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Guaranteed Roofing Solutions

GUARANTEED
ASPHALT

INTRODUCTION

Guaranteed Asphalt Ltd. is a leading manufacturer of mastic asphalt producing both British Standard and high performance polymer modified grades for a wide range of flat roofing applications.

The Company is a manufacturing and contracting member of MAC (the Mastic Asphalt Council) and operates a Technical/Specification service to provide designers and specifiers with the full range of services required to ensure a trouble free roof installation.

Guaranteed Asphalt Ltd operate a registered contractor network to ensure the same high standards are carried through to completion.

A range of Guarantees are available to provide cover up to 20 years (including insurance backed options).

For further information please contact Guaranteed Technical Services on 0207 7327781.

GUARANTEED
ASPHALT

Contents

GENERAL

Mastic Asphalt is the ultimate protection for a wide range of construction applications and offers total waterproofing integrity for roofing and tanking applications.

Whilst it is one of the worlds most traditional construction materials it has continued to develop with the times and even in todays fast-track building industry polymer modified mastic asphalt remains the unrivalled choice for many designers and specifiers.

It is installed by trained operatives who have undertaken the mastic asphalt industry's extensive training programme which lasts for a minimum of three years to NVQ Level Two/Three, or equivalent.

Polymer modified mastic asphalt can only be installed by approved contractors. In this way, the entire industry can offer comprehensive guarantees with complete confidence on both labour and materials.

This manual provides recommendations for the use of polymer modified mastic asphalt in roofing to both flat and sloping roofs and covers a variety of applications including roof gardens.

A flat roof typically comprises ceiling, structural supports, roof deck, waterproof covering and surface protection and incorporates insulation and drainage. It may support ancillary items such as engineering equipment, hand railing and lightning conductors.

Polymer modified asphalt roofing requires the use of ancillary materials and products, most of which are covered by British Standards. Specifiers should satisfy themselves, by reference to manufacturers' information and test results, that materials and products not covered by a British Standard will be suitable for their roofing requirements in particular situations and are compatible with the use of mastic asphalt. All such materials should be installed in accordance with manufacturer's instructions.

For each roof the designer should first determine the form (pitched or flat) and the type (cold deck, warm deck or inverted) before selecting the appropriate deck materials, thermal insulation, and means of vapour control.

GENERAL DESIGN CONSIDERATIONS

DESIGN OF THE BASE

Substrates to which mastic asphalt is to be installed should be prepared to a true and even surface free from irregularities such as abrupt changes in levels, hollows, ridges or dips, therefore enabling the mastic asphalt to be applied to a reasonably uniform thickness.

All materials should provide a substantial and continuous support to the mastic asphalt application and should be able to sustain the loads imposed by traffic both during and after asphalting operations. The designer should study the need for movement joints in the structure. Movement joints should be continued at upstands, walls and perimeters of buildings.

TOLERANCES

Due to the nature of mastic asphalt, the nominal thicknesses given are indicative rather than precise. Any irregularities in the horizontal substrate will be reflected in the final surface with accompanying inconsistencies of thickness.

DAMP-PROOF COURSES

It is essential that a waterproofing membrane does not override a damp-proof course in vertical applications.

Ideally, damp-proof courses should be positioned one brick course above the chase into which mastic asphalt is applied, with the exposed course of brickwork normally being protected with a cover flashing extending 75mm down the face of the mastic skirting.

Where site restraints dictate that it is necessary to install a chase at the same level as the damp-proof course, there is a risk of damage occurring to the continuity of the damp-proof course, and special care is required during installation and cutting the chase.

FALLS

Whilst ponding is not detrimental to the life of mastic asphalt it is generally desirable that falls are incorporated in flat roofs to assist in the discharge of rainwater and to minimise ponding.

All flat roof surfaces should be laid to cross falls and/or falls to ensure proper drainage as recommended in BS 6229:1982. Rainwater outlets should be sited at low points in the general roof area well clear of other penetrations, where possible.

Falls should normally be provided in the base on which the roof covering is to be laid. To ensure adequate drainage, allowance should be made for normal construction tolerances and deflections in order to achieve a minimum finished fall of 1:80. Particular attention should be paid to areas subject to pedestrian traffic such as access balconies or playing areas.

By choosing asphalt roofing adequate drainage is achieved by using a minimum finished fall of 1:80. It should be taken into account that other flat roofing materials usually require a minimum fall of 1:60 resulting in direct additional construction costs.

DRAINAGE

Drainage should be provided and designed in accordance with the requirements of BS 6367:1983, Code of Practice for drainage of roofs and paved areas. Outlets should always be located at the level of the waterproof membrane and should be suitable for use in conjunction with mastic asphalt.

SUBSTRATES

CONCRETE

For in situ concrete or hollow block/pot constructions with an irregular surface, all falls except when provided as part of the structure should be formed by a screed such as given in BS 6229:1982. The surface should be provided with a float finish to a plane even surface free from ridges and indentations.

PRECAST CONCRETE UNITS

Precast concrete units should be used and fixed in accordance with manufacturer's instructions and finished with a surface suitable to receive mastic asphalt.

Falls should be incorporated in the supporting structure or formed in a suitable screed.

DRYING OUT THE BASE

Concrete slabs and concrete decks cast in situ should be drained downwards through temporary drain holes formed in the low points of the roof deck. Subject to checking their effect on structural strength, the holes should be 25mm diameter, positioned to avoid reinforcement bars in the concrete in accordance with BS 6229:1982. The holes should not be filled until seepage and dampness has ceased, before finishing work on the ceiling is commenced. Precast concrete roof decking units with open joints are self-draining and holes are not required, but if the joints are subsequently to be sealed, they should be left open for as long as possible.

SAND & CEMENT SCREEDS

Where a reinforced concrete roof slab is overlaid with a screed to provide falls, such screed should be laid in accordance with BS 6229:1982. The surface should be provided with a float finish, even and smooth, free from hollows and ridges.

The screed should be designed to remain free from cracks.

LIGHTWEIGHT SCREEDS

All lightweight screeds should be installed by contractors specialising in such work and laid strictly in accordance with manufacturer's instructions to a smooth and even surface, free from hollows and ridges.

ASPHALT SCREEDS

Asphalt screeds can be specified in the majority of cases falling to minimum thicknesses where traditional sand/cement and lightweight screeds require a minimum thickness of 50mm.

In addition to replacing a "wet trade" mastic asphalt screeds can be trafficked when cooled to ambient temperature and provide temporary waterproofing to enable internal trades to progress.

It should be noted that with an asphalt screed there is no need for a separate vapour control layer.

TIMBER BOARDING

Roof decks of timber boarding should be designed in accordance with BS 6229:1982 and BS 5268:Part 2:1996.

The timber should be naturally durable or pre-treated against infestation by wood boring insects and fungal decay as recommended in BS 5268:Part 5:1989. Any method of pre-treatment specified should be compatible with the use of bitumen-based products.

Boarding should not be less than 19mm nominal thickness, planed, closely clamped together with tongued and grooved joints or closely butted and secured by nailing with heads not protruding. Falls should be formed by firring or sloping the joists, in accordance with BS 6229:1982.

To avoid fungal attack of the timber boarded structures in cold roof constructions, ventilation should be provided within the roof void.

Adjacent to masonry walls, parapets and abutments, a free standing kerb should be securely fixed to the roof deck to allow for differential movement.

A free standing kerb is not required where a Guaraflash U & T flexible upstand detail is specified.

The timber base should be protected from rainwater during construction. Timber affected by dampness should be allowed to dry. Therefore, the fixing of ceilings should be delayed as necessary.

PLYWOOD

Roof decks of plywood should be designed in accordance with BS 6229:1982 and BS 5268:1996. Falls should be formed by firring or sloping the joists.

The plywood should conform to the relevant requirement of BS 6566:Parts 1 to 8, should be specified as veneer plywood and should:

(a) be WBP bonded in accordance with BS 6566:Part 8: 1985 (1991)

(b) have a plywood durability of Class M of BS 6566:Part 7: 1985 (1991) or higher, or alternatively be preservative treated at least to the minimum requirement of BS 6566: Part 7: 1985 (1991). Any treatment should be compatible with bitumen over prolonged periods.

Note: It is not normally necessary to specify a plywood of appearance quality higher than Grade III of BS 6566: Part 6: 1985 (1991).

WOODWOOL SLABS

Roof decks of wood wool slabs should be formed from slabs conforming to Type SB of BS 1105:1981 (1994), not less than 50mm thick with a pre-screeded surface, fixed in accordance with the wood wool slab manufacturer's instructions.

Pre-felted wood wool may be used to provide temporary weather protection and a vapour control layer in warm roof construction, and should be used in conjunction with a boarded insulant. Joints should be taped.

Where pre-screeded channel reinforced wood wool slabs are specified, the channel may form a thermal bridge unless protected on the outside by insulation. To reduce the risks of condensation, a warm roof system should be constructed by applying a suitable insulation over the wood wool slabs with a vapour control layer.

In cold roof constructions, ventilation should be provided within the roof void.

PROFILED METAL DECKING

Proprietary systems of troughed decks to be used in combination with mastic asphalt should be designed in accordance with BS 6229:1982.

The maximum permissible deflection as a multiple of span should be 1/325.

Metal decking does not provide a continuous supporting surface for mastic asphalt roofing, therefore the decking should be overlaid with a rigid board or sheet material secured to the crowns of the decking profile.

Adjacent to masonry walls, parapets, abutments and metal cladding, a free standing kerb should be securely fixed to the metal decking to allow for differential movement.

In certain circumstances a limited vapour control layer may be formed of felt conforming to BS 747:1994 or similar material. If higher degrees of vapour resistance are necessary, a two-layer or a fully supported vapour control layer should be installed.

SUBSTRATES FOR INVERTED ROOFS

Substrates for inverted roofs are usually designed to be constructed in concrete due to weight considerations. It is possible to lay over other substrates dependent on their ability to accommodate the imposed loadings.

SUBSTRATES FOR WARM DECK ROOFS

Substrates in warm deck roofs will be formed by thermal insulation boards. Thermal insulation thickness and the risk of condensation build-up should be calculated. A vapour control layer should normally be incorporated.

CONTROL OF WATER VAPOUR

Vapour control layers reduce the diffusion of moisture vapour into the thermal insulation element within a warm roof specification. Whilst water vapour diffusion is normally a slow process the need for effective vapour control becomes more necessary as levels of relative humidity increase within the building.

Any provision required to control interstitial condensation within the roof structure should be determined as recommended in BS 6229:1982 but with calculation method modified to conform to BS 5250:1989 (1995).

LAYING VAPOUR CONTROL LAYERS

Whenever a vapour control layer is specified the spreader should ensure its integrity, any damage being made good before the insulation boards are applied.

Particular care should be taken at all detail work to ensure the insulation is completely enclosed and protected against water vapour from below.

Thermal insulation boards for use in warm roofs should be capable of resisting permanent deformation or damage when subjected to loads.

LAYING THERMAL INSULATION BOARDS

WARM ROOF CONSTRUCTION

Boards should be fully bedded to the vapour control layer normally in hot bitumen in a brick bond pattern and with edges firmly pushed together in accordance with the board manufacturer's instructions.

The thermal insulation should be laid with a margin between the edges of the boards and all skirtings and abutments. The margin should be subsequently filled, prior to laying the first coat of horizontal mastic asphalt. This is not normally a requirement where insulated upstands are detailed.

Roof terraces or balconies subjected to static or pedestrian loads should be designed to accommodate the inverted roof system or consideration should be given to the incorporation of a suitable insulation such as cellular glass with a porous concrete tile finish to the membrane.

For information on insulation type/thickness to meet specific U value requirements please refer to Building Regulations 2001 (England and Wales) approved document L (Conservation of Fuel and Power).

N.B. The requirement for a separate vapour control layer is avoided where a warm roof specification using an asphalt screed or a protected membrane system is specified.

SEPARATING MEMBRANE

The separating membrane should be one of the following and should be laid directly under the mastic asphalt:

a) Guarafelt CP/CP super

b) Guarafelt sheathing comprising a base of flax or jute, or other suitable fibres, impregnated with bitumen.

c) Guaraglass tissue.

ISOLATING MEMBRANE

The isolating membrane to be laid over the mastic asphalt should be one of the following:

a) Waterproof building paper or Guarafelt CP where cementitious materials are to be laid onto mastic asphalt.

b) A non-woven polyester fleece, weight 130gm/m^2 to 140gm/m^2 where extruded polystyrene is to be laid onto mastic asphalt in the inverted roof construction.

FILTER MEMBRANE
A non-woven polyester fleece laid over extruded polystyrene insulation in inverted roof specifications when required by the insulation manufacturer.

GUARAFLEX R SYSTEM

INSTALLATION

The system is laid using the techniques for mastic asphalt described in the relevant clauses of BS 8218:1998, manufacturers current product literature and or written technical specifications which may vary from standard given site constraints.

GENERAL

The number of coats should be appropriate to the waterproofing requirements and traffic conditions of the roof. When laid to falls of 1:80 or greater Guaraflex PR roofing is laid in two coats to a thickness of 20mm, in accordance with BS 8218:1998.

Where falls are less than 1:80 or a 'buried' specification is required, three layers of Guaraflex PR to a total thickness of 30mm should be applied.

HORIZONTAL, SLOPING AND VERTICAL SURFACES

HORIZONTAL SURFACES UP TO AND INCLUDING 10° PITCH

On horizontal surfaces up to and including 10° pitch the Guaraflex PR should be laid in two coats to a thickness of 20mm on Guaraflex sheathing membrane.

In general, difficulties can be experienced in laying asphalt directly over insulants to surfaces over 5° pitch.

SLOPING AND VERTICAL SURFACES OVER 10° PITCH, OTHER THAN TIMBER OR LIGHTWEIGHT CONCRETE AND EXCLUDING SKIRTINGS

On sloping and vertical surfaces over 10° pitch the Guaraflex PR should be laid in three coats to a thickness of 20mm without a separating membrane.

SLOPING AND VERTICAL SURFACES OF TIMBER OR LIGHTWEIGHT CONCRETE OVER 10° PITCH, INCLUDING SKIRTINGS.

On sloping and vertical surfaces of timber or lightweight concrete Guaraflex PR should be laid in three coats to a thickness of 20mm on expanded metal lathing over a separating membrane of Guarafelt sheathing.

HORIZONTAL SURFACES DESIGNED AS ROOF GARDENS OR BURIED WATERPROOFING

On horizontal surfaces designed as a roof garden or as a buried waterproofing membrane, the Guaraflex PR should be laid in three coats to a thickness of 30mm over a separating membrane of Guarafelt CP or Guaraglass tissue.

SKIRTINGS TO BRICKWORK AND CONCRETE

Skirtings should be tucked into a chase or groove at the top edge, and should be a minimum 150mm above all roof finishes. Normally skirtings would be applied in two coats to a thickness of 13mm.

Skirtings over 300mm are regarded as vertical work and should be applied in three coats to a thickness of 20mm.

On old or irregular brickwork or blockwork it is usually necessary for the skirtings to be applied in three coats, the first coat being a 'dubbing out' coat to correct irregularities in the wall followed by the standard two coat work. The total thickness should be between 15mm and 20mm. Cement and sand render can be used as an alternative for 'dubbing out' to correct irregularities. Particular care should be taken to ensure proper adhesion of the first coat of mastic asphalt. The exposed uppermost part of the mastic asphalt skirting should be formed with a splay to shed rainwater, even though a metal flashing may be fixed to cover the exposed part. A splayed arris is formed when mastic asphalt is continued through the wall to form a horizontal damp-proof course.

Alternatively flexible upstands may be more suitable and can be specified with the Guaraflex R Waterproofing System - (page 10/11)

FILLETS

Fillets should be formed with a solid angle of Guaraflex PR, in two coats, with a minimum of 40mm on the face, at approximately 45°.

CHASES

Chases should be provided in brickwork and concrete and should be 25mm x 25mm. The lower nib of the chase should be carefully removed in order to maintain a full thickness of Guaraflex PR at this point. The chase should be pointed as soon as practical afterwards using a sand cement mortar containing a suitable polymer admixture such as styrene butadiene rubber or acrylic.

MARGIN INFILL

In a warm roof construction a minimum 25mm margin would normally be created between the edges of the thermal insulation boards and the skirting/upstands. The margin should be solidly filled to provide support to the skirting and angle fillet, and to eliminate voids at these junctions.

With the majority of thermal insulation materials, the margin should be infilled with mastic asphalt, however, where temperature susceptible materials are used, an earth damp sand cement mix should be used.

An infill is not normally required where an insulated and/or Guaraflash U&T flexible upstand detail is specified.

VERGES

EDGE TRIMS

Suitable preformed roof edge trims may be applied at edges of roofs, using a section designed for use with mastic asphalt. Materials adversely affected by thermal movement should be avoided.

KEYING TO TIMBER SURFACES

To provide an adequate key for Guaraflex PR laid on vertical timber surfaces and those of slope greater than 10°, and also at junctions formed with such surfaces, a continuous layer of metal lathing should be securely fixed by means of nails or staples. The expanded metal lathing should be fixed over Guarafelt sheathing at maximum 150mm centres in all directions.

KEYING TO METAL SURFACES

All metal surfaces such as pipes, metal standards etc. should be treated with high-bond primer in accordance with the manufacturer's instructions. Alternatively, expanded metal lathing, strapped or spot welded, may be used to provide the necessary key.

Where pipes penetrate timber, metal or wood wool roof decks, or where pipes carry hot materials or require to be isolated, an appropriate sleeve should be provided in order to isolate the mastic asphalt from the pipe, alternatively flexible upstands may be more suitable and can be specified with the Guaraflex R Waterproofing System - *(see detail finishes page 10/11)*.

Treatments for vertical and sloping surfaces to receive mastic asphalt.

TREATMENT	
Guarafelt Sheathing	1
Bitumen Coated Expanded Metal Lathing	2
High-bond Primer	3
Mechanically Prepared Surface	4

SURFACE	TREATMENT REQUIRED
Facing Bricks (Flush Pointed)	3
Engineering Bricks (Flush Pointed)	3 and 2
Timber	1 and 2
Smooth Concrete (Alternative 1)	4 and 3
Smooth Concrete (Alternative 2)	3 and 2
Textured Concrete (Coarse Aggregate)	3
Lightweight Aggregate Concrete	1 and 2
Lightweight Aggregate Brickwork	1 and 2
Metal Pipes and the like (Alternative 1)	3
Metal Pipes and the like (Alternative 2)	3 and 2

ROOFING DETAILS

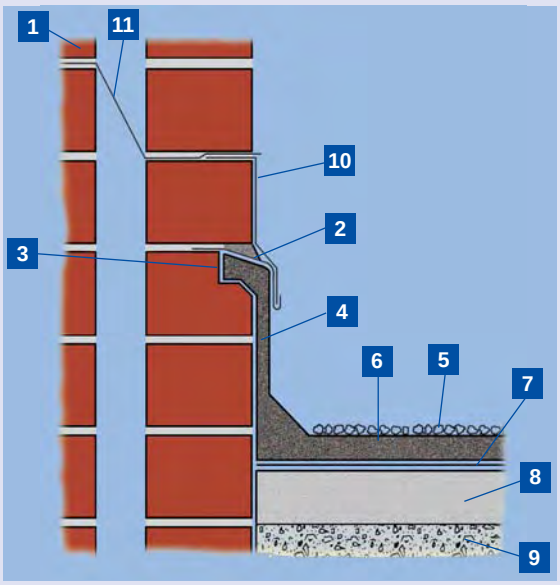
1 **Concrete roof deck and skirting (cold roof)**

1a **Timber roof deck with free-standing kerb (cold roof)**

1b **Private balconies with tiles (bitumen bedded)**

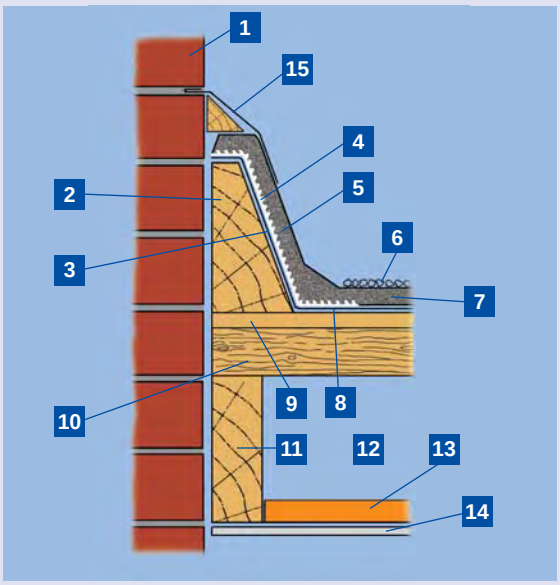
1c **Private balconies with tiles (cement mortar bedded)**

1



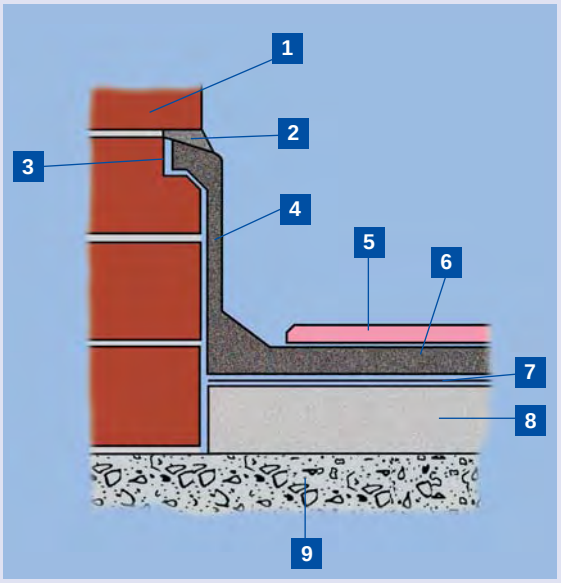
1. Brickwork
2. Cement mortar pointing
3. Chase in brickwork
4. Min. 150mm high 13mm two coat Guaraflex PR skirting with angle fillet and solar reflective paint
5. Solar reflective treatment
6. 20mm two coat Guaraflex PR
7. Guarafelt sheathing membrane
8. Asphalt/sand cement screed laid to falls
9. Concrete roof deck
10. Flashing fixed with traditional plumber's detail
11. Cavity tray or DPC

1a



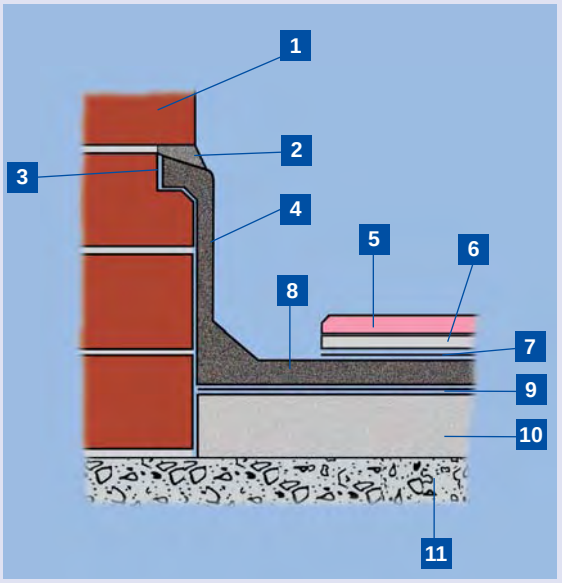
1. Brickwork
2. Free standing timber kerb
3. Separating membrane
4. Expanded metal lathing
5. Min. 150mm high 20mm three coat Guaraflex PR skirting with angle fillet and solar reflective paint
6. Solar reflective treatment
7. 20mm two coat Guaraflex PR
8. Guarafelt sheathing membrane
9. Plywood boarding or similar
10. Cross firring
11. Timber joist
12. Ventilated space
13. Thermal insulant
14. Foil backed plaster board
15. Flashing fixed with traditional plumbers detail including timber fillet

1b



1. Brickwork
2. Cement mortar pointing
3. Chase in brickwork
4. 13mm two coat Guaraflex PR skirting with angle fillet and solar reflective paint (to be min. 150mm above paved level)
5. Porous concrete tiles in bitumen or light coloured pedestrian tiles bedded in a compound in accordance with the manufacturers' recommendations
6. 20mm two coat Guaraflex PR
7. Guarafelt sheathing membrane
8. Asphalt/sand cement screed laid to falls
9. Concrete roof deck

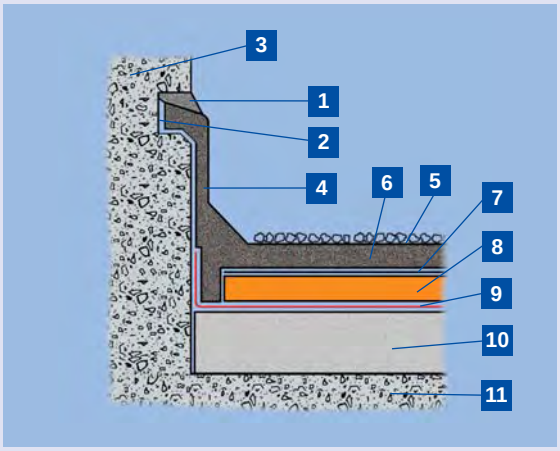
1c



1. Brickwork
2. Cement mortar pointing
3. Chase in brickwork
4. 13mm two coat Guaraflex PR skirting with angle fillet and solar reflective paint (to be min. 150mm above paved level)
5. Porous concrete tiles, ceramic tiles or quarry tiles set back 75mm at perimeters
6. Cement mortar bedding
7. Isolating membrane
8. 20mm two coat Guaraflex PR
9. Guarafelt sheathing membrane
10. Asphalt/sand cement screed laid to falls
11. Concrete roof deck

Concrete deck and skirting

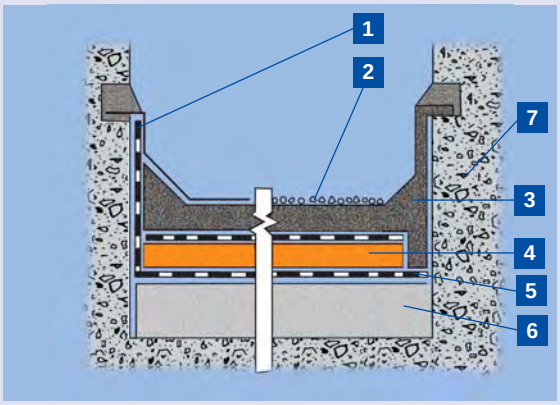
2



1. Cement mortar pointing
2. Chase in concrete
3. Concrete
4. Min. 150mm high 13mm two coat Guaraflex PR skirting with angle fillet and solar reflective paint
5. Solar reflective treatment
6. 20mm two coat Guaraflex PR
7. Guarafelt sheathing membrane
8. Board type thermal insulant
9. Vapour control layer
10. Asphalt/sand cement screed laid to falls
11. Concrete roof deck

Proprietary System 2R – Concrete deck

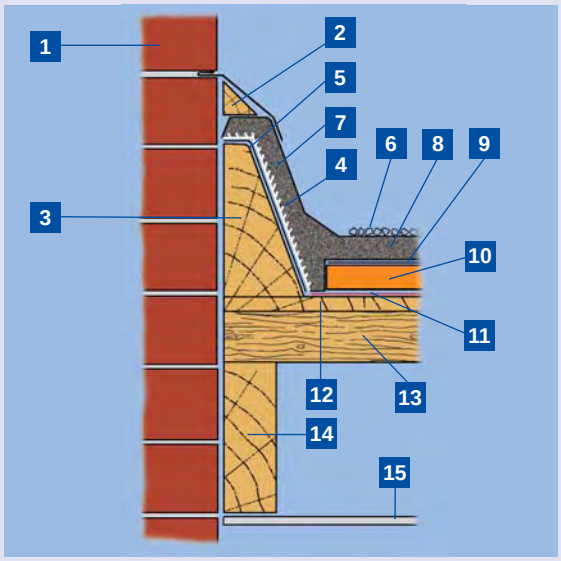
3



1. Guaraflash U & T skirting, or traditional asphalt skirting with Guaraflex PR
2. Solar reflective paint or 10mm reflective chippings in bonding compound
3. 15/20mm Guaraflex on Guarafelt CP/CP super underlay
4. Insulation board
5. 8mm Guaraflex PR vapour barrier on Guarafelt CP underlay
6. Asphalt/sand cement screed to falls
7. Concrete deck

Timber deck with free standing kerb

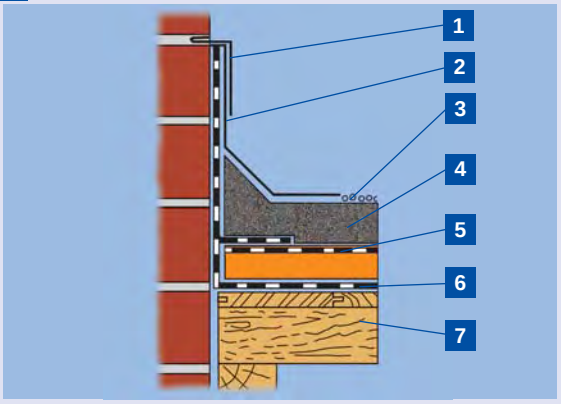
4



1. Brickwork
2. Flashing fixed with traditional plumbers detail including timber fillet
3. Free standing timber kerb
4. Expanded metal lathing
5. Guarafelt sheathing membrane
6. Solar reflective treatment
7. Min. 150mm high 20mm three coat Guaraflex PR skirting with angle fillet and solar reflective paint
8. 20mm two coat Guaraflex PR
9. Separating membrane
10. Board type thermal insulant
11. Vapour control layer
12. Plywood boarding or similar
13. Cross firring
14. Timber joist
15. Foil backed plaster board

Proprietary System 3R – Timber deck

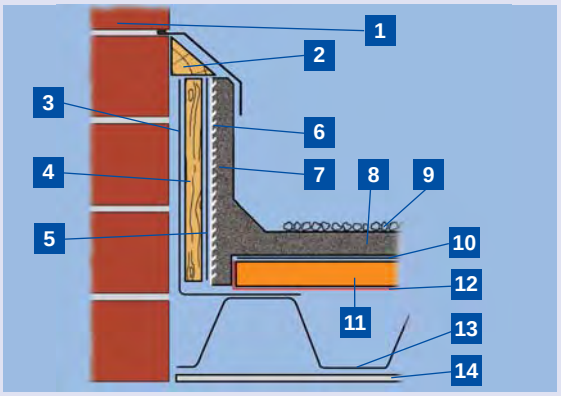
5



1. Cover flashing
2. Guaraflash U & T upstand
3. Solar reflective paint, or 10mm reflective chippings in bonding compound
4. 15/20mm Guaraflex on Guarafelt CP super underlay
5. Insulation board
6. Vapour barrier 8mm Guaraflex PR on Guarafelt CP
7. Plywood deck or softwood boarding

Metal deck with free standing kerb

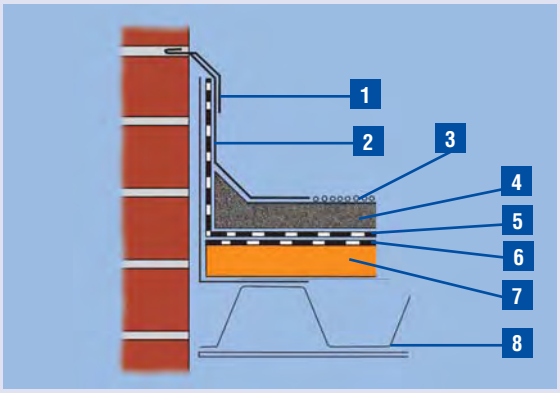
6



1. Brickwork
2. Flashing fixed with traditional plumbers detail including timber fillet
3. Metal angle
4. Timber upstand
5. Separating membrane
6. Expanded metal lathing. Alternatively a metal upstand with spot welded expanded metal lathing may be used
7. Min. 150mm high 20mm three coat Guaraflex PR skirting with angle fillet and solar reflective paint
8. 20mm two coat Guaraflex PR
9. Solar reflective treatment
10. Guarafelt sheathing membrane
11. Board type thermal insulant
12. Vapour control layer
13. Metal roof deck to falls
14. Ceiling

Proprietary System 4R – Metal deck

7

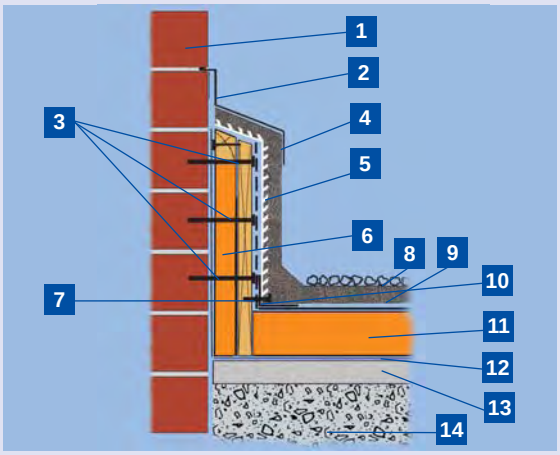


1. Cover flashing
2. Guaraflash U & T upstand
3. Solar reflective paint or chippings
4. Guaraflex PR 20mm
5. Guarafelt CP underlay
6. Plywood joints taped with Guarafelt CP
7. Insulation board with plywood face and foil vapour barrier fixed to deck
8. Metal deck

ROOFING DETAILS CONTINUED
INSULATED UPSTANDS

Traditional asphalt detail concrete deck

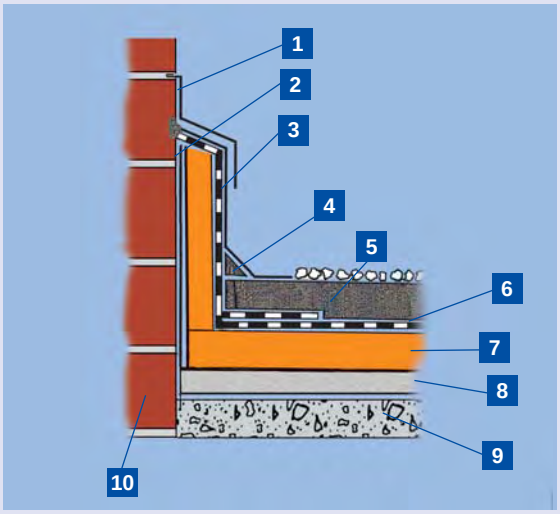
8



1. Brickwork
2. Metal cover flashing
3. Fixing
4. Expanded metal lathing over Guaraflex sheathing
5. Min. 150mm high 20mm three coat Guaraflex PR skirting with angle fillet and solar reflective paint
6. Insulation
7. Plywood (min 20mm thick)
8. Solar reflective finish
9. 2 coat Guaraflex PR on Guarafelt sheathing
10. Suitable closure secured to plywood
11. Insulation
12. Vapour barrier
13. Asphalt or sand and cement screed to falls
14. Concrete deck

Proprietary System 2R[1] – Concrete deck

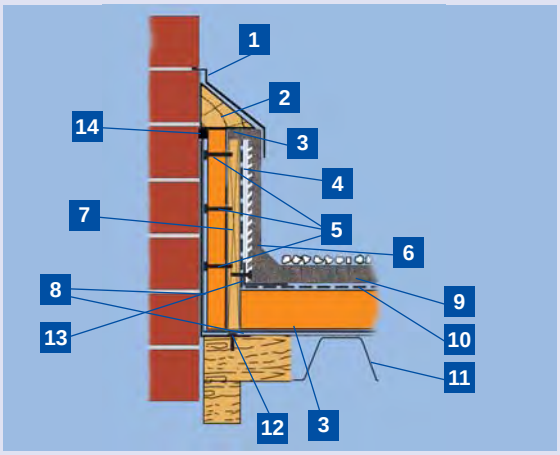
9



1. Metal cover flashing
2. Vapour barrier
3. Guaraflash U & T upstand
4. Guaraflex PR fillet
5. 15/20mm Guaraflex PR
6. Guarafelt CP/CP super underlay
7. Insulation board
8. Asphalt/sand cement to falls
9. Concrete deck
10. Brickwork

Traditional asphalt detail timber/metal deck

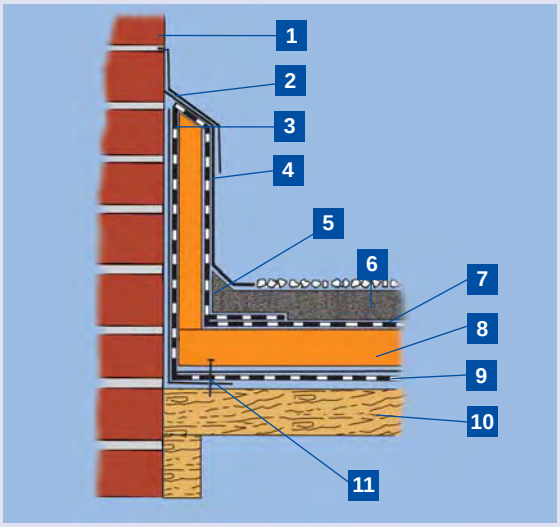
10



1. Metal flashing
2. Timber fillet
3. Suitable insulation
4. Expanded metal lathing over Guarafelt sheathing
5. Fixing
6. Three coat Guaraflex PR
7. Plywood (min 20mm thick)
8. Vapour barrier
9. Two coat Guaraflex PR
10. Guarafelt sheathing
11. Timber/Metal deck
12. Metal angle fixed to deck
13. Suitable closure
14. Heavy duty sealing strip

Proprietary System 3R[1] – Timber deck

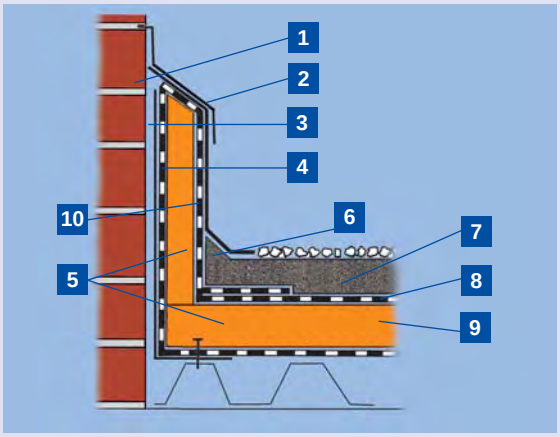
11



1. Brickwork
2. Cover flashing
3. Vapour control layer
4. Guaraflash U & T upstand
5. Guaraflex PR fillet
6. Guaraflex PR 15/20mm thickness
7. Guaraflex CP/CP super underlay
8. Insulation
9. Vapour Barrier – 8mm Guaraflex PR on Guarafelt CP underlay
10. Timber deck to falls
11. Metal angle secured to deck with flexible vapour barrier continued vertically

Proprietary System 4R[1] metal deck

12



1. Brickwork
2. Cover flashing
3. Metal angle
4. Vapour control layer continued up metal angle
5. Insulation board with plywood top and foil face
6. Guaraflex PR fillet
7. 15/20mm Guaraflex PR
8. Guaraflex CP super underlay
9. Plywood joints taped with Guaraflex CP underlay
10. Guaraflash U & T upstand

UNDERCUT DRIP

A mastic asphalt apron with an undercut drip may be provided on masonry constructions, the mastic asphalt being applied in two coats to a thickness of 13mm.

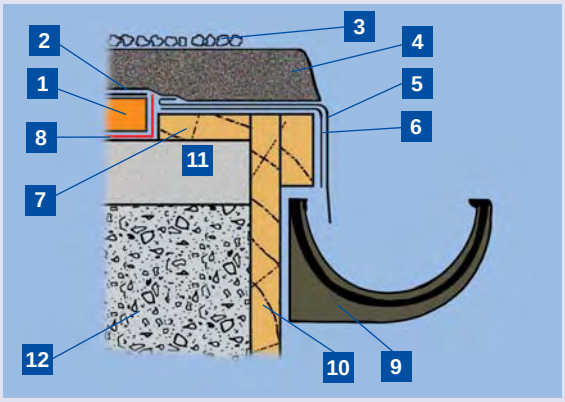
EAVES GUTTERS

Where the roof falls into an eaves gutter, the asphalt would normally be finished over a lead or other suitable flashing set into a rebate in the substructure. The flashings should be welted at the back and the depth of rebate should allow for the full thickness of mastic asphalt to be maintained over the welt. Pre-formed edge trims would not normally be used at this detail, unless specifically designed ie. watershed type.

A lead detail should be designed and installed in accordance with The Lead Sheet Manual, Volume 1, Lead Sheet Flashings.

Concrete roof eaves gutter (warm roof)

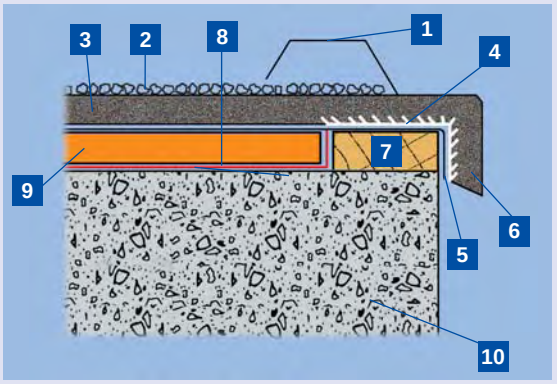
13



1. Board type thermal insulant
2. Separating membrane
3. Solar reflective treatment
4. 20mm two coat Guaraflex PR
5. Flashing fixed with traditional plumbers' detail
6. Felt underlay
7. Timber stop
8. Vapour control layer
9. Gutter
10. Fascia board
11. Asphalt/sand cement screed laid to falls
12. Concrete roof deck

Apron and drip to concrete (optional water check)

14



1. Optional solid mastic asphalt water check
2. Solar reflective treatment
3. 20mm two coat Guaraflex PR
4. Expanded metal lathing
5. Guarafelt sheathing membrane
6. 20mm three coat Guaraflex PR apron and undercut drip
7. Timber stop
8. Vapour control layer
9. Suitable board type thermal insulant
10. Concrete roof deck to falls

Timber roof eaves gutter (warm roof)

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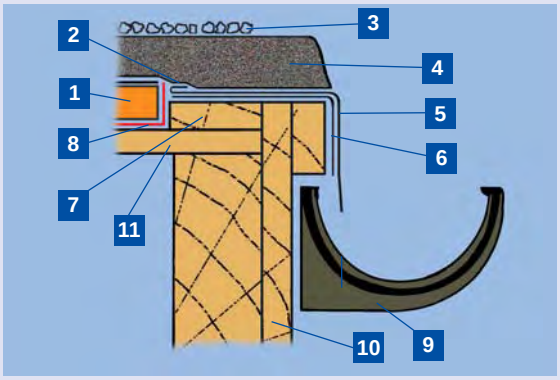

1. Board type thermal insulant
2. Guarafelt sheathing membrane
3. Solar reflective treatment
4. 20mm two coat Guaraflex PR
5. Flashing fixed with traditional plumbers detail
6. Felt underlay
7. Timber stop
8. Vapour control layer
9. Gutter
10. Fascia board
11. Plywood boarding or similar to falls

RAINWATER OUTLETS

Rainwater Outlets should be no higher than the immediate surrounding finish and be mechanically secured to prevent movement. Adequate provision should be made for surface water run-off before the waterproof membrane is completed.

The type of outlet used should be suitable for use in conjunction with mastic asphalt. Usually spun aluminium or cast iron outlets with an internal clamping ring are to be preferred.

Clamping cone outlet

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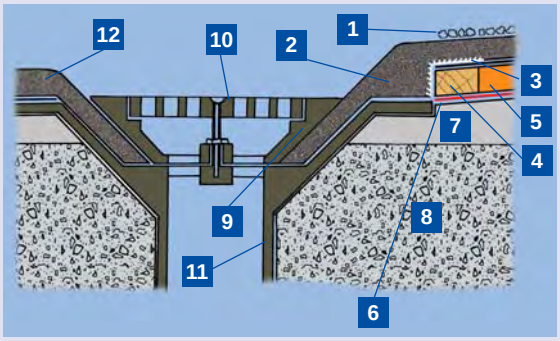


1. Solar reflective treatment
2. 20mm two coat Guaraflex PR
3. Expanded metal lathing on Guarafelt sheathing
4. Timber stop
5. Board type thermal insulant
6. Vapour barrier
7. Asphalt/sand cement screed laid to falls
8. Concrete roof deck
9. Internal clamp ring
10. Metal grating
11. Roof outlet
12. Cold deck alternative

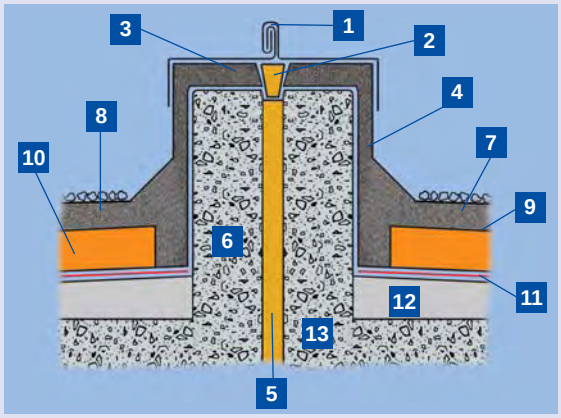
MOVEMENT JOINTS

It is normally only necessary to provide movement joints in a mastic asphalt roof membrane where one is provided in the structure. Any movement joints should always be located at the high point of the falls.
Where it is considered necessary to provide movement joints in the roof structure, these should be of the twin kerb type with a suitable metal or butyl rubber capping.

Flush movement joints in mastic asphalt should be avoided where possible. Where they are unavoidable, care should be taken to ensure that a secure bond can be made between the joint and the roof covering.

Concrete upstand expansion joint (warm roof)

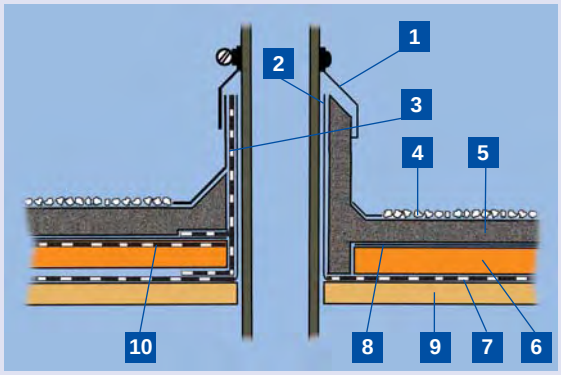
17



1. Flashing fixed with traditional plumbers' detail
2. Waterproof joint filler
3. 20mm two coat Guaraflex PR
4. Min. 150mm high 13mm two coat skirting Guaraflex PR with angle fillet and solar reflective paint
5. Compressible infill
6. Concrete upstand
7. Solar reflective treatment
8. 20mm two coat Guaraflex PR
9. Guarafelt sheathing membrane
10. Board type thermal insulant
11. Vapour control layer
12. Asphalt/sand cement screed laid to falls
13. Concrete roof deck

Sleeved pipe passing through roof (warm roof)

18



1. Metal collar clipped to pipe
2. Non-ferrous metal sleeve to pipe
3. Min. 150mm high 13mm two coat Guaraflex PR skirting with angle fillet and solar reflective paint or Guaraflash U & T Upstand
4. Solar reflective treatment
5. 20mm two coat Guaraflex PR
6. Board type thermal insulant
7. Vapour control layer
8. Guarafelt sheathing membrane
9. Plywood boarding or similar
10. Guarafelt CP/CP Super underlay

INVERTED ROOFING SYSTEM

Extruded polystyrene is used as the insulation within these systems laid loose on a geotextile isolating membrane weighted by either ballast or paving slabs which protect the insulation from UV degradation and prevent flotation in the inverted roofing system.

Lightweight systems are available which use a modified cementitous topping bonded to the extruded board and provide a substantial saving on the imposed loading of the conventional application. The suitability of this method for specific applications should be verified by the insulation manufacturer.

Concrete roof deck and skirting (traditional inverted roof) with external insulant

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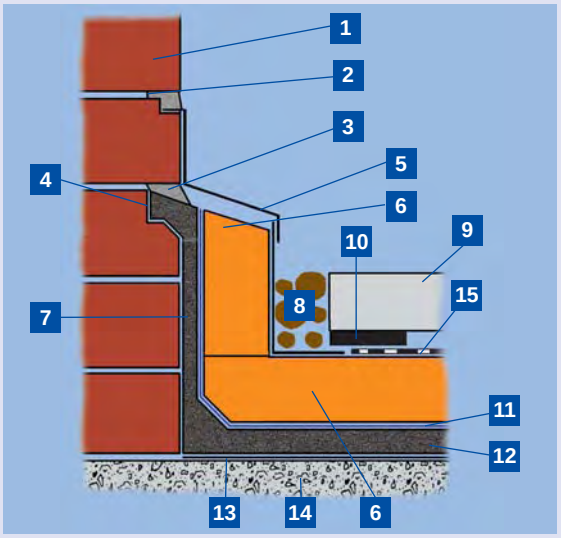

1. Brickwork
2. Chase for cover flashing
3. Cement mortar pointing
4. Chase in brickwork
5. Suitable cover flashing
6. Board type thermal insulant
7. Minimum 13mm two coat skirting Guaraflex PR with angle fillet (to be min. 150mm above paved/ballast level)
8. Pavings kept back at margins
9. Paving slabs or gravel
10. Proprietary supports or roofing felt packing pieces under paving slabs
11. Non-woven polyester fleece isolating membrane
12. 20mm two coat Guaraflex PR
13. Separating membrane
14. Concrete roof deck to falls or asphalt/sand cement screed to falls
15. Filter membrane if required by insulation manufacturer

Proprietary System 1
Standard inverted insulated roof/patio

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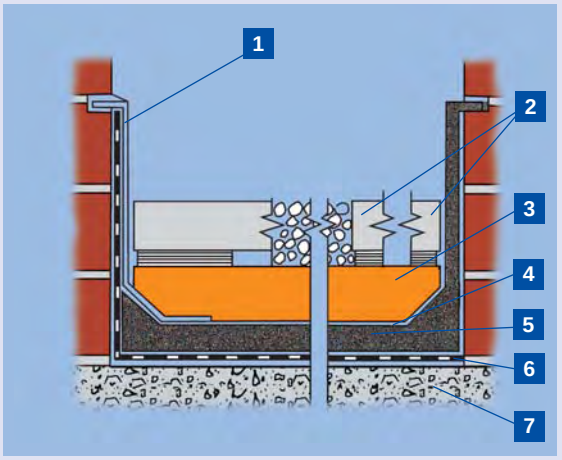

1. Guaraflash U & T upstand or traditional asphalt skirting with Guaraflex PR
2. Precast paving slabs on pads/gravel ballast 50mm to 75mm
3. Thermal insulation
4. Geotextile membrane
5. 15mm/20mm Guaraflex PR
6. Guarafelt CP super underlay
7. Asphalt/sand cement screed laid to falls

Proprietary System 2
Super inverted insulated roof/patio

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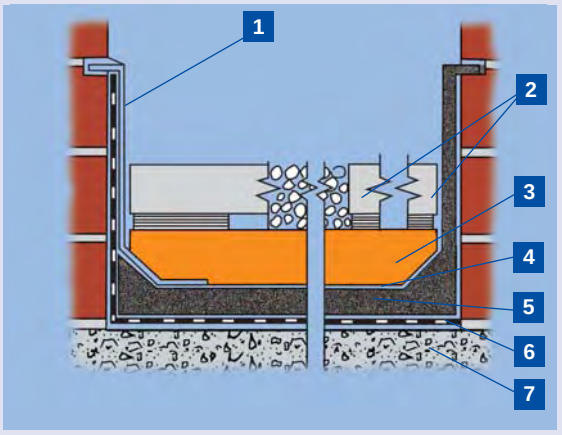

1. Guaraflash U & T upstand or traditional asphalt skirting with Guaraflex PR
2. Precast paving slabs on pads/gravel ballast 50mm to 75mm
3. Thermal insulation
4. Geotextile membrane
5. 20mm Guaraflex PR
6. Guarafelt CP super underlay
7. Concrete substrate flat or asphalt/sand cement screed laid to falls

ROOF GARDEN APPLICATIONS

Waterproofing to roof garden (partly insulated)

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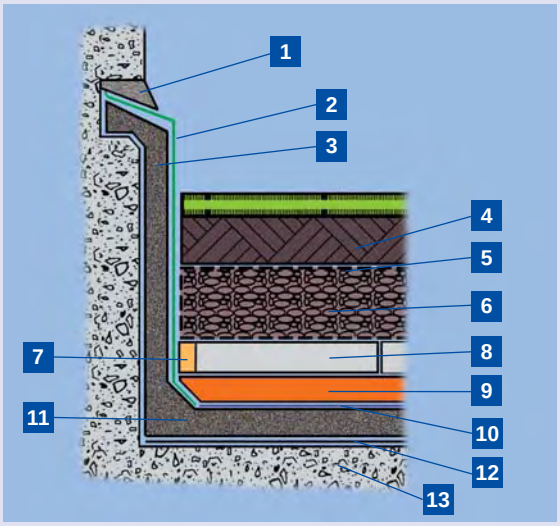

1. Cement mortar pointing
2. Single layer Guaraflash T protection
3. 20mm three coat vertical Guaraflex PR 150mm above landscaped level (minimum)
4. Soil and Vegetation
5. Filter membrane
6. Drainage layer
7. Flexible board
8. Paving slabs or similar protection
9. Board type thermal insulant
10. Non-woven polyester fleece isolating membrane
11. 30mm three coat Guaraflex PR
12. Guarafelt CP super underlay
13. Concrete roof deck or screed laid to falls

Waterproofing to roof garden (fully insulated)

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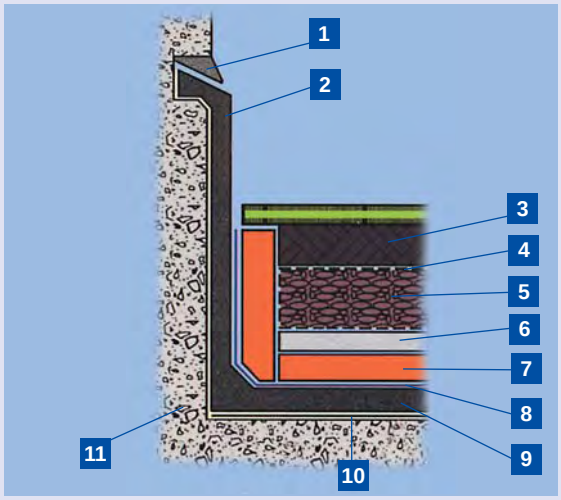

1. Cement mortar pointing
2. 20mm three coat Guaraflex PR 150mm above landscaped level (minimum)
3. Soil and Vegetation
4. Filter membrane
5. Drainage layer
6. Paving slabs or similar protection
7. Board type thermal insulant
8. Non-woven polyester fleece isolating membrane
9. 30mm three coat Guaraflex PR
10. Guarafelt CP super underlay
11. Concrete roof deck or screed laid to falls

GUARAFLEX PRODUCT DATA

FIRE

Because of its high mineral content, mastic asphalt is virtually incombustible. Indicative tests have been performed on samples of insulated mastic asphalt roof decks in accordance with the procedures specified in (draft) European Standard prEN 1187-1 and prEN 1187-2. No significant flame spread was observed and no flame penetration occurred in either test. Mastic asphalt fulfils all the external fire resistance required for a roof covering and achieved the highest rating (p60) when tested as described in BS 476: part 3:1975.

THERMAL CONDUCTIVITY

Mastic Asphalt has a thermal conductivity, (Lambda) value, of between 0.43 W/m K and 1.15 W/m K.

A (lambda) value of 0.50 W/m K may be assumed for design purposes.

THERMAL EXPANSION

Mastic Asphalt is thermoplastic and is capable of accommodating normal movements encountered in well-designed building structures.

COEFFICIENT OF CUBIC EXPANSION

The coefficient of cubic expansion is 15 x 10 -5/°C.

TOXICITY

Mastic Asphalt is non-toxic and is generally suitable for use in contact with potable water.

ODOUR

Mastic Asphalt is odourless after laying.

MASS

The mass of mastic asphalt varies due to a number of factors such as the differing proportions of constituents utilised in its manufacture and the nature and quality of coarse aggregate incorporated. For practical and load calculation purposes, however, the mass can be taken to be 2.4kg/m^2 per mm of thickness.

asphalt thickness (mm)	mass (kg/m^2)
10	24
13	31
15	36
20	48
25	60
30	72

CONTROL OF WATER VAPOUR

The vapour resistivity of mastic asphalt can be assumed to be not less than 100 000 MN s/ (gm). For condensation control calculations a factor of 20,000 MNs/ (gm) may be taken (i.e. the ratio of the vapour resistivity of the material to that of still air) see also BS 6229:1982.

RESISTANCE TO WATER

Mastic asphalt is impervious to water.

RESISTANCE TO BIOLOGICAL ATTACK

Mastic asphalt is vermin-proof and rot-proof.

COMPRESSIVE STRENGTH

When mastic asphalt is fully confined it has the same compressive strength as the containing material. When not confined, the compressive strength is dependent upon a number of factors including the temperature to which it may be subjected. Advice on individual cases should be sought from Guaranteed Technical Services.

DURABILITY

'Asphalt roofing properly designed and laid should prove capable of lasting 50-60 years' BRE Digest 144 Asphalt and built-up felt roofings: Durability.

RECYCLING

Mastic Asphalt can be recycled.

SURFACE PROTECTION

GENERAL

All asphalt roofing, including upstands, should be protected against static point loading and mechanical damage.

On inverted roofs, the ballast and insulation will provide protection to the mastic asphalt. The insulation and ballasting should be installed immediately on completion of the laying of the mastic asphalt or as soon as is practically possible. Care should be taken to provide adequate protection at upstands.

SAND RUBBING

On horizontal and slightly sloping surfaces, immediately after completion of laying and whilst the mastic asphalt is still warm, clean sharp sand should be rubbed evenly into the surface of the mastic asphalt with a wooden float prior to application of the solar reflective coating.

SOLAR RELECTIVE PAINT

Solar reflective paint should be free from materials deleterious to mastic asphalt i.e. metallic pigments, non-compatible solvents or water based emulsions.

CHEMICAL AND OIL-RESISTING PROTECTIVE PAINT

A purpose-made coloured and protective coating based on a synthetic resin in solution with industrial ethanol which does not attack/abuse mastic asphalt surfaces.

Further advice on solar reflective treatments can be obtained from Guaranteed Technical Services.

MAINTENANCE AND REPAIR

GENERAL

Guaraflex roofing which has been installed in accordance with the recommendations of this technical guide and the relevant British Standard Code of Practice can be expected to provide trouble-free service provided it is properly maintained.

Maintenance inspections should be carried out regularly by persons knowledgeable in mastic asphalt work.

All flat roofs should be inspected annually, preferably in the autumn, to clear leaves, debris and dirt, which may prevent proper drainage or cause deterioration. Where the roof is in an area of high dust or pollution, or in close proximity to trees, more frequent inspections may be necessary.

Inspection should be carried out both internally and externally. Particular attention should be given externally to roof covering abutments, joints, gutters and outlets and internally to corners, abutments and penetrations. Observations by occupants of building should be noted.

For situations not covered by the above please contact Guaranteed Technical Services on 0207 7327781.

GUARANTEED
ASPHALT

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