

# FIRE TEST REPORT

## FP20542-01-1

### THE FIRE RESISTANCE IN ACCORDANCE WITH AS 1530.4:2014 OF A CONTROL JOINT AND THREE PERIMETER EDGE SEALS INSTALLED IN A 75 MM THICK HEBEL POWERPANEL SINGLE MESH WALL

**CLIENT**
H.B. Fuller Company Australia Pty. Ltd
16-22 Red Gum Drive
Dandenong
South VIC 3175
Australia

All tests and procedures reported herein, unless indicated, have been performed in accordance with the laboratory's scope of accreditation





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# TEST SUMMARY

## Objective

To determine the fire resistance of control joint sealing systems in accordance with AS 1530.4:2014, *Fire-resistance tests for elements of construction: Section 10, Service penetrations and control joints*, with reference to AS 4072.1-2005.

## Test Sponsor

H.B. Fuller Company Australia Pty. Ltd
16-22 Red Gum Drive
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## Description of Test Specimen

The test specimen consisted of a nominally 2,200 mm high x 1,000 mm wide x 75 mm thick Hebel Powerpanel Single Mesh wall. The Hebel panels were arranged to provide a nominally 1,000 mm long x 20 mm high horizontal perimeter edge seal, two, nominally 1,100 mm high x 20 mm wide vertical perimeter edge seals and one, nominally 1,100 mm high x 20 mm wide vertical control joint. The apertures were sealed with various joint sealing systems. The specimens were refenced A-D.

## Date of Test

16 June 2025

## Test Results

The fire resistance in minutes, in accordance with AS 1530.4:2014, of the three perimeter edge seals and one control joint system installed in a 75 mm thick Hebel Powerpanel Single Mesh wall, was as follows:

| Specimen Ref | Edge Seal/ Control Joint Details Width x Depth | Integrity (min) | Insulation (min) | FRL* |
|---|---|---|---|---|
| **A** | Horizontal Perimeter Edge Seal<br>20 mm x 16 mm<br>Backing rod/FulaFlex™ FR - UXF<br>1.2 mm thick steel angle - EXF | 132 NF | 90 | -/90/90 |
| **B** | Vertical Perimeter Edge Seal<br>20 mm x 16 mm<br>Backing rod/FulaFlex™ FR - UXF<br>1.2 mm thick steel angle - EXF | 132 NF | 118 | -/90/90 |
| **C** | Hebel to Hebel Control Joint<br>20 mm x 16 mm<br>Backing rod/FulaFlex™ FR - EXF & UXF | 132 NF | 109 | -/90/90 |
| **D** | Vertical Perimeter Edge Seal Joint<br>20 mm x 16 mm<br>Backing rod/FulaFlex™ FR - EXF<br>1.2 mm thick steel angle - UXF | 132 NF | 94 | -/90/90 |

UXF = Unexposed Face, EXF = Exposed Face

NF = No Failure.

The test was terminated after 132 minutes.



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*The test was conducted on a wall system with an established FRL of -/90/90. The maximum FRL of any test specimen cannot exceed the FRL achieved by the wall system in which it is installed.

The test standard requires the following statement to be included:

*"The results of these fire tests may be used to directly assess fire hazard, but it should be recognized that a single test method will not provide a full assessment of fire hazard under all fire conditions."*

*"This report details methods of construction, the test conditions and results obtained when the specific element of construction described herein was tested following the procedure outlined in this standard. Any significant variations with respect to size, constructional 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."*

# LIMITATION

The results reported here relate only to the item/s tested.

# TERMS AND CONDITIONS

This report is issued in accordance with the Terms and Conditions as detailed and agreed in the BRANZ Services Agreement for this work.



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# CONTENTS








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# FIGURES



# TABLES



# PHOTOS





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# 1. TEST PROCEDURE

The control joint test was conducted in accordance with AS 1530.4:2014, “Methods for fire tests on building materials, components and structures, Part 4 *Fire-resistance tests for elements of construction: Section 10, Service penetrations and control joints,* with reference to AS 4072.1-2005 for which the fire resistance of the specimen is the time, expressed in minutes, to Integrity and Insulation failure under one or more of the following criteria.

## 1.1 Integrity Failure Criteria

Failure shall be deemed to occur if;

a) there is sustained flaming for a period greater than 10 seconds on the unexposed face; or

b) flames and/or hot gases cause flaming or glowing of the cotton fibre pad.

## 1.2 Insulation Failure Criteria

Failure shall be deemed to occur if;

a) the maximum temperature at any point on the unexposed surface of the control joint exceeds the initial temperature by 180 K; or

b) the maximum temperature on the unexposed surface of the surround element, 25 mm from the control joint edge exceeds the initial temperature by 180 K.

# 2. DESCRIPTION OF THE TEST SPECIMEN

## 2.1 General

The test specimen consisted of a nominally 2,200 mm high x 1,000 mm wide x 75 mm thick Hebel Powerpanel Single Mesh wall. The Hebel panels were arranged to provide a nominally 1,000 mm long x 20 mm high horizontal perimeter edge seal, two, nominally 1,100 mm high x 20 mm wide vertical perimeter edge seals and one, nominally 1,100 mm high x 20 mm wide vertical control joint. The apertures were sealed with various joint sealing systems. The specimens were refenced A-D.

### 2.1.1 Conditioning

The wall was assembled by BRANZ on 26 March 2025. The backing rod and FulaFlex™ FR sealant was applied to the four specimens on 7 April 2025. The specimens were kept under ambient laboratory conditions until testing on 16 June 2025.

### 2.1.2 Specimen Selection

BRANZ was responsible for the construction of the wall assembly using materials supplied by the client, the client was responsible for the selection, supply, and installation of the four specimens.

### 2.1.3 Drawings and Specification

Client supplied drawings of the specimens are shown in Figure 1 to Figure 4.

Where discrepancies between the dimensions in the report text and those shown in the attached drawings exist, the text takes precedence.



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## 2.2 75 mm Thick Hebel Powerpanel Single Mesh Wall

The nominally 2,200 mm high x 1,000 mm wide x 75 mm thick Hebel Powerpanel Single Mesh wall was constructed from four separate 75 mm thick panel sections. At the top and the bottom of the assembly, the panels were installed into the specimen holder, orientated horizontally, the lower panel was full height (600 mm), the upper panel was cut down to nominally 500 mm high with the un-cut edge positioned to be the lower edge of Specimen A. The panels were installed into the specimen holder using angle brackets on the unexposed face, fixed with M6 x 40 mm long masonry screws 14-10 x 65 mm long Type 17 screws.

Between the upper and lower Hebel panels, two further panels were installed into the specimen holder, orientated vertically, the left-hand side panel was full width (600 mm), the right-hand panel was cut down to nominally 360 mm wide with the cut edge positioned to be the right-hand edge of Specimen C.

Nominally 20 mm gaps were provided between the specimen holder and the opposing edges of the upper horizontal and the two central vertical panels to form the openings for specimens A, B & D. A nominally 20 mm gap was provided between the two vertical panel edges to form the opening for Specimen C.

Non-specimen, panel to panel butt joints and the perimeter of the assembly were sealed with FulaFlex™ FR sealant.

## 2.3 Specimen Details

### 2.3.1 Specimen A, B & D

The openings for the three perimeter edge seal specimens were positioned at the edges of the Hebel panel assembly such that one long edge of the joint would be opposite to the face of the concrete lined specimen holder. Lengths of 75 mm x 100 mm x 1.2 mm thick mild steel angle were attached to the specimen holder at the joint position, the angles were orientated to be on the opposite face to the backing rod and sealant, the 75 mm leg was against the specimen holder. The angles were fixed using M6 x 40 mm long masonry screws, one screw 75 mm from the ends of the angle and a third at mid width/length. The panels were fixed to the angles using 14-10 x 65 mm long Type 17 screws, one screw 100 mm from the ends of the angle.

The openings were packed with 30 mm x 20 mm foam backing rod from one face, the opposite face to the steel angle. The backing rod was inserted such that it was recessed within the opening by nominally 16 mm. FulaFlex™ FR sealant was applied onto the backing rod and trowel finished flush with the face of the Hebel panel.

### 2.3.2 Specimen C

The opening for the vertical Hebel to Hebel control joint was positioned central of the Hebel panel assembly. The opening was packed with 30 mm x 20 mm foam backing rod from both faces. The backing rod was inserted such that it was recessed within the opening by nominally 16 mm each face. FulaFlex™ FR sealant was applied onto the backing rod and trowel finished flush with the face of the Hebel panel.

Table 1 lists the measured dimensions of the control joint system components.



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**Table 1: Edge Seal/Control Joint Details**

| Specimen Ref | Edge Seal/ Control Joint System | Sealant Location | Sealant Dimensions as Measured (mm) | | |
|---|---|---|---|---|---|
| | | | Width | Depth | Length |
| **A** | FulaFlex™ FR/Backing rod Horizontal perimeter edge | Unexposed Face | 20 | 16 | 1,010 |
| **B** | FulaFlex™ FR/Backing rod Vertical perimeter edge | Unexposed Face | 20 | 16 | 1,085 |
| **C** | FulaFlex™ FR/Backing rod Vertical panel to panel | Both Faces | 20 | 16 | 1,090 |
| **D** | FulaFlex™ FR/Backing rod Vertical Perimeter edge | Exposed Face | 20 | 16 | 1,090 |



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**Figure 1: Client Supplied Drawing - Specimen A - Section View**

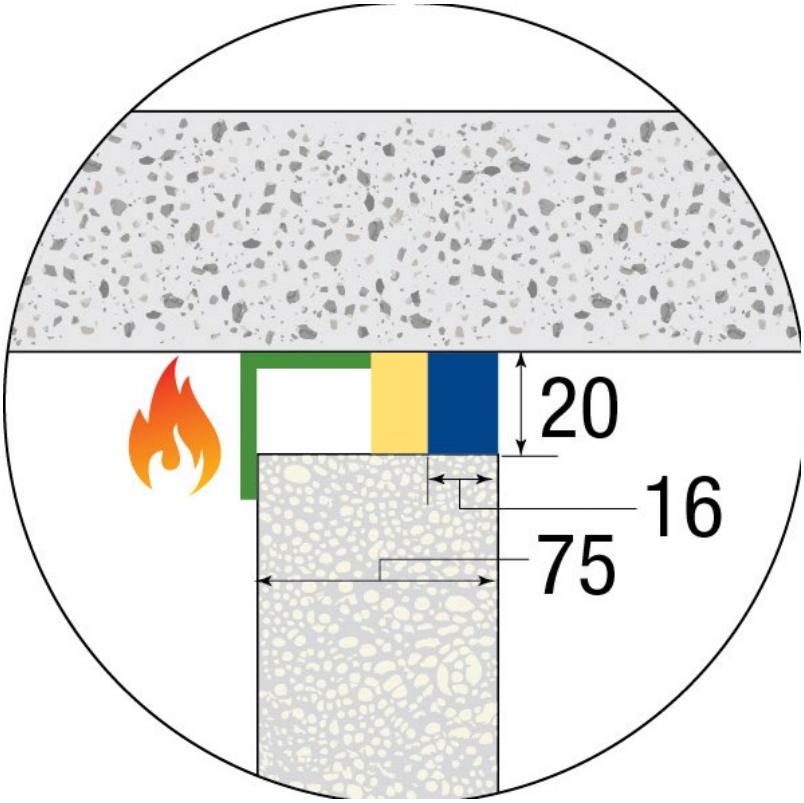


**Figure 2: Client Supplied Drawing - Specimen B - Section View**

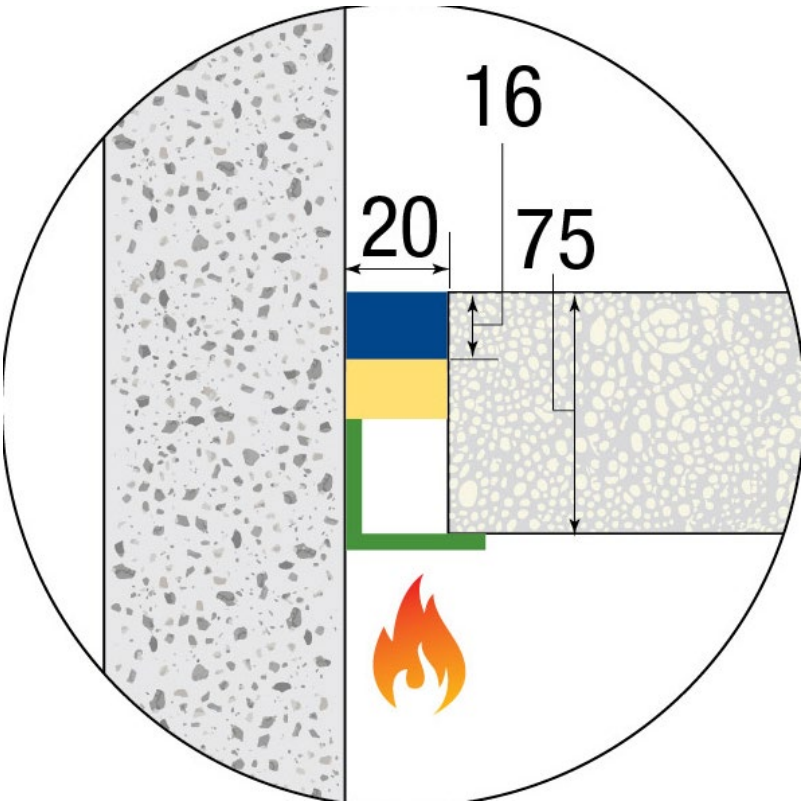







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**Figure 3: Client Supplied Drawing - Specimen C - Section View**

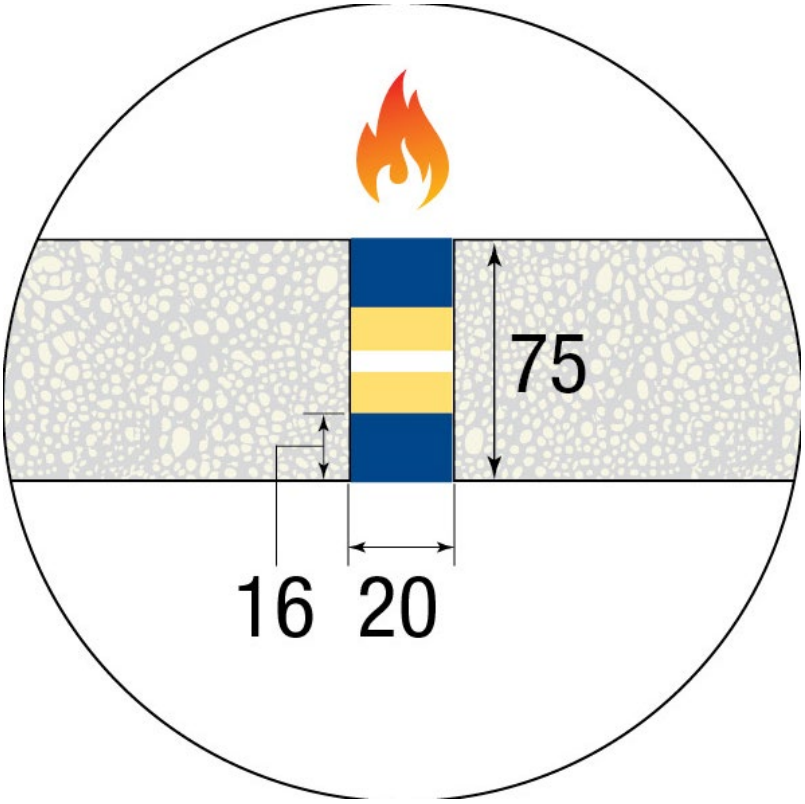
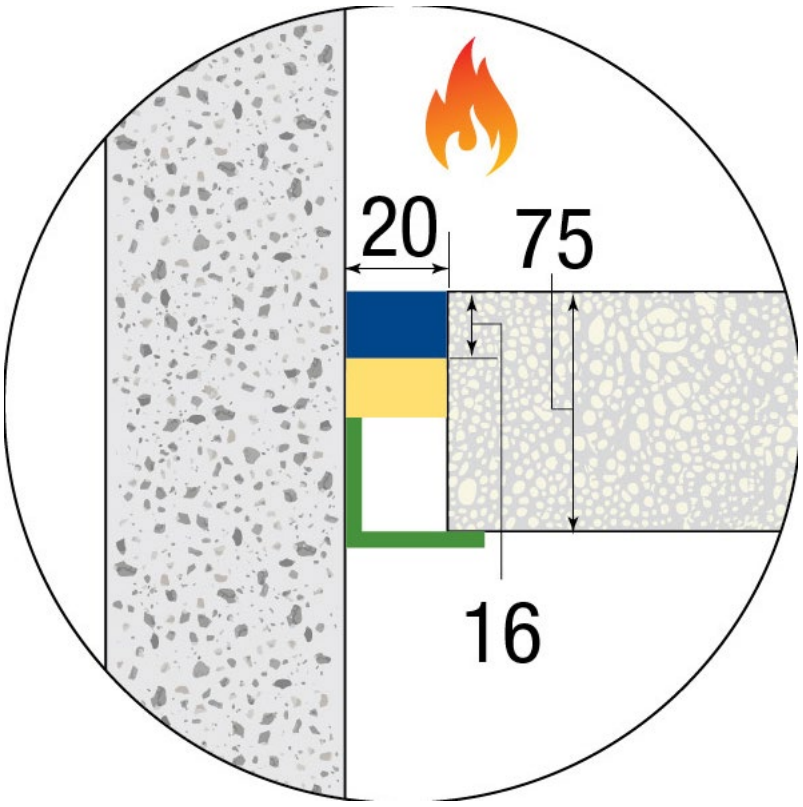



**Figure 4: Client Supplied Drawing - Specimen D - Section View**









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# 3. TEST CONDITIONS AND RESULTS

## 3.1 General

The specimen was tested on 16 June 2025, at the BRANZ laboratories at Judgeford, New Zealand, representatives of the client witnessed the test.

The ambient temperature at the beginning of the test was 10°C.

The specimen was placed against the vertical furnace and the temperature and pressure conditions were controlled to the limits defined in AS 1530.4:2014.

The test was terminated after the specimen had been exposed to the standard fire resistance conditions for 132 minutes.

## 3.2 Furnace Conditions

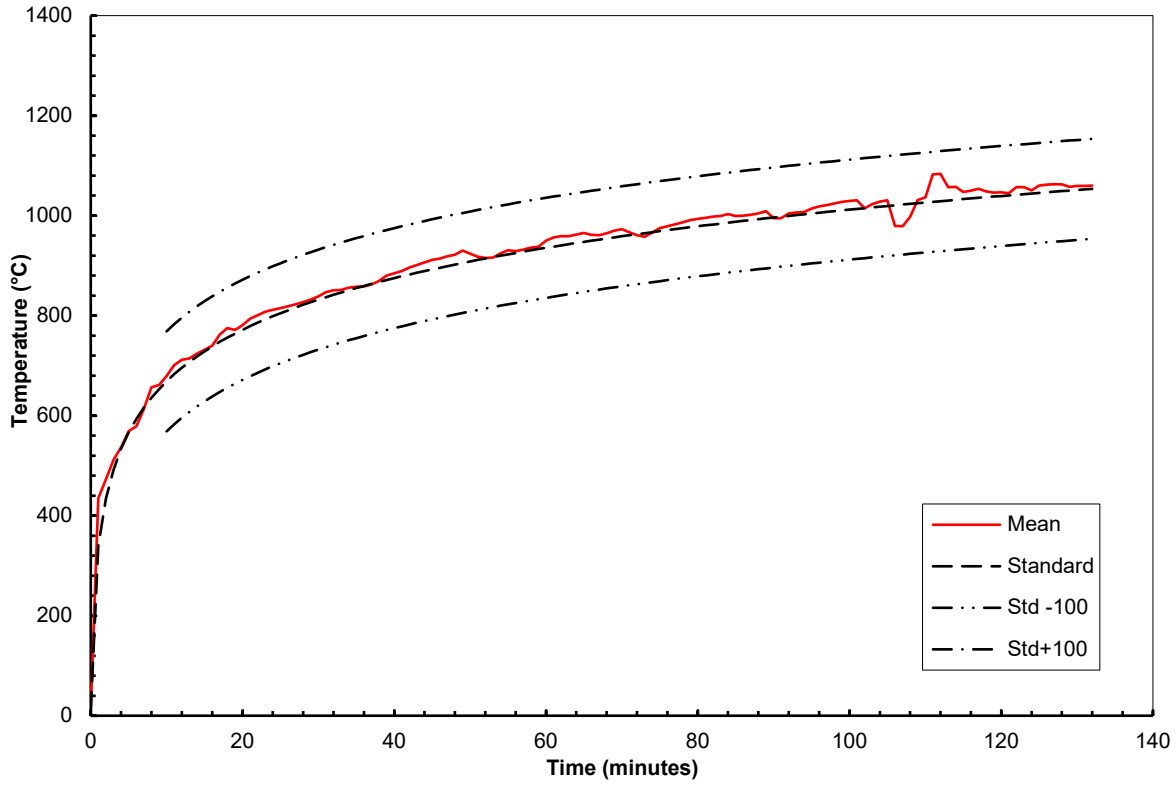
### 3.2.1 Furnace Temperature Measurement

Temperature measurement within the furnace was made using four mineral insulated metal sheathed (MIMS) chromel-alumel thermocouples uniformly distributed in a vertical plane approximately 100 mm from the exposed face of the specimen.

The furnace thermocouples were connected to a computer-controlled data logging system which recorded the temperatures at 15 second intervals.

Figure 5 shows the furnace temperature curve and the permitted upper and lower limits in accordance with AS 1530.4:2014.

**Figure 5: Furnace Temperature**

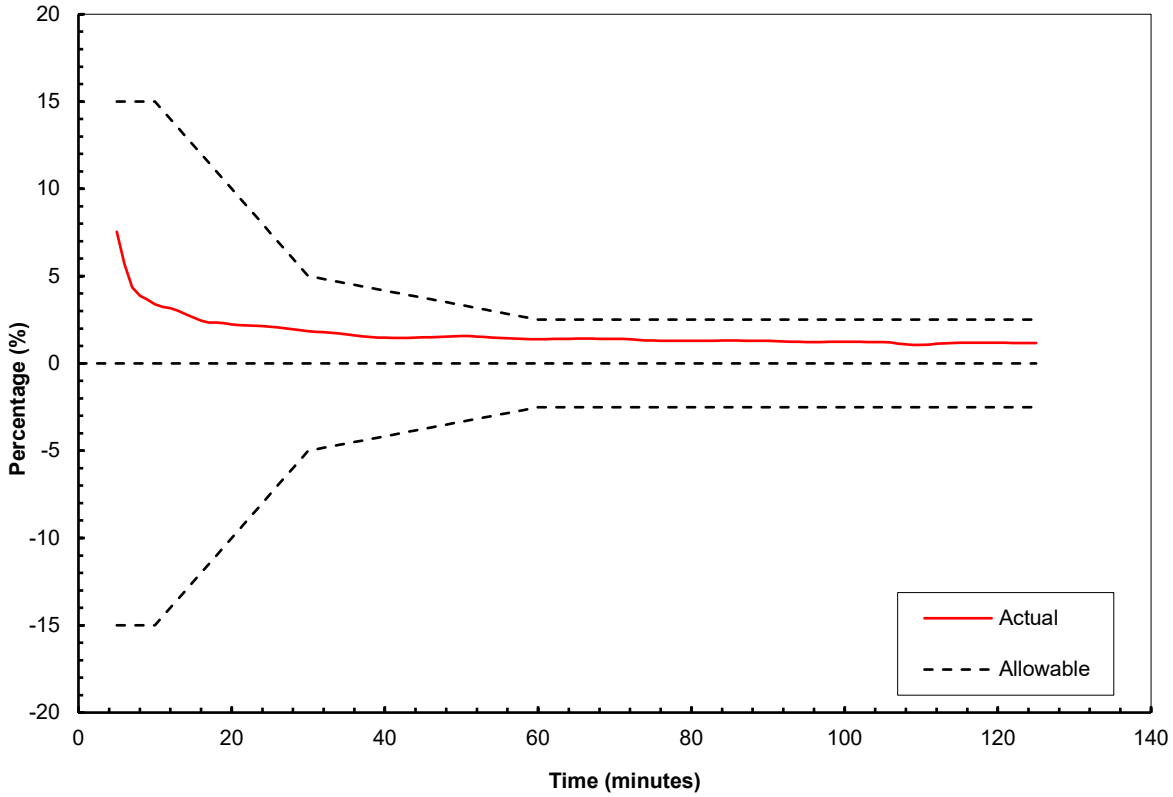


### 3.2.2 Furnace Control

The percentage deviation of the area under the curve of the furnace mean temperature from the standard temperature/time curve was within the standard requirements.

Figure 6 shows the percentage deviation of the mean furnace temperature from the Standard curve.

**Figure 6: Percentage Deviation from Standard Curve**

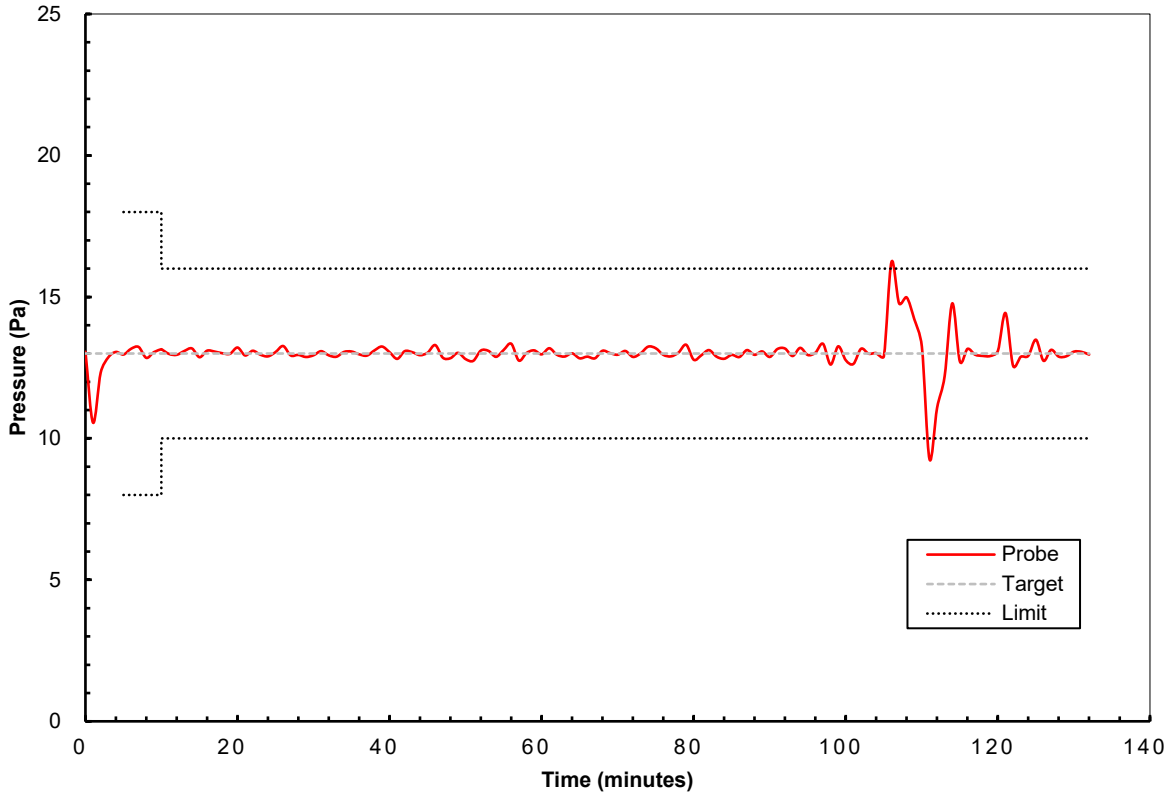



### 3.2.3 Pressure Measurements

The furnace pressure was controlled to be 15 Pa at mid-height of the vertical specimens as defined in the test standard. This corresponds to a pressure of 13 Pa at the pressure probe which was 250 mm below mid height of the vertical specimens. The differential pressure was monitored using a micromanometer connected to a computer-controlled data acquisition system which recorded the pressure at 15 second intervals.

Figure 7 shows the pressure measured at the probe during the test.

**Figure 7: Mean Furnace Pressure**




In summary the furnace conditions complied with the test standard for the majority of the 132 minute test duration except for a brief period where the furnace pressure was outside of the upper and lower limits. It is considered that this minor deviation would not have influenced the tested results.

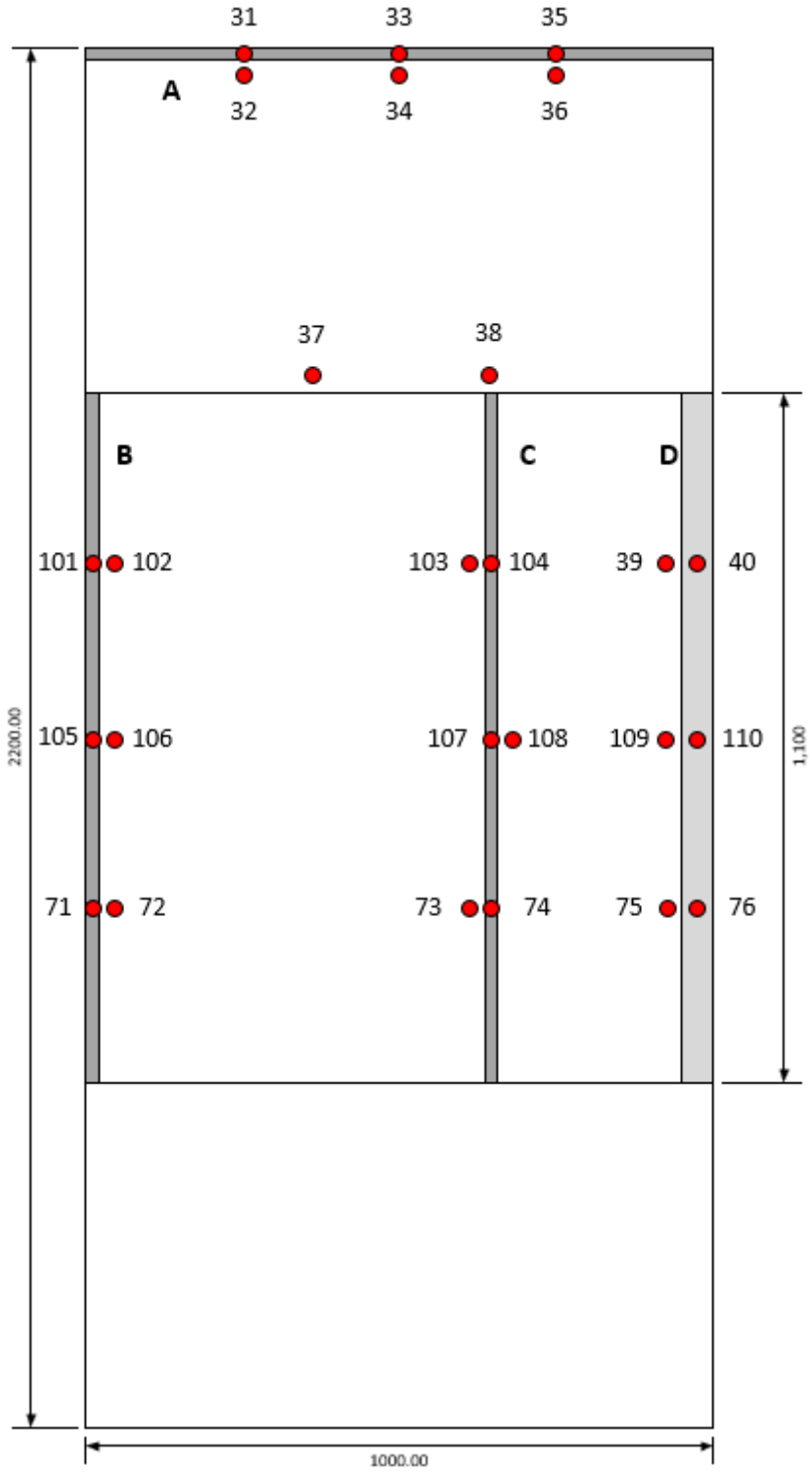
## 3.3 Specimen Temperature Measurement

The temperature on the unexposed face of the control joint specimens and the wall were measured with chromel-alumel thermocouples attached to the specimens. The arrangement consisted of thermocouples placed as specified in clause 10.5 of the test standard AS 1530.4:2014.

The locations of the thermocouples are shown in Figure 8.

Figure 9 to Figure 12 show the temperature rise of each specimen.

**Figure 8: Unexposed Face Thermocouple Positions**







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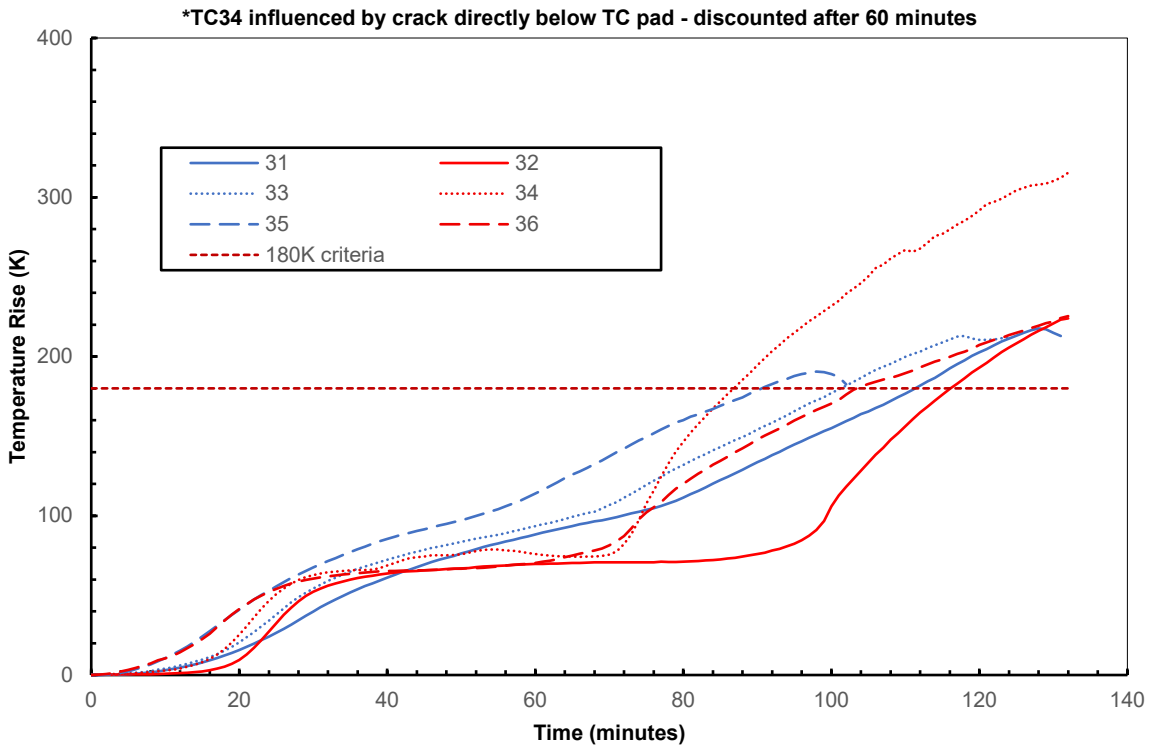
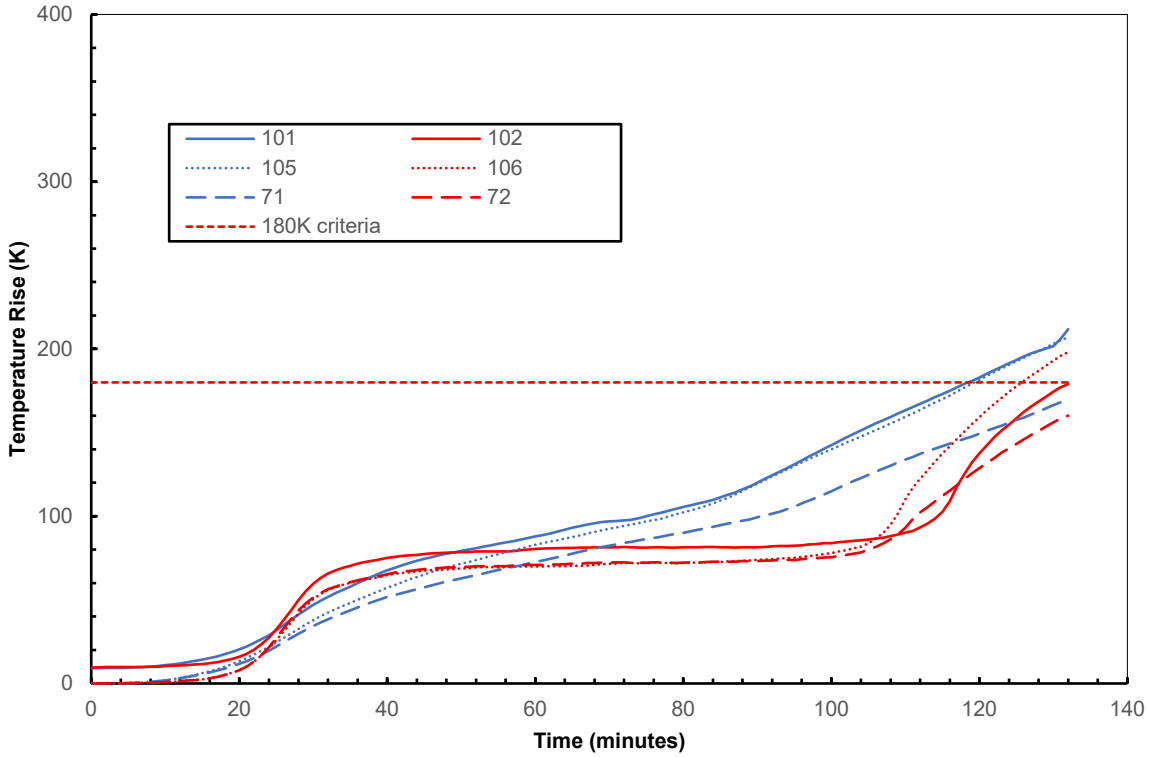
## Figure 9: Specimen A - Temperature Rise




## Figure 10: Specimen B - Temperature Rise







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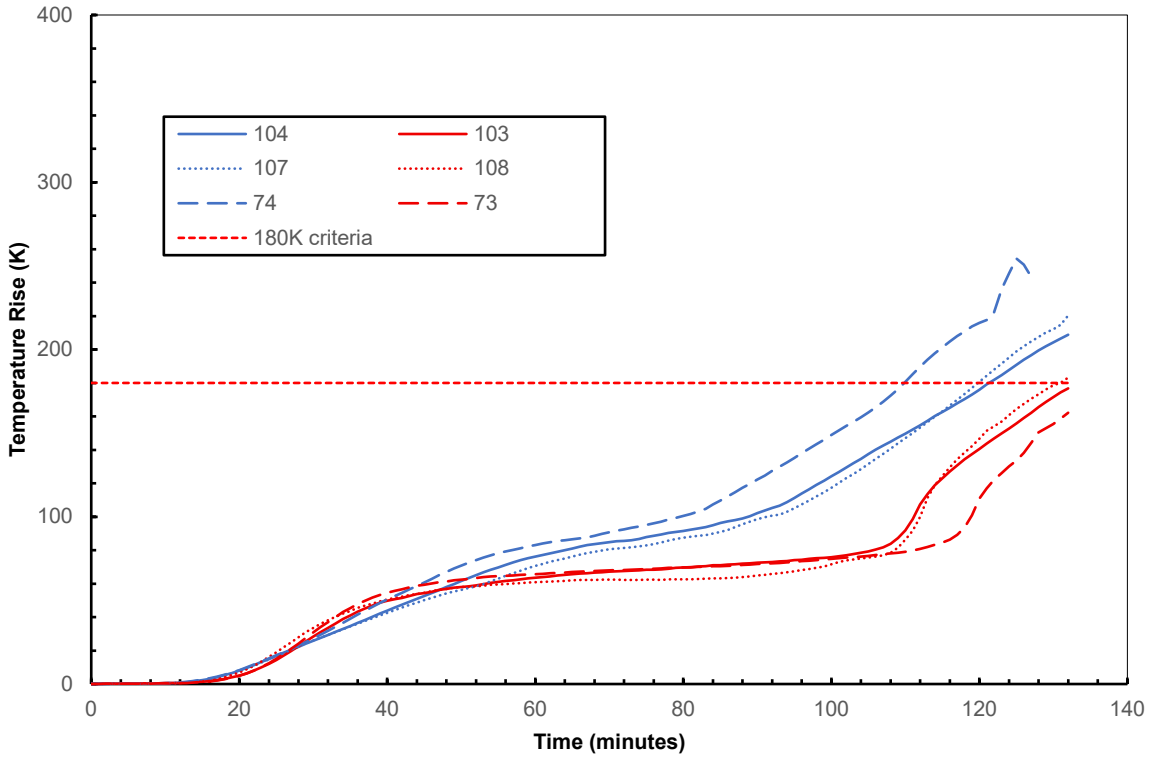
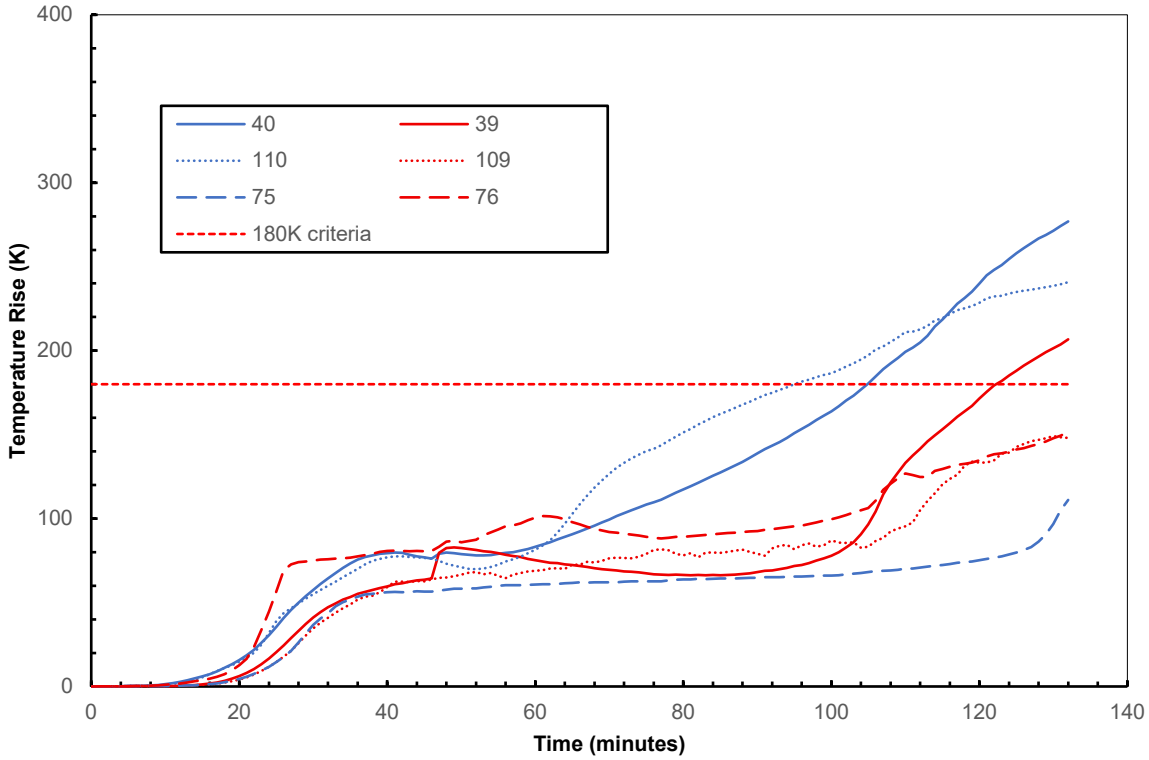
## Figure 11: Specimen C - Temperature Rise




## Figure 12: Specimen D - Temperature Rise







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## 3.4 Specimen Integrity

Integrity failures were recorded as follows in Table 2

**Table 2: Specimen Integrity**

| Specimen Ref | Time (minutes) Until Integrity Failure Occurred |
|---|---|
| A | 132 - No failure |
| B | 132 - No failure |
| C | 132 - No failure |
| D | 132 - No failure |

## 3.5 Specimen Insulation

Insulation failures were recorded as follows in Table 3

**Table 3: Specimen Insulation**

| Specimen Ref | Time (minutes) Until Failure Occurred (T>180K) |
|---|---|
| A | 90 - TC35 |
| B | 118 - TC32 |
| C | 109 - TC74 |
| D | 94 - TC110 |

## 3.6 Observations

Observations related to the Integrity performance of the specimens were at the times stated in minutes and seconds as shown in Table 4.

U = Observations from the unexposed face.
E = Observations from the exposed face.

**Table 4: Observations**

| Time (Min:Sec) | Test Face | Observations |
|---|---|---|
| 00:00 | - | The test commences. |
| 25:00 | U | The sealant near to TC35 (Specimen A) is beginning to swell/expand. |
| 40:00 | U | Swelling of the sealant on Specimen A continues to swell/expand over the length of the joint. |
| 50:00 | U | Cracks are forming in the Hebel panel below Specimen A, one of the cracks has spread below the pad of TC34. |
| 55:00 | U | The sealant on Specimen B and Specimen C has started to swell/expand. |
| 60:00 | U | Horizontal cracks have formed in the Hebel panel between Specimen C and Specimen D. One of the cracks, beginning near to TC104 (Specimen C) runs across the panel and below the pad of TC39 (Specimen D) |
| 69:00 | U | A small vertical crack is visible, starting from the lower edge of the joint of Specimen A, 100 mm from the right-hand edge which extends down by approximately 50 mm. |



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| Time (Min:Sec) | Test Face | Observations |
|---|---|---|
| 76:00 | U | A cotton wool pad was applied over the vertical crack below Specimen A but did not ignite. |
| 88:00 | U | A cotton wool pad was applied over the vertical crack below Specimen A but did not ignite. |
| 90:00 | - | The specimens continue to maintain Integrity. |
| 92:00 | U | Swollen sealant is starting to detach from Specimen A, near to TC35. |
| 118:00 | - | A cotton wool pad was applied over the vertical crack below Specimen A but did not ignite. |
| 130:00 | - | A cotton wool pad was applied over the vertical crack below Specimen A but did not ignite. |
| 132:10 | - | The test is discontinued. |

# 4. SUMMARY

The fire resistance in minutes, in accordance with AS 1530.4:2014, of the three perimeter edge seals and one control joint system installed in a 75 mm thick Hebel Powerpanel Single Mesh wall, was as follows:

| Specimen Ref | Edge Seal/ Control Joint Details Width x Depth | Integrity (min) | Insulation (min) | FRL* |
|---|---|---|---|---|
| **A** | Horizontal Perimeter Edge Seal<br>20 mm x 16 mm<br>Backing rod/FulaFlex™ FR - UXF<br>1.2 mm thick steel angle - EXF | 132 NF | 90 | -/90/90 |
| **B** | Vertical Perimeter Edge Seal<br>20 mm x 16 mm<br>Backing rod/FulaFlex™ FR - UXF<br>1.2 mm thick steel angle - EXF | 132 NF | 118 | -/90/90 |
| **C** | Hebel to Hebel Control Joint<br>20 mm x 16 mm<br>Backing rod/FulaFlex™ FR - EXF & UXF | 132 NF | 109 | -/90/90 |
| **D** | Vertical Perimeter Edge Seal Joint<br>20 mm x 16 mm<br>Backing rod/FulaFlex™ FR - EXF<br>1.2 mm thick steel angle - UXF | 132 NF | 94 | -/90/90 |

UXF = Unexposed Face, EXF = Exposed Face

NF = No Failure.

The test was terminated after 132 minutes.

*The test was conducted on a wall system with an established FRL of -/90/90. The maximum FRL of any test specimen cannot exceed the FRL achieved by the wall system in which it is installed.



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*"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."*

# 5. PERMISSIBLE VARIATIONS

In accordance with AS 1530.4:2014 clause 10.12, the permissible variations that are relevant to the tested penetration systems reported in test report FP20542-01 are as follows.

## 5.1 General

The results of the fire test contained in the test report are directly applicable, without reference to the testing authority, to similar constructions where the following changes have been made.

### 5.1.1 Separating Elements

Results obtained may be applied to the performance of a system in concrete, masonry, or solid gypsum blocks of greater or equal thickness to that of the tested prototype.

# PHOTOS

## Photo 1: The Unexposed Face of the Assembly Prior to Testing


## Photo 2: The Unexposed Face of the Test Assembly After a Duration of 30 Minutes

**Photo 3: The Unexposed Face of the Test Assembly After a Duration of 60 Minutes**


**Photo 4: The Unexposed Face of the Test Assembly After a Duration of 90 Minutes**

**Photo 5: The Unexposed Face of the Test Assembly After a Duration of 120 Minutes**


**Photo 6: The Unexposed Face of the Test Assembly After a Duration of 132 Minutes**

**Photo 7: The Exposed Face of the Test Assembly Immediately After Testing**





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