# Trade Guide
# Plumbing & Hydraulic

## Introduction

The National Construction Code (NCC) prioritises fire safety for occupants. The code mandates not only alerting people to a fire but also incorporating built-in measures to combat it. Smoke detectors and smoke alarms address the warning aspect, while sprinkler systems and fire hoses actively extinguish flames. But how do buildings themselves fight fire? In essence, they're designed with fire resistance in mind.

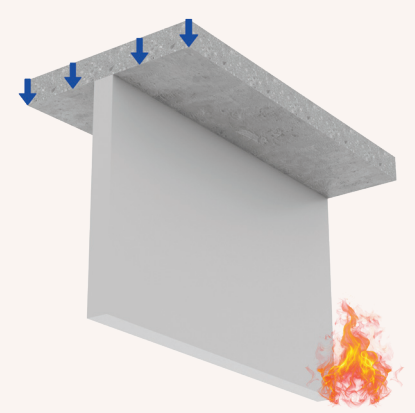
## Passive Fire Protection

Passive Fire Protection can be defined as features built into the structure to slow the spread of fire. It protects occupants by keeping the fire contained in its place of origin or delaying its progress to other parts by using a technique known as Compartmentation. The code legislates that buildings are subdivided into 'Fire Compartments' and dictates the FRL for each element within such compartments. This affects the choice of material used in fire resistant construction like concrete, clay bricks and plasterboard which are known to provide good 'Fire Resistance Level' (FRLs).

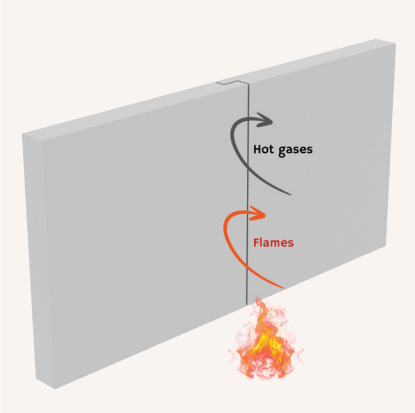
## What is an FRL?

FRL stands for 'Fire Resistance Level'. It is a grading period (of fire resistance) in minutes determined by the NCC for the following three criteria -

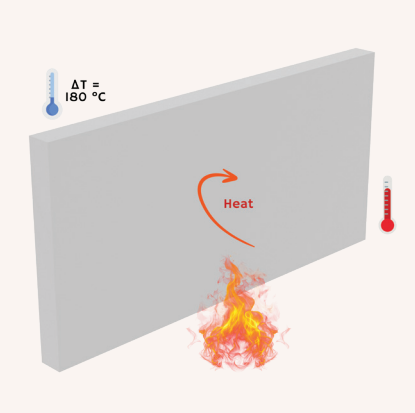
1. **Structural Adequacy:** The NCC defines structural adequacy as the ability of a building element to maintain stability and adequate loadbearing capacity as determined by AS1530.4
2. **Integrity:** The NCC definition of integrity is the ability of a building element to resist the passage of flames and hot gases specified in AS1530.4
3. **Insulation:** The code states that insulation of a building element is its ability to maintain a temperature on the surface not exposed to the furnace below the limits specified in AS1530.4



Structural Adequacy




Integrity




Insulation

## Understanding FRL ratings

To illustrate the three components of an FRL, let's consider a concrete wall with an FRL rating of 120/120/120. Here's how the FRL rating is applicable to the concrete wall:

1. **Holding up (Structural Adequacy - 120 minutes):** The wall must remain strong and stable for 120 minutes during a fire. This means it can support its own weight and any additional weight it carries (beams, floors) without collapsing or bending significantly.
2. **Keeping flames out (Integrity - 120 minutes):** The wall needs to prevent flames and hot gases from passing through for 120 minutes. In simpler terms, it shouldn't develop cracks or holes that would allow fire to spread.
3. **Blocking heat (Insulation - 120 minutes):** The wall should act as a barrier, slowing down heat transfer from the fire side to the other side. This ensures the non-fire side stays cool enough for a safe evacuation.

An FRL rating with a dash in the first position, eg. -/120/120, tells a different story. Here the focus is on fire resistance, not structural support. Take a plasterboard wall, for instance. With a -120/120 rating, it doesn't need to have structural adequacy during a fire. However, it still needs to perform well in the other two aspects, 'Integrity' and 'Insulation'. Such elements are known as non-loadbearing elements.

## Service Penetrations

In theory, building elements with the right FRL rating should hold up well in a fire. But what about building services like pipes and cables that cut through firewalls? These pentrations weaken the firewall's FRL because they create openings for flames and hot gases to pass through. To address this issue, fire stopping systems are used to seal these gaps and restore the firewall's integrity. They use materials that transform on exposure to heat and fire and create seals that block the flames and hot gases. These systems are crucial for maintaining fire compartmentation, preventing flames from spreading to other parts of the building. The NCC requires that such fire stopping systems establish that they can restore the FRL of the building element they are breaching. This is done using AS1530.4 and AS4072.1.

## The importance of Australian Standards AS 1530.4 & AS 4072.1

**AS1530.4 (2014):** Method of fire test on building materials, components and structures. Part 4: Fire-resistance tests for elements of construction

**AS4072.1 (2005):** Components for the protection of openings in fire-resistant separating elements. Part 1: Service penetrations and control joints

AS1530.4 establishes the procedures for conducting fire resistance tests on building elements and AS4072.1 establishes the procedures for interpreting and documenting those results. Consequently, when determining the FRLs of building elements and service penetrations, these two standards go hand in hand.

## Every system is unique

Fire stopping isn't a one-size-fits-all solution. The best material depends on the type of service passing through the firewall. For example:

- **Plastic Pipes:** These melt in a fire, creating gaps in the firewall. Fire stopping for plastic pipes needs to be expandable to fill these gaps and act as a heat barrier, preventing flames from spreading.
- **Steel Pipes:** While steel won't melt easily, it can get very hot during a fire. This heat can transfer through the firewall and ignite combustible materials on the other side. For steel pipes, fire stopping focuses on two things -

  a) **Plugging the gap:** Sealing the small space between the pipe and the firewall with a material that resists high temperatures

  b) **Heat Containment:** Creating a barrier around the pipe to prevent heat transfer to nearby objects and stop the fire from spreading through the compartment

Understanding how different materials react to fire is crucial for choosing the right fire stopping solution. A single approach won't work for all situations.

## What does FIREFLY offer the Plumbing and Hydraulic industry?

We are aware that some pipes are better suited for certain applications. The selection of pipes is influenced by various criteria, including but not limited to, temperature, pressure, corrosion resistance, cost, durability and ease of installation. To accommodate a wide range of applications, we have undergone thorough testing and assessment of of pipes made from various materials, some of which include:

- UPVC
- CPVC
- Copper
- Ferrous
- PVC Class - 12 (Pressure Pipe)
- PEXa & PEXb
- Steel
- PP acoustic
- HDPE
- PEX - AL
- Brass

With our extensive testing and experience, FIREFLY can ensure you have the right fire stopping system in place to protect your building from fire, regardless of the type of pipe you use.

FIREFLY have developed firestopping systems in accordance with AS1530.4 (2014) and AS4072.1 (2005) that can be used to fire stop Plumbing service penetrations in firewalls.

Note: If you require solutions for lagged pipes, refer to the HVAC&R trade guide available on our website.

## The tried and trusted FIREFLY fire stopping range includes

FIREFLYMastic
A water based acrylic fire rated sealant generally used around non-combustible services to maintain integrity.


FIREFLYMasticHP
A high pressure exerting intumescent sealant, used to close off service penetration gaps and holes.


FIREFLYStrap
A high pressure intumescent wrap used to wrap around thermally lagged metal and small plastic pipes.

FIREFLYBatt
A high density mineral fibre batt, factory coated on both sides to a precise thickness with a durable fire resistant mastic.

FIREFLY Penowrap
A highly insulative blanket wrap for metal pipes and to maintain fire resistance in building elements that have been penetrated by a structural or service penetration.


FRF Fire Collars
Retrofit fire collars made from steel lined with high pressure intumescent strips. Used as multi-service collars to fire stop a variety of services including plastic pipes.

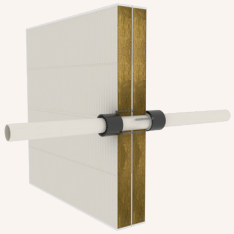
FIREFLYMasticBG
A brush grade mastic used for sealing around services in substrates and FIREFLYBatt, and also for laminating layers of FIREFLYBatt together.


FIREFLY Penowrap Gaskets
Mostly used around service penetrations in timber elements. They provide additional insulation to the timber substrate.

## Plumbing and Hydraulic services through FIREFLYBatt systems

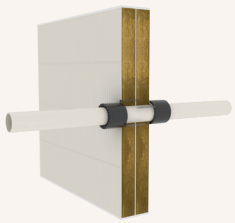
Where larger openings are available in a fire rated wall or floor, services can be treated using our FIREFLYBatt systems. The FIREFLYBatt acts as the main protection which restores the substrate, and the local protection provides fire treatment around the service.

Below are some examples of plastic and metal pipe systems featured in our FAS190235 report, which showcases systems installed in vertical and horizontal orientations within FIREFLYBatt.



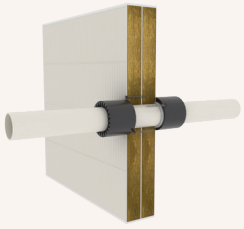
**V33** | -/120/120

FIREFLY FRF 40 collar on 40 mm PVC pipe



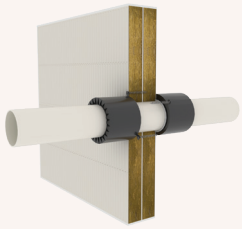
**V34** | -/120/120

FIREFLY FRF 50 collar on 50 mm PVC pipe



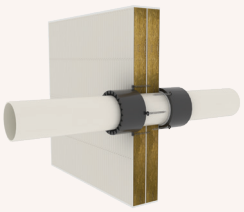
**V35** | -/120/120

FIREFLY FRF 65 collar on 65 mm PVC pipe



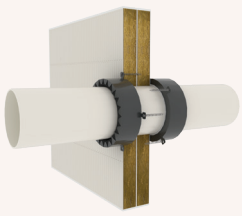
**V36** | -/120/120

FIREFLY FRF 80 collar on 85 mm PVC pipe



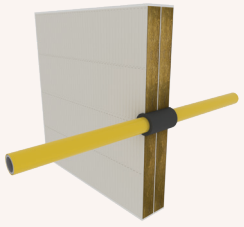
**V37** | -/120/120

FIREFLY FRF 100 collar on 100 mm PVC pipe



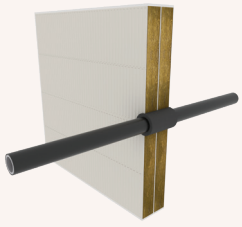
**V38** | -/120/120

FIREFLY FRF 150 collar on 150 mm PVC pipe



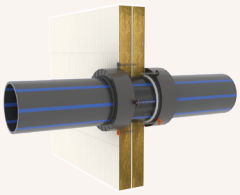
**V68** | -/120/120

FIREFLYMasticHP on PEX-AL pipe



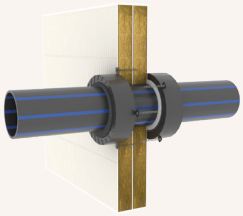
**V69** | -/120/120

FIREFLYMasticHP on PEX pipe



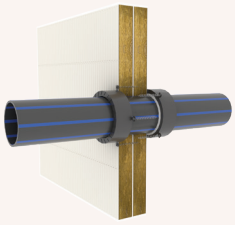
**V94** | -/120/120

FIREFLY FRF 150 collar on 160 mm HDPE pipe



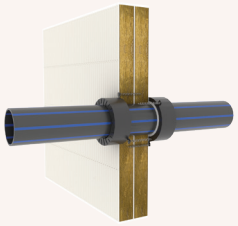
**V95** | -/120/120

FIREFLY FRF 150 collar on 125 mm HDPE pipe



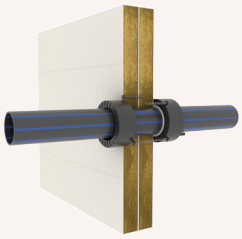
**V96** | -/120/120

FIREFLY FRF 100 collar on 110 mm HDPE pipe



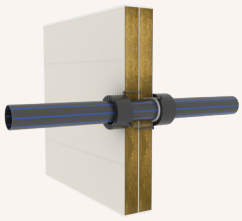
**V97** | -/120/120

FIREFLY FRF 80 collar on 90 mm HDPE pipe



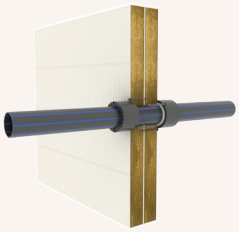
**V98** | -/120/120

FIREFLY FRF 80 collar on 75 mm HDPE pipe



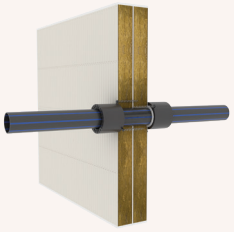
**V99** | -/120/120

FIREFLY FRF 65 collar on 63 mm HDPE pipe



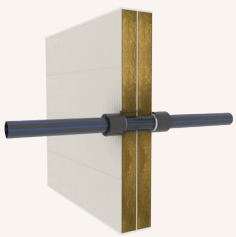
**V100** | -/120/120

FIREFLY FRF 50 collar on 56 mm HDPE pipe



**V101** | -/120/120

FIREFLY FRF 50 collar on 50 mm HDPE pipe



**V102** | -/120/120

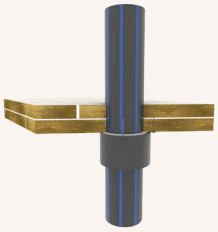
FIREFLY FRF 40 collar on 40 mm HDPE pipe

**H49** | -/120/120

FIREFLYMasticHP on PEX-AL pipe

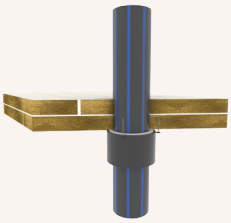
**H50** | -/120/120

FIREFLYMasticHP on PEX pipe



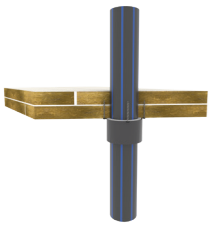
**H76** | -/120/120

FIREFLY FRF 150 collar on 160 mm HDPE pipe



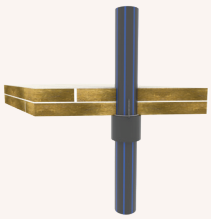
**H77** | -/120/120

FIREFLY FRF 150 collar on 125 mm HDPE pipe



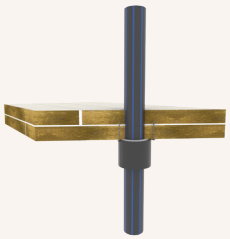
**H78** | -/120/120

FIREFLY FRF 100 collar on 110 mm HDPE pipe



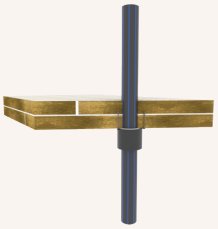
**H79** | -/120/120

FIREFLY FRF 80 collar on 90 mm HDPE pipe



**H80** | -/120/120

FIREFLY FRF 80 collar on 75 mm HDPE pipe



**H81** | -/120/120

FIREFLY FRF 65 collar on 63 mm HDPE pipe

**H82** | -/120/120

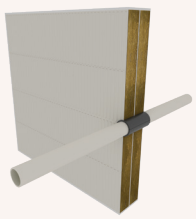
FIREFLY FRF 50 collar on 56 mm HDPE pipe

**H83** | -/120/120

FIREFLY FRF 50 collar on 50 mm HDPE pipe

**H84** | -/180/180

FIREFLY FRF 40 collar on 40 mm HDPE pipe

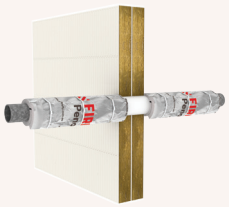


**V32** | -/240/120

40 mm OD uPVC pipe with 2 layers of FIREFLYStrap

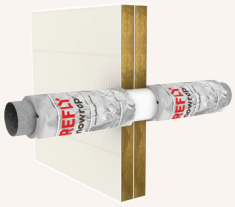
**V67** | -/120/120

Up to 125 mm OD steel pipe with FIREFLYMastic and 500 mm long Penowrap



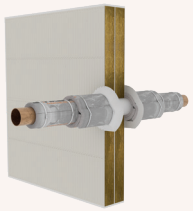
**V77** | -/90/90

Up to 48.6 mm OD steel pipe with FIREFLYMastic and 300 mm long Penowrap



**V78** | -/120/120

Up to 90 mm OD steel pipe with FIREFLYMastic and 300 mm long Penowrap

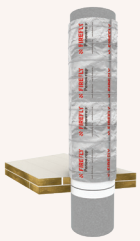


**V123B** | -/120/120

Up to 50.8 mm OD copper pipe with FIREFLYMastic and 300 mm long Penowrap

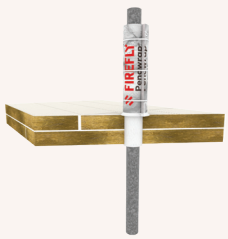
**H16B** | -/180/120

Up to 210 mm OD copper and ferrous pipes with FIREFLYMastic and 1200 mm long topside Penwrap



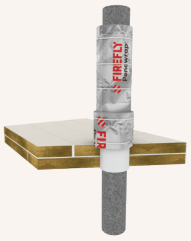
**H48** | -/120/120

Up to 300 mm OD steel pipe with FIREFLYMastic and 1000 mm long topside Penowrap



**H52** | -/90/90

Up to 48.6 OD steel pipe with FIREFLYMastic and 300 mm long Penowrap

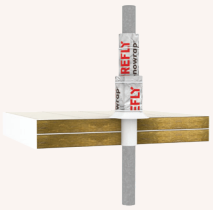


**H54** | -/90/90

Up to 115 mm OD steel pipe with FIREFLYMastic and 500 mm long Penowrap

**H123A** | -/180/180

Up to 50.8 OD copper pipe with FIREFLYMastic and 300 mm long double Penowrap



Up to 48 mm OD steel pipe with FIREFLYMastic and 300 mm long double Penowrap

**H124A** | -/180/180

Up to 100 mm OD steel pipe with FIREFLYMastic and 600 mm long double Penowrap

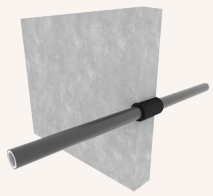
**H125** | -/180/180

## Plumbing and Hydraulic services through various substrates

Where plumbing and hydraulic services penetrate through nominal recommended openings in rigid and non-rigid substrates, they can be fire stopped using FIREFLY products tested and assessed to AS1530.4 and AS4072.1 in a variety of horizontal and verticle substrates. FIREFLY systems have been tested in various substrates including:

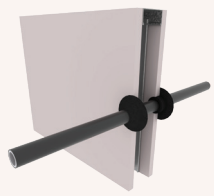
- Concrete
- Masonry
- AAC Panel
- FR Plasterboard
- CLT
- XLAM
- Pronto Panel
- Alpha Panel
- Mineral wool panel walls

Following are a few examples available in our FAS190236 core hole report:



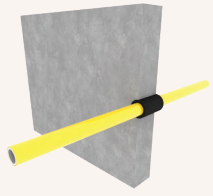
Up to 43 mm PEX pipe in masonry or concrete wall with FIREFLYMasticHP

**V19A** | -/120/120



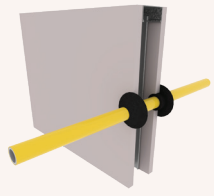
Up to 43 mm PEX pipe in FR Plasterboard with FIREFLYMasticHP

**V19B** | -/120/120



Up to 43 mm PEX-AL pipe in masonry or concrete wall with FIREFLYMasticHP

**V20A** | -/120/120



Up to 43 mm PEX-AL pipe in FR Plasterboard with FIREFLYMasticHP

**V20B** | -/120/120

**V52** | -/60/60

Up to 29.5 mm OD PEX-AL pipe with FIREFLYMasticHP in 1 hour Hebal panel wall

**V53** | -/60/60

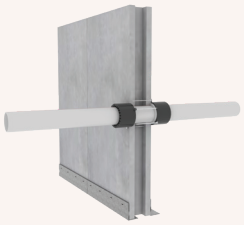
Up to 40 mm OD PEX pipe with FIREFLYMasticHP in 1 hour Hebel panel wall

**V58** | -/60/60

FIREFLY FRF 40 collar on 40 mm PVC pipe in 1 hour Hebel panel wall

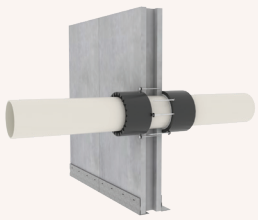
**V59** | -/60/60

FIREFLY FRF 50 collar on 50 mm PVC pipe in 1 hour Hebal panel wall



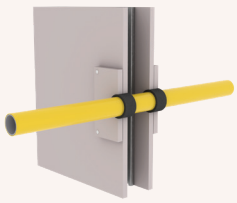
**V60** | -/60/60

FIREFLY FRF 65 collar on 65 mm PVC pipe in 1 hour Hebel panel wall



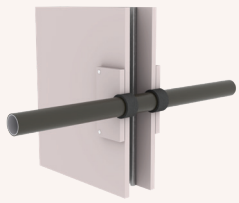
**V62** | -/60/60

FIREFLY FRF 100 collar on 100 mm PVC pipe in 1 hour Hebel panel wall



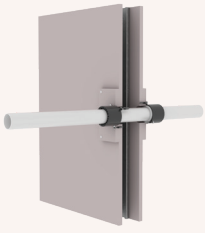
**V107** | -/60/60

Up to 40 mm OD PEX-AL pipe with FIREFLYMasticHP in 90 mm thick FR Plasterboard wall



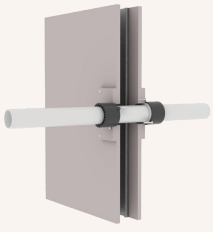
**V108** | -/60/60

Up to 40 mm OD PEX pipe with FIREFLYMasticHP in 90 mm thick FR Plasterboard wall



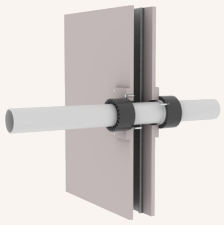
**V112** | -/60/60

FIREFLY FRF 40 collar on 40 mm PVC pipe in 90 mm thick FR Plasterboard wall



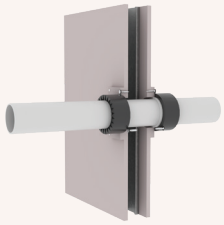
**V113** | -/60/60

FIREFLY FRF 50 collar on 50 mm PVC pipe in 90 mm thick FR Plasterboard wall



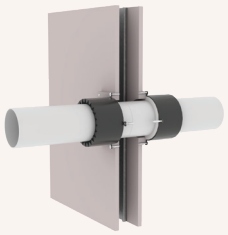
**V114** | -/60/60

FIREFLY FRF 65 collar on 65 mm PVC pipe in 90 mm thick FR Plasterboard wall



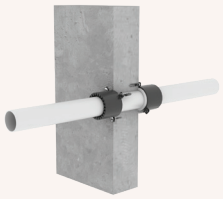
**V115** | -/60/60

FIREFLY FRF 80 collar on 80 mm PVC pioe in 90 mm thick FR Plasterboard wall



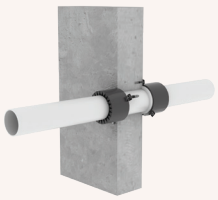
**V116** | -/60/60

FIREFLY FRF 100 collar on 100 mm PVC pipe in 90 mm thick FR Plasterboard wall



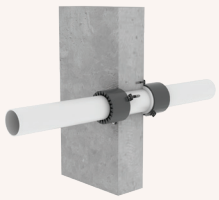
**V125** | -/120/120

FIREFLY FRF 40 collar on 40 mm PVC pipe in 75 mm thick masonry/AAC/concrete wall



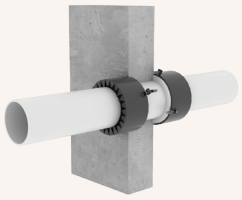
**V126** | -/120/120

FIREFLY FRF 50 collar on 50 mm PVC pipe in 75 mm thick masonry/AAC/concrete wall



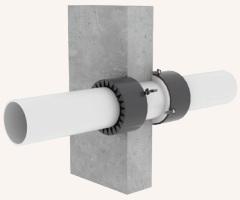
**V127** | -/120/120

FIREFLY FRF 65 collar on 65 mm PVC pipe in 75 mm thick masonry/AAC/concrete wall



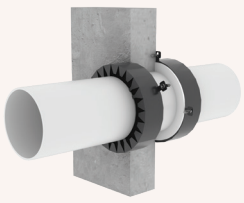
**V128** | -/120/120

FIREFLY FRF 80 collar on 80 mm PVC pipe in 75 mm thick masonry/AAC/concrete wall



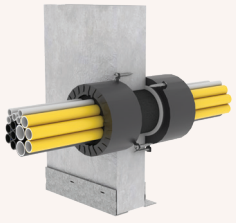
**V129** | -/120/120

FIREFLY FRF 100 collar on 100 mm PVC pipe in 75 mm thick masonry/AAC/concrete wall



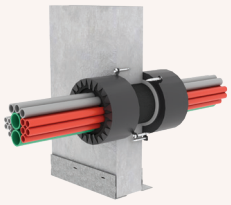
**V130** | -/60/60

FIREFLY FRF 150 collar on 150 mm PVC pipe in 75 mm thick masonry/AAC/concrete wall



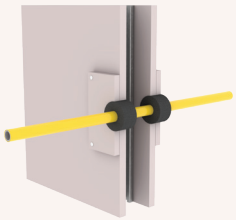
**V232** | -/120/120

FIREFLY FRF 100 collar on multiple PEX pipes in AAC Powerpanel wall



**V233** | -/120/120

FIREFLY FRF 100 collar on multiple PEX pipes in AAC Powerpanel wall



**V480** | -/90/90

Up to 20 mm OD PEX-AL pipe with FIREFLYMastic in 96 mm thick FR plasterboard wall

**H185** | -/180/180

Up to 43 mm OD PEX-AL pipe with FIREFLYMasticHP in concrete floor

**H234** | -/180/120

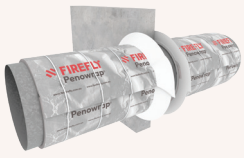
FIREFLYMasticHP and FIREFLY FRF 150 collar on 150 mm OD PVC pipe

**H192** | -/240/240

Up to 76 mm OD galvanised steel pipe with FIREFLYMastic and Penowrap collar in CLT floor

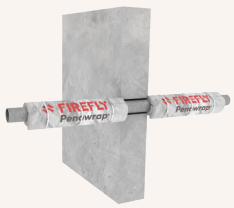
**H184** | -/180/180

Up to 43 mm OD HDPE pipe with FIREFLYMasticHP in concrete floor



**V14** | -/120/120

Up to 300 mm OD steel pipe with FIREFLYMastic and 500 mm long Penowrap in masonry/concrete wall



**V15** | -/120/120

Up to 40 mm OD steel pipe with FIREFLYMastic and 300 mm long Penowrap in masonry/concrete wall

**V132** | -/120/120

Up to 51 mm OD copper pipe with FIREFLYMastic and 300 mm long Penowrap in masonry/concrete wall

**V134A** | -/120/120

Up to 65 mm OD steel pipe with FIREFLYMastic and 300 mm long Penowrap in masonry/concrete wall

**V156** | -/180/180

Up to 48.6 mm OD steel pipe with FIREFLYMastic and 300 mm long Penowrap in masonry/concrete wall

**V173** | -/120/120

Up to 65 mm OD steel pipe with FIREFLYMastic and 300 mm long Penowrap in 116 mm thick FR Plasterboard wall

**V192** | -/60/60

Up to 50 mm OD steel pipe with FIREFLYMastic and 300 mm long Penowrap in 1 hour Hebal panel wall

**V226** | -/120/120

Up to 102 mm OD steel pipe with FIREFLYMastic and 300 mm long Penowrap in masonry/concrete wall

**V477** | -/90/90

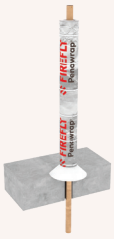
Up to DN 50 copper pipe with FIREFLYMastic and 300 mm long Penowrap in 96 mm thick FR Plasterboard wall

**V483** | -/90/90

Up to NB 50 steel pipe with FIREFLYMastic and 300 mm long Penowrap in 96 mm thick FR Plasterboard wall

**H7B** | -/90/90

Up to 300 mm OD steel pipe with FIREFLYMastic and 700 mm long topside Penowrap in concrete floor



**H67A** | -/120/120

Up to 25.4 mm OD copper pipe with FIREFLYMastic and 600 mm long topside Penowrap in concrete floor

**H109** | -/120/120

Up to 101 mm OD copper pipe with FIREFLYMastic and 450 mm long topside Penowrap in concrete floor

**H110** | -/120/120

Up to 102 mm OD steel pipe with FIREFLYMastic and 300 mm long topside Penowrap in concrete floor

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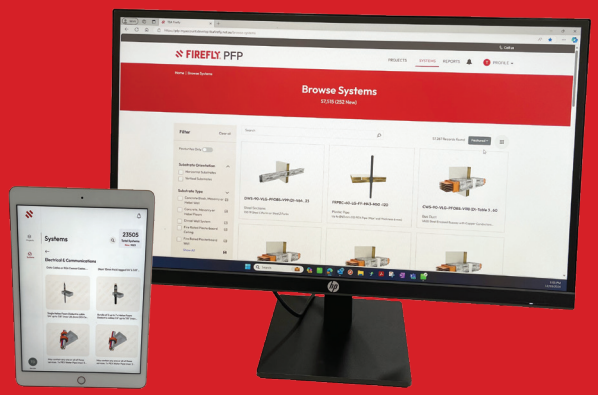


Have a question about FIREFLY PFP, contact us today.

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