



**CONFIDENTIAL  
ADDITIONAL TEST REPORT  
Report: Chilt/RF10167 AR1**

**A fire resistance test performed on ten  
duct penetration sealing systems within  
a flexible supporting construction**

**Test conducted in accordance with  
BSEN 1366-3: 2009 and BS EN 1363-1:  
1999**

**Test date: 15<sup>th</sup> December 2010**

**Page 1 of 24**

The details of the sponsor of test report Chilt/RF10167 are held on file by Chiltern International Fire Ltd. This report is additional to that issued as Chilt/RF10167 and the original report shall remain valid and is not replaced by the additional report.



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Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This document is confidential and remains the property of Chiltern International Fire Ltd. The legal validity of this report can only be claimed on the presentation of the complete report.

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## **1 Introduction**

Fourteen duct sealing systems, of which ten only are subject to this report, were installed into a flexible supporting construction and tested.

## **2 Specimen verification**

The specimens were delivered to Chiltern International Fire Ltd (CIFL) during December 2010. CIFL constructed a 130mm thick steel stud/plasterboard clad partition. The client then subsequently installed the systems into the supporting construction, with assistance from CIFL as required.

## **3 Description of supporting construction**

The supporting construction was comprised of a 3m wide x 3m high steel stud/plasterboard clad partition, built into a refractory lined steel restraint frame

The partition framing was comprised of 70mm wide galvanised steel 'C' section studs, at nominally 600mm centres, and 72mm wide galvanised steel 'U' channel head and base track, clad on both faces with 2 layers of 15mm thick 'Type F' plasterboard. 50mm thick Rockwool mineral fibre insulation (100kg/m<sup>3</sup> density) was friction fitted between the studs, but cut back for 100mm around the penetration aperture perimeters. The supporting construction was fixed on the horizontal edges only, the vertical edges remained free.

## **4 Description of specimen**

Details of the specimens are shown in Appendix 1. All measurements are in millimetres (mm) and the descriptions are written viewing the specimens from the unexposed face unless stated otherwise.

All ducts measured 1150mm long with 500mm protruding from the exposed face.

The ducts were tested uncapped at each end.

#### 4.1 Ducts fitted through partition wall (see figure 1)

| Specimen Ref. | Duct material | Duct dimensions (nominal) | Duct wall thickness (nominal) | Cut out aperture dimension (nominal) |
|---------------|---------------|---------------------------|-------------------------------|--------------------------------------|
| A             | PVC-u         | Ø100mm                    | 1.5-1.7mm                     | Ø160mm                               |
| B             | PVC-u         | 110mm wide x 54mm high    | 1.5-1.7mm                     | 160mm wide x 104mm high              |
| C             | PVC-u         | 310mm wide x 29mm high    | 1.8-2.0mm                     | 360mm wide x 79mm high               |
| D             | PVC-u         | 110mm wide x 54mm high    | 1.5-1.7mm                     | 126mm wide x 72mm high               |
| E             | PVC-u         | Ø100mm                    | 1.5-1.7mm                     | Ø130mm                               |
| F             | PVC-u         | 204mm wide x 60mm high    | 1.5-1.7mm                     | 254mm wide x 110mm high              |
| G             | PVC-u         | 310mm wide x 29mm high    | 1.8-2.0mm                     | 326mm wide x 46mm high               |
| H             | PVC-u         | 204mm wide x 60mm high    | 1.5-1.7mm                     | 234mm wide x 84mm high               |
| L             | PVC-u         | 150mm wide x 70mm high    | 1.5-1.7mm                     | 174mm wide x 94mm high               |
| M             | PVC-u         | 180mm wide x 95mm high    | 1.5-1.7mm                     | 204mm wide x 116mm high              |

## 4.2 Duct seal specifications (see figures 2-4)

| Specimen Ref. | Fire sealing product                                                                                                                     | Intumescent material | Intumescent thickness                             |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------------------------------------|
| A             | Verplas FireCuff                                                                                                                         | Tenmat Firefly 109   | 25mm thick x 150mm long<br>Product ref. FC100X150 |
|               |                                                                                                                                          | Tenmat Firefly 107   | 4mm thick x 150mm long                            |
| B             | Verplas FireCuff                                                                                                                         | Tenmat Firefly 109   | 25mm thick x 180mm long<br>Product ref. FC110X54  |
| C             | Verplas FireCuff                                                                                                                         | Tenmat Firefly 109   | 25mm thick x 180mm long<br>Product ref. FC300X25  |
| D             | Verplas FireWrap fitted within a Verplas Galvanised Steel Sleeve 141mm long x 124mm wide x 70mm high<br>Product reference FWS110X54X141  | Tenmat Firefly 107   | 4mm thick x 100mm long<br>Product ref. FW110X54   |
| E             | Verplas FireWrap fitted within a Verplas Galvanised Steel Sleeve 141mm long x Ø128mm<br>Product reference FWS100X141                     | Tenmat Firefly 107   | 8mm thick x 100mm long<br>Product ref. FW100      |
| F             | Verplas FireCuff                                                                                                                         | Tenmat Firefly 109   | 25mm thick x 180mm long<br>Product ref. FC204X60  |
| G             | Verplas FireWrap fitted within a Verplas Galvanised Steel Sleeve 141mm long x 324mm wide x 44mm high<br>Product reference FWS300X25X141  | Tenmat Firefly 107   | 4mm thick x 100mm long<br>Product ref. FW300X25   |
| H             | Verplas FireWrap fitted within a Verplas Galvanised Steel Sleeve 141mm long x 232mm wide x 82mm high<br>Product reference FWS204X60X141  | Tenmat Firefly 107   | 8mm thick x 100mm long<br>Product ref. FW204X60   |
| L             | Verplas FireWrap fitted within a Verplas Galvanised Steel Sleeve 141mm long x 172mm wide x 92mm high<br>Product reference FWS150X70X141  | Tenmat Firefly 107   | 8mm thick x 100mm long<br>Product ref. FW150X70   |
| M             | Verplas FireWrap fitted within a Verplas Galvanised Steel Sleeve 141mm long x 202mm wide x 114mm high<br>Product reference FWS180X90X141 | Tenmat Firefly 107   | 8mm thick x 100mm long<br>Product ref. FW180X90   |

### **Mastic details**

Penetrations D, E, G, H, L and M -

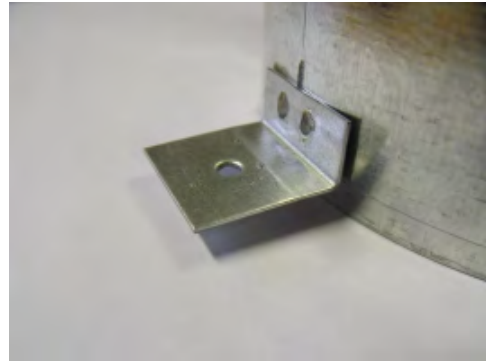
Nominally 5mm wide fillet of acrylic intumescent mastic sealing the steel sleeve to the wall.

Penetration A, B, C and F -

Nominally 5mm wide fillet of acrylic intumescent mastic sealing the firesleeve to the wall.

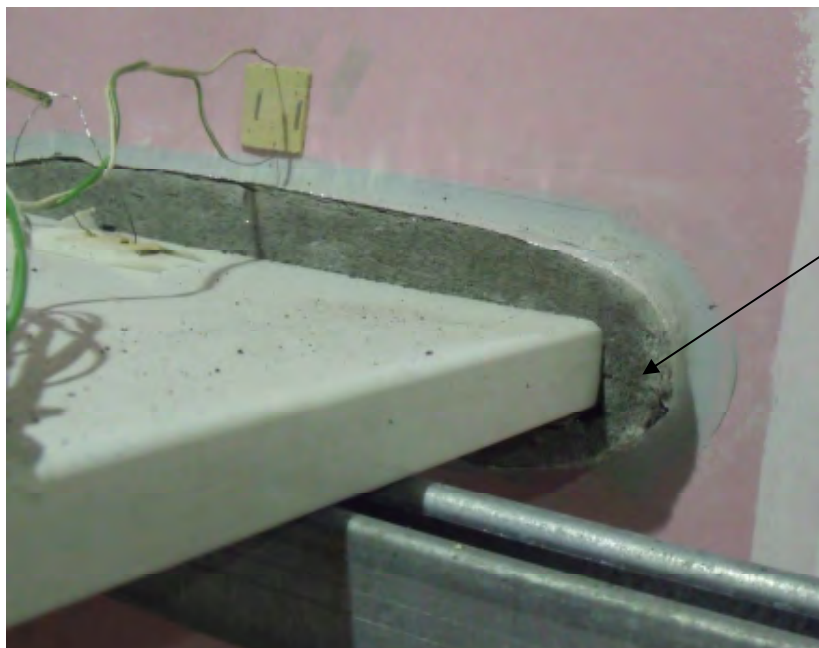
### **Galvanised steel sleeves**

The galvanised steel sleeves for penetrations D, G, H, L and M incorporated 2No 'L' shaped steel fixing brackets (25mm x 25mm footprint size x 0.8mm thick), spot welded 5mm from the edge of the sleeve, on the exposed side, and fixed to the supporting construction using 42mm long drywall screws. The steel sleeve for penetration E had 3No of the brackets fitted.



### **Tenmat 109 Fire sleeves (penetrations A, B, C and F)**

The Tenmat 109 fire sleeves had a longitudinal cut along the sleeve to aid in fitting. The sleeve was resealed along the cut with 50mm wide aluminium foil tape.



Longitudinal cut  
along length of  
fire sleeve

### 4.3 Service penetrations supports

(Read in conjunction with Figures 1 - 4 and photographs)

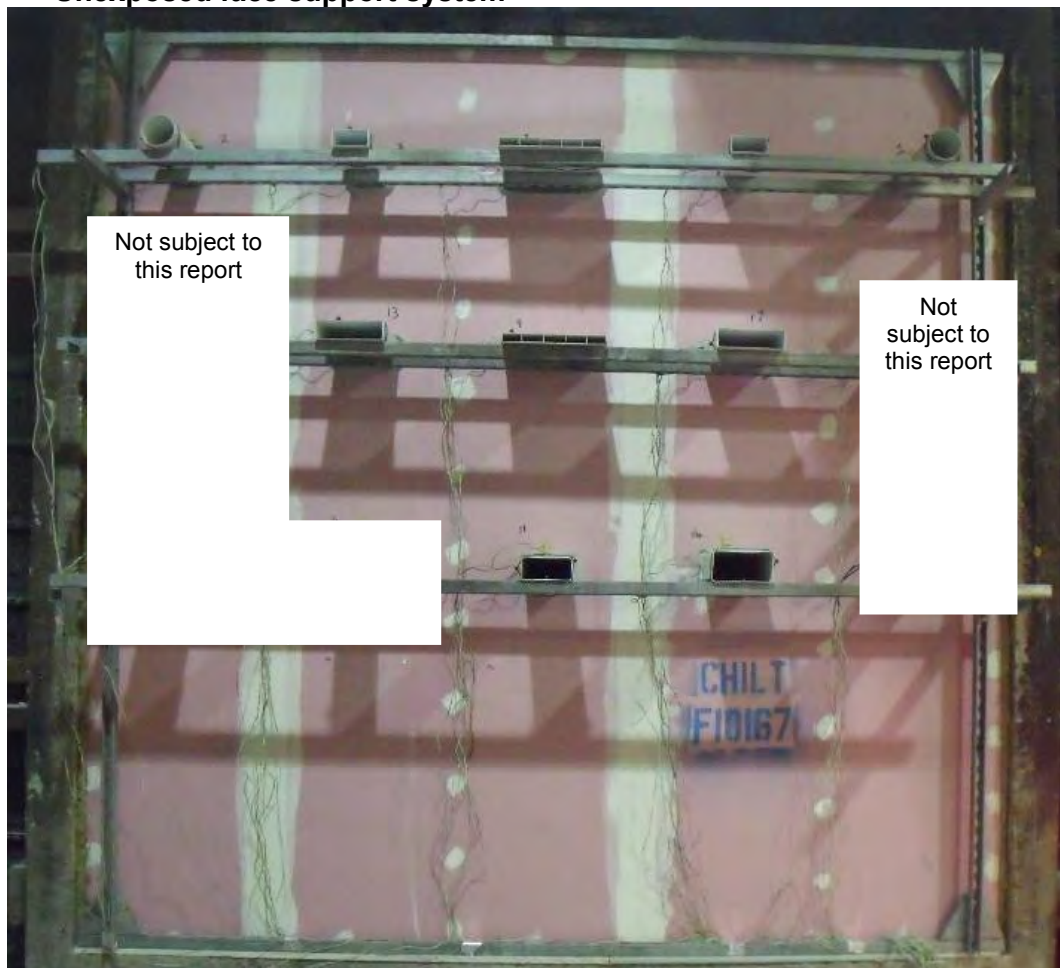
The service penetration support system consisted of Unistrut steel frame sections and associated attachments.

Unistrut frame section – constructed using 3mm thick profiled steel ‘U’ channel.

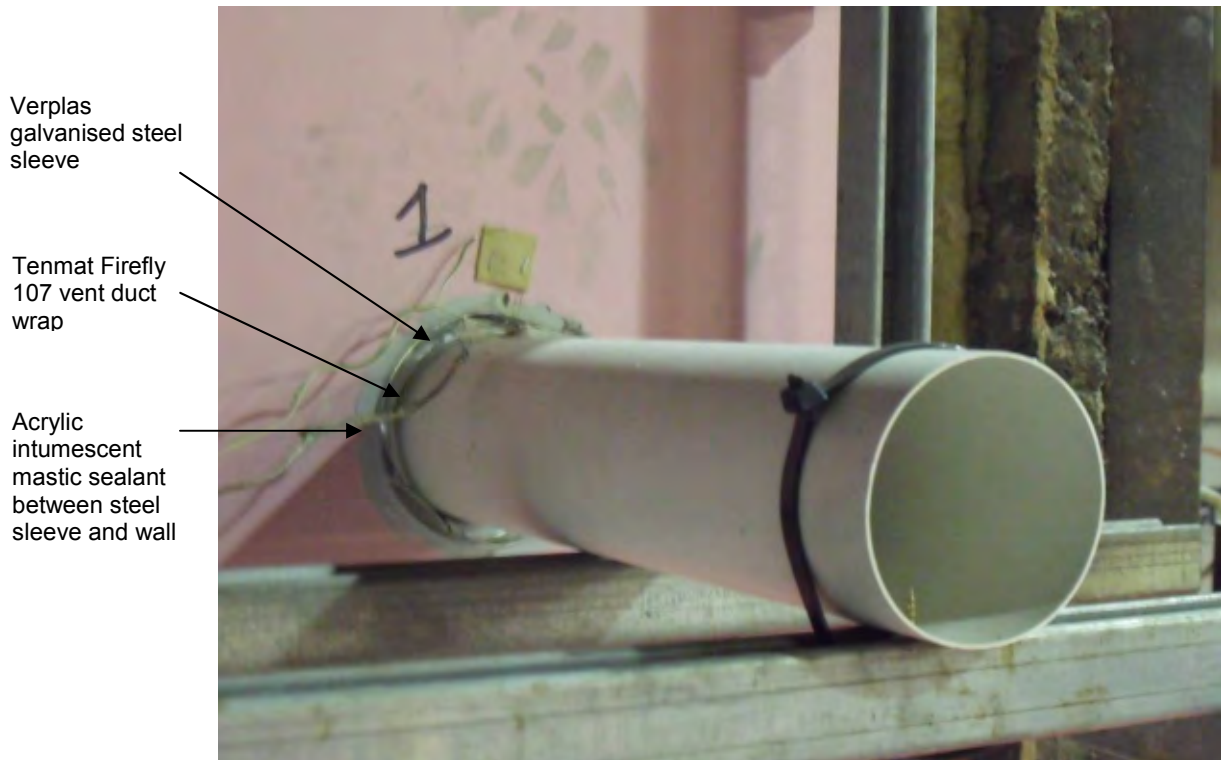
On the unexposed face, 2No 3000mm long lengths of Unistrut frame section were used as vertical supports on the wall/partition (see photographs). The vertical supports were bolted to the restraint frame using Unistrut steel brackets and masonry anchors. 6No 500mm long Unistrut cantilever arm sections provided horizontal supports for 6No 3000mm horizontal lengths of Unistrut, supporting the ducts at 150mm and 450mm from the walls. All ducts were cable tied down to the supports at 450mm from the wall.

On the exposed face, 2No 3000mm were used as vertical supports on the partition. 6No 500mm long Unistrut cantilever arm sections provided support for 6No 3000mm horizontal lengths of Unistrut, supporting the ducts at 150mm and 450mm from the wall.

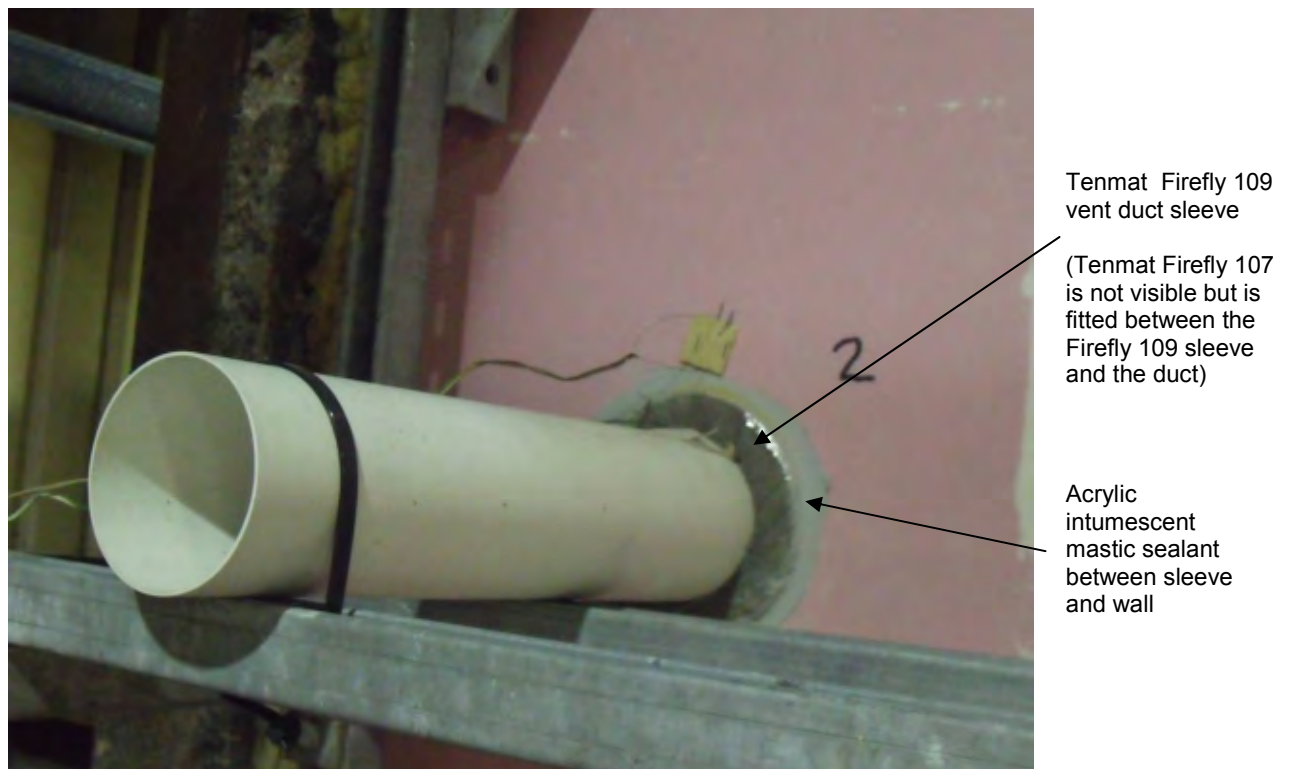
#### Unexposed face support system



Unexposed face – Duct E support system and Verplas Galvanised Steel Sleeve with Verplas FireWrap FW100



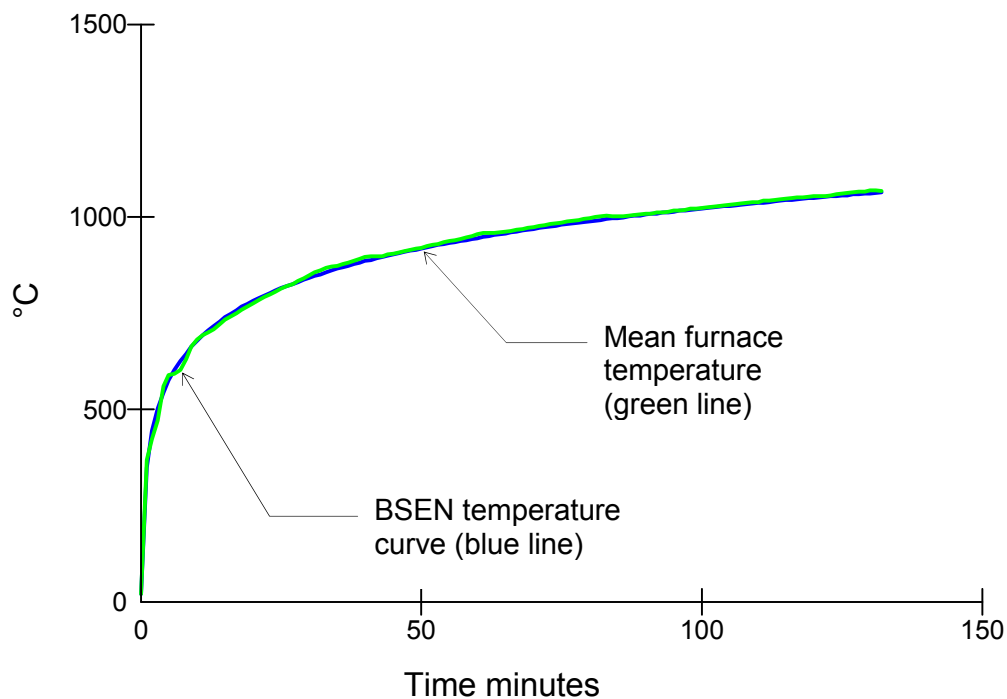
Unexposed face – Duct A support system and Verplas FireCuff FC100X150



## 5 Test conditions

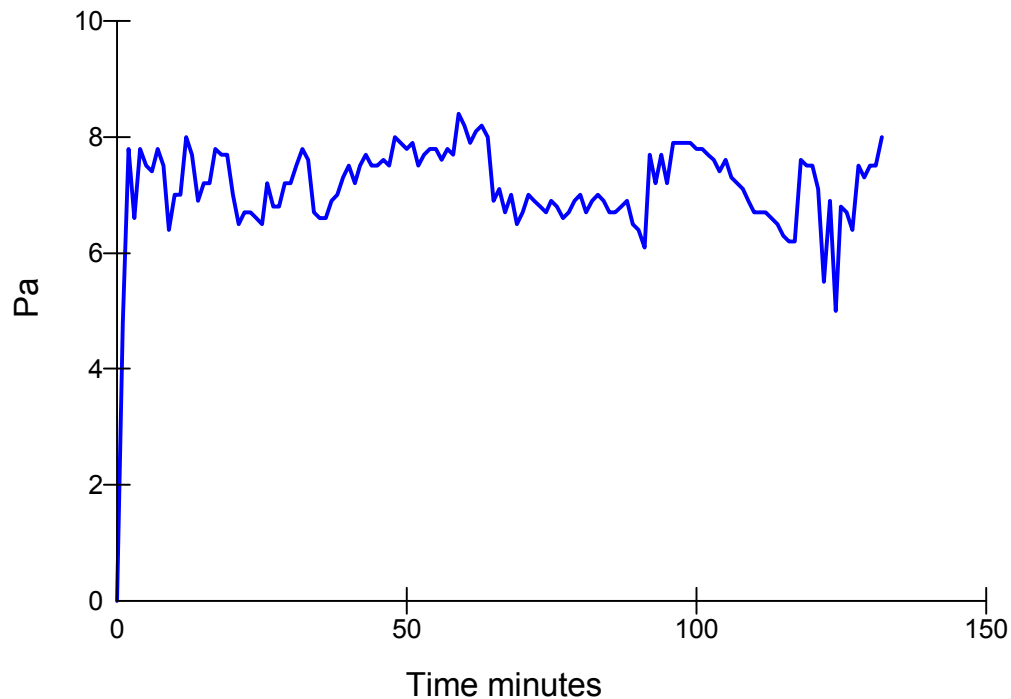
### 5.1 Furnace temperature

The furnace was controlled to follow the temperature/time relationship specified in BSEN 1363-1: 1999 as closely as possible, using the average of nine plate thermocouples suitably distributed within the furnace. The temperatures recorded have been tabulated in Appendix 2 and are shown graphically below:



## 5.2 Pressure readings

After the first 5 minutes of the test, the furnace pressure was maintained at  $7.25 \pm 5$  Pa and after 10 minutes was maintained at  $7.25 \pm 3$  Pa with respect to atmosphere, at a point 0.5m from the notional floor level. Therefore equating to 13.2 Pa at the base of ducts L and M. The pressure readings have been tabulated in Appendix 2 and are shown graphically below:



## 5.3 Ambient temperature

The ambient temperature of the test area at commencement of test was 15° C. The temperatures recorded have been tabulated in Appendix 2.

## 5.4 Thermocouple positions

The temperature of the unexposed face was monitored by means of the following thermocouples.

Graphs of each service penetration can be found in Section 10.

The temperatures recorded have been tabulated in the Appendix 2.

| Duct penetration | Thermocouple number | Type (location)                       |
|------------------|---------------------|---------------------------------------|
| -                | 1                   | Furnace                               |
| -                | 2                   | Furnace                               |
| -                | 3                   | Furnace                               |
| -                | 4                   | Furnace                               |
| -                | 5                   | Furnace                               |
| -                | 6                   | Furnace                               |
| A                | 10                  | On plasterboard 25mm from duct sleeve |
| A                | 11                  | On duct 25mm from plasterboard        |
| B                | 12                  | On plasterboard 25mm from duct sleeve |
| B                | 13                  | On duct 25mm from plasterboard        |
| C                | 14                  | On plasterboard 25mm from duct sleeve |
| C                | 15                  | On duct 25mm from plasterboard        |
| D                | 16                  | On plasterboard 25mm from duct sleeve |
| D                | 17                  | On duct 25mm from plasterboard        |
| E                | 18                  | On plasterboard 25mm from duct sleeve |
| E                | 19                  | On duct 25mm from plasterboard        |
| F                | 20                  | On plasterboard 25mm from duct sleeve |
| F                | 21                  | On duct 25mm from plasterboard        |
| G                | 22                  | On plasterboard 25mm from duct sleeve |
| G                | 23                  | On duct 25mm from plasterboard        |
| H                | 24                  | On plasterboard 25mm from duct sleeve |
| H                | 25                  | On duct 25mm from plasterboard        |
| L                | 32                  | On plasterboard 25mm from duct sleeve |
| L                | 33                  | On duct 25mm from plasterboard        |
| M                | 34                  | On plasterboard 25mm from duct sleeve |
| M                | 35                  | On duct 25mm from plasterboard        |
| -                | 38                  | Laboratory ambient                    |

## 6 Observations

All comments relate to the unexposed face unless otherwise specified, (reference to Appendix 1 - figure 1).

| Time (minutes) | Duct       | Comments                                                                                                                                                       |
|----------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00.00          | -          | Test started                                                                                                                                                   |
| 00.20          | All        | There is smoke issuing from all duct perimeters.                                                                                                               |
| 00.40          | A-G        | The ducts have started to distort out of shape as the sleeves start to react.                                                                                  |
| 02.40          | M          | The intumescent has reacted and sealed off the duct.                                                                                                           |
| 10.00          | A-G        | There is a decrease in the level of smoke issuing from all duct perimeters.                                                                                    |
| 20.00          | H, L and M | All the ducts have collapsed and fully sealed.                                                                                                                 |
| 20.02          | A-G        | All ducts have collapsed and fully sealed.                                                                                                                     |
| 30.30          | L          | There is smoke issuing from the duct perimeter.                                                                                                                |
| 40.50          | H, L and M | There is smoke issuing from all ducts.                                                                                                                         |
| 40.51          | A-G        | There is a decrease in the level of smoke issuing from all ducts.                                                                                              |
| 78.02          | A-G        | There is an increase in the level of smoke issuing from all duct perimeters. All ducts have melted at the end nearest the wall of the supporting construction. |
| 81.33          | A          | The intumescent collar has been forced out and is visible.                                                                                                     |
| 89.17          | A-G        | There is discolouration of the plasterboard above the ducts.                                                                                                   |
| 99.09          | D&G        | The ducts are detaching themselves from the construction wall.                                                                                                 |
| 100.40         | L&H        | The ducts are no longer in contact with the wall but the aperture is still sealed.                                                                             |
| 107.35         | A          | There is a glow visible at the head of the aperture where a small section of the intumescent has fallen away.                                                  |
| 110.02         | M          | There is a glow visible at the top of the aperture.                                                                                                            |
| 119.20         | M          | A cotton pad integrity test was performed on the glow, no failure.                                                                                             |
| 120.00         | L          | There is a glow visible at the top of the aperture.                                                                                                            |

*The legal validity of this report can only be claimed on presentation of the complete report.*

|        |   |                                                                                                                                                                    |
|--------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 121.05 | A | A cotton pad integrity test was performed at the head of the aperture, no failure.                                                                                 |
| 121.50 | L | There is continuous flaming from the specimen thereby constituting <b>integrity failure</b> .                                                                      |
| 122.20 | M | A cotton pad integrity test was performed at the glow visible, no failure.                                                                                         |
| 123.25 | M | A cotton pad integrity test was performed at the glow visible which resulted in ignition of the cotton pad thereby constituting <b>integrity failure</b> .         |
| 126.35 | A | A cotton pad integrity test was performed at the glow visible, no failure.                                                                                         |
|        | D | There is a glow visible at the top of the aperture of the specimen.                                                                                                |
| 128.50 | A | A cotton pad integrity test was performed at the head of the aperture which resulted in ignition of the cotton pad thereby constituting <b>integrity failure</b> . |
| 132.50 |   | Test terminated.                                                                                                                                                   |

## 7 Expression of results

| Duct penetration seal | Integrity                                  |                                             | Insulation                                  |
|-----------------------|--------------------------------------------|---------------------------------------------|---------------------------------------------|
|                       | Cotton pad                                 | Continuous flaming                          |                                             |
| A                     | 128 (one hundred and twenty eight) minutes | *128 (one hundred and twenty eight) minutes | *128 (one hundred and twenty eight) minutes |
| B                     | **132 (one hundred and thirty two) minutes | **132 (one hundred and thirty two) minutes  | **132 (one hundred and thirty two) minutes  |
| C                     | **132 (one hundred and thirty two) minutes | **132 (one hundred and thirty two) minutes  | **132 (one hundred and thirty two) minutes  |
| D                     | **132 (one hundred and thirty two) minutes | **132 (one hundred and thirty two) minutes  | 129 (one hundred and twenty nine) minutes   |
| E                     | **132 (one hundred and thirty two) minutes | **132 (one hundred and thirty two) minutes  | **132 (one hundred and thirty two) minutes  |
| F                     | **132 (one hundred and thirty two) minutes | **132 (one hundred and thirty two) minutes  | **132 (one hundred and thirty two) minutes  |
| G                     | **132 (one hundred and thirty two) minutes | **132 (one hundred and thirty two) minutes  | **132 (one hundred and thirty two) minutes  |
| H                     | **132 (one hundred and thirty two) minutes | **132 (one hundred and thirty two) minutes  | **132 (one hundred and thirty two) minutes  |
| L                     | *121 (one hundred and twenty one) minutes  | 121 (one hundred and twenty one) minutes    | *121 (one hundred and twenty one) minutes   |
| M                     | 123 (one hundred and twenty three) minutes | *123 (one hundred and twenty three) minutes | 120 (one hundred and twenty) minutes        |

\* Failure criteria was not achieved prior to initial failure

\*\* Failure criteria was not achieved prior to test termination at 132 minutes

## 8 Limitations

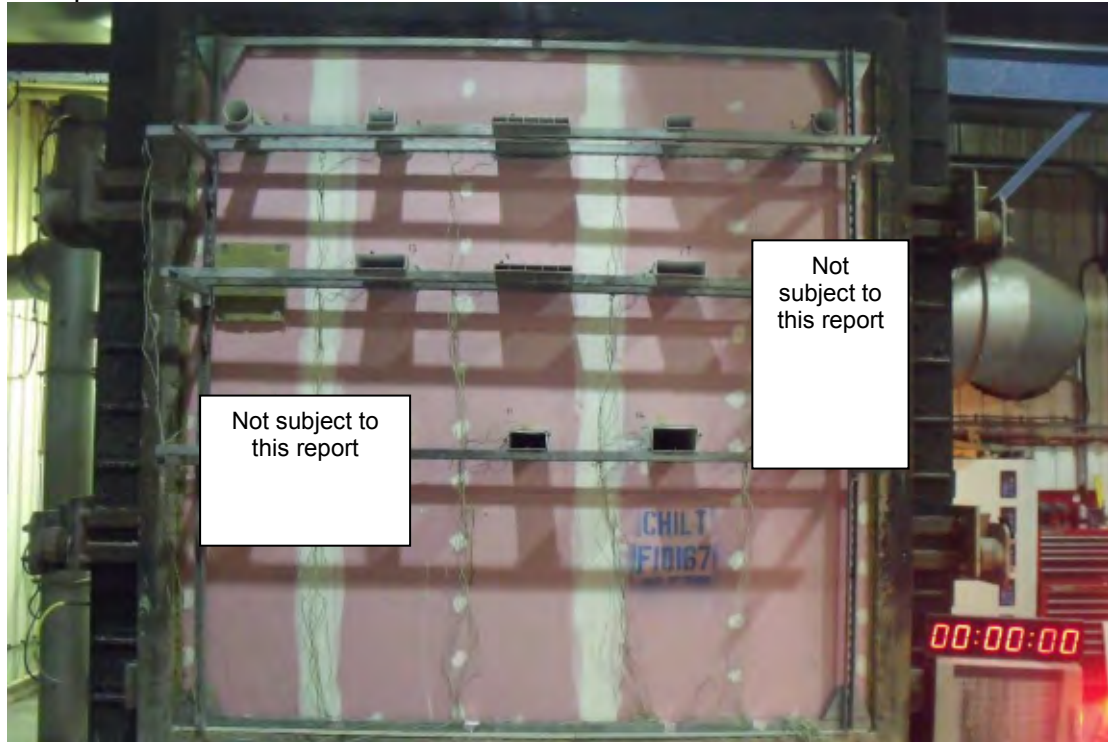
The results only relate to the behaviour of the element of construction under the particular conditions of test; they are not intended to be the sole criteria for assessing the potential fire performance of the element in use nor do they reflect the actual behaviour in fires.

The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over 5 years old should be considered by the user. CIFL will be able to offer, on behalf of the legal owner, a review of the procedures adopted for a particular test to ensure that they are consistent with current practices, and if required may endorse the test report.

|                       |                                                                                    |                                                                                      |
|-----------------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>Signature:</b>     |  |  |
| <b>Name:</b>          | Robert Axe                                                                         | Vincent Kerrigan                                                                     |
| <b>Title:</b>         | Deputy Head of Section –<br>Fire Resistance                                        | Technical Manager                                                                    |
| <b>Date of issue:</b> | 7 / 3 / 11                                                                         | 07-03-2011                                                                           |

## 9 Photograph

Unexposed face at start of test



After 32 minutes

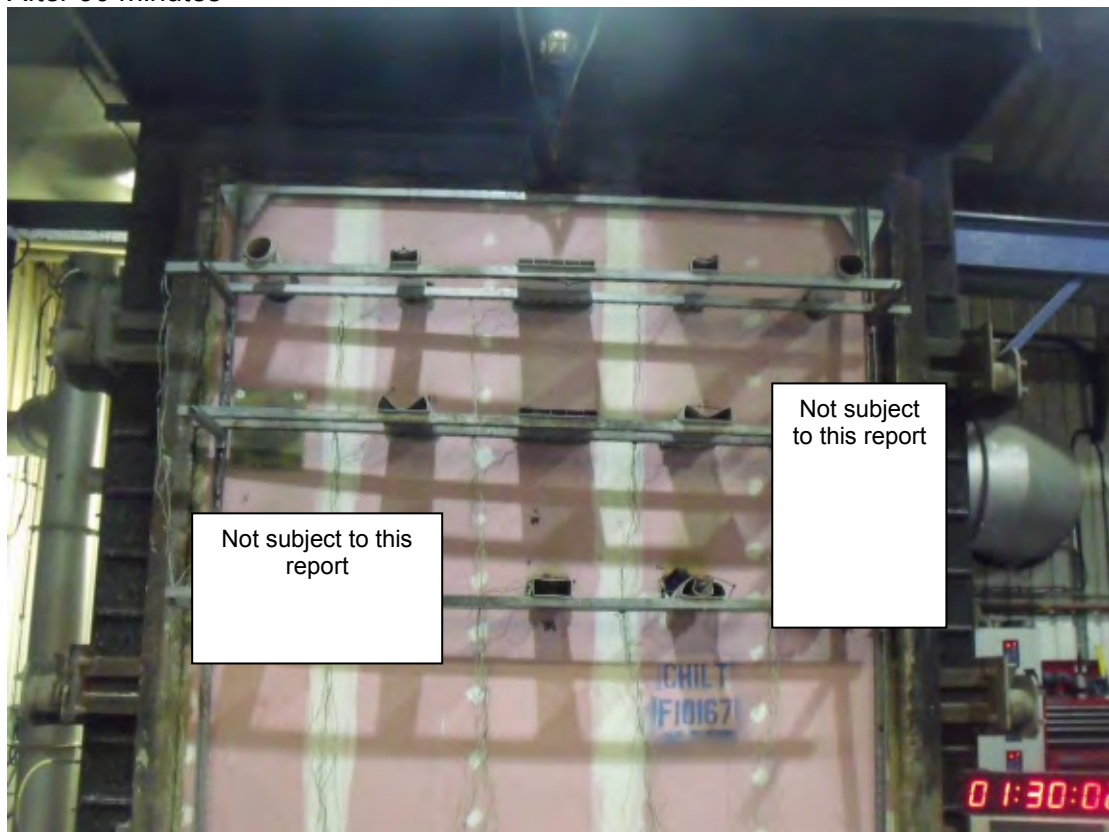


*The legal validity of this report can only be claimed on presentation of the complete report.*

After 60 minutes



After 90 minutes



*The legal validity of this report can only be claimed on presentation of the complete report.*

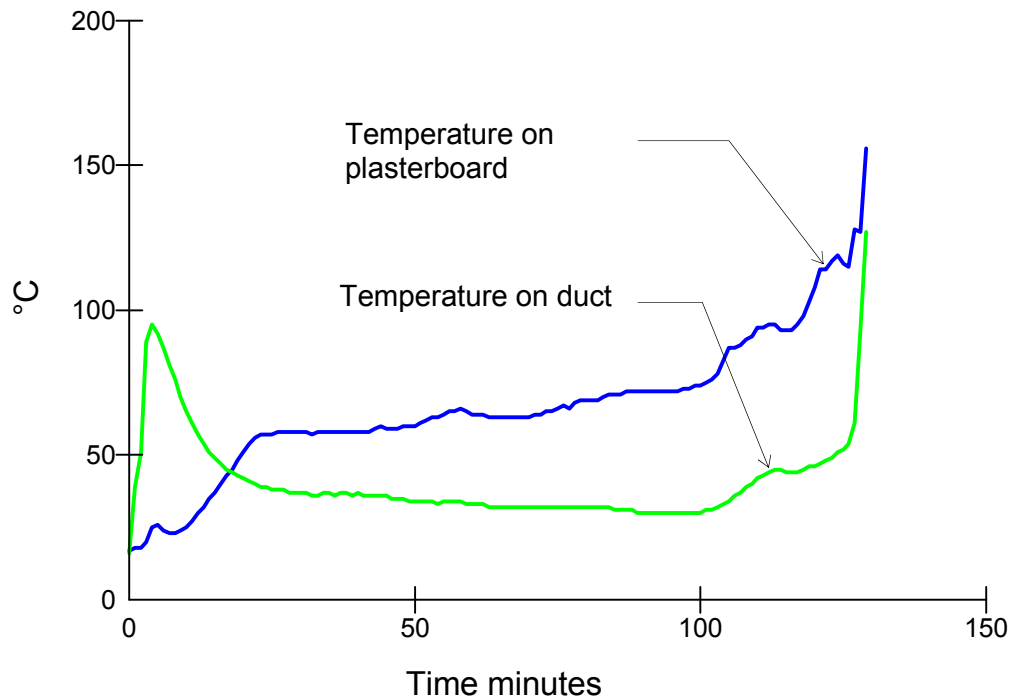
After 132 minutes



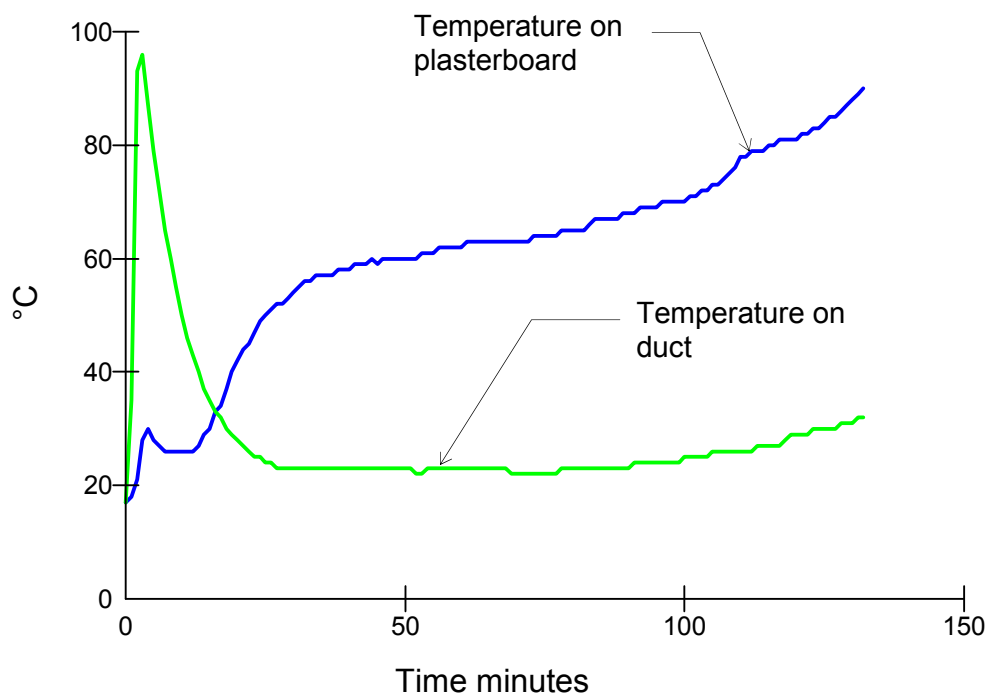
## 10 Graphs

### Unexposed face temperatures

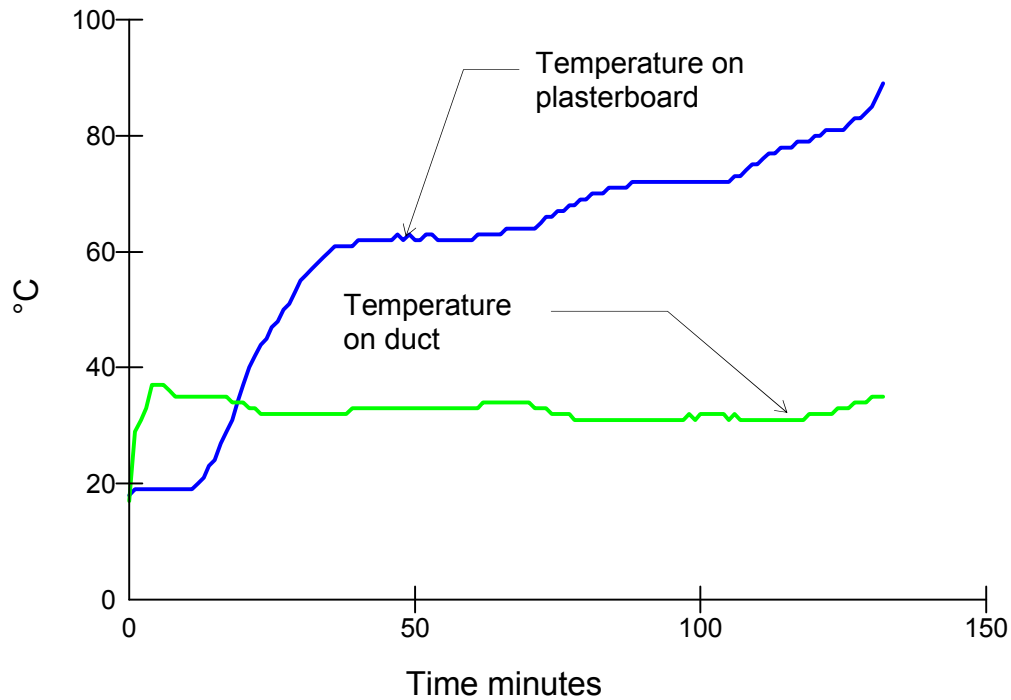
#### Duct A



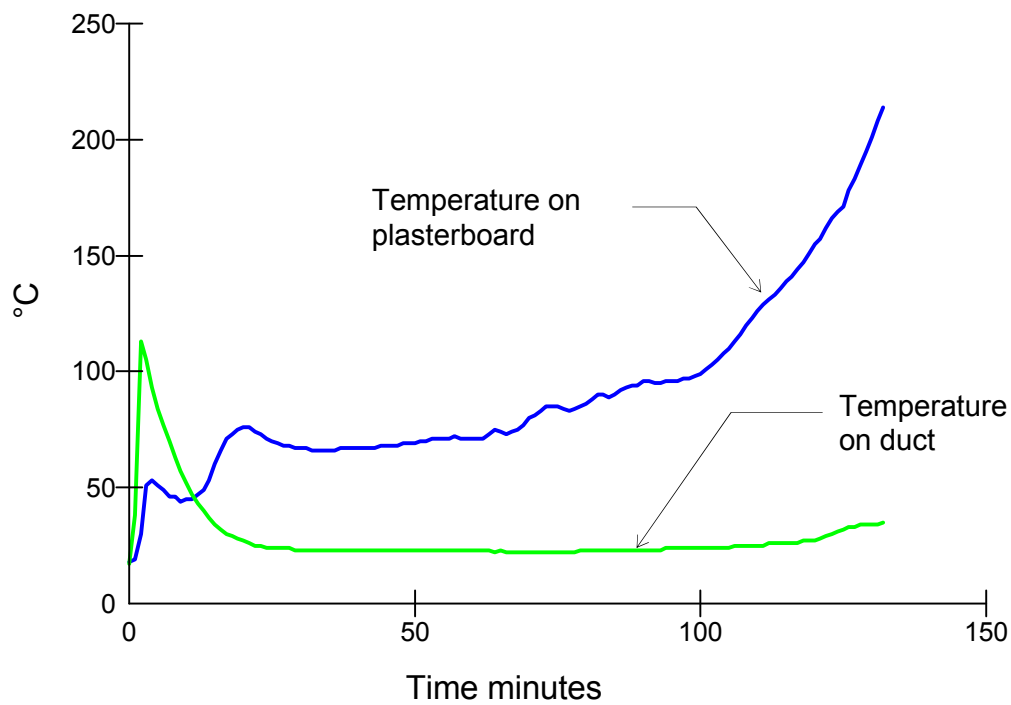
#### Duct B



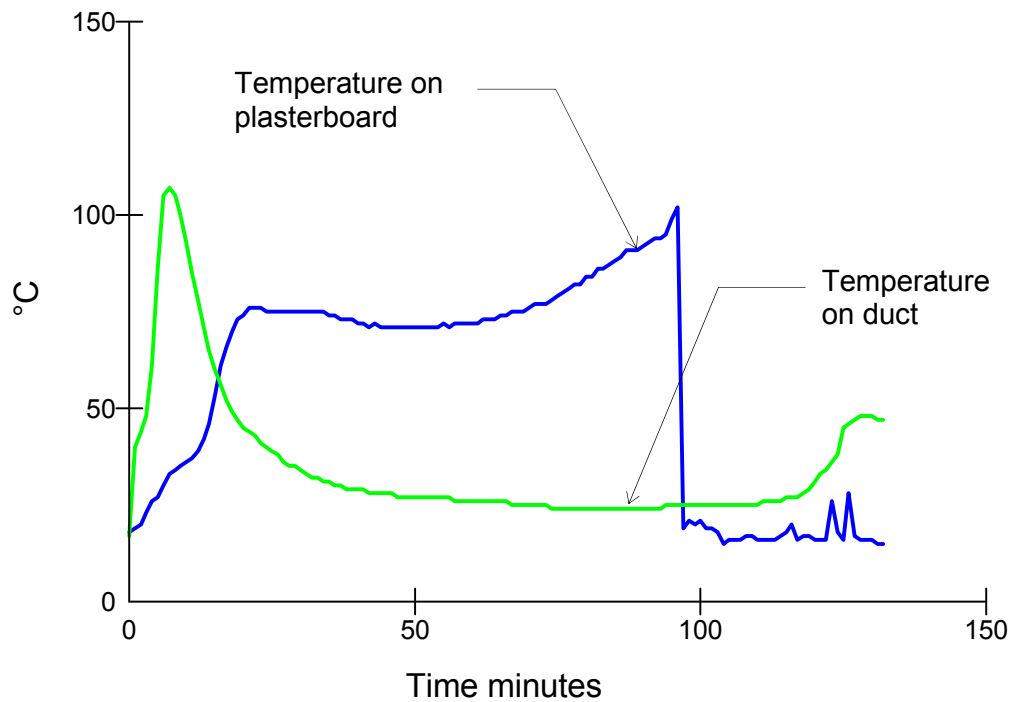
### Duct C



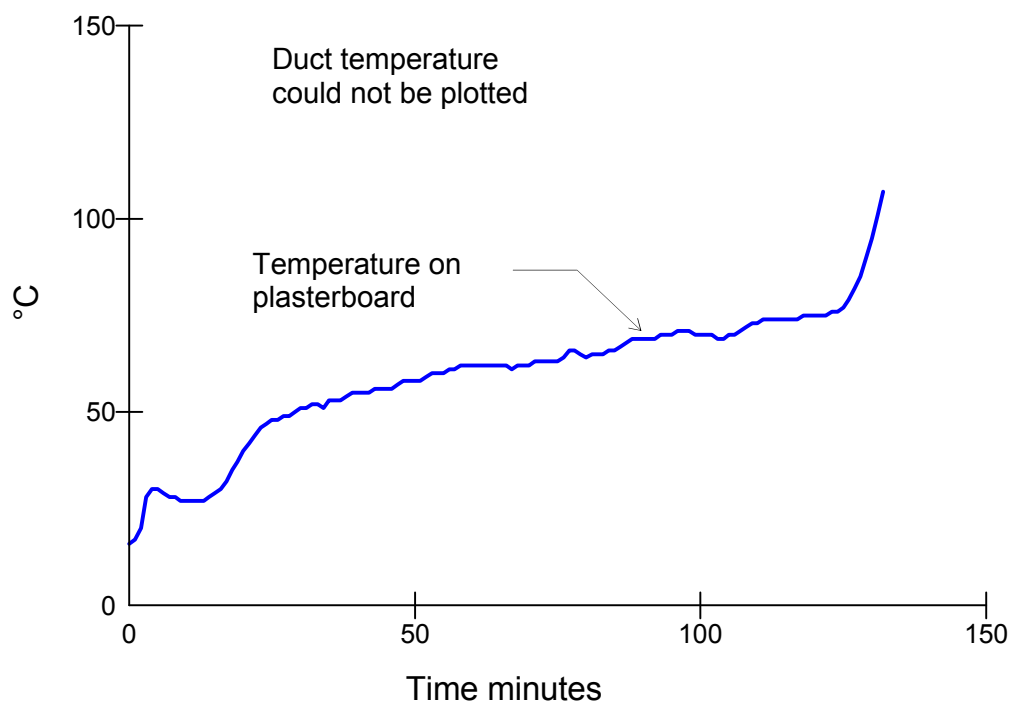
### Duct D



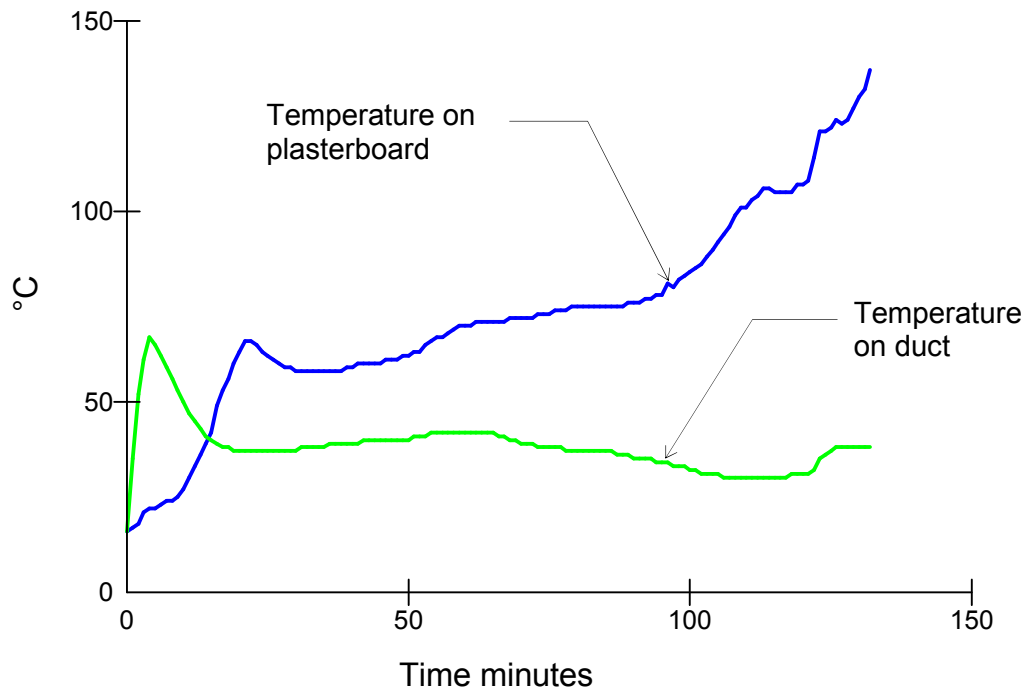
### Duct E



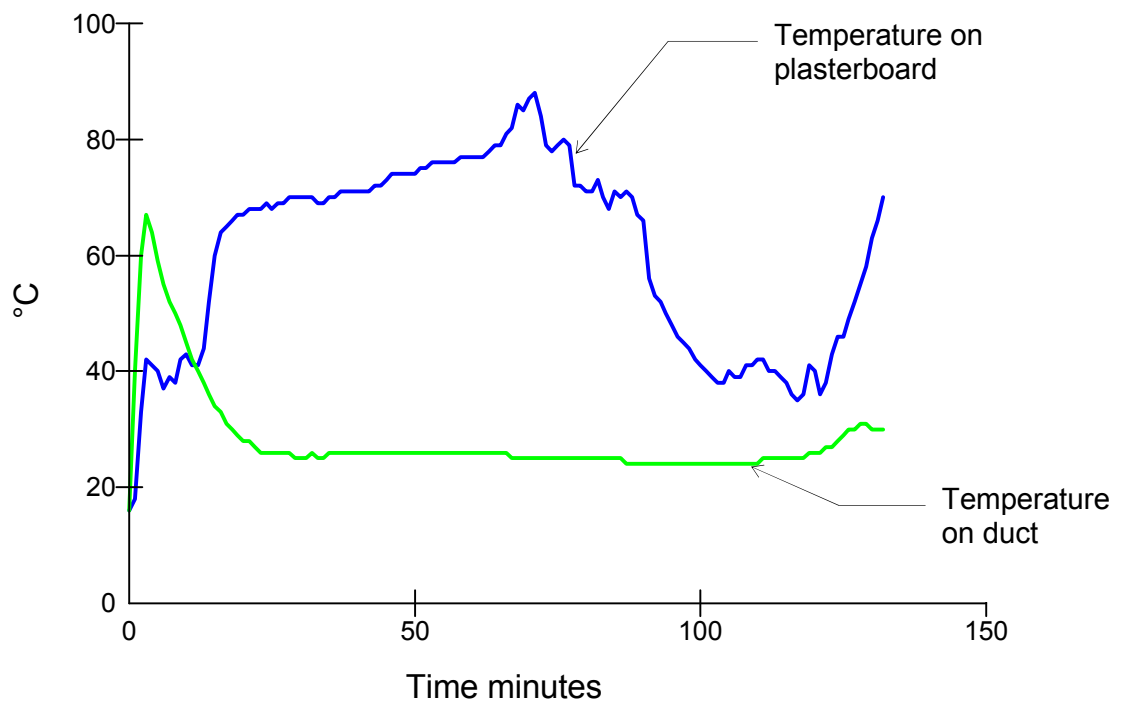
### Duct F



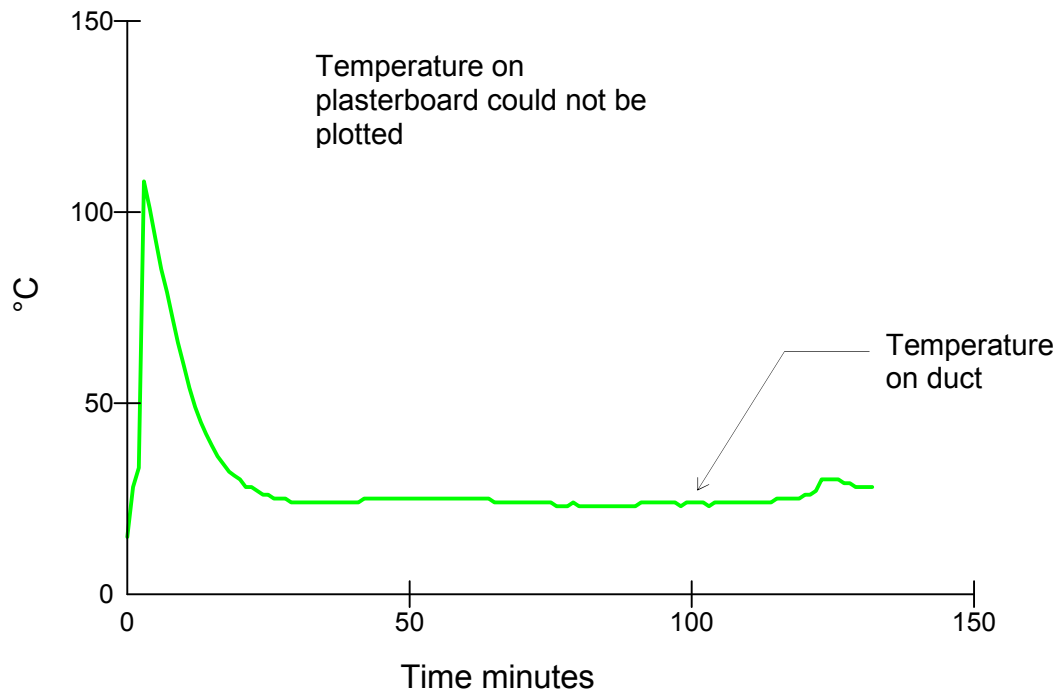
### Duct G



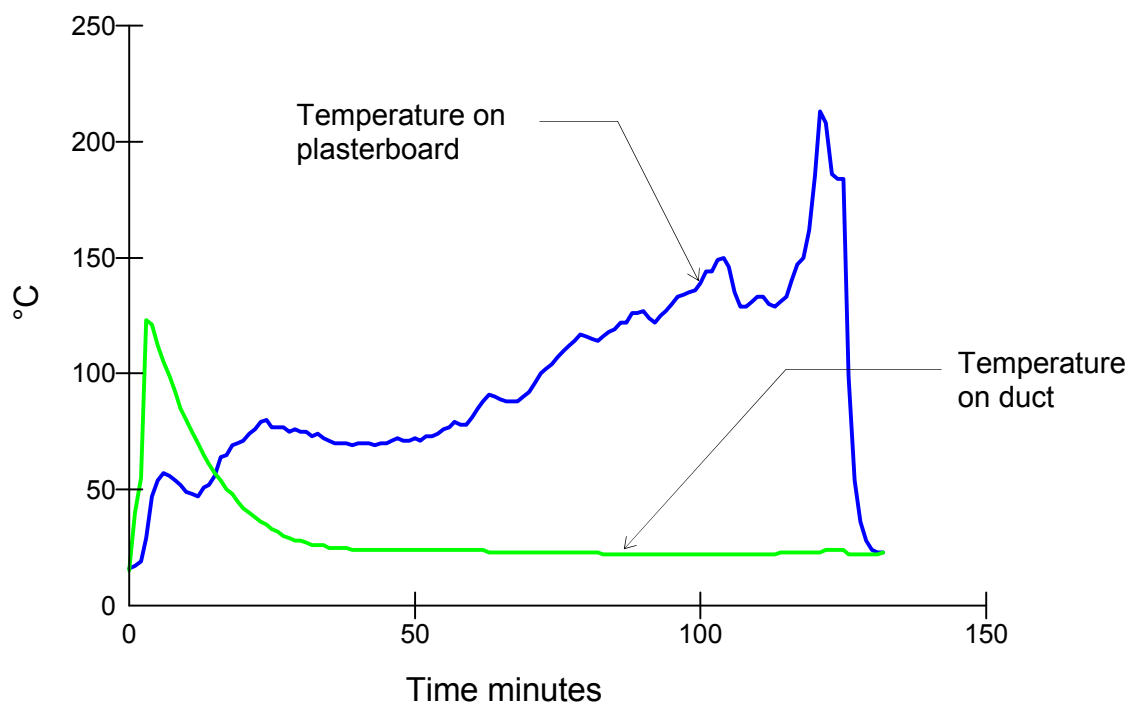
### Duct H



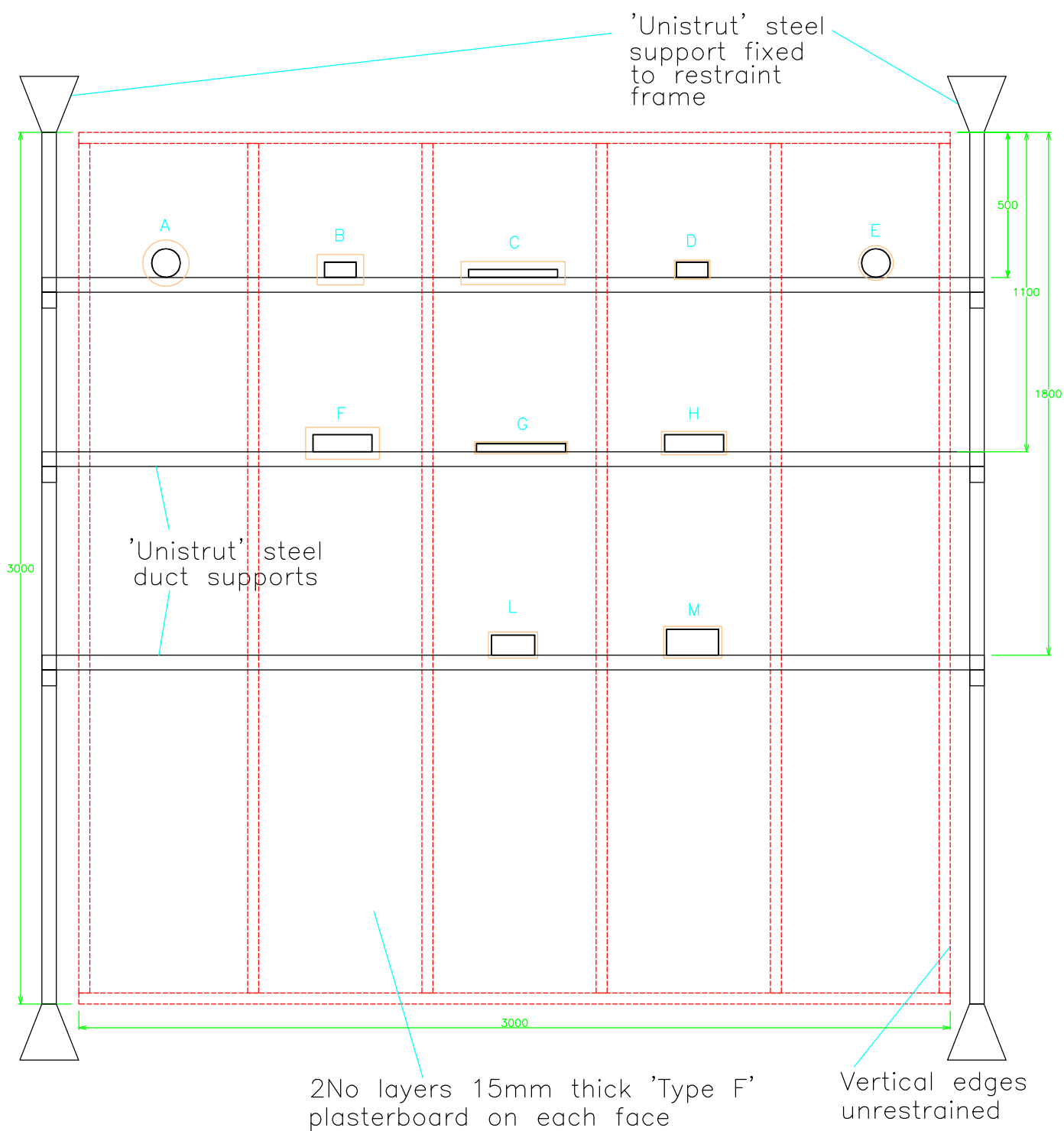
### Duct L



### Duct M



## Appendix 1 – figures 1 – 5



Chiltern House, Stocking Lane, Hughenden Valley  
High Wycombe, Buckinghamshire, HP14 4ND, UK.  
Tel: +44 (0)1494 569800 Fax: +44 (0)1494 564895

Title

Unexposed face front elevation  
showing studwork and duct supports  
(All dimensions in mm)

Date Drawn

19/01/11

Drawn By

ARD

Scale

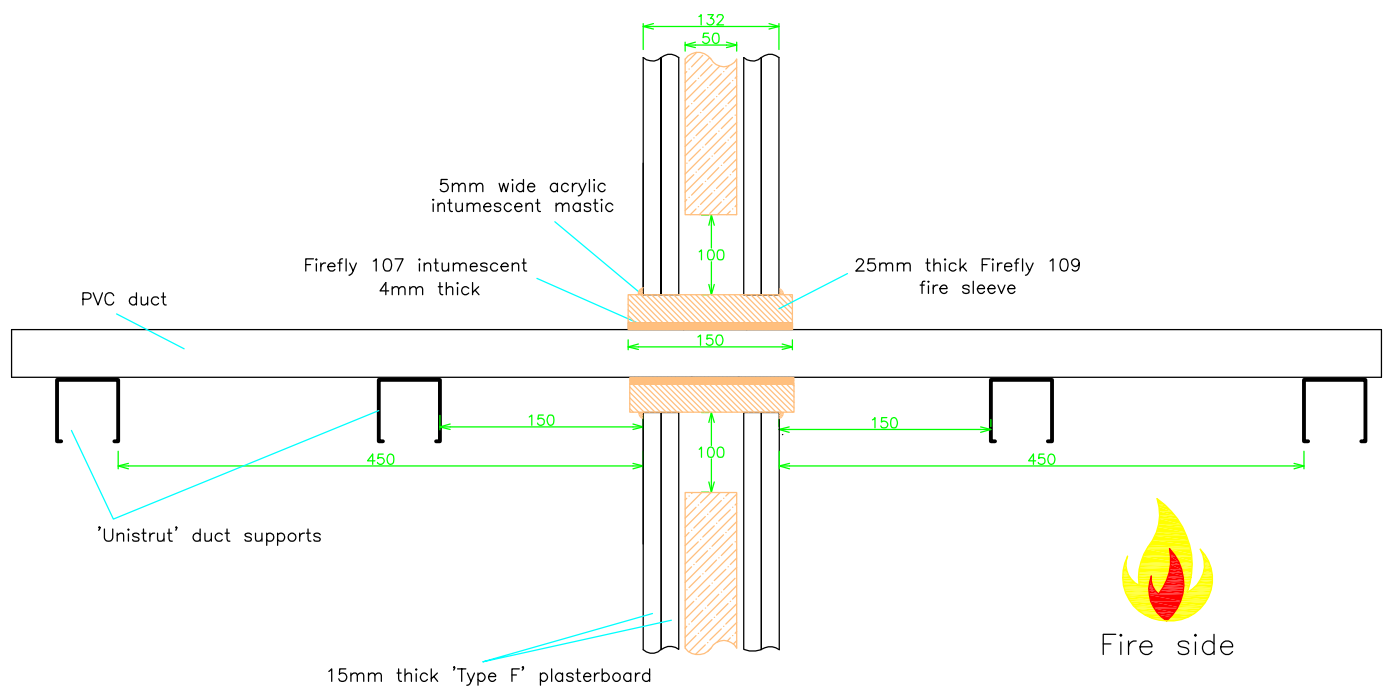
NTS

Project No.

Chilt/RF10167 AR1

Appendix 1

## Duct sealing sealing system A



Chiltern House, Stocking Lane, Hughenden Valley  
High Wycombe, Buckinghamshire, HP14 4ND, UK.  
Tel: +44 (0)1494 569800 Fax: +44 (0)1494 564895

Title

Cross section of duct seal A

Date Drawn

19/01/11

Drawn By

ARD

Scale

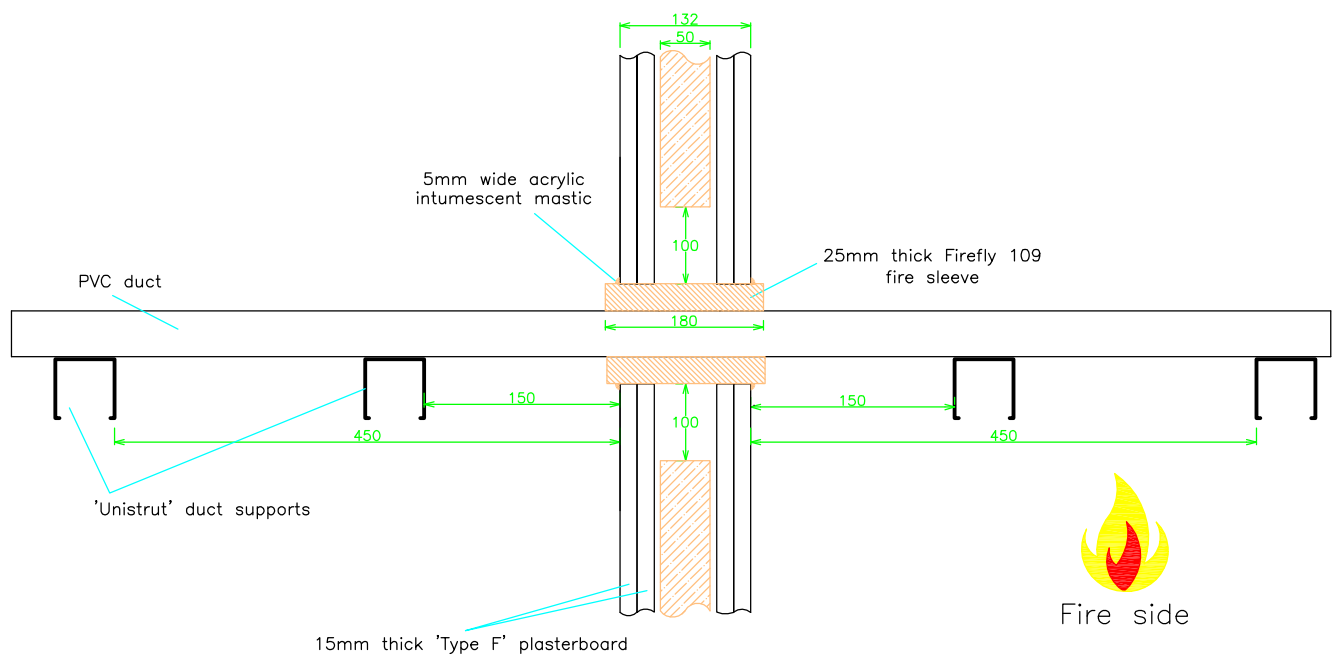
NTS

Project No.

Chilt/RF10167 AR1

Appendix 1

## Duct sealing systems B,C and F



Chiltern House, Stocking Lane, Hughenden Valley  
High Wycombe, Buckinghamshire, HP14 4ND, UK.  
Tel: +44 (0)1494 569800 Fax: +44 (0)1494 564895

Title

Cross section of duct seals  
B, C and F

Date Drawn

19/01/11

Drawn By

ARD

Scale

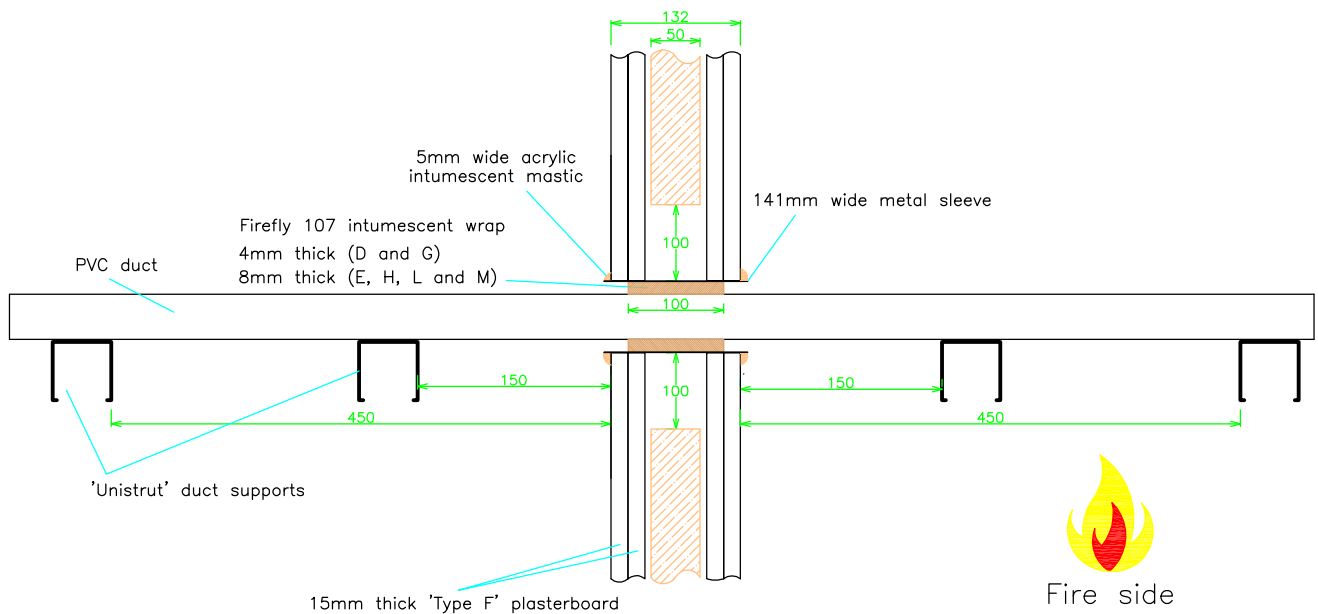
NTS

Project No.

Chilt/RF10167 AR1

Appendix 1

## Duct sealing systems D, E, G, H, L and M



Chiltern House, Stocking Lane, Hughenden Valley  
High Wycombe, Buckinghamshire, HP14 4ND, UK.  
Tel: +44 (0)1494 569800 Fax: +44 (0)1494 564895

Title

Cross section of duct seals  
D, E, G, H, I and M

Date Drawn

19/01/11

Drawn By

ARD

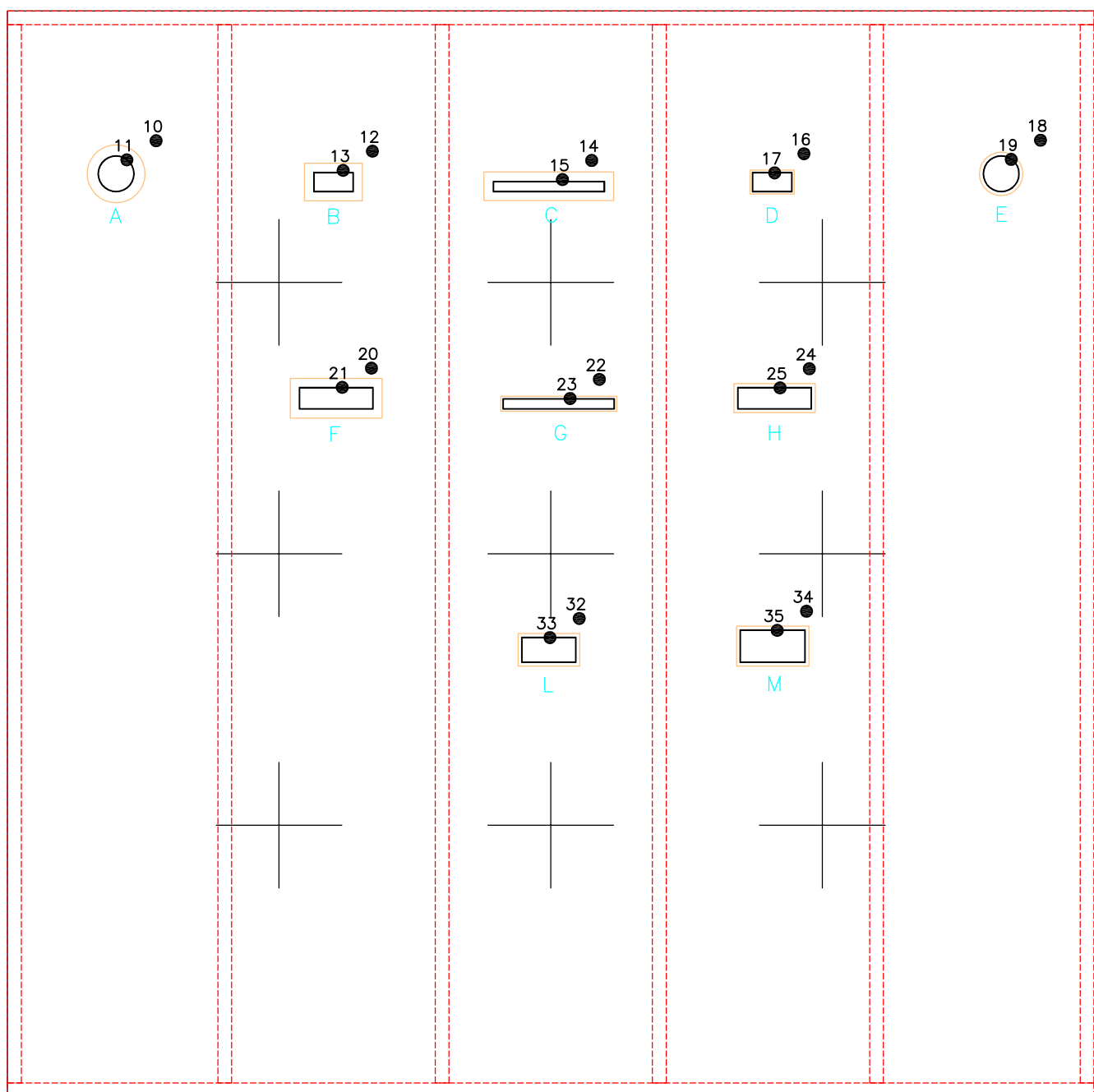
Scale

NTS

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Appendix 1



+ : Furnace Thermocouples  
 • : Unexposed Face Thermocouples

Viewed From Unexposed Face



Chiltern House, Stocking Lane, Hughenden Valley  
 High Wycombe, Buckinghamshire, HP14 4ND, UK.  
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Title

Thermocouple positions  
 (All dimensions in mm)

Date Drawn

19/01/11

Drawn By

ARD

Scale

NTS

Project No.

Chilt/RF10167 AR1

Appendix 1

## Appendix 2 - raw test data (12 pages)

(See figure 5 of appendix 1 for channel locations.)

| Time | Chan 0 | Chan 1 | Chan 2 | Chan 3 | Chan 4 | Chan 5 | Chan 6 | Chan 7 | Chan 8 | Chan 9 | Chan 10 | Chan 11 | Chan 12 | Chan 13 | Chan 14 | Chan 15 | Chan 16 | Chan 17 | Chan 18 |
|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| min  | Pa     | °C     | °C     | °C     | °C     | °C     | °C     | °C     | °C     | °C     | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      |
| 0    | 0      | 15     | 16     | 15     | 16     | 16     | 16     | 17     | 17     | 17     | 17      | 16      | 17      | 17      | 18      | 17      | 18      | 17      | 18      |
| 1    | 4.8    | 312    | 310    | 293    | 378    | 361    | 358    | 386    | 451    | 472    | 18      | 39      | 18      | 35      | 19      | 29      | 19      | 38      | 19      |
| 2    | 7.8    | 356    | 328    | 429    | 432    | 404    | 436    | 478    | 451    | 493    | 18      | 51      | 21      | 93      | 19      | 31      | 30      | 113     | 20      |
| 3    | 6.6    | 403    | 354    | 488    | 472    | 465    | 482    | 525    | 505    | 548    | 20      | 89      | 28      | 96      | 19      | 33      | 51      | 105     | 23      |
| 4    | 7.8    | 476    | 465    | 583    | 566    | 566    | 565    | 588    | 597    | 642    | 25      | 95      | 30      | 87      | 19      | 37      | 53      | 93      | 26      |
| 5    | 7.5    | 508    | 507    | 619    | 596    | 598    | 595    | 611    | 617    | 658    | 26      | 92      | 28      | 79      | 19      | 37      | 51      | 84      | 27      |
| 6    | 7.4    | 515    | 515    | 620    | 600    | 602    | 603    | 619    | 615    | 649    | 24      | 87      | 27      | 72      | 19      | 37      | 49      | 77      | 30      |
| 7    | 7.8    | 529    | 532    | 619    | 613    | 613    | 611    | 632    | 627    | 649    | 23      | 81      | 26      | 65      | 19      | 36      | 46      | 70      | 33      |
| 8    | 7.5    | 563    | 569    | 640    | 641    | 641    | 635    | 653    | 659    | 670    | 23      | 76      | 26      | 60      | 19      | 35      | 46      | 63      | 34      |
| 9    | 6.4    | 596    | 610    | 667    | 676    | 674    | 666    | 681    | 698    | 697    | 24      | 70      | 26      | 55      | 19      | 35      | 44      | 57      | 35      |
| 10   | 7      | 617    | 634    | 687    | 700    | 690    | 683    | 696    | 711    | 711    | 25      | 65      | 26      | 50      | 19      | 35      | 45      | 52      | 36      |
| 11   | 7      | 634    | 649    | 702    | 706    | 697    | 696    | 707    | 723    | 718    | 27      | 61      | 26      | 46      | 19      | 35      | 45      | 47      | 37      |
| 12   | 8      | 642    | 663    | 711    | 716    | 706    | 703    | 713    | 727    | 725    | 30      | 57      | 26      | 43      | 20      | 35      | 47      | 43      | 39      |
| 13   | 7.7    | 651    | 672    | 718    | 725    | 714    | 709    | 719    | 737    | 733    | 32      | 54      | 27      | 40      | 21      | 35      | 49      | 40      | 42      |
| 14   | 6.9    | 665    | 688    | 731    | 740    | 727    | 723    | 734    | 752    | 745    | 35      | 51      | 29      | 37      | 23      | 35      | 53      | 37      | 46      |
| 15   | 7.2    | 678    | 702    | 740    | 748    | 736    | 732    | 742    | 764    | 758    | 37      | 49      | 30      | 35      | 24      | 35      | 60      | 34      | 53      |
| 16   | 7.2    | 689    | 711    | 746    | 756    | 744    | 743    | 752    | 772    | 768    | 40      | 47      | 33      | 33      | 27      | 35      | 66      | 32      | 61      |
| 17   | 7.8    | 700    | 721    | 755    | 764    | 752    | 751    | 761    | 780    | 773    | 43      | 45      | 34      | 32      | 29      | 35      | 71      | 30      | 66      |
| 18   | 7.7    | 711    | 730    | 761    | 767    | 760    | 759    | 767    | 789    | 781    | 45      | 44      | 37      | 30      | 31      | 34      | 73      | 29      | 70      |
| 19   | 7.7    | 721    | 738    | 771    | 773    | 766    | 767    | 776    | 797    | 791    | 48      | 43      | 40      | 29      | 34      | 34      | 75      | 28      | 73      |

| Time | Chan 0 | Chan 1 | Chan 2 | Chan 3 | Chan 4 | Chan 5 | Chan 6 | Chan 7 | Chan 8 | Chan 9 | Chan 10 | Chan 11 | Chan 12 | Chan 13 | Chan 14 | Chan 15 | Chan 16 | Chan 17 | Chan 18 |
|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| min  | Pa     | °C     | °C     | °C     | °C     | °C     | °C     | °C     | °C     | °C     | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      |
| 20   | 7      | 729    | 750    | 776    | 784    | 778    | 776    | 786    | 805    | 797    | 51      | 42      | 42      | 28      | 37      | 34      | 76      | 27      | 74      |
| 21   | 6.5    | 738    | 759    | 781    | 792    | 786    | 785    | 795    | 814    | 804    | 54      | 41      | 44      | 27      | 40      | 33      | 76      | 26      | 76      |
| 22   | 6.7    | 746    | 768    | 791    | 801    | 794    | 793    | 803    | 820    | 808    | 56      | 40      | 45      | 26      | 42      | 33      | 74      | 25      | 76      |
| 23   | 6.7    | 753    | 775    | 798    | 808    | 801    | 800    | 810    | 829    | 815    | 57      | 39      | 47      | 25      | 44      | 32      | 73      | 25      | 76      |
| 24   | 6.6    | 764    | 783    | 805    | 815    | 807    | 810    | 817    | 835    | 820    | 57      | 39      | 49      | 25      | 45      | 32      | 71      | 24      | 75      |
| 25   | 6.5    | 772    | 791    | 811    | 823    | 815    | 815    | 825    | 842    | 828    | 57      | 38      | 50      | 24      | 47      | 32      | 70      | 24      | 75      |
| 26   | 7.2    | 780    | 799    | 817    | 831    | 823    | 823    | 832    | 847    | 834    | 58      | 38      | 51      | 24      | 48      | 32      | 69      | 24      | 75      |
| 27   | 6.8    | 789    | 807    | 823    | 834    | 828    | 829    | 838    | 853    | 841    | 58      | 38      | 52      | 23      | 50      | 32      | 68      | 24      | 75      |
| 28   | 6.8    | 797    | 815    | 831    | 839    | 835    | 838    | 847    | 862    | 847    | 58      | 37      | 52      | 23      | 51      | 32      | 68      | 24      | 75      |
| 29   | 7.2    | 805    | 823    | 835    | 847    | 841    | 844    | 852    | 866    | 852    | 58      | 37      | 53      | 23      | 53      | 32      | 67      | 23      | 75      |
| 30   | 7.2    | 816    | 831    | 844    | 857    | 850    | 851    | 861    | 873    | 862    | 58      | 37      | 54      | 23      | 55      | 32      | 67      | 23      | 75      |
| 31   | 7.5    | 821    | 838    | 851    | 863    | 855    | 858    | 866    | 879    | 864    | 58      | 37      | 55      | 23      | 56      | 32      | 67      | 23      | 75      |
| 32   | 7.8    | 828    | 846    | 859    | 869    | 861    | 865    | 873    | 885    | 870    | 57      | 36      | 56      | 23      | 57      | 32      | 66      | 23      | 75      |
| 33   | 7.6    | 837    | 853    | 863    | 871    | 867    | 870    | 878    | 891    | 879    | 58      | 36      | 56      | 23      | 58      | 32      | 66      | 23      | 75      |
| 34   | 6.7    | 841    | 858    | 868    | 879    | 870    | 874    | 881    | 894    | 880    | 58      | 37      | 57      | 23      | 59      | 32      | 66      | 23      | 75      |
| 35   | 6.6    | 843    | 859    | 868    | 880    | 872    | 875    | 881    | 894    | 882    | 58      | 37      | 57      | 23      | 60      | 32      | 66      | 23      | 74      |
| 36   | 6.6    | 848    | 863    | 872    | 886    | 877    | 879    | 886    | 898    | 888    | 58      | 36      | 57      | 23      | 61      | 32      | 66      | 23      | 74      |
| 37   | 6.9    | 853    | 867    | 876    | 890    | 881    | 884    | 890    | 902    | 891    | 58      | 37      | 57      | 23      | 61      | 32      | 67      | 23      | 73      |
| 38   | 7      | 859    | 872    | 884    | 894    | 886    | 889    | 894    | 906    | 895    | 58      | 37      | 58      | 23      | 61      | 32      | 67      | 23      | 73      |
| 39   | 7.3    | 864    | 877    | 887    | 898    | 891    | 892    | 897    | 908    | 901    | 58      | 36      | 58      | 23      | 61      | 33      | 67      | 23      | 73      |
| 40   | 7.5    | 869    | 883    | 892    | 902    | 895    | 897    | 901    | 913    | 905    | 58      | 37      | 58      | 23      | 62      | 33      | 67      | 23      | 72      |
| 41   | 7.2    | 872    | 886    | 897    | 905    | 896    | 898    | 903    | 915    | 909    | 58      | 36      | 59      | 23      | 62      | 33      | 67      | 23      | 72      |
| 42   | 7.5    | 874    | 886    | 896    | 906    | 895    | 899    | 905    | 915    | 909    | 58      | 36      | 59      | 23      | 62      | 33      | 67      | 23      | 71      |
| 43   | 7.7    | 874    | 887    | 897    | 906    | 897    | 900    | 905    | 916    | 907    | 59      | 36      | 59      | 23      | 62      | 33      | 67      | 23      | 72      |

| Time | Chan 0 | Chan 1 | Chan 2 | Chan 3 | Chan 4 | Chan 5 | Chan 6 | Chan 7 | Chan 8 | Chan 9 | Chan 10 | Chan 11 | Chan 12 | Chan 13 | Chan 14 | Chan 15 | Chan 16 | Chan 17 | Chan 18 |
|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| min  | Pa     | °C     | °C     | °C     | °C     | °C     | °C     | °C     | °C     | °C     | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      |
| 44   | 7.5    | 880    | 890    | 899    | 909    | 900    | 902    | 908    | 920    | 913    | 60      | 36      | 60      | 23      | 62      | 33      | 68      | 23      | 71      |
| 45   | 7.5    | 883    | 893    | 902    | 912    | 903    | 906    | 912    | 922    | 915    | 59      | 36      | 59      | 23      | 62      | 33      | 68      | 23      | 71      |
| 46   | 7.6    | 884    | 897    | 904    | 917    | 907    | 908    | 915    | 925    | 920    | 59      | 35      | 60      | 23      | 62      | 33      | 68      | 23      | 71      |
| 47   | 7.5    | 888    | 900    | 907    | 918    | 910    | 912    | 917    | 928    | 921    | 59      | 35      | 60      | 23      | 63      | 33      | 68      | 23      | 71      |
| 48   | 8      | 890    | 904    | 912    | 924    | 914    | 916    | 920    | 931    | 923    | 60      | 35      | 60      | 23      | 62      | 33      | 69      | 23      | 71      |
| 49   | 7.9    | 894    | 907    | 914    | 925    | 917    | 918    | 923    | 933    | 925    | 60      | 34      | 60      | 23      | 63      | 33      | 69      | 23      | 71      |
| 50   | 7.8    | 896    | 910    | 915    | 929    | 921    | 922    | 927    | 938    | 930    | 60      | 34      | 60      | 23      | 62      | 33      | 69      | 23      | 71      |
| 51   | 7.9    | 899    | 914    | 919    | 932    | 925    | 925    | 930    | 940    | 932    | 61      | 34      | 60      | 23      | 62      | 33      | 70      | 23      | 71      |
| 52   | 7.5    | 905    | 917    | 924    | 936    | 928    | 928    | 934    | 943    | 936    | 62      | 34      | 60      | 22      | 63      | 33      | 70      | 23      | 71      |
| 53   | 7.7    | 906    | 919    | 925    | 937    | 930    | 932    | 937    | 946    | 939    | 63      | 34      | 61      | 22      | 63      | 33      | 71      | 23      | 71      |
| 54   | 7.8    | 910    | 923    | 929    | 942    | 934    | 936    | 940    | 950    | 942    | 63      | 33      | 61      | 23      | 62      | 33      | 71      | 23      | 71      |
| 55   | 7.8    | 914    | 927    | 930    | 946    | 938    | 939    | 942    | 952    | 945    | 64      | 34      | 61      | 23      | 62      | 33      | 71      | 23      | 72      |
| 56   | 7.6    | 916    | 930    | 934    | 948    | 941    | 942    | 946    | 956    | 949    | 65      | 34      | 62      | 23      | 62      | 33      | 71      | 23      | 71      |
| 57   | 7.8    | 918    | 933    | 936    | 953    | 944    | 946    | 950    | 958    | 952    | 65      | 34      | 62      | 23      | 62      | 33      | 72      | 23      | 72      |
| 58   | 7.7    | 924    | 937    | 941    | 954    | 949    | 948    | 954    | 962    | 959    | 66      | 34      | 62      | 23      | 62      | 33      | 71      | 23      | 72      |
| 59   | 8.4    | 928    | 940    | 945    | 958    | 951    | 954    | 956    | 965    | 960    | 65      | 33      | 62      | 23      | 62      | 33      | 71      | 23      | 72      |
| 60   | 8.2    | 931    | 945    | 949    | 963    | 956    | 957    | 959    | 967    | 961    | 64      | 33      | 62      | 23      | 62      | 33      | 71      | 23      | 72      |
| 61   | 7.9    | 937    | 950    | 953    | 965    | 960    | 961    | 963    | 970    | 968    | 64      | 33      | 63      | 23      | 63      | 33      | 71      | 23      | 72      |
| 62   | 8.1    | 937    | 950    | 953    | 966    | 961    | 962    | 962    | 969    | 965    | 64      | 33      | 63      | 23      | 63      | 34      | 71      | 23      | 73      |
| 63   | 8.2    | 937    | 950    | 953    | 965    | 960    | 963    | 963    | 970    | 966    | 63      | 32      | 63      | 23      | 63      | 34      | 73      | 23      | 73      |
| 64   | 8      | 937    | 952    | 954    | 967    | 961    | 965    | 964    | 971    | 967    | 63      | 32      | 63      | 23      | 63      | 34      | 75      | 22      | 73      |
| 65   | 6.9    | 941    | 954    | 957    | 969    | 963    | 966    | 966    | 973    | 968    | 63      | 32      | 63      | 23      | 63      | 34      | 74      | 23      | 74      |
| 66   | 7.1    | 943    | 956    | 958    | 971    | 965    | 968    | 968    | 974    | 971    | 63      | 32      | 63      | 23      | 64      | 34      | 73      | 22      | 74      |
| 67   | 6.7    | 946    | 959    | 963    | 973    | 967    | 971    | 970    | 977    | 972    | 63      | 32      | 63      | 23      | 64      | 34      | 74      | 22      | 75      |

| Time | Chan 0 | Chan 1 | Chan 2 | Chan 3 | Chan 4 | Chan 5 | Chan 6 | Chan 7 | Chan 8 | Chan 9 | Chan 10 | Chan 11 | Chan 12 | Chan 13 | Chan 14 | Chan 15 | Chan 16 | Chan 17 | Chan 18 |
|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| min  | Pa     | °C     | °C     | °C     | °C     | °C     | °C     | °C     | °C     | °C     | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      |
| 68   | 7      | 948    | 961    | 964    | 976    | 969    | 973    | 972    | 979    | 974    | 63      | 32      | 63      | 23      | 64      | 34      | 75      | 22      | 75      |
| 69   | 6.5    | 951    | 964    | 968    | 979    | 972    | 975    | 975    | 982    | 977    | 63      | 32      | 63      | 22      | 64      | 34      | 77      | 22      | 75      |
| 70   | 6.7    | 953    | 966    | 970    | 980    | 974    | 978    | 978    | 983    | 979    | 63      | 32      | 63      | 22      | 64      | 34      | 80      | 22      | 76      |
| 71   | 7      | 955    | 969    | 973    | 984    | 976    | 981    | 980    | 986    | 981    | 64      | 32      | 63      | 22      | 64      | 33      | 81      | 22      | 77      |
| 72   | 6.9    | 958    | 971    | 975    | 985    | 979    | 983    | 982    | 989    | 985    | 64      | 32      | 63      | 22      | 65      | 33      | 83      | 22      | 77      |
| 73   | 6.8    | 962    | 973    | 977    | 988    | 981    | 986    | 985    | 992    | 986    | 65      | 32      | 64      | 22      | 66      | 33      | 85      | 22      | 77      |
| 74   | 6.7    | 963    | 975    | 979    | 990    | 984    | 987    | 987    | 993    | 990    | 65      | 32      | 64      | 22      | 66      | 32      | 85      | 22      | 78      |
| 75   | 6.9    | 967    | 978    | 982    | 992    | 985    | 991    | 990    | 996    | 992    | 66      | 32      | 64      | 22      | 67      | 32      | 85      | 22      | 79      |
| 76   | 6.8    | 970    | 980    | 985    | 994    | 988    | 992    | 992    | 998    | 994    | 67      | 32      | 64      | 22      | 67      | 32      | 84      | 22      | 80      |
| 77   | 6.6    | 971    | 983    | 986    | 996    | 990    | 995    | 994    | 1001   | 995    | 66      | 32      | 64      | 22      | 68      | 32      | 83      | 22      | 81      |
| 78   | 6.7    | 973    | 985    | 988    | 999    | 992    | 997    | 996    | 1002   | 997    | 68      | 32      | 65      | 23      | 68      | 31      | 84      | 22      | 82      |
| 79   | 6.9    | 976    | 988    | 992    | 1002   | 995    | 1000   | 1000   | 1005   | 1000   | 69      | 32      | 65      | 23      | 69      | 31      | 85      | 23      | 82      |
| 80   | 7      | 980    | 990    | 994    | 1005   | 998    | 1003   | 1002   | 1006   | 1001   | 69      | 32      | 65      | 23      | 69      | 31      | 86      | 23      | 84      |
| 81   | 6.7    | 982    | 992    | 996    | 1007   | 1000   | 1005   | 1004   | 1010   | 1005   | 69      | 32      | 65      | 23      | 70      | 31      | 88      | 23      | 84      |
| 82   | 6.9    | 984    | 994    | 998    | 1007   | 1002   | 1008   | 1005   | 1011   | 1006   | 69      | 32      | 65      | 23      | 70      | 31      | 90      | 23      | 86      |
| 83   | 7      | 986    | 996    | 1000   | 1010   | 1003   | 1009   | 1008   | 1013   | 1008   | 70      | 32      | 66      | 23      | 70      | 31      | 90      | 23      | 86      |
| 84   | 6.9    | 984    | 995    | 997    | 1007   | 1001   | 1007   | 1005   | 1010   | 1005   | 71      | 32      | 67      | 23      | 71      | 31      | 89      | 23      | 87      |
| 85   | 6.7    | 985    | 996    | 1000   | 1007   | 1001   | 1008   | 1006   | 1011   | 1005   | 71      | 31      | 67      | 23      | 71      | 31      | 90      | 23      | 88      |
| 86   | 6.7    | 985    | 996    | 1000   | 1008   | 1002   | 1009   | 1006   | 1010   | 1006   | 71      | 31      | 67      | 23      | 71      | 31      | 92      | 23      | 89      |
| 87   | 6.8    | 987    | 998    | 1001   | 1010   | 1002   | 1010   | 1007   | 1012   | 1006   | 72      | 31      | 67      | 23      | 71      | 31      | 93      | 23      | 91      |
| 88   | 6.9    | 988    | 999    | 1002   | 1012   | 1005   | 1012   | 1010   | 1013   | 1008   | 72      | 31      | 67      | 23      | 72      | 31      | 94      | 23      | 91      |
| 89   | 6.5    | 990    | 1000   | 1003   | 1014   | 1005   | 1013   | 1011   | 1015   | 1011   | 72      | 30      | 68      | 23      | 72      | 31      | 94      | 23      | 91      |
| 90   | 6.4    | 992    | 1002   | 1005   | 1014   | 1007   | 1015   | 1013   | 1016   | 1012   | 72      | 30      | 68      | 23      | 72      | 31      | 96      | 23      | 92      |
| 91   | 6.1    | 993    | 1003   | 1007   | 1015   | 1009   | 1017   | 1012   | 1017   | 1014   | 72      | 30      | 68      | 24      | 72      | 31      | 96      | 23      | 93      |

| Time | Chan 0 | Chan 1 | Chan 2 | Chan 3 | Chan 4 | Chan 5 | Chan 6 | Chan 7 | Chan 8 | Chan 9 | Chan 10 | Chan 11 | Chan 12 | Chan 13 | Chan 14 | Chan 15 | Chan 16 | Chan 17 | Chan 18 |
|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| min  | Pa     | °C     | °C     | °C     | °C     | °C     | °C     | °C     | °C     | °C     | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      |
| 92   | 7.7    | 995    | 1005   | 1009   | 1017   | 1010   | 1018   | 1015   | 1019   | 1015   | 72      | 30      | 69      | 24      | 72      | 31      | 95      | 23      | 94      |
| 93   | 7.2    | 996    | 1006   | 1010   | 1018   | 1012   | 1020   | 1017   | 1020   | 1017   | 72      | 30      | 69      | 24      | 72      | 31      | 95      | 23      | 94      |
| 94   | 7.7    | 998    | 1008   | 1012   | 1019   | 1014   | 1021   | 1018   | 1022   | 1018   | 72      | 30      | 69      | 24      | 72      | 31      | 96      | 24      | 95      |
| 95   | 7.2    | 1000   | 1009   | 1014   | 1021   | 1015   | 1023   | 1019   | 1023   | 1020   | 72      | 30      | 69      | 24      | 72      | 31      | 96      | 24      | 99      |
| 96   | 7.9    | 1001   | 1011   | 1016   | 1023   | 1018   | 1023   | 1021   | 1025   | 1022   | 72      | 30      | 70      | 24      | 72      | 31      | 96      | 24      | 102     |
| 97   | 7.9    | 1003   | 1013   | 1017   | 1025   | 1019   | 1025   | 1024   | 1027   | 1024   | 73      | 30      | 70      | 24      | 72      | 31      | 97      | 24      | 19      |
| 98   | 7.9    | 1006   | 1015   | 1018   | 1027   | 1021   | 1025   | 1024   | 1028   | 1026   | 73      | 30      | 70      | 24      | 72      | 32      | 97      | 24      | 21      |
| 99   | 7.9    | 1007   | 1016   | 1020   | 1029   | 1023   | 1027   | 1026   | 1030   | 1025   | 74      | 30      | 70      | 24      | 72      | 31      | 98      | 24      | 20      |
| 100  | 7.8    | 1009   | 1017   | 1021   | 1030   | 1024   | 1028   | 1028   | 1032   | 1028   | 74      | 30      | 70      | 25      | 72      | 32      | 99      | 24      | 21      |
| 101  | 7.8    | 1011   | 1019   | 1023   | 1030   | 1026   | 1029   | 1029   | 1033   | 1030   | 75      | 31      | 71      | 25      | 72      | 32      | 101     | 24      | 19      |
| 102  | 7.7    | 1013   | 1020   | 1026   | 1033   | 1026   | 1031   | 1031   | 1035   | 1032   | 76      | 31      | 71      | 25      | 72      | 32      | 103     | 24      | 19      |
| 103  | 7.6    | 1014   | 1023   | 1027   | 1035   | 1028   | 1032   | 1032   | 1036   | 1033   | 78      | 32      | 72      | 25      | 72      | 32      | 105     | 24      | 18      |
| 104  | 7.4    | 1016   | 1024   | 1028   | 1037   | 1030   | 1036   | 1033   | 1038   | 1034   | 83      | 33      | 72      | 25      | 72      | 32      | 108     | 24      | 15      |
| 105  | 7.6    | 1018   | 1026   | 1029   | 1038   | 1032   | 1035   | 1035   | 1040   | 1036   | 87      | 34      | 73      | 26      | 72      | 31      | 110     | 24      | 16      |
| 106  | 7.3    | 1019   | 1028   | 1031   | 1039   | 1034   | 1039   | 1037   | 1042   | 1037   | 87      | 36      | 73      | 26      | 73      | 32      | 113     | 25      | 16      |
| 107  | 7.2    | 1021   | 1029   | 1032   | 1041   | 1034   | 1039   | 1039   | 1044   | 1038   | 88      | 37      | 74      | 26      | 73      | 31      | 116     | 25      | 16      |
| 108  | 7.1    | 1023   | 1031   | 1034   | 1043   | 1036   | 1041   | 1040   | 1044   | 1039   | 90      | 39      | 75      | 26      | 74      | 31      | 120     | 25      | 17      |
| 109  | 6.9    | 1024   | 1032   | 1036   | 1045   | 1038   | 1043   | 1042   | 1047   | 1041   | 91      | 40      | 76      | 26      | 75      | 31      | 123     | 25      | 17      |
| 110  | 6.7    | 1025   | 1034   | 1037   | 1046   | 1039   | 1043   | 1044   | 1047   | 1042   | 94      | 42      | 78      | 26      | 75      | 31      | 126     | 25      | 16      |
| 111  | 6.7    | 1027   | 1035   | 1039   | 1048   | 1041   | 1046   | 1046   | 1050   | 1044   | 94      | 43      | 78      | 26      | 76      | 31      | 129     | 25      | 16      |
| 112  | 6.7    | 1030   | 1036   | 1039   | 1048   | 1042   | 1048   | 1047   | 1050   | 1046   | 95      | 44      | 79      | 26      | 77      | 31      | 131     | 26      | 16      |
| 113  | 6.6    | 1030   | 1037   | 1042   | 1050   | 1044   | 1049   | 1048   | 1051   | 1048   | 95      | 45      | 79      | 27      | 77      | 31      | 133     | 26      | 16      |
| 114  | 6.5    | 1031   | 1038   | 1043   | 1051   | 1044   | 1050   | 1050   | 1053   | 1049   | 93      | 45      | 79      | 27      | 78      | 31      | 136     | 26      | 17      |
| 115  | 6.3    | 1034   | 1039   | 1044   | 1053   | 1046   | 1052   | 1052   | 1054   | 1050   | 93      | 44      | 80      | 27      | 78      | 31      | 139     | 26      | 18      |

| Time | Chan 0 | Chan 1 | Chan 2 | Chan 3 | Chan 4 | Chan 5 | Chan 6 | Chan 7 | Chan 8 | Chan 9 | Chan 10 | Chan 11 | Chan 12 | Chan 13 | Chan 14 | Chan 15 | Chan 16 | Chan 17 | Chan 18 |
|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| min  | Pa     | °C     | °C     | °C     | °C     | °C     | °C     | °C     | °C     | °C     | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      |
| 116  | 6.2    | 1036   | 1041   | 1045   | 1054   | 1048   | 1054   | 1053   | 1056   | 1052   | 93      | 44      | 80      | 27      | 78      | 31      | 141     | 26      | 20      |
| 117  | 6.2    | 1037   | 1042   | 1047   | 1055   | 1049   | 1056   | 1054   | 1057   | 1053   | 95      | 44      | 81      | 27      | 79      | 31      | 144     | 26      | 16      |
| 118  | 7.6    | 1037   | 1045   | 1048   | 1056   | 1050   | 1056   | 1057   | 1058   | 1054   | 98      | 45      | 81      | 28      | 79      | 31      | 147     | 27      | 17      |
| 119  | 7.5    | 1039   | 1045   | 1050   | 1058   | 1051   | 1058   | 1058   | 1060   | 1057   | 103     | 46      | 81      | 29      | 79      | 32      | 151     | 27      | 17      |
| 120  | 7.5    | 1041   | 1046   | 1052   | 1059   | 1053   | 1062   | 1059   | 1061   | 1058   | 108     | 46      | 81      | 29      | 80      | 32      | 155     | 27      | 16      |
| 121  | 7.1    | 1042   | 1047   | 1051   | 1059   | 1051   | 1059   | 1059   | 1061   | 1058   | 114     | 47      | 82      | 29      | 80      | 32      | 157     | 28      | 16      |
| 122  | 5.5    | 1042   | 1048   | 1052   | 1060   | 1047   | 1058   | 1060   | 1061   | 1060   | 114     | 48      | 82      | 29      | 81      | 32      | 162     | 29      | 16      |
| 123  | 6.9    | 1046   | 1053   | 1056   | 1060   | 1048   | 1063   | 1061   | 1063   | 1062   | 117     | 49      | 83      | 30      | 81      | 32      | 166     | 30      | 26      |
| 124  | 5      | 1047   | 1056   | 1065   | 1065   | 1050   | 1063   | 1064   | 1064   | 1061   | 119     | 51      | 83      | 30      | 81      | 33      | 169     | 31      | 18      |
| 125  | 6.8    | 1052   | 1060   | 1075   | 1058   | 1052   | 1067   | 1059   | 1063   | 1060   | 116     | 52      | 84      | 30      | 81      | 33      | 171     | 32      | 16      |
| 126  | 6.7    | 1055   | 1061   | 1074   | 1058   | 1053   | 1070   | 1061   | 1065   | 1061   | 115     | 54      | 85      | 30      | 82      | 33      | 178     | 33      | 28      |
| 127  | 6.4    | 1056   | 1064   | 1079   | 1061   | 1055   | 1072   | 1063   | 1067   | 1062   | 128     | 61      | 85      | 30      | 83      | 34      | 183     | 33      | 17      |
| 128  | 7.5    | 1054   | 1066   | 1082   | 1064   | 1056   | 1072   | 1065   | 1069   | 1062   | 127     | 93      | 86      | 31      | 83      | 34      | 189     | 34      | 16      |
| 129  | 7.3    | 1056   | 1070   | 1083   | 1064   | 1058   | 1073   | 1066   | 1069   | 1063   | 156     | 127     | 87      | 31      | 84      | 34      | 195     | 34      | 16      |
| 130  | 7.5    | 1060   | 1072   | 1085   | 1066   | 1059   | 1076   | 1068   | 1070   | 1066   | 56      | 145     | 88      | 31      | 85      | 35      | 201     | 34      | 16      |
| 131  | 7.5    | 1061   | 1074   | 1077   | 1066   | 1061   | 1072   | 1067   | 1070   | 1067   | 11      | 71      | 89      | 32      | 87      | 35      | 208     | 34      | 15      |
| 132  | 8      | 1061   | 1070   | 1083   | 1066   | 1061   | 1067   | 1065   | 1069   | 1067   | 8       | 33      | 90      | 32      | 89      | 35      | 214     | 35      | 15      |

| Time | Chan 19 | Chan 20 | Chan 21 | Chan 22 | Chan 23 | Chan 24 | Chan 25 | Chan 32 | Chan 33 | Chan 34 | Chan 35 | Chan 38 |
|------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| min  | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      |
| 0    | 17      | 16      | 15      | 16      | 16      | 16      | 16      | 15      | 15      | 16      | 15      | 15      |
| 1    | 40      | 17      | 38      | 17      | 35      | 18      | 40      | 11      | 28      | 17      | 40      | 15      |
| 2    | 44      | 20      | -1212   | 18      | 52      | 33      | 60      | 12      | 33      | 19      | 55      | 15      |
| 3    | 48      | 28      | -1212   | 21      | 61      | 42      | 67      | -1212   | 108     | 29      | 123     | 15      |
| 4    | 61      | 30      | -1212   | 22      | 67      | 41      | 64      | -18     | 101     | 47      | 121     | 15      |
| 5    | 86      | 30      | -1212   | 22      | 65      | 40      | 59      | 970     | 93      | 54      | 112     | 15      |
| 6    | 105     | 29      | -1212   | 23      | 62      | 37      | 55      | 617     | 85      | 57      | 105     | 14      |
| 7    | 107     | 28      | -523    | 24      | 59      | 39      | 52      | -597    | 79      | 56      | 99      | 14      |
| 8    | 105     | 28      | -554    | 24      | 56      | 38      | 50      | 770     | 72      | 54      | 92      | 14      |
| 9    | 100     | 27      | -1212   | 25      | 53      | 42      | 48      | 1247    | 66      | 52      | 85      | 13      |
| 10   | 93      | 27      | -1212   | 27      | 50      | 43      | 45      | 1247    | 60      | 49      | 80      | 13      |
| 11   | 85      | 27      | -1212   | 30      | 47      | 41      | 42      | 213     | 54      | 48      | 75      | 13      |
| 12   | 78      | 27      | -1213   | 33      | 45      | 41      | 40      | -229    | 49      | 47      | 70      | 13      |
| 13   | 71      | 27      | -1213   | 36      | 43      | 44      | 38      | -305    | 45      | 51      | 65      | 12      |
| 14   | 65      | 28      | -1213   | 39      | 41      | 52      | 36      | 229     | 42      | 52      | 61      | 12      |
| 15   | 60      | 29      | -1213   | 42      | 40      | 60      | 34      | 810     | 39      | 56      | 57      | 12      |
| 16   | 56      | 30      | -1213   | 49      | 39      | 64      | 33      | 1246    | 36      | 64      | 54      | 12      |
| 17   | 52      | 32      | -1213   | 53      | 38      | 65      | 31      | 1246    | 34      | 65      | 50      | 12      |
| 18   | 49      | 35      | -1213   | 56      | 38      | 66      | 30      | 274     | 32      | 69      | 48      | 12      |
| 19   | 47      | 37      | -1213   | 60      | 37      | 67      | 29      | 713     | 31      | 70      | 45      | 11      |
| 20   | 45      | 40      | -1214   | 63      | 37      | 67      | 28      | -824    | 30      | 71      | 42      | 11      |
| 21   | 44      | 42      | -1214   | 66      | 37      | 68      | 28      | -1214   | 28      | 74      | 40      | 11      |
| 22   | 43      | 44      | -1214   | 66      | 37      | 68      | 27      | -1214   | 28      | 76      | 38      | 11      |
| 23   | 41      | 46      | -1214   | 65      | 37      | 68      | 26      | -1214   | 27      | 79      | 36      | 11      |

| Time | Chan 19 | Chan 20 | Chan 21 | Chan 22 | Chan 23 | Chan 24 | Chan 25 | Chan 32 | Chan 33 | Chan 34 | Chan 35 | Chan 38 |
|------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| min  | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      |
| 24   | 40      | 47      | -1214   | 63      | 37      | 69      | 26      | -1214   | 26      | 80      | 35      | 11      |
| 25   | 39      | 48      | -1214   | 62      | 37      | 68      | 26      | -1214   | 26      | 77      | 33      | 11      |
| 26   | 38      | 48      | -1214   | 61      | 37      | 69      | 26      | -1214   | 25      | 77      | 32      | 11      |
| 27   | 36      | 49      | -1214   | 60      | 37      | 69      | 26      | -1214   | 25      | 77      | 30      | 11      |
| 28   | 35      | 49      | -1215   | 59      | 37      | 70      | 26      | -1215   | 25      | 75      | 29      | 11      |
| 29   | 35      | 50      | -1215   | 59      | 37      | 70      | 25      | -1215   | 24      | 76      | 28      | 11      |
| 30   | 34      | 51      | -1215   | 58      | 37      | 70      | 25      | -738    | 24      | 75      | 28      | 11      |
| 31   | 33      | 51      | -1215   | 58      | 38      | 70      | 25      | -661    | 24      | 75      | 27      | 11      |
| 32   | 32      | 52      | -1215   | 58      | 38      | 70      | 26      | -700    | 24      | 73      | 26      | 11      |
| 33   | 32      | 52      | -1215   | 58      | 38      | 69      | 25      | -708    | 24      | 74      | 26      | 11      |
| 34   | 31      | 51      | -1215   | 58      | 38      | 69      | 25      | -819    | 24      | 72      | 26      | 11      |
| 35   | 31      | 53      | -1215   | 58      | 38      | 70      | 26      | -868    | 24      | 71      | 25      | 11      |
| 36   | 30      | 53      | -1215   | 58      | 39      | 70      | 26      | -788    | 24      | 70      | 25      | 11      |
| 37   | 30      | 53      | -1215   | 58      | 39      | 71      | 26      | -836    | 24      | 70      | 25      | 11      |
| 38   | 29      | 54      | -1216   | 58      | 39      | 71      | 26      | -983    | 24      | 70      | 25      | 11      |
| 39   | 29      | 55      | -1216   | 59      | 39      | 71      | 26      | -1046   | 24      | 69      | 24      | 11      |
| 40   | 29      | 55      | -1216   | 59      | 39      | 71      | 26      | -1103   | 24      | 70      | 24      | 11      |
| 41   | 29      | 55      | -1216   | 60      | 39      | 71      | 26      | -1216   | 24      | 70      | 24      | 11      |
| 42   | 28      | 55      | -1216   | 60      | 40      | 71      | 26      | 136     | 25      | 70      | 24      | 11      |
| 43   | 28      | 56      | -1216   | 60      | 40      | 72      | 26      | -944    | 25      | 69      | 24      | 11      |
| 44   | 28      | 56      | -1216   | 60      | 40      | 72      | 26      | -982    | 25      | 70      | 24      | 11      |
| 45   | 28      | 56      | -1216   | 60      | 40      | 73      | 26      | -976    | 25      | 70      | 24      | 11      |
| 46   | 28      | 56      | -1216   | 61      | 40      | 74      | 26      | -953    | 25      | 71      | 24      | 11      |
| 47   | 27      | 57      | -1216   | 61      | 40      | 74      | 26      | -823    | 25      | 72      | 24      | 11      |

| Time | Chan 19 | Chan 20 | Chan 21 | Chan 22 | Chan 23 | Chan 24 | Chan 25 | Chan 32 | Chan 33 | Chan 34 | Chan 35 | Chan 38 |
|------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| min  | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      |
| 48   | 27      | 58      | -1216   | 61      | 40      | 74      | 26      | -537    | 25      | 71      | 24      | 11      |
| 49   | 27      | 58      | -1216   | 62      | 40      | 74      | 26      | -512    | 25      | 71      | 24      | 11      |
| 50   | 27      | 58      | -1216   | 62      | 40      | 74      | 26      | -537    | 25      | 72      | 24      | 11      |
| 51   | 27      | 58      | -1051   | 63      | 41      | 75      | 26      | -559    | 25      | 71      | 24      | 11      |
| 52   | 27      | 59      | -959    | 63      | 41      | 75      | 26      | -532    | 25      | 73      | 24      | 11      |
| 53   | 27      | 60      | -1216   | 65      | 41      | 76      | 26      | -686    | 25      | 73      | 24      | 11      |
| 54   | 27      | 60      | -1216   | 66      | 42      | 76      | 26      | -892    | 25      | 74      | 24      | 11      |
| 55   | 27      | 60      | -834    | 67      | 42      | 76      | 26      | -1009   | 25      | 76      | 24      | 11      |
| 56   | 27      | 61      | -636    | 67      | 42      | 76      | 26      | -1216   | 25      | 77      | 24      | 11      |
| 57   | 26      | 61      | -603    | 68      | 42      | 76      | 26      | -1217   | 25      | 79      | 24      | 10      |
| 58   | 26      | 62      | -782    | 69      | 42      | 77      | 26      | -1217   | 25      | 78      | 24      | 10      |
| 59   | 26      | 62      | -810    | 70      | 42      | 77      | 26      | -1217   | 25      | 78      | 24      | 10      |
| 60   | 26      | 62      | -354    | 70      | 42      | 77      | 26      | -1217   | 25      | 81      | 24      | 10      |
| 61   | 26      | 62      | -487    | 70      | 42      | 77      | 26      | -1217   | 25      | 85      | 24      | 10      |
| 62   | 26      | 62      | -318    | 71      | 42      | 77      | 26      | -1217   | 25      | 88      | 24      | 11      |
| 63   | 26      | 62      | -597    | 71      | 42      | 78      | 26      | -1217   | 25      | 91      | 23      | 10      |
| 64   | 26      | 62      | -1217   | 71      | 42      | 79      | 26      | -1217   | 25      | 90      | 23      | 11      |
| 65   | 26      | 62      | -1131   | 71      | 42      | 79      | 26      | -1217   | 24      | 89      | 23      | 10      |
| 66   | 26      | 62      | -1085   | 71      | 41      | 81      | 26      | -1217   | 24      | 88      | 23      | 11      |
| 67   | 25      | 61      | -1217   | 71      | 41      | 82      | 25      | -1217   | 24      | 88      | 23      | 10      |
| 68   | 25      | 62      | -1217   | 72      | 40      | 86      | 25      | -1217   | 24      | 88      | 23      | 10      |
| 69   | 25      | 62      | -1217   | 72      | 40      | 85      | 25      | -1217   | 24      | 90      | 23      | 10      |
| 70   | 25      | 62      | -1217   | 72      | 39      | 87      | 25      | -1217   | 24      | 92      | 23      | 10      |
| 71   | 25      | 63      | -1217   | 72      | 39      | 88      | 25      | -1217   | 24      | 96      | 23      | 10      |

| Time | Chan 19 | Chan 20 | Chan 21 | Chan 22 | Chan 23 | Chan 24 | Chan 25 | Chan 32 | Chan 33 | Chan 34 | Chan 35 | Chan 38 |
|------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| min  | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      |
| 72   | 25      | 63      | -1217   | 72      | 39      | 84      | 25      | -1217   | 24      | 100     | 23      | 10      |
| 73   | 25      | 63      | -1217   | 73      | 38      | 79      | 25      | -1217   | 24      | 102     | 23      | 10      |
| 74   | 24      | 63      | -1217   | 73      | 38      | 78      | 25      | -1217   | 24      | 104     | 23      | 10      |
| 75   | 24      | 63      | -1217   | 73      | 38      | 79      | 25      | -1217   | 24      | 107     | 23      | 10      |
| 76   | 24      | 64      | -1217   | 74      | 38      | 80      | 25      | -1217   | 23      | 110     | 23      | 10      |
| 77   | 24      | 66      | -1217   | 74      | 38      | 79      | 25      | -1217   | 23      | 112     | 23      | 10      |
| 78   | 24      | 66      | -1217   | 74      | 37      | 72      | 25      | -1217   | 23      | 114     | 23      | 10      |
| 79   | 24      | 65      | -1217   | 75      | 37      | 72      | 25      | -1217   | 24      | 117     | 23      | 10      |
| 80   | 24      | 64      | -1217   | 75      | 37      | 71      | 25      | -1217   | 23      | 116     | 23      | 10      |
| 81   | 24      | 65      | -1217   | 75      | 37      | 71      | 25      | -1217   | 23      | 115     | 23      | 10      |
| 82   | 24      | 65      | -1217   | 75      | 37      | 73      | 25      | -1217   | 23      | 114     | 23      | 10      |
| 83   | 24      | 65      | -1217   | 75      | 37      | 70      | 25      | -1217   | 23      | 116     | 22      | 10      |
| 84   | 24      | 66      | -1217   | 75      | 37      | 68      | 25      | -1217   | 23      | 118     | 22      | 10      |
| 85   | 24      | 66      | -1217   | 75      | 37      | 71      | 25      | -1217   | 23      | 119     | 22      | 10      |
| 86   | 24      | 67      | -1217   | 75      | 37      | 70      | 25      | -1217   | 23      | 122     | 22      | 10      |
| 87   | 24      | 68      | -1217   | 75      | 36      | 71      | 24      | -1217   | 23      | 122     | 22      | 10      |
| 88   | 24      | 69      | -1217   | 75      | 36      | 70      | 24      | -1217   | 23      | 126     | 22      | 10      |
| 89   | 24      | 69      | -1217   | 76      | 36      | 67      | 24      | -1217   | 23      | 126     | 22      | 10      |
| 90   | 24      | 69      | -1217   | 76      | 35      | 66      | 24      | -1217   | 23      | 127     | 22      | 10      |
| 91   | 24      | 69      | -1217   | 76      | 35      | 56      | 24      | -1217   | 24      | 124     | 22      | 10      |
| 92   | 24      | 69      | -1217   | 77      | 35      | 53      | 24      | -1217   | 24      | 122     | 22      | 10      |
| 93   | 24      | 70      | -1217   | 77      | 35      | 52      | 24      | -1217   | 24      | 125     | 22      | 10      |
| 94   | 25      | 70      | -1217   | 78      | 34      | 50      | 24      | -1217   | 24      | 127     | 22      | 10      |
| 95   | 25      | 70      | -1217   | 78      | 34      | 48      | 24      | -1032   | 24      | 130     | 22      | 10      |

| Time | Chan 19 | Chan 20 | Chan 21 | Chan 22 | Chan 23 | Chan 24 | Chan 25 | Chan 32 | Chan 33 | Chan 34 | Chan 35 | Chan 38 |
|------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| min  | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      |
| 96   | 25      | 71      | -1217   | 81      | 34      | 46      | 24      | -1159   | 24      | 133     | 22      | 10      |
| 97   | 25      | 71      | -1217   | 80      | 33      | 45      | 24      | -1217   | 24      | 134     | 22      | 10      |
| 98   | 25      | 71      | -1217   | 82      | 33      | 44      | 24      | -954    | 23      | 135     | 22      | 10      |
| 99   | 25      | 70      | -1217   | 83      | 33      | 42      | 24      | -1069   | 24      | 136     | 22      | 11      |
| 100  | 25      | 70      | -1217   | 84      | 32      | 41      | 24      | -904    | 24      | 139     | 22      | 11      |
| 101  | 25      | 70      | -1217   | 85      | 32      | 40      | 24      | -818    | 24      | 144     | 22      | 11      |
| 102  | 25      | 70      | -1217   | 86      | 31      | 39      | 24      | -699    | 24      | 144     | 22      | 11      |
| 103  | 25      | 69      | -1217   | 88      | 31      | 38      | 24      | -564    | 23      | 149     | 22      | 11      |
| 104  | 25      | 69      | -1217   | 90      | 31      | 38      | 24      | -123    | 24      | 150     | 22      | 11      |
| 105  | 25      | 70      | -1217   | 92      | 31      | 40      | 24      | 409     | 24      | 146     | 22      | 11      |
| 106  | 25      | 70      | -1217   | 94      | 30      | 39      | 24      | 1243    | 24      | 135     | 22      | 11      |
| 107  | 25      | 71      | -1217   | 96      | 30      | 39      | 24      | 1243    | 24      | 129     | 22      | 11      |
| 108  | 25      | 72      | -1217   | 99      | 30      | 41      | 24      | 1243    | 24      | 129     | 22      | 11      |
| 109  | 25      | 73      | -1217   | 101     | 30      | 41      | 24      | 1231    | 24      | 131     | 22      | 11      |
| 110  | 25      | 73      | -1217   | 101     | 30      | 42      | 24      | 1101    | 24      | 133     | 22      | 11      |
| 111  | 26      | 74      | -1217   | 103     | 30      | 42      | 25      | 1011    | 24      | 133     | 22      | 11      |
| 112  | 26      | 74      | -1217   | 104     | 30      | 40      | 25      | 841     | 24      | 130     | 22      | 11      |
| 113  | 26      | 74      | -1217   | 106     | 30      | 40      | 25      | 888     | 24      | 129     | 22      | 11      |
| 114  | 26      | 74      | -1217   | 106     | 30      | 39      | 25      | 938     | 24      | 131     | 23      | 11      |
| 115  | 27      | 74      | -1217   | 105     | 30      | 38      | 25      | 1243    | 25      | 133     | 23      | 11      |
| 116  | 27      | 74      | -1217   | 105     | 30      | 36      | 25      | 1243    | 25      | 140     | 23      | 11      |
| 117  | 27      | 74      | -1217   | 105     | 30      | 35      | 25      | 1243    | 25      | 147     | 23      | 11      |
| 118  | 28      | 75      | -1217   | 105     | 31      | 36      | 25      | 1243    | 25      | 150     | 23      | 11      |
| 119  | 29      | 75      | -1216   | 107     | 31      | 41      | 26      | 1243    | 25      | 162     | 23      | 11      |

| Time | Chan<br>19 | Chan<br>20 | Chan<br>21 | Chan<br>22 | Chan<br>23 | Chan<br>24 | Chan<br>25 | Chan<br>32 | Chan<br>33 | Chan<br>34 | Chan<br>35 | Chan<br>38 |
|------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| min  | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         |
| 120  | 31         | 75         | -1216      | 107        | 31         | 40         | 26         | 1243       | 26         | 185        | 23         | 11         |
| 121  | 33         | 75         | -1216      | 108        | 31         | 36         | 26         | 601        | 26         | 213        | 23         | 11         |
| 122  | 34         | 75         | -1216      | 114        | 32         | 38         | 27         | -1216      | 27         | 208        | 24         | 11         |
| 123  | 36         | 76         | -1216      | 121        | 35         | 43         | 27         | 14         | 30         | 186        | 24         | 11         |
| 124  | 38         | 76         | -1216      | 121        | 36         | 46         | 28         | 14         | 30         | 184        | 24         | 11         |
| 125  | 45         | 77         | -1216      | 122        | 37         | 46         | 29         | 9          | 30         | 184        | 24         | 11         |
| 126  | 46         | 79         | -1216      | 124        | 38         | 49         | 30         | 14         | 30         | 99         | 22         | 11         |
| 127  | 47         | 82         | -1216      | 123        | 38         | 52         | 30         | 15         | 29         | 54         | 22         | 11         |
| 128  | 48         | 85         | -1216      | 124        | 38         | 55         | 31         | 14         | 29         | 36         | 22         | 12         |
| 129  | 48         | 90         | -1216      | 127        | 38         | 58         | 31         | 15         | 28         | 28         | 22         | 12         |
| 130  | 48         | 95         | -1216      | 130        | 38         | 63         | 30         | 14         | 28         | 24         | 22         | 12         |
| 131  | 47         | 101        | -1216      | 132        | 38         | 66         | 30         | 15         | 28         | 23         | 22         | 12         |
| 132  | 47         | 107        | -1216      | 137        | 38         | 70         | 30         | 14         | 28         | 23         | 23         | 12         |