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Trade Guide HVAC&R

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

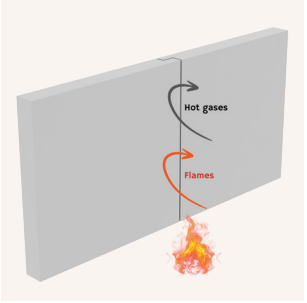
Passive Fire Protection can be defined as features built into the structure to slow the spread of fire. It protects occupants by keeping the fire contained in its place of origin or delaying its progress to other parts by using a technique known as Compartmentation. The code legislates that buildings 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?

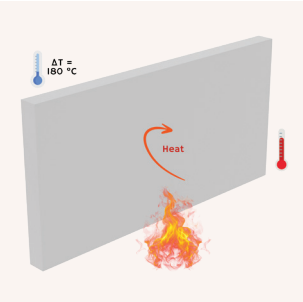
FRL stands for 'Fire Resistance Level'. It is a grading period (of fire resistance) in minutes determined by the NCC for the following three criteria -

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

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



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



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 penetrations 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 HVAC&R industry?

We understand that not all pipes are created equal, and neither are their fire stopping needs. That is why we have rigorously tested and assessed hundreds of fire stopping systems specifically designed for pipes with different types of lagging and insulation, including

- Rock wool
- Glass wool
- Stone wool
- Nitrile rubber
- PIR foam insulation
- Polyolefin insulation
- Polyethylene (XLPE or CLPE)

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 lagged 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 HVAC&R service penetrations in firewalls such as pair coils, lagged pipes, insulated pipes, bare pipes and ducts.

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.

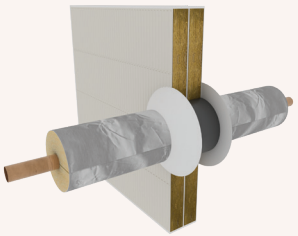
FRF Fire Collars
Retrofit fire collars made from steel lined with high pressure intumescent strips. Used as multi-service collars to fire stop a variety of services including plastic pipes.

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

Lorient Intumescent Fire Dampers
Constructed with a robust galvanised steel framework and reinforced slats containing intumescent material.

HVAC&R services through FIREFLYBatt systems

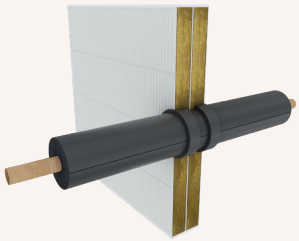
Where larger openings are available in a firewall, services can be fire stopped using our FIREFLYBatt systems. Below are some examples of systems from our FAS190235 report of systems installed in FIREFLYBatt in vertical and horizontal orientations.



V28A | -/120/120

Copper or steel pipe, 8 mm up to 32 mm OD lagged in PIR foam insulation (WT 19 mm to 50 mm)

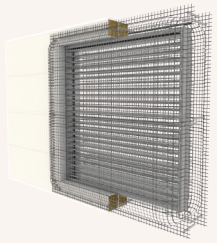
Products
FIREFLYMastic
FIREFLYStrap



V28B | -/120/120

Copper or steel pipe, 8 mm up to 32 mm OD lagged in Nitrile rubber insulation (WT 19 mm up to 38 mm)

Products
FIREFLYStrap



V46A | -/120/120

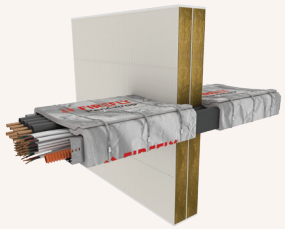
Lorient LVH44 or Kilargo IFD44 intumescent fire damper with mesh guard. Sizes 200 mm x 200 mm up to 450 mm x 450 mm.

Products
FIREFLYMastic

V47 | -/120/-

Bullock 4900 series dampers Maximum size 2400 mm x 2400 mm

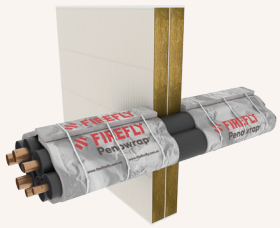
Products
FIREFLYMastic



V61 | -/120/120

Up to nine Copper pipes, 13 mm OD lagged in Nitrile rubber insulation (WT 9 mm) plus 20 TPS cables and 16 mm drain hose with or without cable tray

Products
FIREFLYPenowrap
FIREFLYMasticHP



V80 | -/120/120

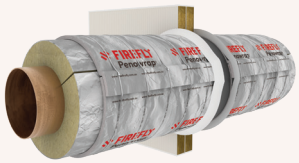
Up to six Nitrile lagged copper pipes: two 29 mm OD, one 22 mm OD, one 19 mm OD, one 16 mm OD, all with 19 mm insulation and one 29 mm OD with 25 mm insulation.

Products
FIREFLYPenowrap
FIREFLYMasticHP

V119 | -/180/180

150 mm OD Lorient or Kilargo damper LVH44C with DuraVent flexible ducting

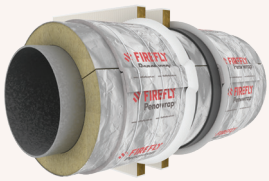
Products
FIREFLYPenowrap
FIREFLYMastic



V120 | -/180/180

Copper pipe, up to 200 mm with continuous 75 mm thick stone wool foil faced lagging

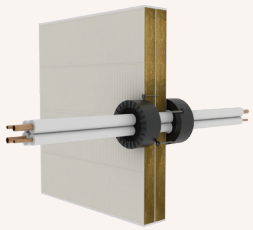
Products
FIREFLYPenowrap
FIREFLYStrap
FIREFLYMastic



V121A | -/240/240

Steel pipe, up to 350 mm with continuous 75 mm thick rock wool lagging

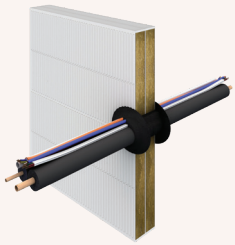
Products
FIREFLY Penowrap
FIREFLYStrap
FIREFLYMasticHP
FIREFLYMasticBG



V128A | -/120/120

Two Copper pair coil 3/8" and 5/8"; maximum 10 mm insulation

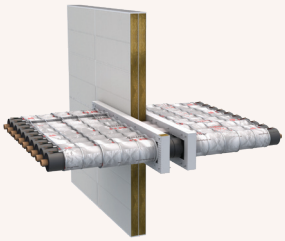
Products
FIREFLY FRF Collar
FIREFLYMasticHP



V137 | -/180/180

Copper pair coil 3/8" & 5/8" with 19 mm insulation and one CAT 6 cable, two 2.5 mm² cable, one 6 mm² circular power cable and one 20 mm condensate pipe

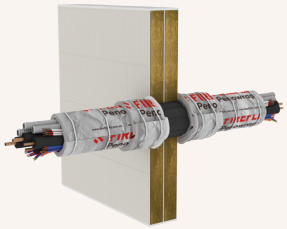
Products
FIREFLYMasticHP



V138 | -/120/120

Up to 10 Nitrile lagged copper pipes various diameters and lagging thickness with up to ten 2.5 mm² TPS cables

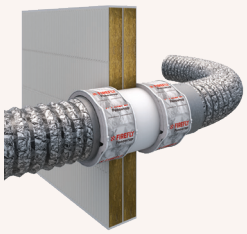
Products
FIREFLY Penowrap
FIREFLYStrap
FIREFLYMasticHP
FIREFLYMastic



V140B | -/120/120

Two Copper pair coil 3/8" & 5/8" with 19 mm insulation and three 18 mm condensate hose, three 6 mm² circular power cable, three 2.5 mm² TPS cables and three CAT 6 cables

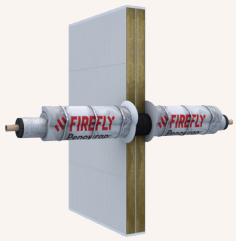
Products
FIREFLYMasticHP



V141 | -/180/180

Up to 250 mm OD Lorient or Kilargo intumescent dampers with casing and flexible ducting

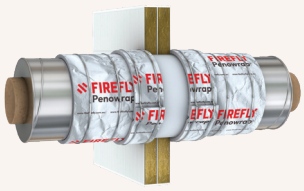
Products
FIREFLYMastic



V144B | -/120/120

Copper pipe, up to 25 mm with 25 mm thick Thermotec lagging

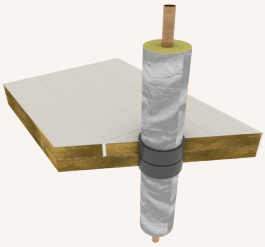
Products
FIREFLY Penowrap
FIREFLYMastic
FIREFLY Foil Tape



V146 | -/120/120

Chilled water pre-insulated copper pipe with steel outer casing. Up to 150 mm OD

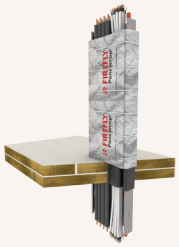
Products
FIREFLY Penowrap
FIREFLYMastic



H18D | -/120/120

Copper or steel pipes, foil coated rock wool (WT20 mm to 50 mm), lagged copper and steel pipes, 8 mm up to 32 mm OD

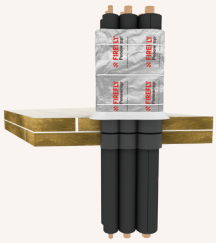
Products
FIREFLYStrap



H42 | -/120/120

Up to nine Copper pipes, 13 mm OD lagged in Nitrile rubber insulation (WT 9 mm) plus 20 TPS cables and 16 mm drain hose with or without cable tray

Products
FIREFLY Penowrap
FIREFLYMasticHP



H56 | -/120/120

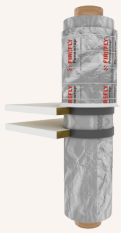
Up to six Nitrile lagged copper pipes - Two 29 mm OD, two 19 mm OD, both with 19 mm insulation & two 35 mm OD with 25 mm insulation

Products
FIREFLY Penowrap
FIREFLYMasticHP

H119 | -/180/180

150 mm OD Lorient or Kilargo damper LVH44C with DuraVent flexible ducting

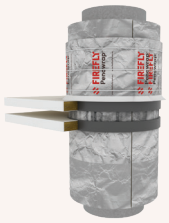
Products
FIREFLY Penowrap
FIREFLYMastic



H120 | -/180/180

Copper pipe, up to 200 mm with continuous 75 mm thick stone wool foil faced lagging

Products
FIREFLY Penowrap
FIREFLYStrap
FIREFLYMastic



H121A | -/240/240

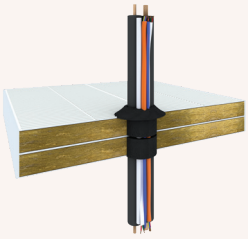
Steel pipe, up to 350 mm with continuous 75 mm thick rock wool lagging

Products
FIREFLY Penowrap
FIREFLYStrap
FIREFLYMasticHP
FIREFLYMasticBG

H123B | -/120/120

Bare copper pipe, up to 50 mm OD

Products
FIREFLY Penowrap
FIREFLYMastic



H137 | -/180/180

Copper pair coil 3/8" & 5/8" with 19 mm insulation and CAT 6 cable, two 2.5 mm² TPS cables, one 6 mm² circular power cable and 20 mm condensate pipe

Products
FIREFLYMasticHP

H138 | -/120/120

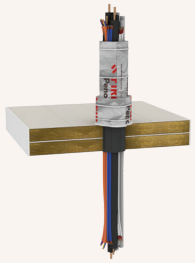
Up to 10 Nitrile lagged copper pipes various diameters and lagging thickness with up to ten 2.5 mm² TPS cables

Products
FIREFLY Penowrap, FIREFLY Strap, FIREFLYMasticHP, FIREFLYMastic

H139 | -/120/120

Up to 10 Nitrile lagged copper pipes various diameters and lagging thickness with up to ten 2.5 mm² TPS cables. Close to edge install

Products
FIREFLY Penowrap, FIREFLY Strap, FIREFLYMasticHP, FIREFLYMastic



H140B | -/120/120

Two Copper pair coil 3/8" & 5/8" with 19 mm insulation and three 18 mm condensate hose, three 6 mm² circular power cable, three 2.5 mm² TPS cables and three CAT 6 cables

Products
FIREFLYMasticHP

H141 | -/180/180

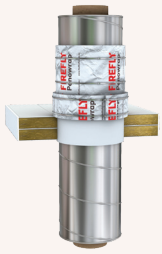
Up to 250 mm OD Lorient or Kilargo intumescent dampers with casing and flexible ducting

Products
FIREFLY Penowrap
FIREFLYMastic

Copper pipe, up to 25 mm with 25 mm thick Thermotec lagging

Products
FIREFLY Penowrap
FIREFLYMasticHP
FIREFLY Foil Tape

H144B | -/120/120



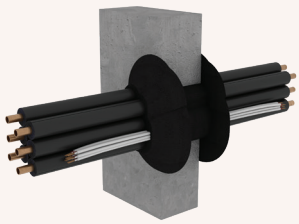
Chilled water pre-insulated copper pipe with steel outer casing. Up to 150 mm OD

Products
FIREFLYMortar
FIREFLY Penowrap
FIREFLYMastic

H146 | -/120/120

HVAC&R services through core holes in various substrates

Where core holes are available in rigid and non-rigid substrates, HVAC&R services can be fire stopped using FIREFLY products tested and assessed to AS1530.4 and AS4072.1 in a variety of horizontal and verticle substrates. Below are a few examples from our FAS192036 core hole report.



Up to six copper pipes, 13 mm OD with Nitrile rubber insulation (WT 9 mm) plus up to 6 TPS cables

Products
FIREFLYMasticHP

V27B | -/120/120

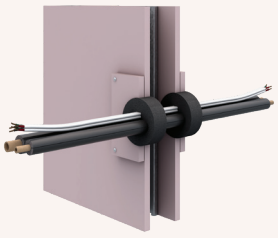
Substrate Masonry, Concrete or AAC wall

Nitrile lagged copper pair coil plus 2 TPS cables and 18 mm drain hose

Products
FIREFLYMasticHP

V75B | -/120/120

Substrate AAC Panel wall



Nitrile lagged copper pair coil plus 2 TPS cables and 18 mm drain hose

Products
FIREFLYMasticHP

V106B | -/60/60

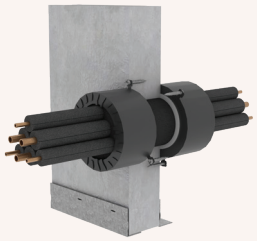
Substrate 90 mm FR Plasterboard wall

Copper pair coil 9.6 mm & 6.7 mm with Nitrile rubber insulation 16.4 mm and 9.4 mm

Products
FIREFLY FRF 50 Collar
FIREFLYMasticHP

V137 | -/120/120

Substrate 116 mm FR Plasterboard wall

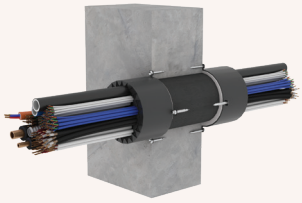


Up to three 3 copper pair coils 3/8" & 5/8" with Nitrile rubber insulation (WT 13 mm)

Products
FIREFLY Penowrap
FIREFLY FRF 100 Collar
FIREFLYMasticHP

V230A | -/120/120

Substrate AAC Panel wall

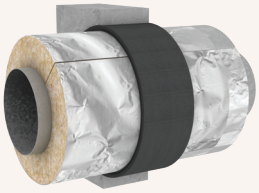


Multi service collar containing up to three insulated pair coils and multiple other services

Products
FIREFLY FRF 100 Collar
FIREFLYMasticHP
FIREFLYMastic

V249 | -/180/180

Substrate Masonry, Concrete or AAC wall

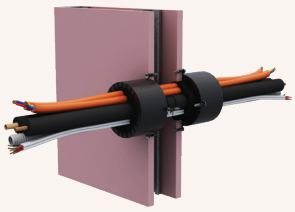


Steel pipe, up to 350 mm with continuous 75 mm thick rock wool lagging

Products
FIREFLYStrap
FIREFLYMasticHP

V434 | -/240/120

Substrate Masonry, Concrete or AAC wall



Copper pair coil 3/8" & 5/8" with 19 mm Nitrile rubber insulation and two 6 mm² circular power cable, one 18 mm condensate hose and two 2.5 mm² TPS cables

Products
FIREFLY FRF Collar
FIREFLYMasticHP

V474 | -/90/90

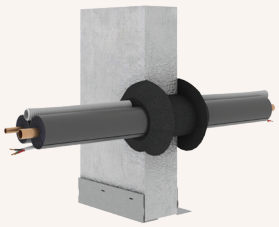
Substrate 96 mm FR Plasterboard wall

Bare copper pipe up to 50 mm OD

Products
FIREFLY Penowrap
FIREFLYMastic

V477 | -/90/90

Substrate 96 mm FR Plasterboard wall

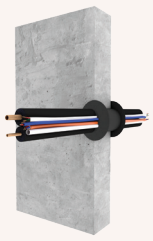


Copper pair coil 3/8" & 5/8" with 19 mm insulation with one 18 mm condensate hose and one 2.5 mm² TPS cable.

Products
FIREFLYMasticHP

V489A | -/90/90

Substrate AAC Panell wall



Copper pair coil 3/8" & 5/8" with 19 mm insulation and one 20 mm condensate hose, one CAT 6 cable, two 2.5 mm² TPS cables and one 6 mm² circular power cable

Products
FIREFLYMasticHP

V498C | -/180/180

Substrate Masonry, Concrete or AAC wall

Up to two Copper pair coil 3/8" & 5/8" with 19 mm insulation, three 18 mm condensate pipe, three 6 mm² circular power cables, three 2.5 mm² TPS cables and three CAT 6 cables

Products
FIREFLY Penowrap
FIREFLYMasticHP

V500A | -/120/120

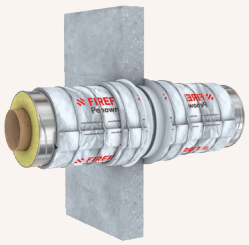
Substrate Masonry, Concrete or AAC wall

Copper pipe, up to 25 mm with 25 mm thick Thermotec lagging

Products
FIREFLY Penowrap
FIREFLYMastic

V502B | -/120/120

Substrate Masonry, Concrete or AAC wall



Chilled water pre-insulated copper pipe with steel outer casing. Up to 150 mm OD

Products
FIREFLY Penowrap
FIREFLYMastic

V504B | -/120/120

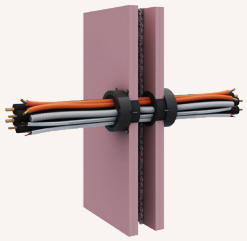
Substrate Masonry, Concrete or AAC wall

Up to three bundles each containing one 3/8" & 5/8" pair coil with 19 mm insulation, one 18 mm condensate hose, two 6 mm² circular power cable and one 2.5 mm² TPS cable

Products
FIREFLY Penowrap
FIREFLYMasticHP

V510C | -/120/120

Substrate Masonry, Concrete or AAC wall

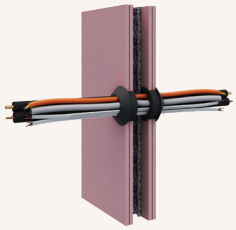


Up to two copper pair coils 3/8" & 5/8" with 19 mm insulation, one 18 mm condensate hose, one 6 mm² circular power cable and two 2.5 mm² TPS cables

Products
FIREFLY FRF 100 Collar
FIREFLYMasticHP

V513C | -/120/120

Substrate 116 mm FR Plasterboard wall

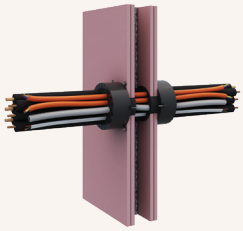


Up to one pair coil 3/8" & 5/8" with 19 mm insulation, one 18 mm condensate hose, one 6 mm² circular power cable and two 2.5 mm² TPS cables

Products
FIREFLYMasticHP

V515C | -/120/120

Substrate 116 mm FR Plasterboard wall

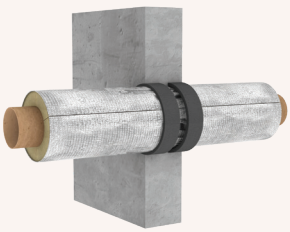


Up to three pair coils 3/8" & 5/8" with 19 mm insulation, one 18 mm condensate hose, two 6 mm² circular power cable and one 2.5 mm² TPS cables

Products
FIREFLY FRF 150 Collar
FIREFLYMasticHP

V521C | -/120/120

Substrate 116 mm FR Plasterboard wall



Copper pipe, up to 50 mm with 39 mm mineral wool insulation

Products
FIREFLYMasticHP

V524C | -/120/120

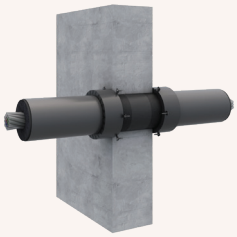
Substrate Masonry, Concrete or AAC wall

Copper pipe, up to 25 mm with 25 mm thick Thermotec lagging

Products
FIREFLY Penowrap
FIREFLYMasticHP

V527C | -/120/120

Substrate 116 mm FR Plasterboard wall



Up to 130 mm thick Beverage Python with Nitrile insulation (38 mm)

Products
FIREFLY FRF 150 Collar
FIREFLYMasticHP

V530 | -/180/180

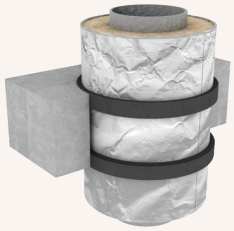
Substrate Masonry, Concrete or AAC wall

Up to two copper pair coils 3/8 & 5/8 with 13 mm Nitrile rubber insulation

Products
FIREFLYMasticHP

H208 | -/120/120

Substrate Concrete floor



Steel pipe, up to 350 mm with continuous rock wool lagging 75 mm thick

Products
FIREFLYStrap
FIREFLYMasticHP

H211A | -/240/120

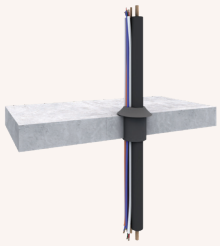
Substrate Concrete floor

Up to two copper pair coils 3/8 & 5/8 with 13 mm Nitrile rubber insulation

Products
FIREFLY FRF 100 Collar
FIREFLYMasticHP

H233 | -/180/120

Substrate Concrete floor

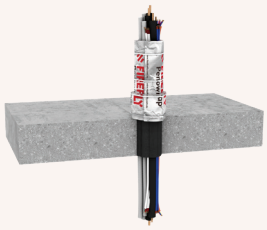


Copper pair coil 3/8" & 5/8" with 19 mm insulation, one CAT 6 cable, two 2.5 TPS cables, one 6 circular power cable and 20 mm condensate pipe

Products
FIREFLYMasticHP

H235C | -/180/180

Substrate Concrete floor

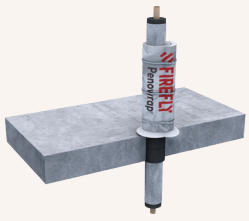


Up to two Copper pair coil 3/8" & 5/8" with 19 mm insulation, three 18 mm condesate pipe, three 6 mm² circular power cables, three 2.5 mm² TPS cables and three CAT 6 cables

Products
FIREFLY Penowrap
FIREFLYMasticHP

H238A | -/120/120

Substrate Concrete floor

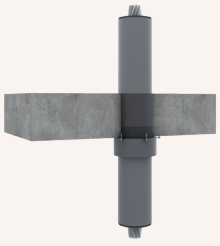


Copper pipe, up to 25 mm with 25 mm thick Thermotec lagging

Products
FIREFLY Penowrap
FIREFLYMastic

H240B | -/120/120

Substrate Concrete floor



Up to 130 mm thick Beverage Python with Nitrile insulation (38 mm)

Products
FIREFLY FRF 150 Collar
FIREFLYMasticHP

H244 | -/180/180

Substrate Concrete floor

HVAC&R services in FIREFLYMortar

FIREFLYMortar is a versatile firestopping solution ideal for sealing HVAC&R system penetrating large or irregular shaped openings in horizontal building elements such as concrete floors. Below are examples of some of the HVAC&R systems delivering reliable performance using FIREFLY products, available in our FAS230181 report.

H33 | -/120/120

Bare copper pipe upto 50 mm OD

Products
FIREFLY Penowrap
FIREFLYMastic

H36 | -/120/120

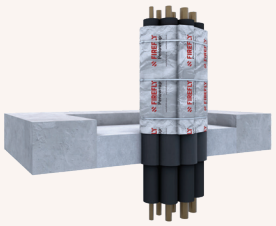
Foil coated rockwool lagged copper or steel pipes 8 mm to 200 mm OD. Lagging thickness 38 mm to 75 mm.

Products
FIREFLYStrap

H38 | -/120/120

Nitrile lagged (WT 19 mm to 38 mm) copper or steel pipes. 8mm up to 32 mm OD

Products
FIREFLYStrap
FIREFLYMasticHP



H46 | -/120/120

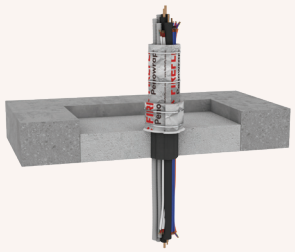
Up to six Nitrile lagged copper pipes: two 29 mm OD, one 22 mm OD, one 19 mm OD and one 16 mm OD, all with 19 mm insulation & one 29 mm OD with 25 mm insulation

Products
FIREFLY Penowrap
FIREFYMasticHP

H54 | -/120/120

Up to 10 Nitrile lagged copper pipes various diameters and lagging thickness

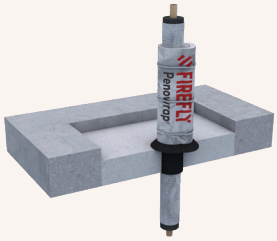
Products
FIREFLY Penowrap
FIREFLYStrap
FIREFLYMasticHP
FIREFLYMastic



H56 | -/120/120

Two 3/8" & 5/8" pair coil with 19 mm insulation, three 18 mm condesate pipe, three 6 mm² circular power cables, three 2.5 mm² TPS cables and three CAT 6 cables

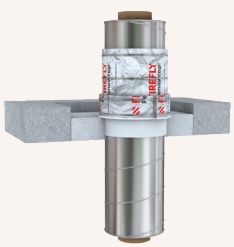
Products
FIREFLY Penowrap
FIREFLYMasticHP
FIREFLY Mastic



H61 | -/120/120

Copper pipe, up to 25 mm with 25 mm thick Thermotec lagging

Products
FIREFLY Penowrap
FIREFLYMasticHP



H63 | -/120/120

Chilled water pre-insulated copper pipe with steel outer casing. Up to 150 mm OD

Products
FIREFLY Penowrap
FIREFLYMastic