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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

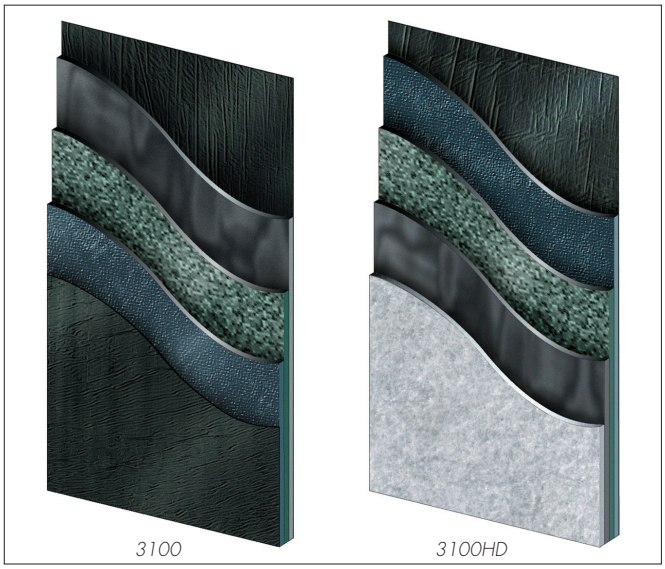
Agrément Certificate
98/3479
Product Sheet 1

HYLOAD TANKING MEMBRANES

HYLOAD 3100 AND 3100HD

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Hyload 3100 and 3100HD, for use as damp-proof and waterproof membranes for solid concrete floors and underground structures, and for use as internally and externally applied tanking below ground.



AGRÉMENT CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigation
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.

KEY FACTORS ASSESSED

Resistance to water and water vapour — the products will resist the passage of moisture to the interior of the building (see section 5).

Resistance to puncture — the products will accept the limited foot traffic and loads associated with installation and maintenance of the system without damage (see section 6).

Adhesion and stability — the adhesion of the products to the substrate and to themselves is satisfactory (see section 7).

Effects of temperature — the products remain flexible and can be formed at the minimum recommended temperatures (see section 8).

Durability — under normal service conditions the products will provide an effective barrier to the transmission of liquid water and water vapour for the life of the structure in which they are incorporated (see section 10).

The BBA has awarded this Agrément Certificate to the company named above for the products described herein. The products have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate

On behalf of the British Board of Agrément

Date of First issue: 28 May 2009
Originally certificated on 23 March 1998

Simon Wroe
Head of Approvals — Materials

Greg Cooper
Chief Executive

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

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Regulations

In the opinion of the BBA, Hyload 3100 and 3100HD, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:

The Building Regulations 2000 (as amended) (England and Wales)

Requirement:	C2(a)	Resistance to moisture
Comment:		Data for water resistance on the products, including joints, indicate that the products meet this Requirement. See section 5 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The products are acceptable. See section 10 and the *Installation* part of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The use of the products can satisfy the requirements of this Regulation. See sections 9 and 10 and the *Installation* part of this Certificate.
Regulation:	9	Building standards — construction
Standard:	3.4	Moisture from the ground
Comment:		Data for water resistance on the products, indicate that the use of the products will enable a roof to satisfy the requirements of this Standard, with reference to clauses 3.4.2[1][2] and 3.4.5[1][2] to 3.4.7[1][2]. See section 5 of this Certificate.
Regulation:	12	Building standards — conversions
Comment:		All comments given for these products under Regulation 9, also apply to this Regulation, with reference to clause 0.12.1[1][2] and Schedule 6[1][2].

(1) Technical Handbook (Domestic).
(2) Technical Handbook (Non-Domestic).

The Building Regulations (Northern Ireland) 2000 (as amended)

Regulation:	B2	Fitness of materials and workmanship
Comment:		The products are acceptable. See section 10 and the *Installation* part of this Certificate.
Regulation:	B3(2)	Suitability of certain materials
Comment:		The products do not normally require maintenance. See section 9 of this Certificate.
Regulation:	C4(a)	Resistance to ground moisture and weather
Comment:		Data for water resistance on the products indicate that the use of the products will enable a roof to satisfy the requirements of this Regulation. See section 5 of this Certificate.

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2008

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See sections: 1 *Description* (1.2) and 2 *Delivery and site handling* (2.3).

NHBC Standards 2008

NHBC accepts the use of Hyload 3100 and 3100HD, when installed and used in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 5.1 *Substructure and ground bearing floors*.

Zurich Building Guarantee Technical Manual 2007

In the opinion of the BBA, Hyload 3100 and 3100HD, when installed and used in accordance with this Certificate, satisfy the requirements of the *Zurich Building Guarantee Technical Manual*, Section 3 *Substructure*, Sub-section *dpc and dpm*.

Technical Specification

1 Description

1.1 Hyload 3100 and 3100HD are manufactured by coating a bitumen-saturated, non-woven polyester fibre base with an SBS-modified bitumen incorporating a mineral filler. Hyload 3100 has a thin polyethylene film adhered to both upper and lower surfaces. Hyload 3100HD has a thin polyethylene film on the lower surface and a thick, non-woven polyester fleece as a protective layer on the upper surface with a 100 mm selvedge protected by a thin plastic film.

1.2 The nominal characteristics for the membranes are given in Table 1.

Table 1 Nominal characteristics

Characteristics (units)	3100	3100HD
Thickness (mm)	3.0	3.7
Width (m)	1.0	1.0
Roll length (m)	10	10
Roll weight (kg)	34	36
Mass per unit area (kgm^{-2})	3.4	3.6

1.3 Ancillary items available for use with the membranes are:

- IKOpro Fast Dry Primer — a bitumen solution for use as a primer for the torch-applied membranes
- Hyload Protection Board — a flexible polymeric board for protecting the tanking membranes against mechanical damage, pedestrian or vehicular traffic and damage caused by backfilling
- Hyload Reinforcing Strip — a 330 mm wide strip of 3100 grade in roll form, for use as reinforcement at angles, corners and other detail work beneath 3100 and 3100HD grades, including jointing of 3100HD
- Hyload Preformed Shapes — a range of preformed angles, corners for detailing.

1.4 Quality control on the final product includes checks on the following properties:

- on membranes
  - — dimensions
  - — tensile strength and elongation
  - — low temperature flexibility
  - — dimensional stability
- on coating mass
  - — softening point
  - — penetration
  - — filler content
  - — dispersion.

2 Delivery and site handling

2.1 Rolls are packed in paper wrappers bearing the manufacturing and marketing company's name, roll type, batch number and the BBA identification mark incorporating the number of this Certificate.

2.2 The rolls must be stored on end on a clean, level surface and not exposed to excessive heat.

2.3 IKOpro Fast Dry Primer is classified under *The Chemicals (Hazard Information and Packaging for Supply) Regulations 2002* (CHIP3) as 'highly flammable'(1), 'harmful' and 'dangerous to the environment' and should be stored appropriately. The product container bears the appropriate hazard warnings.

(1) The products should be stored in accordance with the *Highly Flammable Liquids and Liquefied Petroleum Gases Regulations* (1972).

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Hyload 3100 and 3100HD.

Design Considerations

3 General

3.1 Hyload 3100 and 3100HD are satisfactory for use as a damp-proof and waterproofing membrane under concrete screed and floor slabs, podium slabs, underground structures and internally and externally-applied tanking below ground, in accordance with the relevant Clauses of CP 102 : 1973, Section 2 or BS 8102 : 1990 provided they are fully supported and protected.

3.2 The membranes are compatible with concrete, smooth brickwork and blockwork or screeded substrates and are resistant to those chemicals likely to be present in normal service conditions.

4 Practicability of installation

The products are designed to be installed by contractors, experienced with these types of products.

5 Resistance to water and water vapour

Test data examined confirm that the products, and joints in the membranes, when completely sealed and consolidated, will adequately resist the passage of moisture from the ground and so meet the requirements of national Building Regulations (see section 14, Table for *Physical properties — general*):

England and Wales — Approved Document C, Requirement C2(a), Sections 4.7 and 5.5.

Scotland — Standard 3.4, clauses 3.4.2 and 3.4.5 to 3.4.7

Northern Ireland — Regulation C4(a).

6 Resistance to puncture

6.1 Hyload 3100HD has a polyester fleece protective surface which reduces the risk of puncture. However, Hyload 3100 can be punctured by sharp objects and care should be taken in handling building materials and equipment over the exposed surface. See section 14, Table for *Physical properties — general*.

6.2 Provided there are no sharp objects present on the membrane surfaces prior to and during installation of the protective layer, the products will not be damaged by normal foot traffic. If damaged, repairs can be carried out by patching prior to application of the protection.

7 Adhesion and stability

Test data indicate that the adhesion of the membranes to the substrate and to themselves, jointed as described in this Certificate, is satisfactory. The properties of the membranes accommodate minor movements likely to occur under normal service conditions in the structure in which they are incorporated. See section 14, Table for *Physical properties — general*.

8 Effects of temperature

8.1 The membranes remain flexible and can be formed at the minimum recommended temperatures. See section 14, Table for *Physical properties — general*.

8.2 When installed the membrane should not achieve temperatures at which slippage due to softening of the adhesive layer can occur.

9 Maintenance

As the products are either, protected by a wall, backfill or screed and they have suitable durability (see section 10), maintenance is not required. However, it must be ensured that damage occurring prior to installation of the protection, is repaired (see section 13).

10 Durability

The products, when fully protected and subjected to normal service conditions, will provide an effective barrier to the transmission of liquid water and water vapour for the life of the structure in which they are incorporated. See section 14, Tables for *Physical properties — directional* and *Physical properties — general*.

Installation

11 General

11.1 Hyload 3100 and 3100HD must be installed in accordance with the relevant requirement of CP 102 : 1973, Section 2 or BS 8102 : 1990 and the manufacturer's instructions. Additional guidance on the use of dpm materials is available in BS 8000-4 : 1989.

11.2 All surfaces to which the products are to be applied should have a smooth finish, ie they should be free from cavities, projections and mortar deposits. Surfaces should be dry and free from dust and frost. Concrete surfaces should be dense. Surfaces should be primed with IKOpro Fast Dry Primer, at the recommended coverage rate, and allowed to-dry.

11.3 Vertical surfaces of brickwork and blockwork should be dry and, preferably, rendered to provide an even surface. Brickwork or blockwork not rendered must be flush pointed to give a smooth surface without sudden changes in level.

11.4 Hyload can be installed in all normal site conditions provided the air temperature is not below 5°C to prevent the risk of surface condensation.

11.5 The membranes should be covered by a screed or other protective layer as soon as possible after installation. If blockwork protection is used, care must be taken to avoid damage to the membrane during construction.

11.6 Provided sharp objects are not present prior to and during installation of the protective layer, the membranes will not be damaged by normal foot traffic.

11.7 Hyload Reinforcing Strip should be placed at all angles/changes of direction (such as the junction of horizontal and vertical surfaces and corners), and at the top where the membrane meets the dpc. Suitable fillets and splays should be used.

12 Procedure

12.1 Membranes are generally loose-laid on horizontal surfaces and torch bonded to primed vertical surfaces. Lap joints are 100 mm wide and torch welded. The free end of each roll should be torch bonded to the substrate. Hyload 3100HD should be lapped over Hyload Reinforcing Strip.

Solid concrete floors

12.2 It is essential that the damp-proof membrane in the floor should be continuous with the damp-proof course in the surrounding walls. This is achieved by continuing the membrane up internal wall surfaces to tie in with the damp-proof course. A sand/cement screed should be laid immediately after the installation to prevent damage.

External tanking

12.3 When the foundation block extends beyond the concrete structure, the membrane should be applied to the horizontal surface and extended up the outer face of the wall and cut into it.

12.4 A protection wall of brickwork, blockwork or protection board should be used against all the membranes, except Hyload 3100HD, to protect them against puncture during backfilling, or subsequently by the backfill.

Internal tanking

12.5 The membrane should be applied to the site concrete base as well as to the interior face of the external wall. It should be tucked into the dpc and applied down the wall and 300 mm onto the site concrete base.

12.6 The membranes are applied to the walls to achieve the overlaps defined in section 12.1. A wall (preferably concrete) should be applied immediately after installation to protect the damp-proof membrane and to resist the action of external water pressure. Where brickwork or blockwork is used, it should be set 40 mm away from the membrane to enable the space so formed to be thoroughly filled with a sand/cement mortar.

13 Repair

Damage to the products can be adequately repaired by patching prior to the application of protection or backfilling.

Technical Investigations

14 Tests

Samples of Hyload 3100 and 3100HD were obtained from the manufacturer 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 Tables 2 and 3.

Table 2 Physical properties — directional

Test (units)	Mean results				Method[1]
	3100		3100HD		
	Longitudinal	Transverse	Longitudinal	Transverse	
Tensile strength (N per 50 mm)					BS 2782-3.320A (100 mm min^{-1})
unaged	592	743	1278	1139	
heat aged[2]	832	870	1638	1261	
Elongation at maximum load (%)					BS 2782-3.320A (100 mm min^{-1})
unaged	47	43	19	30	
heat aged[2]	47	46	17	30	
Tear resistance (nail) (N)	254	249	529	643	MOAT 27 : 5.4.1
Dimensional stability (%) (free)	–0.17	+0.13	–0.28	+0.08	MOAT 27 : 5.1.6.1

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

(2) Heat aged at 60°C for 56 days.

Table 3 Physical properties — general

Test (units)	Mean results		Method[1]
	3100	3100HD	
Tensile strength in shear of joints (N per 50 mm)			MOAT 27: 5.2.2/3/4
unaged	797	—	
heat aged[2]	904	—	
water soak[3]	625	—	
Water vapour transmission ($gm^{-2}day^{-1}$)	0.41	—	BS 3177 (25°C/75% RH)
Water vapour resistance ($MNsg^{-1}$)	500	—	BS 3177 (25°C/75% RH)
Resistance to water pressure on joints	pass	—	MOAT 27 : 5.1.4
Static indentation (concrete)	—	I_4	MOAT 27 : 5.1.9
Dynamic indentation (concrete)	—	I_4	MOAT 27 : 5.1.10
Slump resistance (mm)	0	—	MOAT 27 : 5.1.7
Tensile bond strength (Nmm^{-2})			T1/14[4] (20 mm min^{-1})
unaged	0.32	—	
heat aged[2]	0.40	—	
Peel resistance (N)	186	—	MOAT 27 : 5.1.3
Low temperature[5] flexibility (°C)			MOAT 27 : 5.4.2
unaged	≤–20	≤–20	
heat aged[6]	≤–20	—	
water soak[7]	≤–20	—	
Unrolling at low temperature	pass	—	MOAT 27 : 5.4.3
Chisel impact			T1/13[8]
0°C	2[9]	2[9]	
23°C	2[9]	2[9]	

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

(2) Heat aged 28 days at 60°C.

(3) Water soak 7 days at 60°C.

(4) BBA test method for tensile bond strength. Samples prepared using concrete substrate and steel pull-off plates. The plates were bonded to sample using epoxy resin.

(5) Lowest temperature tested – 20°C.

(6) Heat aged 56 days at 60°C.

(7) Water soak 28 days at 23°C.

(8) BBA test method for resistance to chisel impact of a waterproofing membrane using a 1 kg impactor.

(9) Grade 2 slight indentation to surface.

— not tested.

15 Investigations

A factory inspection was carried out to access and examine the manufacturing process and quality control methods.

Bibliography

BS 2782-3.320A to 320F : 1976 *Methods of testing plastics — Mechanical properties — Tensile strength, elongation and elastic modulus*

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

BS 8000-4 : 1989 *Workmanship on building sites — Code of practice for waterproofing*

BS 8102 : 1990 *Code of practice for protection of structures against water from the ground*

CP 102 : 1973 *Code of practice for protection of buildings against water from the ground*

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

16 Conditions

16.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English law.

16.2 Publications and documents referred to in this Certificate are those that the BBA deems to be relevant at the date of issue or re-issue of this Certificate and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

16.3 This Certificate will remain valid for an unlimited period provided that the product/system and the manufacture and/or fabrication including all related and relevant processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

16.4 In granting this Certificate, the BBA is not responsible for:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

16.5 Any information relating to the manufacture, supply, installation, use and maintenance of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used and maintained. It does not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty 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 manufacture, supply, installation, use and maintenance of this product/system.

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