

TECHNICAL SYSTEM SUMMARY

Thermofol System

ADHERED SINGLE PLY PVC SOLUTION

The Bauder Thermofol PVC membrane was introduced in to the UK in 2006 after the successful incorporation of the Thermoplan TPO system into the Bauder portfolio. With over 50 years of technical and production experience of PVC membranes and with over 20million m² of Thermofol PVC already installed, this system is durable, reliable and versatile. A comprehensive range of guarantees are available for this system.

Thermofol U15 FB

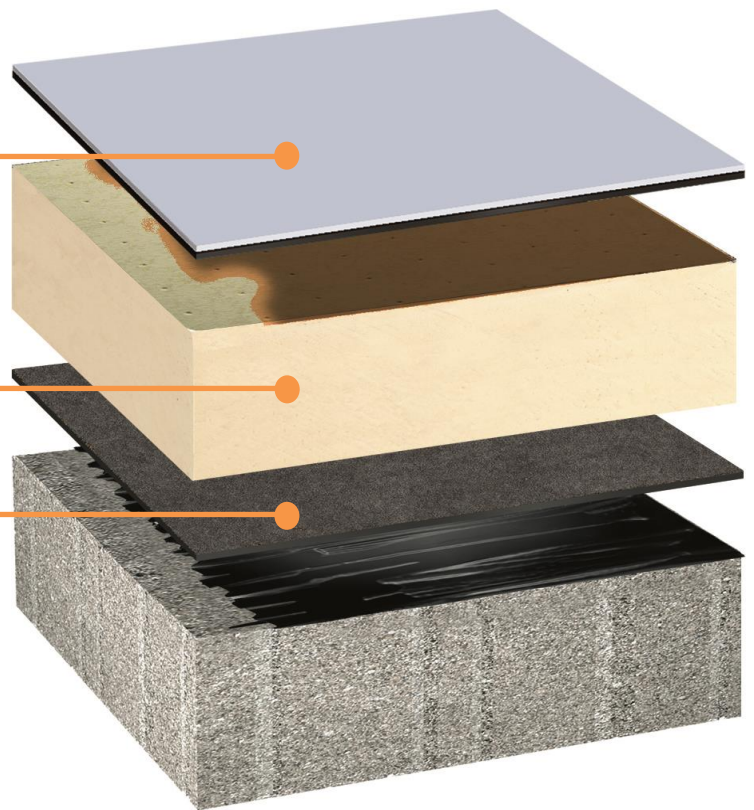
is 1.5mm thick and available in light grey and blue grey. The membrane is easily adhered to glass tissue faced insulation using the specialist Bauder Fleece-backed Membrane Adhesive. Thermofol non-fleeceback membrane may also be bonded using Bauder Thermofol Full Bond Contact Adhesive.

BauderPIR Flatboard Insulation

is fully compatible with the Thermofol membrane. It is a PIR glass tissue faced insulation which is thermally efficient, light weight, fire resistant and zero ODP rated. As an alternative, BauderPIR Tapered Insulation can be used to provide improved drainage falls.

Bauder Vapour Barriers or VCL

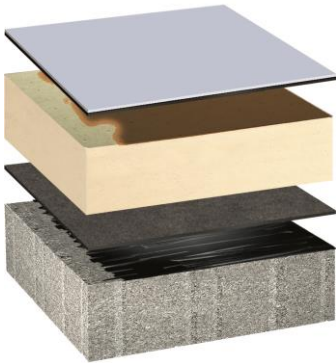
Bauder manufactures a range of Torch on bituminous or Self Adhesive vapour barriers. All of these types of product can be used within a Thermofol adhered system and a recommendation can be made according to cost and project programme.



When to Specify

The Thermofol adhered system is ideally suited for a concrete deck on either new build or refurbishment. Especially where the concrete deck cannot be drilled due to having a high proportion of stone or where the deck structure may be compromised by the drilling, or the visibility of the mechanical fixings is not desirable. The Bauder Thermofol system has been fully tested to ensure compliance with national building codes and has been tested by both BBA and Factory Mutual.

Weight Loading



Product	Thickness (mm)	Weight (Kg/m ²)
Thermofol U15 Membrane	1.5	1.92
BauderPIR Insulation	140*	4.2
BauderTHERM DS1 DUO Vapour Barrier	3.5	4.5
Totals	145.0	10.62

* Example insulation thickness shown above, achieves a typical 'U' value of 0.18W/m²K. The table below gives a comparison of the thicknesses needed to achieve U value requirements on a 18mm plywood deck.

U Values



BAUDERPIR FLATBOARD INSULATION		
Thickness (mm)	Approx. 'U' value (W/m ² K)	Weight (Kg/m ²)
120	0.20	3.6
140	0.18	4.2
160	0.16	4.8
180	0.13	5.4

TECHNICAL DATA SHEET

Bauder EVA 35 Vapour Barrier

DESCRIPTION

A robust, torch-applied, SBS bitumen vapour barrier, featuring an aluminium foil lining for vapour impermeability.

Once installed, the product is a waterproofing layer in its own right, allowing internal works to be carried out immediately.

TECHNICAL DATA:

Weights and sizes

Roll width:	1 metre
Roll length:	8 metres
Thickness:	3.5 mm
Weight:	4.5 Kg/m ²
Reinforcement:	tear resistant aluminium + 60 g/m ² glass fleece

Surface finishes

Top:	mica
Bottom:	foil

Technical performance

Tensile strength:	≥ 400N/50mm
Elasticity at fracture of reinforcement:	≥ 2%
Cold bending test:	-10°C
Softening point:	+70°C



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TECHNICAL DATA SHEET

Bauder PIR Tapered Insulation

DESCRIPTION

An extremely efficient PIR insulation board, shaped to create effective drainage falls. It is lightweight with a high compressive strength and has zero ozone depletion potential.

TECHNICAL DATA:

Weights and Sizes

Board width:	0.8 metres
Board length	1.2 metres
Available thickness:	From 20 to 400mm.
Available gradients:	1:33, 1:40, 1:50, 1:60, 1:67, 1:100
Weight:	30-35 Kg/m ³

Surface Finish

Top & Bottom:	Unfaced
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Technical Performance

PIR index:	>250 (extremely high dimensional stability)	
Thermal conductivity:	Up to 80mm	0.027W/MK
	80-120mm	0.026W/MK
	>120mm	0.025W/MK
Compressive strength:	≥ 0.12 N/mm ²	
Compressive creep:	0.024N/mm ²	

Environmental Information

Ozone Depletion Potential:	Zero
Global Warming Potential:	3 kg CO ₂ -Eq./kg



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TECHNICAL DATA SHEET

Bauder PIR FA-TE Flatboard Insulation

DESCRIPTION

An extremely efficient PIR insulation board with aluminium foil facing on both sides. The top facing features a printed grid pattern to aid site cutting.

This product has been specially developed for use with Bauder self-adhesive underlayers to allow a superior bond strength, whilst also providing immediate protection against rain showers.

TECHNICAL DATA:

Weights and sizes

Board width:	0.6 metres
Board length:	1.2 metres
Available thickness:	30, 40, 50, 60, 80, 100, 120, 140, 160mm
Weight:	Min. 28Kg/M ³

Surface finish

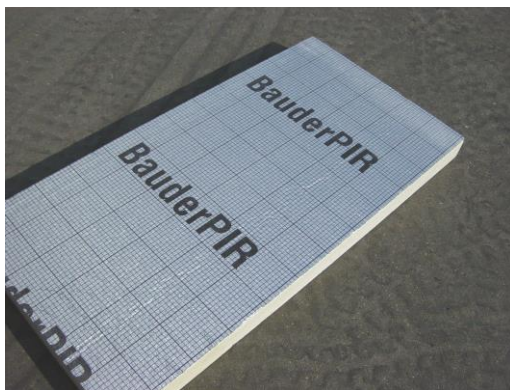
Top & Bottom:	Aluminium foil
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Technical performance

PIR index:	>250 (extremely high dimensional stability)
Thermal conductivity:	0.022W/mK
Compressive strength:	≥ 0.12N/mm ²

Environmental Information

Ozone Depletion Potential:	Zero
Global Warming Potential:	3 kg CO ₂ -Eq./kg



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TECHNICAL DATA SHEET

Bauder Thermofol U15

DESCRIPTION

The membrane is based around a polyester reinforced Poly Vinyl Chloride membrane (PVC). The product is highly flexible due to the incorporation of internal plasticizers during the manufacturing process. This combination of materials gives high tensile strength, good thermal stability, chemical resistance and flexibility.

TECHNICAL DATA:

Weights and sizes

Roll width:	1.5 metre
Roll length:	20 metres
Thickness:	2.5mm (1.5mm membrane +1mm fleece)
Weight:	2.2kg/m ²
Reinforcement:	Synthetic PES fibre fabric

Surface finishes

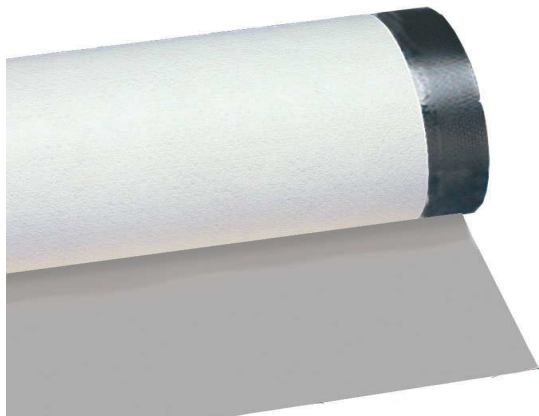
Top:	Light Grey (RAL 7035) Blue Grey (RAL 7031) Anthracite (RAL 7016)
Bottom:	Fleece

Technical performance

Tensile strength: (EN 12311- 1)	≥ 1100N/50mm
Elongation at break: (EN 12311- 1)	≥ 22%
Cold bending test: (EN 1109)	-30°C

Fire Rating

BS 476 Part 3	Ext. F. AB
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TECHNICAL DATA SHEET

Bauder Thermofol Walkway Membrane

DESCRIPTION

Bauder Thermofol Anti Slip Walkway 2.0mm thick, un-reinforced waterproofing membrane with dark grey anti-slip finish to be loose laid over the finished membrane surface. The membrane should be heat welded around it's full perimeter to the surface of the finished waterproofing.

TECHNICAL DATA:

Weights and sizes

Roll width:	0.75 metre
Roll length:	20 metres
Thickness:	2mm
Weight:	2.2Kg/m ²
Reinforcement:	None

Surface finishes

Top:	Dark Grey (anti slip) (RAL 7016)
Bottom:	Dark Grey

Technical performance

Tensile strength: (EN 12311- 1)	≥ 700N/50mm
Elongation at break: (EN 12311- 1)	≥ 300%
Cold bending test: (EN 1109)	-30°C

Fire Rating

BS 476 Part 3	Ext. F. AB
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Project Information

Reference

Date 28 June 2016

Construction Type

Element : Flat roof - B161695-North_South Roof_Average

Internal surface emissivity : High External surface emissivity : High

	Thickness (mm)	Thermal Conductivity (W/mK)	Thermal Resistance (m ² K/W)	Pitch Resistance (°)	Bridge Details
Outside surface resistance	-	-	0.040		
Thermofol U15 V [Fleece Backed]	1.5	0.170	0.009		
Bauder PIR Tapered Insulation (30mm to 80mm)	56.0	0.027	2.050		
Bauder PIR FA-TE Insulation	80.0	0.022	3.600		
Bauder EVA 35 Vapour Barrier	3.5	0.170	0.021		
Concrete Deck	150.0	1.401	0.100		
Inside surface resistance	-	-	0.100		

Total thickness 291.0mm**U-value = 0.17W/m²K**U-value, Combined Method : 0.169W/m²K (upper/lower limit 5.920 / 5.920m²K/W, dUf 0.0000, dUg 0.0000, dUp0.0000, dUr0.0000, dUrc0.0000)(Correction for mechanical fasteners, Delta Uf = 0.000W/m²K)(Correction for air gaps, Delta Ug = 0.000W/m²K)

	Thickness (mm)	Thermal Conductivity (W/mK)	Thermal Resistance (m ² K/W)	Vapour Resistivity (MNs/gm)	Vapour Resistance (MNs/g)
Outside surface resistance	-	-	0.040	-	-
Thermofol U15 V [Fleece Backed]	1.5	0.170	0.009	104000	156.00
Bauder PIR Tapered Insulation (30mm to 80mm)	56.0	0.027	2.050	300.00	16.80
Bauder PIR FA-TE Insulation	80.0	0.022	3.600	300.00	24.00
Bauder EVA 35 Vapour Barrier	3.5	0.170	0.021	0.00	7500.00
Concrete Deck	150.0	1.401	0.100	100.00	15.00
Inside surface resistance	-	-	0.100	-	-
Total thickness	291.0mm				

Advice from BS 5250:2011 regarding acceptable levels of condensate: "In flat roofs with a continuously supported waterproof covering the maximum predicted amount of condensate should not exceed 350g/m² and any condensate should dry out during the course of the year so as to avoid year on year accumulation. Organic materials should not be exposed to harmful and prolonged condensation". Whilst the information contained herein is to the best of our knowledge true and accurate we specifically exclude any liability for errors, omissions or otherwise arising therefrom. Details, practices, principles, values and calculations should be verified for accuracy and suitability for the required purpose for use.

Structure element : Flat roof
Condensation calculations performed in accordance with BS5250:2011

Condensation is occurring at the following layers interfaces:-

Month	Int (C°)	Int (%RH)	Ext (C°)	Ext (%RH)
Jan	20.00	66.30	4.60	82.00
Feb	20.00	65.20	4.70	79.00
Mar	20.00	62.40	6.80	72.00
Apr	20.00	58.80	8.90	64.00
May	20.00	59.60	12.30	64.00
Jun	20.00	62.70	15.50	65.00
Jul	20.00	66.10	17.60	66.00
Aug	20.00	68.20	17.30	69.00
Sep	20.00	67.90	14.90	73.00
Oct	20.00	67.60	11.70	78.00
Nov	20.00	67.30	7.50	83.00
Dec	20.00	67.50	5.40	85.00

Gc = Monthly moisture accumulation per area at an interface

Ma = Accumulated moisture content per area at an interface

Peak accumulated moisture content per area at interface (Ma) = 0.00000 Kg/m²

Annual moisture accumulation = 0.00000 Kg/m²

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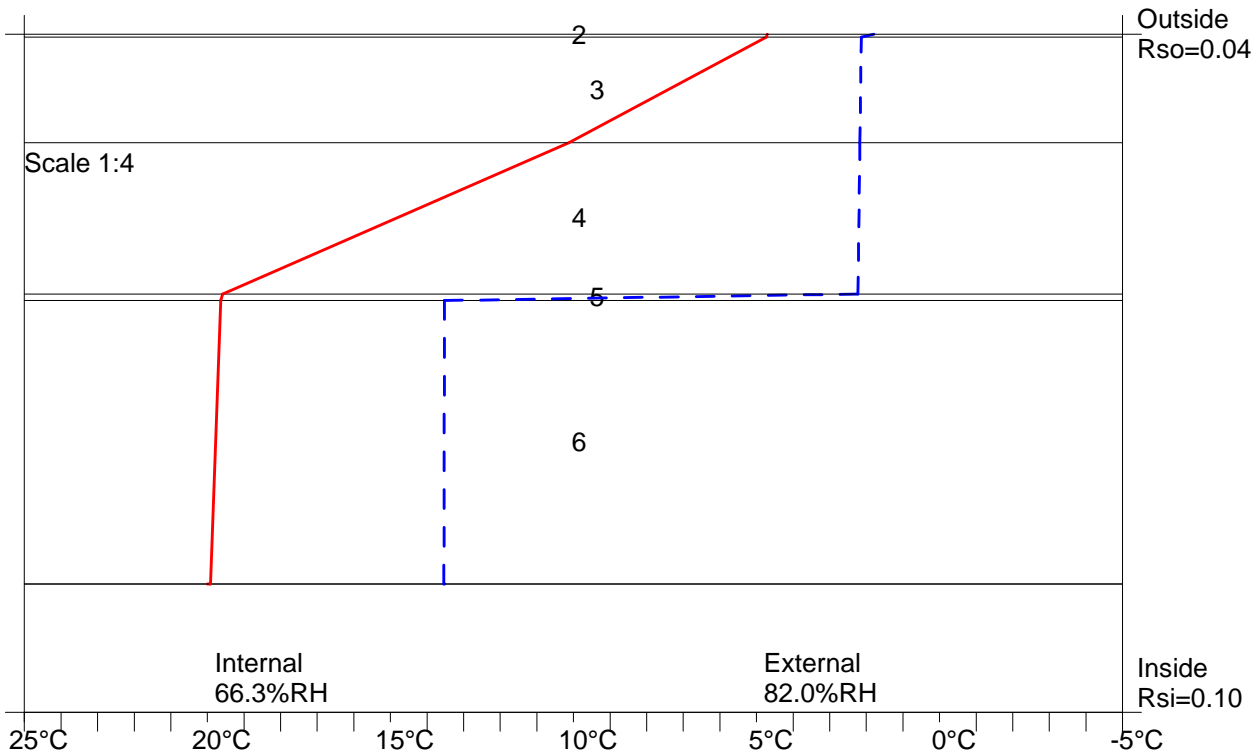
Condensation Risk Analysis (no account taken of thermal bridges)

4 - Dwellings with high occupancy, sport halls, kitchens, canteens; buildings heated with unflued gas heaters

Jan (worst)	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
20.0C 66.3%	20.0C 65.2%	20.0C 62.4%	20.0C 58.8%	20.0C 59.6%	20.0C 62.7%	20.0C 66.1%	20.0C 68.2%	20.0C 67.9%	20.0C 67.6%	20.0C 67.3%	20.0C 67.5%
4.6C 82.0%	4.7C 79.0%	6.8C 72.0%	8.9C 64.0%	12.3C 64.0%	15.5C 65.0%	17.6C 66.0%	17.3C 69.0%	14.9C 73.0%	11.7C 78.0%	7.5C 83.0%	5.4C 85.0%

	Interface Temp. °C	Dewpoint Temp. °C	Vapour Pressure (kPa)	Saturated V.P. (kPa)	Worst Cond. (g/m ²)	Peak Buildup (g/m ²)	Condensation
1 Outside surface resistance	4.7	1.8	0.70	0.85			No
2 Thermofol U15 V [Fleece Backed]	4.7	2.1	0.71	0.86			No
3 Bauder PIR Tapered Insulation (30mm to 80mm)	10.1	2.2	0.71	1.24			No
4 Bauder PIR FA-TE Insulation	19.6	2.2	0.72	2.28			No
5 Bauder EVA 35 Vapour Barrier	19.6	13.5	1.55	2.28			No
6 Concrete Deck	19.9	13.5	1.55	2.32			No
7 Inside surface resistance							No

Worst case internal / external conditions for graph : 20.0°C @ 66.3%RH / 4.6°C @ 82.0%RH



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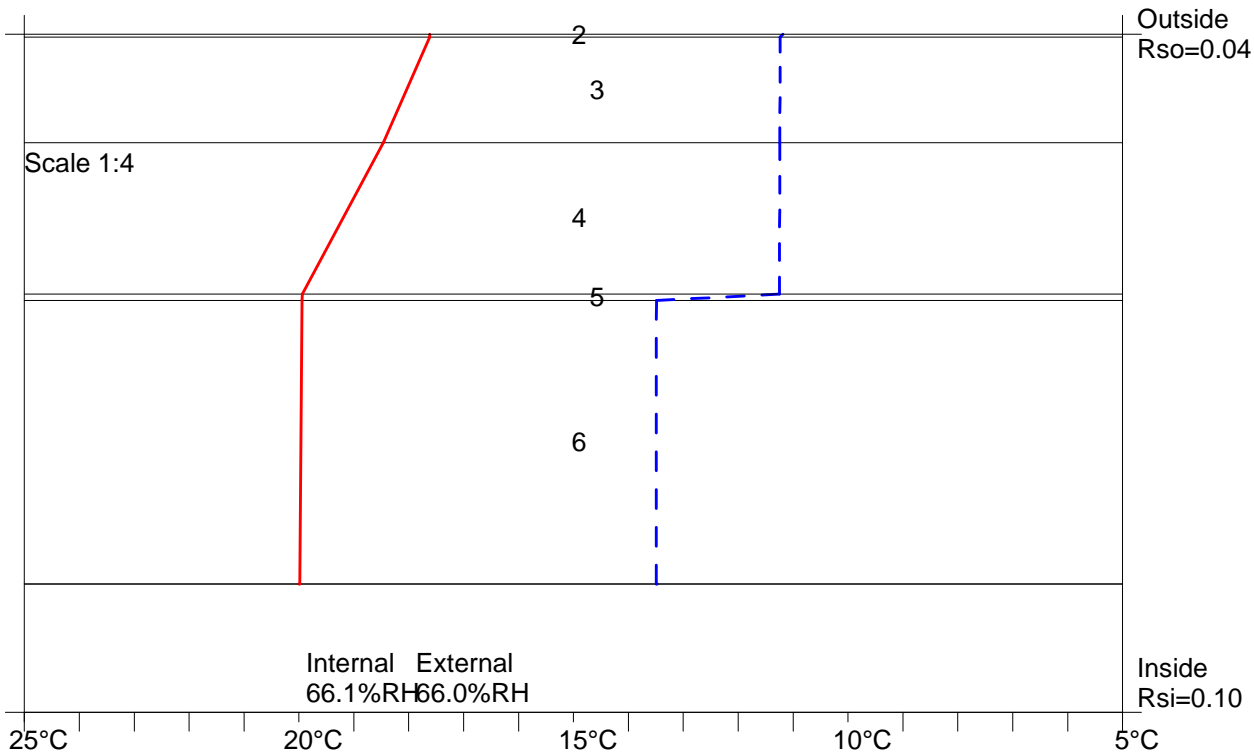
Condensation Risk Analysis (no account taken of thermal bridges)

4 - Dwellings with high occupancy, sport halls, kitchens, canteens; buildings heated with unflued gas heaters

Jan (worst)	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
20.0C 66.3%	20.0C 65.2%	20.0C 62.4%	20.0C 58.8%	20.0C 59.6%	20.0C 62.7%	20.0C 66.1%	20.0C 68.2%	20.0C 67.9%	20.0C 67.6%	20.0C 67.3%	20.0C 67.5%
4.6C 82.0%	4.7C 79.0%	6.8C 72.0%	8.9C 64.0%	12.3C 64.0%	15.5C 65.0%	17.6C 66.0%	17.3C 69.0%	14.9C 73.0%	11.7C 78.0%	7.5C 83.0%	5.4C 85.0%

	Interface Temp. °C	Dewpoint Temp. °C	Vapour Pressure (kPa)	Saturated V.P. (kPa)	Worst Cond. (g/m ²)	Peak Buildup (g/m ²)	Condensation
1 Outside surface resistance	17.6	11.2	1.33	2.01			No
2 Thermofol U15 V [Fleece Backed]	17.6	11.2	1.33	2.01			No
3 Bauder PIR Tapered Insulation (30mm to 80mm)							
4 Bauder PIR FA-TE Insulation	18.5	11.2	1.33	2.12			No
5 Bauder EVA 35 Vapour Barrier	19.9	11.2	1.33	2.33			No
6 Concrete Deck	19.9	13.5	1.54	2.33			No
7 Inside surface resistance	20.0	13.5	1.54	2.34			No

Worst case internal / external conditions for graph : 20.0°C @ 66.1%RH / 17.6°C @ 66.0%RH



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BAUDER SYNTHETIC SINGLE PLY ROOF SYSTEMS

General Maintenance Procedures

The following procedure should be carried out at twice yearly intervals (Spring & Autumn) in order to ensure that the roof is maintained in first class condition, and that any potential problems are identified at an early stage. Any failures of the roofing system resulting from a lack of maintenance may not be covered under the guarantee. Reference should also be made to the guarantee documents to identify if there are any further inspections that may be required to ensure the continuation of the guarantee period'.

- Ensure safe access can be gained to the roof and that relevant Health and Safety procedures are followed.
- Clear all debris from the roof surface, rainwater outlets, chutes, gutters etc. Debris must be removed from the roof and not simply flushed down rainwater pipes
- Cut back tree limbs that overhang the roof to give a 1 metre clearance outside the roof edge. This will significantly reduce blockage of drainage ways due to fallen leaves.
- Ensure that all rainwater pipes are free from blockages and that water flows freely through them.
- Remove any vegetation growth that may have occurred, taking care not to damage the waterproofing.
- Ensure that any protective metal flashings or termination bars remain securely fixed and in place.
- Examine all mastic sealant and mortar pointing for signs of degradation, and repair/replace as necessary.
- Where promenade tiles or pavers are in use, ensure that they remain in position, secure and in good condition.
- Ensure that any items of plant/equipment that may have been introduced to the roof are sited on a suitable slab, with additional surface protection beneath, and that any fixings that may have been used to secure them, do not penetrate the waterproofing.
- The Building owner should keep a record of all inspections and maintenance carried out on the roof. Any signs of damage or degradation should be reported to Bauder Limited immediately, so that arrangements can be made for remedial work to be carried out if necessary.