

WFRC REPORT No. 136507

**A report on an Ad Hoc fire
resistance test performed on two
different eaves vents when built
into a simulated timber eave
construction**

Executive Summary

Objective To determine the fire resistance performance of two different eaves vents which utilised the heating conditions and failure criteria given in EN 1363-1:1999.

Test Sponsor **Sealmaster (a division of Dixon International Group Limited).**

Address Brewery Road, Pampisford, Cambridge, United Kingdom, CB2 4HG.

Summary of Tested Specimen Two differing eaves vents were mounted within a simulated eaves section of a roof and subjected to a heating regime, from below.

The test construction had overall nominal dimensions of 1182 mm by 1180 mm and included two air transfer grilles each of nominal dimensions 500 mm by 150 mm.

Evaluation The following results should not be taken to show compliance with a Test Standard.

Test Results:	Specimen A	Specimen B
	(Sealmaster 4 layer eaves vent)	(Sealmaster 3 layer eaves vent)

Integrity performance	47 minutes	44 minutes
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Insulation performance	47 minutes	41 minutes
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The test was discontinued after a period of 47 minutes

Date of Test The test was conducted on 12th December 2003

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Signatories

Responsible Officer R Wakefield*

Approved CW Miles*

* For and on behalf of Warrington Fire Research Centre.

Report Issued: 23 rd June 2004

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Test Procedure

Introduction

In the scenario where fire within a building breaks through a window opening, there is a risk that this could spread (to attic spaces and/or neighbouring properties) via vented eaves. A possible solution is to provide fire-safe vents into an otherwise closed (fire-rated) eave.

This test was concerned with proving two Sealmaster passive eaves vents, under fire resistance test conditions.

The eaves vents were evaluated using the integrity and insulation failure methods given in EN 1363-1:1999, as there is no specific Test Standard for ventilation grilles.

Procedure

The information enclosed relates to an investigation which utilised the heating and pressure conditions given in EN 1363-1:1999. Due to the lack of a specific Standard for these components, the full requirements of a Standard are not available. However, EN 1363-1:1999 was used as the basis for the test.

The information is provided for the test sponsor's information only and should not be used to demonstrate performance against a Test Standard nor compliance with a regulatory requirement due to the Ad Hoc nature of the test.

The timber supporting construction was mounted to form the top horizontal face of a 1 m³ gas fired furnace, the temperature rise of which was controlled to conform with the relationship given in EN 1363-1:1999. The pressure within the furnace chamber was controlled to equal 20 Pa (± 5 Pa)

The test was not conducted under the requirements of UKAS accreditation.

Instruction to test

The test was conducted at the request of Sealmaster, the sponsor of the test.

Test Specimen Construction

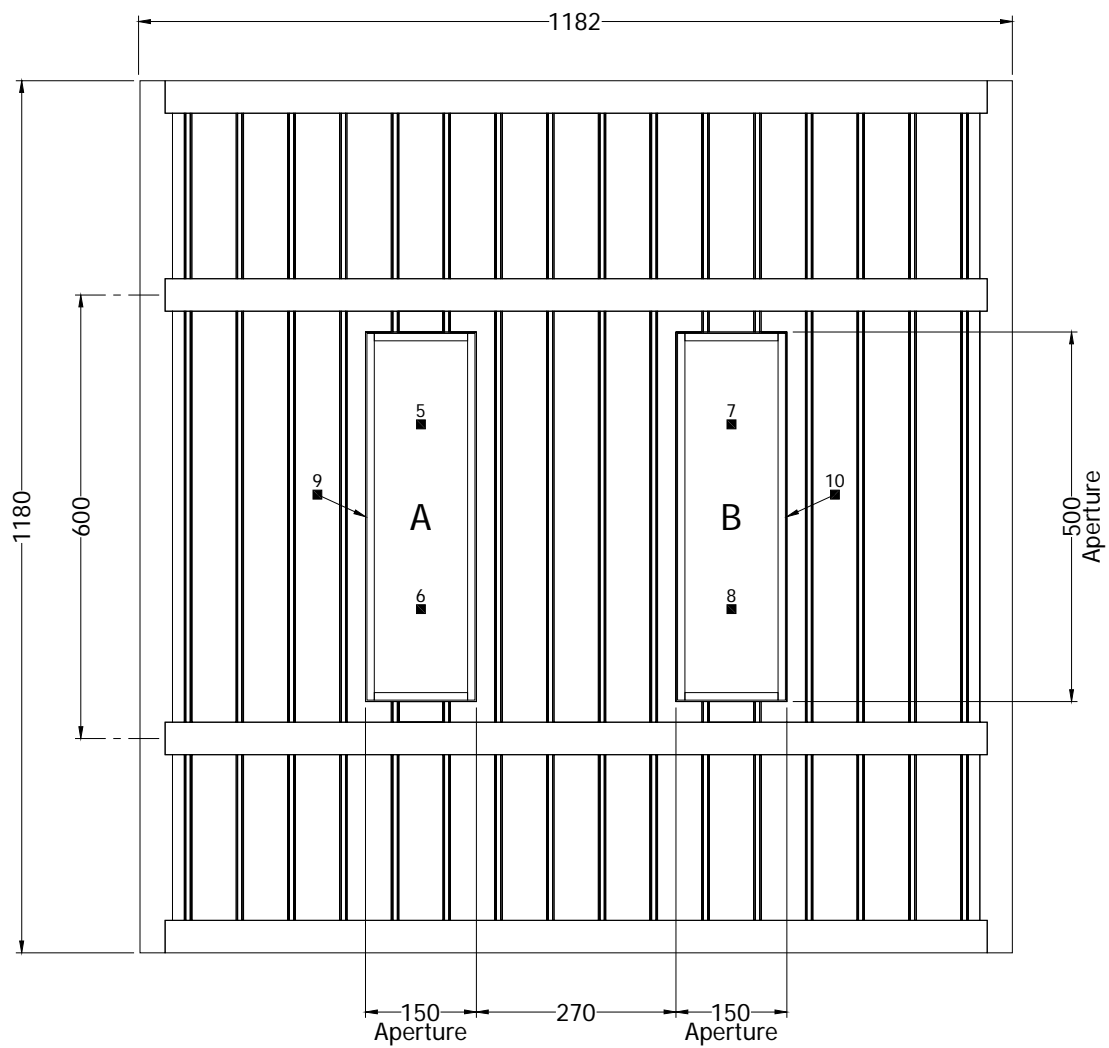
The test construction had overall nominal dimensions of 1182 mm by 1180 mm and included two air transfer grilles each of nominal dimensions 500 mm by 150 mm.

For the purposes of the test the air transfer grilles were referenced Specimen A and Specimen B, construction details of each are included within Figures 1 to 5 of this report.

A comprehensive description of the test construction is given in the Schedule of Components. The description is based on information supplied by Sealmaster and verified by Warrington Fire Research Centre prior to the test.

Test Specimen

Figure 1- General Arrangement Of Test Construction



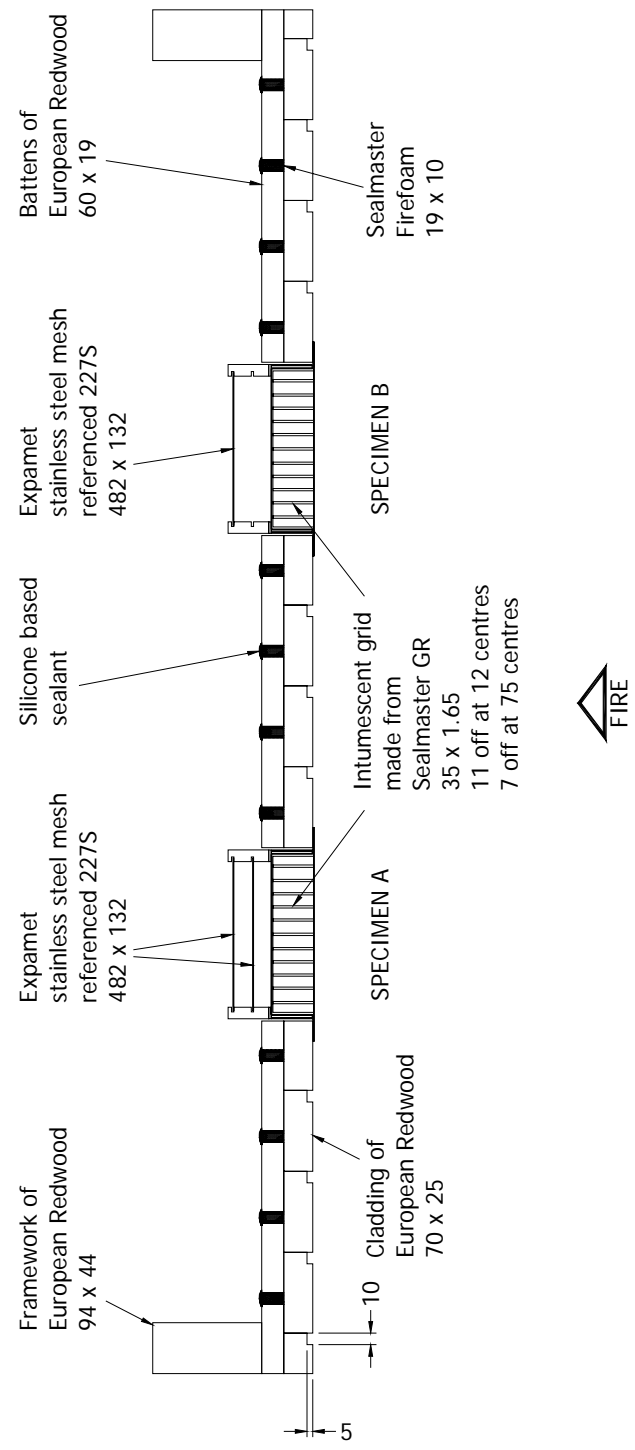
PLAN VIEW

■ Positions of thermocouples

Do not scale. All dimensions are in mm

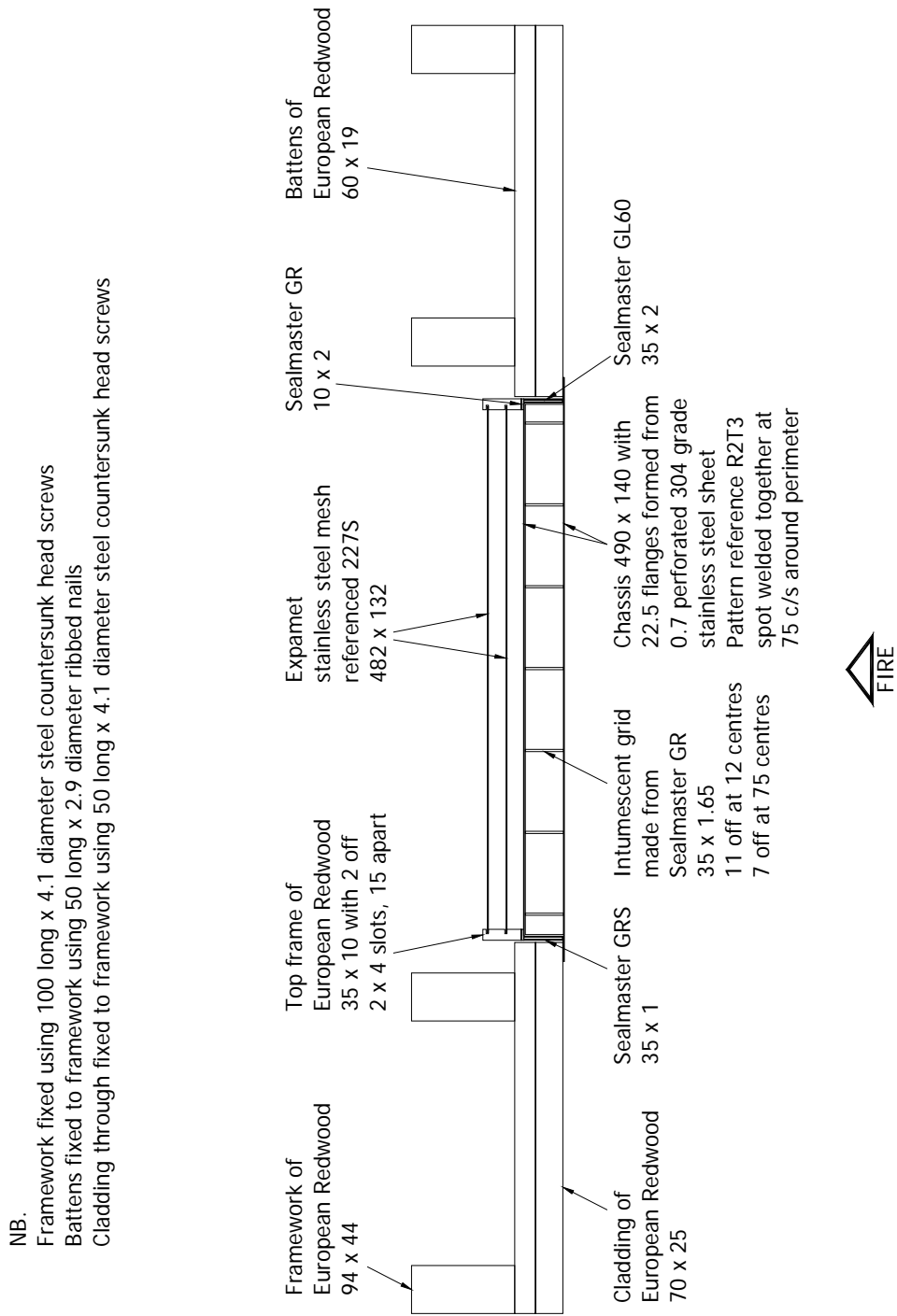
Figure 2 – Lateral Section Through Test Construction

NB.
 Framework fixed using 100 long x 4.1 diameter steel countersunk head screws
 Battens fixed to framework using 50 long x 2.9 diameter ribbed nails
 Cladding through fixed to framework using 50 long x 4.1 diameter steel countersunk head screws



Do not scale. All dimensions are in mm

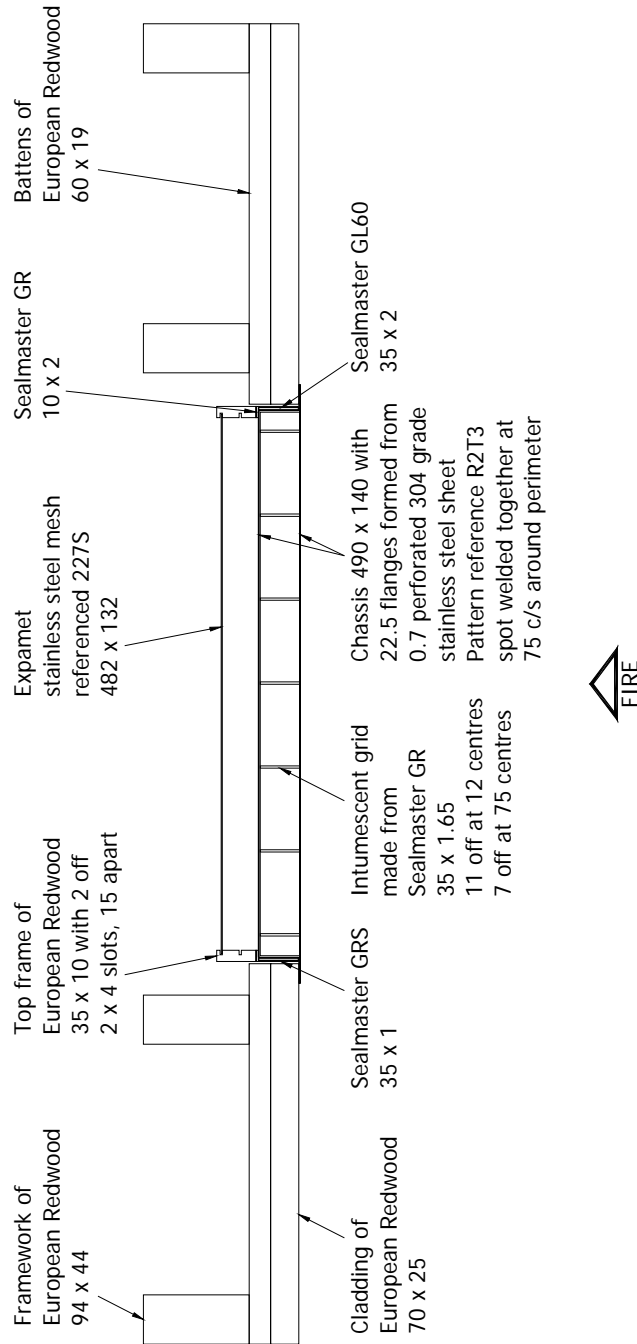
Figure 3 – Longitudinal Section Through Specimen A



Do not scale. All dimensions are in mm

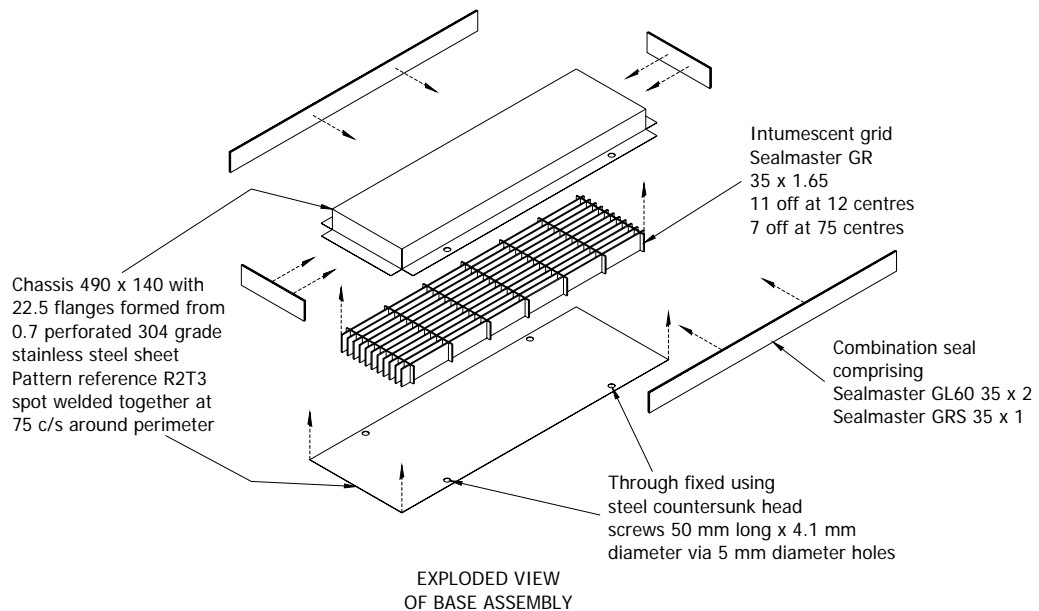
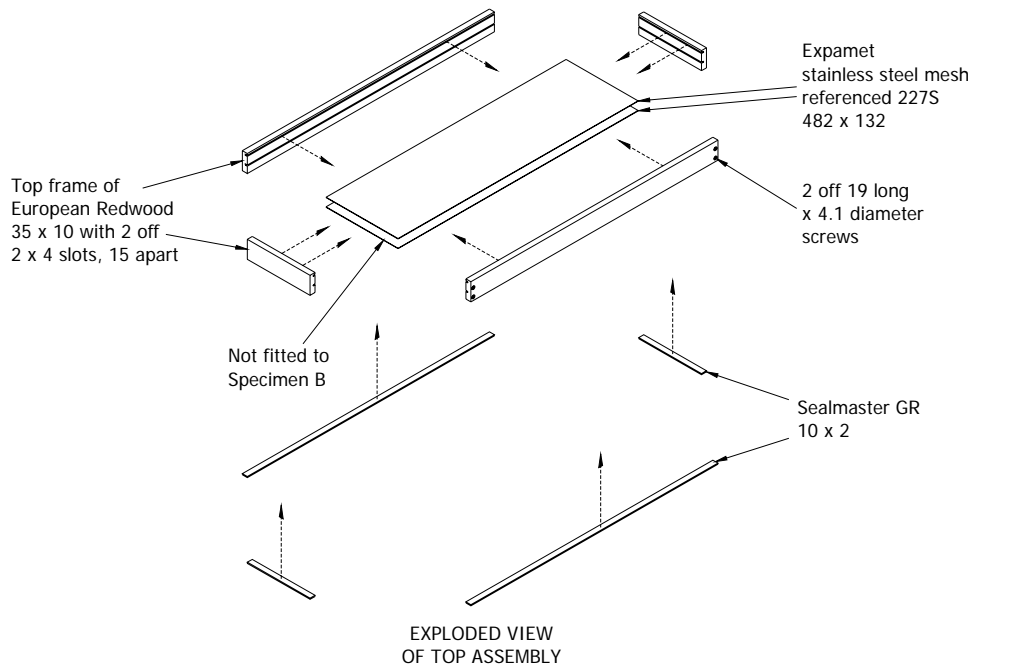
Figure 4 – Longitudinal Section Through Specimen B

NB.
 Framework fixed using 100 long x 4.1 diameter steel countersunk head screws
 Battens fixed to framework using 50 long x 2.9 diameter ribbed nails
 Cladding through fixed to framework using 50 long x 4.1 diameter steel countersunk head screws



Do not scale. All dimensions are in mm

Figure 5 – Exploded Views Of Specimens



Do not scale. All dimensions are in mm

Test Observations

Time	The ambient air temperature in the vicinity of the test construction was 14°C at the start of the test with no variation during the test.	
mins	secs	All observations are from the unexposed face unless noted otherwise.
00	00	The test commences.
00	30	A cotton pad is applied to Specimen B and failed to ignite (furnace pressure still negative).
01	30	Flames issue from the exposed face of the assembly.
02	30	Flaming can be seen within the furnace through both air transfer grilles.
05	30	Smoke has begun to issue from both air transfer grilles.
07	00	Large volumes of flames issue within the furnace.
09	30	There is no flaming visible through the air transfer grilles within the furnace. Smoke continues to issue from the air transfer grilles.
12	30	Loud cracking noises emanate from the specimens.
17	00	The smoke issuing from the air transfer grilles has reduced.
17	30	Large volumes of flames continues to issue within the furnace chamber.
19	00	The timber edges of both specimens have begun to blacken where they penetrate through the timber supporting construction.
21	00	The grill on the unexposed face of each specimen has begun to blacken around its edges. Smoke continues to issue through the air transfer grilles.
30	00	A cotton pad is applied to Specimen B and fails to ignite.
33	00	Small areas of burn through have begun to appear in the timber slats.
38	00	The smoke release continues to increase from both the timber assembly and the air transfer grilles.

Time

mins secs

- 41 40** Specimen B records a temperature rise in excess of 180°C. **Inulation failure of the 3 layer vent is considered to occur**
- 42 40** Large volumes of smoke are now issuing from Specimen B glowing can be seen within.
- 44 20** A cotton pad is applied to Specimen B, which ignites. **Integrity failure of the 3 layer vent is considered to occur**
- 44 40** Flames issue from Specimen B.
- 46 00** A cotton pad is applied to Specimen A, which fails to ignite.
- 47 00** Sustained flames issue from the timber around Specimen A. **Integrity and insulation failure of the 4 layer vent is considered to occur**

The test is discontinued.

Table Showing Specified And Actual Furnace Temperatures

Time Mins	Specified Furnace Temperature Deg. C	Actual Furnace Temperature Deg. C
0	20	46
2	445	424
4	544	508
6	603	609
8	645	619
10	678	700
12	705	710
14	728	718
16	748	743
18	766	761
20	781	778
22	796	796
24	809	808
26	820	820
28	832	830
30	842	843
32	851	853
34	860	863
36	869	868
38	877	877
40	885	887
42	892	888
44	899	897
46	906	905
47	909	905

Table Showing Temperatures Recorded On The Unexposed Surface Of The Specimens

Time	T/C	T/C	T/C	T/C
Mins	Number	Number	Number	Number
	5	6	7	8
	Deg. C	Deg. C	Deg. C	Deg. C
0	15	15	15	16
2	16	16	18	18
4	16	17	18	18
6	56	70	60	60
8	53	66	55	53
10	63	53	55	51
12	78	46	64	57
14	87	47	73	62
16	103	52	80	67
18	102	60	97	74
20	99	68	105	83
22	102	76	110	90
24	106	83	116	101
26	118	89	125	109
28	128	96	136	121
30	137	102	152	132
32	137	110	162	147
34	133	120	170	146
36	131	126	176	149
38	139	134	178	153
40	145	136	187	156
42	158	138	202	160
44	169	142	704	520
46	184	144	830	828
47	370	195	895	883

Figure 1 shows thermocouple positions

Table Showing Temperatures Recorded On The Unexposed Surface Of The Specimens

Time Mins	T/C Number 9 Deg. C	T/C Number 10 Deg. C
0	20	19
2	18	18
4	18	18
6	18	18
8	24	23
10	29	26
12	33	29
14	34	31
16	37	35
18	40	39
20	47	43
22	54	47
24	62	52
26	70	57
28	76	62
30	81	67
32	84	70
34	87	74
36	89	77
38	89	79
40	91	81
42	92	82
44	93	99
46	99	180
47	118	326

Figure 1 shows thermocouple positions

Ongoing Implications

Limitations	<p>This report details the method of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the Ad Hoc procedure outlined in the report. Any significant deviation is not covered by this report.</p> <p>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.</p>
Review	<p>The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over five years old should be considered by the user. The laboratory that issued the report will be able to offer, on behalf of the legal owner, a review of the procedures adopted for a particular test to ensure that they are consistent with current practices, and if required may endorse the test report.</p>

Conclusions

Evaluation against objective	<p>The evaluation of the eaves vents against the requirements set out in this report, show that the two Sealmaster Eaves vents are capable of restricting the passage of flames and/or hot gases, when subjected to an Ad Hoc fire test of the type described herein, for a period of at least 41 minutes.</p>
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