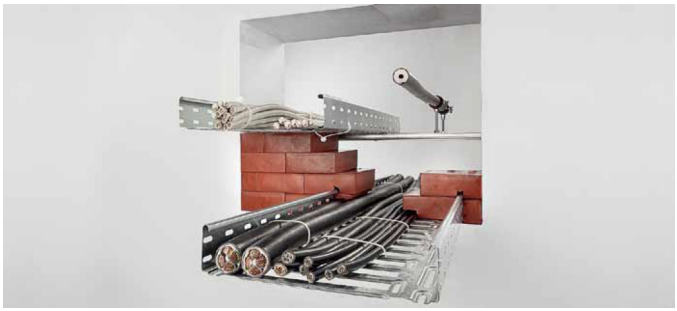
Hilti CFS-BL Firestop Block

Submission Folder

Hilti (HK) | askHilti 工程師技術支援平台 ask.hilti.com.hk | 香港客戶熱線 +852 8228 8118 澳門客戶熱線(免費) 00800 8228 8118 | 香港門市：大角咀洋松街1號形品星寓地下2號舖 澳門門市：澳門布魯塞爾街70號建興龍廣場地下W座地舖 | 電郵：hksales@hilti.com 傳真：+852 2954 1751

Firestop block CFS-BL



APPLICATIONS

- Temporary or permanent sealing around cables, cable bundles and cable trays in wall and floor openings
- Cables, cable bundles and cable trays

ADVANTAGES

- Easy to install, no electric tools required
- Economical installation as the block is pre-cured and ready-to-use
- Painting of cables with firestop coating is not required
- Installation of cables with zero separation to the edge of the penetration is possible
- Best solution for repenetation

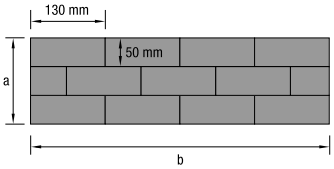
Technical data	
Chemical basis	PU
Dimensions (LxWxH)	200 x 130 x 50 mm
Expansion temperature (approx.)	200 °C
Expansion ratio (unrestricted, up to)	1:3
Reaction to fire class (EN 13501-1)	E
Application temperature range	5 - 40 °C
Colour	Red
Storage and transportation temperature range	-5 - 40 °C

Smoke Acoustic Siesmic Low VOC

Mould & Mildew

Consumption Guide

Brick dimension 200 x 130 x 50 mm
a = opening width in cm
b = opening length in cm

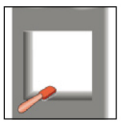


Opening with 30% cross senctional area of services multiply the results by 0.7
Opening with 50% cross senctional area of services, multiply the results by 0.5

Header orientation
Blank opening = $\frac{a \times b}{65}$

e.g. 1 metre by 1 metre opening
Number of bricks required = $\frac{100 \times 100}{65}$ = 154 bricks

Application Procedure

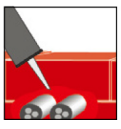


1. Clean opening

2a. Build up blocks

2b. Cut blocks to size for penetration in place

3. Build up blocks



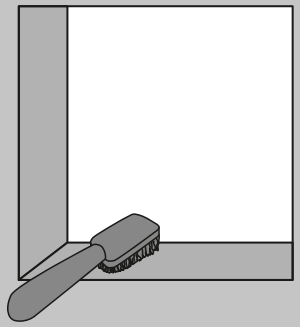
4. Fill gaps with FS-ONE MAX3 / CP 611A

Order Now Watch Video

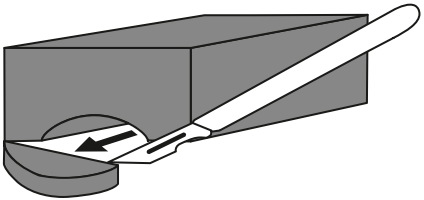
Ordering designation	Package contents	Sales pack quantity	Item number
CFS-BL	1x Firestop block CFS-BL	1 pc	**2062863**

Please visit Hilti website for the latest item numbers and related products

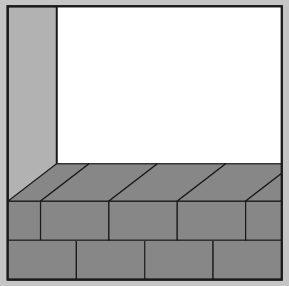
1



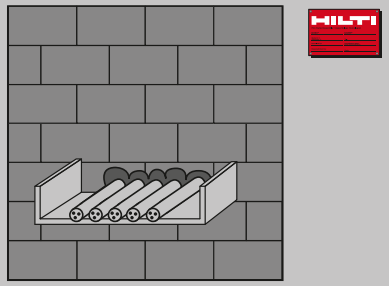
3



2



4



ASSESSMENT REPORT

The Use of Hilti CP636, CP670, CFS-F FX and CFS-BL for Electrical Services Penetration Sealing Systems

Report No.: R22H09-1A

Issue Date: 3 November, 2022

Date of Review: 2 November, 2025

Report Sponsor

Hilti (Hong Kong) Limited
701-704 & 708B, Tower A Manulife Finance Centre,
223 Wai Yip Street, Kwun Tong, Kowloon, HK

CONTENT

REVISION HISTORY

Issue date (DD/MM/YYYY)	Issue number	Remark
03/11/2022	0	Initial version

THE USE OF HILTI CP636, CP670, CFS-F FX AND CFS-BL FOR ELECTRICAL SERVICES PENETRATION SEALING SYSTEMS

1 INTRODUCTION

This assessment report presents an appraisal for the use of the Hilti CP636, CP670, CFS-F FX, and CFS-BL for electrical services penetration sealing systems through concrete, AAC or blockwork like masonry wall or floor supporting construction. This appraisal is based on the substantial test evidence as mentioned in Section 3. This report is prepared for Hilti (Hong Kong) Limited of 701-704 & 708B, Tower A, Manulife Finance Centre, 223 Wai Yip Street, Kwun Tong, Kowloon, HK.

The proposed gap sealing systems used for electrical services penetration are required to provide a fire resistance performance of up to 240 minutes integrity and insulation with respect to BS 476: Part 20: 1987.

2 ASSUMPTIONS

The proposed systems are assumed to be installed in a similar manner to that of the previously tested system by competent installers. It is assumed that the modified systems will be constructed in a similar manner from materials and components of the same manufacture and equivalent quality as tested with supporting test evidence or otherwise appraised by RED. Further assumptions related to the specific modifications will be stated in the report.

It is also assumed that the supporting structures to which the perimeter of the systems will be fixed are capable of supporting the proposed structure effectively.

Assuming that the issue of the original test report is valid, the current testing standard or testing experience has not been changed and the procedures adopted for the original report have been re-examined and reviewed that there have been no changes to the specification of the construction considered in the original report. If contradictory data or any related evidence becomes available to RED, the assessment will be unconditionally withdrawn and the sponsor will be notified. This report is based on the given information, in which is declared by report sponsor that no contradictory data has become available.

3 SUPPORTING DATA

3.1 Summary of Supporting Test Evidence

Report no.	Sections	Description
Primary Test Evidence		
WARRES report no. 62305/A	4.2	Supporting test evidence for the use of the Hilti "CP636" Firestop mortar with electrical services penetration through wall. The test was conducted in accordance with BS476: Part 20: 1987.
WARRES report no. 62305/B	4.2	Supporting test evidence for the use of the Hilti "CP636" Firestop mortar with electrical services penetration through wall. The test was conducted in accordance with BS476: Part 20: 1987.
WARRES report no. 62305/C	4.2	Supporting test evidence for the use of the Hilti "CP636" Firestop mortar with electrical services penetration through wall. The test was conducted in accordance with BS476: Part 20: 1987.
WARRES report no. 62320	4.2	Supporting test evidence for the use of the Hilti "CP636" Firestop mortar with electrical services penetration through floor. The test was conducted in accordance with BS476: Part 20: 1987.
WF report no. 101728	4.2	Supporting test evidence for the use of the Hilti "CP636" Firestop mortar with electrical services penetration through floor. The test was conducted in accordance with BS476: Part 20: 1987.
RED report no. R13C05	4.2	Supporting test evidence for the use of the Hilti "CP636 Firestop mortar and Hilti "CP670" fire safety coating with mineral wool system with electrical services penetration through wall. The test was conducted in accordance with BS476: Part 20: 1987.
WARRES report no. 124662	4.3	Supporting test evidence for the use of Hilti "CP670" fire safety coating with mineral wool panel with electrical services penetration through wall. The test was conducted in accordance with BS476: Part 20: 1987.

Report no.	Sections	Description
WARRES report no. 124663	4.3	Supporting test evidence for the use of Hilti "CP670" fire safety coating with mineral wool panel with electrical services penetration through wall. The test was conducted in accordance with BS476: Part 20: 1987.
PAVUS report no. Pr-03-02.086	4.3	Supporting test evidence for the use of the mineral wool boards with Hilti "CP673" fire safety coating for the penetration of cable tray. The test was conducted in accordance with BS EN 1363-1: 1999 and prEN 1366-3: 2003.
RED report no. R16L28-1B	4.3	Supporting test evidence for the use of the mineral wool boards with Hilti "CP670" fire safety coating and the Hilti "CFS-F FX" for the penetration of cable tray. The test was conducted in accordance with BS 476: Part 20: 1987.
RED report no. R16L28-2A	4.3	Supporting test evidence for the use of the mineral wool boards with Hilti "CP670" fire safety coating for the penetration of cable tray through floor. The test was conducted in accordance with BS 476: Part 20: 1987.
RED report no. R16L28-2B	4.3	Supporting test evidence for the use of the mineral wool boards with Hilti "CP670" fire safety coating and the Hilti "CFS-F FX" for the penetration of cable tray through floor. The test was conducted in accordance with BS 476: Part 20: 1987.

3.2 Primary Test Evidences

3.2.1 Warringtonfire Test Report No. WARRES 62305/A#

A fire resistance test stated to be utilising the general principles of BS 476: Part 20: 1987 in conjunction with additional guidelines from prEN 1366-3: 1993 to evaluate the fire resistance performance of Hilti CP636 fire prevention mortar with cable trays containing services item penetrating through under a wall mount situation was performance by the Warringtonfire testing laboratory on 1st August, 1994. The report was prepared for Hilti AG, the Hilti Entwicklungsgesellschaft mbH had given permission to use this data.

In the test, the section of wall contained a 2,000 mm high by 1,200 mm wide aperture which was penetrated by various steel cable trays, either empty or supporting various electrical services. The aperture was sealed with a 150 mm thick layer of Hilti CP 636 Fire Prevention Mortar. The cable trays containing service items in the upper section of the aperture were additionally provided with a 0.5 mm thick coating of Hilti CP 611A fire Prevention Mastic within the thickness of the barrier. In addition three aperture were provided within CP 636 Mortar, and the other sealed with other products irrelevant to this assessment.

The specimens satisfied the performance requirements specified in BS 476: Part 20: 1987 for the following periods:

Integrity:	**151** Minutes
Insulation:	**121** Minutes

Note: An addendum to this report concludes that if the CP 655 Fire Prevention Bricks were not included in the construction and all serves were coated with CP 611A Fire Prevention Mastic within the thickness of the seal, the expected integrity performance would be 240 minutes.

The test was discontinued after a heating period of 240 minutes (See WARRES report no. 62305/A for full details).

#Note: the test data is more than five years old; we have reviewed this data against the current test procedures as per BS 476: Part 20: 1987 and found it suitable for this assessment.

3.2.2 *Warringtonfire Test Report No. WARRES 62305/B#*

A fire resistance test stated to be utilising the general principles of BS 476: Part 20: 1987 in conjunction with additional guidelines from prEN 1366-3: 1993 to evaluate the fire resistance performance of Hilti CP636 fire prevention mortar with cable trays containing services item penetrating through under a wall mount situation was performance by the Warringtonfire testing laboratory on 16th August, 1994. The report was prepared for Hilti AG, the Hilti Entwicklungsgesellschaft mbH had given permission to use this data.

In the test, the section of wall contained a 600 mm high by 600 mm wide aperture which was penetrated one 200 mm wide, one 300 mm wide and one 500 mm wide cable tray. The aperture was sealed with a 100 mm thick layer of Hilti CP 636 Fire Prevention Mortar. The cable trays containing various electrical cables, coated within the thickness of the barrier with additionally 0.5 mm thick coating of Hilti CP 611A fire Prevention Mastic. In addition, three apertures were provided within CP 636 Mortar, and the other sealed with other products irrelevant to this assessment.

The specimens satisfied the performance requirements specified in BS 476: Part 20: 1987 for the following periods:

Integrity:	**240** Minutes
Insulation:	**86** Minutes

The test was discontinued after a heating period of 240 minutes (See WARRES report no. 62305/B for full details).

#Note: the test data is more than five years old; we have reviewed this data against the current test procedures as per BS 476: Part 20: 1987 and found it suitable for this assessment.

3.2.3 *WARRES Test Report No. 62305/C#*

A fire resistance test stated to be utilising the general principles of BS 476: Part 20: 1987 in conjunction with additional guidelines from prEN 1366-3: 1993 to evaluate the fire resistance performance of Hilti CP636 fire prevention mortar with cable trays containing services item penetrating through under a wall mount situation was performance by the Warringtonfire testing laboratory on 16th August, 1994. The report was prepared for Hilti AG, the Hilti Entwicklungsgesellschaft mbH had given permission to use this data.

In the test, the section of wall contained a 600 mm high by 1,200 mm wide aperture which was penetrated one 200 mm wide, one 300 mm wide and one 500 mm wide cable tray. The aperture was sealed with a 185 mm thick layer of Hilti CP 636 Fire Prevention Mortar. The cable trays containing various electrical cables. In addition, three apertures were provided within CP 636 Mortar, and the other sealed with other products irrelevant to this assessment.

The specimens satisfied the performance requirements specified in BS 476: Part 20: 1987 for the following periods:

Integrity:	**240** Minutes
Insulation:	**81** Minutes

The test was discontinued after a heating period of 240 minutes (See WARRES report no. 62305/C for full details).

#Note: the test data is more than five years old; we have reviewed this data against the current test procedures as per BS 476: Part 20: 1987 and found it suitable for this assessment.

3.2.4 WARRES Test Report No. 62320#

A fire resistance test stated to be utilising the general principles of BS 476: Part 20: 1987 in conjunction with additional guidelines from prEN 1366-3: 1993 to evaluate the fire resistance performance of Hilti CP636 fire prevention mortar with cable trays containing services item penetrating through under a floor mount situation was performance by the Warringtonfire testing laboratory on 17th August, 1994. The report was prepared for Hilti AG, the Hilti Entwicklungsgesellschaft mbH had given permission to use this data.

In the test, the section of wall contained a 600 mm by 1,000 mm aperture which was penetrated with seven (7) nos. of cable trays. The aperture was sealed with a 150 mm thick layer of Hilti CP 636 Fire Prevention Mortar. The cable trays containing various electrical cables.

The specimens satisfied the performance requirements specified in BS 476: Part 20: 1987 for the following periods:

Integrity:	**180** Minutes
Insulation:	**112** Minutes

The test was discontinued after a heating period of 180 minutes (See WARRES report no. 62320 for full details).

#Note: the test data is more than five years old; we have reviewed this data against the current test procedures as per BS 476: Part 20: 1987 and found it suitable for this assessment.

3.2.5 *WARRES Test Report No. 101728#*

A fire resistance test stated to be in accordance with BS 476: Part 20: 1987 on eight different specimens of wall mounted sealings and one specimen of floor mounted sealings was performance by the Warringtonfire testing laboratory on 23rd April, 1998. The report was prepared for Hilti (Great Britain) Limited, the Hilti Entwicklungsgesellschaft mbH had given permission to use this data. In this assessment, only the floor mounted system was concerned.

The floor mounted specimen was installed within a 600 mm by 600 mm aperture with 150 mm thick autoclaved aerated concrete slabs. The aperture was fitted with the 50 mm thick "RW6" mineral wool on the exposed side and the 75 m thick Hilti CP636" fire prevention mortar on the unexposed side. Two cable trays, referenced "A" and "B", were penetrating through the specimen.

The specimens satisfied the performance requirements specified in BS 476: Part 20: 1987 for the following periods:

Integrity:	**240** Minutes
Insulation:	**103** Minutes

The test was discontinued after a heating period of 240 minutes (See WARRES report no. 101728 for full details).

#Note: the test data is more than five years old; we have reviewed this data against the current test procedures as per BS 476: Part 20: 1987 and found it suitable for this assessment.

3.2.6 *RED Test Report No. R13C05#*

A fire resistance test be in accordance with BS 476: Part 20: 1987 on seven different specimens of wall mounted penetration sealings was performance by the RED testing laboratory on 18th April, 2013. As requested by the test sponsor, the specimens were mounted within concrete lined specimen holder. Specimens 'A', 'B', 'D' and 'G' were asymmetrical and the fire side of specimens were determined by the test sponsor. Specimens 'C', 'E' and 'F' were symmetrical and only one side of the specimens were tested as per test sponsor's request.

Specimen 'A' had overall dimensions of 600 mm wide by 1,200 mm high. It was comprised of 2 nos. of nominal 110 mm diameter by 3.5 mm thick by 1,800 mm long PVC pipes, namely specimens 'A1' and 'A2', incorporated with 'Hilti 643N/ CP 644' firestop collars at both of the exposed and unexposed sides. The pipes were penetrated through a fire barrier which constructed by 2 layers of 50 mm thick mineral wool boards with density of 160 kg/m3 with nominal 0.7 mm thick (dry thickness) 'Hilti CP 670' fire safety coating applied on both sides. Each pipe was supported by a pipe ring at unexposed side, which was fixed to a M12 steel rod located at 460 mm and 480 mm from the fire barrier for specimens 'A1' and 'A2' respectively. The M12 steel rods were in turn fixed to an external steel framework by M12 bolts and nuts. The external steel framework was constructed by 40 mm by 40 mm by 2.5 mm thick steel channels and fixed to the concrete lining of test rig by M12 anchor bolts. 'Hilti CP 606' flexible firestop sealant was applied at the gaps between the fire barrier and concrete lining of test rig.

Specimen 'B' had overall dimensions of 600 mm wide by 1,200 mm high. It was comprised of 2 nos. of nominal 150 mm diameter by 4.5 mm thick by 1,770 mm long G.M.S. pipes, namely specimens 'B1' and 'B2'. The pipes were penetrated through a fire barrier which constructed by 2 layers of 50 mm thick mineral wool boards with density of 160 kg/m3 with nominal 0.7 mm thick (dry thickness) 'Hilti CP 670' fire safety coating applied on both sides. The pipes were supported by pipe rings at both sides, which were fixed to M12 steel. The M12 steel rods were in turn fixed to an external steel framework by M12 bolts and nuts. The external steel framework was constructed by 40 mm by 40 mm by 2.5 mm thick steel channels and fixed to the concrete lining of test rig by M12 anchor bolts. 'Hilti CP 606' flexible firestop sealant was applied at the gaps between the fire barrier and concrete lining of test rig.

Specimen 'C' had overall dimensions of 600 mm wide by 1,200 mm high. It was comprised of 2 layers of 50 mm thick mineral wool boards with density of 160 kg/m3 with nominal 0.7 mm thick (dry thickness) 'Hilti CP 670' fire safety coating applied on both sides. 'Hilti CP 606' flexible firestop sealant was applied at the gaps between the fire barrier and concrete lining of test rig.

Specimen 'D' had overall dimensions of 600 mm wide by 1,200 mm high. It was comprised of 2 nos. of steel cable trays with electrical cables, namely specimens 'D1' and 'D2'. Specimen 'D1' was comprised of a 200 mm wide steel cable tray placed with 2 nos. of nominal 7 mm diameter electrical cables while specimen 'D2' was comprised of a 300 mm wide steel cable tray placed with 4 nos. of nominal 7 mm diameter electrical cables. The steel cable trays with electrical cables were penetrated through a fire barrier which constructed by 2 layers of 50 mm thick mineral wool boards with density of 160 kg/m3 with nominal 0.7 mm thick (dry thickness) 'Hilti CP 670' fire safety coating applied on both sides. The steel cable trays with electrical cables were supported by an external steel framework which constructed by 25 mm by 25 mm by 1 mm thick steel angle bars located at 440

mm from the fire barrier. The external steel framework was fixed to the concrete lining of test rig by M12 anchor bolts. Nominal 250 mm coat back of 'Hilti CP 670' fire safety coating was applied on both of the exposed and unexposed sides of the steel cable trays with electrical cables. 'Hilti CP 606' flexible firestop sealant was applied at the gaps between the fire barrier and concrete lining of test rig.

Specimen 'E' had overall dimensions of 1,200 mm wide by 600 mm high. It was comprised of 2 layers of 50 mm thick mineral wool boards with density of 160 kg/m3 with nominal 0.7 mm thick (dry thickness) 'Hilti CP 670' fire safety coating applied on both sides. 'Hilti CP 606' flexible firestop sealant was applied at the gaps between the fire barrier and concrete lining of test rig.

Specimen 'F' had overall dimensions of 525 mm wide by 295 mm high. It was comprised of 'Hilti FS657/ CP657' intumescent firestop bricks and each brick was with sizes of 130 mm by 50 mm by 200 mm.

Specimen 'G' had overall dimensions of 1,200 mm wide by 1,200 mm high. It was comprised of 2 nos. of steel cable trays with electrical cables, namely specimens 'G1' and 'G2' . Specimen 'G1' was comprised of a 200 mm wide steel cable tray placed with 2 nos. of 7 mm diameter electrical cables while specimen 'G2' was comprised of a 300 mm wide steel cable tray placed with 4 nos. of 7 mm diameter electrical cables. The steel cable trays with electrical cables were penetrated through a fire barrier which constructed by a layer of 50 mm thick mineral wool board with density of 160 kg/m3 with nominal 35 mm thick 'Hilti CP 636' firestop mortar applied on both sides. The steel cable trays with electrical cables were supported by an external steel framework which constructed by 25 mm by 25 mm by 1 mm thick steel angle bars located at 440 mm from the fire barrier. The external steel framework was fixed to the concrete lining of test rig by M12 anchor bolts.

The specimens satisfied the performance requirements specified in BS 476: Part 20: 1987, for the following periods:

Specimens	Penetration services	Integrity	Insulation	**Integrity**	**Insulation**
Specimen 'A'	A1	264 Minutes	162 Minutes	**264 Minutes**	**162 Minutes**
	A2	264 Minutes	162 Minutes		
Specimen 'B'	B1	264 Minutes	18 Minutes	**264 Minutes**	**18 Minutes**
	B2	264 Minutes	19 Minutes		
Specimen 'C'	--	264 Minutes	151 Minutes	**264 Minutes**	**151 Minutes**
Specimen 'D'	D1	264 Minutes	198 Minutes	**264 Minutes**	**60 Minutes**
	D2	264 Minutes	60 Minutes		
Specimen 'E'	--	264 Minutes	155 Minutes	**264 Minutes**	**155 Minutes**
Specimen 'F'	--	229 Minutes	209 Minutes	**229 Minutes**	**209 Minutes**
Specimen 'G'	G1	264 Minutes	100 Minutes	**264 Minutes**	**100 Minutes**
	G2	264 Minutes	104 Minutes		

The test was discontinued after a period of 264 minutes (See RED report no. R13C05 for full details)

#Note: the test data is more than five years old; we have reviewed this data against the current test procedures as per BS 476: Part 20: 1987 and found it suitable for this assessment.

3.2.7 *WARRES Test Report No. 124662#*

A fire resistance test stated to be utilising the general principles of BS 476: Part 20: 1987 in conjunction with additional guidelines from prEN 1366-3: 1993 to evaluate the fire resistance performance of Hilti CP670 coating on both sides of mineral wool panel with cable trays penetrating through under a wall mount situation was performance by the Warringtonfire testing laboratory on 20th June, 2002. The report was prepared for Hilti Entwicklungsgesellschaft mbH, who had given permission to use this data.

In the test, the section of wall contained a 1,200 mm high by 1,800 mm wide aperture which was penetrating through various services. The aperture was sealed with two mineral wool panels with sizes of 600 mm wide by 1,200 mm high and 1,200 mm wide x 1,200 mm high, respectively. A vertical butt joint was incorporated. The mineral wool panel was 50 mm thick by 160 kg/m^3 coated with nominal 1 mm thick Hitli "CP670" fire safety coating on both sides. In the test, various services were penetrating through it, whilst only the results for the cable trays were concerned.

The specimens satisfied the performance requirements specified in BS 476: Part 20: 1987 for the following periods:

Integrity:	**125** Minutes (for cable trays position only)
Insulation:	**60** Minutes (for cable trays position only)

The test was discontinued after a heating period of 125 minutes (See WARRES report no. 124662 for full details).

#Note: the test data is more than five years old; we have reviewed this data against the current test procedures as per BS 476: Part 20: 1987 and found it suitable for this assessment.

3.2.8 *WARRES Test Report No. 124663#*

A fire resistance test stated to be utilising the general principles of BS 476: Part 20: 1987 in conjunction with additional guidelines from prEN 1366-3: 1993 to evaluate the fire resistance performance of Hilti CP670 coating on both sides of mineral wool panel with cable trays penetrating through under a wall mount situation was performance by the Warringtonfire testing laboratory on 4th July, 2002. The report was prepared for Hilti Entwicklungsgesellschaft mbH, who had given permission to use this data.

In the test, the wall assembly was formed by the internal steel channel section framework (30 mm thick) clad on both sides with 50 mm thick mineral wool panels coated with Hilti CP670 fire safety coating. The mineral wool panel was 50 mm thick by 160 kg/m^3 coated with nominal 1 mm thick Hitli "CP670" fire safety coating on both sides. In the test, various services were penetrating through it, whilst only the results for the cable trays (Specimens F, G, H, I, J, K and L) were concerned.

The specimens satisfied the performance requirements specified in BS 476: Part 20: 1987 for the following periods:

Specimen	Integrity	Insulation
F, G	211	136
H	213	146
I	213	108
J	213	105
K	213	123
L	213	101

The test was discontinued after a heating period of 240 minutes (See WARRES report no. 124663 for full details).

#Note: the test data is more than five years old; we have reviewed this data against the current test procedures as per BS 476: Part 20: 1987 and found it suitable for this assessment.

3.2.9 *PAVUS Test Report No. Pr-03-02.086**

Two fire resistance tests stated to be in accordance with BS EN 1363-1: 1999 and BS EN 1366-3: 2003 on a number of penetration services through the overall 100 mm thick mineral wool boards coated with dry thickness of 1 mm minimum Hilti CP 673 were performance by the Pavus testing laboratory on 21st and 22nd October, 2003. The report was prepared for Hilti AG, the Hilti Entwicklungsgesellschaft mbH had given permission to use this data.

In the test both the wall and floor supporting construction are identical. They are composed of two layers of 50 mm thick by 150 kg/m^3 mineral wool boards coated with dry thick 1mm of Hitli CP 673, it is as declared by the applicant, the Hilti CP 673 and CP 670 are the same product but with different brand name in different market. For the CP 673 with the mineral wool boards system, a total of 15 nos. of services were penetrating through it. This includes 5 cable trays and a number of individual cables.

The specimen satisfied the performance requirements specified in BS EN 1363-1: 1999 for the following periods:

Integrity:	**Cotton pad**	**125** Minutes
	Gap gauge	**125** Minutes
	Sustained flaming	**125** Minutes
Insulation:		**122** Minutes

The test was discontinued after a heating period of 125 minutes (See Pavus test report no. Pr-03-02.086 for full details).

*Note: The test data is more than five years old; we have reviewed this data against the current test procedures as per BS EN 1366-3: 2003 and BS EN 1363-1: 1999 and found it suitable for this assessment.

3.2.10 RED Test Report No. R16L28-1#

A fire resistance test in accordance with BS 476: Part 20: 1987 on 7 nos, of penetration systems was performance by the RED testing laboratory on 20th January, 2017. The report was prepared for Hilti (Hong Kong) Limited. In this test report, only trunkings, speed sleeve and cable trays, namely specimens '2a', '2b', '3', '6', '8', '9' and '10', were considered. As requested by the test sponsor, the specimens were mounted within concrete line specimen holder. The specimens were symmetrical and only one side of specimen was tested as per test sponsor's request.

Specimen '2a' was comprised of a 100 mm by 100 mm by nominal 1 mm thick by 1,400 mm long trunking filled with 60% of 5 mm diameter 'CAT 6' cables. The cables were protected by 'CFS-BL' firestop blocks and 'CFS-F FX' firestop foam.

Specimen '2b' was comprised of a 100 mm by 100 mm by nominal 1 mm thick by 1,400 mm long trunking filled with 60% of 5 mm diameter 'CAT 6' cables. The cables were protected by 'CFS-BL' firestop blocks.

Specimen '3' was comprised of a 200 mm by 200 mm by nominal 1.2 mm thick by 1,400 mm long trunking filled with 60% of 5 mm diameter 'CAT 6' cables. The cables were protected by 'CFS-F FX' firestop foam.

Specimen '6' was comprised of a nominal 110 mm diameter 'CFS-SL' speed sleeve filled with 60% of 3 mm diameter AV cables.

Specimens '8', '9' and '10' were comprised of a fire barrier with sizes of 600 mm wide by 600 mm high, upper and lower cable trays with electrical cables. The upper and lower cable trays were with a separation of 250 mm. The upper and lower cable tray had a 250 mm wide by 1.2 mm thick and a 150 mm wide by 1.2 mm thick cable trays respectively. 3 nos. of 30 mm diameter 'Armoured Cable 35' and 3 nos. of 40 mm diameter 'Armoured Cable 70' electrical cables were incorporated into the upper and lower 250 mm wide by 1.2 mm thick cable tray respectively. The electrical cables were fixed to the cable tray by nominal 3 mm thick rings with 2 nos. of M5 bolts and nuts on both sides.

For specimen '8', the cable trays with electrical cables were penetrated through a fire barrier which constructed by a layer of 50 mm thick 'ROCKWOOL' mineral wool boards with density of 160 kg/m^3 with nominal 0.7 mm thick (dry thickness) 'Hilti CP 670' fire safety coating applied on both sides. For specimen '9', the cable trays with electrical cables were penetrated through a fire barrier which constructed by nominal 100 mm thick 'CFS-F FX' firestop foam. While for specimen '10', the cable trays with electrical cables were penetrated through a fire barrier which constructed by a layer of 50 mm thick 'ROCKWOOL' mineral wool boards with density of 100 kg/m^3 with nominal 15 mm thick 'FS-ONE MAX' intumescent firestop sealant applied on both sides.

The trunkings of specimens '2a', '2b' and '3', AV cables of specimen '6' and cable trays of specimen '8', '9' and '10' were fixed to 42 mm by 20 mm by 3 mm thick steel channels, located at 500 mm from the concrete wall, by M5 bolts and nuts on both sides. The steel channels were supported by an external steel framework constructed by 50 mm by 50 mm by 3 mm steel L-angles which in turn fixed to the concrete lining of test rig by 2 nos. of M10 anchor bolts.

The specimens satisfied the performance requirements specified in BS 476: Part 20: 1987 for the following periods:

	Integrity	**Insulation**
Specimen '2a'	**121** Minutes (No failure)	N/A
Specimen '2b'	**121** Minutes (No failure)	N/A
Specimen '3'	**121** Minutes (No failure)	N/A
Specimen '6'	**121** Minutes (No failure)	N/A
Specimen '8'	**121** Minutes (No failure)	**38** Minutes
Specimen '9'	**121** Minutes (No failure)	**61** Minutes
Specimen '10'	**121** Minutes (No failure)	**42** Minutes

The test was discontinued after a heating period of 121 minutes (See RED report no. R16L28-1B for full details).

#Note: the test data is more than five years old; we have reviewed this data against the current test procedures as per BS 476: Part 20: 1987 and found it suitable for this assessment.

3.2.11 RED Test Report No. R16L28-2A#

A fire resistance test in accordance with BS 476: Part 20: 1987 on 6 nos, of penetration systems was performance by the RED testing laboratory on 10th May, 2017. The report was prepared for Hilti (Hong Kong) Limited. In this test report, only trunking, speed sleeve and cable tray, namely specimens '2', '4a', '4b', '5b', '7' and '8', were considered. As requested by the test sponsor, the specimens were mounted within concrete line specimen holder. The specimens were symmetrical and only one side of specimens was tested as per test sponsor's request.

Specimen '2' was comprised of a fire barrier with sizes of 600 mm wide by 600 mm high, left and right cable trays with electrical cables. The left and right cable trays were with a separation of 200 mm. The left and right cable tray had a 250 mm wide by 1.2 mm thick and a 150 mm wide by 1.2 mm thick cable trays respectively. 3 nos. of 40 mm diameter 'Armoured Cable 70' and 3 nos. of 30 mm diameter 'Armoured Cable 35' electrical cables were incorporated into the left and right 250 mm wide by 1.2 mm thick cable tray respectively. The electrical cables were fixed to the cable tray by nominal 3 mm thick rings with 2 nos. of M5 bolts and nuts on both sides. The cable trays with electrical cables were penetrated through a fire barrier which constructed by 2 layers of 50 mm thick 'ROCKWOOL' mineral wool boards with density of 160 kg/m^3 with nominal 0.7 mm thick (dry thickness) 'Hilti CP 670' fire safety coating applied on both sides.

Specimen '4a' was comprised of a 200 mm by 200 mm by nominal 1.2 mm thick by 1,000 mm long trunking filled with 60% of 5 mm diameter 'CAT 6' cables. The cables were protected by nominal 200 mm thick 'CFS-F FX' firestop foam.

Specimen '4b' was comprised of a 200 mm by 200 mm by nominal 1.2 mm thick by 1,000 mm long trunking filled with 60% of 5 mm diameter 'CAT 6' cables. The cables were protected by nominal 150 mm thick 'CFS-F FX' firestop foam.

Specimen '5b' was comprised of a 100 mm by 100 mm by nominal 1 mm thick by 1,000 mm long trunking filled with 60% of 5 mm diameter 'CAT 6' cables. The cables were protected by nominal 150 mm thick 'CFS-F FX' firestop foam.

Specimen '7' was comprised of a nominal 110 mm diameter 'CFS-SL' speed sleeve filled with 60% of 3 mm diameter AV cables.

Specimen '8' was comprised of a nominal 110 mm diameter 'CFS-SL' speed sleeve and 25 mm wide 'CP648-E' fire wrap, filled with 60% of 3 mm diameter AV cables.

The trunkings of specimens '4a', '4b' and '5b', AV cables of specimens '7 and '8' and cable trays of specimen '2' were fixed to 50 mm by 50 mm by 3 mm thick steel brackets, located at 300 mm from the concrete floor, by M5 bolts and nuts on both sides. The steel brackets were supported by an external steel framework constructed by 50 mm by 50 mm by 3 mm steel brackets which in turn fixed to the concrete lining of test rig by 2 nos. of M10 anchor bolts.

The specimens satisfied the performance requirements specified in BS 476: Part 20: 1987 for the following periods:

	Integrity	**Insulation**
Specimen '2'	**241** Minutes (No failure)	**85** Minutes
Specimen '4a'	**241** Minutes (No failure)	N/A
Specimen '4b'	**241** Minutes (No failure)	N/A
Specimen '5b'	**241** Minutes (No failure)	N/A
Specimen '7'	**241** Minutes (No failure)	N/A
Specimen '8'	**241** Minutes (No failure)	N/A

The test was discontinued after a heating period of 241 minutes (See RED report no. R16L28-2A for full details).

#Note: the test data is more than five years old; we have reviewed this data against the current test procedures as per BS 476: Part 20: 1987 and found it suitable for this assessment.

3.2.12 *RED Test Report No. R16L28-2B#*

A fire resistance test in accordance with BS 476: Part 20: 1987 on 4 nos, of penetration systems was performance by the RED testing laboratory on 10th May, 2017. The report was prepared for Hilti (Hong Kong) Limited. In this test report, only trunking and cable tray, namely specimens '1', '3a', '3b' and '6', were considered. As requested by the test sponsor, the specimens were mounted within concrete line specimen holder. The specimens were symmetrical and only one side of specimens was tested as per test sponsor's request.

Specimen '1' was comprised of a fire barrier with sizes of 1,000 mm wide by 1.000 mm high, left and right cable trays with electrical cables. The left and right cable trays were with a separation of 400 mm and had 2 nos. of 250 mm wide by 1.2 mm thick cable trays. 3 nos. of 40 mm diameter 'Armoured Cable 70' and 3 nos. of 30 mm diameter 'Armoured Cable 35' electrical cables were incorporated into one of the left and right 250 mm wide by 1.2 mm thick cable tray respectively. The electrical cables were fixed to the cable tray by nominal 3 mm thick rings with 2 nos. of M5 bolts and nuts on both sides. The cable trays with electrical cables were penetrated through a fire barrier which constructed by 2 layers of nominal 50 mm thick 'ROCKWOOL' mineral wool boards with density of 160 kg/m^3 with nominal 0.7 mm thick (dry thickness) 'Hilti CP 670' fire safety coating applied on both sides.

Specimen '3a' was comprised of a fire barrier with sizes of 600 mm wide by 600 mm high, left and right cable trays with electrical cables. The left and right cable trays were with a separation of 200 mm. The left and right cable tray had a 250 mm wide by 1.2 mm thick and a 150 mm wide by 1.2 mm thick cable trays respectively. 3 nos. of 40 mm diameter 'Armoured Cable 70' and 3 nos. of 30 mm diameter 'Armoured Cable 35' electrical cables were incorporated into the left and right 250 mm wide by 1.2 mm thick cable tray respectively. The electrical cables were fixed to the cable tray by nominal 3 mm thick rings with 2 nos. of M5 bolts and nuts on both sides. The cable trays with electrical cables were penetrated through a fire barrier which constructed by a layer of nominal 150 mm thick 'CFS-F FX' firestop foam at the unexposed side and a layer of nominal 50 mm thick 'ROCKWOOL' mineral wool boards with density of 100 kg/m^3 at the exposed side.

Specimen '3b' was comprised of a fire barrier with sizes of 600 mm wide by 600 mm high, left and right cable trays with electrical cables. The left and right cable trays were with a separation of 200 mm. The left and right cable tray had a 250 mm wide by 1.2 mm thick and a 150 mm wide by 1.2 mm thick cable trays respectively. 3 nos. of 40 mm diameter 'Armoured Cable 70' and 3 nos. of 30 mm diameter 'Armoured Cable 35' electrical cables were incorporated into the left and right 250 mm wide by 1.2 mm thick cable tray respectively. The electrical cables were fixed to the cable tray by nominal 3 mm thick rings with 2 nos. of M5 bolts and nuts on both sides. The cable trays with electrical cables were penetrated through a fire barrier which constructed by a layer of nominal 150 mm thick 'ROCKWOOL' mineral wool boards with density of 100 kg/m^3 with nominal 15 mm thick 'FS-ONE MAX' intumescent firestop sealant applied at the

unexposed side.

Specimen '6' was comprised of a 100 mm by 100 mm by nominal 1 mm thick by 1,000 mm long trunking filled with 60% of 5 mm diameter 'CAT 6' cables. The cables were protected by 'CFS-BL' firestop blocks and 'CFS-F FX' firestop foam.

The trunkings of specimen '6' and cable trays of specimens '1', '3a' and '3b' were fixed to 50 mm by 50 mm by 3 mm thick steel brackets, located at 300 mm from the concrete floor, by M5 bolts and nuts on both sides. The steel brackets were supported by an external steel framework constructed by 50 mm by 50 mm by 3 mm steel brackets which in turn fixed to the concrete lining of test rig by 2 nos. of M10 anchor bolts.

The specimens satisfied the performance requirements specified in BS 476: Part 20: 1987 for the following periods:

	Integrity	**Insulation**
Specimen '1'	**174** Minutes	**82** Minutes
Specimen '3a'	**177** Minutes	**101** Minutes
Specimen '3b'	**173** Minutes	**96** Minutes
Specimen '6'	**130** Minutes	N/A

The test was discontinued after a heating period of 241 minutes (See RED report no. R16L28-2A for full details).

#Note: the test data is more than five years old; we have reviewed this data against the current test procedures as per BS 476: Part 20: 1987 and found it suitable for this assessment.

4 PROPOSAL & DISCUSSION

4.1 The use of test evidence, which was tested in accordance with BS EN 1363-1: 1999, for the assessment of linear joint sealing system to BS 476: Part 20: 1987

Proposal

It is proposed that the test evidence of PAVUS test report no. Pr-03-02.086 for the penetration seal systems, which were tested in accordance with BS EN 1363-1: 1999, is suitable for use in the assessment against BS 476: Part 20: 1987.

Discussion

The fire test on the penetration seal systems as tested and described in the above test evidence was carried out in accordance with BS EN 1363-1: 1999. In reviewing the test, we have considered the design and installation of the specimens, the surrounding construction, the initial furnace temperature, the pressure in the furnace, the changes in the integrity criteria and the behaviour of the fire test, it is expected that if this fire test had been conducted in accordance with BS 476: Part 20: 1987 very similar results would have been achieved.

Fire tests to BS EN 1363-1: 1999 and BS 476: Part 20: 1987 have the same furnace temperature-time curve, i.e., the standard ISO temperature time curve represented by $T = 345 \log_{10}(8t + 1) + 20$, where T is the furnace temperature rise and t is the time of heating conditions. However, a more severe overpressure requirement of 5 Pa required by BS EN 1363-1: 1999 was used, which was normally deemed to be more onerous. The passing criteria for the standards of BS EN 1363-1: 1999 and BS 476: Part 20: 1987 are summarised as follows:

Integrity. Monitor the unexposed face of the specimen for evaluation of integrity. A failure of the test construction to maintain integrity occurs when collapse or sustained flaming on the unexposed face occurs or impermeability is exceeded.

Insulation. Failure occurs when (a) the mean unexposed face temperature increases by more than 140 °C above its initial value; or (b) the temperature recorded at any position on the unexposed face is in excess of 180 °C above its initial value; or (c) when integrity failure occurs.

Having stated these criteria, there is no significant difference between the tests to BS EN and British standards. Since the integrity and insulation criteria of BS EN 1363-1: 1999 are basically the same, we can conservatively conclude that the linear joint sealing system as tested and described in PAVUS report no. Pr-03-02.086 will achieve fire resistance performance not worse than tested if test to BS 476: Part 20: 1987.

4.2 The fire resistance performance of cable tray penetration sealing system through the Hilti CP636 firestop mortar with respect to BS 476: Part 20: 1987.

Proposal

It is proposed that Hilti CP636 firestop mortar may be used for the purpose of cable tray penetration sealing purpose under either the wall mounted or floor mounted situation. The required condition of the use of Hilti CP636 firestop mortar for various situation are as stated in the table below:

Table 1: Summary of the required condition of Hilti CP 636 for various FRR

Wall	Thickness	Aperture size		Integrity	Insulation
		Width	Height		
	100 mm	600 mm	600 mm	240	60
	150 mm	1,200 mm	2,000 mm	240	60
	150 mm	1,200 mm	2,000 mm	240	120[Note 1]
	50 mm x 160 kg/m^3 mineral wool with 35 mm thick CP 636 on both sides (overall 120 mm thick)	1,200 mm	1,200 mm	240	60
Floor	150 mm	1,000 mm	600 mm	180	60
	75 mm CP 636 + 50 mm x 160 kg/m^3 wool on exposed side	600 mm	600 mm	240	60

Note1: Coat with 0.5 mm thickness of Hilti CP 611A intumescent firestop mastic around the cables over a distance of 30 mm length at the middle of the penetration.

The clear distance between the top and bottom of the cable trays within one aperture shall be at least 100 mm apart from each other, and there is no limitation impose to the cable trays arranged side by side at the same height level. In all cases, the cable tray shall be adequately supported same as that tested, such that the weight of the cables together with the cable tray will not be added to the penetration sealing.

The assessment is conducted against the integrity and insulation criteria with respect to BS 476: Part 20: 1987.

Discussion

The Hilti CP636 firestop mortar had been substantially tested under various evidence. In the test evidence WARRES 62305/B, the 100 mm thick Hilti CP636 had been used to seal up a 600 mm by 600 mm masonry wall aperture penetrated with three cable trays penetrating through, the cables are applied with 30 mm wide by 0.5 mm thick Hilti CP611A firestop intumescent sealant at the mid-depth of the aperture. The WARRES 62305/A describe the test of the 150 mm thick Hilti CP636 used to seal up a 1,200 mm wide by 2,000 mm high aperture with various services penetrating through it. The cable trays

at the upper section of the aperture were applied with 0.5 mm thick Hilti CP611A while the cable trays at the lower section of the aperture was not applied with the Hilti CP611A. The test result stated the integrity failed at 151 minutes and the insulation failed at 121 minutes.

In the test evidence WARRES 62304/C the 185 mm thick Hilti CP 636 had been used to seal up a 1,200 mm wide by 600 mm high masonry wall aperture penetrated with 5 cable trays. All the cable trays were not applied with the Hilti CP611A and the system had achieved 240 minutes integrity and 86 minutes insulation with respect to BS 476: Part 22: 1987.

The test evidence R13C05 described the test for various penetration sealing, while among these, the Specimen "G" was the sealing system composed of a 50 mm thick by 160 k/m^3 mineral wool system sandwiched by the 35 mm thick Hilti CP636 firestop mortar on both sides. The aperture sizes were 1,200 mm by 1,200 mm with two cable trays penetrating through it. The system had achieved 264 minutes integrity and 100 minutes.

In the test evidence WARRES 62320, the floor mounted specimen was constructed by the 150 mm thick Hilti CP636 firestop mortar within a 150 mm thick masonry floor. The aperture sizes for the Hilti CP636 mortar was 600 mm by 1,000 and a totally of 7 nos. of cable trays were penetrating though it. The system had achieved the fire resistance performance of 180 minutes integrity and 112 minutes insulation.

In the test evidence WARRES 101728, the floor mounted specimen was constructed by the 75 mm thick Hilti CP636 firestop mortar on the unexposed side backed with the 50 mm thick by mineral wool within a 600 mm by 600 mm masonry floor aperture. Immediately after the test, an evenly distributed dead load of approximately 150 kg was placed on the upper face of the floor mounted seal and left in place for a period of approximately 10 minutes without collapse. In this test report, no density of the mineral wool had been mentioned, therefore, it is assumed to be the same as that used in R13C05.

For the proposed conditions of the use of Hilti CP636 firestop mortar for various aperture sizes and fire resistance performance as given in Table 1 are referenced to the direct test evidence and the appraisal is therefore considered as positive. In all the tests, the cable trays are penetrating though the Hilti CP636 firestop mortar in various configuration, and most of them did not have significant deterioration of the fire resistance performance, except that the clear distance between the two height level of cable trays shall be at least 100 mm apart from each other is imposed as the only condition.

4.3 The fire resistance performance of cable tray penetration sealing system through the mineral wool panel coated with Hilti CP670 fire safety coating with respect to BS 476: Part 20: 1987.

Proposal

It is proposed that mineral wool panel coated with Hilti CP670 fire safety coating may be used for the purpose of cable tray penetration sealing purpose under either the wall mounted or floor mounted situation. The required condition of the use of Hilti CP670 fire safety coating and the required thickness of the mineral wool panel for various situation are as stated in the table below:

Table 2: Summary of the required condition of Hilti CP670 and mineral wool panel for various FRR

Wall	Thickness	Aperture size		Cables remark	Integrity	Insulation
		Width	Height			
	50 mm x 160 kg/m³ with 0.7 mm thick CP670 on both sides	3,600 mm	2,000 mm	Nil	120	30
	50 mm x 160 kg/m³ with 0.7 mm thick CP670 on both sides	3,600 mm	2,000 mm	Coated with CP670, 150 mm long extend from wall on both sides	120	60
	2 x 50 mm x 160 kg/m³ with 0.7 mm thick CP 670 on both sides	3,600 mm	2,000 mm	Coated with CP670, 150 mm long extend from wall on both sides	240	120
Floor	2 x 50 mm x 160 kg/m³ with 0.7 mm thick CP 670 on both sides	3,600 mm	2,000 mm	Nil	120	60
	2 x 50 mm x 160 kg/m³ with 0.7 mm thick CP 670 on both sides	3,600 mm	2,000 mm	Coated with CP670, 150 mm long extend from wall on both sides	120	120
	2 x 50 mm x 160 kg/m³ with 0.7 mm thick CP 670 on both sides	600 mm	600 mm	Nil	240	60

The clear distance between the top and bottom of the cable trays within one aperture shall be at least 100 mm apart from each other, and there is no limitation impose to the cable trays arranged side by side at the same height level. In all cases, the cable tray shall be adequately supported same as that tested,

such that the weight of the cables together with the cable tray will not be added to the penetration sealing.

The assessment is conducted against the integrity and insulation criteria with respect to BS 476: Part 20: 1987.

Discussion

The system composed of the mineral wool panel coated with the Hilti CP670 fire safety coating had been substantially tested under various evidence. In the test evidence WARRES 124662, the 50 mm thick by 160 kg/m^3 mineral wool panel coated with nominal 1 mm thick Hilti CP670 fire safety coating was used to seal up the 1,800 mm wide by 1,200 mm high wall aperture. Two mineral wool panels, one 600 mm wide by 1,200 mm high and one 1,200 mm wide by 1,200 mm high were butt jointed side by side. Three cable trays penetrated through it and the system had achieved 120 minutes integrity and 60 minutes insulation performance.

The test evidence WARRES 124663, the 30 mm thick steel frame cladded with 50 mm thick by 160 kg/m^3 mineral wool on each side of the steel frame the exposed face of the panel was coated with nominal 1 mm thick Hilti CP670 fire safety coating. For the cable tray penetration, the specimen generally achieved the fire resistance of not less than 180 minutes integrity and 60 minutes insulation.

Test evidence PAVUS report no. Pr-03-02.086 described the test of the penetrating sealing system with aperture sizes of 1,000 mm x 2,000 mm for both the wall mounted and floor mounted situation. The system composed of two layers of 50 mm thick by 150 kg/m^3 mineral wool panels coated with 0.7 mm thick Hilti CP670 fire safety coating. The system had achieved an overall 125 minutes integrity and 122 minutes insulation performance.

In the test evidence of R16L28-1B, specimen 8 was the cable trays penetrating through a 600 mm by 600 mm system composed of 50 mm thick by 160 kg/m^3 mineral panel coated with nominal 0.7 mm thick Hilti CP670 on both sides. The system had achieved 121 minutes integrity and 38 minutes insulation.

The evidence R16L28-2A described the test of a specimen (referenced '2'), which was the cable tray penetrated through a 600 mm x 600 mm floor mounted Hilti CP670 system. The system composed of two layers of 50 mm thick by 160 kg/m^3 mineral wool panel coated with nominal 0.7 mm thick Hilti CP670 fire safety coating had achieved the fire resistance performance of 240 minutes integrity and 60 minutes insulation performance. While the test evidence R16L28-2B described the test on the specimen (referenced '1'), which was the cable tray penetrated through a 1,000 mm x 1,000 mm floor mounted Hilti CP 670 system, which was the same as the one that in R16L28-2A. The system had achieved the fire resistance performance of 174 minutes integrity and 82 minutes insulation.

In the proposed design of the CP670 systems, for the wall application, the sizes of the system is assessed to become 3,600 mm wide by 2,000 mm high. From the test evidence of wall application, the system with various configuration had been tested. The 2,000 high system was tested in the PAVUS report no. Pr-03-02.086. While the regarding the width of the system, the test evidence WARRES 124662, had been tested with the single layer mineral wool panels incorporation of the vertical butt joints. The test

evidence proved the present of the butt joint shall not deteriorate the tested fire resistance performance. The proposal to increase the width to 3,600 mm which involves three mineral panels of 1,200 mm wide incorporated with two vertical butt joints are still considered as the reasonable proven in the test evidence. The height of 2,000 mm are the tested maximum height and since the height would be a more critical dimension in terms of this type of sealing, therefore the proposed height shall remain the same as that tested. While regarding the insulation performance, the overall thickness of the mineral wool panels, and the application of extended coating on the cables are considered as improvement of the insulation performance as reflected in the test results. Therefore, for the system that requires 120 minutes, only the cables coated with the Hilti CP670 can achieved the 120 minutes insulation. For the system that requires 240 minutes and with the larger aperture sizes, minimum two layers of the 50 mm thick x 160 kg/m^3 mineral wool panels is suggested as referenced to the flooring situation in test evidence R16L28-2B.

For the system in floor mounted situation, again, the maximum aperture sizes of 1,000 mm by 2,000 mm had been proven in the test evidence Pr-03-02.086, while the test evidence R16L28-2A and R16L28-2A also described the same systems achieved the fire resistance performance for floor-mounted situation. While in case the sealing aperture exceed 1,200 mm in width, additional framing shall be incorporated to provide adequate support to the system such that the short span of the system shall not exceed 1,200 mm. For all the floor system, two layers of 50 mm thick x 160 kg/m^3 mineral wool panels shall be used, and the two layers shall be staggered to each other with the overlapping distance of 400 mm. For the system requires 120 minutes insulation, the Hilti CP670 shall be applied to the cables as well.

While in the floor situation, the aperture sizes of 600 mm x 600 mm sealed with two layers of 50 mm thick x 160 kg/m^3 mineral wool panels and coated with Hilti CP670 on both sides to achieve 240 minutes integrity and 60 minutes insulation is the application direct adopted the tested configuration.

4.4 *The fire resistance performance of cable tray penetration sealing system through the Hilti CFS-F FX firestop foam with respect to BS 476: Part 20: 1987.*

Proposal

It is proposed that Hilti CFS-F FX firestop foam may be used for the purpose of cable tray penetration sealing purpose under either the wall mounted or floor mounted situation. The required condition of the use of Hilti CFS-F FX firestop foam for various situation are as stated in the table below:

Table 3: Summary of the required condition of Hilti CFS-F FX and mineral wool panel for various FRR

Wall	Thickness	Aperture size		Integrity	Insulation
		Width	Height		
	100 mm thick CFS-F FX firestop foam	600 mm	600 mm	120	60
Floor	150 mm thick CFS-F FX firestop foam on unexposed side and 50 mm x 100 kg/m3 mineral wool on exposed side.	600 mm	600 mm	120	60

The clear distance between the top and bottom of the cable trays within one aperture shall be at least 100 mm apart from each other, and there is no limitation impose to the cable trays arranged side by side at the same height level. In all cases, the cable tray shall be adequately supported same as that tested, such that the weight of the cables together with the cable tray will not be added to the penetration sealing.

The assessment is conducted against the integrity and insulation criteria with respect to BS 476: Part 20: 1987.

Discussion

The system that used the Hilti CFS-F FX firestop foam for the sealing of apertures on the floor and wall application are as described in the test evidence RED report nos. R16L28-1B and R16L28-2B. In R16L28-1B, specimen '9' was the use of the Hilti CFS-F FX firestop foam sealing up the 600 mm x 600 mm aperture with the present of the cable trays penetrating through it. The system had achieved the fire resistance performance of 121 minutes integrity and 61 minutes insulation. While in the test R16L28-2B, the specimen 3a was the aperture sealing with overall sizes of 600 mm x 600 mm and constructed by 150 mm thick Hilti CFS-F FX firestop foam on the unexposed side and backed with a layer of 50 mm x 100 kg/m^3 mineral wool panel on the exposed side. The system had achieved the fire resistance performance of 177 minutes integrity and 101 minutes insulation.

For the proposed conditions of the use of Hilti FS-F FX firestop foam as given in Table 3, the applications are referenced to the direct test evidence and since there were no significant performance buffer achieved in the test. The appraisal scope is therefore directly adopted the tested condition only. In all the tests, the cable trays are penetrating though the system, and most of them did not have significant deterioration of the fire resistance performance, except that the clear distance between the two height level of cable trays shall be at least 100 mm apart from each other is imposed as the only condition.

4.5 The fire resistance performance of cable trunking application penetrating through masonry wall with respect to BS 476: Part 20: 1987.

Proposal

It is proposed that for the cable trunking penetration through masonry wall, the void inside the trunking may be filled by the use of Hilti CFS-F FX firestop foam or CFS-BL firestop block with the following conditions:

(a) The maximum sizes of the trunking are up to 200 mm x 200 mm and shall be made of minimum 1mm thick steel, the sizes of the aperture may be up to 20 mm larger than the trunking. The clearance between the trunking and the supporting construction shall be sealed with minimum 10 mm deep Hilti "CP606" sealant on both sides of the wall, or at the unexposed side only for the floor mount situation;

(b) For the use of Hilti CFS-BL firestop block, the filling of the cables may be up to 60% of the trunking sectional area only. The Hilti CFS-BL will be filled the rest of nominal 40% of the sectional area;

(c) For the use of Hilti CFS-F FX firestop foam, the filling of the cables may be up to 60% of the trunking sectional area only. The Hilti CFS-F FX will be applied to the cables and filled up the rest of nominal 40% of the sectional area;

The cable trunking shall be supported by separate supporting system such that the weight of the trunking shall not be added to the sealant. The system shall be capable to satisfy 120 minutes integrity only performance with respect to BS 476: Part 20: 1987.

Discussion

The cable trunking systems penetrating through wall were tested under the test evidence R16L28-1B. Specimen referenced '2a', '2b' and 3' were the trunking specimen using either the Hilti CFS-BL and the CFS-F FX, the sizes of the trunkings were 100 mm x 100 mm and 200 mm x 200 mm. In all the specimens, the cables are filled up to 60% of the sectional area, and the rest of the 40% were filled with the Hilti CFS-BL and the CFS-F FX. The clearance between the trunking and the supporting construction shall be sealed with minimum 10 mm deep Hilti CP606 sealant on both sides of the wall. All three specimens had achieved the fire resistance performance of 120 minutes integrity with respect to BS476: Part 20: 1987.

The cable trunking systems penetrating through floor were tested under the test evidence R16L28-2B, in which the specimen '6' was a 100 mm x 100 mm cable trunking system. In the trunking, the cables are filled up to 60% of the sectional area, and the rest of the 40% were filled with the Hilti CFS-BL. The system had achieved 130 minutes integrity performance with respect to BS 476: Part 20: 1987.

For the performance that requires only the integrity performance, the expansion of the sealant to fill up the void for the required fire resistance duration is critical. In this case the 1 mm thick trunking is the metal that provide a rigid area for the forming for the expansion of the cable. The perimeter sealing with the use of the fire rated sealant is adequate as well. Based on this, the proposed design for the trunking sealing purpose is considered as acceptable.

5 CONCLUSION

The proposed use of Hilti CP636, CP670, CFS-F FX, and CFS-BL for electrical services penetration sealing systems through masonry wall or floor supporting construction as discussed in Section 4 of this report, are capable to maintain the fire resistance performance of up to 240 minutes integrity and various insulation performance with respect to BS 476: Part 20: 1987.

6 DECLARATION BY APPLICANT

We, Hilti (Hong Kong) Limited, confirm that the material, component or element of structure, which is the subject of the test report being reviewed, has not to our knowledge been subjected to another 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 another test to the standard against which the assessment is being made.

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 the assessing authority to withdraw the assessment.

7 VALIDITY

This assessment is based on test data, experience and the information supplied. The assessment will be invalidated if the assessed construction is subsequently tested since actual test data is deemed to take precedence over an expressed opinion. Any changes in the specification of product will invalidate this assessment. This assessment relates only to the specimen assessed and does not by itself infer that the product is approved under any other endorsements, approval or certification scheme. Since the appraisal method is under development, the laboratory reserved the right to supersede this assessment in case the appraisal method had been changed.

This report only relates to the specimen(s) tested and may only be reproduced by the sponsor in full, without comment, abridgement and modifications.

8 SIGNATORIES

Assessment by:

Dr. SZE Lip-kit
Test Consultant
Research Engineering Development
Façade Consultants Limited

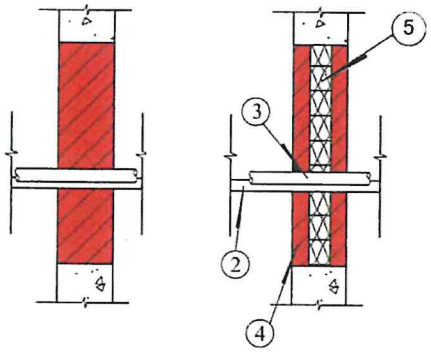
Reviewed by:

Ir Dr. YUEN Sai-wing, MHKIE (Fire)
Authorized Signature
Research Engineering Development
Façade Consultants Limited

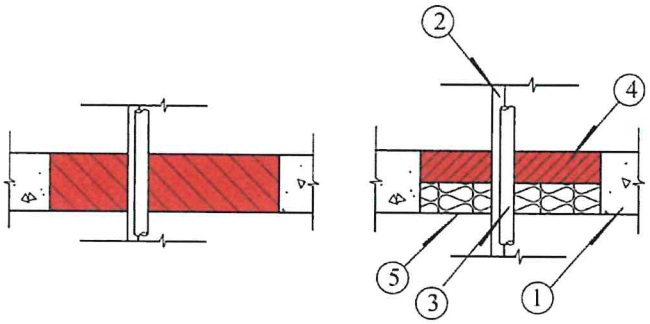
APPENDIX – DRAWINGS PROVIDED BY THE CLIENT

Drawing refers to Table 1 on cable tray penetration application by using CP636

FLOOR CASE



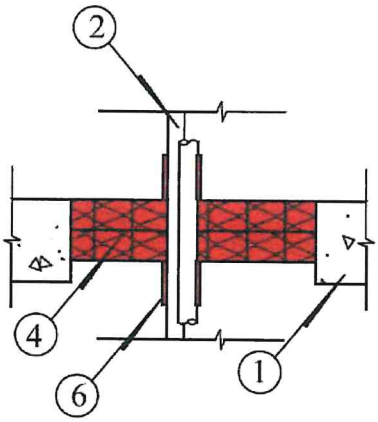
WALL CASE



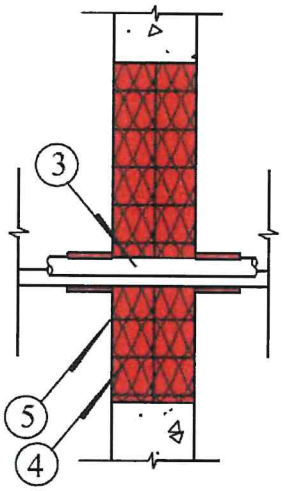
1. Concrete floor or wall assembly or fire-rated blockwall
2. Metal cable tray(s)
3. Cables
4. CP636
5. 50mm mineral wool board in 160 kg/m³
6. Minimum 150mm coat back of CP670 applied on both sides of the cable and cable tray penetration

Drawing refers to Table 2 on cable tray penetration application by using CP670

FLOOR CASE



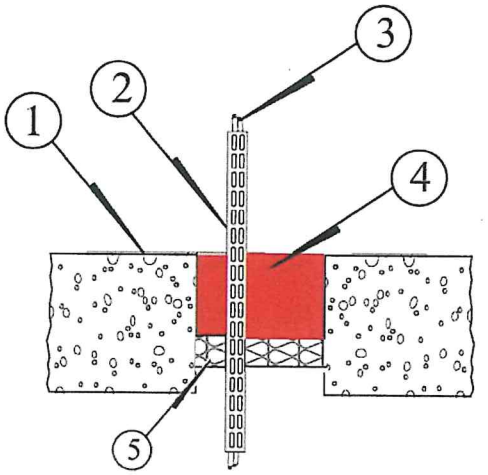
WALL CASE



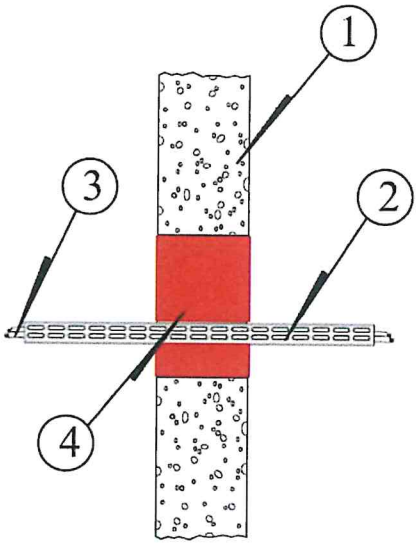
1. Concrete floor or wall assembly or fire-rated blockwall
2. Metal cable tray(s)
3. Cables
4. Double layer (50mm thickness each) mineral wool board in 160 kg/m³
5. Minimum 0.7mm dry thickness of CP670 applied on both sides of the mineral wool board
6. Minimum 150mm coat back of CP670 applied on both sides of the cable and cable tray penetration

Drawing refers to Table 3 on cable tray penetration application by using CFS-F FX

FLOOR CASE



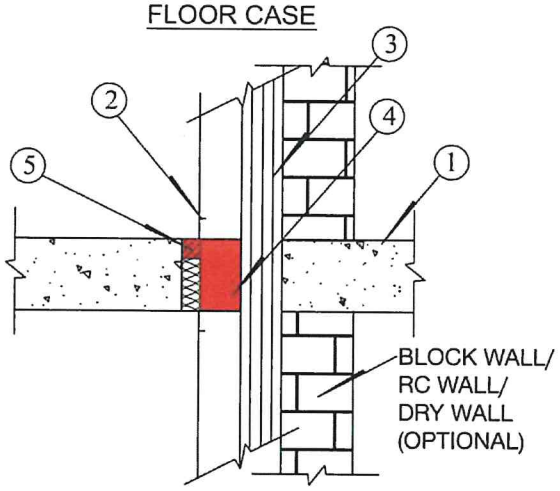
WALL CASE



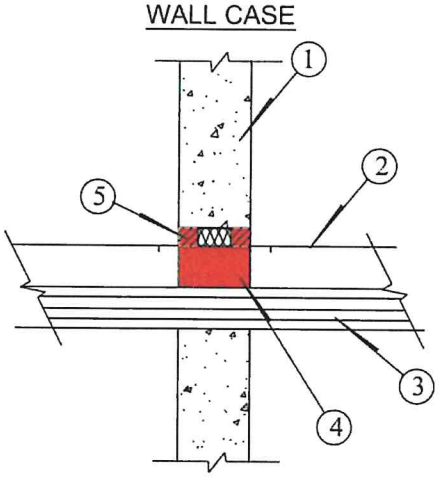
1. Concrete floor or wall assembly or fire-rated blockwall
2. Metal cable tray(s)
3. Cables
4. CFS-F FX
5. 50 mm mineral wool in 100 kg/m³ on exposed side

Drawing refers to Section 4.5 on cable trunking application by using CFS-BL or CFS-F FX

FLOOR CASE



WALL CASE



1. Concrete floor or wall assembly or fire-rated blockwall
2. 200mm x 200mm metal trunking
3. Filling of the cables up to 60% of the trunking sectional area only
4. CFS-F FX or CFS-BL
5. Fill the void by mineral wool with CP606 when annular space ≤ 30mm

- End of Report -

Buildings Department

屋宇署

Our Ref. 本署檔號：(24) BD GR/BM/2(185)
Your Ref. 來函檔號：
Tel. No. 電　話：848 2838
Fax No. 圖文傳真：840 0451

26 May 1994

Hilti (Hong Kong) Ltd.
Unit 3 5/F Harbour Centre Tower 2
8 Hok Cheung Street Hung Hom
Kowloon

Dear Sirs,

Fire Resisting Penetration Sealing System
As Supplied By Hilti (GB) Ltd.

Thank you for your letters dated 4.3.94 and 27.4.94 and the accompanying test/assessment reports on the above. You are asking for comments on the acceptability of the fire resisting product in the context of relevant provisions of the Buildings Ordinance, Chapter 123 of the Law of Hong Kong and its subsidiary legislation.

Under the Buildings Ordinance, "authorized persons" (i.e. architects, engineers or surveyors registered with the Building Authority) are required to supervise building works including the selection and installation of fire resisting products and to certify compliance with the Buildings Ordinance upon completion of works. Authorized persons are therefore responsible for ensuring the safety requirements inter alia of fire resisting products in the building projects which they have been appointed by the developer to coordinate and supervise.

In establishing the acceptability of fire resisting products, reference may be made to the performance standards laid down in Building (Construction) Regulation 90, the current Code of Practice for Fire Resisting Construction issued by the Building Authority and British Standard 476: Parts 20 to 24. Reliance may also be placed on the test/assessment report prepared by a recognized laboratory or an equivalent establishment.

The Buildings Department has a list of recognized laboratories. This is available for reference at our office :

Technical Administration (Building) Unit
Buildings Department
11/F Murray Building
Garden Road Hong Kong

Before fire resisting products are installed in a building project, the authorized person appointed for the project should be approached for advice and guidance.

Your test/assessment reports are returned herewith. In this respect, please note that paragraph 3 of my letter dated 25 January 1994 is no longer applicable. The delay in replying is regretted.

Yours faithfully,

(Patrick H. Tsui)
Technical Secretary/Building
for Director of Buildings

PT/rcy/ac

4/F-12/F, Murray Building, Garden Road, Hong Kong 香港花園道美利大廈四樓至十二樓

消 防 處
防 火 組
香港九龍尖沙咀東部康莊道1號
消防總部大廈

FIRE SERVICES DEPARTMENT,
FIRE PROTECTION BUREAU,
FIRE SERVICES HEADQUARTERS BUILDING,
No. 1 Hong Chong Road,
Tsim Sha Tsui, East, Kowloon,
Hong Kong.

本處檔號 Our Ref.: FPB 207/0005
來函檔號 Your Ref.: L026/92HK
電訊掛號 Telex: 39607 HKFSD HX (24 小時 Hours)
圖文傳真 Fax: 852-3110066
852-3689744
電話 Tel. No.: 733 7596

29 April 1992

Hilti (Hong Kong) Ltd.,
Unit 3, 5/F, Harbour Centre,
Tower 2,
8 Hok Cheung Street,
Hunghom, Kowloon.

Dear Sirs,

"HILTI" Fire Prevention System

I refer to your letter of 30.3.92 and the enclosures attached thereto.

Based on the information contained in your letter under reference and the given test report, I understand that the captioned product is a building material which should be approved by the Director of Buildings and Lands. As such, I am not in a position to process your application and you are advised to refer your enquiry to the Director of Buildings and Lands, whose address is listed hereunder :-

The Director of Buildings and Lands,
(Attn.: Technical Secretary/Building, B.O.O.)
Murray Building,
Garden Road,
Central,
Hong Kong.

Please feel free to contact us should you have any other question in this matter.

Yours faithfully,

(TSE Yu-hing)
for Director of Fire Services

TYH/jt

ARCHITECTURAL SERVICES DEPARTMENT 建築署
QUEENSWAY GOVERNMENT OFFICES, 66 QUEENSWAY, HONG KONG. 香港金鐘道六十六號金鐘道政府合署
FAX 852-2869 0289

Our Ref : ASD 16/92101/AML/APP 06 June 1997
Your Ref. : --------
Tel. No. : 2867 3631
Fax No. : 2877 0594

Hilti (HK) Ltd
17/F, Tower 6, China HK City,
33 Canton Rd,. TST

Dear Sirs,

Architectural Services Department
List of Acceptable Materials
Hilti Firestop Products
Ref. no. 0001P

I am pleased to inform you that approval has been given to include the above product/material in this Department's List of Acceptable Materials. Initially, this listing is for a probationary status and this will be reviewed after the submission of satisfactory performance reports on completion of projects undertaken by this Department where your product has been used.

The Architectural Services Department List of Acceptable Materials is a restricted internal document. This letter should not be used for commercial or marketing purposes and failure to comply with this may result in the removal of the product from the List.

Yours faithfully,

WM Tang

(W.M. TANG)
Technical Secretary/2
for Chief Architect/ Central Management Branch
Architectural Services Department

Filecode : 95202 - LIST_LE.DOC
WMT/WHY/by

Attn. : To whom it may concern

Date : 26 September 2023
Ref. : 096/FP/DY/23

Subject : Country of Origin- Hilti CFS-BL Firestop Block

Dear Sir / Madam,

Enclosed please find the information of Hilti CFS-BL Firestop Block.

Brand Name : Hilti

Model Name : Hilti CFS-BL Firestop Block

Manufacturer : Hilti Corporation

Address of Manufacturer : FL-9494, Principality of Liechtenstein.

Manufacturer Contact Person : Dennis Yeung

Supplier : Hilti (Hong Kong) Ltd

Address of Supplier : 701-704, 7/F, Tower A, Manulife Financial Centre,
223 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong

Supplier Contact Person : Dennis Yeung (+852 9723 4621)

Country of Origin : Germany

Should you have further questions, please do not hesitate to contact our Technical Representatives, Customer Service Hotline at 8228-8118, or email us at hksales@hilti.com.

Yours faithfully,

Dennis Yeung
Head of Product Leadership Strategy, F&P

Hilti (Hong Kong) Ltd.
701-704 | Tower A | Manulife Financial Centre
223 Wai Yip Street | Kwun Tong
Kowloon | Hong Kong
P +852-8228 8118 I **F** +852-2954 1751
www.hilti.com.hk

To whom it may concern

Date: 22nd April 2016

Dear Sir / Madam,

Subject: Hilti Firestop Products non-CFC and Ozone Confirmation

Referring to your enquiry about the captioned subject, please be advised that:

Hilti firestop products, CFS-BL Firestop Block is free of CFC, HCFC nor other ozone depletion elements.

CFC, HCFC and ozone depletion elements were not used during the product process neither.

Should you have further questions, please do not hesitate to contact our Technical Representatives or Customer Service Hotline at 8228-8118.

Yours sincerely,

Dorothy Wai
Product Manger

Hilti (Hong Kong) Ltd.
701-704 & 708A&B | Tower A | Manulife Financial Centre
223 Wai Yip Street | Kwun Tong
Kowloon | Hong Kong
P +852-8228 8118 I **F** +852-2954 1751
www.hilti.com.hk

Material Information Statement

Articles

According to Regulation (EC) 1907/2006, Article 32
Revision: 07.04.2020 Version: 18

1 Identification of the articles and of the company undertaking

1.1 Product identifier

Trade name:

- Firestop Bandage CFS-B / CP 646
- Firestop Back Pan Strip CFS-BPS
- Firestop Block CFS-BL / CFS-BL P
- Firestop Board CP 675
- Firestop Boot CFS-BO
- Firestop Box Insert
- Firestop Cable Collar CFS-CC / CFS-RCC / CFS-RCC EXT
- Firestop Cable Module CFS-T
- Firestop Cast-in device CP 680 / CP 681 / CFS-CID /
- CFS-CID MD P/M
- Firestop Coated Board CFS-CT B / CP670 / CP673 / CP676
- Firestop Collar CFS-C / CFS-C P
- Firestop Collar CP 643 / CP 644
- Firestop Composite Sheet CFS-COS
- Firestop Cord CFS-CO
- Firestop Cushion CP 651N
- Firestop Drop-In Device CFS-DID
- Firestop Edge of Slab QuickSeal CFS-EOS QS
- Firestop Endless Collar CFS-C EL
- Firestop Filler Module CFS-T FB
- Firestop Gangplate CFS-SL GP
- Firestop Module Box CFS-MB / CP 657
- Firestop Plug CFS-PL / CP 658
- Firestop Plug Seal CFS-T RR / CFS-T RRS
- Firestop Retrofit Sleeve CFS-SL RK
- Firestop Sleeve CP 645
- Firestop Sleeve Kit CFS-SL SK
- Firestop Speed Sleeve CFS-SL / CFS-SL GA / CP 653
- Firestop Top Track Seal CFS-TTS
- Firestop Top Track Seal CFS-TTS MD
- Firestop Top Track Cover CFS-TTS MD
- Firestop Top Track Plug CFS-TTS MD
- Firestop Top Track Seal CFS-TTS 212
- Firestop Top Track Seal CFS-TTS R
- Firestop Wedge Seal CFS-T WD120
- Firestop Wrap Strip CFS-W EL / SG / P / CP 648
- Foil Tapes CS-FT
- Intumescent façade cavity closer CP674
- Joint Sealing Tapes CS-JST
- Mineral Wool
- Mineral Wool Boards
- Multifunctional Tapes CS-MFT
- Pre-coated Mineral Wool Boards
- Smoke & Acoustic Track Seal CS-TTS SA
- Speed Plug CP 777
- Speed Strip CP 767

1.2 Application of the listed articles

Construction industry.

Refer to Hilti product literature, technical data sheets, 3rd party published listings and national approvals for specific application information. For more details, please contact your local Hilti organization through http://www.hilti.group

1.3 Manufacturer / Supplier

Hilti AG
Feldkircherstr. 100
FL-9494 Schaan
Liechtenstein

Customer Service
Phone +423 (0)844 84 84 85
Fax +423 (0)844 84 84 86

2 Other information

A Safety Data Sheet is not required due to the classification of these products as “articles” according to Regulation (EC) No. 1907/2006 of 18 December 2006 (EU) / 29CFR 1910.1200 (U.S.A.). Consequently, these products are exempted from CLP / OSHA Labeling and SDS requirements.

These data are based on our present knowledge. However, they shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Informing department:
chemicals.hse@hilti.com

Hilti CFS-BL Firestop Block Job Reference

Year	Project Name	Customer Name	Project type
2020	HKIA AIRPORT SKYCITY REGAL HOTEL	FEI LUNG ENGINEERING CO LTD	Hospitality
2020	FAN GARDEN POLICE STAFF QUARTERS	HUNS ENGINEERING COMPANY LIMITED	Residential
2020	HKIA P581 AIRPORT T1 EAST HALL EXT	INTEGRAL E&M ENGINEERING LIMITED	Transport
2020	New - Residential - Wong Yin Street, Area 2B, Tuen Mun	RUBICON ENGINEERING COMPANY	Residential
2020	TKO LOHAS PARK PH9 (SITE J)	STAR LIGHT AIR-CONDITION	Residential
2021	HKIA AIRPORT SKYCITY REGAL HOTEL	FEI LUNG ENGINEERING CO LTD	Hospitality
2021	HKIA C18W07 AAHK OFFICE TOWER	WELLFIELD M&E ENGINEERING LIMITED	Office
2022	KING LAM ST GOVT DATA CENTRE	ATAL ENGINEERING LIMITED	Office
2022	WAN CHAI HOPEWELL CENTRE 2	FEI LUNG ENGINEERING CO LTD	Hospitality
2022	150-162 QUEEN'S RD WEST - THE QUEENS	FEI LUNG ENGINEERING CO LTD	Residential
2023	WAN CHAI HOPEWELL CENTRE 2	FEI LUNG ENGINEERING CO LTD	Hospitality
2023	Refurbishment - Utilities - Stonecutters Island, West Kowloo	KPA ENGINEERING (HK) LIMITED	Utilities
2023	R6 CTL KLN ROUTE-KAI TAK WEST HY/2014/07	GAMMON CONSTRUCTION LIMITED	Infrastructure