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**Agrément
 Certificate
 No 86/1693**
 Second issue *

Designated by Government
 to issue
 European Technical
 Approvals

VÄRNAMO BUTYL SHEET ROOF WATERPROOFING MEMBRANES

Revêtement d'étanchéité
 Dachabdichtungen

Product




• THIS CERTIFICATE RELATES TO VÄRNAMO BUTYL SHEET FOR USE AS A LOOSE-LAID WATERPROOF ROOF COVERING, BALLASTED WITH AGGREGATE TO PREVENT WIND UPLIFT ON PARAPETED FLAT ROOFS.

- The product is available in four thicknesses: 0.75 mm, 1.00 mm, 1.20 mm and 1.50 mm.
- Installation must be carried out only by approved roofing contractors, whose operatives have received the recommended training by the manufacturer.

Building Regulations

1 The Building Regulations 1991 (as amended 1994) (England and Wales)

 The Secretary of State has agreed with the British Board of Agrément the aspects of performance to be used by the BBA in assessing the compliance of roof waterproofing systems with the Building Regulations. In the opinion of the BBA, Värnamo Butyl Sheet Roof Waterproofing Membranes, if used in accordance with the provisions of this Certificate, will meet the relevant requirements.

Requirement: B4(2)	External fire spread
Comment:	A flat roof waterproofed with the membranes ballasted with a minimum depth of 50 mm of aggregate shall be deemed to be designated AA. See section 9.1 of this Certificate.
Requirement: C4	Resistance to weather and ground moisture
Comment:	Tests for water resistance on the membranes, including joints, indicate that the material meets this Requirement. See section 7.1 of this Certificate.
Requirement: Regulation 7	Materials and workmanship
Comment:	The membranes are acceptable materials when installed in accordance with sections 12, 13 and 14 of this Certificate. See also section 11.

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2 The Building Standards (Scotland) Regulations 1990 (as amended)



In the opinion of the BBA, Värnamo Butyl Sheet Roof Waterproofing Membranes, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Regulations and related Technical Standards as listed below.

Regulation:	10	Fitness of materials
Standard:	B2.1	Selection and use of materials and components
Comment:		The membranes comply with this Standard.
Regulation:	12	Structural fire precautions
Standard:	D2.5	Separation of roofs and rooflights from boundaries
Standard:	D3.6	Roofs and rooflights of buildings ancillary to dwellings
Comment:		A flat roof waterproofed with the membranes ballasted with a minimum depth of 50 mm of aggregate shall be considered to be designated AA. See section 9.2 of this Certificate.
Regulation:	17	Preparation of sites and resistance to moisture
Standard:	G3.1	Resistance to precipitation
Comment:		Test data examined for water resistance on the membranes indicate that the use of the sheets can enable a roof to satisfy the requirements of this Standard. See section 7.2 of this Certificate.

3 The Building Regulations (Northern Ireland) 1994



In the opinion of the BBA, Värnamo Butyl Sheet Roof Waterproofing Membranes, if used in accordance with the provisions of this Certificate, will satisfy the various Building Regulations as listed below.

Regulation:	B2	Fitness of materials and workmanship
Comment:		The membranes are acceptable materials. See section 11 of this Certificate.
Regulation:	C5	Resistance to ground moisture and weather
Comment:		Tests for water resistance on the membranes, including joints, indicate that the use of the sheets can enable a roof to satisfy the requirements of this Regulation. See section 7.2 of this Certificate.
Regulation:	E8	External fire spread
Comment:		A flat roof waterproofed with the membranes ballasted with a minimum depth of 50 mm of aggregate shall be deemed to be designated AA. See section 9.2 of this Certificate.

Technical Specification

4 Description

4.1 Värnamo Butyl Sheet Roof Waterproofing Membranes are black, synthetic rubber sheeting produced by calendaring and vulcanising.

4.2 Quality control includes checks on:

each batch

plasticity
curing speed
thickness
density
hardness

finished product

resistance to heat ageing
ozone cracking
tear resistance
tensile strength
elongation
bond strength.

4.3 The sheets have the following nominal dimensions:

thickness (mm)	0.75, 1.00, 1.20 and 1.50
weight (kgm ⁻²)	0.90, 1.20, 1.44 and 1.80
sheet width* (m)	1.7

* Sheets can be prefabricated in sizes up to 1000 m².

4.4 Other materials to be used with Värnamo butyl sheet are:

Site jointing tape, Type 9060 — available in widths of 60 mm and 80 mm.

Gum tape, Type 0010 — available in widths of 100 mm and 300 mm.

Adhesive, Type 5000 — a rubber-based contact adhesive for jointing on site; can be used with gum tape.

Flashing, Type 4600

Lap sealant, Type 5590 — for dressing upstands, sealing joints, connections and edges.

Metal discs — for mechanical fixings at edges and upstands.

Prefabricated corners, pipe sleeves and collars.

Ballast adhesive — for use at exposed edges.

5 Delivery to site

Rolls or factory fabricated sheets on wooden frames are delivered wrapped in polyethylene bearing the product number, the batch number, sheet size and thickness, the manufacturer's name and the BBA identification mark incorporating the number of this Certificate.

Design Data

6 General

6.1 Värnamo Butyl Sheet Roof Waterproofing Membranes, when installed in accordance with this Certificate and the relevant clauses of the manufacturer's instructions, are suitable for use as loose-laid and ballasted waterproofing layers, mechanically fixed at edges and upstands, on flat roofs with limited access.

6.2 Limited access roofs are defined for the purpose of this Certificate as those roofs subjected only to pedestrian traffic for maintenance of the roof covering and cleaning of gutters, etc. Where traffic in excess of this is envisaged, special precautions, such as additional protection to the membrane, must be taken.

6.3 Flat roofs are defined for the purpose of this Certificate as those roofs having a minimum finished fall of 1:80. Pitched roofs are defined as those having falls in excess of 1:6. For design purposes, twice the minimum finished fall should be assumed, unless a detailed analysis of the roof is available, including overall and local deflection, direction of falls, etc.

6.4 Decks to which the product is to be applied must comply with the relevant requirements of BS 6229 : 1982 and BS 8217 : 1994, and where appropriate NHBC Standards Chapter 7.1 or the Zurich Municipal Technical Manual, Section 5, clause 5.9.3.19.

6.5 Insulation materials used in conjunction with the product must be in line with Division VIAB specifications and:

(a) as described in relevant clauses of BS 8217 : 1994, or

(b) the subject of a current BBA Certificate and be used in accordance with and within the limitations of that Certificate.

6.6 The aggregate used for ballast is rounded with a minimum of fines in the size range 16 mm to 32 mm. The depth of aggregate should reflect the likely wind uplift conditions, but with a recommended minimum depth of 50 mm. In high winds, eg on tall buildings, the aggregate should be either bonded with non-bituminous adhesive or weighted with concrete slabs to prevent wind uplift.

7 Weatherlightness



7.1 Tests confirm that the membranes, and joints in the membranes, when completely sealed and consolidated, will adequately resist the passage of moisture to the inside of the building and so meet the requirements of section 5.1 of Approved Document C4 of the Building Regulations 1991 (as amended 1994) (England and Wales).



7.2 Tests confirm that the membranes, and joints in the membranes, when completely sealed and consolidated, will adequately resist the passage of moisture to the inside of the building and will satisfy the requirements of Regulation 17 (Standard G3.1 as amended) of the Building Standards (Scotland) Regulations 1990 (as amended) and Regulation C5 of the Building Regulations (Northern Ireland) 1994.

8 Resistance to foot traffic

Tests indicate that the systems can accept, without damage, the limited foot traffic and light concentrated loads associated with installation and maintenance operations. Reasonable care should be taken, however, to avoid puncture by sharp objects or concentrated loads.

9 Properties in relation to fire



9.1 A roof waterproofed with Värnamo butyl sheet, ballasted by a minimum depth of 50 mm of aggregate, shall be deemed to be of designation AA. The roof therefore meets the requirements of Requirement B4(2) of the Building Regulations 1991 (as amended 1994) (England and Wales).



9.2 A roof waterproofed with Värnamo butyl sheet, ballasted by a minimum depth of 50 mm of aggregate, shall be deemed to be of designation AA and therefore satisfies the requirements of Regulation 12, Standards D2.5 and D3.6 of the Building Standards (Scotland) Regulations 1990 (as amended) and Regulation E8 of the Building Regulations (Northern Ireland) 1994.

10 Maintenance

Damaged areas of the roof waterproofing sheets can be repaired by removing the affected area, cleaning the surrounding part of the membrane and overlaying with a piece of membrane installed in accordance with either section 14.2 or section 14.3.

11 Durability



Accelerated weathering tests confirm that satisfactory retention of physical properties is achieved. All evidence available suggests that Värnamo Butyl Sheet Roof Waterproofing Membranes should have a life of at least 20 years.

12 General

The membranes should be installed by trained operatives following the manufacturer's appropriate instructions.

13 Site conditions

13.1 Conditions on site should be those for normal roof waterproofing work. Deck surfaces must be dry, clean and free from sharp projections such as nail heads, concrete nibs, etc.

13.2 When the product is to be laid on a rough deck, a loose-laid, non-woven polyester fleece (150 gm⁻² to 270 gm⁻²) should be laid first.

14 Procedures

14.1 Värnamo butyl sheet membranes should be installed on flat roofs in accordance with the following procedures:

- (1) The membranes should be loose laid and jointed by one of the following methods, care should be taken not to stretch the material.
- (2) Wherever possible, prefabricated sheeting should be used for detailed work, such as pipe sleeves, collars and corners.
- (3) Before jointing takes place the contact areas of the membrane must be cleaned.

Lap joints — jointing tape

14.2 Laps should be a minimum of 80 mm when using 60 mm wide jointing tape. The tape is applied to the bottom sheet and the flame of a gas torch is evenly applied, bonding is achieved by pressure from a roller. The procedure is repeated on the underside of the upper sheet. The two sheets are brought together and bonded by the application of firm downward pressure. Details and joints are sealed with Lap Sealant 5590.

Lap joints — adhesive and gum tape

14.3 Laps should be a minimum of 110 mm when using gum tape. Adhesive, Type 5000, is applied to the bottom sheet. The protective layer of one side of the gum tape is removed and the tape laid on the adhesive and bonded by applying pressure with a roller. Adhesive is applied to the underside of the top sheet. The protective layer on the installed gum tape is removed and the two sheets brought together and bonded by the application of firm downward pressure. Details and T-joints are sealed with Lap Sealant 5590.

Lap joints — adhesive only

14.4 Adhesive, Type 5000, can be used also as a contact adhesive. Adhesive is applied to the surfaces of the membranes to be jointed, allowed to dry until tacky, and the two sheets brought together and bonded by the application of firm downward pressure. Laps must be a minimum of 60 mm wide. This type of lap joint should always be sealed with Sealant 5590.

Lap joints — hot bond

14.5 Lap joints, on factory prefabrication, are made using a vulcanising machine, and are a minimum of 25 mm wide.

Edge details

14.6 At edges and upstands the membrane must be mechanically fixed either with 25/25 galvanized clout nails and metal discs at 250 mm centres or by clamping the sheet in position with a timber batten (minimum 19 mm thick) and 75/28 nails at 300 mm centres.

14.7 When applied to lightweight concrete, cut galvanized steel or aluminium nails should be used.

Ballast

14.8 A minimum thickness of 50 mm of aggregate should be applied to the roof covering at the earliest convenience to minimise the risk of damage to the sheet due to wind uplift. When applying the aggregate care must be taken to prevent damage. Ballast at edges should be stuck to the membrane with adhesive approved by the manufacturer.

Technical Investigations

The following is a summary of the technical investigation carried out on Värnamo Butyl Sheet Roof Waterproofing Membranes.

15 Tests

Samples of the membranes were obtained from the manufacturer for testing. The results of tests carried out are summarised in Tables 1 to 3.

Table 1 Physical properties — general

Test (units)	Method*	Mean result
Ash content (%)	MOAT 29 : 4.5.1	16.42
Water vapour permeability (gm ⁻² day ⁻¹)	BS 3177 (at 25°C/75% RH)	0.605
Vapour resistance (MNsg ⁻¹)	BS 3177 (at 25°C/75% RH)	339
Moisture absorption	ISO 62	negligible
Hardness (IRHD)	BS 903 : 26A	65

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

Table 2 Physical properties — directional

Test (units)	Method*	Mean results							
		Longitudinal direction ⁽¹⁾				Transverse direction ⁽¹⁾			
		0.75	1.00	1.20	1.50	0.75	1.00	1.20	1.50
Tensile strength (Nmm ⁻²)	BS 2782 : 320A								
unaged	(test speed 500 mm min ⁻¹)	8.33	7.92	7.41	—	7.28	6.52	7.39	—
aged — heat ⁽²⁾		8.31	—	—	—	6.17	—	—	—
water soak ⁽³⁾		9.16	—	—	—	8.34	—	—	—
UV ⁽⁴⁾		6.10	—	—	—	5.85	—	—	—
Elongation (%)	BS 2782 : 320A								
unaged	(test speed 500 mm min ⁻¹)	340	370	330	—	330	310	400	—
aged — heat ⁽²⁾		240	—	—	—	210	—	—	—
water soak ⁽³⁾		380	—	—	—	350	—	—	—
UV ⁽⁴⁾		260	—	—	—	210	—	—	—
Resistance to tearing load (N)	MOAT 27 : 5.4.1	57	57	81	94	57	33	52	103
Resistance to tear propagation (N)	BS 2782 : 360B	10.1	9.0	13.5	9.4	12.3 ⁽⁵⁾	12.9 ⁽⁵⁾	24.1 ⁽⁵⁾	27.7 ⁽⁵⁾
	(test speed 200 mm min ⁻¹)								
Dimensional change (free) (%)	MOAT 27 : 5.1.6.1	0.19	—	—	0.24	0.19	—	—	0.11

(1) Nominal test sheet thickness (mm) referred to in column.

(2) 56 days heat aged in a ventilated oven at 80°C.

(3) 28 days water soaked at 23 ± 2°C.

(4) 500 hours (daytime) ASTM G 53/77, 4 hours UV/45°C, 4 hours condensation/45°C.

(5) No tear propagation observed.

— = not tested.

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

Table 3 Service performance

Test (units)	Method*	Mean results			
		0.75	1.00	1.20	1.50
Thickness (mm)	Specification				
Static indentation:	MOAT 27 : 5.1.9				
hard substrate		L ₂	L ₃	L ₄	L ₄
soft substrate		L ₂	L ₃	L ₃	L ₃
Dynamic indentation:	MOAT 27 : 5.1.10				
hard substrate		I ₄	I ₄	I ₄	I ₄
soft substrate		I ₄	I ₄	I ₄	I ₄
Low temperature flexibility (°C)	MOAT 27 : 5.4.2				
unaged		< -26	—	—	—
heat aged ⁽¹⁾		< -26	—	—	—
Resistance to water pressure	MOAT 27 : 5.1.4	no penetration			
Effectiveness of joints					
unaged ⁽²⁾	MOAT 27 : 5.2.1	satisfactory			
unaged ⁽³⁾	MOAT 27 : 5.2.1	satisfactory			
heat aged ⁽⁴⁾	MOAT 27 : 5.2.2	satisfactory			
water soak ⁽⁵⁾	MOAT 27 : 5.2.3	satisfactory			

(1) Heat aged for 56 days at 80°C.

(2) Joints prepared by the manufacturer.

(3) Joints prepared by the BBA.

(4) Heat aged for 28 days at 80°C.

(5) Water soak for 7 days at 60°C.

— = not tested.

*The test document is detailed in the *Bibliography*. Numbers in the table refer to sections/parts of the document.

16 Other investigations

16.1 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

16.2 Visits were made to sites in progress to assess method of application.

16.3 Visits were made to existing sites to assess the performance in use.

16.4 A user survey was carried out to assess performance in use.

Bibliography

BS 476 *Fire tests on building materials and structures*
Part 3 : 1958 *External fire exposure roof test*

BS 903 *Physical testing of rubber*
Part A26 : 1969 *Determination of hardness*

BS 2782 *Methods of testing plastics*
Part 3 *Mechanical properties*
Methods 320A to 320F : 1976(1986) *Tensile strength, elongation and elastic modulus*
Method 360B : 1980 *Determination of tear strength of sheet and sheeting (trouser tear method)*

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

BS 6229 : 1982 *Code of practice for flat roofs with continuously supported coverings*

BS 8217 : 1994 *Code of practice for built-up felt roofing (supersedes CP 144 : Part 3)*

ASTM G-53 *Recommended practice for operation of light exposure equipment (Xenon) with and without water, for exposure of non-metallic materials*

ISO 62 : 1980 *Plastics — Determination of water absorption*

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

MOAT No 29 : 1984 *Directives for the Assessment of Roofing Systems using PVC sheets without reinforcement, loose laid under heavy protection and not compatible with bitumen*

17 Conditions

17.1 Where reference is made in this Certificate to any Act of Parliament, Regulation made thereunder, Statutory Instrument, Code of Practice, British Standard, manufacturer's instruction or similar publication, it shall be construed as reference to such publication in the form in which it is in force at the date of this Certificate.

17.2 The quality of materials and the method of manufacture have been examined and found satisfactory by the BBA and must be maintained to this standard during the period of validity of this Certificate. This Certificate will remain valid for an unlimited period provided:

- (a) the specification of the product is unchanged; and
- (b) the manufacturer continues to have the product checked by the BBA.

17.3 This Certificate will apply only to the product that is installed, used and maintained as set out in this Certificate.

17.4 In granting this Certificate, the BBA makes no representation as to:

- (a) the presence or absence of patent or similar rights subsisting in the product; and
- (b) the legal right of Trelleborg Building Products AB to market, install or maintain the product; and
- (c) the nature of individual installations of the product, including methods and workmanship.

17.5 It should be noted that any recommendations relating to the safe use of this product which are contained or referred to in this Certificate are the minimum standards required to be met when the product is used. They do not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory or Common Law duties of care, or of any duty of care which exist at the date of this Certificate or in the future; nor is conformity with such recommendations to be taken as satisfying the requirements of the 1974 Act or of any present or future statutory or Common Law duties of care. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the use of this product.



In the opinion of the British Board of Agrément, Värnamo Butyl Sheet Roof Waterproofing Membranes are fit for their intended use provided they are installed, used and maintained as set out in this Certificate. Certificate No 86/1693 is accordingly awarded to Trelleborg Building Products AB.

On behalf of the British Board of Agrément

Date of Second issue: 14th November 1995

Director

**The original Certificate was awarded to Värnamo Isolerduk AB and issued on 28th July 1986. This amended version includes change of name and address of Certificate holder, references to the revised Building Regulations and associated text, updating of general text and the addition of the Bibliography.*