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icopal

Icopal Reinforced Bitumen Waterproofing

A guide to handling, installation, maintenance and disposal

Part of BMI

Scope

This document is designed to accompany the lifecycle of the product, making the relevant product information clear and accessible.

CONTENT

Section 1 : Handling of construction products

Handling of Construction Products is the movement of Construction Products from the Manufacturer to the point of installation and includes any intermediary storage in between the two points.

Minimum requirements

- Safe manual and mechanical handling
- Safe storage and transport to site to ensure the declared performance has not been compromised

SAFE MANUAL AND MECHANICAL HANDLING

ALL PRODUCTS GENERAL RULES

It is strongly recommended by the HSE to try eliminating manual handling, whenever possible, before proceeding with manual handling. This should be done through the use of safe mechanical handling. For example all bitumen rolls are delivered by BMI on pallets and therefore it is recommended to use devices such as forklifts, hoists and pallet trucks to move the materials from the point of delivery or storage to as near to the point of installation as is practicably possible, prior to involving manual handling. Note care should be taken to ensure that materials are adequately secured to the pallet, to ensure load stability, and therefore we would recommend not to remove the packaging provided as delivered by BMI until the materials are to be removed from the pallet for installation involving manual handling.

Manual handling means transporting or supporting a load by hand or bodily force. It includes lifting, putting down, pushing, pulling, carrying or moving loads. Guidance concerning how to deal with risks from manual handling include the following:

Avoid manual handling, so far as reasonably practicable

- Minimise the length and frequency of carry, use mechanical handling wherever possible
- Assess the risk of injury from any manual handling operations that cannot be avoided

GENERAL MANUAL HANDLING

Reduce the risk of injury from manual handling to as low as reasonably practicable

- The weight of a load is important, though the law does not set specific weight limits.

INSULATION HANDLING

Some insulation and specifically foil faced insulation may reflect light particularly on bright, sunny days. It would be advisable to wear suitable protective eyewear and to protect skin with clothing and appropriate factor sun cream/block. Separately, the surface of some foil faced insulation boards could become slippery underfoot.

Do not stand on or load an unsupported insulation board. Insulation boards should be placed on a fully supported base. During application, take care handling insulation boards to prevent crushing, breakage or damage of the edges and surface.

MANUAL HANDLING IN WINDY CONDITIONS

All laying or handling of reinforced bitumen membranes and hot bitumen at roof level should cease when the mean wind speeds reach 23 mph (gusting to 35 mph or over) as advised by the National Federation of Roofing Contractors (NFRC).

When handling rolls of lightweight membranes and/or working with 'hot bitumen' extreme care is necessary when the wind speeds are in the region of 17 mph (gusting to 26 mph or over).

The handling of rigid insulation boards on a roof in windy conditions is especially dangerous as the board will act as a sail to catch the wind and could cause serious injury to the site operative and to members of the public if they blow off the roof. Work involving the handling of rigid insulation boards should cease as soon as the boards become difficult or dangerous to handle. This may well be lower than the mean average 17 mph wind speed limit for working on a roof that applies to other roofing materials as advised by the NFRC.

PRIMERS & ADHESIVE HANDLING

All liquid products should be retained within the original container.

PRODUCT STORAGE

BITUMEN ROOFING MEMBRANES

Icopal bituminous membranes should be stored upright on a clean, dry, level surface clear of the ground out of direct sunlight.

Membranes stored outside should be kept on the pallet within the original packaging. Membranes removed from the original packaging should be placed on a platform above the ground or roof deck and be protected with a suitably secured water-resistant covering (e.g. tarpaulin).

Membranes are palletised with the selvage edge at the top to prevent damage. Membranes are delivered single stacked. It is not recommended to double stack pallets of bitumen membranes.

Caution should be taken when loading and storing materials on the roof. Overloading the deck can cause deflection, ponding, and even roof collapse. Roofing membranes should always be protected from the weather..   It is recommended to store rolls in a heated area to at least 10°C for a minimum 24 hours prior to their application.

LIQUIDS: (including primers and adhesives)

Store all liquid products in the original container in a bunded dry, well ventilated container removing materials only when needed for daily work. Ensure containers are stored upright with tight-fitting lids to prevent drying out, moisture intrusion, or other contamination. Some liquid products may be highly flammable and should be stored away from sources of ignition in original sealed containers. Do not use a torch or open flame to warm any liquid containers. Always refer to the product material safety data sheet for confirmation.

- Storage temperature should be around +15°C.
- Storage of liquid products on the roof overnight should be avoided. Colder temperatures will affect the application rates. Do not overload the roof structure.

INSULATION

Flat roof insulation must be protected against the elements eliminating the possibility of moisture becoming trapped within the roofing system leading to future defects.

Insulation boards are supplied in a plastic wrapping. This factory packaging is intended for handling during manufacturing and transportation only and must not be relied upon as protection from the elements. It is recommended to slit the wrapping on site prior to application to expel any moisture or condensation that may accumulate. The insulation must be securely protected by a waterproof, breathable covering such as a tarpaulin and raised off the ground during onsite storage.

PRODUCT TRANSPORTATION

BITUMEN

Bitumen membranes should be transported on pallets with appropriate securement to the pallet (e.g. shrink wrap and banding). All pallets loaded onto vehicles should be strapped to the vehicle bed to eliminate movement in transit. Materials damaged in transit should be replaced. During periods of hot weather, additional strapping may be required to restrain pallets of bitumen membranes. Pallets incorporating bitumen membranes should not be double stacked.

INSULATION

The product is delivered to site in polyethylene shrink-wrap for short term protection during transit.

LIQUIDS

Always transport liquid products in closed containers that are upright on pallets with appropriate securement to the pallet (e.g. shrink wrap and banding). All pallets loaded onto vehicles should be strapped to the vehicle bed to eliminate movement in transit. Materials damaged in transit should be replaced. Liquids should be kept away from high temperatures or ignition sources and securely packaged on the pallet. Ensure that persons transporting the product are appropriately trained and qualified where applicable (e.g. Haz Chem qualified) and know what to do in the event of an accident or spillage. Access to material safety data sheets is available at www.bmigroup.com/uk.

ALL DELIVERIES

Deliveries are always made only to the nominated delivery address and must be offloaded onto safe, hard ground.

Standard Vehicle Types include:

- Curtain-sided Artic vehicle
- Curtain-sided Rigid vehicle
- Transit Van (Parcel Service only)

Mechanical offloading facilities (e.g. fork lift truck) will be required to remove the transported products from the vehicles. Please note that no offloading facilities are provided on standard vehicle types.

Specialist Vehicle Types include:

- Flat Bed
- Flat Bed with Moffat
- HIAB Crane vehicle.

Section 2: Product Installation

Installation of a Construction Product is the incorporation of the Construction Product into the construction works for temporary or permanent use.

Minimum requirements

- Safe installation and access
- Interface with other products
- Competency requirements for installation
- Specialist equipment and tools
- Sequencing of works
- System requirements and achieving tested performance
- Legal requirements
- Implications for BMI Icopal Guarantees
- Inspection, testing, and record keeping requirements

SAFE INSTALLATION AND ACCESS

Reinforced bitumen membrane roofing should be suitably attached to the substrate, and to each subsequent layer, in order to resist wind uplift forces. The edges of the roof should be closed off against entry of air to the underside of the waterproofing. When considering the effects of wind uplift forces, careful consideration should be given to the method of attaching the whole roof covering, including any insulation and vapour control layer. At all perimeters and changes of level, the fixing of kerbs, battens and the like should be robust enough to provide a secure mounting for the membrane system. Attention should be paid to the need for appropriate PPE requirements, in particular the wearing of gloves, when installing Icopal reinforced bitumen membranes.

Reinforced bitumen membrane roofing should not be laid in frost, rain, snow, high winds or in extremes of temperature. Where adverse weather is anticipated, site specific risk assessments should be conducted before the start of each working day to determine whether it's safe to continue working. For cold applied systems, the manufacturer's guidelines should be followed.

Successive roof layers should be laid with the minimum of delay, to avoid trapping water during construction.

The works should be planned so that, at the end of works each day, or earlier if adverse weather develops, a "night joint" can be formed to seal off the completed (or part-completed) areas and prevent water ingress. A strip of robust bitumen membrane roofing should be dressed over and sealed onto new and old sections along the full working edge.

Any substrate to receive reinforced bitumen membrane roofing should be dry, even, free of dust, debris, laitance, grease, projecting nail heads, mortar snots, holes or sharp rises. The choice of system type will be determined by the presence of combustible materials. Typically, where combustible materials are present, application methods involving 'hot works' should be avoided in accordance with the National Federation of Roofing Contractors (NFRC) Safe2Torch guidance. (For further information see: https://www.nfrc.co.uk/resource-library-search.html?sortBy=recent&information_type=safe2torch)

PRIMING TO RECEIVE SELF-ADHESIVE MEMBRANES

Apply the specified Icopal self-adhesive primer (web link) to the prepared substrate (see above) which is to receive self-adhesive membranes. Apply at the recommended coverage rate depending on ambient temperature and surface porosity by brush or roller to the whole surface thoroughly. The self-adhesive membrane is to be installed whilst the primer is in a semi-cured state (tacky to touch). The primer must only be used between +4°C to +25°C, adhesion strength may vary if used outside of this.

PRIMING TO RECEIVE TORCH ON MEMBRANES

Icopal Primers should be used in well ventilated areas in the manner recommended by BMI. Apply the specified Icopal torch on primer (web link) to the prepared substrates (see above) by brush or roller ensuring the primer is evenly applied to the surface to a consistent coverage while avoiding pooling of the primer. Apply at the recommended coverage rate depending on ambient temperature and surface porosity by brush or roller to the whole surface thoroughly. Leave the primer to dry before installing any subsequent layers.

VAPOUR CONTROL LAYERS

To provide an effective vapour control layer (VCL) in a warm roof build up, the reinforced bitumen membrane should be securely attached by bonding or fastening to the supporting substrate, and with all joints lapped by 75 mm and bonded. Bonding can be with hot bitumen, torching, or self-adhesion, as appropriate to the Icopal product being used, see relevant TDS for further information.

Torching of the Icopal VCL is not recommended, unless it has been specifically designed for torch application and the roof deck and adjacent materials are non-combustible see NFRC Safe2Torch guidance for further information. When bonding reinforced bitumen membranes, supporting decks should be primed with a suitable Icopal primer (see above) prior to the installation of the VCL. Apply the Icopal VCL to the substrate by careful torching. Head laps should be a minimum of 100 mm and side laps 75mm. Ensure the membrane is sufficiently adhered to the prepared and primed substrate and a continuous visible extrusion of bitumen is present at all laps.

Self-adhesive VCL's are recommended above all combustible substrates. Care should be taken to ensure that the adhesion strength of the membrane to the substrate is sufficient for the wind uplift requirements of the building location. All types of substrate/deck should be primed (see above). Certain types of adhesives require minimum material temperatures, and might require warming before adequate adhesion can be achieved. Install a layer of the specified Icopal VCL to the prepared and primed surface following removal of the release sheet. Head laps should be a minimum of 100 mm and side laps 75mm. Ensure the membrane is pressed firmly into the primed substrate using a water filled pressure roller or similar. All laps should be heat welded using a hot air gun and hand pressure roller. Enhanced adhesion if required can be achieved with the use of a hot air gun prior to the application of the insulation.

In pour and roll applications, fully bond the Icopal VCL with hot grade bitumen using traditional pour and roll techniques with minimum side laps of 100mm and end laps of 150mm.

Where the thermal insulation and/or waterproofing is to be mechanically fastened, it is recommended that the bitumen vapour control layer be bonded and all laps sealed in accordance with manufacturer's recommendations.

At all upstands and around details, the Icopal VCL must be bonded from the vertical surface onto the field area Icopal VCL by a minimum of 150mm and extend vertically in accordance with the main specification. At all edges, abutments and penetrations the Icopal VCL should be either turned back at least 150mm onto the insulation and sealed down or turned up and sealed to the main roof covering for at least 50mm, to encapsulate the insulation.

INSULATION - ADHERED TO HEAT ACTIVATED BITUMEN STRIPES

Bond the insulation boards to the striped surface of the vapour control layer (VCL) by first applying sufficient heat by torch to melt the thermofusible film on the upper surface of the Icopal VCL and activate the low melt resin stripes. Place the board firmly onto the activated resin stripes in preparation for receiving the insulation boards. Tee Guards must be used to protect all insulation board edges from flame during the installation process.

INSULATION - ADHERED USING A COLD APPLIED ADHESIVE

Adhesives should be used in well ventilated areas in the manner recommended by BMI, see MSDS for further information. Refer to product specific material safety data sheet for personal protective equipment. Adhere the insulation boards to the sanded Icopal VCL using the specified insulation adhesive in accordance with the current Icopal application guidance. Apply beads of adhesive at the required centres as required by the wind uplift calculation. Adhesive should always be applied across the width of the insulation board. Lay the insulation board immediately into the adhesive. Do not allow the adhesive to skin over as this will affect the bond strength.

INSULATION - ADHERED USING HOT APPLIED BITUMEN

Bond the insulation boards using hot bitumen in accordance with current installation guidelines and all the current relevant recommendations of BS 6229 and BS 8217

INSULATION - MECHANICALLY FIXED

Mechanically fix the insulation boards using the appropriate Icopal screw fastener and tube washer/insulation plate combination in accordance with BS EN 1991-1-4 and NA to BS EN 1991-1-4, and the BMI Group UK Ltd. wind uplift calculation. All Icopal fixings and washers/plates should be located within the individual board area and not overlap board joints. Icopal fixings should be sited greater than 50mm and less than 150mm from the edges and corners of the board.Icopal fixings positioned along the centre line of the insulation board should be offset with those at the board edge.

UNDERLAYS

Fully bonded torch-applied Icopal membranes should only be used with non-combustible substrates and with surfaces designed to enable the torch application of subsequent layers. For combustible substrates, fully bonded self-adhesive Icopal membranes should be used.

Full bonding by laying the Icopal membranes in hot bitumen should only be used with suitable substrates (e.g. stone mineral wool, cellular glass insulation boards).

Partial bonding is recommended for use in field area applications to provide vapour pressure release and accommodate minor movement over substrates of plywood, OSB board, concrete (including cementitious screeds) and faced insulation including rigid polyurethane / polyisocyanurate boards or mineral wool.

Partial bonding is achieved by the use of specifically designed, partial bond torch-on or self-adhered Icopal membranes (e.g. Total Torch Vapour Dispersion Layer and/or Torchsafe TA Underlay). For pour and roll applications the partial bond is achieved using a perforated base layer (e.g. 3G) which is laid into molten bitumen above the prepared surface.

CAPSHEETS

Apply a layer of Icopal torch-on capsheet, fully bonded to the underlay by careful torching to ensure the thermofusible film is completely removed from the underside of the membrane as works proceed. Head laps should be a minimum of 100 mm and side laps 75mm minimum following the manufactured selvedge edge. The capsheet must be offset horizontally by around 300mm from the underlay to avoid excessive membrane build up at side laps. The end laps must also be offset by around 300mm. Ensure there is a continuous extrusion of bitumen visible at all laps.

Icopal capsheets can also be installed using self-adhesive technology, typically in conjunction with Icopal SA Primer. Side laps and head laps should be sealed by hot air welding, ensuring a continuous bead of bitumen is visible.

DETAIL WATERPROOFING

Apply the Icopal SA Primer as specified to the prepared substrate at the recommended coverage rate. Install the specified vapour control layer in accordance with Icopal's instructions (see previous section titled Vapour Control Layers). Head laps should be a minimum of 100 mm and side laps 75mm. All laps should be appropriately sealed. The membrane must be bonded down onto the field area VCL membrane by a minimum of 150mm.

Install the specified insulation board to the VCL ensuring it is securely fixed. All joints should be close butted. Insulation boards should be covered immediately. Install angle fillets at the junction of the horizontal and vertical surfaces.

Icopal Self Adhered Underlay - Apply the Icopal SA Primer to the substrate or insulation at the required rates before installing the detailing underlay following removal of the release sheet. Head laps to be a minimum of 100 mm and side laps 75 mm minimum. All laps should be heat welded using a hot air gun. A consistent extrusion of bitumen should be visible at all laps. Ensure the membrane is firmly pressed into the substrate using a hand roller or similar.

Icopal Torch Applied Underlay - Apply the specified underlay, fully bonded to the prepared detail substrate by careful torching ensuring the thermofusible film is completely removed from the underside as work proceeds. Ensure the membrane is firmly pressed into the substrate. Head laps to be 100 mm and side laps 75 mm minimum. The end laps must also be offset by around 300mm. Ensure there is a continuous extrusion of bitumen visible at all laps.

Icopal Pour & Roll Underlay - Apply a layer of the sanded underlay fully bonded in Kegged Bitumen (95/25) with 75 mm side laps and 100mm end laps. All laps must be checked for security as work proceeds.

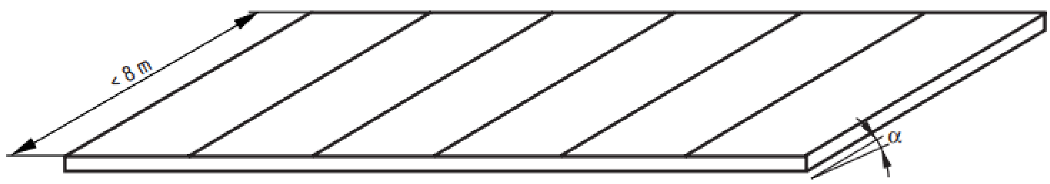
The Icopal capsheet to the details should be the same as that used for field areas; fully bonded by careful torching or self-adhered. Ensure a continuous visible extrusion of bitumen is present at all laps. Head laps to be 150 mm and side laps to follow the mineral-free selvage. The capsheet and underlay should be staggered to prevent a build up of bitumen at the side and head laps. The cap sheet should be installed so that it extends out onto the field area by a minimum of 300 mm. At the top edge of the bitumen membrane it should be secured with a termination bar and cover flashing. All upstands must have a vertical height of no less than 150 mm above the finished roof level which includes any surface finishes.

Pour & Roll - Apply a layer of Icopal Mineral capsheet, fully bonded in Kegged Bitumen (95/25) in accordance with current codes of practice. Head laps to be 100 mm and side laps 75 mm minimum. All laps should have a consistent extrusion of bitumen visible.

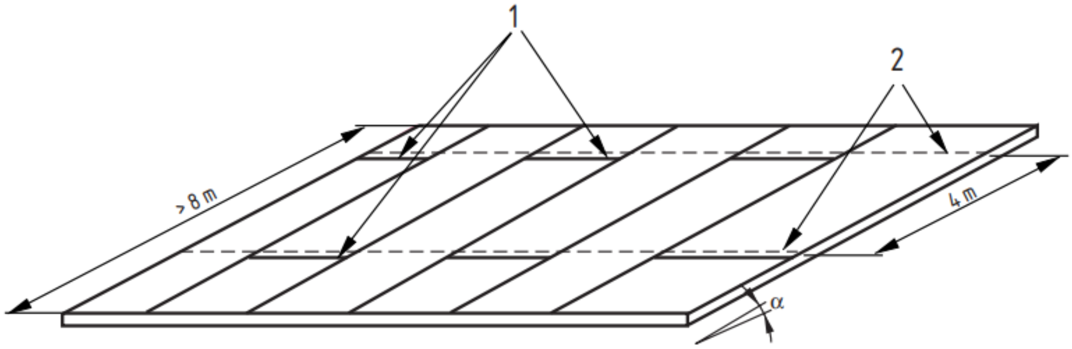
SLOPING APPLICATIONS >5°

On slopes greater than 5°, a partially bonded membrane has insufficient adhesion or attachment to resist slippage and a full bond membrane should be used. Head laps should be physically restrained with a suitable mechanical fixing and plate/washer placed at 75 mm centres in two rows, with 50mm between rows, to prevent slippage of bituminous membranes. On substrates that cannot accept particular fixings, timber battens should be firmly fixed to the substrate at specified intervals. Icopal pour & roll membranes should not be installed on slopes greater than 5°.

On slopes between 5-25° (a) with a length less than 8m, the reinforced bitumen membranes should be laid down the line of slope and should be restrained at the eaves and ridge.



On slopes between 5-25° (a) with a length greater than 8m, in addition to being fixed at the eaves and ridge, intermediate fixation of the membrane is required via the introduction of timber battens.

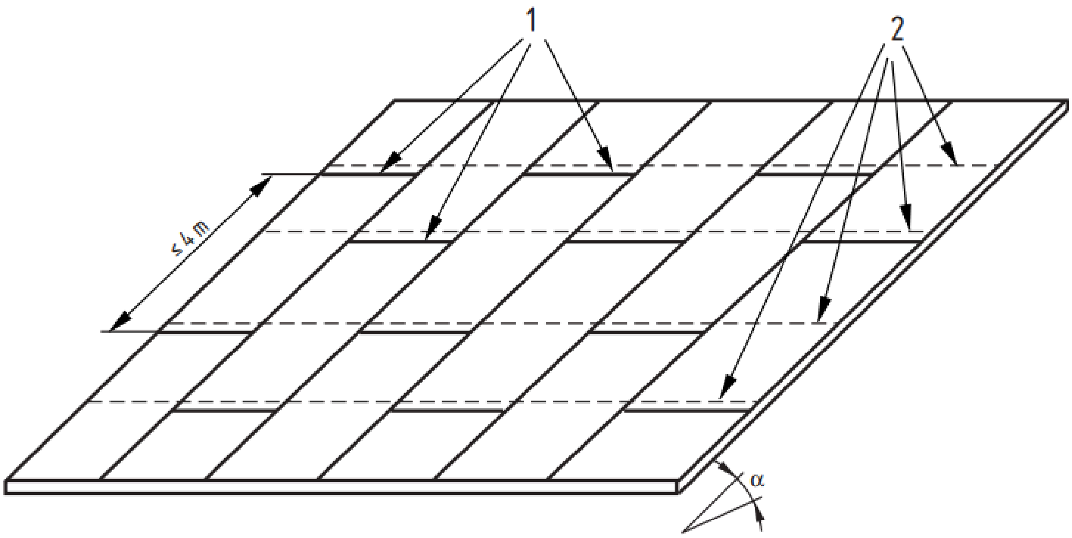


1 = Lap joint over mechanical fixings

2 = Support battens for nailing

SLOPING APPLICATIONS 25-60°

On slopes between 25-60° (a) the maximum membrane length should not exceed 4m. In addition to being fixed at the eaves and ridge, intermediate fixation of the membrane is required via the introduction of timber battens.

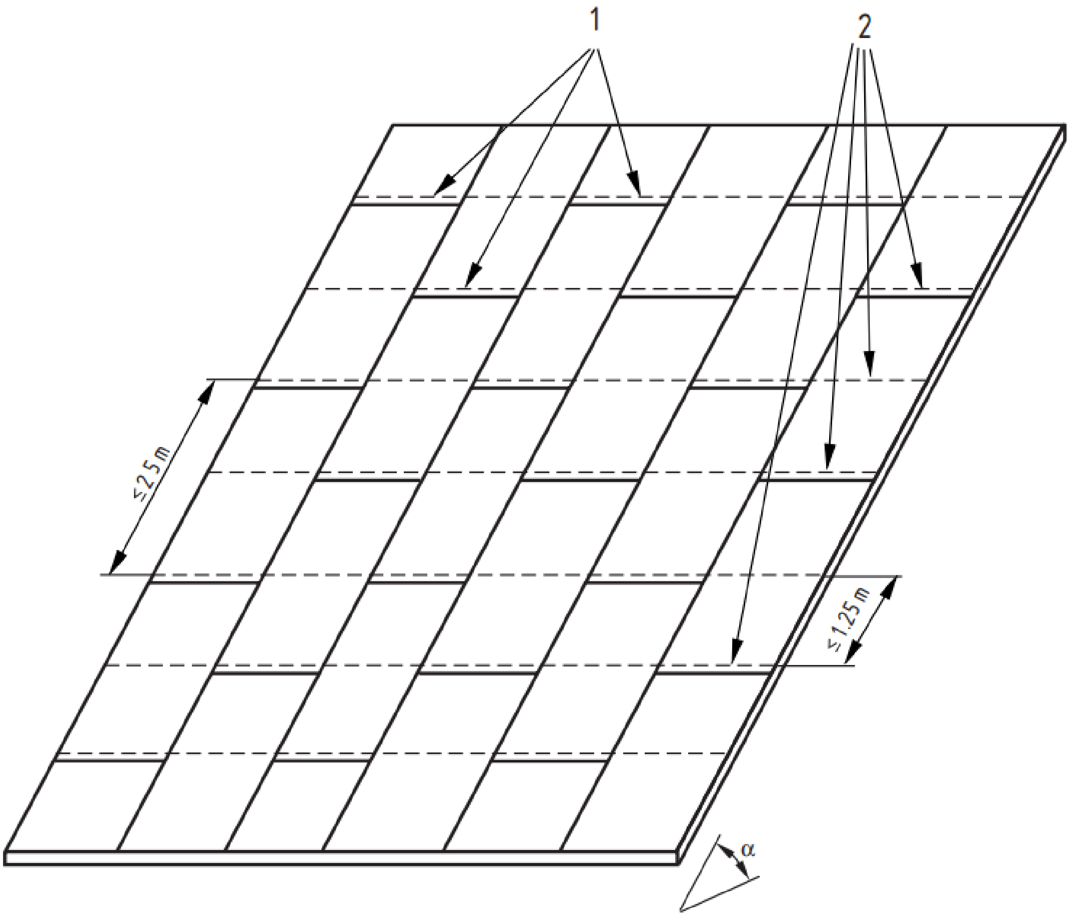


1 = Lap joint over mechanical fixings

2 = Support battens for nailing

SLOPING APPLICATIONS 60-70°

On slopes between 60-70° (a) the maximum membrane length should not exceed 2.5m. In addition to being fixed at the eaves and ridge, intermediate fixation of the membrane is required via the introduction of timber battens.



1 = Lap joint over mechanical fixings

2 = Support battens for nailing

SAFE INSTALLATION AND ACCESS (Cont'd)

Working on roofs is a hazardous activity because it involves working at height. Roof work accounts for a quarter of all deaths in the construction industry. Health & Safety in Roof Work, HSG 33 (published by the Health and Safety Executive) provides guidance on how to safely access a roof as well as provide a safe place for work on a roof.

In terms of safely accessing roofs this could be via internal access, general access scaffolds, tower scaffolds and stair towers, fixed or mobile scaffold towers, mobile elevating work platforms, ladders or roof access hatches. A safe place of work, including safe access, should be provided for all roof work. Further information can be found in HSG 33 which can be downloaded from https://www.hse.gov.uk/pubns/books/hsg33.htm.

On flat roofs, falls most frequently occur from the edge of a completed roof, during surveying, inspection or construction, from the edge where work is being carried out, through openings or gaps, and through surfaces that are slippery or have become fragile e.g. strawboard, woodwool, reinforced aerated autoclaved concrete (RAAC), unfixed profiled, metal decking or aged roof lights. Where the design of the roof does not provide permanent edge protection, such as a suitably strong parapet wall of at least 950 mm in height, temporary edge protection will be required (e.g. guardrails and toe boards, or other suitable proprietary edge protection systems. This should, when erected, give protection for the full duration of the work, be strong and rigid enough to prevent people from falling and be able to withstand other loads likely to be placed upon it, and be designed in such a way that it is not necessary to remove it to work at the edge of the roof. Again HSG 33 provides comprehensive guidance on working safely on flat roofs.

INTERFACE WITH OTHER PRODUCTS

BMI bitumen products where used as part of warm roof waterproofing systems will interface with other materials and building materials. Examples of such interfaces are provided below:

- Bitumen capsheets to bitumen underlays
- Bitumen underlays to insulation (e.g. Polyisocyanurate - PIR, Stone Mineral Wool)

- Bitumen membranes to masonry, metal, plywood/OSB, concrete
- Bitumen membranes to drip trims, outlets, rooflights, penetrations, green roofs

COMPETENCY REQUIREMENTS FOR INSTALLATION

BMI Group UK Limited operates two separate BMI-approved roofing contractor schemes - The Intelligent Membrane Association (IMA) and Team Icopal respectively - which allow clients to access a comprehensive range of BMI Icopal Guarantees via the installation of BMI's waterproofing systems by a BMI-approved roofing contractor. Each scheme has a set of requirements that must be met by the contractor as part of the membership application and renewal process which includes possession of adequate insurance cover, evidence of satisfactory past workmanship, fulfilment of BMI training in Icopal materials and financial checks for solvency. Detailed information on the requirements for each scheme can be obtained from BMI Icopal Guarantee Administration Department at BMI House, 2 Pitfield, Kiln Farm, Milton Keynes MK11 3LW.

In the UK, roofing contractors and other roof workers can demonstrate competence in a number of ways.

Roofers can gain qualifications through a Level 6 in Roofing Occupations, a modern apprenticeship, or a Specialist Applied Skills Programme. They can also have RoofCERT accreditation by passing a knowledge test, proving they have a relevant NVQ/SVQ Level 2 or above, and passing a practical assessment.

Roofers should have knowledge of building and construction, be able to work well with their hands, and be physically fit. They should also be able to operate and control equipment, and be able to carry out basic tasks on a computer or hand-held device.

Roofers should also hold the relevant insurance to protect them in case of potential damage to people and property during their work.

Roofers who intend to do technical jobs such as asbestos removal will also likely need a licence.

In Building Regulation 7: Materials and Workmanship, of the England Building Regulations and its national equivalents in Wales, Scotland and Northern Ireland there is a requirement in Clause 7.(1) (b) to carry out building work in a workmanlike manner. To satisfy the requirements of Building Regulation 7 the workmanship should be such that, where relevant materials are adequately mixed or prepared and applied, used or fixed so as to perform adequately the functions for which they are intended.

Under Section 2: Workmanship of Approved Document 7 it sets out the ways of establishing the adequacy of workmanship. For products that are CE-marked, such as reinforced bitumen waterproofing it is important that products CE marked to the relevant current harmonised product standard BS EN 13707: Flexible sheets for waterproofing, are used only as well as installed in accordance with the current codes of practice BS 8000-0: Workmanship on Construction Sites. Introduction and general principles and BS 8000-4: Workmanship on building sites. Code of practice for waterproofing. For products also assessed under independent certification schemes the product certificates should also be checked as they may also specify how workmanship will deliver a declared level of performance. In that regard the person carrying out the work should show that the workmanship will provide the appropriate level of protection and performance. For BMI's range of reinforced bitumen waterproofing copies of the UKAS-accredited independent certificates for each product can be found in the specific product page for each product on the BMI UK & Ireland website at https://www.bmigroup.com/uk/icopal-flat-roofing-systems-and-services/bituminous-waterproofing-and-roofing/.

SPECIALIST EQUIPMENT AND TOOLS

The equipment for the installation of reinforced bitumen membrane roofing systems should be selected to suit the method of application. The following is a list of basic tools and equipment used for the applications materials used as part of bituminous warm roof systems. Depending on the project and installers' personal preferences, other tools and equipment may also be used.

PRIMING

- Short or medium pile rollers - large roller frames should be double armed with screw type extension poles.
- Gloves
- Paddle mixer
- Personal Protective Equipment (PPE)

INSULATION

- Blade saw
- Pencil
- Tape measure
- Adhesive application equipment (where applicable)

BITUMEN MEMBRANES - TORCH APPLIED

- Long and Short arm gas torches
- Gas bottle & regulator
- Roll bar
- Trimming knife with hook blades
- Tape measure
- Straight edge
- Tee guards

BITUMEN MEMBRANES - ADHERED

- Application gun and hose
- Seam roller
- Hot Air Welder / cable / transformer
- Large, weighted roller
- Brush / Rollers
- Trimming knife with hook blades
- Tape measure
- Straight edge

BITUMEN MEMBRANES - MECHANICALLY FIXED

- Seam Roller
- Hot Air Welder / cable / transformer
- Drill & drive bar
- Trimming knife with hook blades
- Tape measure
- Straight edge

POUR & ROLL

- Bitumen boilers (thermostatically controlled)
- Gas bottle & regulator
- Trimming knife with hook blades
- Tape measure
- Metal buckets (with pouring spouts & lids)
- Mops
- Straight edge

PPE - Refer to product specific safety data sheet

SEQUENCING OF WORKS

Where installing a multi-layer bitumen warm flat roof waterproofing system, the sequence of works involves the following:

- Priming
- Bitumen Vapour Control Layer
- Insulation
- Bitumen Underlay
- Bitumen Capsheet

With regards to the specific sequence based on the nature of application, the following steps are suggested:

TORCHING (e.g. Capsheet, Underlay Vapour Control Layer)

Full bonding of reinforced bitumen membrane roofing by torching techniques is achieved by activating the coating on the underside of the membrane with a gas torch. Icopal products have a heat dispersible film on the underside that melts during application. The sequence of work should be as follows.

a) Roll the reinforced bitumen membrane into position and cut to length.
b) Roll back the membrane for a portion of the length (approximately 50 %).
c) Heat activate by torching in the vee area between the roll and substrate. Heated coating should flow down the front of the roll to provide a continuous bead of molten coating across the full width of the membrane. The roll should be moved along with a downward pressure exuding a continuous bead of bitumen from the edges.
d) The roll can be pushed forward with the aid of a roll bar.

It is not practical to achieve clean lap finishes when torching. With good control of the bitumen flow at lap joints a neat bead of bitumen should exude along each lap joint and be left in situ.

SELF-ADHESIVE (e.g. Capsheet, Underlay Vapour Control Layer)

Full bonding of self-adhesive reinforced Icopal bitumen membrane roofing is achieved by removal of the backing release film while unreeling the membrane onto the substrate. The full work sequence should be as follows.
a) Roll the Icopal bitumen membrane into position and cut to length.
b) Roll back the Icopal membrane for a portion of its length (approximately 50 %).
c) Carefully cut across the backing release film and peel the film off the roll.
d) Peel the leading edge of the backing film up and tuck it under the roll to enable release of the remainder when unreeling.
e) Roll the Icopal membrane forward, pressing downward and outward, ensuring that no air pockets are trapped.
f) Roll back the other portion of the Icopal membrane to the leading edge of release film.
g) Peel the remainder of the film away while pushing the roll forward, pressing downward and outward, ensuring that no air pockets are trapped.
h) On completion, use a soft broom or roller to apply pressure over the total area.

POUR & ROLL (e.g. Capsheet, Underlay Vapour Control Layer)

Full bonding of reinforced bitumen membrane roofing is achieved by pouring hot bonding compound onto the substrate and then unrolling the membrane into it.
The full work sequence should be as follows.

a) Roll the reinforced bitumen Icopal membrane roofing into position and cut to length.
b) Roll back the Icopal bitumen membrane roofing for a portion of its length (approximately 50 %).
c) Pour hot bonding compound onto the substrate just in front of the roll.
d) Immediately unroll the Icopal bitumen membrane roofing into the hot bonding compound, applying sufficient pressure to ensure an even spread of compound. There should be sufficient bonding compound to ensure that a small quantity squeezes out at each edge of the roll.
e) Use a broad-bladed scraper to spread out the excess compound at the edges of the bitumen membrane.
f) Roll back the other portion of the length and repeat steps c) to e).

This method of application requires the use of approximately 1.5 kg of compound per square metre of roof per layer, the exact amount varying according to the substrate.

Hot bitumen (pour & roll) applications generally require a clean lap finish. This can be achieved by brushing a debonding agent along the adjoining membrane, adjacent to the selvedge, prior to installation of the hot bitumen. Surplus bitumen spilling onto this area can be removed on cooling by trimming and peeling the excess bitumen from the lap. Care should be taken to ensure that no release agent gets under the lap and that the membrane is not damaged when trimming off the surplus bitumen

MECHANICALLY FIXED (Single layer bitumen membranes only)

Secure the specified bituminous roofing membrane along the membrane selvage using Tubular Washers and Screw Fasteners of appropriate type and length as per the project specific wind uplift calculation. Position the adjacent membrane parallel to the first and attach in the same way. allowing for. Side laps should follow the mineral-free selvage achieving a minimum 80mm hot air weld beyond the extent of the washer head. .End laps should be a minimum 150mm. Ensure a continuous extrusion of bitumen is produced at all laps.

SYSTEM REQUIREMENTS AND ACHIEVING TESTED PERFORMANCE

Icopal products and systems are tested in accordance with industry recognised tests and standards. The following list provides an indication of some of the relevant standards:

Minimum System Requirements:

- DD CEN/TS 1187:2012 - Test methods for external fire exposure to roofs
- BS EN 13501-5:2016 - Fire classification of construction products and building elements - Classification using data from external fire exposure to roofs tests
- BS EN 1991-1-4: 2005 + A1: 2010 and UK National Annex to BS EN 1991-1-4: 2005 + A1: 2010 - Eurocode 1. Actions on Structures - General actions - Wind actions.

Minimum Product Requirements:

- EN 13970: 2004 - Flexible sheets for waterproofing. Bitumen water vapour control layers. Definitions and characteristics.
- EN 13707: 2004 + A2: 2009 - Flexible sheets for waterproofing. Reinforced bitumen sheets for roof waterproofing. Definitions and characteristics.
- EN 13165: 2012 + A2: 2016 - Thermal insulation products for buildings. Factory legalmade rigid polyurethane foam (PU) products. Specification
- EN 13162: 2012 + A1: 2015 -Thermal insulation products for buildings. Factory made mineral wool (MW) products. Specification
- BS 6229: 2018 Flat roofs with continuously supported flexible waterproof coverings. Code of practice.

- BS 5250: 2021 - Management of moisture in buildings. Code of practice.
- BS 8217: 2005 Reinforced bitumen membranes for roofing. Code of practice.
- ISO 9001: 2015 Quality Management System
- ISO 14001: 2015 Environmental Management System

LEGAL REQUIREMENTS

There are several legal requirements that one needs to be mindful of when installing BMI Icopal reinforced bitumen waterproofing products. Compliance with the building regulations in terms of materials used and the workmanship (see previous section) used to install the products; this is Building Regulation 7 in England and its equivalents in the Wales, Scotland and Northern Ireland building regulations. For reinforced bitumen waterproofing this means that only CE-marked products should be used since for waterproofing there is a harmonised European product standard BS EN 13707: Flexible sheets for waterproofing. In terms of the design of how the products are used, all the parts of the relevant national building regulations must be satisfied in accordance with building regulations and the Building Safety Act 2022.

There are a range of laws relevant to roof work health and safety including The Health and Safety at Work Act 1974, The Work at Height Regulations 2005, The Management of Health and Safety at Work Regulations 1999, The Construction (Design and Management) Regulations 2015, The Lifting Operations and Lifting Equipment Regulations 1998 and The Provision and Use of Work Equipment Regulations 1998.

From a health and safety perspective the Construction (Design and Management) Regulations 2015 set out the legal requirements for the whole construction process from concept to completion, and what each duty holder (clients, designers, contractors, workers etc) must or should do to comply with the law to ensure projects are carried out in a way that secures health and safety.

The Building Safety Act 2022 has also named the Health and Safety Executive (HSE) as the new Building Safety Regulator as well as introducing new duties relating to fire and structural safety.

The external fire performance of BMI's range of Icopal reinforced bitumen waterproofing membranes depends on the complete roof system since DD CEN/TS 1187: 2012 Test 4 is a system test and this is needed to achieve the required classification to BS EN 13501-5: 2016. Please contact BMI Icopal Technical Services to verify that the proposed roof system meets building regulation requirements.

The reaction to fire performance of BMI's range of Icopal reinforced bitumen membranes classified in accordance with BS EN 13501-1: 2018 is declared in the Declaration of Performance (DoP) Certificate for the respective product which can be downloaded from the BMI UK website (see https://www.bmigroup.com/uk/bmi-icopal/)

IMPLICATIONS FOR BMI ICOPAL GUARANTEES

BMI Icopal Guarantees for BMI's range of reinforced bitumen waterproofing membranes vary from those that just provide cover for roof leakage caused by defective materials installed to those that provide more comprehensive cover for roof leakage caused not only by defective materials installed but also by defective design or defective installation of the materials supplied.

Depending on the BMI Icopal Guarantee type there are specific minimum guarantee requirements relating to surveys, specifications, whether a BMI-approved contractor is required for the installation, whether site inspections during installation carried out by BMI are required, and other requirements such as whether a proof of purchase of BMI materials is required and also whether independent electronic leak detection tests are required. For detailed requirements depending on guarantee type it is recommended that the BMI Technical Guarantee Administration department is contacted on Tel. 0330 1234585 Option 1.

INSPECTION, TESTING, AND RECORD KEEPING REQUIREMENTS

As discussed in the "Implications for BMI Icopal Guarantees" section where BMI Icopal guarantees are to be ultimately issued at the end of the completed project depending on the type of guarantee to be issued and the scope of cover there may be requirements for inspection and testing prior to the issue of the BMI Icopal Guarantee. For projects where the BMI Icopal Guarantee includes workmanship cover there is normally a requirement for site inspections to be carried out normally either by a member of the BMI site technician team or in some cases (for smaller projects up to 100 m2) photographs of completed roof can be accepted. The schedule of site inspections depends on the guarantee type. In all cases the workmanship must be judged by BMI to be of a satisfactory quality before a BMI Icopal Guarantee can be issued upon completion.

For certain types of flat roof construction additional testing may be required before a BMI Icopal Guarantee can be issued. Where BMI reinforced bitumen waterproofing is buried or covered typically in an inverted or warm roof construction a satisfactory electronic leak detection test must be carried out by an independent testing organisation before a BMI Icopal Guarantee can be issued. This is to prove the integrity of the waterproofing is intact before follow on trades bury or cover the waterproofing layer.

In all cases it is important that the client retains the BMI Icopal Guarantee for the whole period of the guarantee cover after completion for record keeping and to ensure any future claim process against the guarantee, in the event of a roof leakage, can be carried out smoothly.

For detailed requirements depending on guarantee type it is recommended that the BMI Technical Guarantee Administration department is contacted on Tel. 0330 1234585 Option 1.

Section 3: Product maintenance

Maintenance of a Construction Product is the regular inspection and required interventions to maintain the performance of the Construction Product in use.

Minimum requirements:

- Maintaining BMI Icopal Guarantees
- Legal requirements
- Competency requirements for maintenance
- Safe access
- Replacement parts
- Specialist equipment and tools
- Cleaning requirements
- Record keeping requirements

Maintenance is the regular inspection and required interventions to maintain the performance of the Construction Product in use.

MAINTAINING BMI ICOPAL GUARANTEES

It is important that this guidance document is read in its entirety as it contains important guidance throughout that needs to be followed. If a BMI Icopal Guarantee is in place for your roof it should be read alongside this document so you understand clearly the scope of cover of the guarantee as well as the terms and conditions relevant to the specific guarantee.

Why is it important to care for, inspect and maintain your flat roof?

It is a condition of all BMI Icopal Guarantees and best practice for all BMI flat roof installations that the finished roof after installation of BMI-supplied materials is inspected and maintained in accordance with this document throughout the service life of the roof and the duration period of any BMI Icopal Guarantees issued for the roof. Any failures of the roof system resulting from lack of inspections and maintenance will not be covered under the terms and conditions of BMI Icopal Guarantees.

The waterproofing membrane on your flat roof should be installed as detailed in the BMI Icopal specification, application instructions and current British Standard Code of Practices BS 6229 (and for reinforced bitumen membranes, BS 8217), as well as Trade Association Best Practice Guides (i.e. SPRA, LRWA) as appropriate in force on the date of installation. However, to ensure your flat roof continues to prevent water penetration throughout its service life and period of your BMI Icopal Guarantee (if applicable) it is important that the waterproofing membranes on your roof are properly inspected and maintained. The following sections explain the BMI Icopal-recommended roof care, inspection and maintenance regime required to ensure any BMI Icopal Guarantees in place remain valid.

RECOMMENDED CARE, INSPECTION AND MAINTENANCE REGIME

The Client shall arrange two inspections per year of their flat roof as a minimum - ideally in Spring and Autumn - and maintenance in accordance with the current standard BS 6229 in force on the date of installation, and any other relevant standards including this guidance document and guidance therein specific to the waterproofing materials installed. Additional inspections should also be carried out after any roof maintenance works or heating, ventilation and air conditioning work on the roof including plant installation, after installation of Solar PV roof systems or after major storms. All inspections should be carried out by an appropriately qualified professional contractor and if any maintenance work is deemed to be required the BMI-Approved Contractor (named on the BMI Icopal Guarantee) should be contacted to carry out such maintenance work.

An inspection in Spring may detect any problems that may have occurred during the winter months. An inspection made in Autumn may detect leaves, silt or other debris that could cause blockage of outlets or otherwise impede drainage from the flat roof. Following this inspection regime will ensure that the roof is maintained in good condition, and that any potential problems are identified at an early stage.

If the roof is especially prone to deposits of industrial pollution (e.g. near power stations or

airports), leaves from nearby or overhanging trees or other debris such as bird guano, then more frequent inspections and maintenance than twice per year may be advisable e.g. quarterly.
In addition to the inspections carried out each year the Client (named on the BMI Icopal Guarantee) shall arrange for the BMI-Approved Contractor (named on the BMI Icopal Guarantee) to inspect the roof in each fifth year after issue of the guarantee. If any repair work is found to be necessary during these inspections, repairs must be undertaken promptly by the BMI-Approved Contractor. A detailed inspection report along with a record of any subsequent maintenance work carried out should be returned to BMI Group UK Limited for the attention of the BMI Technical Guarantee Administration Department, confirming the integrity of the waterproofing membrane(s) after completion of any works.

A roof plan and inspection checklist is provided in this guidance document for recording observations.

If the original BMI-Approved Contractor (named on the BMI Icopal Guarantee) is no longer trading an alternative BMI-Approved Contractor can be used but must be approved by the BMI Technical Guarantee Administration Department in advance of any inspection and maintenance works being carried out.

The Client (named on the BMI Icopal Guarantee) shall be responsible for all costs of roof inspections, and in addition any repair work found to be necessary unless covered by a valid claim against any BMI Icopal Guarantee in place for the roof; it is recommended that the cover, terms and conditions for any BMI Icopal Guarantee in place for the roof are read and understood before making a claim to the BMI Technical Guarantee Administration Department.

It is the Client's responsibility that prior to any inspection and/or maintenance that safe access is provided to the roof in accordance with the relevant Health & Safety Executive (HSE) guidance.

FLAT ROOF CARE

Clear all debris from the roof surface, rainwater outlets, chutes, gutters etc. Debris must be

safely removed from the roof and not simply flushed down rainwater pipes. If a brush is used it should be a soft bristle to prevent damage to the waterproofing.
Where installed, remove the lids from all inspection chambers or access grilles and ensure that all rainwater outlets and downpipes are free from blockages and that water drains freely.

Cut back tree limbs that overhang the roof to give a 1 metre clearance outside the roof edge. This will significantly reduce blockage of drainage systems due to fallen leaves, needles and twigs.

Remove any moss, algae, lichens, bird nesting, or other biological growth that may have occurred, taking care not to damage the waterproofing.

Once clean the roof can then be properly inspected.

FLAT ROOF INSPECTION

- Check the main roof area for integrity of lap seals, any blistering or any other signs of degradation that may occur, or any damage caused to the membrane by maintenance personnel, for instance.

- All roof details, i.e. upstands, change of level, gutters and sumps etc, should be checked for waterproofing integrity. Upstand details should be checked for any slumping, loose pointing or sprung flashings.

- Ensure that any protective cover flashings (including lead flashings) or termination bars to abutment upstands remain securely fixed and in place; repair or renew as necessary. Examine all mastic sealant and mortar pointing for signs of degradation, and repair/replace as necessary.

- Ensure that any hard landscaping or surface finishes e.g. promenade tiles or paving slabs are securely fixed/adhered to the roofing surface, remain in position and in good condition. Any algae growth should be treated to avoid a slippery surface.

- Internal surfaces and, if possible, roof voids should be inspected for any sign of water ingress or condensation.

Temporary ponding of water (*see Note below*) on BMI Icopal waterproofing membranes will have no detrimental effect on the integrity of the waterproofing system, provided it has been installed in accordance with the BMI Icopal specification and installation guidance, and any other applicable standards. BMI Icopal waterproofing membranes have the capacity to accommodate the additional stresses imposed on the membranes by temporary ponding. However, we recommend that all guidance in accordance with the current revisions of codes of practice BS 6229 and BS 8217 are followed as well as industry best practice guidance from SPRA, LRWA, NFRC, LABC, and NHBC is followed to avoid ponding wherever possible.

Note: With regards to ponding water BMI Group UK Limited consider temporary to be a period whereby the ponding may persist for up to 48 hours after rainfall but disappear thereafter. Temporary ponding water will not affect the BMI Icopal Guarantee. However, any areas of more persistent water ponding should be monitored to determine the cause. Possible causes include but are not limited to upward displacement of outlets or deflection of the structure. The point at which ponding water in general becomes detrimental to a waterproofing membrane is not clearly defined within industry standards or codes of practice. This will vary according to a number of factors—the amount of ponding water, the area covered, the frequency, duration of time for which it is retained before drying, the amount of local vegetation, maintenance routines etc. To ensure the BMI Icopal Guarantee is not invalidated where ponding persists for longer than 48 hours after any rainfall, consideration should be given to the above factors, potential corrective actions, as well as additional roof maintenance and inspections provided..

In the event of the roof being subject to extended periods of ponding, additional roof maintenance and inspections, in addition to those in this document are required. There should also be an initial inspection to determine the cause of the extended periods of ponding and the practicalities of undertaking work to prevent this continuing to occur; this should involve the installing contractor, be formally reported, and a copy of the report be forwarded to the BMI Icopal Guarantees Department. As a minimum additional maintenance will be required to regularly clear leaves, silt or other debris from the affected roof areas, records of such maintenance are to be kept and include before and after photos.

Appropriate remedial actions to such roof areas should be implemented as soon as reasonably practicable as the conditions causing the persistent ponding should not be allowed to remain in place indefinitely for the reasons set out below.
Persistent ponding water may have the following negative effects on the finished flat roof:

- Potential increased water loading on the structure;
- Roof aesthetics may be affected with the increased risk of membrane staining, algae, moss and insect infestations;
- Potential health and safety concerns that may also arise such as odour/hygiene and a slip risk especially in freezing conditions;
- If the waterproofing membrane is penetrated in an area where ponding water forms there is a high risk of water ingress into the building below.

Ensure that any items of plant/equipment present on the roof are sited on suitable equipment supports, and that any fixings that may have been used to secure them, do not penetrate the BMI Icopal waterproofing membrane. If new or replacement plant/equipment is to be introduced to the roof after any BMI Icopal flat roof waterproofing covered by a BMI Icopal Guarantee has already been installed then prior written consent and advice should be sought from BMI Group UK Limited before proceeding to ensure that the BMI Icopal Guarantee is not invalidated. Check for any signs of contamination including oil or lubricant leaks caused by plant equipment that may degrade the waterproofing.

FLAT ROOF MAINTENANCE & REPAIRS

A comprehensive record or log of inspections and any observations and subsequent maintenance should be kept by the Client (named on the BMI Icopal Guarantee) or their agents to demonstrate compliance with the terms and conditions of the BMI Icopal Guarantee (if applicable) with regard to the Client's obligations to maintain the roof. Any signs of damage, contamination or degradation should be notified within 24 hours to the BMI Technical Guarantee Administration Department at Tel. 0330 1234585 Option 1, so that arrangements can be made for a BMI site inspection and remedial works as may be appropriate depending on the terms and conditions of the BMI Icopal Guarantee in place.

The Client shall be responsible for the costs of any repair work found to be necessary unless covered by a valid claim against the BMI Icopal Guarantee. If the repairs are covered by a BMI Insured System Plus Guarantee then the Client or their agents should contact the BMI Technical Guarantee Administration Department to organise a site visit by a BMI Site Inspector. If the repairs are covered by a BMI Insured Product Plus & Workmanship Guarantee then the Client or their agents should contact the original BMI-Approved Contractor named on the guarantee to organise a site inspection by the contractor. For roofs covered by either a BMI Insured Product or Product Plus Guarantee the Client should contact the installer of the roofing materials.

If regular maintenance access on the roof is required then the BMI Icopal waterproofing membrane should be protected with either walkway tiles or other suitable surface or temporary protection boards as necessary. When carrying out any maintenance, care must be taken to ensure that no damage is caused to either the landscaping or the waterproofing system. If it is considered that either has been affected, then BMI Technical Guarantee Administration Department should be contacted for advice. Any waterproofing damage caused after completion of the original installation may invalidate the BMI Icopal Guarantee. Furthermore, any unauthorised alterations to the waterproofing system will invalidate the BMI Icopal Guarantee. If any alterations are required, then BMI should be contacted in advance so that BMI can advise on the alteration and whether its incorporation can be made without affecting the BMI Icopal Guarantee in place for the roof.

For more information and advice contact the BMI Technical Guarantee Administration Department at Tel. 0330 1234585 Option 1.

Other Risk Factors – More frequent inspections

Specifically, for all BMI Icopal waterproofing membranes, if bird guano on the flat roof is a persistent problem, precautions should be taken to prevent bird nesting subject to any relevant regulations. Anti-bird netting or other bird deterrents should be considered. A more frequent inspection regime should also be carried out if the presence of bird guano on the flat roof surface cannot be prevented to ensure the surface is cleaned more regularly to prevent build-up of bird guano.

The assessment of the risk of bird guano and the need for a more frequent inspection regime (more than two inspections per year) should be established in the first three months after installation of the flat roof.

If the roof is also prone to deposits of industrial pollution, leaves from nearby or overhanging trees or other debris, then more frequent inspections than two per year should be carried out e.g. quarterly inspections.

LEGAL REQUIREMENTS

When it comes to maintaining and repairing roofs installed with BMI's range of reinforced bitumen waterproofing products there is a range of law relevant to roof work health and safety including The Health and Safety at Work Act 1974, The Work at Height Regulations 2005, The Management of Health and Safety at Work Regulations 1999, The Construction (Design and Management) regulations 2015, The Lifting Operations and Lifting Equipment regulations 1998 and The Provision and Use of Work Equipment Regulations 1998.

The Construction (Design and Management) regulations apply to all building work, including maintenance and repair. These regulations require roofs to be designed with safety in mind throughout their life, including for maintenance, inspections and repairs.

COMPETENCY REQUIREMENTS FOR MAINTENANCE

See Section 2 for discussion on demonstrating general competency to carry out roof inspection and maintenance repair work to roofs.

For flat roofs covered by a BMI Icopal Guarantee that includes workmanship cover it is a requirement that any maintenance or repair works are carried out by the original BMI-approved contractor if still trading so as not to invalidate the BMI Icopal Guarantee. In the first instance contact the BMI Technical Guarantee Administration Department (Tel. 0330 12345 85 Option 1) in the event of a roof leak or if roof repairs to the BMI waterproofing are likely to be needed so that the original installing contractor is involved in the investigation and any subsequent repairs that may be required depending on the root cause of the issue.

SAFE ACCESS

For access to flat roofs for inspection and maintenance purposes it is recommended that HSG 33 Health and Safety in Roof Work (HSE) be consulted for guidance. A free copy of HSG 33 can be downloaded from https://www.hse.gov.uk/pubns/books/hsg33.htm.

Where you cannot avoid work at height, access to the roof should be planned and any risks associated with the work should be risk assessed and mitigated.

REPLACEMENT PARTS

Refer to BMI for product specific information. Replacement parts can be ordered from BMI Customer Services. Refer to the BMI Uk & Ireland website for further information.

SPECIALIST EQUIPMENT AND TOOLS

The following is a list of basic tools and equipment for the purposes of maintenance. Depending on the project and installers' personal preferences, other tools and equipment may also be used.

- Stiff brush
- Towels
- Squeegee
- Buckets

Personal Protective Equipment

- Gloves
- Goggles
- Knee pads
- Boots

CLEANING REQUIREMENTS

Refer to the flat roof maintenance section.

RECORD KEEPING REQUIREMENTS

A comprehensive record or log of inspections and any observations and subsequent maintenance should be kept by the Client (named on the BMI Icopal Guarantee) or their agents to demonstrate compliance with the terms and conditions of the BMI Icopal Guarantee (if applicable) with regard to the Client's obligations to maintain the roof.

The following template and checklist can be used for recording observations during roof inspections. A copy can be downloaded from the following link:
.https://drive.google.com/file/d/1UO-9kM9DFItGiWNTF8soKntwY9YuBJ1Q/view?usp=sharing

ROOF PLAN GRID

No: ___________ For use in conjunction with the Building Owner Flat Roof Maintenance - Inspection Checklist.

Building: Inspection Date: ______ Location: Inspector:

Scale: 1cm =

BUILDING OWNER FLAT ROOF MAINTENANCE - INSPECTION CHECKLIST

Provide the roof plan using the roof plan grid and indicate the location of observed conditions keyed to this inspection report. Use the item codes to show location.

Building: _______ Inspection Date: ____________ Location: ______

Inspector: ______

Contact: ______

Membrane: ______ Surfacing: ______

Attachment: ______

Has the occupancy or use of the building changed since the last inspection?

No Yes If Yes, how?

Have any changes, additions or new penetrations been made to the roof since the last inspection?

No Yes If Yes, indicate on roof plan and describe:

Has there been leakage?

No Yes If Yes, under what conditions?

Light Rain Heavy Rain Wind Driven Rain

Leaks continuously (Indicate where leaks occurred on roof plan)

Were emergency repairs performed? *(Note: Please contact BMI Technical on Tel. 0330 12345 85 Option 1 to ask about leak kits)*

No Yes If Yes, describe

Photographic Evidence of Remedial Works

INSPECTION CHECKLIST

Perform an initial general building inspection, condition may indicate roof problem. Note location for investigation on roof plan:

ITEM CODE		CONDITION SEVERITY: G= Good, no action F= Fair, Monitor at next inspection P= Poor, Immediate Action			
		G	F	P	ACTION TAKEN
	INTERIOR **Roof Deck**				
A1	Corrosion				
A2	Spalling				
A3	Cracking				
A4	Buckling				
A5	Sagging				
A6	Open Joints				
	Walls				
B1	Movement				
B2	Settling				
B3	Cracks				
B4	Spalling				
B5	Paint Peeling				
B6	Water Stains				
	EXTERIOR **Walls**				
C1	Mortar Joints				
C2	Cracks				
C3	Stains				

C4	Efflorescence				
C5	Sealant Joints				
C6	Windows				
C7	Fascia Displaced				
C8	Gutters Anchored				
C9	Downspouts				
	ROOF General				
D1	Ponded Water				
D2	Debris				
D3	Physical Damage				
	METAL FLASHINGS Counterflashings				
E1	Loose/Missing Fasteners				
E2	Loose/Displaced Metal				
E3	Deformed Metal				
E4	Corrosion				
E5	Loose/Missing Joint Cover				
E6	Sealant Joints				
E7	Punctures				
E8	Other				
	Coping/Cap Flashing				
F1	Loose/Missing Fasteners				
F2	Loose/Displaced Metal				
F3	Deformed Metal				
F4	Corrosion				
F5	Loose/Missing Joint Cover				
F6	Cracked Sealant				

F7	Punctures				
F8	Other				
	Expansion Joints				
G1	Loose/Missing Fasteners				
G2	Loose/Displaced Metal				
G3	Deformed Metal				
G4	Loose/Missing Joint Cover				
G5	Spliced Joints				
G6	Stripped-in Flashing				
G7	Punctures				
G8	Splitting				
G9	Mechanical Damage				
G10	Hinders Drainage				
G11	Other				
	Edge Metal				
H1	Loose/Missing Fasteners				
H2	Loose/Missing Stripped in Flashing				
H3	Splits in Stripped in flashing joints				
H4	Corrosion				
H5	Loose/Missing Metal Sections				
H6	Loose/Missing Joint Cover				
H7	Open End Joints				
H8	Sealant Joints				
H9	Other				
	BASE FLASHING				
J1	Exposed Top Seal				

J2	Adhesion				
J3	Seams/Attachment to Field				
J4	Vertical Laps				
J5	Deterioration				
J6	Punctures				
J7	Sagging/Wrinkling				
J8	Excessive Bridging				
J9	Other				
	PENETRATIONS General				
K1	Pitch Pocket Sealants				
K2	Loose Flashing				
K3	Drawbands				
K4	Other				
	Drains				
L1	Strainers/Clamping Ring				
L2	Clear of Debris				
L3	Flashing				
L4	Ponding				
	Rooftop Equipment				
M1	Attachment to Curbs				
M2	Access Panels				
M3	Housing				
M4	Liquid Discharge				
M5	Condensation				
M6	Roof Adjacent to Equipment				
	Conduit or Pipe				

N1	Sagging				
N2	Supports Moving				
N3	Joints				
N4	Corrosion				
	MEMBRANE **General**				
O1	Discoloration				
O2	Coating/Surface				
O3	Cracking				
O4	Wrinkles				
O5	Punctures				
O6	Walkways, Displaced				
O7	Walkways, Deteriorated				
O8	Walkways, Needed				
	Laps				
P1	Open Joints				
P2	Fishmouths				
	Membrane				
Q1	Unadhered Areas				
Q2	Blisters				
Q3	Loose Insulation				
Q4	Fasteners Backing Out				
Q5	Ridges				
	MISCELLANEOUS				
R1	Antennas				
R2	Guy Wires				
R3	Ice or Icicles				

R4	Oil Deposits				
R5	Surface Contamination				
R6	Soft Areas				
R7	Vandalism				
R8	Vegetation Growth				
R9	Other Damage				

Section 4: Product Disposal

The disposal of a Construction Product is the removal from the site of waste which has occurred due to pre-installation damage, offcuts/damage during installation, post installation damage and end of life disposal.

Minimum requirements

- End of life information
- Recycling options (including reuse)
- Safe disposal
- Legal requirements
- Environmental hazards

END OF LIFE INFORMATION

BITUMEN MEMBRANES / INSULATION / ADHESIVES / PRIMERS
Dispose of previously installed materials in a safe manner in accordance with local/national regulations. Empty containers should be taken to an approved waste handling site for recycling or disposal.

RECYCLING OPTIONS (Including reuse)

It is not currently considered possible to recycle or reuse materials previously installed as part of an Icopal bituminous warm roof waterproofing system.

SAFE DISPOSAL

This includes the disposal of non-hazardous, hazardous and recyclable materials in separate skips. After storing your waste, you can then arrange construction waste removal by licensed waste carriers. Dispose of materials in a safe manner in accordance with local/national regulations. Empty containers should be taken to an approved waste handling site for recycling or disposal. Sweep or shovel spills into an appropriate container for disposal.

LEGAL REQUIREMENTS

In the UK, construction companies have a legal duty of care or are obligated to responsibly manage waste under the Environmental Protection Act 1990, Section 34. Although there is no legal requirement for a Site Waste Management Plan (SWMP) in the UK, its implementation allows more effective material management, waste reduction, and cost savings and represents best practice. If a SWMP is implemented, all construction employees are responsible for adhering to the plan including following their employer's waste management procedures and comply with the relevant aspects of the duty of care for waste. This includes the disposal of non-hazardous, hazardous and recyclable materials in separate skips. After storing your waste, you can then arrange construction waste removal by licensed waste carriers.

ENVIRONMENTAL HAZARDS

Refer to product specific material safety data sheets from BMI.

Bibliography

Further guidance on flat roof care, inspection, maintenance and repair procedures is given in the following documents. Where the reference is undated, the current version of the document should be followed.

1. BS 6229: 2018, Flat roofs with continuously supported flexible waterproof coverings. Code of practice: British Standards Institution (BSI).

2. BS 8217: 2005, Reinforced bitumen membranes for roofing. Code of practice: British Standards Institution (BSI).

3. Single Ply: Design Guide, Single Ply Roofing Association (SPRA).

4. Design Guide for Specifiers, Liquid Applied Waterproofing Systems for Roofs and Balconies. Liquid Roofing and Waterproofing Association (LRWA), 2020.

5. HSG 33, Health and Safety in Roof Work, Health & Safety Executive (HSE).

6. The Householder's Guide to Flat Roofing, National Federation of Roofing Contractors (NFRC), 2015.

BMI Group UK Limited does not accept liability for any of the recommendations contained in this document. BMI Group UK Limited's liability extends only to the supply of products in accordance with our terms and conditions of sale, and any relevant guarantees that apply to the project in question. It remains the designer & contractors' responsibility, to ensure that all aspects of the remedial work comply with relevant regulations and codes of practice.

Appendix

Attached below are a selection of section drawings representing a small number of typical details likely to be installed as part of a warm flat roof utilising BMI Icopal reinforced bitumen waterproofing. Further details are available from BMI Technical Services and can be made available on request.

UPSTANDS
WARM ROOF UPSTAND TO ABUTMENT FLASHING
WARM ROOF UPSTAND TO PARAPET WALL WITH GRP TRIM

CHANGE IN LEVEL
CHANGE IN LEVEL

EXPANSION JOINTS
TWIN KERB EXPANSION JOINT

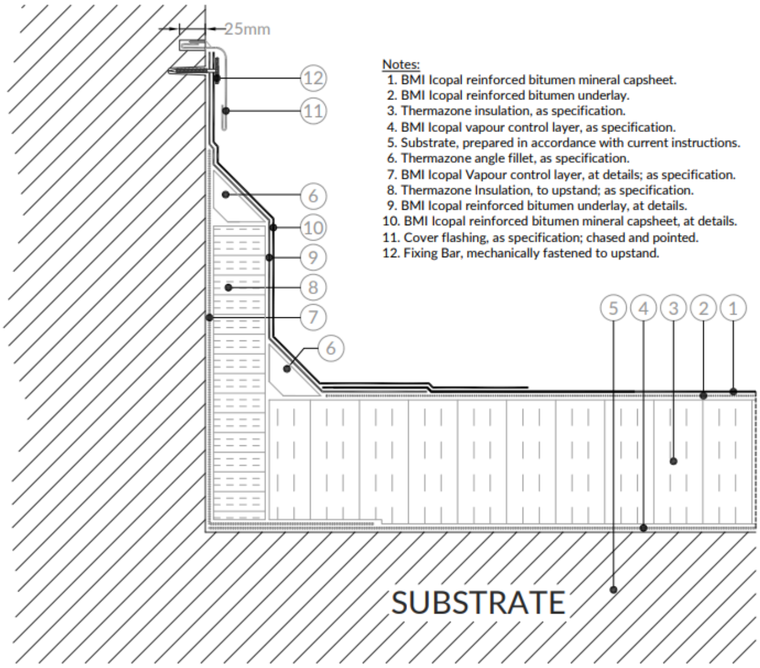
WATERCHECK & DRIPS
WATERCHECK WITH GRP EDGE TRIM

RAINWATER OUTLETS
SUMPED OUTLET

ROOFLIGHTS
DALITE STANDARD
DALITE STANDARD WITH BUILDERS KERB

PENETRATIONS
SOIL VENT PIPES
CABLE DUCTS

WARM ROOF UPSTAND TO ABUTMENT FLASHING



Notes:
1. BMI Icopal reinforced bitumen mineral capsheet.
2. BMI Icopal reinforced bitumen underlay.
3. Thermazone insulation, as specification.
4. BMI Icopal vapour control layer, as specification.
5. Substrate, prepared in accordance with current instructions.
6. Thermazone angle fillet, as specification.
7. BMI Icopal Vapour control layer, at details; as specification.
8. Thermazone Insulation, to upstand; as specification.
9. BMI Icopal reinforced bitumen underlay, at details.
10. BMI Icopal reinforced bitumen mineral capsheet, at details.
11. Cover flashing, as specification; chased and pointed.
12. Fixing Bar, mechanically fastened to upstand.

Notes

Substrate Preparation

i. The substrate is to be prepared in accordance with current instructions and should comply with all current standards. Where a BMI Icopal project specification has been provided these drawings should be considered as part of the project specification and together these take precedence over other instructions. Please consult BMI Technical Department for detailed guidance or queries.

Construction Notes

i. This drawing is intended to demonstrate the recommended detailing of BMI Icopal waterproofing membranes and systems.

ii. Building details shown are intended to be an indication of typical construction only and may vary to actual site and project conditions. Please refer to the principal designer for project details in this regard.

Additional Notes

i. For roofing product references please see BMI Icopal specification where applicable.

ii. Continuity of waterproof covering must be maintained for a minimum vertical height of 150mm above finished roof level, in accordance with the current version of BS:6229, BS:8217 and BS:5250.

iii. Upstands (for reinforced bitumen) of more than 250mm high should be regarded as vertical work, and it will be necessary to mechanically fasten the membrane at the top edge, in accordance with the current version of BS8217. Upstands for single ply and liquid membranes must be terminated as per the BMI Icopal instructions.

iv. BMI Group UK Limited provides this indicative detail in good faith and takes no responsibility for the sufficiency or otherwise of the drawing.

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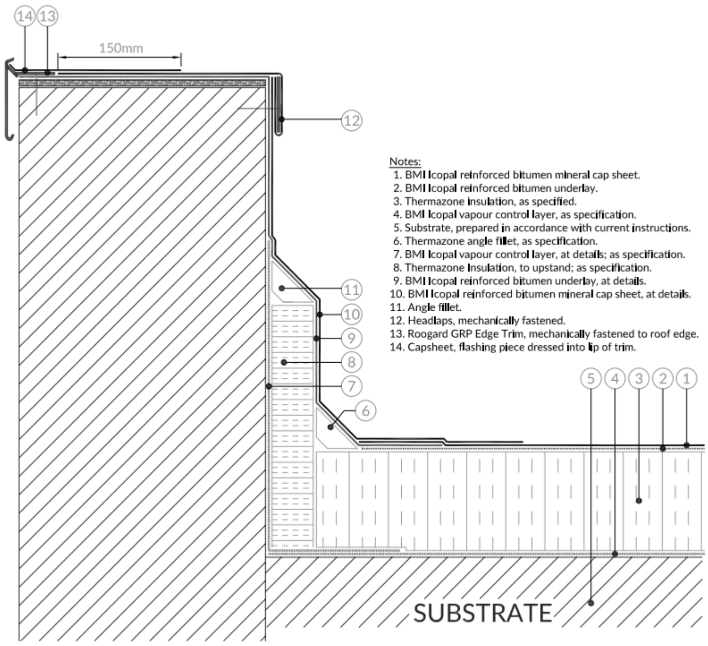
Drawing Title:	Warm Roof Upstand To Abutment Wall with Cover Flashing				
System:	Reinforced Bitumen Membranes - Two Layer System				
Dwg. No:	T-W-01-101	Date:	15/06/2022	Scale	NTS

This drawing has been prepared for general information purposes only. This details drawing is to recommend the correct procedure for installing BMI products. All other building details are indicative and are not to be used for building construction. (Do not scale- use figured dimensions only)

Install new Code 4 lead or lead replacement cover flashings dressed into the chases provided. These should be temporarily secured with lead wedges or fixing clips at 400mm centres and every change of direction. Cut, joint and dress the new flashing neatly to provide a minimum 75mm cover to the upstand waterproofing. Complete the flashing detail by pointing with a suitable mastic sealant. All lead work should be in accordance with current Codes of Practice and the Lead Development Association recommendations, and should be carried out by competent trades persons.

WARM ROOF UPSTAND TO PARAPET WALL WITH GRP TRIM



Notes

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Additional Notes

i. For roofing product references please see BMI Icopal specification where applicable.

ii. Continuity of waterproof covering must be maintained for a minimum vertical height of 150mm above finished roof level, in accordance with the current version of BS:6229, BS:8217 and BS:5250.

iii. Upstands (for reinforced bitumen) of more than 250mm high should be regarded as vertical work, and it will be necessary to mechanically fasten the membrane at the top edge, in accordance with the current version of BS8217. Upstands for single ply and liquid membranes must be terminated as per the BMI Icopal instructions.

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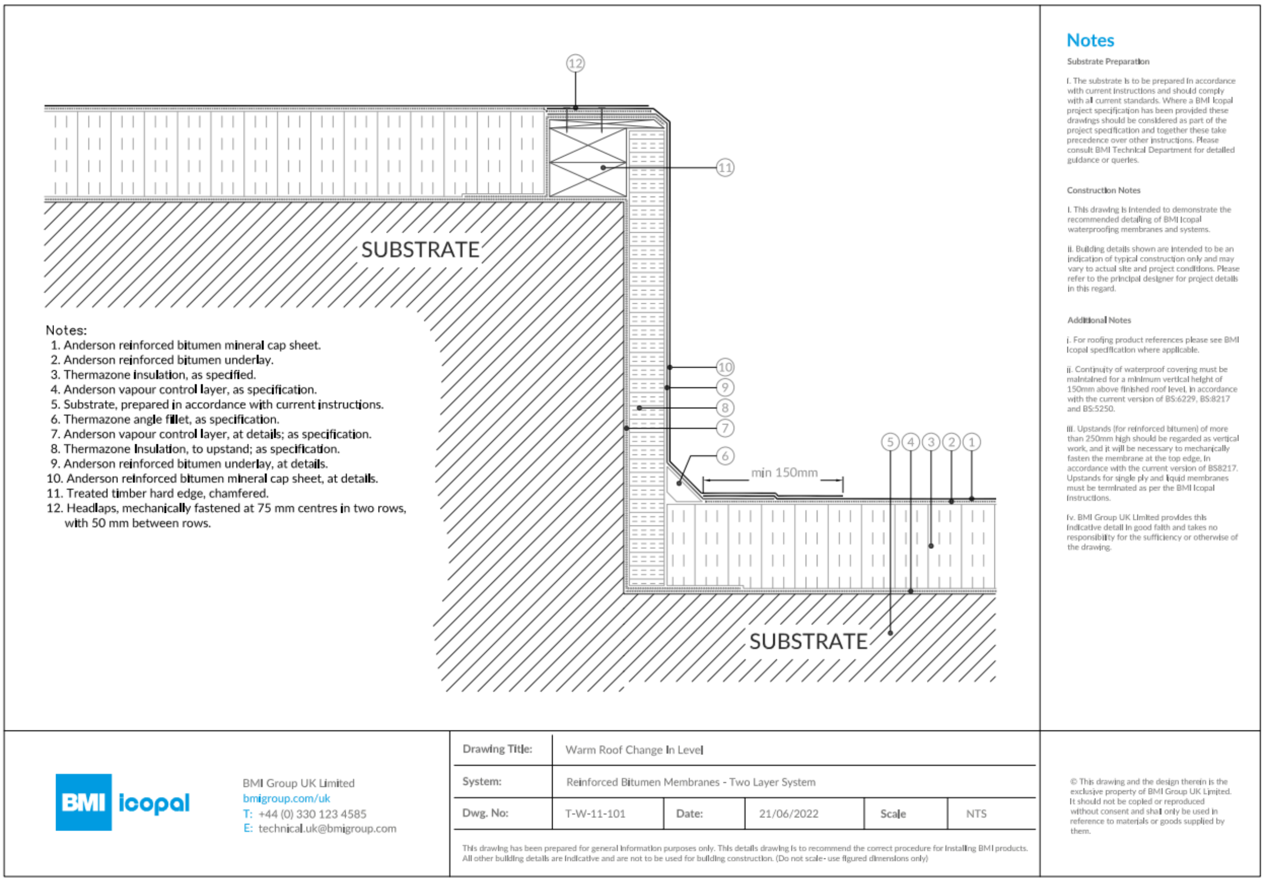
Drawing Title:	Warm Roof Upstand To Parapet Wall With GRP Edge Trim				
System:	Reinforced Bitumen Membranes - Two Layer System				
Dwg. No:	T-W-02-103	Date:	15/06/2022	Scale	NTS

This drawing has been prepared for general information purposes only. This details drawing is to recommend the correct procedure for installing BMI products. All other building details are indicative and are not to be used for building construction. (Do not scale- use figured dimensions only)

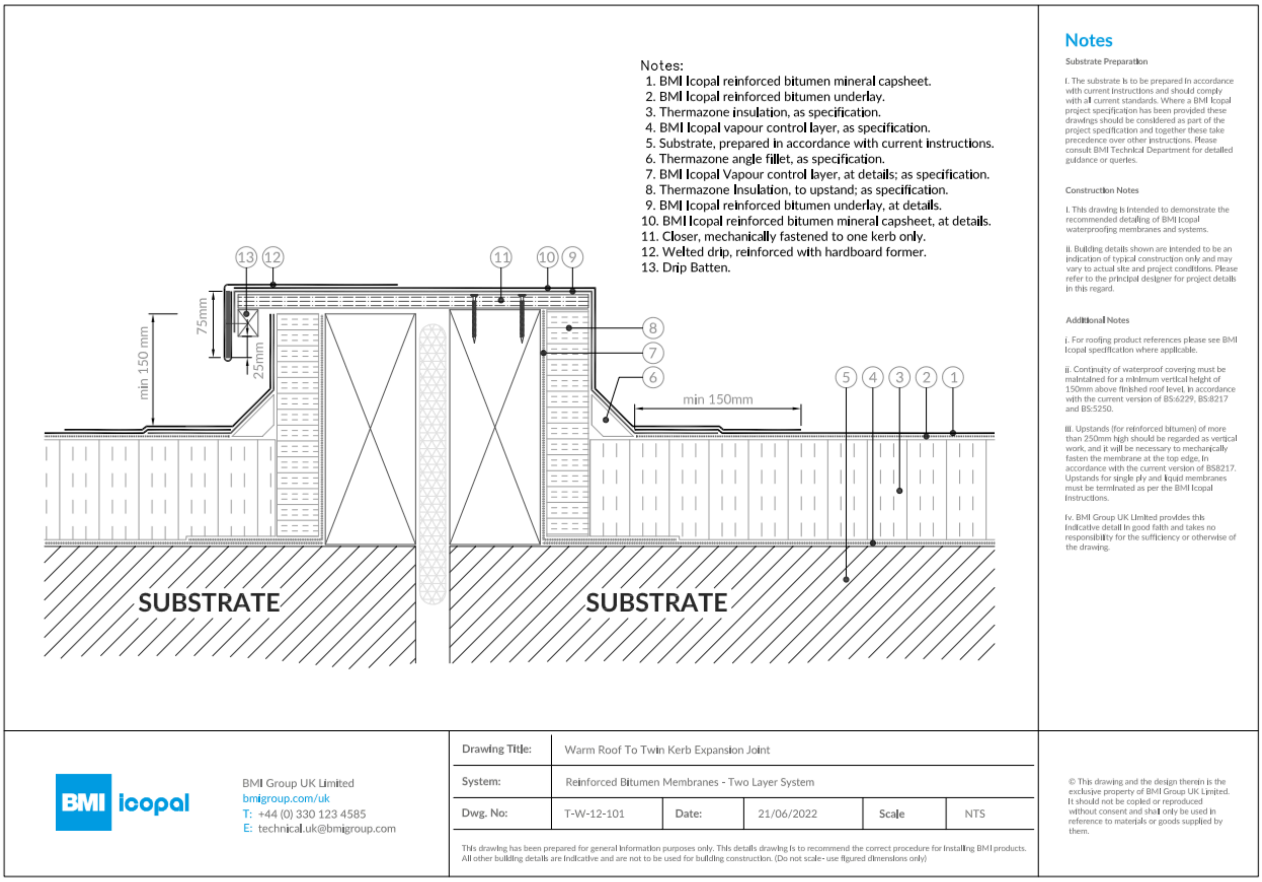
Install the waterproofing underlay, dressing up and over, and take it to the edge of the parapet. Install appropriate sized Roofgard GRP Edge Trim to the outside edge of the parapet. The trim should be screw fixed at 300mm centres, including pre-formed internal and external corners; in accordance with the current instructions. The capsheet flashing must be dressed tightly into the trim edge. Ensure a continuous bead of bitumen is extruded to complete the seal.

CHANGE IN LEVEL



Install the specified detailing Vapour Control Layer (VCL) to the prepared, primed, change in level detail in accordance with the main detailing specification. The thickness of the insulation boards must satisfy relevant building regulations and client instructions. Install an angle fillet at the base of the change in direction between the horizontal and vertical faces to provide a continuous supported surface for the bituminous waterproofing membrane(s) to be installed to. Insulation boards should be covered immediately by the specified waterproofing system as per the main detailing section of the specification. Changes in level over 225mm high should be regarded as vertical work. It will be necessary to mechanically fasten bitumen membranes at the top edge. Head laps should be nailed, with large-headed galvanized clout nails, or screwed with appropriate washer plate and screw fasteners, placed at 75 mm centres in two rows, with 50 mm between rows, to prevent slippage of bituminous membranes.

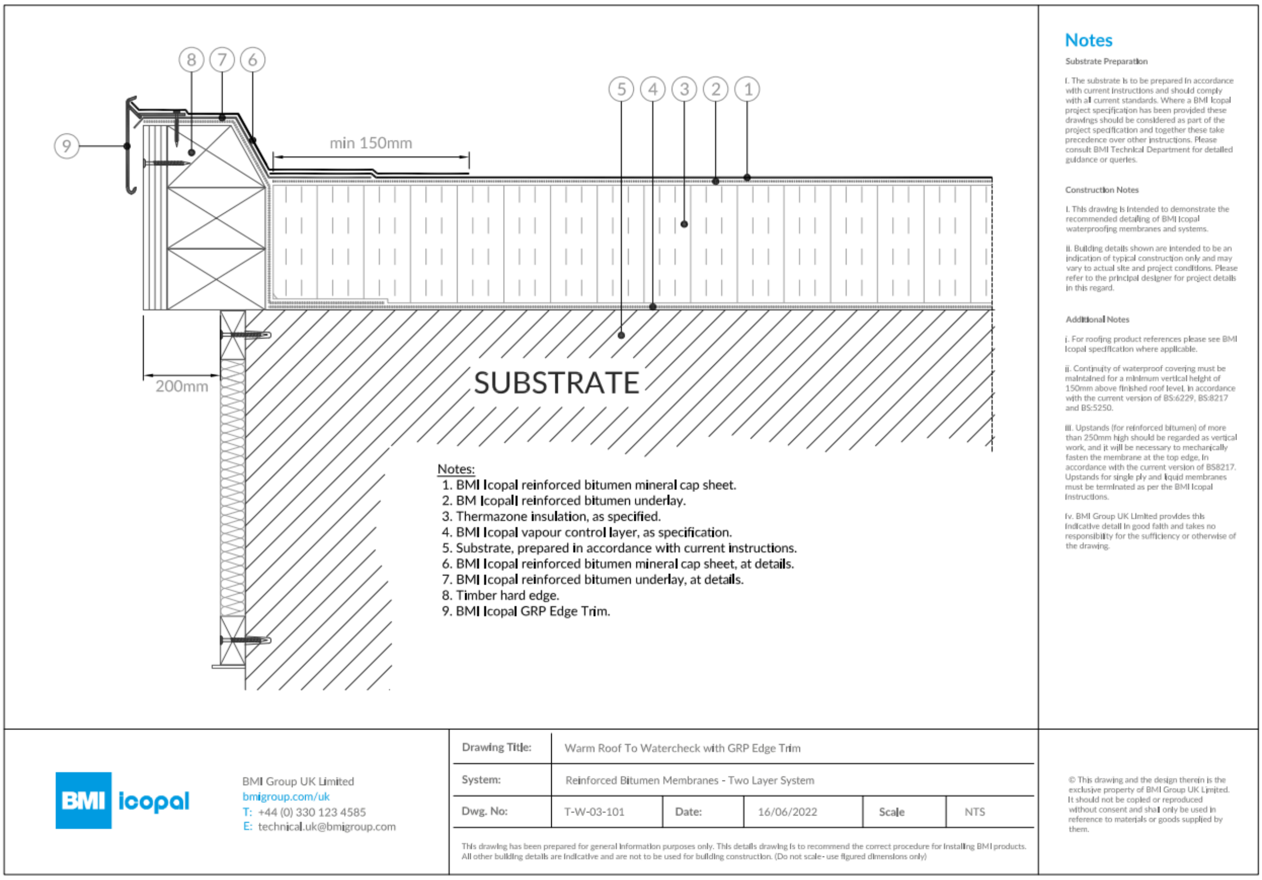
EXPANSION JOINT



Apply a layer of the specified detailing underlay to the kerb, fully bonded in accordance with the main detailing specification, lapping onto the field area a minimum 100mm. Following installation of the specified field area waterproofing apply the detailing capsheet, fully bonded in accordance with current instructions, lapping onto the field area by a minimum 150mm. Dress the membranes to the full height of one kerb only.

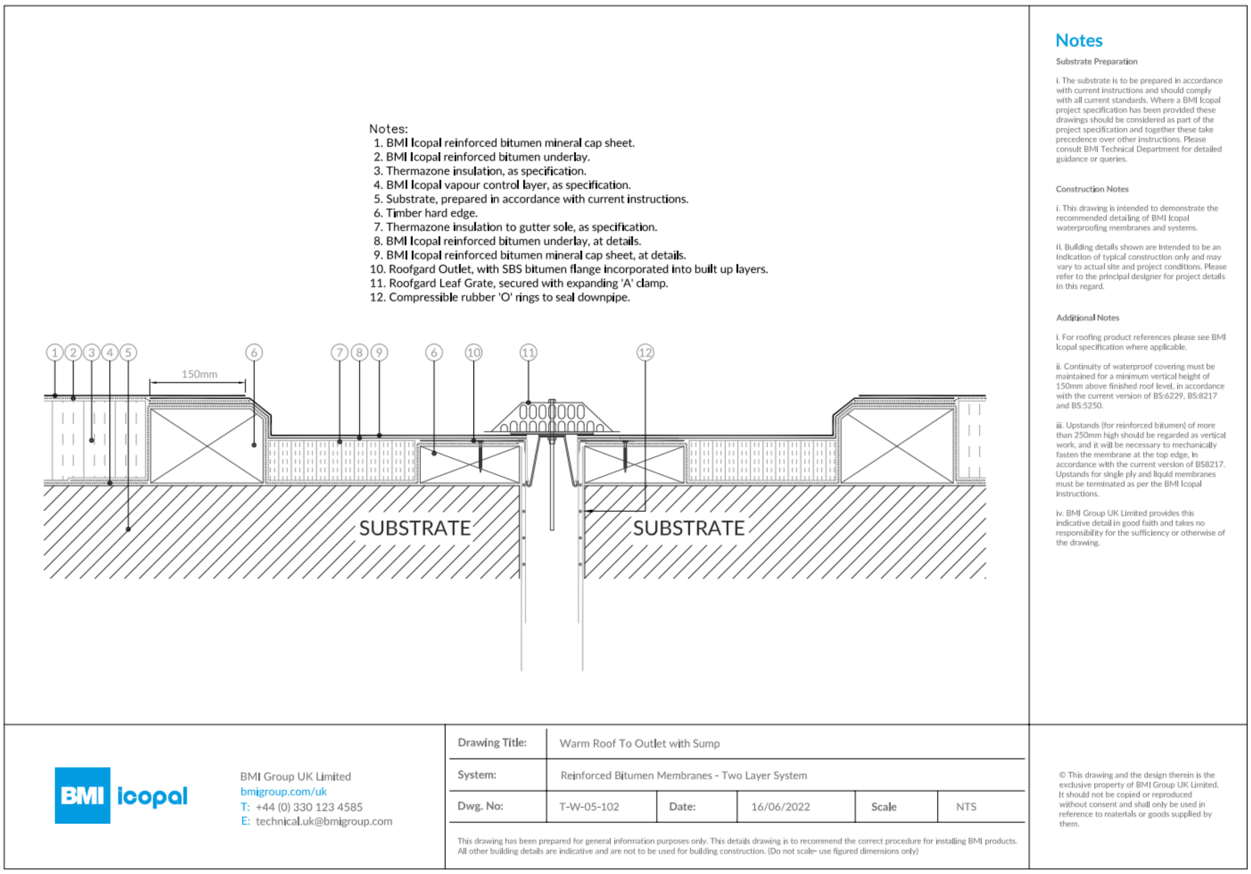
Mechanically fix a minimum 18mm exterior grade plywood capping pieceto to one timber kerb only. Repeat the above waterproofing instructions for the opposite kerb detail, terminating
Form a welted drip detail or GRP drip edge from the specified waterproofing system, reinforced using strips of 6mm hardboard or plywood fixed to a treated timber drip batten at 50mm staggered centres. Turn the capsheet back over the kerb to complete. Alternatively this detail can be completed with a GRP trim detail.

WATERCHECK WITH GRP EDGE TRIM



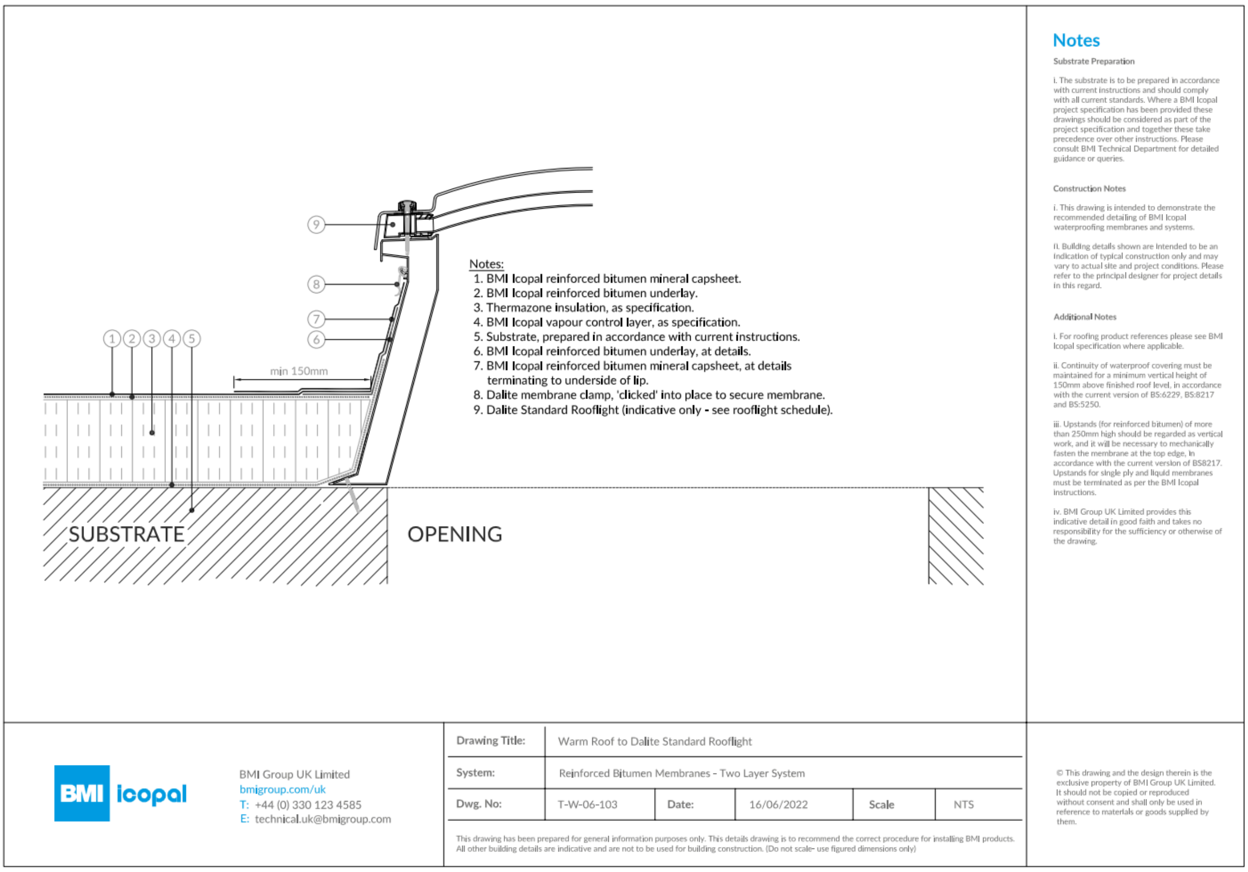
Install the specified detailing cap sheet to the installed trim in line with the main detailing specification. The cap sheet must lap onto the field area membrane by a minimum of 300mm.There must be a continuous visible extrusion at all laps. Please refer to the products datasheet, BMI Group UK Ltd. drawing details and installation guides for further information.

SUMPED OUTLET



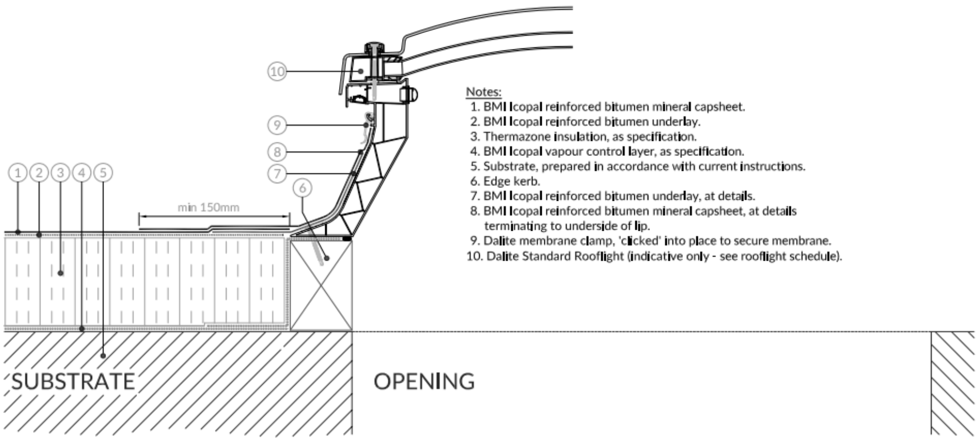
Where required, a sump should be formed to receive the rainwater outlet in the insulation using a suitably sized thickness of insulation and timber hard edges. The sump should be detailed carefully using the same products as specified in the detailing section of the specification.

DALITE STANDARD ROOFLIGHT



Install Dalite Standard rooflight ensure installation is in accordance with the manufacturer's current installation instructions

DALITE STANDARD ROOFLIGHT WITH BUILDERS KERB



Notes:
1. BMI Icopal reinforced bitumen mineral capsheet.
2. BMI Icopal reinforced bitumen underlay.
3. Thermazone insulation, as specification.
4. BMI Icopal vapour control layer, as specification.
5. Substrate, prepared in accordance with current instructions.
6. Edge kerb.
7. BMI Icopal reinforced bitumen underlay, at details.
8. BMI Icopal reinforced bitumen mineral capsheet, at details terminating to underside of lip.
9. Dalite membrane clamp, 'clicked' into place to secure membrane.
10. Dalite Standard Rooflight (indicative only - see rooflight schedule).

Notes

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Additional Notes

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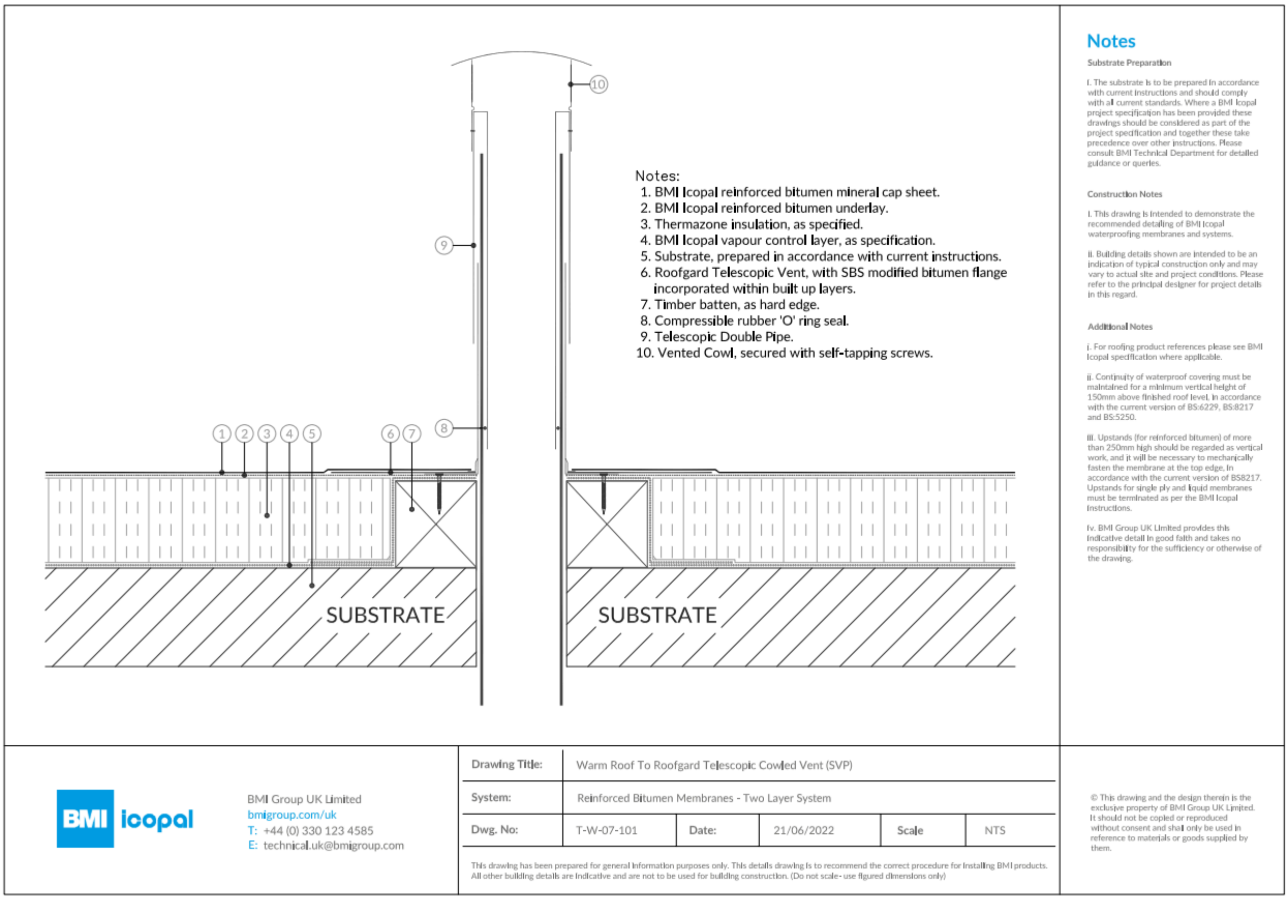
Drawing Title:	Warm Roof to Dalite Standard Rooflight with Edge Kerb				
System:	Reinforced Bitumen Membranes - Two Layer System				
Dwg. No:	T-W-06-104	Date:	16/06/2022	Scale	NTS

This drawing has been prepared for general information purposes only. This details drawing is to recommend the correct procedure for installing BMI products. All other building details are indicative and are not to be used for building construction. (Do not scale- use figured dimensions only)

Dress the specified waterproofing system up and over the top of the builders kerb in readiness to receive the specified rooflight. The kerb should be constructed so as to maintain continuity of the waterproofing for a vertical height of not less than 150 mm above finished roof level; this includes any surface finishes.

Install Dalite Standard rooflight ensuring installation is in accordance with the manufacturer's current installation instructions

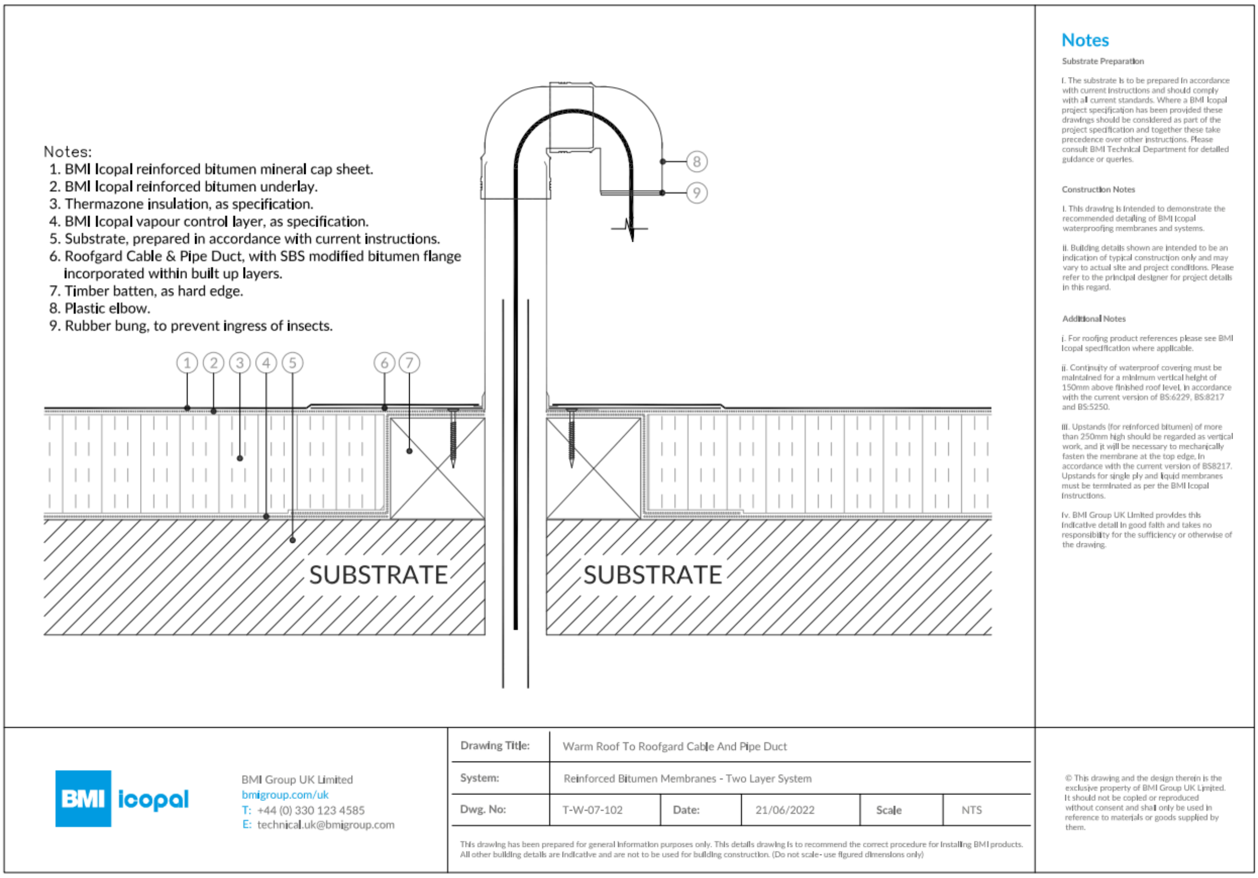
PENETRATIONS - SOIL VENT PIPE



Install the Roofgard Cowled Telescopic Vent where a soil vent pipe penetrates the waterproofing system. Place the telescopic vent pipe over the soil vent pipe centrally. Ensure the high performance membrane flange on the pipe is fully supported and is bonded between the underlay and capsheet by careful torching or flame-free hot-air welding, as appropriate to the main detailing specification.

The telescopic double pipe is then positioned to fit into the soil vent pipe incorporating the 'O' ring seal and simultaneously over the upstand pipe. The height of the telescopic double pipe can be adjusted as required and secured with the self-tapping screw. Compliance for the minimum height must be in accordance with all current relevant building regulations. The installation is completed by fixing the vented cowl, secured with the self-tapping screw.

PENETRATIONS - CABLE DUCT



Install the Roofgard Cable & Tube Duct where suitable cables and/or tubes penetrate the waterproofing system. Ensure the integral membrane flange on the Roofgard Cable & Tube Duct upstand pipe is fully supported and is bonded between the underlay and capsheet by careful torching or flame-free hot-air welding, as appropriate to the main detailing specification.

Approval:

Name	Title	Signature	Date
Approver 1	*Title*		*Date*
Approver 2	*Title*		*Date*

Icopal

Date of issue - January 2025

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