

# FireSmart® Flat Roofing System and Application Technology

**Anderson  
Monarflex**

A member of the Icopal group



CI/SfB	July 2005
47	Ln2

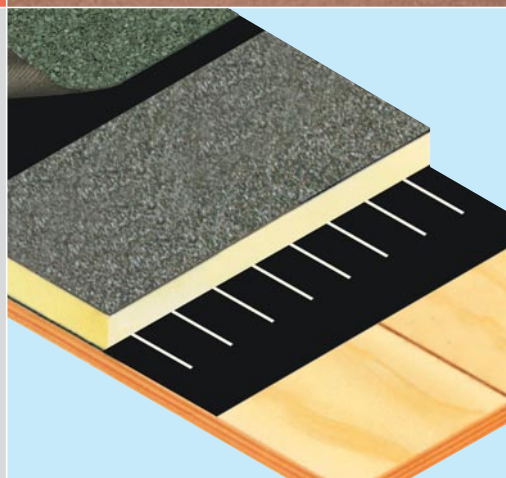
The first fire  
protection flat  
roofing membrane  
system accredited  
by the LPCB



572a to BS476:  
Part 3 1958



572b to EN1187:  
2002 Test 1



Installed by



Intelligent Membrane Trade Association

Approved Contractors

IN PURSUIT OF EXCELLENCE

# FireSmart®

## Fire Protection Flat Roofing Systems



### Overview

FireSmart® is the first flat roofing membrane system approved by the Loss Prevention Certification Board (LPCB), whose standards are used by many insurance companies when assessing potential fire risk. It is also the first fire protection built up roofing system to be listed in the Red Book of Approved Fire & Security Products & Services.

### FireSmart® Flat Roofing Systems: Benefits

- Icopal patented 120mm flameless bonded systems provide high speed safe installation and maximum resistance to wind uplift.
- Unique patented FireSmart® application equipment provides safe installation without the requirement of naked flames or boilers.
- Combines the proven characteristics and waterproofing performance of SBS modified membranes with a formulation that exceeds any proposed EU fire standard.
- Other membranes including synthetics can melt and shrink away when in contact with a flame. FireSmart® will not do this, maintaining its integrity to protect the system beneath.
- Because a flame will not penetrate the surface the system and roof are fully protected.
- Zero spread of flames means that any potential fire will not spread to any other parts of the system.
- Because it won't support flame, the FireSmart® roofing system emits minimal smoke, the main hazard to life during a fire.
- Proven fire performance should help lessen the impact of rising building insurance premiums.
- FireSmart® systems shown in this brochure are supported by a waterproofing guarantee for 12 and 20 years depending on system specification, details of which can be found on pages 4 to 5 and 8 to 9. Our insurance backed waterproof guarantees cover materials, workmanship and insolvency, provided that installation is by approved (IMA) installers who have been fully trained in system application, health & safety and risk assessment (please see page 10).
- FireSmart® Capsheets have a unique 120mm selvedge. By simply measuring the distance between the seams, you can ensure that the product used is FireSmart®. The distance between seams should be 880mm. Standard selvedges for all other polymer modified systems are 75mm or less.

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## Description

FireSmart® Roofing Systems comprise a range of polyester reinforced, SBS modified membranes, insulation boards and vapour control layers. Products and specifications are available for application using either the unique FireSmart® Flame Free application technology or traditional Torch On and Pour & Roll applications. FireSmart® cap sheets provide a fire protection layer, shielding the roof from both spread of flame and fire penetration.

FireSmart® membranes are formulated using finely ground volcanic silicone rock which has withstood temperatures in excess of 5,000 degrees Celsius.

## How FireSmart® Roofing Systems protect against flame spread and fire penetration

When a flame comes into contact with the surface of the FireSmart® cap sheet, the presence of volcanic rock brings about an endothermic reaction within the membrane. Heat is actually drawn from the flame to support a process of carbonisation in the cap sheet, so reducing the burn temperature. The resulting unbroken carbonised 'shell' then seals off combustible material beneath, denying the already-weakened flame further fuel and preventing any further combustion.

## NEW – Unique Flame Free Application brings further insurance benefits

Following four years of dedicated research we're pleased to announce the first ever flame free application technology suitable for the application of SBS modified roofing systems. Patented by Icopal and available for use exclusively with FireSmart® products, the new technology gives you the option of installing FireSmart® systems without naked flames or boilers. The combination of fire protection membrane and flame free application using trained and approved Intelligent Membrane Association (IMA) contractors provides the industry with the most persuasive argument ever to reduce lifetime insurance on properties for building owners, and both guarantee re-insurance and limit insurance premium rises to roofing contractors.

## How the FireSmart® system has been tested

The FireSmart® system exceeds the existing UK fire standard BS476: Part3: 1958.

Looking to the future, prEN1187 is the draft code for European harmonisation of fire testing on roofing systems. Currently it incorporates three different national testing methods: the German, the French and the Nordic. Of these three, the German standard (prEN 1187:Test Method 1) is considered the most exacting. FireSmart® has been tested to this high standard and so, whatever new test method is finally adopted in the UK, FireSmart® will be guaranteed to comply. All Icopal FireSmart® systems achieve an EXT.FAA fire rating in accordance with BS476:Part 3:1958.

## The tests

Two tests were carried out by the world renowned Warrington Fire Research Centre. Both place the roofing under greater flame intensity than that which normally results from fires started by vandals or the landing of burning embers from adjacent buildings.

**Warrington  
FIRE  
research**



Information on products, equipment, specifications and IMA Approved Contractors for FireSmart® Flame Free application is included later in this brochure.

## TEST 1



A pilot flame was applied in an attempt to ignite the FireSmart® cap sheet and measure the spread of flame.

**Result:** Zero spread of flame was recorded.

## TEST 2



A FireSmart® system incorporating PIR insulation was built up to test for fire penetration. The system surface was inclined at 15° and on it was placed a metal cage containing highly combustible material. This was ignited and the fire was left to burn itself out. Penetration into the roofing system was then measured in accordance with the German (prEN 1187/1:Test Method 1) standard.

**Result:** Zero penetration was recorded.



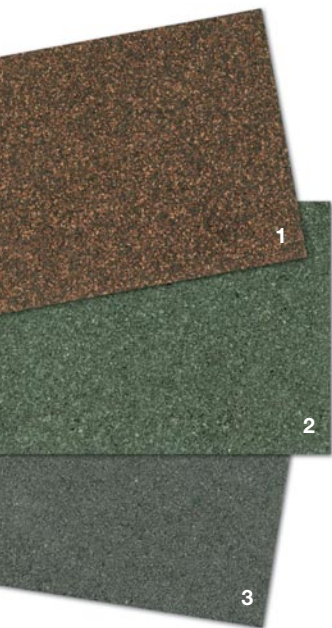
# FireSmart®

## Flame Free Application: System Guarantees

In order to comply with the guarantee requirements, FireSmart® Flame Free systems must be constructed in accordance with the recommended specification. Installation must be carried out by approved (IMA) contractors (see page 10) who have been trained and approved in the use of FireSmart® equipment and the application techniques.



### CAP SHEET COLOUR RANGE

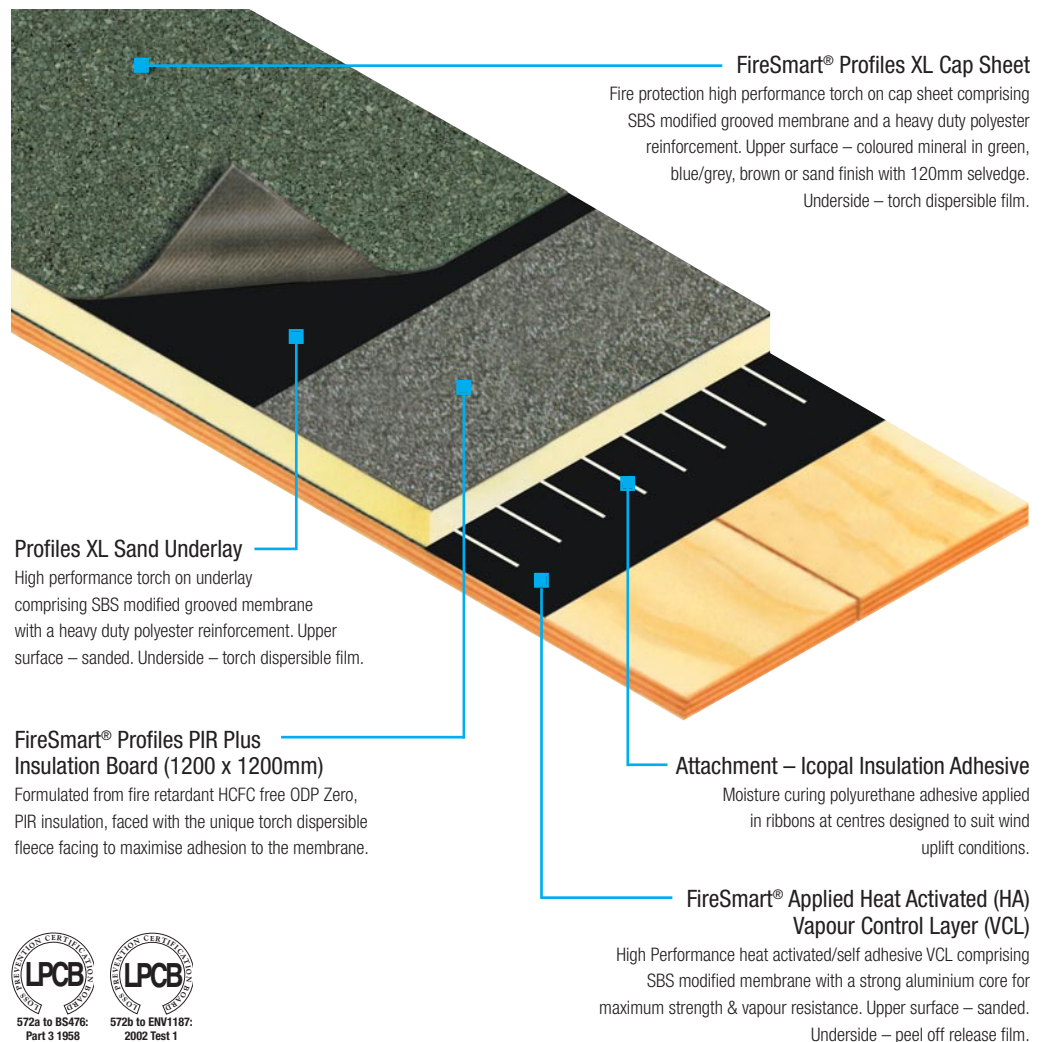


- 1 Brown Mineral Cap Sheet
- 2 Green Mineral Cap Sheet
- 3 Blue/Grey Mineral Cap Sheet

### System Specification

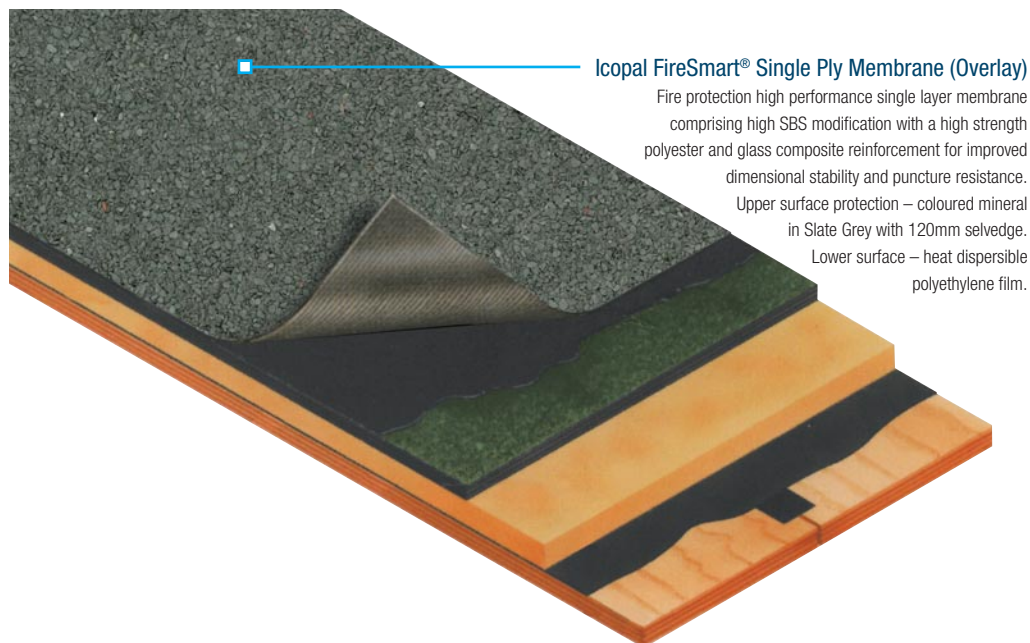
You have a choice in the way FireSmart® roofing membrane systems are applied. The system specifications required for Flame Free application are shown here. (The system specifications required if FireSmart® membranes are applied using conventional Torch-On or Pour & Roll techniques are detailed on pages 8-9). Suitable for metal decking, screeded woodwool and concrete substrates primed with Icopal Primer. Also suitable for approved grades of Plywood and OSB timber decks.

### 20 Year Pro-Spec Insurance Backed Guarantee



## Single Ply Refurbishment – 12 Year Pro-Spec Insurance Backed Guarantee

This system is recommended to refurbish ageing roofs which have not yet been damaged by water ingress and are structurally sound.



### HOW TO FORMULATE YOUR PERFORMANCE SPECIFICATION

All the diagrams and associated descriptions shown are designed to help you write the correct performance specification to achieve the required waterproofing insurance backed guarantee. To support you in this process one of our Technical Representatives will be pleased to carry out a survey on existing roofs, including the taking of core samples to determine the existing roof construction. You will then receive a comprehensive written condition report and remedial specification based on the survey's findings.



Setting out Cap Sheet



Side Lap Welder in action

# FireSmart®

## Flame Free Application

### A Brief Guide

#### The Flame Free Welding Principle

FireSmart® Flame Free equipment features the first flame free technology (WO2004057243 Patent Pending) that can apply FireSmart® membranes efficiently without a naked flame. Combustion of the propane fuel takes place within a sealed cylinder and it is the stream of exhaust gases that provides the heat source. Because combustion is complete there is no oxygen present in the heat source – so ignition of any combustible material is impeded during application.

#### The Equipment – WO2004057243 Patent Pending

This unique application equipment comprises a hand held welder for detail work and an automatic side lap welder for attaching the membrane to the substrate and sealing overlaps. Both run on 110 volts, the hand held welder comes complete with a detachable drying out nozzle for wet roofs. Please note that all equipment is available on a hire basis to IMA trained and approved contractors only.



#### Typical Multi-Layer Application – International Patent Nb:98.933.564.1

FireSmart® membranes have been specially formulated from low heat reactive blends and resins to produce products with superior strength, flexibility and adhesive properties. The special resins give a unique high tack capability for improved adhesion equal to that achieved with traditional fully bonded systems.

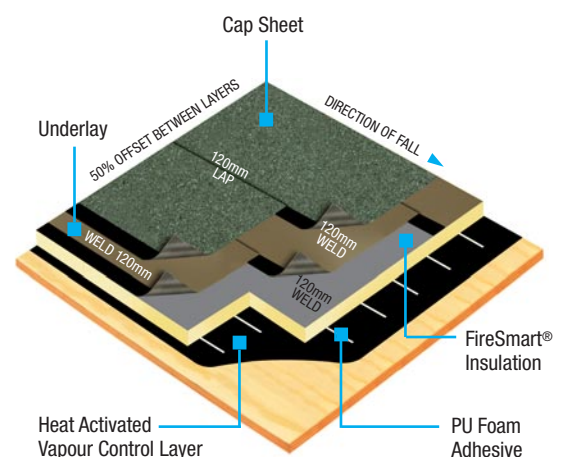


Side Lap Welder in action

#### System Layout

##### 1. Vapour Control Layer and Insulation Attachment

The HA vapour control layer is fully bonded to the suitably prepared substrate by simply removing the peel off backing and activating the self adhesive underside using the FireSmart® hand held application equipment. The FireSmart® PIR Plus Insulation is adhered using Icopal moisture curing adhesive applied in ribbons and centres to suit wind uplift requirements (typically 150-300mm centres). Substrate preparation – metal decking, screeded woodwool and concrete surfaces to be primed using Icopal primer.



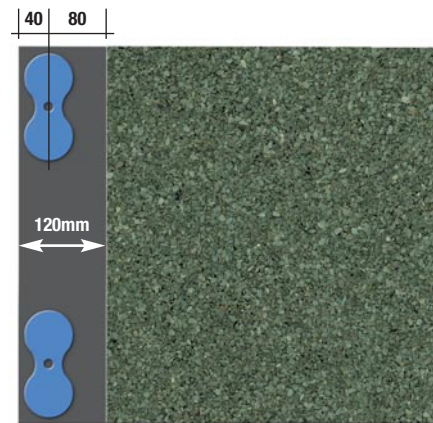


## 2. Underlay Installation

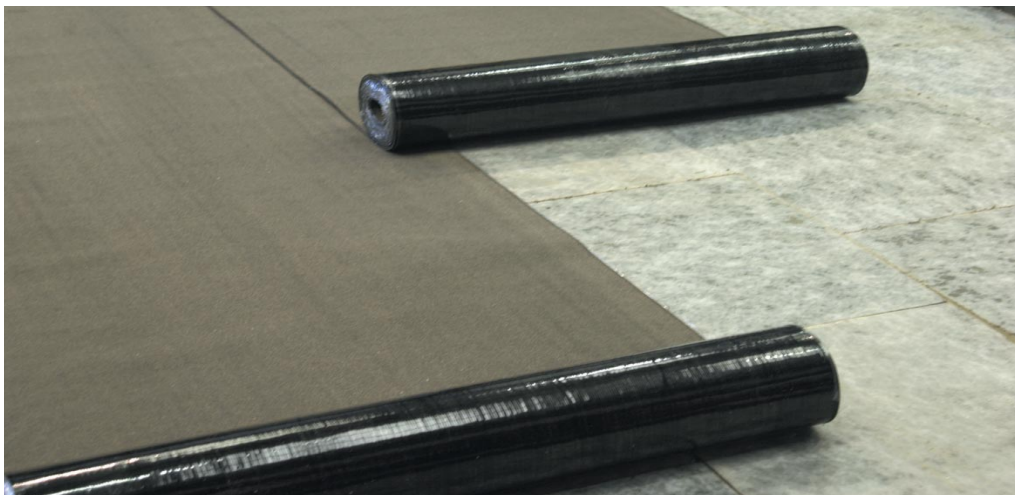
The underlay is adequately restrained against wind uplift by directly welding a continuous 120mm strip to the insulation at intervals of 880mm using a unique and patented direct welding technique.

## 3. Capsheet Installation

A unique Icopal patented 120mm sidelap is used throughout the multi-layer system. This is the only side lap bonded system that does not rely on mechanical fixing to achieve the required wind uplift performance on 95% of roofs. The capsheet is applied with a 50% offset between the seams in the underlayer. The 120mm wide sidelap allows supplementary mechanical fasteners to be introduced easily as an integral part of the system in areas of high exposure to wind uplift.



Positioning of supplementary  
Mechanical Fasteners if required.



2. Setting out underlay.



### DETAILING

This is completed according to the specification and detailing procedure using the FireSmart® hand held application equipment.



3. Setting out Cap Sheet offset 500mm.

# FireSmart®

## Torch-On Application: System Guarantees

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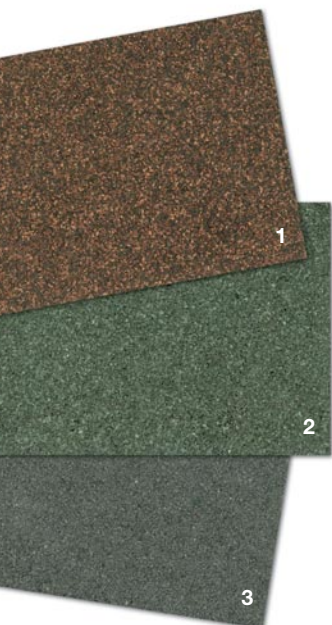


In order to comply with the guarantee requirements, all FireSmart® systems must be constructed in accordance with the recommended specification. Installation must be carried out by approved (IMA) contractors (see page 10) who have been trained and approved in the correct fixing techniques for the products used.

### HOW TO FORMULATE YOUR PERFORMANCE SPECIFICATION

All the diagrams and associated descriptions shown are designed to help you write the correct performance specification to achieve the required waterproofing insurance backed guarantee. To support you in this process one of our Technical Representatives will be pleased to carry out a survey on existing roofs, including the taking of core samples to determine the existing roof construction. You will then receive a comprehensive written specification based on the survey's findings.

### CAP SHEET COLOUR RANGE

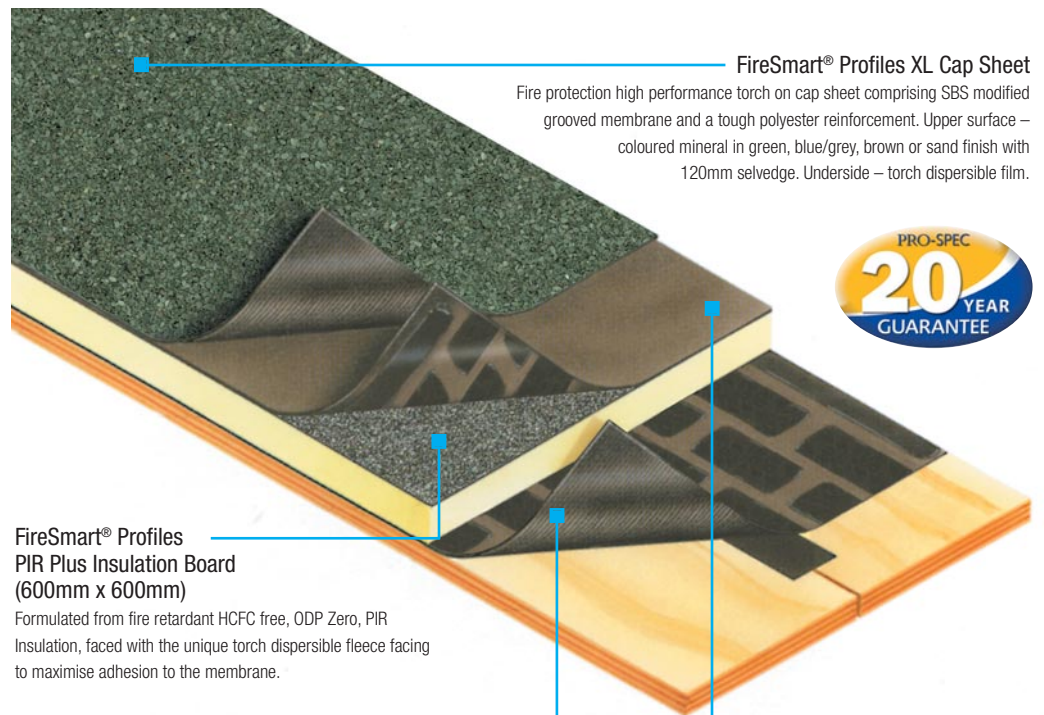


- 1 Brown Mineral Cap Sheet
- 2 Green Mineral Cap Sheet
- 3 Blue/Grey Mineral Cap Sheet

## System Specification

Suitable for metal decking, screeded woodwool and concrete substrates primed with Icopal Primer. Also suitable for approved grades of Plywood and OSB timber decks.

## 20 Year Pro-Spec Insurance Backed Guarantee



### FireSmart® Profiles XL Cap Sheet

Fire protection high performance torch on cap sheet comprising SBS modified grooved membrane and a tough polyester reinforcement. Upper surface – coloured mineral in green, blue/grey, brown or sand finish with 120mm selvedge. Underside – torch dispersible film.



### FireSmart® Profiles PIR Plus Insulation Board (600mm x 600mm)

Formulated from fire retardant HCFC free, ODP Zero, PIR Insulation, faced with the unique torch dispersible fleece facing to maximise adhesion to the membrane.

### Profiles Vapour Vent XL Vapour Control Layer

High performance torch on vapour control layer comprising SBS modified membrane with an extra strong aluminised core. Partial bonding stripes lozenges to upper surface, underside torch dispersible film. To specify an Envelope roofing system, a FireSmart® Profiles Vapour Vent XL Vapour Control Layer should replace the above.

### Profiles Vent XL Underlay

High performance vapour dispersion layer comprising SBS modified membrane with heavy duty glass reinforcement. Torch dispersible film to upper surface. Underside partial bonding stripes.





# FireSmart®

## Pour & Roll Application: System Guarantees

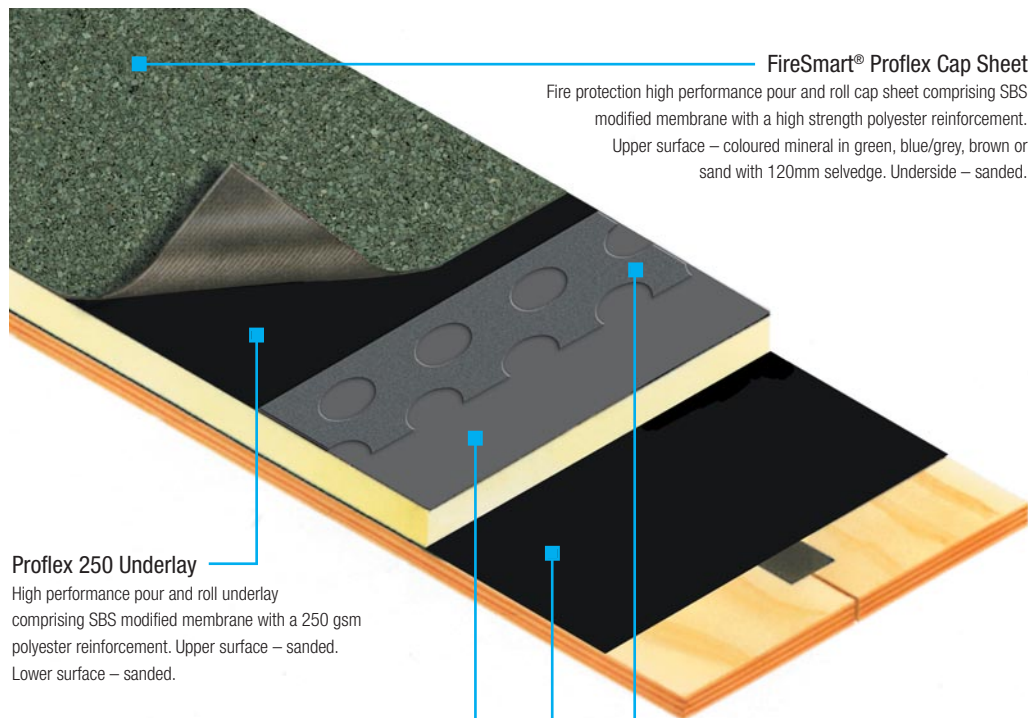
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### System Specification

Suitable for metal decking, screeded woodwool and concrete substrates primed with Icopal Primer. Also suitable for approved grades of Plywood and OSB timber decks.

### 20 Year Pro-Spec Insurance Backed Guarantee



#### FireSmart® Proflex Cap Sheet

Fire protection high performance pour and roll cap sheet comprising SBS modified membrane with a high strength polyester reinforcement.  
Upper surface – coloured mineral in green, blue/grey, brown or sand with 120mm selvedge. Underside – sanded.

#### Proflex 250 Underlay

High performance pour and roll underlay comprising SBS modified membrane with a 250 gsm polyester reinforcement. Upper surface – sanded. Lower surface – sanded.

#### FireSmart® PIR Plus P&R Insulation Board (1200 x 600mm)

Formulated from fire retardant HCFC free, ODP Zero, PIR Insulation, with a coated glass fibre facing on one side and a plain glass fibre facing on the other, auto-adhesively bonded to the foam during production.

#### Proflex Perforated Underlay

High performance pour and roll partially bonded loose laid preparation layer with a high strength glass fibre base.  
Sanded upper surface, underside slate flakes.

#### Proflex Vapour Control Layer

High performance pour and roll vapour control layer comprising SBS modified membrane with a high strength polyester reinforcement and metal core. Upper surface – sanded. Lower surface – sanded.

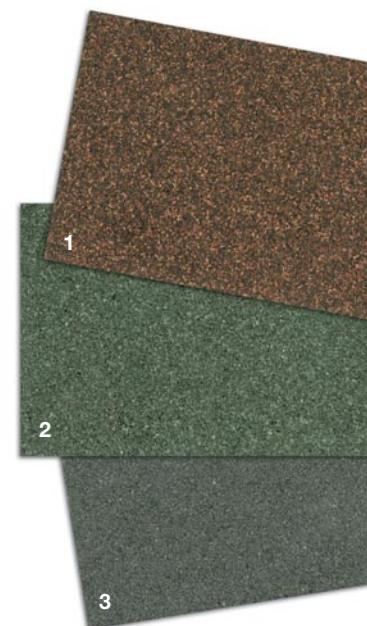
To specify an Envelope roofing system, an Icopal FireSmart® Proflex Vapour Control Barrier should replace the above.

### FIRESMART® ENVELOPE ROOFING SYSTEMS

The FireSmart® system provides specifiers with the option of incorporating a FireSmart® vapour control layer to 'sandwich' the insulation layer and so create a fire protection envelope. To achieve this specification, the vapour control layer shown in each diagram should simply be replaced with the version prefixed FireSmart®.



### CAP SHEET COLOUR RANGE



- 1 Brown Mineral Cap Sheet
- 2 Green Mineral Cap Sheet
- 3 Blue/Grey Mineral Cap Sheet



# Installation & Technical Support

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Monarflex**

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## MEMBER ORGANISATIONS



**Hoechst Trevira**



## Installation

To ensure long term performance, all FireSmart® systems shown in this brochure must be installed by Intelligent Membrane Association (IMA) approved contractors in accordance with relevant Codes of Practice and our recommended design details.

Although advanced in their formulation, FireSmart® products are easy to install, using either the revolutionary FireSmart® Flame Free application equipment or conventional techniques.

## The Intelligent Membrane Trade Association gives you assured quality



## Dedicated to reducing insurance risk

The IMA has been initiated by leading companies (see list in right hand column) as a non-profit making organisation to champion the very highest quality standards of flat roof waterproofing in the UK. The association brings together a range of technically advanced high performance roofing products applied exclusively through a network of approved IMA contractors. Our overall aim is to give Architects, Surveyors and Design & Build professionals the reassurance

of knowing that the best products are being installed to the required standards, complying with all relevant Codes of Practice.

The IMA is committed to supporting today's construction industry as it faces the threat of escalating insurance premiums for contractors and building owners alike. IMA contractors are able to combine a range of FireSmart® fire protection roofing products with unique FireSmart® Flame Free application equipment if required, so providing specifiers with an innovative product & installation service package designed to reduce insurance risk.

## Only the best can become members

The Intelligent Membrane Trade Association only accepts expert contractors who can demonstrate excellence in working practice. Even then, all approved contractors must still undertake compulsory training in Health & Safety, Risk Assessment and workmanship. This tightly controlled membership ensures that the quality chain is maintained from initial roof specification, through materials and workmanship to the finished contract – and beyond if necessary. IMA contractors are easily identified on site by their distinctive uniforms and identity badges.

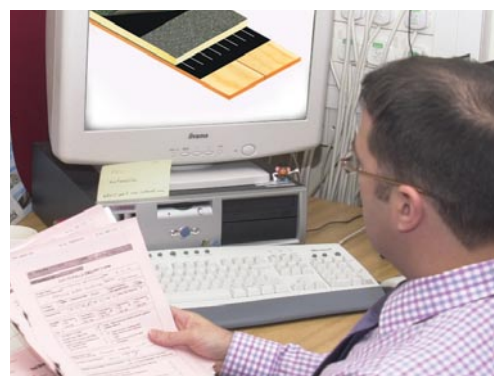
To IMA and its aims has the endorsement of several world class organisations.

## Technical Support

At Icopal we're committed to helping professionals get the best possible performance from our range of products.

Our advisory service for specifiers and contractors is free of charge. Members of our technical team are available at any time during working hours to answer queries on any aspect of roofing materials or best practice.

Our service also extends to compulsory site inspections. These surveys are essential to investigate the suitability of any existing substrate for a single layer overlay. After the site inspection a detailed roofing specification can be prepared, itemising waterproofing requirements and incorporating CAD drawings where necessary.



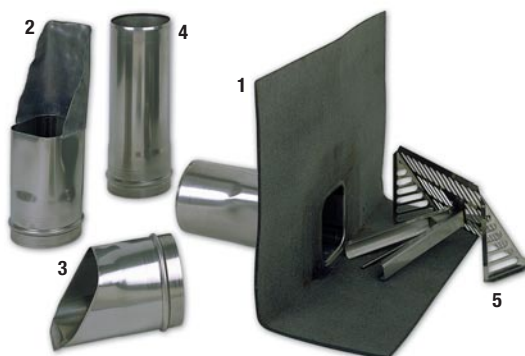
For our Technical Services Team please call  
**0161 865 4444** or email  
**[technical.uk@icopal.com](mailto:technical.uk@icopal.com)**

A wide range of technical information including drawings is also available at **[www.icopal.co.uk](http://www.icopal.co.uk)**

All systems are complimented by a comprehensive range of ancillary products to ensure maximum compatibility and single source responsibility for the waterproofing system. All ancillary products shown will be covered by the Icopal roof waterproofing guarantee. Where appropriate we will be pleased to provide detailed CAD drawings. More detailed information on ancillary products is available on request.

## Icopal Primer

Metal and concrete decks, and masonry must be primed prior to applying membrane with Icopal Primer for the system to be guaranteed.



1. Parapet Outlet 2. Lead Chute 3. Steel Chute  
4. Extension 5. Parapet Outlet Grate

## Roofgard Outlet Range

A range of stainless steel factory sealed units designed to drain water effectively from a flat roof. Independently tested, the Roofgard Outlet Range exceeds one of the highest technical standards: DIN 19599. Available as straight or parapet drainage options and in a range of sizes to suit all standard pipework.

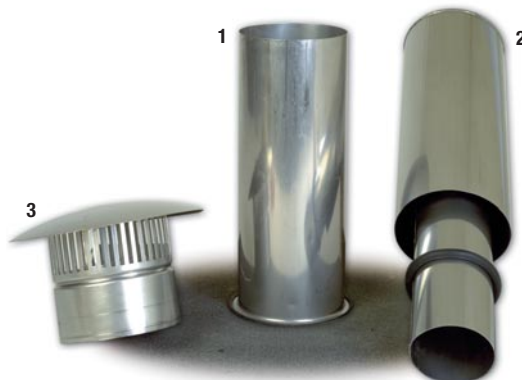


Roofgard Roof Outlet Grate.

## Roofgard Cowled Telescopic Vent

A system in stainless steel comprising:

- **Uprand Pipe with an SBS modified polyester reinforced flange positioned externally around the soil vent pipe.**
- **Telescopic Double Pipe. This slides into the upstand pipe and also into the soil vent pipe.**
- **Vented Cowl. Covers the top of the telescopic double pipe, fixed with a self-tapping screw.**



1. Uprand Pipe 2. Telescopic Double Pipe 3. Vented Cowl



## Roofgard Cable & Tube Duct

Consists of a high quality stainless steel pipe incorporating a polymer modified polyester reinforced membrane flange for extra durability, capped with two socket end PVC pipe elbows. The felt flange is incorporated within the layers of a built-up felt roofing system. The stainless steel pipe provides a rigid 300mm upstand.



## Icopal Roof Edge Trims

The Icopal Trim range provides a superior and effective roof edge trim to built-up felt roofing. Quick and easy to install, they will retain their colour and shape for the life of the building. Available in GRP or Aluminium finish.



## Icopal Anchor Fast – Lightening Conductor Pads

Anchor-Fast allows thermal movement of the conductor, with a guaranteed bond area for secure fixing. It eliminates the hazards created by lightening conductor tape that will not stay in place. Available in all colours.

## Icopal Engineered Fall Protection Safety Systems

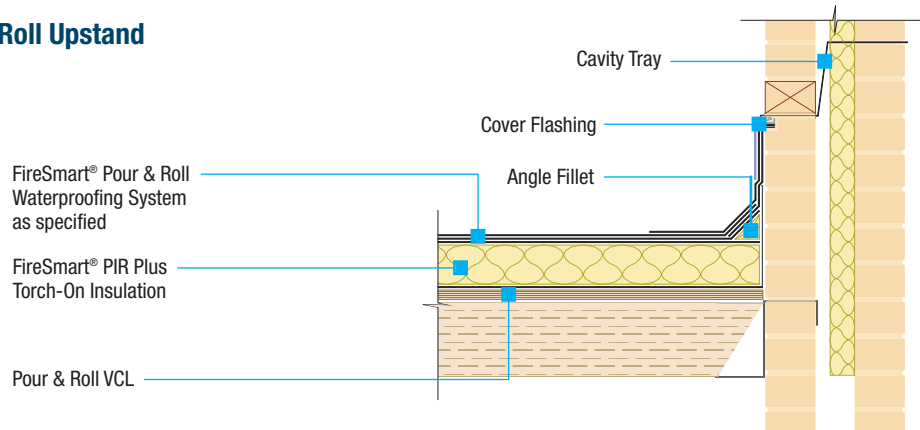
Current Health & Safety Legislation requires any person working at height close to an exposed edge or fall should be properly protected against the risk of falling. Icopal Engineered Fall Protection Safety Systems provide an affordable means of continuous protection from falls from height in compliance with current legislation.

### Systems available include

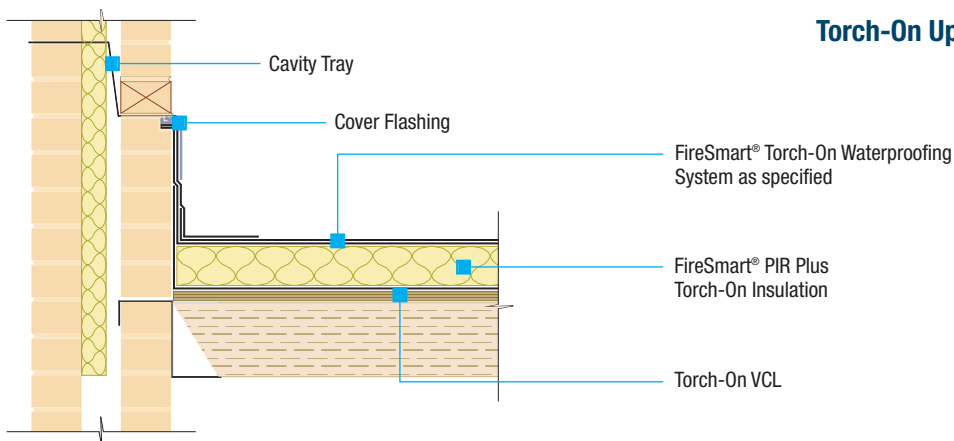
- **Icopal Kwikline Cable Based Systems –**  
Cable based fall arrest and restraint systems.
- **Icopal Kwikguard Edge Protection System –**  
Free standing, fixed rail system that does not penetrate the roof surface and compromise the waterproofing.



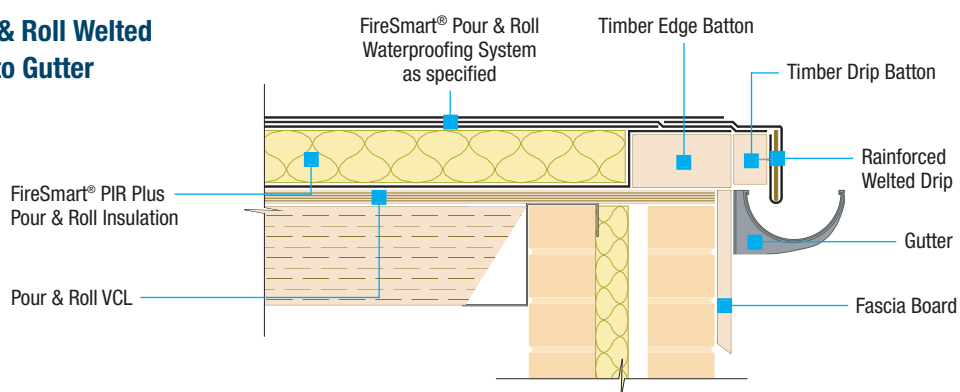
## Pour & Roll Upstand



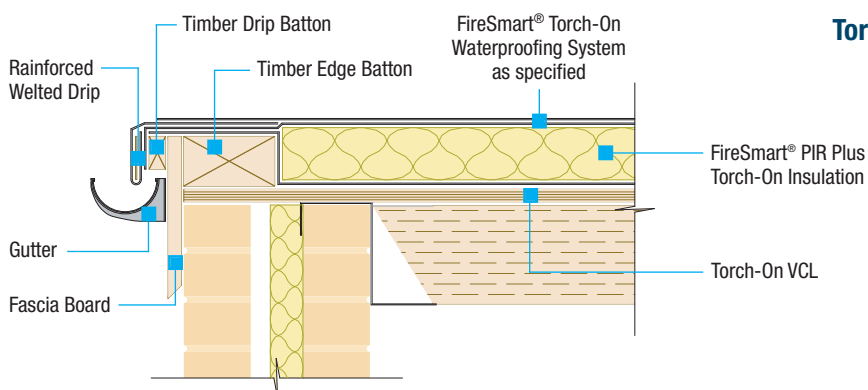
## Torch-On Upstand



## Pour & Roll Welled Drip to Gutter



## Torch-On Welled Drip to Gutter



# Properties

## Conventional Application

The following data provides information on FireSmart® products and also on other products required to build up the systems outlined on pages 8-9. (these pages refer to conventional FireSmart® build ups only.

	Length (m)	Width (m)	Max Roll Weight (kg)	Weight/ Unit Area (kgm <sup>-2</sup> )	Tensile Strength (N/50mm)		Resistance to Tearing (N)		Low Temp Flexibility
CAPSHEETS									
FireSmart® Tecnatorch	7	1	40	5.7	1300	1100	400	420	-20°C
FireSmart® Proflex	8	1	40	5	1200	1050	350	370	-20°C
UNDERLAYS									
Proflex 250 Underlay	16	1	45	2.8	1100	785	350	330	-20°C
VAPOUR DISPERSION									
Profiles Vent XL Underlay	7	1	40	5.7	690	620	110	130	-6°C
Proflex Perforated Underlay	10	1	30	3.0	N/A	N/A	N/A	N/A	5°C
VAPOUR CONTROL									
FireSmart® Profiles Vapour Vent XL Vapour Control Layer	7	1	35	5.7	690	620	110	130	-6°C
Profiles Vapour Vent XL Vapour Control Layer	7	1	32	4.6	690	620	110	130	-6°C
FireSmart® Proflex Vapour Control Layer	20	1	45	2.3	500	310	200	210	-1°C
Proflex Vapour Control Layer	20	1	45	2.3	500	310	200	210	-1°C



## To FireSmart® Flame Free Application Systems

The following data provides information on FireSmart® products and also on other products required to build up the Flame Free application systems outlined on pages 4-5. (these pages refer to FireSmart® Flame Free application system build ups only).

	Length (m)	Width (m)	Max Roll Weight (kg)	Max Weight/ Unit Area (kgm <sup>-2</sup> )	Tensile Strength (N/50mm)		Resistance to Tearing (N)		Low Temp Flexibility
CAPSHEETS									
FireSmart® Profiles XL	7	1	40	5.7	1300	1100	400	420	-20°C
FireSmart® Single Ply Membrane	7	1	43	6.1	1200	1200	400	400	-20°C
UNDERLAYS									
Profiles XL Sand Underlay	7	1	35	5.0	1300	1100	400	420	-20°C
VAPOUR CONTROL									
HA Vapour Control Layer	7.5	1	25	3.3	600	400	<150	<150	-18°C

## Insulation Boards – Achieving the required U-Value

The Buildings Regulation Part L requires the U-Value of flat roofs to be 0.25W/m²K. The following shows the thickness of system insulation needed to achieve the minimum requirement of part L. The calculation method used to determine the U-Values within a build up is in compliance with BS EN ISO 6946.

	Thickness of Insulation Required	U-Value Achieved
FLAT ROOF SUBSTRATES WITH WARM ROOF BUILD UP		
Metal Deck, No Ceiling	90mm	0.25
Metal Deck, Woodfibre Suspended Ceiling	90mm	0.23
Dense Concrete Block with Plasterboard Suspended Ceiling	90mm	0.23
Dense Concrete Block with Woodfibre Suspended Ceiling	80mm	0.25
Plywood or Timber with Plasterboard Ceiling	90mm	0.24
Plywood or Timber with Woodfibre Ceiling	80mm	0.25

	Thickness			Board Size	Lambda Value	HCFC Free
INSULATION BOARDS						
FireSmart® Profiles PIR Plus	50mm,	60mm,	70mm,	1200mm x 1200mm	0.025	yes
	80mm,	90mm,	100mm	1200mm x 1200mm	0.024	yes

## Icopal Ltd

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email: marketing.uk@icopal.com

## Northern Ireland

Telephone: 028 9037 0888  
Fax: 028 9037 0747

## Republic of Ireland

Freephone Facility  
Telephone: 1800 409 056  
Fax: 1800 409 055

[www.icopal.co.uk](http://www.icopal.co.uk)



Intelligent Membrane Trade Association

The Intelligent Membrane range covers a comprehensive choice of waterproofing products and accessories for Flat and Pitched Roofing.

For further information please contact: Intelligent Membrane Trade Association  
P.O. Box 74, Stretford,  
Manchester M32 0XN

Telephone: 0161 865 8913  
Fax: 0161 866 9859  
E-mail: [ima@icopal.com](mailto:ima@icopal.com)

Every effort has been taken in the preparation of this brochure to ensure the accuracy of representations contained herein. Recommendations as to the use of materials, construction details and methods of installation are given in good faith and relate to typical situations. However, every site has different characteristics and reliance should not be placed upon the foregoing recommendations. Advice can be given as to specific applications of the products, upon request.

Design Ref: ICO0800/RP0605

## Total Building Protection from Icopal

### Protection for Flat Roofs

- Fire Protection Roofing Systems
- Flame Free Application Technology
- Non-Combustible Insulation
- Built Up Roof Systems
- Single Ply Roof Systems
- Green Roof Systems
- Liquid Waterproofing Systems



### Protection for Pitched Roofs

- Warm Pitched Roof Systems including Breather Membranes, Insulation and Air Leakage Barriers
- Standard and Fire Retardant Vapour Control Layers
- Non-permeable Roof Tile Underlays
- Decra Lightweight Steel Roofing Systems

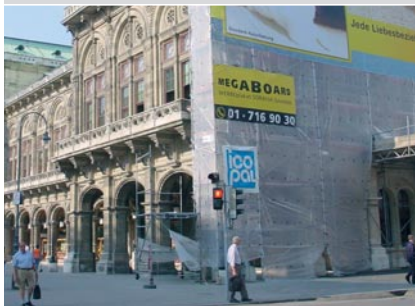


### Sound Protection

- Monarflex Acoustic Systems for New Build and Refurbishment

### Structural and Bridge Deck Protection

- Damp Proof Membranes
- Damp Proof Course and Cloaks
- Containment Membranes
- Gas Control Systems for Methane and Radon
- Tanking/Below Ground Waterproofing
- Bridge Deck Waterproofing



### Protection for People and the Worksite

- Standard and Fire Retardant Scaffold Sheeting with Logo Printing Service
- Engineered Fall Protection Safety Systems