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Title:

The Fire Resistance Performance Of Thirteen Specimens Of Penetration Sealing Systems Tested In Accordance With BS EN 1366-3: 2009

Report No:

411551 Issue 3

Prepared for:

Tenmat
Ashburton Road West
Trafford Park
Manchester
M171RU

Date:

19th July 2019

Notified Body No:

0249

Summary

Objective

To evaluate the ability of thirteen specimens of penetration sealing systems to reinstate the integrity and insulation performance of an associated construction when tested in accordance with BS EN 1366-3: 2009.

Test Sponsor

Tenmat, Ashburton Road West, Trafford Park, Manchester, M171RU.

Summary of the Tested Specimens

The specimens were referenced 1 to 17 for the purpose of the test. Specimens 7 to 9 and Specimen 12 were reported separately.

The associated construction was of overall dimensions 3000 mm wide by 3000 mm high by 180 mm thick. The framing comprised 90 mm wide galvanised mild steel Metsec studs, at maximum 600 mm centres, friction fitted into galvanised 92 mm mild steel Metsec head and base track. A 70 mm galvanised mild steel flat plate was fixed across the studs 600 mm down from the head. The exposed face of the framing was faced with two layers of 12.5 mm thick Siniat GTEC Fire Board SE plasterboard. The unexposed face of the framing was faced with a single layer of Siniat GTEC Weather Defence Board SE and a single layer of Celotex PIR foil faced foam insulation board. The framing was filled with a single layer of 100 mm thick Rockwool ProRox SL920 rock fibre insulation. The wall incorporated seventeen apertures, each penetrated by a range of plastic services sealed with various fire stopping Vent Duct Sleeves and Pipe Sleeves, The drywall construction incorporated two free edges.

Details of each specimen are included in the tables below:

Specimen	Aperture dimensions / Seal type	Services
1	134 mm x 83 mm / FF109 + Low Profile Vent Duct Fire Sleeve	110 mm by 54 mm PVC Ductwork with 1.5 (±0.15) mm wall thickness
2	228 mm x 89 mm / FF109 + Low Profile Vent Duct Fire Sleeve	204 mm by 60 mm PVC Ductwork with 2.25 (±0.15) mm wall thickness
3	244 mm x 124 mm / FF109 + Low Profile Vent Duct Fire Sleeve	220 mm by 90 mm PVC Ductwork with 2.25 (±0.15) mm wall thickness
4	160 mm x 104 mm / Firefly 109 Standard Vent Duct Fire Sleeve	110 mm by 54 mm PVC Ductwork with 1.5 (±0.15) mm wall thickness
5	254 mm x 110 mm / Firefly 109 Standard Vent Duct Fire Sleeve	204 mm by 60 mm PVC Ductwork with 2.25 (±0.15) mm wall thickness
6	270 mm x 150 mm / Firefly 109 Standard Vent Duct Fire Sleeve, c/w Firefly 107 Intumescent Strips.	220 mm by 90 mm by PVC Ductwork with 2.25 (±0.15) mm wall thickness

Test Specimens

Specimen	Aperture dimensions / Seal type	Services
10	134 mm ø / FF109 + Low Profile Vent Duct Fire Sleeve	100 mm ø by 1.8 mm wall thickness PVC Pipe
11	160 mm ø / FF109 + Low Profile Vent Duct Fire Sleeve	125 mm ø by 1.8 mm wall thickness PVC Pipe
13	165 mm ø / Firefly 109 Standard Pipe Fire Sleeve	110 mm ø by 3.2 mm wall thickness PVC Pipe
14	165 mm ø / Firefly 109 Standard Pipe Fire Sleeve	110 mm ø by 3.2 mm wall thickness PVC Pipe
15	92 mm ø / Firefly 109 Standard Pipe Fire Sleeve	36 mm ø by 1.8 mm wall thickness ABS pipe
16	100 mm ø / Firefly 109 Standard Pipe Fire Sleeve	43 mm ø by 1.9 mm wall thickness ABS pipe
17	110 mm ø / Firefly 109 Standard Pipe Fire Sleeve	55 mm ø by 2 mm wall thickness ABS pipe

Full details of the specimens and installation methods are given in the Schedule of Components.

Test Results

Specimens 1 to 6 were not deemed to be fully in accordance with the requirements of BS EN 1366-3: 2009 as stated in the Clause 1 – scope: *Penetration seals used to seal gaps around chimneys, air ventilation systems, fire rated ventilation ducts, fire rated ventilation ducts, fire rated service ducts, shafts and smoke extraction ducts are excluded from this standard except for mixed penetration seals.* However if the results were to be assessed against the criteria from BS EN 1366-3: 2009 the test results may be expressed as follows:

Specimen	Integrity (minutes)			Insulation (minutes)
	Cotton Pad	Sustained Flame	Gap Gauge	
1	112	112	113*	102
2	112	112	113*	112
3	112	112	113*	112
4	112	112	113*	112
5	112	112	113*	112
6	112	112	113*	112
10	112	112	113*	112
11	112	112	113*	112
13	112	112	113*	112
14	104	104	107#	95
15	112	112	113*	45
16	112	112	113*	112
17	112	112	113*	112

* The test duration. The test was discontinued after a period of 113 minutes.

Specimen blanked off to allow the test to continue.

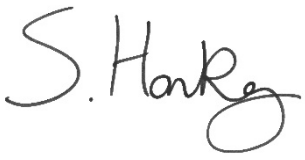
Date of Test

23rd April 2019

Signatories

Responsible Officer
D. Whittle*
Technical Officer

Approved
W. Drazkiewicz*
Technical Manager



Head of Department
S. Hankey*
Business Unit Head

* For and on behalf of **Warringtonfire.**

Report Issued

Date : 19th July 2019

Issue 2 – Changes made to duct wall thickness (Specimens 1 – 6) in Summary and Schedule of Components. Amendments made by D. Whittle. Issued 24th July 2019.
Issue 3 – Changes made to References of Specimens 13 – 17 in Summary and Schedule of Components. Amendments made by D. Whittle. Issued 14th August 2019.

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Test Procedure

Introduction

Penetration sealing systems are required to maintain the fire resistance of a separating element at the position at which it has been penetrated by a service. Specimens 10 to 17 were therefore tested in accordance with BS EN 1366-3: 2009. 'Fire resistance tests for service installations - Part 3: Penetration seals' This test report should be read in conjunction with those Standards and with BS EN 1363-1: 1999, Fire resistance tests - Part 1: General requirements'

Specimens 1 to 6 were not deemed to be fully in accordance with the requirements of BS EN 1366-3: 2009 as stated in the Clause 1 – scope: *Penetration seals used to seal gaps around chimneys, air ventilation systems, fire rated ventilation ducts, fire rated ventilation ducts, fire rated service ducts, shafts and smoke extraction ducts are excluded from this standard except for mixed penetration seals.*

The specimens were judged on their ability to comply with the performance criteria for integrity and insulation, as required by BS EN 1366-3: 2009.

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 coned on the 23rd April 2019 at the request of **Tenmat**, the sponsor of the test.

Mr. I. Hainsworth, and Mr. M. Davies representatives of the test sponsor witnessed the test.

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 associated construction was assembled by representatives of **Warringtonfire** between the 1st April 2019 and 5th April 2019.

The supports were supplied and installed by representatives of **Warringtonfire** between the 8th April 2019 and 9th April 2019.

The pipe services and specimen penetration seals were supplied and installed by representatives of the sponsor on the 10th April 2019.

Sampling

A representative of **Warringtonfire** selected and sampled the Vent Duct Sleeves, and the Pipe Sleeves on the 9th April 2019, document reference FM412880.

Conditioning

The specimens' storage, construction, and test preparation took place in the test laboratory over a total, combined time of 23 days. Throughout this period of time both the temperature and the humidity of the laboratory were measured and recorded as being within a range of from 10°C to 27°C and 33% to 60% respectively.

Test Specimen

Figure 1 – General elevation from unexposed face showing details of partition only (before specimens '1' to '17' fitted)

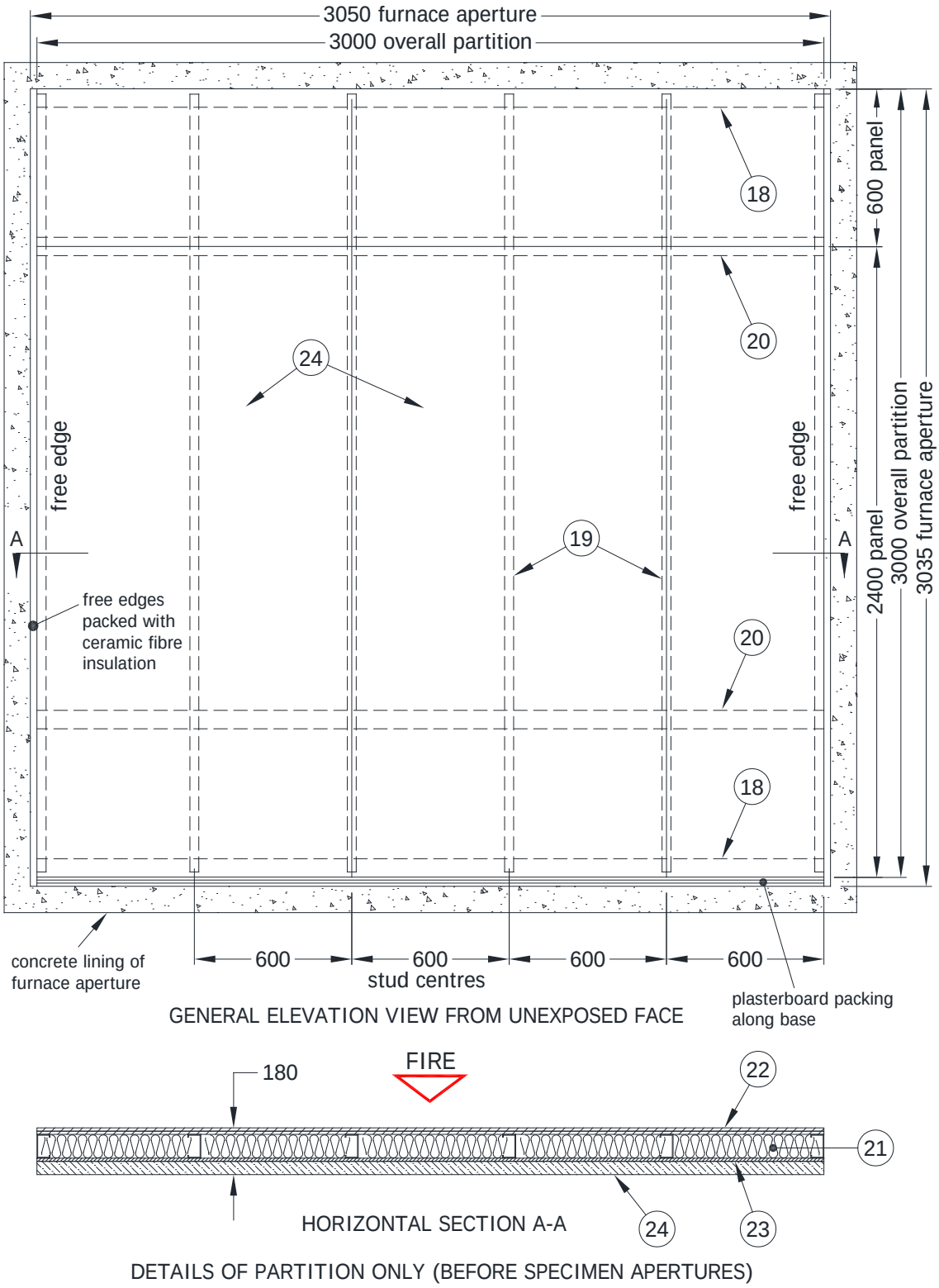

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Figure 2 – General elevation from unexposed face showing position of apertures for specimens ‘1’ to ‘17’

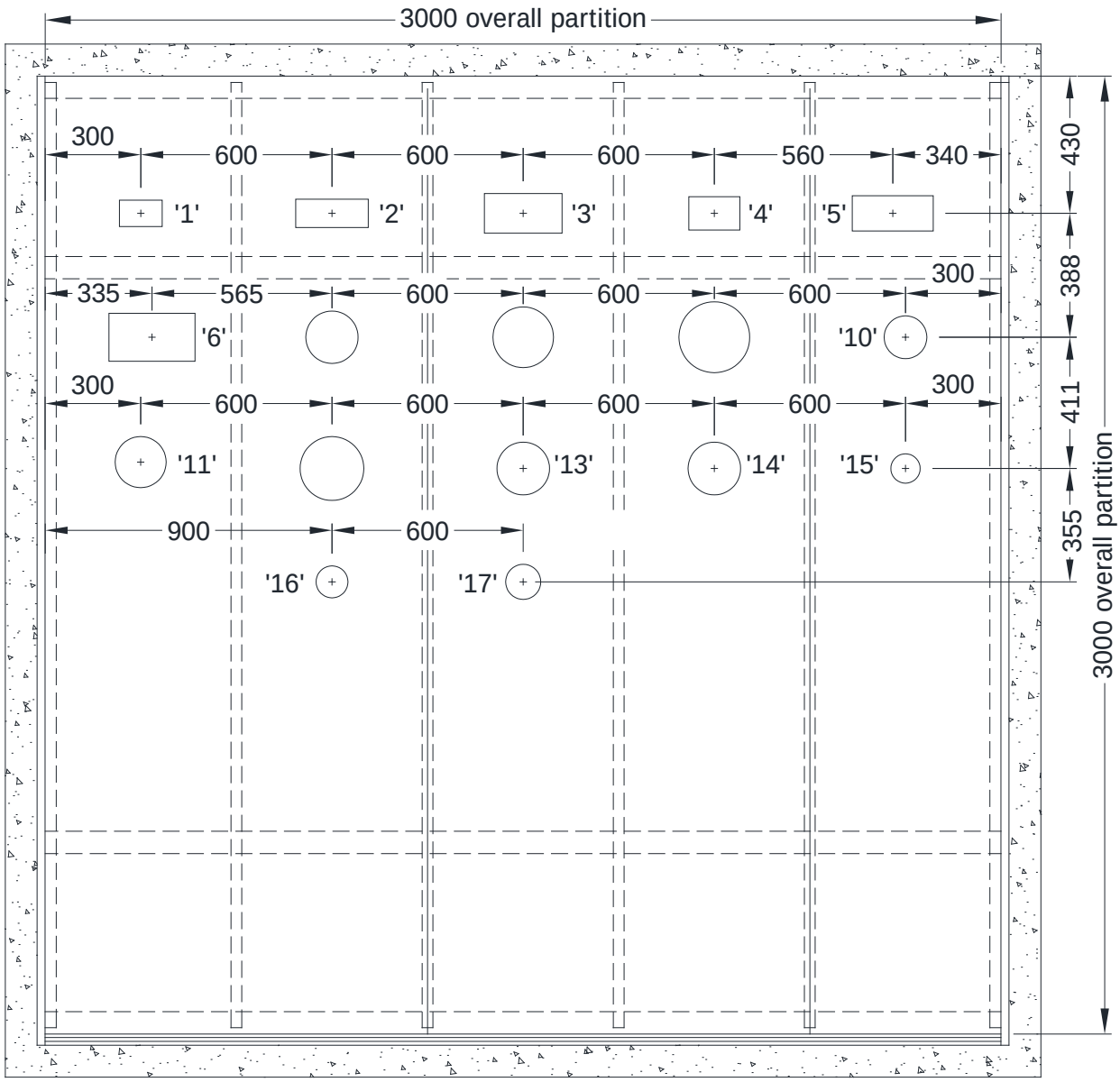

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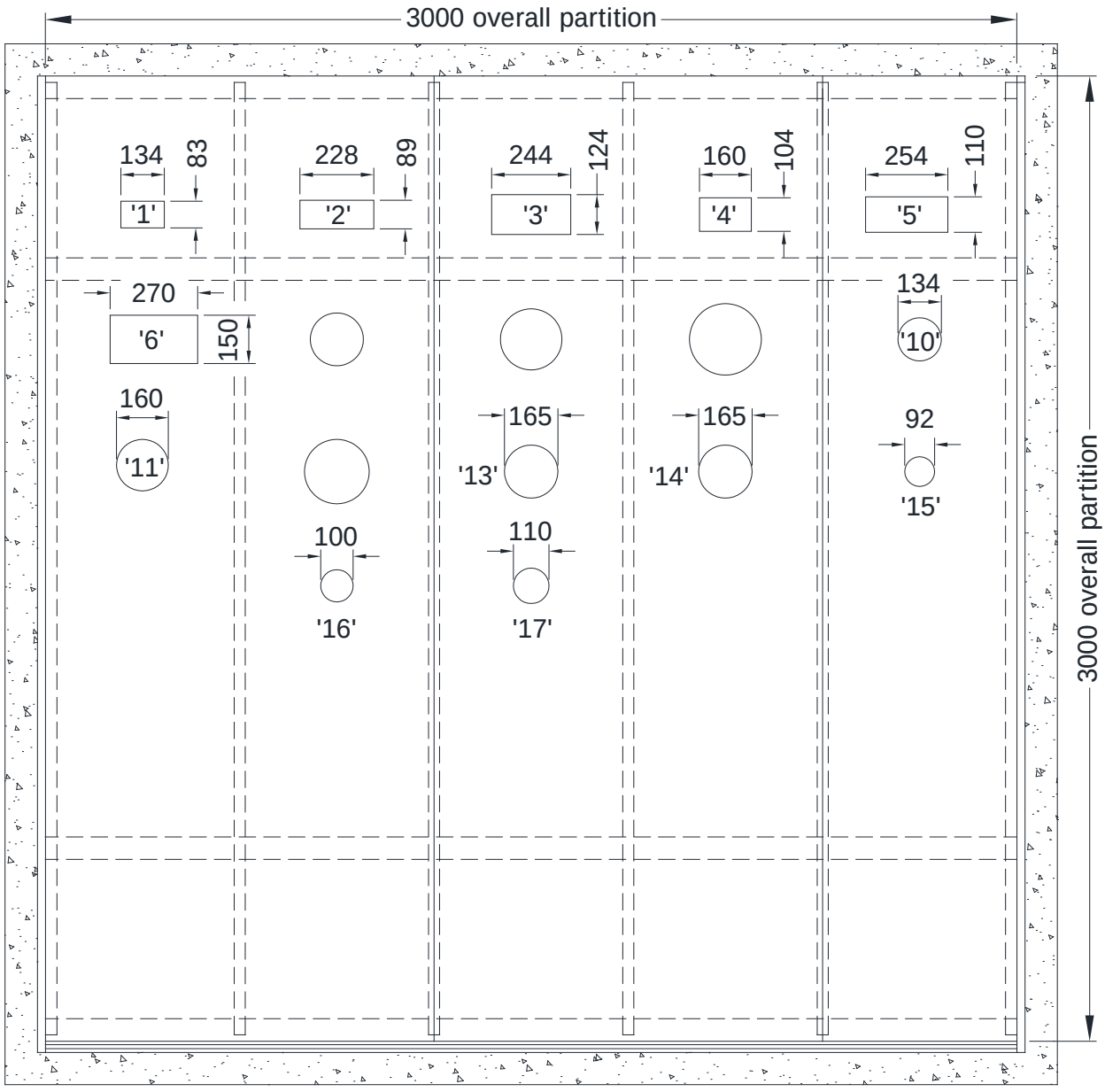
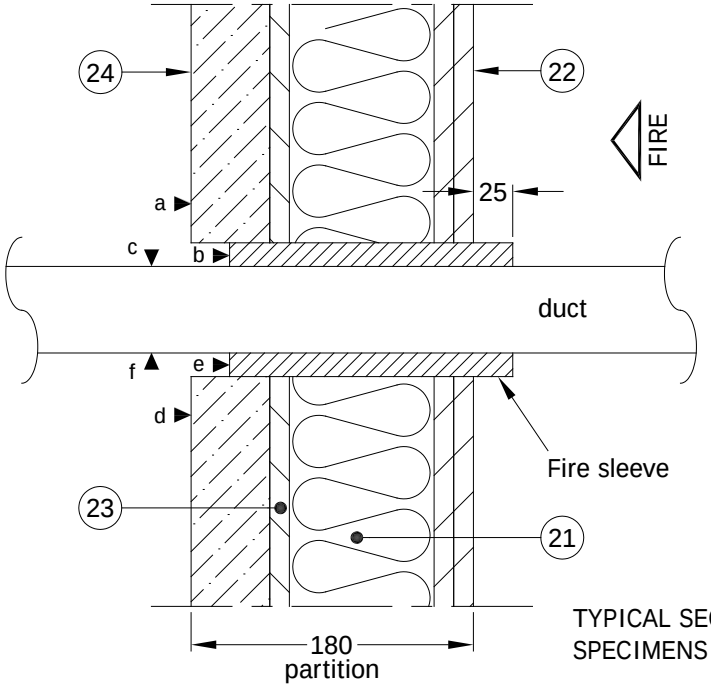
Figure 3 – General elevation from unexposed face showing aperture sizes for specimens ‘1’ to ‘17’

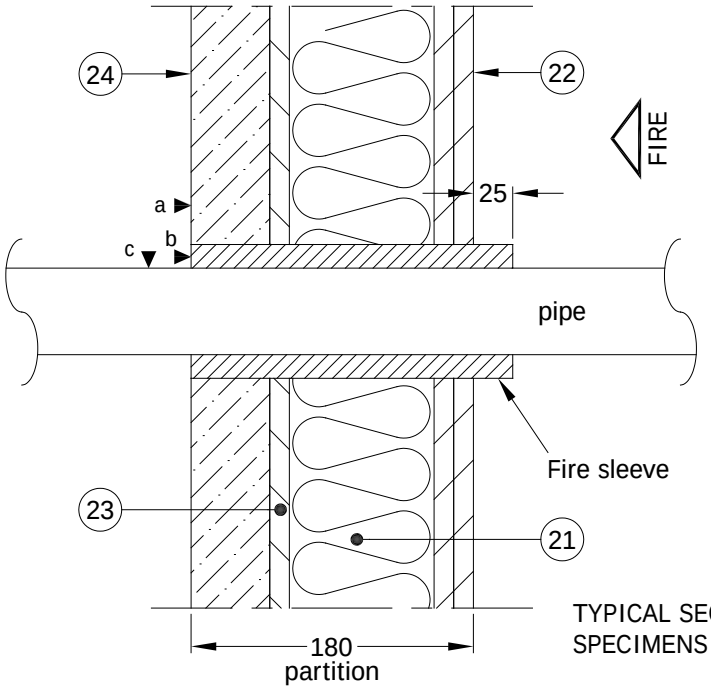


Do not scale. All dimensions are in mm

Figure 4 – Typical details of each test specimen



TYPICAL SECTION FOR SPECIMENS '1' TO '13'



TYPICAL SECTION FOR SPECIMENS '14' TO '17'

▼ Positions of thermocouples ('a' to 'f') (see Table on Figure 5)

Do not scale. All dimensions are in mm

Figure 5 – Thermocouple positions for each specimen

	Thermocouple numbers					
Specimen	a	b	c	d	e	f
'1'	4		5			
'2'	6		7	8		9
'3'	10		11	12		13
'4'	14	15	16			
'5'	17	18	19	20	21	22
'6'	23	24	25	26	27	28
'10'	41	42	43			
'11'	44		45			
'13'	52	53	54			
'14'	55	56	57			
'15'	58	59	60			
'16'	61	62	63			
'17'	64	65	66			

THERMOCOUPLES FOR SPECIMENS '1' TO '17'
(READ IN CONJUNCTION WITH FIGURE 4)

Do not scale. All dimensions are in mm

Schedule of Components

(Refer to Figures 1 to 5)
(All values are nominal unless stated otherwise)
(All other details are as stated by the sponsor)

Item		Description
1. Specimen '1'		
Aperture size in partition	:	134 mm wide x 83 mm high
Details of rectangular duct		
Material	:	Polyvinyl chloride (PVC)
Overall section size	:	110 mm wide x 54 mm high
Wall thickness	:	1.5 (±0.15) mm (stated)
Details of Fire sleeve		
Manufacturer	:	Tenmat
Reference	:	FF109 + Low profile vent duct fire sleeve c/w a single graphite intumescent strip FF107.
Material	:	FF109 & FF107 graphite intumescent strips wrapped within aluminium foil.
Overall section size	:	134 mm wide x 83 mm high x approx 12 mm thick sleeve.
Overall length	:	180 mm
Fixing method	:	Friction fit around the duct within the partition aperture
2. Specimen '2'		
Aperture size in partition	:	228 mm wide x 89 mm high
Details of rectangular duct		
Material	:	Polyvinyl chloride (PVC)
Overall section size	:	204 mm wide x 60 mm high
Wall thickness	:	2.25 (±0.15) mm (stated)
Details of Fire sleeve		
Manufacturer	:	Tenmat
Reference	:	FF109 + Low profile vent duct fire sleeve c/w a single graphite intumescent strip FF107.
Material	:	FF109 & FF107 graphite intumescent strips wrapped within aluminium foil.
Overall section size	:	228 mm wide x 89 mm high x approx 12 mm thick sleeve.
Overall length	:	180 mm
Fixing method	:	Friction fit around the duct within the partition aperture
3. Specimen '3'		
Aperture size in partition	:	244 mm wide x 124 mm high
Details of rectangular duct		
Material	:	Polyvinyl chloride (PVC)
Overall section size	:	220 mm wide x 90 mm high
Wall thickness	:	2.25 (±0.15) mm (stated)

Item		Description
Specimen '3' continued		
Details of Fire sleeve		
Manufacturer	:	Tenmat
Reference	:	FF109 + Low profile vent duct fire sleeve c/w two graphite intumescent strip FF107.
Material	:	FF109 & FF107 graphite intumescent strips wrapped within aluminium foil.
Overall section size	:	244 mm wide x 124 mm high x approx 12 mm thick sleeve.
Overall length	:	180 mm
Fixing method	:	Friction fit around the duct within the partition aperture
4. Specimen '4'		
Aperture size in partition	:	160 mm wide x 104 mm high
Details of rectangular duct		
Material	:	Polyvinyl chloride (PVC)
Overall section size	:	110 mm wide x 54 mm high
Wall thickness	:	1.5 (±0.15) mm (stated)
Details of Fire sleeve		
Manufacturer	:	Tenmat
Reference	:	FF109 standard vent duct fire sleeve
Material	:	FF109 graphite intumescent strip wrapped within aluminium foil.
Overall section size	:	160 mm wide x 104 mm high x 25 mm thick
Overall length	:	180 mm
Fixing method	:	Friction fit around the duct within the partition aperture
5. Specimen '5'		
Aperture size in partition	:	254 mm wide x 110 mm high
Details of rectangular duct		
Material	:	Polyvinyl chloride (PVC)
Overall section size	:	204 mm wide x 60 mm high
Wall thickness	:	2.25 (±0.15) mm (stated)
Details of Fire sleeve		
Manufacturer	:	Tenmat
Reference	:	FF109 standard vent duct fire sleeve
Material	:	FF109 graphite intumescent strip wrapped within aluminium foil.
Overall section size	:	254 mm wide x 110 mm high x 25 mm thick
Overall length	:	180 mm
Fixing method	:	Friction fit around the duct within the partition aperture
6. Specimen '6'		
Aperture size in partition	:	270 mm wide x 150 mm high
Details of rectangular duct		
Material	:	Polyvinyl chloride (PVC)
Overall section size	:	220 mm wide x 90 mm high
Wall thickness	:	2.25 (±0.15) mm (stated)

Item		Description
Specimen '6' continued		
Details of Fire sleeve		
Manufacturer	:	Tenmat
Reference	:	FF109 + Low profile vent duct fire sleeve c/w a single graphite intumescent strip FF107.
Material	:	FF109 & FF107 graphite intumescent strips wrapped within aluminium foil.
Overall section size	:	270 mm wide x 150 mm high x 25 mm thick
Overall length	:	180 mm
Fixing method	:	Friction fit around the duct within the partition aperture
7. Specimen '10'		
Aperture size in partition	:	134 mm diameter
Details of circular duct		
Material	:	Polyvinyl chloride (PVC)
Overall size	:	100 mm outside diameter x 1.8 mm thick wall
Details of Fire sleeve		
Manufacturer	:	Tenmat
Reference	:	FF109 + Low profile vent duct fire sleeve c/w a single graphite intumescent strip FF107.
Material	:	FF109 & FF107 graphite intumescent strips wrapped within aluminium foil.
Overall section size	:	134 mm outside diameter x 103 mm inner diameter
Overall length	:	180 mm
Fixing method	:	Friction fit around the duct within the partition aperture
8. Specimen '11'		
Aperture size in partition	:	160 mm diameter
Details of circular duct		
Material	:	Polyvinyl chloride (PVC)
Overall size	:	125 mm outer diameter x 1.8 mm wall thickness
Details of Fire sleeve		
Manufacturer	:	Tenmat
Reference	:	FF109 + Low profile vent duct fire sleeve c/w a single graphite intumescent strip FF107.
Material	:	FF109 & FF107 graphite intumescent strips wrapped within aluminium foil.
Overall section size	:	160 mm outside diameter x 127 mm inner diameter
Overall length	:	180 mm
Fixing method	:	Friction fit around the duct within the partition aperture
9. Specimen '13'		
Aperture size in partition	:	165 mm diameter
Details of pipe		
Type	:	Soil vent pipe
Material	:	Polyvinyl chloride (PVC), colour black
Overall size	:	110 mm outer diameter x 3.2 mm wall thickness
Details of Fire sleeve		
Manufacturer	:	Tenmat
Reference	:	FF109 standard Pipe fire sleeve
Material	:	FF109 graphite intumescent strip wrapped within aluminium foil.
Overall section size	:	165 mm outer diameter x 25 mm thick sleeve
Overall length	:	180 mm
Fixing method	:	Friction fit around the pipe within the partition aperture

Item		Description
10. Specimen '14'		
Aperture size in partition	:	165 mm diameter
Details of pipe		
Type	:	Underground soil pipe
Material	:	Polyvinyl chloride (PVC), colour brown
Overall size	:	110 mm outer diameter x approx. 3.5 mm wall thickness
Details of Fire sleeve		
Manufacturer	:	Tenmat
Reference	:	FF109 standard Pipe fire sleeve
Material	:	FF109 graphite intumescent strip wrapped within aluminium foil.
Overall section size	:	165 mm outer diameter x 25 mm thick sleeve
Overall length	:	205 mm
Fixing method	:	Friction fit around the duct within the partition aperture
11. Specimen '15'		
Aperture size in partition	:	92 mm diameter
Details of pipe		
Type	:	Waste pipe
Material	:	Acrylonitrile Butadiene Styrene (ABS) plastic
Overall size	:	36 mm outer diameter x 1.8 mm wall thickness
Details of Fire sleeve		
Manufacturer	:	Tenmat
Reference	:	FF109 standard Pipe fire sleeve
Material	:	FF109 graphite intumescent strip wrapped within aluminium foil.
Overall size	:	92 mm outer diameter x 25 mm thick sleeve
Overall length	:	205 mm
Fixing method	:	Friction fit around the duct within the partition aperture
12. Specimen '16'		
Aperture size in partition	:	100 mm diameter
Details of pipe		
Type	:	Waste pipe
Material	:	ABS plastic
Overall size	:	43 mm outer diameter x 1.9 mm wall thickness
Details of Fire sleeve		
Manufacturer	:	Tenmat
Reference	:	FF109 standard Pipe fire sleeve
Material	:	FF109 graphite intumescent strip wrapped within aluminium foil.
Overall size	:	100 mm outer diameter x 25 mm thick sleeve
Overall length	:	205 mm
Fixing method	:	Friction fit around the duct within the partition aperture

Item		Description
13. Specimen '17'		
Aperture size in partition	:	110 mm diameter
Details of pipe		
Type	:	Waste pipe
Material	:	ABS plastic
Overall size	:	55 mm outer diameter x 2 mm wall thickness
Details of Fire sleeve		
Manufacturer	:	Tenmat
Reference	:	FF109 standard Pipe fire sleeve
Material	:	FF109 graphite intumescent strip wrapped within aluminium foil.
Overall size	:	110 mm outer diameter x 25 mm thick sleeve
Overall length	:	205 mm
Fixing method	:	Friction fit around the duct within the partition aperture
Details of partition surround (items 14 to 20)		
14. Head and base channel		
Reference	:	Metsec track
Material	:	Galvanised mild steel formed 'U' channel
Overall section size	:	92 mm deep x 70 mm flange width
Thickness	:	1.2 mm
Fixing method	:	Fixed through to concrete lining of furnace aperture using masonry fixings at 600 mm centres along length of track.
15. Vertical studs		
Reference	:	Metsec studs
Material	:	Galvanised mild steel formed 'C' channel
Overall section size	:	90 mm deep x 50 mm flange width, with 10 mm returns
Thickness	:	1.2 mm
Centres	:	Studs fitted at 600 mm centres
Fixing method		
i. studs to head track	:	Friction fit (studs left 20 mm short in the head track)
ii. studs to base track	:	Friction fit (studs left 20 mm short in the base track)
iii. perimeter studs to concrete	:	The outer perimeter studs were not fixed to the concrete lining of the furnace aperture but were kept as free edges.
16. Horizontal fixing strap		
Reference	:	70 mm wide fixing strap
Material	:	Galvanised mild steel flat plate
Width	:	70 mm
Thickness	:	0.7 mm
Fixing method	:	Fixed to each vertical stud using 13 mm long wafer head jackpoint screws, at positions shown on Figure 1. Upper strap is fitted behind the horizontal joint of the Weather boards (item 23) at the unexposed face. Lower strap is fitted behind the horizontal joint of the first layer Fire Boards (item 22) at the exposed face.

Item		Description
17. Partition insulation		
Manufacturer	:	Rockwool
Reference	:	ProRox SL920 (formally RWA45)
Material	:	Rock fibre insulation
Thickness	:	100 mm
Density	:	45 kg/m^3 (stated)
Fixing method	:	Friction fit within all voids between the framework members.
18. Cladding boards (exposed face)		
Reference	:	Siniat GTEC Fire Board SE (square edge)
Material	:	Plasterboard
Thickness	:	2 no. layers, each 12.5 mm thick
Density	:	816 kg/m^3 (stated)
Fixing method	:	Each layer screw fixed along all the partition framework members. The board butt joints were staggered with respect to those of the adjacent boards.
Details of board fixings		
i. type	:	GTEC Self-tapping steel screws
ii. overall size	:	25 mm long screws (1st layer) and 42 mm long (2nd layer).
iii. spacing	:	300 mm centres
19. Cladding boards – first layer (unexposed face)		
Reference	:	Siniat GTEC Weather Defence Board SE (square edge)
Material	:	Plasterboard
Thickness	:	Single layer 12.5 mm thick
Density	:	864 kg/m^3 (stated)
Fixing method	:	Screw fixed along all the partition framework members
Details of board fixings		
i. type	:	GTEC Self-tapping steel screws
ii. overall size	:	25 mm long screws
iii. spacing	:	300 mm centres
20. Insulation panels – second layer (unexposed face)		
Manufacturer	:	Celotex Saint-Gobain
Manufacturers Product reference	:	GA4050 Insulation Board
Material	:	Rigid Polyisocyanurate (PIR) foam board, foil faced
Thickness	:	Single layer, 50 mm thick
Density	:	31 kg/m^3 (stated)
Fixing method	:	Screw fixed through to all the partition framework members.
Details of board fixings		
i. type	:	Timco Baypole self-tapping wafer head steel screws
ii. overall size	:	90 mm long x 4.8 mm diameter screws, used with 25 mm diameter penny washers.
iii. spacing	:	300 mm centres

Additional installation notes

i. overall length of services	:	All services extended 500 mm from each face of the partition.
ii. services supports	:	All services were fixed to a support frame fabricated from proprietary steel unistrut channels of section size 41 mm x 41 mm x 2.5 mm thick at 450 mm from unexposed face of the partition only.
iii. gap sealant	:	Film of intumescent sealant was cartridge gunned to seal any gaps between Fire sleeves and the partition surround, at the exposed face.
iv. capping details	:	All services were uncapped/uncapped.

Instrumentation

General

The instrumentation was provided in accordance with the requirements of BS EN 1366-3: 2009.

Furnace

The furnace was controlled so that its mean temperature complied with the requirements of BS EN 1363-1: 1999 Clause 5.1 using nine plate thermometers, distributed over a plane 100 mm from the surface of the test construction.

Thermocouple Allocation

Thermocouples were provided to monitor the unexposed surface temperatures of the specimens. The output of all instrumentation was recorded at no less than one minute intervals.

The locations and reference numbers of the various unexposed surface thermocouples are shown in Figures 4 and 5.

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

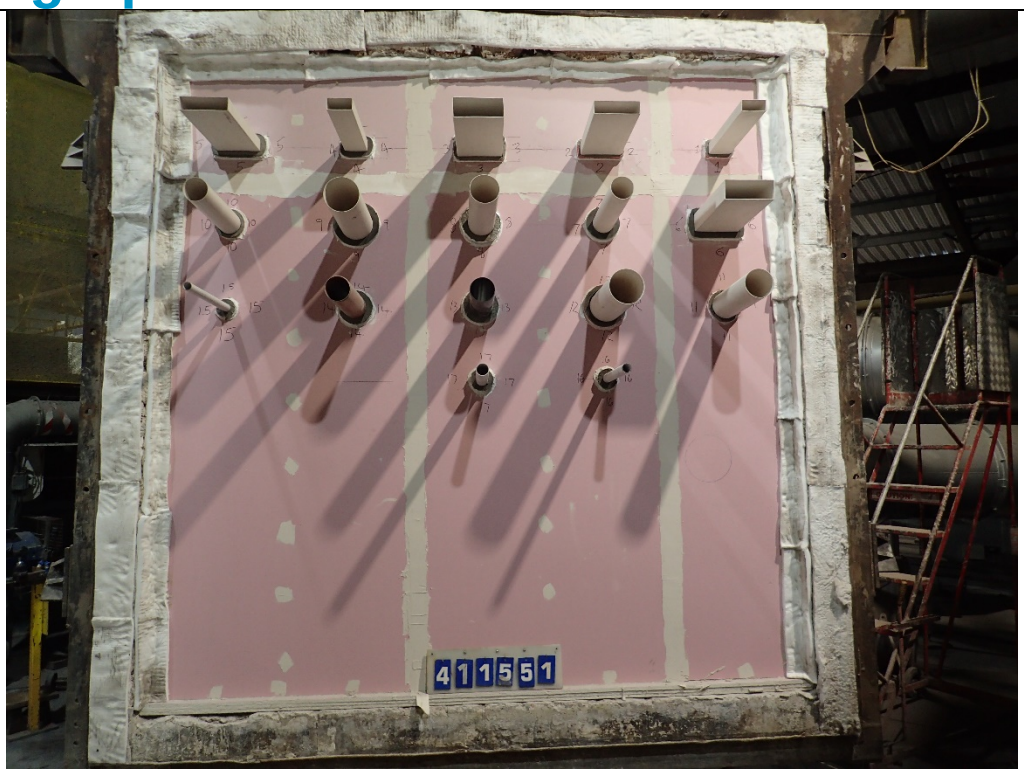
The furnace atmospheric pressure was controlled so that it complied with the requirements of BS EN 1366-3: 2009, Clause 5.2. The pressure differential relative to the laboratory atmosphere at the base of the lowest specimen was 10 (±2) Pa, and a minimum pressure of 20 Pa was maintained at the top of the uppermost specimen.

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 21ºC at the start of the test with a maximum variation of -1ºC during the test.
00	00	**The test commences.**
00	10	Smoke release from around Specimens 15 and 16.
01	00	Smoke release from the end of all services.
03	30	Services passing through Specimens 1, 4 and 5 have collapsed on the unexposed face.
06	00	Services passing through Specimens 11, 13, and 14 have collapsed on the unexposed face.
11	00	Smoke release continues from Specimens 13 and 14.
35	00	Smoke release from the point of penetration of Specimens 1 to 6.
39	00	The joints in the exposed face are expanding and small cracks are forming around the fixings of the exposed face boards.
48	00	Discolouring to the phenolic insulation slab above Specimens 2 and 6.
57	00	Discolouring above Specimen 2 has increased.
70	00	Discolouring to the phenolic insulation slab above Specimens 3 to 5.
78	00	The joints on the exposed face have continued to open and the boards have started to detach.
95	00	Smoke release has increased from Specimen 16.
95	30	The supporting construction has deflected towards the heating conditions.
104	20	**Sustained flaming on Specimen 14. Integrity failure is deemed to have occurred.**
107	00	**Specimen 14 blanked off to allow the test to continue.**
110	00	Glowing around Specimen 13 at the point of penetration.
112	40	**Burning through the PIR insulation slabs below Specimen 3, and approximately one meter from the base of the construction below Specimen 14. Sustained flame on the supporting construction, integrity failure is deemed to have occurred to all remaining specimens.**
113	30	**Test discontinued.**

Test Photographs

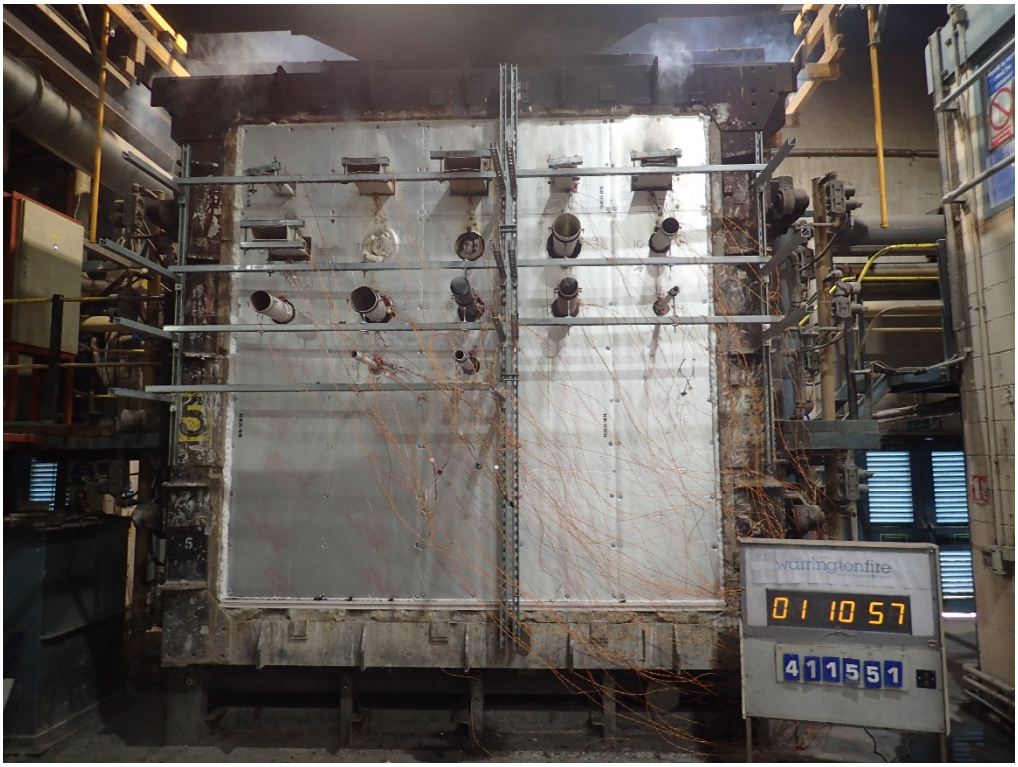
The exposed face of the test construction prior to the start of the test



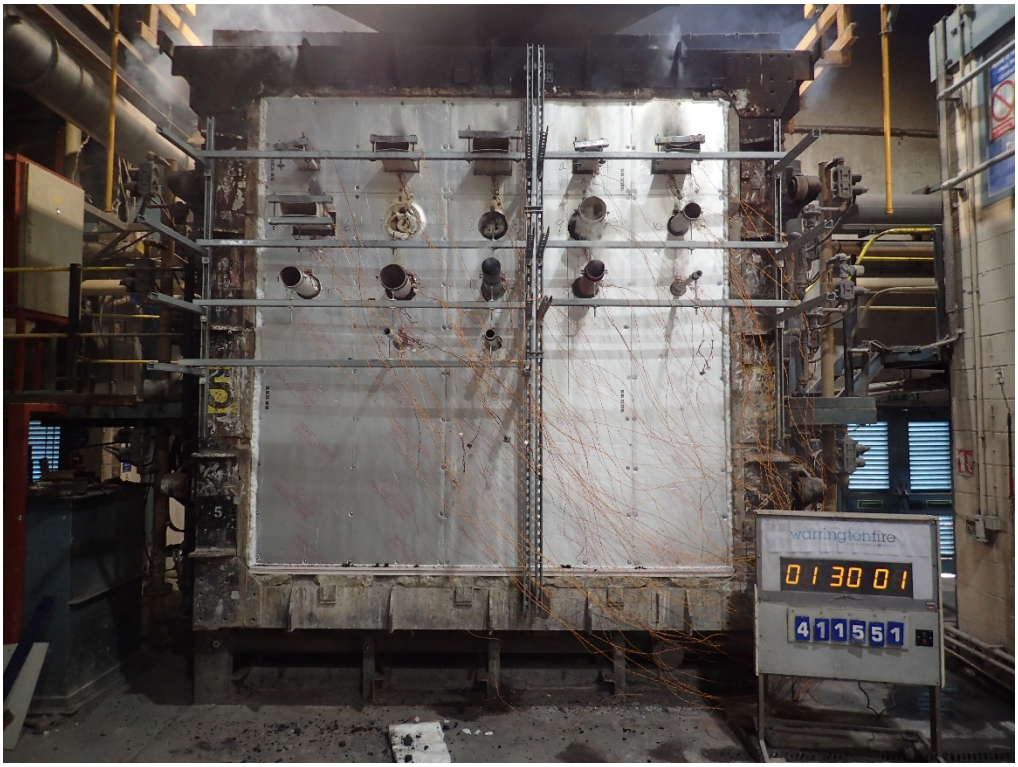
The unexposed face of the test construction prior to the start of the test

The unexposed face of the test construction after a test duration of 30 minutes

The unexposed face of the test construction after a test duration of 70 minutes



The unexposed face of the test construction after a test duration of 90 minutes



The unexposed face of the test construction after a test duration of 113 minutes

The exposed face of the test construction after the test

Temperature Data

Mean furnace temperature, together with the temperature/time relationship specified in BS EN 1363-1:2012

Time Mins	Specified Furnace Temperature Deg. C	Actual Furnace Temperature Deg. C
0	20	30
3	502	508
6	603	611
9	663	675
12	706	702
15	739	741
18	766	770
21	789	793
24	809	812
27	826	826
30	842	838
33	856	851
36	869	859
39	881	881
42	892	893
45	902	904
48	912	914
51	921	923
54	930	933
57	938	942
60	945	949
63	953	956
66	960	963
69	966	969
72	973	977
75	979	982
78	985	988
81	990	995
84	996	999
87	1001	1007
90	1006	1013
93	1011	1016
96	1016	1017
99	1020	1015
102	1025	1015
105	1029	1029
108	1033	1040
111	1037	1048
113	1040	1034

Individual temperatures recorded on the unexposed surface and adjacent of Specimen 1

Time Mins	T/C Number 4 Deg. C	T/C Number 5 Deg. C
0	21	22
3	34	102
6	43	98
9	47	86
12	46	74
15	40	64
18	40	59
21	41	56
24	46	55
27	46	55
30	64	55
33	92	54
36	101	53
39	116	51
42	119	50
45	114	49
48	119	47
51	123	46
54	118	45
57	128	46
60	130	51
63	125	58
66	127	61
69	134	58
72	133	65
75	139	74
78	142	65
81	140	55
84	144	54
87	149	51
90	141	50
93	145	49
96	136	49
99	136	50
102	157	53
103	*	54
105	*	55
108	*	55
111	*	57
113	*	58

* Thermocouple Detached

Individual temperatures recorded on the unexposed surface and adjacent of Specimen 2

Time Mins	T/C Number 6 Deg. C	T/C Number 7 Deg. C	T/C Number 8 Deg. C	T/C Number 9 Deg. C
0	21	22	20	22
3	47	74	32	50
6	47	75	41	51
9	49	65	41	50
12	64	61	35	45
15	67	60	30	41
18	73	65	28	38
21	64	68	59	56
24	60	64	55	57
27	67	63	52	55
30	66	62	55	56
33	81	67	53	55
36	80	68	42	49
39	78	69	42	48
42	79	71	35	43
45	76	70	35	40
48	74	69	36	39
51	72	68	37	39
54	70	68	37	39
57	68	67	40	41
60	68	67	38	39
63	70	66	38	39
66	71	64	36	37
69	70	62	38	38
72	69	60	37	37
75	71	59	38	37
78	73	58	40	38
81	78	58	44	40
84	78	58	43	40
87	77	57	46	41
90	75	57	50	44
93	76	58	52	46
96	77	61	53	47
99	80	64	61	52
102	74	69	83	71
105	68	75	96	83
108	66	79	96	86
111	69	85	93	84
113	83	89	135	141

Individual temperatures recorded on the unexposed surface and adjacent of Specimen 3

Time Mins	T/C Number 10 Deg. C	T/C Number 11 Deg. C	T/C Number 12 Deg. C	T/C Number 13 Deg. C
0	21	22	21	21
3	50	81	46	49
6	66	83	56	52
9	77	82	63	44
12	67	78	50	47
15	54	77	72	104
17	51	79	74	120
18	50	79	80	*
21	50	80	65	*
24	52	79	55	*
27	48	78	51	*
30	49	77	50	*
33	49	77	51	*
36	50	77	40	*
39	49	77	48	*
42	47	77	38	*
45	46	74	36	*
48	45	72	31	*
51	47	71	30	*
54	51	70	31	*
57	53	69	32	*
60	56	69	32	*
63	59	69	31	*
66	64	69	32	*
69	63	68	34	*
72	61	67	35	*
75	57	67	38	*
78	57	66	38	*
81	58	67	40	*
84	62	68	42	*
87	65	70	46	*
90	67	71	60	*
93	66	72	71	*
96	69	75	71	*
99	69	79	76	*
102	71	82	50	*
105	76	85	33	*
108	82	90	26	*
111	83	97	27	*
113	98	128	33	*

* Thermocouple Detached

Individual temperatures recorded on the unexposed surface and adjacent of Specimen 4

Time Mins	T/C Number 14 Deg. C	T/C Number 15 Deg. C	T/C Number 16 Deg. C
0	21	20	22
3	36	44	88
6	49	65	97
9	56	74	96
12	56	80	90
15	54	77	84
18	55	75	84
21	60	75	83
24	61	76	78
27	63	79	76
30	65	79	76
33	66	78	78
36	64	77	75
39	67	77	74
42	65	77	73
45	59	73	73
48	55	71	74
51	51	71	77
54	51	71	82
57	49	73	81
60	49	75	87
63	47	75	88
66	48	75	84
69	49	74	78
72	50	73	76
75	53	75	74
78	53	76	72
81	53	76	69
84	53	76	64
87	53	76	62
90	58	79	61
93	59	81	62
96	60	84	63
99	63	87	65
102	66	91	69
105	66	94	71
108	67	98	73
111	71	104	75
113	94	129	87

Individual temperatures recorded on the unexposed surface and adjacent of Specimen 5

Time Mins	T/C Number 17 Deg. C	T/C Number 18 Deg. C	T/C Number 19 Deg. C	T/C Number 20 Deg. C	T/C Number 21 Deg. C	T/C Number 22 Deg. C
0	21	21	23	21	21	22
3	32	33	58	38	33	52
6	55	61	79	51	53	69
9	56	68	71	43	54	60
12	56	73	62	38	53	53
15	53	72	55	35	55	47
18	54	73	51	31	55	42
21	54	72	48	30	57	39
24	54	74	45	29	58	37
27	54	75	44	29	57	36
30	55	77	42	29	58	35
33	57	81	42	31	62	35
36	60	84	41	31	63	34
39	62	86	41	32	64	34
42	64	88	39	31	65	33
45	62	82	36	30	67	32
48	66	75	35	30	70	31
51	65	68	35	31	74	31
54	69	70	34	29	63	31
57	67	63	33	29	58	31
60	63	60	33	30	54	30
63	60	55	32	31	54	30
66	59	47	32	31	53	30
69	59	45	32	30	51	29
72	58	45	32	31	52	29
75	58	46	32	31	53	29
78	59	48	32	32	56	30
81	59	49	33	33	61	31
84	58	51	33	34	69	32
87	59	54	34	35	75	33
90	61	58	35	37	73	35
93	63	62	36	37	77	37
96	65	68	38	38	81	38
99	69	82	39	40	87	40
102	70	90	41	40	92	41
105	73	90	42	42	98	43
108	76	92	44	43	106	45
111	77	80	46	44	116	46
113	80	87	47	47	125	49

Individual temperatures recorded on the unexposed surface and adjacent of Specimen 6

Time Mins	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	T/C Number 28 Deg. C
0	21	21	23	22	21	23
3	29	34	53	25	25	45
6	38	58	58	25	28	44
9	46	70	58	25	29	43
12	52	76	57	25	32	42
15	52	79	56	25	38	41
18	52	80	53	25	46	40
21	52	82	53	26	51	40
24	55	81	52	26	54	40
27	57	80	52	26	56	40
30	61	75	50	27	58	40
33	64	66	50	27	59	40
36	66	65	50	28	59	39
39	67	68	52	28	61	39
42	69	76	56	28	63	39
45	65	73	57	28	65	39
48	67	73	56	29	70	39
51	67	73	55	29	76	39
54	62	73	55	29	83	39
57	63	74	51	29	87	39
60	64	76	50	29	88	39
63	66	71	51	30	89	39
66	66	69	51	29	88	39
69	64	63	51	29	88	38
72	62	58	51	29	84	38
75	60	51	51	29	77	38
78	61	49	50	30	75	38
81	64	49	49	30	75	38
84	67	48	49	30	75	38
87	69	48	49	31	78	39
90	70	50	49	31	81	39
93	74	50	49	32	79	39
96	79	51	49	33	78	40
99	76	50	49	33	77	41
102	81	53	49	34	82	41
105	79	51	51	39	87	45
108	85	46	51	37	100	44
111	89	49	52	38	113	44
113	92	53	54	40	119	45

Individual temperatures recorded on the unexposed surface and adjacent of Specimen 10

Time Mins	T/C Number 41 Deg. C	T/C Number 42 Deg. C	T/C Number 43 Deg. C
0	22	21	22
3	72	85	108
6	88	101	113
9	70	99	90
12	56	92	69
15	50	86	54
18	46	82	45
21	44	78	40
24	41	75	37
27	41	75	36
30	41	75	35
33	42	76	36
36	44	76	37
39	47	74	41
42	47	73	45
45	46	72	47
48	46	73	32
51	47	73	27
54	47	76	27
57	46	77	27
60	47	79	27
63	49	81	27
66	49	83	27
69	50	85	27
72	51	87	27
75	53	86	27
78	54	86	28
81	55	87	28
84	57	87	28
87	59	86	28
90	61	85	28
93	64	83	28
96	69	81	28
99	71	78	28
102	68	79	29
105	65	77	28
108	61	76	28
111	61	77	29
113	62	79	33

Individual temperatures recorded on the unexposed surface and adjacent of Specimen 11

Time Mins	T/C Number 44 Deg. C	T/C Number 45 Deg. C
0	21	23
3	25	45
6	25	48
9	27	74
12	40	74
15	39	78
18	38	100
21	40	106
24	42	105
27	43	102
30	42	96
33	43	89
36	40	82
39	41	76
42	40	71
45	39	67
48	40	64
51	39	62
54	39	60
57	40	59
60	40	58
63	40	56
66	40	55
69	43	55
72	43	54
75	45	54
78	48	53
81	51	53
84	52	53
87	54	53
90	56	53
93	57	53
96	59	52
99	62	51
102	69	50
105	72	52
108	78	49
111	77	49
113	78	51

Individual temperatures recorded on the unexposed surface and adjacent of Specimen 13

Time Mins	T/C Number 52 Deg. C	T/C Number 53 Deg. C	T/C Number 54 Deg. C
0	17	17	19
3	22	26	58
6	34	34	58
9	53	48	60
12	47	54	69
15	54	62	77
18	57	68	85
21	62	72	93
24	66	75	95
27	65	78	94
30	72	77	89
33	69	77	84
36	65	74	79
39	72	75	74
42	69	76	69
45	65	78	64
48	62	78	62
51	59	79	60
54	55	74	59
57	53	*	58
60	51	*	58
63	46	*	58
66	48	*	58
69	53	*	59
72	53	*	60
75	49	*	59
78	49	*	60
81	44	*	60
84	49	*	60
87	45	*	59
90	51	*	59
93	51	*	58
96	54	*	58
99	65	*	56
102	37	*	56
105	17	*	106
108	13	*	113
111	12	*	123
113	13	*	149

* Thermocouple Malfunction

Individual temperatures recorded on the unexposed surface and adjacent of Specimen 14

Time Mins	T/C Number 55 Deg. C	T/C Number 56 Deg. C	T/C Number 57 Deg. C
0	18	17	14
3	21	27	44
6	22	31	43
9	30	46	92
12	44	63	127
15	53	78	137
18	54	79	122
21	54	78	112
24	54	76	100
27	55	74	87
30	57	73	78
33	58	72	69
36	67	70	61
39	72	71	57
42	71	71	52
45	67	*	49
48	64	67	46
51	58	68	45
54	55	68	44
57	51	68	44
60	49	67	43
63	50	68	43
66	48	69	43
69	50	70	44
72	52	72	44
75	54	73	44
78	57	76	45
81	62	79	46
84	64	82	47
87	62	84	47
90	61	88	48
93	55	96	48
95	50	105	49
96	53	112	*
99	60	147	*
102	68	172	*
105	78	196	*
106	68	*	*
107	#	#	#

* Thermocouple Malfunction
# Specimen blanked Off

Individual temperatures recorded on the unexposed surface and adjacent of Specimen 15

Time Mins	T/C Number 58 Deg. C	T/C Number 59 Deg. C	T/C Number 60 Deg. C
0	13	13	15
3	16	21	46
6	27	24	39
9	61	36	33
12	64	47	30
15	68	51	28
18	71	49	28
21	68	49	28
24	71	47	29
27	69	40	29
30	69	39	30
33	64	40	31
36	62	40	32
39	64	*	32
42	63	*	32
45	66	*	31
46	*	*	31
48	*	*	30
51	*	*	30
54	*	*	28
57	*	*	28
60	*	*	27
63	*	*	27
66	*	*	27
69	*	*	26
72	*	*	25
75	*	*	25
78	*	*	25
81	*	*	24
84	*	*	24
87	*	*	24
90	*	*	23
93	*	*	22
96	*	*	23
99	*	*	22
102	*	*	22
105	*	*	22
108	*	*	22
111	*	*	21
113	*	*	22

* Thermocouple Detached

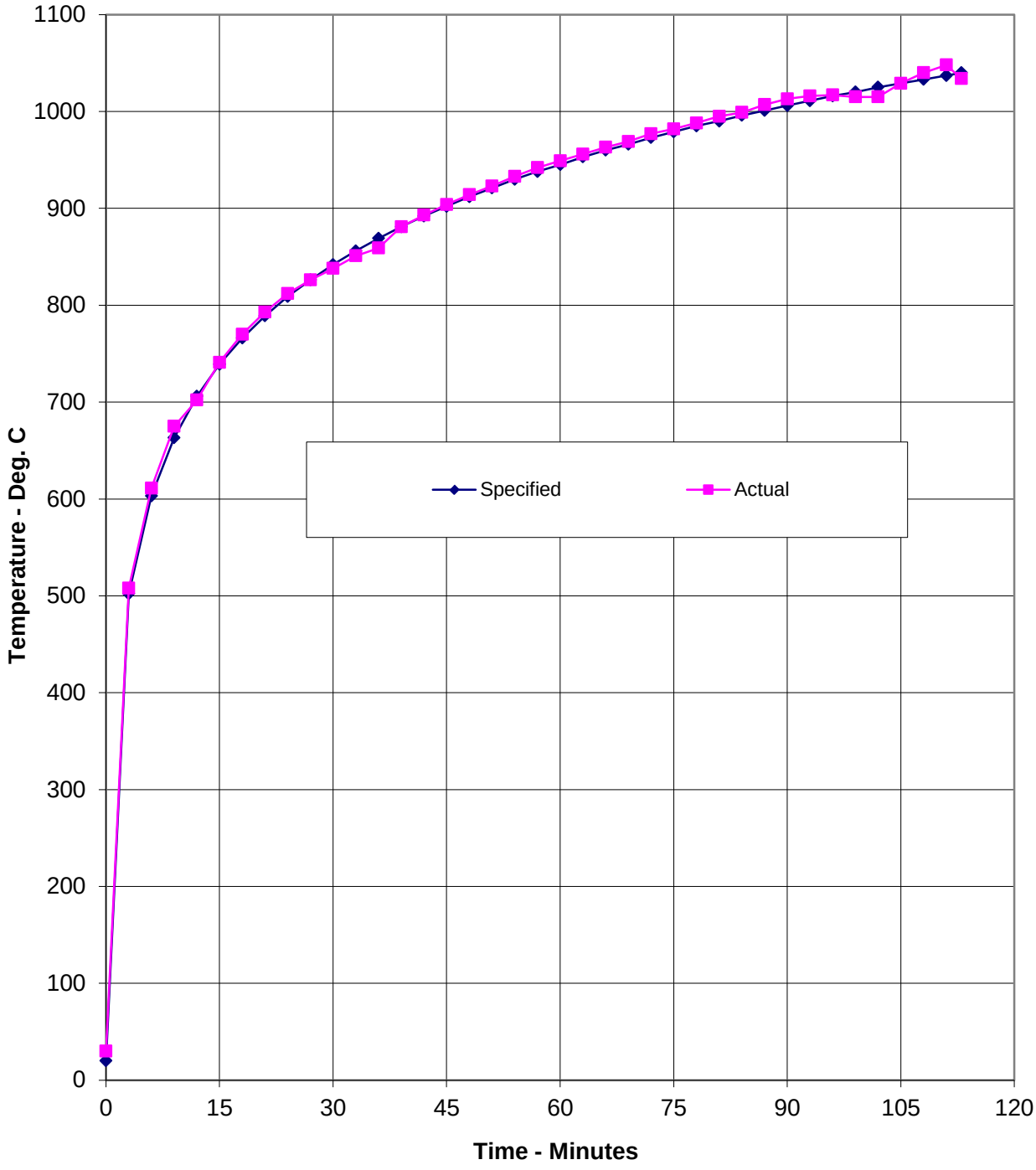
Individual temperatures recorded on the unexposed surface and adjacent of Specimen 16

Time Mins	T/C Number 61 Deg. C	T/C Number 62 Deg. C	T/C Number 63 Deg. C
0	14	14	16
3	16	19	31
6	16	19	27
9	21	20	24
12	29	24	26
15	26	24	26
18	24	24	26
21	26	25	26
24	28	28	27
27	30	31	27
30	32	35	29
33	35	39	30
36	36	41	31
39	38	43	31
42	40	47	32
45	41	50	33
48	44	51	33
51	44	52	33
54	45	52	32
57	44	51	31
60	43	50	29
63	39	49	28
66	40	48	28
69	41	48	27
72	41	47	26
75	40	47	26
78	40	46	25
81	41	46	25
84	41	45	25
87	40	45	24
90	44	45	24
93	45	45	23
96	45	45	23
99	46	47	23
102	49	51	24
105	49	59	43
108	43	59	31
111	40	55	27
113	42	56	27

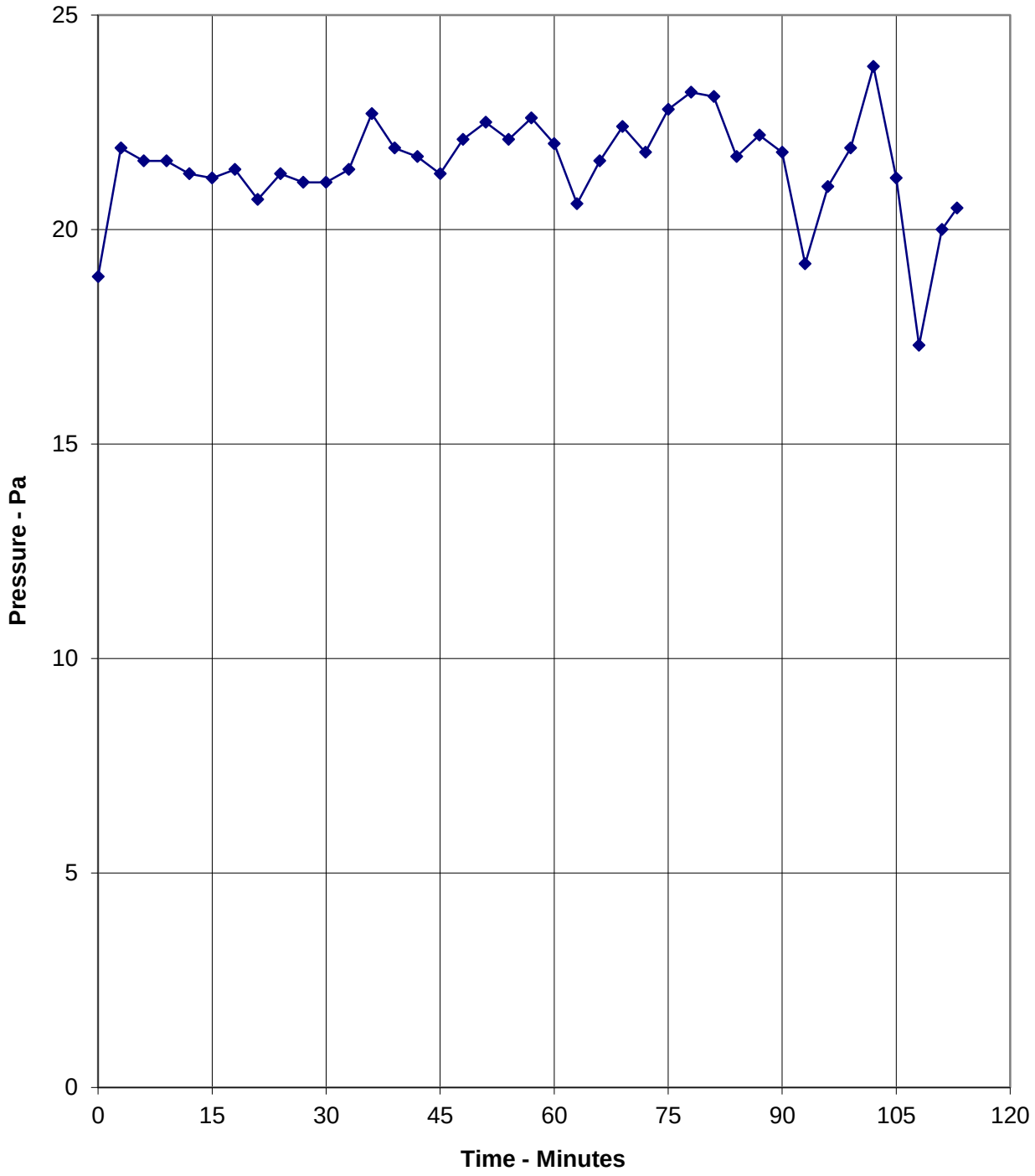
Individual temperatures recorded on the unexposed surface and adjacent of Specimen 17

Time Mins	T/C Number 64 Deg. C	T/C Number 65 Deg. C	T/C Number 66 Deg. C
0	16	16	17
3	19	21	62
6	22	32	73
9	65	49	65
12	64	58	59
15	57	62	53
18	51	62	49
21	49	62	46
24	50	63	44
27	54	64	43
30	51	67	42
33	55	68	41
36	50	68	40
39	49	69	40
42	48	68	39
45	44	64	38
48	40	63	37
51	41	60	35
54	44	58	34
57	41	58	33
60	41	57	32
63	40	56	31
66	37	57	30
69	38	58	30
72	39	58	29
75	35	59	29
78	35	59	28
81	36	59	28
84	35	59	27
87	35	58	27
90	39	59	26
93	38	60	26
96	34	59	26
99	40	62	25
102	44	64	25
105	44	69	32
108	27	67	29
111	22	68	27
113	25	25	27

Graph showing mean furnace temperature, together with the temperature/time relationship specified in BS EN 1363-1: 2012



Graph showing the pressure reading 300mm below the head of the test construction



Performance Criteria and Test Results

Integrity Performance

It is required that the specimens retain their separating function, without either permitting the penetration of a gap gauge in the prescribed manner, causing ignition of a cotton pad when applied as specified in BS EN 1363-1:1999, or resulting in sustained flaming on the unexposed surface.

These requirements were satisfied for the periods shown below:

Test Results

Specimen	Integrity (minutes)		
	Cotton Pad	Sustained Flame	Gap Gauge
1	112	112	113*
2	112	112	113*
3	112	112	113*
4	112	112	113*
5	112	112	113*
6	112	112	113*
10	112	112	113*
11	112	112	113*
13	112	112	113*
14	104	104	107#
15	112	112	113*
16	112	112	113*
17	112	112	113*

*The test duration. The test was discontinued after 113 minutes.
Specimen blanked off to allow the test to continue.

Insulation Performance

The requirements of the standard are that the maximum temperature rise shall not be greater than 180°C. Insulation failure also occurs simultaneously with integrity failure as specified in BS EN 1363-1:2012.

These requirements were satisfied for the periods shown below:

Test Results

Specimen	Insulation (minutes)
1	102
2	112
3	112
4	112
5	112
6	112
10	112
11	112
13	112
14	95
15	45
16	112
17	112

The test was discontinued after 113 minutes.

Ongoing Implications

Limitations

This report details the method of construction, the test conditions and the results obtained when the specific elements of construction described herein was tested following the procedure outlined in BS EN 1366-3: 2009. Any significant deviation with respect to size, constructional details, loads, stresses, edge or end conditions other than those allowed under the field of direct application in the relevant test method is not covered by this report. Annex A of BS EN 1363-1: 2012, provides guidance information on the application of fire resistance tests and the interpretation of test data.

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.

Conclusions

Evaluation against objective

Thirteen specimens of wall mounted penetration sealing systems have been tested to evaluate their ability to reinstate the integrity and insulation performance (as defined in BS EN 1366-3: 2009.) of the associated supporting construction, where it has been provided with apertures and penetration services.

The evaluation of the specimens against the requirements of BS EN 1366-3: 2009 showed that they satisfied the requirements for the periods shown below.

Test Results

Specimen	Integrity (minutes)			Insulation (minutes)
	Cotton Pad	Sustained Flame	Gap Gauge	
1	112	112	113*	102
2	112	112	113*	112
3	112	112	113*	112
4	112	112	113*	112
5	112	112	113*	112
6	112	112	113*	112
10	112	112	113*	112
11	112	112	113*	112
13	112	112	113*	112
14	104	104	107#	95
15	112	112	113*	45
16	112	112	113*	112
17	112	112	113*	112

*The test duration. The test was discontinued after 113 minutes.
Specimen blanked off to allow the test to continue.

Field of Direct Application

General

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

Orientation

Test results are only applicable to the orientation in which the penetration sealing systems were tested.

Test results obtained with flexible supporting walls may be applied to concrete or masonry elements of an overall thickness equal to or greater than that of the element used in the tests. This rule does not apply to pipe closure devices positioned within the supporting construction unless the length of the seal is increased by an equal amount and the distance from the surface of the supporting construction remains the same on both sides.

Service support construction

The distance from the surface of the separating element to the nearest support position for services shall be as tested or less.

Seal size and distances

The test results obtained using standard wall and floor configurations for penetration systems are valid for any penetration size (in terms of linear dimensions) equal to or smaller than that tested, provided the total amount of cross sections of the services (including insulation) does not exceed 60 % of the penetration area, the working clearances are not smaller than the minimum working clearances (as defined in Annex A, B, E and F) used in the test and a blank penetration seal of the maximum seal size desired was tested in addition.

The distance between a single service and the seal edge (annular space, e.g. a1 according to Figures B.7 and E.2) shall remain within the tested range.

Plastic pipes General

Results from a multiple penetration seal may be extended to a single penetration seal of the same type but not vice versa.

Seal size

The maximum pipe closure device size within a design group determined according to E.2.2.1 covers smaller sizes of this design group.

Pipe closure devices

If the thickness of the active component of the pipe closure device is changed (length remains constant) the maximum pipe closure device sizes from the design groups comprising the smallest and the largest pipe closure device sizes cover the size range / design groups in between provided the thickness of their active components is higher than the calculated value from the straight line that connects the maximum and minimum size in a thickness - pipe diameter diagram (see Figure E.8). This interpolation is only permissible if the inner diameter of the smallest pipe closure device included in the test is greater than or equal to 40 mm. NOTE: For further details see H.4.7.2

Pipe end configuration

Test results obtained from tests with “plastic pipes” having both ends uncapped (see Table 2, test condition "U/U") are valid for all other test conditions of Table 2. Test results obtained from tests where a flue gas recovery system was used are valid for pipe end conditions U/C and C/C.

Table E.1 – Field of application rules for pipe end configuration

		Tested			
		U/U	C/U	U/C	C/C
Covered	U/U	Y	N	N	N
	C/U	Y	Y	N	N
	U/C	Y	Y	Y	N
	C/C	Y	Y	Y	Y

Y = acceptable, N = not acceptable

Pipe and insulation material

The pipe and/or insulation material range permitted is the range covered by the test including the critical pipe approach results where applicable.

Test results on pipes made from PVC-U according to EN 1329-1, EN 1453-1 or EN 1452-1 are valid for pipes made from PVC-U according to EN 1329-1, EN 1453-1 and EN 1452-1 as well as pipes made from PVC-C according to EN 1566-1.

Test results on pipes made from PE-HD according to EN 1519-1 or EN 12666-1 are valid for pipes made from PE according to EN 12201, EN 1519-1 and EN 12666-1, for pipes made from ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1.

Pipe wall thickness

Pipe closure devices for pipes without insulation

The range between that tested is covered for a particular size of the pipe closure device. The maximum thickness tested with the maximum size within a design group (see Annex E.2.2.1) of pipe closure device sizes is valid for smaller sizes within the design group. For a design group not included in the test either a linear interpolation between the corners points tested or a step approach as illustrated in Figure E.9 may be used. Where the minimum wall thickness remains the same over several design groups, the design groups representing the maximum and minimum sizes cover the intermediate ones.

Seals other than pipe closure devices

Results of tests coned as specified in the standard configurations may be interpolated for pipes with diameters between those tested and wall thicknesses between those tested.

Pipe orientation

If a pipe was tested perpendicular to the seal as well as oblique, the result is valid for each angle between a right-angle and the angle tested.

Separations

For multiple penetrations the separations a_1 to a_3 from a test coned as specified in the standard configurations may be increased without limitation (see Figure E.1).

Where single pipes penetrate directly through the structural associated construction (masonry walls, flexible walls, concrete floors etc.) the annular space between the pipe and the supporting construction shall remain within the tested range. Separation a_2 may be increased.

For seals other than pipe closure devices the results of a test coned as specified in Option 1 of the standard configurations does not cover 'clusters' of pipes, unless the distances a_3 (Figure E.1) or a_2 (Figure E.2) are > 100 mm in practice. The results of a test coned as specified in Option 2 of the standard configurations covers pipes with linear separation.

Additional rules for pipes fitted with an insulation

Pipe closure devices

In the case where a pipe closure device is used, the maximum pipe closure device size within a design group determined according to E.2.2.1 covers smaller sizes. If the thickness of the active component of the pipe closure device is changed (length remains constant) the maximum pipe closure device sizes from the design groups comprising the smallest and the largest pipe closure device sizes cover the size range / design groups in between provided the thickness of their active components is higher than the calculated value from the straight line that connects the maximum and minimum size in a thickness - pipe diameter diagram (see Figure E.8). In this situation pipe diameter as shown in Figure E.9 equals the sum of the actual pipe diameter and twice the thickness of the insulation.

Tests on non-insulated pipes do not cover insulated pipes.

Seals other than pipe closure devices

Tests with sustained insulation cover interrupted insulation but not vice versa. Tests with sustained insulation do not cover interrupted insulation where the pipe closure device is in direct contact with the pipe.

The thickness of the insulation may be interpolated between tested dimensions

Sample Report

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Sample Report

This report provides a record of the information relating to samples taken by Warringtonfire Testing and Certification Limited trading, or its agent, for certification of the products detailed below.

Job No.	FM412880-1
Manufacturer	TENMAT
Manufacturing site	ASHBURTON RD TRAFFORD PARK MANCHESTER M17 1TA
Place of sampling	AS ABOVE
Traceability information	Date/time of production: 9/4/19 Production unit/line: BEETLE LINE Batch number: Shift: DAY
Product Number/ Description	VENT DUCT SLEEVE/PIPE WRAP
Marking of the product by the manufacturer e.g. label, batch number and date of manufacture	I109MAC085013401800O
Marking of the samples by Warringtonfire Testing and Certification Limited	Job No: WF FM412880 Date: 9/4/19 Signature or initials: AJC
Stock/batch quantity from which samples selected and sample quantity	SAMPLES FROM STOCK
Results of tests and/or inspections during manufacture	PASS FOR DENSITY & EXPANSION (SEE ATTACHED)
Essential Characteristics to be tested ie. Test reference	BS EN 1366-3 PENETRATION SEALS
Samples to be dispatched by manufacturer to *** within *** weeks/month(s)	TEST DATE 23/4/19
Date of sampling	9/4/19
Warringtonfire Testing and Certification Limited notified body number	1121

Signed: (for and on behalf of Manufacturer)	Signed: (for and on behalf of Warringtonfire Testing and Certification Limited)
Print: IAN HAINSWORTH	Print: ANDY CAFE
Date: 9/4/19	Date: 9/4/19

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Sample Report

This report provides a record of the information relating to samples taken by Warringtonfire Testing and Certification Limited trading, or its agent, for certification of the products detailed below.

Job No.	FM412880-2
Manufacturer	TENMAT
Manufacturing site	ASHBURTON RD TRAFFORD PARK MANCHESTER M17 1TJ
Place of sampling	AS ABOVE
Traceability information	Date/time of production: 9/4/19 Production unit/line: BEETLE LINE Batch number: Shift: DAY
Product Number/ Description	VENT DUCT SLEEVE/PIPE WRAP
Marking of the product by the manufacturer e.g. label, batch number and date of manufacture	I109MAC0890228018000
Marking of the samples by Warringtonfire Testing and Certification Limited	Job No: WF FM412880 Date: 9/4/19 Signature or initials: AJC
Stock/batch quantity from which samples selected and sample quantity	SAMPLES FROM STOCK
Results of tests and/or inspections during manufacture	PASS FOR DENSITY & EXPANSION (SEE ATTACHED)
Essential Characteristics to be tested ie. Test reference	BS EN 1366-3 PENETRATION SEALS
Samples to be dispatched by manufacturer to *** within *** weeks/month(s)	TEST DATE 23/4/19
Date of sampling	9/4/19
Warringtonfire Testing and Certification Limited notified body number	1121

Signed: (for and on behalf of Manufacturer)	Signed: (for and on behalf of Warringtonfire Testing and Certification Limited)
Print: IAN HAINSWORTH	Print: ANDY CAFE
Date: 9/4/19	Date: 9/4/19

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Sample Report

This report provides a record of the information relating to samples taken by Warringtonfire Testing and Certification Limited trading, or its agent, for certification of the products detailed below.

Job No.	FM412880-3
Manufacturer	TENMAT
Manufacturing site	ASHBURTON RD TRAFFORD PARK MANCHESTER M17 1TJ
Place of sampling	AS ABOVE
Traceability information	Date/time of production: 9/4/19 Production unit/line: BEETLE LINE Batch number: Shift: DAY
Product Number/ Description	VENT DUCT SLEEVE/PIPE WRAP
Marking of the product by the manufacturer e.g. label, batch number and date of manufacture	I109MA01240244018000
Marking of the samples by Warringtonfire Testing and Certification Limited	Job No: WF FM412880 Date: 9/4/19 Signature or initials: AJC
Stock/batch quantity from which samples selected and sample quantity	SAMPLES FROM STOCK
Results of tests and/or inspections during manufacture	PASS FOR DENSITY & EXPANSION (SEE ATTACHED)
Essential Characteristics to be tested ie. Test reference	BS EN 1366-3 PENETRATION SEALS
Samples to be dispatched by manufacturer to *** within *** weeks/month(s)	TEST DATE 23/4/19
Date of sampling	9/4/19
Warringtonfire Testing and Certification Limited notified body number	1121

Signed: (for and on behalf of Manufacturer)	Signed: (for and on behalf of Warringtonfire Testing and Certification Limited)
Print: IAN HAINSWORTH	Print: ANDY CAFE
Date: 9/4/19	Date: 9/4/19

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Sample Report

This report provides a record of the information relating to samples taken by Warringtonfire Testing and Certification Limited trading, or its agent, for certification of the products detailed below.

Job No.	FM412880-4
Manufacturer	TENMAT
Manufacturing site	ASHBURTON RD TRAFFORD PARK MANCHESTER M17 1TA
Place of sampling	AS ABOVE
Traceability information	Date/time of production: 9/4/19 Production unit/line: BEETLE LINE Batch number: Shift: DAY
Product Number/ Description	VENT DUCT SLEEVE/PIPE WRAP
Marking of the product by the manufacturer e.g. label, batch number and date of manufacture	I109MT0104160018003
Marking of the samples by Warringtonfire Testing and Certification Limited	Job No: WF FM412880 Date: 9/4/19 Signature or initials: AJC
Stock/batch quantity from which samples selected and sample quantity	SAMPLES FROM STOCK
Results of tests and/or inspections during manufacture	PASS FOR DENSITY & EXPANSION (SEE ATTACHED)
Essential Characteristics to be tested ie. Test reference	BS EN 1366-3 PENETRATION SEALS
Samples to be dispatched by manufacturer to *** within *** weeks/month(s)	TEST DATE 23/4/19
Date of sampling	9/4/19
Warringtonfire Testing and Certification Limited notified body number	1121

Signed: (for and on behalf of Manufacturer)	Signed: (for and on behalf of Warringtonfire Testing and Certification Limited)
Print: IAN HAINSWORTH	Print: ANDY CAFE
Date: 9/4/19	Date: 9/4/19

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Sample Report

This report provides a record of the information relating to samples taken by Warringtonfire Testing and Certification Limited trading, or its agent, for certification of the products detailed below.

Job No.	FM412880-5
Manufacturer	TENMAT
Manufacturing site	ASHBURTON RD TRAFFORD PARK MANCHESTER M17 1TA
Place of sampling	AS ABOVE
Traceability information	Date/time of production: 9/4/19 Production unit/line: BEETLE LINE Batch number: Shift: DAY
Product Number/ Description	VENT DUCT SLEEVE/PIPE WRAP
Marking of the product by the manufacturer e.g. label, batch number and date of manufacture	I109MTO1100254018003
Marking of the samples by Warringtonfire Testing and Certification Limited	Job No: WF FM412880 Date: 9/4/19 Signature or initials: AJC
Stock/batch quantity from which samples selected and sample quantity	SAMPLES FROM STOCK
Results of tests and/or inspections during manufacture	PASS FOR DENSITY & EXPANSION (SEE ATTACHED)
Essential Characteristics to be tested ie. Test reference	BS EN 1366-3 PENETRATION SEALS
Samples to be dispatched by manufacturer to *** within *** weeks/month(s)	TEST DATE 23/4/19
Date of sampling	9/4/19
Warringtonfire Testing and Certification Limited notified body number	1121

Signed: (for and on behalf of Manufacturer)	Signed: (for and on behalf of Warringtonfire Testing and Certification Limited)
Print: IAN HAINSWORTH	Print: ANDY CAFE
Date: 9/4/19	Date: 9/4/19

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Sample Report

This report provides a record of the information relating to samples taken by Warringtonfire Testing and Certification Limited trading, or its agent, for certification of the products detailed below.

Job No.	FM412880-6
Manufacturer	TENMAT
Manufacturing site	ASHBURTON RD TRAFFORD PARK MANCHESTER M17 1TD
Place of sampling	AS ABOVE
Traceability information	Date/time of production: 9/4/19 Production unit/line: BEETLE LINE Batch number: Shift: DAY
Product Number/ Description	VENT DUCT SLEEVE/FIRE WRAP
Marking of the product by the manufacturer e.g. label, batch number and date of manufacture	I109MA0158028018000
Marking of the samples by Warringtonfire Testing and Certification Limited	Job No: WF FM412880 Date: 9/4/19 Signature or initials: AJC
Stock/batch quantity from which samples selected and sample quantity	SAMPLES FROM STOCK
Results of tests and/or inspections during manufacture	PASS FOR DENSITY & EXPANSION (SEE ATTACHED)
Essential Characteristics to be tested ie. Test reference	BS EN 1366-3 PENETRATION SEALS
Samples to be dispatched by manufacturer to *** within *** weeks/month(s)	TEST DATE 23/4/19
Date of sampling	9/4/19
Warringtonfire Testing and Certification Limited notified body number	1121

Signed: (for and on behalf of Manufacturer)	Signed: (for and on behalf of Warringtonfire Testing and Certification Limited)
Print: IAN HAINSWORTH	Print: ANDY CAFE
Date: 9/4/19	Date: 9/4/19

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Sample Report

This report provides a record of the information relating to samples taken by Warringtonfire Testing and Certification Limited trading, or its agent, for certification of the products detailed below.

Job No.	FM412880-7
Manufacturer	TENMAT
Manufacturing site	ASHBURTON RD TRAFFORD PARK MANCHESTER M17 1TA
Place of sampling	AS ABOVE
Traceability information	Date/time of production: 9/4/19 Production unit/line: BEETLE LINE Batch number: Shift: DAY
Product Number/ Description	VENT DUCT SLEEVE/PIPE WRAP
Marking of the product by the manufacturer e.g. label, batch number and date of manufacture	I109MA01030134018000
Marking of the samples by Warringtonfire Testing and Certification Limited	Job No: WF FM412880 Date: 9/4/19 Signature or initials: AJC
Stock/batch quantity from which samples selected and sample quantity	SAMPLES FROM STOCK
Results of tests and/or inspections during manufacture	PASS FOR DENSITY & EXPANSION (SEE ATTACHED)
Essential Characteristics to be tested ie. Test reference	BS EN 1366-3 PENETRATION SEALS
Samples to be dispatched by manufacturer to *** within *** weeks/month(s)	TEST DATE 23/4/19
Date of sampling	9/4/19
Warringtonfire Testing and Certification Limited notified body number	1121

Signed: (for and on behalf of Manufacturer)	Signed: (for and on behalf of Warringtonfire Testing and Certification Limited)
Print: IAN HAINSWORTH	Print: ANDY CAFE
Date: 9/4/19	Date: 9/4/19

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Sample Report

This report provides a record of the information relating to samples taken by Warringtonfire Testing and Certification Limited trading, or its agent, for certification of the products detailed below.

Job No.	FM412880 -8
Manufacturer	TENMAT
Manufacturing site	ASHBURTON RD TRAFFORD PARK MANCHESTER M17 1TJ
Place of sampling	AS ABOVE
Traceability information	Date/time of production: 9/4/19 Production unit/line: BEETLE LINE Batch number: Shift: DAY
Product Number/ Description	VENT DUCT SLEEVE/PIPE WRAP
Marking of the product by the manufacturer e.g. label, batch number and date of manufacture	I109MA0127016002800O
Marking of the samples by Warringtonfire Testing and Certification Limited	Job No: WF FM412880 Date: 9/4/19 Signature or initials: AJC
Stock/batch quantity from which samples selected and sample quantity	SAMPLES FROM STOCK
Results of tests and/or inspections during manufacture	PASS FOR DENSITY & EXPANSION (SEE ATTACHED)
Essential Characteristics to be tested ie. Test reference	BS EN 1366-3 PENETRATION SEALS
Samples to be dispatched by manufacturer to *** within *** weeks/month(s)	TEST DATE 23/4/19
Date of sampling	9/4/19
Warringtonfire Testing and Certification Limited notified body number	1121

Signed: (for and on behalf of Manufacturer)	Signed: (for and on behalf of Warringtonfire Testing and Certification Limited)
Print: IAN HAINSWORTH	Print: ANDY CAFE
Date: 9/4/19	Date: 9/4/19

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Sample Report

This report provides a record of the information relating to samples taken by Warringtonfire Testing and Certification Limited trading, or its agent, for certification of the products detailed below.

Job No.	FM412880 -9
Manufacturer	TENMAT
Manufacturing site	ASHBURTON RD TRAFFORD PARK MANCHESTER M17 1TA
Place of sampling	AS ABOVE
Traceability information	Date/time of production: 9/4/19 Production unit/line: BEETLE LINE Batch number: Shift: DAY
Product Number/ Description	VENT DUCT SLEEVE/PIPE WRAP
Marking of the product by the manufacturer e.g. label, batch number and date of manufacture	I109MA1588200028000
Marking of the samples by Warringtonfire Testing and Certification Limited	Job No: WF FM412880 Date: 9/4/19 Signature or initials: AJC
Stock/batch quantity from which samples selected and sample quantity	SAMPLES FROM STOCK
Results of tests and/or inspections during manufacture	PASS FOR DENSITY & EXPANSION (SEE ATTACHED)
Essential Characteristics to be tested ie. Test reference	BS EN 1366-3 PENETRATION SEALS
Samples to be dispatched by manufacturer to *** within *** weeks/month(s)	TEST DATE 23/4/19
Date of sampling	9/4/19
Warringtonfire Testing and Certification Limited notified body number	1121

Signed: [signature] (for and on behalf of Manufacturer)	Signed: [signature] (for and on behalf of Warringtonfire Testing and Certification Limited)
Print: IAN HAINSWORTH	Print: ANDY CAFE
Date: 9/4/19	Date: 9/4/19

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Sample Report

This report provides a record of the information relating to samples taken by Warringtonfire Testing and Certification Limited trading, or its agent, for certification of the products detailed below.

Job No.	FM412880 -10
Manufacturer	TENMAT
Manufacturing site	ASHBURTON RD TRAFFORD PARK MANCHESTER M17 1TA
Place of sampling	AS ABOVE
Traceability information	Date/time of production: 9/4/19 Production unit/line: BEETLE LINE Batch number: Shift: DAY
Product Number/ Description	VENT DUCT SLEEVE/PIPE WRAP
Marking of the product by the manufacturer e.g. label, batch number and date of manufacture	I109MA0103016401S000
Marking of the samples by Warringtonfire Testing and Certification Limited	Job No: WF FM412880 Date: 9/4/19 Signature or initials: AJC
Stock/batch quantity from which samples selected and sample quantity	SAMPLES FROM STOCK
Results of tests and/or inspections during manufacture	PASS FOR DENSITY & EXPANSION (SEE ATTACHED)
Essential Characteristics to be tested ie. Test reference	BS EN 1366-3 PENETRATION SEALS
Samples to be dispatched by manufacturer to *** within *** weeks/month(s)	TEST DATE 23/4/19
Date of sampling	9/4/19
Warringtonfire Testing and Certification Limited notified body number	1121

Signed: (for and on behalf of Manufacturer)	Signed: (for and on behalf of Warringtonfire Testing and Certification Limited)
Print: IAN HAINSWORTH	Print: ANDY CAFE
Date: 9/4/19	Date: 9/4/19

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Sample Report

This report provides a record of the information relating to samples taken by Warringtonfire Testing and Certification Limited trading, or its agent, for certification of the products detailed below.

Job No.	FM412880-11
Manufacturer	TENMAT
Manufacturing site	ASHBURTON RD TRAFFORD PARK MANCHESTER M17 1TA
Place of sampling	AS ABOVE
Traceability information	Date/time of production: 9/4/19 Production unit/line: BEETLE LINE Batch number: Shift: DAY
Product Number/ Description	VENT DUCT SLEEVE/PIPE WRAP
Marking of the product by the manufacturer e.g. label, batch number and date of manufacture	I109MA0127019C020000
Marking of the samples by Warringtonfire Testing and Certification Limited	Job No: WF FM412880 Date: 9/4/19 Signature or initials: AJC
Stock/batch quantity from which samples selected and sample quantity	SAMPLES FROM STOCK
Results of tests and/or inspections during manufacture	PASS FOR DENSITY & EXPANSION (SEE ATTACHED)
Essential Characteristics to be tested ie. Test reference	BS EN 1366-3 PENETRATION SEALS
Samples to be dispatched by manufacturer to *** within *** weeks/month(s)	TEST DATE 23/4/19
Date of sampling	9/4/19
Warringtonfire Testing and Certification Limited notified body number	1121

Signed: (for and on behalf of Manufacturer)	Signed: (for and on behalf of Warringtonfire Testing and Certification Limited)
Print: IAN HAINSWORTH	Print: ANDY CAFE
Date: 9/4/19	Date: 9/4/19

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Sample Report

This report provides a record of the information relating to samples taken by Warringtonfire Testing and Certification Limited trading, or its agent, for certification of the products detailed below.

Job No.	FM412880-12
Manufacturer	TENMAT
Manufacturing site	ASHBURTON RD TRAFFORD PARK MANCHESTER M17 1TA
Place of sampling	AS ABOVE
Traceability information	Date/time of production: 9/4/19 Production unit/line: BEETLE LINE Batch number: Shift: DAY
Product Number/ Description	VENT DUCT SLEEVE/PIPE WRAP
Marking of the product by the manufacturer e.g. label, batch number and date of manufacture	I109MA01S80222018001
Marking of the samples by Warringtonfire Testing and Certification Limited	Job No: WF FM412880 Date: 9/4/19 Signature or initials: AJC
Stock/batch quantity from which samples selected and sample quantity	SAMPLES FROM STOCK
Results of tests and/or inspections during manufacture	PASS FOR DENSITY & EXPANSION (SEE ATTACHED)
Essential Characteristics to be tested ie. Test reference	BS EN 1366-3 PENETRATION SEALS
Samples to be dispatched by manufacturer to *** within *** weeks/month(s)	TEST DATE 23/4/19
Date of sampling	9/4/19
Warringtonfire Testing and Certification Limited notified body number	1121

Signed: [signature] (for and on behalf of Manufacturer)	Signed: [signature] (for and on behalf of Warringtonfire Testing and Certification Limited)
Print: IAN HAINSWORTH	Print: ANDY CAFE
Date: 9/4/19	Date: 9/4/19

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Sample Report

This report provides a record of the information relating to samples taken by Warringtonfire Testing and Certification Limited trading, or its agent, for certification of the products detailed below.

Job No.	FM412880 – 13
Manufacturer	TENMAT
Manufacturing site	ASHBURTON RD TRAFFORD PARK MANCHESTER M17 1TJ
Place of sampling	AS ABOVE
Traceability information	Date/time of production: 9/4/19 Production unit/line: BEETLE LINE Batch number: Shift: DAY
Product Number/ Description	VENT DUCT SLEEVE/PIPE WRAP
Marking of the product by the manufacturer e.g. label, batch number and date of manufacture	I109MB0034008403000O
Marking of the samples by Warringtonfire Testing and Certification Limited	Job No: WF FM412880 Date: 9/4/19 Signature or initials: AJC
Stock/batch quantity from which samples selected and sample quantity	SAMPLES FROM STOCK
Results of tests and/or inspections during manufacture	PASS FOR DENSITY & EXPANSION (SEE ATTACHED)
Essential Characteristics to be tested ie. Test reference	BS EN 1366-3 PENETRATION SEALS
Samples to be dispatched by manufacturer to *** within *** weeks/month(s)	TEST DATE 23/4/19
Date of sampling	9/4/19
Warringtonfire Testing and Certification Limited notified body number	1121

Signed: (for and on behalf of Manufacturer)	Signed: (for and on behalf of Warringtonfire Testing and Certification Limited)
Print: IAN HAINSWORTH	Print: ANDY CAFE
Date: 9/4/19	Date: 9/4/19

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Sample Report

This report provides a record of the information relating to samples taken by Warringtonfire Testing and Certification Limited trading, or its agent, for certification of the products detailed below.

Job No.	FM412880-14
Manufacturer	TENMAT
Manufacturing site	ASHBURTON RD TRAFFORD PARK MANCHESTER M17 1TA
Place of sampling	AS ABOVE
Traceability information	Date/time of production: 9/4/19 Production unit/line: BEETLE LINE Batch number: Shift: DAY
Product Number/ Description	VENT DUCT SLEEVE/FIRE WRAP
Marking of the product by the manufacturer e.g. label, batch number and date of manufacture	I109MB0042009203000O
Marking of the samples by Warringtonfire Testing and Certification Limited	Job No: WF FM412880 Date: 9/4/19 Signature or initials: AJC
Stock/batch quantity from which samples selected and sample quantity	SAMPLES FROM STOCK
Results of tests and/or inspections during manufacture	PASS FOR DENSITY & EXPANSION (SEE ATTACHED)
Essential Characteristics to be tested ie. Test reference	BS EN 1366-3 PENETRATION SEALS
Samples to be dispatched by manufacturer to *** within *** weeks/month(s)	TEST DATE 23/4/19
Date of sampling	9/4/19
Warringtonfire Testing and Certification Limited notified body number	1121

Signed: (for and on behalf of Manufacturer)	Signed: (for and on behalf of Warringtonfire Testing and Certification Limited)
Print: IAN HAINSWORTH	Print: ANDY GAFE
Date: 9/4/19	Date: 9/4/19

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Sample Report

This report provides a record of the information relating to samples taken by Warringtonfire Testing and Certification Limited trading, or its agent, for certification of the products detailed below.

Job No.	FM412880 -15
Manufacturer	TENMAT
Manufacturing site	ASHBURTON RD TRAFFORD PARK MANCHESTER M17 1TJ
Place of sampling	AS ABOVE
Traceability information	Date/time of production: 9/4/19 Production unit/line: BEETLE LINE Batch number: Shift: DAY
Product Number/ Description	VENT DUCT SLEEVE/PIPE WRAP
Marking of the product by the manufacturer e.g. label, batch number and date of manufacture	I109MB00540104030000
Marking of the samples by Warringtonfire Testing and Certification Limited	Job No: WF FM412880 Date: 9/4/19 Signature or initials: AJC
Stock/batch quantity from which samples selected and sample quantity	SAMPLES FROM STOCK
Results of tests and/or inspections during manufacture	PASS FOR DENSITY & EXPANSION (SEE ATTACHED)
Essential Characteristics to be tested ie. Test reference	BS EN 1366-3 PENETRATION SEALS
Samples to be dispatched by manufacturer to *** within *** weeks/month(s)	TEST DATE 23/4/19
Date of sampling	9/4/19
Warringtonfire Testing and Certification Limited notified body number	1121

Signed: (for and on behalf of Manufacturer)	Signed: (for and on behalf of Warringtonfire Testing and Certification Limited)
Print: IAN HAINSWORTH	Print: ANDY CAFE
Date: 9/4/19	Date: 9/4/19

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Sample Report

This report provides a record of the information relating to samples taken by Warringtonfire Testing and Certification Limited trading, or its agent, for certification of the products detailed below.

Job No.	FM412880-16
Manufacturer	TENMAT
Manufacturing site	ASHBURTON RD TRAFFORD PARK MANCHESTER M17 1TA
Place of sampling	AS ABOVE
Traceability information	Date/time of production: 9/4/19 Production unit/line: BEETLE LINE Batch number: Shift: DAY
Product Number/ Description	VENT DUCT SLEEVE/PIPE WRAP
Marking of the product by the manufacturer e.g. label, batch number and date of manufacture	I109MB0108015803000D
Marking of the samples by Warringtonfire Testing and Certification Limited	Job No: WF FM412880 Date: 9/4/19 Signature or initials: AJC
Stock/batch quantity from which samples selected and sample quantity	SAMPLES FROM STOCK
Results of tests and/or inspections during manufacture	PASS FOR DENSITY & EXPANSION (SEE ATTACHED)
Essential Characteristics to be tested ie. Test reference	BS EN 1366-3 PENETRATION SEALS
Samples to be dispatched by manufacturer to *** within *** weeks/month(s)	TEST DATE 23/4/19
Date of sampling	9/4/19
Warringtonfire Testing and Certification Limited notified body number	1121

Signed: (for and on behalf of Manufacturer)	Signed: (for and on behalf of Warringtonfire Testing and Certification Limited)
Print: IAN HAINSWORTH	Print: ANDY CAFE
Date: 9/4/19	Date: 9/4/19

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Sample Report

This report provides a record of the information relating to samples taken by Warringtonfire Testing and Certification Limited trading, or its agent, for certification of the products detailed below.

Job No.	FM412880-17
Manufacturer	TENMAT
Manufacturing site	ASHBURTON RD TRAFFORD PARK MANCHESTER M17 1TA
Place of sampling	AS ABOVE
Traceability information	Date/time of production: 9/4/19 Production unit/line: BEETLE LINE Batch number: Shift: DAY
Product Number/ Description	VENT DUCT SLEEVE/PIPE WRAP
Marking of the product by the manufacturer e.g. label, batch number and date of manufacture	I109MAC0830134018000
Marking of the samples by Warringtonfire Testing and Certification Limited	Job No: WF FM412880 Date: 9/4/19 Signature or initials: AJC
Stock/batch quantity from which samples selected and sample quantity	SAMPLES FROM STOCK
Results of tests and/or inspections during manufacture	PASS FOR DENSITY & EXPANSION (SEE ATTACHED)
Essential Characteristics to be tested ie. Test reference	BS EN 1366-3 PENETRATION SEALS
Samples to be dispatched by manufacturer to *** within *** weeks/month(s)	TEST DATE 23/4/19
Date of sampling	9/4/19
Warringtonfire Testing and Certification Limited notified body number	1121

Signed: (for and on behalf of Manufacturer)	Signed: (for and on behalf of Warringtonfire Testing and Certification Limited)
Print: IAN HAINSWORTH	Print: ANDY CAFE
Date: 9/4/19	Date: 9/4/19