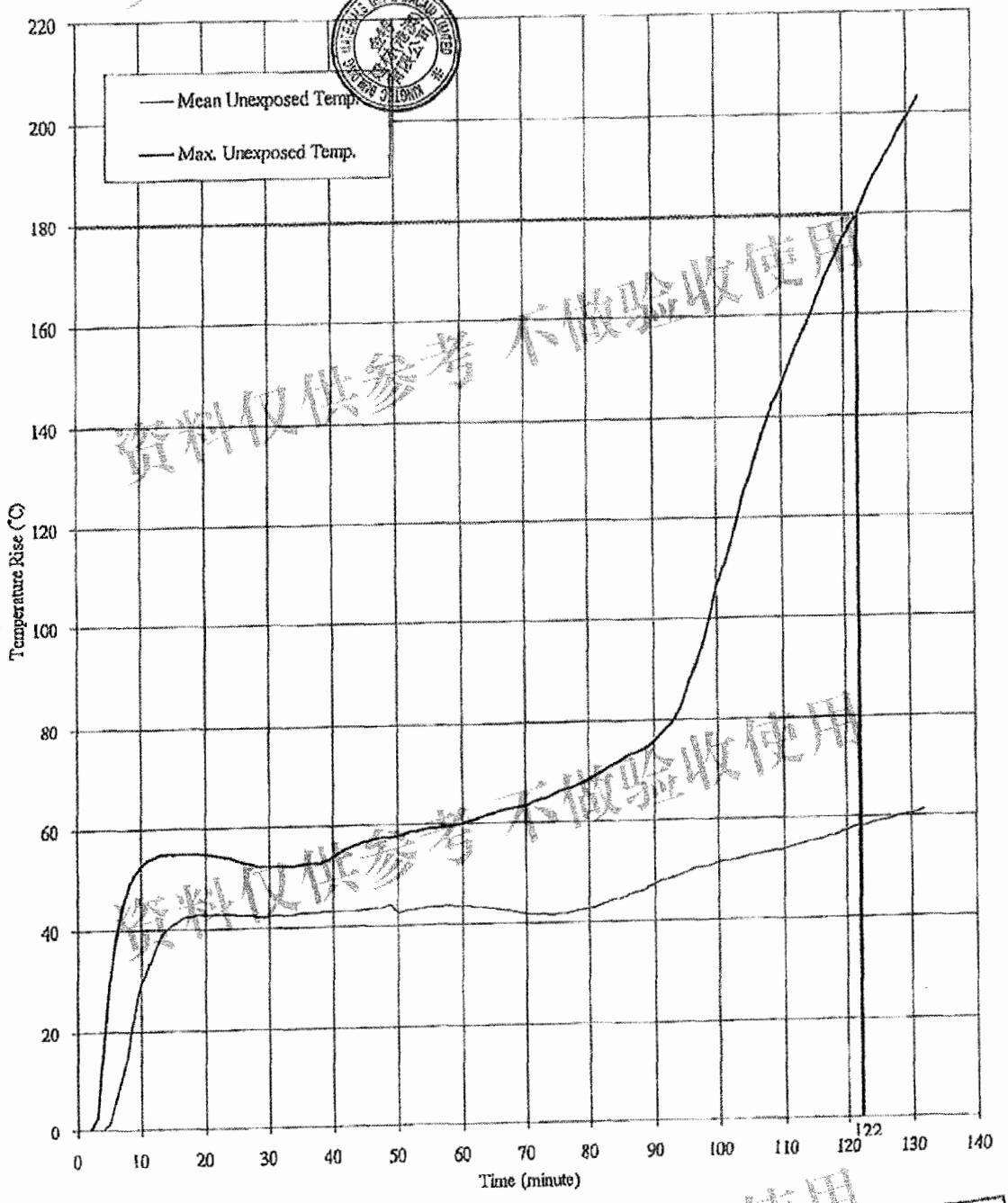


Figure 5 - Temperatures of unexposed surface.

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.

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

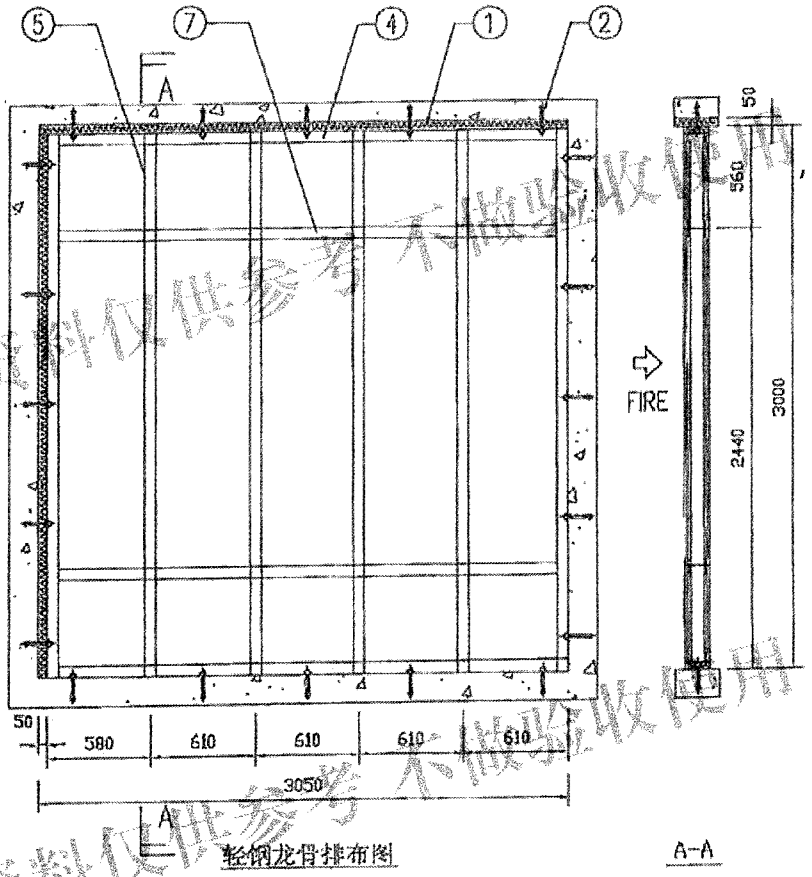
Positive deflections indicate movement towards the furnace (see Figure 3 for the locations). The maximum deflection occurred at D2 is 33 mm moving towards the furnace at a heating period of 90 minutes.

Information from client

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

This report is invalid unless accompanied with authorization letter or certificate issued by Kingtec Building Materials (HK & Macau) Ltd.

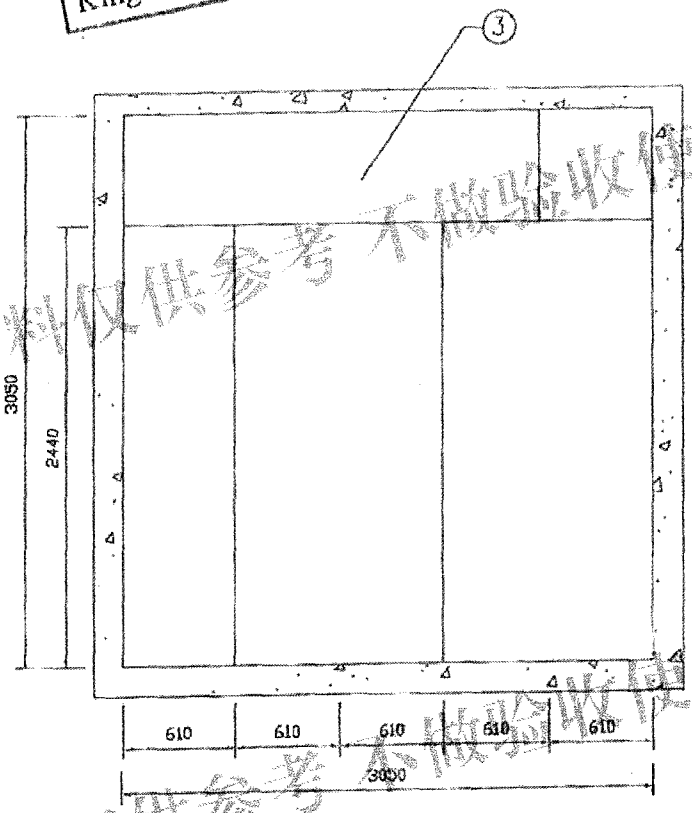
Drawings from client



轻钢龙骨排布图

① 岩棉(100kg/m³ 75mm厚)
② 膨胀螺栓(M6X100mm)
③ 火克板(2440X1220X9mm)
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

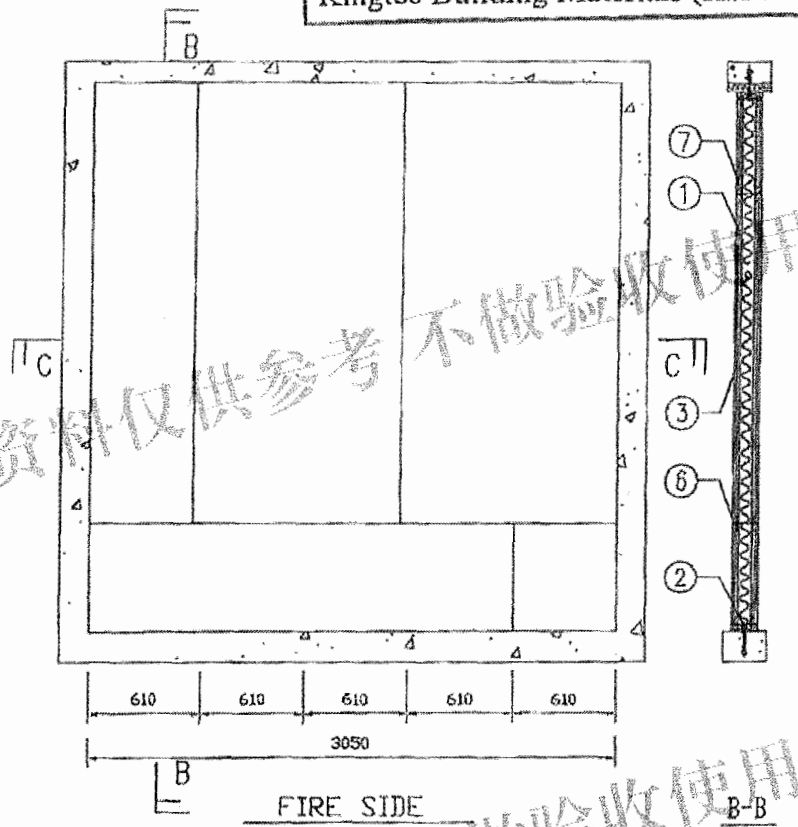
FIGURE 1

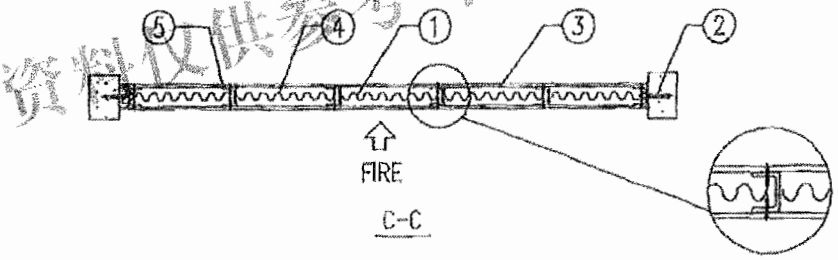


NON-FIRE SIDE

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 门攻螺钉3. 5X25mm间距200-250mm
⑦ 50X0.6 mm镀锌铁皮条

FIGURE





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⑥ 自攻螺钉3.5X25mm间距200-250mm
⑦ 50X0.6 mm镀锌铁皮条

FIGURE

- End of report -

TEST REPORT

Your Ref: Email dated 28 Jun 2006 | Date: 04 Jul 2006

Our Ref: 54S063476/2A/LGJ | Page: 1 of 3

DID: 68653783 | Fax: 68621433

NOTE: This report is issued subject to PSB Corporation's "Terms and Conditions Governing Technical Services". The terms and conditions governing the issue of this report are set out as attached within this report.

SUBJECT:

Non-combustibility test on "Hawk" Calcium Silicate Board material submitted by Kingtec (Hong Kong) Building Materials Industiral Co., Ltd. on 30 May 2006.

TESTED FOR:

Jinte Constructional Material Industrial Limited Company
368 Ping An Road, Yichun City
Jiangxi Province
People's Republic of China

Attn: Mr Shi Po De

DATE OF TEST:

27 Jun 2006 and 28 Jun 2006

PURPOSE OF TEST:

To determine whether the material is non-combustible when it is exposed to the conditions of the test specified in British Standard 476: Part 4: 1970 "Fire Test on Building Materials and Structures - Non-combustibility Test for Materials".
The test was conducted at PSB Corporation fire test laboratory located at No. 10 Tuas Avenue 10, Singapore 639134.
fire propagation for products".

54S063476/2A/LGJ

PSB

DESCRIPTION OF SAMPLES:

42 pieces of sample, said to be "Hawk" (1244kg/m^3) Calcium Silicate Board material, each of nominal size of 40mm x 40mm x 8mm thickness were received. 6 blocks of specimen, each of nominal test size of 40mm x 40mm x 50mm thickness were prepared.

TEST PROCEDURE:

Specimens were exposed to the specified heating conditions (750 ± 10°C) in a furnace conforming to Clause 6 and illustrated in Figure 1, 2 and 3 of the Standard. The furnace was heated and its temperature stabilized at 750 ± 10°C for more than 10 minutes. One specimen was then inserted in the furnace, the whole operation was performed in less than 5 seconds. The temperature of the specimens and the furnace were measured by two separate Chromel/Alumel thermocouples continuously for 20 minutes on the chart of a recorder. The flaming time of the specimen was determined by a stop watch. The procedure was repeated twice for two other specimens, one at each time.

RESULTS:

Description	Specimen 1	Specimen 2	Specimen 3	Requirements
Time of continuous flaming (sec.)	0	0	0	<10
Temperature rise of furnace (°C)	0	17	15	<50
Temperature rise of sample (°C)	0	0	0	<50
Classification	Non-combustible	Non-combustible	Non-combustible	-

CONCLUSION:

A non-combustibility test for materials in accordance with British Standard 476 Part 4 : 1970 has been performed on the material as described in this report and the classification of the sample is non-combustible.

Mah Poh Huat
Associate Engineer

Chan Lung Toa
Product Manager
(Fire Safety & Security Products)
Mechanical

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4. The sample/s mentioned in this report is/are submitted/supplied/manufactured by the Client. PSB Corporation therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture, consignment or any information supplied.

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8. Nothing in this report shall be interpreted to mean that PSB Corporation has verified or ascertained any endorsement or marks from any other testing authority or bodies that may be found on that sample.

9. This report shall not be reproduced wholly or in parts and no reference shall be made by the Client to PSB Corporation or to the report or results furnished by PSB Corporation in any advertisements or sales promotion.

10. Unless otherwise stated, the tests are carried out in PSB Corporation Pte Ltd, No.1 Science Park Drive Singapore 118221.

June 2006

TEST REPORT

Your Ref Email dated 28 Jun 2006 | Date. 04 Jul 2006

Our Ref 54S063476/1A/OKH | Page 1 of 6

DID 68653783 | Fax 68621433

NOTE: This report is issued subject to PSB Corporation's "Terms and Conditions Governing Technical Services". The terms and conditions governing the issue of this report are set out as attached within this report.

SUBJECT:

Fire propagation test on "Hawk" Calcium Silicate Board material submitted by Kingtec (Hong Kong) Building Materials Industrial Co., Ltd. on 30 May 2006.

TESTED FOR:

Jinte Constructional Material Industrial Limited Company
368 Ping An Road, Yichun City
Jiangxi Province
People's Republic of China

Attn: Mr Shi Po De

DATE OF TEST:

16 Jun 2006

PURPOSE OF TEST:

To determine the Index of Performance of the material when it is exposed to the conditions of the test specified in British Standard 476 : Part 6 : 1989 "Method of test for fire propagation for products".
The test was conducted at PSB Corporation fire test laboratory located at No. 10 Tuas Avenue 10, Singapore 639134.

PSB TEST® Your Peace of Mind

ISO 9001 JQA-QMA 15040

ACCREDITED LABORATORY SAC-SINGLAS

LA-2001-0212-A
LA-2001-0213-F
LA-2001-0214-E
LA-2001-0215-B
LA-2001-0216-G
LA-2001-0217-G

The results reported herein have been performed in accordance with the laboratory's terms of accreditation under the Singapore Accreditation Council - Singapore Laboratory Accreditation Scheme. Tests marked "Not SAC-SINGLAS Accredited" in this Report are not included in the SAC-SINGLAS Accreditation Schedule for our laboratory.

DESCRIPTION OF SAMPLES:

6 pieces of sample, said to be "Hawk" (1244kg/m^3) Calcium Silicate Board material, each of nominal size of 225mm x 225mm x 8mm thickness were received.

TEST PROCEDURE:

Three specimens were tested with either face exposed to the specified heating conditions, in an apparatus conforming to paragraph 5 and illustrated in Figures 1 to 3 of the Standard.

The calibration and test procedures were as defined in paragraphs 8 and 9 respectively, of the specification. The apparatus was calibrated prior to test and the actual calibration curve obtained is shown in Figure 1 of this report.

RESULTS OF TEST:

The mean temperature rise above ambient obtained from three specimens is also shown in Figure 1 (i.e. with the actual calibration curve). The mean temperature readings for the material and the calibration curve were obtained at the following intervals from the start of the test: at 1/2 minute intervals up to 3 minutes, at 1 minute intervals from 4 to 10 minutes, and at 2 minutes intervals from 12 to 20 minutes.

资料仅供参考 不作验收使用
资料仅供参考 不作验收使用

RESULTS OF TEST: (Cont'd)

From these readings, the index of performance for the material was determined as follows:

$$s_1 = \sum_{t=0.5}^{t=3} \frac{\Theta_s - \Theta_c}{10t} \qquad s_2 = \sum_{t=4}^{t=10} \frac{\Theta_s - \Theta_c}{10t}$$

and $$s_3 = \sum_{t=12}^{t=20} \frac{\Theta_s - \Theta_c}{10t}$$

$$S = s_1 + s_2 + s_3$$

where S = Index of performance for each of the specimens tested and s_1, s_2 and s_3 are sub-indices

t = Time in minutes from the origin at which readings are taken.

Θ_s = Temperature rise in deg. C for the specimen at time, t

Θ_c = Temperature rise in deg. C for the calibration sheet at time, t

In computations only the positive value of $\frac{\Theta_s - \Theta_c}{10t}$ was used.

RESULTS OF TEST: (Cont'd)

The following test results were obtained for each specimen tested:

Specimen	Sub-Indices			Index of Performance
	S_1	S_2	S_3	S
A	0.0	0.0	0.0	0.0
B	0.0	0.0	0.0	0.0
C	0.0	0.0	0.0	0.0

CONCLUSION:

The test results obtained for the sample tested are as follows:

Index of overall performance, I = 0.0
(Fire propagation index)

Sub-index, I_1 = 0.0

Sub-index, I_2 = 0.0

Sub-index, I_3 = 0.0

REMARKS:

1. The test results relate only to the behaviour of the test specimens of the product under the particular conditions of test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.
2. The sample was tested with either exposed to the heat and backed with calcium silicate board.

Mah Poh Huat
Associate Engineer

Chan Lung Tca
Product Manager
(Fire Safety & Security Products)
Mechanical

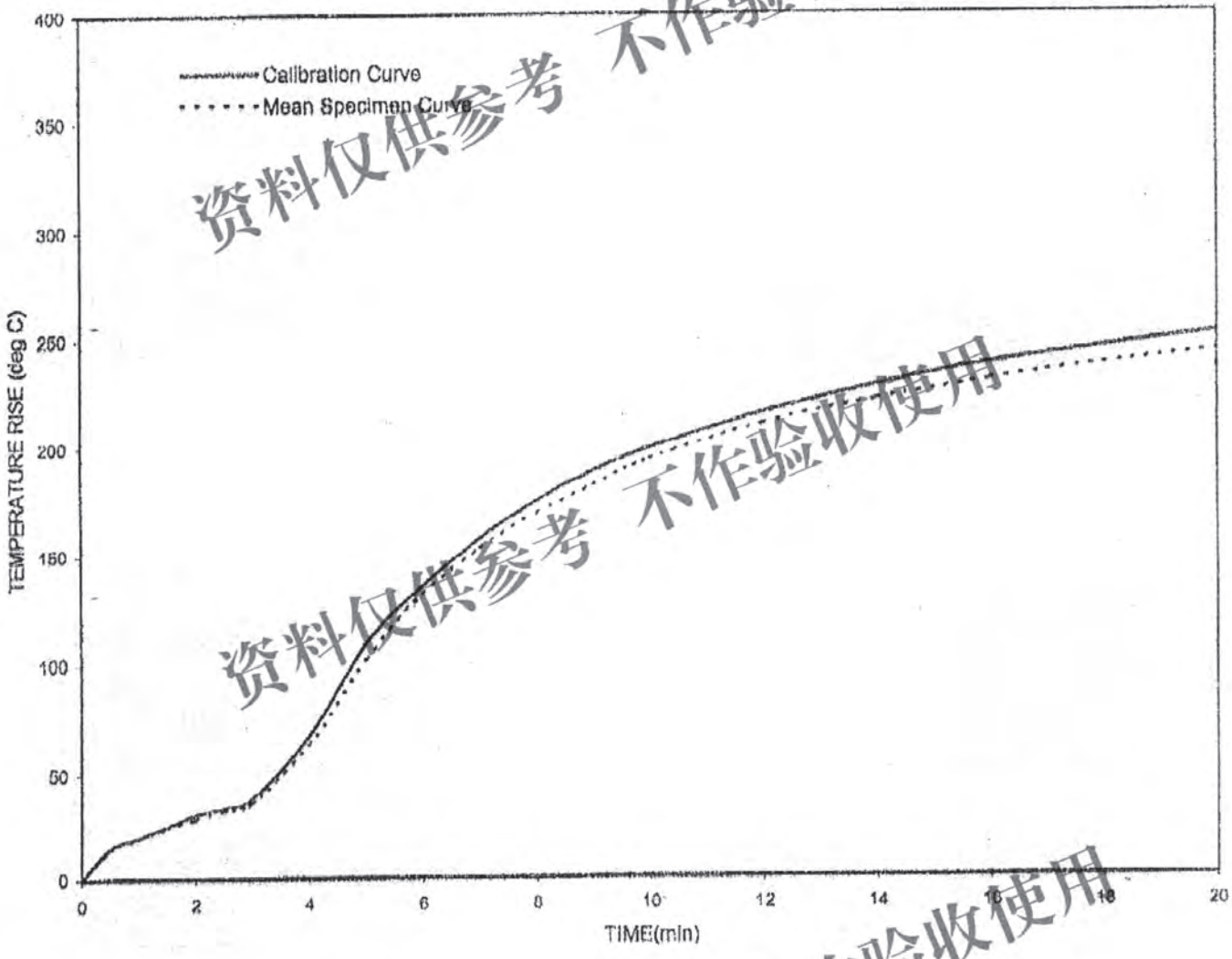

FIGURE 1 : COMPARISON OF MEAN SPECIMEN AND CALIBRATION CURVES

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June 2006

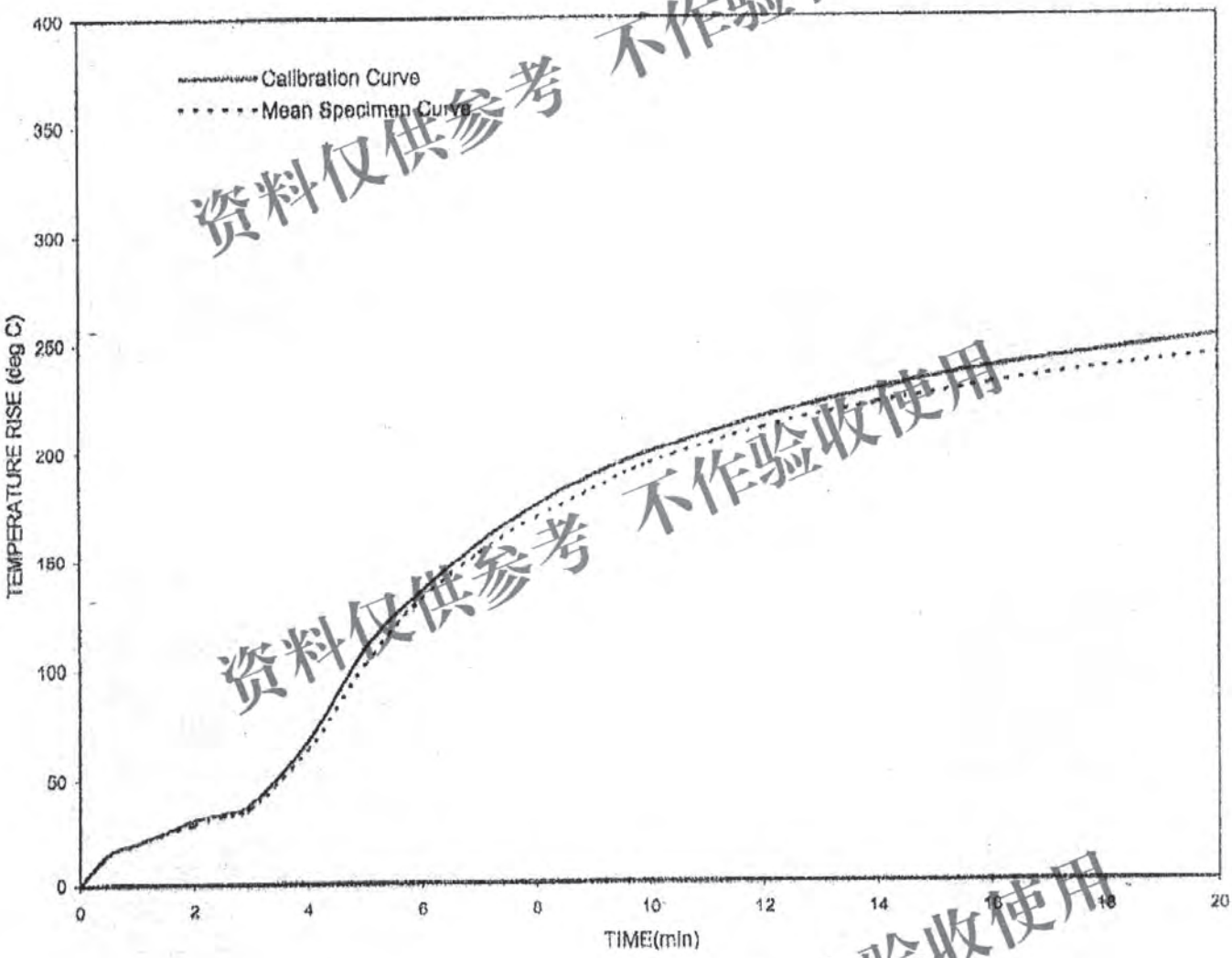

FIGURE 1 : COMPARISON OF MEAN SPECIMEN AND CALIBRATION CURVES

TEST REPORT

PSB Corporation

Your Ref: Email 26 Oct 05

Date: 28 Oct 2005

Our Ref: 64S055811/OKH

Page: 1 of 6

DID: 68653763

Fax: 68621433

NOTE: This report is issued subject to PSB Corporation's "Terms and Conditions Governing Technical Services". The terms and conditions governing the issue of this report are set out as attached within this report.

SUBJECT:

Large scale surface spread of flame test on "Hawk" Calcium Silicate Board material submitted by Kingtec Building Materials Industrial Co., Ltd. on 28 Sep 2005.

TESTED FOR:

Jinte Constructional Material Industrial Limited Company
368 Ping An Road, Yichun City
Jiangxi Province
People's Republic of China

Attn: Mr Shi Zi De

DATE OF TEST:

08 Oct 2005

PURPOSE OF TEST:

To determine the tendency of the surface of a material or a combination of materials to support the spread of flame across its surface and to classify the surface according to the test given in British Standard 476: Part 7: 1997.
The test was conducted at PSB Corporation fire test laboratory located at No. 10 Tuas Avenue 10, Singapore 639134.

香 港 認 可 處
Hong Kong Accreditation Service
創新科技署 Innovation and Technology Commission

RQA 1/003/25
Tel No. 2829 4870

12 December 2005

Mr. SZE Po Tak,
Director,
Kingtec (Hong Kong) Building Materials Industrial Co. Ltd,
Shop D, G/F, Lucky House Industrial Building,
64, Tong Mi Road,
Mongkok,
Kowloon

Dear Mr. SZE,

Mutual Recognition Agreement (MRA) Between HKAS and SAC-SINGLAS

I refer to your letter dated 6 December 2005 and the attached SAC-SINGLAS endorsed test reports dated 28 October 2005 and Ref No. 68653783 (Total 5 pages).

HKAS of Hong Kong and SAC-SINGLAS of Singapore are both signatories of the Asia Pacific Laboratory Accreditation Co-operation (APLAC) and the International Laboratory Accreditation Co-operation (ILAC) Multilateral Arrangements (MLA). Under the MLA, signatories accept laboratory accreditation granted by each other as equivalent and undertake to promote the acceptance of test reports endorsed by any signatories to the arrangements. This means that we will regard test report to BS 476:Part 7:1997 standard endorsed by SAC-SINGLAS as equivalent to test reports to the same respective test standards endorsed by HKAS under the Hong Kong Laboratory Accreditation Scheme (HOKLAS).

I hope the above information will be useful to you. If you have any further questions, please do not hesitate to contact the undersigned.

Yours sincerely,

(C K Cheung)
for Executive Administrator

香港灣仔告士打道七號入境事務大樓三十六樓 36/F, Immigration Tower, 7 Gloucester Road, Wan Chai, Hong Kong
電話 Tel: 2829 4837 傳真 Fax: 2824 1302 電郵 E-mail: hkas@itc.gov.hk 網址 Website: http://www.itc.gov.hk/hkas/

54S055811/OKH

PSBCorporation

DESCRIPTION OF SAMPLES:

9 pieces of sample, said to be "Hawk" Calcium Silicate Board material, each of nominal size of 885mm x 270mm x 8mm thickness were received. The bulk density of the sample was found to be about 1244kg/m^3.

TEST PROCEDURE:

Prior to test, the specimens were prepared and conditioned in accordance with paragraphs 5.3 to 5.6 of the standard and secured to a specimen holder as described in paragraph 6.3.

Six specimens were tested with either face exposed to the specified thermal radiation from the apparatus described in paragraph 6.1 of the standard. The intensity of the radiated heat incident on the specimen varies with distance from the hotter end, so that when the specified calibration panel is mounted in the place to be occupied by the specimen, the irradiance of the radiometer is as given in Table 1. The test was terminated when the flame front reached the 825mm reference line, or after 10 minutes has elapsed, whichever is the shorter.

Table 1 : Irradiance Along Horizontal Reference Line on the Calibration Board

Distance along reference line from inside edge of specimen holder	Irradiance kW/m^2		
mm	specified	min.	max.
75	32.5	32.0	33.0
225	21.0	20.5	21.5
375	14.5	14.0	15.0
525	10.0	9.5	10.5
675	7.0	6.5	7.5
825	5.0	4.5	5.5

RESULTS OF TEST:

Specimen No.	1	2	3	4	5	6
Spread of flame at first 1½ minutes (mm)	0	0	0	0	0	0
Distance (mm)	Time of spread of flame to indicated distance (minutes • seconds)					
Start of flaming	nil	nil	nil	nil	nil	nil
75	-	-	-	-	-	-
165	-	-	-	-	-	-
190						
215						
240						
265						
290						
375						
455						
500						
525						
600						
675						
710						
750						
785						
825						
865						
Time of maximum spread of flame (minutes • seconds)	-	-	-	-	-	-
Distance of maximum spread of flame (mm)	0	0	0	0	0	0
Comments	None					

54S055811/OKH

PSB Corporation

Classification of Surface Spread of Flame

Classification	Spread of flame at 1.5 min.		Final spread of flame	
	Limit (mm)	Limit for one specimen in sample (mm)	Limit (mm)	Limit for one specimen in sample (mm)
Class 1	165	165 + 25	165	165 + 25
Class 2	215	215 + 25	455	455 + 45
Class 3	265	265 + 25	710	710 + 75
Class 4	Exceeding the limits for class 3			

CONCLUSION:

In accordance with the class definitions specified in the Standard, the test results show that the sample tested has a Class One Surface Spread of Flame.

REMARKS:

1. The test results relate only to the behaviour of the test specimens of the product under the particular conditions of test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.
2. The sample was tested with either face exposed to the heat and backed with calcium silicate board.

Mah Poh Huat
Associate Engineer

Chan Eang Tee
Product Manager
(Fire Safety & Security Products)
Mechanical

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May 2005

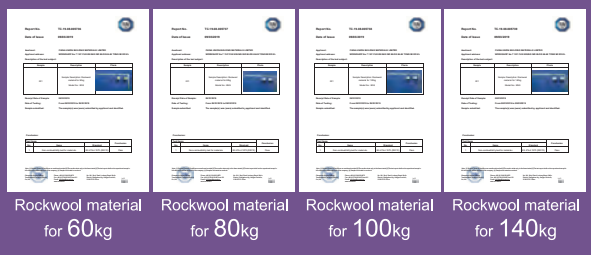
ROCK MINERAL WOOL

BNS mineral rockwool uses selected basalt as the base material and is a heat preservating material made through the processes of being melted at a high temperature, fiber forming through high speed centrifugation and fiber laying through oscillating beltVertically pressed and molded. BNS mineral rockwool is ideal for thermal insulation and sound absorption.It has a stable chemical Properties as well as fireproof and corrosion resistant.It can be made into different forms of boards, felt and pipe shell according to it's different purposes, They are widely applied for exterior walls, roofs, equipments and piping, drywalls help with acoustic corrections & heat preservation as well.

ROCK MINERAL WOOL

Fire Performance Certificate:

BS 476-4:1970, BS 476-6:1970, BS 476-7:1970


Rockwool material for 60kg | Rockwool material for 80kg | Rockwool material for 100kg | Rockwool material for 140kg


Rockwool material for 60kg | Rockwool material for 80kg | Rockwool material for 100kg | Rockwool material for 140kg


Rockwool material for 60kg | Rockwool material for 80kg | Rockwool material for 100kg | Rockwool material for 140kg

Description

BNS rockwool boards are supplied in 1200 x 600mm format with a density of 60- 140 kg/cu.m. The standard product is bare, but could be manufactured with a factory applied foil or tissue facing if required.

Distributed by:

CHINA UNION BUILDING MATERIALS

E-mail: Chinaunion2office@gmail.com

Tel: 5596 7709

Due to it's superior acoustic performances and the speed of installation of drywalls, lightweight steel-framed partitions are becoming more popularly used in commercial use buildings such as hospitals, cinemas studios and offices.

Below are some suggested specifications of BNS drywalls

ROCK MINERAL WOOL

Fire Performance

BNS rockwool is classified as non-combustible to BS476: Part 4.

Thermal performance

The thermal conductivity of BNS rockwool varies from 0.035 to 0.043 w/mk.

Durability

BNS rockwool is odorless, non-hygroscopic, rot proof, not sustain vermin and does not promote mildew, fungi, or bacteria.

1 Standard metal stud partitions

In all, inside BNS (steel stud) partitions, install acoustic insulation of BNS Rockwool (Unfaced), (50-200mm thick).

Secure BNS Rockwool (Unfaced) at roof of partition using timber batten or light steel angle.

Insulation to fit snugly between studs and at bottom of the structure to ensure that there are no gaps.

Seal partition at sides and all service penetration with acoustic sealant

2 Staggered stud partitions

In all, BNS (steel stud) partitions, install acoustic insulation of BNS Rockwool (Unfaced). (50-200mm thick)

Once the BNS studs have been positioned and boarded on one side, wound the insulation through the studs horizontally. Ensure there are no gaps at abutments or between adjacent lengths of the insulation.

Seal partition at sides and all service penetrations with acoustic sealant.

3 High performance twin frame

In all BNS (twin frame) partitions, install acoustic insulation of BNS Rockwool, (50-200mm thick).

Once the BNS studs have been positioned and boarded on one side, the insulation layer should be inserted between the studs horizontally.

Ensure there are no gaps at abutments or between adjacent lengths of the insulation.

Seal partition at side and all service penetrations with acoustic sealant.

Report No. TC.19.08.005738

Date of Issue 09/03/2019

Applicant: CHINA UNION BUILDING MATERIALS LIMITED

Applicant address: WORKSHOP No.7 13/F FUK KEUNG IND BLDG 66-68 TONG MI RD KL

Description of the test subject:

Sample	Description	Photo
001	Sample Description: Rockwool material for 100kg Model No.: BNS	

Receipt Date of Sample: 08/23/2019

Date of Testing: From 08/23/2019 to 09/03/2019

Sample submitted: The sample(s) was (were) submitted by applicant and identified.

Conclusion:

Test Items			Conclusion
No.	Items	Standard	
1	Non-combustibility test for materials	BS 476-4:1970 (R2012)	Pass

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Report No. TC.19.08.005738

Date of Issue 09/03/2019

Test Results

1. BS 476-4:1970 (R2012) Fire tests on building materials and structures. Non-combustibility test for materials

1.1 Sample describe

Specimen size	40mm x 40mm
Height	50mm

conditioning	temperature	relative humidity	Period
	60±5°C	desiccative	24h

1.2 Test result

Specimen	1	2	3	Average
Furnace temperature (initial) (°C)	746	749	748	748
Duration of sustained flaming inside the furnace (s)	--	--	--	--
Highest temperature of the centre of specimen Tc(max) (°C)	723	727	729	726
Final temperature of the centre of specimen Tc(final °C)	677	684	685	682
Highest temperature of furnace inside TF(max) (°C)	767	769	770	769
Final temperature of furnace inside TF(final °C)	756	756	754	755
The centre of specimen temperature rise △TC(°C)	46	43	44	44
Furnace inside temperature rise △TF(°C)	21	20	22	21

Requirement:
The material shall be deemed non-combustible if, during the test, none of the three specimens either
1) Causes the temperature reading from either of the two thermocouples to rise by 50 deg C or more above the initial furnace temperature (the stabilized temperature is 750°C), or
2) Is observed to flame continuously for 10 s or more inside the furnace. Otherwise, the material shall be deemed combustible.

Conclusion: According to the test results, the sample **complies** with the requirement of BS 476-4:1970 (R2012).

Statement: The test results relate to the behaviour of the test specimens of a product under the particular conditions of the test; they are not intended to the sole criterion for assessing the potential smoke and toxicity hazard of the product in use.

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Report No. TC.19.08.005738

Date of Issue 09/03/2019

Changzhou Jinbiao Railway Transportation Technical Service Co., Ltd.

Drafted by:

Lynn liu

Approved by:

Shen hui

-End of Report-

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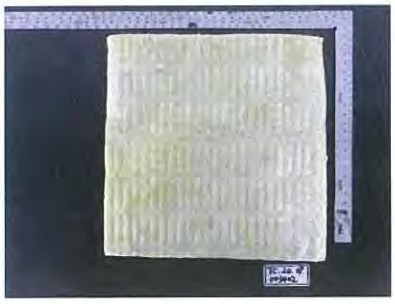
Report No. TC.20.07.003402

Date of Issue 08/04/2020

Applicant: CHINA UNION BUILDING MATERIALS LIMITED

Applicant address: WORKSHOP No.7 13/F FUK KEUNG IND BLDG 66-68 TONG MI RD KL

Description of the test subject:

Sample	Description	Photo
001	Sample Description: Rockwool material for 100kg Style No.: BNS	

Receipt Date of Sample: 07/27/2020

Date of Testing: From 07/27/2020 to 08/04/2020

Sample submitted: The sample(s) was (were) submitted by applicant and identified.

Conclusion:

Test Items			Conclusion
No.	Items	Standard	
1	Fire tests on building materials and structures —Part 6: Method of test for fire propagation for products	BS 476-6:1989+A1:2009	See test results

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Report No. TC.20.07.003402

Date of Issue 08/04/2020

Test Results

1. BS476-6:1989+A1:2009 Fire tests on building materials and structures —Part 6: Method of test for fire propagation for products

1.1 Sample details

Size of specimen	225mm×225mm
Thickness	About 50.0 mm

Precondition	Temperature	Relative humidity	Duration
	23±2°C	50±5%R.H.	48h

1.2 Test result

Specimens	Index of performance of specimens			The index of performance
	S_1	S_2	S_3	S
A	0.93	0	0	0.93
B	0.96	0	0	0.96
C	0.92	0	0	0.92

Sample quantity	i_1	i_2	i_3	Fire propagation index I
3	0.94	0	0	0.94

Note: S, S1, S2 and S3 are given by the following expressions.

$$S_1 = \sum_{t=0.5}^{t=3} \frac{\theta_s - \theta_c}{10t} \quad ; \quad S_2 = \sum_{t=4}^{t=10} \frac{\theta_s - \theta_c}{10t} \quad ; \quad S_3 = \sum_{t=12}^{t=20} \frac{\theta_s - \theta_c}{10t}$$

$$S = S_1 + S_2 + S_3$$

Fire propagation index:

$$i_1 = \frac{1}{3}\left[(S_1)_A + (S_1)_B + (S_1)_C\right] \quad ; \quad i_2 = \frac{1}{3}\left[(S_2)_A + (S_2)_B + (S_2)_C\right]$$

$$i_3 = \frac{1}{3}\left[(S_3)_A + (S_3)_B + (S_3)_C\right] \quad ; \quad I = i_1 + i_2 + i_3$$

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Date of Issue 08/04/2020

Remark:

θ_S the temperature rise for the flue gases, °C

θ_C the actual temperature rise to the nearest, °C

Statement: The test results relate to the behaviour of the test specimens of a product under the particular conditions of the test; they are not intended to the sole criterion for assessing the potential smoke and toxicity hazard of the product in use. Test results are just for internal reference.

Changzhou Jinbiao Railway Transportation Technical Service Co., Ltd.

Drafted by: Wayne Wang

Approved by: Shen hui

-End of Report-

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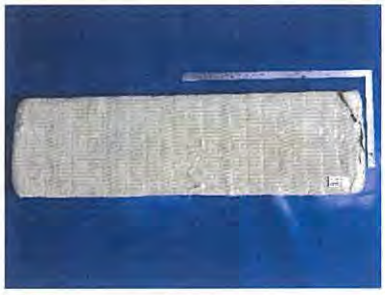
Report No. TC.20.07.002874

Date of Issue 07/13/2020

Applicant: CHINA UNION BUILDING MATERIALS LIMITED

Applicant address: WORKSHOP No.7 13/F FUK KEUNG IND BLDG 66-68 TONG MI RD KL

Description of the test subject:

Sample	Description	Photo
001	Sample Description: Rockwool material for 100kg Style No.: BNS	

Receipt Date of Sample: 07/03/2020

Date of Testing: From 07/03/2020 to 07/13/2020

Sample submitted: The sample(s) was (were) submitted by applicant and identified.

Conclusion:

Test Items			Conclusion
No.	Items	Standard	
1	Fire tests on building materials and structures Part 7. Method of test to determine the classification of the surface spread of flame of products	BS 476-7:1997(R2016)	Class 1

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Report No. TC.20.07.002874

Date of Issue 07/13/2020

Test Results

1. BS 476-7:1997(R2016) Fire tests on building materials and structures Part 7. Method of test to determine the classification of the surface spread of flame of products

1.1 Sample details:

Specimen size	885mm×270mm
Thickness	About 50 mm
Conditioning	Constant mass at a temperature of 23±2°Cand a relative humidity of 50±10%

1.2 Test results:

Distance (mm)	Time to travel to indicated distance (second)					
	1	2	3	4	5	6
165	NR	NR	NR	NR	NR	NR
455	NR	NR	NR	NR	NR	NR
710	NR	NR	NR	NR	NR	NR
825	NR	NR	NR	NR	NR	NR
Maximum distance traveled at 1.5 minutes (mm)	--	--	--	--	--	--
Maximum distance traveled during the whole test (mm)	--	--	--	--	--	--
Time to reach maximum distance traveled(second)	--	--	--	--	--	--
Observations	--					

Remark:

1.Six specimens are usually tested. If the test on any specimen is deemed to be invalid, as defined in the standard, it is permissible for up to a maximum of nine specimens to be tested in order to obtain the six valid test results.

2. NR=Not reached

Classification:

In accordance with the tested results and the classifications defined in BS 476-7:1997(R2016), the submitted sample is classified as **Class 1**

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Classification requirements:

Classification	Spread of flame at 1.5 min		Final spread of flame	
	Limit (mm)	Limit for one specimen in sample(mm)	Limit (mm)	Limit for one specimen in sample(mm)
Class 1	165	165+25	165	165+25
Class 2	215	215+25	455	455+45
Class 3	265	265+25	710	710+75
Class 4	Exceeding the limits for class 3			

Statement: The test results relate to the behaviour of the test specimens of a product under the particular conditions of the test; they are not intended to the sole criterion for assessing the potential smoke and toxicity hazard of the product in use. Test results are just for internal reference.

Changzhou Jinbiao Railway Transportation Technical Service Co., Ltd.

Drafted by:

Lynn liu

Approved by:

Shen hui

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REPORT TO: Kingtec Building Materials (HK & Macau) Ltd.

ADDRESS: Unit 1, 3/F, Block B, Shatin Ind. Ctr.
5-7 Yuen Shun Circuit,
Shatin, N.T., Hong Kong

ATTN.: Ms. Lilian Tse / Mr. Sammy Chan

REPORT NO.: APJ15-070-RP002(STC)

ISSUE DATE: 20 August 2015

HOKLAS Accredited Laboratory
Laboratory Sound Transmission Loss Measurement
Test Report
for
90mm Kingtec Hawk Pan Fire-rated Partition System

for Kingtec Building Materials (HK & Macau) Ltd.

(PROJECT NO.: APJ15-070)

HKAS has accredited this Laboratory (Reg. No. 122-TEST) under HOKLAS for specific laboratory activities as listed in the HOKLAS directory of accredited laboratories.

Room 422, Leader Industrial Centre, 57-59 Au Pui Wan Street, Fo Tan, Shatin, N.T., Hong Kong
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Homepage: http://www.aa-lab.com E-mail: inquiry@aa-lab.com

1. Method of Measurement

1.1 The measurement was carried out in accordance with ASTM E90-09 "Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions" in the reverberation room of Acoustics and Air Testing Laboratory Co. Ltd. And the single number rating of airborne sound transmission loss is given as Sound Transmission Class (STC) by evaluated in accordance with ASTM E413-10 "Classification for Rating Sound Insulation".

2. Details of Measurement

2.1 Principle of Measurement

The sound transmission loss is usually measured in a laboratory by placing the element in an opening between two adjacent reverberant rooms designed for such tests. Noise is introduced into one of the rooms, referred to as the source room, and part of the sound energy is transmitted through the test element into the second room, referred to as the receiving room. The resulting mean space-average sound pressure levels in the source and receiving rooms are denoted by L_1 and L_2 respectively.

The sound transmission loss is given by

$$TL = L_1 - L_2 + 10\log(S/A)$$

Where

L_1 is the average sound pressure level in the source room, in dB;
L_2 is the average sound pressure level in the receiving room, in dB;
S is the area of the test specimen, in m^2;
A is the equivalent absorption area in the receiving room, in meters sabins.

$$A = (0.9210Vd/c)$$

Where

V is the receiving room volume, in m^3;
d is the rate of decay of sound pressure level in receiving room, dB/s;
c is the speed of sound in the medium , m/s.

The speed of sound changes with temperature and is shall be calculated for the conditions existing at the time of test from the equation:

$$c = 20.047\sqrt{273.15 + t}$$

Where

t is the receiving room temperature, measured to nearest degree.

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The Sound Transmission Class (STC) of test specimen is calculated by comparing the sixteen values of Sound Transmission Loss from 125 Hz to 4000 Hz with a defined reference curve which is incremented until the requirements of ASTM E 413-10 are met.

2.2 Laboratory Location

Fo Tan Main Laboratory -
Room 422, Leader Industrial Centre, 57-59 Au Pui Wan Street,
Fo Tan, Shatin, N.T., Hong Kong.

2.3 Test Condition

Conditions	Source room	Receiving room
Volume	84m^3	203m^3
Air Temperature	25.8°C	25.1°C
Relative Humidity	66.0%	66.7%

2.4 Test Date

Date of receipt of test item: 17 August 2015

Date test commencement and completion
Commencing date: 18 August 2015
Completion date 18 August 2015

2.5 Instrumentation

2.5.1 For sound production

Type	Serial No.
One Real Time Frequency Analyzer – LAN-XI 3160A	3160-100361
One Equalizer – Marantz EQ20D	56E040097
One Amplifier – B&K 2716 Power Amplifier	2571771
One OmniPower Sound Source – Bruel & Kjaer 4296	2128136
One Loudspeaker – JBL EON 515 Loudspeaker	VTP0890-14112

2.5.2 For sound measurement

One Real Time Frequency Analyzer – LAN-XI 3160A	3160-100361
Two Free-field ½" Microphone – Bruel & Kjaer 4190	2731708 & 2731709
Two ½" Microphone Preamplifier – Bruel & Kjaer 2669	2081972 & 2081971
One Sound Level Calibrator – Bruel & Kjaer 4231	1914426

2.5.3 For reverberation time measurement

One Real Time Frequency Analyzer – LAN-XI 3160A	3160-100361
One Free-field ½" Microphone – Bruel & Kjaer 4190	2731708
One ½" Microphone Preamplifier – Bruel & Kjaer 2669	2081972

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3. Results Application

3.1 The results obtained can be used to design building elements with appropriate acoustic properties, to compare the sound insulation properties of building elements and to classify such elements according to their sound insulation capabilities.

3.2 The measurements are performed in laboratory test facilities in which transmission of sound on flanking paths is suppressed. Results of measurements shall not be applied directly in the field without accounting for other factors affecting sound insulation, especially flanking transmission and loss factor.

3.3 The obtained test results relate only to the tested specimen.

4. Description of the Test Construction

4.1 Specimen description: The test specimen composed of totally two layers of 9mm thick Kingtec Hawk Pan calcium silicate board with nominal density of 1000kg/m^3, two calcium silicate fillets (50mm x 9mm), 50mm thick steel stud (at 600mm o.c.) which containing 50mm thick rockwool insulation (density: 100kg/m^3). All gaps were fully caulked.

The 90mm thick partition system was constructed in the test opening between Receiving Room and Source Room and consisted of:

Face layer	: 9mm Kingtec Hawk Pan calcium silicate board (9kg/m^2)
Base layer	: 9mm x 50mm Kingtec Hawk Pan calcium silicate fillet (9kg/m^2)
Metal Stud	: 50mm Steel Stud
Acoustic Infill	: 50mm Rockwool (5kg/m^2)
Base layer	: 9mm x 50mm Kingtec Hawk Pan calcium silicate fillet (9kg/m^2)
Face layer	: 9mm Kingtec Hawk Pan calcium silicate board (9kg/m^2)

4.2 The partition system was essentially as detailed in the client supplied drawing reproduced as in Appendix 1.

4.3 Overall specimen size: 1200 mm (wide) X 2340 mm (high) X 90mm (approx.) thick.

4.4 The tested partition system was supplied and installed by Kingtec Building Materials (HK & Macau) Ltd. on 18 August 2015.

4.5 Photographic records showing the test specimen and measurement setup are given in Appendix 2.

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5. Measurement Results

5.1 The results of measurement for the tested specimen are given in the following table:

Frequency f, Hz	Sound Transmission loss, dB	Sound Transmission loss, dB	Uncertainty, dB
100	14	18	±1.6
125	22		±1.7
160	32		±1.3
200	38	41	±1.0
250	43		±0.8
315	46		±0.7
400	50	51	±0.7
500	51		±0.5
630	53		±0.6
800	54	55	±0.5
1000	56		±0.9
1250	56		±0.5
1600	56	56	±0.5
2000	56		±0.4
2500	56		±0.4
3150	52	54	±0.4
4000	54		±0.4
5000	58		±0.4

5.2 The measured sound transmission loss of the tested specimen against 1/3-octave band center frequencies is plotted on Figure 1.

5.3 The 95% measurement uncertainty is calculated according to the method stated in the Standard ASTM E90-09 A2.

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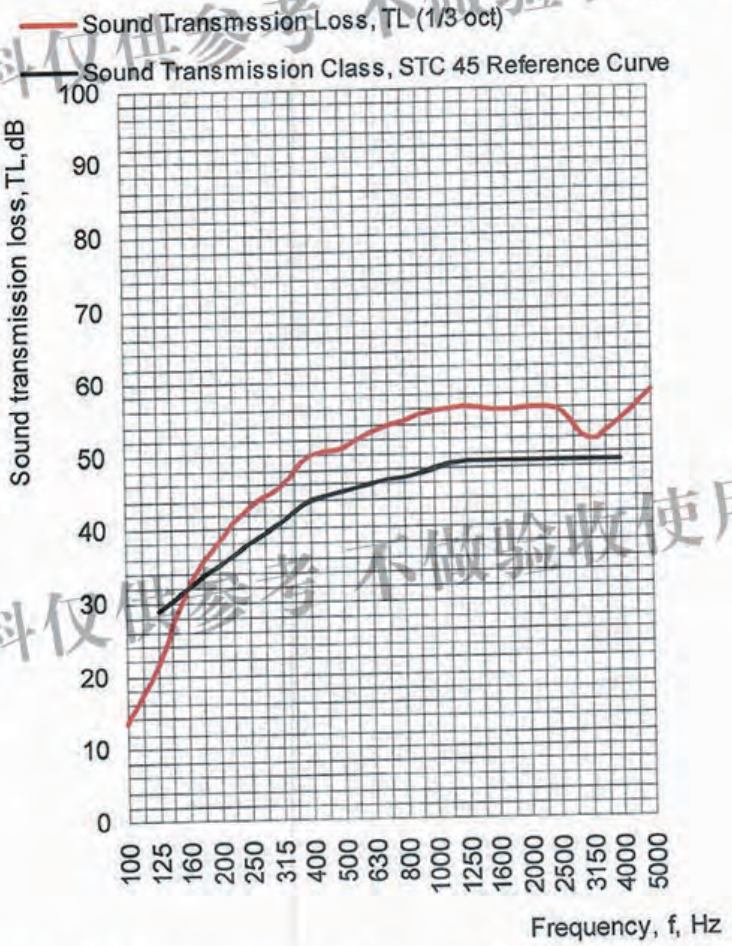

Figure 1. Sound transmission loss against Frequency

5.4 The single number rating of sound transmission class (STC) In accordance with ASTM E413-10 of the tested specimen is given below:

Description	Sound Transmission Class, STC, dB
90mm Kingtec Hawk Pan Fire-rated Partition System	STC 45

Prepared by:

Tang Cheuk Hang
Quality Manager
WN / MT / NS

Endorsed by:

Ng Yan Wa
Laboratory Manager
(Approved Signatory)

- END -

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Appendix List

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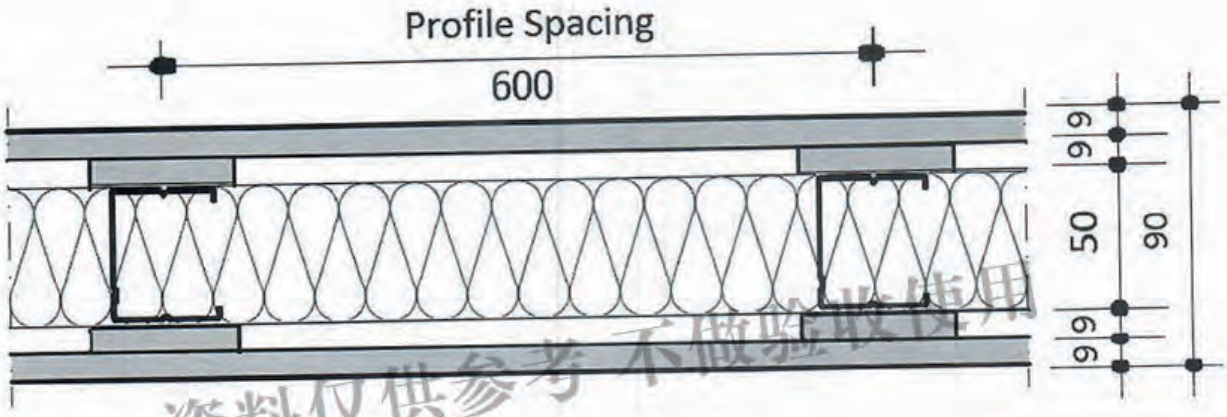
Appendix 1

Details of Test Specimen



Fire-rated Partition System:

The partition system was constructed in the test opening between Receiving Room and Source Room and consisted of:

Face layer	: 9mm Kingtec Hawk Pan calcium silicate board (9kg/m^2)
Base layer	: 9mm x 50mm Kingtec Hawk Pan calcium silicate fillet (9kg/m^2)
Metal Stud	: 50mm Steel Stud
Acoustic Infill	: 50mm Rockwool (5kg/m^2)
Base layer	: 9mm x 50mm Kingtec Hawk Pan calcium silicate fillet (9kg/m^2)
Face layer	: 9mm Kingtec Hawk Pan calcium silicate board (9kg/m^2)

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Appendix 2

Photographic Records

Measurement set-up (Source room)

Measurement set-up (Receiving room)

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REPORT TO: Kingtec Building Materials (HK & Macau) Ltd.

ADDRESS: Unit 1, 3/F, Block B, Shatin Ind. Ctr.
5-7 Yuen Shun Circuit,
Shatin, N.T., Hong Kong

ATTN.: Ms. Lilian Tse / Mr. Sammy Chan

REPORT NO.: APJ15-070-RP002(Rw)

ISSUE DATE: 20 August 2015

HOKLAS Accredited Laboratory Laboratory Sound Reduction Index Measurement Test Report for 90mm Kingtec Hawk Pan Fire-rated Partition System

for Kingtec Building Materials (HK & Macau) Ltd.

(PROJECT NO.: APJ15-070)

Prepared by:

Tang Cheuk Hang
Quality Manager
WN / MT / NS

Endorsed by:

Ng Yan Wa
Laboratory Manager
(Approved Signatory)

HKAS has accredited this Laboratory (Reg. No. 122-TEST) under HOKLAS for specific laboratory activities as listed in the HOKLAS directory of accredited laboratories.

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1. Method of Measurement

1.1 The measurements were carried out in accordance with ISO 140-3:1995 (E) "Acoustics – Measurement of airborne sound insulation in buildings and of building elements - Part 3 Laboratory measurements of airborne sound insulation of building elements" (equivalent to BS 2750 Part 3: 1995) in the reverberation chamber of Acoustics and Air Testing Laboratory Co. Ltd. And the single-figure quantity for airborne sound insulation rating was evaluated in accordance with BS EN ISO 717-1:1997.

2. Details of Measurement

2.1 Principle of Measurement

The expression "sound transmission loss" (TL) is also equivalent to "sound reduction index" (R).

The sound reduction index of a partition is usually measured in a laboratory by placing the element in an opening between two adjacent reverberant rooms designed for such tests. Noise is introduced into one of the rooms, referred to as the source room, and part of the sound energy is transmitted through the test element into the second room, referred to as the receiving room. The resulting mean space-average sound pressure levels in the source room and receiving room is L_1 and L_2, respectively.

The sound reduction index is given by

$$TL = L_1 - L_2 + 10 \log(S/A)$$

Where

S is the area of the test specimen, in square metres.

A is the equivalent absorption area in the receiving room, in square metres, which may preferably be evaluated from the reverberation time measured according to ISO 354: 1985 and evaluated using Sabine's formula

$$A = 0.16\,V/T$$

Where

V is the receiving room volume, in cubic metres;

T is the reverberation time, in seconds, which was obtained by reading and averaging the measured value in receiving room.

The Weighted Sound Reduction Index (Rw) in decibels (dB) is calculated by comparing the sixteen values of Sound Transmission Loss from 100 Hz to 3150 Hz with a defined reference curve which is incremented until the requirements of BS EN ISO 717-1: 1997 are met. Spectrum adaptation terms C and C_{tr} are also calculated.

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2.2 Laboratory Location

Acoustics and Air Testing Laboratory Company Limited
Room 422, Leader Industrial Centre, 57-59 Au Pui Wan Street,
Fo Tan, Shatin, N.T., Hong Kong.

2.3 Test Condition

Conditions	Source room	Receiving room
Volume	84m^3	203m^3
Air Temperature	25.8°C	25.1°C
Relative Humidity	66.0%	66.7%

2.4 Test Date

Date of receipt of test item: 17 August 2015

Date test commencement and completion
Commencing date: 18 August 2015
Completion date 18 August 2015

2.5 Instrumentation

2.5.1 For sound production

Type	Serial No.
One Real Time Frequency Analyzer – LAN-XI 3160A	3160-100361
One Equalizer – Marantz EQ20D	56E040097
One Amplifier – B&K 2716 Power Amplifier	2571771
One OmniPower Sound Source – Bruel & Kjaer 4296	2128136
One Loudspeaker – JBL EON 515 Loudspeaker	VTP0890-14112

2.5.2 For sound measurement

One Real Time Frequency Analyzer – LAN-XI 3160A	3160-100361
Two Free-field ½" Microphone – Bruel & Kjaer 4190	2731708 & 2731709
Two ½" Microphone Preamplifier – Bruel & Kjaer 2669	2081972 & 2081971
One Sound Level Calibrator – Bruel & Kjaer 4231	1914426

2.5.3 For reverberation time measurement

One Real Time Frequency Analyzer – LAN-XI 3160A	3160-100361
One Free-field ½" Microphone – Bruel & Kjaer 4190	2731708
One ½" Microphone Preamplifier – Bruel & Kjaer 2669	2081972

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3. Results Application

3.1 The results obtained can be used to design building elements with appropriate acoustic properties, to compare the sound insulation properties of building elements and to classify such elements according to their sound insulation capabilities.

3.2 The measurements are performed in laboratory test facilities in which transmission of sound on flanking paths is suppressed. Results of measurements shall not be applied directly in the field without accounting for other factors affecting sound insulation, especially flanking transmission and loss factor.

3.3 The test results obtained relate only to the specimen tested.

4. Description of the Test Construction

4.1 Specimen description: The test specimen composed of totally two layers of 9mm thick Kingtec Hawk Pan calcium silicate board with nominal density of 1000kg/m^3, two calcium silicate fillets (50mm x 9mm), 50mm thick steel stud (at 600mm o.c.) which containing 50mm thick rockwool insulation (density: 100kg/m^3). All gaps were fully caulked.

The 90mm thick partition system was constructed in the test opening between Receiving Room and Source Room and consisted of:

Face layer	: 9mm Kingtec Hawk Pan calcium silicate board (9kg/m^2)
Base layer	: 9mm x 50mm Kingtec Hawk Pan calcium silicate fillet (9kg/m^2)
Metal Stud	: 50mm Steel Stud
Acoustic Infill	: 50mm Rockwool (5kg/m^2)
Base layer	: 9mm x 50mm Kingtec Hawk Pan calcium silicate fillet (9kg/m^2)
Face layer	: 9mm Kingtec Hawk Pan calcium silicate board (9kg/m^2)

4.2 The partition system was essentially as detailed in the client supplied drawing reproduced as in Appendix 1.

4.3 Overall specimen size: 1200 mm (wide) X 2340 mm (high) X 90mm (approx.) thick.

4.4 The tested partition system was supplied and installed by Kingtec Building Materials (HK & Macau) Ltd. on 18 August 2015.

4.5 Photographic records showing the test specimen and measurement setup are given in Appendix 2.

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5. Measurement Results

5.1 The results of measurement for the tested specimen are given in the following table:

Frequency f, Hz	Sound reduction index R, dB	Sound reduction index R, dB	Uncertainty
100	13.7	17.8	±1.56
125	21.6		±1.63
160	32.0		±1.27
200	38.4	41.4	±1.01
250	43.2		±0.81
315	45.8		±0.66
400	50.1	51.2	±0.66
500	50.8		±0.49
630	53.3		±0.53
800	54.6	55.6	±0.43
1000	56.1		±0.85
1250	56.3		±0.51
1600	55.9	56.0	±0.43
2000	56.2		±0.35
2500	55.8		±0.32
3150	51.6	53.9	±0.36
4000	54.2		±0.31
5000	58.3		±0.37

NOTE: The 95% measurement uncertainty is calculated according to an engineering method in compliance with the "Guide to the Expression of Uncertainty in Measurement", 1995.

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5.2 The measured sound reduction index of the tested specimen against 1/3-octave band center frequencies is plotted on Figure 1.

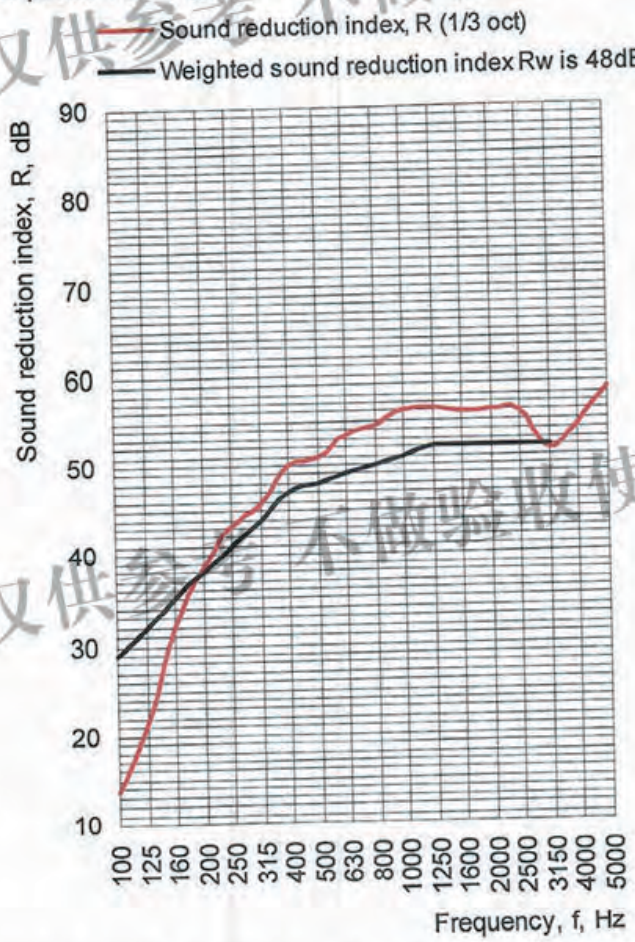

Figure 1. Sound Reduction Index against Frequency

Weighted Sound Reduction Index R'w:

Description	Weighted Sound Reduction Index Rw, dB
90mm Kingtec Hawk Pan Fire-rated Partition System	48

5.3 The rating standard, BS EN ISO 717-1:1997, identifies a number of single figure ratings for this type of test. Evaluation based on laboratory measurement results is obtained by a laboratory method. The calculated values of these rating are:

R'w (C;C_{tr}) = 58 (-7;-15) dB	$C_{100\text{-}5000}$ = -6 dB
	$C_{tr,100\text{-}5000}$ = -15 dB

- END -

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Appendix List

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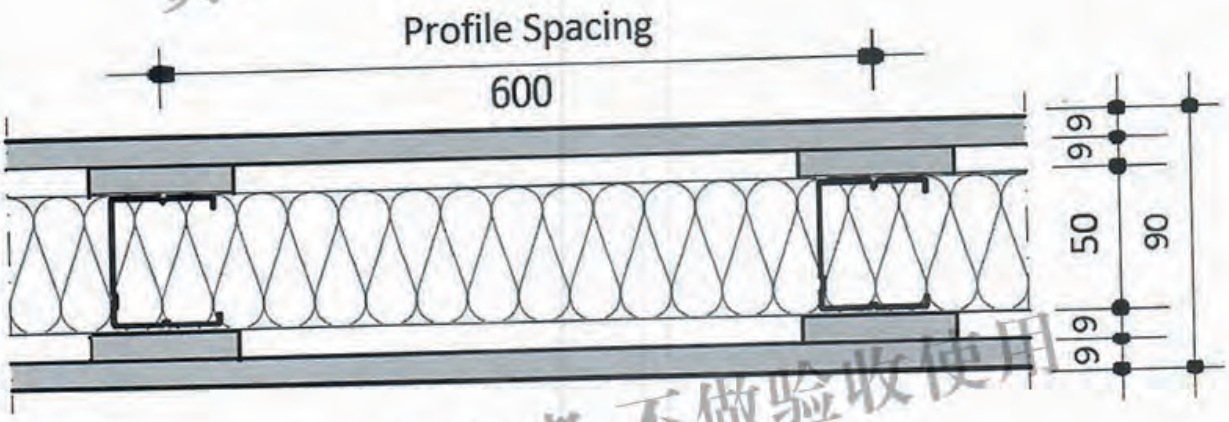
Appendix 1

Details of Test Specimen



Fire-rated Partition System:

The partition system was constructed in the test opening between Receiving Room and Source Room and consisted of:

Face layer	: 9mm Kingtec Hawk Pan calcium silicate board (9kg/m^2)
Base layer	: 9mm x 50mm Kingtec Hawk Pan calcium silicate fillet (9kg/m^2)
Metal Stud	: 50mm Steel Stud
Acoustic Infill	: 50mm Rockwool (5kg/m^2)
Base layer	: 9mm x 50mm Kingtec Hawk Pan calcium silicate fillet (9kg/m^2)
Face layer	: 9mm Kingtec Hawk Pan calcium silicate board (9kg/m^2)

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Appendix 2

Photographic Records

Measurement set-up (Source room)

Measurement set-up (Receiving room)

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