



Sure-Weld TPO Single Ply Roofing Systems



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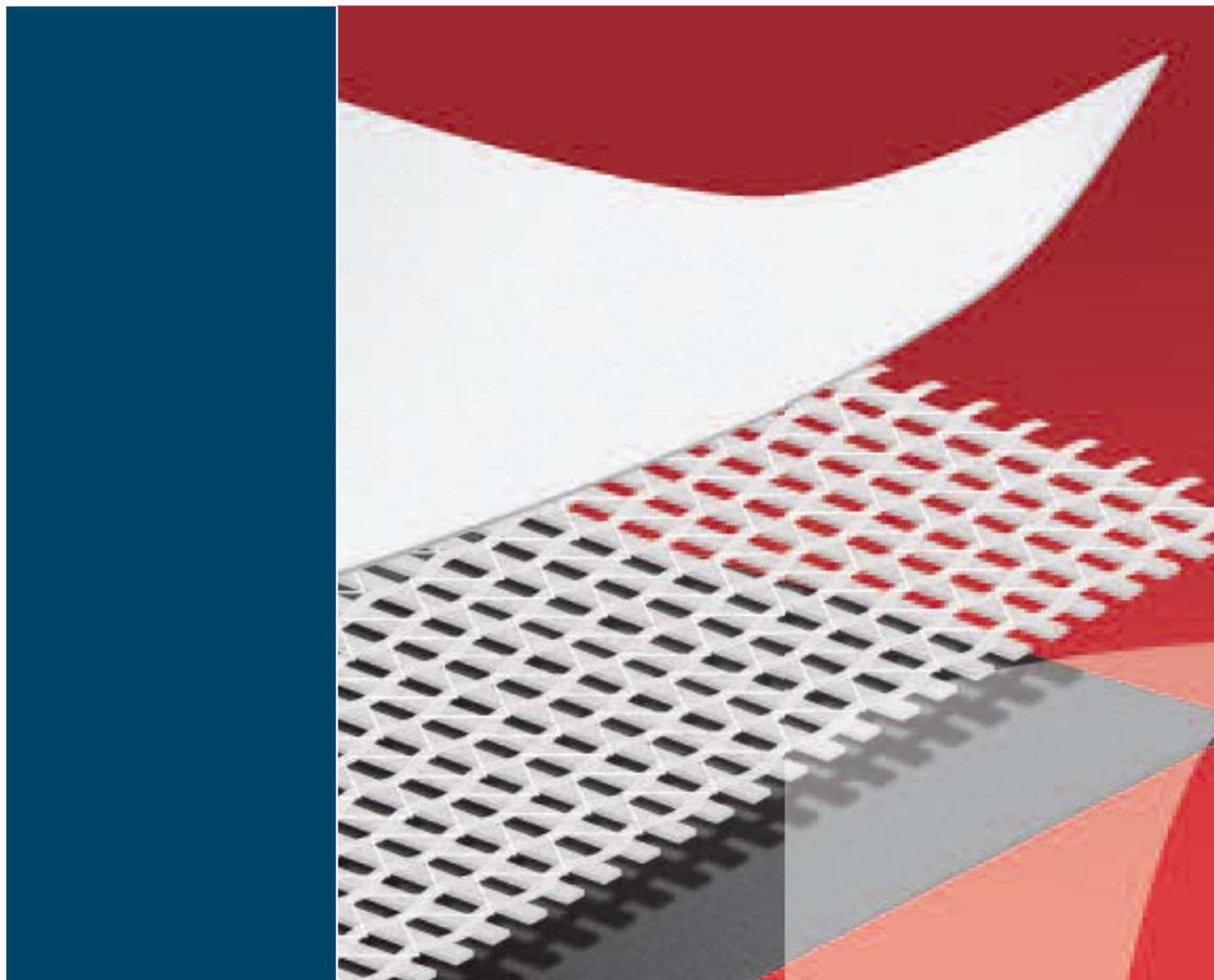
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**Thermoplastic
 Polyolefin Single Ply
 Roofing System**



Date



WORLD LEADER IN BUILDING MEMBRANES

A Positive Approach to a Greener Solution



Icopal pride themselves on being at the forefront of waterproofing technology. Spanning three centuries, Icopal have established themselves as a market leader in high performance waterproofing systems.

The Icopal Group is the largest roofing membrane manufacturer in the world and are supported in their innovative approach by extensive research and development resources available throughout the UK, Europe and the USA.

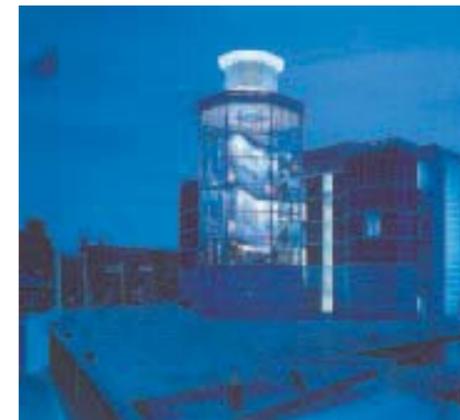


Drawing upon these extensive resources and to meet the need for environmentally considerate flat and low pitch roofing systems in the New Build arena, Icopal have joined forces with Carlisle Syntec Inc to promote the "Sure-Weld TPO" brand alongside other waterproofing systems for the renovation and new build sectors.

Icopal product design teams are continually striving to develop innovative product systems and applications that are environmentally friendly and technically superior. This partnership will provide the specifier and building owner with a versatile single-ply roofing solution which includes free site inspections, approved applicators, advanced Thermazone Insulation options and quality accessories. Coupled with state of the art design and technical support, alongside a proven record of performance and reliability, the specifier can be assured of a fully compatible, durable and quality assured waterproofing solution.



Since 1917 Carlisle Syntec has grown and diversified its rubber product capabilities. In the 1950's it developed the first synthetic rubber sheet membrane to be used in waterproofing. The first commercial roofing system using synthetic rubber was installed at Chicago's O'Hare International Airport and is still in service today. Like Icopal, Carlisle today stands as a world leader in the development and manufacture of commercial roofing and waterproofing systems. The brand "Sure-Weld TPO" is an innovative solution for waterproofing problems. This advanced membrane combines the flexibility of rubber with the security of heat weldable seams.



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Sure-Weld Total Quality Concept



Quality Assured

For over 150 years Icopal has assumed a leadership role in the introduction of the worlds most advanced waterproofing systems. This progressive approach has established Icopal as a market leader in the specification of high performance waterproofing solutions. The level of knowledge and skill offered through the alliance of Icopal and Carlisle offers the specifier assured quality and commitment from project design through to completion.



Quality in Manufacture & Service

With over 40 years experience Carlisle is reputedly the worlds largest manufacturer of single ply roofing membranes. The continued use of progressive technology and commitment to develop ever more environmentally considerate roofing membranes, combined with a proven track record of over 200,000 projects completed and under warranty worldwide, makes Carlisle an ideal partner for Icopal. Sure-Weld TPO products are manufactured to exceed the highest quality standards using the latest in production techniques, and are independently tested and certified by all major accreditation bodies throughout the world. Sure-Weld TPO is distributed throughout the UK and Ireland under the control of Icopal's Quality Management System.



Quality in Installation

All Sure-Weld TPO installations are carried out by a network of trained and approved applicators who demonstrate excellence in all areas of working practice. Supported by the Icopal's technical service team who make regular site visits to inspect work in progress and offer any assistance necessary on all aspects of detailing. The Area Manager will track the project to final completion and carry out an inspection ensuring that full compliance with the specification has been met and all guarantee criteria is covered.



Quality in Design

Identifying the critical issues and design requirements as early as possible in a project is a major contributor to ensuring performance criteria, contract programs and budgetary constraints are achieved. An Icopal area manager is available to assist in ensuring the correct waterproofing system is specified first time and to assume responsibility for the co-ordination of the roof survey, specification, calculations, detail drawings and budget pricing. Icopal offers total market coverage that is without equal in the waterproofing industry. With the support of such a dedicated partner you can be assured of success regardless of the size or location of the project.



Quality is Peace of Mind

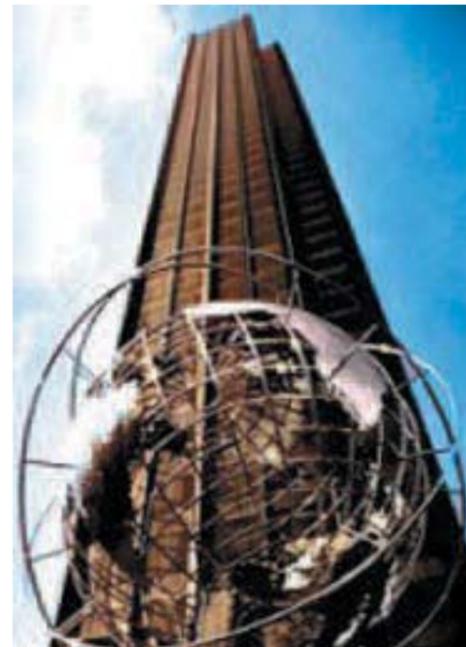
To complete this unique Quality Chain, Sure-Weld TPO roofing systems are covered by a comprehensive range of product warranties, and recommended maintenance schedules from Icopal, for periods up to twenty years.



History of Sure-Weld TPO

Sure-Weld TPO was introduced into the UK marketplace in 1993 in order to satisfy the need for a thoroughly technical, yet environmentally considerate roofing membrane, FREE OF PVC. TPO is considered by many as the “new generation” of single ply roofing membranes, incorporating the proven waterproofing properties of EPDM with advanced heat welding capabilities.

Applicator feedback has been unanimous in that the weldability and ease of application of the Sure-Weld system due to increased sheet widths (up to 3.6 metres) is of major importance in terms of cost savings and a subsequently reduced installation period. State-of-the-art, high speed welding equipment, has produced consistent outstanding seaming performance as required under our stringent Quality Assurance Warranty Scheme. Sure-Weld TPO has rapidly gained acceptance amongst architects, consultants, building owners and roofing contractors alike and has been successfully installed on many landmark buildings over the years where environmental consideration and technical excellence has been a major factor in the selection of the roofing system.

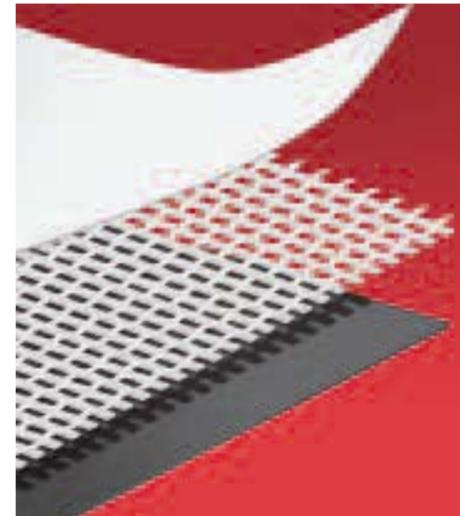


What is Sure-Weld TPO?

Sure-Weld TPO is a 1.2 mm thick thermoplastic heat weldable, reinforced waterproofing membrane for flat, curved and low pitched roofs.

Advanced polymerisation technology combines the durability and wearing properties of ethylene propylene rubber with the excellent heat welding characteristics of polypropylene.

The membrane, which is FREE OF PVC, is specifically formulated for long-term exposure without the use of either polymeric or liquid plasticisers.



System Benefits

The polyester reinforcement encapsulated between the TPO top and bottom layers provides Sure-Weld membranes with extremely high tensile and tear strength capabilities together with excellent puncture resistance.

Sure-Weld TPO is available in widths of 1.5, 2.4, 3.0 and 3.6 metres in grey, dark grey or white finish.

A fleeceback version is also available for fully adhered systems.

- Suited to new or refurb applications
- Environmentally considerate alternative to PVC
- May be recycled
- BBA certificate
- Factory Mutual and UL approved
- Excellent puncture resistance
- Excellent low temperature flexibility
- Good chemical resistance
- FAA fire rating available
- Solvent free welding system
- Sheet width up to 3.6m metres/rapid installation
- Full Design assistance
- Compatible with bituminous substrates
- Full warranty package
- Easily repaired

PHYSICAL PROPERTY	TEST METHOD	PROPERTY OF UNAGED SHEET	PROPERTY AFTER AGEING
Tolerance on nominal thickness, %	ASTM D 751	± 10	No change
Thickness over scrim, mm	ASTM D 4637 Optical Method	0.381 ± 10%	No change
Solar reflectance (albedo X 100), %	Solar Spectrum Reflectometer	White - 75 min 87 typical	Average - 71 After cleaning - 83.5
Breaking strength, kN	ASTM D 751 Grab Method	1.0 min 1.5 typical	1.0 min 1.5 typical
Elongation at break of fabric	ASTM D 751	25 typical	25 typical
Tearing strength, N 200mm x 200mm specimen	ASTM D 751 B Tongue Tear	245 min 578 typical	245 min 578 typical
Low temperature flexibility, oC	MOAT 27:5.4.2	≤ -20°C	≤ -20°C
Dimensional stability, %	MOAT 27:5.1.6.1	N/A	Longitudinal 0.26 Transverse 0.03
Ozone resistance, 100 pphm, 168 hrs	ASTM D 1149	No cracks	No cracks
Resistance to water absorption After 7 days immersion 70°C Change in mass, %	ASTM D 471	N/A	4.0 max 2.0 typical
Resistance to microbial growth, rating (1 very poor, 10 no growth)	ASTM D 3274 2 yr S. Florida	N/A	9 - 10 typical
Field seam strength, N 50mm-1 Seam tested in peel	MOAT 46:6P	229	179 239 (Joint made with exposed membrane)
Water vapour permeance, perms	ASTM E 96	0.10 max 0.05 typical	No change
Puncture resistance N	FTM 101C Method 2031	1110 min 1330 typical	1110 min 1330 typical
Resistance to xenon-arc weathering Xenon-Arc, 5040kJ/m2 total radiant exposure, visual condition at 10X	ASTM G 26 0.7 W/m2 80EC B.P.T.	N/A	No cracks No loss of breaking or tearing strength

For Roofing
UTN 792 134



For Lining
UTN 792 133



Benefits of Sure-Weld TPO



All roofing materials are subjected to environmental conditions that can alter the physical and chemical properties of the material. These conditions include ozone, heat, solar radiation, thermal cycling, freeze/thaw, pollution, biological growth and ponding rainwater. Roof membrane properties must be maintained during exposure to the roof environment or the roof will not perform as expected. The inherent performance benefits of Sure-Weld TPO ensure the specifier and building owner of a versatile, durable and stable roofing option.

Design Flexibility

With today's construction trends of highly intricate and complex structures and the requirement for higher thermal insulation values, only membranes which aspire to the highest quality standards and possess unquestionable technical properties, will be considered in the design process. The versatility of Sure-Weld TPO ensures the designer total freedom and security when specifying the roof waterproofing system.



Environmental Consideration

Sure-Weld TPO has been independently tested and approved to BS6920 by the Water Research Council (WRC).

BS6920 is used by the Water Regulations Advisory Scheme (WRAS) to ensure the suitability of non-metallic products for use in contact with water intended for human consumption with regard to the effect on the quality of water.

Sure-Weld TPO roofing membrane will not contribute any harmful contaminants into rainwater which is discharged from roof areas into drainage and water collection systems. Sure-Weld TPO has been specifically formulated without the use of either polymeric or liquid plasticisers and does not contain any chlorinated ingredients.

Sure-Weld TPO is:

- Free of PVC
- Fully recyclable and provides one of the most environmentally considerate roofing solutions available.
- Sure-Weld TPO in white finish provides additional reflectivity and carries the Energy Star rating for Energy Conservation in structures.
- Sure-Weld TPO is a recognised roofing membrane by the Association for Environment-Conscious Building.



Durability

Sure-Weld TPO provides long term weather resistance and demonstrates excellent protection against extremes of temperature and is proven throughout the world in both the hottest and coldest climates. Sure-Weld TPO is ozone and UV resistant whilst its physical and performance properties remain virtually unchanged throughout its serviceable life.

Fire Approvals

- BS476 Ext. - FAA Grades Available
- UL Class A
- Factory Mutual Approval
- Building regulations - unrestricted use
- Din B2
- Danish Institute of Fire Technology
- Veritas M3



Biological Resistance

Sure-Weld TPO will not rot, support plant growth and is resistant to bacteria found in normal atmospheric pollution, animal fats, grease, hydrochloric acid and calcium chloride (salt).

Compatibility

Sure-Weld TPO roof membrane can be installed on all major roof deck types such as plywood, timber boards, profiled metal, concrete and cementitious screeds and is not affected by direct contact with commonly used roofing materials such as bitumen, asphalt, mortar, polystyrene or rubber. This makes Sure-Weld TPO the ideal membrane for overlaying existing roofs.

Security in Application

Adjoining sheets of Sure-Weld TPO are fused together by hot air welding which is generally considered to be the strongest and safest method available in the Industry today.

Typically for the main area of the roof an automatic welding machine is used providing clean and consistent welds whilst providing maximum control over both temperature and speed.

Sure-Weld TPO exhibits a wide "welding window" allowing perfect welds to be produced over a broad temperature range. On completion the integrity of each weld is checked manually with a seam probe or an electronic integrity test may be carried out.



Excellent weathering capability in extreme climate.

For example:-



MGM Hotel and Casino, Las Vegas



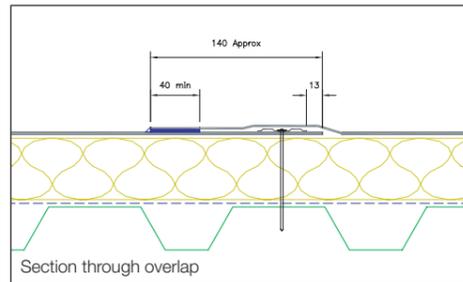
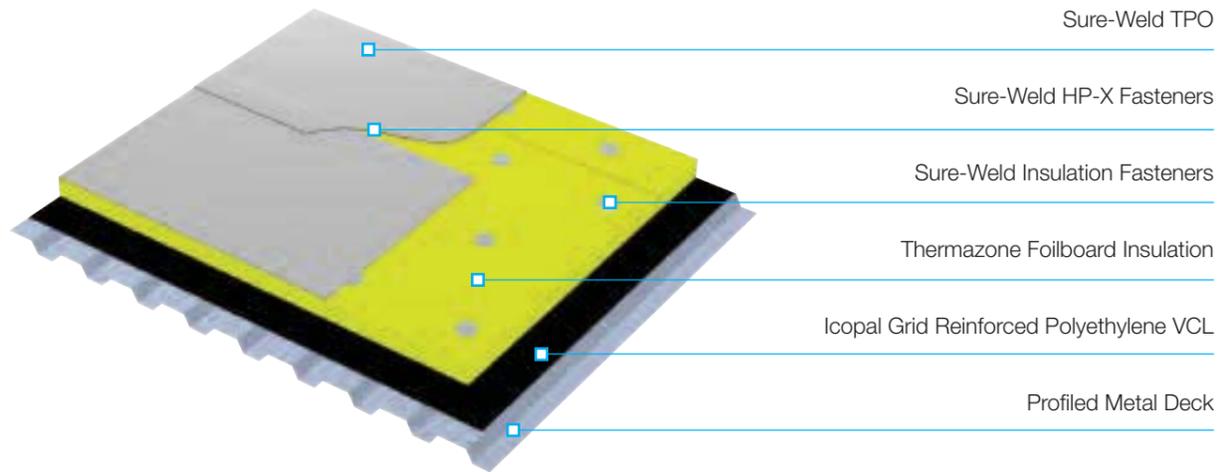
The Kremlin, Moscow

System Options - Mechanically Fastened

- High productivity
- Smooth flat appearance
- Few components
- Flexible application
- Negligible VOC's
- Instant seam strength
- Competitive cost advantage
- Wind uplift performance inherent in the system
- Hot air welded

Installation Benefits

Sure-Weld mechanically fastened roofing systems are fast and easy to install utilising roll widths up to 3.6m, and minimal system components. Sure-Weld TPO sheets are mechanically fastened along their edge, and the adjoining sheet is overlapped and joined together with a minimum 40 mm wide hot air weld. Hot air welding provides the strongest and safest seaming method available in the industry today. The system is installed using automatic hot air devices that make sheet welding clean and consistent whilst also reducing strain on the roofing applicator.



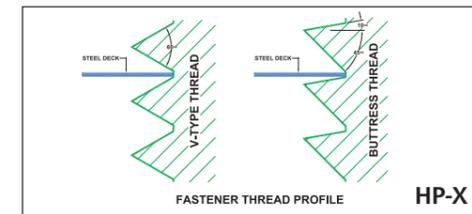
Sure-Weld HP-X Fastener System

The unique HP-X Fastener System has been specifically designed as an integral part of the complete Sure-Weld Roofing System. The fastener spacing in the membrane laps are normally determined by the profile of the metal deck and the designed fixing density is therefore achieved by varying the width of the individual sheets of membrane across the roof.

The design loads for the Sure-Weld HP-X fastener system have been determined by independent large scale dynamic wind uplift tests, however pull out tests will be undertaken on all existing roof decks to determine actual design loads for calculation.



Reproduced from BRE Digest 346 Part 3 with permission*



Factors influencing the behaviour of a Mechanically Fixed System

The effects of wind on a building and in particular the roof depend on various factors i.e. the shape of the roof, the height of the building, its geographical location and its degree of exposure or topography.

The various parts of the roof i.e. the roof edges, flat surfaces, changes in level & projections are all subject to stresses and must be considered in the calculations of the roofing system when designing the resistance to wind action.

The fastener density and pattern are individually designed for every Sure-Weld project to comply with the codes of practice BS6399 (additional codes can be accommodated if required) and this requires the need for increased fastener density at perimeters and corners to account for higher wind uplift forces.

Benefits

- 60mm diameter Pirhana plate with 12 barbs that penetrate the membrane and the substrate trapping the membrane firmly in position.
- Mini drill point fixings creates a force-fit action.
- Epoxy electro-deposition coating provides excellent corrosion resistance and reduced "head fill"
- Increased fastener performance
- Reduction in the number of fasteners
- Allows larger roll widths to be used
- Fewer joints
- Reduced installation time
- Reduced cost
- Large 5.85mm diameter buttress thread, the flat top allows more of the thread to be in contact with the underside of the deck.

*BRE Digest 346 'The assessment of wind loads' (in 8 parts) is available from CRC Ltd, tel 020 7505 6622

Typical Specification - Mechanically Fastened

1. Deck

Install the Profiled metal deck to the required falls in accordance with the manufacturers instructions. Ensure that the deck is firmly fixed, clean, dry, smooth, and free from frost & contaminants.

2. Grid Reinforced Polyethylene Vapour Control

Install Icopal Vapour Control Layer to a manageable area. Joints in the Vapour Control Layer must be a minimum of 150mm and joined with Icopal Monobond LT tape. The overlap must be made on the crown of the metal deck and seams must be hand rolled to secure the joint. Hold down the Vapour Control Layer by placing and fixing the insulation as detailed in the mechanical fixing layout drawing ref..... Turn the Vapour Control Layer up all upstands, kerbs and other penetrations and wrap around the edges of the insulation turning back to provide a complete seal.

3. Thermal Insulation Foilboard (See page 15)

Install Icopal Thermazone Foil Roofboard 2400 x 1200mm closed cell polyurethane insulation board.....mm thick, loose laid over the Vapour Control Layer. All boards must be laid breaking joint with long edges running at right angles to troughs and ends fully supported. Insulation boards to be fixed using at a minimum rate of 11 fixings per board using Sure-Weldmm long HP-X fasteners and insulation plates. On completion of fixing ensure that the boards are in good condition, well fitting with no springing, flexing or rocking.

4. Membrane Attachment

Install Sure-Weld TPO membrane to provide a secure and watertight roof with membrane free from wrinkles or blemishes. Side laps are mechanically fixed at centres as described on the fixing scheme-drawing ref..... All sheets to be mechanically fixed around the perimeter and all apertures or attached to Sure-Weld pre formed metal flashing for securement. All mechanical fixings must be Sure-Weld HP-X and Pirhana plate washers and fitted in accordance with the recommend equipment to ensure correct and consistent insertion. The fixing scheme drawing illustrating the various zones of fixing density will be issued on receipt of order. The method of fixing must be followed correctly in order to meet wind uplift resistance requirements.

5. Side Lap Welding

Overlap adjacent Sure-Weld sheets 140mm to form laps where mechanical fixings are located and a minimum of 50mm in all other locations ensuring water will drain over and not into them. If the membrane has been exposed for more than seven days clean and dry the joint surfaces using Sure-Weld membrane cleaner for the whole length of the lap prior to welding. Seal all side and end laps by heat welding ensuring a 40mm hot air weld using manufacturers recommended welding machinery. All laps should be checked after the completion of welding and the membrane

has cooled by drawing a metal scribe along the joint in a firm but non-destructive way. All cut edges to be finished with a 3mm bead of Sure-Weld TPO cut edge sealant following welding. This operation should be carried out as work is in progress.

6. Corners

Internal and external corners should be formed using Sure-Weld TPO pre formed corners, or site formed using Sure-Weld TPO flashing

7. Perimeter details

Install Sure-Weld TPO metal sheet bent to suit the detail and fixed in accordance with the relevant detail drawing.

8. Terminations

Install Sure-Weld termination bar where a surface mounted termination is required. Install a bead of Sure-Weld cut off mastic behind the membrane at the top of the termination. Install Sure-Weld termination bar fixed at max 300mm centres with the appropriate fastener. Do not wrap termination bar around corners. Cut all termination bars at corners to accommodate expansion and contraction. Install Sure-Weld water cut off mastic completely filling the channel on top of the termination bar and point to eliminate voids.

9. Outlets

Install suitably sized Sure-Weld roof outlet in accordance with the current fixing instructions. The Sure-Weld outlet has a rubber "O" ring fitted to the spigot. This "O" ring provides a seal to the internal diameter of the down pipe. The outlet has a reinforced TPO flange that should be fully supported and mechanically fixed. The Sure-Weld TPO field membrane must be fully sealed to the flange.

10. Walkways

Install Sure-weld TPO walkway to designated areas by hot air welding along the long edges to main field membrane. Provide 100mm wide gaps to ensure that the walkway does not bridge over welds in membrane.

11. Pipes and Vents

Cut membrane around the roof penetration and secure to the deck. Install Sure-Weld pre-moulded pipe flashing 25 to 150mm diameter. Hot air weld the flange of the pipe flashing to the membrane surface and seal to the pipe with Sure-Weld water cut off mastic and stainless steel clamping ring or Install a counter flashing or weathering cravat to the projection.

12. Lightning Conductor Strip

Install Sure-Weld lightning conductor pads to provide attachment of the lightning conductor strip to the finished waterproofing. The pads should be fixed in a straight line with centres not more than 1m. At changes of direction the pads should be installed as close as practical to either side of the juncture. The pads are secured by heat welding.

13. Approved Applicators

All work should be carried out only by an approved Sure-Weld applicator and in accordance with the Manufacturers current application guidelines.

14. Storage of Materials

Materials should be delivered to site in the original packaging and bearing the appropriate Sure-Weld labels. Store rolls of Sure-Weld membrane in clean, dry conditions. Insulation products must be kept dry and protected from wet weather during storage and installation. Care should be taken when loading roof areas to ensure that material is positioned over structural supports and that adequate protection is taken to protect the deck and insulation from damage.

15. Incomplete Work

At the end of each working day ensure adequate protection of the insulation by temporary seal and ensure the laying sequence enables all temporary sealing to occur down the slope and not against the flow of water.

16. Protection of Work

Ensure that the roof is not used as a working platform unless fully protected to the satisfaction of the CA. No paints, solvents or substances harmful to the membrane are allowed to come into contact with the roof surface. No building materials are stored on the roof without adequate protection. Finished roof areas should be adequately protected from damage by subsequent building operations.

17. Adverse Weather

Sure-Weld TPO should not be laid in wet or damp conditions and work should be suspended in severe or continuously wet periods unless an effective temporary roof is provided over the working area. If unavoidable wetting of the construction occurs, take prompt action to minimise and make good any damage.

18. Completion/Quality Assurance

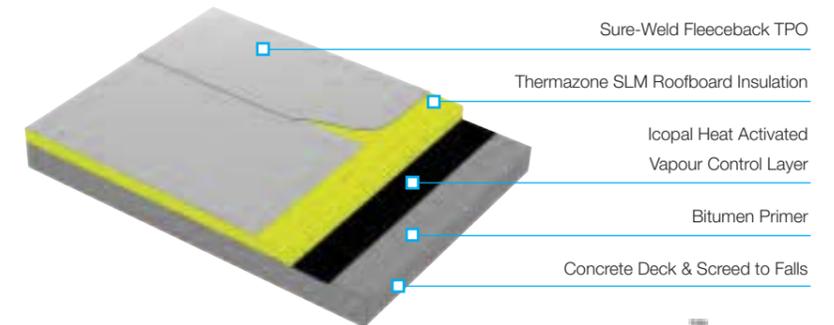
Upon completion, Icopal should be notified to make a final inspection of the work. Roof areas should be clean with all outlets clear and running free. All work by third parties necessary to provide a watertight finish should be completed. The approved applicator should ensure attendance at the final inspection. Any defects where possible should be completed whilst the Icopal technician is on site. Warranties will only be issued when the completed roofing system has been deemed to be in compliance with the specification and working details applicable for the Sure-Weld Roofing System. Upon satisfactory completion the Sure-Safe Warranty will be issued to the client via the approved applicator.

Fully Adhered System

Installation Benefits

Sure-Weld Fleeceback TPO offers an ideal solution on very complex building shapes or where drilling and mechanical fasteners are inappropriate or impractical.

- Allows use of maximum sheet widths up to 3.6m
- Distributes stress equally across roof area
- Smooth flat appearance
- Easy to install
- Double reinforced membrane
- Factory mutual approved
- High productivity



NBS format specifications are available if required

Sample Specification

1. Deck

Install concrete deck with screed to falls and ensure the surface is free from latents and rough projections. Apply Icopal quick drying primer and allow to dry thoroughly

2. Vapour Control

Apply a layer of Icopal Heat Activated Vapour Control Layer creating a full bond to the substrate. At all upstands and penetrations the Vapour Control Layer should be dressed to form protection to the ends of the Insulation.

3. Thermal Insulation

Bond to the Vapour Control Layer Icopal Thermazone SLM Roofboard insulation boardmm thick (refer to page 15 for insulation thickness), laid breakbond pattern in accordance with the current fixing instructions.

4. Membrane Attachment

Verify that the surfaces to receive the Sure-Weld adhered membrane are clean, dry, smooth and free from defects. During membrane installation, inspect and correct the substrate where necessary to avoid gaps between insulation boards, uneven or step off conditions. Apply the Sure-Weld Fleeceback bonding adhesive to

insulation with a medium nap roller ensuring continuous and even distribution of the adhesive, avoiding puddles. Sure-Weld Fleeceback bonding adhesive must be left open until it starts to string or stick to a dry finger touch. **Do not apply adhesive to lap areas which are to be hot air welded.** Roll the membrane into the wet adhesive coated substrate (once foaming or stringing has occurred) avoiding wrinkles in the sheet. Immediately roll with a weighted roller to adhesive maximum contact.

Side Lap Welding

Lap side and end joints not less than 50mm ensuring that water will drain over and not into them. Seal all side and end joints by welding. If the membrane has been exposed for more than seven days, clean and dry the joint surfaces using Sure-Weld Membrane Cleaner for the whole length of the lap prior to heat welding. At end laps overlap butt edges with a 150mm wide strip of Sure-Weld Reinforced membrane and hot air weld along all edges. Apply 3mm bead of edge sealant to all cut edges of membrane and all the end laps



Please refer to Page 11, points 5 - 18 for remainder of Specification.

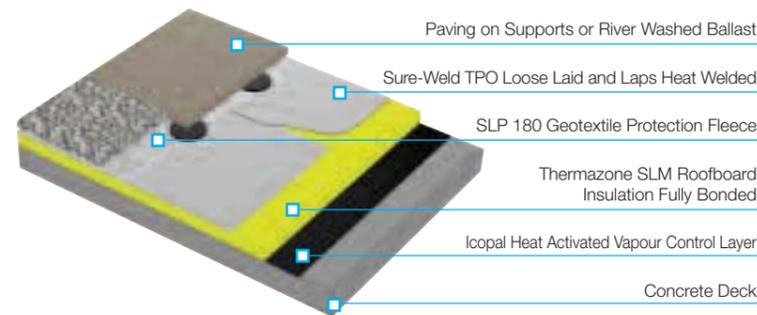
Ballasted Warm Roof System

Sample specifications for Sure-Weld Ballasted Warm Roof and Sure-Weld Inverted roof designs are available from Icopal Technical Services Department on: 0161 865 4444 or at www.icopal.co.uk

Installation Benefits

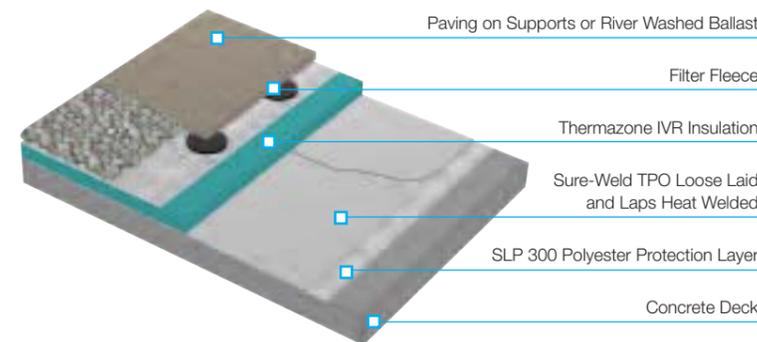
Please note the designers should satisfy themselves that the structure and supporting deck are capable of receiving the additional dead load of a Ballasted System.

Ballast Requirements	
Thermazone IVR Thickness (mm)	Gravel Depth (16kg per 10mm)
30,40,50	50
60	60
70,80,90	75
100	80
120,140	90



- Allows use of maximum sheet widths
- Maximum resistance to external fire
- Speed of installation - Membrane loose laid
- Maximum restraint against wind uplift
- Protected from mechanical damage
- Protected from solar/UV degradation

Inverted Roof System

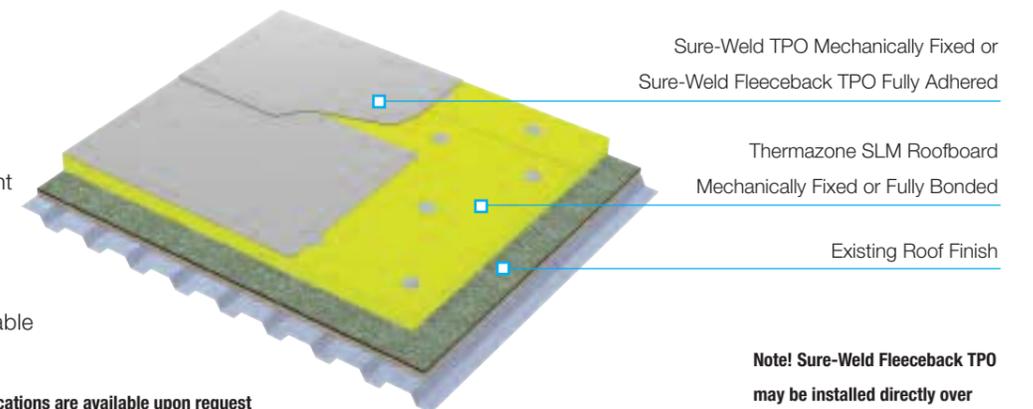


- Allows use of maximum sheet widths
- Max resistance to external fire
- Speed of installation - Membrane loose laid
- Maximum restraint against wind uplift
- Protected from mechanical damage
- Protected from solar/UV degradation
- Membrane temperature lowest of all systems
- Eliminates damage by condensation
- Movement within insulation not transmitted to membrane
- Unaffected by freeze/thaw cycles
- Thermal upgrade easily achievable

Refurbishment - Mechanically Fastened or Fully Adhered

Installation Benefits

- Cost effective
- Minimal disturbance to occupants
- Additional securement of existing system
- Allows Thermal Insulation upgrade
- Full site survey available



NBS format specifications are available upon request

Note! Sure-Weld Fleeceback TPO may be installed directly over the existing roof surface subject to confirmation by Icopal Technical Services

Sample Specification

1. Preparation

Release and re-seal all blisters. Make good any other defects in the roof covering. Remove all superfluous materials, dust and debris from the roof and leave in a clean and dry condition.

2. Thermal Insulation (If Required)

Install Icopal Thermazone SLM Roofboard insulation by mechanical fixing at a rate of 11 fixings per board, or by bonding in Insta-stik PU adhesive or other similar approved bonding adhesive to manufacturers recommendations.

3a. Membrane Mechanically Fixed

Install Sure-Weld TPO membrane to provide a secure and watertight roof with membrane free from wrinkles or blemishes. Side laps are mechanically fixed at centres as described on the fixing scheme-drawing ref.... All sheets to be mechanically fixed around the perimeter and all apertures or attached to Sure-Weld pre formed metal flashing for securement.

All mechanical fixings must be Sure-Weld HP-X and Pirhana plate washers and fitted in accordance with the recommend equipment to ensure correct and consistent insertion.

3b. Membrane Fully Adhered

Verify that the surfaces to receive the Sure-Weld adhered membrane are clean, dry, smooth and free from defects. During membrane installation,

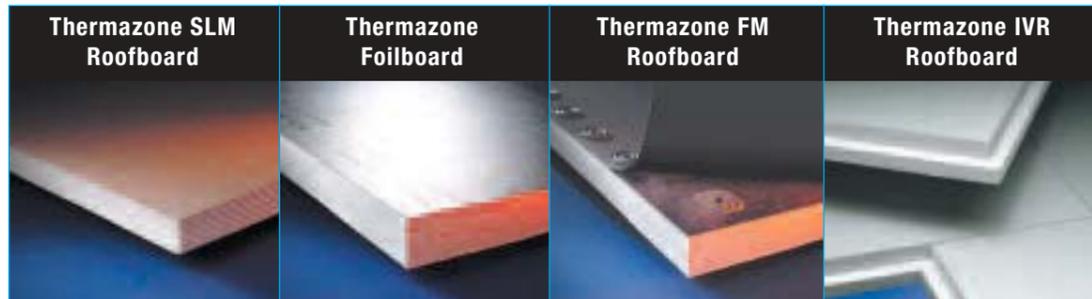
inspect and correct the substrate where necessary to avoid gaps between insulation boards, uneven or step off conditions. Apply the Sure-Weld Fleeceback bonding adhesive to insulation with a medium nap roller ensuring continuous and even distribution of the adhesive, avoiding puddles. Sure-Weld Fleeceback bonding adhesive must be left open until it starts to string or stick to a dry finger touch. **Do not apply adhesive to lap areas which are to be hot air welded.** Roll the membrane into the wet adhesive coated substrate (once foaming or stringing has occurred) avoiding wrinkles in the sheet. Immediately roll with a weighted roller to adhesive maximum contact.

Side Lap Welding

Lap side and end joints not less than 50mm ensuring that water will drain over and not into them. Seal all side and end joints by welding. If the membrane has been exposed for more than seven days, clean and dry the joint surfaces using Sure-Weld Membrane Cleaner for the whole length of the lap prior to heat welding. At end laps overlap butt edges with a 150mm wide strip of Sure-Weld Reinforced membrane and hot air weld along all edges. Apply 3mm bead of edge sealant to all cut edges of membrane and all the end laps

Note! All roof areas being considered for overlay must be assessed for suitability by Icopal Technical Services. Please refer to Page 11, points 5 - 18 for remainder of Specification.

Sure-Weld System Insulation



	Thermazone SLM Roofboard	Thermazone Foilboard	Thermazone FM Roofboard	Thermazone IVR Roofboard
Description	Consists of a CFC and HCFC free polyurethane rigid core and has an Ozone depletion potential of zero. Facings of wet lay glass fibre tissue with a mineralised coating are autohesively bonded to both sides of the foam during manufacture.	Consists of a CFC free polyurethane rigid core, with Foil Kraft facings autohesively bonded to both sides of the foam during manufacture.	Consists of a CFC and HCFC free polyisocyanurate rigid core and has an Ozone depletion potential of zero. Facings of wet lay glass fibre tissue with a mineralised coating are autohesively bonded to both sides of the foam during manufacture.	Manufactured from CFC free extruded Polystyrene with a closed cell structure for high resistance to water absorption. Thermazone IVR Roofboard is unaffected by Freeze/ Thaw cycling and retains its thermal properties throughout its lifetime.
Quality Management System	Manufactured under a quality management system approved to BS EN ISO 9002: 1994 by BSI quality assurance.	Manufactured under a quality management system approved to BS EN ISO 9002: 1994 by BSI quality assurance.	Manufactured under a quality management system approved to BS EN ISO 9002: 1994 by BSI quality assurance.	Manufactured under a quality management system approved to BS EN ISO 9002: 1994 by BSI quality assurance
Board Size	2400 x 1200mm	2400 x 1200mm	2400 x 1200mm	1250 x 600mm
Available Board Thickness	30 to 120mm	25 to 120mm	25 to 120mm	30 to 100mm
Installation	Approved for use with Sure-Weld Mechanically Fixed and Fully Adhered Systems.	Approved for use with Sure-Weld Mechanically Fastened Systems.	Approved for use with Sure-Weld Mechanically Fixed and Fully Adhered Systems.	Approved for use with Sure-Weld Inverted Roof System
Thermal Conductivity	0.0024 w/m2K > 80mm 0.0025 < 80mm	0.020 w/m2K	0.024 w/m2K > 80mm 0.0025 < 80mm	0.026 w/m2K
Compressive Strength	140 kN/m2	>140 kN/m2	140 kN/m2	Typically exceeds 330 kPa at 10% compression when tested to BS 4370: Part 1: 1988 (1996) (Methods of test for rigid cellular materials).
Water Vapour Resistance	>15MN/g	>15MN/g	>15MN/g	>15MN/g
Tolerances	Length +/- 10mm Width +/- 3mm Thickness Up to 30mm +/- 1.5mm Up to 50mm +/- 2mm Over 50mm +/- 3mm Over 75mm +/- 4mm	Length +/- 10mm Width +/- 3mm Thickness Up to 30mm +/- 1.5mm Up to 50mm +/- 2mm Over 50mm +/- 3mm Over 75mm +/- 4mm	Length +/- 3mm Width +/- 3mm Thickness Up to 30mm +/- 1.5mm Up to 50mm +/- 2mm Over 50mm +/- 3mm Over 75mm +/- 4mm	Length +/- 7.5mm Width +/- 3mm Thickness Up to 30mm +/- 2mm Up to 50mm +/- 2mm Over 50mm +/- 3mm
Additional information	The free spanning distance must not exceed the following figures Thickness (mm) Span (mm) 25 75 30 100 35 125 40 150 45 175 50+ 200+	The free spanning distance must not exceed the following figures Thickness (mm) Span (mm) 25 75 30 100 35 125 40 150 45 175 50+ 200+	The free spanning distance must not exceed the following figures Thickness (mm) Span (mm) 25 75 30 100 35 125 40 150 45 175 50+ 200+	<ul style="list-style-type: none"> Rebated on all four edges for continuous thermal performance When surfaced with Paving or stone ballast achieves Ext FAA (BS476 Pt 3)
U value (W/m²k)				
0.45	60 Mech Fixed 50 Adhered	50	50	50
0.35	70 Mech Fixed 70 Adhered	60	70	70
0.25	100 Mech Fixed 90 Adhered	90	100	100

Typical values assuming profiled metal deck without ceiling. For other build ups please contact Technical Services.

Icopal's range of Thermazone SLM rigid urethane thermal insulation has been specifically designed to complement the Sure-Weld TPO roofing system offering high quality and environmentally friendly solutions to all insulation requirements.

Key features of the Thermazone range of insulation are:

- Excellent Thermal Performance
- Dimensional Stability
- Compressive strength
- Resistant to Mould and Microbial growth
- Resistant to most oils, greases and adhesives (with the exception to those containing ketones and esters)
- Easy to handle and install

Thermazone SLM Cut to Falls

Using the latest in computer aided design technology our design office can produce the most efficient and cost effective layouts and quotations for every project. The combined effect of providing thermal insulation and positive falls to the roof structure in one installation remains one of the major benefits in roof drainage design.



Site Handling and Storage

Thermazone Insulation is delivered to site on pallets secured with strapping and labelled according to type.

Thermazone Insulation should be stored flat, clear of the ground and protected from the rain and damp, ideally in a building or under cover. Packaging must not be relied upon to provide protection from moisture.

Thermazone Insulation boards are light and easily handled. They can be cut with a sharp knife or fine tooth saw. In normal use, Thermazone Insulation boards are not hazardous to health. However the products contain some materials for which maximum exposure levels (mels) or occupational exposure standards have been set by the Health and Safety Executive. Please refer to the relevant C.O.S.H.H data sheet for this information.

Calculations for "U" Value and condensation risk are carried out and maximum depths of Insulation indicated on drawings to aid detailing. Schemes can be submitted as hard copy or electronically for approval before the issue of working drawings.

A comprehensive site survey will be carried out and detailed report produced for all refurbishment projects giving consideration to:

- Areas of Ponding
- Deflection of the structure
- Drainage points
- Upstand heights
- Position of all roof furniture, and windows.

Sure-Weld System Product Data

Sure-Weld accessories have been individually designed to ensure total compatibility and ease of application and play a vital role in achieving the total integrity of the overall Sure-Weld waterproofing system. All Membranes and Accessories are available in Light and Dark grey as standard and White to order. Separate Technical data sheets on all products are available upon request.



■ Sure-Weld TPO Membrane

Description: Reinforced thermoplastic polyolefin (TPO) Thickness: 1.2mm
Roll Sizes: 1.52m x 25m (44.8kg), 2.44 x 25m(72.0kg). Application: Main Roof Areas and Details.
Attachment: Mechanically fastened or fully bonded using Sure-Weld contact adhesive.



■ Sure-Weld TPO Fleeceback Membrane

Description: Reinforced thermoplastic polyolefin (TPO) factory laminated to a 1.4mm spunbond polyester fleece. Thickness: 2.6mm Roll Size: 1.83m x 30.48m (76.4kg), 3.66m x 30.48m (152.8kg)
Application: Main Roof Areas and Details
Attachment: Fully Bonded using Sure-Weld Fleeceback Adhesive.



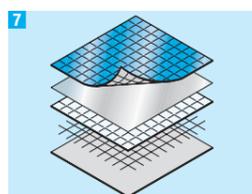
■ Sure-Weld TPO Flashing

Description: Non-Reinforced TPO membrane. Thickness: 1.5mm
Roll Sizes: 0.3m x 15.25m (6.86kg), 0.6m x 15.25m (13.72kg).
Application: Site fabrication of corners, pipe flashings and sealant pockets.
Attachment: Hot air welded



■ Sure-Weld Walkway Membrane

Description: Anti Slip TPO Walkway Membrane. Thickness: 3.5mm
Roll Size: 0.75 x 15.25m (34.0kg) Colour: White
Application: Roof walkway areas, Designated roof access and escape routes, around plant areas and at the base of roof ladders.



■ SLP Polyester Protection Fleece

Description: Non-Woven polyester fleece. Weight: 180g/sq.m & 300g/sq.m.
Roll Size: 2.0 x 100.0m (36.0kg) & 2.0 x 75.0m (45.0kg) Colour: Grey & White
Application: Protection of Sure-Weld membrane from rough surfaces such as Concrete, Brickwork or for isolation layer over existing roof surfaces.



■ Icopal Vapour Control Layers

Description: A range of Vapour Control Layers made from a special formulation of low density polyethylene to give maximum vapour diffusion resistance without degradation.
Application: Vapour Control Layers are loose laid with a minimum overlap along all edges and at penetrations of 100mm and taped with Monobond double sided tape which is hand pressure rolled to secure the joint.

■ Sure-Weld Coated Metal

Description: A 0.6mm galvanised steel sheet coated with a layer of non-reinforced TPO film (total thickness 1.5mm) Sheet Size: 1.20m x 3.0m Sheet Weight: 20.0kg
Application: Fabrication of edge details, upstands and flashings.

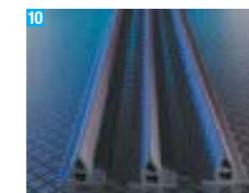
■ Sure-Weld TPO Corners

Description: 1.5mm thick pre-moulded universal corner. Packaging: 12 corners per pack
Application: Used to reinforce internal and external corners with no stretching or cutting required



■ Sure-Weld Standing Seam Profile

Description: A 25mm high pre-moulded TPO extrusion. Size: 25mm x 3.0m
Application: Heat welded to the roof membrane to replicate the appearance of lead standing seam or metal profiles.



■ Sure-Weld Pipe Boot

Description: Moulded and pre-formed TPO pipe flashing, complete with stainless steel clamp ring. Size: to suit pipe sizes 25 - 150mm
Application: Flashing of cold pipe applications, hot air welds directly to membrane. Seal to pipe with Sure-Weld water cut-off mastic and clamping ring.



■ Sure-Weld Cut Edge Sealant

Description: A medium solids content, free flowing polymeric material.
Packaging: 8 No - 0.48 litre Squeeze Bottles per box (4.0kg)
Coverage: 250 linear metres for a 3mm bead per box. Colour: Clear
Application: To seal cut edges of Sure-Weld membrane where the reinforcement has been exposed.



■ Sure-Weld Membrane Cleaner

Description: A citrus based (non-solvent) cleaner. Packaging: 1US gallon can.
Coverage: 180 lin m for a 100mm wide strip. Colour: Clear.
Application: Used for the preparation of membrane for hot air welding which has been exposed to the weather for longer than seven days or for the general removal of dirt.



■ Sure-Weld Pressure-Sensitive Cover Strip

Description: A 1.15mm reinforced TPO membrane strip laminated to a 0.9mm layer of fully cured synthetic rubber pressure sensitive adhesive. Roll Size: 0.15m x 30.50m (10.0kg)
Application: For jointing Sure-Weld TPO to materials which are not compatible with hot air welding such as connection to Plastisol coated metal edge conditions or GRP & PVC rooflights. Must be used in conjunction with HP-250 primer.

■ Sure-Weld HP-250 Primer

Description: A one step cleaner and primer to be used with Sure-Weld Pressure Sensitive Cover Strip. Packaging: 1 US Gallon drum Weight: 3.55kg
Coverage Rate: Approx 25 Sq.m per drum.



■ Sure-Weld Lightning Conductor Pads

Description: A circular TPO disc complete with a lightning conductor cable clip suitable for 25mm lightning conductor strip. Specify options -bare copper or PVC coated strip.
Application: Hot air welded to a sacrificial pad of Sure-Weld TPO which is in turn welded to the main field sheet at 1.0m centres max.



■ Sure-Weld Aluminium Jointing Tape

Application: Positioned over the 5mm expansion gap in Sure-Weld coated metal as an isolation layer before applying a 100mm Sure-Weld TPO butt strap.
Roll Size: 50mm x 100.0m Weight: 493gms per roll.

Sure-Weld System Product Data Continued



■ Sure-Weld Compressive Foam Strip

Application: Positioned under Sure-Weld metal edge detail to provide a wind tight installation.
Roll Size: 20mm x 10m **Weight:** 108gms per roll.



■ Sure-Weld Sealant Pockets

Description: A prefabricated pocket with a polymer support and pre-applied Sure-Weld Flashing.
Sizes: 150mm & 200mm Depth. **Colour:** Grey.
Application: Ideal for sealing irregular hard to flash penetrations through the membrane. Inside of pocket and the penetration must be primed with HP250 primer before filling the pocket with CCW-102 sealant.



■ Sure-Weld Termination Bar

Description: Extruded aluminium termination bar. **Size:** 25mm x 3.0m pre drilled at 150mm centres.
Application: Compression seal of membrane to concrete or brickwork using Sure-Weld Water Cut Off Mastic and Hammer Fixings.

■ Sure-Weld Roof Outlets

Description: A range of high quality stainless steel drainage outlets incorporating a Sure-Weld TPO flange for maximum integrity complete with neoprene "O" Ring and Gravel Grate.
Sizes: Suit downpipe sizes 60mm, 75mm, 90mm, 110mm, 160mm

■ Sure-Weld Bonding Adhesive

Description: A high strength synthetic rubber contact adhesive that allows membrane and flashing to be bonded to porous and non-porous surfaces. **Colour:** Yellow
Packaging: 5 US gallon drum (18.0kg) **Coverage Rate:** Approx 28 Sq.m per drum.
Open time: 5 – 50 minutes dependant upon ambient temperatures.
Application: Apply the adhesive to both surfaces to be bonded and allow to dry until it does not string or stick to a dry finger. Brush or roll the surfaces together for maximum adhesion. Avoid getting adhesive into lap areas which are to be hot air welded.

■ Sure-Weld Fleeceback Adhesive

Description: A one part moisture curing polyurethane based adhesive designed for maximum adhesion with an optimum curing window for installation. **Colour:** Blue **Packaging:** 10kg drum.
Coverage Rate: Approx 3sq.m /Litre, 30sq.m per drum dependant upon substrate.
Open time: up to 15 minutes dependant upon ambient conditions.
Application: Adhesive is applied to the substrate by roller or squeegee. The adhesive is left open for approx 15 minutes before applying the membrane. Apply the membrane into the adhesive coated substrate (once foaming or stringing has occurred) avoiding wrinkles in the sheet. Immediately roll with a weighted roller to achieve maximum contact.

■ Sure-Weld HPX & HP Fasteners & Piranha Seam Plates

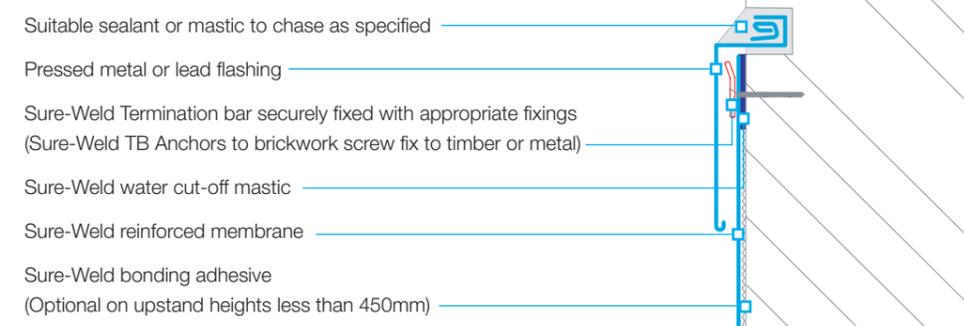
Description: Corrosion resistant fasteners designed to offer an optimum combination of driving performance, back out and pull out resistance.
 HPX fasteners are for use with: Profile Metal Deck 0.9mm, Timber & Plywood roof decks.
 HP fasteners are for use with concrete and screeded roof decks. Piranha seam plates are a 60mm dia twelve barb fixing plate for use with reinforced Sure-Weld membrane.
Application: No Pre-drilling is required. Locate the appropriate fastener through the seam plate and install with a standard clutch drive electric screw gun.
 Optimum fastener performance is achieved when the fasteners are installed perpendicular to the roof deck. Consult with Icopal Technical Services for project wind uplift calculations.

Typical Details - Mechanically Fixed Application

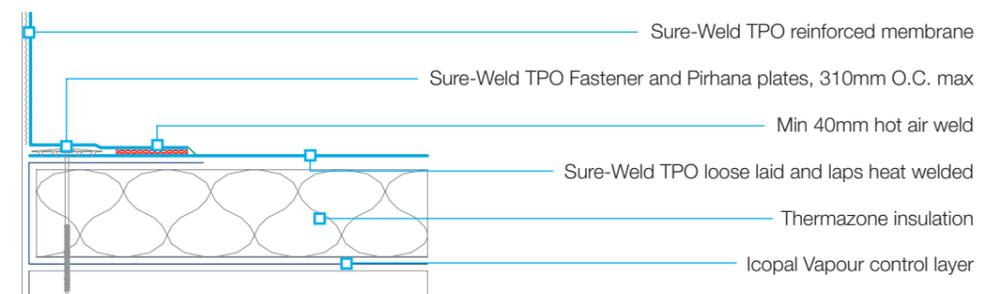
Termination Under Renderstop



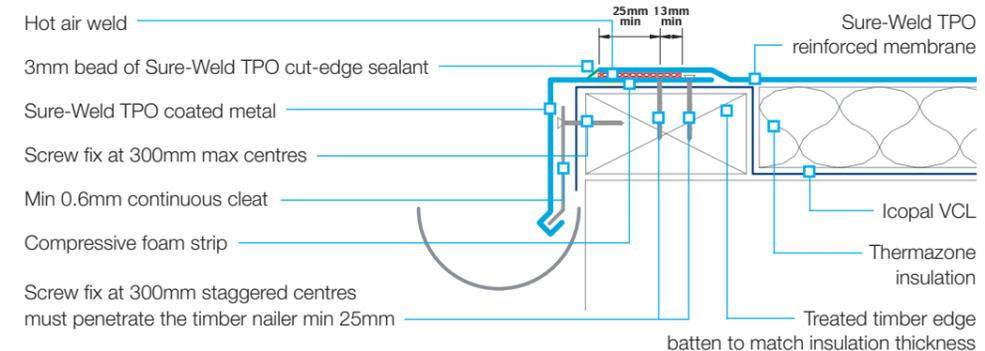
Termination Bar & Cover Flashing Detail



Upstand Flashing



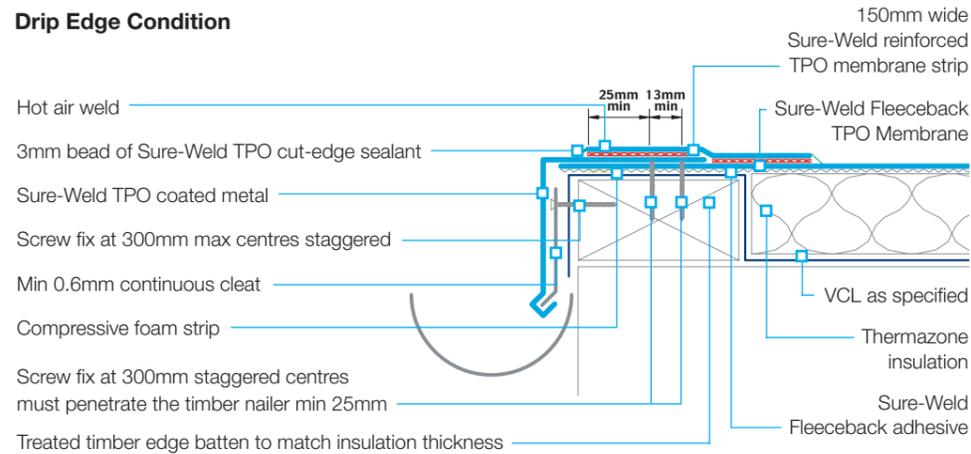
Drip Edge Condition



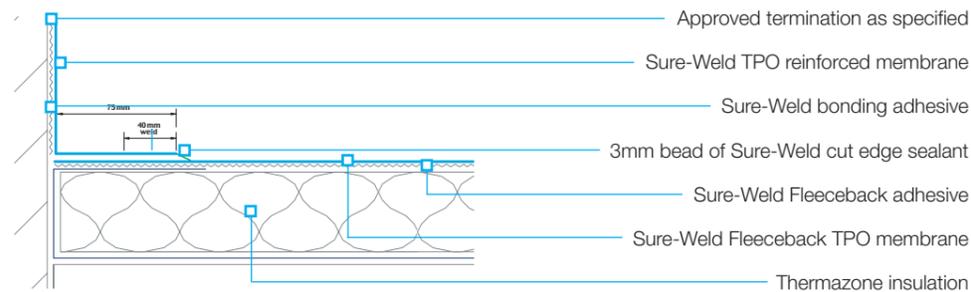
NOTE! Details are prepared on a bespoke basis for each project. Further standard details are available from technical services or via the website.

Typical Details - Bonded Application

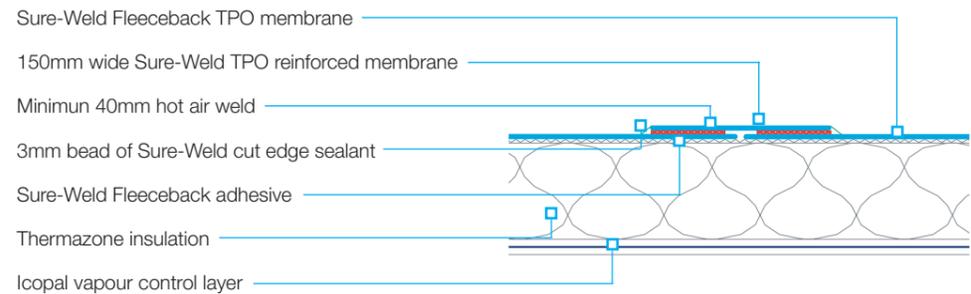
Drip Edge Condition



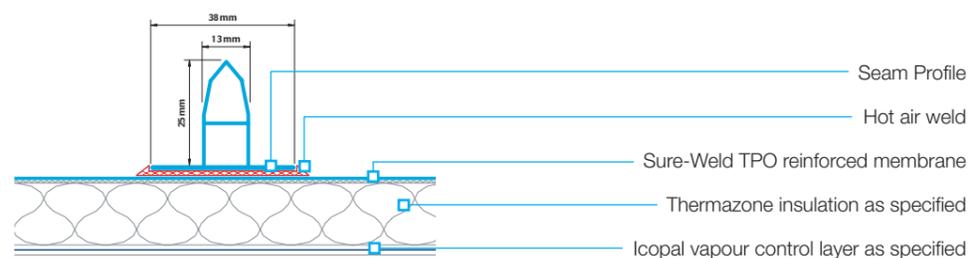
Upstand Flashing



End Lap/Butt Strap



Standing Seam Profile



Repair and Maintenance

All roofing systems will require periodical inspection and maintenance. BS6229: 2003 recommends that all flat roofs be inspected annually, it also states that in areas of high dust or pollution, inspections should be carried out more frequently. This ensures that dirt or debris is removed before causing damage and that signs of failure can be reported and remedial action taken at an early stage. Ideally flat roofs should be inspected once every six months, in the Spring and Autumn. These inspections involve a routine look at the roof structure and its ancillary services. In Spring it is important to check that the gutters and outlets are not blocked by fallen leaves which may cause water to pond.

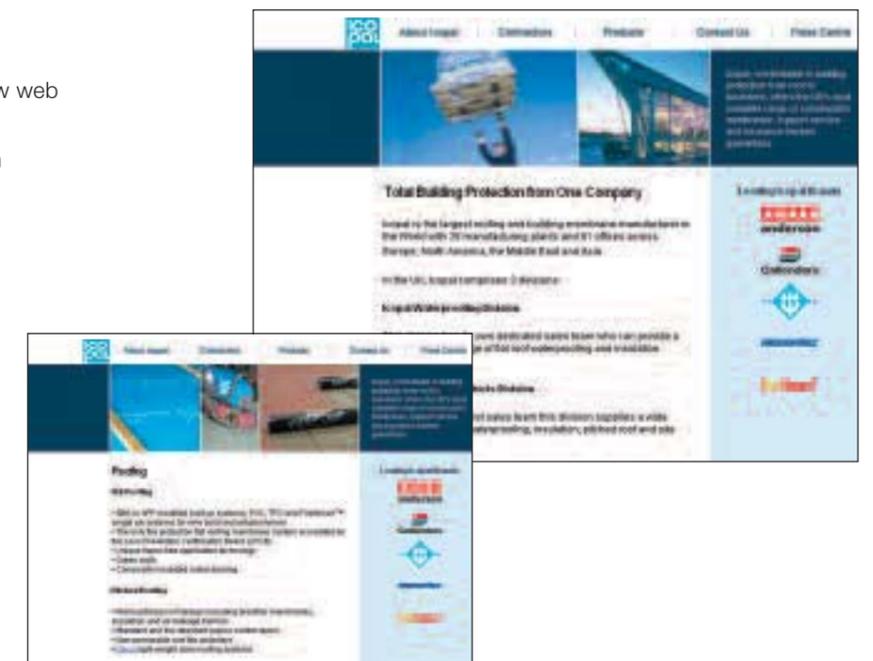
Once A Year

Each year it is essential that a roof inspection is made as a routine maintenance requirement to identify any potential problems and renew damaged components. Before any work is undertaken the original specifications should be consulted as the roof may be under guarantee. If there is a guarantee it is essential that remedial work is carried out by the original approved applicator to ensure that the guarantee is not invalidated. As with the six monthly inspection, the roof must be checked for debris and gutters and outlets cleaned. Gratings and wire cages should be renewed where necessary and flashings, trims and cappings replaced if damaged.

Website

Revolutionising the way you receive information from 4 days to 4 minutes! Designed as a one-stop-shop our new web site enables you to read on-line, print and download all the information needed for your roofing specifications 24 hours a day.

- CAD Drawings
- Specifications
- Guarantees
- Data Sheets/Literature
- Safety & Maintenance details
- Project Information
- Approved Applicators



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