INTERNATIONAL FIRE CONSULTANTS LIMITED

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IFC FIELD OF APPLICATION REPORT

Field of Application for Therm-A-Foam when used as a Linear Gap Seal in Fire Resisting Walls and Floors

Fire Resistance Standard: BS476: Part 20: 1987

IFC Report IFCA/91015 Revision E

Prepared on behalf of:

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ISSUE AND AMENDMENT RECORD

Rev	Date	Author	Review	Section	Amendments
-	March 1991	DJI	PEJ	-	-
A	August 1999	DJI	PEJ	Various	Test evidence J88625/1 added. Analysis changed, and Appendix A added to comply. Validity and report format amended August 1999.
B	September 2001	DC	PEJ	Various	Review and revalidation
C	March 2010	DC	PEJ	Various	Review, revalidation and upgrading of format
D	July 2013	MB	DC	Various	Review, revalidation and upgrading of format. Minor editorial changes to clarify scope of approval
E	October 2018	SP/CM	MB	Various	Review, revalidation and upgrading of format. Changes to scope of approval in line with current practice.

CONTENTS

1. INTRODUCTION

This report has been prepared by International Fire Consultants Ltd (IFC), on the instruction of Intumescent Seals, to define the field of application for Therm-A-Foam when used as a linear gap seal in fire resisting walls and floors, when adjudged against BS476: Part 20: 1987.

When establishing the variations in the construction that can achieve the required fire resistance performance, International Fire Consultants Ltd follow the general guidance given in ISO/TR 12470-2: 2017 *'Fire resistance tests - Guidance on the application and extension of results from tests conducted on fire containment assemblies and products. Part 2: Non-load bearing elements'.*

The assessment is based upon the product information supplied to us (detailed in Sections 2 and 3) and upon the fire resistance test evidence for the product (detailed in Section 4). A summary of our analysis of the performance of the product is presented in Section 5.

2. PROPOSAL

It is proposed that this Field of Application Report will establish the performance of Therm-A-Foam in the following applications;

a) Linear gaps with widths of 10, 20, 30, 40, 50, 60, 70, 80, 90 and 100mm.

b) Vertical and horizontal linear gaps in vertical walls, and linear gaps in horizontal substrates (floors).

c) Gaps between different types of substrate, i.e. 100 and 150mm thick blockwork, concrete and masonry, and steel faced/edged blockwork, concrete and masonry substrate. (Clarification of parameters is included in Section 5 herein).

d) Performance rating with respect to integrity at 60, 90, 120, 180 and 240 minutes.

The depth of the Therm-A-Foam varies, depending upon the combination of the above factors; as discussed in Section 5.

It is important to note that no British Standard test procedure currently exists for the purpose of testing linear gap sealing systems and cannot therefore be undertaken under UKAS accreditation. Hence the fire performance of linear gap sealing systems can only be evaluated by test and/or assessment against the general conditions of temperature and pressure given in BS476: Part 20: 1987.

This Assessment considers the contribution provided by the Therm-a-Foam, in terms of its ability to 'reinstate' the fire resistance of the construction, local to the linear gap, which would otherwise be reduced by the presence of the gap. The contribution is expressed in terms of integrity when evaluated in accordance with the general principles and test methodology of BS476: Part 20: 1987.

It is the responsibility of others to ensure that the structural stability of the wall or floor is not affected by the inclusion of the gap/hole which is fitted with Therm-a-Foam and that the wall or floor construction itself is capable of achieving the required level of fire resistance, at the sizes/spans/loadings concerned.

In situations where one of the substrates that lines the gap is steel, it is important that the steel stays straight, while exposed to the heating conditions of the fire resistance test, for the required period. The conclusions herein cannot be guaranteed should the steel move more than that experienced by the specimen in fire resistance test IFCI 163. Further, this report takes no responsibility for gaps that may open up 'behind' the steel substrate.

Within this generic assessment, it is inappropriate for IFC to define the parameters for all likely/possible applications that include steel profiles. The approval in Appendix A applies to use of Therm-A-Foam against a steel channel, as tested, which is installed 'around' the edge of the wall forming the opening; and where the channel is back-filled with mortar grout. The thermal characteristics of other steel profiles, and/or other arrangements, will affect the overall fire performance of the Therm-A-Foam, and IFC should be commissioned to analyse any other scenarios, on a project-by-project basis.

3. DESCRIPTION OF PRODUCT

Therm-A-Foam consists of a fire retardant open cell foam coated with an expandable graphite based intumescent material incorporating glass fibre reinforcement, the exact details of the components, construction and coating formulation are lodged with International Fire Consultants Ltd, in confidence.

Therm-A-Foam is manufactured using two thicknesses of open cell foam i.e. 10 and 20mm. The surfaces of each side of the foam have a graphite based intumescent applied to produce a layer approximately 1.5mm deep, with a glass fibre cloth interlayer between the foam and intumescent material.

The build-up of Therm-A-Foam installed in different sized gap consists of the following layers:

Gap Width	10mm	20mm	30mm	40mm	50mm
No. of Layers of Therm-A-Foam	1 x 10mm	1 x 20mm	1 x 20mm 1 x 10mm	2 x 20mm	3 x 20mm

Gap Width	60mm	70mm	80mm	90mm	100mm
No. of Layers of Therm-A-Foam	3 x 20mm	4 x 20mm	4 x 20mm	5 x 20mm	5 x 20mm

Note: Reference to 10mm and 20mm layers, in the table above, applies the thickness of the foam layers, and excludes the graphite coating. The total thickness of the Therm-A-Foam product depends upon the number of foam layers and graphite layers.

The Therm-A-Foam is bonded together and cut to the required depth in the factory prior to installation into the gap. Composite seals shall not be assembled on site, using smaller sections.

The seals are located centrally within the thickness of the wall or floor and are retained in place by compression induced friction, in gaps where the width is up to, and including, 100mm. In certain circumstances, identified herein, the interface between the seal and the blockwork shall be sealed with a low modulus, black silicon sealant conforming to BS EN ISO 11600: 2003+A1: 2011.

4. TEST EVIDENCE

The following test evidence has been considered in producing this assessment:

4.1 IFCI/160

This test was carried out at BRE Fire Research Station on 18 April 1990.

In this test, two vertical, 150mm blockwork specimens were constructed and contained five different gap with the following geometries:

Width	20mm	30mm	50mm	80mm	100mm
Length	225mm	225mm	750mm	750mm	750mm
Aspect Ratio	11.25	7.5	15.0	9.4	7.5
Depth of Seal	25mm	25mm	25mm	35mm	35mm

The overall size of the specimens was 1.23m², with the specimens located in two opposing faces of a 1m³ furnace.

The seals, when tested to the time/temperature curve and pressure specified in BS476: Part 20: 1987, achieved the following fire resistance times for integrity:

Width of Gap	20mm	30mm	50mm	80mm	100mm
Depth of Seal	25mm	25mm	25mm	35mm	35mm
Performance	121 minutes *	121 minutes *	121 minutes *	117 minutes	25 minutes

* *Test terminated at 121 minutes and failure had not occurred.*

4.2 IFCI/161

This test was carried out at BRE Fire Research Station on 24 April 1990.

In this test, two vertical, 150mm blockwork specimens were tested containing five different gap with the following geometries:

Width	20mm	30mm	50mm	80mm	100mm
Length	235mm	235mm	750mm	750mm	750mm
Aspect Ratio	11.75	7.8	15.0	9.4	7.5
Depth of Seal	45mm	45mm	70mm	115mm	115mm

The overall size of the specimens was 1.23m², with the specimens located in two opposing faces of a 1m³ furnace.

The seals were tested to the time/temperature curve and pressure specified in BS476: Part 20: 1987, achieving the following fire resistance times for integrity:

Width of Gap	20mm	30mm	50mm	80mm	100mm
Depth of Seal	45mm	45mm	70mm	115mm	115mm
Performance	255 minutes *	255 minutes *	255 minutes *	255 minutes *	255 minutes *

* *The test was terminated due to the design limits of the furnace being reached and not because failure of the seals was thought to be imminent. After the completion of the test, it was established that the seals were firmly located in the gap.*

4.3 IFCI/162

This test was carried out at BRE Fire Research Station on 11 May 1990.

In this test two vertical specimens and a horizontal specimen, each containing gaps fitted with Therm-A-Foam, were constructed. One specimen contained two vertical, 100mm wide gaps in a vertical, 150mm thick blockwork substrate.

The other specimen contained four horizontal gap, each of which were 700mm long, in a 150mm thick floor construction; and the ends of the seals were infilled with rockwool.

The geometries of the gap tested were:

	Horizontal Gaps				Vertical Gaps	
Width	20mm	50mm	80mm	100mm	100mm	100mm
Length	700mm	700mm	700mm	700mm	750mm	750mm
Aspect Ratio	35	14	8.8	7	7.5	7.5
Depth of Seal	25mm	25mm	35mm	45mm	45mm	60mm

The heated area of each specimen was in the order of $1m^2$, as they were tested simultaneously in a $1m^3$ furnace.

The seals, when tested to the time/temperature curve and pressure specified by BS476: Part 20: 1987 achieved the following fire resistance times for integrity:

	Horizontal Gaps				Vertical Gaps	
Width of Gap	20mm	50mm	80mm	100mm	100mm	100mm
Depth of Seal	25mm	25mm	35mm	45mm	45mm	60mm
Performance	93 minutes	90 minutes	41 minutes	60 minutes	125 minutes *	125 minutes *

* *Test terminated at 125 minutes and failure had not occurred.*

4.4 IFCI/163

This test was carried out at the DOE, BRE Fire Research Station on 18 June 1990.

In this test three specimens containing Therm-A-Foam were constructed. One specimen contained five, vertical gaps of various widths in a 100mm thick blockwork substrate. A second specimen contained two steel lined vertical gaps of width 40 and 80mm wide in a blockwork substrate. The gaps were lined with 178 x 76mm, 21kg steel channels grouted into 150mm, thick, blockwork substrate.

The third horizontal specimen contained 4no. 700mm long gaps and the ends of the gaps were filled with blockwork.

The geometry of the gaps tested were:

	Vertical Gaps				
Width	20mm	30mm	50mm	80mm	100mm
Length	235mm	235mm	235mm	460mm	460mm
Aspect Ratio	11.75	7.83	4.7	5.75	4.6
Depth of Seal	25mm	25mm	40mm	40mm	45mm

	Horizontal Gaps				Vertical Steel Lined Gaps	
Width	20mm	50mm	80mm	100mm	40mm	80mm
Length	700mm	700mm	700mm	700mm	750mm	750mm
Aspect Ratio	35	14	8.75	7	18.75	9.4
Depth of Seal	40mm	40mm	60mm	75mm	30mm	40mm

The overall size of the specimens was 1.23m^2 and were placed opposite each other in a 1m^3 furnace. The heated area of each specimen was 1m^2.

Each seal was instrumented with a thermocouple to measure the temperature rise of the unexposed face. The seals were tested to the time/temperature curve and pressure specified by BS476: Part 20 and achieved the following fire resistance times for integrity. The temperature rises of 140, 180, 250 and 350^{0}C, have only been presented for the horizontal gaps as problems with retaining the thermocouple on the unexposed face of the vertical seals were encountered.

	Horizontal Gap			
Width	20mm	50mm	80mm	100mm
Depth of Seal	40mm	40mm	60mm	75mm
Performance Integrity	182 minutes *	182 minutes *	182 minutes *	182 minutes *
Temperature Rise of 140^{0}C	53 minutes	25 minutes	39 minutes	103 minutes
Temperature Rise of 180^{0}C	70 minutes	35 minutes	61 minutes	88 minutes
Temperature Rise of 250^{0}C	101 minutes	55 minutes	NR	NR
Temperature Rise of 350^{0}C	NR	88 minutes	NR	NR

NR = Not Reached

	Vertical Gaps					Vertical Steel Lined Gaps	
Width of Gap	20mm	30mm	50mm	80mm	100mm	40mm	80mm
Depth of Seal	25mm	25mm	40mm	40mm	45mm	30mm	40mm
Performance Integrity	182 mins *	182 mins *	182 mins *	49 mins	49 mins	182 mins *	95 mins

* *At the end of the test these seals had not failed. The seals in the horizontal substrate were firmly in position at the end of the test*

4.5 J 88625/1

This test was performed at SGS Yarsley Ltd on 21 November 1991, on a number of linear gap seals known as Therm-A-Foam. The seals were located in a 230 mm thick brickwork wall. The geometries of the gaps are given below:

Width	10mm	30mm	30mm	40mm	40mm	80mm	80mm	90mm	100mm
Depth of Seal	20mm	20mm	25mm	25mm	30mm	35mm	40mm	40mm	45mm
No of Layers of Therm-A-Foam	1 x 10mm	1 x 10mm 1 x 20mm	1 x 10mm 1 x 20mm	2 x 20mm	2 x 20mm	4 x 20mm	4 x 20mm	4 x 20mm 1 x 10mm	5 x 20mm
Performance Integrity	140 mins *	140 mins *	140 mins *	140 mins *	140 mins *	72 mins	132 mins	36 mins	38 mins

* *Test terminated at 140 minutes without integrity failure occurring.*

The length of all seals was 1000 mm.

The seals were not installed with any silicone sealant between seal and brickwork. The length of gap within the brickwork was 1050 mm high. The top 50 mm of the gap was infilled with mineral wool. The failures associated at 72 and 132 minutes occurred at the top of the seal between the mineral wool and Therm-A-Foam as a result of a cotton pad failure at these locations.

Test Report J88625 made the following comment in Section 3, Test Method, sheet 4, paragraphs one and two.

> *"The gap seals described above were tested to an ad-hoc method following BS476: Part 22: 1987 on 30 August 1991. In addition, the procedures laid down in SGS Yarsley in-house Procedure No. YT 368 Rev 1 were followed as there is no British Standard for testing to this type of construction."*

5. ANALYSIS

It is the opinion of International Fire Consultants Ltd that, in order to characterise the performance of Therm-A-Foam, it is necessary to be sure that the failure mechanism is established. There are two mechanisms which have caused the failure of Therm-A-Foam.

1. The heat transfer through the seal or adjacent substrate, over a long period, has caused the graphite to finish intumescing. This occurs because of the gradual attrition of the open cell foam allowing the intumescent to be expended. Ultimately, the foam and intumescent will degrade, causing cracks and gaps to develop in the seal.

2. The stability of a seal can be lost when more than three layers of foam have been used, because any central layers of foam will exude from the seal. This occurs because the exposed front face of the seal starts to intumesce and will start to push out the unexposed face of the seal. The layers can only be restrained by providing sufficient depth of seal to develop adequate shear resistance between the interlayers, which will prevent the extrusion of any intermediate layers. Ultimately, as the Therm-A-Foam intumesces throughout the depth of the seal, it will cause the seal to become 'wedged' into the gap, due to the pressure developed by the intumescent, throughout the depth of the seal.

The testing program has shown that the performance of a seal is a function of the following:

i) Vertical or horizontal substrate
ii) Thickness of the substrate
iii) Conductivity of the substrate
iv) Gap Width / Layers of Therm-A-Foam
vi) Depth of seal

Fire test reports IFCI/160, 161, 162, 163 and J88625/1 have been reviewed to develop Table A1 in Appendix A which gives the depth of the seal required for different gap widths and fire resistance periods, based on measured results for vertical and horizontal gaps in vertical, 150mm thick lightweight blockwork walls.

Fire test IFCI/163 indicated that the performance of a vertical seal was affected by the thickness of the substrate. It was found that, during this test, a stability failure of the seals occurred prior to that recorded in a similar test using a thicker substrate. This occurred as the centre layers of Therm-A-Foam were extruded from the unexposed face, due to intumescent activity at the exposed face. The reason for this was because there was less substrate 'behind' the seal to which the extruded layers could adhere, and prevent its complete extrusion from the gap. This has been taken into consideration and hence Table A1 can also be used for walls with a minimum thickness of 100mm, subject to the limitations in the table.

Test IFCI/163 also demonstrated the performance of the seal when in contact with a highly conductive substrate, i.e. steel. This test showed that when the steel was grouted into a material with a high thermal capacitance, such that it provided a good heat sink for the steel, then the performance of the seal was unaffected by the steel surface. When there was no heat sink adjacent to the steel, however, the performance of the seal was reduced, because during the test, the steel rapidly heated up which caused the intumescent adjacent to the steel to become exhausted more quickly. This rapid heat transfer caused the matrix of the seal to break down and promoted a local integrity failure between seal and the steel substrate.

Although this steel specimen (without heat sink effect) did satisfy the integrity criteria for a certain period, with that specific combination, the integrity of Therm-A-Foam with other combinations cannot be positively quantified or predicted; because the thermal characteristics of other steel profiles, and/or other arrangements, will affect the overall fire performance of the Therm-A-Foam. IFC should be commissioned to analyse any other scenarios, on a project-by-project basis.

The performance of Therm-A-Foam in horizontal substrates has been established in fire test IFCI/162 and 163. These tests were terminated prior to seal failure, however, the failure mechanism would have been expected to be due to attrition of foam and intumescent by the flames, causing the matrix of the seal to become weakened; resulting in the seal becoming unable to retain its pressure within the gap and falling away from the substrate in its entirety. It was found that the seal was generally required to be slightly deeper, compared to that used in the vertical application, because when tested vertically, the self-weight of the seal will not adversely affect the fire resistance to the same degree. Table A2 in Appendix A indicates the depth of seal required in a horizontal substrate at least 150mm thick.

Failures observed in fire test J88625/1, for gap widths of 80mm, were associated with integrity failures occurring between the mineral wool and the Therm-A-Foam. Based on the results from this test, the system can be used with or without the silicon seal between Therm-A-Foam and substrate, up to 80mm wide and for fire resistance periods up to and including 120 minutes. However, in view of the results obtained in J 88625/1, for gap widths of 80mm and greater, and also for any case where 180 minutes or greater fire resistance is required, silicone sealant must be used as part of the system, as proven in other tests.

The Therm-A-Foam must be located within a gap which is surrounded by one, or more, of the approved substrates, (i.e. backfilled steel channel, concrete, blockwork or brickwork), on all four edges. A maximum of one long edge formed from steel is permitted.

6. CONCLUSION

It is the opinion of International Fire Consultants Ltd that, if Therm-A-Foam were to be used for the purposes of sealing linear gaps, in compliance with the sizes and conditions given in Appendix A, the resultant seal would satisfy the integrity, criteria, of BS476: Part 20: 1987 for the durations given in the appropriate tables in Appendix A of this assessment report.

This assumes that the Therm-A-Foam linear gap sealing systems are correctly installed in compliance with any parameters/limitations given in this report, and that there is no significant movement of the substrate local to the gap, and that no services or penetrations pass through the seals.

7. DECLARATION BY THE APPLICANT

We the undersigned, confirm that, except for that information declared to International Fire Consultants Ltd previously during the original engineering evaluation process, (and during subsequent revisions), the components, products, and/or assemblies evaluated within IFC Field of Application Report **IFCA/91015 Revision E** have not been altered in any way; and have not subsequently, to our knowledge, been included in a fire test to BS 476: Part 20: 1987 in the form and/or configurations proposed.

We also confirm that we have supplied all information and assurances requested of us, for the purpose of writing this Field of Application Report and are not aware of any other information that would adversely influence or affect the conclusions of this report.

We agree that if fire test evidence or other information subsequently becomes available, to supply this to IFC in full and seek immediate review of the continuing validity of the original report from IFC. If after review IFC conclude that the original evaluation and report is no longer appropriate, we agree to withdraw it and any references to it from circulation and advise clients and agents accordingly.

Signature: _____

Position: _____

Company: **Intumescent Seals**

8. LIMITATIONS

This assessment addresses itself solely to the ability of the Therm-A-Foam to satisfy the integrity criteria of the fire resistance test and does not imply any suitability for use with respect to other unspecified criteria.

This document only considers the construction described herein and assumes that the surrounding construction will provide no less restraint than the tested assembly, and that it will remain in place and be substantially intact for the full fire resistance period.

Where the constructional information in this report is taken from details provided to International Fire Consultants Ltd (IFC) and/or from fire resistance test reports referenced herein, it is, therefore, limited to the information given in those documents. It is necessarily dependent upon the accuracy and completeness of that information. Where constructional or manufacturing details are not specified, or discussed herein, it should not, therefore, be taken to infer approval of variation in such details from those tested or otherwise approved.

Where the assessed constructions have not been subject to an on-site audit by International Fire Consultants Ltd, it is the responsibility of anyone using this report to confirm that all aspects of the assemblies fully comply with the descriptions and limitations herein.

When establishing the variations in the construction that can achieve the required fire resistance performance, IFC follow the general guidance in BS ISO/TR 12470-2: 2017 *'Fire resistance tests - Guidance on the application and extension of results from tests conducted on fire containment assemblies and products. Part 2: Non-load bearing elements'*. This report does not purport to follow the guidance regarding direct or extended application of test results outlined in EN product standards, and the approvals herein shall not be used as supporting evidence for CE marking.

Where the constructional information in this report is taken from details provided to International Fire Consultants Ltd (IFC) and/or from fire resistance test reports referenced herein, it is, therefore, limited to the information given in those documents. It is necessarily dependent upon the accuracy and completeness of that information. Where constructional or manufacturing details are not specified, or discussed herein, it shall not, therefore, be taken to infer approval of variation in such details from those tested or otherwise approved.

Any materials specified in this report have been selected and judged primarily on their fire performance. IFC do not claim expertise in areas other than fire safety. Whilst observing all possible care in the specification of solutions, we would draw the reader's attention to the fact that during the construction and procurement process, the materials used shall be subjected to more general examination regarding the wider Health and Safety, and CoSHH Regulations. Designers, manufacturers and installers are reminded of their responsibilities under the CDM Regulations; but particularly with regard to installation and maintenance of heavy or inaccessible items.

This Report is provided to the sponsor on the basis that it is a professional independent engineering opinion as to what the fire performance of the construction/system would be should it be tested to the named standard. It is IFC's experience that such an opinion is normally acceptable in support of an application for building approvals, certainly throughout the UK and in many parts of Europe and the rest of the world.

However, unless IFC have been commissioned to liaise with the Authorities that have jurisdiction for the building in question for the purpose of obtaining the necessary approvals, IFC cannot assure that the document will satisfy the requirements of the particular building regulations for any building being constructed.

It is, therefore, the responsibility of the sponsor to establish whether this evidence is appropriate for the application for which it is being supplied and IFC cannot take responsibility for any costs incurred as a result of any rejection of the document for reasons outside of our control. Early submittal of the Report to the Authorities will minimise any risks in this respect.

The analysis and conclusions within this report are based upon the likely fire resisting performance of a complete assembly whereby the construction is formed, and the Therm-A-Foam installed, in accordance with this document, and offered for fire resistance testing in 'perfect' condition. In practice, management procedures must be in place in any building where the Therm-A-Foam is installed, to ensure that no parts of the adjacent construction, or the Therm-A-Foam, are damaged or faulty. Any such shortfalls in respect to the condition of the construction will invalidate the approval by IFC and may seriously affect the ability of the assembly to provide the required level of fire resistance performance. Determination of what constitutes wear or damage, and any corrective actions in order to return the construction to the required condition, should only be carried out following consultation with the manufacturer and IFC.

9. VALIDITY

This Field of Application Report has been prepared based on International Fire Consultants Ltd's present knowledge of the products described, the stated testing regime and the submitted test evidence. For this reason, anyone using this document after October 2023 should confirm its ongoing validity.

This Field of Application Report is not valid unless it incorporates the declaration by the applicant given in Section 7 duly signed by the applicant.

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APPENDIX A

TABLES A1 to A2

Depths of Therm-A-Foam in substrates for stated integrity periods and gap widths

Gap Width	Fire Resistance (Integrity)				
	60 Minutes	90 Minutes	120 Minutes	180 Minutes	240 Minutes
10mm	20	20	20	35	45
20mm	20	20	25	35	45
30mm	20	20	25	35	45
40mm	25	25	30	40	70
50mm	35	35	40	55	70
60mm	35	35	40	60	115
70mm	35	35	40	80	115
80mm	35	35	40	80	115
90mm	45	45	45	80	115
100mm	45	45	45	80	115

Table A1 **Depth (in Millimetres) of Therm-A-Foam when installed in minimum 150mm thick** *Note 1* **Blockwork Concrete or Masonrywalls** *Note 2*, **with either Vertical or Horizontal Linear Gaps for Stated Integrity Periods and Gap Widths**

Note 1 *Specifications above also apply to 100mm thick walls, but subject to a maximum fire resistance of 180 minutes and maximum gap sizes of 50mm. Minimum wall thickness refers to contribution towards performance of Therm-A-Foam; but wall thickness may need to be greater, as defined by others, to suit other performance criteria.*

Note 2 *The prescribed thickness of supporting construction excludes any decorative plaster/render/facings.*

Note 3 *, One long edge of the linear gap may include a steel channel, but the approval is limited to a maximum fire resistance period of 180 minutes and maximum gap sizes of 50mm. (See Sections 2 and 5 of this report for further clarification of scope/parameters with steel elements)*

Indicates gap widths at which silicone sealant must be used between substrate and Therm-A-Foam.

Gap Width	Fire Resistance (Integrity)			
	60 Minutes	90 Minutes	120 Minutes	180 Minutes
10mm	25	25	40	40
20mm	25	25	40	40
30mm	25	25	40	40
40mm	30	30	45	45
50mm	35	40	45	55
60mm	50	60	60	60
70mm	50	60	60	80
80mm	50	60	60	80
90mm	50	75	75	80
100mm	50	75	75	80

Table A2 Depth (in Millimetres) of Therm-A-Foam when installed in minimum 150mm thick Floors *Note 1* **for Stated Integrity Periods and Gap Widths**

Note 1 *Floors shall be formed from cast concrete or lightweight concrete blocks/beams. Minimum floor thickness refers to contribution towards performance of Therm-A-Foam; but floor thickness may need to be greater, as defined by others, to suit other performance criteria.*

Note 2 *Use in floors with linear gaps that include a steel profile is not approved.*

Note 3 *The prescribed thickness of supporting construction excludes any decorative plaster/render/facings.*

Indicates gap widths at which silicone sealant must be used between substrate and Therm-A-Foam.