THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

Property Services Design Standards and Guidelines

Section **10-3**

10-3 Passive Fire Guide, Basic Solutions

Version 1.0

Document Control Information

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Document Control

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1.0	20 January 2020	Design Standards Steering Group	Initial version of manual.
			(Either note which sections have changed or 'annual review – no changes')

10-3 Passive Fire Guide, Basic Solutions

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10-3.1 Introduction

Introduction

This section shall be specifically read in conjunction with *Section 1 About this Document* and *Section 2 Project and Building Works Requirements* of the University of Auckland's (the University) Property Services Design Standards and Guidelines.

10-3.1.1 About this document

The University's Passive Fire guide outlines the requirements when undertaking fire and smoke stopping within any building at the University. It is made up of 3 parts:

Table 1: Passive fire guide documents

Name	Description
Part 1, General	Focuses on defining the performance requirements for the systems, the fire stopping documentation package and other general requirements.
Part 2, Product Selection	Provides, for information only, details on a significant number of fire stopping products from various manufacturers / suppliers / importers which manufacturers attest to achieving compliance with NZ Building Code requirements (AS4072 Part 1).
Part 3, Basic Solutions.	Provides, for information only, a number of documented solutions for frequently occurring fire stopping situations. This information is intended to minimise the design effort required to ascertain the suitability of the solution and to minimise the risk of installation errors.

10-3.1.2 Using this document

All fire stopping works are undertaken as a contractor 'design and build' element. The contractor is responsible for fully reviewing the fire stopping problem, developing a solution and installing it in a satisfactory way.

It is the responsibility of the fire stopping contractor to confirm that the installation or construction has been carried out in accordance with the Building Code (and any University requirements). In situations of uncertainty, information conflicts or missing information, the contractor must confirm any design and installation details with the product manufacturer (or their local representative).

The responsibility of NZ Building Code compliance of fire stopping products within this guide lies solely with the product manufacturer / supplier / importer. This includes all installation details.

All product information detailed within this guide is provided for information only. Given normal product development cycles, it is possible that products identified within the guide will be superseded, withdrawn or redesigned. Whilst the intent is for the guide to be periodically updated, the fire stopping contractor shall be responsible for checking the product information is current and correct.

"**Passive Fire**" relates to maintaining the fire resistance rating of a fire separation and / or the integrity of a smoke separation. This guide frequently uses 'fire stopping' and 'smoke stopping' to denote this. For simplicity, this guide frequently refers to fire and smoke stopping as 'fire stopping'.

This guide does not remove the requirement for the installer to be competent, both in understanding the fire performance objectives of the fire stopping works and the specific limitations of the fire stopping solution to be used.

Those undertaking passive fire works for the University are expected to understand all parts of this guide. Any questions about this information should in the first instance be raised with Property Services.

10-3.1.3 Purpose

The purpose of this section is to:

- Provide, for information only, several documented solutions for frequently occurring fire stopping situations.
- Minimise the design effort required to ascertain the suitability of the solution
- Minimise the risk of installation errors
- Identify the design limitations of each solution
- Identify the appropriate installation details.

10-3.1.4 Applicable standards

This table lists the standards that are applicable to this document.

Note: The list is not exhaustive and if superseded by other standard(s), the latest version and/or amendment applies.

Table 2: Passive Fire Guide, Basic Solutions Standards

Standard	No	Title
AS	4072 Part 1	Components for the protection of openings in fire-resistant separating elements. Part 1: Service penetrations and control joints.
AS	1530, Part 4	Methods for fire tests on building materials, components and structures. Part 4: Fire-resistance test of elements of construction
NZS BS	476 Part 21	Fire tests on building materials and structures. Methods for determination of the fire resistance of loadbearing elements of construction
NZS BS	476, Part 22	Fire tests on building materials and structures. Methods for determination of the fire resistance of non-Smoke and loadbearing elements of construction
NZS	4520 (2010)	Fire resisting doorsets
BS/EN	12101, Part 1	Smoke and heat control systems, Specifications for smoke barriers
EN	1634 Part 3	Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware, Part 3 – Smoke control test for door and shutter assemblies
AC	1825	Auckland Council statement for acceptance of firestopping
UL	1479	Standard for Fire Tests of Penetration Firestops.
ETAG	026 Part1_2012	Fire Stopping Guide – General and "Hilti" Firestop Systems Ageing Resistance

10-3.1.5 Design documentation

As well as design documentation outlined within *Parts 1 and 2 of Section 10* and *Section 2 Project and Building Works Requirements* of the Property Services Design Standards and Guidelines the consultant may be requested to make available to FM the following design documentation for their review:

- The Acceptable Solutions, C/AS1 – C/AS7, and the Verification Method, C/VM2
- NZ Construction Industry Council Design Documentation Guidelines

10-3.2 Abbreviations

Passive Fire Guide, Basic Solutions abbreviations

Table 3: Passive Fire Guide, Basic Solutions abbreviations

Abbreviation	Description
AC	Auckland Council
BCA	Building Consent Authorities
BWoF	Building Warrant of Fitness
DIBT	Deutches Institut für Bautechnik
EJ	Engineer's Judgement
FRR	Fire resistance rating
ICT	Information and Communication Technology Includes server and communications rooms
ISO	International Organisation for Standardisation
NZBC	New Zealand Building Code
TA	Territorial Authority
UL	Underwriters Laboratories
Primary element	A building element providing the basic loadbearing capacity to the structure, and which if affected by fire may initiate instability or premature structural collapse.
Secondary element	A building element not providing load bearing capacity to the structure and if affected by fire, instability or collapse of the building structure will not occur.
Fire separation	Any building element which separates firecells or firecells and safe paths and provides a specific fire resistance rating (FRR). **Note**: The FRR relates to a standard test which established criteria for structural adequacy, fire integrity and fire insulation.
Fire-rated floor infills	• Minimum 1.5 kPa live load capacity to enable maintenance access to the services and/or their respective fire stops. • Maximum 100mm clearance between the service penetrating the fire separation and the load-carrying fire-rated infill. (Clearance to be filled by non-load carrying fire stopping.)
Fire resisting closure	A fire rated device or assembly for closing an opening through a fire separation.
Sleeping risk spaces	• Includes bedrooms in a hall of residence, dormitories, hospital ward bedrooms, and clinical treatment spaces using sedation. • Does not include bedrooms in a domestic dwelling owned by the University.
Smoke separation	Any building element able to prevent the passage of smoke between two spaces

10-3.3 Basic Fire Stopping Solutions

10-3.3.1 Introduction

Applying fire and smoke stopping to walls and floors (fire and smoke separations) is both a requirement of the NZ Building Code (NZBC) and the Building Warrant of Fitness regime.

The fire guidance documents to support the NZBC result in the need to include fire or smoke rated construction in most buildings. The fire and smoke performance for these elements are usually defined within the fire engineering documentation submitted as part of the of Building Consent process. The Building Warrant of Fitness regime seeks to maintain, for the life of a building, the fire or smoke rating performance of these building elements as defined at the time of their construction.

The NZBC requires that the continuity and effectiveness of fire separations (the substrate) shall be maintained around penetrations, and in gaps between or within building elements, using fire stops.

Testing fire stops

Fire stops shall be tested:

- In circumstances representative of their use in service, paying due regard to the size of expected gaps to be fire stopped, and the nature of the fire separation within which they are to be used, and
- In accordance with AS 4072: Components for the protection of openings in fire resistant separating elements – Part 1: Service penetrations and control joints.

Solutions

While there are many fire and smoke stopping solutions available to meet these requirements (refer to the *Passive Fire Guide, Part 2 - Product Selection*), the information provided in this document is intended to simplify these works by providing prescriptive details for a number of fire stopping situations that frequently occur on the campus.

The design of all 'fire stopping' is dependent on many variables that are only determined during Construction Phase Design (as per NZ Construction Industry Council Design Documentation Guidelines). For this reason, fire stopping design must be included in the Construction Phase design (i.e. by the Contractor). The contractor is responsible for fully reviewing the fire stopping problem, developing a solution and installing it in a satisfactory way. Involvement by the project fire engineer may facilitate this work.

It is intended that the information provided in this document is enough to clearly:

- Identify the design limitations of each solution
- Identify the appropriate installation details.

All work undertaken using the details within this document are expected to be complied with in full (i.e. no deviations from these prescribed solutions permitted). If no solution is provided in this guide, refer *Passive Fire Guide, Part 2 - Product Selection*.

10-3.3.2 How to use this guide

No	
1.	Review the Methodology Flowchart (refer to Passive Fire Guide, General). Check the actual fire or smoke performance requirement relevant to the wall, floor or ceiling.
2.	Review the flowchart which is applicable to the onsite issue: • Concrete Vertical Fire Separations, page 12 • Concrete Horizontal Fire Separations, page 13 • GIB Vertical Fire Separations, page 14. These flowcharts provide a solution reference code (e.g. CH5).
3.	Review the design and installation details found in Appendix A applicable to the solution reference code.
4.	Complete the works in accordance to steps 4-8 (approval and installation) of the Methodology Flowchart.

10-3.3.3 Methodology Flowchart

The methodology flowchart in Passive Fire Guide, General summarises the required steps when undertaking fire and smoke stopping. The prescribed solutions within this guide is expected to simplify steps 1-3 (design). The contractor is still expected to address steps 4-8 (approval and installation).

Notes:

- Fire ratings (FRR) are typically specified in a form comprising three values (e.g. 60/60/60) for stability, integrity and insulation respectively. The number relates to the performance in minutes.
- Many suppliers of fire stopping products rely on local or overseas fire tests which have been carried out on gypsum plasterboard assemblies with significantly greater fire resistance than may be found onsite. The flowchart in 10-3.5 Concrete Vertical Separations on page 12 requires plasterboard linings which are at least 26mm on each side of the wall. Local patching of the wall may therefore be required. Refer to the extract from the GIB Fire Rated Systems guide in 10-3.4 GIB Information on Proprietary Penetration Seals on page 11 for further details.
- As referenced in the Gib Fire Rated Systems guide, fire stops are not to be supported directly by the plasterboard lining. Unless specified by the fire stopping manufacturer, the fire stop will need to be fixed to wall framing. Heavy items such as cable trays are not to be supported by the plasterboard lining.

10-3.4 GIB Information on Proprietary Penetration Seals

OCTOBER 2012

PROPRIETARY PENETRATION SEALS

Resolve and specify fire rated service penetrations in the design office rather than on-site. Combine services as much as possible in service shafts which can themselves be fire rated, eliminating the need for many different and individual penetrations.

ENSURE FITNESS FOR PURPOSE

Fire test results for penetration seals, such as plastic pipe collars that have been tested in concrete, can not be simply transferred to other types of construction such as framed cavity construction lined with gypsum plasterboard.

Many suppliers of penetration seals in New Zealand rely on overseas or local tests carried out on gypsum plasterboard assemblies with significantly greater fire resistance than what is claimed for the penetration seal.

Check test reports and manufacturer's information carefully. A penetration seal must be suitable for the construction type it is intended to be installed in.

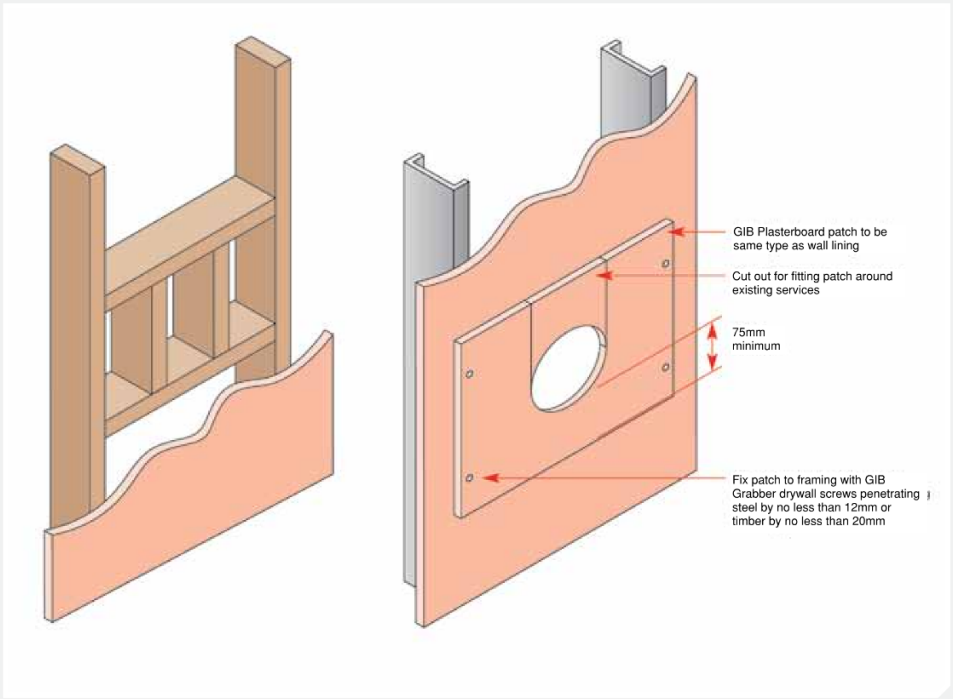
SUPPORT PENETRATION SEALS

To erase doubt, ensure penetration seals are supported by framing around the aperture and not directly by gypsum plasterboard linings. Installation of additional framing members is often required.

Alternatively an additional strip of plasterboard can be installed over the existing lining and supported by adjacent framing members. This option is suitable for penetration seals such as cable bundles, metal pipes and PVC pipe collars.

Penetration patches are not required when penetration seals are installed in one-way universal (UW) systems.

Heavy penetrating items such as cable trays and ducts must have separate supports, such as hangers to the floor above.



FOR FURTHER INFORMATION VISIT **WWW.GIB.CO.NZ** OR PHONE **0800 100 442**

GIB® FIRE RATED SYSTEMS

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10-3.5 Concrete Vertical Separations

10-3.5.1 Flowchart

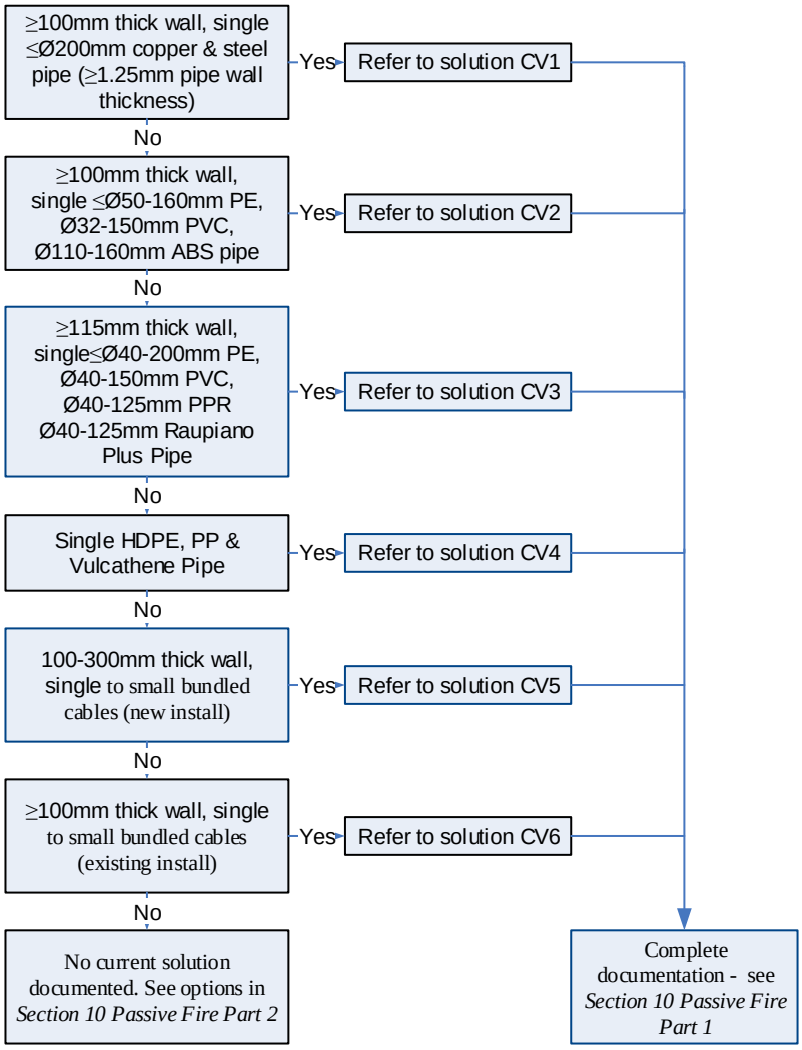


Figure 1: Concrete vertical separations flowchart

10-3.6 Concrete Horizontal Fire Separations

10-3.6.1 Flowchart

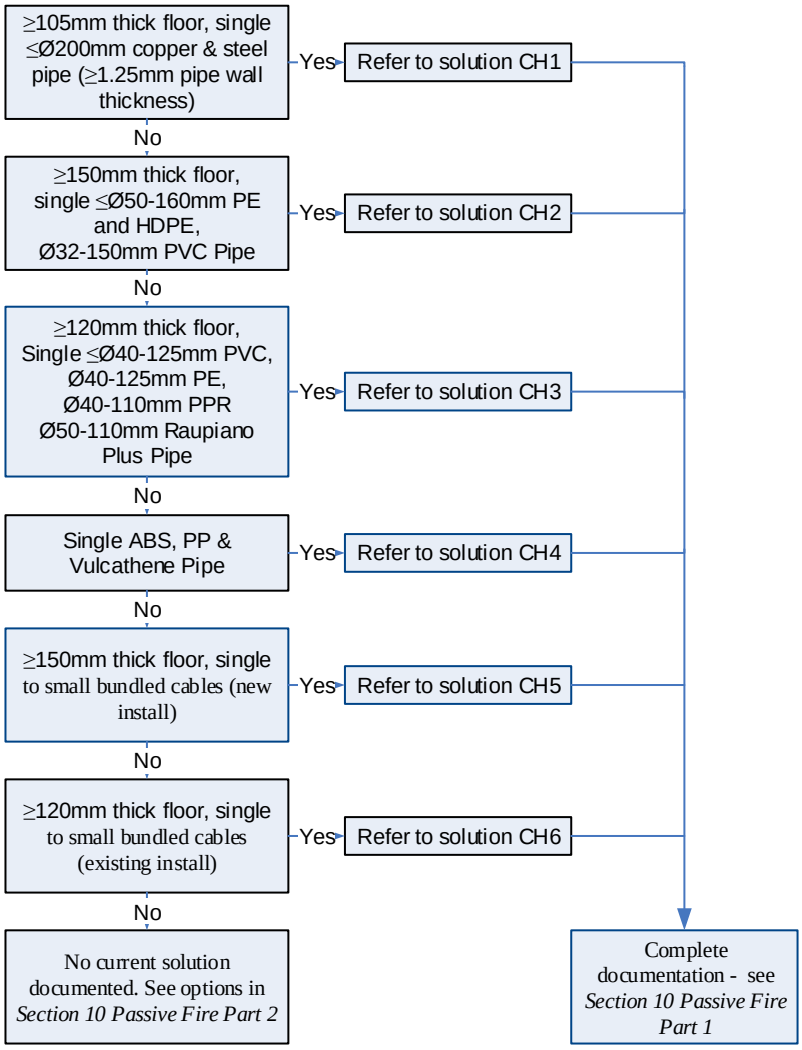


Figure 2: Concrete horizontal fire separations flowchart

10-3.7 GIB Vertical Fire Separations

10-3.7.1 Flowchart

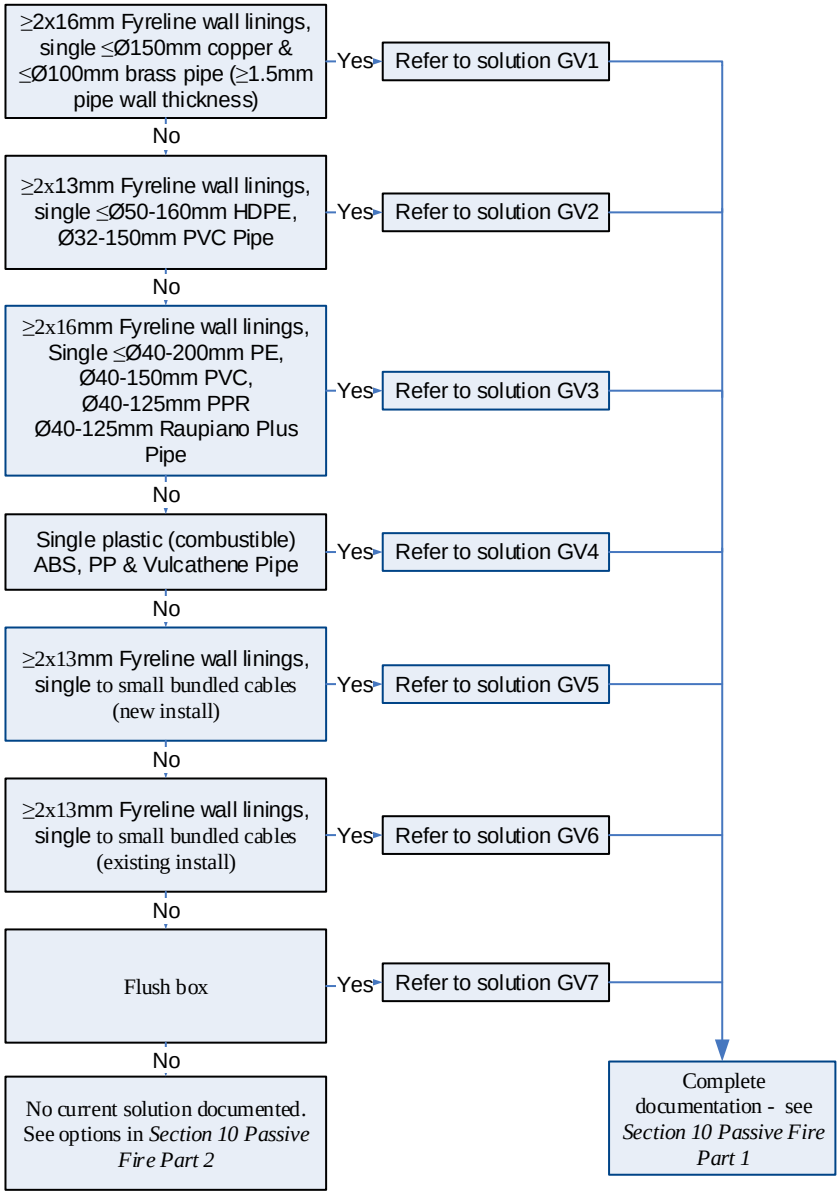
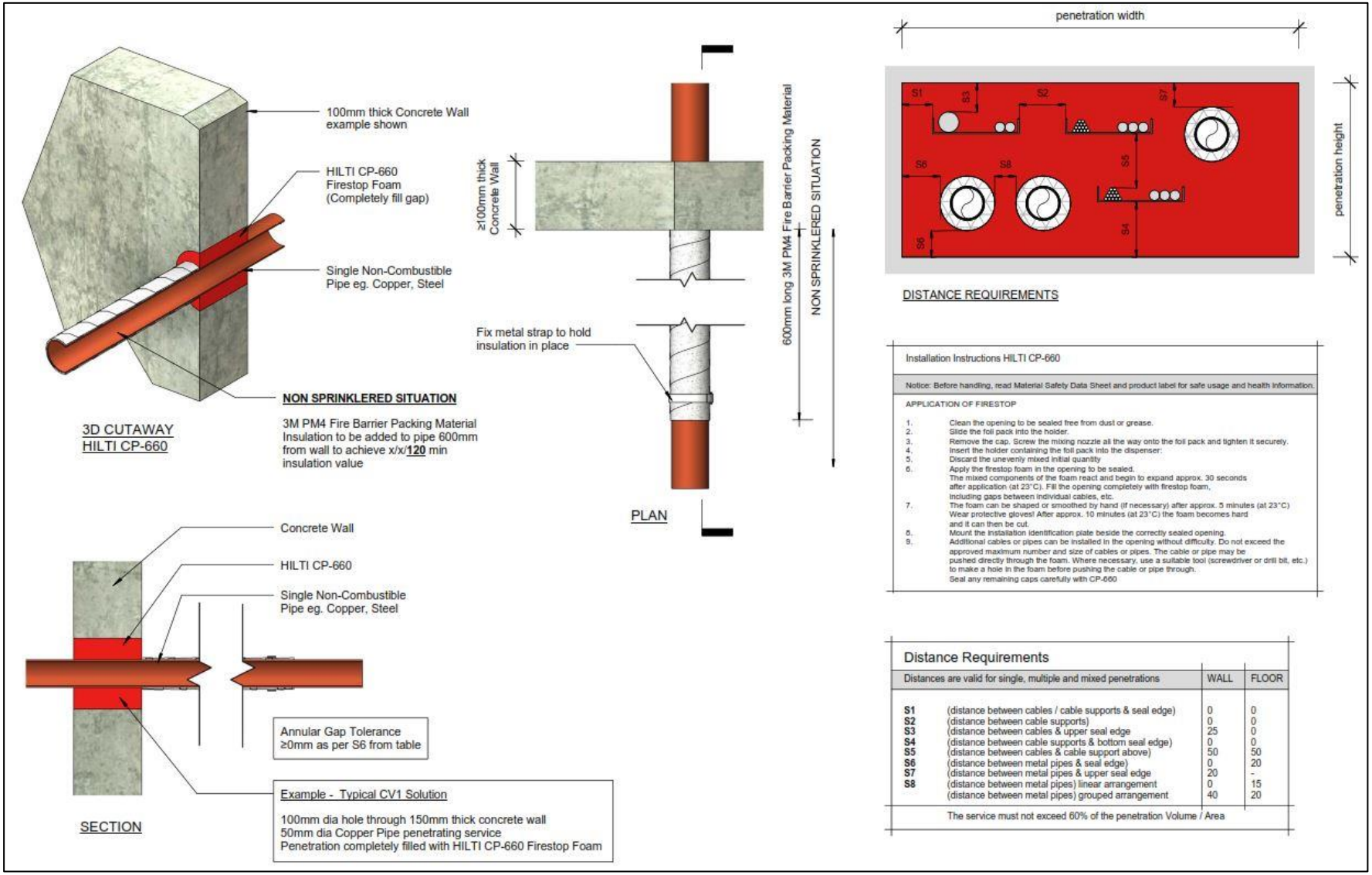


Figure 3: GIB vertical fire separations flowchart

Appendix A - Fire Penetration Details

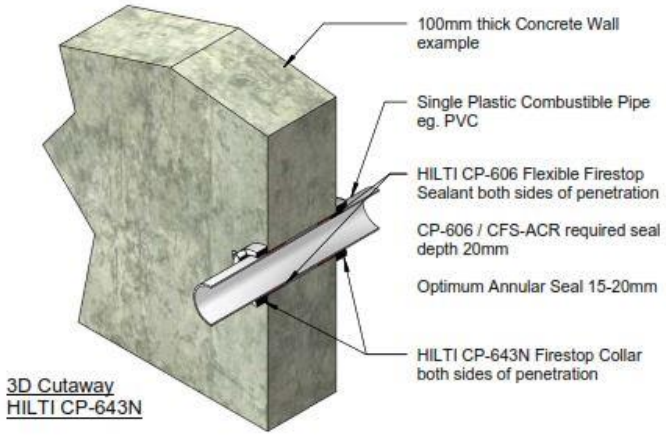
A.1 CV1 - HILTI CP-660

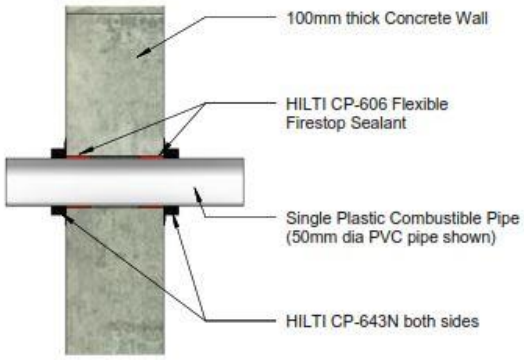
≥100mm thick Concrete wall – single non-combustible pipe. ≤100mm dia steel pipe, ≥1.5mm pipe wall thickness



A.2 CV2 – HILTI CP-643N

≥100mm thick concrete wall – single plastic (combustible) pipe. 50-160 PE, 32-150 PVC, 110-160 ABS (all mm dia)

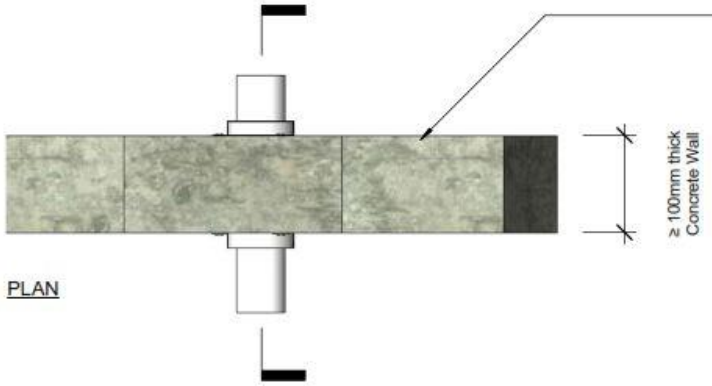




CP-643N

Description	Pipe outside dia(mm)	Collar outside dia (mm)	Collar height (mm)	No. of hooks & fasteners
CP-643-50/1.5"N	32-51mm	71mm	22mm	2
CP-643-63/2"N	52-64mm	86mm	33mm	2
CP-643-90/3"N	65-91mm	125mm	43mm	3
CP-643-110/4"N	92-115mm	150mm	48mm	3
CP-643-160/6"N	126-170mm	250mm	48mm	4

	Wall	Floor
Material	Cellular Concrete Masonry Solid Concrete	Cellular Concrete Solid Concrete
Min thickness of building component for pipe	100mm	100mm
Min pipe dia Max pipe dia CP-643N	32mm 170mm two mounted one on each side	32mm 170mm one mounted on the underside



Example - Typical CV2 Solution

65mm dia hole through 100mm thick concrete wall
50mm dia PVC pipe penetrating service
HILTI CP-606 Flexible Firestop Sealant both sides of penetration
HILTI CP-643N Firestop Collar both sides of penetration
Annular GAP 5mm

Note;

Suitable for: uPVC, PE & HDPE

PLASTIC SLEEVE NAIL - ANCHORS ARE NOT TO BE USED

Collar to be attached using M6.5 x 25 Metal Pin Anchors

Hilti DBZ 6/4.5 Item No. 256312
Hilti HUS3-P 6x40 Item No. 416745

Installation instructions for CP-643 N

Notice: Before handling, read Material Safety Data Sheet and product label for safe usage and health information.

OPENING

1. Clean the plastic pipes. Expansion of the intumescent material during a fire acts to close the plastic pipe. Very dirty pipes (ie: with remains of mortar) may lead to a delay in this closing action. Soiled plastic pipes should, therefore, be cleaned in the area where the CP-643N Firestop Collar is to be installed.

APPLICATION OF FIRESTOP SYSTEM

2. Seal the opening if required. Gaps may be closed with CP-606. The approved methods vary.
3. Close the CP-643 N Firestop Collar. Place the CP-643 N Firestop Collar around the plastic pipe and lock the closure by applying firm pressure until it latches.
4. Attach fastening hooks. The fastening hooks can be attached to various points on the metal housing. This allows the fastening points to be made to suit the space available in each case. The hooks must be positioned as symmetrically as possible. The required number of fastening hooks is indicated on the packaging.
5. Fastening the CP-643 N Firestop Collar. Only when fastened properly can CP-643 N offer protection against fire.

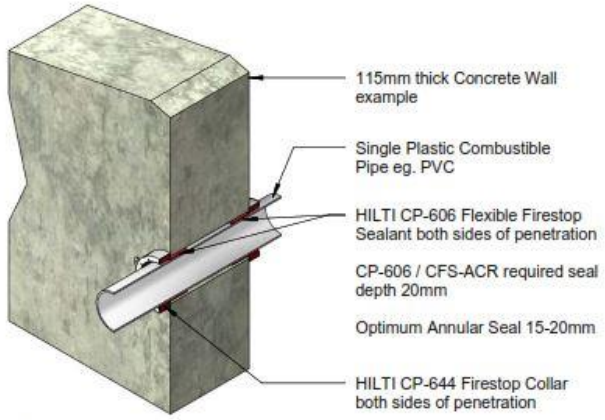
a. Mark the fastening points.
b. Drill holes with a Hilti rotary hammer drill (i.e. TE 4-A22) or, depending on base material, fasten using Hilti powder-actuated tool.
c. To secure the CP-643 N Firestop Collar, use Hilti anchors/fasteners.
d. For maintenance reasons, a penetration can be permanently marked with an identification plate and fastened in a visible position next to the seal.

NOT FOR USE WITH

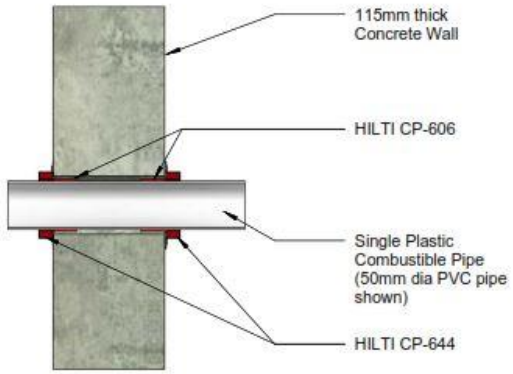
- Metal Pipes
- In highly corrosive surroundings
- With unapproved anchors / fasteners

A.3 CV3 – HILTI CP-644

≥115 thick concrete wall – single plastic (combustible) pipe. 40-200PE, 40-150PVC, 40-125PPR, 40-125 Raupiano (all mm dia)

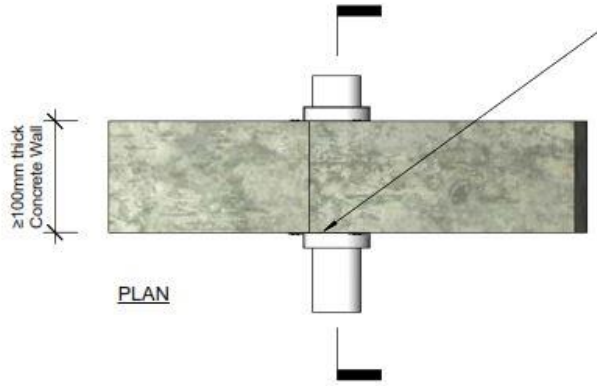


3D Cutaway
HILTI CP-644



SECTION

CP-644				
Fire Rating Base Materials Colour Temperature Resistance Expansion Ratio (unrestricted)	Up to 4 hours Concrete, Drywall, Masonry Metallic Grey -40°C to 60°C Up to 1:10			
Designation / size	Pipe outside dia(mm)	Collar outside dia (mm)	Collar Length (mm)	No. of hooks & fasteners
CP-644-50/1.5" CP-644-63/2" CP-644-90/3" CP-644-110/4" CP-644-125/5" CP-644-160/6" CP-644-160/7" CP-644-200/8" CP-644-225/9" CP-644-250/10"	32-51mm 52-64mm 75-91mm 92-115mm 116-125mm 126-170mm 160mm 200mm 225mm 250mm	66.7mm 51.7mm 116.7mm 145.7mm 166.1mm 235.5mm 226mm 257mm 269mm 319mm	22.4mm 32.4mm 42.4mm 47.6mm 47.6mm 46.2mm 152.5mm 177.5mm 202.5mm 232.5mm	2 2 3 3 4 6 8 8 10 12



PLAN

Example - Typical CV3 Solution

60mm dia hole through 115mm thick concrete wall
50mm dia PVC pipe penetrating service
HILTI CP-606 Flexible Firestop Sealant both sides of penetration
HILTI CP-644 Firestop Collar both sides of penetration
Annular GAP 5mm

NOTE:

Suitable for: PE, uPVC, PP

PLASTIC SLEEVE NAIL - ANCHORS ARE NOT TO BE USED

Collar to be attached using M6.5 x 25 metal pin anchors

Hilti DBZ 6/4.5 Item No. 256312
Hilti HUS3-P 6x40 Item No. 416745

Installation instructions for CP-644

Notice: Before handling, read Material Safety Data Sheet and product label for safe usage and health information.

OPENING

1. Clean the plastic pipes. Expansion of the intumescent material during a fire acts to close the plastic pipe. Very dirty pipes, (ie: with remains of mortar) may lead to a delay in this closing action. Soiled plastic pipes should, therefore, be cleaned in the area where the CP 644 Firestop Collar is to be installed.

APPLICATION OF FIRESTOP SYSTEM

2. Seal the opening. Gaps must be closed with CP-606. The approved methods vary.
3. Close the CP-644 Firestop Collar. Place the CP-644 Firestop Collar around the plastic pipe and lock the closure by applying firm pressure until it latches.
4. Attach fastening hooks. The fastening hooks can be attached to various points on the metal housing. This allows the fastening points to be made to suit the space available in each case. The hooks must be positioned as symmetrically as possible. The required number of fastening hooks is indicated on the packaging.
5. Fastening the CP-644 Firestop Collar. Only when fastened properly can CP-644 offer protection against fire passing through.

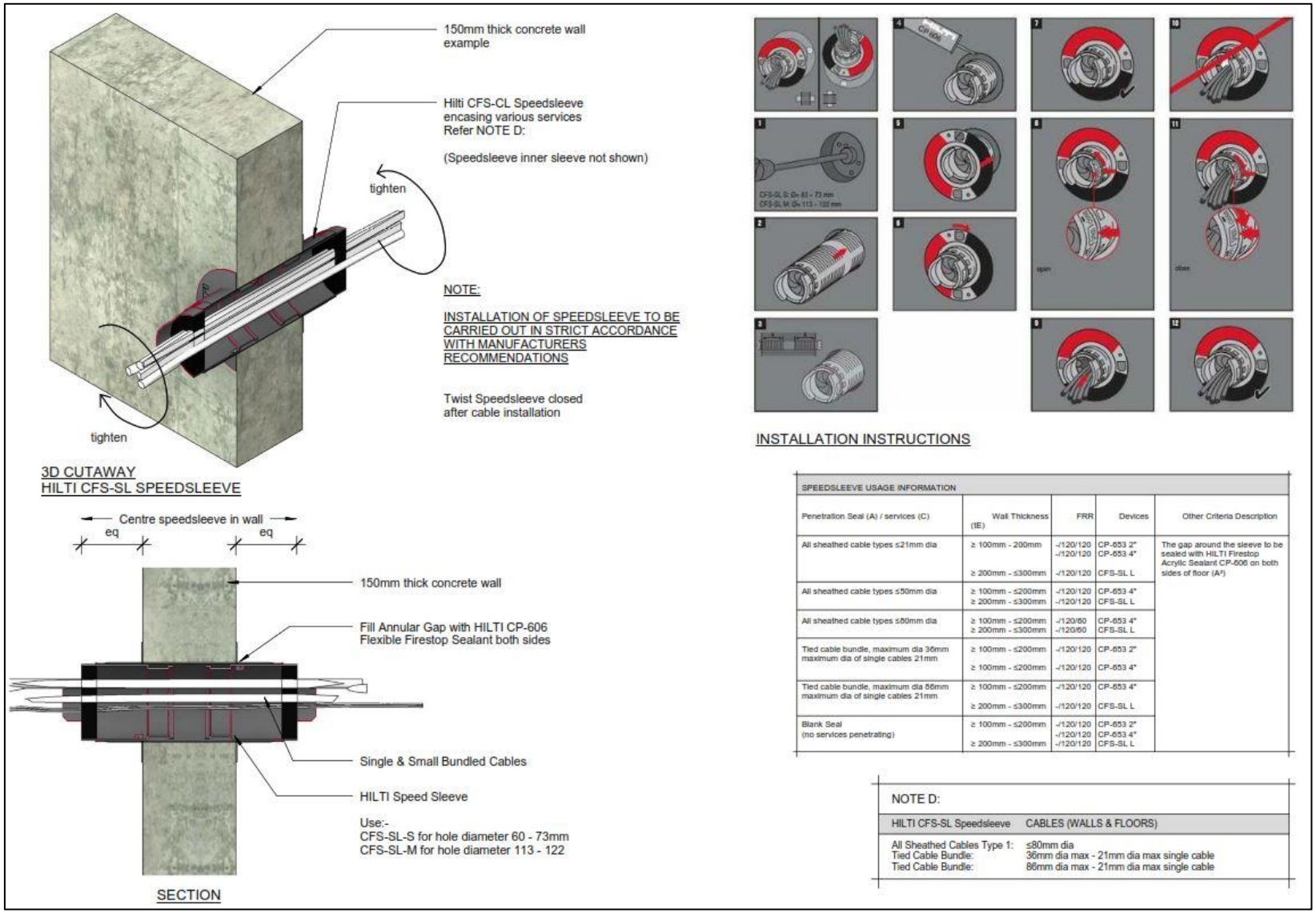
   a. Mark the fastening points.
   b. Drill holes with a Hilti rotary hammer drill (i.e. TE 4-A22) or, depending on base material, fasten using Hilti powder-actuated tool.
   c. To secure the CP-644 Firestop Collar, use Hilti anchors/fasteners.
   d. For maintenance reasons, a penetration can be permanently marked with an identification plate and fastened in a visible position next to the seal.

NOT FOR USE WITH

- Metal Pipes
- In highly corrosive surroundings
- With unapproved anchors/fasteners

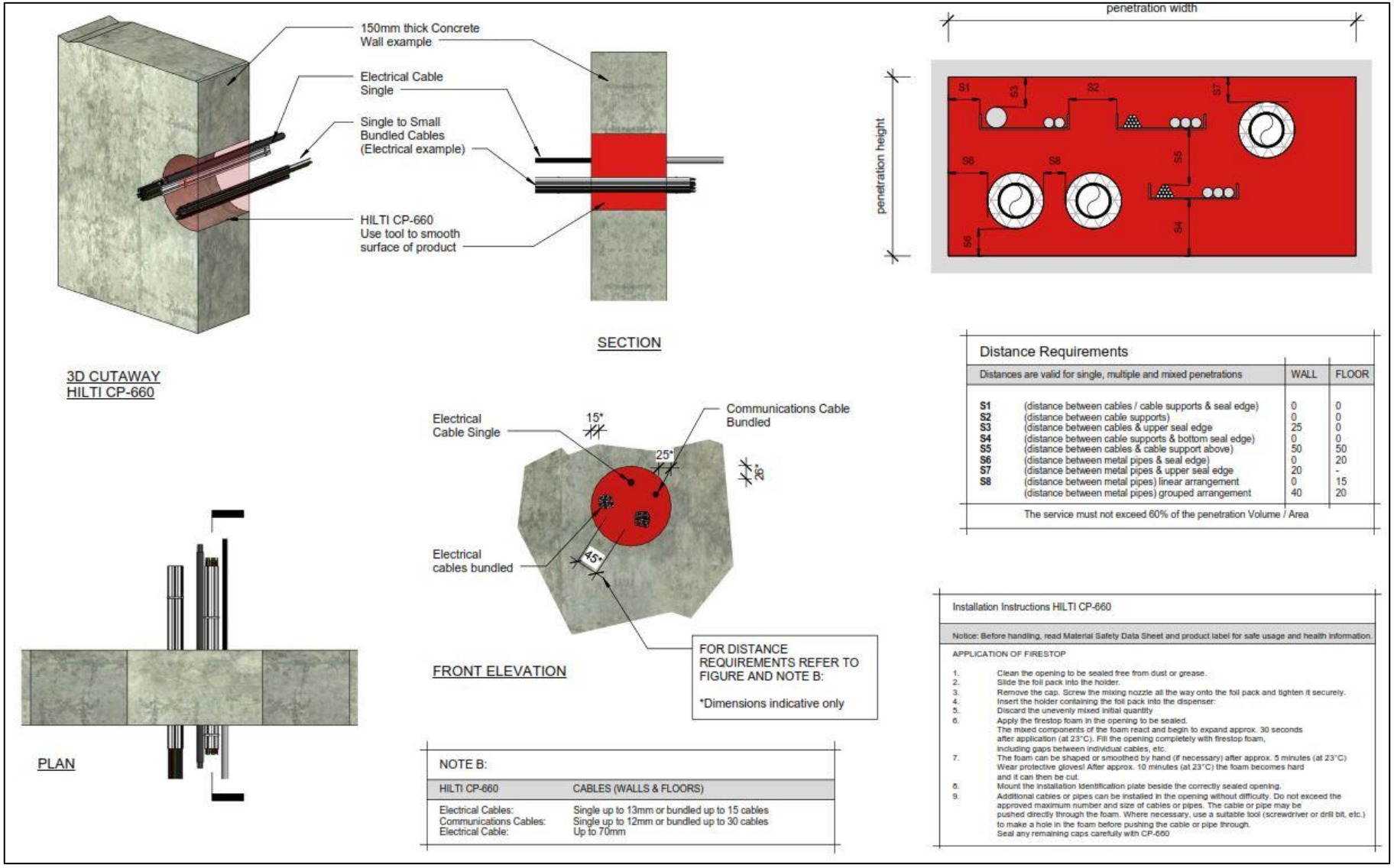
A.4 CV5 – HILTI CFS-SL

100-300mm thick concrete wall. Single to small bundled cables (new install)



A.5 CV6 – HILTI CP-660

≥110mm thick concrete wall. Single to small bundled cables (existing install)



Distance Requirements			
Distances are valid for single, multiple and mixed penetrations		WALL	FLOOR
S1	(distance between cables / cable supports & seal edge)	0	0
S2	(distance between cable supports)	0	0
S3	(distance between cables & upper seal edge	25	0
S4	(distance between cable supports & bottom seal edge)	0	0
S5	(distance between cables & cable support above)	50	50
S6	(distance between metal pipes & seal edge)	0	20
S7	(distance between metal pipes & upper seal edge	20	-
S8	(distance between metal pipes) linear arrangement	0	15
	(distance between metal pipes) grouped arrangement	40	20
The service must not exceed 60% of the penetration Volume / Area			

NOTE B:	
HILTI CP-660	CABLES (WALLS & FLOORS)
Electrical Cables:	Single up to 13mm or bundled up to 15 cables
Communications Cables:	Single up to 12mm or bundled up to 30 cables
Electrical Cable:	Up to 70mm

Installation Instructions HILTI CP-660

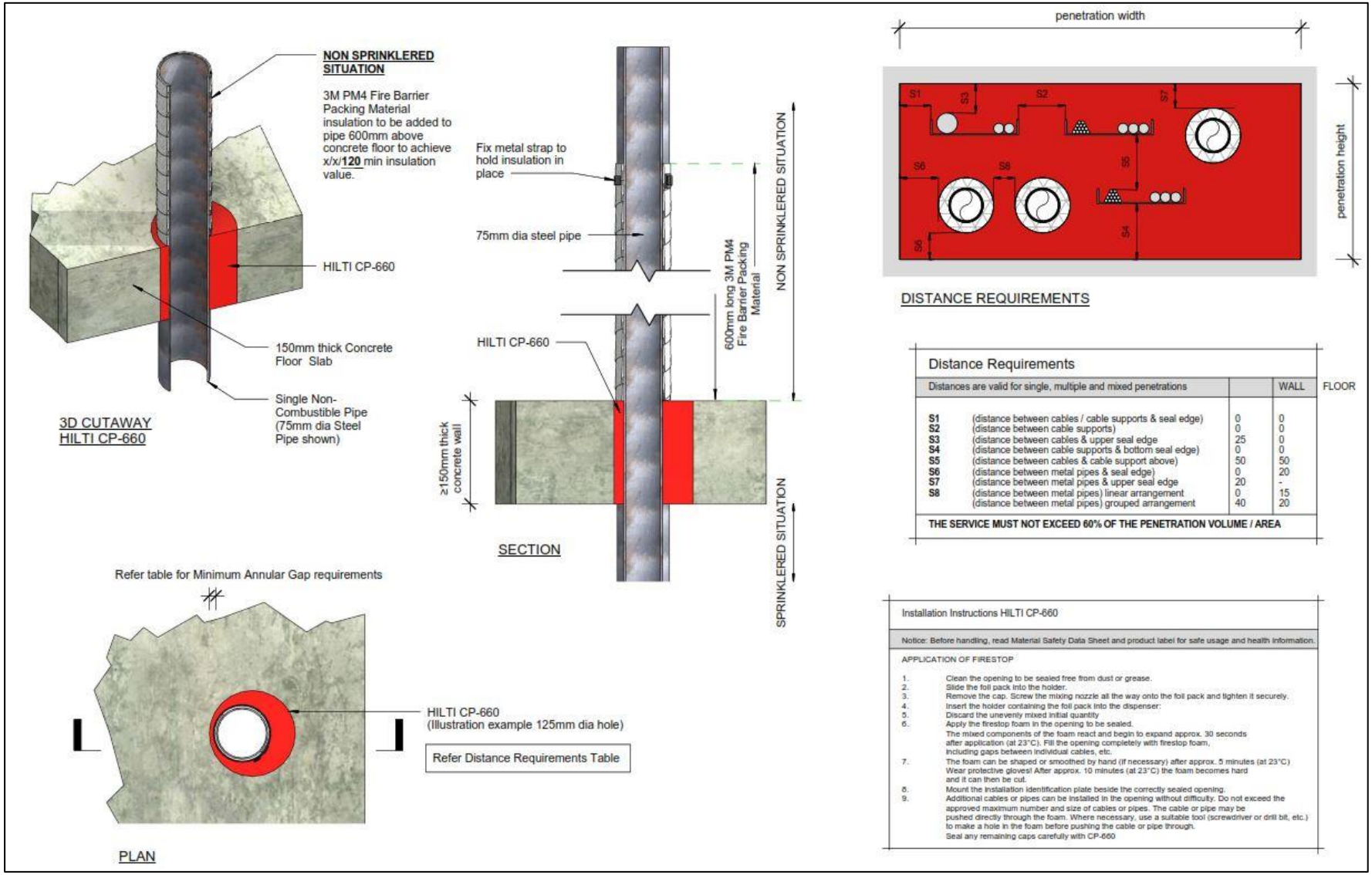
Notice: Before handling, read Material Safety Data Sheet and product label for safe usage and health information.

APPLICATION OF FIRESTOP

1. Clean the opening to be sealed free from dust or grease.
2. Slide the foil pack into the holder.
3. Remove the cap. Screw the mixing nozzle all the way onto the foil pack and tighten it securely.
4. Insert the holder containing the foil pack into the dispenser.
5. Discard the unevenly mixed initial quantity
6. Apply the firestop foam in the opening to be sealed.
   The mixed components of the foam react and begin to expand approx. 30 seconds after application (at 23°C). Fill the opening completely with firestop foam, including gaps between individual cables, etc.
7. The foam can be shaped or smoothed by hand (if necessary) after approx. 5 minutes (at 23°C) Wear protective gloves! After approx. 10 minutes (at 23°C) the foam becomes hard and it can then be cut.
8. Mount the installation identification plate beside the correctly sealed opening.
9. Additional cables or pipes can be installed in the opening without difficulty. Do not exceed the approved maximum number and size of cables or pipes. The cable or pipe may be pushed directly through the foam. Where necessary, use a suitable tool (screwdriver or drill bit, etc.) to make a hole in the foam before pushing the cable or pipe through.
   Seal any remaining caps carefully with CP-660

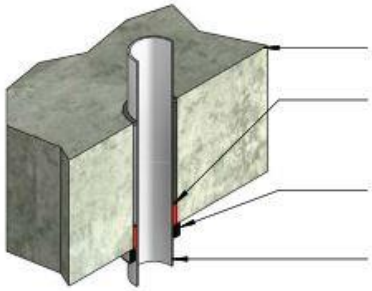
A.6 CH1 – HILTI CP-660

≥150mm thick concrete floor – single non-combustible pipe. ≤100mm steel pipe (≥1.5mm pipe wall thickness)



A.7 CH2 – HILTI CP-643N

≥150mm concrete floor – single plastic (combustible) pipe. 50-160 PE & HDPE, 32-150 PVC (all mm dia)



3D CUTAWAY
HILTI CP-643N

150mm thick Concrete Floor

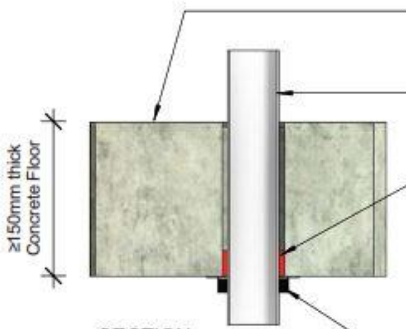
HILTI CP-606 Flexible Firestop Sealant - top or bottom as smoke seal @ penetration

HILTI CP-643N Firestop Collar underside of floor

Single Plastic Combustible Pipe eg. uPVC, PE & HDPE

NOTE:

Refer to manufacturers instructions for installation of HILTI CP-606



SECTION

150mm thick Concrete Wall

Single Plastic Combustible Pipe (50mm dia PVC pipe shown)

HILTI CP-606

CP-606 / CFS-ACR required seal depth 20mm

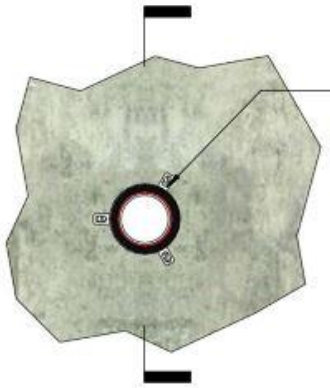
Optimum Annular Seal 15-20mm

HILTI CP-643N

CP-643N

Description	Pipe outside dia(mm)	Collar outside dia (mm)	Collar height (mm)	No. of hooks & fasteners
CP-643-50/1.5"N	32-51mm	71mm	22mm	2
CP-643-63/2"N	52-64mm	86mm	33mm	2
CP-643-90/3"N	65-91mm	125mm	43mm	3
CP-643-110/4"N	92-115mm	150mm	46mm	3
CP-643-160/6"N	126-170mm	250mm	46mm	4

	Wall	Floor
Material	Cellular Concrete Masonry Solid Concrete	Cellular Concrete Solid Concrete
Min thickness of building component for pipe	100mm	100mm
Min pipe dia Max pipe dia CP-643N	32mm 170mm two mounted one on each side	32mm 170mm one mounted on the underside



PLAN FROM BELOW

Example - Typical CH2 Solution

60mm dia hole through 150mm thick concrete floor
50mm dia PVC pipe penetrating service
HILTI CP-606 Firestop Sealant top or bottom as smoke seal
HILTI CP-643N Firestop Collar underside of penetration
Annular GAP 5mm

Note;

Suitable for: uPVC, PE & HDPE

PLASTIC SLEEVE NAIL - ANCHORS ARE NOT TO BE USED

Collar to be attached using M6.5 x 25 Metal Pin Anchors

Hilti DBZ 6/4.5 Item No. 256312
Hilti HUS3-P 6x40 Item No. 416745

Installation instructions for CP-643 N

Notice: Before handling, read Material Safety Data Sheet and product label for safe usage and health information.

OPENING

1. Clean the plastic pipes. Expansion of the intumescent material during a fire acts to close the plastic pipe. Very dirty pipes (ie: with remains of mortar) may lead to a delay in this closing action. Soiled plastic pipes should, therefore, be cleaned in the area where the CP-643N Firestop Collar is to be installed.

APPLICATION OF FIRESTOP SYSTEM

2. Seal the opening if required. Gaps may be closed with CP-606. The approved methods vary.
3. Close the CP-643 N Firestop Collar. Place the CP-643 N Firestop Collar around the plastic pipe and lock the closure by applying firm pressure until it latches.
4. Attach fastening hooks. The fastening hooks can be attached to various points on the metal housing. This allows the fastening points to be made to suit the space available in each case. The hooks must be positioned as symmetrically as possible. The required number of fastening hooks is indicated on the packaging.
5. Fastening the CP 643 N Firestop Collar. Only when fastened properly can CP-643 N offer protection against fire.

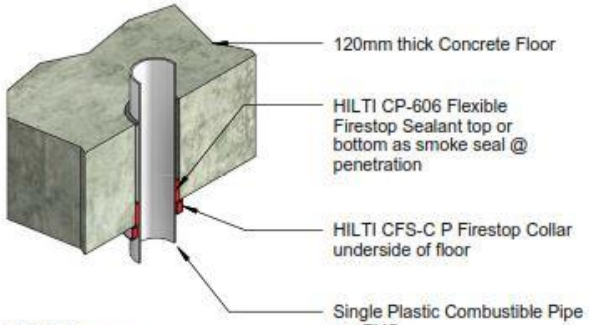
a. Mark the fastening points.
b. Drill holes with a Hilti rotary hammer drill (i.e. TE 4-A22) or, depending on base material, fasten using Hilti powder-actuated tool.
c. To secure the CP-643 N Firestop Collar, use Hilti anchors/fasteners.
d. For maintenance reasons, a penetration can be permanently marked with an identification plate and fastened in a visible position next to the seal.

NOT FOR USE WITH

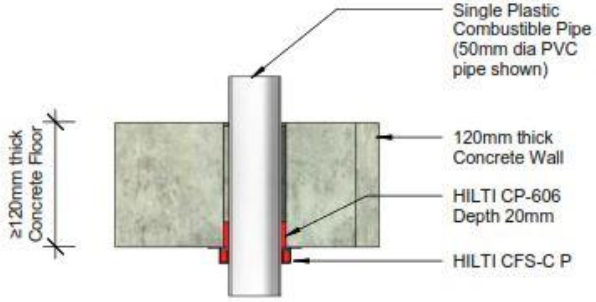
- Metal Pipes
- In highly corrosive surroundings
- With unapproved anchors / fasteners

A.8 CH3 – HILTI CFS-C P

≥120mm concrete floor – single plastic (combustible) pipe. 40-125 PVC, 40-125 PE, 40-110 PPR, 50-110 Raupiano (all mm dia)

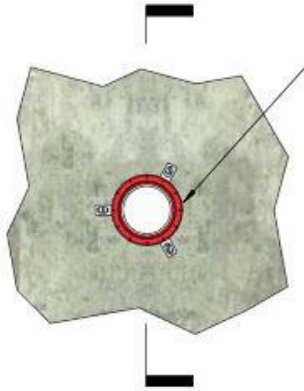


3D Cutaway
HILTI CFS-C P



SECTION

Hilti CFS-C P				
Fire Rating	Up to 4 hours			
Base Materials	Concrete, Drywall, Masonry			
Colour	Metallic Grey			
Temperature Resistance	-40°C to 60°C			
Expansion Ratio (unrestricted)	Up to 1:10			
Designation / size	**Pipe outside dia(mm)**	**Collar outside dia (mm)**	**Collar Length (mm)**	**No. of hooks & fasteners**
CFS-C P-50/1.5"	32-51mm	66.7mm	22.4mm	2
CFS-C P-63/2"	52-64mm	81.7mm	32.4mm	2
CFS-C P-90/3"	75-91mm	116.7mm	42.4mm	3
CFS-C P-110/4"	92-115mm	145.7mm	47.8mm	3
CFS-C P-125/5"	116-125mm	166.1mm	47.8mm	4
CFS-C P-160/6"	126-170mm	235.5mm	46.2mm	6
CFS-C P-160/7"	160mm	226mm	152.5mm	6
CFS-C P-200/8"	200mm	257mm	177.5mm	8
CFS-C P-225/9"	225mm	269mm	202.5mm	10
CFS-C P-250/10"	250mm	319mm	232.5mm	12



PLAN FROM BELOW

Example - Typical CH3 Solution

60mm dia hole through 120mm thick concrete floor
50mm dia PVC pipe penetrating service
HILTI CP-606 Flexible Firestop Sealant top or bottom as smoke seal
HILTI CFS-C P Firestop Collar underside of penetration
Annular GAP 5mm

NOTE:

Suitable for: PE, uPVC, PP, HDPE, CPVC, RAUPIANO PLUS

PLASTIC SLEEVE NAIL - ANCHORS ARE NOT TO BE USED

Collar to be attached using M6.5 x 25 metal pin anchors

Hilti DBZ 6/4.5 Item No. 256312
Hilti HUS3-P 6x40 Item No. 416745

Installation instructions for CFS-C P

Notice: Before handling, read Material Safety Data Sheet and product label for safe usage and health information.

OPENING

1. Clean the plastic pipes. Expansion of the intumescent material during a fire acts to close the plastic pipe. Very dirty pipes, (ie: with remains of mortar) may lead to a delay in this closing action. Soiled plastic pipes should, therefore, be cleaned in the area where the CP-644 Firestop Collar is to be installed.

APPLICATION OF FIRESTOP SYSTEM

2. Seal the opening. Gaps must be closed with CP-606. The approved methods vary.
3. Close the CFS-C P Firestop Collar. Place the CFS-C P Firestop Collar around the plastic pipe and lock the closure by applying firm pressure until it latches.
4. Attach fastening hooks. The fastening hooks can be attached to various points on the metal housing. This allows the fastening points to be made to suit the space available in each case. The hooks must be positioned as symmetrically as possible. The required number of fastening hooks is indicated on the packaging.
5. Fastening the CFS-C P Firestop Collar. Only when fastened properly can CFS-C P offer protection against fire passing through.

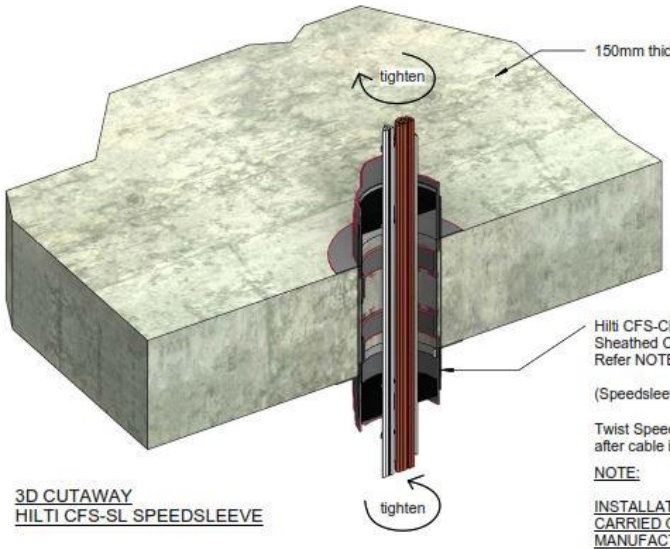
a. Mark the fastening points.
b. Drill holes with a Hilti rotary hammer drill (i.e. TE 4-A22) or, depending on base material, fasten using Hilti powder-actuated tool.
c. To secure the CFS-C P Firestop Collar, use Hilti anchors/fasteners.
d. For maintenance reasons, a penetration can be permanently marked with an identification plate and fastened in a visible position next to the seal.

NOT FOR USE WITH

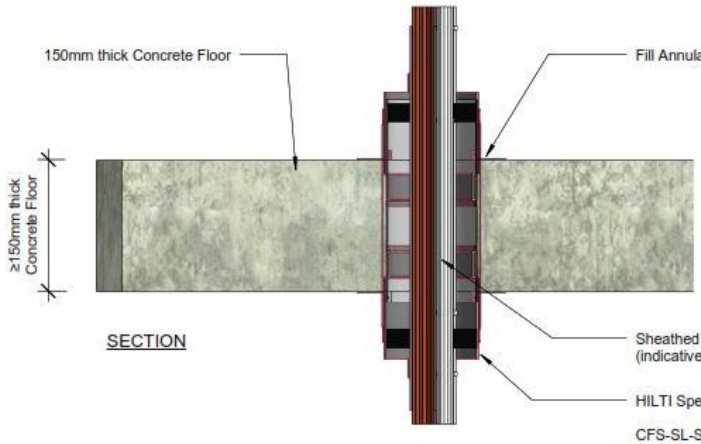
- Metal Pipes
- In highly corrosive surroundings
- With unapproved anchors/fasteners

A.9 CH5 – HILTI CFS-SL

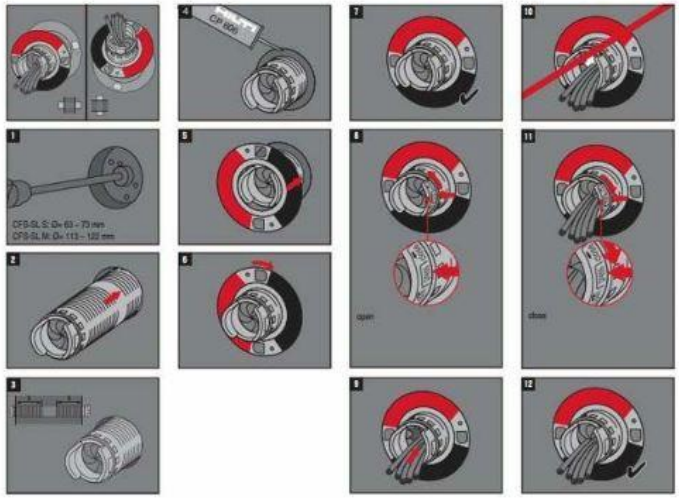
≥150mm thick concrete floor. Single to small bundled cables



3D CUTAWAY
HILTI CFS-SL SPEEDSLEEVE



SECTION



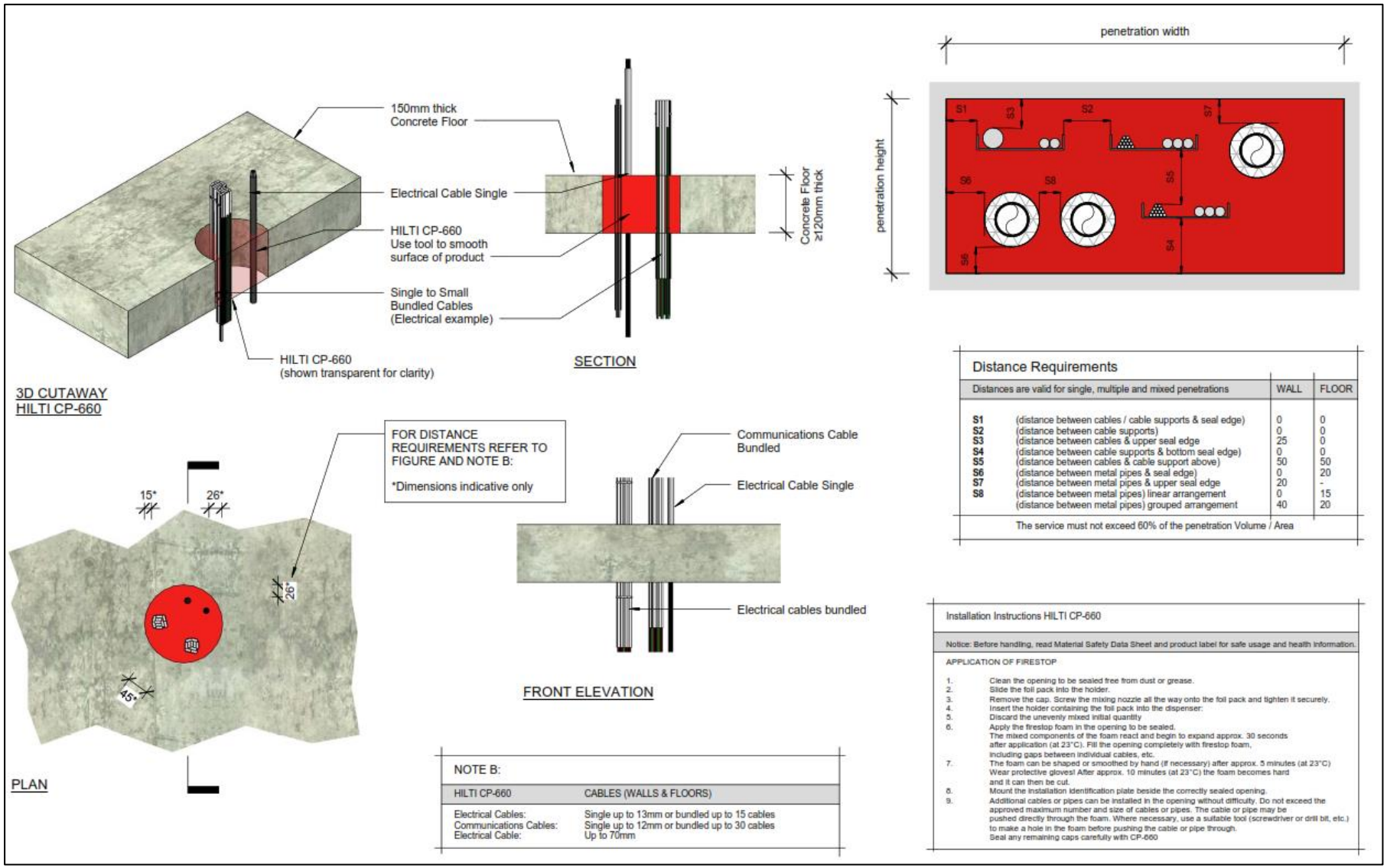
SPEEDSLEEVE INSTALLATION INSTRUCTIONS

SPEEDSLEEVE USAGE INFORMATION				
Penetration Seal (A) / services (C)	Wall Thickness (tE)	FRR	Devices	Other Criteria Description
All sheathed cable types ≤21mm dia	≥ 100mm - 200mm	-/120/120 -/120/120	CP-653 2" CP-653 4"	The gap around the sleeve to be sealed with HILTI Firestop Acrylic Sealant CP-606 on both sides of floor (A²)
	≥ 200mm - ≤300mm	-/120/120	CFS-SL L	
All sheathed cable types ≤50mm dia	≥ 100mm - ≤200mm ≥ 200mm - ≤300mm	-/120/120 -/120/120	CP-653 4" CFS-SL L	
All sheathed cable types ≤80mm dia	≥ 100mm - ≤200mm ≥ 200mm - ≤300mm	-/120/60 -/120/60	CP-653 4" CFS-SL L	
Tied cable bundle, maximum dia 36mm maximum dia of single cables 21mm	≥ 100mm - ≤200mm	-/120/120	CP-653 2"	
	≥ 100mm - ≤200mm	-/120/120	CP-653 4"	
Tied cable bundle, maximum dia 86mm maximum dia of single cables 21mm	≥ 100mm - ≤200mm	-/120/120	CP-653 4"	
	≥ 200mm - ≤300mm	-/120/120	CFS-SL L	
Blank Seal (no services penetrating)	≥ 100mm - ≤200mm	-/120/120 -/120/120	CP-653 2" CP-653 4"	
	≥ 200mm - ≤300mm	-/120/120	CFS-SL L	

NOTE D:	
HILTI CFS-SL Speedsleeve	CABLES (WALLS & FLOORS)
All Sheathed Cables Type 1:	≤80mm dia
Tied Cable Bundle:	36mm dia max - 21mm dia max single cable
Tied Cable Bundle:	86mm dia max - 21mm dia max single cable

A.10 CH6 – HILTI CP-660

≥120mm thick concrete floor. Single to small bundled cables (existing install)



Distance Requirements

Distances are valid for single, multiple and mixed penetrations		WALL	FLOOR
S1	(distance between cables / cable supports & seal edge)	0	0
S2	(distance between cable supports)	0	0
S3	(distance between cables & upper seal edge	25	0
S4	(distance between cable supports & bottom seal edge)	0	0
S5	(distance between cables & cable support above)	50	50
S6	(distance between metal pipes & seal edge)	0	20
S7	(distance between metal pipes & upper seal edge	20	-
S8	(distance between metal pipes) linear arrangement	0	15
	(distance between metal pipes) grouped arrangement	40	20
The service must not exceed 60% of the penetration Volume / Area			

NOTE B:

HILTI CP-660	CABLES (WALLS & FLOORS)
Electrical Cables:	Single up to 13mm or bundled up to 15 cables
Communications Cables:	Single up to 12mm or bundled up to 30 cables
Electrical Cable:	Up to 70mm

Installation Instructions HILTI CP-660

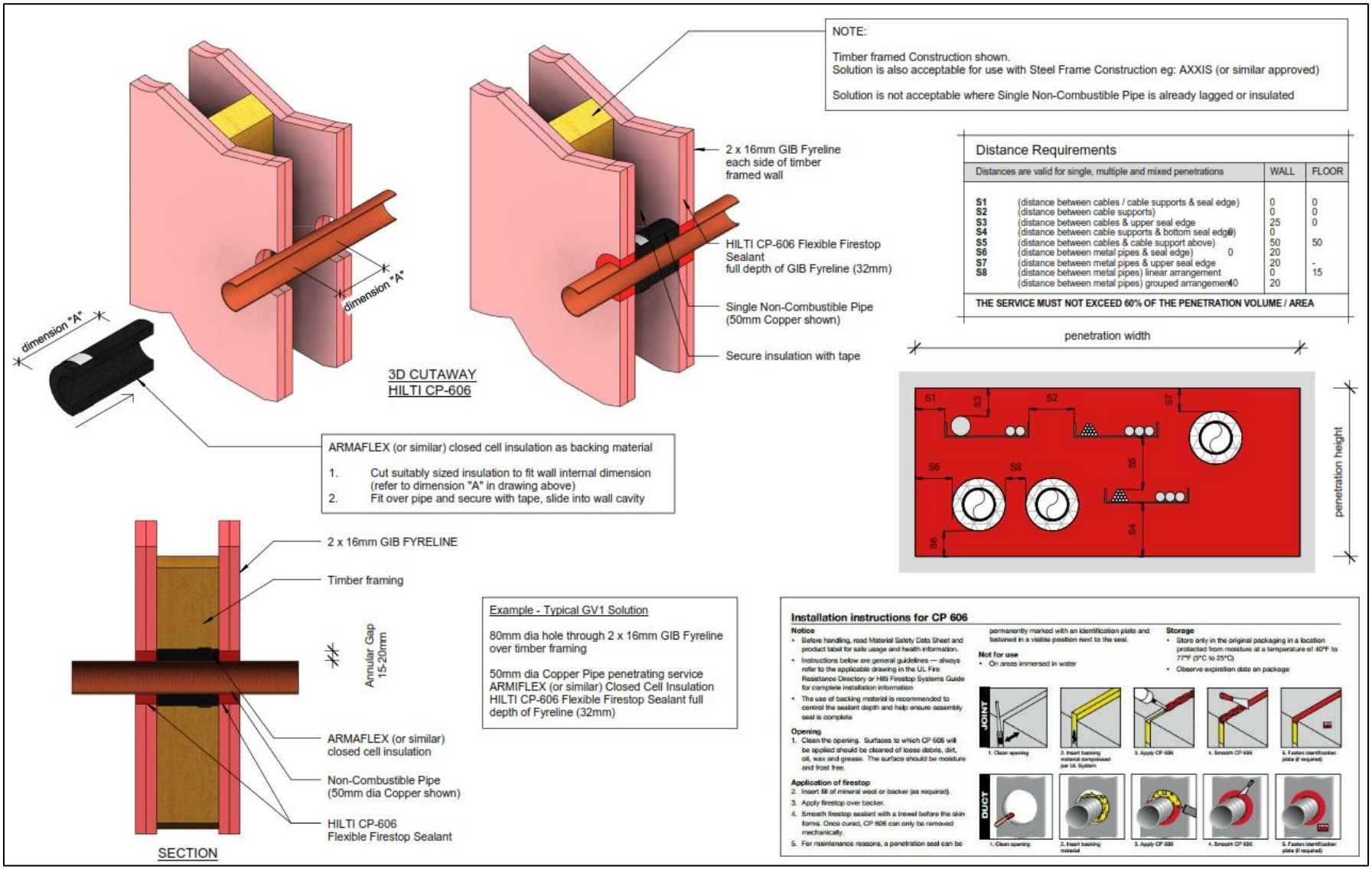
Notice: Before handling, read Material Safety Data Sheet and product label for safe usage and health information.

APPLICATION OF FIRESTOP

1. Clean the opening to be sealed free from dust or grease.
2. Slide the foil pack into the holder.
3. Remove the cap. Screw the mixing nozzle all the way onto the foil pack and tighten it securely.
4. Insert the holder containing the foil pack into the dispenser.
5. Discard the unevenly mixed initial quantity
6. Apply the firestop foam in the opening to be sealed.
   The mixed components of the foam react and begin to expand approx. 30 seconds after application (at 23°C). Fill the opening completely with firestop foam, including gaps between individual cables, etc.
7. The foam can be shaped or smoothed by hand (if necessary) after approx. 5 minutes (at 23°C)
   Wear protective gloves! After approx. 10 minutes (at 23°C) the foam becomes hard and it can then be cut.
8. Mount the installation identification plate beside the correctly sealed opening.
9. Additional cables or pipes can be installed in the opening without difficulty. Do not exceed the approved maximum number and size of cables or pipes. The cable or pipe may be pushed directly through the foam. Where necessary, use a suitable tool (screwdriver or drill bit, etc.) to make a hole in the foam before pushing the cable or pipe through.
   Seal any remaining caps carefully with CP-660

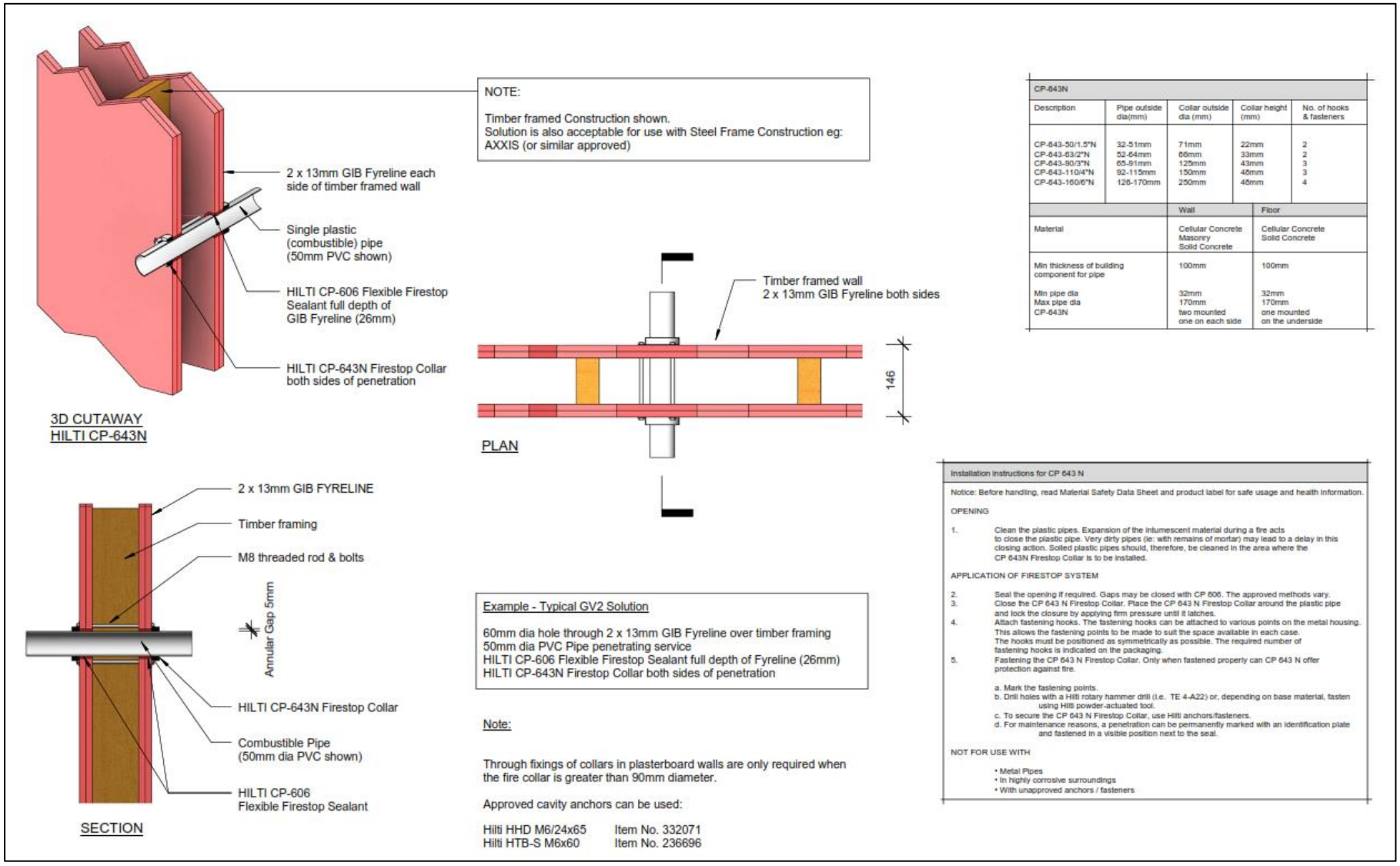
A.11 GV1 – HILTI CP-606

≥2 x 16mm GIB Fyreline – single non-combustible pipe. ≤150 copper, ≤100 brass (all dia mm & ≥1.5mm pipe wall thickness)



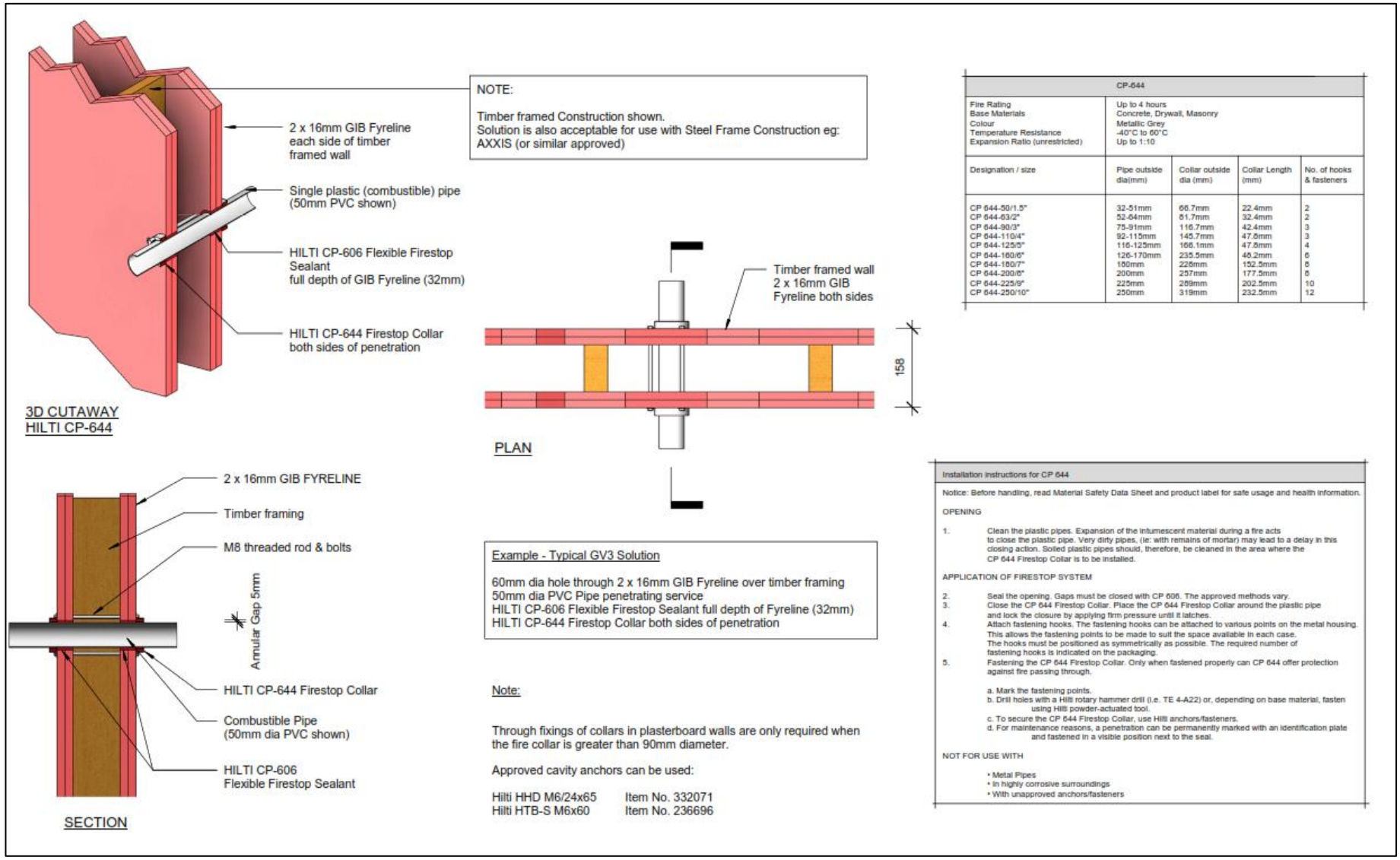
A.12 GV2 – HILTI CP-643N

≥2 x 13mm GIB Fyreline – single plastic combustible pipe. 50-60 HDPE, 32-150 PVC (all mm dia)



A.13 GV3 – HILTI CP-644

≥2 x 16mm GIB fyreline – single plastic combustible pipe. 40-200PE, 40-150PVC, 40-125PPR, 40-125 Raupiano (all mm dia)



CP-644				
Fire Rating	Up to 4 hours			
Base Materials	Concrete, Drywall, Masonry			
Colour	Metallic Grey			
Temperature Resistance	-40°C to 60°C			
Expansion Ratio (unrestricted)	Up to 1:10			
Designation / size	Pipe outside dia(mm)	Collar outside dia (mm)	Collar Length (mm)	No. of hooks & fasteners
CP 644-50/1.5"	32-51mm	66.7mm	22.4mm	2
CP 644-63/2"	52-64mm	81.7mm	32.4mm	2
CP 644-90/3"	75-91mm	116.7mm	42.4mm	3
CP 644-110/4"	92-115mm	145.7mm	47.6mm	3
CP 644-125/5"	116-125mm	166.1mm	47.6mm	4
CP 644-160/6"	126-170mm	235.5mm	48.2mm	6
CP 644-160/7"	160mm	226mm	152.5mm	6
CP 644-200/8"	200mm	257mm	177.5mm	6
CP 644-225/9"	225mm	289mm	202.5mm	10
CP 644-250/10"	250mm	319mm	232.5mm	12

Installation instructions for CP 644

Notice: Before handling, read Material Safety Data Sheet and product label for safe usage and health information.

OPENING

1. Clean the plastic pipes. Expansion of the intumescent material during a fire acts to close the plastic pipe. Very dirty pipes, (ie: with remains of mortar) may lead to a delay in this closing action. Soiled plastic pipes should, therefore, be cleaned in the area where the CP 644 Firestop Collar is to be installed.

APPLICATION OF FIRESTOP SYSTEM

2. Seal the opening. Gaps must be closed with CP 606. The approved methods vary.
3. Close the CP 644 Firestop Collar. Place the CP 644 Firestop Collar around the plastic pipe and lock the closure by applying firm pressure until it latches.
4. Attach fastening hooks. The fastening hooks can be attached to various points on the metal housing. This allows the fastening points to be made to suit the space available in each case. The hooks must be positioned as symmetrically as possible. The required number of fastening hooks is indicated on the packaging.
5. Fastening the CP 644 Firestop Collar. Only when fastened properly can CP 644 offer protection against fire passing through.

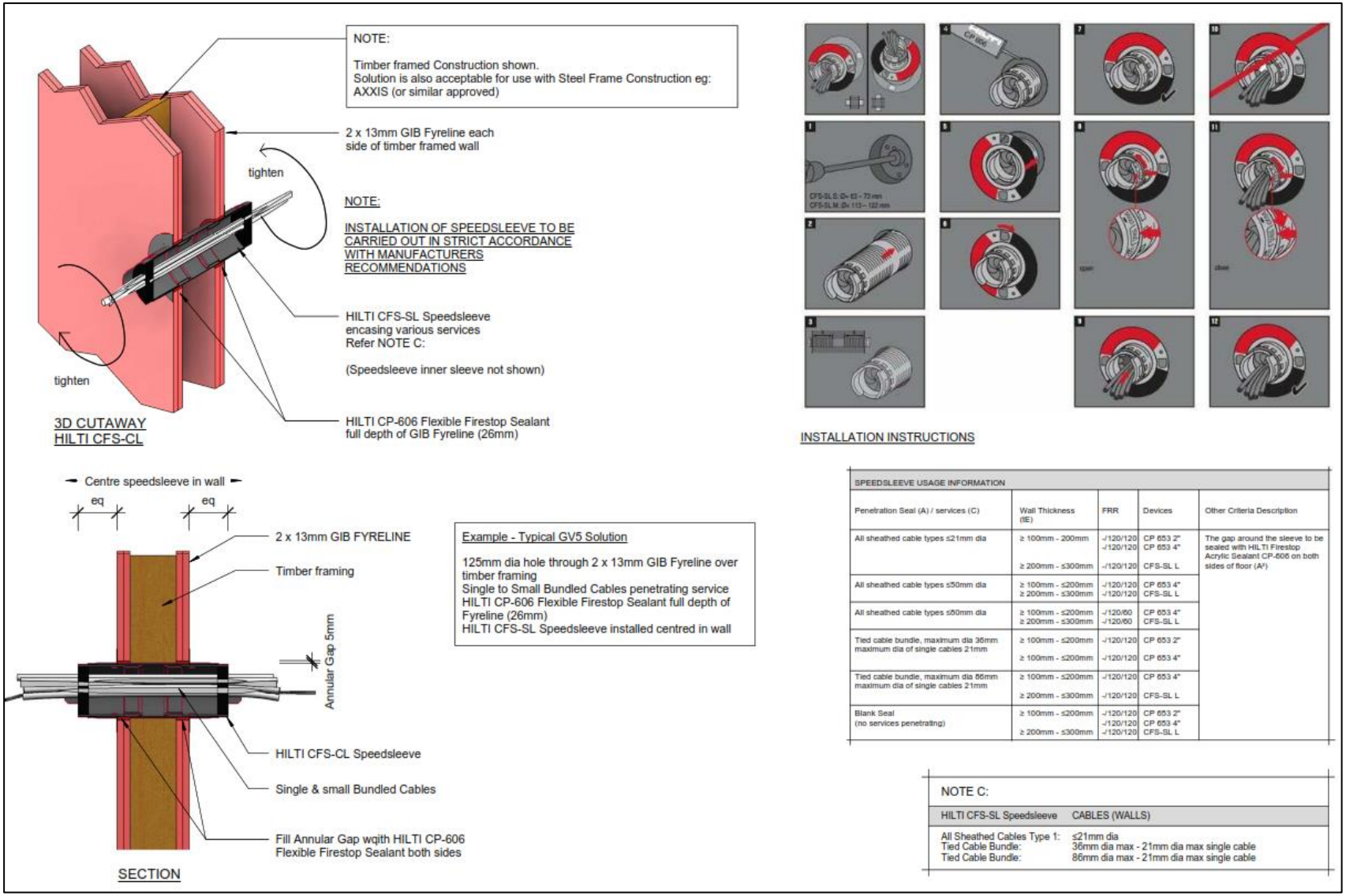
a. Mark the fastening points.
b. Drill holes with a Hilti rotary hammer drill (i.e. TE 4-A22) or, depending on base material, fasten using Hilti powder-actuated tool.
c. To secure the CP 644 Firestop Collar, use Hilti anchors/fasteners.
d. For maintenance reasons, a penetration can be permanently marked with an identification plate and fastened in a visible position next to the seal.

NOT FOR USE WITH

- Metal Pipes
- In highly corrosive surroundings
- With unapproved anchors/fasteners

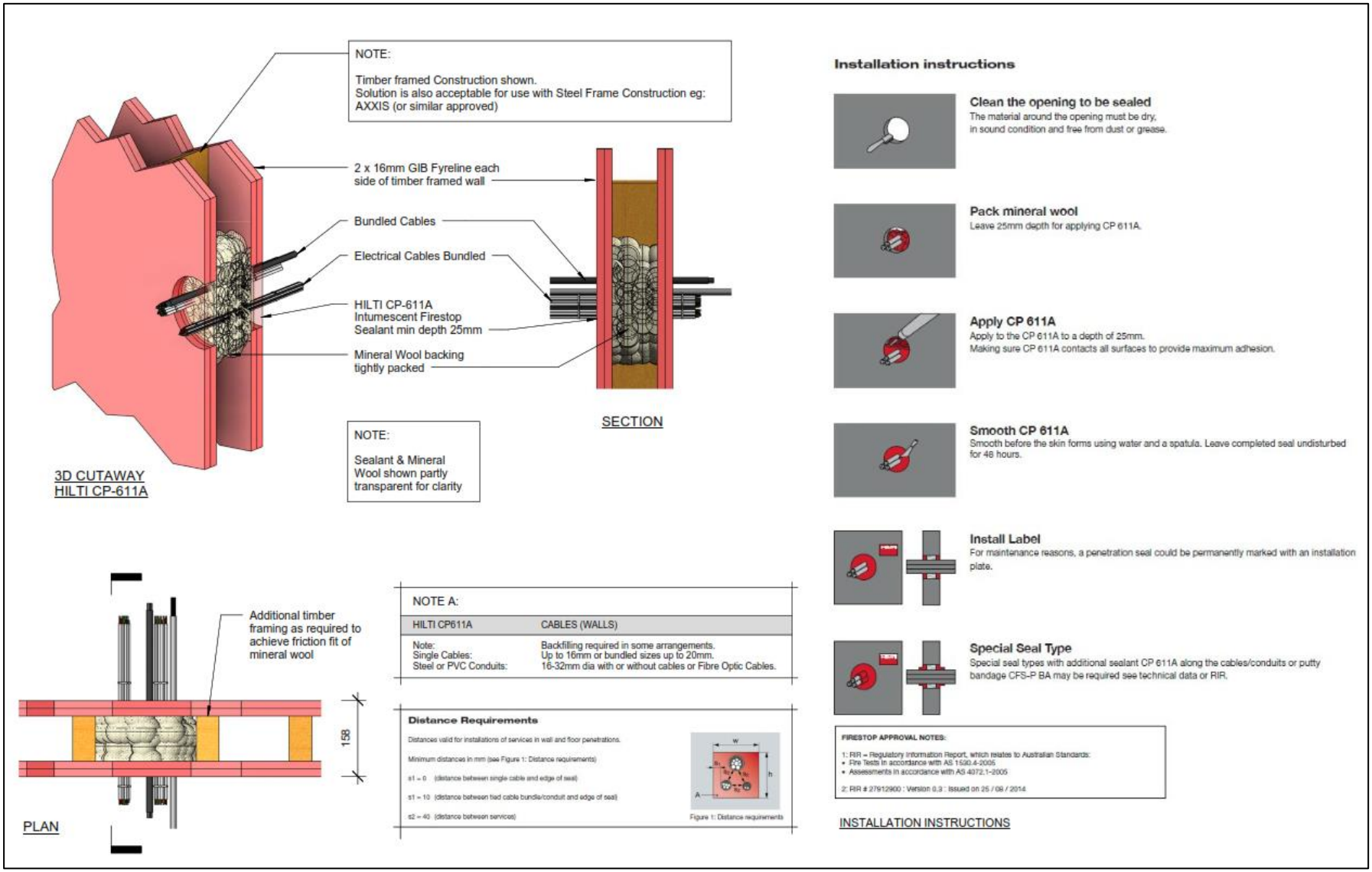
A.14 GV5 – HILTI CFS-CL

≥2 x 13mm GIB Fryeline. Single to small bundled cables



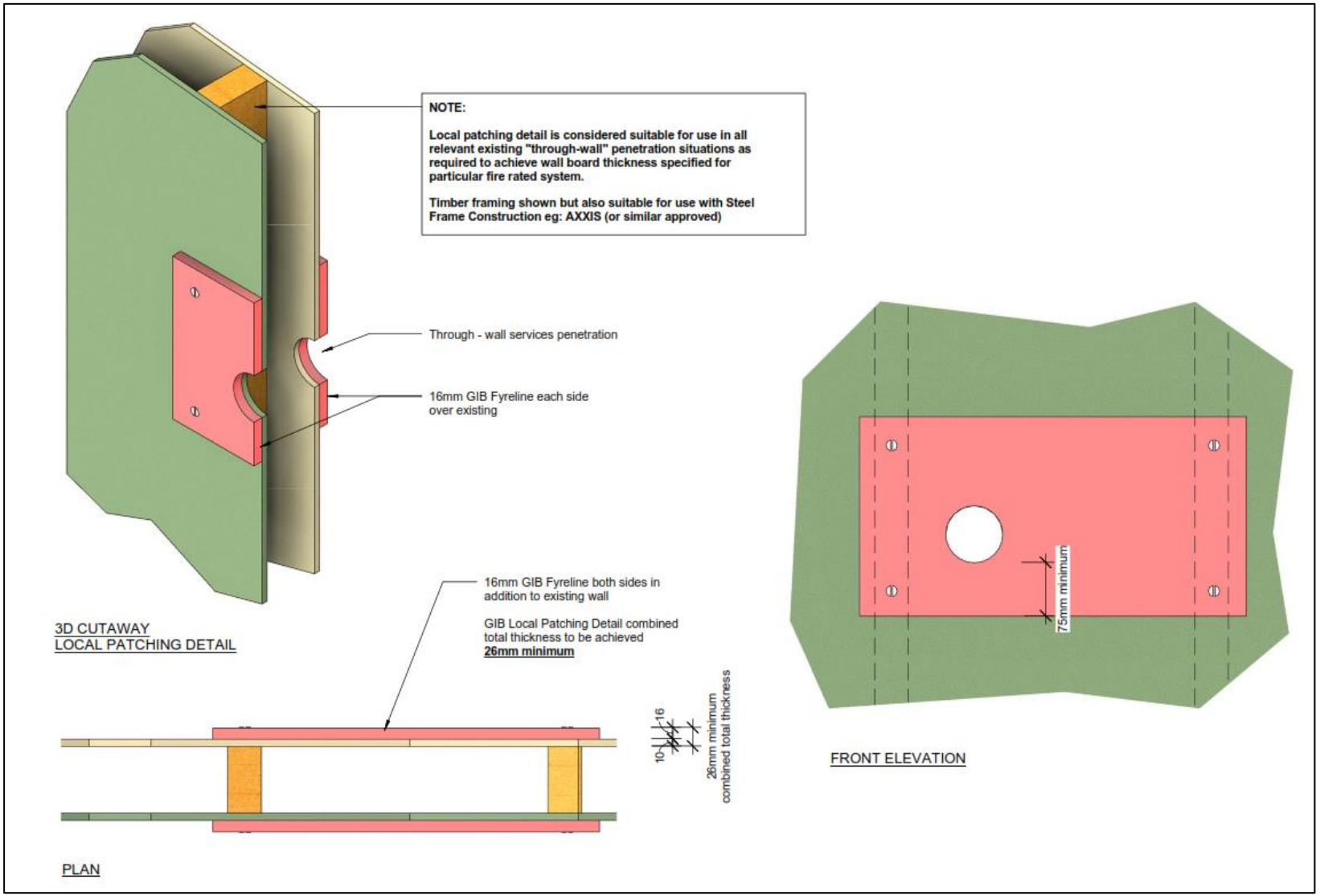
A.15 GV6 – HILTI CP-611A

≥2 x 16mm GIB Fyreline. Single to small bundled cables (existing install)



A.16 GV-LPD

Local patching detail – GIB Fyreline & HILTI CP – CP606



Appendix B Feedback Form

We love hearing from you. Please take a few moments to let us know how we can improve the *Property Services Design Standards and Guidelines*.

1.	**Name:**			
2.	Contact Details: (in case we need clarification)			
Complete this section if you have found a typo / formatting error. (If possible, attach a photo of the error)				
3.	Section No:		Page No/s:	
	Description of error:			
Complete this section if you have a suggestion about content.				
4.	Section No:		Page No/s: (if applicable)	
	Suggestion/s:			
Complete this section if you have any other suggestions for improvement.				
5.	Suggestion/s:			
6.	Email your feedback to PSTechServices@auckland.ac.nz			
Thanks for your feedback!				

Appendix C Index