





FIRE RESISTANCE TEST REPORT

PARTITION SYSTEM with SINGLE LAYER LINING

in accordance with BS EN 1364-1: 1999

Test Sponsor: Kingtec Building Materials (HK & Macau) Limited

Unit 1, 3/F., Block B, Shatin Industrial Centre,

5-7 Yuen Shun Circuit, Shatin, New Territories, Hong Kong.

Tel: 852-2640 8688 Fax: 852-2142 8128

Test Laboratory!

Forte Testing and Consultants Company Limited

Contact Information:

Room 11, 2 Floor, Po Hong Centre, 2 Wang Tung Street,

Kowloon Bay, Kowloon, Hong Kong.

Tel: 852-2152 0638 Fax: 852-3186 2737

Report Number: IT 14-190

Date of Issue: 2014-10-20

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HOKLAS Approved Signatory:

Ir. Dr Chan Yuk Kit

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REPORT no.: IT 14-190

Scope of Tes资料仅供参考不做验收使用 This report is a record of a fire resistance test conducted by Forte Testing and Consultants Co., Ltd, in conformity with requirements in BS EN 1364-1: 1999 "Fire resistance tests for non-loadbearing elements -Part 1: Walls" and particular requirements in BS EN 1363-1: 1999 "Fire resistance tests - Part 1: General requirements".

The test subject was a partition system. The partition comprised of a single layer of "Hawk Pan" fire board lining with nominal thickness of 9 mm, and steel framework which was protected by 9 mm thick fillet boards. The specimen was supplied for test by Kingtec Building Materials (HK & Macau) Limited, the Sponsor.

INTEGRITY	(E) 100 101 111	肚然考	INSULATION	(I)		
	Sustained Flaming	255 Minutes		Average Temp. Rise	6	Minutes
	Gap Gauge	255 Minutes		Max. Temp. Rise	7	Minutes
	Cotton Pad	255 Minutes				

2. Test Information

Test Laboratory:	FORTE Testing and	d Consultants Company Limited
Test Location:	Shenzhen, Guang	n Xiang Shan, Xin Yu Road, Shajin, Baoan District, Jdong Province, China.
Test Sponsor:	Kingtec Building N	Materials (HK & Macau) Limited
ID no. of the Specimen:	QT 14-223A	大做验收使用
Date Received:	2014-08-25	多 小师
Test Number: 17 19	QT 14-223	
Date Tested:	2014-09-02	Start Time: 14:26
Approved Test Operators from FORTE:	Ms. Cheng San N	
Witness of the Test:	Mr. Sammy Chan Sponsor	n, Mr. James Yung and Ms. Lilian Tse– Official Delegates of the
Renort Issue Record:	Version 1 – 2014	4- 10 - 20

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3. Construction Details of Specimen

3.1 Specimen Description

3.1.1 Board Configuration

The partition system has an overall size 3070 mm (width) \times 3100 mm (height) comprised of a single layer of nominal 9 mm (thick) surface board. The surface was consisted of 5 sheets of boards including 2 numbers of board with nominal sizes 2440 mm (w) \times 1220 mm (h), 1 number of board with nominal sizes 2440 mm (w) \times 660 mm (h), 1 number of board with nominal sizes 2440 mm (w) \times 630 mm (h) and 1 number of board with nominal sizes 530 mm (w) \times 660 mm (h).

Surface boards were fixed to the framework by Ø3.5 mm X 35 mm flat screws at 160 - 200 mm centre to centre.

70 mm (w) x nominal 9 mm (t) board fillets were fixed on the exposed side of the steel framework under the surface boards. The fillets were fixed to the framework by Ø3.5 mm X 35 mm flat screws at approximate 150 – 200 mm centre to centre.

Fire sealant was caulked at all board joints and between the edges between boards and framework on the specimen.

The space between the space between free edge and the concrete support frame was filled by ceramic fibre.

3.1.2 Structural Framework

The structural framework of the partition was made of horizontal galvanized steel channels and vertical galvanized steel studs. The framework was secured to the test rig by $M6 \times 60$ mm anchor bolts at 550 – 600 mm centre to centre.

Steel studs were sized 32 mm (flange) x 50 mm (depth) x 0.5 mm (t). First stud were for made of single stud; whereas the second to fifth studs were formed as double-stud configuration, which were made by fixing two studs back to back by screws at 500 – 600 mm centre to centre. Steel studs were inserted in between the head and base channels with 2-5 mm expansion gap at both ends of studs. Each end of the studs was fixed to channels by aluminium rivets.

Steel channels were sized of 24 mm (flange) \times 50 mm (depth) \times 0.5 mm (t). Head, base and three rows of stiffening horizontal channels were fixed to the boards. The stiffening channels were fitted between vertical studs and fixed to the studs at both end by aluminium rivets.

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Material Schame 仅供参考不做验收使用 3.2

Parts specifications of the specimen were summarized in the following tables. A star mark "*" indicates those not being verified by FORTE.

Ciro	Board	

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Supplier:	Kingtec Building Materials (HK & Macau) Limited
Supplier: Brand:	Hawk Pan
Material:	Calcium Silicate *
Nominal Density:	950 kg/m ³ *
Nominal Thickness:	9 mm
Location Applied:	Linings of the Specimen and Fillet on the Structural Framework
Location rippinous	- 1 - 1

Location Applied:	Limings of the opecunion and thick on the state of
U-channel	一大战验收使用
Supplier:	Kingtec Building Materials (HK & Macau) Limited
Material:	Galvanized Steel
Sizes:	24 mm x 50 mm x 0.5 mm

Cchannel

O-difamilion		
Supplier:	Kingtec Building Materials (HK & Macau) Limited	
Material:	Galvanized Steel	
Sizes:	32 mm x 50 mm x 0.5 mm	

Fixing - outches	and a second sec	
Supplier:	Kingtec Building Materials (HK & Macau) Limited	All the second second
Туре:	Self-tapping Screws	
Sizes:	Ø3.5 mm X 35 mm	

Fixing - Rivets

Supplier:	Kingtee Building Materials (HK & Macau) Limited
Type:	Blind Rivet
Type: Material:	Aluminum
Sizes:	Ø4 mm X 10 mm

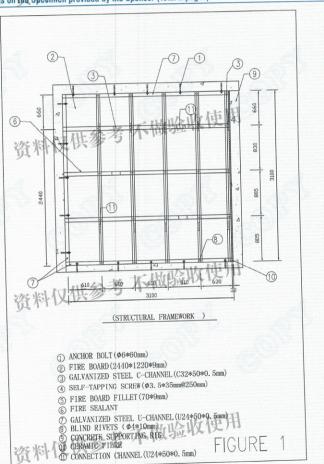
FIXING - Anonor Done	and a second of the second of	
Supplier:	Kingtec Building Materials (HK & Macau) Limited	
Type:	Expansion Anchor Bolt	
Supplier: Type: Material:	Steel	
Sizes:	Ø6 mm x 60 mm	
Location Applied:	Perimeter Framework to Test Rig	

Fire Sealant	The state of the s
Supplier:	Kingtec Building Materials (HK & Macau), Limited
Brand:	Lorient
Material:	Intumescent Masties
Waterial.	Joints Between Boards and Framework of Specimen – Fire and Non Fire
Location Applied:	Evnosed Surface



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Drawings on the Specimen provided by the Sponsor (Total 2 pages) 3.3





考不做验收使用 6 0 FIRE TC 3100 805 305 610 B-B 610 610 630 3100 BELEVATION OF FIRE EXPOSED SIDE FIRE Drawings of Specimen provided by the Sponsor (2) ① ANCHOR BOLT (\$\phi6*60mm) (2) FIRE BOARD (2440*1220*9mm) (3) GALVANIZED STEEL C-CHANNEL (C32*50*0.5mm) (4) SELF-TAPPING SCREW (\$\phi_3.5*35mm@250mm) FIRE BOARD FILLET (70*9mm) 6 FIRE SEALANT GALVANIZED STEEL U-CHANNEL (U24*50*0.5mm) BLIND RIVETS (\$\phi4*10mm) CONCRETE SUPPORTING RIG CERAMIC FIBRE (I) CONNECTION CHANNEL (U24*50*0.



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Specimen Conditi

Selection of the Specimen 41

The specimen was selected by the Sponsor and submitted to the Test Location. FORTE did not involve in the selection of the specimen.

All the components of the test specimen were supplied by the Sponsor.

Verification of the Specimen 42

Additional components of the specimen such as lining and steel studs were transferred to the Test Location on 2014-08-25 by the Sponsor. Samples of the components were taken randomly for verification.

FORTE verified the specimen description given by the Sponsor to the best of its ability. In section 3.2 of this report, items which had been verified by FORTE was clearly identified and distinguished from those relying on Sponsor's declaration.

Supporting Construction 43

The specimen was fixed into a supporting construction made of fully cured reinforced normal density concrete slabs provided by FORTE. The concrete slabs formed a structural opening 3110 mm (w) x 3110 mm (h).

Installation of the Specimen 4.4

The specimen was assembled and installed by workers delegated by the Sponsor on 2014-08-26 to 2014-08-29.

Specimen Conditioning 4.5

The specimen was stored in the Test Location from 2014-08-25, the date which components of the specimen were received, to 2014-09-02, the date which fire resistance test performed.

The average environment parameters in the Test Location within this period were:

Ambient Temperature (°C)	Relative Humidity (%)
32 ± 5	70 ± 5

Direction of Fire Side and Others 4.6

The Sponsor designated and installed that the steel framework was standing on the unexposed side.

The vertical free edge was set adjacent to the smaller board on the exposed face.

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Test Method资料仅供参考不做验收使用 REPORT no.: IT 14-190

Ambient Temperature 5.1

The ambient temperature was measured by a type K thermocouple. The measuring junction was positioned approximately 1500 mm away the test construction.

5.2 **Heating Condition**

The average temperature inside the furnace was monitored and controlled throughout the test according to the standard heating curve stated in BS EN 1363-1:1999 given by the equation:

$$T = 345 \log_{10} (8t+1) + 20$$

7 is the average furnace temperature, in degree Celsius

is the time, in minutes

The temperature inside the furnace was measured in conformity with BS EN 1363-1: 1999 by 9 numbers of plate thermometers. These thermometers were evenly distributed over a vertical plane approximately 100 mm from the exposed surface of the test construction.

The positions of furnace thermocouples are shown in Figure 1.

Unexposed Surface Temperature 5.3

The unexposed surface temperatures of specimen were measured by 15 numbers of type K thermocouples. These thermocouples were positioned and fixed on unexposed surface of specimen in conformity with BS EN 1364-1: 1999.

The positions of unexposed surface temperature measurement points are shown in Figure 3. The locations of 出版体 thermocouples are explained in the following table.

Thermocouple	Description开会差人们以多
U1 – U5	For average and maximum unexposed surface temperature rise
U6 – U14	For maximum unexposed surface temperature rise
U15 – U26	For additional information only and NOT assessed against insulation criterion; Data shown in Appendix A

Pressure Condition 5.4

The pressure inside the furnace was continuously monitored in compliance with BS EN 1363-1: 1999 during the whole test. The pressure at a point 500 $\,$ mm above the notional floor level was to be maintained 0 ± 5 Pa by five minutes from commencement of the test and 0 ±3 Pa that from ten minutes onwards with respect to the atmosphere.

Deflection Measurements 5.5

Measurements of the deflection of the specimen were taken with a steel rule from cross line laser across the mid-height of the specimen with reference to BS EN 1364-1:1999.

The positions of deflection measurement points are shown in Figure 2. FORTS-TESTING AND CONSULTANTS CO LID FORTE TESTING AND CONSULTANTS CO LID FORTE TESTING AND CONSULTANTS CO LID FORTE TESTING AND



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Figure 1. Position of thermocouples and pressure measuring probe inside the furnace.

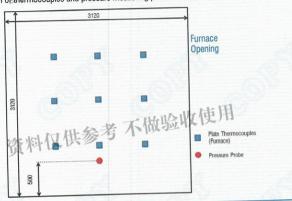
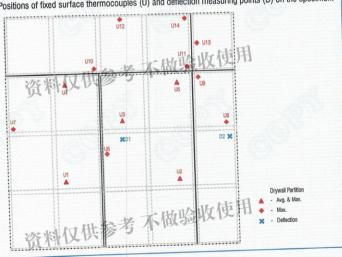


Figure 2. Positions of fixed surface thermocouples (U) and deflection measuring points (D) on the specimen.



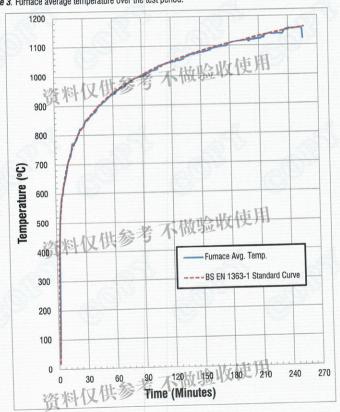


资料仅供参考不做验收使用 **Test Data**

Furnace Temperature

The furnace average temperature over the test period is shown in Figure 3.

Figure 3. Furnace average temperature over the test period.





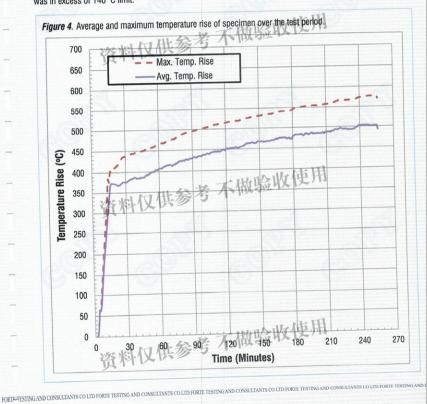
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6.2 **Unexposed Surface**

Fixed surface thermocouples 6.2.1

The temperature rises of unexposed surface of specimen measured by fixed surface thermocouples over the test period are shown in Figure 4.

The maximum temperature rise measured on U6 at 7.24 minute of test was 180.8°C, which was in excess of 180°C limit. The average temperature rise measured at specimen at 6.48 minute of test was 141.8°C, which was in excess of 140°C limit.





6.2.2

Fixed surface thermocouples – Detailed Temperature Records
uts of the unexposed surface thermocouples The outputs of the unexposed surface thermocouples on specimen are summarized in the following tables. Measurements were taken in °C.

Temperature outputs from unexposed surface temperature U1 to U8

me (min)	U1	U2	U3	U4	U5	U6	U7	U8 33.4
0.0	34.7	34.7	34.9	34.8	35.2	34.4	33.6	34.2
1.0	35.8	35.9	36.5	36.7	37.0	36.3	34.9	46.7
2.0	49.3	52.9	57.0	56.5	63.7	57.4	48.6	
3.0	94.3	94.6	95.9	98.4	97.7	95.1	88.4	89.9
4.0	95.4	96.6	97.0	98.9	100.1	97.9	94.8	94.0
5.0	97.6	106.0	110.8	122.0	131.5	128.0	101.9	95.3
6.0	128.6	141.2	147.5	159.5	169.2	167.7	136.1	109.4
7.0	162.9	172.1	180.8	194.3	200.2	202.5	162.6	140.8
8.0	198.3	204.6	212.9	225.2	230.1	239.1	195.8	170.5
9.0	227.9	230.6	241.5	250.4	255.4	272.3	218.0	196.5
10.0	256.0	258.1	271.5	278.1	280.5	307.3	236.9	223.3
20.0	378.8	395.3	400.0	428.1	428.4	407.7	369.5	422.3
30.0	381.4	404.8	402.8	435.7	435.9	420.7	397.5	400.1
40.0	392.4	412.0	406.9	446.9	443.6	426.4	421.1	414.1
50.0	402.0	426.6	419.1	452.5	455.8	441.2	424.0	414.7
60.0	413.1	437.0	431.5	466.2	466.6	454.9	437.1	426.0
70.0	417.2	442.5	436.4	477.4	474.8	462.5	433.6	439.4
80.0	428.3	450.3	444.8	489.2	488.4	474.6	441.6	443.5
90.0	434.2	455.0	454.1	497.4	496.1	481.6	450.7	448.5
100.0	440.0	459.2	458.4	503.8	501.6	492.0	457.5	457.0
110.0	444.7	470.5	467.4	510.5	512.0	497.8	468.8	467.3
120.0	451.5	477.5	474.9	516.4	517.5	501.4	475.0	473.8
130.0	453.8	475.9	476.4	519.4	516.1	508.1	483.9	474.7
	460.5	486.6	489.7	526.7	531.0	511.6	487.1	489.
140.0	463.1	490.4	491.0	532.2	533.9	515.1	492.9	489.
150.0	467.8	496.9	491.2	536.0	534.7	517.5	500.9	494.
160.0	473.1	503.5	494.8	542.7	540.6	524.2	501.5	500.
170.0	475.1	503.9	501.4	550.4	542.9	526.4	515.8	505.
180.0	481.0	511.3	502.6	553.1	546.5	532.7	512.9	510.
190.0	480.4	511.5	503.8	554.1	547.9	534.0	515.2	510.
200.0	484.5	513.9	508.0	559.7	550.0	536.2	523.8	515.
210.0		524.0	515.0	562.5	558.3	543.5	517.2	521.
220.0	489.0	521.2	510.5	562.7	556.8	545.7	518.1	520
230.0	488.0	530.0	521.5	570.3	568.6	552.0	524.4	527
240.0	495.7	529.6	520.1	570.7	565.0	553.6	528.0	528
250.0	497.1	/ -		561.2	556.4	541.1	521.2	522
255.0	487.1	521.7	512.6	301.2	550.4	01111		



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Temperature outputs from unexposed surface temperature U9 to U14

0.0 33.4 34.4 34.3 34.8 34.2 35.0 1.0 34.2 35.7 36.2 36.2 35.6 36.3 2.0 46.7 56.8 55.6 55.1 55.0 53.7 3.0 89.9 97.3 96.8 95.9 97.2 96.3 4.0 94.0 98.3 98.1 97.8 98.1 98.2 5.0 95.3 124.1 125.1 122.5 121.6 118.1 6.0 109.4 158.8 162.7 167.4 159.3 154.3 7.0 140.8 188.2 194.9 187.1 187.5 181.4 8.0 170.5 2215.6 223.4 213.5 212.8 207.2 9.0 196.5 239.3 246.7 234.8 231.3 227.9 10.0 261.3 272.8 257.0 251.7 247.7 232.9 10.0 461.3 247.7 441.0 438	Time (min)	U9	U10	U11	U12	U13	U14
1.0 34.2 35.7 36.2 36.2 35.6 36.3 2.0 46.7 56.8 55.6 55.1 55.0 53.7 3.0 89.9 97.3 96.8 95.9 97.2 96.3 4.0 94.0 98.3 98.1 97.8 98.1 98.2 5.0 95.3 124.1 125.1 122.5 121.6 118.1 6.0 109.4 158.8 162.7 167.4 159.3 154.3 7.0 140.8 188.2 194.9 187.1 187.5 181.4 8.0 170.5 215.6 223.4 213.5 212.8 207.2 9.0 196.5 239.3 246.7 234.8 231.3 227.9 10.0 261.3 272.8 257.0 251.7 247.7 232.9 20.0 422.1 447.7 441.0 438.7 424.5 441.5 30.0 440.9 471.6 465.1 <		33.4	34.4	34.3			
2.0 46.7 56.8 55.6 55.1 55.0 53.7 3.0 89.9 97.3 96.8 95.9 97.2 96.3 4.0 94.0 98.3 98.1 97.8 98.1 98.2 5.0 95.3 124.1 125.1 122.5 121.6 118.1 6.0 109.4 158.8 162.7 167.4 159.8 154.3 7.0 140.8 188.2 194.9 187.1 187.5 181.4 8.0 170.5 215.6 223.4 213.5 212.8 207.2 9.0 196.5 239.3 246.7 234.8 231.3 227.9 10.0 261.3 272.8 257.0 251.7 247.7 232.9 20.0 422.1 447.7 441.0 438.7 242.5 441.5 30.0 440.9 471.6 465.1 443.0 428.7 454.9 40.0 448.0 484.4 477.7		34.2	35.7	36.2	36.2		
3.0 89.9 97.3 96.8 95.9 97.2 96.3 4.0 94.0 98.3 98.1 97.8 98.1 98.2 5.0 95.3 124.1 125.1 122.5 121.6 118.1 6.0 109.4 158.8 162.7 167.4 159.8 154.3 7.0 140.8 488.2 194.9 197.1 187.5 181.4 8.0 170.5 215.6 223.4 213.5 212.8 207.2 9.0 196.5 239.3 246.7 234.8 231.3 227.9 10.0 261.3 272.8 257.0 251.7 247.7 232.9 20.0 422.1 447.7 441.0 438.7 424.5 441.5 30.0 440.9 471.6 465.1 443.0 428.7 454.9 40.0 448.0 484.4 477.7 451.1 438.2 461.4 50.0 456.8 488.9 483.5<		46.7	56.8	55.6	55.1		
4.0 94.0 98.3 98.1 97.8 98.1 98.2 5.0 95.3 124.1 125.1 122.5 121.6 118.1 6.0 109.4 158.8 162.7 157.4 159.3 154.3 7.0 140.8 188.2 194.9 187.1 187.5 181.4 8.0 170.5 215.6 223.4 213.5 212.8 207.2 9.0 196.5 239.3 246.7 234.8 231.3 227.9 20.0 422.1 447.7 441.0 438.7 424.5 441.5 30.0 440.9 471.6 465.1 443.0 428.7 454.9 40.0 448.0 484.4 477.7 451.1 438.2 461.4 50.0 456.8 488.9 483.5 453.4 444.0 470.5 60.0 467.7 501.7 490.7 463.2 456.2 476.3 70.0 474.5 511.9 <td< td=""><td></td><td></td><td>97.3</td><td>96.8</td><td>95.9</td><td></td><td>-</td></td<>			97.3	96.8	95.9		-
5.0 95.3 124.1 125.1 122.5 121.6 118.1 6.0 109.4 158.8 162.7 167.4 159.8 154.3 7.0 140.8 488.2 194.9 167.1 187.5 181.4 8.0 170.5 215.6 223.4 213.5 212.8 207.2 9.0 196.5 239.3 246.7 234.8 231.3 227.9 10.0 261.3 272.8 257.0 251.7 247.7 232.9 20.0 422.1 447.7 441.0 438.7 424.5 441.5 30.0 440.9 471.6 465.1 443.0 428.7 454.9 40.0 448.0 484.4 477.7 451.1 438.2 461.4 50.0 456.8 488.9 483.5 453.4 444.0 470.5 60.0 467.7 501.7 490.7 463.2 456.2 476.3 70.0 474.5 511.9		94.0	98.3	98.1	97.8		
6.0 109.4 158.8 162.7 167.4 159.8 154.3 7.0 140.8 488.2 194.9 197.1 187.5 181.4 8.0 170.5 215.6 223.4 213.5 212.8 207.2 9.0 196.5 239.3 246.7 234.8 231.3 227.9 10.0 261.3 272.8 257.0 251.7 247.7 232.9 20.0 422.1 447.7 441.0 438.7 424.5 441.5 30.0 440.9 471.6 465.1 443.0 428.7 454.9 40.0 448.0 484.4 477.7 451.1 438.2 461.4 50.0 456.8 488.9 483.5 453.4 444.0 470.5 60.0 467.7 501.7 490.7 463.2 456.2 476.3 70.0 474.5 511.9 500.5 474.1 482.6 485.9 80.0 481.2 533.7		95.3	124.1	125.1	122.5	-	
7.0 140.8 188.2 194.9 187.1 187.5 181.4 8.0 170.5 215.6 223.4 213.5 212.8 207.2 9.0 196.5 239.3 246.7 234.8 231.3 227.9 10.0 261.3 272.8 257.0 251.7 247.7 232.9 20.0 422.1 447.7 441.0 438.7 424.5 441.5 30.0 440.9 471.6 465.1 443.0 428.7 454.9 40.0 448.0 484.4 477.7 451.1 438.2 461.4 50.0 456.8 488.9 483.5 453.4 444.0 470.5 60.0 467.7 501.7 490.7 463.2 456.2 476.3 70.0 474.5 511.9 500.5 474.1 462.6 485.9 80.0 481.2 523.7 512.3 490.1 475.9 498.8 90.0 484.1 538.3		109.4	158.8	162.7	157.4	159.3	
8.0 170,5 215.6 223.4 213.5 212.8 207.2 19.0 196.5 239.3 246.7 234.8 231.3 227.9 10.0 261.3 272.8 257.0 251.7 247.7 232.9 20.0 422.1 447.7 441.0 438.7 424.5 441.5 30.0 440.9 471.6 465.1 443.0 428.7 454.9 40.0 448.0 484.4 477.7 451.1 438.2 461.4 50.0 456.8 488.9 483.5 453.4 444.0 470.5 60.0 467.7 501.7 490.7 463.2 456.2 476.3 70.0 474.5 511.9 500.5 474.1 462.6 485.9 80.0 481.2 523.7 512.3 490.1 475.9 498.8 90.0 489.7 530.9 521.4 498.8 484.7 509.0 10.0 503.4 545.9			188.2	194.9	187.1	187.5	
19.0			215.6	223.4	213.5		
10.0 261.3 272.8 257.0 251.7 247.7 232.9 20.0 422.1 447.7 441.0 438.7 424.5 441.5 30.0 440.9 471.6 465.1 443.0 428.7 454.9 40.0 448.0 484.4 477.7 451.1 438.2 461.4 50.0 456.8 488.9 483.5 453.4 444.0 470.5 60.0 467.7 501.7 490.7 463.2 456.2 476.3 70.0 474.5 511.9 500.5 474.1 462.6 485.9 80.0 481.2 523.7 512.3 490.1 475.9 498.8 90.0 489.7 530.9 521.4 498.8 484.7 509.0 100.0 494.1 538.3 527.6 504.3 489.1 516.4 110.0 503.4 545.9 536.7 510.3 498.0 523.6 120.0 507.2 551.2<			239.3	246.7	234.8		
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50.0 456.8 488.9 483.5 453.4 444.0 470.5 60.0 467.7 501.7 490.7 463.2 456.2 476.3 70.0 474.5 511.9 500.5 474.1 462.6 485.9 80.0 481.2 523.7 512.3 490.1 475.9 498.8 90.0 489.7 530.9 521.4 498.8 484.7 509.0 100.0 494.1 538.3 527.6 504.3 489.1 516.4 110.0 503.4 545.9 536.7 510.3 498.0 523.6 120.0 507.2 551.2 542.1 515.2 504.5 529.0 130.0 517.2 554.5 547.4 518.1 506.9 534.5 140.0 520.9 561.8 556.2 524.6 515.7 541.3 150.0 522.6 566.5 560.6 529.5 518.7 546.4 160.0 526.7 57			484.4	477.7	451.1	438.2	
60.0 467.7 501.7 490.7 463.2 456.2 476.3 70.0 474.5 511.9 500.5 474.1 462.6 485.9 80.0 481.2 523.7 512.3 490.1 475.9 498.8 90.0 489.7 530.9 521.4 498.8 484.7 509.0 100.0 494.1 538.3 527.6 504.3 489.1 516.4 110.0 503.4 545.9 536.7 510.3 498.0 523.6 120.0 507.2 551.2 542.1 515.2 504.5 529.0 130.0 517.2 554.5 547.4 518.1 506.9 534.5 140.0 520.9 561.8 556.2 524.6 515.7 541.3 150.0 522.6 566.5 560.6 529.5 518.7 546.4 160.0 528.7 570.0 560.9 532.2 521.6 546.7 170.0 528.2 5			488.9	483.5	453.4	444.0	
70.0 474.5 511.9 500.5 474.1 462.6 485.9 80.0 481.2 523.7 512.3 490.1 475.9 498.8 90.0 489.7 530.9 521.4 498.8 484.7 509.0 100.0 494.1 538.3 527.6 504.3 489.1 516.4 110.0 503.4 545.9 536.7 510.3 498.0 523.6 120.0 507.2 551.2 542.1 515.2 504.5 529.0 130.0 517.2 554.5 547.4 518.1 506.9 534.5 140.0 520.9 561.8 556.2 524.6 515.7 541.3 150.0 522.6 566.5 560.6 529.5 518.7 546.4 160.0 526.7 570.0 560.9 532.2 521.6 546.7 170.0 528.2 576.5 564.1 538.7 525.5 550.6 180.0 532.1				490.7	463.2	456.2	
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130.0 517.2 554.5 547.4 518.1 506.9 534.5 140.0 520.9 561.8 556.2 524.6 515.7 541.3 150.0 522.6 566.5 560.6 529.5 518.7 546.4 160.0 526.7 570.0 560.9 532.2 521.6 546.7 170.0 528.2 576.5 564.1 538.7 525.5 550.6 180.0 532.1 582.4 570.1 542.8 529.3 555.0 190.0 537.9 588.5 574.8 548.7 532.9 561.5 200.0 540.3 589.8 576.6 550.5 534.1 563.7 210.0 538.5 593.1 580.2 552.3 537.4 565.5 220.0 546.4 600.7 588.1 560.5 544.9 573.9 230.0 547.5 601.9 589.7 561.6 544.5 576.7 240.0 556.9 <		0.5	551.2	542.1	515.2	504.5	
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180.0 532.1 582.4 570.1 542.8 529.3 555.0 190.0 537.9 588.5 574.8 548.7 532.9 561.5 200.0 540.3 589.8 576.6 550.5 534.1 563.7 210.0 538.5 593.1 580.2 552.3 537.4 565.5 220.0 546.4 600.7 588.1 560.5 544.9 573.9 230.0 547.5 601.9 589.7 561.6 544.5 576.7 240.0 556.9 608.2 597.8 569.3 555.1 587.1 250.0 556.8 610.8 601.4 571.0 555.5 578.8				564.1	538.7	525.5	
190.0 537.9 588.5 574.8 548.7 532.9 561.5 200.0 540.3 589.8 576.6 550.5 534.1 563.7 210.0 538.5 593.1 580.2 552.3 537.4 565.5 220.0 546.4 600.7 588.1 560.5 544.9 573.9 230.0 547.5 601.9 589.7 561.6 544.5 576.7 240.0 556.9 608.2 597.8 569.3 555.4 583.7 250.0 556.8 610.8 601.4 571.0 555.1 587.0				570.1	542.8	529.3	
200.0 540.3 589.8 576.6 550.5 534.1 563.7 210.0 538.5 593.1 580.2 552.3 537.4 565.5 220.0 546.4 600.7 588.1 560.5 544.9 573.9 230.0 547.5 601.9 589.7 561.6 544.5 576.7 240.0 556.9 608.2 597.8 569.3 555.4 583.7 250.0 556.8 610.8 601.4 571.0 555.1 587.1				574.8	548.7	532.9	
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220.0 546.4 600.7 588.1 560.5 544.9 573.9 230.0 547.5 601.9 589.7 561.6 544.5 576.7 240.0 556.9 608.2 597.8 569.3 555.4 583.2 250.0 556.8 610.8 601.4 571.0 555.1 587.1			593.1	580.2	552.3		
230.0 547.5 601.9 589.7 561.6 544.5 576.7 240.0 556.9 608.2 597.8 569.3 555.4 583.5 250.0 556.8 610.8 601.4 571.0 555.1 587.1 250.0 556.8 610.8				588.1	560.5		
240.0 556.9 608.2 597.8 569.3 555.4 583.5 250.0 556.8 610.8 601.4 571.0 555.1 587.7 250.0 556.8 610.8 601.4 570.0 566.9 578.4				589.7	561.6	MITTER LAND	
250.0 556.8 610.8 601.4 571.0 555.1 587.7					569.3		
250.0 500.0 578.4		20.0	And the second	601.4	571.0	555.1	587.7
	255.0	548.3	604.8	592.1	560.2	546.9	578.4



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6.3 The furnace pressure over the test period is summarized in the following table.

Time (min)	Pressure: 500 mm above notional floor level	Time (min)	Pressure: 500 mm above notional floor level
6	-2.5	140	0.8
10	-2.0	150	1.2
20	1.7	160	-1.5
30	1.5	170	1.1
40	-0.2	180	八水柱 10.2
50	-0.9 111 公才	190	0.5
60	次料 2.8 共 / /	200	-1.2
70	-1.0	210	-0.4
80	-0.7	220	-1.8
90	-1.4	230	0.5
100	-0.8	240	1.3
	-1.2	250	-2.0
110	0.0	260	0.8
120	0.1	263	-1.7

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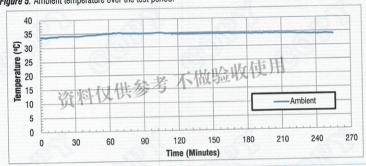


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Ambient Tempera 6.4

The ambient temperature over the test period was recorded and is shown in Figure 5.

The ambient temperature at the commencement of test was 32.3°C. Figure 5. Ambient temperature over the test period.



Lateral Deflections 6.5

Measured lateral deflections over the test period are summarized in the following table. A positive measurement indicates a movement towards into the furnace and vice versa.

Measurements were taken in mm.

Maximum deflection measured on specimen was +68 mm at D1 at 240 and 250 minute of the test period.

2//C		30	60	90	120	150	180	210	220
Position \ Time (min)	10	+25	+57	+63	+63	+65	+66	+66	+66
D1 D2	+0	+5	+10	+14	+14	+16	+13	+15	+18
Position \ Time (min)	230	240	250		IMILE STATE				
A STATE OF THE PARTY OF THE PAR	100		00						

Position \ Time (min)	230	240	250
D1	+67	+68	+68
D2	+18	+14	+19

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Observation资料仅供参考不做验收使用 REPORT no.: IT 14-190

6.6

Significant behaviours on the specimen during the test period are summarized in the following table. Photos taken during the test period are also attached.

ime (min.sec)	Observation (from unexposed side)
00.00	Test Started.
07.06	The boards turned dull in appearance. Fire sealants at the gap between framework and
	fire board turned yellowish.
15.30	The boards turned deeper in color.
20.19	Smoke was released from the seams. A portion of the fire board turned dark brown at the top position of the specimen.
30.00	No integrity failure had occurred.
33.35	Light smoke was released from the seams.
35.28	Cotton fibre pad test was carried out over the lower right region on the specimen. No
	flaming or glowing on the cotton pad was observed.
49.53	The specimen was slightly deformed towards to furnace.
45.00	The specimen was stable.
	The center of the specimen move into the furnace.
60.00	No integrity failure had occurred.
95.00	The specimen was stable.
119.48	The specimen was stable.
120.00	N. Internity foilure had accurred
146.31	Cotton fibre pad test was carried out over the upper left region on the specimen. No flaming or glowing on the cotton pad was observed.
168.08	The appairmen was deformed towards to furnace.
178.16	Cotton fibre pad test was carried out over the upper left region on the specimen. No
170.10	design or glowing on the cotton had was observed.
179.59	Cotton fibre pad test was carried out over the upper right region on the specimen. No
179.55	flaming or glowing on the cotton pad was observed.
180.00	The appairmon was stable
201.54	Old view and the crossing corner along second horizontal stud.
207.18	Cotton fibre pad test was carried out over the upper right region on the specimen.
207.10	the mine or glowing on the cotton had was observed.
208.38	Cotton fibre pad test was carried out over the upper middle region on the specimen. W
200.30	flaming or glowing on the cotton pad was observed.



料仅供参考不做验收使用 REPORT no.: IT 14-190 Observation Con't (from unexposed side) Time (min.sec) Cotton fibre pad test was carried out over the upper left region on the specimen. No 209 43 flaming or glowing on the cotton pad was observed. The specimen was deformed towards to furnace. 220.08 Cotton fibre pad test was carried out over the upper left region on the specimen. No 235.45 flaming or glowing on the cotton pad was observed. Cotton fibre pad test was carried out over the upper right region on the specimen. No 236.34 flaming or glowing on the cotton pad was observed. Cotton fibre pad test was carried out over the upper left region on the specimen. No 237 30 flaming or glowing on the cotton pad was observed. No integrity failure had occurred. 240.00 The specimen was stable. 250.00 Test was terminated at request of the Sponsor. 255.00

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6.7 Photos



Photo 1. Exposed surface of the specimen before test.



Photo 2. Unexposed surface of the specimen before commencement of test.



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Photo 3. Unexposed surface of the specimen at 30 minute of test.



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Photo 4. Unexposed surface of the specimen at 60 minute of test.



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Photo 5. Unexposed surface of the specimen at 100 minute of test.



Photo 6. Unexposed surface of the specimen at 140 minute of test.

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Photo 7. Unexposed surface of the specimen at 180 minute of test.



Photo 8. Unexposed surface of the specimen at 210 minute of test. FORTE-TESTING AND CONSULTANTS COLD FORTE TESTING AND





Photo 9. Unexposed surface of the specimen at 240 minute of test.



Photo 10. Unexposed surface of the specimen after the test. FORTE-SESTING AND CONSULTANTS CO. LTD FORTE TESTING AND CO. LTD FO



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Photo 11. Exposed surface of the specimen after test.

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Test Results

Test was terminated after a period of 255 minutes at request of the Sponsor.

The test data obtained from the fire resistance test was assessed against performance criteria given in BS EN 1364-1: 1999. The test results are summarized in the following table.

Performar	nce Criteria		Elapsed Time before Failure Occurrence	
ntegrity (E)		255 minutes	
	of Failure	Description HATEL	Elapsed Time before Failure Occurrence	
Sustained I	Flaming 炎	Continuous flaming for a period of time greater than 10 seconds on unexposed surface	255 minutes (No Failure)	
Gap	Ø6 mm	Penetration of the gauge into the furnace through the specimens and movable along a 150 mm gap	255 minutes (No Failure)	
Gauge	Ø25 mm	Penetration of the gauge into the furnace through the specimens		
Cotton Pag		Ignition of the cotton pad	255 minutes (No Failure)	
Performa Insulatio	nce Criteria	a state Will	Elapsed Time before Failure Occurrence 6 minutes	
	of Failure	10世经著人似地(1)	Elapsed Time before Failure Occurrence	
Integrity F	ailure	The performance criterion "insulation" shall automatically be assumed not to be satisfied when the "integrity" criterion ceases to be satisfied	255 minutes (No Failure)	
Average Temperat	ure Rise	An increase of the average temperature of unexposed surface of the specimens above the initial average temperature by more than 140°C	6 minutes	
Maximum Temperature Rise		An increase of temperature at any other point of the specimens above the initial average temperature by more than 180 °C	7 minutes	

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7. Limitations 资料仅供参考 不做验收使用 REPORT no.: IT 14-190

This report details the method of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the procedure outlined in BS EN 1363-1, and where appropriate BS EN 1363-2. Any significant deviation with respect to size, construction details, loads, stresses, edge or end conditions other than those allowed under the field of direct application in the relevant test

method is not covered by this report. Because of the nature of fire resistance testing and the consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result.

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Field of Direct Applications of Test Results

The field of direct application defines the allowable changes to the test specimen following a successful fire resistance test. These variations can be introduced automatically without the need for the sponsor to seek additional evaluation, calculation or approval.

The series of rules and guidelines are defined in Clause 13 "Field of direct application of test results", BS EN 1364-1: 1999 and relevant clauses and annexes.

The field of direct applications may only be defined following the identification of classification(s). The field of direct and, where applicable, extended application will be included in classification relevant documents.

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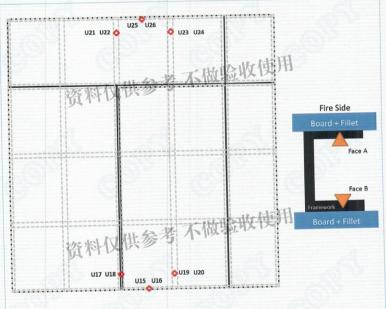
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Appendix A

Additional Temperature - Framework A.1 Fixed surface thermocouples were attached to different locations of the framework to obtain additional information. Locations of these thermocouples are shown and summarized in the following figure and table.



Location of Additional Thermocouples

Position	Face A	Face B
100 mm below Top Edge	U22, U24	U21, U23
500 mm above Bottom Edge	U18, U20	U17, U19
Centre of Top Track	U26	U25
Centre of Bottom Track	U16	U15



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A.2 Additional Thermocouples - Detailed Temperature Records

The outputs of the additional thermocouples on framework of the specimen are summarized in the following tables. Measurements were taken in °C.

Temperature outputs from unexposed surface temperature U15 to U20

Time (min)	U15	U16	U17	U18	U19	U20
0.0	32.8	32.0	34.0	33.8	34.2	34.2
5.0	39.7	36.2	57.4	44.4	58.3	43.8
10.0	93.2	68.5	97.7	85.2	97.2	84.7
20.0	98.3	91.4	159.9	120.6	171.5	120.2
30.0	151.6	110.4	236.2	150.4	252.0	158.2
40.0	183.6	132.2	278.7	174.0	288.9	180.3
50.0	201.4	142.7	298.4	186.0	305.3	188.8
60.0	215.7	150.8	312.7	193.6	316.4	195.4
70.0	223.8	150.8	318.4	190.9	321.1	193.4
80.0	228.8	153.3	318.1	187.4	320.3	190.4
90.0	235.8	158.0	321.7	188.9	322.4	191.4
100.0	242.8	161.7	327.3	191.5	325.1	194.1
110.0	250.3	167.6	332.2	196.1	328.8	196.1
120.0	256.1	172.9	335.2	198.2	332.7	197.8
130.0	262.5	176.8	336.4	198.4	334.4	199.1
140.0	270.4	186.9	343.2	205.1	340.5	204.8
150.0	274.4	187.9	343.6	204.7	341.7	204.1
160.0	279.4	192.5	343.3	207.8	344.2	207.9
170.0	285.2	196.8	345.9	209.4	349.2	212.5
180.0	285.1	196.4	343.9	206.3	346.4	207.7
190.0	290.1	199.5	347.6	208.2	348.9	209.1
200.0	292.8	199.9	349.1	209.0	348.7	208.2
210.0	296.6	204.4	352.6	212.5	351.4	212.4
220.0	299.6	208.4	356.3	215.6	354.0	215.5
230.0	301.9	207.9	356.6	214.8	353.3	211.6
240.0	304.2	211.0	360.5	218.6	357.5	218.5
250.0	306.4	213.2	362.6	217.6	356.9	213.3
255.0	307.6	213.6	361.4	214.9	356.3	215.1

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Temperature outputs from unexposed surface temperature U21 to U26

Time (min)	U21	U22	U23	U24	U25	U26
0.0	34.5	33.1	33.1	32.3	32.9	32.9
5.0	57.2	49.2	57.6	48.3	76.6	46.4
10.0	91.2	93.3	96.1	92.8	95.1	77.2
20.0	161.1	147.0	182.9	151.6	115.2	117.1
30.0	247.5	199.2	266.3	196.7	182.0	145.7
40.0	293.4	229.4	309.9	222.6	220.7	165.3
50.0	315.2	239.7	336.8	234.0	241.0	174.6
60.0	331.0	250.5	352.4	242.7	257.6	185.5
70.0	335.1	253.3	360.8	246.7	270.8	192.2
80.0	337.1	254.6	364.3	247.5	283.3	199.6
90.0	341.2	257.5	369.4	250.8	295.3	206.4
100.0	343.2	260.8	373.3	253.5	304.0	210.8
110.0	346.9	264.9	376.6	257.6	309.8	214.4
120.0	350.1	268.4	379.9	261.3	314.9	216.7
130.0	352.4	268.8	383.0	261.4	321.8	221.1
140.0	353.7	271.2	385.4	266.2	324.7	223.5
150.0	357.5	274.0	386.5	267.4	329.7	226.4
160.0	359.1	274.8	388.0	268.9	333.1	228.2
170.0	359.9	275.2	389.3	268.7	336.5	233.2
180.0	362.7	278.9	389.4	270.5	341.3	236.0
190.0	365.0	279.4	392.7	271.6	345.3	238.9
200.0	366.2	279.2	394.5	271.4	349.5	243.4
210.0	344.0	286.0	395.2	274.2	352.4	245.2
220.0	341.1	286.7	397.8	274.5	356.4	249.2
230.0	344.8	285.8	400.3	274.6	360.9	251.9
240.0	129.3	288.7	403.6	279.3	360.4	250.4
250.0	123.0	291.6	405.1	280.2	369.4	257.6
255.0	120.3	293.2	404.9	281.1	369.2	256.4
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