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Trade Guide Electrical

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.

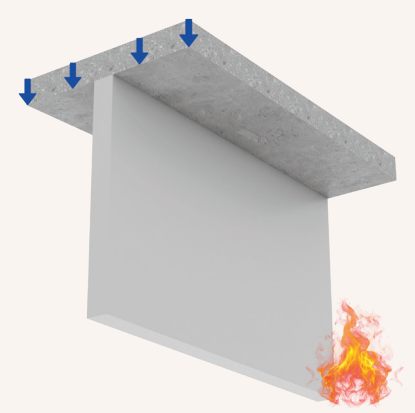
Passive Fire Protection

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).

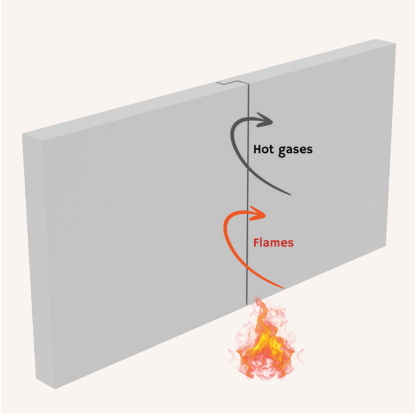
What is an FRL?

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 -

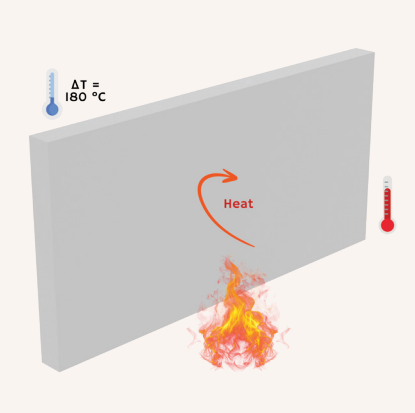
1. **Structural Adequacy:** The NCC defines structural adequacy as the ability of a building element to maintain stability and adequate loadbearing capacity as determined by AS1530.4
2. **Integrity:** The NCC definition of integrity is the ability of a building element to resist the passage of flames 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 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... that is why selecting the right one is crucial

Consider a commercial or multi-residential building. Many people are unaware of the various types of cables that run overhead through the false ceiling or through service risers hidden from public view. Each set of cables has a specific purpose. Fire alarm cables are used for signalling and powering smoke detectors and fire alarm panels. Cat 5/5e/6 screened or unscreened twisted pair cables serve communication network needs like ethernet ports (data points), CCTVs, audio//video intercoms and access control systems. Flat TPS cables are used for small power and lighting circuits. Multi-core cables transmit power between switchboards, distribution boards or machine control centres such as those powering lifts, escalators and pumps.

Similar to electrical and communications systems, fire stopping systems are also unique. Each system is designed for a specific purpose - to restore the FRL of a fire compartment where a unique service penetrates through its fire rated element. Unlike plastic pipes or metal pipes, which are homogenous, cables have a composite construction of metal cores and various insulating and sheathing materials. Therefore, different types of tested systems exist, each meeting a required FRL level according to the requirements of the code.

Understanding how different materials react to fire is crucial for selecting the right fire stopping solution. A single approach won't work for all solutions. Let us understand the factors and challenges of fire stopping services such as cables below:

- **Conductor to insulation ratio in cables:** Where the conductor area as compared to the insulation area is large, chances of insulation failure are high. This would necessitate the introduction of a thermal wrap such as FIREFLY Penowrap for insulation criteria. Whereas in the opposite case, if the insulation area is larger compared to the conductor area, there is a risk of burn through. Without the help of an intumescent sealant such as FIREFLYMasticHP, which takes the space the insulation originally occupied, chances of an integrity fail are high.
- **Choice of conductor material:** For the same size and type of insulation, cables with copper cores heat up faster than aluminium cores, due to the thermal conductivity of copper being much higher than aluminium. As such, cables with copper conductors tend to heat up faster and may require a mineral wool wrap such as FIREFLY Penowrap for insulation.
- **Cable diameter:** Smaller cables heat up faster in a compartment fire than larger cables.
- **Temperature difference:** The temperature difference between exposed and unexposed sides depends on the separating element, seal, conductors and cable sheathing.

Every system is unique... that is why selecting the right one is crucial

- **Conductor distribution:** Cables with conductors closer to the surface of the cable jacket are more likely to fail insulation.
- **Insulation and sheathing materials:** Ignition temperature of insulation/sheathing, char type of intumescent seal, melting point of conductors are some of the important factors in determining the right kind for the fire stopping materials.

The ABCs of D1 and D2 cables

An individual within the field of electrical engineering, whether a designer, an engineer or an electrician may classify a cable based on one or more of the following categories:

- Electrical characteristics such as voltage rating, current capacity, conductor size, impedance and frequency.
- Mechanical properties such as flexibility, strength, weight and installation method.
- Environmental factors such as temperature range, chemical resistance, moisture resistance and UV resistance.
- Safety standards such as the National Electrical Code, International Electrotechnical Commission or our own Australian Standards or New Zealand Standards.
- Types such as power cables, control cables, sensor cables, ethernet cable, fibre optic cables, coaxial cables, speaker cables, telephone cables etc

However, in fire test reports and assessment reports the only specifying characteristics listed are the type, conductor material and insulating material. While you will find references to cables such as CAT5/5e, CAT6, coaxial, fire alarm, speaker, fibre optic amongst others, you will also find terms such as D1 standard configuration power cables and D2 standard configuration telecommunications cables. As such, it is important to understand the origin of the terms D1 and D2 as we come across them so often in reports.

To gain insight into D1 and D2 cable sets, let's revisit two standards referenced in the NCC concerning the fire resistance of building components - AS1530.4 and AS4072.1. In addition to the overarching test requirements outlined in section 2, the detailed criteria for testing electrical and communications cables can be found in section 10 of AS1530.4. This standard advocates the use of standardised configurations for testing these cables, which are precisely detailed in Appendix D, leading to the designation of D1 and D2 cables. Specifically, D1 categorises power cables within group A, while D2 pertains to telecommunication cables within group B. Below is a breakdown of the specific cables falling under each classification:

- D1 Group A cable configuration for evaluation of PVC insulated power cables
  - One, 630 mm² single core PVC or XLPE insulated, PVC sheathed cable with copper conductors (OD 41.4mm
  - One 185 mm² 3C+E PVC or XLPE insulated, PVC sheathed cable with copper conductors (OD 53.8 mm)
  - Three 6 mm² 3C+E PVC insulated, PVC sheathed cable with copper conductors (OD 16 mm)
  - Eight 16 mm² 3C+E PVC insulated, PVC sheathed cable with copper conductors (OD 20.4 mm)

- D2 Group B cable configuration for evaluation of large bundles of telecommunication cables
  - Pack of 60 (10 x 6) 50 pair telecommunications cables
  - 100 wires, each wire OD 0.5 mm

The common feature of the above cables is that they all have copper conductors and PVC insulation. This means that aluminium cables, fibre optic cables, high voltage cables, conduit with or without cables, busbars or busways, and mineral insulated cables do not fall into these categories and must be tested separately.

We have extensively tested AS1530.4 (2014) Appendix D1 and D2 cables. When tested, the full integrity and insulation was achieved on the standard configuration D1 group A and D2 group B cables. Therefore, in accordance with AS4072.1 (2005) section 4.5.1, the FRLs determined within our reports are applicable to all power and communication cables with copper conductors having PVC insulation and sheathing and no limitations are required to be specified regarding cable sizes or cable bundle dimensions.

The standards adopt a practical approach and recognise that it might not be possible, nor commercially feasible to test every single combination/configuration of PVC insulated power cables and their interaction with different types of sealing systems within a multitude of substrates. In short, Appendix D - D1 and D2 - cables are a representative sample of installations commonly encountered in Australian building construction practice. They provide the service configurations that are recommended for evaluating the performance of cable fire stopping systems used in normal commercial buildings such as a multi-storey apartment building, a retail building or a small hospital. For specialised projects such as tunnels, substations, large hospital complexes or industrial complexes that use larger or special cables, it is always recommended that you obtain a formal opinion from an accredited laboratory.

In our FAS190235 report, we have multiple FIREFLY systems in both vertical and horizontal configurations that cater to the needs of firestopping large openings that contain standard D1 and D2 service configurations. In our FAS190236 report we have multiple systems catering to standard D1 and D2 service configurations through core holes. We recognise the individual challenges presented at each construction site. This understanding has prompted us to develop tailored systems that contain a combination of D1 and D2 cables in the same penetration. Our solutions feature aluminium cables representing the D1 configuration, 3-sided wrap systems for penetrations against a slab or wall, close to edge systems ideal for services situated against apertures, among other innovative offerings.

What does FIREFLY offer the electrical and communications industry?

Understanding the need for tailored fire stopping solutions, FIREFLY is committed to ongoing testing and development to provide customised solutions. We currently offer over 58,000 unique systems, continually expanding to meet evolving needs. Rest assured, all our systems comply with AS1530.4 (2014) and AS4072.1 (2005), ensuring peace of mind regarding code compliance.

FIREFLY systems have been tested on the following types of services:

- Flat TPS cables
- Round TPS cables
- Fire alarm cables
- RG6 cables
- Cable trays
- Busducts
- Fibre optic cables
- Cat 5/5e cables
- Cat 6 cables
- Foam dielectric cables
- Mixed bundles
- uPVC conduits
- Standard D1 copper cables
- Standard D2 copper cables
- Stanard D1 type aluminium cables
- D1 & D2 mixed cables
- 3 core & earth power cables
- Single core power cables

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.

Electrical and Communication services through FIREFLYBatt systems

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

Following are some examples of electrical and communication (comms) systems from our FAS190235 report of systems installed in FIREFLYBatt in vertical and horizontal orientations.

FIREFLYMastic and FIREFLY Penowrap on standard config PVC insulated D1 power cables.

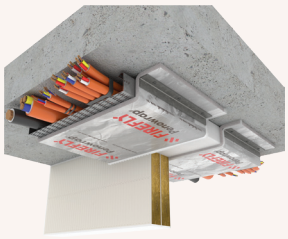
Note: PVC sheathed power cables with copper conductors with or without steel cable tray with no limitation specified for cable sizes and cable bundle dimensions.

V1 | -/120/120

FIREFLYMastic and FIREFLY Penowrap on standard config PVC insulated D2 comms cables.

Note: PVC sheathed comms cables with copper conductors with or without steel cable tray with no limitation specified for cable sizes and cable bundle dimensions.

V2 | -/120/120



FIREFLYMastic and FIREFLY Penowrap on standard config PVC insulated D1 power cables. This is a close to edge installation.

Note: PVC sheathed power cables with copper conductors with or without steel cable tray with no limitation specified for cable sizes and cable bundle dimensions.

V5 | -/120/120

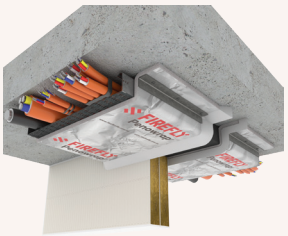
FIREFLYMastic and FIREFLY Penowrap on standard config PVC insulated D2 comms cables . This is a close to edge installation.

Note: PVC sheathed comms cables with copper conductors with or without steel cable tray with no limitation specified for cable sizes and cable bundle dimensions.

V6 | -/120/120

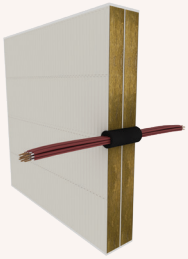
FIREFLYMastic, FIREFLYMastic-HP and FIREFLY Penowrap on aluminium cables resembling standard D1 configuration with or without cable tray.

V12A | -/120/120



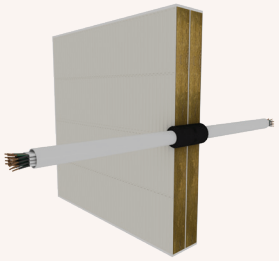
FIREFLYMastic, FIREFLYMastic-HP and FIREFLY Penowrap on aluminium cables resembling standard D1 configuration with or without cable tray. This is a close to edge installation.

V12B | -/120/120



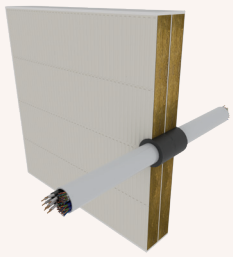
FIREFLYMasticHP on up to 12 fire alarm cables (or TPS electrical cables).

V49 | -/180/120



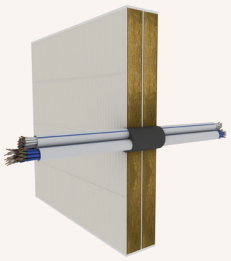
FIREFLYMasticHP on a bundle of up to 33 mm uPVC conduit or flexi-conduit with up to 8 TPS cables.

V60 | -/120/120



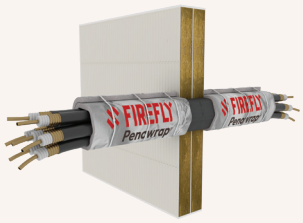
V76 | -/120/120

FIREFLYMasticHP on up to 50 mm uPVC conduit or flexi-conduit with multiple NBN, Cat 5e, Cat 6 and RG6 coaxial cables.



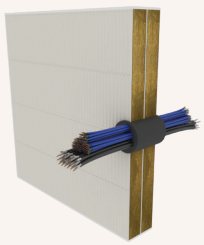
V81 | -/180/180

FIREFLYMasticHP on a bundle of up to 2 or 3 uPVC conduits or flexi-conduits up to 32 mm OD with multiple RG6, Cat 5e and Cat 6 cables.



V85 | -/120/120

FIREFLYMasticHP and FIREFLY Penowrap on a bundle of up to 7 Heliax Foam Dielectric coaxial cables.



V110A | -/120/120

FIREFLYMasticHP on single or mixed bundle of up to 30 Cat 5, Cat 6, RG6 and optical fibre cables.

V117 | -/240/240

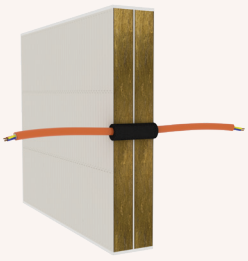
FIREFLYMastic, FIREFLY Mastic-HP and FIREFLYPenowrap on standard config copper D1 power cables.

Note: PVC sheathed power cables with copper conductors with or without steel cable tray with no limitation specified for cable sizes and cable bundle dimensions.

V118A | -/240/240

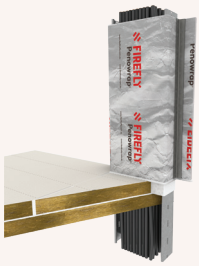
FIREFLYMastic, FIREFLY Mastic-HP and FIREFLYPenowrap on standard config copper D2 comms cables.

Note: PVC sheathed comms cables with copper conductors with or without steel cable tray with no limitation specified for cable sizes and cable bundle dimensions.



V136 | -/180/180

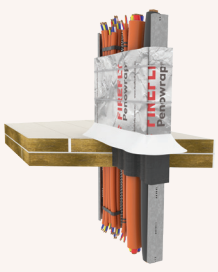
FIREFLYMasticHP on single power cable (16 mm², 3 core and earth).



H6 | -/120/120

FIREFLYMastic and FIREFLY Penowrap on standard config PVC insulated D2 comms cables. This is a close to edge installation.

Note: PVC sheathed comms cables with copper conductors with or without steel cable tray with no limitation specified for cable sizes and cable bundle dimensions.



H11A | -/120/120

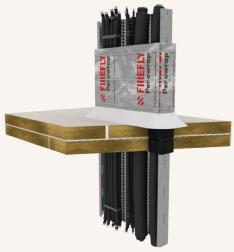
FIREFLYMastic, FIREFLY Mastic-HP and FIREFLYPenowrap on standard config copper D1 power cables.

Note: PVC sheathed power cables with copper conductors with or without steel cable tray with no limitation specified for cable sizes and cable bundle dimensions.

H11B | -/120/120

FIREFLYMastic, FIREFLY Mastic-HP and FIREFLYPenowrap on standard config copper D1 power cables. This is a close to edge installation.

Note: PVC sheathed power cables with copper conductors with or without steel cable tray with no limitation specified for cable sizes and cable bundle dimensions.



H12A | -/120/120

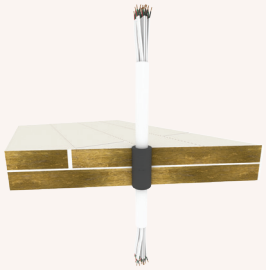
FIREFLYMastic, FIREFLY Mastic-HP and FIREFLY Penowrap on aluminium cables resembling standard D1 configuration with or without cable tray.

H14A | -/120/120

FIREFLYMasticHP on up to 6, 2C and earth cables.

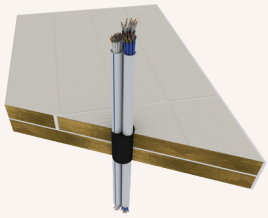
H30 | -/180/120

FIREFLYMasticHP on up to 12 fire alarm cables (or TPS electrical cables).



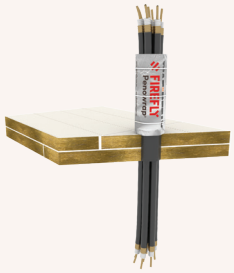
H41 | -/120/120

FIREFLYMasticHP on up to 33 mm uPVC conduit or flexi-conduit with up to 8 TPS cables.



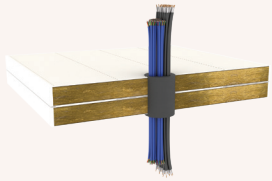
H63 | -/180/180

FIREFLYMasticHP on a bundle of up to 2 or 3 uPVC conduits or flexi-conduits up to 32 mm OD with multiple RG6, Cat 5e and Cat 6 cables.



H67 | -/120/120

FIREFLYMasticHP and FIREFLY Penowrap on a bundle of up to 7 Heliax Foam Dielectric coaxial cables.



H110A | -/180/180

FIREFLYMasticHP on single or mixed bundle of up to 30 Cat 5, Cat 6, RG6 and optical fibre cables.

H111 | -/240/240

FIREFLYMastic and FIREFLY-MasticHP on on up to 110 fibre optic cables.

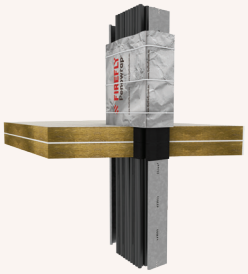
H116 | -/240/240

FIREFLYMasticHP on up to 50 mm uPVC conduit filled with fibre optic cables.

H117 | -/240/240

FIREFLYMastic, FIREFLY Mastic-HP and FIREFLYPenowrap on standard config copper D1 power cables.

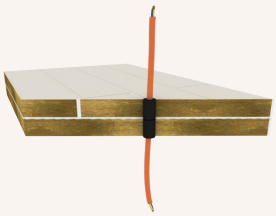
Note: PVC sheathed power cables with copper conductors with or without steel cable tray with no limitation specified for cable sizes and cable bundle dimensions.



H118C | -/120/120

FIREFLYMastic, FIREFLY Mastic-HP and FIREFLY Penowrap on standard config copper D2 comms cables.

Note: PVC sheathed comms cables with copper conductors with or without steel cable tray with no limitation specified for cable sizes and cable bundle dimensions.



H136 | -/180/180

FIREFLYMasticHP on single power cable (16 mm², 3 core and earth).

Electrical and Communication services through various substrates

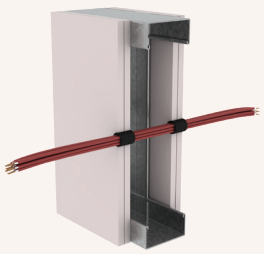
Where electrical and communication services penetrate through nominal recommended openings in rigid and non-rigid substrates, they can be fire stopped using FIREFLY systems, tested and assessed to AS1530.4 and AS4072.1 in a variety of horizontal and vertical substrates. FIREFLY systems have been tested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

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

Following are a few examples from our FAS190236 core hole report:

V9 | -/120/120

FIREFLYMasticHP on a bundle of up to 12 fire alarm cables (or TPS cables) in masonry or concrete wall.



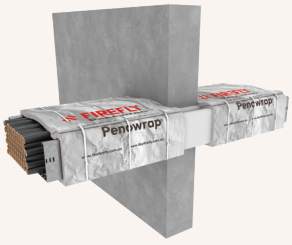
V10 | -/120/120

FIREFLYMasticHP on a bundle of up to 6 fire alarm cables (or TPS cables) in FR plasterboard wall.

V11 | -/120/120

FIREFLYMastic and FIREFLY Penowrap on standard config D1 power cables in masonry or concrete wall.

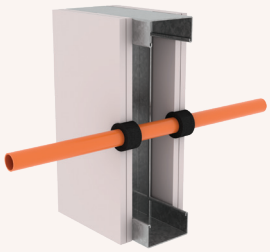
Note: PVC sheathed power cables with copper conductors with or without steel cable tray with no limitation specified for cable sizes and cable bundle dimensions.



V12 | -/120/120

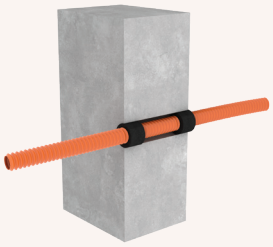
FIREFLYMastic and FIREFLY Penowrap on standard config D2 comms cables in masonry or concrete wall.

Note: PVC sheathed power cables with copper conductors with or without steel cable tray with no limitation specified for cable sizes and cable bundle dimensions.



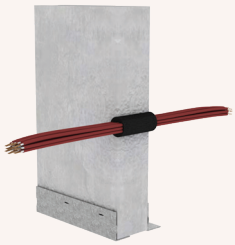
V28A | -/120/120

FIREFLYMasticHP on 25 mm PVC conduit or flexi-conduit in FR plasterboard wall.



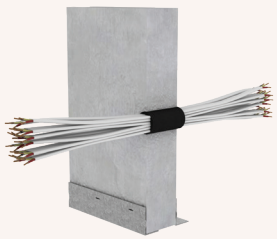
V28B | -/120/120

FIREFLYMasticHP on 25 mm PVC conduit or flexi-conduit in masonry or concrete wall.



V49 | -/60/60

FIREFLYMasticHP on a bundle of up to 12 fire alarm cables in 1 hour Hebel Panel wall.



V50 | -/60/60

FIREFLYMasticHP on a bundle of up to 12 TPS cables in 1 hour Hebel Panel wall.

V56 | -/60/60

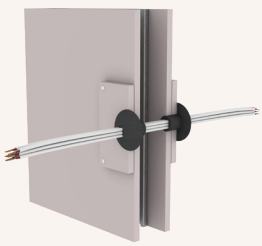
FIREFLYMasticHP on up to 26 mm uPVC conduit or flexi-conduit filled with up to 14 Cat 5e cables in 1 hour Hebel Panel wall.

V57 | -/60/60

FIREFLYMasticHP on up to 26 mm uPVC conduit or flexi-conduit filled with up to 10 Cat 6 cables in 1 hour Hebel Panel wall.

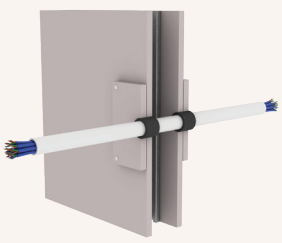
V103 | -/60/60

FIREFLYMasticHP on a bundle of up to 6 fire alarm cables in FR plasterboard wall.



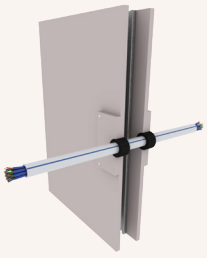
V104 | -/60/60

FIREFLYMasticHP on a bundle of up to 6 TPS cables in FR plasterboard wall.



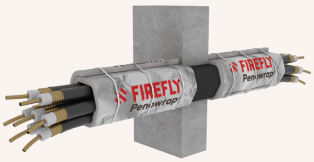
V110 | -/60/60

FIREFLYMasticHP on up to 26 mm uPVC conduit or flexi-conduit filled up with up to 14 Cat 5e cables in FR plasterboard wall.



V111 | -/60/60

FIREFLYMasticHP on up to 26 mm uPVC conduit or flexi-conduit filled up with up to 10 Cat 5e cables in FR plasterboard wall.



V161 | -/120/120

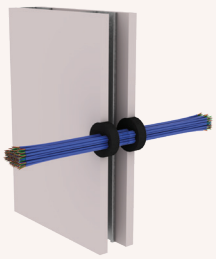
FIREFLYMasticHP and FIREFLY Penowrap on a bundle of up to 7 Heliax Foam Dielectric coaxial cables in masonry or concrete wall.

V162 | -/120/120

FIREFLYMasticHP and FIREFLY Penowrap on single Heliax Foam Dielectric coaxial cables in masonry or concrete wall.

V178 | -/120/120

FIREFLYMasticHP on a bundle of up to 50 RG6 coaxial cables in FR plasterboard wall.



V179 | -/90/190

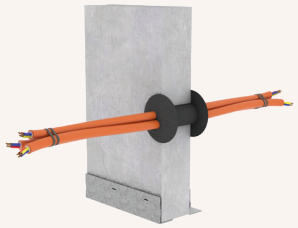
FIREFLYMasticHP on a bundle of up to 50 Cat 6 data cables in FR plasterboard wall.

V194 | -/60/60

FIREFLYMasticHP on a single 4 mm² orange power cable in 1 hour Hebel Panel wall.

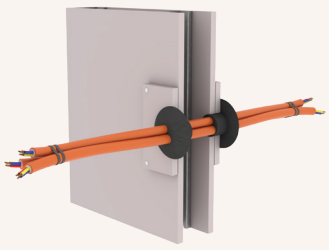
V195 | -/60/60

FIREFLYMasticHP on a single 4 mm² orange power cable in FR plasterboard wall.



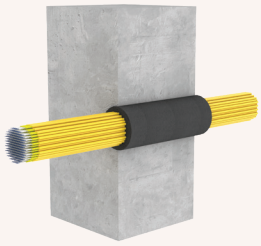
V196 | -/60/60

FIREFLYMasticHP on a bundle of up to 2 or 3, 4 mm² orange power cables in 1 hour Hebel Panel wall.



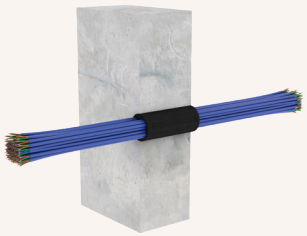
V197 | -/60/60

FIREFLYMastic HP on a bundle of up to 2 or 3, 4 mm² orange power cables in FR plasterboard wall.



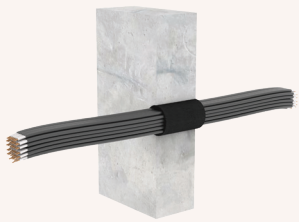
V200 | -/120/120

FIREFLYMasticHP on a bundle of up to 150 fibre optic cables in masony or concrete wall.



V202 | -/120/120

FIREFLYMasticHP on a bundle of up to 40 Cat 6 data cables in masonry or concrete wall.

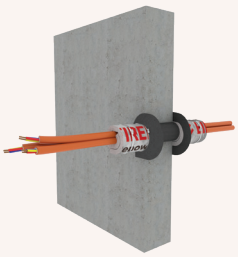


V203 | -/120/120

FIREFLYMasticHP on a bundle of up to 30 RG6 coaxial cables in masonry or concrete wall.

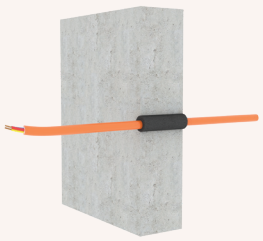
V204 | -/120/120

FIREFLYMasticHP on a bundle of up to 30 Cat 5 data cables in masonry or concrete wall.



V208 | -/120/120

FIREFLYMasticHP and FIREFLY Penowrap on a bundle of up to 2 or 3, 16 mm² orange power cables in masonry or concrete wall.



V209 | -/120/120

FIREFLYMasticHP on a single 16 mm² orange power cable in masonry or concrete wall.

V213A | -/240/240

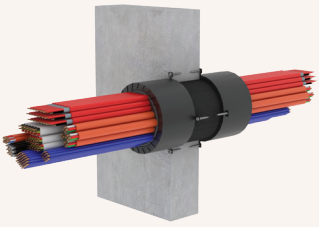
FIREFLYMastic, FIREFLY Mastic-HP and FIREFLYPenowrap on standard config D1 power cables in masonry or concrete wall.

Note: PVC sheathed power cables with copper conductors with or without steel cable tray with no limitation specified for cable sizes and cable bundle dimensions.

V213B | -/240/240

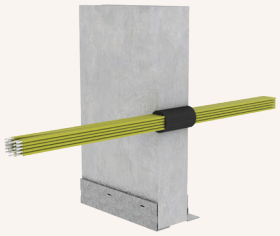
FIREFLYMastic, FIREFLY Mastic-HP and FIREFLYPenowrap on standard config D1 power cables in masonry or concrete wall. This is a close to edge installation.

Note: PVC sheathed power cables with copper conductors with or without steel cable tray with no limitation specified for cable sizes and cable bundle dimensions.



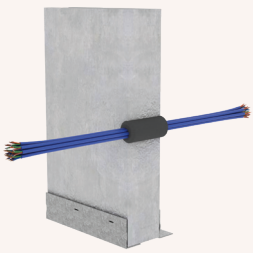
V236 | -/120/120

FIREFLYMasticHP and FIREFLY FRF 100 Fire Collar on mixed bundle of cables in masonry or concrete wall.



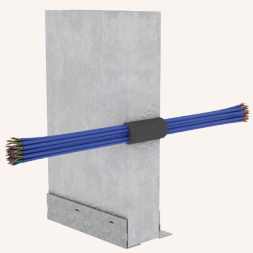
V250 | -/120/120

FIREFLYMasticHP on a bundle of up to 24 fibre optic cables in 2 hour Hebel Power Panel wall.



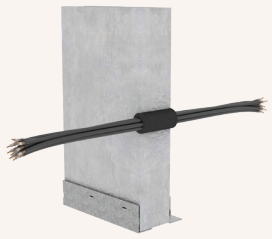
V253 | -/120/120

FIREFLYMasticHP on a bundle of up to 28 Cat 6 cables in 2 hour Hebel Panel wall.



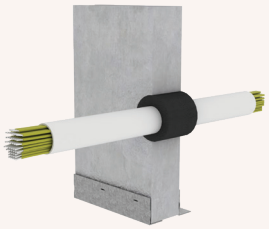
V254 | -/90/90

FIREFLYMasticHP on a bundle of up to 48 Cat 5, Cat 5e or Cat 6 cables in Hebel Panel wall.



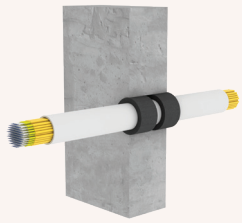
V255 | -/120/120

FIREFLYMasticHP on a bundle of up to 20 RG6 coaxial cables in Hebel Panel wall.



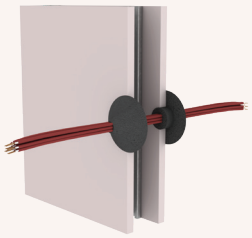
V263 | -/120/120

FIREFLYMasticHP on up to 50 mm uPVC conduit filled with up to 64 fibre optic cables in Hebel Power Panel wall.



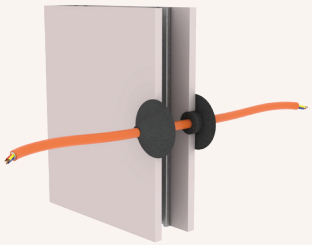
V273 | -/120/120

FIREFLYMasticHP on up 50 mm uPVC conduit filled with up to 64 fibre optic cables in masonry or concrete wall.



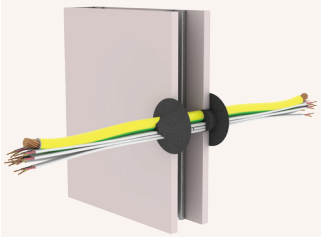
V469 | -/90/90

FIREFLYMasticHP on a bundle of up to 6 fire alarm cables in FR plasterboard wall.



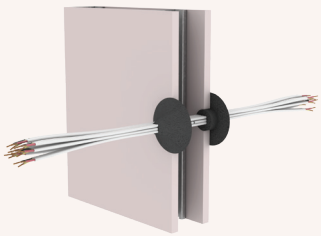
V470 | -/90/90

FIREFLYMasticHP on a single 16mm² orange power cable in FR plasterboard wall.



V471 | -/90/90

FIREFLYMasticHP on up to 6, 2.5 mm² TPS cables and one 10 mm² single core cable in FR plasterboard wall.



V472 | -/90/90

FIREFLYMasticHP on a bundle of up to 6, 1.5 mm² TPS cables in FR plasterboard wall.

H1 | -/120/120

FIREFLYMasticHP and FIREFLY Penowrap on a bundle of up to 7 Heliax Foam Dielectric coaxial cables in concrete floor.

H2 | -/120/120

FIREFLYMasticHP and FIREFLY Penowrap on a single Heliax Foam Dielectric coaxial cable in concrete floor.

H3 | -/120/120

FIREFLYMasticHP on a bundle of up to 12 fire alarm cables (or TPS cables or mixed cables) in concrete floor.

H5 | -/120/120

FIREFLYMastic and FIREFLY Penowrap on standard config D1 power cables in concrete floor.

Note: PVC sheathed power cables with copper conductors with or without steel cable tray with no limitation specified for cable sizes or cable bundle dimensions.

H6 | -/120/120

FIREFLYMastic and FIREFLY Penowrap on standard config D2 comms cables in concrete floor.

Note: PVC sheathed comms cables with copper conductors with or without steel cable tray with no limitation specified for cable sizes or cable bundle dimensions.

H82 | -/120/120

FIREFLYMasticHP on a bundle of mixed fibre optic cables in concrete floor.

H86 | -/120/120

FIREFLYMasticHP on a bundle of up to 40 Cat 6 cables in concrete floor.

H87 | -/120/120

FIREFLYMasticHP on a bundle of up to 30 RG6 cables in concrete floor.

H88 | -/120/120

FIREFLYMasticHP on a bundle of up to 30 Cat 5 cables in concrete floor.

H92 | -/120/120

FIREFLYMasticHP and FIREFLY Penowrap on a bundle of up to 2 or 3, 16 mm² orange power cables in concrete floor.

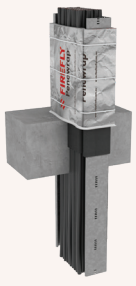
H93 | -/120/120

FIREFLYMasticHP on a single 16 mm² orange power cable in concrete floor.

H95A | -/120/120

FIREFLYMasticHP and FIREFLY Penowrap on standard config D1 power cables in concrete floor.

Note: PVC sheathed power cables with copper conductors with or without steel cable tray with no limitation specified for cable sizes and cable bundle dimensions.



H169 | -/120/120

FIREFLYMasticHP and FIREFLY Penowrap on standard config D2 comms cables in concrete floor.

Note: PVC sheathed comms cables with copper conductors with or without steel cable tray with no limitation specified for cable sizes and cable bundle dimensions.

H181A | -/120/120

FIREFLYMasticHP and FIREFLY Penowrap on standard config D1 power in concrete floor. This is a close to edge detail with 3-sided wrap.

Note: PVC sheathed power cables with copper conductors with or without steel cable tray with no limitation specified for cable sizes and cable bundle dimensions.

H231 | -/240/240

FIREFLYMasticHP and FIREFLY FRF 100 Fire Collar on bundle of up to 7, 32 mm conduits, each filled with multiple cables including Cat 5, Cat 6, RG6, fire alarm, TPS cables or empty.