

Monarflex Tanking & DPM Systems

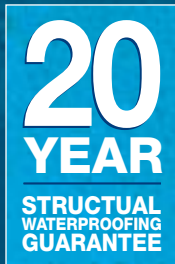
Monarflex
Geomembranes

A member of the Icopal Group



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27.2 N6

**Cold and Hot
Applied
Structural
Waterproofing
Membranes**



Exclusively Supplied and
Installed by

Monarflex
Geomembranes

A member of the Icopal Group



WORLD LEADER IN WATERPROOFING

Monarflex Tanking & DPM Systems



Overview

Monarflex Geomembranes, part of the Icopal Group, uniquely design, manufacture and install complete tanking solutions from its comprehensive range of Structural Waterproofing Systems capable of achieving totally dry environments (Grade 4: Archive Status; BS 8102) on even the most complex below ground structures.

Supported by a range of complimentary product guarantees on both products and installation, Monarflex Geomembranes are the first to offer this complete service including design, manufacture, installation, project management and inspection.

A World Class Resource, Available Locally

Icopal is the world leader in building protection from roof right down to basement. From our St. Albans office, we offer you the UK's most complete range of ground membranes, support services and product guarantees.



Tanking & DPM System Guarantees Backed by the Strength of a Global Partner

Our guarantees apply to any Icopal tanking / DPM system which has been designed, specified and installed by Monarflex Geomembranes. As a result the following guarantees are available:

- **Materials & Workmanship with Insolvency Cover**
- **Materials only**

Where Monarflex Geomembranes install or project manage the system installation, a materials and workmanship guarantee (with insolvency cover) will be offered for a period upto 20 years. Applications not project managed by Monarflex Geomembranes will be offered a materials only guarantee.

System Considerations

A successful structural waterproofing solution requires good design, appropriate material specification and correct installation to ensure water does not enter the building. Failure to comply with any one of the above can lead to a waterproofing breach, resulting in substantial remedial measures and costs.

Design

Structural Waterproofing systems can fail as a result of poor design. The reasons for this can be a follows:

- **Complex Construction**
- **Technical Experience**
- **Misunderstanding of the Product Capabilities**

Product Specification

Whilst the majority of membranes are adaptable to different construction scenarios, they may not always be suitable or compatible with surrounding construction materials.

Furthermore, whilst correct products may be specified, inappropriate competitor materials are still delivered to site and used in their place.

Installation

Results of an independently commissioned report concluded that 60% of all system failures were a direct result of poor installation. The remainder of failures are largely due to poor site preparation.

Complete System Solutions

Monarflex Geomembranes introduces a complete waterproofing system solution aimed at eliminating the causes of system failures. Supported by a range of complimentary products, Monarflex Geomembranes are the first to offer a complete service including design, manufacture, installation, project management and inspection ensuring specified products are used and site preparation is adequate.

From initial system design through to final on-site completion, Monarflex Geomembranes Guaranteed Waterproofing Solutions aim to remove all risk associated with below ground water ingress giving specifiers and contractors complete peace of mind.

BS 8102: 1990; Code of Practice for the Protection of Structures against water from the ground.

| GUIDE OF LEVEL OF PROTECTION TO SUIT BASEMENT USE | | | | |
|---|---|--|--|--|
| Grade | Basement Usage | Performance Level | Form of Construction | Comment |
| 1 | Car parking; plant rooms (excluding electrical equipment); workshops | Some seepage and damp patches tolerable | Type B. Reinforced concrete design in accordance with BS8110 | Groundwater should be checked for chemicals which may have a deleterious effect on the structure or internal finishes |
| 2 | Workshops and plant rooms requiring drier environment; retail storage areas | No water penetration but moisture vapour tolerable | Type A. Type B. Reinforced concrete design in accordance with BS8007 | Careful supervision of all stages of construction is necessary. Membranes can be applied in multi-layers with well lapped joints |
| 3 | Ventilated residential and working areas including offices, restaurants etc., leisure centres | Dry environment | Type A. Type B. With reinforced concrete design to BS8007 Type C. With wall and floor cavity and DPM | As grade 2 |
| 4 | Archives and stores requiring controlled environment | Totally dry environment | Type A. Type B. With reinforced concrete design to BS8007 plus vapour proof membrane Type C. With ventilated wall cavity with vapour barrier to inner skin and floor cavity with DPM | As grade 2 As grade 1 |

Complete Design Liability

With many years proven experience of below ground waterproofing, all Monarflex Geomembranes system designs are professionally indemnified offering designers the opportunity to transfer the associated risks.

The design and detailing of a tanking system cannot be determined in isolation; it's context is vital. A clear understanding of hydrostatic pressure related to the water table and any subsequent seasonal variation must be considered. Of equal importance, especially with regard to previously developed land, is the possible existence of dangerous gases and other ground related hazards which could have implications for the proposed tanking solution.

Comprehensive Product Specification

Using our comprehensive range of design solutions, all eventualities can be accommodated. Monarflex Geomembranes offer a range of waterproofing products of exceptional quality and performance. They include bonded, loose laid membranes and liquid applied membranes capable of successfully waterproofing the building. Involving Monarflex Geomembranes at the design stage will ensure the correct products are specified each time.

Installation – Quality Assured

Following the successful completion of the design and specification stages, it is important to ensure the products are installed correctly.

Quality assured installations with proven history, provide fully trained staff, project management, CHAS and CSCS certified personnel.

Full Compliance with Regulations

Guidance on the protection of buildings from ground water ingress is initially provided by Approved Document C (Site Preparation and Resistance to Moisture), 2000. Besides establishing the minimum waterproofing requirements for different structural elements, Part C refers users to BS 8102: 1990 Code of Practice for the "Protection of Structures against water from the ground". This standard addresses the different kinds of below ground waterproofing whilst also grading the different levels attainable (Grades 1 to 4; Grade 4 being a Totally Dry Environment or Archive Status).

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The Monarflex Geomembranes product solutions can be split into two categories. Cold applied technology refers to membranes that do not require the application of heat during their installation. Conversely, the Hot applied technology does require the application of heat, be it via an open flame or bitumen boiler.

Xtra-Seal Cold Applied Technology

■ Xtra-Seal Diamond

A high performance, self-adhesive, flexible waterproofing membrane for horizontal and vertical applications, manufactured from tough, HDPE film laminated to a 1.5mm layer of modified bitumen/polymer.

■ Monarflex Ultra 300 DPM

A loose laid, reinforced polyethylene damp proof membrane for horizontal applications. 0.3mm thick.

■ Blackline 1000

A loose laid, Un-reinforced polyethylene more robust damp proof membrane for horizontal applications. 1.0mm thick.

■ Xtra-Seal Liquaprufe

A brush applied modified bitumen/rubber emulsion, for horizontal and vertical applications

Accessories

■ Xtra-Seal Protection Board

A flexible, bitumen impregnated, water resistant cellulose board, 3mm thick, for use with the self-adhesive membranes.

■ 70mm Monobond

A double sided butyl tape used for sealing laps.

■ Icopal Quick Drying Primer

Bitumen primer used prior to the application of any membrane.

Imperma Hot Applied Technology

■ Imperma SBS

An SBS modified bitumen membrane for horizontal and vertical application. 4mm thick with a fine sand upper surface and a polyethylene film underside.

■ Imperma Hot Liquid Seal

A hot applied bitumen, self levelling membrane for horizontal applications. Used to seal around penetrating steelwork.

Accessories

■ Imperma Protection Layer

Mineral finished bitumen protection layer, for use with Imperma SBS.

■ Icopal Quick Drying Primer

Bitumen primer used prior to the application of any membrane.

■ Monarflow 27(S)

A high strength HDPE cusped core hot welded to a geotextile filter specifically designed to allow the passage of water and gases to drainage outlets or vents.



Cold Technology materials do not require the use of heat to be applied. They can be self-adhered, paint applied or loose laid.



Xtra-Seal Diamond Self-Adhesive Tanking Membrane

Xtra-Seal Diamond is specifically designed for use as a below ground waterproofing membrane in critical areas such as lift pits and retaining walls. Its self-adhesive properties enable the membrane to be applied internally or externally to a variety of substrates.

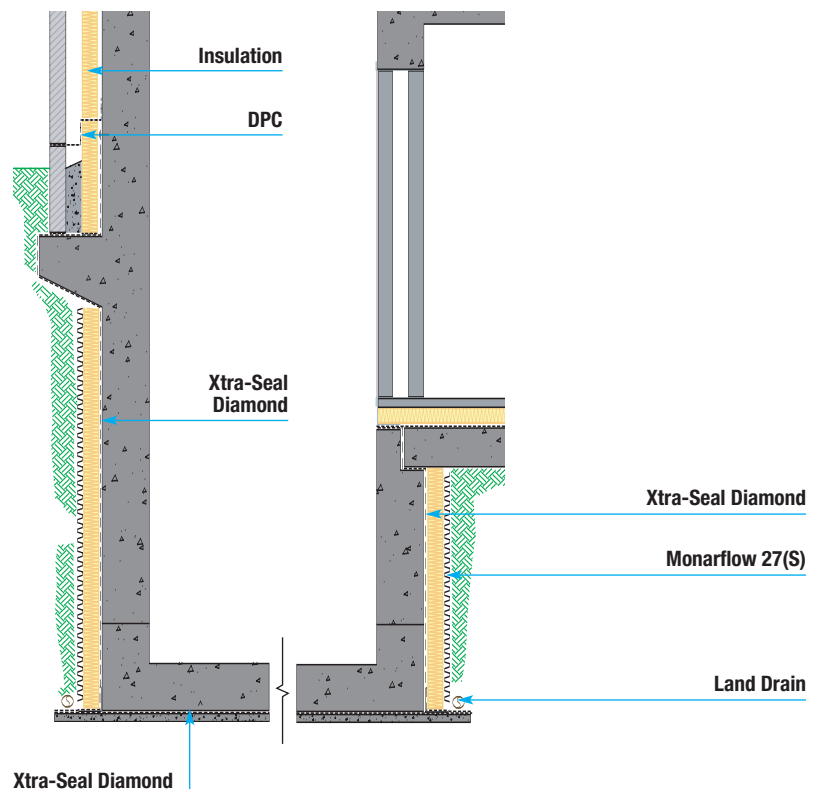
- **Quick and easy to install, the membrane is applied from the top, down to the base of the substrate. Xtra-Seal Diamond carries BBA Certificate 97/3381**
- **When designed and installed correctly, Xtra-Seal Diamond will achieve Grade 4 (Archive Status) in accordance with BS 8102:1990**
- **Xtra-Seal Diamond should be used in conjunction with Icopal Quick Drying Primer and Icopal Protection Boards**



Typical Applications

Submerged Lift Pit

Internal or external tanking of a submerged lift pit depends upon the intended construction. In the example shown, the reinforced concrete structure will maintain a clear, flush internal space. Here, internal tanking is not feasible as no lateral support is provided for the membrane (eg. Blockwork skin with filled cavity). Without internal lateral support, the tanking membrane would be 'pushed' off the wall by hydrostatic pressures leading to a system failure. The external tanking (shown), used in conjunction with drainage boards and land drains, maintains a dry, clear, internal, functioning space. When linked correctly with the DPC and DPM, the lift pit tanking will maintain the structural waterproofing continuity.





Monarflex Ultra 300 DPM

Ultra 300 is a reinforced polyethylene damp proof membrane designed to withstand the rigours of a busy building site. Laid above concrete or a sand blinding, its HDPE reinforcing grid provides exceptional tear and puncture resistance.

Available in either 2 or 4m widths, Ultra 300 meets the requirements for a polyethylene DPM given in Approved Document C of the Building Regulations.

Ultra 300 should be laid horizontally and lapped with a compatible Damp Proof Course to maintain waterproofing continuity across the cavity wall. Laps should be sealed using Monobond LT tape.



Blackline 1000

Blackline 1000 is an extremely robust unreinforced damp proof membrane, designed to withstand the rigours of a busy site. Site preparation will determine if protection is necessary. If protection is required a suitable Geotextile, sand or concrete blinding may be used.

Available in 2 or 4 metre widths, Blackline 1000 meets the requirements for a polyethelene DPM, as set out in approved documents C of the Building Regulations. Due to the addition of carbon black, Blackline 1000 will last extremely well if exposed to Ultra Violet.

Blackline 1000 should be installed by Monarflex Geomembranes approved installation teams and lapped with a compatible DPC to maintain waterproofing continuity across cavity walls. Where possible all laps should be welded.



Hot Technology materials require the use of heat to be applied. The heat source may be in the form of a gas torch, (torch on) or poured heated bitumen (via a boiler).

Imperma SBS Torch On Tanking Membrane

Imperma SBS is a modified bitumen membrane with spun bonded polyester carriers exceeding its classification under BS 747: Type 5 membranes. Applied with the use of heat, Imperma was the first SBS modified membrane to be compatible with torch-on application. Applied horizontally or vertically, complete bonding to the substrate is achieved with a good flow of bitumen ahead of the membrane.

- Can be applied internally or externally to a majority of construction materials.
- Particularly recommended for deep piled retaining walls.
- Ideal where fixings or structural elements puncture the tanking membrane.
- When designed and installed correctly, Imperma SBS will achieve Grade 4 (Archive Status) in accordance with BS 8102:1990.

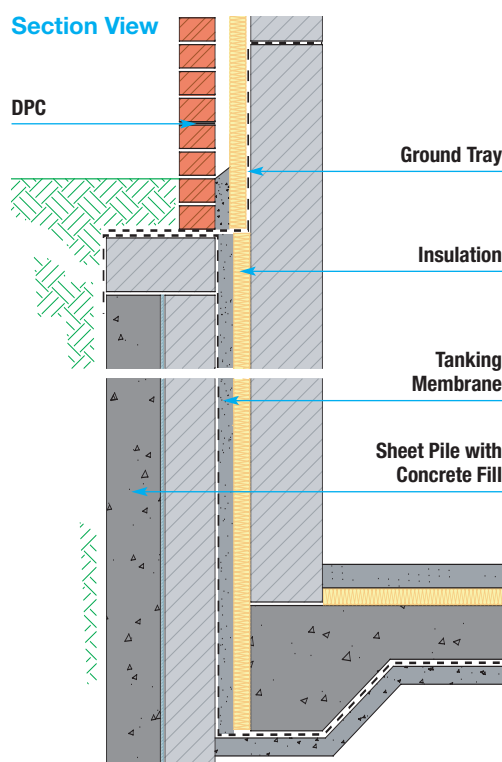
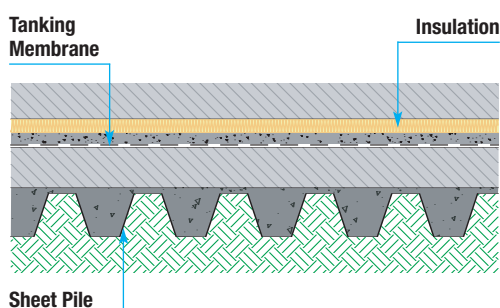


Typical Applications

Steel Sheet Piled Retaining Wall

The interlocking steel sheet pile is driven into the ground to form a retaining wall. This form of 'permanent shutter' provides a level of water retention but requires additional measures in the form of a flexible tanking membrane. Reinforced concrete infilling of the trapezoidal profile or construction of a trench block skin wall that would provide a flush surface for the tanking installation as indicated in the detail.

Plan View



Hot Applied Technology Cont.

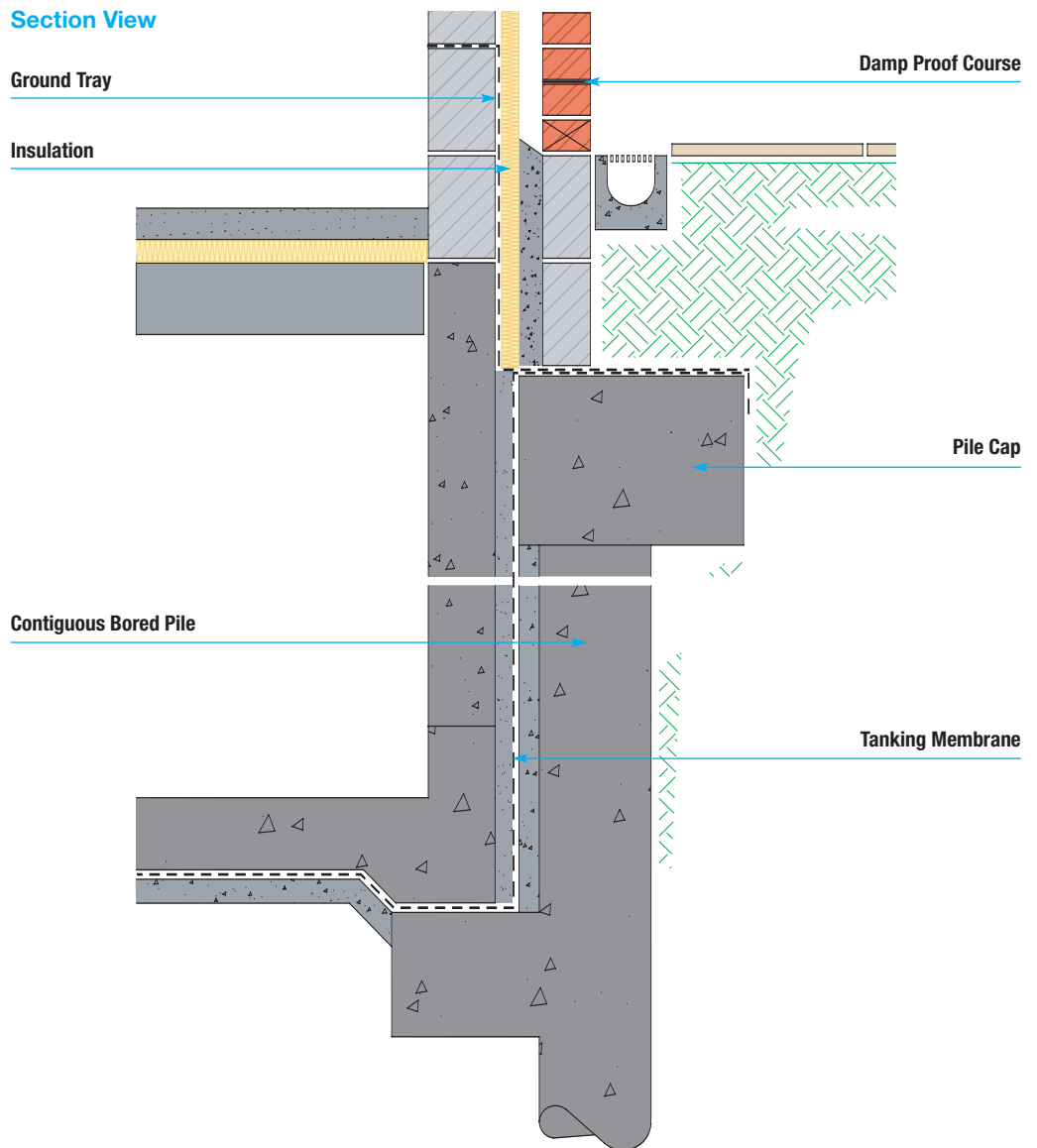


Typical Applications

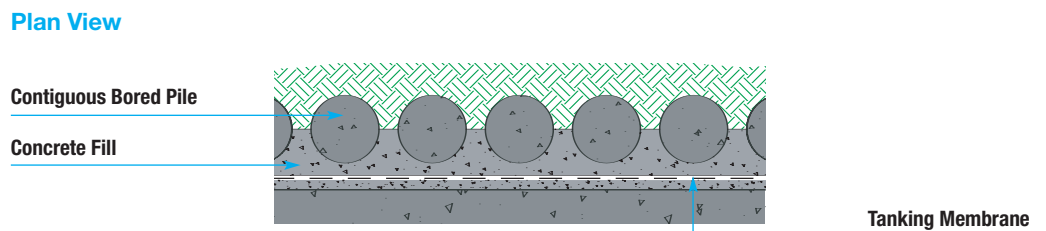
Contiguous Bored Piles

Bored piles in contact with each other will support the sides of excavations but do not provide water retention. Additional work in the form of concrete infill or a trench block skin wall will be required to form a flush surface to receive the tanking installation as detailed.

Section View



Plan View



Typical Applications

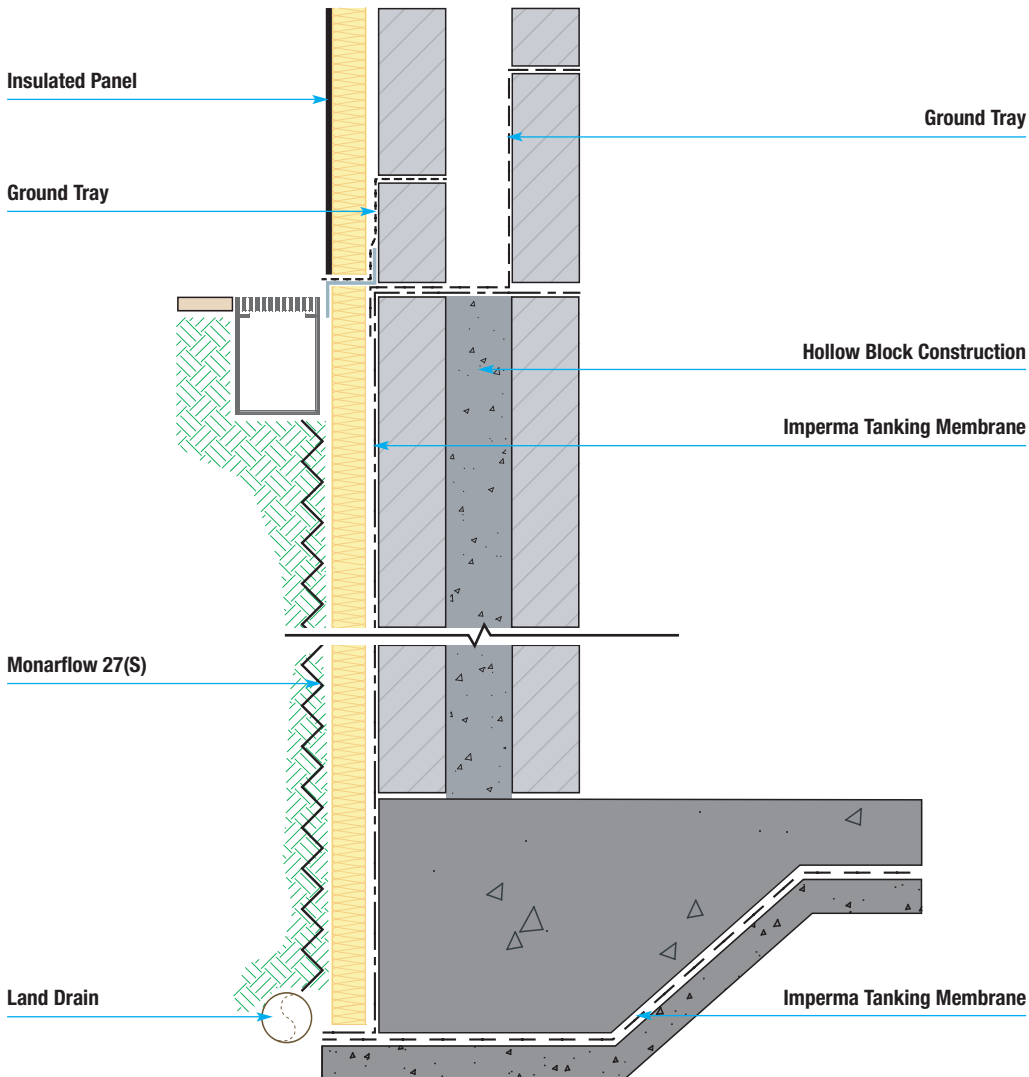
Composite Retaining Walls

Composite retaining walls are commonly built using hollow block construction with vertical steel reinforcements rising out of the ground slab through the cellular structure, which is in sequence, filled with poured concrete. External tanking of the composite wall avoids puncturing of the membrane by the steel reinforcements.

By taking the tanking membrane completely across the top of the retaining wall, potential damage by overnight rainfall will be reduced or avoided.



Section View





Xtra-Seal Diamond Self-Adhesive Membrane

| Physical Property | Result | Test Method |
|------------------------------|---------------------------------------|--------------------------|
| Size: | 1.05m x 19.05m | |
| Area: | 20m ² | |
| Thickness: | 1.5mm | |
| Weight: | 34kg | |
| Water Vapour Permeability: | 0.3gm ⁻² day ⁻¹ | ASTM E96 |
| Water Penetration at joints: | NIL (%) | MOAT 27 :5.4.1 |
| Puncture Resistance: | 250N | ASTM E154 |
| Membrane Strength: | 3.5N/mm | ASTA D1000 |
| Elongation: | 210% (md), 160% (td) | ASTM D638 |
| Dimensional Stability: | -0.1% (md), -0.2% (td) | MOAT 27 :5.1.6 (80°C) |
| Adhesion | 3.5N/mm | ASTA D1000 (24hr) |

Xtra-Seal Liquaprufe Cold Bitumen/Rubber Liquid Membrane

| Physical Property | Result |
|-------------------------------|---|
| Flash Point | Non-flammable |
| Approximate Specific Gravity | 1.0 |
| Approximate Coverage | Floors: 0.8L/m ² Walls: 0.5L/m ² |
| Application Temperature Limit | Not below 5°C |
| Containers | 25 litre and 5 litre |
| Storage Life | 12 months under good storage conditions, in sealed containers |
| Storage Conditions | Store under cover at temperatures of between 5°C and 30°C. Protect from frost |

Imperma SBS Torch Applied Bitumen Membrane

| Physical Property | Result |
|----------------------------|--|
| Roll Size | 8m x 1m |
| Appearance | Sand Upper Surface; Polyethylene Film Lower Surface |
| Weight | 4.5kg/m ² |
| Tensile Strength | 1000/900 N/5cm |
| Elongation | 55%/65% |
| Water Penetration at Joint | NIL% |

Imperma Protection Layer Bitumen Protection Membrane

| Physical Property | Result |
|-----------------------|-----------------------|
| Roll Size | 8m x 1m |
| Roll Weight | 38kg |
| Weight/m ² | 4.75kg/m ² |
| Appearance | Mineral Surface |

Monarflow 27(S) Drainage Board

| Physical Property | Result |
|----------------------|---------|
| Thickness | 27mm |
| Width | 915mm |
| Roll Length | 50m |
| Compressive Strength | 250 kPa |

Imperma Hot Liquid Seal Hot Applied Bitumen Membrane

| Physical Property | Result |
|---|-------------------------------------|
| Container Size | 100kg |
| Softening Point (Ring and Ball) | 47-58°C |
| Pouring Temperature | 110-130°C |
| Typical Flashpoint (Cleveland Open Cup) | 250°C |
| Approx. Coverage on Smooth Surfaces | 3kg/m ² at 3mm Thickness |
| Curing Time | 30mins to 1 hour |

Monarflex Ultra 300 DPM Reinforced Polyethylene Membrane

| Physical Property | Result |
|---------------------------|---|
| Appearance | Clear with Green Reinforcement Grid |
| Roll Size | 4 x 25m, 2 x 25m |
| Thickness | 300µm or 1200g |
| Weight | 0.32kg/m ² |
| Water Vapour Permeability | 0.38gm ⁻² m ⁻¹ |
| Water Vapour Resistance | 540 MNs/g ⁻¹ |
| Tensile Strength | 380 (Long) N/50mm 448 (Trans) N/50mm |

Icopal Quick Drying Primer Bituminous Primer

| Physical Property | Result |
|--|--|
| Type of Solvent | Petroleum Hydrocarbon |
| Approx. Flash Point BS2000:170:1982 IP170/75(81) | 32°C |
| Approx. Specific Gravity | 0.9 |
| Application Rate (Depending on Surface) | 0.10 to 0.20 Litres/m ² |
| Application Temperature | 2°C to 50°C |
| Drying Time (Depending on Prevailing Conditions) | 20-40 Minutes |
| Relative Density at 20°C | 0.94kg/m ³ |
| Container Size | 5 Litres, 25 Litres |
| Coverage Rate | Metal Surface: 11m ² /Litre Porous Surface: 5m ² /Litre |

Xtra-Seal Protection Board Rigid Bitumen/Fibre Board

| Physical Property | Result |
|---------------------|-------------------------------------|
| Thickness | 3mm |
| Board Size | 1.29m x 1.63m (2.09m ²) |
| Normal Weight | 3.3kg/m ² |
| Tensile Strength | 19.305 kN/m ² |
| Temperature Limits | -40°C to 135°C |
| Puncture Resistance | 1827 kPa |

Blackline 1000 Unreinforced Polyethylene Membrane

| Physical Property | Result |
|-------------------|--|
| Description | Black, unreinforced, loose laid membrane |
| Roll Size | 4m x 25m or 2m x 25m |
| Thickness | 1mm |
| Weight | 1kg/m ² |

XTRA-SEAL DIAMOND

J40 - Flexible Sheet Tanking/Damp Proofing

To be read with Preliminaries/General conditions

190 - Self-Adhesive Bitumen Damp Proof Membrane/Tanking

- **Manufacturer:** Monarflex Geomembranes
- **Product reference:** Xtra-Seal Diamond Tanking Membrane
- **Number of layers:** To comply with BS8102
- **Substrate:** Concrete Blinding
- **Primer:** Icopal Quick Drying Primer
- **Bonding:** Smooth out to exclude air
- **Jointing:**
 - Laps (minimum): 100mm
 - Sealing: Roll to fully adhere

ULTRA 300 DPM

J40 - Flexible Sheet Tanking/Damp Proofing

To be read with Preliminaries/General conditions

110 - Hardcore Beds

- **Preparation:** Blind with soft sand or pulverised fuel ash
- **Thickness (minimum):** 50mm
- **Finishing:** Consolidate to provide a smooth bed free of sharp projections

120 - Loose Laid Polyethylene Damp Proof Membrane

- **Manufacturer:** Monarflex Geomembranes
- **Product reference:** Monarflex Ultra 300 DPM
- **Thickness/Gauge:** 0.3mm
- **Substrate:** Sand blinded hardcore
- **Jointing:**
 - Preparation: Clean and dry membrane surfaces beyond full width of joint
 - Laps (minimum): 150mm
 - Sealing: Continuous mastic strip between overlaps, edge of top sheet with jointing tape

130 - Loose Laid Polyethylene Oversite Damp Proof Membrane

- **Manufacturer:** Monarflex Geomembranes
- **Product reference:** Monarflex Ultra 300 DPM
- **Thickness/Gauge:** 0.3mm
- **Jointing:** Laps (minimum), 300mm & Sealed
- **Covering:** Concrete to BS 5328
- **Mix:** Designated GEN 1 or Standard ST2
- **Thickness (minimum):** 50mm
- **Time of laying:** Immediately after laying membrane

IMPERMA

J40 - Flexible Sheet Tanking/Damp Proofing

To be read with Preliminaries/General conditions

160 - Loose Laid Bitumen Damp Proof Membrane

- **Manufacturer:** Monarflex Geomembranes
- **Product reference:** Imperma SBS Tanking Membrane
- **Number of layers:** To comply with BS8102
- **Substrate:** Concrete
- **Laying:**
 - Torch bond free end to substrate
 - Vertical/sloping surfaces: Fully torch bond
 - Primer: Not required
- **Jointing:**
 - Laps (minimum): End and side, 100mm
 - Sealing: Torch bond

230 - Fully Bonded Bitumen Damp Proof Membrane

- **Manufacturer:** Monarflex Geomembranes
- **Product reference:** Imperma SBS Tanking Membrane
- **Number of layers:** To comply with BS8102
- **Substrate:** Concrete
- **Primer:** Icopal Quick Drying Primer
- **Bonding:** Torching, using equipment and methods recommended for the purpose by sheet manufacturer
- **Jointing:**
 - Laps (minimum): Side 100mm, end 150mm
 - Sealing: Fully bond

270 - Fully Bonded Bitumen Damp Proof Membrane/Tanking

- **Manufacturer:** Monarflex Geomembranes
- **Product reference:** Imperma SBS Tanking Membrane
- **Preparation:** All surfaces are to have a smooth finish, free from cavities, projections and mortar deposits. Surfaces are to be dry and free from dust and frost. Concrete surfaces are to be dense. Vertical surfaces of brickwork and blockwork are to be dry and rendered or flush pointed to provide an even, smooth surface without sudden changes in level
- **Number of layers:** To comply with BS8102
- **Primer:** Icopal Quick Drying Primer

BLACKLINE 1000

J40 - Flexible Sheet Tanking/Damp Proof Membranes

To be read with Preliminaries/General conditions

145 - Weldable Polyethylene Gas Retardant/Damp Proof Membrane

- **Manufacturer:** Monarflex Geomembranes
- **Product reference:** Blackline 1000
- **Thickness/gauge:** 1.0mm
- **Weight:** 1kg/m²
- Lay sheets neatly and tuck well into angles to prevent bridging and creasing
- Joint sheets by Monarflex extrusion welding system with laps of not less than 150mm
- Form internal and external corners using Self Adhesive gas membrane to Monarflex Geomembranes Ltd standard working details
- All pipe and duct penetrations to be sealed using RAC 0.9mm preformed Top Hats complete with stainless steel jubilee clips
- All steel columns, concrete penetrations etc to be sealed to using Self Adhesive gas membrane to Monarflex Geomembranes Ltd standard working details
- All materials to be installed by Monarflex Geomembranes Ltd to ISO 9001.2000 using BBA certified products where applicable

310 - Workmanship Generally

- Apply materials carefully to provide a completely impervious, continuous membrane
- Ensure that surfaces to be covered are clean, dry, smooth and free from voids, sharp protrusions and frost
- Protect finished sheeting adequately to prevent puncturing during following work
- Cover sheeting with permanent overlying construction as soon as possible. Immediately prior to covering check for damage and repair as necessary

320 - Inspection

- Inform CA a reasonable length of time before covering any part of membrane with overlying construction, to allow inspection

330 - Primer(s)

- Type(s) recommended for the purpose by the sheet manufacturer. Apply by mopping, brushing or spraying to achieve an even and full cover of the surface. Allow to dry thoroughly before covering



Monarflex Geomembranes

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- Damp Proof Course and Cloaks
- Containment Membranes
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- Engineered Fall Protection Safety Systems

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

