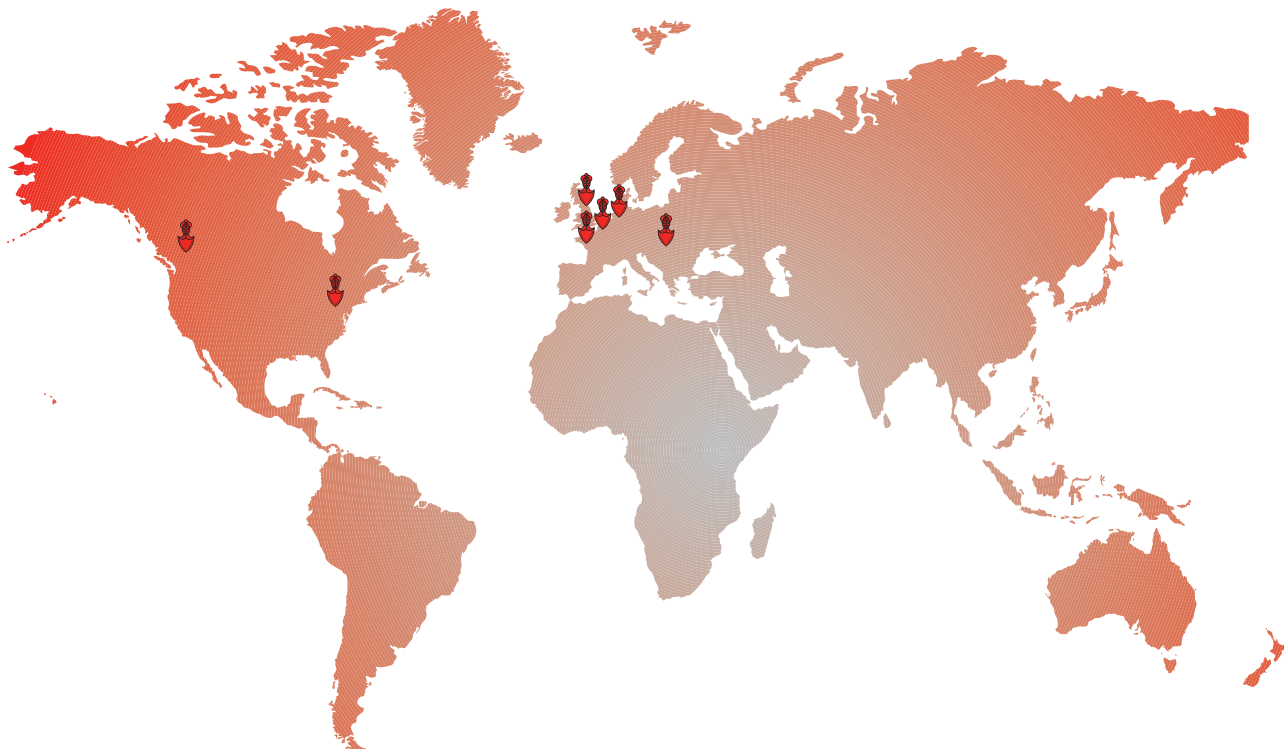




Design and Specification Guide



IKO is a **worldwide enterprise**, with more than **3000 employees**, and manufacturing plants in Canada, the United States, United Kingdom, Belgium, Holland, France and Slovakia. The company's operations ship products to **96 countries** around the globe.



The IKO Group

Despite tremendous growth, IKO has also remained firmly rooted in its family values of **entrepreneurial spirit, craftsmanship and innovation**. The company maintains the fierce independence of its founder, and his belief in the importance of controlling the raw materials used in the manufacturing process.

IKO also strives to back the **best products** in the industry with the **best service**. The IKO family includes not just the ownership, but the thousands of dedicated employees across its global operations who share the company's ideals of craftsmanship, attention to detail and world class service for our customers. The commitment of IKO's employees is the key pillar in the company's success in today's competitive marketplace.

The ultimate proof of the company's commitment to quality and innovation is its own success. From humble beginnings to a modern manufacturer with global reach, IKO has remained committed to the values that were the foundation of the business envisioned by our founder, **Isidore Koschitzky**. That combination of old-time values, combined with cutting edge technology and innovation, means IKO will continue to **Set the Standard** both now and in the future.

IKO in the UK

In the UK, the IKO name has become synonymous with delivering dependable waterproofing solutions backed by supreme levels of customer service. And little wonder. This hard earned reputation has been built on a foundation of quality and an ethos of customer service, which permeates through the organisation and remains as strong today as it did **100 years ago**.

The rewards speak for themselves. IKO PLC is now well established as the **UK market leader** in the design, manufacture and installation of roofing and waterproofing systems. With this enviable position comes an unwavering commitment and responsibility to continue investing in new product solutions, new manufacturing facilities and the industry's largest team of people, all dedicated to achieving excellence at every level.





Hot melt waterproofing systems have been successfully installed for well over 50 years.

Today, many prestigious buildings in the UK have incorporated a hot melt system and many have chosen IKO Permaterc, utilising its numerous benefits which include excellent life expectancy, extreme high performance and competitive installation costs.

The IKO Permaterc system provides a tough, flexible, self-sealing membrane which is suitable for use on most protected membrane roofs (e.g. inverted or paved roof areas) and structural waterproofing applications.



Rope Maker Place, London

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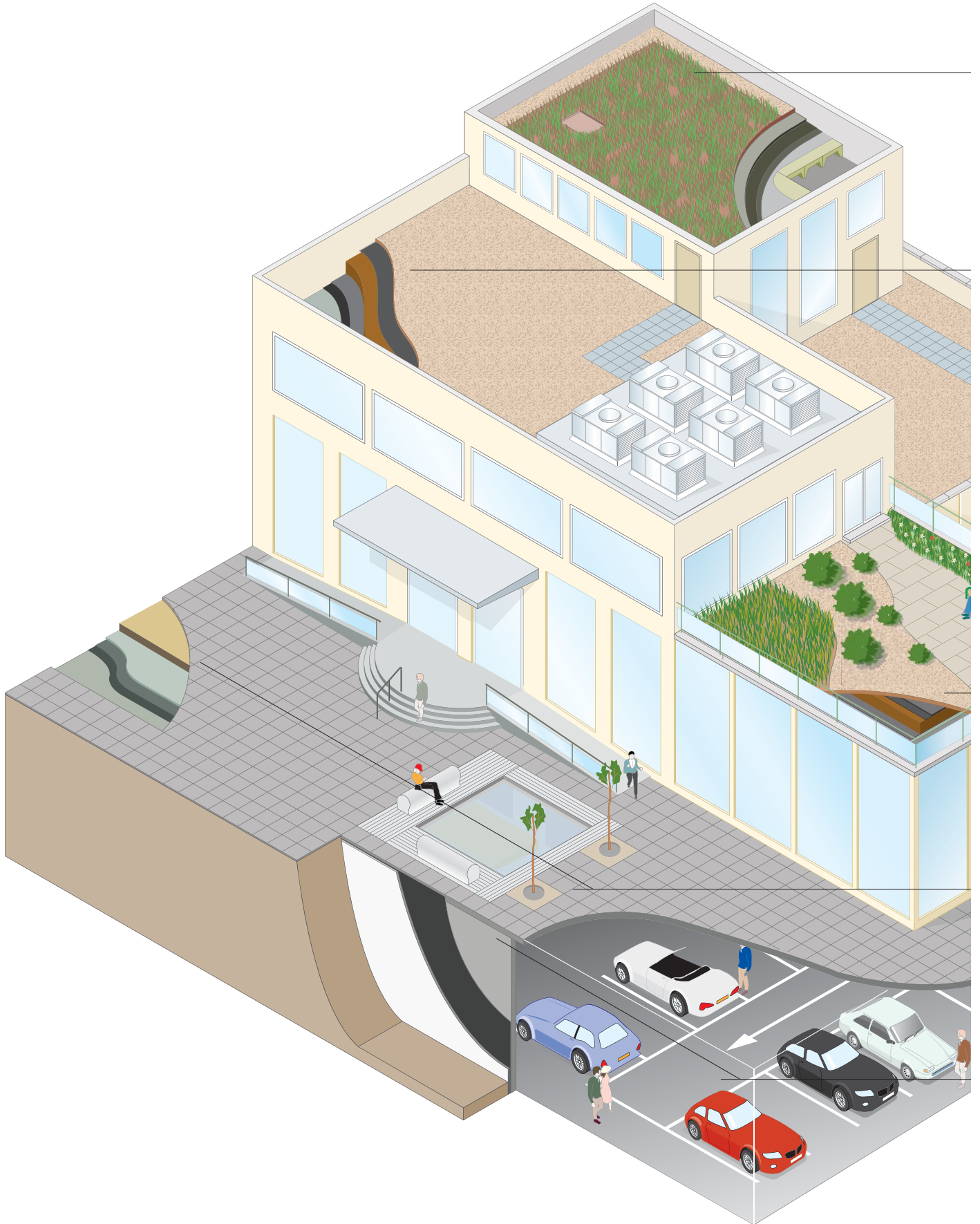
"I first worked with hot melt waterproofing on the Broadgate Development in 1988, and I've been using it successfully ever since."

Bob Gordon, Chief Engineer, MACE



5 Broadgate, London

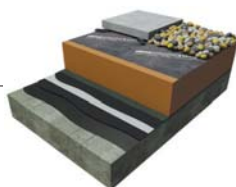
Complete Structural Waterproofing with **Permatec**





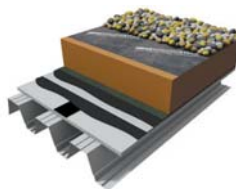
Extensive Green Roof

Lightweight green roof system, usually incorporating sedum mats or sedum plug plants and minimal growing medium (concrete, metal or composite decks). *See page 19.*



Inverted Ballasted Roof

Most popular hot melt system build up, usually installed onto a concrete deck (alternative decks can be used). *See page 16.*



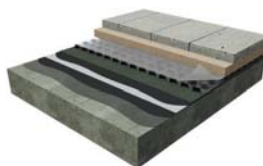
Inverted Roof on Metal Deck with Cement Board

Suitable for use with lightweight structural decks. *See page 16.*



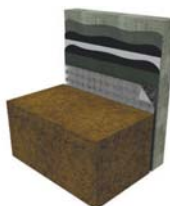
Intensive Green Roof

Heavyweight green roof system, usually incorporating bushes, trees, grass etc, and an appropriate depth of growing medium to support them. *See page 18.*



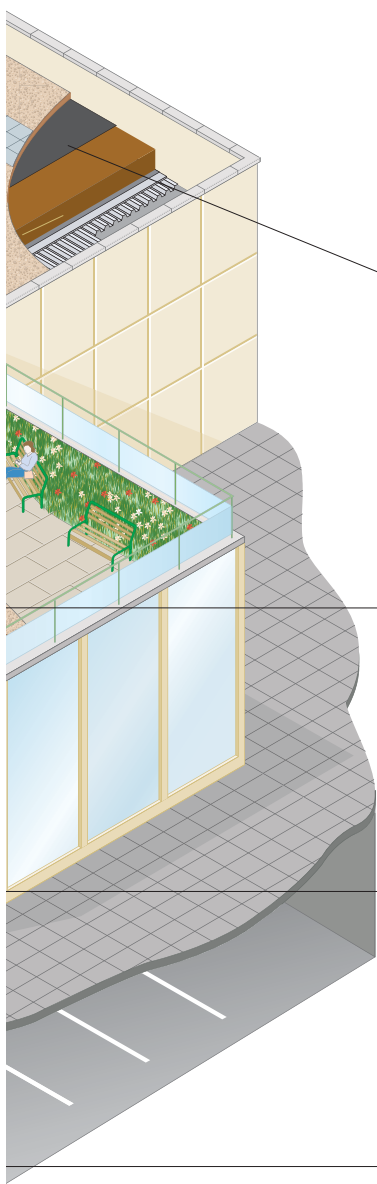
Podium Deck

Often used over undercroft car parks to retail and residential buildings, usually uninsulated. *See page 17.*



Substructure Waterproofing

Vertical surface waterproofing to car parks etc. Also used underneath floor slabs. *See page 21.*



Permaterc Hot Melt Waterproofing - The Versatile Roofing Solution

IKO Permaterc is a hot applied membrane which is manufactured from a specially formulated combination of refined bitumen, synthetic rubbers, fillers and other additives. It is melted in a purpose built machine and is applied to a prepared structural deck in two nominal 3mm coats, providing a monolithic waterproofing system. It is suitable for use as the waterproofing layer in most new build flat roofing applications, when covered by suitable protection or when used in an inverted roof or green roof specification.

Key Benefits

Lifetime performance

- Formulated to last for the lifetime of the building or structure on which it is installed
- Long-term waterproofing integrity

Fully bonded and monolithic

- Applied as a liquid directly to the deck
- Completely seamless so no possibility of lap failure

Flexibility of design

- No screeds to falls required meaning less cost, weight and time
- Unaffected by standing water, dilute acids and fertilizers
- Effective detailing to difficult penetrations like 'I' beams, posts etc.

Safe, speedy installation

- No two part system to mix
- No on-site curing requirements
- Solvent-free formulation

Ideal for demanding site conditions

- Excellent low temperature flexibility and adhesion
- Can be readily applied in low temperatures on a clean, dry, frost-free surface
- Work can proceed during winter months, minimising lost construction time
- Permaterc is not affected by rain, snow or frost immediately after its application
- Can be walked on immediately after installation of the system

Quality workmanship on every project

- Permaterc is installed by trained, registered operatives
- Dedicated IKO Engineers monitoring site installations
- Long-term, meaningful guarantees for ultimate peace of mind

Riverbank House, London

"Hot melt has risen to become the first choice for many specifiers seeking a reliable, long-term waterproofing solution."

Environmental Benefits of Permaterc

We all have a fundamental responsibility to reduce to an absolute minimum the carbon footprint of any product and system that we use. Everyone in the construction industry should seek to source products and systems 'locally' on a best value basis.

IKO is determined to set new standards of excellence in the efficiency and performance of hot melt systems in the UK – covering both manufacture and installation. We have achieved the environmental standards ISO 14001 and BES 6001 for our new mastic asphalt and hot melt factory in Derbyshire alongside ISO 9001 for quality management. The site at Grangemill Quarry only officially opened in September 2014 following investment to develop the factory and making it as environmentally friendly as possible.

In 2002, IKO was the first to offer safer, more convenient product packaging to the roofing contractors. This resulted in the North American manufacturers changing from 45 gallon steel oil drums to thick cardboard boxes and plastic wrappers.

In 2008, IKO was the first to offer zero wrapper waste and the first to develop lower application temperatures.

In 2010, it continued to innovate the market by developing a hot melt compound with built-in anti-root protection.

IKO has also lobbied the UK manufacturers of hot melt machines to develop more effective equipment, to enable the material to be melted faster and at lower temperatures, thus reducing energy consumption on site. IKO understands that it has a responsibility to continually develop its products and systems to minimise their impact on the environment.



First to manufacture in the UK

- Provides the most efficient carbonfootprint delivery miles
- IKO manufactures all system components
- Less logistics worries - IKO delivers from factory to site in one operation
- Delivery miles kept to minimum
- No need to buy full containers
- No need for expensive storage and reloading
- No lengthy lead times

Zero wrapper waste

- Significantly less on-site waste and disposal costs, 98.5% less than cardboard boxes
- Increased site efficiency - no opening and disposing of cardboard boxes
- Environmental status improved for clients and specifiers
- Helps contractors to achieve Site Waste Management Plans

Low melt technology

- Application temperature reduced
- Saves preparation time: material can be ready sooner
- Reduces energy consumption
- Melter machines can be more productive
- Material remains 'workable' longer



"Permaterc was the first hot melt system manufactured in the UK."

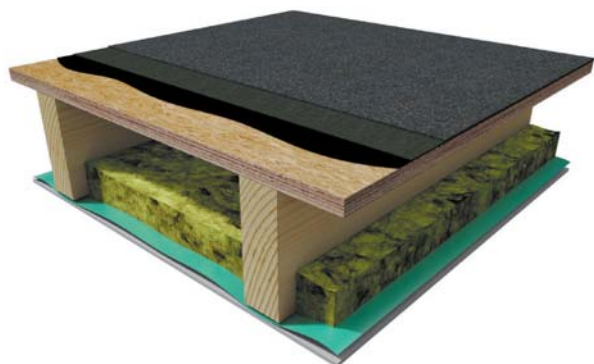
Permaterc Anti-Root

Permaterc Anti-Root is the world's first monolithic 'anti-root' hot melt structural waterproofing system. The latest innovation from IKO, eliminating the need for a separate anti-root membrane, thereby making the specification and installation process both simpler and more cost-effective. For added reliability and peace of mind the Permaterc Anti-Root compound provides a nominal 6mm thick monolithic barrier system without side or end laps.

Less rolls, fewer pallets, less transport, less hoisting, more savings.

Why Specify an Inverted Roof?

Cold Roofs



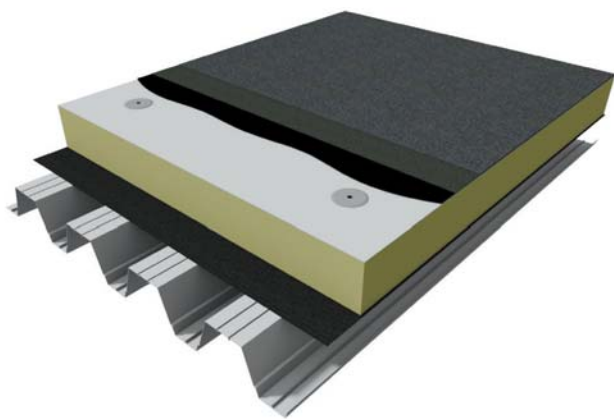
Typical specification

Timber joists supporting plywood panels. In the past tongued and grooved timber boarding or chipboard were used. Waterproofing systems (built-up bitumen felt, mastic asphalt, single ply membranes) are installed (using various means of attachment) to the top of the timber deck. Foil backed plasterboard to the soffit, with fibreglass insulation above and an air space above the insulation.

Key considerations

External problems for cold roofs include extremes of temperatures, ultra violet, weather (rain, wind, snow etc), fire and physical damage! Internal problems for cold roofs include vapour driving through the plasterboard, through the insulation into the air space under the timber deck. In winter, warm moist air vapour comes into contact with the underside of the cold deck and, if not adequately ventilated, condensation forms and drops back onto the top of the insulation, and eventually onto the top of the plasterboard causing damp stains to the underside.

Warm Roofs



Typical specification

There are three preferred structural decks, concrete, timber (plywood) and the most popular being profiled galvanised metal deck on steel purlins. These deck systems are usually installed flat. Metal decking and plywood could be installed to falls at extra cost.

Warm roofs normally require a vapour control membrane (various types available) to be installed (by various means of attachment) to the top of the decking system.

Insulation material (e.g. rigid polyurethane, mineral wool etc.) is installed using various means of attachment to the top of the vapour control membrane.

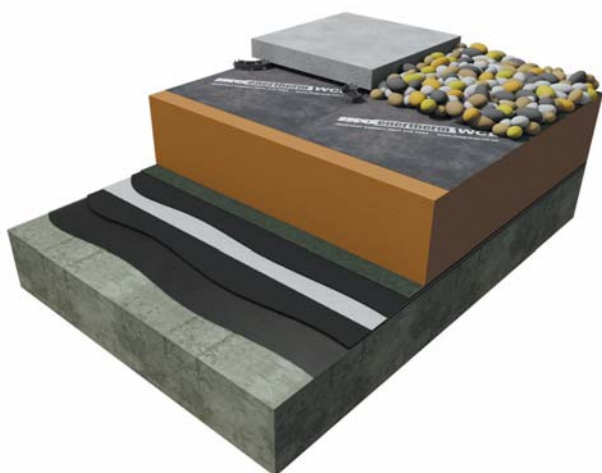
Waterproofing systems (built-up bitumen felt, mastic asphalt, single ply and cold applied liquids) are installed over the insulation layer.

Key considerations

External considerations for warm roofs are the same as those for cold roofs, due to the waterproofing system being totally exposed. Furthermore the compressive strength of most of these types of insulations is unsuitable for use where installations involve heavy loads and impact damage.

There are less internal concerns for warm roofs than cold roofs, but extra care must be taken to ensure that the vapour control membrane is sealed at all laps and abutments/penetrations, so that vapour cannot pass through any gaps into the insulation zone, thereby increasing the risk of condensation.

Inverted Roofs



5 Broadgate, London

Typical specification

Most inverted roofs are installed on concrete decks. Alternative materials like plywood or calcium silicate boards can be installed onto timber joists or metal deck substrates, or metal/insulation composite panels can be used. Waterproofing systems (built-up bitumen felt, mastic asphalt, single ply, cold applied and hot melt) are installed (using various methods) to the deck. Hot melt is fully bonded to the deck.

To comply with relevant codes of practice and BBA certification most of the waterproofing systems require a minimum of 1 in 80 drainage falls to be introduced either within the structure or using a screed. An inverted roof using hot melt waterproofing does not require falls. Extruded polystyrene (XPS) insulation is loose-laid on to the top of the waterproofing system (some waterproofing membranes need to be isolated from the XPS).

Water Control Layer (WCL)

A proprietary Water Control Layer (WCL) is installed loose-laid on top of the insulation. The loose laid insulation and separation layer needs to be weighed down to prevent wind uplift. Ballasting materials are used such as round washed stones or concrete pavers on supports, the minimum ballast weight required is 80kg/m².

Key considerations

Although one of the main benefits of inverted roof design is that the waterproofing membrane is totally protected, there are two important design factors to be considered.

Firstly, the structural deck should be capable of supporting the weight loading of an inverted roof system, which would usually be 95kg/m² minimum.

Secondly, it is essential to ensure that the waterproofing system is fully tested (usually electronically or flood test) for damage prior to the installation of the insulation and loading coat (ballast/pavers/green roof).

Failure to discover and repair any damage could lead to the time consuming and costly removal of the loading coat and insulation to access the waterproofing system.

“One of the main advantages of this form of construction is its simplicity. With the weatherproofing acting also as a vapour barrier, the need for complicated calculation can often be avoided. In addition there are advantages in speed of weatherproofing, ease of drying out, avoidance of entrapped moisture, in-built protection of the weatherproofing and the ability to upgrade the insulation without disturbing the weatherproofing.

This system is preferred to other forms.”

Government's Property Service Agency - Technical Guide to Flat Roofing, Section 2.11

Design Considerations (Inverted Roofs)



Podium Deck Waterproofing - Westfield Olympic Park, London

It is essential that designers of inverted flat roofs consider many aspects before issuing their specifications. Apart from practical and performance criteria, compliance with the latest regulations and codes of practice should be achieved.

There are at least four fundamental sectors to consider when designing an inverted flat roof:

1. Design Factors

- (a) Falls
- (b) Drainage
- (c) Thermal Design
- (d) Structural Movement
- (e) Wind
- (f) Fire

2. Structural Decks

3. Choice of Waterproofing Systems

4. Maintenance and Repairs

Design Factors

Falls

BS 6229 Flat roofs with continuously supported coverings
- Code of Practice: Refers to the minimum finished falls for specific flat roof waterproofing materials. Most of the waterproofing systems require a minimum fall of 1 in 80.

However, certain systems are designed and third party certified for use on completely flat roofs within inverted roofs, podium decks, green roofs and bio-diverse roofs. BBA Certificate No .03/4009 (Permatec Monolithic Hot Melt Waterproofing System), provides the following information: "The Permatec Hot-Applied Monolithic Membrane System is satisfactory for use on flat, including completely flat, roofs with limited access in either (a) a waterproofing layer in inverted roof specifications (b) a waterproofing layer in a protected roof specification, e.g. covered by pavers or other suitable protection (c) a waterproofing layer in intensive and biodiversity roof garden or extensive green roofs." Section 3.3 provides the following information: "Flat roofs are defined for the purpose of this Certificate as those having a minimum finished fall of 1:80. Pitched roofs are defined as those having falls in excess of 1:6. Completely flat roofs are defined for the purpose of this certificate as those having a finished fall of less than 1:80."

N.B. If falls are required they can be provided in the structural deck at the initial design and construction stage, or by use of a compatible screed.

Drainage

If inverted roofs are to be designed with 'completely flat' structural decks it is essential to provide adequate drainage for the roof areas, considering any deflection which may take place.

Drainage specialist and the manufacturers of roof drainage systems (e.g. Alutec) should determine the amount, type and location of the rainwater outlets required to cope with the projects 'local' rainfall conditions, in accordance with the appropriate code of practice.

Rainwater outlets used in inverted roof design should be compatible with the waterproofing systems used. Hot melt systems require a metal clamp ring type, and they could be gravity or syphonic in performance.

It is advisable to consider the inclusion of overflow outlets.

Podium and Green Roof Drainage

Inverted roof waterproofing systems are also used in podium and green roof designs, where the design of drainage or water retention (green roofs) is especially important. Drainage specialists, manufacturers of drainage systems, hard and soft landscaping specialists should be consulted to enable a suitable 'system' to be designed.

Thermal Design

Thermal design is concerned with the flow of both heat and vapour through the roof construction, and the effect of these on the performance of the roof and the various components of the roofing systems. The designer has two separate areas of consideration, the amount of thermal insulation required to control heat loss and the amount of insulation required to control condensation.

Inverted roof construction is different to the traditional warm roof (vapour control layer, insulation and waterproofing material), the principal thermal insulation is placed above the waterproofing covering. The system is also referred to as 'protected membrane' or 'upside down roof'.

Due to the insulation material being placed above the waterproofing covering, it needs to be unaffected by moisture. Extruded polystyrene (XPS), which is a closed cell construction, fits the criteria.⁽¹⁾

Vapour Control (Condensation Risk)

The air in a building normally contains more water vapour than the external air and so has a higher vapour pressure. This creates a vapour drive from the areas of high pressure and low pressure and therefore the water vapour will try to escape by all available routes to the low pressure conditions outside the building.

In cold weather the temperature under the waterproofing will fall and in the warm roof build ups create a zone in the roof structure where the temperatures are below the dew point. Moisture will condense in this zone to form interstitial condensation. When interstitial condensation is occurring, the vapour pressure in the relatively cold condensation zone will be less than the vapour inside the building and the resulting pressure difference causes a vapour drive into the zone of condensation.

Inverted roof structures, especially using fully bonded monolithic waterproofing systems like Permatec hot melt are not affected in the same way as warm roof structures. Moisture movement in the insulation layer of an inverted roof are virtually unaffected by internal conditions. Below the level of the waterproofing (fully bonded to the top of the structural deck) moisture vapour from inside the building will flow in and out of the roof components as a result of the humidity changes inside the building. But the temperature in the roof components will be maintained above the dew point, and interstitial condensation will not occur.

Interstitial condensation analysis calculations can be obtained from IKO.

Structural Movement

All flat roofs comprise a number of elements which expand, contract or move in relation to each other and therefore subject the waterproofing element to stress.

Movement is primarily caused by thermal expansion and contraction of the roof structure or insulation, or in the case of hygroscopic materials the expansion and contraction as a result of wetting and drying.

Unlike warm roof structures where the waterproofing and insulation are exposed to extremes of temperatures the waterproofing system in an inverted roof is in a protected position underneath the insulation and ballast materials, and therefore suffer far less stress.

The main area of design consideration of structural movement in inverted roofs is detailing the joints or cracks in the structural deck, joints between varying construction materials (concrete to blockwork upstands etc.) and the use of appropriate high performance expansion joint systems over movement joints.

Wind

Protection against wind forces should be one of the fundamental principles behind good roofing design. When wind hits a building, it is deflected to generate a positive pressure on the windward face, and it accelerates round the side of the building and over the roof, leading to a reduced or negative pressure over the roof and the lee of the building.

With an inverted roof specification the insulation is laid loose, and the security of the entire system depends on the loading coat which may be a minimum 50mm of gravel ballast, 50mm concrete paving and recently, green roof systems. The weight of the loading coat should prove adequate to resist wind damage, and also guard against floatation of the insulation if significant ponding occurs.

Wind loading calculations should be calculated in accordance with the recommendations of BS EN 1991-1-4: 2005 and advice can be obtained from IKO enertherm.

Fire

The various statutory regulations considering the performance of a flat roof in respect of external and internal fire conditions, are based on performance tests set out in the British Standard 476, 'Fire Test' on British Materials and Structures.

The ultimate external fire rating in accordance with BS 476: Part 3: 1975, is EXT. F.AA. The stone ballast or concrete paving loading coat used in inverted roof structures provide an EXT. F.AA rating.

⁽¹⁾ Further information about XPS insulation can be obtained from IKO enertherm.

Structural Decks

The structural deck provides the primary support for the roofing system. It must resist dead loads, live loads and wind loads as specified in BS EN 1991-1: 2002, BS EN 1991 -1-3: 2003, BS EN 1991-1-4: 2005.

There are a number of structural decks which can be used in inverted roof construction.

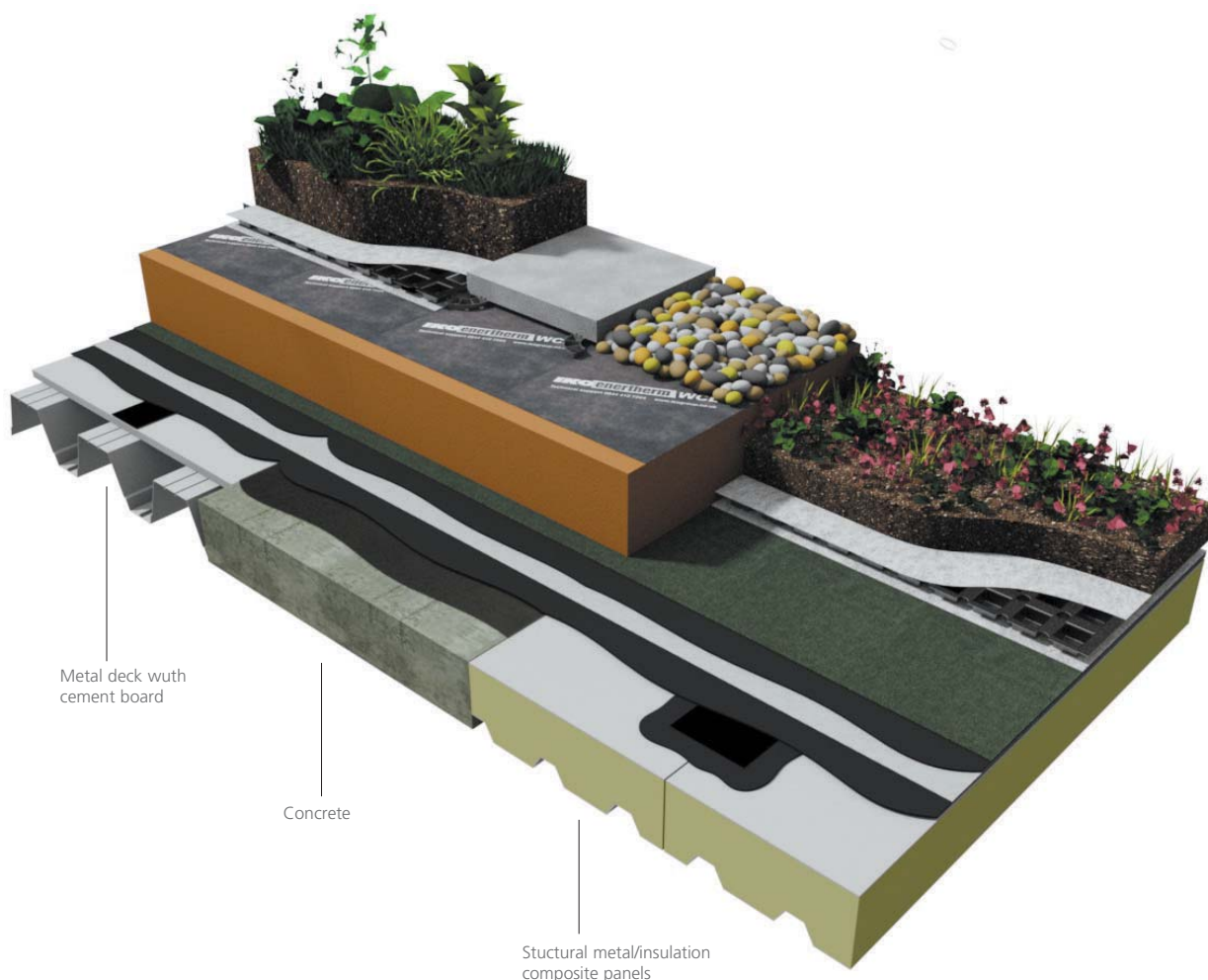
The most common is in-situ concrete, but there are many other options to consider:

- Precast concrete deck
- Metal deck with cement particle board
- Metal deck with plywood board
- Plywood
- Structural metal/insulation composite panels

Given the varied choice of structural decks available for inverted roof design, it is essential that the surface of the deck is of a suitable finish to accept the waterproofing system, for example – concrete deck with 'easy float finish.' Please refer to waterproofing system manufacturers for details.

Waterproofing Options

Fully bonded monolithic hot melt systems are the preferred choice of many specifiers and contractors involved with new build inverted roof constructions in the UK. There are, however, a number of other suitable waterproofing options for this type of application. These include polymeric single ply, reinforced bituminous membranes, mastic asphalt and cold applied liquid systems, which are all also available from the IKO Group.



Maintenance and Repairs

BS 6229 gives guidance on the maintenance and inspection of flat roofs. Flat roofs should be designed to avoid the need for maintenance as far as possible, but inevitably some items of maintenance will occur. As a matter of good housekeeping, the building owner should arrange for an inspection of all roof and details at least once a year. A simple inspection by maintenance personnel will suffice, but a number of manufacturers or specialist contractors can provide maintenance inspections on an annual contract. Many roofing system guarantees require annual inspections.

Owing to the design and nature of an inverted roof, there are very few items to inspect or maintain. It is essential that rainwater outlets are inspected and cleaned on a regular basis (at least twice per year) and kept free of debris, which could seriously affect the performance of the roof. Exposed waterproofing details at upstands and penetrations (pipes etc.) should be inspected for damage and repaired by the installing roofing contractor, so as not to invalidate any guarantee which may be in place. The remainder of the waterproofing and insulation is protected by the loading coat (stone ballast or concrete paving, green roofs etc.), which should be checked for damage or displacement.

Note: In the event that the waterproofing system is covered by a guarantee programme, it is essential that the building owner or their representatives do not perform any alterations or repairs to the original waterproofing without the approval of the guarantor. Failure to comply will invalidate the guarantee and could cause failure of the original waterproofing system if inappropriate repair materials are used.



The Broadway Shopping Centre, Bradford

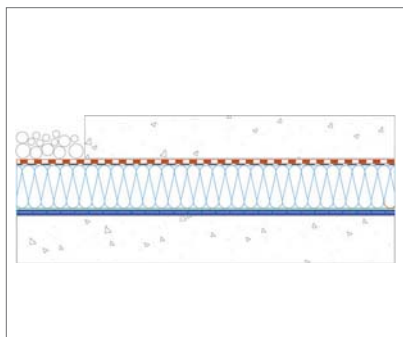
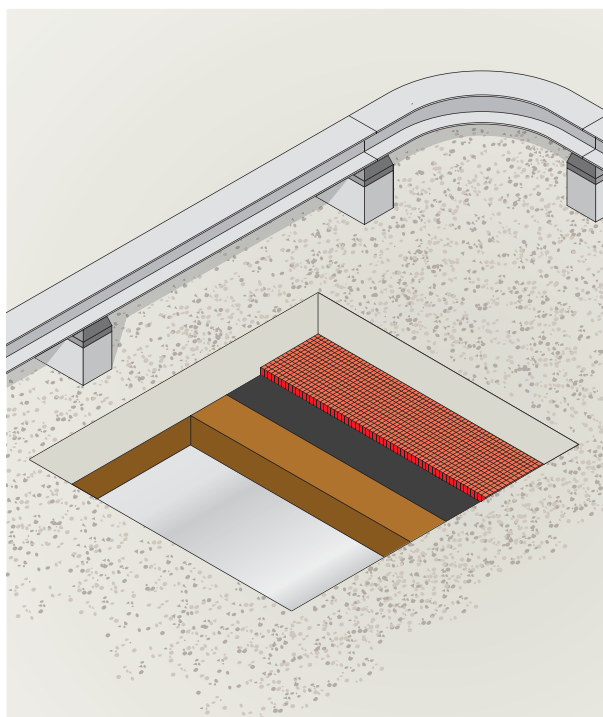
Simple Solutions to Difficult Problems

The majority of failures to any roof waterproofing system are due to physical damage to the waterproofing material, or the inability to successfully waterproof difficult detail areas and vulnerable locations.

Owing to the many unique advantages of hot melt structural waterproofing systems, a number of simple detailing solutions are available to effectively waterproof difficult forms and other problem areas. Many of these installation techniques could not be considered with other flat roof waterproofing systems.



Riverbank House, London



Floating plinth detail

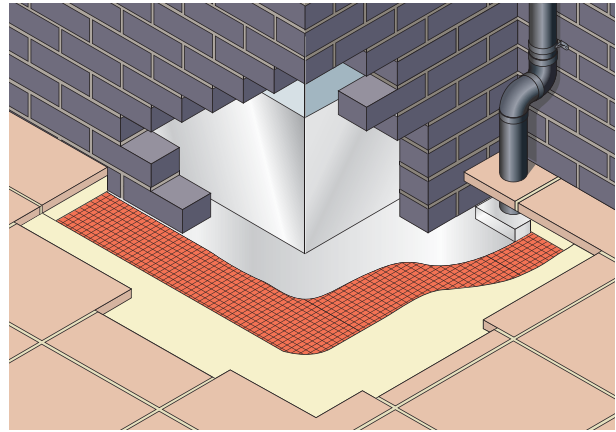
One of the major problems of flat roof design is the correct placement of roof mounted plant and the issue of cold bridging of the concrete plinths supporting the plant. Hot melt roofing systems provide the roof designer unlimited freedom to support the plant on concrete plinths which are cast on to the top of the XPS insulation and separation layer to provide an ideal substrate and no cold bridging.

Installation Technique

The Permatec hot melt system is fully bonded to the structural deck; the XPS insulation and separation layer is installed on to the top of the waterproofing and then a concrete plinth (approx 150mm deep) is cast onto the top of the 300 kpa XPS insulation which is capable of supporting a maximum load of 12 tonnes/m² (alternative compressive strengths are available to support up to 20 tonnes/m²). The concrete plinths can be installed or removed without disturbing the waterproofing system.



City House, Croydon

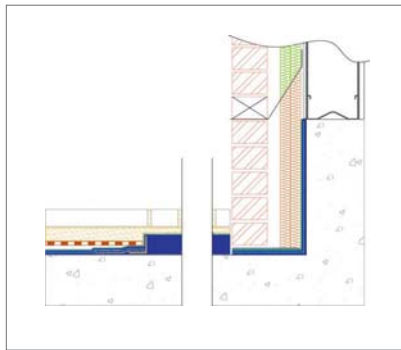


Wall onto hot melt detail

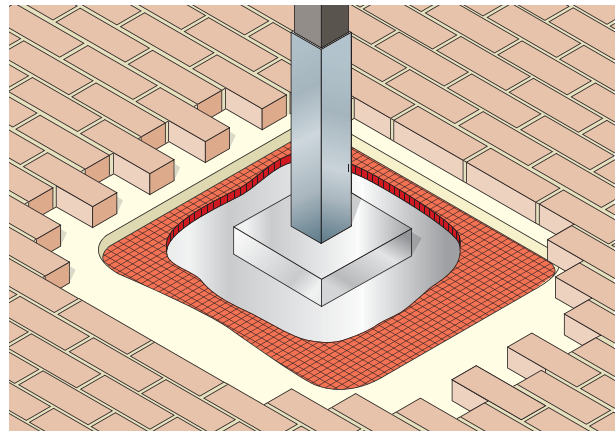
The provision of an effective and secret upstand waterproofing detail can be created behind a wall using hot melt structural waterproofing.

Installation Technique

The Permatec hot melt system is installed to the horizontal and vertical substrates and terminated 150mm above the finished roof level. A 500mm wide sacrificial layer of Permaguard-M mineral surfaced protection sheet is then applied to the top of the installed Permatec system prior to the construction of the wall.



City House, Croydon

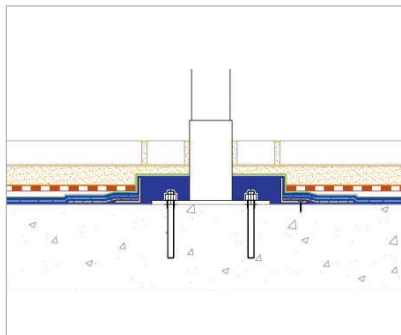


Posts/balustrades detail

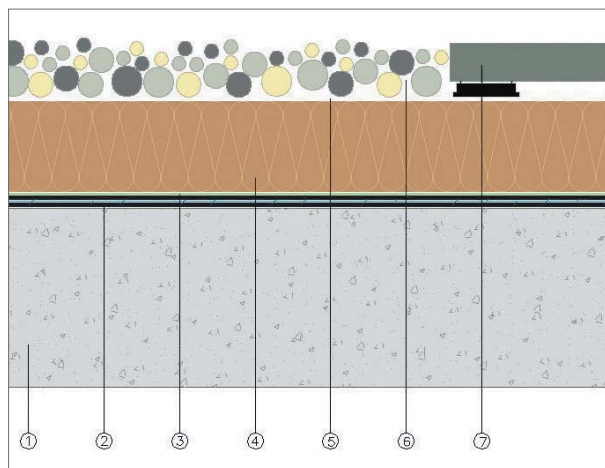
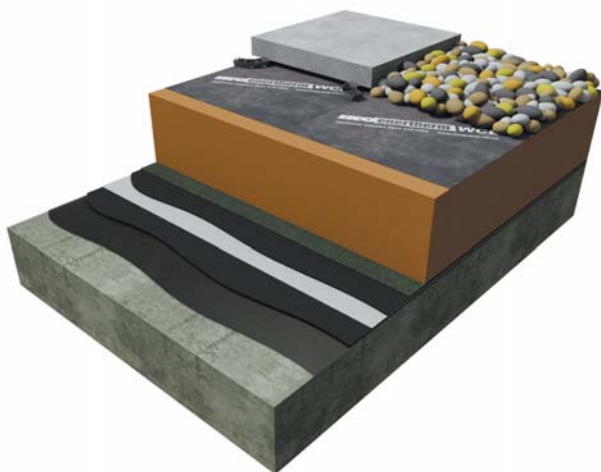
Many kinds of posts are included in flat roof designs. Balustrades, louvre supports, mansafe systems etc require the mechanical attachment of a base plate to the structural deck to secure the post system. These plates and posts can be simply waterproofed using the hot melt 'pitch pocket' detail.

Installation Technique

A once bent galvanised metal angle (usually 50mm high and 75mm long) is bonded to the deck in hot Permatec minimum 20mm away from the base plate. The 75mm horizontal leg of the metal angle is covered flashed with Permaflash-D150 bonded in Permatec compound. The full Permatec system is dressed to the metal angle. Permatec compound is poured into the inside of the metal angle frame to provide a 50mm deep fill. Permaguard-F protection sheet is dressed over the completed detail.



Inverted Ballasted Roof



1. Concrete deck primed with Permatec Primer
2. 2 coats of Permatec Ecowrap incorporating Permaflash-R reinforcement
3. Permaguard-F protection layer
4. IKO enertherm XPS
5. IKO WCL (Water Control Layer)
6. Minimum 50mm layer of 20-40mm rounded washed aggregate
7. Minimum 50mm thick paving slabs on proprietary supports

Specification (NBS J31 available upon request)

Substrate preparation

The surface of the substrate (concrete, plywood, calcium silicate board, metal/insulation composite etc.) should be suitably prepared to accept the Permatec fully bonded system. Joints, cracks or interfaces between different substrate materials should be detailed in accordance with Permatec Standard Drawings and Permatec NBS J31 Specification.

Membrane

Using a suitable spreader or squeegee, the first coat of hot Permatec compound is applied to the prepared substrate at a nominal coat thickness of 3mm. The Permaflash-R polyester reinforcement is brushed into the Permatec compound whilst it is still hot. All laps in the Permaflash-R should be at least 75mm wide and fully sealed with the Permatec compound. The second coat is applied in the same manner ensuring complete coverage of Permaflash-R at the nominal coating thickness of 3mm. The second coat of Permatec must be protected.

Protection

Permaguard-F sand surfaced bitumen membrane is the standard protection layer. It is applied directly to the second coat of Permatec whilst it is still hot and tacky. It is used on the main horizontal area which is to be subsequently covered with a range of system components such as insulation, separation layer and loading coat (stone ballast, concrete paving etc). It is also used on unexposed detail items. The Permaguard-F protection layer should be rolled into the hot Permatec as quickly as possible. Laps in Permaguard-F to be minimum 75mm and sealed using hot Permatec compound.

Permaguard-M slate surfaced bitumen membrane is used on exposed upstand details. It is applied to the second coat of Permatec by controlled torch application. Laps in Permaguard-M to be minimum 75mm and fully sealed.

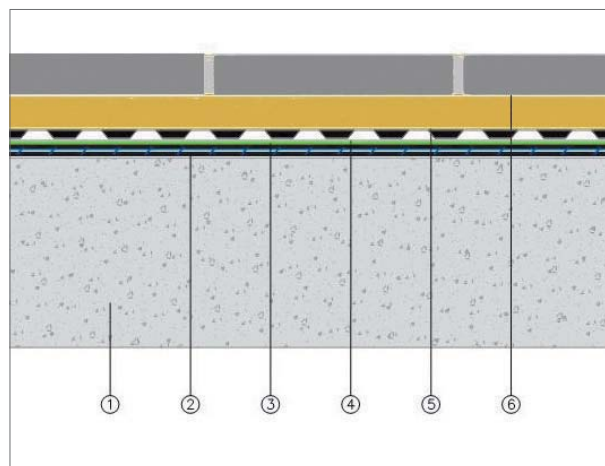
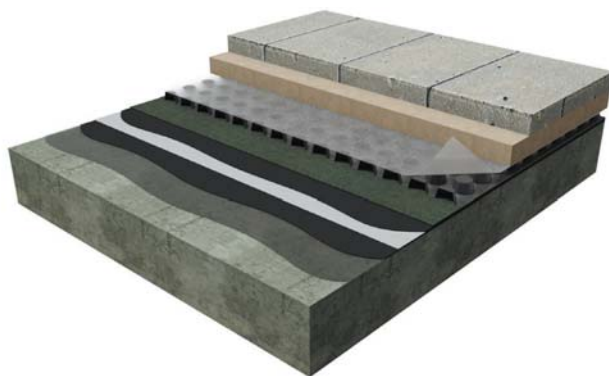
Detailing

Rainwater outlets and penetrations in the roof waterproofing system should be detailed in accordance with Permatec Standard Drawings and Permatec NBS J31 Specification.

System components

A standard Permatec inverted roof system will include a range of system components including: XPS insulation (thickness in accordance to "U" values requirements), water control layer and loading coat (stone ballast or concrete paving).

Podium Deck



1. Concrete deck primed with Permaterc Primer
2. 2 coats of Permaterc Ecowrap incorporating Permaflash-R reinforcement
3. Permaguard-F protection layer
4. IKO Plasdrain drainage layer
5. Sand/cement sub-base
6. Brick paviours/concrete slabs

Specification (NBS J31 available upon request)

Substrate preparation

The surface of the substrate (usually concrete) should be suitably prepared to accept the Permaterc fully bonded system. Joints, cracks or interfaces between different substrate materials should be detailed in accordance with Permaterc Standard Drawings and Permaterc NBS J31 Specification.

Membrane

Using a suitable spreader or squeegee, the first coat of hot Permaterc compound is applied to the prepared substrate at a nominal coat thickness of 3mm. The Permaflash-R polyester reinforcement is brushed into the Permaterc compound whilst it is still hot. All laps in the Permaflash-R should be at least 75mm wide and fully sealed with the Permaterc compound. The second coat is applied in the same manner ensuring complete coverage of Permaflash-R at the nominal coating thickness of 3mm. The second coat of Permaterc must be protected.

Protection

Permaguard-F sand surfaced bitumen membrane is the standard protection layer. It is applied directly to the second coat of Permaterc whilst it is still hot and tacky. It is used on the main horizontal area which is to be subsequently covered with a range of system components such as drainage layer, sand and cement bedding and pedestrian paving. It is also used on unexposed detail items. The Permaguard-F protection layer should be rolled into the hot Permaterc as quickly as possible. Laps in Permaguard-F to be minimum 75mm and sealed using hot Permaterc compound.

Permaguard-M slate surfaced bitumen membrane is used on exposed upstand details. It is applied to the second coat of Permaterc by controlled torch application. Laps in Permaguard-M to be minimum 75mm and fully sealed.

Permaguard-HDPB (Heavy Duty) or Permaguard-PB protection boards can be used to provide additional protection to the waterproofing system. They are installed butt-jointed to the second coat of Permaterc compound. Joints are taped over with 75mm reinforced adhesive tape.

Note: The use of a drainage layer in podium deck design is highly recommended, as it provides important lateral drainage whilst also preventing the sand and cement bedding from becoming saturated.

Detailing

Rainwater outlets and penetrations in the roof waterproofing system should be detailed in accordance with Permaterc Standard Drawings and Permaterc NBS J31 Specification.

System components

A standard Permaterc podium deck system will include a range of system components including: drainage layer to suit loading, sand and cement bedding and pedestrian paving.

Intensive Green Roof



1. Concrete deck primed with Permatec Primer
2. 2 coats of Permatec Anti-Root incorporating Permaflash-R reinforcement
3. Permaguard-F protection layer
4. IKO enertherm XPS
5. IKO WCL (Water Control Layer)
6. IKO Plasfeed drainage/moisture retention layer
7. IKO Growing Medium
8. Shrubs and plant finishes

Specification (NBS J31 and NBS Q37 available on request)

Substrate preparation

The surface of the substrate (concrete, plywood, calcium silicate board, metal/insulation composite etc.) should be suitably prepared to accept the Permatec Anti-Root fully bonded system. Joints, cracks or interfaces between different substrate materials should be detailed in accordance with Permatec Anti-Root Standard Drawings and Permatec NBS J31 Specification.

Membrane

Using a suitable spreader or squeegee, the first coat of hot Permatec Anti-Root compound is applied to the prepared substrate at a nominal coat thickness of 3mm. The Permaflash-R polyester reinforcement is brushed into the Permatec Anti-Root compound whilst it is still hot. All laps in the Permaflash-R should be at least 75mm wide and fully sealed with the Permatec Anti-Root compound. The second coat is applied in the same manner ensuring complete coverage of Permaflash-R at the nominal coating thickness of 3mm. The second coat of Permatec Anti-Root must be protected.

Protection

Permaguard-F sand surfaced bitumen membrane is the standard protection layer. It is applied directly to the second coat of Permatec Anti-Root whilst it is still hot and tacky. It is used on the main horizontal area which is to be subsequently covered with a range of system components such as

insulation, separation layer, drainage/moisture retention layer, growing medium, soft landscaping. It is also used on unexposed detail items. The Permaguard-F protection layer should be rolled into the hot Permatec Anti-Root as quickly as possible. Laps in Permaguard-F to be minimum 75mm and sealed using hot Permatec Anti-Root compound.

Permaguard-M slate surfaced bitumen membrane is used on exposed upstand details. It is applied to the second coat of Permatec by controlled torch application. Laps in Permaguard-M to be minimum 75mm and fully sealed.

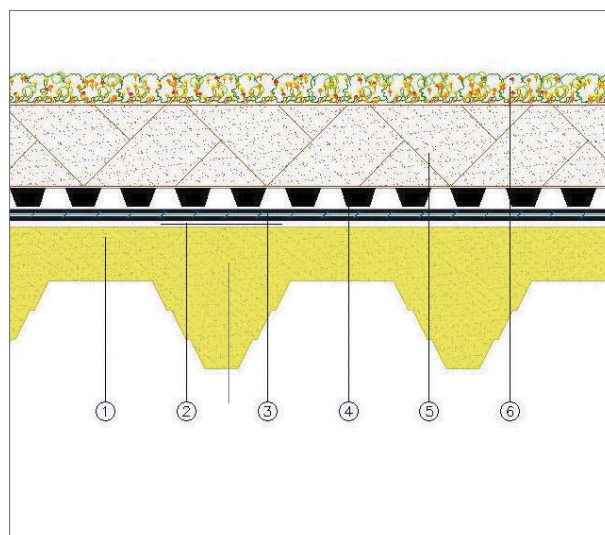
Detailing

Rainwater outlets and penetrations in the roof waterproofing system should be detailed in accordance with Permatec Standard Drawings and Permatec NBS J31 and NBS Q37 Specification.

System components

A standard Permatec Anti-Root intensive roof system will include a range of system components including: insulation, water control layer, drainage/moisture retention layer, growing medium to a depth in accordance with landscape architects requirements, plants, trees, grasses in accordance with landscape architect requirements.

Extensive Green Roof



1. Metal insulated composite panel
2. 150mm wide Permaflash-D150 bonded in Permatec
3. 2 coats of Permatec Anti-Root incorporating Permaflash-R reinforcement
4. IKO Plasfeed drainage/moisture retention layer
5. IKO Growing Medium
6. IKO sedum blanket

Specification (NBS J31 and NBS Q37 available on request)

Substrate preparation

The surface of the substrate (concrete, plywood, calcium silicate board, metal/insulation composite etc.) should be suitably prepared to accept the Permatec Anti-Root fully bonded system. Joints, cracks or interfaces between different substrate materials should be detailed in accordance with Permatec Anti-Root Standard Drawings and Permatec NBS J31 Specification.

Membrane

Using a suitable spreader or squeegee, the first coat of hot Permatec Anti-Root compound is applied to the prepared substrate at a nominal coat thickness of 3mm. The Permaflash-R polyester reinforcement is brushed into the Permatec Anti-Root compound whilst it is still hot. All laps in the Permaflash-R should be at least 75mm wide and fully sealed with the Permatec Anti-Root compound. The second coat is applied in the same manner ensuring complete coverage of Permaflash-R at the nominal coating thickness of 3mm. The second coat of Permatec Anti-Root must be protected.

Protection

Permaguard-F sand surfaced bitumen membrane is the standard protection layer. It is applied directly to the second coat of Permatec Anti-Root whilst it is still hot and tacky. It is used on the main horizontal area which is to be subsequently covered with a range of system components such as drainage/

moisture retention layer, growing medium, sedum blanket.

It is also used on unexposed detail items. The Permaguard-F protection layer should be rolled into the hot Permatec as quickly as possible. Laps in Permaguard-F to be minimum 75mm and sealed using hot Permatec Anti-Root compound.

Permaguard-M slate surfaced bitumen membrane is used on exposed upstand details. It is applied to the second coat of Permatec by controlled torch application. Laps in Permaguard-M to be minimum 75mm and fully sealed.

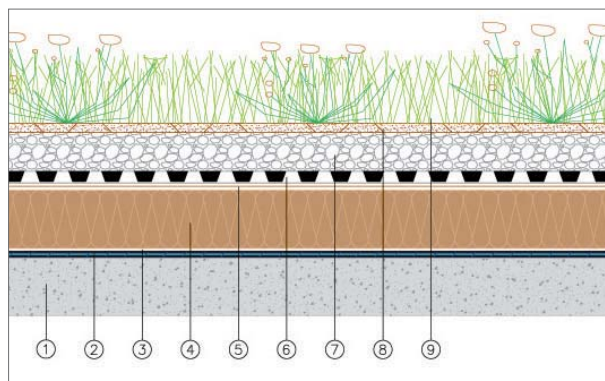
Detailing

Rainwater outlets and penetrations in the roof waterproofing system should be detailed in accordance with Permatec Standard Drawings and Permatec NBS J31 and NBS Q37 Specification.

System components

A standard Permatec Anti Root extensive roof system will include a range of system components including: drainage/ moisture retention layer, growing medium, sedum blanket, sedum plug plants, wildflower blanket in accordance with designers' requirements.

Biodiverse Brown Roof



1. Concrete deck primed with Permatec Primer
2. 2 coats of Permatec Anti-Root incorporating Permaflash-R reinforcement
3. Permaguard-F protection layer
4. IKO enertherm XPS
5. IKO WCL (Water Control Layer)
6. IKO Plasfeed drainage/moisture retention layer
7. Broken rubble / brick
8. IKO Biodiversity Growing Medium
9. Wildflower seed mix

Specification (NBS J31 and NBS Q37 available on request)

Substrate preparation

The surface of the substrate (concrete, plywood, calcium silicate board, metal/insulation composite etc.) should be suitably prepared to accept the Permatec Anti-Root fully bonded system. Joints, cracks or interfaces between different substrate materials should be detailed in accordance with Permatec Anti-Root Standard Drawings and Permatec NBS J31 Specification.

Membrane

Using a suitable spreader or squeegee, the first coat of hot Permatec Anti-Root compound is applied to the prepared substrate at a nominal coat thickness of 3mm. The Permaflash-R polyester reinforcement is brushed into the Permatec Anti-Root compound whilst it is still hot. All laps in the Permaflash-R should be at least 75mm wide and fully sealed with the Permatec Anti-Root compound. The second coat is applied in the same manner ensuring complete coverage of Permaflash-R at the nominal coating thickness of 3mm. The second coat of Permatec Anti-Root must be protected.

Protection

Permaguard-F sand surfaced bitumen membrane is the standard protection layer. It is applied directly to the second coat of Permatec Anti-Root whilst it is still hot and tacky. It is used on the main horizontal area which is to be subsequently

covered with a range of system components such as insulation, separation layer, drainage/moisture retention layer, biodiversity substrate mix, wildflower seeds etc. It is also used on unexposed detail items. The Permaguard-F protection layer should be rolled into the hot Permatec Anti-Root as quickly as possible. Laps in Permaguard-F to be minimum 75mm and sealed using hot Permatec Anti-Root compound.

Permaguard-M slate surfaced bitumen membrane is used on exposed upstand details. It is applied to the second coat of Permatec by controlled torch application. Laps in Permaguard-M to be minimum 75mm and fully sealed.

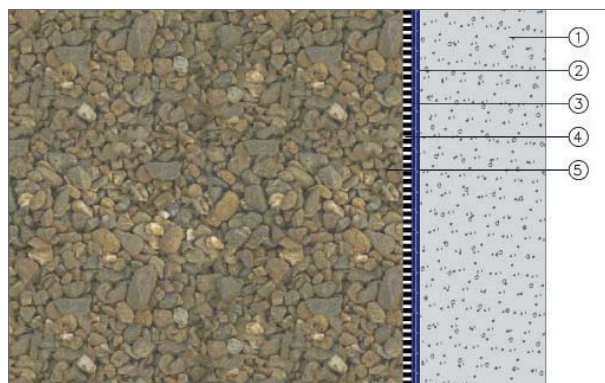
Detailing

Rainwater outlets and penetrations in the roof waterproofing system should be detailed in accordance with Permatec Standard Drawings and Permatec NBS J31 and NBS Q37 Specification.

System components

A standard Permatec biodiversity green roof system will include a range of components including: insulation, separation layer, drainage/moisture retention layer, biodiversity substrate mix, wildflower seeds or other vegetation in accordance with designers requirements.

Substructure Waterproofing



1. Concrete deck primed with Permaterc Primer
2. 2 coats of Permaterc Ecowrap incorporating Permaflash-R reinforcement
3. Permaguard-F protection layer
4. Plasdrain drainage mat
5. Backfill

Specification (NBS J40 available on request)

Substrate preparation

The surface of the substrate (usually concrete) should be suitably prepared to accept the Permaterc fully bonded system. Joints, cracks or interfaces between different substrate materials should be detailed in accordance with Permaterc Standard Drawings and Permaterc NBS J40 Specification.

Membrane

Using a suitable spreader or squeegee, the first coat of hot Permaterc compound is applied to the prepared substrate at a nominal coat thickness of 3mm. The Permaflash-R polyester reinforcement is brushed into the Permaterc compound whilst it is still hot. All laps in the Permaflash-R should be at least 75mm wide and fully sealed with the Permaterc compound. The second coat is applied in the same manner ensuring complete coverage of Permaflash-R at the nominal coating thickness of 3mm. The second coat of Permaterc must be protected.

Protection

Permaguard-F sand surfaced bitumen membrane is the standard protection layer. It is applied directly to the second coat of Permaterc whilst it is still hot and tacky. It is used on the vertical or horizontal area which is to be subsequently covered with a range of system components such as protection/drainage layers. The Permaguard-F protection layer should be rolled into the hot Permaterc as quickly as possible. Laps in Permaguard-F to be minimum 75mm and sealed using hot Permaterc compound.

Extraordinary loadings may require an additional protection layer of Permaguard-M slate surfaced bitumen membrane, applied by controlled torch application. Contact IKO Technical Services for details.

Permaguard-HDPB (Heavy Duty) or Permaguard-PB protection boards can be used to provide additional protection to the waterproofing system. They are installed butt-jointed to the second coat of Permaterc compound. Joints are taped over with 75mm reinforced adhesive tape.

Detailing

In the event that a rainwater outlet detail in the waterproofing system is required. Use Permaterc Standard Drawing details or contact IKO Technical Services for advice.

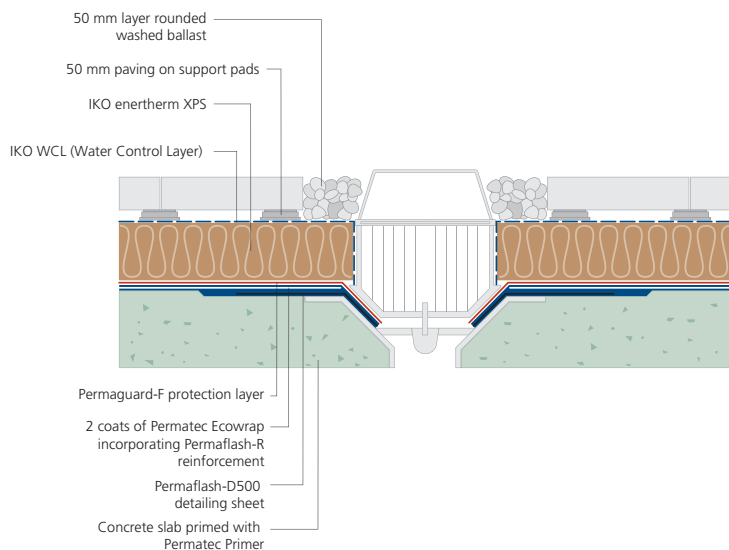
System components

A standard Permaterc system will include a range of system components including: protection/drainage layer prior to the installation of the backfill material or loading coat material (concrete etc).

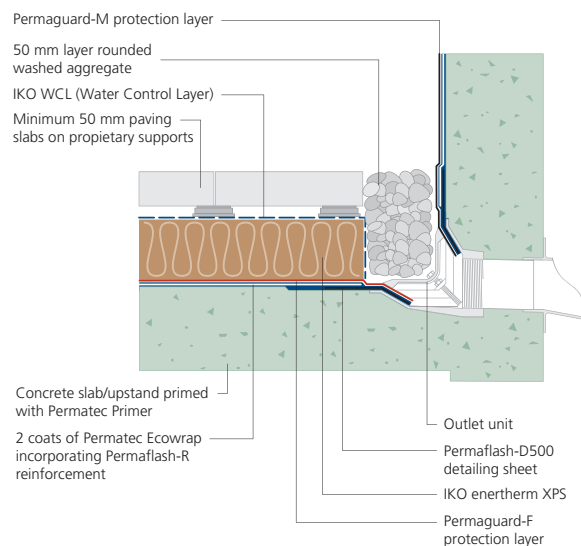
Typical Details

Drainage

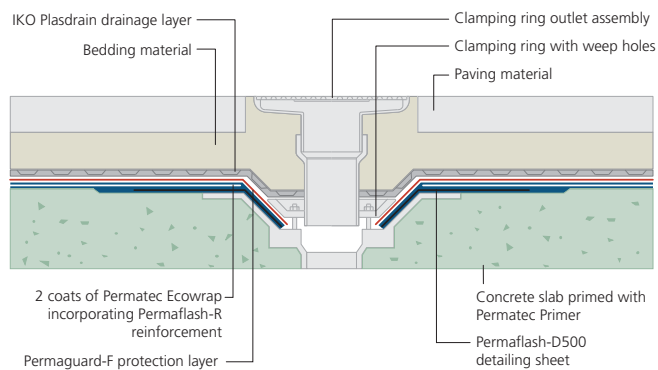
Rainwater outlet inverted



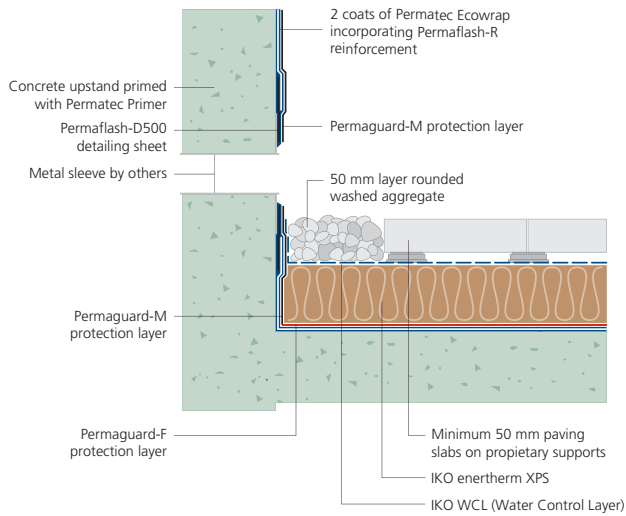
Rainwater outlet parapet/balcony



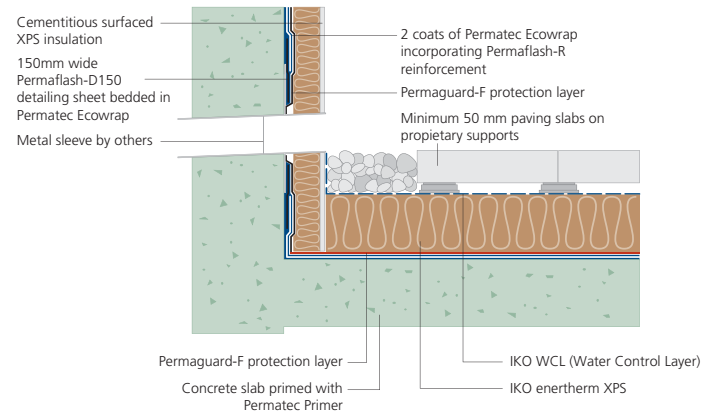
Rainwater outlet uninsulated podium deck



Rainwater overflow chute

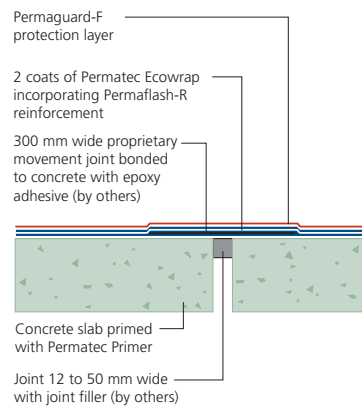


Insulated rainwater overflow chute

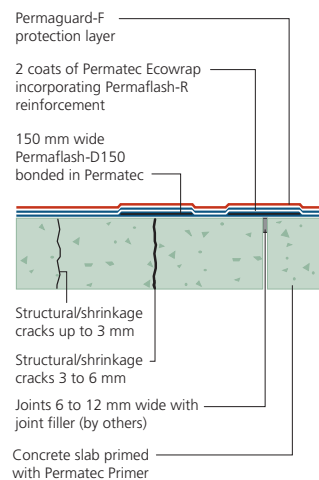


Joints

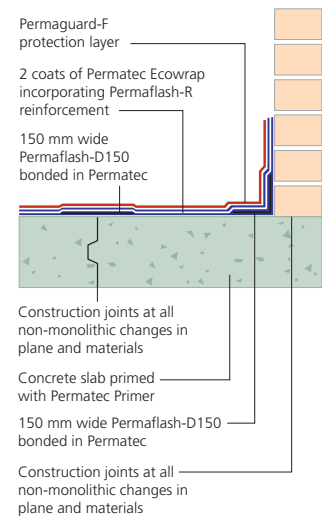
Typical expansion joint detail



Crack and joint detail

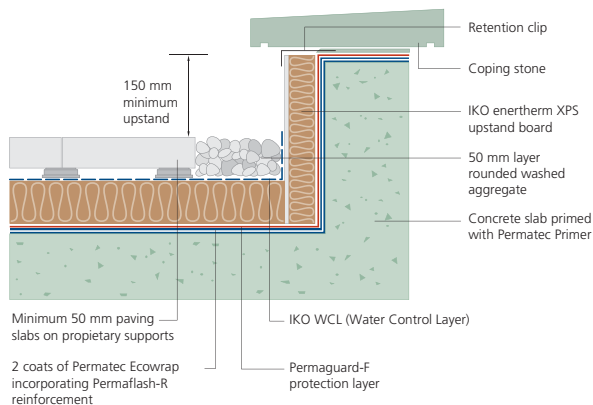


Crack and joint detail

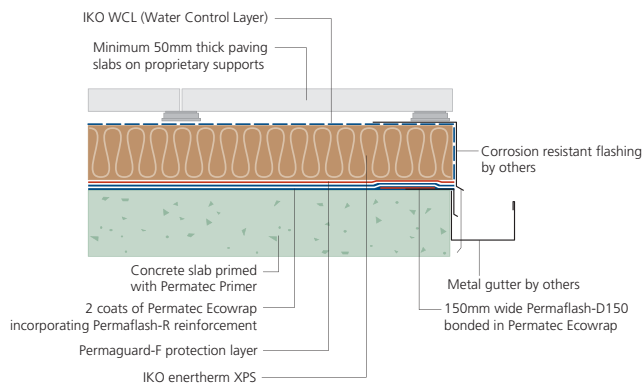


Upstands and Edge Details

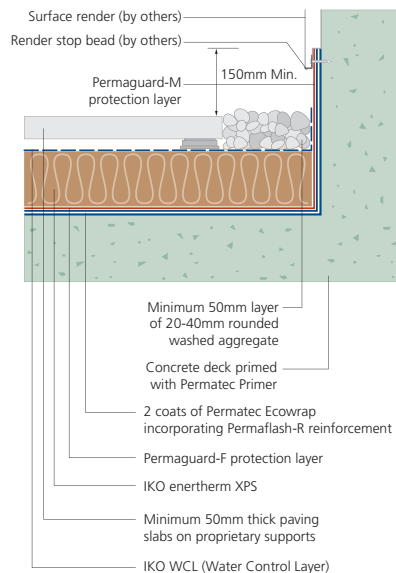
Typical parapet with capping detail



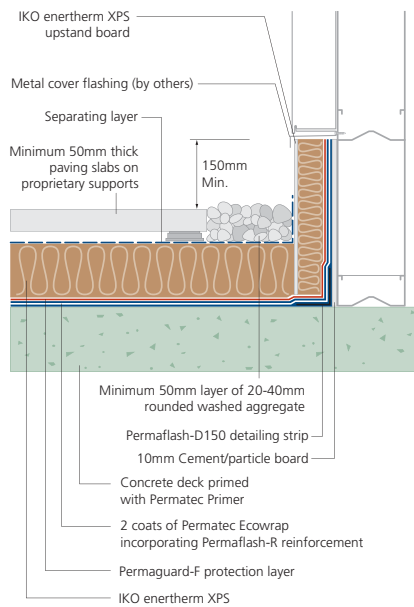
Typical drip to external gutter



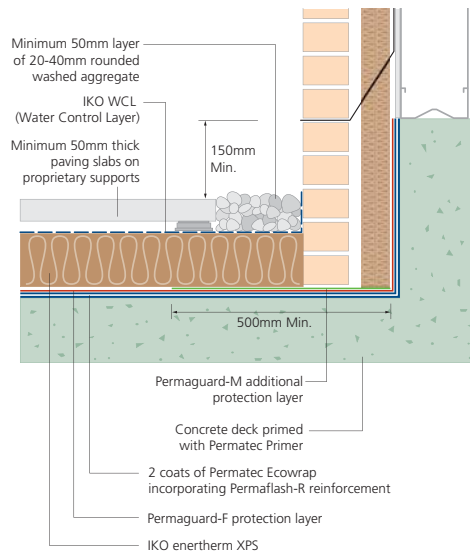
Typical rendered upstand section



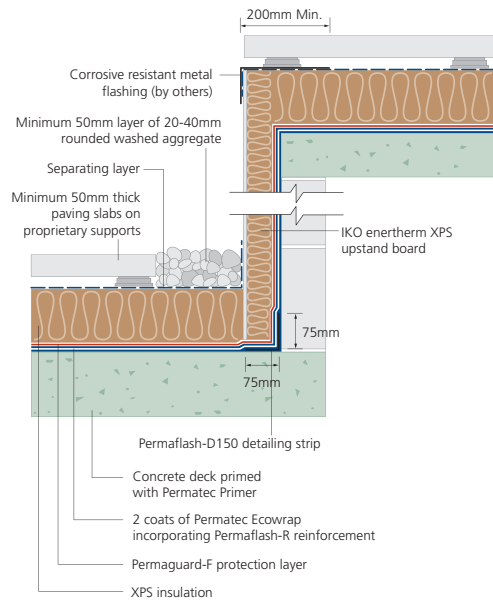
Typical upstand to Metsec



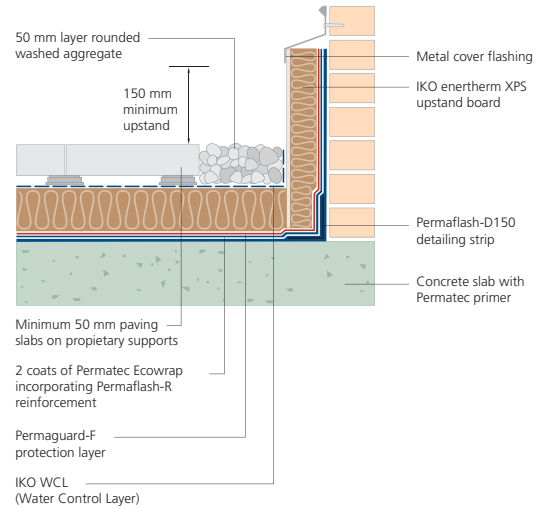
Typical upstand behind brickwork



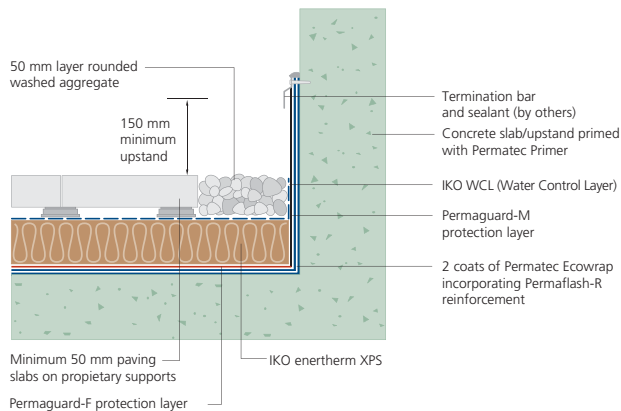
Typical insulated change in level



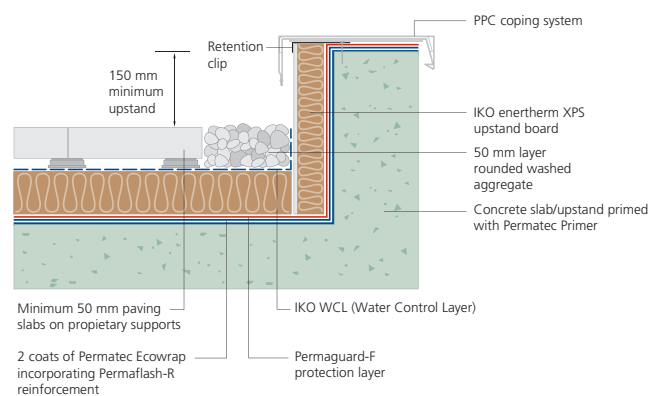
Typical insulated upstand section



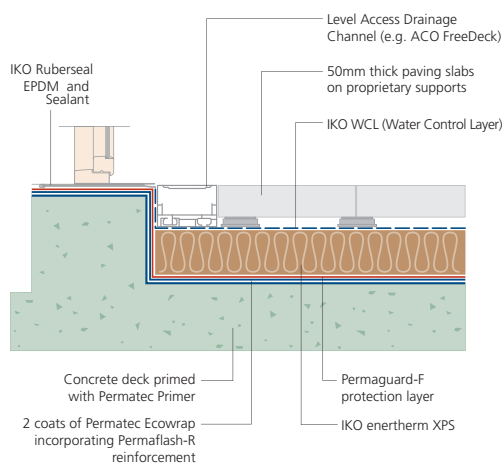
Typical uninsulated upstand with termination detail



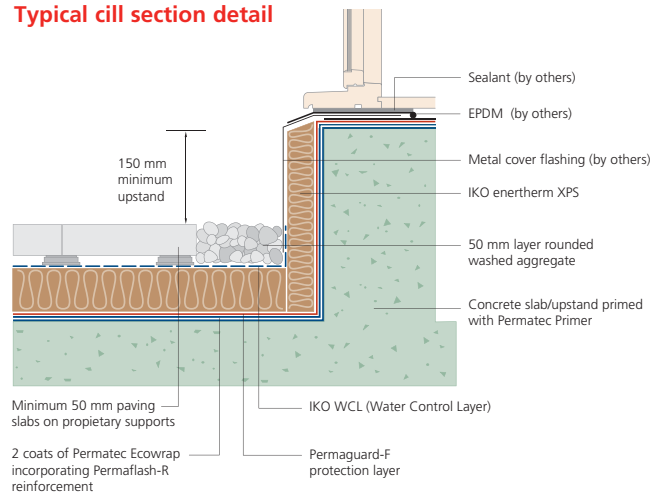
Typical parapet with coping detail



Typical level access threshold

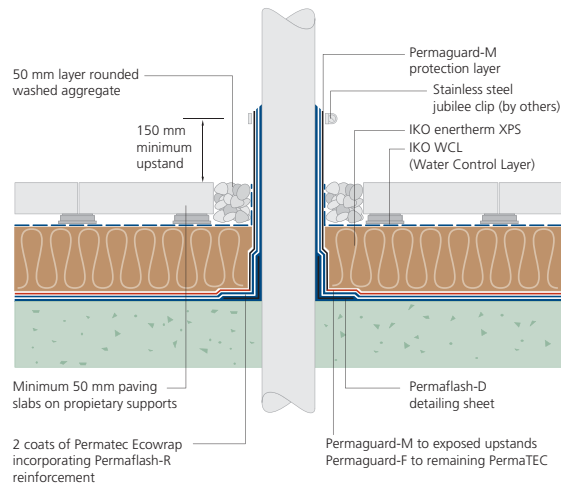


Typical cill section detail

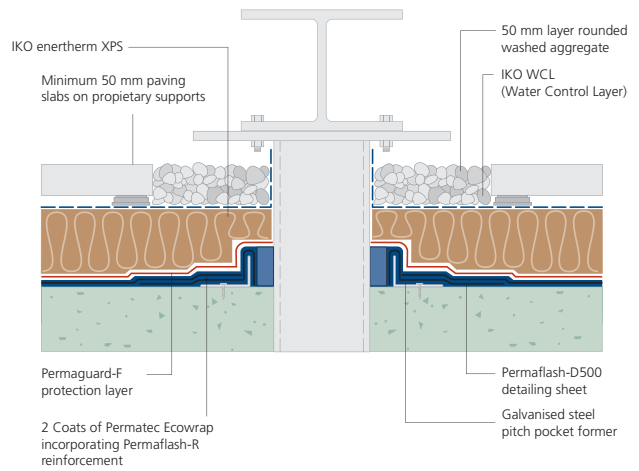


Penetrations and Plinths

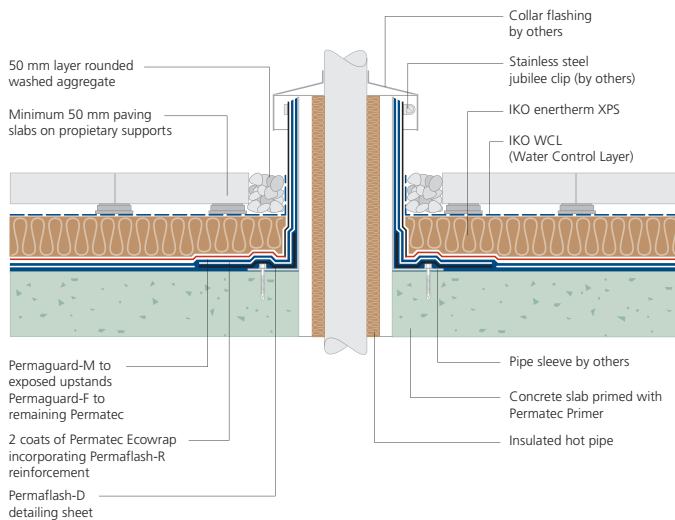
Typical cold metal penetration detail



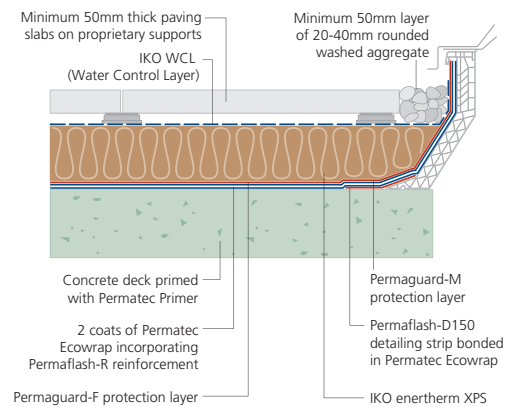
Typical pitch pocket detail



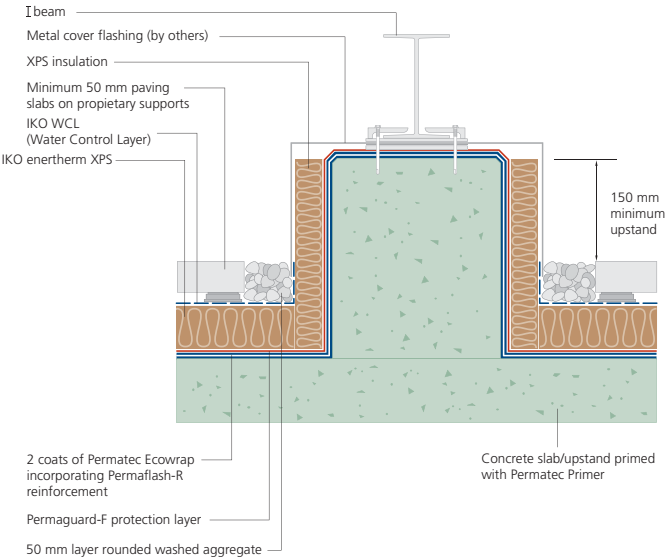
Typical hot pipe detail



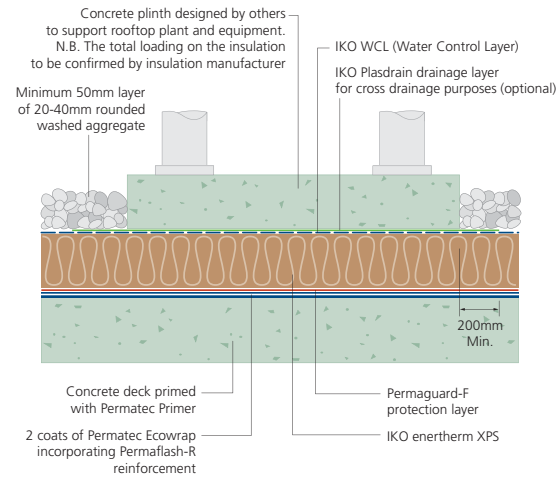
Upstand to rooflight



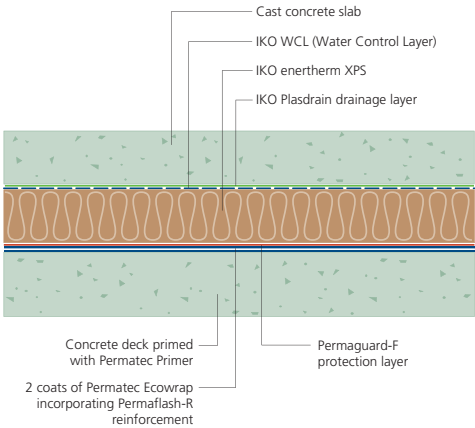
Typical plinth detail



Typical floating plinth



Typical floating concrete base



4 Simple Components for the Standard Waterproofing System...

1 Prime



Permatec High Penetration Primer

A specially formulated bitumen primer for use on concrete and other surfaces prior to the installation of the Permatec system.

Size: 25 litre drum

Coverage: 6-8m² per litre

2 Waterproof



Permatec Ecowrap Compound

A specially formulated combination of refined bitumen, synthetic rubbers, fillers and other additions. It is hot applied to the prepared substrate using squeegees to a total nominal thickness of 6mm. Permatec is covered by BBA Certificate No. 03/4009.

Size: 12kg in polypropylene wrapper

3 Reinforce



Permaflash-R

A 55g/m² polyester reinforcement sheet. Permaflash-R is installed between the 2 x 3mm coats of Permatec compound, to provide high tensile strength.

Roll size: 1m x 200m

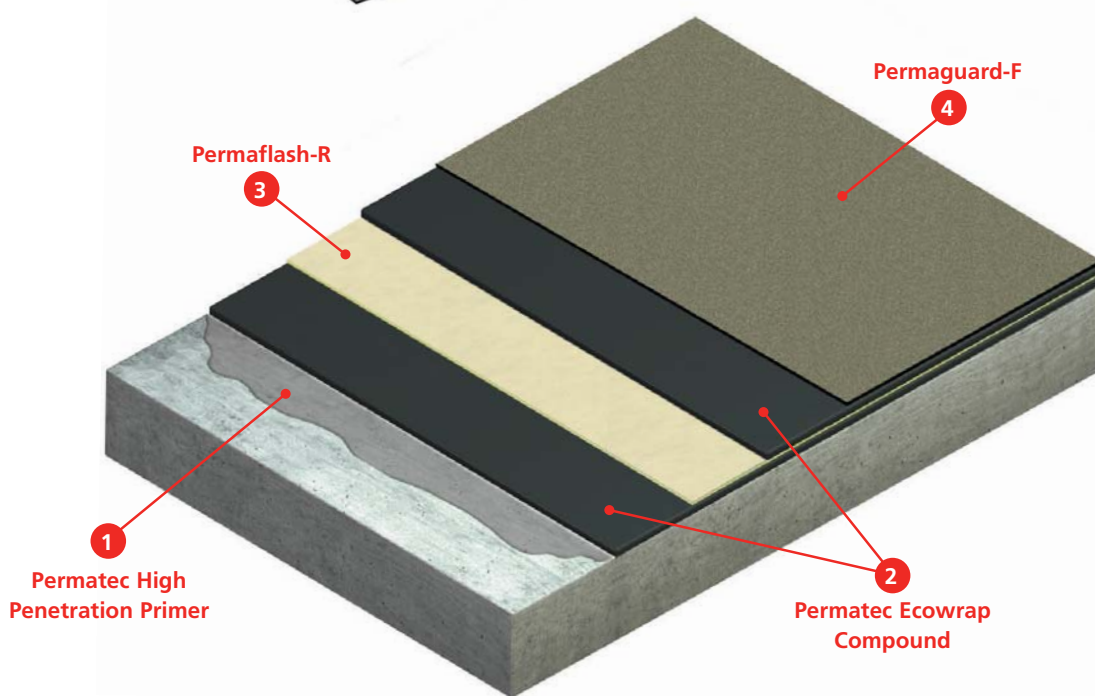
4 Protect



Permaguard-F

A sand surfaced 180g/m² polyester based bitumen membrane. Permaguard-F is installed as a protection layer into the final coat of the Permatec compound whilst it is still hot.

Roll size: 1m x 20m



With a Full Range of Accessories to Cover Every Eventuality

For detailing...

Permaflash Detailing Strip

A flexible bitumen and EPDM polymer detailing strip, which is bedded into a coat of Permaterc followed by the full Permaterc system. D500 is installed to rainwater outlets while D150 is installed to reinforce upstands, change of angle details and minor movement joints.

Permaflash D150 - Roll size: 150mm x 20m

Permaflash D500 - Roll size: 500mm x 20m



Permaguard-M

A slate surfaced 180g/m² polyester based SBS modified bitumen membrane. It is used on exposed detail areas and is installed into the final coat of Permaterc whilst it is still hot.

Roll size: 1m x 8m



For green roofs...



Permaterc Anti-Root

A special anti-root formulation of the Permaterc compound, for use in green roof specifications. It is applied to the prepared substrate using squeegees to a total nominal thickness of 6mm. Permaterc Anti-Root is covered by BBA Certificate 03/4009 (Product Sheet 3).

Size: 12kg keg in polypropylene wrapper marked 'Permaterc Anti-Root'.



Permatorch Anti-Root

A slate surfaced high performance protection sheet consisting of 180g/m² polymeric base, coated with polymer modified bitumen, containing a specially formulated root resistant treatment, for use in green roof systems. Note: This product was used in Permaterc specifications prior to the introduction of Permaterc Anti-Root compound.

Roll size: 1m x 7.5m



Permaterc Polymer Primer

A specially formulated sythetic rubber based primer for use on concrete and other similar surfaces to receive Permaterc.

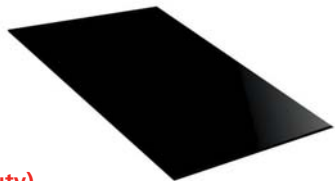
Size: 20kg

For drainage and additional onsite protection...

Permaguard PB

3.2mm thick protection board fabricated with a bituminous core of non woven glass fibre reinforcement. It exhibits high strength, excellent puncture resistance and non-compressible nature. Permaguard PB is installed into the final coat Permaterc compound whilst it is still hot. All joints are taped.

Size: 1.22m x 1.22m



Plasdrain Drainage Layers

The IKO Plasdrain system is a plastic drainage composite with a geotextile filter sheet adhered to the upper surface.

Plasdrain 6: 6mm x 1100mm x 50m

Plasdrain 12: 12mm x 1100mm x 50m

Plasdrain 25: 25mm x 915mm x 50m



Permaguard HDPB (Heavy Duty)

A high density polymeric protection board which is extremely tough with high impact resistance used in heavy duty situations. Permaguard HDPB is installed into the final coat of a Permaterc compound whilst it is still hot. All joints are taped.

Size: 1m x 2m

IKO - Setting the Standard in Innovation, Quality and Service



The Complete Waterproofing Service

As the global leader in the manufacture and supply of roofing and waterproofing solutions, IKO is a company that is in tune with the needs of its customers. An IKO flat roofing solution gives you reassurance of working with an acknowledged leader in the design and implementation of proven roofing and waterproofing systems.

IKO is a global specialist with a reputation for innovation and quality stretching back over 100 years. That gives us a level of knowledge and support unrivalled by any other roofing system provider; a difference you'll appreciate in the service, expertise and performance we bring to your project.

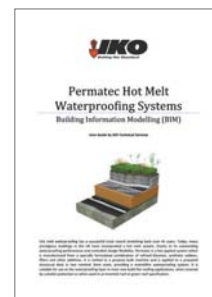
Our unparalleled choice of flat roof waterproofing systems is a result of significant investment in R&D on a global scale, and is one of the reasons that IKO is the preferred partner for so many specifiers, contractors, building managers and local authorities across the UK and beyond.

By combining a global strength with local expertise, IKO's overall aim is to continue to set the standards in roofing and waterproofing through investment, innovation and a commitment to quality and service.

Specification Support

IKO provides a comprehensive technical support service for architects, specifiers and contractors. Regionally based technical advisors can assess technical drawings, advise on specific requirements and offer individual solutions for any given project. IKO's technical support service is maintained with proper resource, in both equipment and experienced personnel, and our bespoke specification design service is founded on the desire and commitment to be the industry leader, delivering best value 'right first time' flat roofing.

- Bespoke specification design service issuing NBS J31 and Q37 documents
- CAD Standard Drawings
- Assistance with new build design
- CDM Regulations
- Building Regulations e.g. Part L
- U-value calculations
- Condensation risk analysis
- Guarantee packages for up to 35 years
- RIBA Approved CPD Presentations
- Building Information Modelling (BIM) available



“ We specified the Permatec system because of IKO's ongoing commitment to reducing their environmental impact.”

Francis Walker, Senior Architect, RMJM





Driving and Supporting Installation Excellence

IKO roofing systems are only ever installed by fully qualified and licensed contractors. With selection and training criteria that are among the most demanding in the industry and nationwide network coverage, you can be confident that wherever you call on their services, your installation will be managed to the highest possible standards.

- Dedicated hot melt training facilities at IKO's National Training Academy
- Nationwide network of trained and qualified contractors
- Installation by trained and badged operatives

Commitment to the Environment

In a world with an ever increasing focus on the environment and the challenge of achieving new targets for sustainability and energy performance, IKO has developed processes, complete systems and packaging which lead the industry in environmental performance.

In the hot melt sector alone IKO has been responsible for pioneering the market in terms of environmental responsibility. This began by introducing the first UK manufactured hot melt waterproofing system back in 2002, followed by other leading innovations such as zero waste packaging, ant-root and specially formulated compounds allowing for lower application temperatures on site.

Quality Assurance and Ongoing Maintenance

All IKO projects are regularly monitored during installation by our dedicated Technical Services Department, to maintain full specification compliance, and ensure that any site queries are handled quickly and effectively.

- Dedicated IKO engineers monitoring site installations
- QA procedure ensuring specification compliance on all projects
- Pre-contract system briefing for all key site management personnel
- Prompt and professional response to technical issues on site
- Comprehensive guarantees

An IKO flat roof solution is an investment that will deliver many years of faultless service.

A long-term commitment from you deserves an equally long-term commitment from us, and that's why all of our waterproofing systems are fully backed-up by long-term, meaningful guarantees offering ultimate peace of mind.

" At IKO, just like the dedicated roofing solutions we provide, we're here for you now and into the future."





nbsPlus



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