

**Title:**

The fire resistance performance of two single-leaf, single-acting steel doorsets, when tested in accordance with BS EN 1634-1: 2014 +A1: 2018

**WF Report No:**

429750 Version 2



**Prepared for:**

**PANEL  
TECHNOLOGIES  
LIMITED**  
49-61 Jodrell Street,  
Nuneaton,  
Warwickshire,  
England,  
CV11 5EG

**Test date:**

7<sup>th</sup> July 2020

**Notified Body No:**

1314

This report is a revision to that issued as 429750 Version 1 and dated 18/12/2020. The details of the test report 429750 Version 1 are held on file by Warringtonfire. The original report and any previous revisions are replaced by this revised report 429750 Version 2.



## Contents

|                                                                                | Page No |
|--------------------------------------------------------------------------------|---------|
| 1 Summary of Performance.....                                                  | 3       |
| 2 Introduction.....                                                            | 5       |
| 3 Specimen verification .....                                                  | 5       |
| 3.1 Conditioning .....                                                         | 5       |
| 3.2 Sampling .....                                                             | 5       |
| 4 Description of supporting construction .....                                 | 6       |
| 5 Description of specimens.....                                                | 6       |
| 5.1 Door leaves.....                                                           | 6       |
| 6 Description of Construction (Refers to Figures 1 to 5 of the Appendix) ..... | 7       |
| 7 Pre-test measurements and mechanical conditioning.....                       | 10      |
| 7.1 Method of installation .....                                               | 10      |
| 7.2 Pre-cycling operability .....                                              | 10      |
| 7.3 Specimen self-closing .....                                                | 10      |
| 7.4 Leaf/frame perimeter gaps .....                                            | 10      |
| 7.5 Closer forces.....                                                         | 10      |
| 7.6 Final setting.....                                                         | 10      |
| 8 Test Conditions .....                                                        | 11      |
| 8.1 Ambient temperature.....                                                   | 11      |
| 8.2 Pressure readings .....                                                    | 11      |
| 8.3 Furnace temperature.....                                                   | 12      |
| 8.4 Unexposed face temperatures .....                                          | 13      |
| 8.6 Leaf and frame distortion data.....                                        | 16      |
| 9 Observations .....                                                           | 19      |
| 10 Expression of results .....                                                 | 20      |
| 11 Limitations .....                                                           | 21      |
| 12 Field of direct application of test results .....                           | 22      |
| 13 Photographs .....                                                           | 23      |
| Appendix 1 – Figures 1 to 5.....                                               | 28      |
| Appendix 2 – Raw test data                                                     |         |

## 1 Summary of Performance

The following performance was achieved from the specimens tested. Full details of the testing and specimens construction are described in the report.

Results:

Fire resistance test in accordance with BS EN 1634-1: 2014 +A1: 2018 and BS EN 1363-1: 2012

Doorset A

| Integrity                                       |                                            |
|-------------------------------------------------|--------------------------------------------|
| Cotton pad                                      | 78 (seventy eight) minutes                 |
| Continuous flaming                              | 132 (one hundred and thirty two) minutes   |
| Gap gauges                                      | 144 (one hundred and forty four) minutes * |
| Thermal insulation                              |                                            |
| Insulation I <sub>2</sub> (mandatory procedure) | 56 (fifty six) minutes                     |
| Radiation – time to 15kW/m <sup>2</sup>         | 144 (one hundred and forty four) minutes * |

\* No failure of this test criteria at test termination at 144 minutes

Doorset B

| Integrity                                       |                                            |
|-------------------------------------------------|--------------------------------------------|
| Cotton pad                                      | 144 (one hundred and forty four) minutes * |
| Continuous flaming                              | 144 (one hundred and forty four) minutes * |
| Gap gauges                                      | 144 (one hundred and forty four) minutes * |
| Thermal insulation                              |                                            |
| Insulation I <sub>2</sub> (mandatory procedure) | 10 (ten) minutes                           |
| Radiation – time to 15kW/m <sup>2</sup>         | 144 (one hundred and forty four) minutes * |

\* No failure of this test criteria at test termination at 144 minutes



**Summary of specimens:**

Two latched single leaf single-acting, steel doorsets hung opening in towards the furnace

Doorset A leaf size –:  
2397mm high x 895mm wide x 73mm thick.

Doorset B leaf size - :  
2397mm high x 895mm wide x 69mm thick.

## **2 Introduction**

The doorsets were installed into a flexible supporting construction. In accordance with BS EN 16034: 2014 Annex A the leaves were pre-cycled before the fire test. The doorsets were instrumented with the standard set of thermocouples. Both doorsets were installed opening into the furnace.

## **3 Specimen verification**

The specimens were supplied for testing and delivered to Warringtonfire during July 2020. The component parts of the doorsets were identified based on nominal information provided by the client. The conformity of the specimens against these nominal values has been verified and agreed by the laboratory insofar as the structure of the specimen allowed verification to take place. If possible, additional moisture content readings, species verification and density checks were performed on either the original specimen, or, samples provided by the sponsor. These details are outlined in the construction section of this report (Section 6).

### **3.1 Conditioning**

Warringtonfire stored the specimens in climatic conditions approximate to those in normal service.

### **3.2 Sampling**

Warringtonfire was not involved in factory sampling of the products and materials used for the test specimen described in this report, and as such the results apply to the sample as received.

## **4 Description of supporting construction**

The supporting construction comprised a steel stud flexible supporting construction found within BS EN 1363-1:2012 Table 1, Group A as the intended duration for the products being subject to test was 120 minutes, Category B performance was required. Therefore, the supporting construction comprised 70mm steel stud internal framework with 2No. layers of 15mm thick Type F plasterboard to each face, insulated with 70mm thick stone based mineral fibre with a nominal density of 85kg/m<sup>3</sup>. The aperture of Doorset A was lined with 15mm thick Type F plasterboard. The aperture of Doorset B was unlined. Softwood timber inserts 45 mm wide x 28 mm thick were fitted within the C stud and track sections around the perimeter of the doorsets, vertical inserts were fitted to the full height of the partition.

## **5 Description of specimens**

Details of the specimens are shown in Figures 1 to 5 of Appendix 1.

### **5.1 Door leaves**

Doorset A, the leaf measured 2397mm high x 895mm wide x 73mm thick.

Doorset B, the leaf measured 2397mm high x 895mm wide x 69mm thick.

## 6 Description of Construction (Refers to Figures 1 to 5 of the Appendix)

### Leaf – Doorset A

|                          | Material                                                                                    | Dimensions (mm)                                     | Density (kg/m³) | Moisture (% w/w) | Key to figures |
|--------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------|-----------------|------------------|----------------|
| Facings – exposed face   | Profiled steel tray section                                                                 | 0.9 thick*                                          | -               | -                | 1              |
| Sub facings              | Gyproc Type F Multiboard plasterboard                                                       | 6 thick                                             | --              | -                | 2              |
| Facings – unexposed face | Gyproc TE Fireline plasterboard                                                             | 15 thick                                            | -               | 12.9             | 3              |
| Sub facings              | Profiled steel with returns to hold the plasterboard facings – welded to the reinforcements | 0.9 thick*                                          | -               | -                | -              |
| Insulation               | Rockwool RW3 semi rigid slab                                                                | 50 thick                                            | 60*             | -                | 5              |
| Reinforcement            | 2No. - horizontally orientated profiled steel sections fitted at the top and bottom edges   | 65 high x 55 deep x full width of leaf x 1.2 thick* | -               | -                | 6              |

\* Stated by client, not verified by laboratory

### Leaf – Doorset B

|                          | Material                                                                                                    | Dimensions (mm)                                   | Density (kg/m³) | Moisture (% w/w) | Key to figures |
|--------------------------|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-----------------|------------------|----------------|
| Facings – exposed face   | Siniat Soundbloc dB board*                                                                                  | 12.5 thick                                        | -               | 13.7             | 7              |
| Facings – unexposed face | Profiled steel tray section with 25mm wide returns to retain the dB board*                                  | 0.9 thick*                                        | -               | -                | 8              |
| Plasterboard supports    | 6No. - horizontally orientated steel sections                                                               | Full width of leaf x 10.5 thick*                  | -               | -                | 9              |
| Reinforcement            | 4No. steel top hat sections horizontally and vertically orientated, fitted around the perimeter of the leaf | 50 high x 40 deep x full width of leaf 0.9 thick* | -               | -                | 10             |

\* Stated by client, not verified by laboratory

## Door frame – Doorset A

|                                                            | Material                                                                                                              | Dimensions (mm)                                                                                            | Density (kg/m <sup>3</sup> ) | Key to figures |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------|----------------|
| Head, jambs and threshold                                  | Profiled steel                                                                                                        | 63 wide x 74 deep x 1.2 thick including a 25 high x 42 wide integral stop and 25 wide integral architrave* | -                            | 11             |
| Stop – jambs                                               | Integral                                                                                                              | -                                                                                                          | -                            | -              |
| Frame enclosure angle                                      | Profiled steel fitted behind the frame across the partition opening enclosing insulation, and faced with plasterboard | 1.2 thick*                                                                                                 | -                            | 12             |
| Frame jamb to supporting construction fire stopping detail | None fitted                                                                                                           | -                                                                                                          | -                            | -              |
| Frame to supporting construction fixing detail             | Frame enclosure angle fixed to steel stud framing aperture                                                            | 50 long screws at 300 centres*                                                                             | -                            | -              |
|                                                            | Frame fixed through stop into frame enclosure angle and steel stud framing                                            | 60 long screws*                                                                                            |                              |                |

\* Stated by client, not verified by laboratory

## Door frame – Doorset B

|                                                            | Material                                                                 | Dimensions (mm)                                                                                            | Density (kg/m <sup>3</sup> ) | Key to figures |
|------------------------------------------------------------|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------|----------------|
| Head, jambs and threshold                                  | Profiled steel                                                           | 47 wide x 77 deep x 1.2 thick including a 19 high x 46 wide integral stop and 25 wide integral architrave* | -                            | 13             |
| Stop – jambs                                               | Integral                                                                 | -                                                                                                          | -                            | -              |
| Frame jamb to supporting construction fire stopping detail | None fitted                                                              | -                                                                                                          | -                            | -              |
| Frame to supporting construction fixing detail             | Frame fixed through plasterboard lining aperture into steel stud framing | 50 long screws*                                                                                            | -                            | -              |

\* Stated by client, not verified by laboratory

### Intumescent and sealing materials – both doorsets

|              | Make/type                            | Size (mm) | Location                          | Key to figures |
|--------------|--------------------------------------|-----------|-----------------------------------|----------------|
| Frame reveal | Norseal FS1000 intumescent foam seal | 15 x 4.5  | Fitted to the upstand of the stop | 14             |
| Leaf edge    | None fitted                          | -         | -                                 | -              |

### Hardware – both doorsets

|                              | Make/type                                                                 | Size (mm)                 | Location                                              | Key to figures |
|------------------------------|---------------------------------------------------------------------------|---------------------------|-------------------------------------------------------|----------------|
| Hinges – Doorset A           | Bagshaw Engineering HINGE-RF-R51 Spring Hinge*                            | Ø8 pin size               | Fitted at the top and bottom edge of the leaf         | 15             |
| Hinges – Doorset B           | Bagshaw Engineering HINGE-RF-R53-37A Spring Hinge*                        | Ø6 pin size*              | Fitted at the top and bottom edge of the leaf         | 16             |
| Closer                       | None fitted                                                               | -                         | -                                                     | -              |
| Lock – engaged at all points | 3- point budget lock (keep is cut out slot in frame reveal – 80mm x 10mm) | 110 x 30 (lock body size) | Centre lock fitted 1200mm from the bottom of the leaf | 17             |
|                              | Top and bottom shoot bolts – steel rod                                    | Ø 8*                      | -                                                     | 18             |

\* Stated by client, not verified by laboratory

## **7 Pre-test measurements and mechanical conditioning**

Pre-test measurements and mechanical conditioning were conducted on the sample in the order detailed below.

### **7.1 Method of installation**

The doorsets were fixed into pre-prepared openings. The details of the fixings and fire stopping between frame and supporting construction are outlined in the construction section and Figure 4 of Appendix 1.

### **7.2 Pre-cycling operability**

Operability test of 25 manual cycles was completed on each leaf in accordance with BS EN 16034: 2014 Annex A, Section A.2.2.

|                                      |     |
|--------------------------------------|-----|
| Minimum angle of opening             | 90° |
| Number of operation cycles completed | 25  |

### **7.3 Specimen self-closing**

No closers were fitted. The multi-point locking systems were engaged for the test at all positions on both doorsets.

### **7.4 Leaf/frame perimeter gaps**

The manufacturer installed the doors to open and close freely, maintaining gaps, where possible, to a range of 2-4mm along all edges. The gaps between the edge of the leaf and frame were measured prior to test in accordance with BS EN 1634-1 2014 +A1:2018, Section 10.1.2. A total of 24 readings were recorded. The measurements (in mm) are detailed in Section 8.7.

### **7.5 Closer forces**

No closers were fitted – the door leaves were held closed by means of the engaged multi-point locks.

### **7.6 Final setting**

Final setting of the specimens was conducted in accordance with BS EN 1634-1: 2014 +A1:2018, Section 10.1.4.

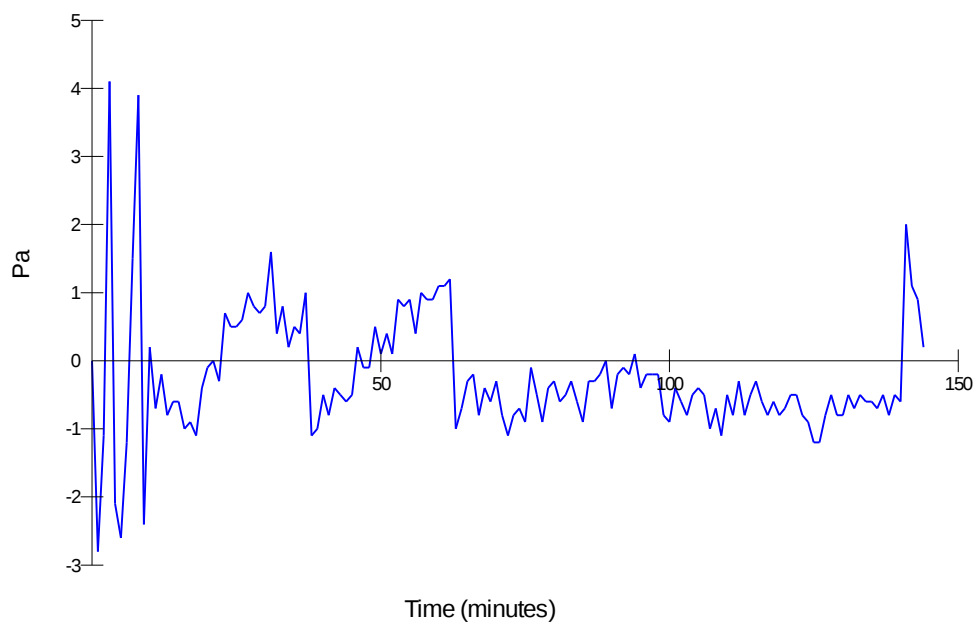
## 8 Test Conditions

### 8.1 Ambient temperature

The ambient temperature of the test area at commencement of test was 20°C

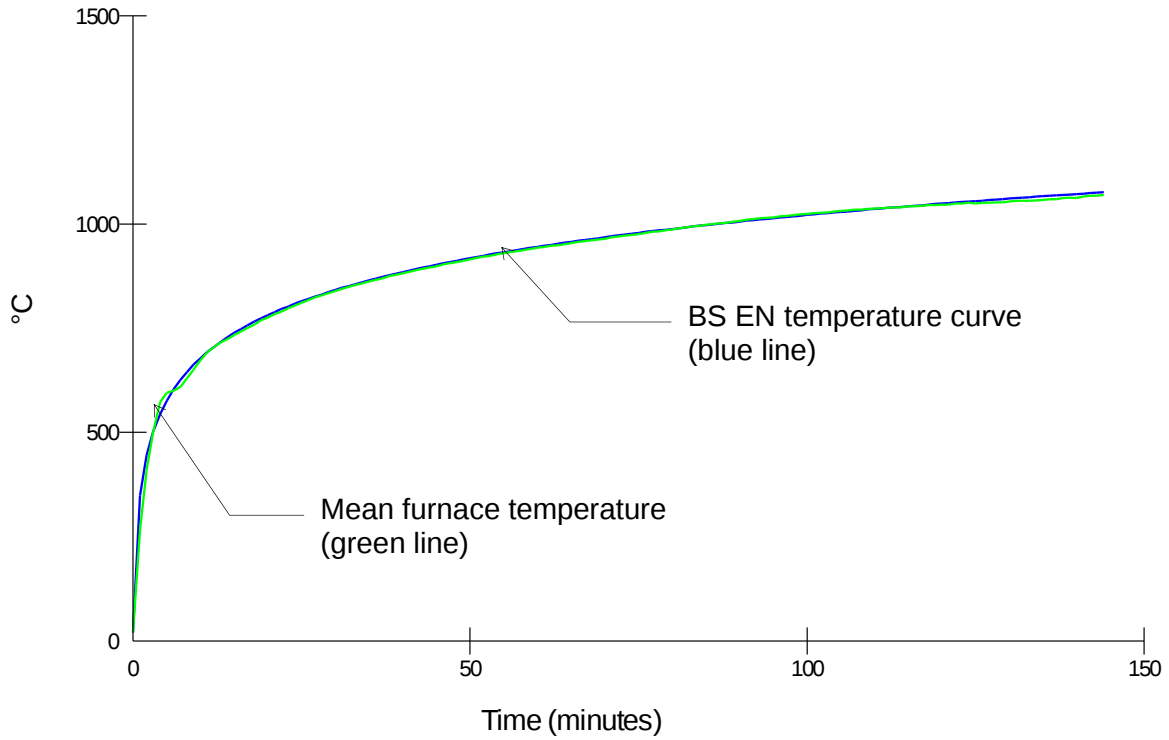
### 8.2 Pressure readings

After the first 5 minutes of the test, the furnace pressure was maintained at  $0 \pm 5$  Pa and after 10 minutes was maintained at  $0 \pm 3$  Pa with respect to atmosphere, at a point 0.5m from the furnace floor, equating to a pressure of 0 Pa with respect to atmosphere at a point 0.5m from the notional floor level. The pressure readings were recorded and are shown graphically below:



### 8.3 Furnace temperature

The furnace was controlled to follow the temperature/time relationship specified in BS EN 1363: Part 1: 2012 Section 5.1.1 as closely as possible, using the average of eight plate thermometers suitably distributed within the furnace. The temperatures were recorded and are shown graphically below:



#### 8.4 Unexposed face temperatures

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

##### Doorset A

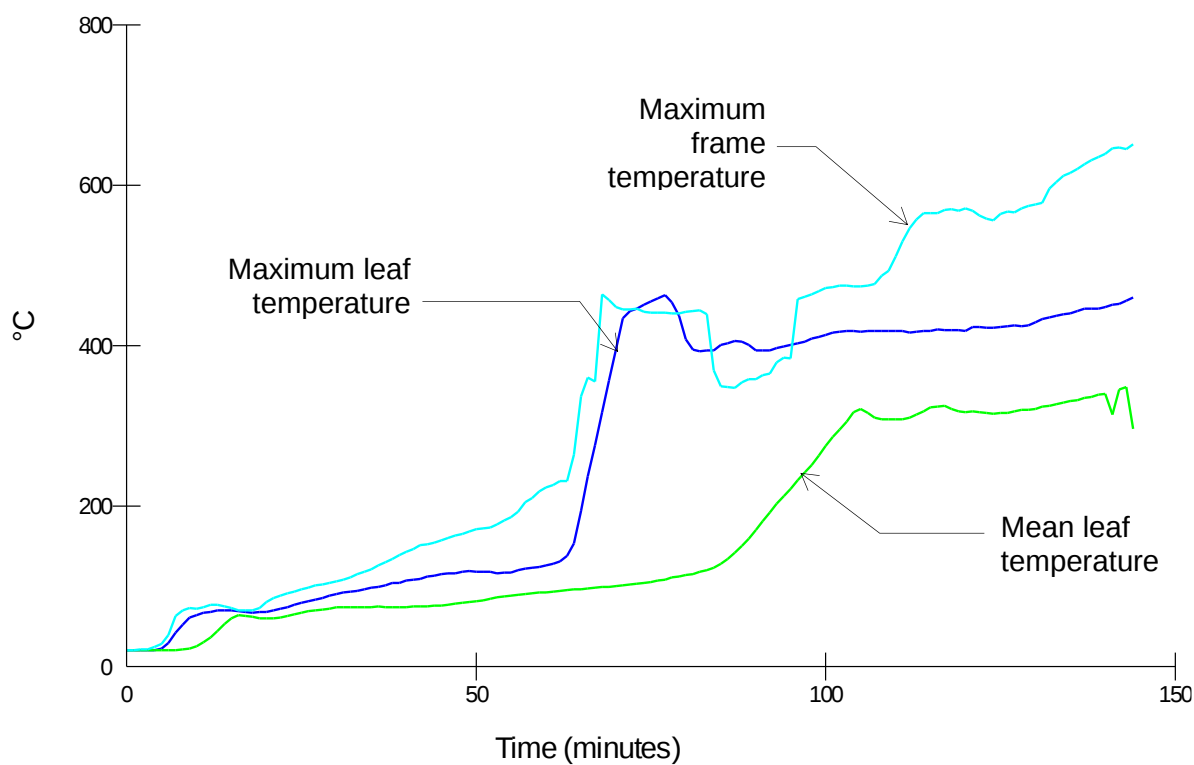
|       | 1 discrete area              |                                                                                                                            |
|-------|------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Leaf  | Discrete area (Plasterboard) | 5 measuring mean temperature rise.<br><br>5 measuring maximum temperature rise, standard set 100mm in from the leaf edges. |
| Frame |                              | 5 measuring maximum temperature rise.                                                                                      |

##### Doorset B

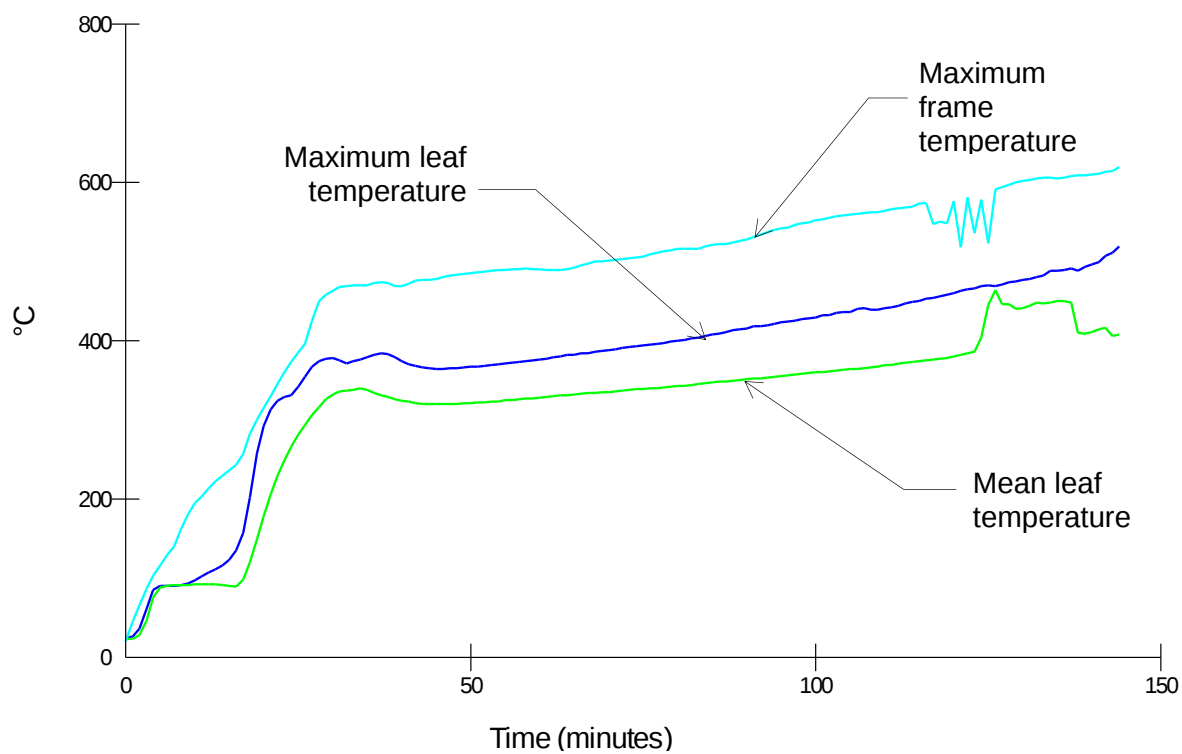
|       | 1 discrete area       |                                                                                                                            |
|-------|-----------------------|----------------------------------------------------------------------------------------------------------------------------|
| Leaf  | Discrete area (steel) | 5 measuring mean temperature rise.<br><br>5 measuring maximum temperature rise, standard set 100mm in from the leaf edges. |
| Frame |                       | 5 measuring maximum temperature rise.                                                                                      |

The locations of the thermocouples are shown in Figure 5 of the appendix. The readings recorded are tabulated in Appendix 2 and are shown graphically below.

### Doorset A

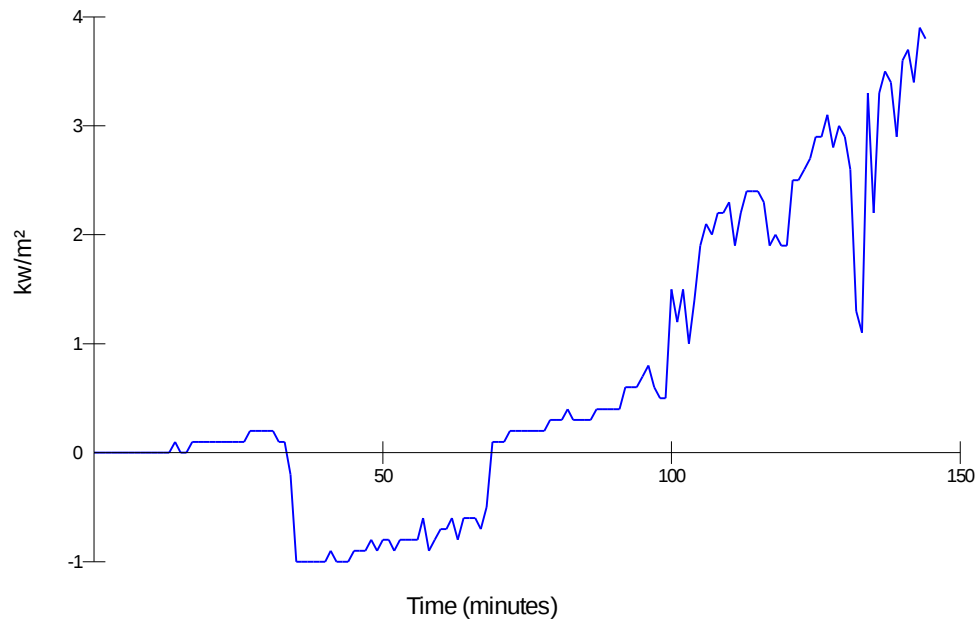


### Doorset B

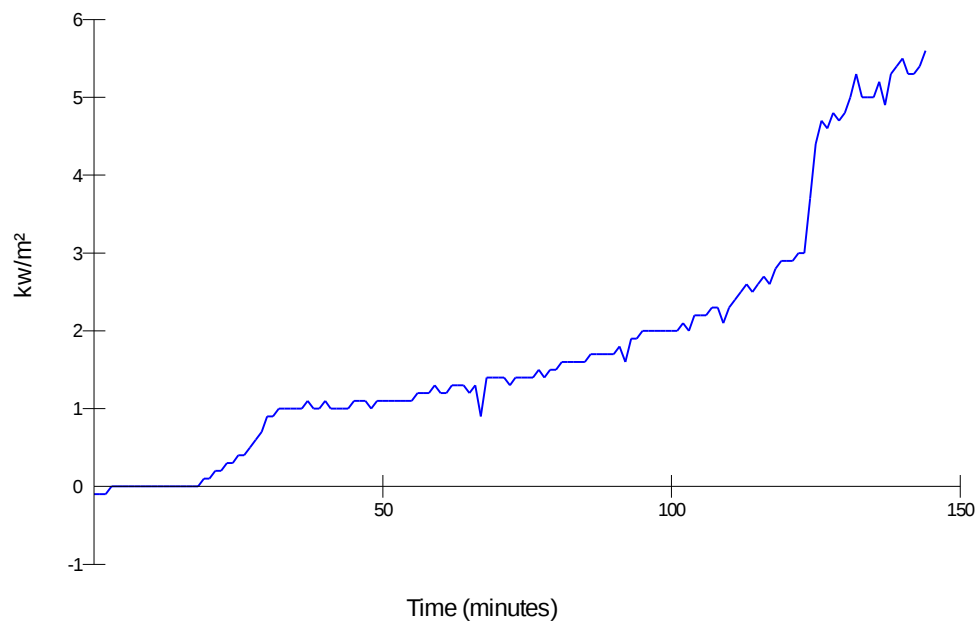


## 8.5 Radiation

### Doorset A



### Doorset B



[illegible]

| Doorset B        |     |   |   |   |   |    |    |     |    |    |    |    |    |    |    |    |
|------------------|-----|---|---|---|---|----|----|-----|----|----|----|----|----|----|----|----|
| Deflections – mm |     |   |   |   |   |    |    |     |    |    |    |    |    |    |    |    |
| TIME<br>mins     | A   | B | C | D | E | F  | G  | H   | I  | J  | K  | L  | M  | N  | O  | P  |
| 0                | 0   | 0 | 0 | 0 | 0 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 15               | 7   | 2 | 1 | 2 | 2 | 1  | -1 | 1   | 4  | 9  | 12 | 26 | 25 | 22 | 22 | 2  |
| 30               | -12 | 4 | 0 | 2 | 8 | 12 | -2 | -14 | -2 | 11 | 11 | 27 | 29 | 22 | 56 | 9  |
| 45               | -   | - | - | - | - | -  | -  | -   | -  | 27 | 21 | 27 | 35 | 22 | 46 | 8  |
| 60               | -   | - | - | - | - | -  | -  | -   | -  | 28 | 22 | 34 | 32 | 25 | 46 | 7  |
| 75               | -   | - | - | - | - | -  | -  | -   | -  | 29 | 21 | 38 | 33 | 26 | 44 | 7  |
| 90               | -   | - | - | - | - | -  | -  | -   | -  | 37 | 20 | 48 | 34 | 26 | 54 | 8  |
| 105              | -   | - | - | - | - | -  | -  | -   | -  | -  | -  | -  | -  | 28 | 55 | 9  |
| 120              | -   | - | - | - | - | -  | -  | -   | -  | -  | -  | -  | -  | 37 | 57 | 10 |
| 135              | -   | - | - | - | - | -  | -  | -   | -  | -  | -  | -  | -  | 39 | 57 | 10 |
| 150              | -   | - | - | - | - | -  | -  | -   | -  | -  | -  | -  | -  | -  | -  | -  |

Where a dash (-) applies, a distortion measurement could not be taken

[illegible]

## 9 Observations

All comments relate to the unexposed face unless otherwise specified.

| Time<br>(minutes) | Comments                                                                                                                                                                                                                   |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00:00             | Test Started                                                                                                                                                                                                               |
| 02:00             | Doorset A. There is smoke issuing all around                                                                                                                                                                               |
| 02:20             | Doorset B. There is smoke issuing at the hanging edge, the closing edge and across the head                                                                                                                                |
| 06:00             | Doorset B. There is smoke issuing at the latch position and across the head only                                                                                                                                           |
| 07:05             | Doorset A. There is an increase in the smoke issuing at all the previous locations                                                                                                                                         |
| 09:40             | Doorset B. There is an increase in the smoke issuing at the bottom hanging corner and the bottom closing corner                                                                                                            |
| 12:20             | Doorset B. There is discolouration on the wall at the top hanging corner                                                                                                                                                   |
| 13:00             | Doorset A. There is discolouration on all the edges                                                                                                                                                                        |
| 18:40             | Doorset B. There is discolouration at the centre of the head                                                                                                                                                               |
| 23:00             | Doorset B. There is discolouration on the wall at the top closing corner                                                                                                                                                   |
| 25:00             | Doorset A. There is an increase in the smoke issuing across the head, at the hanging edge and midway up the closing edge                                                                                                   |
| 26:40             | Doorset B. There is a glow visible at the top hanging corner                                                                                                                                                               |
| 33:00             | Doorset A. There is an increase in the smoke issuing at the threshold                                                                                                                                                      |
| 33:30             | Doorset B. There is a glow visible at the top closing corner                                                                                                                                                               |
| 34:00             | Doorset B. There is molten aluminium dripping from the latch position                                                                                                                                                      |
| 45:00             | Both doorsets. There is a decrease in smoke issuing                                                                                                                                                                        |
| 52:00             | Doorset A. There is charring on the board edge at the hanging edge                                                                                                                                                         |
| 54:40             | Doorset A. The paper on the board is burning at the hanging edge                                                                                                                                                           |
| 67:00             | Doorset A. There is a glow visible across the head                                                                                                                                                                         |
| 69:45             | Doorset A. There is an increase in the smoke issuing from the firestopping                                                                                                                                                 |
| 70:50             | Doorset A. There is discolouration and a glow is visible at the firestopping on the hanging edge and the closing edge.                                                                                                     |
| 78:49             | Doorset A. A cotton pad integrity test was performed at the firestopping gap on the hanging edge which resulted in the ignition of the cotton pad thereby constituting <b>integrity failure</b>                            |
| 80:30             | Doorset A. There is an increase in the smoke issuing across the head                                                                                                                                                       |
| 107:00            | Doorset A. A cotton pad integrity test was performed at the firestopping gap at the mid-point of the closing edge which resulted in the ignition of the cotton pad therefore constituting <b>further integrity failure</b> |
| 132:38            | Doorset A. There is continuous flaming at the firestopping gap on the closing edge therefore constituting <b>further integrity failure</b>                                                                                 |
| 144.00            | Test terminated                                                                                                                                                                                                            |

## 10 Expression of results

### Doorset A

|                                                       |                                            |
|-------------------------------------------------------|--------------------------------------------|
| <b>Integrity</b>                                      |                                            |
| Cotton pad                                            | 78 (seventy eight) minutes                 |
| Continuous flaming                                    | 132 (one hundred and thirty two) minutes   |
| Gap gauges                                            | 144 (one hundred and forty four) minutes * |
| <b>Thermal insulation</b>                             |                                            |
| <b>Insulation I<sub>2</sub></b> (mandatory procedure) | 56 (fifty six) minutes                     |
| <b>Radiation</b> – time to 15kW/m <sup>2</sup>        | 144 (one hundred and forty four) minutes * |

\* No failure of this test criteria at test termination at 144 minutes

### Doorset B

|                                                       |                                            |
|-------------------------------------------------------|--------------------------------------------|
| <b>Integrity</b>                                      |                                            |
| Cotton pad                                            | 144 (one hundred and forty four) minutes * |
| Continuous flaming                                    | 144 (one hundred and forty four) minutes * |
| Gap gauges                                            | 144 (one hundred and forty four) minutes * |
| <b>Thermal insulation</b>                             |                                            |
| <b>Insulation I<sub>2</sub></b> (mandatory procedure) | 10 (ten) minutes                           |
| <b>Radiation</b> – time to 15kW/m <sup>2</sup>        | 144 (one hundred and forty four) minutes * |

\* No failure of this test criteria at test termination at 144 minutes

## 11 Limitations

This report details the method of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the procedure outline in BS EN 1634-1, BS EN 1363-1, and where appropriate BS EN 1363-2. Any significant deviation with respect to size, construction details, loads, stresses, edge or end conditions other than those allowed under the field of direct application in the relevant test method is not covered by this report.

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 results of this test were obtained using the leaf to frame gaps recorded in Section 8.7. The fire resistance performance of doors of this design may change if substantially different gaps are employed.

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. Warringtonfire 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.

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.

**This report may only be reproduced in full. Extracts or abridgements of reports shall not be published without permission of Warringtonfire. All work and services carried out by Warringtonfire Testing and Certification Limited are subject to, and conducted in accordance with, the Standard Terms and Conditions of Warringtonfire Testing and Certification Limited, which are available at <https://www.element.com/terms/terms-and-conditions> or upon request.**

|                | Written and checked by:                                                             | Authorised by:                                                                       |
|----------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Signature:     |  |  |
| Name:          | Christopher Berger                                                                  | Courtney Clifford                                                                    |
| Title:         | Technical Officer                                                                   | Lead Technical Officer                                                               |
| Date of issue: | 15/08/2023                                                                          | 15/08/2023                                                                           |

### Version 2

Supporting construction details on page 6 updated to include detail of the timber inserts used within the studwork. Drawings in appendix 1 updated to show the timber inserts within the studwork.

## **12 Field of direct application of test results**

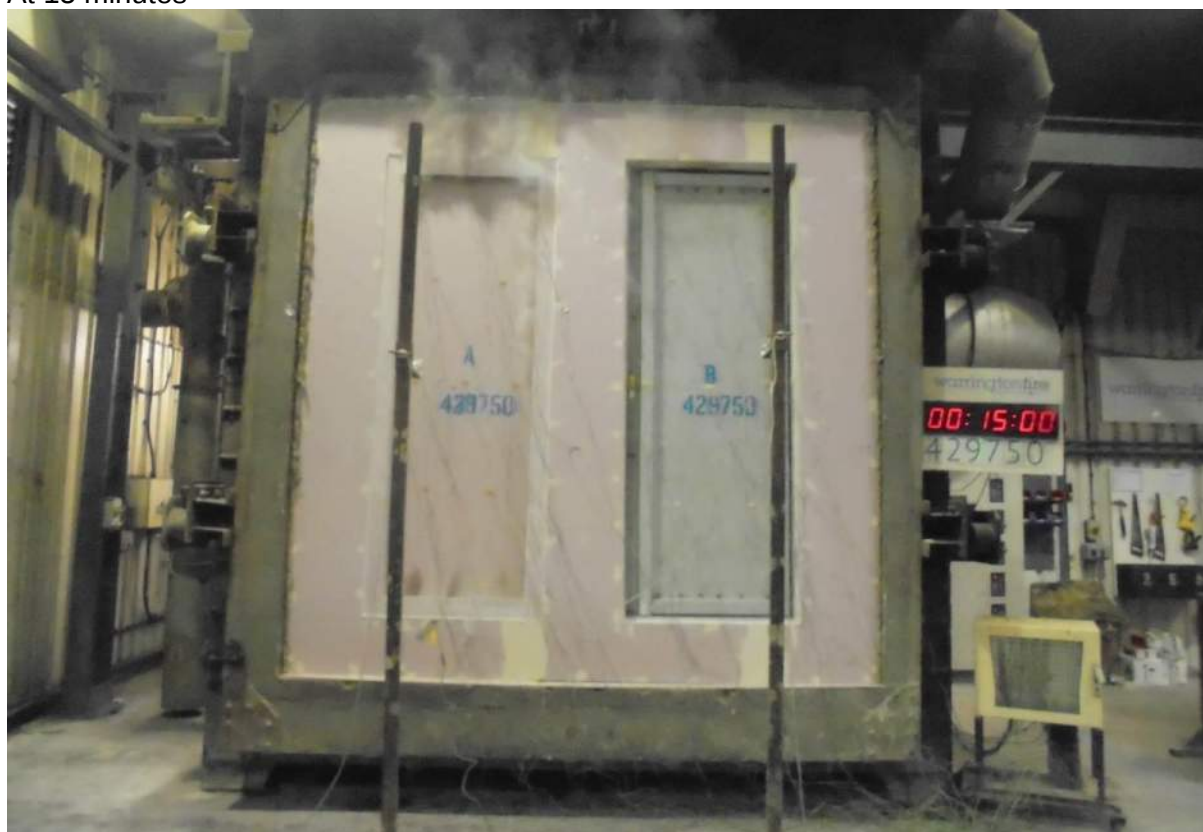
BS EN 1363-1:2012, Fire resistance tests - Part 1: General requirements, states within Section 12.1, Clause v) that “The field of direct application of the results for the specimen being evaluated, either in the form of the full text from the appropriate standard, or only those clauses which are relevant for the specimen tested” shall be included within the test report. The full text of the field of direct application for the results of the specimen being evaluated herein, can be found within the appropriate test standard, which is referenced on the front cover of this report.

## 13 Photographs

At start of test



At 15 minutes



At 30 minutes



At 45 minutes



After 75 minutes



At 90 minutes



After 105 minutes



After 120 minutes



After 135 minutes

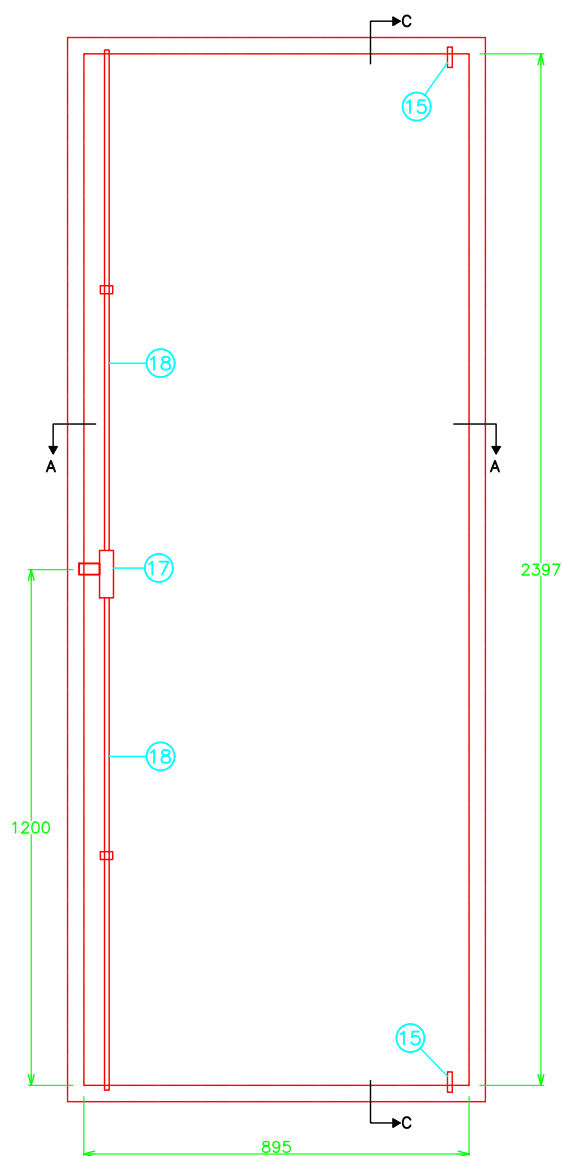


Exposed face – post test

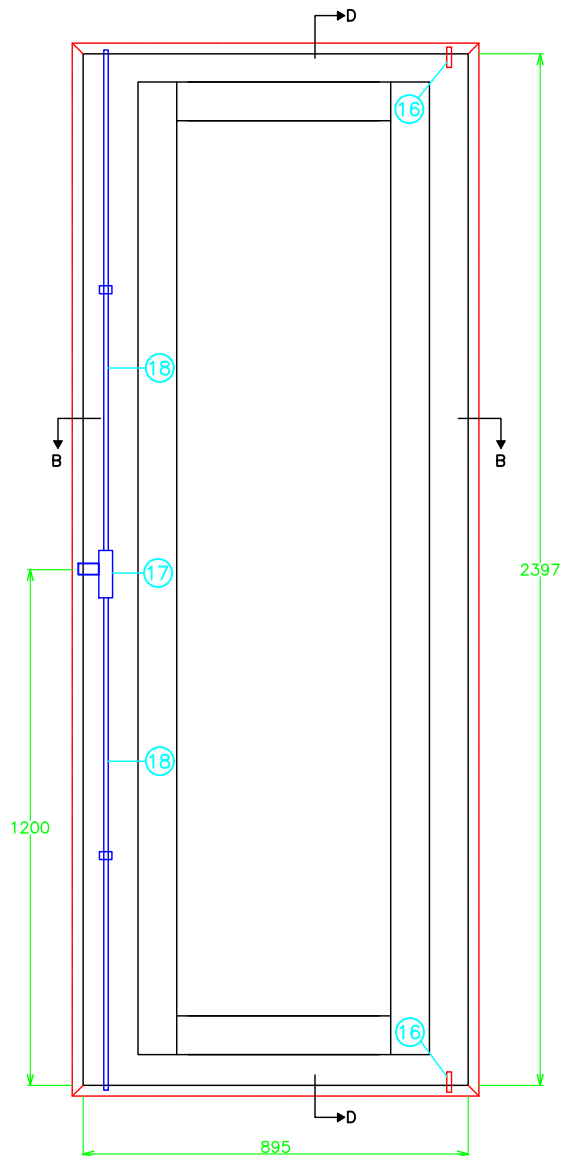


## Appendix 1 – Figures 1 to 5

Doorset A



Doorset B



**warringtonfire**  
Proud to be part of  element

Warringtonfire, Stocking Lane,  
Hughenden Valley, High Wycombe,  
Buckinghamshire, HP14 4ND, UK.  
Tel: +44 (0)1494 569750

Title Unexposed face elevation  
showing hardware positions  
(All dimensions in mm)

Date Drawn  
23/07/20

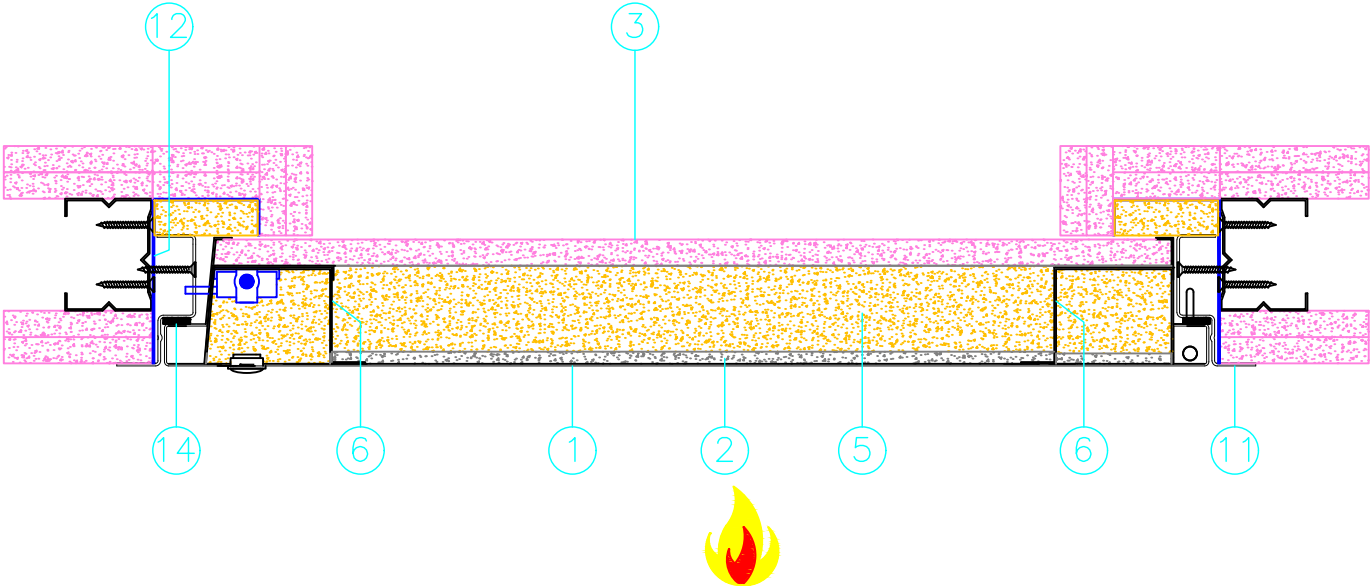
Drawn By  
ARD

Scale  
NTS

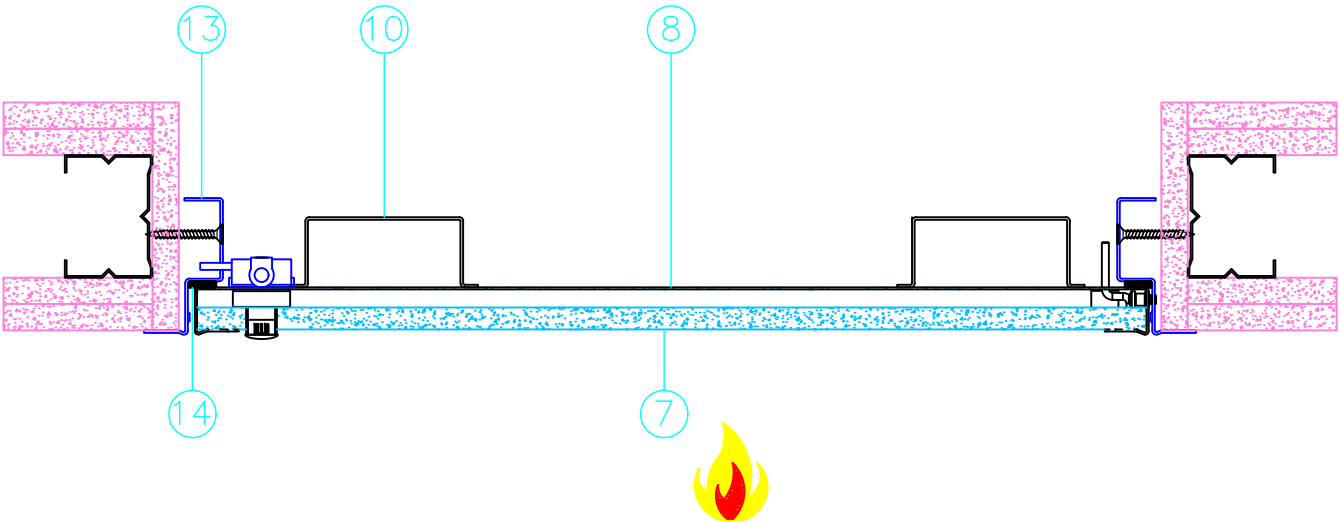
Project No.  
WF 429750

Appendix 1

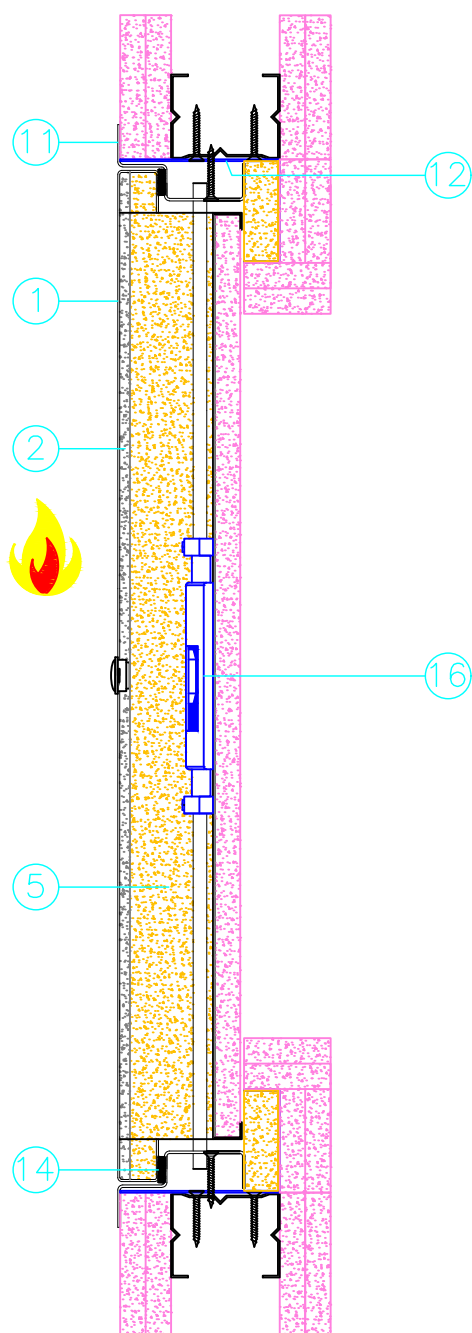
Section A–A



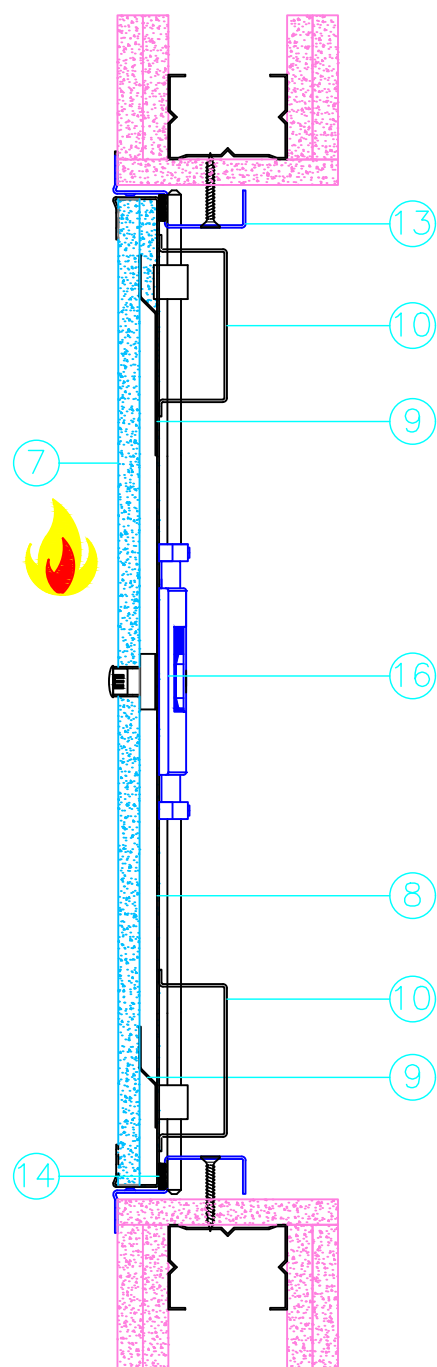
Section B–B



Section C-C



Section D-D



**warringtonfire**  
Proud to be part of 

Warringtonfire, Stocking Lane,  
Hughenden Valley, High Wycombe,  
Buckinghamshire, HP14 4ND, UK.  
Tel: +44 (0)1494 569750

Title

Vertical cross-sections  
(All dimensions in mm)

Date Drawn

23/07/20

Drawn By

ARD

Scale

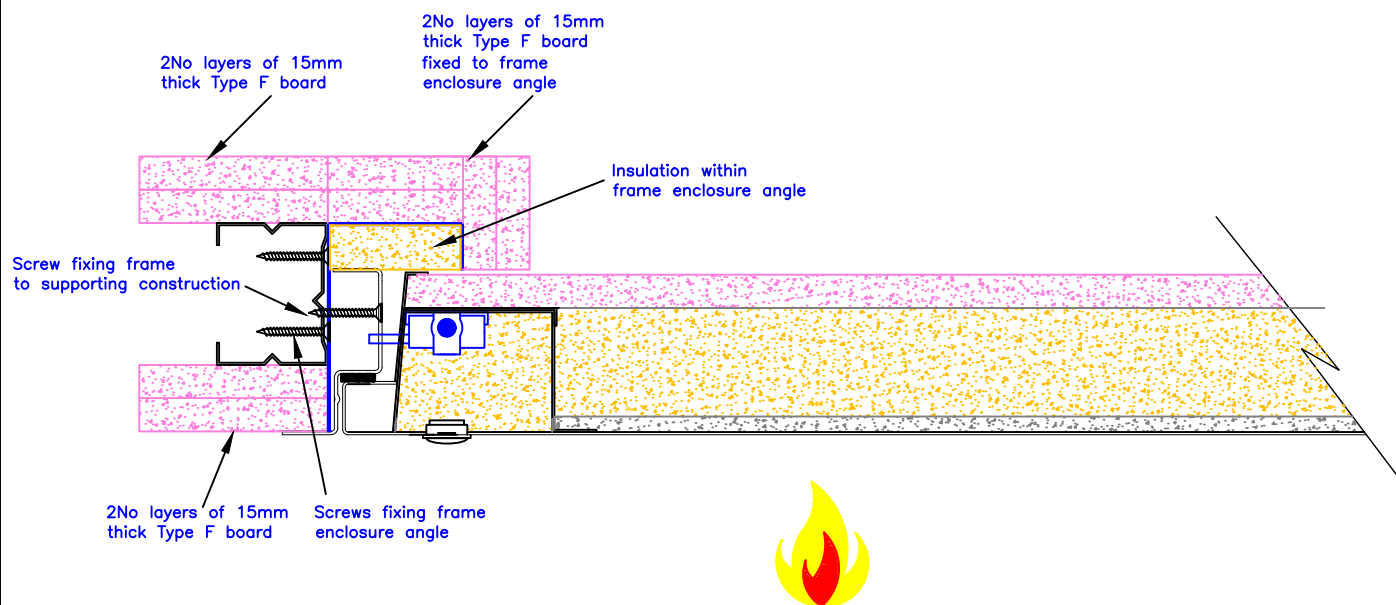
NTS

Project No.

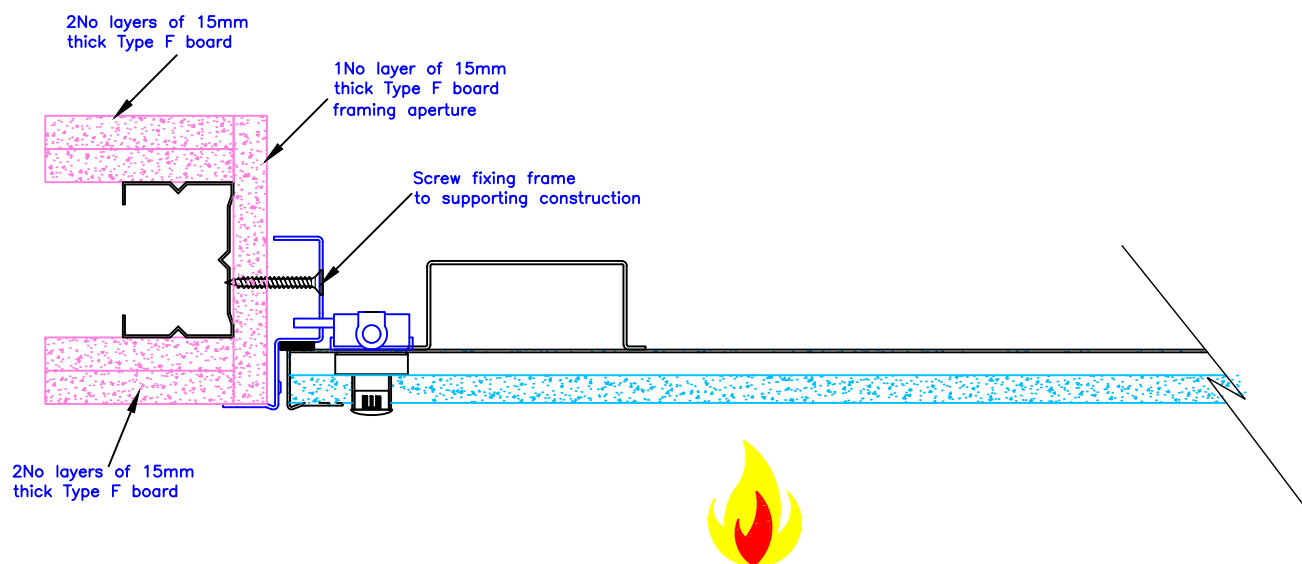
WF 429750

Appendix 1

## Doorset A



## Doorset B



**warringtonfire**  
Proud to be part of 

Warringtonfire, Stocking Lane,  
Hughenden Valley, High Wycombe,  
Buckinghamshire, HP14 4ND, UK.  
Tel: +44 (0)1494 569750

Title  
Frame to supporting construction  
fixing detail  
(All dimensions in mm)

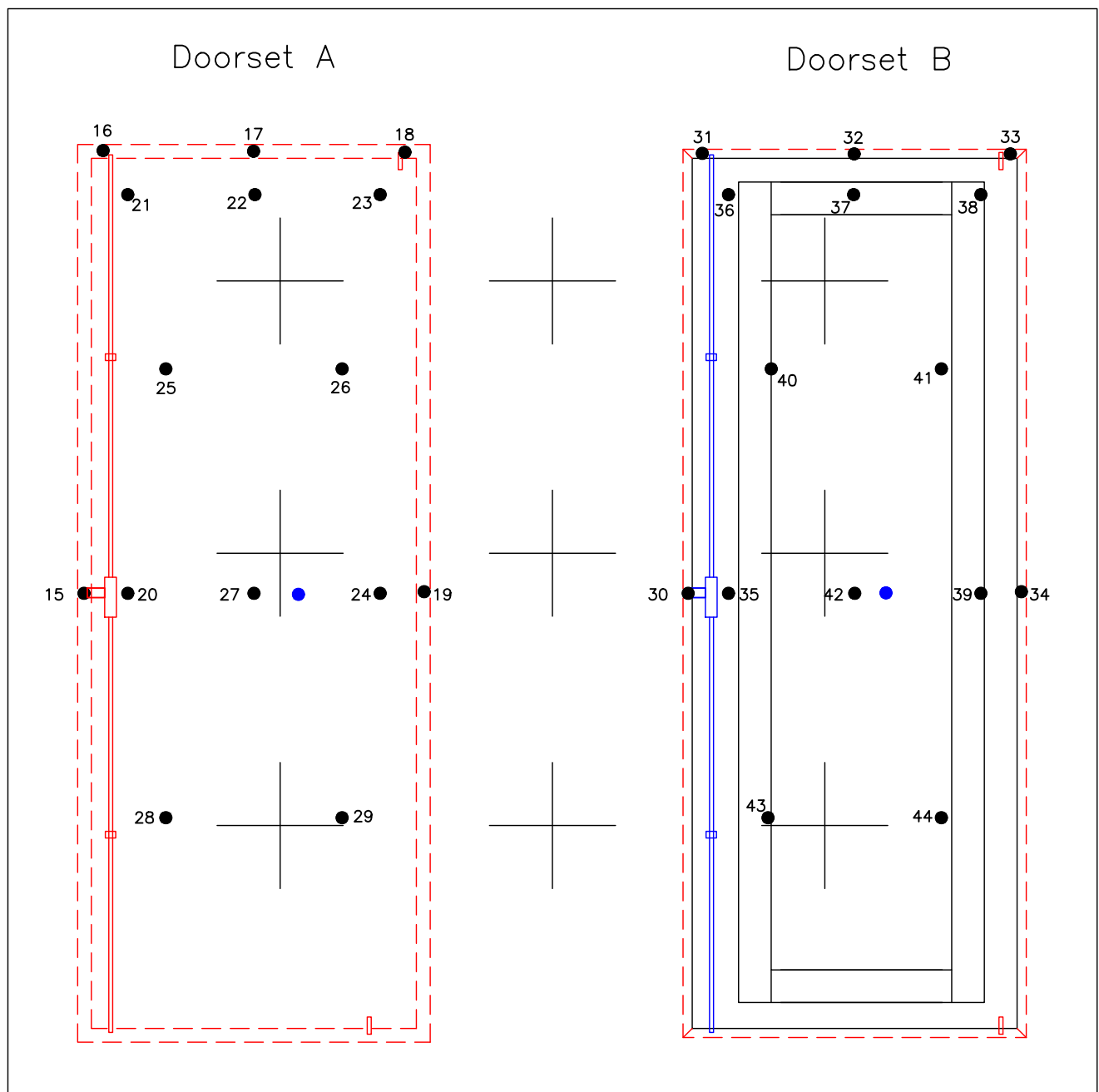
Date Drawn  
23/07/20

Drawn By  
ARD

Scale  
NTS

Project No.  
WF 429750

Appendix 1



- + : Furnace Thermocouples  
 ● : Unexposed Face Thermocouples  
 ● : Radiometer

Viewed From Unexposed Face

**warringtonfire**  
 Proud to be part of **element**

Warringtonfire, Stocking Lane,  
 Hughenden Valley, High Wycombe,  
 Buckinghamshire, HP14 4ND, UK.  
 Tel: +44 (0)1494 569750

Title Thermocouple positions

(All dimensions in mm)

Date Drawn  
 23/07/20

Drawn By  
 ARD

Scale  
 NTS

Project No.  
 WF 429750

Appendix 1

## Appendix 2 - raw test data

(see figure 5 of Appendix 1 for channel locations)

| Time | Chan 15 | Chan 16 | Chan 17 | Chan 18 | Chan 19 | Chan 20 | Chan 21 | Chan 22 | Chan 23 | Chan 24 | Chan 25 | Chan 26 | Chan 27 | Chan 28 | Chan 29 | Chan 30 |
|------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| min  | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      |
| 0    | 19      | 20      | 19      | 20      | 20      | 18      | 19      | 19      | 19      | 20      | 20      | 20      | 19      | 19      | 20      | 19      |
| 1    | 20      | 20      | 20      | 20      | 20      | 18      | 20      | 19      | 20      | 20      | 20      | 20      | 20      | 20      | 20      | 42      |
| 2    | 20      | 20      | 20      | 21      | 21      | 18      | 20      | 20      | 20      | 20      | 20      | 20      | 20      | 19      | 20      | 60      |
| 3    | 20      | 20      | 20      | 21      | 21      | 19      | 20      | 20      | 20      | 20      | 20      | 20      | 20      | 20      | 20      | 74      |
| 4    | 20      | 21      | 21      | 24      | 21      | 19      | 20      | 20      | 20      | 20      | 20      | 20      | 20      | 20      | 20      | 91      |
| 5    | 20      | 25      | 24      | 28      | 21      | 18      | 22      | 20      | 21      | 20      | 20      | 20      | 20      | 20      | 20      | 107     |
| 6    | 20      | 39      | 28      | 38      | 21      | 18      | 29      | 20      | 22      | 20      | 20      | 20      | 20      | 20      | 20      | 122     |
| 7    | 20      | 63      | 38      | 61      | 21      | 18      | 42      | 20      | 24      | 20      | 20      | 20      | 20      | 20      | 20      | 140     |
| 8    | 22      | 70      | 61      | 65      | 23      | 19      | 52      | 22      | 32      | 21      | 21      | 21      | 20      | 20      | 21      | 162     |
| 9    | 22      | 73      | 69      | 68      | 25      | 19      | 61      | 25      | 38      | 23      | 23      | 23      | 22      | 21      | 23      | 180     |
| 10   | 23      | 72      | 69      | 71      | 27      | 20      | 64      | 29      | 47      | 26      | 26      | 25      | 25      | 24      | 27      | 195     |
| 11   | 24      | 71      | 72      | 74      | 29      | 24      | 67      | 35      | 54      | 30      | 31      | 29      | 29      | 28      | 32      | 203     |
| 12   | 26      | 71      | 73      | 77      | 29      | 25      | 68      | 43      | 64      | 34      | 38      | 34      | 35      | 34      | 38      | 213     |
| 13   | 27      | 72      | 74      | 77      | 30      | 30      | 70      | 52      | 69      | 41      | 47      | 42      | 43      | 42      | 46      | 222     |
| 14   | 28      | 71      | 74      | 75      | 31      | 32      | 69      | 60      | 70      | 49      | 55      | 52      | 54      | 51      | 54      | 229     |
| 15   | 29      | 69      | 73      | 72      | 33      | 31      | 67      | 64      | 70      | 57      | 60      | 60      | 62      | 59      | 61      | 236     |
| 16   | 29      | 68      | 66      | 70      | 35      | 33      | 67      | 65      | 69      | 62      | 62      | 65      | 66      | 63      | 63      | 243     |
| 17   | 30      | 68      | 65      | 70      | 37      | 34      | 65      | 65      | 68      | 63      | 61      | 65      | 65      | 63      | 62      | 250     |
| 18   | 31      | 68      | 68      | 70      | 38      | 34      | 64      | 63      | 67      | 62      | 60      | 63      | 63      | 62      | 61      | 258     |
| 19   | 32      | 68      | 68      | 73      | 38      | 32      | 63      | 62      | 68      | 61      | 59      | 61      | 62      | 61      | 59      | 266     |
| 20   | 32      | 68      | 69      | 80      | 39      | 32      | 63      | 62      | 68      | 60      | 59      | 61      | 61      | 60      | 59      | 280     |
| 21   | 33      | 69      | 71      | 85      | 40      | 31      | 65      | 62      | 70      | 60      | 59      | 61      | 62      | 60      | 59      | 294     |
| 22   | 33      | 70      | 71      | 88      | 41      | 34      | 67      | 64      | 72      | 61      | 60      | 62      | 63      | 60      | 61      | 308     |
| 23   | 34      | 71      | 72      | 91      | 43      | 34      | 69      | 65      | 74      | 61      | 61      | 64      | 64      | 62      | 63      | 324     |

| Time | Chan<br>15 | Chan<br>16 | Chan<br>17 | Chan<br>18 | Chan<br>19 | Chan<br>20 | Chan<br>21 | Chan<br>22 | Chan<br>23 | Chan<br>24 | Chan<br>25 | Chan<br>26 | Chan<br>27 | Chan<br>28 | Chan<br>29 | Chan<br>30 |
|------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| min  | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         |
| 24   | 35         | 73         | 73         | 93         | 43         | 34         | 71         | 68         | 77         | 64         | 63         | 66         | 66         | 64         | 66         | 343        |
| 25   | 36         | 74         | 73         | 96         | 45         | 34         | 72         | 69         | 79         | 66         | 65         | 68         | 68         | 66         | 68         | 365        |
| 26   | 37         | 75         | 75         | 98         | 46         | 35         | 73         | 71         | 81         | 68         | 66         | 70         | 70         | 68         | 70         | 396        |
| 27   | 38         | 77         | 76         | 101        | 47         | 34         | 75         | 72         | 83         | 70         | 68         | 71         | 72         | 70         | 71         | 425        |
| 28   | 39         | 79         | 76         | 102        | 48         | 37         | 77         | 73         | 85         | 71         | 69         | 72         | 73         | 71         | 72         | 450        |
| 29   | 40         | 81         | 77         | 104        | 49         | 37         | 77         | 73         | 88         | 73         | 70         | 73         | 74         | 72         | 73         | 458        |
| 30   | 41         | 83         | 78         | 106        | 49         | 36         | 78         | 74         | 90         | 74         | 71         | 74         | 75         | 74         | 74         | 463        |
| 31   | 42         | 84         | 79         | 108        | 50         | 37         | 79         | 75         | 92         | 75         | 71         | 74         | 75         | 74         | 74         | 468        |
| 32   | 43         | 86         | 79         | 111        | 51         | 37         | 79         | 75         | 93         | 76         | 72         | 75         | 75         | 75         | 74         | 469        |
| 33   | 45         | 88         | 79         | 115        | 52         | 34         | 81         | 75         | 94         | 76         | 72         | 75         | 75         | 75         | 74         | 470        |
| 34   | 46         | 89         | 80         | 118        | 53         | 33         | 82         | 76         | 96         | 76         | 73         | 75         | 75         | 75         | 74         | 470        |
| 35   | 47         | 91         | 81         | 121        | 54         | 36         | 82         | 76         | 98         | 76         | 73         | 75         | 75         | 75         | 74         | 470        |
| 36   | 48         | 93         | 81         | 126        | 56         | 37         | 84         | 76         | 99         | 75         | 73         | 75         | 76         | 75         | 74         | 473        |
| 37   | 50         | 94         | 82         | 130        | 57         | 33         | 85         | 76         | 101        | 75         | 73         | 75         | 76         | 74         | 74         | 474        |
| 38   | 52         | 96         | 83         | 134        | 58         | 33         | 87         | 76         | 104        | 76         | 73         | 75         | 76         | 74         | 74         | 473        |
| 39   | 53         | 98         | 84         | 139        | 59         | 37         | 87         | 76         | 104        | 75         | 73         | 74         | 76         | 74         | 74         | 469        |
| 40   | 55         | 100        | 84         | 143        | 60         | 35         | 90         | 76         | 107        | 76         | 73         | 75         | 76         | 74         | 74         | 469        |
| 41   | 57         | 101        | 85         | 146        | 61         | 35         | 95         | 76         | 108        | 76         | 72         | 75         | 76         | 75         | 75         | 472        |
| 42   | 58         | 104        | 87         | 151        | 62         | 37         | 97         | 77         | 109        | 76         | 73         | 75         | 76         | 75         | 75         | 476        |
| 43   | 60         | 106        | 88         | 152        | 63         | 36         | 99         | 78         | 112        | 77         | 73         | 76         | 77         | 75         | 75         | 477        |
| 44   | 62         | 108        | 90         | 154        | 65         | 36         | 101        | 78         | 113        | 77         | 73         | 77         | 77         | 76         | 76         | 477        |
| 45   | 63         | 111        | 91         | 157        | 66         | 39         | 102        | 79         | 115        | 78         | 74         | 77         | 78         | 76         | 77         | 478        |
| 46   | 65         | 114        | 93         | 160        | 67         | 41         | 103        | 80         | 116        | 79         | 74         | 78         | 79         | 77         | 77         | 480        |
| 47   | 66         | 116        | 95         | 163        | 69         | 37         | 105        | 81         | 116        | 80         | 75         | 79         | 80         | 78         | 78         | 482        |
| 48   | 68         | 119        | 96         | 165        | 70         | 39         | 106        | 82         | 118        | 82         | 76         | 80         | 81         | 78         | 80         | 483        |
| 49   | 70         | 121        | 98         | 168        | 71         | 39         | 107        | 84         | 119        | 83         | 77         | 81         | 82         | 79         | 81         | 484        |
| 50   | 71         | 125        | 100        | 171        | 73         | 40         | 107        | 85         | 118        | 84         | 77         | 82         | 83         | 80         | 82         | 485        |
| 51   | 72         | 128        | 102        | 172        | 74         | 42         | 107        | 87         | 118        | 86         | 78         | 86         | 85         | 80         | 83         | 486        |

| Time | Chan<br>15 | Chan<br>16 | Chan<br>17 | Chan<br>18 | Chan<br>19 | Chan<br>20 | Chan<br>21 | Chan<br>22 | Chan<br>23 | Chan<br>24 | Chan<br>25 | Chan<br>26 | Chan<br>27 | Chan<br>28 | Chan<br>29 | Chan<br>30 |
|------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| min  | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         |
| 52   | 74         | 130        | 103        | 173        | 76         | 40         | 107        | 89         | 118        | 88         | 79         | 88         | 87         | 81         | 85         | 487        |
| 53   | 75         | 132        | 104        | 177        | 78         | 39         | 106        | 91         | 116        | 90         | 80         | 90         | 89         | 82         | 87         | 488        |
| 54   | 77         | 134        | 105        | 182        | 80         | 39         | 106        | 93         | 117        | 92         | 81         | 91         | 91         | 82         | 89         | 489        |
| 55   | 79         | 136        | 107        | 186        | 82         | 41         | 107        | 94         | 117        | 94         | 82         | 93         | 92         | 83         | 90         | 489        |
| 56   | 82         | 137        | 110        | 193        | 85         | 42         | 109        | 96         | 120        | 95         | 84         | 94         | 93         | 84         | 91         | 490        |
| 57   | 85         | 140        | 113        | 205        | 88         | 42         | 110        | 98         | 122        | 96         | 85         | 94         | 94         | 85         | 91         | 490        |
| 58   | 88         | 144        | 116        | 210        | 91         | 43         | 113        | 100        | 123        | 97         | 86         | 95         | 95         | 86         | 92         | 491        |
| 59   | 92         | 148        | 119        | 218        | 93         | 41         | 114        | 103        | 124        | 98         | 87         | 95         | 96         | 87         | 93         | 490        |
| 60   | 94         | 152        | 124        | 223        | 94         | 46         | 117        | 106        | 126        | 98         | 88         | 96         | 97         | 88         | 93         | 490        |
| 61   | 97         | 158        | 128        | 226        | 96         | 47         | 121        | 109        | 128        | 99         | 89         | 96         | 97         | 90         | 94         | 489        |
| 62   | 101        | 166        | 134        | 231        | 100        | 47         | 126        | 113        | 131        | 99         | 89         | 97         | 98         | 91         | 95         | 489        |
| 63   | 105        | 170        | 142        | 231        | 101        | 74         | 133        | 117        | 138        | 100        | 90         | 97         | 99         | 93         | 96         | 484        |
| 64   | 108        | 175        | 150        | 264        | 103        | 54         | 153        | 122        | 150        | 101        | 91         | 97         | 100        | 94         | 97         | 483        |
| 65   | 112        | 182        | 160        | 337        | 104        | 55         | 194        | 129        | 182        | 102        | 91         | 98         | 100        | 95         | 98         | 483        |
| 66   | 116        | 189        | 169        | 360        | 107        | 53         | 237        | 139        | 232        | 103        | 92         | 99         | 101        | 96         | 99         | 484        |
| 67   | 118        | 199        | 181        | 355        | 108        | 54         | 275        | 171        | 276        | 104        | 93         | 100        | 102        | 97         | 99         | 484        |
| 68   | 118        | 203        | 199        | 464        | 111        | 58         | 313        | 218        | 317        | 104        | 93         | 100        | 103        | 98         | 100        | 484        |
| 69   | 119        | 206        | 219        | 457        | 115        | 57         | 352        | 258        | 356        | 105        | 94         | 101        | 103        | 98         | 101        | 484        |
| 70   | 121        | 212        | 232        | 448        | 120        | 60         | 387        | 296        | 396        | 106        | 95         | 102        | 104        | 99         | 101        | 484        |
| 71   | 123        | 215        | 242        | 445        | 125        | 59         | 414        | 337        | 434        | 107        | 95         | 103        | 105        | 100        | 102        | 485        |
| 72   | 126        | 225        | 248        | 445        | 129        | 61         | 430        | 381        | 443        | 108        | 96         | 104        | 106        | 101        | 103        | 485        |
| 73   | 130        | 230        | 256        | 446        | 130        | 62         | 430        | 422        | 446        | 110        | 98         | 105        | 107        | 102        | 104        | 486        |
| 74   | 138        | 234        | 257        | 442        | 134        | 63         | 426        | 451        | 444        | 111        | 99         | 105        | 108        | 103        | 106        | 486        |
| 75   | 145        | 242        | 261        | 441        | 142        | 73         | 421        | 455        | 441        | 112        | 100        | 107        | 109        | 103        | 107        | 487        |
| 76   | 149        | 249        | 271        | 441        | 157        | 109        | 409        | 459        | 436        | 115        | 103        | 108        | 110        | 105        | 109        | 489        |
| 77   | 148        | 248        | 278        | 441        | 179        | 134        | 388        | 463        | 424        | 119        | 104        | 111        | 111        | 106        | 110        | 490        |
| 78   | 149        | 259        | 285        | 440        | 198        | 243        | 377        | 454        | 413        | 124        | 108        | 114        | 112        | 107        | 113        | 490        |
| 79   | 151        | 262        | 296        | 440        | 228        | 227        | 373        | 437        | 405        | 128        | 109        | 116        | 114        | 108        | 114        | 490        |

| Time | Chan<br>15 | Chan<br>16 | Chan<br>17 | Chan<br>18 | Chan<br>19 | Chan<br>20 | Chan<br>21 | Chan<br>22 | Chan<br>23 | Chan<br>24 | Chan<br>25 | Chan<br>26 | Chan<br>27 | Chan<br>28 | Chan<br>29 | Chan<br>30 |
|------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| min  | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         |
| 80   | 155        | 263        | 309        | 442        | 208        | 255        | 371        | 408        | 400        | 138        | 109        | 120        | 115        | 110        | 116        | 491        |
| 81   | 160        | 262        | 318        | 443        | 192        | 285        | 368        | 300        | 395        | 149        | 108        | 122        | 117        | 111        | 119        | 492        |
| 82   | 164        | 266        | 329        | 444        | 179        | 316        | 367        | 298        | 393        | 168        | 110        | 123        | 119        | 113        | 123        | 492        |
| 83   | 169        | 269        | 338        | 439        | 172        | 356        | 366        | 269        | 394        | 192        | 110        | 125        | 122        | 115        | 128        | 494        |
| 84   | 174        | 273        | 345        | 369        | 167        | 386        | 365        | 344        | 394        | 226        | 112        | 127        | 125        | 117        | 133        | 494        |
| 85   | 178        | 279        | 349        | 260        | 176        | 401        | 367        | 264        | 393        | 261        | 114        | 134        | 128        | 120        | 144        | 495        |
| 86   | 183        | 281        | 348        | 282        | 172        | 403        | 366        | 272        | 394        | 295        | 115        | 141        | 134        | 123        | 155        | 497        |
| 87   | 191        | 283        | 347        | 261        | 170        | 406        | 366        | 246        | 394        | 327        | 117        | 149        | 142        | 126        | 174        | 497        |
| 88   | 201        | 286        | 354        | 261        | 161        | 405        | 368        | 390        | 393        | 352        | 121        | 158        | 147        | 130        | 193        | 499        |
| 89   | 209        | 293        | 358        | 270        | 174        | 401        | 370        | 392        | 394        | 371        | 122        | 174        | 154        | 138        | 209        | 500        |
| 90   | 219        | 299        | 358        | 270        | 170        | 391        | 370        | 391        | 394        | 384        | 124        | 189        | 167        | 147        | 224        | 502        |
| 91   | 227        | 306        | 363        | 275        | 151        | 372        | 371        | 393        | 394        | 392        | 127        | 203        | 179        | 156        | 238        | 503        |
| 92   | 235        | 314        | 365        | 278        | 137        | 346        | 373        | 287        | 394        | 387        | 134        | 215        | 190        | 172        | 249        | 505        |
| 93   | 245        | 328        | 379        | 317        | 147        | 340        | 377        | 397        | 396        | 371        | 142        | 227        | 199        | 185        | 260        | 506        |
| 94   | 249        | 335        | 385        | 356        | 147        | 335        | 378        | 399        | 397        | 349        | 147        | 239        | 207        | 197        | 270        | 508        |
| 95   | 249        | 339        | 384        | 358        | 156        | 332        | 377        | 398        | 401        | 335        | 156        | 249        | 214        | 208        | 280        | 509        |
| 96   | 251        | 342        | 386        | 458        | 153        | 330        | 378        | 398        | 403        | 327        | 170        | 260        | 221        | 218        | 290        | 511        |
| 97   | 255        | 345        | 391        | 461        | 159        | 330        | 378        | 400        | 405        | 324        | 181        | 272        | 227        | 227        | 301        | 512        |
| 98   | 260        | 349        | 395        | 464        | 199        | 325        | 380        | 402        | 409        | 324        | 192        | 285        | 232        | 235        | 313        | 514        |
| 99   | 268        | 351        | 394        | 468        | 197        | 324        | 379        | 402        | 411        | 326        | 200        | 310        | 237        | 241        | 325        | 514        |
| 100  | 277        | 358        | 399        | 472        | 170        | 322        | 382        | 403        | 413        | 329        | 210        | 345        | 241        | 246        | 334        | 515        |
| 101  | 296        | 365        | 403        | 473        | 181        | 320        | 382        | 402        | 416        | 333        | 217        | 377        | 244        | 251        | 339        | 515        |
| 102  | 327        | 371        | 404        | 475        | 170        | 320        | 383        | 402        | 417        | 330        | 225        | 405        | 247        | 255        | 341        | 516        |
| 103  | 367        | 376        | 397        | 475        | 176        | 318        | 383        | 400        | 418        | 334        | 235        | 421        | 250        | 260        | 357        | 517        |
| 104  | 414        | 382        | 390        | 474        | 186        | 318        | 383        | 399        | 418        | 333        | 246        | 427        | 254        | 267        | 389        | 518        |
| 105  | 447        | 392        | 383        | 474        | 183        | 321        | 385        | 397        | 417        | 333        | 252        | 414        | 257        | 278        | 406        | 518        |
| 106  | 457        | 406        | 376        | 475        | 188        | 309        | 389        | 396        | 418        | 335        | 256        | 382        | 260        | 288        | 393        | 520        |
| 107  | 464        | 417        | 372        | 477        | 193        | 309        | 390        | 395        | 418        | 336        | 260        | 358        | 262        | 298        | 371        | 521        |

| Time | Chan<br>15 | Chan<br>16 | Chan<br>17 | Chan<br>18 | Chan<br>19 | Chan<br>20 | Chan<br>21 | Chan<br>22 | Chan<br>23 | Chan<br>24 | Chan<br>25 | Chan<br>26 | Chan<br>27 | Chan<br>28 | Chan<br>29 | Chan<br>30 |
|------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| min  | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         |
| 108  | 470        | 427        | 368        | 487        | 185        | 312        | 393        | 394        | 418        | 340        | 266        | 345        | 265        | 306        | 358        | 522        |
| 109  | 473        | 432        | 365        | 493        | 188        | 315        | 396        | 393        | 418        | 344        | 272        | 339        | 268        | 313        | 348        | 524        |
| 110  | 464        | 437        | 368        | 511        | 189        | 319        | 402        | 392        | 418        | 349        | 283        | 337        | 271        | 316        | 335        | 524        |
| 111  | 445        | 431        | 361        | 530        | 191        | 321        | 403        | 391        | 418        | 353        | 296        | 335        | 272        | 312        | 325        | 524        |
| 112  | 432        | 429        | 356        | 546        | 188        | 341        | 407        | 390        | 416        | 357        | 317        | 334        | 274        | 307        | 319        | 525        |
| 113  | 428        | 429        | 352        | 557        | 181        | 343        | 410        | 390        | 417        | 361        | 337        | 334        | 276        | 308        | 314        | 527        |
| 114  | 425        | 430        | 348        | 565        | 181        | 343        | 410        | 389        | 418        | 364        | 355        | 335        | 277        | 311        | 312        | 529        |
| 115  | 424        | 434        | 348        | 565        | 196        | 336        | 413        | 390        | 418        | 363        | 380        | 336        | 279        | 307        | 311        | 538        |
| 116  | 424        | 436        | 345        | 565        | 189        | 333        | 411        | 390        | 420        | 365        | 393        | 337        | 280        | 300        | 311        | 543        |
| 117  | 422        | 443        | 345        | 569        | 193        | 343        | 413        | 391        | 419        | 366        | 397        | 338        | 283        | 295        | 310        | 547        |
| 118  | 420        | 448        | 346        | 570        | 188        | 341        | 415        | 391        | 419        | 366        | 380        | 338        | 287        | 293        | 309        | 550        |
| 119  | 419        | 454        | 347        | 568        | 183        | 342        | 417        | 391        | 419        | 365        | 358        | 338        | 293        | 291        | 308        | 548        |
| 120  | 419        | 458        | 350        | 571        | 169        | 339        | 357        | 390        | 418        | 365        | 345        | 339        | 306        | 289        | 307        | 549        |
| 121  | 418        | 465        | 352        | 568        | 179        | 356        | 423        | 391        | 416        | 366        | 339        | 339        | 315        | 288        | 307        | 472        |
| 122  | 416        | 469        | 354        | 562        | 211        | 355        | 423        | 392        | 418        | 366        | 333        | 341        | 317        | 288        | 307        | 548        |
| 123  | 414        | 475        | 353        | 558        | 236        | 354        | 422        | 392        | 420        | 366        | 329        | 342        | 313        | 288        | 308        | 536        |
| 124  | 413        | 480        | 351        | 556        | 229        | 352        | 420        | 391        | 422        | 366        | 327        | 344        | 308        | 289        | 309        | 410        |
| 125  | 415        | 482        | 353        | 564        | 215        | 350        | 423        | 391        | 420        | 369        | 329        | 345        | 307        | 289        | 309        | 484        |
| 126  | 415        | 486        | 356        | 567        | 208        | 349        | 424        | 392        | 419        | 368        | 328        | 345        | 310        | 290        | 309        | 549        |
| 127  | 414        | 488        | 357        | 566        | 221        | 347        | 425        | 393        | 421        | 370        | 331        | 348        | 310        | 291        | 310        | 552        |
| 128  | 412        | 489        | 360        | 571        | 232        | 345        | 424        | 394        | 422        | 371        | 339        | 350        | 305        | 293        | 311        | 557        |
| 129  | 412        | 490        | 360        | 574        | 226        | 342        | 424        | 394        | 425        | 372        | 342        | 354        | 299        | 294        | 312        | 562        |
| 130  | 412        | 496        | 357        | 576        | 256        | 336        | 421        | 394        | 429        | 372        | 345        | 359        | 295        | 295        | 313        | 566        |
| 131  | 413        | 498        | 358        | 578        | 252        | 333        | 422        | 395        | 433        | 371        | 350        | 364        | 292        | 297        | 315        | 571        |
| 132  | 413        | 497        | 361        | 596        | 229        | 332        | 421        | 395        | 435        | 371        | 357        | 367        | 289        | 298        | 315        | 576        |
| 133  | 412        | 497        | 365        | 604        | 243        | 333        | 419        | 396        | 437        | 369        | 364        | 369        | 288        | 299        | 315        | 579        |
| 134  | 412        | 499        | 367        | 612        | 232        | 334        | 418        | 396        | 439        | 368        | 370        | 373        | 288        | 300        | 315        | 583        |
| 135  | 414        | 502        | 367        | 615        | 248        | 336        | 407        | 396        | 440        | 365        | 373        | 375        | 290        | 301        | 315        | 585        |

| Time | Chan 15 | Chan 16 | Chan 17 | Chan 18 | Chan 19 | Chan 20 | Chan 21 | Chan 22 | Chan 23 | Chan 24 | Chan 25 | Chan 26 | Chan 27 | Chan 28 | Chan 29 | Chan 30 |
|------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| min  | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      |
| 136  | 412     | 509     | 364     | 620     | 279     | 338     | 411     | 396     | 443     | 362     | 370     | 378     | 293     | 302     | 317     | 587     |
| 137  | 414     | 507     | 367     | 626     | 311     | 341     | 407     | 398     | 446     | 360     | 374     | 382     | 297     | 303     | 317     | 590     |
| 138  | 414     | 508     | 370     | 631     | 297     | 344     | 406     | 398     | 446     | 360     | 375     | 383     | 302     | 304     | 316     | 593     |
| 139  | 415     | 509     | 370     | 635     | 291     | 349     | 401     | 398     | 446     | 359     | 377     | 386     | 307     | 305     | 318     | 596     |
| 140  | 416     | 510     | 370     | 639     | 298     | 352     | 426     | 399     | 448     | 360     | 377     | 388     | 312     | 305     | 319     | 600     |
| 141  | 420     | 507     | 372     | 646     | 340     | 357     | 422     | 400     | 451     | 363     | 381     | 245     | 317     | 305     | 321     | 606     |
| 142  | 423     | 505     | 373     | 647     | 397     | 360     | 416     | 400     | 452     | 367     | 384     | 393     | 323     | 304     | 319     | 608     |
| 143  | 427     | 508     | 376     | 645     | 401     | 365     | 410     | 401     | 456     | 372     | 394     | 397     | 330     | 302     | 319     | 614     |
| 144  | 430     | 511     | 375     | 651     | 331     | 367     | 420     | 402     | 460     | 377     | 287     | 239     | 337     | 300     | 317     | 619     |

| Time | Chan 31 | Chan 32 | Chan 33 | Chan 34 | Chan 35 | Chan 36 | Chan 37 | Chan 38 | Chan 39 | Chan 40 | Chan 41 | Chan 42 | Chan 43 | Chan 44 |
|------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| min  | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      | °C      |
| 0    | 20      | 20      | 19      | 20      | 22      | 22      | 24      | 23      | 23      | 23      | 24      | 23      | 22      | 22      |
| 1    | 43      | 39      | 27      | 45      | 26      | 25      | 25      | 24      | 24      | 24      | 24      | 24      | 22      | 22      |
| 2    | 59      | 58      | 38      | 66      | 32      | 27      | 34      | 36      | 33      | 30      | 31      | 28      | 26      | 25      |
| 3    | 74      | 75      | 49      | 86      | 38      | 33      | 60      | 61      | 60      | 47      | 54      | 49      | 43      | 39      |
| 4    | 92      | 86      | 59      | 103     | 41      | 40      | 85      | 80      | 84      | 77      | 84      | 81      | 71      | 67      |
| 5    | 107     | 95      | 65      | 116     | 47      | 47      | 89      | 87      | 90      | 87      | 90      | 91      | 86      | 86      |
| 6    | 121     | 102     | 68      | 129     | 54      | 54      | 89      | 86      | 90      | 90      | 91      | 91      | 91      | 89      |
| 7    | 133     | 110     | 72      | 138     | 61      | 60      | 87      | 85      | 90      | 90      | 91      | 91      | 91      | 90      |
| 8    | 144     | 117     | 76      | 146     | 67      | 65      | 86      | 88      | 91      | 90      | 92      | 92      | 91      | 90      |
| 9    | 156     | 123     | 81      | 154     | 71      | 70      | 90      | 93      | 91      | 91      | 92      | 92      | 92      | 90      |
| 10   | 166     | 129     | 86      | 161     | 75      | 74      | 89      | 97      | 92      | 91      | 92      | 92      | 92      | 91      |
| 11   | 177     | 136     | 90      | 168     | 78      | 78      | 91      | 102     | 92      | 91      | 92      | 92      | 92      | 91      |
| 12   | 186     | 143     | 94      | 176     | 81      | 83      | 93      | 107     | 92      | 91      | 92      | 92      | 92      | 91      |
| 13   | 195     | 150     | 97      | 183     | 85      | 87      | 94      | 111     | 92      | 91      | 92      | 92      | 92      | 91      |
| 14   | 204     | 158     | 101     | 191     | 89      | 91      | 96      | 116     | 92      | 90      | 91      | 92      | 92      | 90      |
| 15   | 215     | 165     | 106     | 197     | 92      | 95      | 100     | 123     | 92      | 89      | 90      | 91      | 91      | 90      |

| Time | Chan<br>31 | Chan<br>32 | Chan<br>33 | Chan<br>34 | Chan<br>35 | Chan<br>36 | Chan<br>37 | Chan<br>38 | Chan<br>39 | Chan<br>40 | Chan<br>41 | Chan<br>42 | Chan<br>43 | Chan<br>44 |
|------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| min  | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         |
| 16   | 231        | 173        | 113        | 204        | 96         | 100        | 106        | 135        | 97         | 90         | 90         | 89         | 89         | 89         |
| 17   | 257        | 184        | 119        | 210        | 101        | 137        | 122        | 157        | 108        | 106        | 107        | 96         | 94         | 87         |
| 18   | 282        | 197        | 126        | 217        | 108        | 202        | 151        | 188        | 129        | 136        | 135        | 115        | 116        | 97         |
| 19   | 300        | 213        | 132        | 226        | 116        | 258        | 186        | 227        | 157        | 167        | 167        | 142        | 148        | 119        |
| 20   | 315        | 223        | 137        | 235        | 126        | 292        | 221        | 264        | 186        | 197        | 198        | 172        | 180        | 143        |
| 21   | 330        | 229        | 143        | 244        | 137        | 313        | 255        | 294        | 211        | 222        | 224        | 201        | 208        | 173        |
| 22   | 345        | 234        | 149        | 254        | 149        | 324        | 284        | 314        | 232        | 242        | 245        | 229        | 230        | 200        |
| 23   | 360        | 240        | 155        | 262        | 162        | 329        | 307        | 325        | 250        | 259        | 264        | 253        | 248        | 221        |
| 24   | 373        | 245        | 161        | 272        | 176        | 331        | 327        | 331        | 267        | 275        | 282        | 272        | 264        | 238        |
| 25   | 385        | 250        | 166        | 281        | 191        | 333        | 342        | 334        | 283        | 288        | 298        | 287        | 277        | 253        |
| 26   | 394        | 255        | 171        | 290        | 207        | 332        | 354        | 337        | 298        | 299        | 314        | 298        | 289        | 266        |
| 27   | 400        | 259        | 177        | 299        | 219        | 332        | 367        | 339        | 312        | 308        | 329        | 311        | 300        | 280        |
| 28   | 406        | 264        | 182        | 308        | 230        | 334        | 374        | 340        | 324        | 317        | 340        | 322        | 311        | 292        |
| 29   | 412        | 269        | 186        | 317        | 238        | 335        | 377        | 340        | 337        | 325        | 348        | 331        | 320        | 304        |
| 30   | 418        | 273        | 191        | 326        | 246        | 337        | 378        | 341        | 349        | 329        | 356        | 335        | 328        | 314        |
| 31   | 422        | 277        | 195        | 335        | 252        | 336        | 375        | 342        | 361        | 328        | 360        | 335        | 335        | 322        |
| 32   | 426        | 280        | 200        | 344        | 257        | 336        | 371        | 343        | 368        | 330        | 355        | 335        | 337        | 328        |
| 33   | 429        | 283        | 203        | 353        | 262        | 333        | 366        | 344        | 374        | 332        | 348        | 335        | 340        | 335        |
| 34   | 432        | 285        | 207        | 362        | 266        | 331        | 363        | 344        | 376        | 334        | 340        | 334        | 348        | 342        |
| 35   | 434        | 288        | 210        | 370        | 270        | 328        | 360        | 345        | 379        | 334        | 334        | 333        | 352        | 335        |
| 36   | 436        | 293        | 214        | 378        | 273        | 327        | 359        | 346        | 382        | 335        | 330        | 332        | 349        | 326        |
| 37   | 436        | 298        | 216        | 385        | 275        | 325        | 358        | 347        | 384        | 337        | 327        | 331        | 342        | 318        |
| 38   | 437        | 304        | 219        | 391        | 278        | 323        | 357        | 348        | 383        | 340        | 325        | 331        | 335        | 312        |
| 39   | 437        | 310        | 222        | 393        | 279        | 320        | 357        | 349        | 379        | 340        | 323        | 330        | 329        | 308        |
| 40   | 435        | 314        | 225        | 394        | 281        | 319        | 357        | 350        | 374        | 338        | 323        | 331        | 325        | 305        |
| 41   | 436        | 319        | 227        | 394        | 283        | 319        | 357        | 351        | 370        | 335        | 322        | 331        | 322        | 304        |
| 42   | 438        | 321        | 230        | 394        | 284        | 320        | 357        | 352        | 368        | 331        | 321        | 331        | 320        | 303        |
| 43   | 439        | 323        | 233        | 395        | 286        | 321        | 357        | 352        | 366        | 329        | 321        | 330        | 319        | 302        |

| Time | Chan<br>31 | Chan<br>32 | Chan<br>33 | Chan<br>34 | Chan<br>35 | Chan<br>36 | Chan<br>37 | Chan<br>38 | Chan<br>39 | Chan<br>40 | Chan<br>41 | Chan<br>42 | Chan<br>43 | Chan<br>44 |
|------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| min  | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         |
| 44   | 440        | 324        | 235        | 397        | 288        | 322        | 358        | 354        | 365        | 327        | 321        | 331        | 318        | 303        |
| 45   | 441        | 325        | 238        | 400        | 289        | 323        | 359        | 355        | 364        | 325        | 322        | 330        | 318        | 303        |
| 46   | 444        | 334        | 241        | 403        | 290        | 325        | 360        | 356        | 364        | 324        | 323        | 330        | 318        | 303        |
| 47   | 448        | 344        | 244        | 406        | 291        | 327        | 361        | 357        | 365        | 324        | 323        | 330        | 318        | 304        |
| 48   | 451        | 353        | 247        | 410        | 293        | 329        | 363        | 358        | 365        | 325        | 323        | 331        | 319        | 304        |
| 49   | 454        | 360        | 250        | 414        | 295        | 331        | 364        | 359        | 366        | 325        | 323        | 331        | 320        | 305        |
| 50   | 457        | 365        | 252        | 418        | 296        | 332        | 365        | 360        | 367        | 325        | 324        | 331        | 320        | 305        |
| 51   | 459        | 370        | 255        | 421        | 296        | 334        | 367        | 361        | 367        | 326        | 324        | 331        | 321        | 306        |
| 52   | 462        | 371        | 258        | 425        | 297        | 336        | 368        | 362        | 367        | 326        | 325        | 332        | 321        | 307        |
| 53   | 466        | 374        | 261        | 429        | 299        | 337        | 369        | 364        | 368        | 327        | 325        | 332        | 322        | 308        |
| 54   | 469        | 376        | 264        | 432        | 300        | 339        | 370        | 365        | 369        | 328        | 326        | 332        | 323        | 308        |
| 55   | 470        | 377        | 267        | 436        | 301        | 341        | 371        | 366        | 370        | 329        | 327        | 333        | 325        | 309        |
| 56   | 472        | 376        | 270        | 440        | 302        | 344        | 372        | 367        | 372        | 329        | 327        | 333        | 325        | 310        |
| 57   | 474        | 378        | 272        | 443        | 303        | 346        | 373        | 368        | 372        | 330        | 328        | 334        | 326        | 311        |
| 58   | 474        | 378        | 275        | 446        | 304        | 348        | 374        | 369        | 373        | 331        | 329        | 335        | 326        | 312        |
| 59   | 477        | 382        | 276        | 448        | 305        | 351        | 375        | 370        | 374        | 332        | 330        | 335        | 327        | 312        |
| 60   | 479        | 383        | 279        | 450        | 307        | 354        | 376        | 371        | 375        | 333        | 330        | 336        | 328        | 313        |
| 61   | 481        | 385        | 281        | 451        | 308        | 354        | 377        | 373        | 375        | 333        | 331        | 337        | 329        | 315        |
| 62   | 485        | 386        | 283        | 451        | 309        | 354        | 379        | 374        | 376        | 334        | 333        | 338        | 330        | 315        |
| 63   | 489        | 390        | 284        | 452        | 310        | 352        | 380        | 375        | 377        | 335        | 333        | 338        | 331        | 316        |
| 64   | 490        | 393        | 286        | 453        | 311        | 351        | 382        | 377        | 377        | 336        | 334        | 339        | 332        | 316        |
| 65   | 492        | 395        | 286        | 453        | 311        | 352        | 382        | 378        | 378        | 337        | 335        | 340        | 333        | 317        |
| 66   | 495        | 400        | 288        | 454        | 312        | 351        | 384        | 379        | 379        | 337        | 335        | 340        | 334        | 318        |
| 67   | 497        | 403        | 289        | 455        | 313        | 349        | 384        | 380        | 381        | 338        | 337        | 340        | 334        | 319        |
| 68   | 500        | 408        | 290        | 456        | 313        | 346        | 386        | 381        | 382        | 339        | 337        | 341        | 335        | 320        |
| 69   | 500        | 410        | 291        | 458        | 313        | 343        | 387        | 383        | 382        | 339        | 338        | 341        | 335        | 321        |
| 70   | 501        | 414        | 293        | 459        | 313        | 342        | 388        | 384        | 383        | 339        | 339        | 342        | 336        | 321        |
| 71   | 502        | 420        | 296        | 460        | 314        | 342        | 389        | 385        | 382        | 341        | 340        | 343        | 337        | 321        |

| Time | Chan<br>31 | Chan<br>32 | Chan<br>33 | Chan<br>34 | Chan<br>35 | Chan<br>36 | Chan<br>37 | Chan<br>38 | Chan<br>39 | Chan<br>40 | Chan<br>41 | Chan<br>42 | Chan<br>43 | Chan<br>44 |
|------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| min  | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         |
| 72   | 503        | 424        | 298        | 461        | 315        | 341        | 391        | 386        | 383        | 341        | 340        | 343        | 338        | 322        |
| 73   | 504        | 429        | 300        | 461        | 316        | 342        | 392        | 388        | 384        | 343        | 341        | 344        | 339        | 323        |
| 74   | 505        | 433        | 302        | 462        | 318        | 342        | 393        | 389        | 384        | 344        | 342        | 345        | 339        | 323        |
| 75   | 506        | 438        | 305        | 462        | 319        | 342        | 394        | 390        | 385        | 345        | 341        | 345        | 340        | 324        |
| 76   | 509        | 441        | 308        | 463        | 321        | 344        | 395        | 391        | 385        | 345        | 342        | 346        | 341        | 324        |
| 77   | 511        | 447        | 311        | 465        | 322        | 345        | 396        | 393        | 386        | 346        | 343        | 346        | 342        | 324        |
| 78   | 513        | 450        | 314        | 465        | 323        | 346        | 397        | 395        | 387        | 346        | 344        | 347        | 343        | 326        |
| 79   | 514        | 453        | 317        | 466        | 325        | 347        | 399        | 396        | 388        | 347        | 345        | 348        | 344        | 327        |
| 80   | 516        | 458        | 319        | 467        | 326        | 348        | 400        | 398        | 388        | 348        | 346        | 349        | 345        | 328        |
| 81   | 516        | 461        | 322        | 468        | 327        | 349        | 401        | 399        | 389        | 348        | 347        | 349        | 345        | 328        |
| 82   | 516        | 466        | 325        | 469        | 329        | 351        | 403        | 401        | 391        | 349        | 348        | 350        | 346        | 329        |
| 83   | 516        | 470        | 328        | 471        | 331        | 352        | 404        | 402        | 392        | 350        | 348        | 351        | 347        | 330        |
| 84   | 519        | 474        | 331        | 472        | 332        | 354        | 406        | 403        | 392        | 351        | 349        | 351        | 348        | 331        |
| 85   | 521        | 477        | 334        | 474        | 334        | 356        | 408        | 405        | 393        | 352        | 350        | 352        | 349        | 331        |
| 86   | 522        | 478        | 337        | 476        | 336        | 357        | 409        | 406        | 393        | 353        | 350        | 353        | 350        | 332        |
| 87   | 522        | 480        | 340        | 477        | 338        | 359        | 411        | 408        | 394        | 353        | 351        | 354        | 351        | 332        |
| 88   | 524        | 481        | 343        | 478        | 339        | 360        | 413        | 409        | 395        | 354        | 352        | 355        | 352        | 333        |
| 89   | 526        | 484        | 346        | 480        | 342        | 362        | 414        | 410        | 396        | 356        | 353        | 356        | 353        | 334        |
| 90   | 528        | 486        | 349        | 481        | 343        | 364        | 415        | 411        | 397        | 356        | 353        | 356        | 354        | 334        |
| 91   | 531        | 487        | 353        | 481        | 345        | 366        | 418        | 413        | 398        | 357        | 355        | 357        | 354        | 335        |
| 92   | 534        | 487        | 356        | 482        | 347        | 368        | 418        | 414        | 399        | 357        | 355        | 358        | 355        | 336        |
| 93   | 537        | 490        | 359        | 484        | 349        | 369        | 419        | 416        | 400        | 358        | 356        | 359        | 356        | 337        |
| 94   | 540        | 492        | 226        | 485        | 350        | 369        | 421        | 417        | 401        | 359        | 357        | 360        | 358        | 338        |
| 95   | 542        | 492        | 233        | 487        | 352        | 370        | 423        | 418        | 402        | 360        | 358        | 360        | 358        | 338        |
| 96   | 543        | 492        | 237        | 489        | 354        | 372        | 424        | 420        | 402        | 361        | 359        | 361        | 359        | 339        |
| 97   | 546        | 491        | 236        | 490        | 356        | 373        | 425        | 421        | 403        | 361        | 360        | 363        | 360        | 341        |
| 98   | 548        | 490        | 241        | 492        | 359        | 375        | 427        | 423        | 403        | 362        | 361        | 364        | 361        | 342        |
| 99   | 549        | 490        | 248        | 494        | 360        | 377        | 428        | 424        | 404        | 363        | 361        | 365        | 362        | 342        |

| Time | Chan<br>31 | Chan<br>32 | Chan<br>33 | Chan<br>34 | Chan<br>35 | Chan<br>36 | Chan<br>37 | Chan<br>38 | Chan<br>39 | Chan<br>40 | Chan<br>41 | Chan<br>42 | Chan<br>43 | Chan<br>44 |
|------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| min  | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         |
| 100  | 552        | 490        | 256        | 496        | 362        | 379        | 429        | 421        | 405        | 364        | 363        | 366        | 363        | 344        |
| 101  | 553        | 488        | 373        | 498        | 364        | 380        | 432        | 421        | 406        | 365        | 363        | 366        | 363        | 344        |
| 102  | 555        | 488        | 376        | 500        | 365        | 382        | 432        | 423        | 407        | 366        | 364        | 367        | 364        | 345        |
| 103  | 557        | 487        | 379        | 502        | 367        | 383        | 435        | 425        | 408        | 367        | 366        | 368        | 365        | 346        |
| 104  | 558        | 486        | 380        | 503        | 368        | 385        | 436        | 426        | 408        | 367        | 367        | 369        | 365        | 347        |
| 105  | 559        | 238        | 379        | 505        | 369        | 386        | 436        | 428        | 409        | 368        | 367        | 370        | 366        | 348        |
| 106  | 560        | 251        | 379        | 505        | 371        | 387        | 440        | 430        | 411        | 368        | 368        | 370        | 367        | 348        |
| 107  | 561        | 246        | 379        | 506        | 373        | 389        | 441        | 431        | 411        | 369        | 369        | 371        | 368        | 349        |
| 108  | 562        | 251        | 380        | 506        | 376        | 391        | 439        | 432        | 411        | 370        | 370        | 372        | 369        | 350        |
| 109  | 562        | 472        | 380        | 507        | 378        | 392        | 439        | 433        | 411        | 372        | 371        | 373        | 370        | 350        |
| 110  | 564        | 479        | 379        | 508        | 380        | 394        | 441        | 433        | 411        | 373        | 372        | 375        | 372        | 352        |
| 111  | 566        | 478        | 380        | 509        | 381        | 396        | 442        | 434        | 412        | 374        | 372        | 376        | 372        | 352        |
| 112  | 567        | 477        | 381        | 510        | 383        | 397        | 444        | 435        | 413        | 375        | 374        | 377        | 374        | 353        |
| 113  | 568        | 474        | 384        | 511        | 385        | 399        | 447        | 437        | 413        | 376        | 374        | 379        | 376        | 355        |
| 114  | 569        | 473        | 385        | 511        | 387        | 401        | 449        | 438        | 413        | 377        | 375        | 379        | 377        | 355        |
| 115  | 573        | 474        | 386        | 512        | 388        | 402        | 450        | 440        | 414        | 377        | 376        | 380        | 379        | 356        |
| 116  | 574        | 473        | 387        | 513        | 390        | 405        | 453        | 442        | 414        | 378        | 377        | 381        | 380        | 357        |
| 117  | 300        | 472        | 388        | 514        | 391        | 407        | 454        | 443        | 415        | 378        | 377        | 382        | 382        | 359        |
| 118  | 234        | 470        | 389        | 514        | 393        | 409        | 456        | 444        | 414        | 379        | 377        | 383        | 384        | 360        |
| 119  | 232        | 466        | 391        | 515        | 395        | 411        | 458        | 445        | 414        | 380        | 378        | 385        | 387        | 361        |
| 120  | 576        | 462        | 392        | 516        | 398        | 413        | 460        | 446        | 415        | 380        | 379        | 386        | 391        | 363        |
| 121  | 6          | 460        | 405        | 518        | 400        | 416        | 463        | 448        | 415        | 381        | 380        | 388        | 396        | 366        |
| 122  | 581        | 460        | 406        | 519        | 402        | 419        | 465        | 449        | 416        | 382        | 381        | 389        | 399        | 369        |
| 123  | 268        | 460        | 407        | 520        | 404        | 421        | 466        | 451        | 418        | 381        | 382        | 390        | 407        | 371        |
| 124  | 578        | 460        | 412        | 521        | 406        | 423        | 469        | 452        | 418        | 381        | 382        | 391        | 487        | 378        |
| 125  | 159        | 456        | 416        | 523        | 411        | 426        | 470        | 454        | 422        | 383        | 383        | 394        | 670        | 395        |
| 126  | 591        | 453        | 419        | 526        | 419        | 431        | 469        | 456        | 425        | 412        | 384        | 398        | 716        | 410        |
| 127  | 594        | 463        | 421        | 530        | 427        | 435        | 471        | 458        | 427        | 416        | 385        | 285        | 721        | 424        |

| Time | Chan<br>31 | Chan<br>32 | Chan<br>33 | Chan<br>34 | Chan<br>35 | Chan<br>36 | Chan<br>37 | Chan<br>38 | Chan<br>39 | Chan<br>40 | Chan<br>41 | Chan<br>42 | Chan<br>43 | Chan<br>44 |
|------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| min  | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         | °C         |
| 128  | 597        | 446        | 421        | 535        | 432        | 439        | 474        | 457        | 430        | 386        | 385        | 300        | 726        | 434        |
| 129  | 600        | 453        | 422        | 256        | 435        | 442        | 475        | 454        | 432        | 385        | 386        | 260        | 729        | 440        |
| 130  | 602        | 454        | 423        | 294        | 437        | 445        | 477        | 454        | 434        | 386        | 386        | 250        | 736        | 446        |
| 131  | 603        | 454        | 422        | 227        | 440        | 448        | 478        | 456        | 436        | 387        | 387        | 255        | 739        | 451        |
| 132  | 605        | 453        | 423        | 219        | 441        | 451        | 480        | 458        | 439        | 387        | 388        | 265        | 743        | 455        |
| 133  | 606        | 455        | 422        | 217        | 442        | 452        | 482        | 459        | 440        | 387        | 389        | 258        | 743        | 460        |
| 134  | 606        | 454        | 424        | 222        | 442        | 454        | 488        | 461        | 441        | 386        | 389        | 259        | 744        | 462        |
| 135  | 605        | 456        | 424        | 227        | 443        | 456        | 488        | 462        | 442        | 386        | 389        | 263        | 746        | 466        |
| 136  | 606        | 458        | 424        | 222        | 443        | 458        | 489        | 463        | 442        | 388        | 389        | 255        | 748        | 471        |
| 137  | 608        | 459        | 421        | 227        | 443        | 459        | 491        | 465        | 444        | 387        | 390        | 240        | 747        | 475        |
| 138  | 609        | 460        | 416        | 241        | 443        | 461        | 488        | 471        | 445        | 389        | 391        | 233        | 751        | 287        |
| 139  | 609        | 460        | 415        | 249        | 443        | 463        | 493        | 473        | 447        | 389        | 391        | 231        | 751        | 285        |
| 140  | 610        | 461        | 238        | 259        | 444        | 465        | 496        | 476        | 445        | 390        | 392        | 241        | 753        | 279        |
| 141  | 611        | 462        | 233        | 280        | 445        | 466        | 499        | 479        | 448        | 390        | 394        | 247        | 758        | 280        |
| 142  | 613        | 465        | 235        | 290        | 447        | 469        | 507        | 483        | 448        | 391        | 395        | 250        | 761        | 284        |
| 143  | 614        | 465        | 240        | 301        | 448        | 472        | 511        | 487        | 449        | 391        | 396        | 248        | 764        | 231        |
| 144  | 614        | 465        | 418        | 413        | 450        | 475        | 519        | 489        | 449        | 392        | 397        | 244        | 767        | 238        |