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Title:

The Fire Resistance
Performance Of Dana Lim
'Fire Guard S 564' Linear
Joint Seals

**WF Assessment Report
No:**

331372

Prepared for:

Dana Lim

KOBENHAVNSVEJ 220
DK-4600
Denmark

Date:

16th July 2013

TABLE OF CONTENTS

SECTION	PAGE
Executive Summary.....	3
Introduction	4
Assumptions	4
Proposals	4
Basic Test Evidence	4
Assessed Performance	7
Conclusions	9
Validity	9
Summary of Primary Supporting Data	10
Declaration by Dana Lim	14
Signatories	15
Annex.....	16

Executive Summary

Objective	This report presents an appraisal of the fire resistance performance of 'Fire Guard S 564' linear gap sealing systems when used in various supporting constructions, if tested in accordance with BS EN 1366-4: 2006.
Report Sponsor	Dana Lim
Address	KOBENHAVNSVEJ 220 DK-4600 Denmark
Summary of Conclusions	Should the recommendations given in this report be followed, it can be concluded that 'Fire Guard S 564' linear gap seals, should provide up to 300 minutes integrity and insulation performance depending upon dimensions and supporting construction (as shown in the Annex to this report), if tested in accordance with BS EN 1366-4: 2006.
Valid until	1 st July 2018

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Introduction

This report provides a considered opinion regarding the fire resistance performance of 'Fire Guard S 564' wall and floor mounted linear gap sealing systems.

The proposed linear gap seals are required to provide up to 300 minutes integrity and insulation performance with respect to BS EN 1366-4: 2006, when installed into various supporting constructions.

FTSG

The data referred to in the supporting data section has been considered for the purpose of this appraisal which has been prepared in accordance with the Fire Test Study Group Resolution No. 82: 2001.

Assumptions

Installation

It is assumed that the sealants will be installed into the gaps in the proposed supporting construction in a similar manner to the tested specimens and that adequate curing time will be provided.

Elements of construction

It is assumed that the joint seals will be installed into joints between walls and floor which are at least 150 mm deep and that the elements of construction will have at least the same fire rating as that required of the seal.

Proposals

It is proposed that 'Fire Guard S 564' linear gap sealing systems will provide up to 300 minutes integrity and insulation performance, when used in various supporting constructions, if tested in accordance with BS EN 1366-4: 2006.

Basic Test Evidence

WF No. 181970

The test referenced WF No. 181970 and described briefly in the supporting data section of this report describes a fire resistance test in accordance with BS EN 1366-4: 2006, on six specimens of horizontal and six specimens of vertical linear joint sealing systems.

The test demonstrated the ability of the seals to provide the following performances:

Ref.	Gap width	Seal depth	Gap face	Backing material	Integrity	Insulation
A (Floor)	12 mm	6 mm	AAC/ AAC	PE-Rod	244 mins	122 mins
B (Floor)	30 mm	15 mm	AAC/ AAC	PE-Rod	300 mins	186 mins
C (Floor)	50 mm	25 mm	AAC/ AAC	PE-Rod	246 mins	65 mins
D (Floor)	12 mm	6 mm	AAC/ Steel	PE-Rod	300 mins	48 mins
E (Floor)	30 mm	15 mm	AAC/ Steel	PE-Rod	300 mins	43 mins
F (Floor)	50 mm	25 mm	AAC/ Steel	PE-Rod	229 mins	33 mins
G (Wall)	12 mm	6 mm (double)	AAC/ AAC	PE-Rod	300 mins	300 mins
H (Wall)	30 mm	15 mm (double)	AAC/ AAC	PE-Rod	300 mins	300 mins
I (Wall)	12 mm	6 mm (double)	AAC/ SW	PE-Rod	199 mins	145 mins
J (Wall)	30 mm	15 mm (double)	AAC/ SW	PE-Rod	143 mins	143 mins
K (Wall)	12 mm	6 mm (double)	AAC/ HW	PE-Rod	208 mins	208 mins
L (Wall)	12 mm	6 mm	AAC/ Steel	PE-Rod	300 mins	69 mins

WF No. 181968

The test referenced WF No. 181968 and described briefly in the supporting data section of this report describes a fire resistance test in accordance with BS EN 1366-4: 2006, on twelve specimens of vertical linear joint sealing systems.

The test demonstrated the ability of the seals to provide the following performances:

Ref.	Gap width	Seal depth	Gap face	Backing material	Integrity	Insulation
A	50 mm	25 mm (Double)	AAC/ Steel	PE-Rod	300 mins	130 mins
B	30 mm	15 mm (Double)	AAC/ Steel	PE-Rod	290 mins	115 mins
C	50 mm	25 mm (Double)	AAC/ HW	PE-Rod	186 mins	163 mins
D	30 mm	15 mm (Double)	AAC/ HW	PE-Rod	161 mins	147 mins
E	50 mm	25 mm (Double)	AAC/ SW	PE-Rod	203 mins	203 mins
F	50 mm	25 mm (Double)	AAC/ AAC	PE-Rod	300 mins	300 mins
G	50 mm	25 mm (Double)	AAC/ AAC	PE-Rod	300 mins	300 mins
H	50 mm	25 mm (Double)	AAC/ SW	PE-Rod	284 mins	284 mins
I	30 mm	15 mm (Double)	AAC/ HW	PE-Rod	285 mins	285 mins
J	50 mm	25 mm (Double)	AAC/ HW	PE-Rod	240 mins	240 mins
K	30 mm	15 mm (double)	AAC/ Steel	PE-Rod	300 mins	97 mins
L	50 mm	25 mm (Double)	AAC/ Steel	PE-Rod	300 mins	154 mins

Assessed Performance

Alternative seal dimensions

The tests referenced WF Nos. 181968 & 181970 were specifically designed to provide 'corner point' data for the interpolation of 'Fire Guard S 564' joint seals with a 2:1 width to depth ratio for use in gaps between 12 and 50 mm wide. Additionally a selection of different substrates were represented in the tests to reflect joints between various elements of construction.

With each substrate type, the following seal dimensions were therefore tested:

- 12 mm wide x 6 mm deep
- 30 mm wide x 15 mm deep
- 50 mm wide x 25 mm

Horizontally oriented seals were single sided, positioned with the sealant flush to the top side of the floor and vertically oriented seals were double-sided, flush to both faces of the wall.

Since a consistent aspect ratio was utilised for the test specimens, it is reasonable to assume that, where the performance achieved by all specimen sizes for a particular substrate are identical, then by maintaining this ratio, the performance intermediate seal sizes would also be expected to provide the same performance.

Where the performance of the seals varies depending upon joint width, a conservative approach may be adopted to interpolating intermediate sizes, by utilising the performance of the specimen which provided the shortest integrity and/or insulation time. This may be further divided into performances appraised between 12 to 30 mm widths and 31 to 50 mm widths etc. by using the intermediate 30 x 15 mm seal performance, where the data supports this.

The following seal dimensions and performances (rounded down to periods reflecting building regulations) are therefore appraised on the basis of the above principles, for each substrate individually:

AAC/AAC Walls (double-seals)

Gap width	Joint seal width/ depth ratio	Backing material	Integrity	Insulation
12 - 50 mm	2:1	PE-Rod	300 mins	300 mins

**AAC/Softwood
Walls (double-
seals)**

Gap width	Joint seal width/ depth ratio	Backing material	Integrity	Insulation
12 mm	2:1	PE-Rod	180 mins	120 mins
13 - 50 mm	2:1	PE-Rod	120 mins	120 mins

**AAC/Hardwood
Walls (double-
seals)**

Gap width	Joint seal width/ depth ratio	Backing material	Integrity	Insulation
12 - 30 mm	2:1	PE-Rod	120 mins	120 mins
31 - 50 mm	2:1	PE-Rod	240 mins	240 mins

**AAC/Mild Steel
Walls (double-
seals)**

Gap width	Joint seal width/ depth ratio	Backing material	Integrity	Insulation
12 - 30 mm	2:1	PE-Rod	300 mins	60 mins
31 - 49 mm	2:1	PE-Rod	300 mins	90 mins
50 mm	2:1	PE-Rod	300 mins	120 mins

AAC/AAC Floors

Gap width	Joint seal width/ depth ratio	Backing material	Integrity	Insulation
12 -30 mm	2:1	PE-Rod	240 mins	120 mins
31 - 50 mm	2:1	PE-Rod	240 mins	60 mins

**AAC/Mild Steel
Floors**

Gap width	Joint seal width/ depth ratio	Backing material	Integrity	Insulation
12 - 30 mm	2:1	PE-Rod	300 mins	30 mins
31 - 50 mm	2:1	PE-Rod	180 mins	30 mins

Colours

It is proposed that the colour of the seals may be changed from the white tested to various alternatives. Addition of pigments to the sealant to alter the colour is for aesthetic purposes only and would not be expected to have any effect on the fire resistance performance of the seals

Conclusions

'Fire Guard S 564' linear gap seals, should provide up to 300 minutes integrity and insulation performance depending upon dimensions and supporting construction (as shown in the Annex to this report), if tested in accordance with BS EN 1366-4: 2006.

Validity

This assessment is issued on the basis of test data and information available at the time of issue. If contradictory evidence becomes available to **warringtonfire** the assessment will be unconditionally withdrawn and **Dana Lim** will be notified in writing. Similarly the assessment is invalidated if the assessed construction is subsequently tested because actual test data is deemed to take precedence over an expressed opinion. The assessment is valid initially for a period of five years i.e. until 1st July 2018, after which time it is recommended that it be returned for re-appraisal.

The appraisal is only valid provided that no other modifications are made to the tested construction other than those described in this report.

Summary of Primary Supporting Data

WF No. 181970

A fire resistance test in accordance with BS EN 1366-4: 2006, on six specimens of horizontal and six specimens of vertical linear joint sealing systems.

For the purpose of the test the floor specimens were referenced A to F and the wall specimens were referenced G to L.

The section of wall had overall dimensions of 1500 mm high by 1500 mm wide by 150 mm thick and was made up of aerated blockwork arranged to provide four 12 mm wide by 1000 mm long and two 30 mm wide by 1000 mm long linear gaps.

The section of floor had overall dimensions of 2240 mm long by 1730 mm wide by 150 mm thick and was made up of autoclaved aerated concrete lintels arranged to provide two 12 mm wide by 1000 mm long, two 30 mm wide by 1000 mm long and two 50 mm wide by 1000 mm long linear gaps.

Each gap was sealed with Silicone based intumescent sealant referenced 'Fire Guard S 564'. Each seal was cartridge gunned into the gaps. Specimens I and J incorporated a softwood timber gap facing, Specimen K incorporated a hardwood timber gap facing and Specimens D, E, F and L incorporated a mild steel angle gap facing. Specific details of each of the seals are given in the table below:

Specimen	Gap width	Seal details
A	12 mm	6 mm deep, cartridge gunned then trowelled flush with the unexposed face and faced on the exposed side with 13 mm diameter polyethylene backing rod
B	30 mm	15 mm deep, cartridge gunned then trowelled flush with the unexposed face and faced on the exposed side with 30 mm diameter polyethylene backing rod
C	50 mm	25 mm deep, cartridge gunned then trowelled flush with the unexposed face and faced on the exposed side with 2 no. 25 mm diameter polyethylene backing rod
D	12 mm	6 mm deep, cartridge gunned then trowelled flush with the unexposed face and faced on the exposed side with 13 mm diameter polyethylene backing rod
E	30 mm	15 mm deep, cartridge gunned then trowelled flush with the unexposed face and faced on the exposed side with 30 mm diameter polyethylene backing rod

Specimen	Gap width	Seal details
F	50 mm	25 mm deep, cartridge gunned then trowelled flush with the unexposed face and faced on the exposed side with 2 no. 25 mm diameter polyethylene backing rod
G	12 mm	6 mm deep, cartridge gunned then trowelled flush with both faces of the cavity. Both unexposed and exposed gap seals were faced internally with 13 mm diameter polyethylene backing rods
H	30 mm	15 mm deep, cartridge gunned then trowelled flush with both faces of the cavity. Both unexposed and exposed gap seals were faced internally with 30 mm diameter polyethylene backing rods
I	12 mm	6 mm deep, cartridge gunned then trowelled flush with both faces of the cavity. Both unexposed and exposed gap seals were faced internally with 13 mm diameter polyethylene backing rods
J	30 mm	15 mm deep, cartridge gunned then trowelled flush with both faces of the cavity. Both unexposed and exposed gap seals were faced internally with 30 mm diameter polyethylene backing rods
K	12 mm	6 mm deep, cartridge gunned then trowelled flush with both faces of the cavity. Both unexposed and exposed gap seals were faced internally with 13 mm diameter polyethylene backing rods
L	12 mm	6 mm deep, cartridge gunned then trowelled flush with both faces of the cavity. Both unexposed and exposed gap seals were faced internally with 13 mm diameter polyethylene backing rods

The results of the test were as follows:

Reference	Integrity (mins)		Insulation (mins)
	Cotton Pad	Sustained flaming	
A	244	300*	122
B	300*	300*	186
C	246	300*	65
D	300*	300*	48
E	300*	300*	43
F	229	300*	33
G	300*	300*	300*
H	300*	300*	300*
I	199	199	145
J	143	143	143
K	208	208	208
L	300*	300*	69

Test date : 24th April 2009

Test sponsor : Held on confidential file

WF No. 181968

A fire resistance test in accordance with BS EN 1366-4: 2006, on twelve specimens of vertical linear joint sealing systems.

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

The wall assembly had overall dimensions of 3035 mm high by 3050 mm wide by 150 mm thick and was made up of aerated blockwork arranged to provide eight 50 mm wide by 1000 mm long and four 30 mm wide by 1000 mm long linear gaps.

Specimens A to F were sealed with Acrylic based intumescent sealant referenced 'confidential' Specimens G to L were sealed with Silicone based intumescent sealant referenced 'Fire Guard S 564' Each seal was cartridge gunned into the gaps. Specimens E and H incorporated a softwood timber gap facing, Specimens C, D, I and J incorporated a hardwood timber gap facing and Specimens A, B, K and L incorporated a mild steel angle gap facing. Specific details of each of the seals are given in the table below:

Specimen	Gap width	Gap Depth
A	50 mm	25 mm deep, cartridge gunned then trowelled flush with both faces of the cavity. Both unexposed and exposed gap seals were faced internally with 2no. 30 mm diameter polyethylene backing rods.
B	30 mm	15 mm deep, cartridge gunned then trowelled flush with both faces of the cavity. The unexposed and exposed gap seals were faced internally with 2 no. polyethylene backing rods, each 30 mm diameter (for sealant at exposed face) and 2no. 25 mm diameter polyethylene backing rods (for sealant at unexposed face).
Specimen	Gap width	Gap Depth
C	50 mm	25 mm deep, cartridge gunned then trowelled flush with both faces of the cavity. The unexposed and exposed gap seals were faced internally with 2 no. polyethylene backing rods, each 30 mm diameter (for sealant at exposed face) and 2no. 25 mm diameter polyethylene backing rods (for sealant at unexposed face).
D	30 mm	15 mm deep, cartridge gunned then trowelled flush with both faces of the cavity. The unexposed and exposed gap seals were faced internally with 2no. 25 mm diameter polyethylene backing rods.
E	50 mm	25 mm deep, cartridge gunned then trowelled flush with both faces of the cavity. The unexposed and exposed gap seals were faced internally with 2no. 25 mm diameter polyethylene backing rods.

F	50 mm	25 mm deep, cartridge gunned then trowelled flush with both faces of the cavity. The unexposed and exposed gap seals were faced internally with 2no. 25 mm diameter polyethylene backing rods.
G	50 mm	25 mm deep, cartridge gunned then trowelled flush with both faces of the cavity. The unexposed and exposed gap seals were faced internally with 2no. 25 mm diameter polyethylene backing rods.
H	50 mm	25 mm deep, cartridge gunned then trowelled flush with both faces of the cavity. The unexposed and exposed gap seals were faced internally with 2no. 25 mm diameter polyethylene backing rods.
I	30 mm	15 mm deep, cartridge gunned then trowelled flush with both faces of the cavity. The unexposed and exposed gap seals were faced internally with 2no. 25 mm diameter polyethylene backing rods.
J	50 mm	25 mm deep, cartridge gunned then trowelled flush with both faces of the cavity. The unexposed and exposed gap seals were faced internally with 2no. 25 mm diameter polyethylene backing rods
K	30 mm	15 mm deep, cartridge gunned then trowelled flush with both faces of the cavity. The unexposed and exposed gap seals were faced internally with 2no. 25 mm diameter polyethylene backing rods.
L	50 mm	25 mm deep, cartridge gunned then trowelled flush with both faces of the cavity. The unexposed and exposed gap seals were faced internally with 2no. 25 mm diameter polyethylene backing rods

The results of the test were as follows:

Reference	Integrity (mins)		Insulation (mins)
	Cotton Pad	Sustained flaming	
A	300*	300*	130
B	300*	290	115
C	186	186	163
D	161	161	147
E	203	203	203
F	300*	300*	300*
G	300*	300*	300*
H	284	284	284
I	285	285	285
J	240	240	240
K	300*	300*	97
L	300*	300*	154

Test date : 23rd April 2009

Test sponsor : Held on confidential file

Declaration by Dana Lim

We the undersigned confirm that we have read and complied with the obligations placed on us by the UK Fire Test Study Group Resolution No. 82: 2001.

We confirm that the component or element of structure, which is the subject of this assessment, has not to our knowledge been subjected to a fire test to the Standard against which the assessment is being made.

We agree to withdraw this assessment from circulation should the component or element of structure be the subject of a fire test to the Standard against which this assessment is being made.

We are not aware of any information that could adversely affect the conclusions of this assessment.

If we subsequently become aware of any such information we agree to cease using the assessment and ask **warringtonfire** to withdraw the assessment.

Signed:

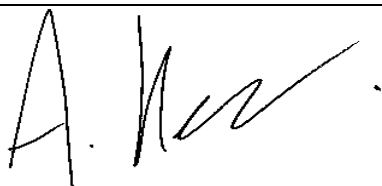
For and on behalf of:

Signatories



Responsible Officer

C Abbott* - Senior Certification Engineer



Approved

A Kearns* - Technical Manager

* For and on behalf of **warringtonfire**.

Report Issued: 16th July 2013

The assessment report is not valid unless it incorporates the declaration duly signed by the applicant.

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Annex

Dana Lim – Fire Guard S 564 (various colours)

Wall Mounted Seals*					
Gap Width mm	Seal width/ depth ratio	Backing material	Gap face material	Integrity mins	Insulation mins
12-50	2:1	PE open cell foam	AAC/AAC	300	180
12			AAC/Softwood	180	120
13-49				120	120
50				240	240
12-29			AAC/Hardwood	120	120
30-50				240	240
12-29			AAC/Steel	300	60
30-49				300	90
50				300	120

* Double-sided seal

Floor Mounted Seals					
Gap Width mm	Seal width/ depth ratio	Backing material	Gap face material	Integrity mins	Insulation mins
12-30	2:1	PE open cell foam	AAC/AAC	240	120
31-50				240	60
12-30			AAC/Steel	300	30
31-50				180	30

AAC - Autoclaved aerated concrete
PE - Polyethylene