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Agrément Certificate

11/4732

Product Sheet 1

DON & LOW CONSTRUCTION MEMBRANES

REFLECTASHIELD TF

This Agrément Certificate Product Sheet⁽¹⁾ relates to Reflectashield TF⁽²⁾, a low-emissivity, insulating breather membrane for use on timber-frame, steel-frame, structural insulated panels (SIP) and cross-laminated timber (CLT) panel walls with a cavity and a masonry outer leaf, weatherboarding or tile/slate cladding.

(1) Hereinafter referred to as 'Certificate'.

(2) Reflectashield TF is a registered trademark of Don & Low Ltd.

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 investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



KEY FACTORS ASSESSED

Weathertightness — the product will contribute to protecting a wall against water penetration (see section 6).

Thermal insulation — the product can contribute to limiting heat loss through a wall (see section 7 and BBA Information Bulletin No 5 *Reflective breather membranes in timber frame walls — Thermal performance claims*).

Risk of condensation — the product has a low resistance to water vapour and will reduce the risk of interstitial condensation (see section 8).

Strength — the product has adequate strength to resist the loads associated with the construction of the wall (see section 9).

Properties in relation to fire — the product is classified as Class E in accordance with BS EN 13501-1 : 2007 and its use is restricted in some cases by the national Building Regulations (see section 10).

Durability — the product will have a lifetime equal to that of the building element in which it is installed (see section 12).



The BBA has awarded this Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of Fourth issue: 7 May 2019

John Albon
Chief Scientific Officer

Claire Curtis-Thomas
Chief Executive

Originally certificated on 7 April 2011

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
Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.

British Board of Agrément

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Regulations

In the opinion of the BBA, Reflectashield TF, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	B3(3)(4)	External fire spread
Comment:		The product can contribute to satisfying this Requirement. See section 10.1 of this Certificate.
Requirement:	B4(1)	External fire spread
Comment:		The product is restricted by this Requirement. See section 10 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		The product will contribute to a wall satisfying this Requirement. See section 6.1 of this Certificate.
Requirement:	C2(c)	Resistance to moisture
Comment:		The product can contribute to limiting the risk of condensation. See sections 8.5 and 8.9 of this Certificate.
Requirement:	L1(a)(i)	Conversion of fuel and power
Comment:		The product can contribute to satisfying this Requirement. See section 7 of this Certificate.
Regulation:	7	Materials and workmanship (applicable to Wales only)
Regulation:	7(1)	Materials and workmanship (applicable to England only)
Comment:		The product is acceptable. See section 12.1 and the <i>Installation</i> part of this Certificate.
Regulation:	26	CO₂ emission rates for new buildings
Regulation:	26A	Fabric energy efficiency rates for new dwellings (applicable to England only)
Regulation:	26A	Primary energy consumption rates for new buildings (applicable to Wales only)
Regulation:	26B	Fabric energy efficiency rates for new dwellings (applicable to Wales only)
Comment:		The product can contribute to satisfying these Regulations. See section 7 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)	Durability, workmanship and fitness of materials
Comment:		The product can contribute to a construction satisfying this Regulation See section 12.1 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	2.4	Cavities
Comment:		The product can contribute to satisfying this Standard with respect to clause 2.4.2 ⁽¹⁾⁽²⁾ . See section 10.1 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The product will contribute to a wall satisfying clauses 3.10.1 ⁽¹⁾⁽²⁾ and 3.10.5 ⁽¹⁾⁽²⁾ of this Standard. See section 6.1 of this Certificate.

Standard:	3.15	Condensation
Comment:		The product can contribute to limiting the risk of condensation with reference to clauses 3.15.1 ⁽¹⁾ and 3.15.5 ⁽¹⁾ of this Standard. See sections 8.5 and 8.10 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The product can contribute to satisfying the requirements of these Standards, with reference to clauses 6.1.1 ⁽¹⁾ , 6.1.2 ⁽²⁾ , 6.2.4 ⁽¹⁾ , 6.2.6 ⁽²⁾ , 6.2.10 ⁽¹⁾ , 6.2.11 ⁽¹⁾⁽²⁾ , 6.2.12 ⁽²⁾ and 6.2.13 ⁽²⁾ . See section 7 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The product can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard. In addition, the product can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4 ⁽¹⁾ [Aspects 1 ⁽¹⁾ and 2 ⁽¹⁾], 7.1.6 ⁽¹⁾⁽²⁾ [Aspects 1 ⁽¹⁾⁽²⁾ and 2 ⁽¹⁾⁽²⁾], 7.1.7 ⁽¹⁾ [Aspect 1 ⁽¹⁾], 7.1.9 ⁽²⁾ [Aspects 1 ⁽²⁾ and 2 ⁽²⁾] and 7.1.10 ⁽²⁾ [Aspects 1 ⁽²⁾]. See section 7 of this Certificate.
Regulation:	12	Building standards applicable to conversions
Comment:		Comments in relation to the product under Regulation 9, Standards 1 to 6, 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) 2012 (as amended)

Regulation:	23(a)(i)	Fitness of materials and workmanship
Comment:	(iii)(b)(i)	The product is acceptable. See section 12.1 and the <i>Installation</i> part of this Certificate.
Regulation:	28(a)	Resistance to moisture and weather
Comment:		The product will contribute to a wall satisfying this Regulation. See section 6.1 of this Certificate.
Regulation:	29	Condensation
Comment:		The product can contribute to limiting the risk of condensation. See section 8.5 of this Certificate.
Regulation:	35(3)(4)	Internal fire spread - structure
Comment:		The product can contribute to satisfying this Regulation. See section 10.1 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Regulation:	40(2)	Target carbon dioxide emission rate
Comment:		The product can contribute to satisfying these Regulations. See section 7 of this Certificate.

Construction (Design and Management) Regulations 2015

Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See section: 1 *Description* of this Certificate.

Additional Information

NHBC Standards 2019

In the opinion of the BBA, Reflectashield TF, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapters 6.2 *External timber framed walls* and 6.10 *Light steel framing*.

CE marking

The Certificate holder has taken the responsibility of CE marking the product in accordance with harmonised European Standard BS EN 13859-2 : 2014. An asterisk (*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

Reflectashield TF is a low-emissivity insulating breather membrane, comprising a spunbonded polypropylene and an aluminium foil on one face. The product has the nominal characteristics given in Table 1.

Characteristic (unit)	Reflectashield TF
Thickness (mm)	0.55
Mass per unit area* ($\text{g}\cdot\text{m}^{-2}$)	134
Roll length* (m)	50, 100 ⁽¹⁾
Roll width* (m)	2.9 ⁽¹⁾
Colour	
upper	silver
lower	white
Tensile strength* (N per 50 mm)	
longitudinal	230
transverse	150
Elongation* (%)	
longitudinal	60
transverse	80
Tear resistance* (N)	
longitudinal	160
transverse	160
Resistance to penetration of air ($\text{m}^3/\text{m}^2\cdot\text{h}^{-1}\cdot 50\text{ Pa}^{-1}$)	23.2
Watertightness*	
unaged	W2
aged ⁽²⁾	W2
Equivalent air layer thickness * (S_d) (m)	0.083
Vapour resistance ($\text{MN}\cdot\text{s}\cdot\text{g}^{-1}$)	0.41

(1) Other roll sizes and colours are available.

(2) Aged in accordance with BS EN 13859-2 : 2014, Annex C.

2 Manufacture

2.1 The membrane is manufactured by heat laminating a UV-stabilised, non-woven polypropylene spunbond layer to a perforated, reflective metal foil.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities

- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.3 The management system of Don & Low Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by BSI (Certificate FM 45536).

2.4 The product is marketed by the product's UK distributor, A Proctor Group, The Haugh, Blairgowrie, Perthshire, PH10 7ER, tel: 01250 872261, fax: 01250 872727, e-mail : contact@proctorgroup.com, website: www.proctorgroup.com.

3 Delivery and site handling

3.1 The product is delivered to site in rolls individually wrapped in polythene. A technical leaflet bearing the name of the product and the BBA logo, incorporating the number of this Certificate, is included with each roll. Each roll bears labels with lot numbers for traceability.

3.2 The rolls should be stored on their side, on a smooth, clean, surface, under cover and protected from sunlight.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Reflectashield TF.

Design Considerations

4 Use

4.1 Reflectashield TF is satisfactory for use as an on-site or factory-applied, low emissivity, breather membrane in timber-frame, steel-frame, SIP's and CLT panel walls with a cavity, and either a masonry outer leaf, weatherboarding or tile/slate cladding.

4.2 The product reduces the U value (thermal transmittance) of walls by inhibiting radiant heat transfer across the cavity and reduces solar heat gain by reflection.

4.3 In the absence of other guidance, suitable timber- and steel-frame constructions are defined as those designed and built in accordance with *NHBC Standards 2019*, Chapters 6.2 and 6.10.

4.4 The product satisfies the requirements for a Class W2* material and meets the NHBC requirements given in *NHBC Standards 2019*, Chapter 6.2, as a high-performance breather membrane for use in very severe conditions⁽¹⁾.

(1) Very severe conditions are defined in the *NHBC Standards 2019*, see Figure 1 therein showing categories of exposure to wind-driven rain.

5 Practicability of installation

The product can be installed by a competent general builder, or a contractor, experienced with this type of product.

6 Weathertightness



6.1 The product is classified as Class W2* in accordance with BS EN 13859-2 : 2014. The product will resist liquid water penetration and wind-blown snow, and will protect the sheathing and frame from external moisture.

6.2 The period of installation prior to completion of the of the brickwork or outer cladding should be kept to a minimum. The membrane should not be used as a temporary waterproof covering during this time.

7 Thermal insulation



7.1 Calculations for thermal transmittance (U value) should be carried out in accordance with BS EN ISO 6946 :2017 and BRE Report BR 443 : 2006:

0.05 foil surface emissivity

0.66 m²·K·W⁻¹ resistance of a vented cavity >20 mm thick

0.36 m²·K·W⁻¹ external boundary layer resistance (*R*_{se}) where the cavity is well ventilated.

Table 1 Example U values (W·m⁻²·K⁻¹) for a timber-frame wall with brick outer leaf⁽¹⁾

Breather membrane type	Insulation conductivity between studs (W·m ⁻¹ ·K ⁻¹)		
	0.032	0.033	0.037
Non-reflective	0.32	0.33	0.35
Reflectashield TF	0.28	0.28	0.30

(1) Construction of wall: 12.5 mm plasterboard approximately 0.25 W·m⁻¹·K⁻¹, 110 mm studs (15% bridging), 12 mm OSB sheathing, 50 mm vented cavity, 102 mm brickwork.

7.2 Calculations for an example wall⁽¹⁾ in Table 1 show that the product improves the U value when compared to the same wall with a standard (non-reflective) breather membrane.

(1) Construction of wall: 12.5 mm plasterboard approximately 0.25 W·m⁻¹·K⁻¹, 110 studs (15% bridging), 12 mm OSB sheathing, 50 mm vented cavity, 102 mm brickwork.

7.3 Care must be taken in the overall design and construction of junctions with other elements to minimise thermal bridges and air infiltration. Detailed guidance can be found in the documents supporting the national Building Regulations.

8 Risk of condensation

8.1 Conventional timber- and steel-frame walls designed in accordance with BS 5250 : 2011, Annex G, Section G4, and incorporating the product, will adequately minimise the risk of condensation.

8.2 The use of the product does not preclude the normal precautions against the formation of condensation, especially in rooms expected to have high humidity.

8.3 Convective water vapour transfer into the wall construction can be reduced by installing a vapour control layer/air barrier.

Interstitial condensation

8.4 The product, although metallised, is perforated, and therefore, vapour open. It can be used in timber-frame constructions installed on sheathing as a direct replacement for a traditional breather membrane.



8.5 For design purposes, the product has a resistance to water vapour transmission of less than or equal to 0.6 MN·s·g⁻¹ and is classified as a breather membrane in accordance with BS 5250 : 2011, Annex G. Walls incorporating the product will therefore adequately limit the risk of interstitial condensation when designed and constructed in accordance with BS 5250 : 2011, Annex G.

8.6 The risk of condensation occurring within the wall of the timber-frame building will depend upon the properties and vapour resistance of the other materials used in the construction, the internal and external conditions and the effectiveness of the internal vapour control layer.

8.7 The risk of interstitial condensation is greatest when the building is drying out after construction. Guidance on preventing condensation from this and other sources is given in BRE Digest 369 and BRE Report BR 262 : 2002.

8.8 The product has additional insulating properties (see section 7.1) and will maintain the frame sheathing at a higher temperature than for the same construction incorporating a conventional breather membrane. This will in turn assist in

limiting the risk of interstitial condensation arising from breaches/imperfections in the vapour control layer in the wall's internal lining. However, it must not be relied upon as an alternative to conventional good practice for maintaining integrity of the vapour control layer.

Surface condensation



8.9 Walls incorporating the product will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed $0.7 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ at any point and the junctions and openings are designed in accordance with the relevant requirements of *Limiting thermal bridging and air leakage : Robust construction details for dwellings and similar buildings* TSO 2002 or BRE Information Paper IP 1/06.



8.10 Walls incorporating the product will adequately limit the risk of surface condensation when designed in accordance with BS 5250 : 2011, and when the thermal transmittance (U value) does not exceed $1.2 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ at any point. Additional guidance may be obtained from BRE Report BR 262 : 2002.

9 Strength

9.1 The product will resist the normal loads associated with construction and installation into timber- and steel-frame buildings.

9.2 The product is not adversely affected by water and will retain its properties when wet.

10 Properties in relation to fire



10.1 The product is classified as Class E* in accordance with BS EN 13501-1 : 2007. Where the product forms the face of a cavity the permissible areas of use and the spacing of cavity barriers are restricted by the national Building Regulations⁽¹⁾.

(1) Test Report Reference 27/04640B/06/18, issued by BTTG. A copy of the report is available from the Certificate holder.



10.2 The product should not be used on buildings in England that have a storey at least 18 m above ground level and contain: one or more dwellings, an institution, a room for residential purposes (excluding any room in a hostel, hotel or boarding house), student accommodation, care homes, sheltered housing, hospitals or dormitories in boarding schools.

11 Maintenance

As the product is confined within a wall construction and has suitable durability (see section 12), maintenance is not required. However, any damage occurring before enclosure must be repaired (see section 16).

12 Durability



12.1 The product will be unaffected by the normal conditions found in a timber- or steel-frame wall and will have a life equal to that of the building in which it is installed.

12.2 The product can be damaged by high winds, prolonged exposure to UV, careless handling or by vandalism, and must be covered as soon as possible on completion of installation. Any damaged areas should be repaired or replaced before completion in accordance with section 16.

13 Reuse and recyclability

The product is made of polyolefins, which can be recycled.

14 General

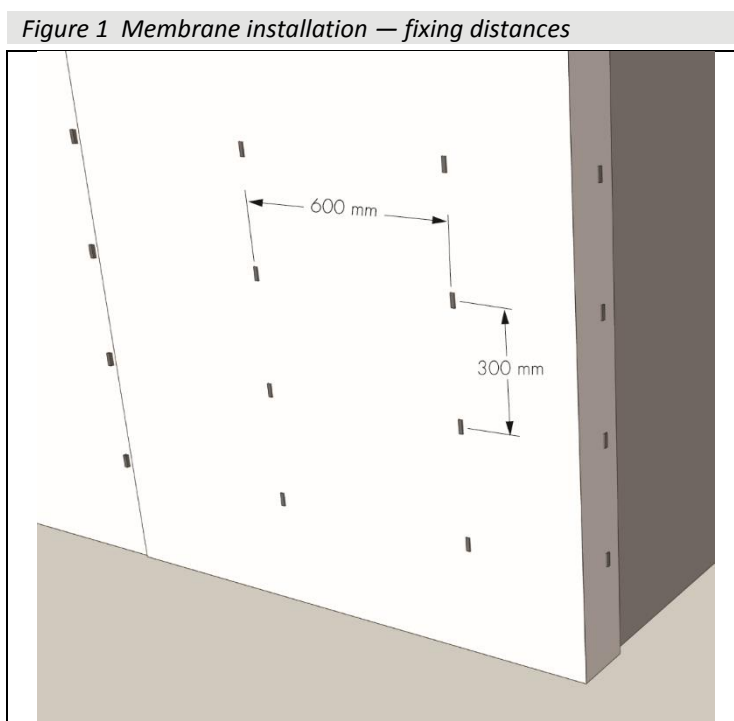
Reflectashield TF must be installed in accordance with the marketing company's instructions, the recommendations given in *NHBC Standards 2019*, Chapters 6.2 and 6.10, and this Certificate.

15 Procedure

15.1 To prevent damage by wind action, the membrane should be fixed with the silver side installed to the outside at regular intervals, not exceeding 500 mm, with austenitic stainless steel staples or nails.

15.2 Upper layers should overlap lower layers to shed water away from the sheathing and below the level of the lowest timber.

15.3 Horizontal laps should be at least 100 mm and vertical laps 150 mm. Vertical laps should be staggered wherever possible (see Figure 1).



15.4 Where necessary, the positions of the studs should be marked on the face of the breather membrane, to enable placement of wall ties and cladding fixings.

15.5 It is essential that the lowest timbers are protected by the membrane.

16 Repair

Damage to the membrane must be repaired prior to the installation of external walls or claddings, by laying another sheet over the damaged area and sealing it correctly, ensuring water is shed away from the sheathing.

17 Tests

17.1 Tests were carried out and the results assessed to determine:

- dimensions
- mass per unit area
- tensile strength and elongation
- resistance to tear
- dimensional stability
- resistance to water penetration
- resistance to artificial ageing
- resistance to penetration of air
- water vapour transmission
- reaction to fire.

17.2 Tests on a material of similar specification were carried out on wet strength and liquid water penetration.

17.3 The effect of UV and heat ageing on the emissivity of the material was evaluated.

18 Investigations

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

18.2 The risk of interstitial condensation in a range of typical wall constructions was successfully evaluated.

18.3 The thermal performance by calculation of effective thermal resistance of the cavity in which the product is installed was assessed.

Bibliography

BBA Information Bulletin No 5 *Reflective breather membranes in timber frame walls – Thermal performance claims*

BRE Digest 369 *Interstitial condensation and fabric degradation*

BRE Information Paper IP 1/06 *Assessing the effects of thermal bridging at junctions and around openings*

BRE Report BR 262 : 2002 *Thermal insulation: avoiding risks*

BRE Report BR 443 : 2006 *Conventions for U-value calculations*

BS 5250 : 2011 + A1 : 2016 *Code of practice for control of condensation in buildings*

BS EN 13501-1 : 2007 + A1 : 2009 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*

BS EN 13859-2 : 2014 *Flexible sheets for waterproofing — Definitions and characteristics of underlays — Underlays for walls*

BS EN ISO 6946 : 2007 *Building components and building elements- Thermal resistance and thermal transmittance – Calculation method.*

BS EN ISO 9001 : 2015 *Quality management systems — Requirements*

19 Conditions

19.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page – no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- 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.

19.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

19.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and 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.

19.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

19.5 In issuing this Certificate the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- 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
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

19.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal 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, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue 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.