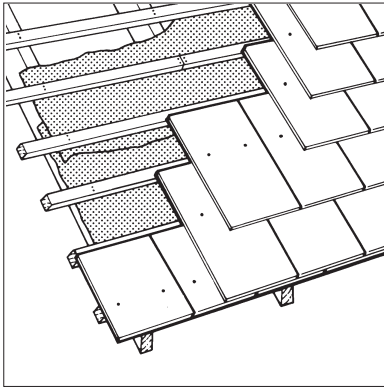


Product



• THIS DETAIL SHEET RELATES TO MONARPERM 500 ROOF LINING SYSTEM, FOR USE AS A FULLY SUPPORTED (OVER INSULATION/SARKING) UNDERLAY FOR TILED OR SLATED PITCHED ROOFS.

- The product prevents the ingress of wind-blown rain or snow.
- The product is resistant to tearing and is flexible at low ambient temperatures during installation.

This Detail Sheet must be read in conjunction with the Front Sheets, which give the product's position regarding the Building Regulations, general information relating to the product and the Conditions of Certification, respectively.

Technical Specification

1 Description

1.1 Monarperm 500 is manufactured by laminating a plastic film between two polypropylene fabric layers to form a breathable waterproof membrane. The membrane is produced with a blue upper surface and a white underside, and printed with overlap guideline and the product name.

1.2 Monarperm 500 has the nominal characteristics given in Table 1.

Table 1 Nominal characteristics

Characteristics (units)	Monarperm 500
thickness (mm)	0.50
weight (gm ⁻²)	120
roll length (m)	50
roll width (m)	1.50
Tensile strength (N per 50 mm)	
longitudinal	200
transverse	130
Elongation at break (%) ⁽¹⁾	
longitudinal	15.0
transverse	40.0
Hydrostatic head (m of H ₂ O)	>6
Colour	grey underside/ blue top side

(1) Minimum.

1.3 Quality control includes visual inspection, measurement of physical properties, thickness and roll weight.

2 Delivery to site and storage

2.1 Rolls are delivered to site packaged. Each package carries a label bearing the marketing company's name, the grade identification and the BBA identification mark incorporating the number of this Certificate.

2.2 Rolls are stored laid flat, on a smooth, clean surface, under cover and protected from sunlight.

Design Data

3 Strength

3.1 Monarperm 500 will resist the loads associated with the installation of the roof.

3.2 Monarperm 500 has adequate resistance to the wind uplift forces likely to be experienced in most locations in the British Isles and, for design purposes, may be considered at least equal in strength to a Type 1F reinforced bitumen underlay as defined in BS 747 : 2000. Tests on Monarperm 500 fixed over rafters at 600 mm centres with batten centres at 250 mm have shown that the material does not extend unduly or tear around nail holes when subjected to a range of negative pressures.

3.3 Project design wind speeds should be determined, and wind uplift forces calculated, in accordance with BS 6399-2 : 1997.

4 Weathertightness



4.1 Tests indicate that the product will resist the passage of water and wind-blown rain, snow and dust into the interior of a building, under all conditions to be found in a roof constructed in accordance with the relevant clauses of BS 5534-1 : 1997.

4.2 Monarperm 500 resists penetration of liquid water when subjected to hydrostatic head of water in excess of six metres and consequently may be used as temporary waterproofing prior to the installation of slates or tiles. The period of such use should, however, be kept to a minimum.

5 Risk of condensation

5.1 Monarperm 500 has a significantly higher water vapour permeability than that quoted as a minimum for conventional roof tile underlays in BS 5534-1 : 1997, which also describes the factors to be considered in reducing condensation to a satisfactory minimum.

5.2 Monarperm 500 may be treated as a vapour permeable underlay when considering ventilation of the roof space, and may be laid directly over the insulation without ventilated air space provided the passage of moisture through the rest of the roof structure is controlled, and the system is convection tight for the life of the roof.

5.3 Condensation risk assessment calculations in accordance with BS 5250 : 1989 should be carried out for specific applications. When using thermal insulation with a low vapour resistance, a vapour control layer on the warm side of the insulation may be required. Where the roof may be subject to high humidity conditions (eg kitchens, swimming pools, bathrooms) a vapour control layer should be considered with all types of insulation.

5.4 Monarperm 500 may be used supported in roofs using sarking boards of either softwood, or water-resistant grade plywood, with either continuous insulation or insulation placed between rafters. The insulation used should have a low vapour permeability (eg expanded or extruded polystyrene, PUR and PIR) so it can be considered as a vapour check. However, since the roof decking may be significantly below the dew-point for long periods during winter conditions with no significant ventilation, then the following conditions should be observed:

- (1) insulation boards should be tightly butted against the rafter and details
- (2) joints between insulation boards should be tightly fitted and taped

(3) sources of moisture (eg water tanks) in the roof should be covered and placed so they are well ventilated

(4) cold roof spaces should be ventilated in accordance with the minimum requirements of BS 5250 : 1989

(5) ingress of moisture to the roof space should be restricted by sealing around pipe penetrations and consideration given to a vapour control layer at ceiling level.

5.5 Typical values of water vapour transmission rate are given in Table 2.

Table 2 Water vapour transmission rate and resistance

Material	Water vapour resistance (MNsg ⁻¹)	Water vapour transmission rate (gm ⁻² day ⁻¹)
Monarperm 500	0.18	1171
Traditional felt underlay	570 (maximum)	0.36 (minimum)
Polythene sheet (0.15 mm)	450	0.46

Installation

6 Procedure

6.1 Monarperm 500 must be installed and fixed in accordance with the manufacturer's instructions and the relevant recommendations of BS 5534-1 : 1997 and BS 8000-6 : 1990. Installation can be carried out under all conditions normal to roofing work.

6.2 When used in a fully-supported specification, Monarperm 500 is laid over the insulation and secured, with counter battens at least 38 mm thick, to the support or rafters using corrosion-resistant staples or galvanized clout nails. The battens for tiling are fixed to the counter battens, leaving an air space between the lining and the tiles for drainage and natural ventilation.

6.3 Monarperm 500 must be laid with vertical and horizontal laps as defined in Table 7 of BS 5534-1 : 1997 for fully supported underlays.

6.4 The vapour resistance of the insulation material should be taken into account to decide if a vapour control layer is required (see section 5).

6.5 For both open and closed eaves constructions, Monarflex eaves guards should be used to conduct water into the gutter, and to protect the underlay from UV light.

Technical Investigations

The following is a summary of the technical investigations carried out on Monarperm 500.

7 Tests

7.1 Samples of Monarperm 500 were obtained from the company for testing. The results of the tests carried out by, or on behalf of, the BBA, which show typical results for the material, are summarised in Table 3 and Table 4. The results shown are from tests carried out on the upper side.

Table 3 Service performance

Test (units)	Method ⁽¹⁾	Mean result
Mullen burst strength (kNm ⁻²)	BS 3137	418
Hydrostatic head of water (mm)	BS EN 20811	6480 (mean) 6180 (minimum)
Water vapour transmission rate (gm ⁻² day ⁻¹)	BS 3177 (25°C/75% RH)	1171
Water vapour resistance (MNs ^g ⁻¹)	BS 3177 (25°C/75% RH)	0.18
Resistance to water spray	BBA T1/15 ⁽²⁾	pass
Coefficient of friction	BBA T1/10 ⁽²⁾	
dry		0.86
wet		0.71

(1) The test documents are detailed in the *Bibliography*. Numbers in the table refer to sections/parts of the various documents.

(2) BBA test method.

Table 4 Physical properties — directional

Test (units)	Method ⁽¹⁾	Mean result	
		Machine direction	Cross direction
Tensile strength (N per 50 mm)	EN ISO 527-3 (Test speed 100 mm min ⁻¹)		
unaged		199	128
heat aged ⁽²⁾		192	142
water soak ⁽³⁾		206	125
water soak ⁽⁴⁾		207	135
UV aged ⁽⁵⁾		130	100
UV aged ⁽⁶⁾		106	85
Elongation at break (%)	EN ISO 527-3 (Test speed 100 mm min ⁻¹)		
unaged		16	49
heat aged ⁽²⁾		14	40
water soak ⁽³⁾		17	54
water soak ⁽⁴⁾		18	45
UV aged ⁽⁵⁾		8	34
UV aged ⁽⁶⁾		8	35
Nail tear (N)	MOAT 27 : 5.4.1		
unaged		67	57
heat aged ⁽²⁾		53	49
water soak ⁽⁴⁾		61	58
Low temperature flexibility (°C)	MOAT 27 : 5.4.2		
unaged		-25	-25

(1) The test documents are detailed in the *Bibliography*. Numbers in the table refer to sections/parts of the various documents.

(2) Heat aged at 70°C for 56 days.

(3) Water soak at 23°C for 56 days — tested dry.

(4) Water soak at 23°C for 56 days — tested wet.

(5) UV aged 200 hours UVB lamps.

(6) UV aged 500 hours UVB lamps.

8 Investigations

8.1 The methods of quality control were examined and details obtained of the quality and composition of the materials used.

8.2 Test data on the condensation risk in warm roof constructions incorporating other similar composition membranes, with similar vapour permeability qualities were examined.

8.3 An assessment of practicability of installation was made from data gathered during previous assessments of similar roof lining systems.

Bibliography

BS 747 : 2000 Reinforced bitumen sheets for roofing — Specification

BS 3137 : 1972 Methods for determining the bursting strength of paper and board

BS 3177 : 1959 Method for determining the permeability to water vapour of flexible sheet materials used for packaging

BS 5250 : 1989 Code of practice for control of condensation in buildings

BS 5534-1 : 1997 Code of practice for slating and tiling (including shingles) — Design

BS 6399-2 : 1997 Loading for buildings — Code of practice for wind loads

BS 8000-6 : 1990 Workmanship on building sites — Code of practice for slating and tiling of roofs and claddings

BS EN 20811 : 1992 Textiles — Determination of resistance to water penetration — Hydrostatic pressure test

BS EN ISO 527-3 : 1996 Plastics — Determination of tensile properties — Test conditions for films and sheets

MOAT No 27 : 1983 General directive for the Assessment of Roof Waterproofing Systems



On behalf of the British Board of Agrément

Date of issue: 4th December 2002


Chief Executive