test report

**Title:**

Fire resistance test utilising the general principles of BS 476: Part 20: 1987 on four specimens of wall and four specimens of floor mounted linear gap seals

**Report No:**

152720/C Issue 2


**Prepared for:**

**Bostik**
Common Road
Stafford
St16 3EH

**Date: 5th May 2006**

**Notified Body No:**
0833

UKAS TESTING
0249

warringtonfire
global safety
TESTING

# Summary

**Objective**

A fire resistance test has been conducted to assess the ability of four floor and four wall specimens of linear gap sealing systems, to reinstate the fire resistance of pre-cast aerated concrete floor constructions. The performance of the specimens was assessed, with respect to the integrity and insulation (maximum temperature rise only) performance criteria, as defined in BS 476: Part 20: 1987.

**Sponsor**

**Bostik** Common Road, Stafford, ST16 3EH.

**Tested Product:**

Evo-Stik Fireseal Silicone.

**Summary of the Tested Specimens**

For the purpose of the test the specimens were referenced A to H.

The section of wall had overall dimensions of 1000 mm long by 1000 mm wide by 250 mm thick and was provided with four linear joints, referenced Specimens A, B, C, and D. The section of floor had overall dimensions of 1200 mm high by 1200 mm wide by 250 mm thick and was provided with four linear joints, referenced Specimens E, F, G, and H.

If the performance of the specimens were assessed against the integrity and insulation (maximum temperature rise only) performance criteria of BS 476: Part 20: 1987. The results obtained could be expressed as follows:

**Test Results**

| | Seal A | Seal B | Seal C | Seal D | Seal E | Seal F | Seal G | Seal H |
|---|---|---|---|---|---|---|---|---|
| **Specimen orientation** | Wall | Wall | Wall | Wall | Floor | Floor | Floor | Floor |
| **Dimensions (mm)** | 10 x 10 | 20 x 15 | 30 x 25 | 30 x 15 | 100 x 15 | 50 x 15 | 30 x 15 | 15 x 6 |
| **Integrity** | 240 minutes | 240 minutes | 240 minutes | 240 minutes | 240 minutes | 240 minutes | 240 minutes | 240 minutes |
| **Insulation** | 220 minutes | 156 minutes | 161 minutes | 105 minutes | 240 minutes | 240 minutes | 240 minutes | 240 minutes |

The test was discontinued after a period of 240 minutes.

**Date of Test**

31st March 2006

# Signatories

Responsible Officer
**N. Howard***
Testing Officer

Approved
**S. Hankey***
Technical Consultant

* For and on behalf of warringtonfire.

Report Issued

Date : 5th May 2006

**This report is additional to that issued as WF number 152720/A, dated 5th May 2006. The original report remains valid and is not replaced by this additional test report.**

Issue 2: Amendment to tested product and backing rod description.

**CONTENTS** **PAGE NO.**

# Test Procedure

**Introduction**

Walls and floors often incorporate gaps to accommodate expansion, contraction or other movement of the structure. The fire resistance of such elements is only as good as their weakest point and it is, therefore, important that any gaps or apertures are adequately sealed, such that weaknesses are not created at these positions.

There is not, as yet, any specified British Standard fire test method for evaluating gap seals which are designed to act as an effective barrier to the penetration of fire and to reinstate the necessary fire resistance performance of the separating element. However, the fire resistance of walls and floors is determined by tests utilising the general principles given in BS 476: Part 20: 1987, and it would appear appropriate to use the principles of that Standard to evaluate the performance of gap sealing systems. Some additional guidelines were adopted from the draft European document referenced prEN 1366-4, relating to the testing of these types of sealing systems. This report should be read in conjunction with the above mentioned documents.

**Fire Test Study Group/EGOLF**

Certain aspects of some fire test specifications are open to different interpretations. The Fire Test Study Group and EGOLF have identified a number of such areas and have agreed Resolutions which define common agreement of interpretations between fire test laboratories which are members of the Groups. Where such Resolutions are applicable to this test they have been followed.

**Instruction To Test**

The test was conducted on the 31st March 2006 at the request of the original sponsor of the test.

The test was witnessed by Mr. M. Freeman and Mr. M. Thomas representatives of the test sponsor.

**Test Specimen Construction**

A comprehensive description of the test construction is given in the Schedule of Components. The description is based on a detailed survey of the specimens and information supplied by the sponsor of the test.

**Installation**

The wall and floor constructions were supplied by warringtonfire. The specimen seals were provided and installed by the test sponsor on the 28th February 2006.

**Sampling**

warringtonfire was not involved in any sampling or selection procedure of the sealing system components.

# Instrumentation

**General**

The instrumentation and measuring equipment provided was in accordance with BS 476: Part 20: 1987 and the draft European document, where appropriate.

**Furnace**

The furnace was controlled so that its mean temperature complied with the requirements of BS 476: Part 20: 1987, Clause 3.1, using four mineral insulated thermocouples distributed over a plane 100 mm from the surface of the wall construction.

**Thermocouple Allocation**

Thermocouples were provided to monitor the unexposed surface of the specimens and the output of all instrumentation was recorded at no less than one minute intervals as follows:

At a minimum of two positions on the surface of the sealant material of each specimen, one nominally 100 mm from each end and one at mid span. All positioned at nominally mid-width.

At a minimum of two positions on the surface of the wall and floor assembly, 25 mm away from the edge of each seal and adjacent to the positions of the thermocouples on the surface of the sealant.

The locations and reference numbers of the various unexposed surface thermocouples are shown in Figure 1.

**Roving Thermocouple**

A roving thermocouple was available to measure temperatures on the unexposed surface of the specimens at any position which might appear to be hotter than the temperatures indicated by the fixed thermocouples.

**Integrity Criteria**

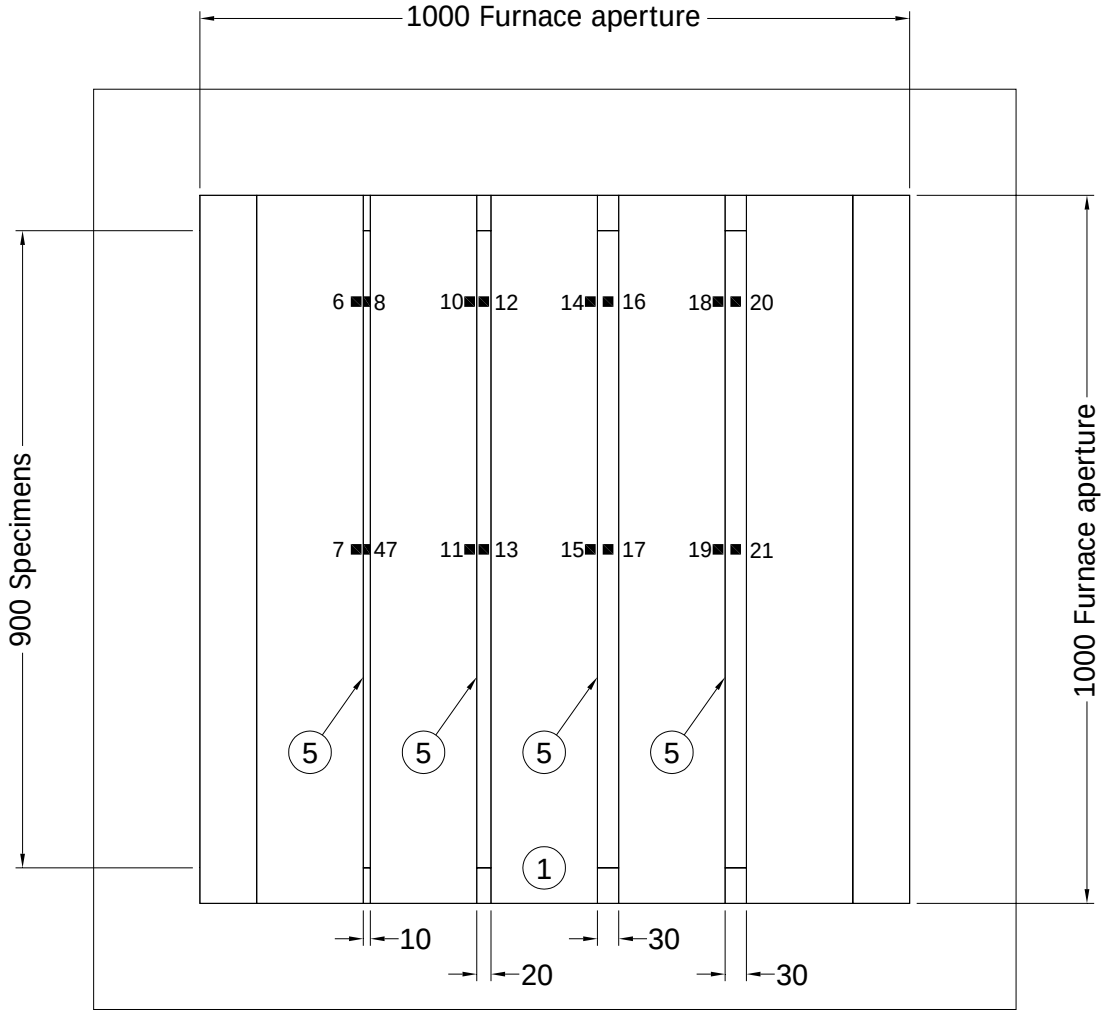
Cotton pads and gap gauges were available to evaluate the integrity of the specimens.

**Furnace Pressure**

After the first five minutes of testing, the furnace pressure was controlled to maintain a slightly positive pressure relative to the pressure of the laboratory. The furnace atmospheric pressure was measured and controlled such that, at a point 100 mm below the soffit of the floor assembly, the differential pressure was calculated to be between 18 Pa and 20 Pa.

# Test Specimen

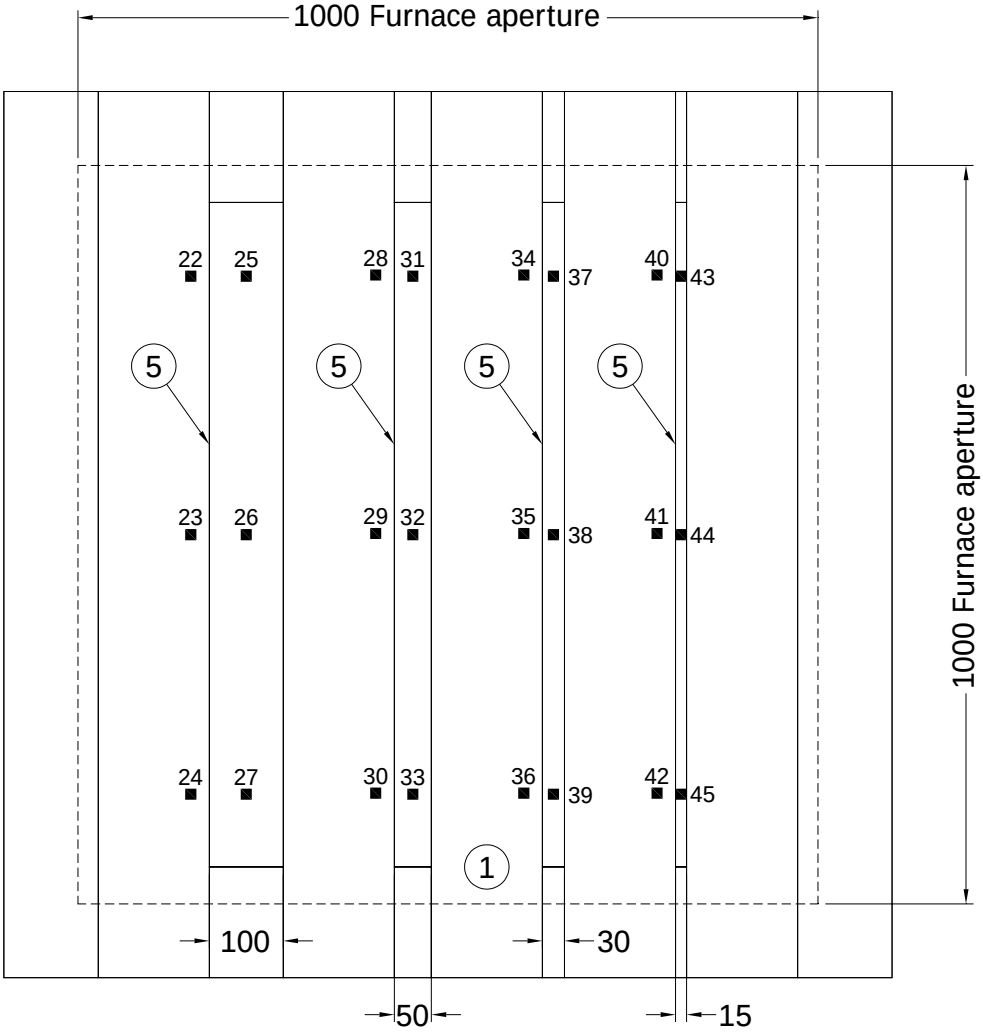
**Figure 1- General Elevation of Wall Specimen**




■ Positions of thermocouples

Do not scale. All dimensions are in mm

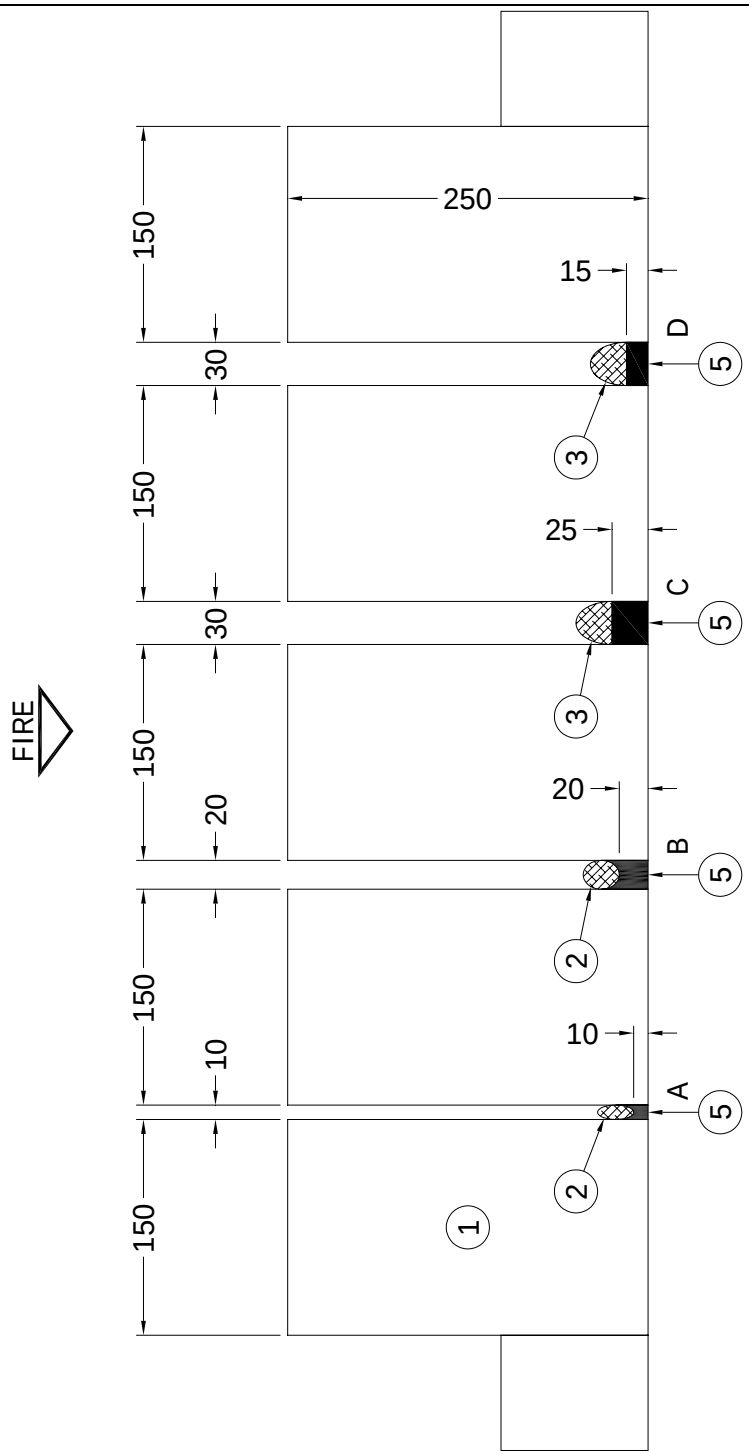
**Figure 2 – General Elevation of Wall Specimen**




■ Positions of thermocouples

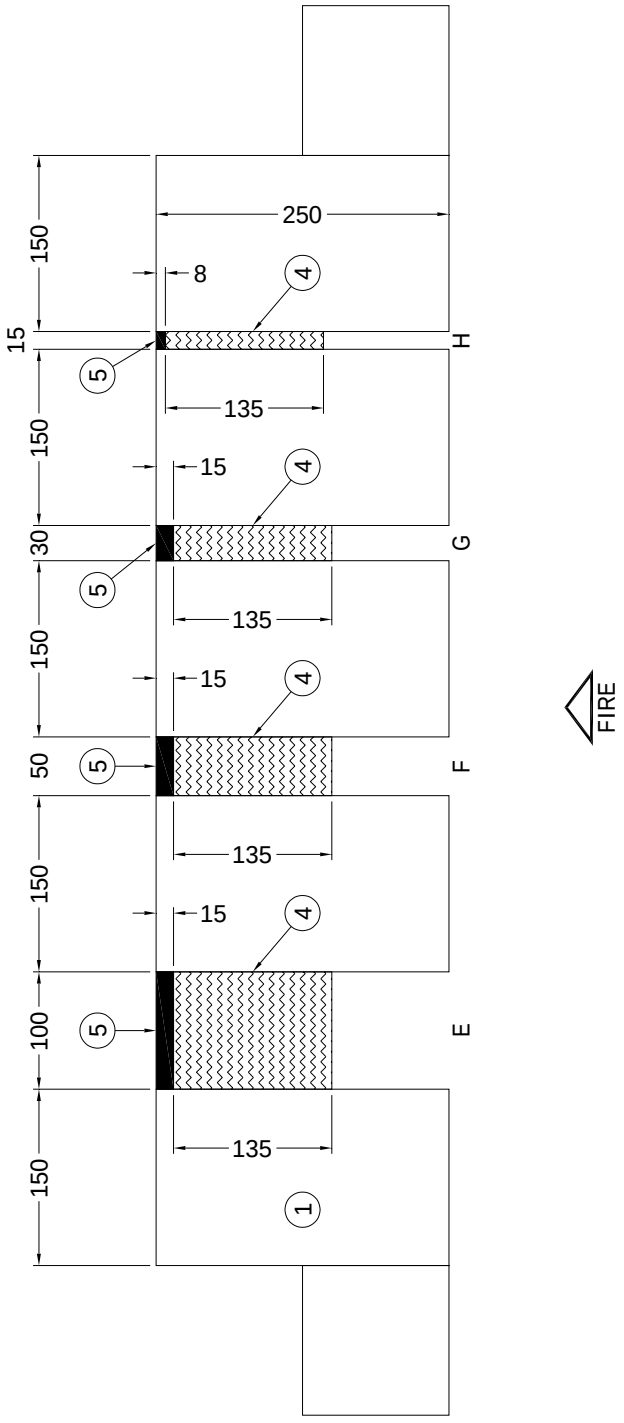
Do not scale. All dimensions are in mm

**Figure 3 – Horizontal Section Through Wall Specimens**




Do not scale. All dimensions are in mm

**Figure 4 – Vertical Section Through Floor Specimens**




Do not scale. All dimensions are in mm

# Schedule of Components

(Refer to Figures 1 to 4)
(All values are nominal unless stated otherwise)
(All other details are as stated by the sponsor)

| Item | | Description |
|---|---|---|
| **1. Separating Element** | | |
| Material | : | Aerated concrete slab |
| Overall size | : | 150 mm wide x 250 mm deep |
| **2. Backing Rod** | | |
| Material | : | Polyethylene foam |
| Overall size | : | 25 mm diameter |
| Fitting method | : | Friction fitted into wall specimens A & B |
| **3. Backing Rod** | | |
| Material | : | Polyethylene foam |
| Overall size | : | 50 mm diameter |
| Fitting method | : | Cut in half and friction fitted into wall specimens C & D |
| **4. Backing Material** | | |
| Material | : | Mineral fibre based insulation |
| Depth | : | 135 mm deep x width of specimen |
| Fitting method | : | Friction fitted into floor specimens E, F, G & H |
| **5. Sealant** | | |
| Manufacturer | : | Bostik |
| Reference | : | Evo-Stik Fireseal Silicone |
| Material | : | Silicone based, fire retardant sealant |
| Overall sizes | | |
| i. specimen A | : | 10 mm wide x 10 mm deep |
| ii. specimen B | : | 20 mm wide x 15 mm deep |
| iii. specimen C | : | 30 mm wide x 25 mm deep |
| iv. specimen D | : | 30 mm wide x 15 mm deep |
| v. specimen E | : | 100 mm wide x 15 mm deep |
| vi. specimen F | : | 50 mm wide x 15 mm deep |
| vii. specimen G | : | 30 mm wide x 15 mm deep |
| viii. specimen H | : | 15 mm wide x 8 mm deep |
| Application method | : | Cartridge gunned and levelled with a spatula |

# Test Observations

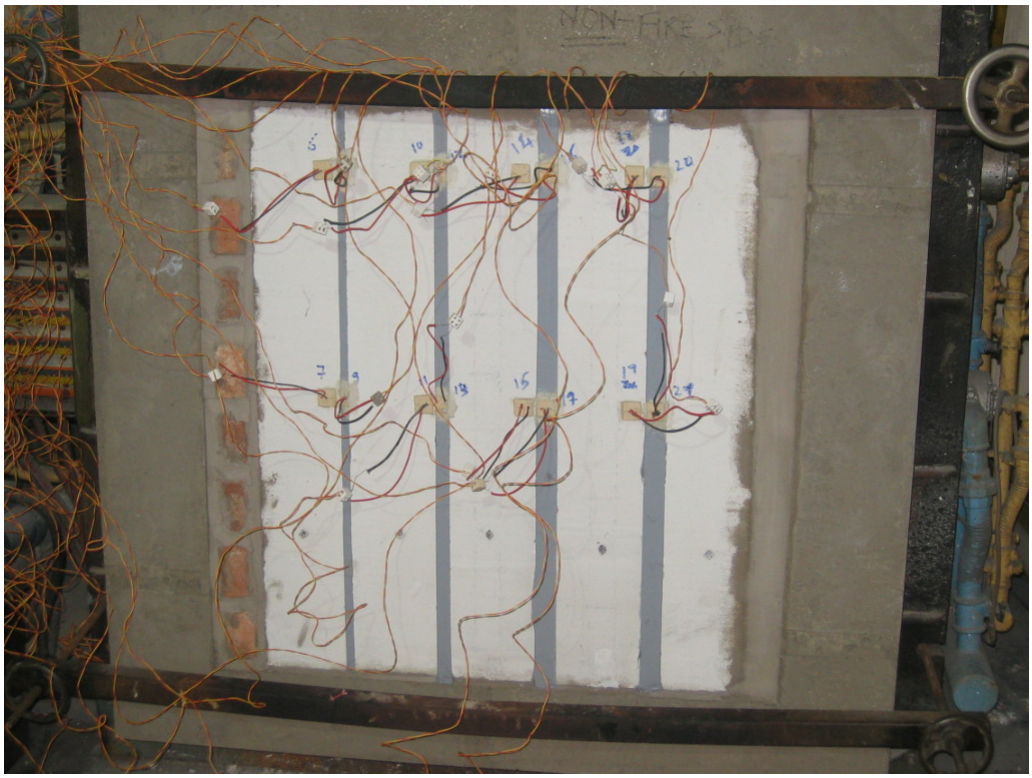
| Time | | All observations are from the unexposed face unless noted otherwise. |
|---|---|---|
| **mins** | **secs** | The ambient air temperature in the vicinity of the test construction was 12˚C at the start of the test with a maximum variation of +4˚C throughout the test. |
| **00** | **00** | The test commences. |
| **18** | **00** | Slight smoke/steam release is evident. |
| **30** | **00** | No significant changes are evident to any of the specimens. |
| **60** | **00** | No significant changes are evident to any of the specimens. |
| **90** | **00** | Specimen D begins to expand outwards from the heating conditions from its approximate centre. |
| **104** | **50** | Thermocouple number 21 positioned on specimen D measures a temperature rise in excess of 180°C. **Insulation failure of Specimen D is deemed to occur.** |
| **155** | **58** | Thermocouple number 12 positioned on specimen B measures a temperature rise in excess of 180°C. **Insulation failure of Specimen B is deemed to occur.** |
| **158** | **02** | Thermocouple number 16 positioned on specimen C measures a temperature rise in excess of 180°C. **Insulation failure of Specimen C is deemed to occur.** |
| **160** | **00** | The upper half of specimen C begins to expand outwards from the heating conditions. |
| **180** | **00** | No significant changes are evident to any of the specimens of the test. |
| **202** | **00** | Specimen B expands outwards from the heating conditions of the test. |
| **204** | **00** | Specimen F shows signs of slumping at its approximate centre. |
| **216** | **49** | Thermocouple number 47 positioned on specimen A measures a temperature rise in excess of 180°C. **Insulation failure of Specimen A is deemed to occur.** |
| **219** | **00** | Smoke release from each wall specimen is evident. |
| **240** | **00** | **The test is discontinued.** |

# Test Photographs

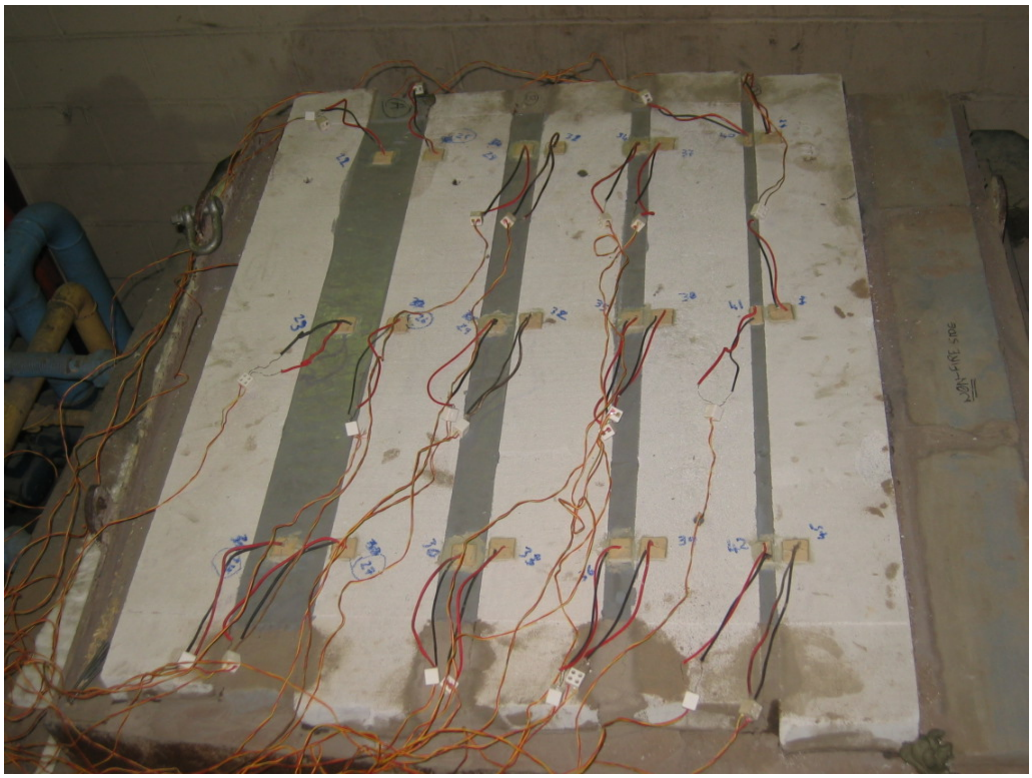
**The exposed face of the floor construction prior to testing**

**The unexposed face of the wall construction prior to testing**

**The unexposed face of the wall construction after 60 minutes of testing**



**The unexposed face of the floor construction after 60 minutes of testing**



**The unexposed face of the wall construction after 90 minutes of testing**

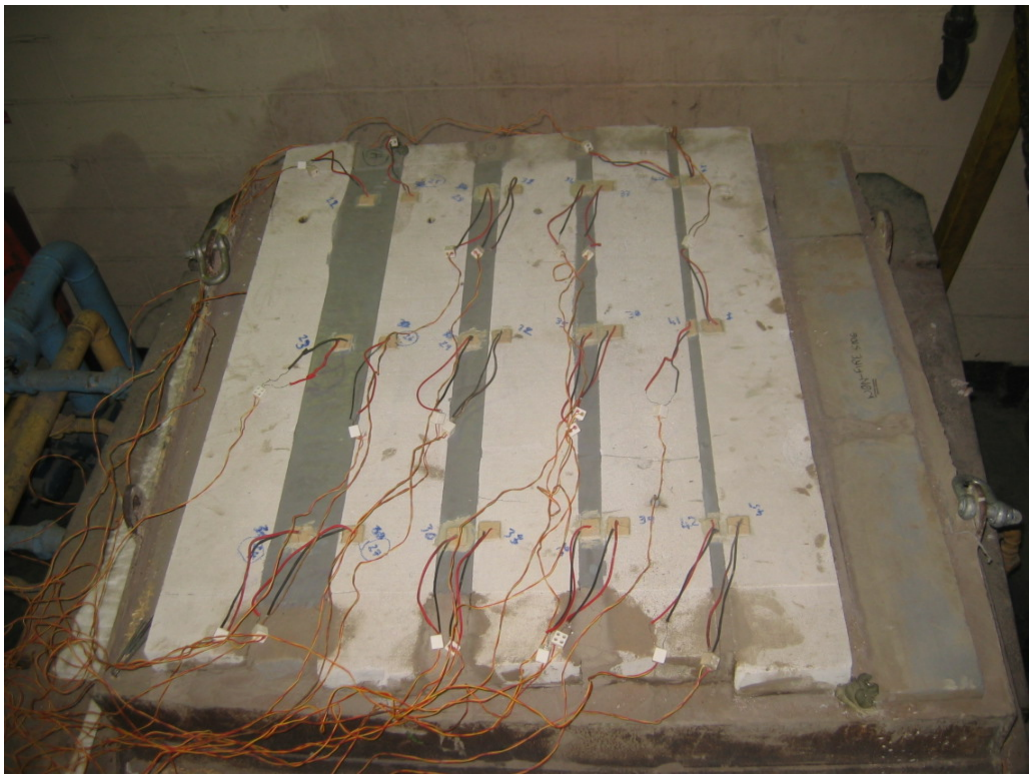

**The unexposed face of the floor construction after 90 minutes of testing**

**The unexposed face of the wall construction after 120 minutes of testing**


**The unexposed face of the floor construction after 120 minutes of testing**

**The unexposed face of the wall construction after 240 minutes of testing**


**The unexposed face of the floor construction after 240 minutes of testing**



# Temperature Data

**Mean Furnace Temperature, Together With The Temperature/Time Relationship Specified In The Standard**

| Time Mins | Specified Furnace Temperature Deg. C | Actual Furnace Temperature Deg. C |
|---|---|---|
| 0 | 20 | 17 |
| 10 | 678 | 671 |
| 20 | 781 | 786 |
| 30 | 842 | 847 |
| 39 | 881 | 883 |
| 40 | 885 | 884 |
| 50 | 918 | 928 |
| 60 | 945 | 935 |
| 70 | 968 | 964 |
| 80 | 988 | 985 |
| 90 | 1006 | 1004 |
| 100 | 1022 | 1023 |
| 110 | 1036 | 1044 |
| 120 | 1049 | 1050 |
| 130 | 1061 | 1065 |
| 140 | 1072 | 1075 |
| 150 | 1082 | 1084 |
| 160 | 1092 | 1087 |
| 170 | 1101 | 1102 |
| 180 | 1110 | 1111 |
| 190 | 1118 | 1120 |
| 200 | 1126 | 1123 |
| 210 | 1133 | 1129 |
| 220 | 1140 | 1136 |
| 230 | 1146 | 1141 |
| 240 | 1153 | 1147 |

## Individual Temperatures Recorded On The Unexposed Surface Of And Adjacent To Seal A

| Time<br>Mins | T/C Number 6<br>Deg. C | T/C Number 7<br>Deg. C | T/C Number 8<br>Deg. C | T/C Number 9<br>Deg. C |
|---|---|---|---|---|
| 0 | 16 | 16 | 16 | 17 |
| 10 | 16 | 16 | 17 | * |
| 20 | 19 | 19 | 24 | 23 |
| 30 | 28 | 22 | 43 | 28 |
| 39 | 37 | 27 | 59 | 41 |
| 40 | 38 | 28 | 61 | 42 |
| 50 | 45 | 35 | 72 | 60 |
| 60 | 50 | 42 | 82 | 76 |
| 70 | 54 | 48 | 88 | 86 |
| 80 | 58 | 51 | 95 | 95 |
| 90 | 62 | 55 | 101 | 104 |
| 100 | 65 | 59 | 107 | 115 |
| 110 | 69 | 64 | 113 | 123 |
| 120 | 73 | 69 | 121 | 132 |
| 130 | 77 | 72 | 128 | 139 |
| 140 | 82 | 76 | 136 | 146 |
| 150 | 86 | 80 | 143 | 153 |
| 160 | 89 | 82 | 149 | 158 |
| 170 | 94 | 85 | 157 | 162 |
| 180 | 98 | 89 | 162 | 165 |
| 190 | 102 | 92 | 168 | 173 |
| 200 | 106 | 96 | 175 | 183 |
| 210 | 112 | 101 | 181 | 191 |
| 220 | 115 | 104 | 186 | 198 |
| 230 | 120 | 109 | 192 | 203 |
| 240 | 125 | 114 | 197 | 209 |

* Thermocouple Malfunction, transferred to spare channel number 47

## Individual Temperatures Recorded On The Unexposed Surface Of And Adjacent To Seal B

| Time<br>Mins | T/C Number 10<br>Deg. C | T/C Number 11<br>Deg. C | T/C Number 12<br>Deg. C | T/C Number 13<br>Deg. C |
|---|---|---|---|---|
| 0 | 17 | 17 | 15 | 15 |
| 10 | 18 | 18 | 19 | 18 |
| 20 | 31 | 30 | 53 | 43 |
| 30 | 48 | 48 | 83 | 71 |
| 39 | 58 | 59 | 99 | 89 |
| 40 | 58 | 61 | 101 | 90 |
| 50 | 67 | 70 | 113 | 103 |
| 60 | 74 | 78 | 124 | 112 |
| 70 | 81 | 87 | 133 | 121 |
| 80 | 86 | 94 | 140 | 129 |
| 90 | 92 | 100 | 148 | 136 |
| 100 | 95 | 105 | 155 | 143 |
| 110 | 102 | 112 | 162 | 150 |
| 120 | 108 | 117 | 171 | 156 |
| 130 | 114 | 121 | 178 | 161 |
| 140 | 121 | 127 | 185 | 167 |
| 150 | 128 | 132 | 191 | 172 |
| 160 | 132 | 136 | 199 | 177 |
| 170 | 138 | 141 | 204 | 181 |
| 180 | 143 | 147 | 210 | 186 |
| 190 | 148 | 151 | 216 | 191 |
| 200 | 152 | 156 | 221 | 195 |
| 210 | 158 | 162 | 227 | 201 |
| 220 | 162 | 166 | 231 | 204 |
| 230 | 167 | 172 | 236 | 208 |
| 240 | 172 | 177 | 241 | 213 |

## Individual Temperatures Recorded On The Unexposed Surface Of And Adjacent To Seal C

| Time Mins | T/C Number 14 Deg. C | T/C Number 15 Deg. C | T/C Number 16 Deg. C | T/C Number 17 Deg. C |
|---|---|---|---|---|
| 0 | 16 | 16 | 17 | 17 |
| 10 | 16 | 16 | 18 | 17 |
| 20 | 22 | 21 | 35 | 27 |
| 30 | 35 | 34 | 60 | 45 |
| 39 | 44 | 45 | 78 | 61 |
| 40 | 45 | 46 | 80 | 64 |
| 50 | 53 | 57 | 94 | 78 |
| 60 | 59 | 63 | 108 | 91 |
| 70 | 66 | 69 | 118 | 101 |
| 80 | 71 | 76 | 129 | 112 |
| 90 | 78 | 83 | 140 | 121 |
| 100 | 83 | 90 | 149 | 131 |
| 110 | 90 | 99 | 158 | 141 |
| 120 | 95 | 107 | 167 | 150 |
| 130 | 101 | 115 | 175 | 158 |
| 140 | 108 | 125 | 183 | 167 |
| 150 | 114 | 133 | 190 | 174 |
| 160 | 119 | 140 | 197 | 182 |
| 170 | 125 | 148 | 204 | 189 |
| 180 | 131 | 154 | 211 | 195 |
| 190 | 136 | 160 | 218 | 201 |
| 200 | 141 | 166 | 224 | 206 |
| 210 | 147 | 171 | 230 | 210 |
| 220 | 152 | 176 | 234 | 214 |
| 230 | 157 | 181 | 239 | 217 |
| 240 | 164 | 187 | 244 | 222 |

## Individual Temperatures Recorded On The Unexposed Surface Of And Adjacent To Seal D

| Time<br>Mins | T/C Number 18<br>Deg. C | T/C Number 19<br>Deg. C | T/C Number 20<br>Deg. C | T/C Number 21<br>Deg. C |
|---|---|---|---|---|
| 0 | 17 | 17 | 16 | 16 |
| 10 | 18 | 18 | 20 | 19 |
| 20 | 32 | 29 | 54 | 49 |
| 30 | 48 | 47 | 85 | 83 |
| 39 | 57 | 58 | 103 | 104 |
| 40 | 58 | 59 | 105 | 105 |
| 50 | 65 | 68 | 120 | 122 |
| 60 | 73 | 77 | 133 | 139 |
| 70 | 83 | 87 | 145 | 156 |
| 80 | 91 | 96 | 156 | 171 |
| 90 | 98 | 105 | 166 | 182 |
| 100 | 103 | 113 | 175 | 192 |
| 110 | 111 | 122 | 184 | 200 |
| 120 | 118 | 129 | 192 | 208 |
| 130 | 123 | 137 | 199 | 215 |
| 140 | 130 | 145 | 206 | 221 |
| 150 | 136 | 151 | 213 | 227 |
| 160 | 140 | 157 | 220 | 233 |
| 170 | 146 | 164 | 226 | 238 |
| 180 | 152 | 171 | 234 | 244 |
| 190 | 158 | 177 | 241 | 249 |
| 200 | 164 | 183 | 248 | 254 |
| 210 | 171 | 189 | 254 | 259 |
| 220 | 176 | 194 | 259 | 263 |
| 230 | 182 | 200 | 264 | 266 |
| 240 | 189 | 207 | 270 | 271 |

## Individual Temperatures Recorded On The Unexposed Surface Of And Adjacent To Seal E

| Time Mins | T/C Number 22 Deg. C | T/C Number 23 Deg. C | T/C Number 24 Deg. C | T/C Number 25 Deg. C | T/C Number 26 Deg. C | T/C Number 27 Deg. C |
|---|---|---|---|---|---|---|
| 0 | 16 | 17 | 16 | 14 | 14 | 16 |
| 10 | 17 | 17 | 16 | 15 | 15 | 16 |
| 20 | 17 | 17 | 16 | 15 | 15 | 16 |
| 30 | 18 | 18 | 16 | 15 | 15 | 16 |
| 39 | 20 | 21 | 18 | 16 | 16 | 17 |
| 40 | 20 | 21 | 18 | 16 | 16 | 17 |
| 50 | 24 | 25 | 22 | 17 | 17 | 19 |
| 60 | 28 | 31 | 25 | 19 | 19 | 21 |
| 70 | 34 | 37 | 31 | 22 | 22 | 24 |
| 80 | 39 | 44 | 37 | 24 | 25 | 28 |
| 90 | 46 | 50 | 42 | 29 | 30 | 32 |
| 100 | 50 | 55 | 47 | 36 | 36 | 37 |
| 110 | 55 | 60 | 51 | 43 | 42 | 43 |
| 120 | 57 | 55 | 53 | 47 | 47 | 47 |
| 130 | 59 | 54 | 55 | 49 | 50 | 49 |
| 140 | 59 | 55 | 57 | 51 | 52 | 51 |
| 150 | 59 | 55 | 57 | 51 | 53 | 52 |
| 160 | 59 | 54 | 58 | 52 | 54 | 52 |
| 170 | 59 | 54 | 60 | 52 | 55 | 53 |
| 180 | 60 | 54 | 61 | 53 | 56 | 54 |
| 190 | 61 | 54 | 63 | 53 | 57 | 54 |
| 200 | 62 | 55 | 64 | 55 | 57 | 55 |
| 210 | 64 | 54 | 66 | 55 | 58 | 56 |
| 220 | 65 | 54 | 68 | 56 | 60 | 56 |
| 230 | 68 | 56 | 70 | 56 | 60 | 56 |
| 240 | 70 | 58 | 72 | 57 | 61 | 56 |

## Individual Temperatures Recorded On The Unexposed Surface Of And Adjacent To Seal F

| Time Mins | T/C Number 28 Deg. C | T/C Number 29 Deg. C | T/C Number 30 Deg. C | T/C Number 31 Deg. C | T/C Number 32 Deg. C | T/C Number 33 Deg. C |
|---|---|---|---|---|---|---|
| 0 | 17 | 17 | 17 | 17 | 16 | 16 |
| 10 | 17 | 17 | 17 | 17 | 16 | 16 |
| 20 | 17 | 17 | 17 | 17 | 16 | 16 |
| 30 | 17 | 17 | 17 | 18 | 16 | 16 |
| 39 | 19 | 18 | 18 | 18 | 17 | 17 |
| 40 | 19 | 18 | 18 | 18 | 17 | 17 |
| 50 | 22 | 20 | 21 | 19 | 18 | 18 |
| 60 | 26 | 23 | 24 | 22 | 20 | 20 |
| 70 | 32 | 28 | 29 | 25 | 22 | 22 |
| 80 | 38 | 35 | 35 | 29 | 25 | 26 |
| 90 | 43 | 41 | 41 | 34 | 30 | 30 |
| 100 | 48 | 48 | 47 | 40 | 34 | 35 |
| 110 | 53 | 53 | 52 | 45 | 40 | 40 |
| 120 | 56 | 57 | 56 | 50 | 46 | 45 |
| 130 | 58 | 59 | 58 | 52 | 50 | 49 |
| 140 | 59 | 59 | 59 | 54 | 52 | 51 |
| 150 | 59 | 60 | 59 | 56 | 54 | 52 |
| 160 | 59 | 60 | 60 | 57 | 56 | 55 |
| 170 | 59 | 60 | 61 | 57 | 57 | 55 |
| 180 | 59 | 59 | 61 | 58 | 58 | 56 |
| 190 | 60 | 60 | 61 | 60 | 60 | 57 |
| 200 | 59 | 59 | 61 | 61 | 60 | 59 |
| 210 | 59 | 59 | 61 | 61 | 61 | 60 |
| 220 | 59 | 59 | 61 | 61 | 62 | 60 |
| 230 | 58 | 58 | 60 | 62 | 62 | 60 |
| 240 | 57 | 58 | 60 | 63 | 63 | 60 |

* Thermocouple Malfunction

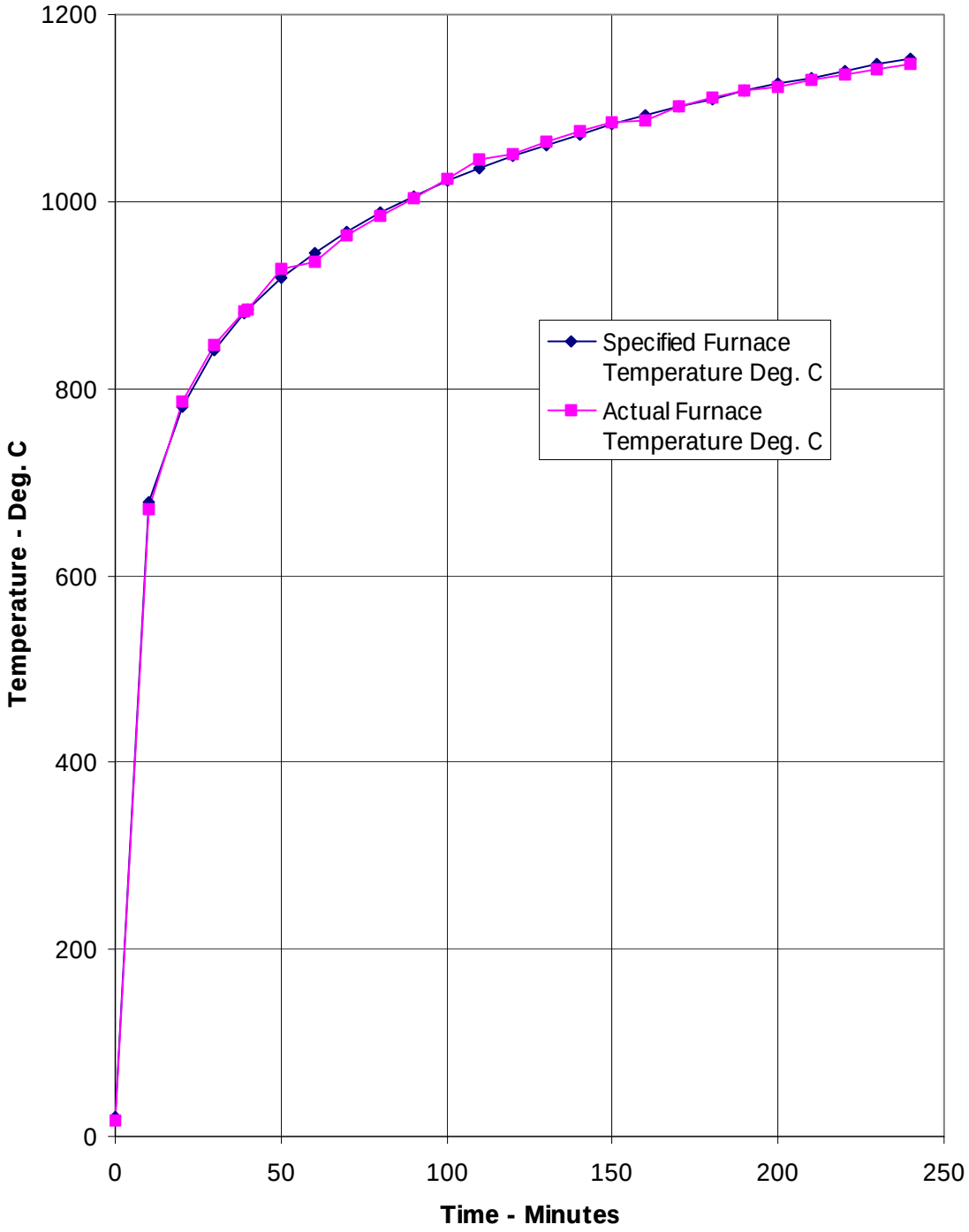
## Individual Temperatures Recorded On The Unexposed Surface Of And Adjacent To Seal G

| Time Mins | T/C Number 34 Deg. C | T/C Number 35 Deg. C | T/C Number 36 Deg. C | T/C Number 37 Deg. C | T/C Number 38 Deg. C | T/C Number 39 Deg. C |
|---|---|---|---|---|---|---|
| 0 | 16 | 16 | 16 | 17 | 17 | 17 |
| 10 | 16 | 16 | 17 | 17 | 17 | 18 |
| 20 | 16 | 17 | 17 | 17 | 17 | 18 |
| 30 | 17 | 17 | 17 | 17 | 17 | 20 |
| 39 | 17 | 17 | 18 | 18 | 18 | 21 |
| 40 | 17 | 17 | 18 | 18 | 18 | 22 |
| 50 | 19 | 18 | 20 | 19 | 18 | 25 |
| 60 | 22 | 20 | 24 | 20 | 19 | 29 |
| 70 | 29 | 25 | 33 | 24 | 21 | 34 |
| 80 | 39 | 33 | 42 | 29 | 25 | 40 |
| 90 | 48 | 41 | 49 | 35 | 30 | 45 |
| 100 | 56 | 50 | 56 | 42 | 35 | 50 |
| 110 | 60 | 57 | 60 | 47 | 41 | 54 |
| 120 | 64 | 63 | 62 | 53 | 47 | 58 |
| 130 | 65 | 65 | 64 | 57 | 52 | 60 |
| 140 | 67 | 67 | 65 | 60 | 54 | 61 |
| 150 | 68 | 68 | 66 | 62 | 57 | 62 |
| 160 | 68 | 69 | 66 | 64 | 59 | 65 |
| 170 | 68 | 70 | 66 | 64 | 61 | 66 |
| 180 | 68 | 69 | 67 | 65 | 61 | 67 |
| 190 | 69 | 70 | 67 | 66 | 63 | 68 |
| 200 | 69 | 70 | 66 | 67 | 63 | 68 |
| 210 | 70 | 70 | 66 | 68 | 64 | 69 |
| 220 | 70 | 71 | 66 | 68 | 65 | 69 |
| 230 | 70 | 70 | 66 | 68 | 66 | 71 |
| 240 | 70 | 69 | 66 | 68 | 66 | 71 |

## Individual Temperatures Recorded On The Unexposed Surface Of And Adjacent To Seal H

| Time Mins | T/C Number 40 Deg. C | T/C Number 41 Deg. C | T/C Number 42 Deg. C | T/C Number 43 Deg. C | T/C Number 44 Deg. C | T/C Number 45 Deg. C |
|---|---|---|---|---|---|---|
| 0 | 15 | 16 | 16 | 17 | 17 | 17 |
| 10 | 16 | 16 | 16 | 17 | 17 | 17 |
| 20 | 16 | 16 | 16 | 17 | 17 | 17 |
| 30 | 17 | 16 | 16 | 17 | 17 | 17 |
| 39 | 17 | 17 | 17 | 17 | 17 | 17 |
| 40 | 17 | 17 | 17 | 17 | 17 | 17 |
| 50 | 18 | 19 | 17 | 17 | 18 | 17 |
| 60 | 19 | 21 | 18 | 18 | 19 | 18 |
| 70 | 22 | 27 | 19 | 19 | 22 | 20 |
| 80 | 25 | 35 | 19 | 21 | 26 | 24 |
| 90 | 29 | 43 | 21 | 24 | 31 | 29 |
| 100 | 35 | 49 | 23 | 28 | 35 | 35 |
| 110 | 41 | 54 | 24 | 33 | 40 | 41 |
| 120 | 47 | 57 | 26 | 38 | 44 | 47 |
| 130 | 52 | 59 | 28 | 42 | 48 | 51 |
| 140 | 55 | 60 | 30 | 46 | 50 | 54 |
| 150 | 58 | 61 | 31 | 49 | 52 | 56 |
| 160 | 60 | 62 | 33 | 51 | 55 | 55 |
| 170 | 61 | 64 | 33 | 54 | 57 | 57 |
| 180 | 62 | 63 | 34 | 56 | 58 | 57 |
| 190 | 63 | 65 | 35 | 58 | 60 | 58 |
| 200 | 63 | 65 | 36 | 59 | 62 | 58 |
| 210 | 63 | 66 | 37 | 61 | 63 | 58 |
| 220 | 63 | 65 | 37 | 62 | 63 | 58 |
| 230 | 64 | 66 | 38 | 63 | 65 | 58 |
| 240 | 64 | 65 | 38 | 64 | 65 | 57 |

**Graph Showing Mean Furnace Temperature, Together With The Temperature/Time Relationship Specified In The Standard**



# Performance Criteria and Test Results

**Integrity**

It is required that there is no collapse of the specimen, no sustained flaming on the unexposed surface and no loss of impermeability. These requirements were satisfied for the periods given in the table below:

| Seal A | Seal B | Seal C | Seal D | Seal E | Seal F | Seal G | Seal H |
|---|---|---|---|---|---|---|---|
| 240 minutes | 240 minutes | 240 minutes | 240 minutes | 240 minutes | 240 minutes | 240 minutes | 240 minutes |

**Insulation**

The mean and maximum temperature rise allowable on the unexposed face of the specimen by BS 476: Part 20: 1987 are 140°C and 180°C respectively, however, due to the reduced size of the specimens only the maximum temperature rise criterion was utilised. These requirements were satisfied for the periods given in the table below:

| Seal A | Seal B | Seal C | Seal D | Seal E | Seal F | Seal G | Seal H |
|---|---|---|---|---|---|---|---|
| 219 minutes | 157 minutes | 161 minutes | 109 minutes | 240 minutes | 240 minutes | 240 minutes | 240 minutes |

# Ongoing Implications

**Limitations**

The results relate only to the behaviour of the specimens 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 may not be applicable to situations where the joint widths, orientations and supporting construction vary from those tested.

As no movement was induced into the specimens during the test there can be no evaluation of the performance of the seals where movement is induced in a building under actual fire conditions.

This test report is additional to that issued as WF No. 152720/A and dated 27th April 2006. The original test report remains valid and is not replaced by this additional test report. The products that were the subjects of the test have not been retested and this additional report does not involve any technical change or technical review of the original test report. Details of the original products names and sponsor of the test are documented by warringtonfire and are maintained in confidential company records.

**Review**

This report covers a test which was conducted to a procedure which is not the subject of any British Standard specification, but the test utilised the general principles of fire resistance testing given in BS 476: Part 20: 1987 and prEN 1366-4: 2005. Since fire tests are the subject of a continuing Standardisation process, and because existing standards are the subject of review and possible amendment and new interpretations, it is recommended that the report be referred back to the test laboratory after a period of two years to ensure that the methodology adopted and the results obtained remain valid in the light of the situation prevailing at that time.

# Conclusions

**Evaluation against objective**

A fire resistance test which utilised the general principles of BS 476: Part 20: 1987, in conjunction with additional guidelines adopted from prEN 1366-4: 2005, has been conducted to assess the ability of four specimens of wall and four specimens of floor mounted linear gap seals to reinstate the integrity and insulation performance (as defined in BS 476: Part 20: 1987) of a simulated wall and floor construction where adjacent structures abut.

If the performance of each specimen was assessed against the performance requirements for integrity and insulation (maximum temperature rise) specified in BS 476: Part 20: 1987, the results obtained could be expressed as follows:

**Tested Product:** Evo-Stik Fireseal Silicone.

**Test Specimens:**

| **Test Results** | **Seal A** | **Seal B** | **Seal C** | **Seal D** | **Seal E** | **Seal F** | **Seal G** | **Seal H** |
|---|---|---|---|---|---|---|---|---|
| **Specimen orientation** | Wall | Wall | Wall | Wall | Floor | Floor | Floor | Floor |
| **Dimensions (mm)** | 10 x 10 | 20 x 15 | 30 x 25 | 30 x 15 | 100 x 15 | 50 x 15 | 30 x 15 | 15 x 6 |
| **Integrity** | 240 minutes | 240 minutes | 240 minutes | 240 minutes | 240 minutes | 240 minutes | 240 minutes | 240 minutes |
| **Insulation** | 220 minutes | 156 minutes | 161 minutes | 105 minutes | 240 minutes | 240 minutes | 240 minutes | 240 minutes |

The test was discontinued after a period of 240 minutes.

warringtonfire
global safety

Warrington Fire Research Centre Ltd - Holmesfield Road - Warrington - Cheshire - UK - WA1 2DS
**t:** +44 (0) 1925 655116 - **f:** +44 (0) 1925 655419 - **w:** warringtonfire.net