BAILEY®
TOTAL BUILDING ENVELOPE

Bailey Atlantic

SUSTAINABLE SINGLE PLY TPE MEMBRANE AVAILABLE IN 3 THICKNESSES



BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE No 04/4146

FOR FLAT ROOFS THAT WON'T LEAK

Bailey is a long established company with over 25 years of experience and technical expertise in flat roofing. Bailey's commitment to provide a first class service starts by supplying products of the highest quality backed up by willing and competent technical assistance.

Through its involvement in roof maintenance, Bailey recognised that the challenges of conventional flat roofs could only be overcome by the development of new materials capable of taking the thermal stresses and strains imposed on roof membranes. Bailey Atlantic is a thermoplastic polyolefine (TPO) roofing membrane which meets the highest environmental and performance standards.

Bailey Atlantic's remarkable features make it the first choice for specifiers for new build and refurbishment projects. Bailey Atlantic's strength, longevity and speed and safety of installation result in major cost savings over other membranes. When environmental factors are considered, both in manufacture and recyclability, Bailey Atlantic is clearly the most advanced, highest performing and most beneficial waterproofing membrane.

BAILEY ROOFING SYSTEMS

Specifying the roof to match your project requirements

Bailey supplies roofing systems for new build and refurbishment projects. To ensure that your roof exactly matches the needs of the building, Bailey's approach is to provide a complete roofing package uniquely designed to suit your roof.

Because Bailey handles a wide range of products they can offer unbiased opinions for the most appropriate solution, including vapour control, insulation and roof accessories. This impartial approach means that you can be assured that your new roof membrane will match the performance and economic demands of your project.

Throughout Bailey's history as suppliers and installers of flat roofing there have been many improvements in the quality of roof membranes. As the membranes have evolved Bailey has selected those which are most useful and most appropriate and supplied them as part of providing a complete roofing package.

Bitumen felts – the originals

The earliest bitumen felts caused concern through their use of asbestos reinforcement and the energy wasting and dangerous application of hot bitumen during installation. Their inability to allow for building movement meant that they had comparatively short useful lives.

High performance felts

Improved bitumen felts are still used where appropriate but now using polyester carriers and with the bitumen modified with APP (actactic polypropylene) or SBS (styrene-butyl-styrene). These have a longer life than unmodified felts and allow for more efficient torching installation. Further information on these systems is available from the Bailey Technical Department.

A high performance felt has recently been developed which can be installed using hot air and cold adhesive, reducing the fire risks associated with bitumen felts.

Thermoset membranes – the interim stage

Roof membrane technology further improved with the introduction of single ply membranes, originally made of polyvinyl chloride (PVC) or ethylene propylene diene rubber (EPDM). However the performance advantages of PVC membranes are compromised by widespread concern over environmental pollution during manufacture and low resistance to puncture. A further problem is that of plasticiser migration which shortens life and prevents re-welding during repair.

Bailey Atlantic – the present and the future

Bailey Atlantic is a further advance in roof membrane technology.

Now you can specify a membrane that has the strength and other superior mechanical properties of thermoset materials and bituminous systems coupled with the ease of fixing of thermoplastic materials.

Bailey Atlantic not only combines elongation, root resistance, chemical resistance, fire resistance and vapour permeability, it surpasses the performance of all previous membranes, being particularly tough mechanically and hence resistant to accidental damage both during installation and subsequently, for example from following trades. Furthermore it has a cold temperature flexibility of -40C.

Bailey Atlantic is manufactured from 100% polyolefine, the result is a membrane which is long lasting and environmentally sound and is quicker and safer to install than previous roofing systems.

Sustainable and safe

One of the development objectives for Bailey Atlantic was to produce a material free from adverse effects on the environment. This has been achieved in several ways:

Firstly the production of Bailey Atlantic has none of the potentially harmful environmental factors resulting from the manufacture of PVC membranes. It contains no chlorides or HCFCs.

Secondly it is energy efficient during installation. Heat guns are set at 500C to 600C and are used only as required. There are no carcinogenic fumes as is the case with other materials.

Thirdly all production waste is immediately recycled and most of the installation waste and packaging can be returned to the factory for recycling. If it is necessary to remove the roofing system, Bailey Atlantic can be separated from other materials and completely recycled.

BAILEY ATLANTIC

Performance beyond all others
Bailey Atlantic polyolefine roofing systems provide performance and longevity far beyond membranes manufactured from other materials.

Safety
Safe to manufacture, safe to install, safe in use and safe to recycle, Bailey Atlantic is unique in its risk reduction. No chlorides or HCFCs are used in its manufacture. Because there are no carcinogenic fumes, no naked flames and no messy equipment required for installation, Bailey Atlantic reduces hazard assessment and insurance premiums for installers.

Because of its non toxic nature and because it eliminates the use of hot bitumen boilers and buckets, there is no danger to building occupants and Bailey Atlantic can be installed whilst a building is occupied, for example in schools during term time.

Once installed the membrane is safer in use than many other membranes as it is non-slip even when wet.

Performance
Polyolefine is an extremely tough and durable material so Bailey Atlantic is highly resistant to damage during and after installation and to weathering in use. The material is strong and hot air welding results in joins even stronger than the material itself.

Bailey Atlantic is ideal for roof renovation as it is vapour permeable and thus allows trapped moisture to escape. Bailey Atlantic is also thermally stable, retaining flexibility across a range from -40C to 130C.

As Bailey Atlantic is rootproof it will not support plantlife and can be used safely without further layers in roof gardens.

Sustainability
Sustainability requires that a project be as energy efficient and to make as little impact on the environment as possible. Recyclability and longevity are inherent in determining how sustainable a roofing membrane is. Bailey Atlantic is 100% recyclable and following demolition of a building the membrane can be removed and completely recycled as can any on-site waste and packaging.

Because of its chemical inertness, Bailey Atlantic is resistant to most atmospheric pollution and effluent, so it will not rot or corrode and thus has a very long life.

Economics
The economic arguments for using Bailey Atlantic are very strong. Because of its very rapid installation, contractor's on-site time is much reduced.

Its compatibility with other materials means that it is highly suitable for re-roofing, there being no additional cost of isolating layers with existing roofing materials. It is even compatible with bitumen making it suitable for overlaying existing roofs.

Bailey Atlantic's availability in grey, red or green, with other colours to order, means that, coupled with its flexibility, it can be used for complex roofs in a wide variety of projects instead of more expensive materials.

Long life expectancy
Laboratory tests indicate a life expectancy of in excess of 40 years, depending on roof construction.

Even after 10 years' exposure to UV, Bailey Atlantic's properties are virtually unchanged from when laid. As the material is always weldable, accidental damage repairs and alterations can be carried out even years after installation. This is good evidence of the membrane's weathering resistance and further confirms the long life that can be expected from Bailey Atlantic.

Special applications

Bailey Atlantic's remarkable mechanical and chemical properties make it suitable for a wide variety of uses in addition to roofing.

Roof gardens
For roof gardens Bailey Atlantic's root resistance means that it can be laid without herbicidal additives. The soil bed is laid on a drainage layer which is on Bailey Atlantic laid over the deck. See Figure 6.

Water storage
Bailey Atlantic's hygienic nature and chemical resistance make it suitable for tanking, reservoirs, commercial fish tanks, ordinary sewage effluent holding tanks. In underground structures Bailey Atlantic's flexibility enables effective and simple waterproofing.

Car parks
For car parks, bridge decks and other civil engineering applications Bailey Atlantic's toughness provides rapid, lightweight and adaptable solutions for waterproofing. A wearing course is laid over the Bailey Atlantic which has been laid on the deck.

ATLANTIC FIXING

General principles

Bailey Atlantic is normally supplied and installed as a complete system, including insulation and vapour barrier, to current Building Regulations requirements. Installation is either by mechanical fixing, cold adhesive or ballasted with the laps being sealed by hot air, completely eliminating the fire hazards and burn risks associated with older systems. Bailey Atlantic is very energy efficient to install as heat is only applied as required. Installation is clean and non-hazardous to operators as well as causing less mess, less smell and less inconvenience to building occupants.

The substrates on which Bailey Atlantic is laid should be level, smooth and clean. The substrate should meet the design requirements for compressive strength and be damp and rot proof. Bailey Atlantic can be mechanically fastened to most types of deck especially timber and metal. Barrier and cushion layers are not generally required when laying over insulation boards, other synthetic membranes or bituminous felts.

An advantage of Bailey Atlantic is that the membrane can be mechanically fastened, a quick and clean method of installation. Adhesion is only necessary if the substrate is unsuitable for mechanical fixing. Installation without adhesion can be used where rounded gravel, paving slabs or a roof garden will form the topmost layer.

Atlantic can be applied to a cold roof provided the roof space is ventilated in accordance with the Building Regulations. It can be used with all usual types of roof insulation including cut-to-fall schemes.

Detailing options include pre-formed accessories for kerbs, verges and outlets.

Bailey Atlantic gives architects and designers the confidence to specify flat roof and tanking membranes that will outperform and outlast membranes made from other materials. However no matter how effective the material and how proficient the specifier, no roof will perform to specification if installation is poor. Installation of Bailey Atlantic should only be carried out by recommended companies whose staff have been trained in the installation of Bailey Atlantic. Additional details, technical advice, on-site guidance and further information on the safe and speedy installation of Bailey Atlantic are available from the Bailey Technical Department.

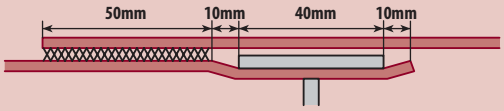
Installation

Mechanical fixing is the preferred method and can be used with timber, plywood, galvanised steel or profiled aluminium sheet decks. It can also sometimes be used with woodwool slabs and screeded concrete decks provided pull-out tests are carried out first.

The normal method of layout is shown in Figure 1. End and side laps should be 110mm overall with the washers a minimum of 10mm from the edge of the base sheet.

Normally the membrane and insulation can be fixed in one operation. However it may be necessary to use additional fixings to secure the insulation boards adequately. Mechanical fixings should be of a size and type recommended by the manufacturer and be coated for long term corrosion resistance. Fixings must incorporate a feature which will lock the pressure plate to prevent damage to the membrane.

Fixings will normally be installed at a maximum of 300mm centres on side and end laps. There should be a row of fixings around the perimeter and around any protrusions through the roof such as rooflights. Additional fixings should be installed at corners.



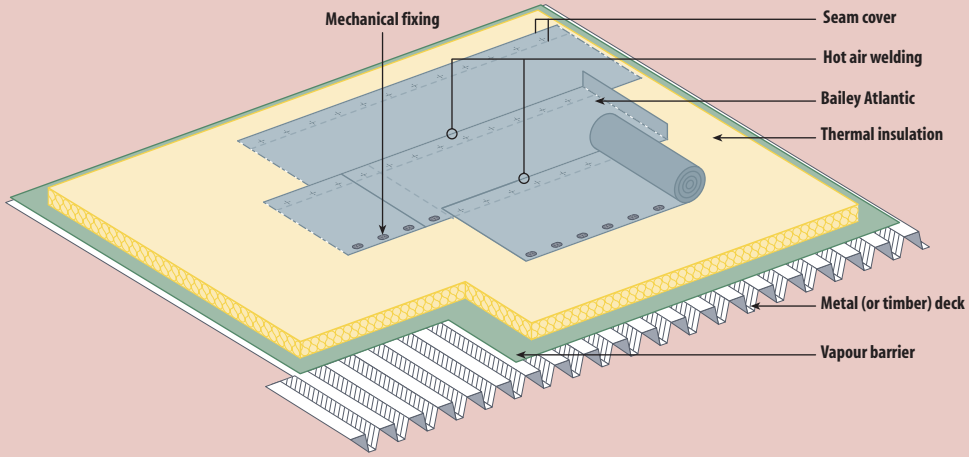


FIGURE1

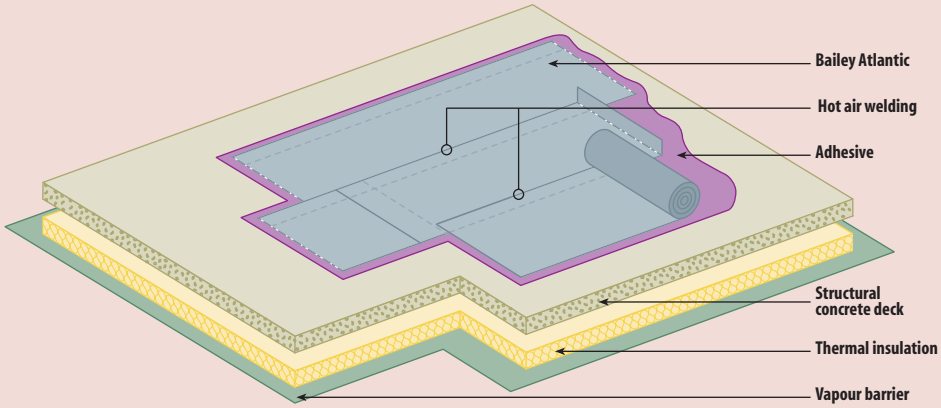


FIGURE2

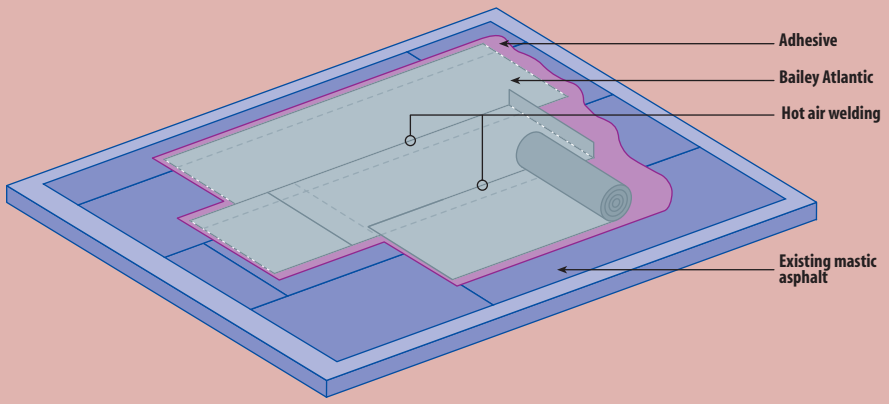


FIGURE3

Metal or timber deck warm roof – mechanical fixing

Bailey Atlantic 301 mechanically fixed at 100mm-300mm centres, depending on roof situation and size, with adjacent sheets overlapped approximately 110mm and hot air seam welded, see Figure 1.

Concrete deck cold roof – adhesive fixing

Bailey Atlantic 401 cold adhesive fixed except for band under laps with adjacent sheets overlapped approximately 60mm and hot air seam welded.

Structural concrete deck with ventilated airspace, insulation and vapour barrier as appropriate, see Figure 2.

Overlaying (eg over asphalt roofs) – adhesive fixing

Bailey Atlantic 401 cold adhesive fixed (except band under laps) with adjacent sheets overlapped approximately 60mm and hot air seam welded, see Figure 3.

Existing mastic asphalt (pre-treated with Bailey Atlantic 501 primer,) or other existing roof suitably prepared

When applied to a warm roof, a vapour barrier must be installed. This can be heavy duty polythene sealed with double sided tape or a cold applied bituminous membrane incorporating aluminium foil. The Bailey Technical Department will produce a complete specification for any type of roof on request.

Three methods of fixing may be used – mechanical fixing, adhesion, ballasting.

ATLANTIC FIXING

For high rise buildings and those in exposed situations, a plan of the fixing frequency required must be produced.

Adhesion

Bailey Atlantic 400 fleece backed membrane should be laid using adhesive. The membrane can be bonded to various substrates including solid decks, insulation boards and bituminous surfaces. All layers of the built-up system must be firmly bonded to one another.

Surfaces must be clean and dry before bonding.

The recommended adhesive is Bailey Atlantic Polyurethane Adhesive although other adhesives, including hot bitumen, can be used.

Bailey Atlantic Polyurethane Adhesive (Code 501) is applied in strips to the substrate using four beads per metre width. Alternatively the adhesive can be spread over the entire area to create a full bond. In either case the selvedge should be kept free of adhesive. Average coverage is 250g per square metre. This rate is increased on the perimeter and at corners. For high rise buildings and those in exposed situations, a plan of the quantity of adhesive required in each area must be produced. Apply adhesive sufficient for five to ten minutes of laying.

The Atlantic membrane should be rolled out and then lifted to ensure that the adhesive has been pressed flat. Side laps must be a minimum of 50mm. For end laps sheets should be butted and a 200mm wide flashing applied to the joint. The position of the sheets can be adjusted for up to 20 minutes.

Polyurethane adhesives are moisture curing so in dry conditions it is necessary to apply a fine spray of water after the adhesive has been applied to speed curing. Slight foaming of the adhesive is quite normal.

Full cure takes several hours so the membrane should be ballasted for the first night after application.

Ballasting

Bailey Atlantic can be laid loose to various types of decking or insulation boards over a vapour barrier. Ballasting must be applied immediately after laying to prevent wind uplift of the membrane.

Gravel used for ballasting must be rounded and between 16mm and 32mm in diameter. The membrane should be covered to a minimum thickness of 50mm, increased to 80mm at corners and perimeters depending on the geometry and location of the building. If possible mechanical fixings should be installed at perimeters and corners, in this case ballast depth can be reduced to 50mm overall.

Bailey Atlantic is root resistant and can be used as a waterproofing layer for roof gardens, however an isolation layer of Bailey polyester fleece (Code 610) should be applied first to prevent mechanical damage. A typical installation is shown in Figure 6.

Roofs can also be ballasted using suitable lightweight concrete slabs or tiles. These should be laid on rubber pads to prevent damage to the membrane and allow free drainage. For terraced areas, timber decking can be applied over a Bailey polyester isolation layer or an additional layer of Atlantic under the timber bearers.

FIGURE4

Welding of laps

Regardless of the fixing method, all laps are sealed with hot air. Normally no cleaning or use of solvent is required before welding the laps.

Welding can be carried out using a hand held gun and a small seam roller. The temperature should be set at 500C to 600C depending on the ambient temperature.

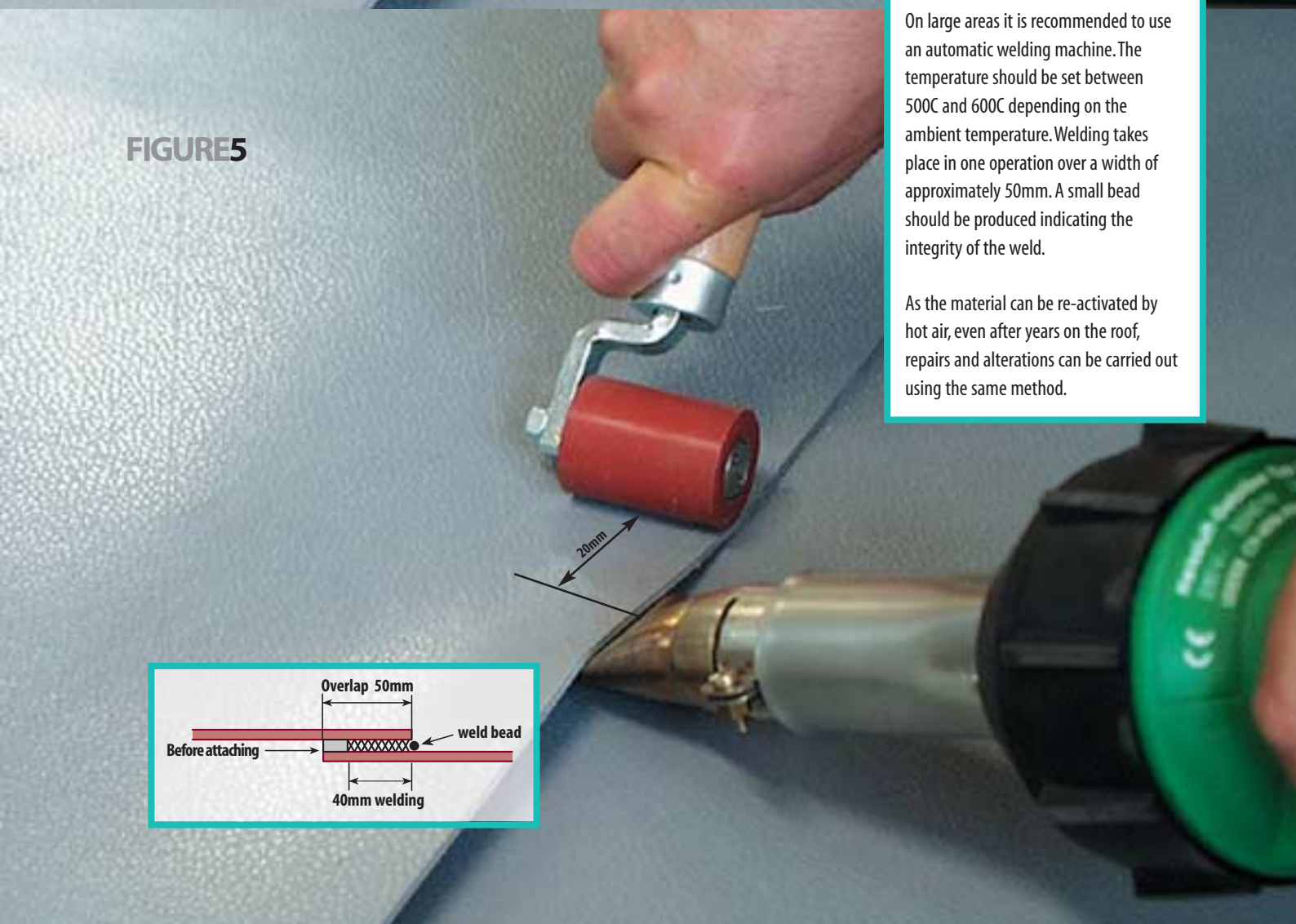
First the upper sheet is tacked to the lower membrane approximately 40mm from the edge, see Figure 4.

Then the final 40mm is welded continuously moving the gun and roller together. A small bead should be obtained indicating that the weld has been properly carried out, see Figure 5.

On large areas it is recommended to use an automatic welding machine. The temperature should be set between 500C and 600C depending on the ambient temperature. Welding takes place in one operation over a width of approximately 50mm. A small bead should be produced indicating the integrity of the weld.

As the material can be re-activated by hot air, even after years on the roof, repairs and alterations can be carried out using the same method.

FIGURE5



ATLANTIC DETAILING

Detailing
Regardless of the method of attachment, the same principles are followed for roof details. These will normally use Grade 300 Atlantic unbacked, but for some details it is preferable to use Grade 100 non-reinforced available in 520mm rolls.

Upstands
Normally a row of fixings will be applied at the perimeter and around protrusions. An Atlantic flashing is taken a minimum of 150mm up the vertical surface and a maximum of 200mm on to the horizontal surface. The flashings should be hot air welded to the main roof layer. Use of a termination bar is recommended to mechanically fix the top edge of the upstand. Bailey Expanding Tape is used behind the termination bar to ensure a good watertight seal, see Figure 7.

The top edge of the upstand may also be protected by a cover flashing. In this case it may be necessary to adhere the Atlantic flashing to the vertical surface using a good quality contact adhesive.

If the upstand flashing is higher than 350mm, for instance on a parapet, it is necessary to provide an intermediate fixing point as shown in Figure 8.

The method for cutting internal and external corners is shown in Figure 9. Grade 100 should be used for small corner pieces, alternatively factory-cut corner pieces are available.

For internal outlets to external downpipes, one piece moulded outlets are available. These are recessed into the insulation to prevent ridging and a 500mm square flashing is heat welded to the outlet and to the main Atlantic sheeting.

Where downpipes are internal to the building it is recommended that proprietary outlets, which form a seal to the downpipe and where the body is constructed of polyolefine, should be used. Olympic outlets supplied by Bailey are suitable. Again a cover flashing should be welded to the outlet body and to the main sheeting and a circular clamp fitted afterwards.

When installing rooflights, the same principles should be adopted. If it is not possible to mechanically fix to the kerb then the upstands are applied using contact adhesive.

Draining kerbs
The preferred method for draining edges is to use a Bailey Atlantic metal profile. This should be screwed to the kerb at minimum 300mm centres after the main sheeting has been applied. A cover flashing 200mm wide should then be heat welded to the Bailey Atlantic metal profile and to the main roof sheeting. Small cover pieces are required over the joints normally at 2000mm centres, see Figure 10.

Pitched roofs
When waterproofing a double pitched roof, the membrane is separated at the ridge, mechanical fixings applied to either side and a separate cover flashing, minimum 300mm wide, is heat welded to the main sheeting.

Kerbs and waterchecks
A timber batten should be used and a Bailey Atlantic metal flashing screwed to the kerb, see Figure 11.

Pipe flashings
A flange is cut with rounded corners using non-reinforced Grade 100 Atlantic. A round hole is cut in the centre of the flange 60mm less in diameter than the pipe diameter. The flange is stretched over the pipe to leave a small upstand. A collar is then applied, at least 150mm above the finished roof level and heat welded to the flange. The top edge should be protected with a circular clamp or similar, refer to Figure 12.

FIGURE6

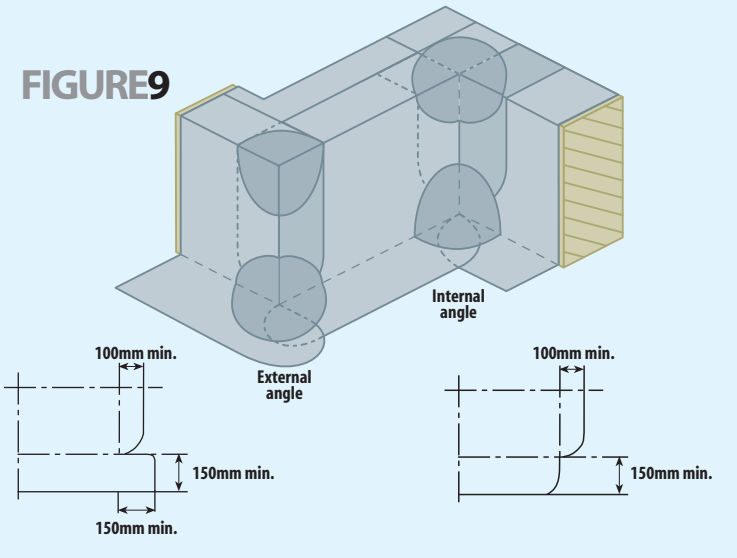


FIGURE9

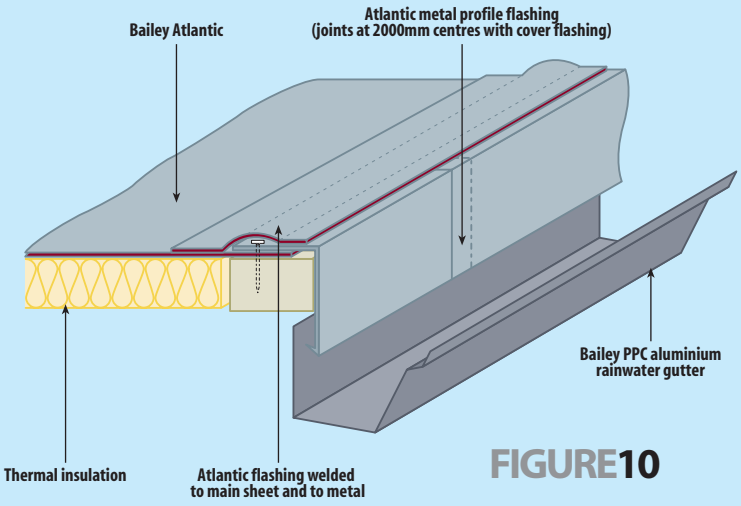


FIGURE10

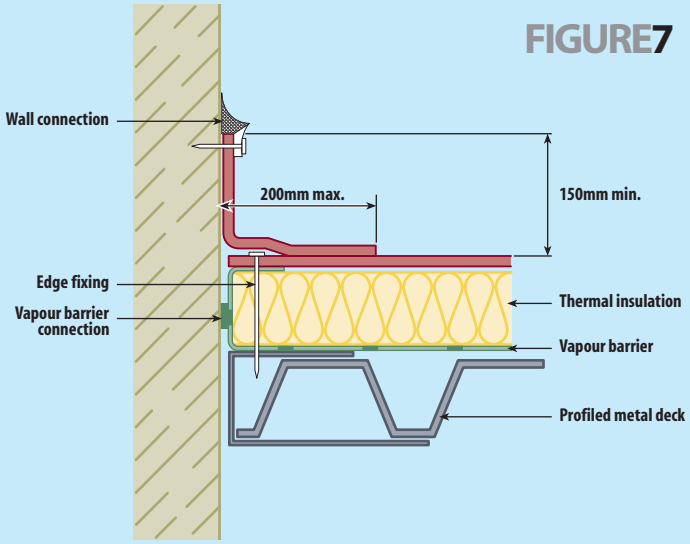


FIGURE7

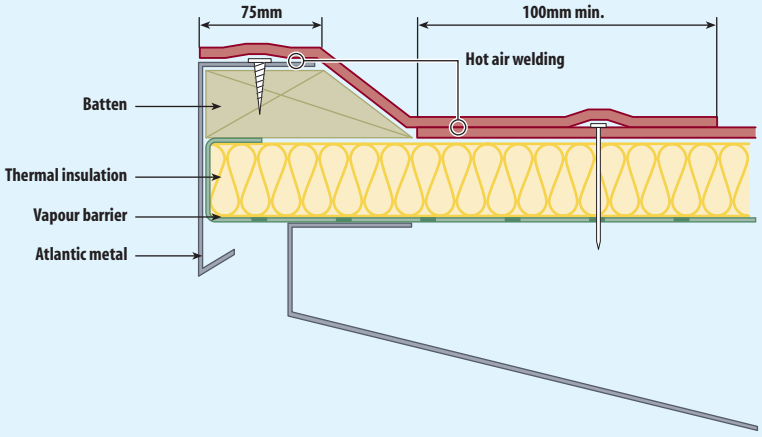


FIGURE11

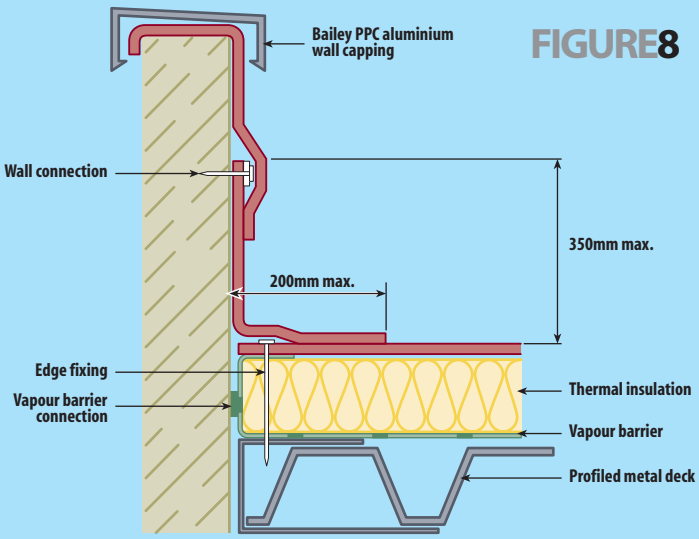


FIGURE8

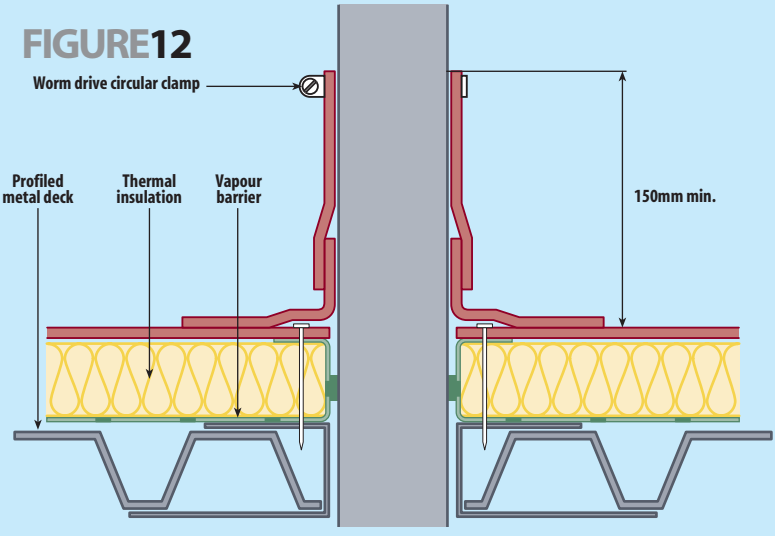


FIGURE12

ATLANTIC PRODUCT DATA

All Bailey Atlantic membranes are 2.0mm thick. With the exception of Grade 100 all membranes are reinforced with an inorganic glass fibre mat.

Grade			Colour	Width (mm)
Atlantic	**101**	Non-reinforced for pipe flashings and corners	Grey	525
	102	Non-reinforced for pipe flashings and corners	Green	525
	103	Non-reinforced for pipe flashings and corners	Red	525
Atlantic	**301**	Reinforced	Grey	250,350,525,750,1050,1500,2100
	302	Reinforced	Green	250,350,525,750,1050,1500,2100
	303	Reinforced	Red	250,350,525,750,1050,1500,2100
Atlantic	**401**	Fleece backed and reinforced	Grey	525,1050,2100
	402	Fleece backed and reinforced	Green	525,1050,2100
	403	Fleece backed and reinforced	Red	525,1050,2100

Technical data

Application		Atlantic 300	Atlantic 400 (fleece backed)
Loose laid under gravel		Yes	Yes
Loose laid, mechanically fixed		Yes	Yes
Strip bonding		No	Yes
Full surface bonding		No	Yes
DIN specification		**Material** flexible polyolefines (FPO)	**Material** flexible polyolefines (FPO)
Composition		Central glass mat	Central glass mat with non-woven polyester backing
Thickness (mm)		2.0	3.0
Width (mm)		250,350,525,750,1050,1500,2100	525,1050,2100
Length (m)		20	20
Density	DIN 53 479	Approx 1g per cm	Approx 1g per cm
Fire rating	BS 476: Part 3: 1958	AC with plywood or insulation AA when used with slabs or ballast	
Tear resistance	DIN 53 455	**Lengthwise** >8.0N per mm **Across** >7.0N per mm	**Lengthwise** >8.0N per mm **Across** >7.0N per mm
Maximum tensile strength	DIN 53 354	>1000N per 50mm	
Elongation at tear	DIN 53 455	>500%	
Maximum tensile elongation	DIN 53 354		>50%
Deformation owing to heat	DIN 53 377	<3%	<3%
Cold temperature flexibility	DIN 53 361	-40C	-40C
Perforation	DIN 16 726	>750mm	>1000mm
Slot pressure resistance	DIN 16 726	Withstands 72 hrs, 12 bar	Withstands 72 hrs, 12 bar
Water vapour diffusion resistance factor	DIN 16	Approx 90,000	Approx 90,000
Resistance to rooting (FLL factor)		Resistant	Resistant
Joint factor	DIN 16 726	1	1
Colour		Grey, green and red (other colours on request)	Grey, green and red (other colours on request)

Specification guidance

Bailey will provide technical assistance and will prepare specifications for both new and existing buildings. Below are some typical specification clauses which can be incorporated into NBS format documents.

NBS format specification notes (Section J42)

110	**WARM DECK ROOF COVERING BAILEY ATLANTIC ROOFING FOR FLAT ROOF TO**	.....
	Drawing reference(s)	.....
	Vapour control layer	Bailey fire resistant polythene 500 gauge
	Insulation	Bailey fire resistant CFC and HCFC free insulation board to BS 476 Part 6 Class O and less than 5% obscurity to BS 5111
	Thickness	.....
	Attachment	Mechanical fixing
	Waterproof membrane	Bailey Atlantic Grade .....
	Manufacturer	Bailey Roofing Systems, Victoria Gardens, Victoria Industrial Estate, Burgess Hill, West Sussex, RH15 9NB Telephone 01444 244330
	Thickness	Minimum 2.0mm
	Colour	Grey / red / green
	Finish	Self finished, ultra violet resistant without further surface preparation
	Attachment	See clauses 260 and 510
	Damage resistance	Resistant to penetration by sharp objects, following trades and hail
	Cold temperature flexibility	Membrane to remain flexible to -40C
	Chemical resistance	Membrane to be rot proof and resistant to atmospheric pollution
	Vegetation resistance	Membrane to be resistant to plant root penetration
	Installation	Entire roof to be installed according to manufacturer's instructions and by a subcontractor selected from the list of subcontractors recommended by Bailey. Roofing membrane to be installed using hot air at maximum 500-600C with no use of naked flames or production of harmful fumes
	Sustainability	Roofing membrane to be inert and produce no HCFCs or chlorides during production or installation. Membrane to be totally recyclable at any stage in its life and remain re-weldable for its entire life
550	**WELDING JOINTS**	Lap side and end laps not less than 50mm ensuring water will drain over and not into them. Seal all sides and end joint by welding with hot air at 500C to 600C and rolling. Test the joint after welding by drawing a metal probe along the seam edge. Make good any defective welds. Seal outlets and flood roof to a depth of 100mm to test integrity of waterproofing

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