INTERNATIONAL FIRE CONSULTANTS LIMITED

PRIVATE & CONFIDENTIAL

IFC FIELD OF APPLICATION REPORT

Field of Application of Firehalt SF 120 (120/0) Vertical Fire Barrier Systems

Fire Resistance Standard: BS 476: Part 20/22: 1987

IFC Report PAR/17184/01

Prepared on behalf of:

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NOTE: This report should not be manipulated, abridged or otherwise presented without the written consent of International Fire Consultants Ltd

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ISSUE AND AMENDMENT RECORD

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1. INTRODUCTION

This report has been prepared by International Fire Consultants Ltd, (IFC), on the instruction of Culimeta-Saveguard Ltd to determine the field of application, using existing fire resistance test evidence, for Firehalt SF120 (120:0) vertically orientated fire barrier systems, manufactured by Culimeta-Saveguard Ltd.

This assessment has been produced using the principles outlined in the Passive Fire Protection Forum (PFPF): *'Guide to undertaking technical assessments of the fire performance of construction products based on fire test evidence, 2019, Industry Standard Procedure'*.

When establishing the variations in the construction that can achieve the required fire resistance performance, IFC complies with the principles found in the following documents:

- BS ISO/TR 12470-1: 2017 *'Fire resistance tests - Guidance on the application and extension of results from tests conducted on fire containment assemblies and products. Part 1: Load bearing elements and vertical and horizontal separating elements'.*

- 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'.*

- EN 15725: 2010: *'Extended application reports on the fire performance of construction products and building elements.'*

It is proposed that variations to the tested specifications, as described in the following sections, may be accommodated into assemblies, without reducing their potential to achieve a 120 minute integrity rating, if tested in accordance with the method and criteria of BS 476: Part 20/22: 1987. The omission of information on any components or manufacturing methods does not imply a lack of approval of those details but these would need to be the subject of a separate analysis. Only variations specifically mentioned are supported by this assessment document, and all other aspects must otherwise be as proven in tests summarised herein.

2. TEST EVIDENCE

Test evidence is available to support the fire resistance performance of Firehalt SF 120 (120/0) vertical fire barrier systems when installed in rigid supporting constructions and this is summarised in Sections 2.1 and 2.2 below.

2.1 WF Test Report No: 106497

This test was performed at the Warringtonfire fire test laboratory, in Warrington, on 25 January 1999. The test specimen was a non-loadbearing fire barrier system.

A test specimen was built into the framework that forms the front vertical face of the furnace. The overall size of the assembly measured 3035mm high x 3050mm wide.

The fabric was a chemically treated woven glass fabric with a weight of 470gsm, and 0.4mm thick.

The barrier comprised four lengths of barrier material, each joined at the vertical edges. From left to right the visible width of the fabric sections were 402mm, 900mm, 900mm and 850mm.

At the head and vertical perimeters of the assembly a galvanised mild steel stud section, 50mm x 35mm x 0.5mm, was fixed back to the supporting construction, using M6 10P steel rawlbolts at 250mm centres. A galvanised mild steel angle, 25mm x 25mm x 0.5mm, was fixed to the stud section using 38mm long x 4mm diameter self-drilling steel screws, at 250mm centres. These screw fixings passed through the fabric that was trapped between the angle and the stud section and the angle and supporting construction. A length of excess fabric was included at the head and vertical edges of the specimen.

The barrier was retained at the base edge using a galvanised steel angle, 25mm x 25mm x 0.5mm. The barrier was trapped between this angle and the supporting construction. Steel rawlbolts, M6 10P, passed through the angle, the fabric barrier, and into the supporting construction, at 250mm centres. A length of excess fabric included at the base of the assembly.

The test incorporated three vertical joints in the fabric. Each joint comprised a 50mm length of fabric, of adjacent sections, folded perpendicular to the surface of the barrier. The faces of the folded sections were fixed together using a row of galvanised steel staples, size 10, at 500mm centres. This section was folded back onto itself leaving a 25mm hem. An additional row of staples, size 10, secured this joint at 100mm centres.

The fire resistance performance of the barrier assembly was determined by testing in accordance with BS 476: Part 20/22: 1987. The test specimen satisfied the criteria of the BS 476: Part 20/22: 1987 test standard as follows:

Integrity	**:**	**132 minutes***
Insulation	**:**	**2 minutes**

** No integrity failure had occurred at termination of the test at 132 minutes.*

This test is more than 5 years old. In accordance with industry practice, IFC have reviewed the test evidence, and have concluded that it is still valid, and suitable to form the basis of this approval.

2.2 WF Test Report No. 402892

This test was performed at the Exova Warringtonfire laboratory in Warrington, United Kingdom, on 20 August 2018. The test specimen incorporated two wall mounted penetration sealing systems in an autoclaved aerated concrete (AAC) block wall. The test was carried out generally in accordance with BS EN 1366-3: 2009.

The overall size of the assembly measured 1500mm wide x 1500mm high x 150mm thick and incorporated a total of 4no penetrations detailed herein as A, B, C and D.

Two apertures were incorporated into the assembly 1200mm high x 675mm wide. The first aperture included services A and C and the second services B and D.

The aperture incorporating services B and D was sealed with a single layer of Firehalt SF 120 fabric.

The aperture incorporating penetrations A and C was sealed with a single layer of Firehalt Ultralight 60 fabric.

Each barrier included 2no horizontal joints in the fabric, each in line with the services that passed through it. Areas of fabric, for the complete width of the barrier were stapled together.

Both barriers were installed into the corresponding aperture using two galvanised mild steel angles, 25mm x 50mm x 0.8mm and 25mm x 25mm x 0.8mm, between which the fabric barrier was trapped.

Service A:

300mm wide x 29mm deep perforated steel cable tray complete with cables (1no D1, 2no E, 1no D2 (as designated within BS EN 1366-3: 2009)). This service was supported at 400mm from both faces of the assembly.

Sealing system A:

3no 2 Firehalt Brush Seal wraps installed to the exposed face around the penetrating service and to fill in between the cables. Finished off with beads of Firehalt HT adhesive.

Service B:

300mm wide x 29mm deep perforated steel cable tray complete with cables (1no D1, 2no E, 1no D2 (as designated within BS EN 1366-3: 2009)). This service was supported at 400mm from both faces of the assembly.

Sealing system B:

2no 2 Firehalt Brush Seal wraps installed to the exposed face around the penetrating service and to fill in between the cables. Finished off with beads of Firehalt HT Adhesive.

Service C:

100mm diameter x 3.0mm wall thickness mild steel pipe. This service was supported at 400mm from both faces of the assembly.

Sealing system C:

3no 2 Firehalt Brush Seal wraps installed to the exposed face around the penetrating service. Finished off with beads of Firehalt HT adhesive.

Service D:

100mm diameter x 3.0mm wall thickness mild steel pipe. This service was supported at 400mm from both faces of the assembly.

Sealing system D:

2no 2 Firehalt Brush Seal wraps installed to the exposed face around the penetrating service. Finished off with beads of Firehalt HT Adhesive.

The furnace was controlled so that at the height of the lowest service in the specimen the pressure differential relative to the laboratory pressure was a minimum of 10 (+3, -0) Pa.

The fire resistance performance of assembly was determined by testing in accordance with BS EN 1366-3: 2009. The test specimen satisfied the criteria of the BS EN 1366-3: 2009 test standard as follows:

Integrity

Service A	**:**	**66 minutes***
Service B	**:**	**66 minutes***
Service C	**:**	**66 minutes***
Service D	**:**	**47 minutes**

Insulation

Service A	**:**	**19 minutes**
Service B	**:**	**4 minutes**
Service C	**:**	**17 minutes**
Service D	**:**	**5 minutes**

* *No integrity failure had occurred at termination of the test at 66 minutes.*

3. SCOPE OF APPROVAL

3.1 General

The Firehalt SF 120 (120/0) vertical fire barriers are non-insulating, fixed fire barrier systems, which consist of a single thickness fabric retained by steel stud and angle sections.

3.2 Fabric

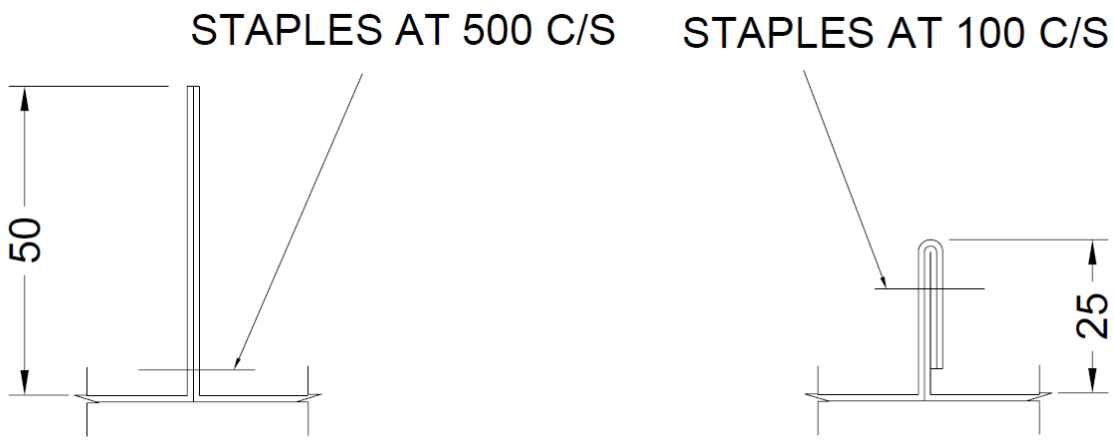
The Firehalt SF 120 (120/0) vertical fire barrier system consists of a fabric, manufactured by Culimeta-Saveguard Ltd. The thickness of the fabric is nominally 0.5mm, with a typical fabric weight of 430g/m^2. The fabric is supplied in widths of 1100mm.

3.3 Fabric Joints

Lengths of fabric can be joined at their vertical edges to form a single, wider, barrier.

Joints comprise 50mm folds, of adjacent fabric sections, perpendicular to the surface of the barrier. The faces of the folded sections are fixed together using a row of steel staples, size 10, at maximum 500mm centres. This hem of fabric, formed from the adjacent sections, is folded back onto itself for a 25mm deep hem and fixed with a row of staples, size 10, at maximum 100mm centres.

See figure below showing both steps in forming the joint;



See Section 3.5.2 for the maximum barrier width allowable made up of widths of fabric joined at their vertical edges.

3.4 Perimeter Fixing Brackets

3.4.1 Head Bracket and Vertical Edge Brackets

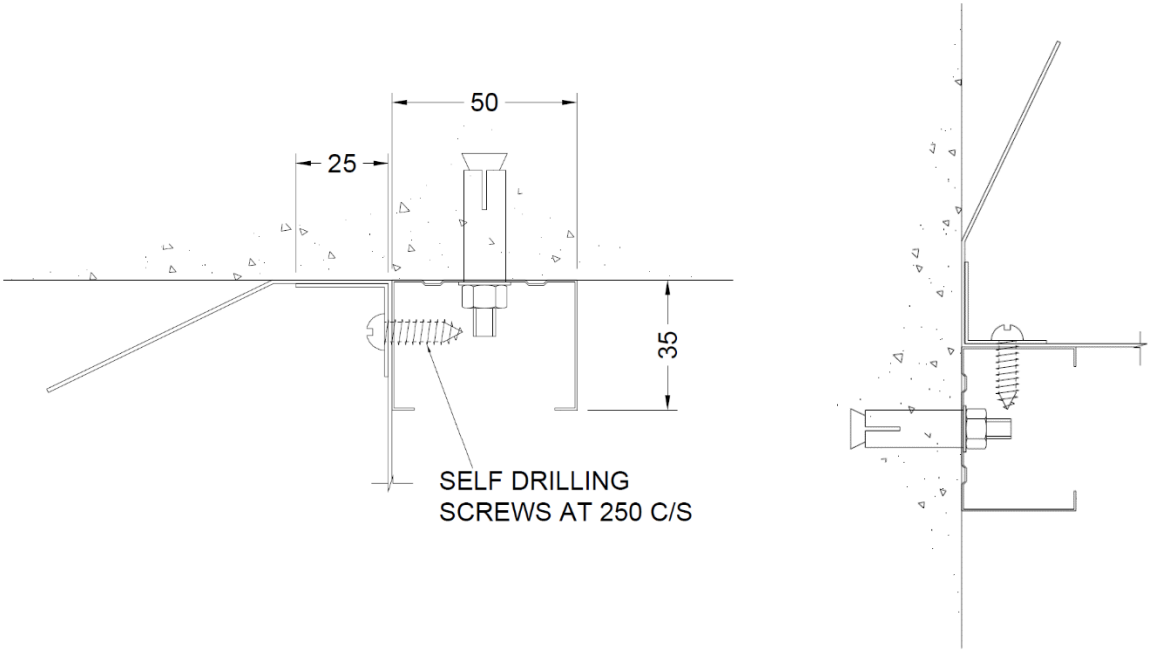
The fabric is retained at the head and vertical edges of the barrier between steel angles and steel stud sections.

A steel stud section, 50 x 35 x 0.5mm thick, is fixed back to the supporting construction at maximum 250mm centres and 250mm from the ends of the stud sections. Fixed to the stud section is a galvanised steel angle, 25mm x 25mm x 0.5mm, fixed at maximum 250mm centres and 250mm from the ends of the angle section.

Fixings used to secure the steel stud section to the supporting construction shall be M6 10P steel rawlbolts extending into the substrate at a minimum length as required for a robust fixing. It shall be ensured that the fixings are tightened to the correct tension as listed on the products specification, for a robust fixing. Fixings used to secure the steel angle section to the steel stud shall be steel self-drilling screws, 38mm x 4mm. This fixing passes through the angle, fabric and into the stud section and should be fitted at no greater than 250mm centres.

The bracketry detailed above is fitted such that the fabric is trapped between the stud and angle, as well as being trapped between the angle and supporting construction. The fabric shall be sized such that there shall be a length of excess fabric at the head and vertical edges, which is required to be a minimum of 100mm.

See figures below.



3.4.2 Base

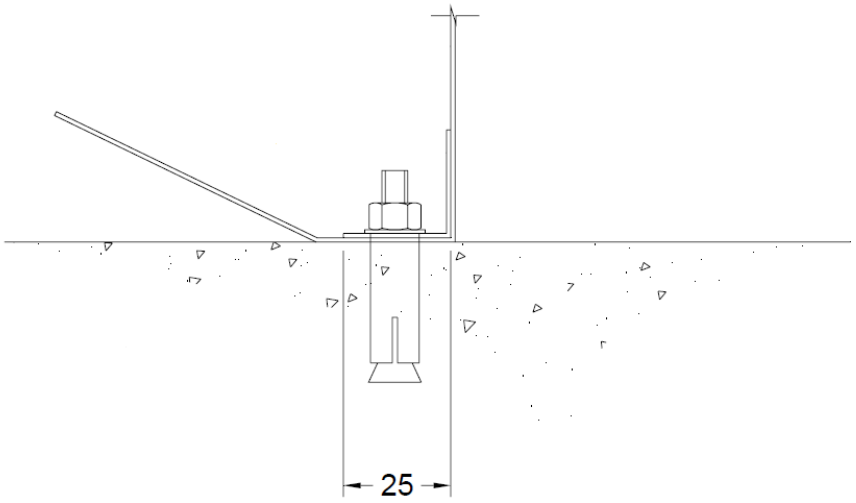
The fabric is retained at the base of the barrier between a steel angle and the supporting construction.

An angle, 50mm x 50mm x 0.7mm, is fixed to the supporting construction at maximum 250mm centres and 250mm from the ends of the stud sections.

Fixings used to secure the steel angle section to the supporting construction shall be M6 10P steel rawlbolts extending into the substrate at a minimum length as required for a robust fixing. It shall be ensured that the fixings are tightened to the correct tension as listed on the products specification, for a robust fixing. This fixing passes through the angle, fabric and into the supporting construction.

The bracketry detailed above is fitted such that the fabric is trapped between the angle and supporting construction. The fabric shall be sized such that there shall be a length of excess fabric at the base, which is required to be a minimum of 100mm.

See figure below.



3.5 Barrier Size

The Firehalt SF 120 (120/0) vertical fire barrier system is approved for use in the following sizes.

3.5.1 Single Fabric Section

A fully framed (see Section 3.4), single section of fabric may be used in a Firehalt SF 120 (120/0) vertical fire barrier system to a maximum size, for the specified fire resistance period, as detailed in the table below:

Fire Resistance Period	Maximum Assembly Dimensions (height x width)
120 minutes Integrity	3000mm x 900mm

The complete width shall be made up of a 'complete' piece of fabric 1100mm wide.

3.5.2 Multiple Fabric Sections

Multiple sections of fabric may be joined at the vertical edges (see Section 3.3), fully framed at the perimeter, as per Section 3.4, and may be used in a Firehalt SF 120 (120/0) vertical fire barrier system to a maximum size, for the specified fire resistance period, as detailed in the table below:

Fire Resistance Period	Maximum Assembly Dimensions (height x width)
120 minutes Integrity	3000mm x 8000mm

Note *A number of multiple fabric sections may be positioned adjacent to each other, however, additional robust restraint and support is needed at maximum 8000mm centres to ensure that wind loading does not rip the fabric from the perimeter fixing brackets. This is generic advice, however, it is the responsibility of Culimeta-Saveguard Ltd to ensure that this is sufficient for the project in question, and introduce further compensatory measures as required.*

The complete width shall be made up of equal width 'complete' pieces of fabric each up to 1100mm wide.

3.6 Supporting Construction

The supporting construction may be blockwork, brickwork or a concrete wall/soffit, but shall be of a type that has been tested or assessed to provide in excess of 120 minutes fire resistance, at the required size, when incorporating openings.

3.7 Service Penetrations

Fire resistance test evidence is available for Culimeta-Saveguard Ltd.'s Firehalt SF 120 vertical (120/0) fire barrier systems including various service penetrations. In all cases it must be ensured that choice of services, and their installation within the assemblies, does not have a detrimental effect upon their achievement of the required period of fire resistance.

Guidance for all service penetrations items is outlined in Appendix A, based upon the range of items tested, to a maximum of 60 minutes fire resistance. All service penetrations beyond the scope of the general guidance must have been subjected to fire resistance testing, and/or assessed by a relevant body to support its use in fabric barriers of a similar construction to that proposed.

3.8 Directionality

The Firehalt SF120 fire barrier assemblies detailed herein may be installed with either face being exposed to fire conditions.

4. CONCLUSION

Based upon the available test evidence, and subsequent analysis performed by International Fire Consultants Ltd, if the proposed fire barrier systems utilising Firehalt SF120 (120/0) installed vertically in galvanised steel framework were manufactured and installed within the limitations of this Field of Application Report and tested for fire resistance, they would satisfy the integrity criteria of BS476: Part 22: 1987 for 120 minutes.

5. DECLARATION BY THE APPLICANT

Reference: IFC Field of Application Report **PAR/17184/01**

We, the undersigned, confirm that we have read and complied with the obligations placed on us by the

Passive Fire Protection Forum (PFPF)

Guide to undertaking technical assessments of the fire performance of construction products based on fire test evidence

2019

Industry Standard Procedure

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 this assessment is being made.

We confirm that the change which is the subject of this assessment has not to our knowledge been tested to the standard against which this assessment has been 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 understand that this assessment is based on test evidence and will be withdrawn should evidence become available that causes the conclusion to be questioned. In that case, we accept that new test evidence may be required.

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

If we subsequently become aware of any such information, we agree to ask International Fire Consultants Ltd (IFC) to withdraw the assessment.

Signature: _____

Name: _____

Position: _____

Company: Culimeta-Saveguard Ltd

Date: _____

6. LIMITATIONS

This report addresses itself solely to the ability of the proposed assemblies described to satisfy the 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 assemblies 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.

This assessment is issued on the basis of test data and information to hand at the time of issue. If contradictory evidence becomes available to International Fire Consultants Ltd (IFC) the assessment will be unconditionally withdrawn and the applicant will be notified in writing. Similarly, the assessment evaluation is invalidated if the assessed construction is subsequently tested since actual test data is deemed to take precedence.

As per the guidance outlined in the Passive Fire Protection Forum (PFPF): *'Guide to undertaking technical assessments of the fire performance of construction products based on fire test evidence, 2019, Industry Standard Procedure',* appropriate action has been taken to mitigate the risk of a conflict of interest arising during the preparation of this report. All individuals involved in the production, or subsequent review, of this assessment have declared any perceived conflicts of interest, with regards to the sponsor or subject(s) of this report, prior to working on this project.

The assessor and reviewer have been deemed suitable for involvement in the production of this assessment in accordance with the guidance outlined in the Passive Fire Protection Forum (PFPF): *'Guide to undertaking technical assessments of the fire performance of construction products based on fire test evidence, 2019, Industry Standard Procedure'*.

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.

The analysis and conclusions within this report are based upon the likely fire resisting performance of a complete door assembly that is manufactured and 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 assemblies are installed, to ensure that no parts of the assembly are damaged or faulty. Any such shortfalls in respect to the condition of the assemblies will invalidate the approval by IFC, and may seriously affect the ability of the assemblies to provide the required level of fire resistance performance. Determination of what constitutes wear or damage, and any corrective actions in order to return assemblies to the required condition, should only be carried out following consultation with the manufacturer and IFC.

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.

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 should 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 evaluation as to what the fire performance of the construction/system would be should it to be tested to the named standard. It is IFC's experience that such an evaluation 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.

7. 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.

The assessment is valid initially for a period of five years after which time it is recommended that it be submitted to International Fire Consultants Ltd for re-evaluation. For this reason, anyone using this document after October 2024 should confirm its ongoing validity.

This assessment report is not valid unless it incorporates the declaration, in Section 5, duly signed by the applicant.

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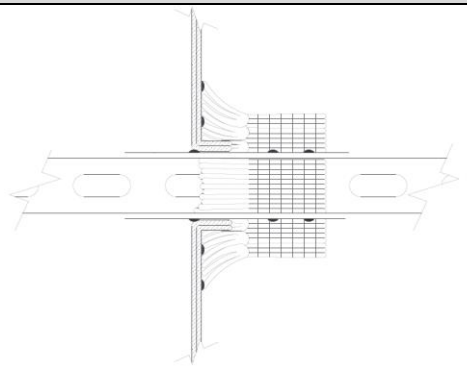
APPENDIX A

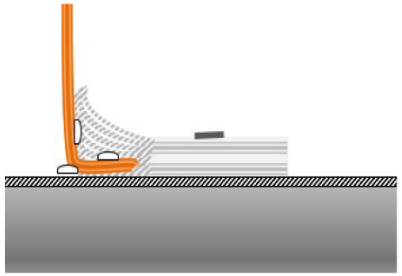
Guidance on installation of Service Penetrations to maximum 60 minutes fire resistance (Integrity only)

Penetrating Service	Diameter / Size	Thickness	Penetration Sealing System	
Steel Cable Tray with Cables	Cable tray up to 150mm wide x 25mm high	Up to 1.5mm – steel thickness	2no layers - Firehalt Brush seals wraps installed to the exposed face around the penetrating service and to fill in between the cables to ensure no visible gaps. Finished with beads of Firehalt HT adhesive	

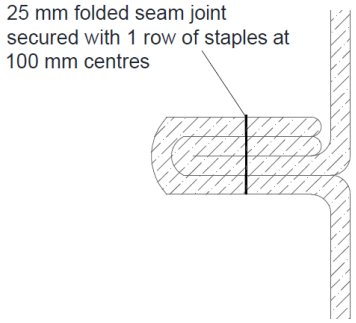
Note: The drawings included in the above table are indicative only and the descriptions should be followed as priority.

Analysis

- Test reference WF 402892 has demonstrated the above detailed sealing system for cable trays has achieved a minimum integrity result of 60 minutes.
- The Firehalt Brushseal penetration management system shall be installed as tested and in line with the following requirements;
  - The brush seal is used as a filler above and between cables ensuring that there are no visible gaps
  - Continuous beads of Firehalt HT adhesive, 10mm x 10mm, are used to seal between the Brushseal, penetration and existing barrier, as per figure below;



  - A stainless-steel tie shall be installed around the Brushseal and penetration.
  - A horizontal joint in the fabric, at the centre of the penetration shall be incorporated into the barrier. The joint shall comprise of 50mm of fabric of adjacent sections folded back onto themselves as to create a 25mm hem secured with 8mm steel staples at maximum 100mm centres.



A cable service is defined as an individual cable. A minimum of 15mm must be present between individual cables.

Cable Type	Maximum Cable Diameter
Multi-core 'power' cables including copper conductors and sheathed with PVC; with steel wire armour	25mm
Multi-core 'power' cables, including copper conductors and sheathed with PVC	12mm

Limitations

- 4no penetrations, of the types detailed in the table above, may be installed through one fully framed section of fire barrier system.
- Cables installed on a cable tray shall have a minimum of 15mm spacing between each adjacent cable.
- Whereby the table above denotes maximum sizes of penetrations, the minimum allowable sizes shall be determined by the minimum size the penetration sealing system can be suitably supplied and installed in.
- Any penetration must be located a minimum of 250mm from the perimeter of the fabric and there must be a minimum separation between services of 250mm.
- All penetrations must be supported independently, fixed back to the supporting construction. Support must provide adequate restraint to the penetration/sealing system such that the fire barrier system and penetration sealing system are not adversely affected by any deflections experienced under fire conditions.
- The sealing system may be installed at either the face of the assembly exposed to fire or the unexposed face.
- Penetrations shall not be installed in barriers with a total height in excess of 1.5m.