Hilti CP636 Firestop Mortar

Submission Folder

Product Information and Method Statement 2

Test Reports

General

- VOC Content 5

Electrical Trade – Cable Penetration

- RED No. R22H09-1A 6
- RED No. R24F41-1A 38
- RED No. R13A16 39

Lift Door Frame

- RED No. R23D18-1A 47

Letters

Government Letters 68

Country of Origin 71

LEED Letter 72

BEAM Plus Information 73

Material Safety Data Sheet 74

Job Reference 82

Firestop mortar CP 636

APPLICATIONS

- Permanent firestopping of cables, cable trays, and non-combustible pipes in medium to large wall and floor openings
- Single, multiple and mixed penetrations
- Medium to large multiple penetrations in concrete and masonry in combination with other products
- Lift door frame

ADVANTAGES

- Excellent application characteristics

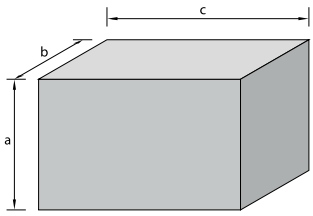
Acoustic | Siesmic | Low VOC | Mould & Mildew

Technical data	
Base materials	Concrete, Masonry
Approx. mix ratio	2.5 : 1 (mortar to water by weight)
Working time (approx.)	45 min
Cured density - min.	700 kg/m³
Max. compressive strength after 28 days	2.9 N/mm²
Application temperature range	5 - 80 °C
Temperature resistance range	-10 - 80 °C
Storage and transportation temperature range	5 - 30 °C
Shelf life[1)]	12 Months
Colour	Grey

[1)] at 77°F/25°C and 50% relative humidity; from date of manufacture

Consumption Guide

20 kg bags yield 22.2 litres
a = opening depth in cm
b = opening length in cm
c = opening width in cm



Blank Opening

Number of bags required $= \frac{a \times b \times c}{22{,}000}$

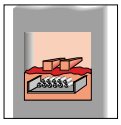
e.g. 100 mm thick floor with 1 metre x 1 metre opening:
Therefore number of bags required = $\frac{10 \times 100 \times 100}{22{,}000}$ = 5 bags

Application Procedure

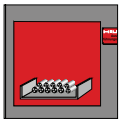
1. Clean opening, moisten surfaces

2. Mix CP 636 mortar with 3:1 ratio (by adding mortar to water)

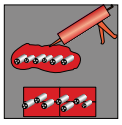
3. Put mortar into place



4. Optional: add CP 651 for future cable changes



5. Fasten installation plate in place (if required)



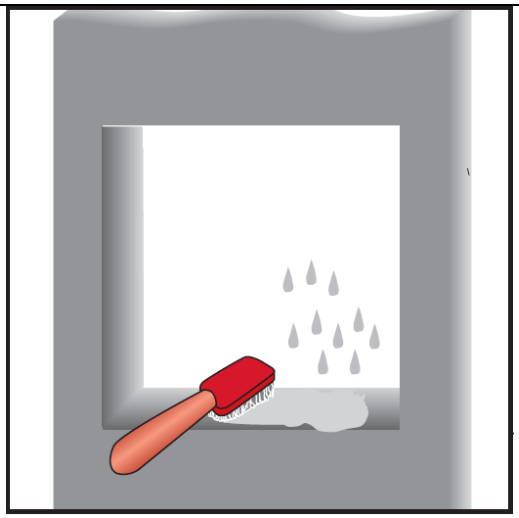
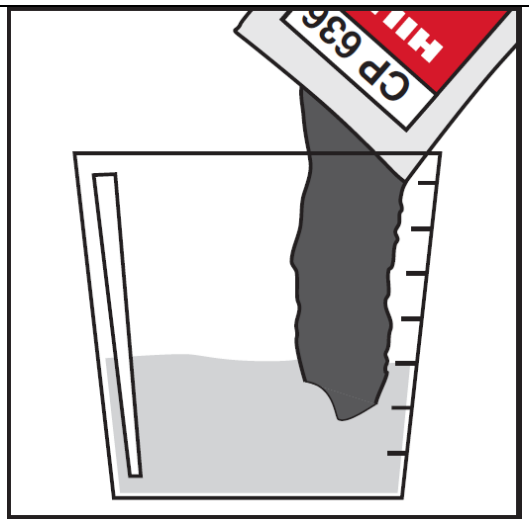
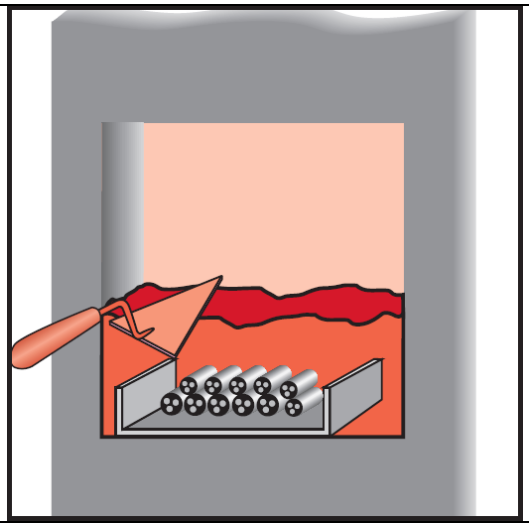
6. Re-installation: lay cables and close remaining opening

Order Now

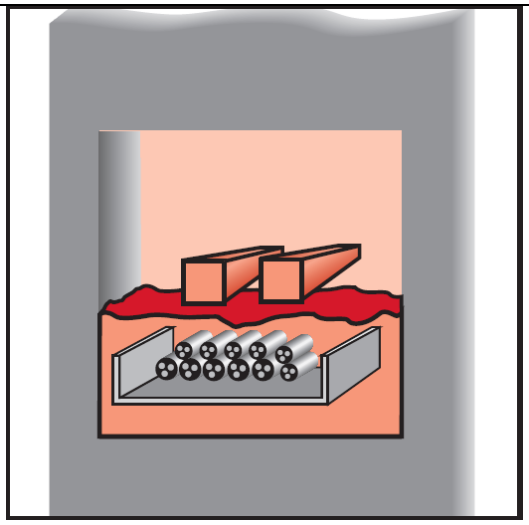
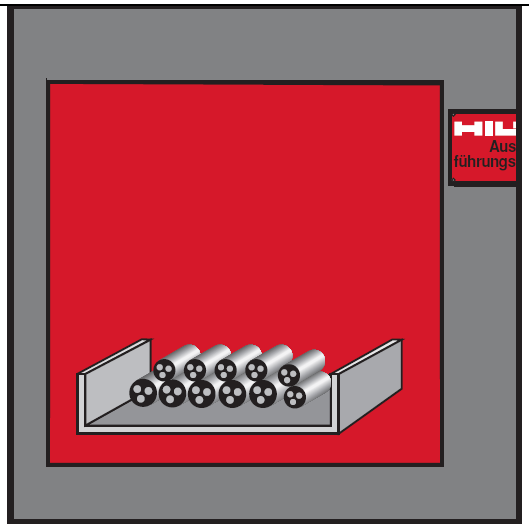
Ordering designation	Weight	Sales pack quantity	Item number
CP 636 20KG	20 kg	1 pc	**2219154**

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

Subject: **Method Statement of CP 636**
Material: CP 636 Firestop mortar
Accessory: Nil

Setting Operation		
1	Clean and premoisten the surfaces. Cables and cable supporting structures must be installed in compliance with local building and electrical standards.	
2	Add mortar to water in a ratio of about 3:1 by volume (mortar to water). Stir the mixture thoroughly with, for example, a Hilti TE-MP/ TE-18M paddle. The mix ratio of water to CP 636 determines the desired consistency. Do not use any other binders or additives/ aggregates	
3	Method 1 : Apply mixed mortar in the opening using a trowel or a pump and compact it. Make sure all gaps and spaces are completely filled and closed. Method 2: The penetration sealing system shall be constructed on 50 mm thick of mineral wool with 35mm thick Hilti CP 636 Fire Prevention Mortar on both sides.	

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

4	CP 611A can be used in conjunction with mortar. In such case, apply CP 611A to the cables over a width of approx. 30mm and 5mm thick. Fill the gap between cables with CP 611A. Application of the mortar can be continued immediately after CP 611A has been applied.	
5	For maintenance reasons, a penetration seal could be permanently marked with an identification plate. In such a case, mark the identification plate and fasten it in a visible position next to the seal.	

Safety precautions:

- Keep it out of the reach of children

LEGEND
Technical Services, Inc.
www.legend-group.com
88 Empire Drive • St. Paul, Minnesota • 55103
(651) 642-1150 • fax (651) 642-1239

VOC Content Test Certificate

October 26, 2009

Supplier: Hilti Entwicklungsgesellschaft mbH
BU Chemicals
Hiltistrasse 6
86916 Kaufering
GERMANY

Sample Description: Hilti CP 636

Date tested: July 20, 2009

Test Method: SCAQMD method 304-91 Determination of Volatile Organic Compounds (VOC) in various materials as referenced by South Coast Air Quality Management District (SCAQMD) rule 1168. The values also comply with the requirements of EPA test method #24.

Test Data: Legend Project Number 0903311

Specification	Product
LEED 2009 (LEED 3.0) **LEED 2.2** IEQ-4.1: Low-Emitting Materials – Firestop Materials	**Hilti** **CP 636**
Green Building Council of Australia Green Star Office Design 3.0, IEQ-13 Green Star Office Design 2.0, IEQ-13 Green Star Office Interiors 1.1, IEQ-11	
Multipurpose Construction Materials; VOC Limit: 70 g/L	**Product contains: <1 g/L of VOC**

William Welbes
Vice President of Laboratory Operations

Allen Noreen, Ph.D.
Technical Director

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

Section	Description	Page
1	INTRODUCTION	3
2	ASSUMPTIONS	3
3	SUPPORTING DATA	4
4	PROPOSAL & DISCUSSION	22
5	CONCLUSION	30
6	DECLARATION BY APPLICANT	30
7	VALIDITY	30
8	SIGNATORIES	30
APPENDIX – DRAWINGS PROVIDED BY THE CLIENT		31

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

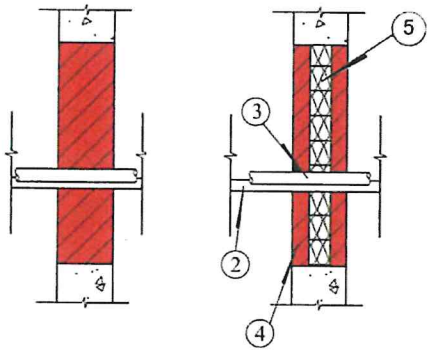
Reviewed by:

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

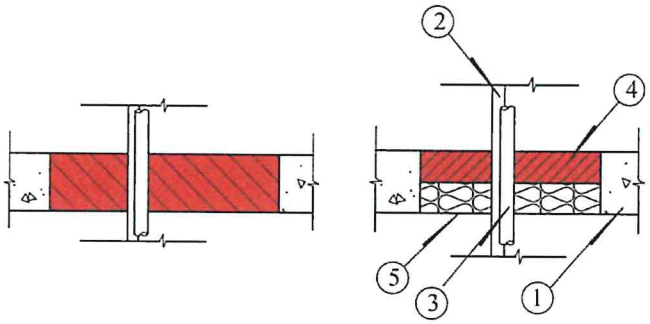
APPENDIX – DRAWINGS PROVIDED BY THE CLIENT

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

FLOOR CASE



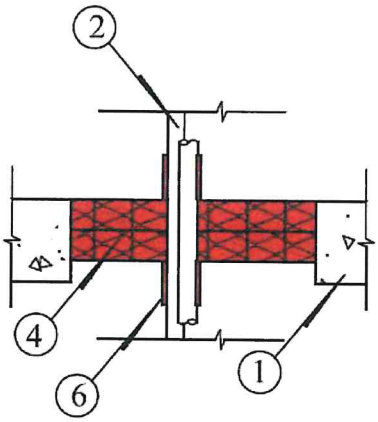
WALL CASE



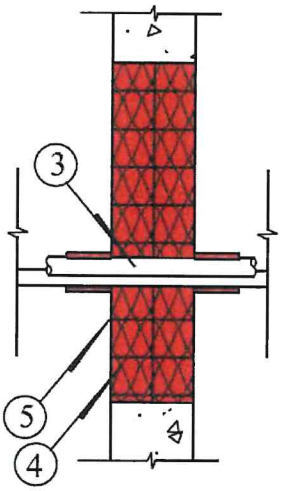
1. Concrete floor or wall assembly or fire-rated blockwall
2. Metal cable tray(s)
3. Cables
4. CP636
5. 50mm mineral wool board in 160 kg/m³
6. Minimum 150mm coat back of CP670 applied on both sides of the cable and cable tray penetration

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

FLOOR CASE



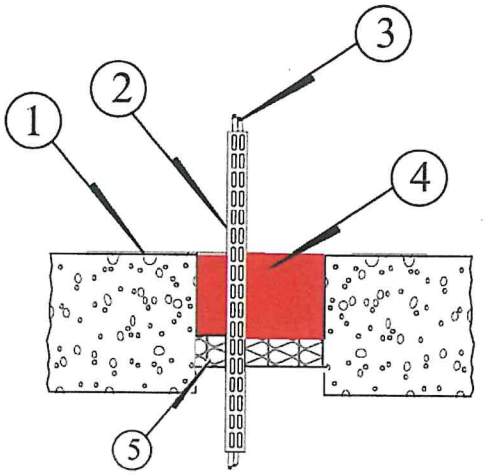
WALL CASE



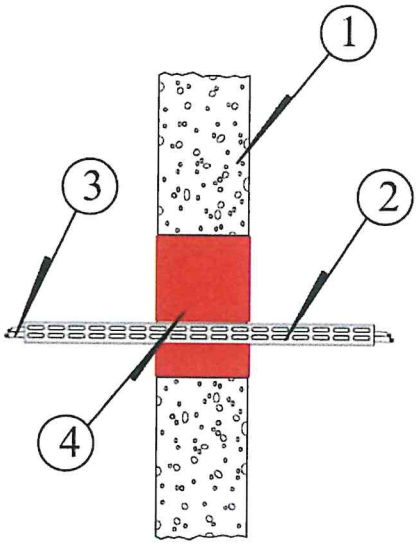
1. Concrete floor or wall assembly or fire-rated blockwall
2. Metal cable tray(s)
3. Cables
4. Double layer (50mm thickness each) mineral wool board in 160 kg/m³
5. Minimum 0.7mm dry thickness of CP670 applied on both sides of the mineral wool board
6. Minimum 150mm coat back of CP670 applied on both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



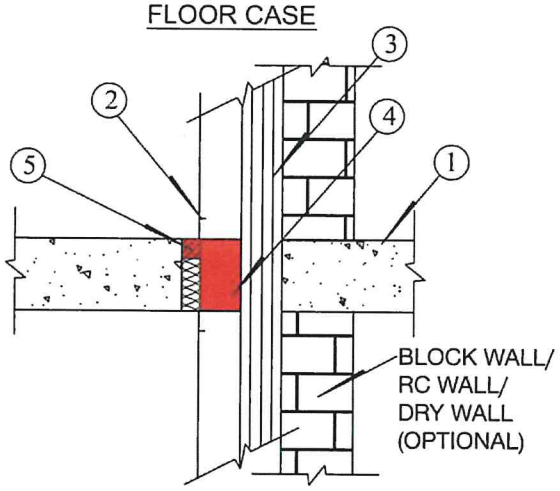
WALL CASE



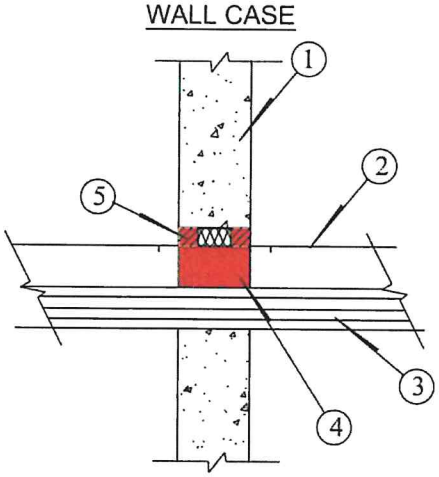
1. Concrete floor or wall assembly or fire-rated blockwall
2. Metal cable tray(s)
3. Cables
4. CFS-F FX
5. 50 mm mineral wool in 100 kg/m³ on exposed side

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 -

Research Engineering Development Façade Consultants Limited
雄略幕牆顧問有限公司
DD134, Lung Kwu Tan, Tuen Mun, N.T., Hong Kong

Hilti (Hong Kong) Limited

701-704 and 708A&B, Tower A Manulife Financial Centre,

223 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong

Date: 10th July, 2024 Our Ref: R24F41-1A

TO WHOM IT MAY CONCERN

Re: Assessment Report no. R13A16 – Fire Resistance Performance of Hilti 'CP636' Penetration Sealing System for 120 Minutes Integrity with Respect to BS 476: Part 20: 1987

The RED assessment report no. R13A16 was issued on 5th March, 2013 and expired on 4th March, 2015. The specification and interpretation of test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. Whilst RED has conducted a review of the procedures adopted for the supporting data to ensure they are consistent with current practices, the assessment report no. R13A16 has been reviewed and found satisfactory.

Therefore, it is recommended that the assessment report no. R13A16 is valid until 9th July, 2026 and another review shall be undertaken by 8th July, 2026.

Declaration by the Applicant:

By distributing this copy of technical review, we, Hilti (Hong Kong) Limited, confirmed that there have been no changes to the material specifications, nor the methods of construction of the test specimen considered in the original appraisal of assessment report no. R13A16.

Yours Sincerely,

Assessment by:

Dr. SZE Lip-kit
Authorized Signature
Research Engineering Development
Façade Consultants Limited

Reviewed by:

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

T: +852 2807 0930 F: +852 2662 6105 E: fire@red.com.hk W: www.red.com.hk

Research Engineering Development Façade Consultants Limited
雄略幕牆顧問有限公司
Tel: (852) 2807-0930 Fax: (852) 2662-6105

Assessment Report

R13A16

Fire Resistance Performance on Hilti 'CP636' Penetration Sealing System

Reported for

Hilti (Hong Kong) Limited
701-704, Tower A Manualife Financial Centre
223 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong

Date of Issue: 5 March 2013
Review Date: 4 March 2015

Research Engineering Development Façade Consultants Limited
雄略幕牆顧問有限公司
Tel: (852) 2807-0930 Fax: (852) 2662-6105

Assessment Report R13A16
Fire Resistance Performance on
Hilti 'CP636' Penetration Sealing System

Content

Section	Description	Page
1	Introduction	3
2	Assumption	3
3	Supporting Data	4
4	Proposal & Discussion	5
5	Conclusion	7
6	Declaration by the Applicant	7
7	Validity	7

Assessment Report R13A16
Fire Resistance Performance on
Hilti 'CP636' Penetration Sealing System

1. Introduction

This assessment report presents an appraisal of a penetration sealing system with construction referenced to that tested and described in WARRES No. 101728 issued by Warrington Fire Research Centre. It is reported for Hilti (Hong Kong) Limited of 701-704, Tower A Manualife Financial Centre, 223 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong. The proposed penetration sealing system is required to provide a fire resistance performance of 120 minutes integrity with respect to BS 476: Part 20.

2. Assumption

The proposed assembly is assumed to be installed in a similar manner to that of the previously tested assembly by competent installers. All penetration service items shall be self-supported by framework and shall not impose any loading to the system. The size of aperture for the penetration service items shall be the same or less than those as tested. It is assumed that the modified assembly 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 relating to specific modifications may be stated in the report. It is also assumed that the supporting structure to which the perimeter of the assemblies will be fixed are capable of supporting the proposed structure effectively. Assuming that the issue of the original test report is valid, the current fire 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 WARRES Test Report No.101728**

A fire resistance test utilised the general principles of BS 476: Part 20 in conjunction with additional guidelines from pr EN 1366-3: 1993 on specimens of wall mounted and floor mounted penetration sealing systems performed by Warrington Fire Research Centre on 23rd April 1998. The test sponsor was Hilti (Great Britain) Limited who had given permission to use this data.

The section of wall was of nominal thickness 150 mm and was provided with eight circular apertures each penetrated by a service item. The specimens were referenced 1 to 8 for the purposes of the test. The apertures were sealed by "Rockwool RW 6" mineral wool with Hilti CP 611A Intumescent Fire Prevention Mastic at two ends. The section of floor was of nominal thickness 150 mm and was provided with a single 600 mm square central aperture penetrated by various electrical service items. The aperture was sealed by 50 mm thick "Rockwool RW6" mineral wool at the exposed side and backed by 75 mm thick Hilit CP 636 Fire Prevention Mortar. 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. The mineral wool and the mortar remained intact in position throughout the test. The specimens satisfied the performance requirements specified in BS 476: Part 20:1987 for the following periods:

Wall mounted seals

Specimen reference	Aperture Diameter (mm)	Penetrating Service	Integrity (minutes)	Insulation (minutes)
1	67	Single cable	240	119
2	67	Single cable	240	56
3	67	Single cable	240	58
4	67	Bundled cables	240	190
5	67	Bundled cables	240	240
6	67	Bundled cables	240	240
7	72	PVC pipe	25	19
8	72	PP pipe	158	158

Floor mounted seal

Integrity : 240 minutes
Insulation : 103 minutes

The test was discontinued after a heating period of 240 minutes (see WARRES No.101728 for details).

**Note: the test data is more than five years old; we have reviewed this data against the current test procedures as per BS476: Part 22: 1987 and found it suitable for this assessment.*

4. Proposal & Discussion

Hilti 'CP636' wall-mounted penetration sealing system

Proposal

The construction of the wall-mounted penetration sealing system is basically similar to that tested and described in WARRES No. 101728 with the modifications as mentioned below. The proposed system may provide a fire resistance performance of 120 minutes integrity with respect to BS 476: Part 20: 1987.

(a) The assessed sealing system will be used in wall-mounted configuration only;
(b) The penetration sealing system shall be constructed of 50 mm thick "Rockwool RW 6" mineral wool with 35 mm thick Hilit CP 636 Fire Prevention Mortar on both sides;
(c) The aspect ratio of the aperture size shall be varied modestly (as much as 50%), with the area limited to 0.36 m^2 same as tested (as shown in the table below). Smaller aperture is considered acceptable; and

Reference Test Report	Type of Product	Tested Aperture Size			Proposed Aperture Sizes		
		Height (mm)	Width (mm)	Area (m^2)	Max. Height (mm)	Max Width (mm)	Area (m^2)
WARRES No. 17128	Hilti 'CP 636'	600	600	0.36	900	900	0.36

For the above table, a reduction in width is required for an increase in height, and vice versa.

(d) The sealing system shall be used with or without services penetration.

Discussion

From the test evidence of WARRES No. 101728, the floor-mounted sealing system composed of 50 mm thick "Rockwool RW6" mineral wool on the exposed side and backed by 75 mm thick Hilti CP 636 Fire Prevention Mortar satisfied 240 minutes integrity criteria in accordance with BS 476: Part 20: 1987. 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. The mineral wool and the mortar remained intact in position throughout the test.

(a) The tested sealing system was in floor-mounted configuration which is considered as an onerous testing condition for this type of product. The tested sealing system, which composed of mineral wool and mortar, was not supported by additional framing system. The whole system was

self-supported by friction fit or adherence of mortar to the supporting construction. During the test, the system has to be withstood the differential pressure between the furnace and atmosphere and also the self-weight. The wall-mounted configuration is less onerous as the differential pressure condition is similar but the necessity in carrying the self-weight is ignorance. The sealing system remained intact in position throughout the test in floor mounted configuration, it is reasonable to expect that the sealing system as tested or as assessed in (a) used for wall mounted configuration shall satisfy 120 minutes integrity.

(b) In the proposed design, the CP 636 Fire Prevention Mortar was trowelled on both sides of the mineral wool instead of only on the unexposed side as tested. Although the thickness of the mortar on single side is reduced by 40 mm, equivalent to 53% reduction in thickness, the total thickness of the mortar adding up on both sides is only reduced by 7%. The tested sealing system had achieved a performance overrun of 100% compare to the required assessed performance of 120 minutes integrity. Since the thickness of the mineral wool, which is the one of the main components to perform insulation and sealing the service penetration, remain unchanged. It is reasonable to expect that the proposed system shall provide a fire resistance performance of 120 minutes integrity

(c) It is supported by direct test evidence that the tested sealing system was able to seal up the aperture size of 600 mm by 600 mm without integrity failure for the duration of 240 minutes. A modest variation in the aspect ratio (as much as 50%) of the aperture size is not expected to affect the fire resistance performance achieved by the tested assembly. A performance overrun of 100% is used to justify this modification. Smaller aperture size shall present a less onerous situation due to smaller exposed surface and enhanced stability due to closer distance from the rigid fire resisting supporting construction. In general, the modest variation of aperture size as discussed above is considered acceptable.

(d) It is supported by direct test evidence that the tested sealing system with services penetration was able to seal up the aperture without integrity failure for the duration of 240 minutes. Aperture with no services penetration present a less onerous situation due to absence of discontinuity of the fire rated material or heat conducting material which may introduce local fire resisting weaknesses. Therefore sealing system as tested or as assessed in (a) used for sealing aperture with no services penetration is considered acceptable.

5. Conclusion

The proposed penetration sealing system is based on the specimen as tested and described in WARRES No. 101728 and modified as described in section 4.

The proposed penetration sealing system is required to provide a fire resistance performance of 120 minutes integrity with respect to BS 476: Part 20: 1987.

6. Declaration by the 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 fire test to the standard against which the assessment is being made.

We agree to withdraw this assessment from circulation should the component or element of structure be the subject of another fire 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 the 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.

Assessment by:

Mr. LEE Kwok Shing
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

- End of Report -

Research Engineering Development Façade Consultants Limited
雄略幕牆顧問有限公司
DD134, Lung Kwu Tan, Tuen Mun, N.T., Hong Kong

Hilti (Hong Kong) Limited

701-704 and 708A&B, Tower A Manulife Financial Centre,

223 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong

Date: 4 July 2022

Our Ref: R22F35-1A

TO WHOM IT MAY CONCERN

Re: Assessment Report no. R13A16 – Fire Resistance Performance of Hilti 'CP636' Penetration Sealing System for 120 Minutes Integrity with Respect to BS 476: Part 20: 1987

The RED assessment report no. R13A16 was issued on 5th March, 2013 and expired on 4th March, 2015. The specification and interpretation of test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. Whilst RED has conducted a review of the procedures adopted for the supporting data to ensure they are consistent with current practices, the assessment report no. R13A16 has been reviewed and found satisfactory.

Therefore, it is recommended that the assessment report no. R13A16 is valid until 4 July 2024 and another review shall be undertaken by 3 July 2024.

Declaration by the Applicant:

By distributing this copy of technical review, we, Hilti (Hong Kong) Limited, confirmed that there have been no changes to the material specifications, nor the methods of construction of the test specimen considered in the original appraisal of assessment report no. R13A16.

Yours Sincerely,

Assessment by:

Dr. SZE Lip-kit
Authorized Signature
Research Engineering Development
Façade Consultants Limited

Reviewed by:

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

ASSESSMENT REPORT

Fire Resistance Performance of
Lift Landing Doorset Related Linear Joint / Penetration Seal Systems

Report No.: R23D18-1A

Issue Date: 26 September, 2023

Date of Review: 25 September, 2026

Report Sponsor

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

T: +852 2807 0930 F: +852 2662 6105 E: fire@red.com.hk W: www.red.com.hk

CONTENT

Section	Description	Page
1	INTRODUCTION	3
2	ASSUMPTIONS	3
3	SUPPORTING DATA	4
4	PROPOSAL & DISCUSSION	14
5	CONCLUSION	20
6	DECLARATION BY APPLICANT	20
7	VALIDITY	20
8	SIGNATORIES	20

REVISION HISTORY

Issue date (DD/MM/YYYY)	Issue number	Remark
25/09/2023	0	Initial version

FIRE RESISTNACE PERFORMANCE OF LIFT LANDING DOORSET RELATED LINEAR JOINT/ PENTRATION SEALING SYSTEMS

1 INTRODUCTION

This assessment report presents an appraisal for the fire resistance performance of lift landing doorset related linear joint / penetration sealing system using the Hilti "CP 636" firestop mortar, "CP617" firestop putty pad and "CFS-COS" firestop composite sheet that was tested under the reference WARRES Nos. 62305/B, 167424, 167427, 167428 and 167429 issued by Warringtonfire and R16L28-1D and R18G14-2A issued by Research Engineering Development Façade Consultants Limited. It 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 sealing systems are required to provide a fire resistance performance of up to 120 minutes integrity performance (and insulation performance for switch box backing application) 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 No. 62305/B	4.1	Supporting test evidence for the use of the Hilti 'CP 636' fire prevention mortar for penetration sealing systems for fire resistance performance up to 240 minutes integrity and 86 minutes insulation.
RED test report no. R16L28-1D	4.1	Supporting test evidence for the use of Hilti "CP617" putty pad for sealing the electrical sockets
RED test report no. R18G14-1A	4.1	Supporting test evidence for the use of Hilti "CFS-COS" Composite sheet for slab aperture sealing.
RED test report no. R18G14-2A	4.1	Supporting test evidence for the use of Hilti "CFS-COS" Composite sheet for wall aperture sealing.
Secondary Test Evidence		
WF No. 164724	4.1	Supporting test evidence for the use of the Hilti "CP617" putty pad for the sealing of mortise electrical sockets within the drywall system.
WF No. 164727	4.1	Supporting test evidence for the use of the Hilti "CP617" putty pad for the sealing of mortise electrical sockets within the drywall system.
WF No. 164728	4.1	Supporting test evidence for the use of the Hilti "CP617" putty pad for the sealing of mortise electrical sockets within the drywall system.
WF No. 164729	4.1	Supporting test evidence for the use of the Hilti "CP617" putty pad for the sealing of mortise electrical sockets within the drywall system.

3.2 Primary Test Evidence

3.2.1 WARRES Test Report No. 62305/B*

A fire resistance test stated to be in accordance with BS 476: Part 20: 1987 and in conjunction with the EN 1366-3: 1993 of the Hilti "CP 636" fire prevention mortar^ of a 120 mm thick masonry wall at a position where it had been provided with a 600 mm square aperture to allow for its penetration by various electrical services was performed at the Warringtonfire Laboratory on 16th August, 1994. The test sponsor was Hilti AG, who had given permission to use this data.

In this test report, the section of wall contained a 600 mm square centre aperture which was penetrated by one 200 mm wide, one 300 mm wide and one 500 mm wide cable tray, each supporting various electrical cables. The aperture was sealed with a 100 mm thick layer of Hilti "CP 636" fire prevention mortar^. The penetrating services were coated within the thickness of the barrier with a 0.5 mm thickness of Hilti CP 611A mastic.

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 no. 62305/B for 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.

^Note: The Hilti "CP636" fire prevention mortar is renamed as Hilti "CP636" Firestop Mortar as declared in the report.

3.2.2 *RED Test Report No. R16L28-1D**

A fire resistance test in accordance with BS 476: Part 20: 1987 on two specimens of steel boxed protected by Hilti 'CP 617' firestop putty pad was performed at the RED Laboratory on 20th January, 2017. The test sponsor was Hilti (Hong Kong) Limited. As requested by the test sponsor, the specimens were mounted within concrete line specimen holder. The specimens referenced '4' and '5' were asymmetrical and the fire side of specimen was determined by the test sponsor.

Specimen '4' was comprised of a steel box with sizes of 1,050 mm wide by 300 mm high by 100 mm deep by nominal 1 mm thick protected by a layer of nominal 3 mm thick 'CP617' firestop patty pad at the exposed side.

Specimen '5' was comprised of a steel box with sizes of 200 mm wide by 800 mm high by 100 mm deep by nominal 1 mm thick protected by a layer of nominal 3 mm thick 'CP617' firestop patty pad at the exposed side.

The gaps between the concrete wall and specimen '4' were filled with mineral wool with density of 100kg/m³ and 'Hilti CP606' firestop sealant, while the gaps between the concrete wall and specimen '5' were filled with 'Hilti CP606' firestop sealant.

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

	Integrity	Insulation
Specimen '4'	**121** Minutes (No failure)	N/A
Specimen '5'	**121** Minutes (No failure)	**79** Minutes

The test was discontinued after a heating period of 121 minutes (See RED test report no. R16L28-1D for 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 *RED Test Report No. R18G14-1A**

A fire resistance test in accordance with BS 476: Part 20: 1987 on a total of four specimens of firestop composite sheets, namely specimens 'A', 'B', 'C' and 'D' was conducted at the Research Engineering Development Façade Consultants Limited (RED) Laboratory on 18 July 2018. The test sponsor was Hilti (Hong Kong) Limited.

As requested by the test sponsor, the specimens were mounted within concrete line specimen holder. The specimens were asymmetrical and only one side of specimens was tested, in which the fire side was determined by the test sponsor.

Specimen 'A' was comprised of Firestop Composite Sheets and Rockwool. The overall sizes of the Firestop Composite Sheets were 1,300 mm long by 1,100 mm wide by 3.8 mm thick. The Firestop Composite Sheets were joined together with M5 by 30 mm long screws at 300 mm nominal centres and fixed to the concrete with M6 by 45 mm long anchor bolts at 300 mm nominal centres. The Rockwool was installed at the bottom of Firestop Composite Sheets and had the thickness of 50 mm and density of 160 kg/m^3. The Rockwool was supported by C-channel with sizes of 50 mm wide by 125 mm high by 1 mm thick at one side and L-angles with sizes of 50 mm by 50 mm by 3 mm thick at three sides. Both the channel and L-angles were fixed to the concrete with M6 by 45 mm long anchor bolts at 300 mm nominal centres. The separation distance between the Firestop Composite Sheets and Rockwool was 70 mm.

Specimen 'B' was comprised of 2 layers of Firestop Composite Sheets and Rockwool. The overall sizes of the first layer of Firestop Composite Sheets were 1,300 mm long by 1,100 mm wide by 3.8 mm thick. The first layer of Firestop Composite Sheets were joined together with M5 by 30 mm long screws at 300 mm nominal centres and fixed to the concrete with M6 by 45 mm long anchor bolts at 300 mm nominal centres. The Rockwool was installed at the bottom of first layer of Firestop Composite Sheets and had the thickness of 50 mm and density of 160 kg/m^3. The second layer of Firestop Composite Sheets with the same construction as the first layer was placed at the bottom of the Rockwool. The Rockwool and second layer of Firestop Composite Sheets were supported by C-channel with sizes of 50 mm wide by 125 mm high by 1 mm thick at one side and L-angles with sizes of 50 mm by 50 mm by 3 mm thick at three sides. Both the C-channel and L-angles were fixed to the concrete with M6 by 45 mm long anchor bolts at 300 mm nominal centres. The separation distance between the first layer of Firestop Composite Sheets and Rockwool was 100 mm.

*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.

Specimen 'C' was comprised of Firestop Composite Sheets. The overall sizes of the Firestop Composite Sheets were 1,750 mm long by 1,100 mm wide by 3.8 mm thick. The Firestop Composite Sheets were joined together with M5 by 30 mm long screws at 300 mm nominal centres and fixed to the concrete with M6 by 45 mm long anchor bolts at 300 mm nominal centres. The Firestop Composite Sheets were supported by L-angle with sizes of 50 mm by 50 mm by 3 mm thick which was fixed to the concrete with M6 by 45 mm long anchor bolts at 300 mm nominal centres at one side.

Specimen 'D' was comprised of Firestop Composite Sheets. The overall sizes of the Firestop Composite Sheets were 1,600 mm long by 1,100 mm wide by 3.8 mm thick. An opening with sizes of 300 mm diameter by 200 mm deep by 0.7 mm thick was created at the surface of Firestop Composite Sheets. The Firestop Composite Sheets were joined together with M5 by 30 mm long screws at 300 mm nominal centres and fixed to the concrete with M6 by 45 mm long anchor bolts at 300 mm nominal centres. The Firestop Composite Sheets were supported by L-angle with sizes of 50 mm by 50 mm by 3 mm thick which was fixed to the concrete with M6 by 45 mm long anchor bolts at 300 mm nominal centres at one side. The Rockwool with thickness of 50 mm and density of 160 kg/m^3 was used to cover the opening.

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

	Integrity	Insulation
Specimen 'A'	**219** Minutes	**36** Minutes
Specimen 'B'	**288** Minutes (No failure)	**69** Minutes
Specimen 'C'	**199** Minutes	N/A
Specimen 'D'	**209** Minutes	N/A

The test was discontinued after a heating period of 288 minutes (See R18G14-1A for full details).

3.2.4 *RED Test Report No. R18G14-2A**

A fire resistance test in accordance with BS 476: Part 20: 1987 on nine specimens of penetration sealing systems was performed at the RED Laboratory on 28th September, 2018. The test sponsor was Hilti (Hong Kong) Limited. As requested by the test sponsor, the specimens were mounted within concrete line specimen holder. The specimens were asymmetrical and only one side of specimens was tested, in which the fire side was determined by the test sponsor. Only specimen nos.: "12" to"15" are considered in this report.

Specimen '12' was comprised of Firestop Composite Sheets. The overall and exposed sizes of the Firestop Composite Sheets were 910 mm wide by 910 mm high by 3.8 mm thick. The Firestop Composite Sheets were joined together with M5 by 25 mm long screws at 250 mm nominal centres and fixed to L-angles with sizes of 50 mm by 50 mm by 5 mm thick at four sides. The L-angles was fixed the concrete with M6 by 54 mm long anchor bolts at 250 mm nominal centres. Stainless steel facing was faced at exposed side.

Specimen '13' had overall dimensions 910 mm wide by 1,200 mm high by 3.8 mm thick with exposed area 810 mm wide by 1,100 mm high. It was comprised of Firestop Composite Sheets and a G.I. squared pipe. The G.I. squared pipe with sizes of 250 mm wide by 250 mm high by 1 mm thick was penetrated in the centre of specimen. The Firestop Composite Sheets were joined together with M5 by 25 mm long screws at 250 mm nominal centres and fixed to the concrete with M6 by 54 mm long anchor bolts at 250 mm nominal centres. Stainless steel facing was faced at unexposed side.

Specimen '14' had overall dimensions of 1,010 mm wide by 910 mm high by 3.8 mm thick with clear opening area 900 mm wide by 810 mm high. It was comprised of two layers of Firestop Composite Sheets and a G.I. pipe. The G.I. pipe with sizes of 500 mm wide by 200 mm high by 1 mm thick was penetrated in the centre of specimen. The Firestop Composite Sheets were joined together with M5 by 25 mm long screws at 250 mm nominal centres and fixed to the concrete with M6 by 54 mm long anchor bolts at 250 mm nominal centres. Stainless steel facing was faced at both.

Specimen '15' had overall dimensions of 600 mm wide by 300 mm high by 81 mm thick. It was comprised of two nos. of socket boxes with 'Hilti CP617' firestop putty pad incorporated with 75 mm thick 'Ytong' lightweight block wall with nominal 3 mm thick plaster on both sides. Each socket box with cover with sizes of 70 mm by 70 mm by 50 mm deep by 3.5 mm thick was incorporated in each side of block wall. 'Hilti CP617' firestop putty pad was placed inside the socket boxes.

*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.

All penetrated pipes were supported by fixed to 40 mm by 20 mm by 3 mm thick steel L-angles, located at 100 mm from the concrete wall on both sides. The steel angles were supported by 2 nos. of M10 steel rods to the concrete lining. The opening was covered by nominal 40 mm thick rockwool with density 160 kg/m^3.

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

	Integrity	Insulation
Specimen '12'	**242** Minutes (No failure)	**8** Minutes
Specimen '13'	**242** Minutes (No failure)	**6** Minutes
Specimen '14'	**242** Minutes (No failure)	**27** Minutes
Specimen '15'	**242** Minutes (No failure)	**242** Minutes

The test was discontinued after a heating period of 242 minutes (See Report R18G14-2A for full details).

3.3 Secondary Test Evidence

3.3.1 WF Test Report No. 167424^

An indicative fire resistance test stated to be utilizing the general heating condition and principle of BS EN 1363-1: 1999 on the electrical socket protected by the use of the Hilti "CP 617" putty pad incorporated within the drywall partition was performed at the Warringtonfire Laboratory on 24th September, 2007. The test sponsor was Hilti (Great Britain) Ltd., who had given permission to use this data. As stated in the report, the test was not conducted under the requirements of UKAS accreditation. However, the report is still accepted to be used as the secondary test evidence for the application of the Hilti CP617 putty pad.

In this test report, two apertures were cut through each face of a drywall assembly composed of plasterboards. The electrical sockets were position back to back with each other. An electrical socket complete with its rear plastic box and a connected 3-core electrical wire tail was installed into each aperture. The overall size of the back boxes were fixed to the plasterboards with two steel screws.

Specimen 'A' incorporated the self-adhesive putty pad moulded over the face of each back box within the drywall cavity and onto the adjacent plasterboard over a distance of approximately 15 mm.

Specimen 'B' incorporated the self-adhesive putty pad moulded internally within each back box.

Thermocouples attached to and around the sockets recorded a maximum temperature rise of 109 °C after 120 minutes.

The test was discontinued after a heating period of 184 minutes (See WF report no. 167424 for full details).

3.3.2 WF Test Report No. 167427^

An indicative fire resistance test stated to be utilizing the general heating condition and principle of BS EN 1363-1: 1999 on the electrical socket protected by the use of the Hilti "CP 617" putty pad incorporated within the drywall partition was performed at the Warringtonfire Laboratory on 24th September, 2007. The test sponsor was Hilti (Great Britain) Ltd., who had given permission to use this data. As stated in the report, the test was not conducted under the requirements of UKAS accreditation. However, the report is still accepted to be used as the secondary test evidence for the application of the Hilti CP617 putty pad.

In this test report, two apertures were cut through each face of a drywall assembly composed of plasterboards. The electrical sockets were position back to back with each other. An electrical socket complete with its rear plastic box and a connected 3-core electrical wire tail was installed into each aperture. The overall size of the back box was 132 mm x 73 mm x 36 mm deep with a cover plate size of 145 mm x 85 mm. The back boxes were fixed to the plasterboards with two steel screws.

Specimen 'A' incorporated the self-adhesive putty pad moulded over the face of each back box within the drywall cavity and onto the adjacent plasterboard over a distance of approximately 15 mm.

Specimen 'B' incorporated the self-adhesive putty pad moulded internally within each back box.

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

Thermocouples attached to and around the sockets recorded a maximum temperature rise of 111 °C after 120 minutes.

The test was discontinued after a heating period of 164 minutes (See WF report no. 167427 for full details).

*3.3.3 WF Test Report No. 167428^*

An indicative fire resistance test stated to be utilizing the general heating condition and principle of BS EN 1363-1: 1999 on the electrical socket protected by the use of the Hilti "CP 617" putty pad incorporated within the drywall partition was performed at the Warringtonfire Laboratory on 24th September, 2007. The test sponsor was Hilti (Great Britain) Ltd., who had given permission to use this data. As stated in the report, the test was not conducted under the requirements of UKAS accreditation. However, the report is still accepted to be used as the secondary test evidence for the application of the Hilti CP617 putty pad.

In this test report, two apertures were cut through each face of a drywall assembly composed of plasterboards. The electrical sockets were position back to back with each other. An electrical socket complete with its rear plastic box and a connected 3-core electrical wire tail was installed into each aperture. The overall size of the back box was 132 mm x 73 mm x 36 mm deep with a cover plate size of 145 mm x 85 mm. The back boxes were fixed to the plasterboards with two steel screws.

Specimen 'A' incorporated a self-adhesive putty pad moulded over the face of the back box within the drywall cavity and onto the adjacent plasterboard over a distance of approximately 15 mm to the socket on 'exposed' face. In addition Specimen 'A' incorporated a self-adhesive putty pad moulded internally within the back box on the 'unexposed' face of the drywall.

Specimen 'B' incorporated a self-adhesive putty pad moulded over the face of the back box within the drywall cavity and onto the adjacent plasterboard over a distance of approximately 15 mm to the socket on 'unexposed' face. In addition Specimen 'B' incorporated a self-adhesive putty pad moulded internally within the back box on the 'exposed' face of the drywall.

Thermocouples attached to and around the sockets recorded a maximum temperature rise of 92 °C after 120 minutes.

The test was discontinued after a heating period of 149 minutes (See WF report no. 167428 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 1363-1 and found it suitable for this assessment.

3.3.4 *WF Test Report No. 167429^*

An indicative fire resistance test stated to be utilizing the general heating condition and principle of BS EN 1363-1: 1999 on the electrical socket protected by the use of the Hilti "CP 617" putty pad incorporated within the drywall partition was performed at the Warringtonfire Laboratory on 24th September, 2007. The test sponsor was Hilti (Great Britain) Ltd., who had given permission to use this data. As stated in the report, the test was not conducted under the requirements of UKAS accreditation. However, the report is still accepted to be used as the secondary test evidence for the application of the Hilti CP617 putty pad.

In this test report, two apertures were cut through each face of a drywall assembly composed of plasterboards. The electrical sockets were position back to back with each other. An electrical socket complete with its rear plastic box and a connected 3-core electrical wire tail was installed into each aperture. The overall size of the back box was 132 mm x 73 mm x 36 mm deep with a cover plate size of 145 mm x 85 mm. The back boxes were fixed to the plasterboards with two steel screws.

Specimen 'A' incorporated a self-adhesive putty pad moulded over the face of the back box within the drywall cavity and onto the adjacent plasterboard over a distance of approximately 15 mm to the socket on 'exposed' face. In addition, Specimen 'A' incorporated a self-adhesive putty pad moulded internally within the back box on the 'unexposed' face of the drywall.

Specimen 'B' incorporated a self-adhesive putty pad moulded over the face of the back box within the drywall cavity and onto the adjacent plasterboard over a distance of approximately 15 mm to the socket on 'unexposed' face. In addition, Specimen 'B' incorporated a self-adhesive putty pad moulded internally within the back box on the 'exposed' face of the drywall.

Thermocouples attached to and around the sockets recorded a maximum temperature rise of 99 °C after 120 minutes.

The test was discontinued after a heating period of 149 minutes (See WF report no. 167429 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 1363-1 and found it suitable for this assessment.

4 PROPOSAL & DISCUSSION

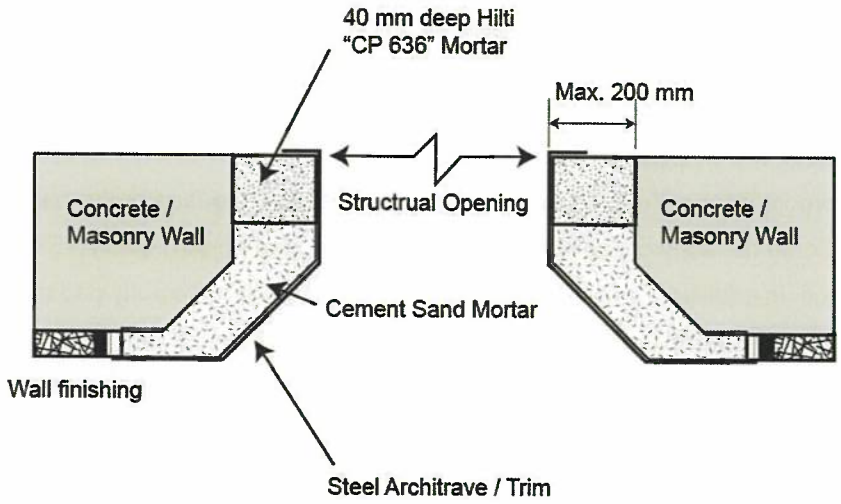
4.1 Fire Resistance Performance of Hilti CP 636 Firestop Mortar for 120 Minutes Integrity Only in Accordance with BS 476: Part 20/22: 1987

Proposal

It is proposed that previously fire tested lift landing doorsets with appropriate fire test evidence may be installed within a masonry/concrete construction with the use of Hilti "CP636" firestop mortar to adjust the structural opening sizes. The lift landing doorsets will be fixed to the supporting construction via the door trim/architrave in a similar means to that originally tested. The maximum allowable distance from the supporting construction to the door steel architrave/trim of 200 mm.

The illustration below indicates the proposed installation details of the Hilti CP 636:

Figure 1: Illustration of the installation details of Hilti "CP636" firestop mortar for lift-landing door opening



The Hilti "CP636" firestop mortar for use of lift-landing opening shall be capable to maintain the integrity performance for up to 120 minutes integrity performance when subjected to a test in accordance with BS 476: Part 20/22: 1987.

Discussion

The test evidence WARRES no. 62305/B described the test of the use of Hilti CP636 for the sealing of the aperture within the concrete wall that allows the penetration of various electrical service items. The specimen was a 600 mm by 600 mm aperture with the present of three cable trays. The Hilti "CP 636" firestop mortar was used to seal up the void in between the cable trays within the aperture. The thickness of the mortar was 100 mm thick. The system had achieved the fire resistance performance of 240 minutes integrity and 86 minutes insulation.

Actually, for the proposed design, the Hilti "CP 636" firestop mortar is used to filing the void in between the lift landing doorset architrave / trim while maintaining the fire resistance performance of the extension

from the wall. The tested specimen in WARRES 62305/B included a layer of 100 mm thick Hilti "CP636" firestop mortar which was directly exposed to fire.

In the proposal, the minimum 40 mm thick Hilti "CP 636" firestop mortar and backed with the sand/cement mortar to the full depth of the architrave/trim. Since both the Hilti "CP636" and the send/cement mortar infill are both non-combustible in nature, coupled with the retention afforded via the steel architrave/trim that ensure the mortar remain intact in position, this gives confidence in the ability for the proposed details to provide the fire resistance performance of 120 minutes integrity.

The maximum unsupported area of the seal in the test was approximately 250-300 mm high by 600 mm wide. This demonstrated the ability and resistance to collapse of the seal without support for the 240 minute test duration. Therefore, the proposal of the width up to 200 mm wide is considered as reasonable with the support of the available test evidence.

The tested seal had achieved the fire resistance performance of 240 minutes integrity which was equivalent to 100% performance overrun compared to the required fire resistance performance of 120 minutes integrity performance as proposed. This provides confidence buffer for the proposal as well.

4.2 *Fire Resistance Performance of Hilti CP 636 Firestop Mortar for 120 Minutes Integrity and Insulation in Accordance with BS 476: Part 20/22: 1987*

Proposal

It is proposed that the Hilti 'CP 636' firestop mortar and the 'CP 617' firestop putty pad for the switch control box may be used to seal up the switch control penetration for lift land doorset under the following conditions:

(a) For swich control box with maximum dimensions of up to 150 mm wide by 250 mm high by 150 mm deep incorporated within a minimum 250 mm thick concrete supporting construction, the back of the switch box fully filled with minimum 100 mm thick Hilti 'CP636' firestop mortar. The sealing provision shall be capable to maintain 120 minutes integrity and insulation performance with respect to BS 476: Part 20/22: 1987;

(b) For switch control box with maximum dimensions up to 300 mm wide by 600 mm high by 150 mm deep incorporated within a minimum 250 mm thick concrete supporting construction, one layer of 3 mm thick Hilti 'CP 617' fire stop putty pad shall be fitted either inside or outside of switch box and the back of the switch box may be fully filled with minimum 100 mm thick Hilti 'CP 636' firestop mortar. This sealing provision shall be capable to maintain 120 minutes integrity and insulation performance with respect to BS 476-20/22: 1987;

(c) For switch control box with the height exceeds the case in (a) and up to 1,050 mm high, the same requirement of the Hilti 'CP 617' and 'CP 636' shall be applied, but this sealing provision only capable to maintain 120 minutes integrity and 60 minutes insulation performance with respect to BS 476-20/22: 1987; or

(d) For switch control box maximum dimensions up to 200 mm wide by 1,050 mm high by 150 mm deep and make up 1 mm thick steel sheet, one layer of 3 mm thick Hilti 'CP 617' putty pad shall be applied on the heat exposure side. This sealing provision shall be capable to maintain 120 minutes integrity and 60 minutes insulation performance with respect to BS 476-20/22: 1987.

Table 4.2.1: The application of the firestop sealant

Switch control box sizes	Min. wall thickness	FS System	FRR
150 mm (w) x 250 mm (h) x 150 mm (d)	250 mm	100 mm CP 636	--/120/120
300 mm (w) x 600 mm (h) x 150 mm (d)	250 mm	100 mm CP636 + 3 mm CP617 putty pad	--/120/120
300 mm (w) x 1,050 mm (h) x 150 mm (d)	250 mm	100 mm CP636 + 3 mm CP617 putty pad	--/120/60
200 mm (w) x 1,050 mm (h) x 150 mm (d)	250 mm	3 mm thick CP 617 putty pad on the socket box at the heat exposure side	--/120/60

The illustration below indicates the proposed installation details for the switch box.

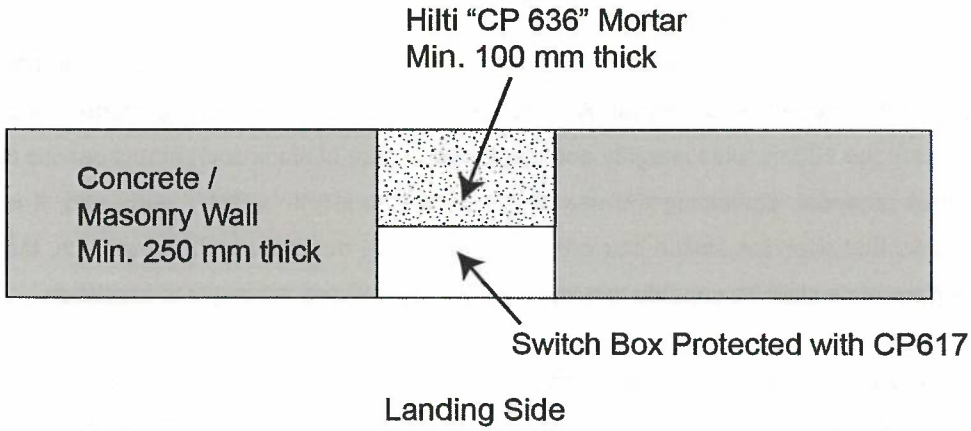


Figure 2: Illustration of the installation details of Hilti "CP636" firestop mortar for installation of switch box

Discussion

The test evidence WARRES no. 62305/B was used to support the usage of the Hilti "CP636" Firestop mortar for the usage of switch box backing. In the test evidence WARRES no. 62305/B, the tested system was the use of the Hilti 'CP636' firestop mortar to seal up a 600 mm x 600 mm concrete wall aperture with the service penetration through. The system had achieved the fire resistance performance of 240 minutes integrity and 86 minutes insulation. From the test observation and the recorded temperature, the failure in insulation is due to the maximum temperature rise measured on the penetration device exceed 180 °C. While for the rest of the area within this aperture that sealed up by the Hilti 'CP636' firestop mortar only, the achieved insulation performance was significantly in excess of the required 120 minutes.

(a) For the proposal applies to the switch box with maximum sizes of 150 mm wide by 250 mm high by 150 mm deep within a minimum 250 mm thick concrete / masonry wall adjacent to the lift landing doorset. The minimum 100 mm thick Hilti "CP 636" with the area of 150 mm by 250 mm is smaller than the maximum unsupported area in the test as stated above. Therefore, this proposal is considered as supported by the available test evidence with reasonable modification.

(b) While for the proposal that applied to larger switch box sizes up to 300 mm wide by 600 mm high by 150 mm deep within the same supporting construction, the supporting test evidence R16L28-1D is considered as the another supporting evidence for this proposed scope of application. In the test evidence R16L28-1D described the test of two specimens which were the 200 mm deep concrete aperture filled with steel box backed with one layer of 3 mm thick putty pad on the exposed side. Specimen 4 was a steel box with sizes of 1,050 mm wide x 300 mm high x 100 mm deep x 1 mm thick and specimen 5 was a steel box with sizes of 200 mm wide x 800 mm high x 100 mm deep x 1 mm thick. In specimen 4, the clearance gap between the steel box and the concrete wall was filled

with 50 mm deep mineral wool and 10 mm deep CP 606 firestop sealant. In specimen 5, the clearance gap between the steel box and the concrete wall was sealed up with 10 mm deep CP606 firestop sealant. In this proposal, the switch box within the aperture is backed with additional 100 mm thick Hilti CP636 firestop mortar. As discussed in (a), the CP636 firestop mortar have the potential to provide the 120 minutes integrity and insulation in case of blank seal without service penetration, and it this proposal, combining the use of the 3 mm thick Hilti "CP617" putty pad, it is reasonable to expect that even the switch box with sizes up to 300 mm wide by 600 mm high, the fire resistance performance shall be capable to provide up to 120 minutes integrity and insulation.

(c) For the switch box sizes exceed 600 mm high, up to 1,050 mm high and with the steel box backed with 3 mm thick Hilti 'CP617', the system to provide 120 minutes integrity and 60 minutes insulation is considered as basically direct applied the result as referenced from R16L28-1D.

(d) For the switch box sizes with sizes of 200 mm wide x 1,050 mm high and 150 mm deep and the swich box shall be composed of minimum 1 mm thick steel sheet. The switch box may be fitted with a layer of 3 mm thick Hilti 'CP617' putty pad on either side of the switch box, provided that the putty pad is apply to the heat exposure side. This proposed scope is again considered as directly adopted the tested system as described in R16L28-1D.

4.3 *Fire Resistance Performance of Hilti CFS-COS Composite Sheet for 180 or 240 Minutes Integrity in Accordance with BS 476: Part 20/22: 1987*

Proposal

It is proposed that the Hilti "CFS-COS" composite sheet which was tested in R18G14-1A, R18G14-2A and appraised in R18M03-1A may be used to seal up the aperture fitted with lift control cabinet:

(a) Maximum aperture sizes up to 2,630 mm high by 1,770 mm wide fitted with one (1) layer of Hilti CFS-COS composite sheet at the back of the control cabinet to satisfy 180 minutes integrity performance; or
(b) Maximum aperture sizes up to 1,200 mm high by 910 mm wide fitted with one (1) layer of Hilti CFS-COS composite sheet at the back of the control cabinet to satisfy 240 minutes integrity performance.

Discussion

The test evidence R18G14-1A and R18G14-2A described the tests of the Hilti CFS-COS composite sheet that used to seal up the apertures that formed within concrete wall and slab construction to satisfy the fire resistance performance of up to 180 minutes or 240 minutes fire resistance performance with respect to BS 476: Part 20/22: 1987.

(a) The proposal to use the Hilti "CFS-COS" composite sheet to seal up the aperture within the concrete wall is considered directly supported by the test results of specimens '12' and '13' as tested in R18G14-2A. From the test, both cases had demonstrated the "CFS-COS" composite sheet with joints that had up to three panel jointed together, although some panels are not in their full sizes. And as similar case has been tested in R18G14-1A for horizontal configuration with up to six panels joined together. Based on this, it is reasonable to believe that the tested jointing method with the "CFS-COS" overlapping each other by 50 mm and screw fixed with M5 screws at maximum 300 mm c/c can provide the adequate engagement between. Provided 6 panels are in their full sizes, the maximum opening sizes that can be protected would be 2,630 mm high by 1,770 mm wide achieve the fire resistance performance of at least 180 minutes integrity. The fixing of the composite sheet shall be via 25 mm by 25 mm by 3 mm thick steel angle fixed to the supporting construction by M6 anchor bolts at 250 mm c/c.
(b) For the system requires to provide the fire resistance performance of 240 minutes integrity performance, the maximum sizes of 910 mm wide by 1,200 mm high which is the sizes of one "CFS-COS" composite sheet, and it is as tested in R18G14-2A that the system had achieved the 240 minutes integrity. The proposal is therefore directly supported by the test evidence.

5 CONCLUSION

The proposed use of Hilti "CP 636" firestop mortar, "CP617" putty pad, and "CFS-COS" composite sheet for the purpose of sealing up the lift-landing doorset related penetration seal as discussed in Section 4 of this report, is capable to maintain the fire resistance performance of up to 120 minutes, 180 minutes or 240 minutes integrity performance (and insulation performance for the usage of swich box backing) with respect to BS 476: Part 20/22: 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:

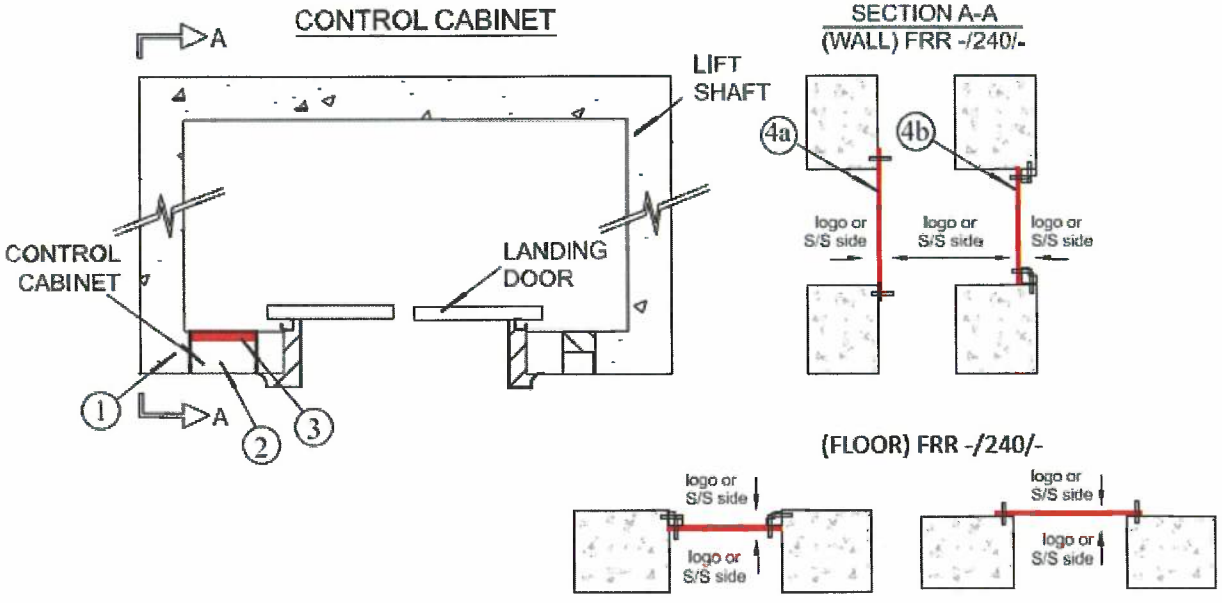
Ir Dr. YUEN Sai-wing, MHKIE (Fire)
Authorized Signature
Research Engineering Development
Façade Consultants Limited

T: +852 2807 0930 F: +852 2662 6105 E: fire@red.com.hk W: www.red.com.hk

APPENDIX – DRAWINGS PROVIDED BY THE CLIENT

Drawing refers to Section 4.3 on lift landing doorsets application by using CFS-COS

FIRE RESISTANCE RATING: UP TO -/240/-



1. CONCRETE WALL ASSEMBLY (120/120/120 F.R.R)
   - CONCRETE WALL OR FIRE-RATED BLOCKWALL
2. LIFT CONTROL CABINET
3. **CFS-COS FIRESTOP COMPOSITE SHEET** WITH EITHER LOGO OR S/S SIDE FACING THE FIRE SIDE, TO BE INSTALLED AT THE BACK OF CONTROL (SEE APPLICATION DETAILS)
4. CABINET WITH EITHER INSTALLATION METHOD AS INDICATED IN 4a AND 4b

Application Details:

	Layer(s) of CFS-COS	FRR
Wall / Floor Case (2630 mm Height x 1770 mm Width)	1	Up to -/180/-
Wall / Floor Case (910 mm Height x 1200 mm Width)	1	Up to -/240/-

- 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
圖文傳真 Fax: 852-3110066 (24 小時 Hours)
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

Number and date should be quoted in reference to this letter

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. : 106/FP/DY/23

Subject : Country of Origin- Hilti CP636 Firestop Mortar

Dear Sir / Madam,

Enclosed please find the information of Hilti CP636 Firestop Mortar. .

Brand Name : Hilti

Model Name : Hilti CP636 Firestop Mortar

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 : India

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

Date: 30 June 2021

Ref.: 076/FP/BL/21

Subject: Hilti CP 636 Firestop Mortar – LEED Information

To Whom It May Concern:

- The Hilti CP 636 Firestop Mortar is manufactured in India.
- The package of Hilti CP 636 Firestop Mortar can be recycled.
- There is no recycled content in Hilti CP 636 Firestop Mortar and it cannot be recycled.
- The Hilti CP 636 Firestop Mortar does not share any rapidly renewable materials.
- The VOC content of the Hilti CP 636 Firestop Mortar is <1 g/l.

If you would like to know more about Hilti solutions for LEED buildings or should you have any further questions, please do not hesitate to contact our Customer Service Hotline at 8228-8118 or email us at hksales@hilti.com.

Yours faithfully,

Bill Lee
Product Portfolio Manager
Hilti (Hong Kong) Ltd.

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

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, CP636 Firestop Mortar 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,

Andrew Lau
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

CP 636

Safety Data Sheet

according to the United Nations GHS (Rev. 5, 2013)

Issue date: 13/10/2020 Revision date: 13/10/2020 Supersedes: 03/04/2020 Version: 2.1

SECTION 1: Identification

1.1. GHS Product identifier

Product form	Mixture
Product name	CP 636
Product code	BU Fire Protection

1.2. Other means of identification

No additional information available

1.3. Recommended use of the chemical and restrictions on use

Recommended use	Firestop mortar

1.4. Supplier's details

Hilti (Hong Kong) Ltd.
701-704, 7/F, Tower A, Manulife Financial Centre
223 Wai Yip Street, Kwun Tong
Kowloon - Hong Kong
T +852 27734 700
hksales@hilti.com

Supplier
Hilti (Hong Kong) Ltd.
701-704, 7/F, Tower A, Manulife Financial Centre
223 Wai Yip Street, Kwun Tong
Kowloon - Hong Kong
T +852 27734 700
hksales@hilti.com

Department issuing data specification sheet
Hilti AG
Feldkircherstraße 100
9494 Schaan - Liechtenstein
T +423 234 2111
chemicals.hse@hilti.com

1.5. Emergency phone number

Emergency number	Schweizerisches Toxikologisches Informationszentrum – 24h Service +41 44 251 51 51 (international) +852 27734 700

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

Classification according to the United Nations GHS

Skin corrosion/irritation, Category 2	H315	Calculation method
Serious eye damage/eye irritation, Category 1	H318	Calculation method
Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation	H335	Calculation method

Full text of H statements : see section 16

Adverse physicochemical, human health and environmental effects	May cause respiratory irritation,Causes skin irritation,May cause an allergic skin reaction,Causes serious eye damage.

2.2. GHS Label elements, including precautionary statements

Labelling according to the United Nations GHS

Hazard pictograms (GHS UN)

GHS05 GHS07

Signal word (GHS UN)	Danger
Hazardous ingredients	Portland cement; Flue dust, Portland, chemicals
Hazard statements (GHS UN)	H315 - Causes skin irritation H318 - Causes serious eye damage H335 - May cause respiratory irritation
Precautionary statements (GHS UN)	P261 - Avoid breathing dust. P280 - Wear eye protection, protective gloves, protective clothing. P302+P352 - IF ON SKIN: Wash with plenty of water/…. P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P332+P313 - If skin irritation occurs: Get medical advice/attention. P310 - Immediately call a POISON CENTER/doctor/….

2.3. Other hazards which do not result in classification

No additional information available

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	Classification according to the United Nations GHS
Portland cement	(CAS-No.) 65997-15-1	25 – 40	Skin corrosion/irritation, Category 2, H315 Serious eye damage/eye irritation, Category 1, H318 Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation, H335
Flue dust, Portland, chemicals	(CAS-No.) 68475-76-3	1 – 2.5	Skin corrosion/irritation, Category 2, H315 Serious eye damage/eye irritation, Category 1, H318 Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation, H335

Full text of H-statements: see section 16

SECTION 4: First-aid measures

4.1. Description of necessary first-aid measures

First-aid measures after inhalation	Remove person to fresh air and keep comfortable for breathing. Call a poison center or a doctor if you feel unwell.
First-aid measures after skin contact	Wash skin with plenty of water. Take off contaminated clothing. If skin irritation or rash occurs: Get medical advice/attention.

First-aid measures after eye contact	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician immediately.
First-aid measures after ingestion	Call a poison center or a doctor if you feel unwell.

4.2. Most important symptoms/effects, acute and delayed

Symptoms/effects after inhalation	May cause respiratory irritation.
Symptoms/effects after skin contact	Irritation. May cause an allergic skin reaction.
Symptoms/effects after eye contact	Serious damage to eyes.

4.3. Indication of immediate medical attention and special treatment needed, if necessary

Treat symptomatically.

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media

Suitable extinguishing media	Water spray. Dry powder. Foam.

5.2. Specific hazards arising from the chemical

No additional information available

5.3. Special protective actions for fire-fighters

Protection during firefighting	Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Emergency procedures	Ventilate spillage area. Avoid breathing dust. Avoid contact with skin and eyes.

6.1.2. For emergency responders

Protective equipment	Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

6.2. Environmental precautions

Prevent entry to sewers and public waters.

6.3. Methods and materials for containment and cleaning up

Methods for cleaning up	Mechanically recover the product.
Other information	Dispose of materials or solid residues at an authorized site.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling	Use only outdoors or in a well-ventilated area. Avoid breathing dust. Avoid contact with skin and eyes. Wear personal protective equipment.
Hygiene measures	Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions	Store locked up. Store in a well-ventilated place. Keep container tightly closed. Keep cool. Protect from moisture.
Storage temperature	5 – 30 °C

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

No additional information available

8.2. Appropriate engineering controls

Appropriate engineering controls: Ensure good ventilation of the work station.

Environmental exposure controls: Avoid release to the environment.

8.3. Individual protection measures, such as personal protective equipment (PPE)

Hand protection: Wear protective gloves.

Type	Material	Permeation	Thickness (mm)	Penetration	Standard
Disposable gloves	Nitrile rubber (NBR)	3 (> 60 minutes)			EN ISO 374

Eye protection: Chemical goggles or safety glasses

Type	Use	Characteristics	Standard
Safety glasses	Dust		EN 166, EN 170

Skin and body protection: Wear suitable protective clothing

Respiratory protection: Dust production: dust mask with filter type P2

Personal protective equipment symbol(s)

8.4. Exposure limit values for the other components

No additional information available

SECTION 9: Physical and chemical properties

9.1. Basic physical and chemical properties

Physical state	Solid
Appearance	Powder
Colour	Grey.
Odour	Not available
Odour threshold	Not available
Melting point	> 1000 °C
Freezing point	Not applicable
Boiling point	Not available
Flammability (solid, gas)	Non flammable.
Explosive limits	Not applicable
Lower explosive limit (LEL)	Not applicable
Upper explosive limit (UEL)	Not applicable
Flash point	Not applicable
Auto-ignition temperature	Not applicable
Decomposition temperature	Not available

pH	Not available
pH solution	Not available
Viscosity, kinematic (calculated value) (40 °C)	Not applicable
Partition coefficient n-octanol/water (Log Kow)	Not available
Vapour pressure	Not available
Vapour pressure at 50 °C	Not available
Density	Not available
Relative density	Not applicable
Relative vapour density at 20 °C	Not applicable
Solubility	Soluble in water.
Particle size	Not available
Particle size distribution	Not available
Particle shape	Not available
Particle aspect ratio	Not available
Particle specific surface area	Not available

9.2. Data relevant with regard to physical hazard classes (supplemental)

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

The product is non-reactive under normal conditions of use, storage and transport.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use.

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

No additional information available

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral)	Not classified
Acute toxicity (dermal)	Not classified
Acute toxicity (inhalation)	Not classified

Skin corrosion/irritation	Causes skin irritation.
Serious eye damage/irritation	Causes serious eye damage.
Respiratory or skin sensitisation	Not classified
Germ cell mutagenicity	Not classified
Carcinogenicity	Not classified

Reproductive toxicity	Not classified
STOT-single exposure	May cause respiratory irritation.
STOT-repeated exposure	Not classified
Aspiration hazard	Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general	The product is not considered harmful to aquatic organisms nor to cause long-term adverse effects in the environment.
Hazardous to the aquatic environment, short-term (acute)	Not classified
Hazardous to the aquatic environment, long-term (chronic)	Not classified

Portland cement (65997-15-1)	
LC50 fish 1	> 1000 mg/l (96 h, Pisces)

12.2. Persistence and degradability

CP 636	
Persistence and degradability	No additional information available

Portland cement (65997-15-1)	
Not rapidly degradable	
Persistence and degradability	Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable
ThOD	Not applicable
BOD (% of ThOD)	Not applicable

12.3. Bioaccumulative potential

CP 636	
Bioaccumulative potential	No additional information available

Portland cement (65997-15-1)	
Bioaccumulative potential	Bioaccumulation: not applicable.

12.4. Mobility in soil

CP 636	
Mobility in soil	No additional information available

Portland cement (65997-15-1)	
Ecology - soil	No (test)data on mobility of the substance available.

12.5. Other adverse effects

Ozone	Not classified
Other adverse effects	No additional information available

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste treatment methods	Dispose of contents/container in accordance with licensed collector's sorting instructions.
Product/Packaging disposal recommendations	Dispose in a safe manner in accordance with local/national regulations. Avoid release to the environment.

SECTION 14: Transport information

In accordance with ADR / RID / IMDG / IATA / ADN

ADR	IMDG	IATA	RID
14.1. UN number			
Not applicable	Not applicable	Not applicable	Not applicable
14.2. UN proper shipping name			
Not applicable	Not applicable	Not applicable	Not applicable
14.3. Transport hazard class(es)			
Not applicable	Not applicable	Not applicable	Not applicable
14.4. Packing group			
Not applicable	Not applicable	Not applicable	Not applicable
14.5. Environmental hazards			
Dangerous for the environment : No	Dangerous for the environment : No Marine pollutant : No	Dangerous for the environment : No	Dangerous for the environment : No
No supplementary information available			

14.6. Special precautions for user

Overland transport

No data available

Transport by sea

No data available

Air transport

No data available

Rail transport

No data available

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations specific for the product in question

No additional information available

SECTION 16: Other information

SDS Major/Minor	None
Issue date	13/10/2020
Revision date	13/10/2020
Supersedes	03/04/2020

Indication of changes:
Composition/information on ingredients.

Full text of H-statements:	
H315	Causes skin irritation
H318	Causes serious eye damage
H335	May cause respiratory irritation

SDS_UN_Hilti

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

Hilti CP 636 Firestop Mortar Job Reference

Year	Project Name	Customer Name	Project type
2020	TAI WAI STATION NW RES	HIP SENG CONTRACTING COMPANY	Residential
2020	SIN FAT RD, KWUN TONG NKIL 6584	HIP HING CONSTRUCTION CO LTD	Residential
2020	A&A - Infrastructure - Near Lok Wah South Estate, Chun Wah R	CHEUK WAI CONSTRUCTION (HK) LIMITED	Infrastructure
2020	NW KLN RECLAM 6 & FAT TSEUNG ST W	YAU LEE CONSTRUCTION CO LTD	Residential
2020	1-25 A KUNG NGAM RD HOUSING	MATTEX ASIA DEVELOPMENT LIMITED	Residential
2020	HKIA SKYCITY COMPLEX BLDG A2&A3	HIP SENG BUILDERS LIMITED	Retail
2020	Refurbishment - Residential - Wu King Estate, Tuen Mun	CHEUK WAI CONSTRUCTION (HK) LIMITED	Residential
2020	VEHICLE EXAM CENTRE	HIP HING JOINT VENTURE (VEC)	Industrial
2020	TKO LOHAS PARK PH9 (SITE J)	GAMMON ENGINEERING & CONSTRUCTION	Residential
2020	Refurbishment - Residential - Tai Hang Tung Estate, Sham Shui Po	CHEUK WAI CONSTRUCTION (HK) LIMITED	Residential
2021	TAIKOO PLACE PH 2B	HIP HING CONSTRUCTION CO LTD	Office
2021	KAI TAK AREA 1F SITE 2, NKIL 6556	HIP HING CONSTRUCTION CO LTD	Office
2021	EAST KOWLOON CULTURAL CENTRE	LEIGHTON CONTRACTORS (ASIA) LTD	Community & Cultural
2021	A&A - Infrastructure - Near Lok Wah South Estate, Chun Wah R	CHEUK WAI CONSTRUCTION (HK) LIMITED	Infrastructure
2021	KAI TAK 1E SITE 2A&B (6557)	HIP HING CONSTRUCTION CO LTD	Office
2021	KAI TAK AREA 1L2 (6563)	GAMMON ENGINEERING & CONSTRUCTION	Residential
2021	CHAI WAN RD HOUSING	SHUI ON BUILDING	Residential
2021	KAI TAK INLAND REVENUE TOWER	HIP HING ENGINEERING CO LTD	Office
2021	TAI WAI STATION NW RES	BESPARK TECHNOLOGIES ENGINEERING	Residential
2021	1-3 SHEK KOK RD, TKO AREA 85	`	Residential
2022	KAI TAK AREA 1F1 (6568) ELDERLY	SANFIELD (MANAGEMENT) LIMITED	Residential
2022	KAI TAK AREA 1F SITE 2, NKIL 6556	HIP HING CONSTRUCTION CO LTD	Office
2022	A&A - Infrastructure - Near Lok Wah South Estate, Chun Wah R	CHEUK WAI CONSTRUCTION (HK) LIMITED	Infrastructure
2022	HKIA SKYCITY COMPLEX BLDG A2&A3	HIP SENG CONSTRUCTION COMPANY	Retail
2022	New - Health - Ching Hong Road, Tsing Yi	MILTON CONSTRUCTION ENGINEERING	Health
2022	LOT 1068 S.D. 3, ANDERSON RD - MOUNT ANDERSON	PAUL Y. GENERAL CONTRACTORS LIMITED	Residential
2022	ANDERSON ROAD QUARRY, SITE R2-3	PAUL Y. BUILDERS LIMITED	Residential
2022	KAI TAK 1E SITE 2A&B (6557)	SHUN TAI ELECTRICAL ENGINEERING	Office
2022	YIN PING RD, TAI WO PING (6542)	HIP HING CONSTRUCTION CO LTD	Residential
2022	SIN FAT RD, KWUN TONG NKIL 6584	HIP HING CONSTRUCTION CO LTD	Residential
2023	SIN FAT RD, KWUN TONG NKIL 6584	HIP HING CONSTRUCTION CO LTD	Residential
2023	KAI TAK AREA 1F1 (6568) ELDERLY	SANFIELD (MANAGEMENT) LIMITED	Residential
2023	KAI TAK AREA 4A, SITE 2, NKIL 6554	HIP HING CONSTRUCTION CO LTD	Residential
2023	WEST KOWLOON - LYRIC THEATRE	GAMMON CONSTRUCTION LIMITED	Community & Cultural
2023	KAI TAK AREA 4C, SITE 2, NKIL 6552	ERIC TSE CEMENT WORKS	Residential
2023	YIN PING RD, TAI WO PING (6542)	HIP HING CONSTRUCTION CO LTD	Residential
2023	SHING KAI RD, KAI TAK NKIL 6607	HUNS ENGINEERING COMPANY LIMITED	Hospitality
2023	KAI TAK AREA 4B, SITE 3, NKIL 6574	KOON WO ELECTRICAL DEVELOPMENT	Residential
2023	QUEEN MARY HOSPITAL PH1 (SS F501)	CORNWALL ELECTRICAL ENGINEERING	Health
2023	IMMIGRATION HEADQUARTERS, TKO	CORNWALL ELECTRICAL ENGINEERING	Office
		`	