Hong Kong Industrial Safety Association

Firestop Applications for Fire Safety in Buildings 2012

Speaker: Mr. Ricky Tsang, Design Engineer, Hilti (HK) Ltd

Agenda (1.5hr)

- Introduction

- Passive Fire Protection Overview
- The new FS COP 2011
- Firestop Designs and Applications
- Additional Tests for Firestop Products
- Open Discussion

What's the COST of a fire ?

Worldwide, at 2010,
a fire breaks out every 23 sec:

- **1.33 million fires incidents**
- **31,20 deaths, 17,720 injuries in fires**
- **Direct Property losses $11.6 billion**

rbour Plaza HK – Apr 20

Fa Yuen Street – Nov 2011

rnwall Court, Hong Kong – Aug 20

Who suffer ? Definitely the property owner. More importantly, life is invaluable.

Source: Apple Daily

Windsor Tower: Madrid, Spain

Introduction

SMOKE is the major Killer

- Smoke travels at between 50 and 100m per minute
- 67% of fire related deaths are through smoke inhalation
- 44% of deaths are people who were not in the room of origin
- 47% of survivors could not see more than 4 m

Flash-over Time

Home Fire
http://www.youtube.com/watch?v=QqMVm72FMRk&feature=related

Offce Fire
http://www.youtube.com/watch?v=G6lLbDQcJyA&feature=related

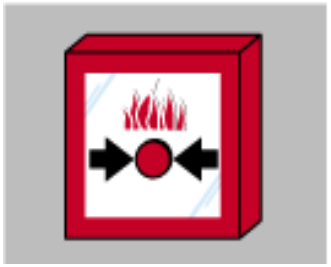
A Fire Accident
http://www.youtube.com/watch?v=10SuXWMOQlo

4 Levels of Life Safety

Prevention

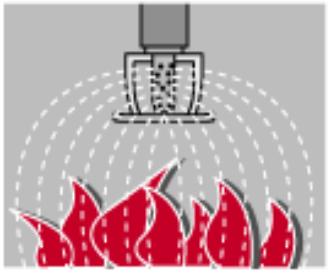
Training,
Fire Exercises, ...

Detection



Fire Alarms

Active
Fire Protection



Sprinkler Systems,
Extinguishers

Passive
Fire Protection

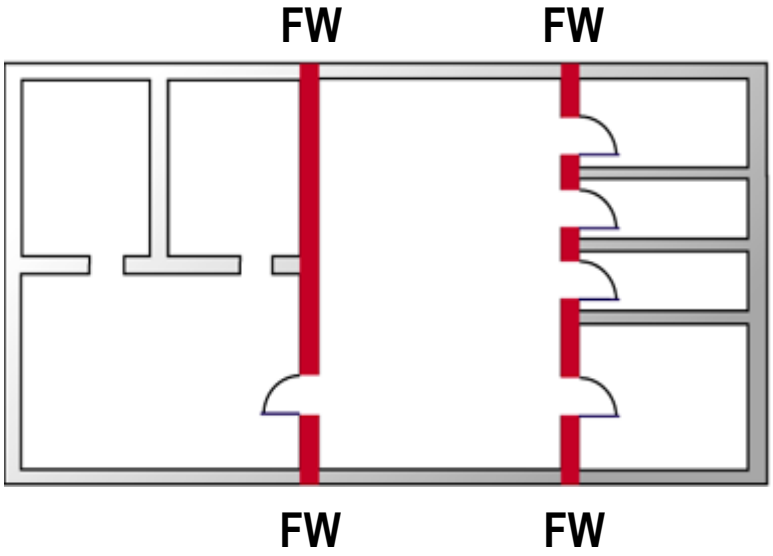
Fire Doors,
Fire-rated Walls / Floors,
Firestop Systems

Fire Compartments

Every Buildings should be divided into fire compartment not exceeding the szie stipulated in Code of Practice for Fire Safety in Buildings 2011 (Table C1)

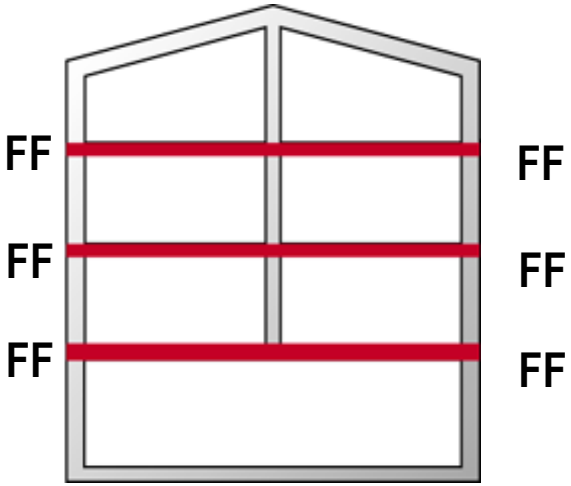
For Example: Compartment for Commercial Business Facilities should < 10,500m2

Fire walls



FW = Fire walls

Fire floors



FF = Fire floors

Weak Points in Buildings

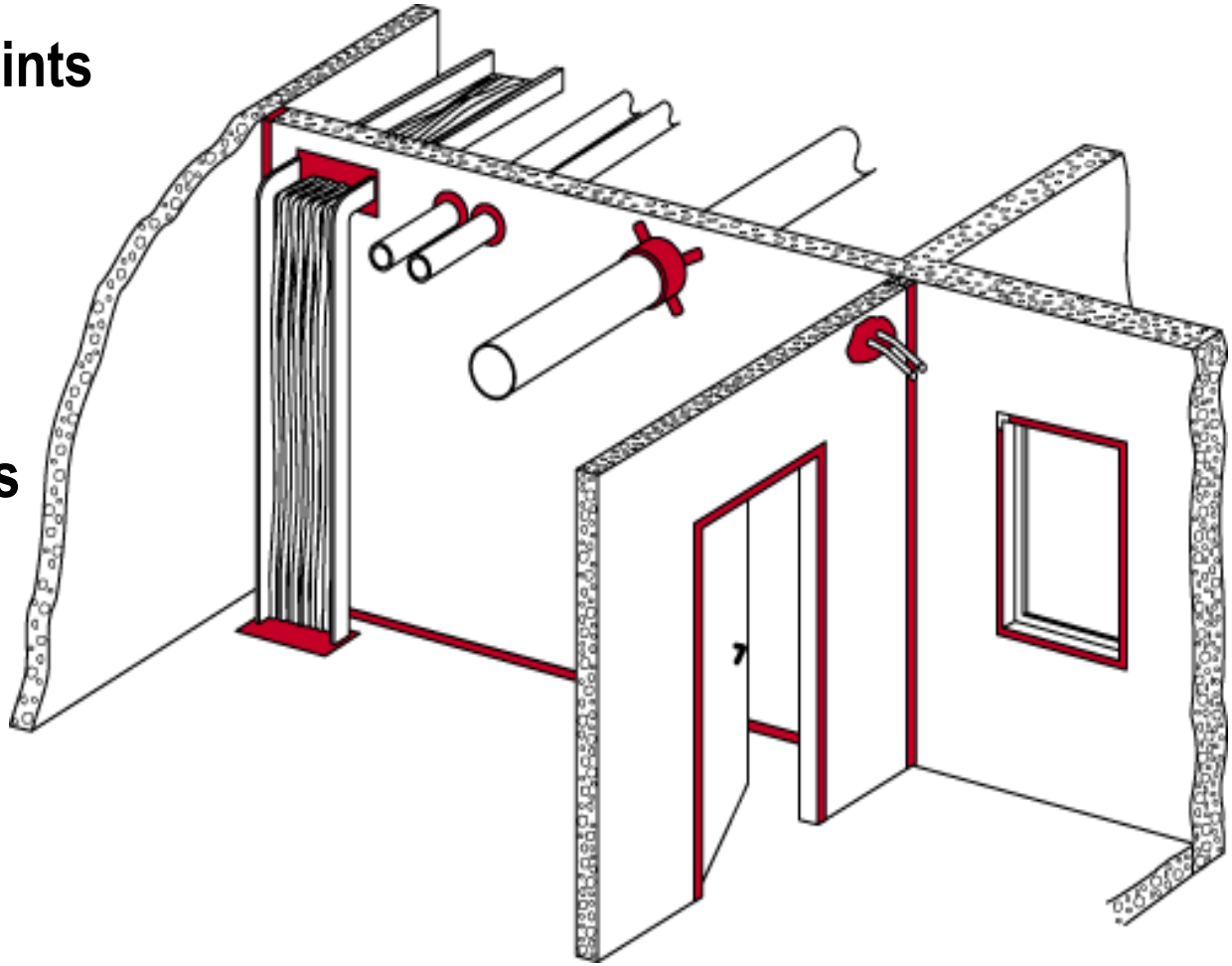
1 Unsealed / Open Joints

2 Unsealed Cable Penetrations

3 Unsealed Pipe Penetrations / Ducts

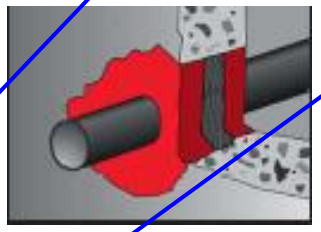
4 Doors / Windows

5 Curtain Wall Joints

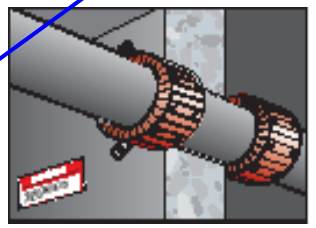


Firestop applications survey

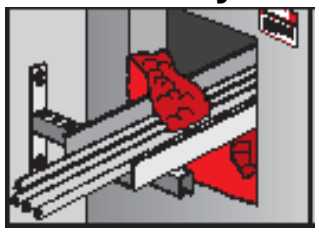
Pipes



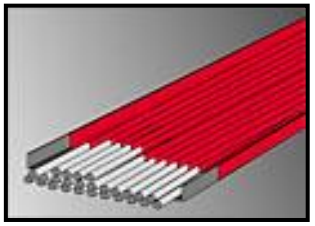
Pipes

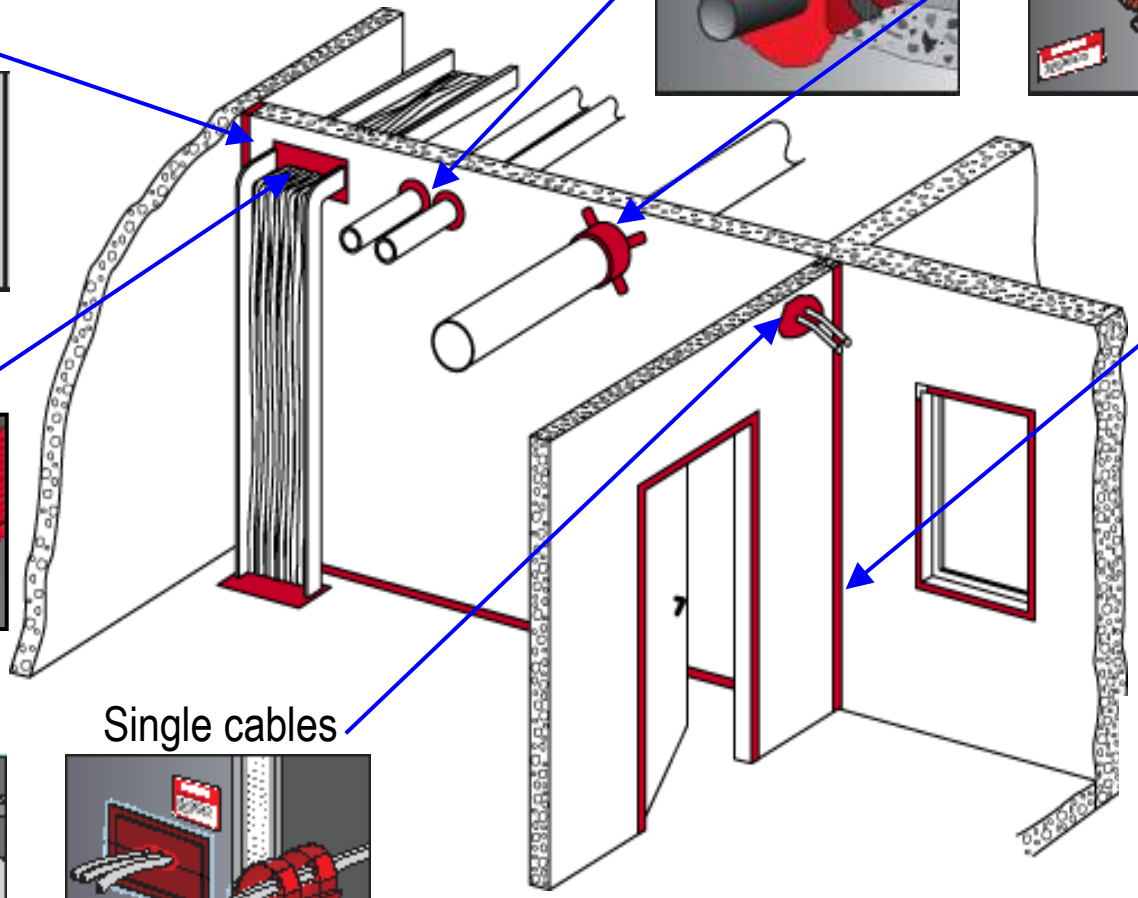


Cable trays

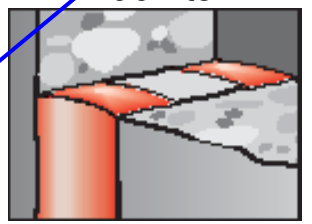


Cable coating

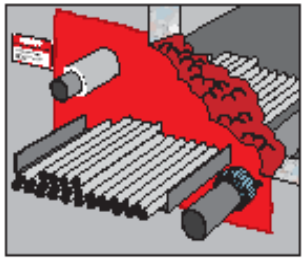




Joints



Multiple penetrations



Cable bunch

Single cables

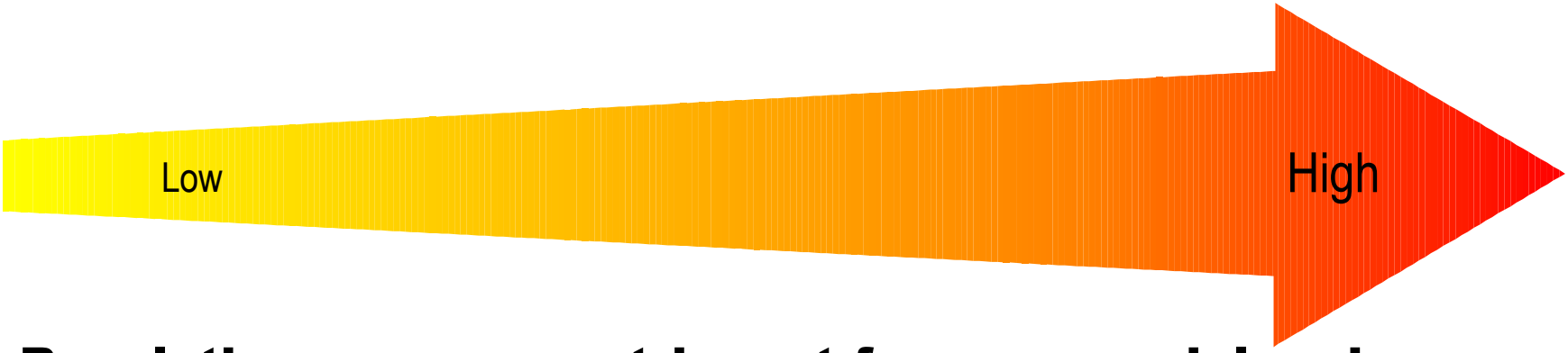
Regulations

Regulations depend on the size and type of construction:

Residential

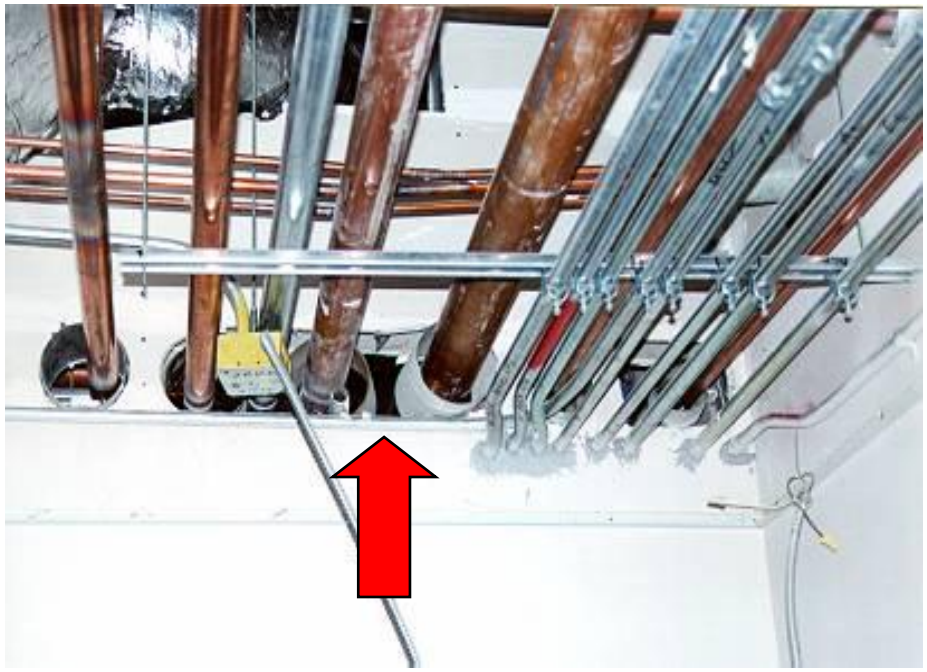
Commercial

Industrial



Regulations are more stringent for commercial and industrial buildings.

Weak Points in Buildings (Example)



Risk:

Unsealed pipe penetration

Result:

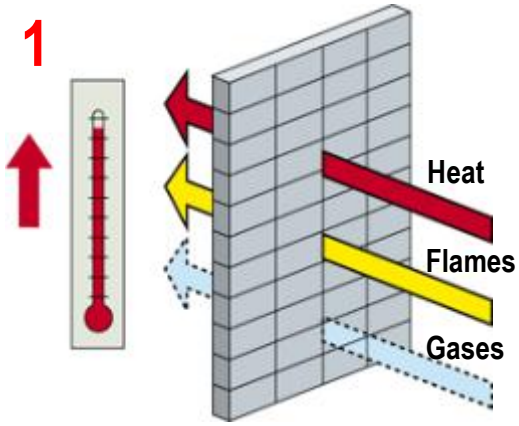
Ash & rubble

(Damage & Loss)

Test Measurement (F.R.R Fire Resistance Rating)

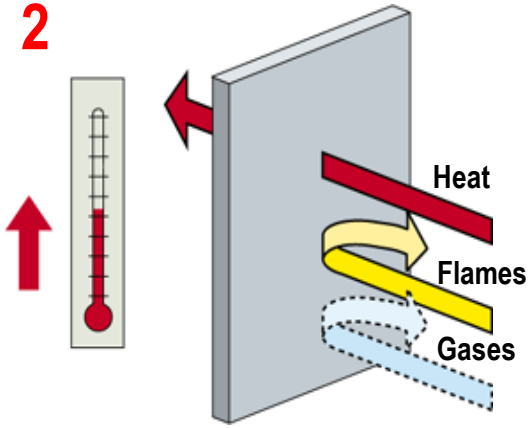
Fire resistance is measured with the following factors:

1



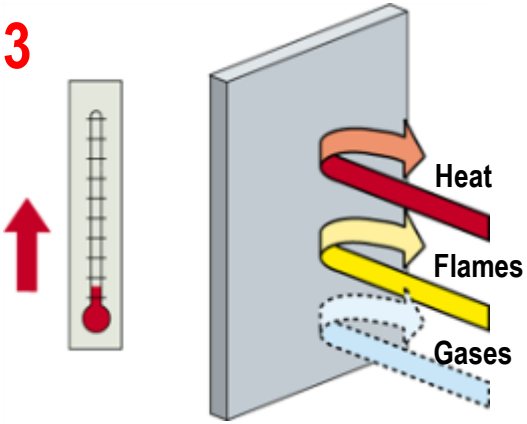
Load bearing Capacity:
Measures the structural stability of an element in case of a fire

2



Integrity (F-Rating)
Measures the abililty of an element to prevent gas and flame to pass through in case of a fire

3



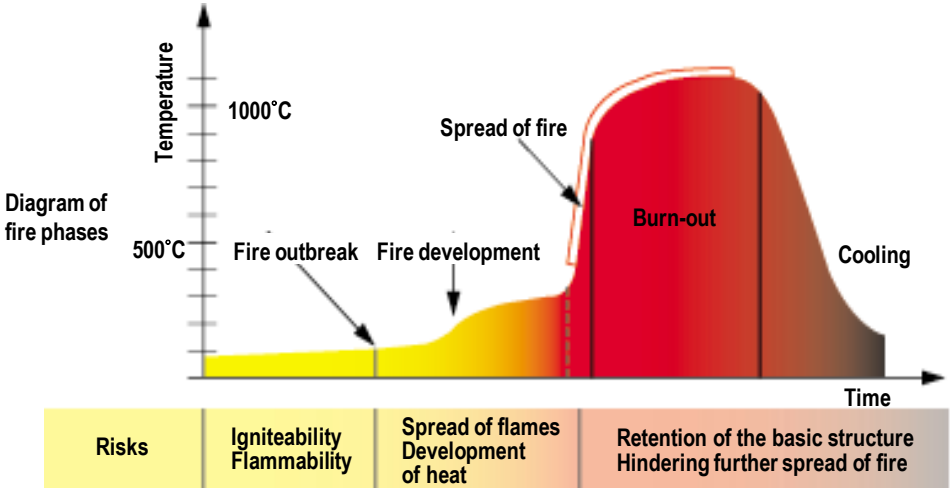
Insulation (T-Rating)
Measures the abililty of an element to insulate, i.e. how long it takes for the non-fire side of the element to reach 180˚ C/325˚ F plus ambient temperature

All three criteria are measured in hours and minutes.

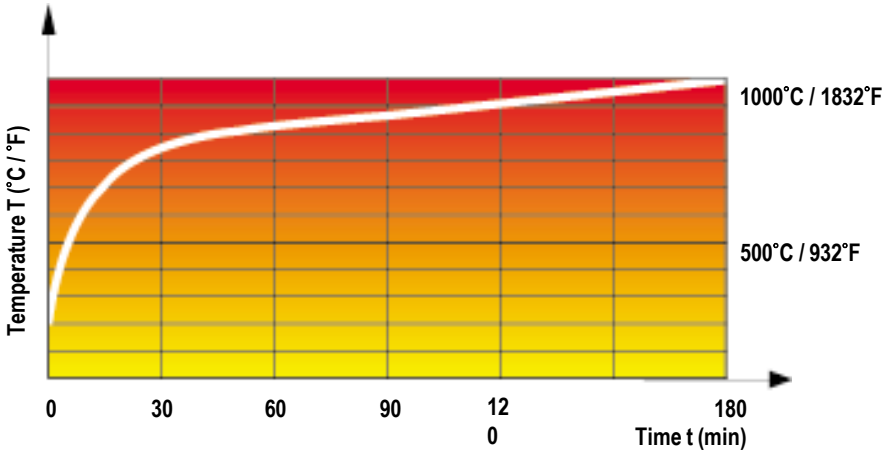
Fire Test

- Firestop products are tested under severe fire conditions according to a world-wide standard ISO-temperature curve

Phases of a fire in practice

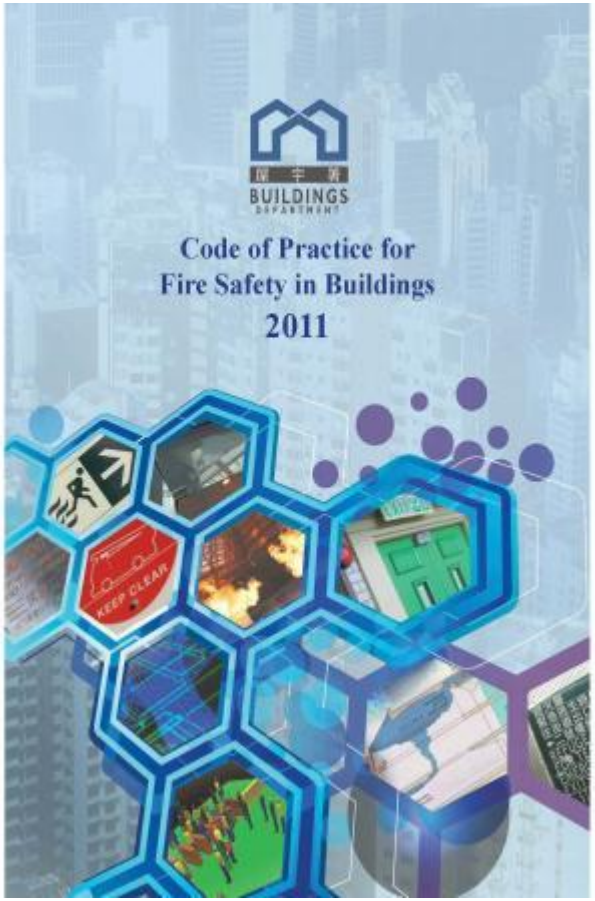


Phases of a fire when testing



- Each country may require additional test conditions.
  Examples: Furnace pressure, thermo couple position, hose stream test, ...

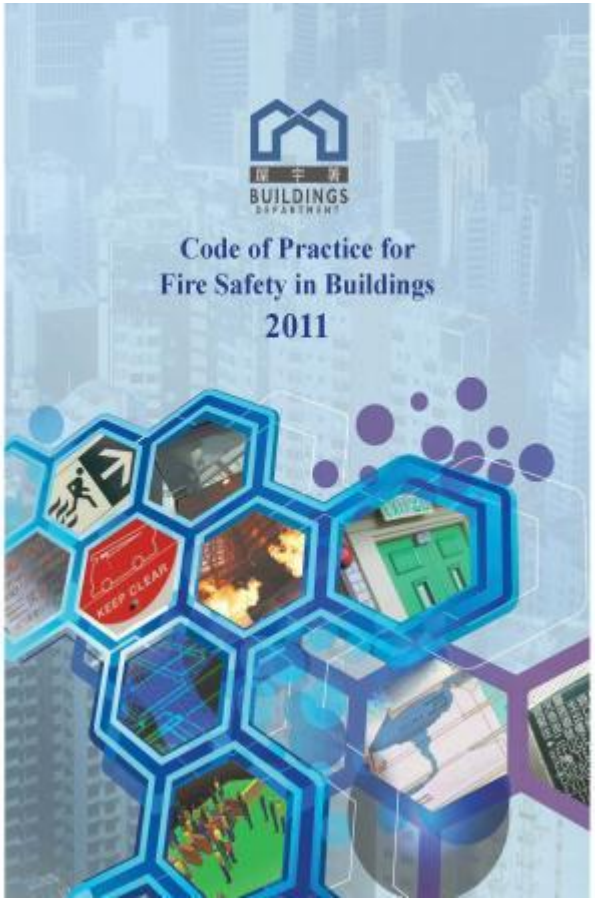
The Code of Practice for Fire Safty in Building 2011



The FS Code comprises 7 parts and 1 annex:

Part A	Introduction
Part B	Means of Escape
Part C	**Fire Resisting Construction**
Part D	Means Of Access
Part E	Fire Properties of Building Elements and Components
Part F	Fire Safety Management
Part G	Guidelines on Fire Engineering
Annex A issued	List of Codes of Practice and Guides by Licensing Authorities for Licensed Premises

The Code of Practice for Fire Safty in Building 2011



Application of the New Fire Code 2011 has come into operation on 1.Apr.2012 except:

- For buildings or buildings work which are being carried out or consent to the commencement of which has been given on or before 1.Apr.2012, the MOE code, the FRC code and the MOA Code may continue to be applicable. Consent refers to that of foundation works of such buildings.

Fire resistance ratings (FRR) are designed by three terms, to represent the make up of the element of construction, i.e. X/Y/Z, where

X – Stability fire resistance rating (minutes)
Y – Integrity fire resistance rating (minutes)
Z – Insulation fire resistance rating (minutes)

Part C Fire Resisting Construction

It includes the requirements on:

- Fire separation between buildings, fire compartments, Use Classification and occupancies
- Protection of required staircases, openings, area of special hazard, basement, refuge floor etc.

Part C Fire Resisting Construction – Subsection C3

Paragraph 5.2 (FRC 1996)

- Compartment walls, compartment floors, separations and lobbies should be constructed such that all joints are completely filled with non-combustible material to prevent the passage of smoke or flame. No compartment should exceed the volume specified in Table 1 below.

Clause C3.2 (Fire code 2011)

- A fire compartment should be enclosed by fire barriers. Protection of all openings, joints and penetrations located in a fire barrier should have an FRR not less than that of the fire barrier.

Part C Fire Resisting Construction – Subsection C4

- Every Building should be divided into fire compartment not exceeding the size stipulated in Table C1 (in term of area)
- Every element of construction and fire barrier should have an FRR not less than the specifies in Table C1
- All openings, joints and penetrations should be protected by materials with FRR not less than that of the fire barriers

Use Classification	Compartment Area/ Volume	Fire Resistance Rating (minutes)
4. Commercial:		
4a. Business Facilities	Not exceeding 10,500m²	60
4b. Mercantile Facilities	Not exceeding 2,500m²	60
	Exceeding 2,500m² but not exceeding 10,500m²	120
5. Assembly:		
5a & 5d. PPE & Other assembly premises	Not exceeding 2,500m²	60
	Exceeding 2,500m² but not exceeding 10,500m²	120
5b. Educational establishments	Not exceeding 2,500m²	60
	Exceeding 2,500m² but not exceeding 10,500m²	120
5c. Transport facilities	Not exceeding 10,500m²	120

Table C1

Part C Fire Resisting Construction – Subsection C4

Notes:

2. Different Use Classifications should be separated in accordance with Subsection C7

3. Special hazards should be separated in accordance with Subsection C13

4. For any use not covered by Table C1, the FRR required will be determined by the Building Authority having regard to the fire load, hazard level and other relevant fire safety provisions of the building

5. For Use Classification 1 - Residential, each flat should be separated from adjoining flats by fire barriers

6. For Use Classification 2 - Hotel, each guestroom should be separated from the adjoining guestrooms and other Use Classifications by fire barriers

Part C Fire Resisting Construction – Subsection C4

			Integrity		
6	Loadbearing wall being a fire barrier	Y	Y	Y	Each side separately
7	Non-loadbearing wall being a fire barrier	N	Y	Y	Each side separately
8	Protected shaft, lobby and corridor	Y*	Y	Y	Each side separately
9	Fire shutter, fire stop, fire dampers, sealing system	N	Y	N (unless specified)	Each side separately
10	Smoke outlet shaft	Y	Y	Y	From outside
11	Enclosure around services other than Item 14	N	Y	Y	From outside

Table C2

Part C Fire Resisting Construction – Subsection C6

Protection of flats in Use Classifications 1 and 2 (Clause C6.1)

- Common internal corridor should be protected by fire barriers having an FRR that complies with Table C1
- Doors of each flat / guestroom should have an FRR not less than that of the common internal corridor

(FRC 1996, FRP of doors not less than ½ of the common internal corridor)

- A smoke seal should be installed to each fire rated door

CP 606 Firestop Sealant

Part C Fire Resisting Construction – Subsection C8

Protection of openings for passing building services

Every opening through a fire barrier should be protected with firestop to maintain the FRR of that fire barrier.

The gaps between the water-borne metallic pipes and fire barrier should be filled by fire rated material having an FRR of not less than that of the fire barrier.

Part C Fire Resisting Construction – Subsection C8

Protection of openings for passing building services

Clause C8.5

Any Fire sealing system should comply with the following requirements:

(a) The sealing system should comply with the requirement in Part E

(b) The performance of the sealing system should not be affected by moisture or dampness

(c) The life of the sealing system should not be shorter than that of the duct, pipe or wire; and

(d) The sealing should be firmly fixed

Manufacturer Certificate

This is to certify HILTI (HONG KONG) LTD. has supplied

Product: CP606 Flexible Firestop Sealant

A long-term functionality for 25-30 years under room condition and fire resistance period is up to 4 hrs

Project: CEPAGE – 23 Wing Fung Street, Wan Chai (Location: Service Penetration for Fridge & Red Wine Storage Cabine)

Completion: 12 Dec 2008

In accordance with Building Regulation

BS476 : Part 20, 1987

Test Report No.: Warres No. 69754C

To: Wai Man Engineering Company

Signature

2 Jan 2009
Date

MAKE USE OF OUR AGING TEST REPORT & MANUFACTURER CERTIFICATE

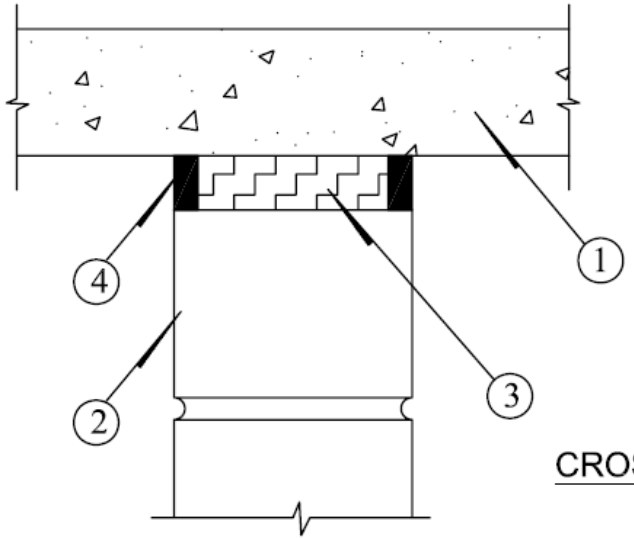
Part C Fire Resisting Construction – much more

Protection of lifts
Protection of Openings between Floors (Curtain Wall)
Protection against external fire spread
Protection of Areas of Sepcial Hazard
Protection of Basement

Firestop Designs and Applications

Passive fire protection is NOT just firestop sealant...

Design Example



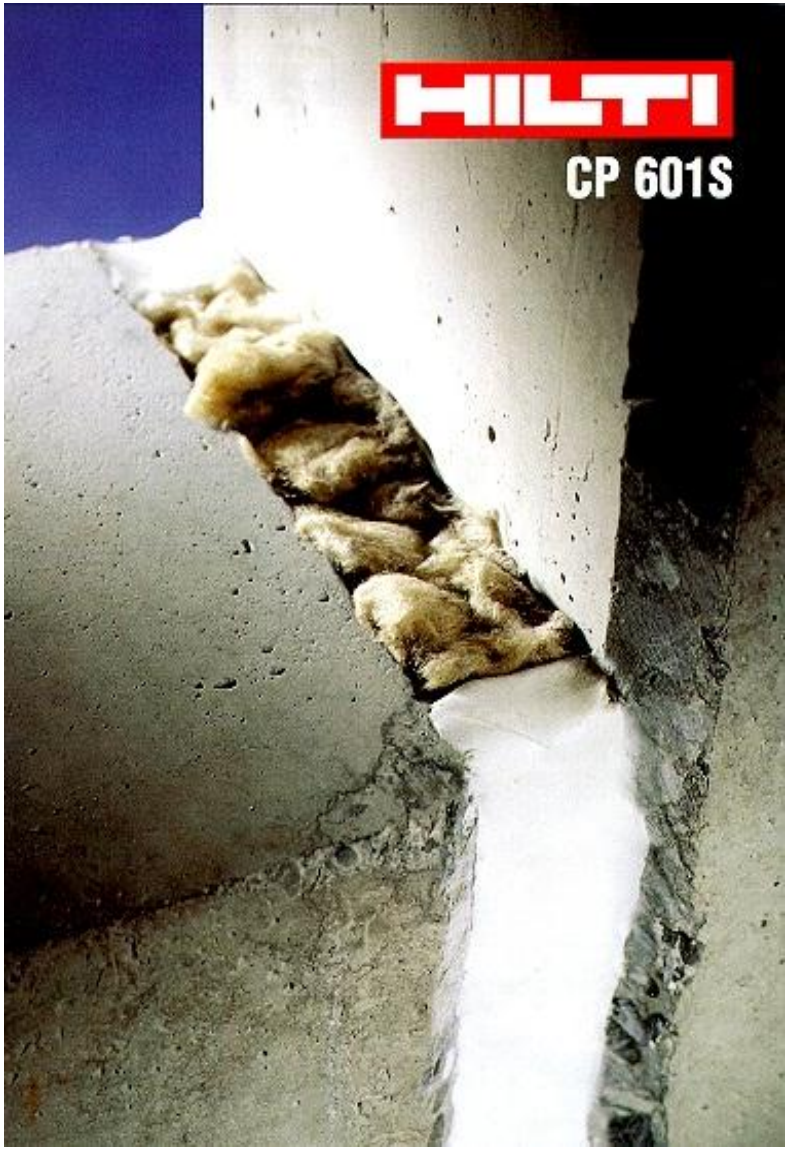
CROSS-SECTIONAL VIEW

1. CONCRETE FLOOR ASSEMBLY (4-HR F.R.P.).
2. CONCRETE WALL OR FIRE-RATED BLOCK WALL
3. **MINERAL WOOL**
4. **JOINT WIDTH = 90mm**

CP601S Elastic Firestop Sealant

Features:
- Up to 4-hr-FRP
- Up to 25% movement capability

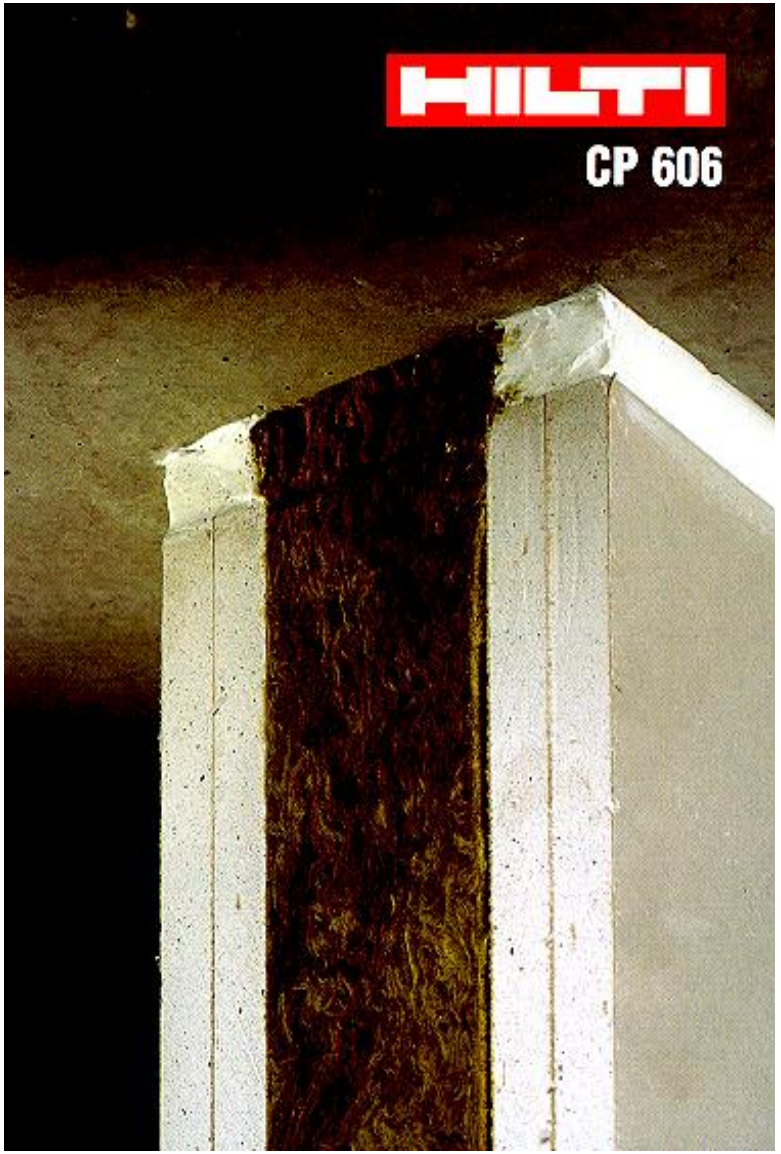
Applications:
- Movement Joints (100mm gap width)
- Metal Water Pipes (40mm gap width)



CP606 Flexible Firestop Sealant

What is ?
Features?
- Up to 4-hr-FRP
- Up to 10% movement capability

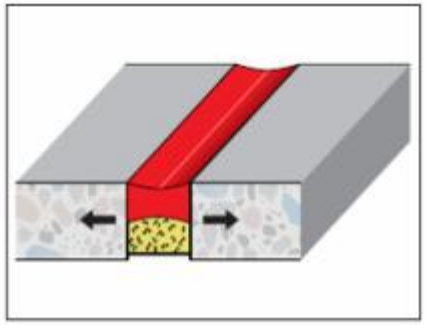
Applications:
- Movement Joint (30mm gap width)



Joint Application

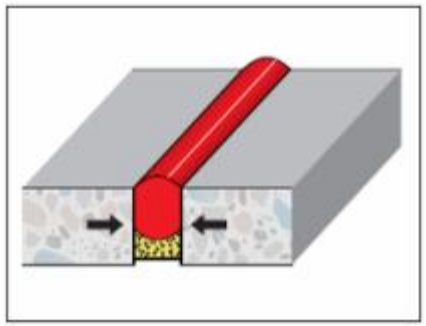
CP606 Flexible Firestop Sealant

- Acrylic Based
- Indoor-use
- Paintable
- 10% movement
- Constant 80ºC
- Max. 30mm joint



CP601S Elastic Firestop Sealant

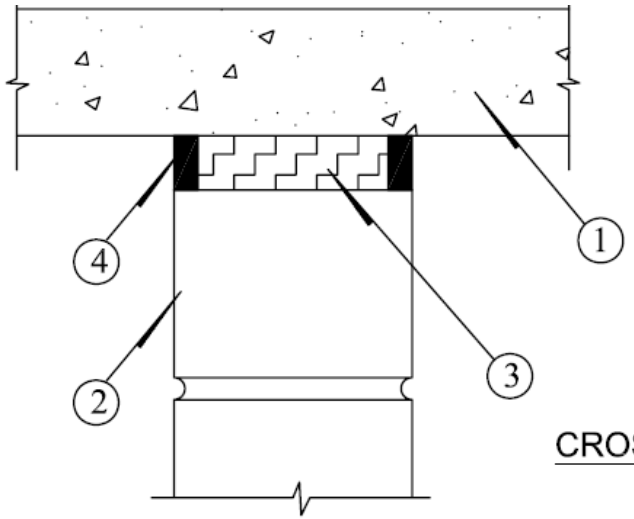
- Silicone Based
- Outdoor-use
- Non-paintable
- 25% movement
- Constant 160ºC
- Max. 100mm joint



Design Example (Cont')

British Standard
BS 476-20

FIRE RATED PERIOD : 4 HOURS
PRODUCT USED : CP601S ELASTIC FIRESTOP SEALANT

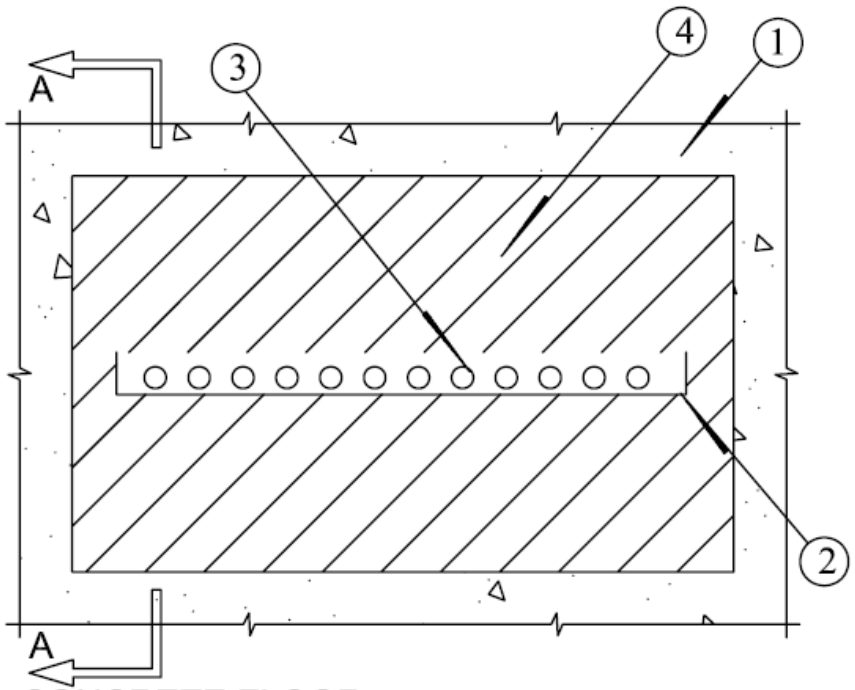


CROSS-SECTIONAL VIEW

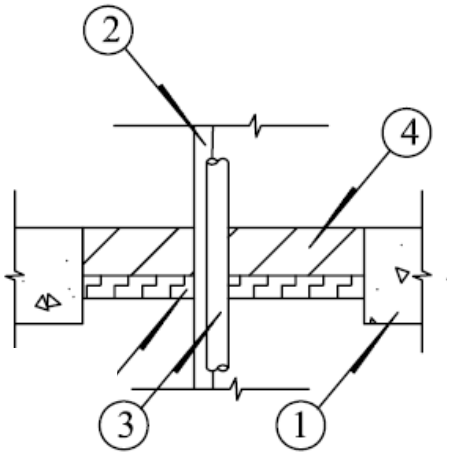
1. CONCRETE FLOOR ASSEMBLY (4-HR F.R.P.).
2. CONCRETE WALL OR FIRE-RATED BLOCK WALL (MIN. 150mm THK) (4-HR F.R.P.).
3. MIN. 100kg/m3 DENSITY MINERAL WOOL FULLY FILLED ACROSS AS BACKING.
4. (JOINT WIDTH ≤ 15mm) MIN. 6mm DEPTH **HILTI CP601S ELASTIC FIRESTOP SEALANT**, FLUSH WITH BOTH SIDES OF THE WALL SURFACE.
   (JOINT WIDTH ≤ 100mm) MIN. 15mm DEPTH **HILTI CP601S ELASTIC FIRESTOP SEALANT**, FLUSH WITH BOTH SIDES OF THE WALL SURFACE.

Design Example 2

TOP VIEW / SIDE VIEW



SECTION A-A
(FLOOR)



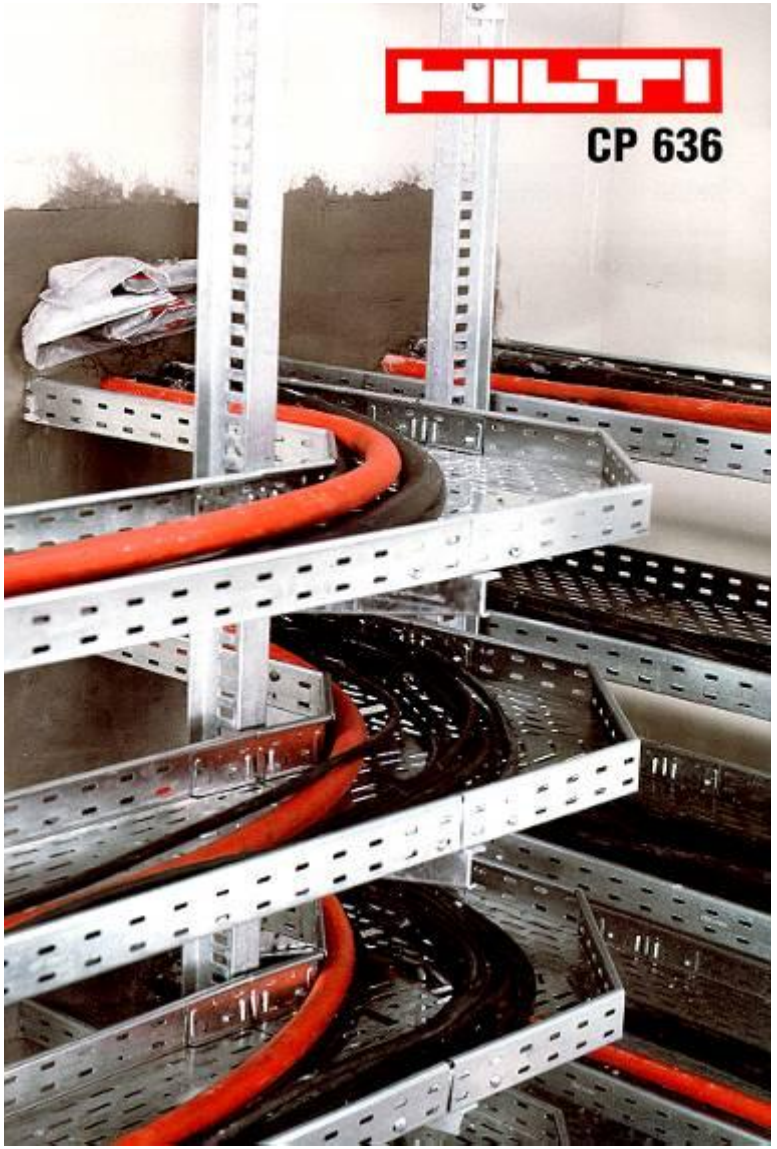
1. CONCRETE FLOOR
~~A. CONCRETE WALL OR FIRE-RATED BLOCKWALL~~
B. CONCRETE FLOOR
2. METAL CABLE TRAY(S).
3. ELECTRIC CABLE(S).
4. **OPENING TO BE FILLED (3m x 0.6m)**

CP636 Firestop Mortar

Features:
- Up to 4-hr-FRP
- No shrinkage
- Paintable

Applications:
- Cable Tray
- Lift Door Frame
- Damper
- max opening size

floor 1mx0.6mx150mm(T)
wall 1.2x2m(H)x100mm(T)



CP 670 – Fire Safety Board

Quick cut. Perfect fit.

Features:

- Up to 2-hr-FRP
- No shrinkage
-Paintable
-Easy to apply

Applications:

- Cable Tray
- Lift Door Frame
- Damper
- max opening size

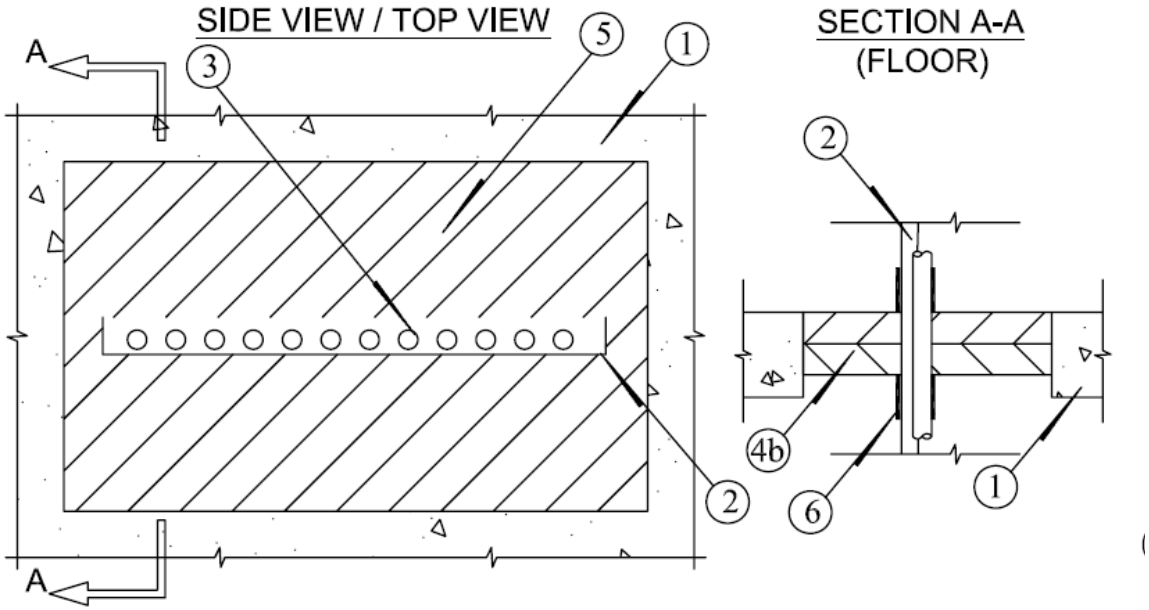
floor 1.3x5mx150mm(T)

wall 2.4x5mx100mm(T)

Design Example 2 Cont'

FIRE RATED PERIOD : 2 HOURS
PRODUCT USED : CP 670 FIRE SAFETY COATING
CP 606 FLEXIBLE FIRESTOP SEALANT

British Standard
BS 476-20



1. CONCRETE FLOOR OR WALL ASSEMBLY
~~A. CONCRETE WALL OR FIRE-RATED BLOCKWALL (MIN. 100mm THICK).~~
B. CONCRETE FLOOR (MIN. 150mm THICK).
2. METAL CABLE TRAY(S).
3. ELECTRIC CABLE(S).
4. DOUBLE LAYERED (50mm THK EACH) MINERAL WOOL BOARD (MIN. 160kg/m3 DENSITY)

5. MINIMUM 0.7mm (DRY) THICK **HILTI CP670 FIRE SAFETY COATING** APPLIED ON BOTH SIDES OF THE MINERAL WOOL BOARD.
6. MINIMUM 150mm COAT BACK OF **HILTI CP670 FIRE SAFETY COATING** APPLIED ON BOTH SIDES OF THE CABLE AND CABLE TRAY PENETRATION.

CP643 Firestop Jacket

Features:
- For CP643: up to 2-hr-FRP
- For CP643S (stainless Steel casing: up to 2-hr & 4-hr Fire rating

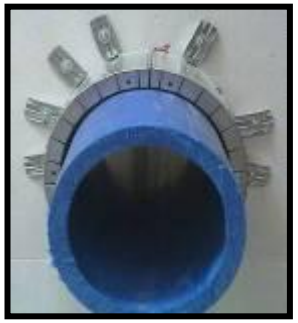
Applications:
- UPVC Water Pipes from external dia. 32mm to 100mm

Example for Intumescence with pressure

What is the power of a 10“ (250mm) collar ?

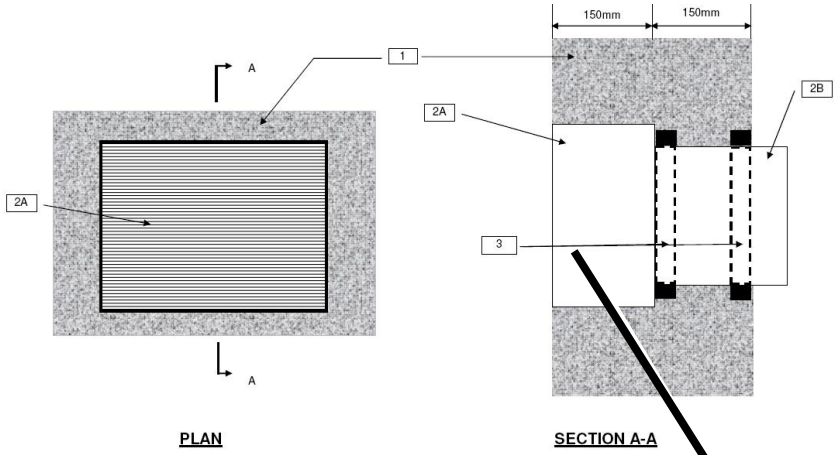
Abt. 31 t
or 4 elephants

Material Technology Take 5



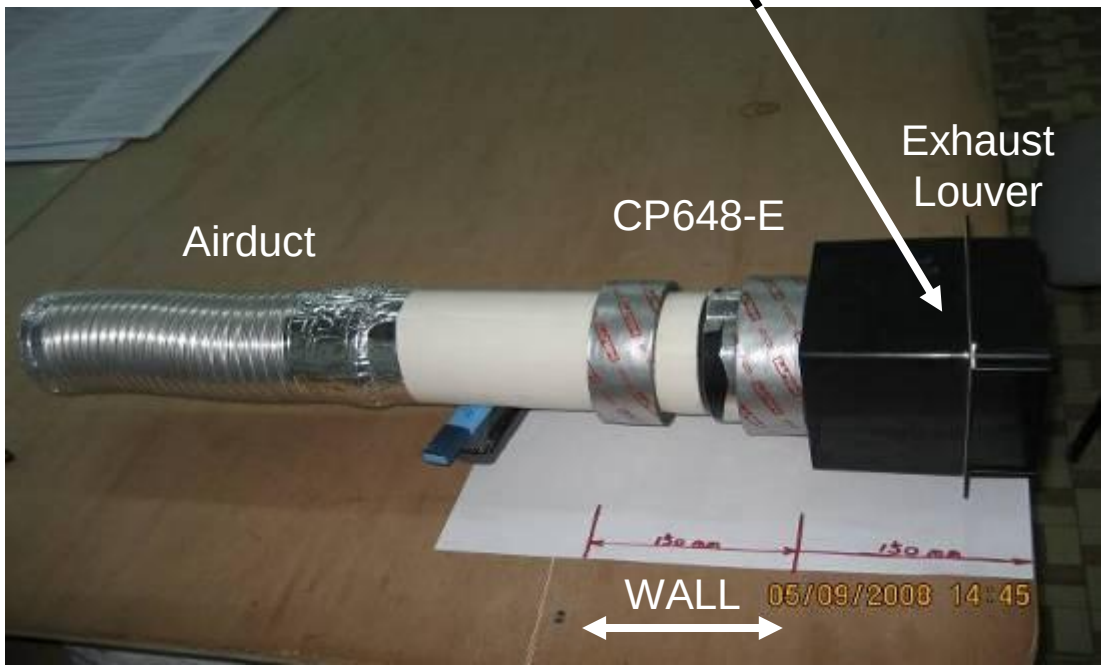
Inlay surface:
9 x 35,4 inch
23 x 90 cm

CP648 Intumescent Pipe Wraps



CP 648-S

CP 648-E



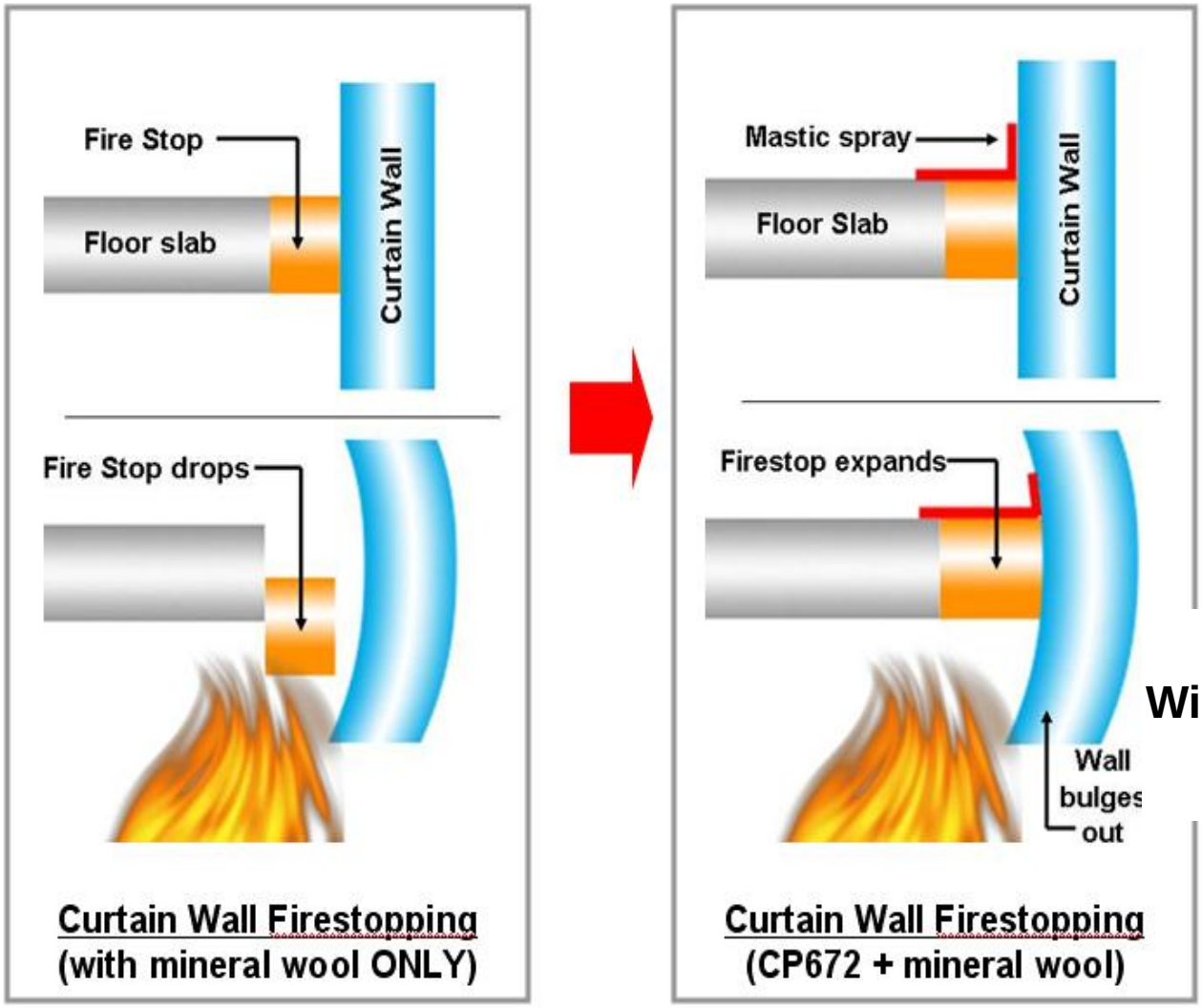
Site Installation

CP651 Firestop Cushion

Install or re-install...
Simply convenient.

- max opening size 1mx1.5m

CP672 Firestop Joint Spray



2005 Madrid Windsor Tower

The One-Stop

CP 653 Speed Sleeve

Trades / Applications : Hilti CP 653 Speed Sleeve for High Traffic Cable Penetrations

Pre-installed cable manangement device

2“- and 4“-diameter solutions for high traffic cable penetrations

Wall and floor applications

I&G, Telecom and Electrical

Installation – MATH

1. Making the hole

2. Attaching to the wall or floor

3. Threading cables through

4. Hindering smoke, gases & fire

Customer Value: The 4 most important sales arguments you should know

Outperform

Smoke Leakage Rating (L-rating)

→ **Inner fabric tube limits smoke migration from room-to-room significantly, protecting occupants and equipment.**

Speed of installation

→ **Cylindrical profile facilitates fast installation (wall and floor) via bi-metal hole saws and core bits; "spin on" flanges promote fast product fixation – no screws needed!**

Outlast

User friendly cable re-penetration

→ **Frequent re-penetration by easy opening and closing the device: depress the red tabs from one side and twist the inner housing, no special tools required!**

Ageing tested

→ **Built to work during the lifetime of the building**

System : Project Securing, Gateway* Product that initiates the Application Chain and Introduces 4 Different Hilti Lines

Measuring Systems

CP 653 Firestop Sleeve

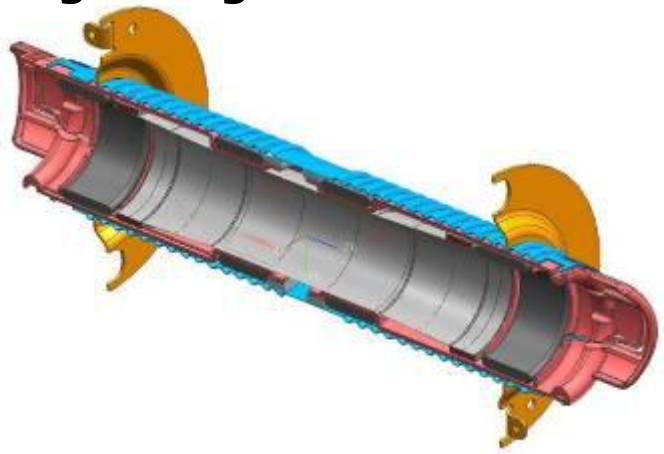
TE x-A

Firestop Sealants as well as all FS products

Installation Systems

*** specified product which guarantees early project entree**

Summary / Index: CP 653 Firestop Sleeve – The easy way of cable management



Trades / Customers
- I&G (hospitals), Telecom and Electrical

Applications
- One-stop firestop solution for cable penetrations in wall and floor applications
- Integrated and superior smoke seal
- Easy solution for frequent re-penetration

Competition
- STI
- 3M

	Customer Need	Customer Value / Sales Argument	Product Features
Outperform	High productivity	▪ Fast install translates to lower total installed cost ▪ Up to 100% cable load	▪ Round profile and spin-on flanges promote fast installation ▪ Device may be easy opened and closed from one side
Outperform	Air leakage	▪ Whether empty or 100% visual fill, CP 653 boasts very low L-rating values	▪ Constrictive smoke seal limits smoke migration by reducing (1) the annular space between cable bundles and inside of the CP 653; and (2) the interstitial spaces between cables
Outlast	Product longevity & performance	▪ Designed for frequent re-penetrations and long-term service	▪ UL 1479 testing; 30 years age testing for wrap strip ▪ UL L-rating: 1 cfm / ft2 for empty or single cable penetrations; 7 cfm / ft2 may be achieved for cable bundles ▪ Further testing on additional attributes in process
Outlast	Service	▪ Broad UL listing range ▪ Technical support / EJ service ▪ Breadth of additional product offerings	▪ UL tested and approved ▪ FM approved ▪ Hilti on-site support

CP617 Firestop Putty Pad

Never build another baffle box

Features:

- Quick & Simple to install

- Pad can be moulded by hand to fit any size of outlet box

- Proven to re-instate the full acoustic performance of a Rw = 65dB drywall

CP617 Firestop Putty Pad

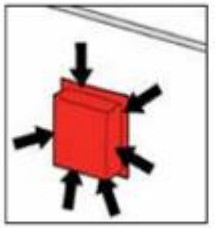
Venetian Parcel 5&6

Application Procedure

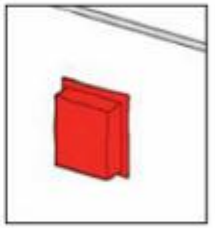
1. Remove label from one side of CP 617

2. Adhere CP 617 to application

3. Reshape CP 617 fit around box



4. Press CP 617 to all sides of application



5. Remove other side of label

Additional Tests

Case 4: Fire Sealing in Complicated Openings...

Weak Points in Fire Compartment

- Fire, smoke and acoustic barrier failed
- Location difficult to reach

Water resistance

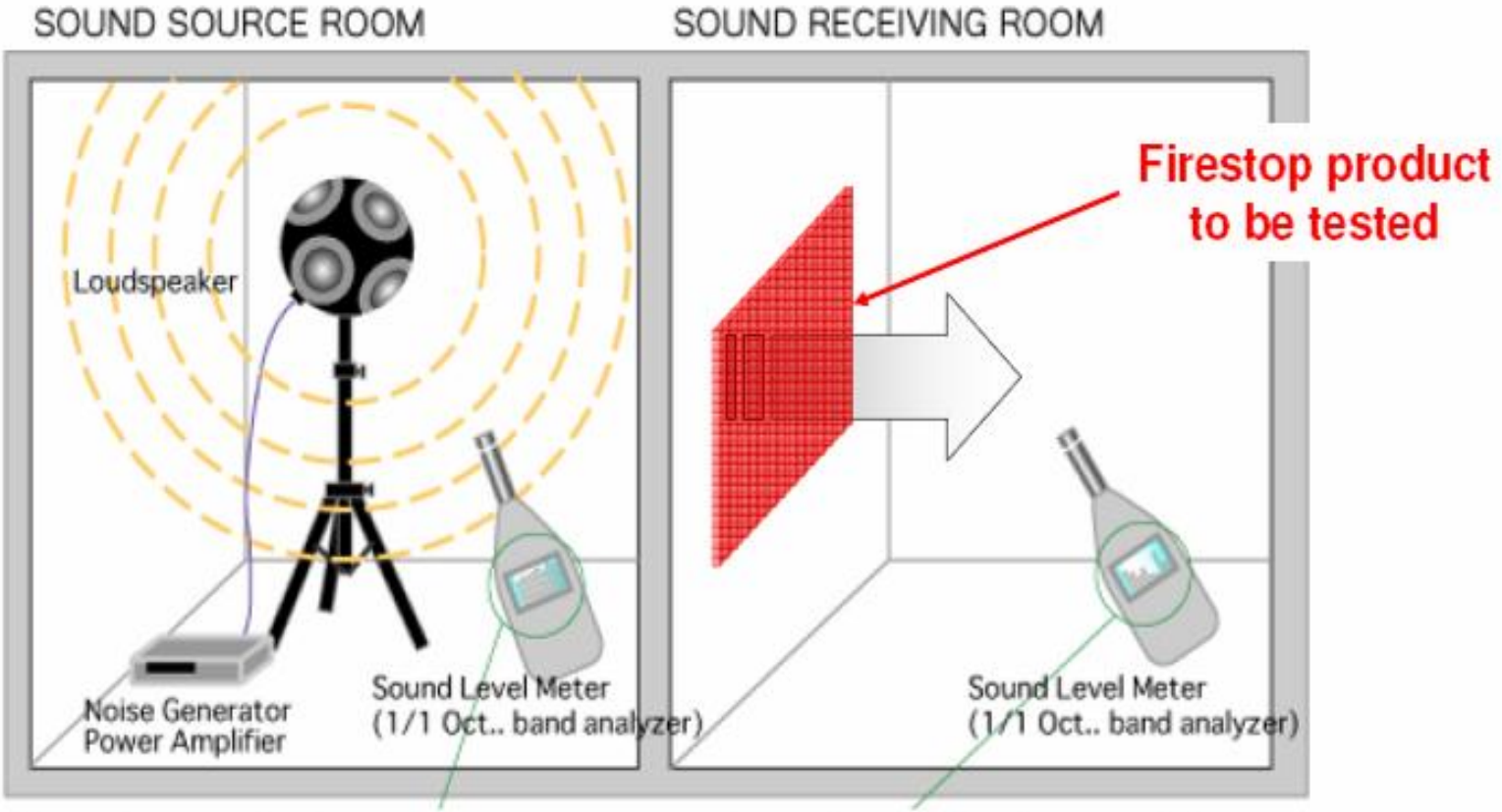
Sound insulation

Smoke- and gas-tightness

30 years

Ageing resistance

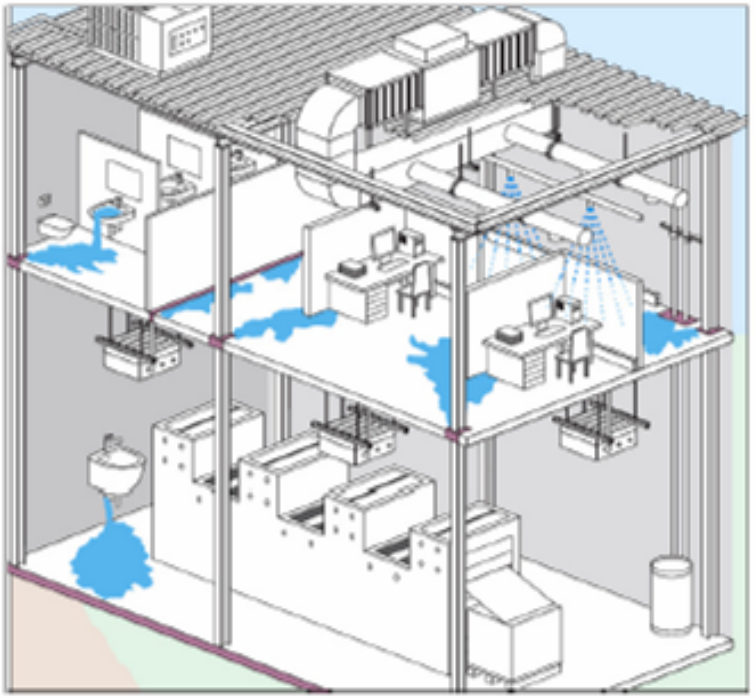
Acoustics: Sound Insulation Testing



Sound magnitude / source room Sound magnitude / receiving room

→ Measurements are taken to determine country specific noise reduction values

Water tightness of firestop systems minimizes consequential damage



Challenges for floor openings:

- Water leakage w/o fire impact e.g. broken pipe
- Water leakage as results of fire

  ↔ fire insurance impact

→ Water running out of compartment

Target for floor openings:

- Make sure that water stays in the compartment

→ Minimize consequential losses

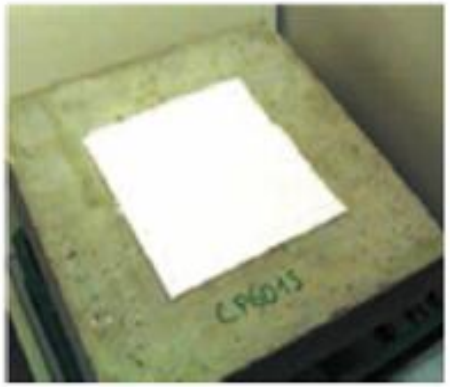
➡ UL test for firestop products: UL 1479 / W-Rating

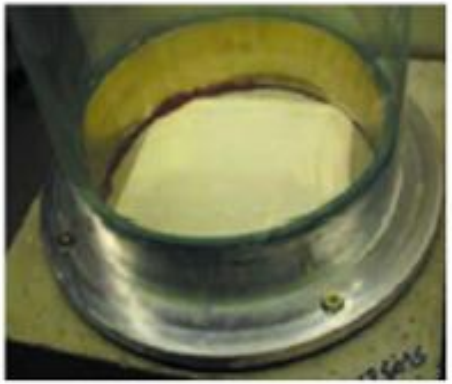
Water tightness – testing

Conditions for UL1479/W-rating

Class 1 – commercial construction

- 1 m water column ❶
- Water (colored) ❷
- Test specimen ❸
- 72 hours (daily check of leakage)
- No leakage
- Fire test afterward





Gas-/ water-/ fire-barrier in one product


IBeWa - Consulting
Freiberg

Material certificate

Gas Permeability Hilti CP 620

Trade name:	CP 620 PU Hard Foam
Sample description:	CP 620 K18/K17 (PU hard foam)
Test parameter:	gas permeability for methane

in reference to: DIN EN 1026, ASTM E 283-04, Approved Document L1, L2, release 2006

Results

Standard flow rate through an area of 1 m² at Δp=50 Pa	0.0002	m³/h
Standard flow rate through an area of 1 m² at Δp=250 Pa	0.0010	m³/h

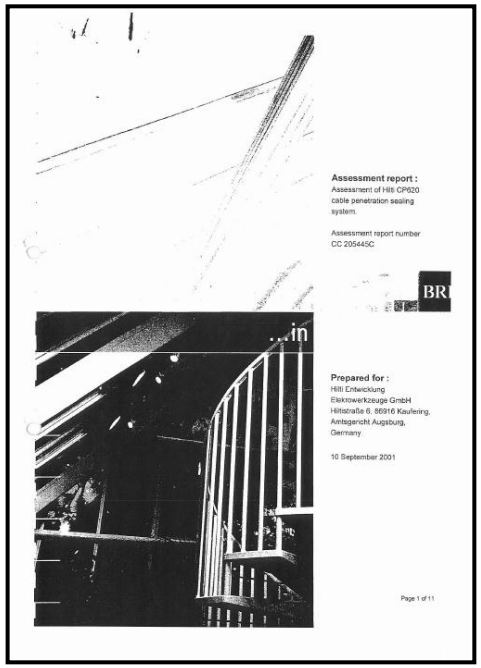

Internal Report
Water tightness of Firestop Products – CP 620

Wherever water tightness is required the sealing has to be applied very accurately to avoid any holes and openings. Also the edges have to be sealed tight. In these cases an overcoating of the sealing is recommended.

A Plexiglas pipe with an inner diameter of 20 cm was fixed to the concrete block with HUS-screws and sealed with Hilti CP 619 Firestop Putty.

Then the Plexiglas pipe was filled with coloured water.

The set up was checked daily on the water tightness of the Firestop material.


Assessment report :
Assessment of Hilti CP620 cable penetration sealing system.

Assessment report number
CC 205445C

BRE

Prepared for :
Hilti Entwicklung
Elektrowerkzeuge GmbH
Hiltistraße 6, 86916 Kaufering,
Amtsgericht Augsburg,
Germany

10 September 2001

Page 1 of 11

Gas	Water	Fire
Methane / Nitrogen / CO2 IBeWa Certificate (DIN / ASTM / GB – Doc. L)	1m water column Internal Report (UL1479 W-rating)	2-hour FRP BRE Test Report (BS476 pt-20)

CP620 Firestop Foam as the ONLY perfect solution

Even more … Blast Protection

Fraunhofer Institut Kurzzeitdynamik Ernst-Mach-Institut

Director
Prof. Dr. rer. nat. Klaus Thoma

Am Klingelberg 1
79588 Efringen-Kirchen

Test Report Summary of
Test Report No. 01-2001-AB-5 (January 2001)

in compliance with the European Standard specification
of Ref. No. prEN13123-1:1998 E and prEN13124-1:1998 E

Windows, doors and shutters - Explosion resistance
- Requirements and classification, Part 1: Shock Tube
- Test method, Part 1: Shock Tube

The Applicant: **Hilti Entwicklung Elektrowerkzeuge GmbH**
Bereich Befestigungstechnik
Hiltistrasse 6
86916 Kaufring

The reference, manufacturer's trade mark type of tested product and assembling :

Test specimen:	**Modul „CP 620" -3**	which was previously tested in the EPR3 classification of explosion pressure resistance and subsequently, in an unmodified test set-up, successful in EPR 4

Prior to being assembled, Module „CP 620" has the dimensions 585 ± 10 mm x 785 ± 10 mm. The soffit of the structural component, having a wall thickness of 200 mm and built of foam concrete, has an opening of 360 ± 10 mm x 520 ± 10 mm in which, according to DIN 4102, part 9, firestop system „CP 620" together with the cable lines and cable types can be found. The holding construction system M, developed by Hilti, for the two cable lines is fixed to the component soffit. These lateral mounting rails and the lower and upper structural component soffits serve as bearing in the test specimen frame at the rear face. By means of two additionally cross struts the module was attached to the test specimen frame at the attack face (load side). All cables lie on galvanized steel trays. Plastic cable ties serve to fix the cables to the trays, which are attached to the holding profiles with the help of iron taping wire. When assembled, the cables and cable lines stick out of the module on both sides at about 500 mm. The upper cable line adjoins the soffit on one side, the lower one is positioned in the center of the soffit. The installation was carried out following the product data sheets provided by Hilti. The side exposed to the load was chosen at random on site by the examiner.
The test refers to the loading of a partial area of 470 ± 10 mm x 610 ± 10 mm, which was tested for punching and composite effect of the fire protection material „CP 620" as termination for the cable types according to DIN 4102, part 9, as well as composite effect between fire protection material „CP 620" and foam concrete. This test gives no information concerning the ability of the surrounding wall or building structure to resist the direct or transmitted forces.

Observation:

No perforation or **visual opening** through the test specimen is evident after the test, also no visual opening between the test specimen frame and the test specimen and **no splinters** (NS) ejected from the rear face (protected side). There was some formation of cracks at the foam concrete on both sides, but **no further visual damage** has been seen. The test criteria from Ref. prEN13123-1:1998 were fulfilled in this case.

Classification of the level of Explosion-Pressure-Resistance:

Classification EPR4 (NS)

Efringen-Kirchen, 31.01.2001

Dr. Ch. Mayrhofer
(Head of Division – Protective Structures)

Dipl.-Ing. (FH) C. Kranzer
(Staff Scientist – Protective Structures)

Test Report: 01-2001-AB-5
Carried by: EMI in Germany

Test:
a very sudden rise in pressure of 0.5 to 2 bar, which corresponds to a pressure of 50 ~ 200 kPa

Result:
class EPR4
in accordance with EN 13123 and EN 13124

Additional information – provide upon request

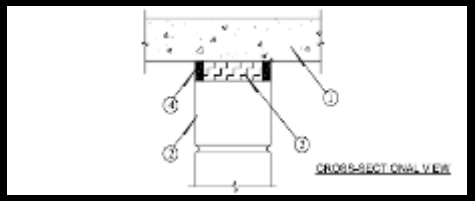
Submission and Approval

No matter which countries, firestop submission approval are based on the following 3 requirement:

Product

- Local + intnl' approval
- Validity of product
- Job reference

+



Details

- Joint width
- Opening size
- Base material
- Penetration items

+

Quality Control

- Factory audit
- Training
- Workmanship
- Site inspection

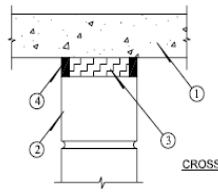
For “Quality Control”, what Hilti can offer...

Application details (trade specific)

TOP OF WALL JOINT APPLICATION DETAIL (1 OF 3)

British Standard BS 476-20

FIRE RATED PERIOD : 4 HOURS
PRODUCT USED : CP606 FIRESTOP SEALANT



CROSS-SECTIONAL VIEW

1. CONCRETE FLOOR ASSEMBLY (4-HR F.R.P.).
2. CONCRETE WALL OR FIRE-RATED BLOCK WALL (MIN. 150mm THK) (4-HR F.R.P.).
3. MIN. 100kg/m3 DENSITY MINERAL WOOL FULLY FILLED ACROSS AS BACKING. SEE NOTES NO. 2 BELOW FOR DIFFERENT BACKING MATERIAL.
4. (JOINT WIDTH ≤ 15mm) MIN. 6mm DEPTH **HILTI CP606 FLEXIBLE FIRESTOP SEALANT**, FLUSH WITH BOTH SIDES OF THE WALL SURFACE.
   (JOINT WIDTH ≤ 30mm) MIN. 15mm DEPTH **HILTI CP606 FLEXIBLE FIRESTOP SEALANT**, FLUSH WITH BOTH SIDES OF THE WALL SURFACE.

NOTES :
1. MAXIMUM JOINT WIDTH = 30mm.
2. INTEGRITY & INSULATION PERFORMANCE SUMMARIZED AS BELOW:

JOINT WIDTH	SEALANT DEPTH	BACKING MATERIAL	INTEGRITY	INSULATION
≤ 15mm	6mm	MINERAL WOOL	4-HR	4-HR
≤ 30mm	15mm	MINERAL WOOL	4-HR	3-HR
≤ 15mm	6mm	CF 125-50 FOAM	2-HR	1-HR
≤ 30mm	15mm	CF 125-50 FOAM	4-HR	2-HR
≤ 15mm	6mm	PE ROD	2-HR	1-HR
≤ 30mm	15mm	PE ROD	4-HR	2-HR

ALL CONFIGURATIONS SHOWN MUST BE SUBMITTED AND APPROVED BY THE SPECIFYING ARCHITECTS OR ENGINEERS FOR THE PROJECT.
FOR ANY DETAILS BEYOND THE SCOPE AS ABOVE, PLEASE CONTACT HILTI ENGINEERING SERVICE FOR ADVICES.
REFERENCE TEST REPORTS ; WARRES No. 69754/C & WFRC No. 141323
WF No. 168400

HILTI (HONG KONG) LTD.
Hilti Firestop Systems
Designed by: Michael Leung
Sheet: 1 OF 1
Scale: NIL
Date: 9th JAN, 2009
Drawing No.: TW-09001

Saving Lives through Innovation and Education

Manufacturer Cert (+ Delivery note tracking)

HILTI

Certificate No. 058

Manufacturer Certificate

This is to certify HILTI (HONG KONG) LTD. has supplied

Product: CP606 Flexible Firestop Sealant

A long-term functionality for 25-30 years under room condition and fire resistance period is up to 4 hrs

Project: CEPAGE – 23 Wing Fung Street, Wan Chai (Location: Service Penetration for Fridge & Red Wine Storage Cabinet)

Completion: 12 Dec 2008

In accordance with Building Regulation

BS476 : Part 20, 1987

Test Report No.: Warres No. 69754C

To: Wai Man Engineering Company

Signature

2 Jan 2009
Date

Site demonstration and training

Open Discussion

ricky.tsang@hilti.com