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Agrément Certificate
20/5770
Product Sheet 1

PAVATEX WOODFIBRE ROOF INSULATION

ISOLAIR AND PAVATHERM-COMBI SARKING BOARDS

This Agrément Certificate Product Sheet(1) relates to Isolair and Pavatherm-Combi Sarking Boards, wood fibre material of different densities, for use as insulating sarking boards on pitched roofs of dwellings and other buildings with similar temperature and humidity conditions.

(1) Hereinafter referred to as 'Certificate'.

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

Thermal performance — the products have thermal conductivities (λ_D) of 0.041 $W \cdot m^{-1} \cdot K^{-1}$ and 0.044 $W \cdot m^{-1} \cdot K^{-1}$, depending on the thickness range and density (see section 6).

Condensation risk — the products can contribute to limiting the risk of condensation (see section 7).

Behaviour in relation to fire — the products have a classification of Class E for reaction to fire in accordance with BS EN 13501-1 : 2018. For roof pitches greater than 70°, use of the products is restricted in some cases (see section 8).

Durability — the products are durable, rot proof and sufficiently stable to remain effective as an insulation for the life of the building (see section 10).

The BBA has awarded this Certificate to the company named above for the products described herein. These 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: 17 June 2020

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Regulations

In the opinion of the BBA, Isolair and Pavatherm-Combi Sarking Boards, 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:	**C2(c)**	**Resistance to moisture**
Comment:		The products are acceptable. See sections 7.1 and 7.4 of this Certificate.
Requirement:	**L1(a)(i)**	**Conservation of fuel and power**
Comment:		The products can contribute to satisfying this Requirement. See sections 6.1 and 6.2 of this Certificate.
Regulation:	**7(1)**	**Materials and workmanship**
Comment:		The products are acceptable. See section 10 and the *Installation* part of this Certificate.
Regulation:	**7(2)**	**Materials and workmanship**
Comment:		The products are restricted by this Regulation in some cases . See sections 8.1 and 8.2 of this Certificate.
Regulation:	**26**	**CO_2 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 performance values for new dwellings (applicable to Wales only)**
Comment:		The products can contribute to satisfying these Regulations, although compensating fabric / service measures will need to be taken. See sections 6.1 and 6.2 of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	**8(1)**	**Durability, workmanship and fitness of materials**
Comment:		The products are acceptable. See section 10 and the *Installation* part of this Certificate.
Regulation:	**9**	**Building standards applicable to construction**
Standard:	3.15	Condensation
Comment:		The products are acceptable, with reference to clauses 3.15.1(1)(2), 3.15.3(1)(2), 3.15.4(1)(2), 3.15.5(1)(2) and 3.15.7(1)(2) of this Standard. See sections 7.1 and 7.5 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The products can contribute to satisfying clauses, or parts of, 6.1.1(1), 6.1.2(2), 6.1.6(1), 6.2.1(1)(2), 6.2.3(1), 6.2.4(1)(2), 6.2.5(2), 6.2.6(2), 6.2.7(1), 6.2.8(2), 6.2.9(1)(2), 6.2.10(1), 6.2.11(1)(2), 6.2.12(2) and 6.2.13(1)(2) of these Standards, although compensating fabric/service measures will need to be taken. See sections 6.1 and 6.2 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The products 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. See section 6.1 of this Certificate.
Regulation:	**12**	**Building standards applicable to conversions**
Comment:		All comments given for the products 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)(b)**	**Fitness of materials and workmanship**
Comment:		The products are acceptable. See section 10 and the *Installation* part of this Certificate.
Regulation:	**29**	**Condensation**
Comment:		The products are acceptable. See section 7.1 of this Certificate.
Regulation:	**39(a)(i)**	**Conservation measures**
Regulation:	**40(2)**	**Target carbon dioxide emission rate**
Comment:		The products can contribute to satisfying this Regulation although compensating fabric / service measures will need to be taken . See sections 6.1 and 6.2 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 sections: 1 *Description* (Table 1), 3 *Delivery and site handling* (3.2 and 3.3) and 12 *General* (12.2, 12.3 and 12.4) of this Certificate.

Additional Information

NHBC Standards 2020

In the opinion of the BBA, Isolair and Pavatherm-Combi Sarking Boards, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapter 7.2 *Pitched roofs*.

CE marking

The Certificate holder has taken the responsibility of CE marking all of the products in accordance with harmonised European Standard BS EN 13171 : 2012 and Isolair (30 to 80 mm thick) also in accordance with BS EN 14964 : 2006.

Technical Specification

1 Description

1.1 Isolair and Pavatherm-Combi Sarking Boards are wood fibre insulation boards. The products have the nominal characteristics given in Table 1.

Table 1 Nominal characteristics

Characteristic (unit)	Pavatherm-Combi	Isolair	Isolair
Thermal conductivity group	41	44	41
Length(1) (mm)	1780	1780 and 2480	1780
Width (mm)	560	750	560
Thickness(2) (mm)	40 – 80(2)	30 – 80(2)	100 – 200(2)
Nominal density ($kg^{-1} \cdot m^{-3}$)	145	200	145
Compressive strength at 10% deformation (CS(10/Y) kPa	100	250	100
Dimensional stability (70,-) %	2	2	2
Water vapour diffusion resistance factor	3	3	3
Edge detail	tongue-and-groove (all edges)		

(1) Other sizes available to special order.
(2) Thickness increment of 20 mm but different thicknesses within the range stated are available to order

1.2 Ancillary items used with the products (but outside the scope of this Certificate) are:

- Pavatape — a butyl rubber tape with laminated aluminium foil
- Pavafix and Pavatape Flex – adhesive tape for joints
- Pavacoll – for joint gluing
- Pavabase or Pavaprim (primer) — for use on cut pieces/edges, prior to taping
- Pavatex system adhesive — in a dispensing gun
- Fixings — Staifix Thor Helical and/or Helifix Inskew 600 and/or EJOT TKR
- Roof tile underlays
- Additional insulation of mineral wool between the rafters.

2 Manufacture

2.1 The products are manufactured from sawmill wood chips.

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 the manufacturer has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by SGS (Certificate FR18/81842815).

3 Delivery and site handling

3.1 Boards are delivered to the site in shrink wrap, with each pack bearing the manufacturer's trade name and identification characteristics.

3.2 Where possible, packs should be stored inside. The products should not be stacked by more than four pallets on top of each other. If stored outside, they should be off the ground on a clean, dry, level surface and under cover to protect against moisture and mechanical damage.

3.3 Where large volumes are stored, particularly indoors, flammable materials and ignition sources should not be permitted in the vicinity.

3.4 Contact with solvent-based wood preservatives, paint thinners and solvents can damage the products and, therefore, should be avoided.

3.5 The boards may suffer damage if handled inappropriately during installation.

3.6 Damaged and wet products should be discarded.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Isolair and Pavatherm-Combi Sarking Boards.

Design Considerations

4 Use

4.1 Isolair and Pavatherm-Combi Sarking Boards are for use above rafters as insulating sarking boards for tiled or slated warm pitched roofs designed and constructed in accordance with the relevant clauses of BS 5250 : 2011 and BS 5534 : 2014 for dwellings or other buildings with similar temperature and humidity conditions. To satisfy the thermal requirements of the documents supporting the national Building Regulations, Isolair (100 to 200 mm thicknesses only) can be used on its own above the rafters; however, additional insulation must be used between the rafters for the other products/thicknesses (see example in section 6.2).

4.2 Roofs should be designed by a suitably competent and experienced individual and constructed in accordance with the relevant clauses of BS 5250 : 2011, BS 5534 : 2014 and BS EN 1995-1-1 : 2004 and its UK National Annex.

4.3 Vapour permeable roof tile underlays used in conjunction with the Isolair (100 to 200 mm thicknesses only) and Pavatherm-Combi (Note: not required with Isolair 30 to 80 mm thicknesses) must have a current BBA Certificate and must be used in accordance with, and within the limitations of, that Certificate. They must be fitted directly onto the surface of these products.

4.4 NHBC standard 7.2.14 requires that the underlays be of low vapour resistance, ie less than 0.25 $MNsg^{-1}$ where fully supported.

4.5 It is essential that detailing and jointing of the boards achieves a convection-free envelope . Any gaps should be filled and/or taped. Ridges, abutments and penetrations should also be sealed. Flue pipes passing through the insulation should be suitably sleeved.

4.6 A ventilated air space of minimum 50 mm may be required between the underside of the roof tile and the upper face of the products. Where underlays are used, they should be draped to allow water to drain behind the tiling battens as per NHBC performance standard 7.2.14.

5 Practicability of installation

The products are designed to be installed by a competent general builder, or a contractor, experienced with these types of product.

6 Thermal performance

6.1 Calculations of the thermal transmittance (U value) of a specific roof construction should be carried out in accordance with BS EN ISO 6946 : 2017 and BRE Report BR 443 : 2006, using the declared thermal conductivities (λ_D) of the products given in Table 2.

Table 2 Declared thermal conductivities of the products

Product	Thickness (mm)	Declared thermal conductivity ($W \cdot m^{-1} \cdot K^{-1}$)
Pavatherm-Combi	40 – 80	0.041
Isolair	30 – 80	0.044
	100 – 200	0.041

6.2 The U value of a completed roof will depend on the thickness of the product, number and type of fixings, and the roof structure and its internal finish. Calculated U values for example constructions are given in Table 3.

Table 3 Example U values for use as sarking board[1][2] in pitched roofs

U value ($W \cdot m^{-2} \cdot K^{-1}$)	U values of pitched roofs $W \cdot m^{-2} \cdot K^{-1}$			
	With 150 mm mineral wool insulation[3] (with λ_D of 0.036 $W \cdot m^{-1} \cdot K^{-1}$) between the rafters (150 mm deep)		With 220 mm mineral wool insulation[3] (with λ_D of 0.036 $W \cdot m^{-1} \cdot K^{-1}$) between the rafters (220 mm deep)	
	Pavatherm-Combi	Isolair	Pavatherm-Combi	Isolair
0.13	–	160	–	100
0.15	–	120	60	60
0.16	–	100	40	40
0.18	80	80	40	30
0.20	60	60 (200[4])	40	30 (200[4])
0.25	40	30 (160[4])	40	30 (160[4])

(1) 8.8% timber (λ = 0.13 $W \cdot m^{-1} \cdot K^{-1}$) bridging with 91.2% of the additional insulation between rafters.
(2) Fastenings: 4 m^{-2} with λ = 17 $W \cdot m^{-1} \cdot K^{-1}$ and cross-sectional area of 12.5 m.
(3) The additional insulation between rafters is a mineral wool fibre-based CE-marked product.
(4) Thickness of Isolair (100-200 mm) required as sarking boards without any use of additional insulation between rafters.

Junctions

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

7 Condensation risk

Interstitial condensation

7.1 Roofs will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2011 Annex H and the relevant guidance.

7.2 The products have a water vapour diffusion resistance factor (μ) of 3.

7.3 A vapour control layer (VCL) should also be used unless a condensation risk analysis in accordance with BS 5250 : 2011 shows that it is not necessary. If a VCL is required and is not practical to be installed, then ventilated voids should be provided as per BS 5250 : 2011 H6.3 (see also section 4.6 of this Certificate).

Surface condensation

7.4 Roofs will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 0.35 $W \cdot m^{-2} \cdot K^{-1}$ at any point and the junctions with walls are designed in accordance with section 6.3 of this Certificate.

7.5 In Scotland, roofs will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 1.2 $W \cdot m^{-2} \cdot K^{-1}$ at any point. Guidance may be obtained from BS 5250 : 2011 Annex H. Further guidance may be obtained from BRE Report BR 262 : 2002 and section 6.3 of this Certificate.

8 Behaviour in relation to fire

8.1 The products have a Class E classification[1] for reaction to fire in accordance with BS EN 13501-1 : 2018. As such, the products are not classified as 'non-combustible' or 'of limited combustibility'.

(1) KIWA classification reports for reaction to fire test: 0110-L-20/4 & 0110-L-20/7; 0111-L-20/4; and 0112-L-20/4 & 0112-L-20/7 issued 11 May 2020 and 5 June 2020.

8.2 The products, when used in pitches greater than 70°, should not be used on buildings in England and Wales that have a storey at least 18 m above ground level and which 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.

8.3 The products must not be carried over junctions with walls that are required to provide a minimum period of fire resistance. The continuity of fire resistance must be maintained, as described in the national Building Regulations

9 Maintenance

9.1 As the products are confined within the pitched roof (see section 10), maintenance is not required.

9.2 Damaged products can be replaced before the installation of counter battens.

10 Durability

The products are durable, rot-proof, dimensionally stable and, when installed with the overlays specified in this Certificate, will remain effective as an insulating material for the life of the building in which they are incorporated.

11 Reuse and recyclability

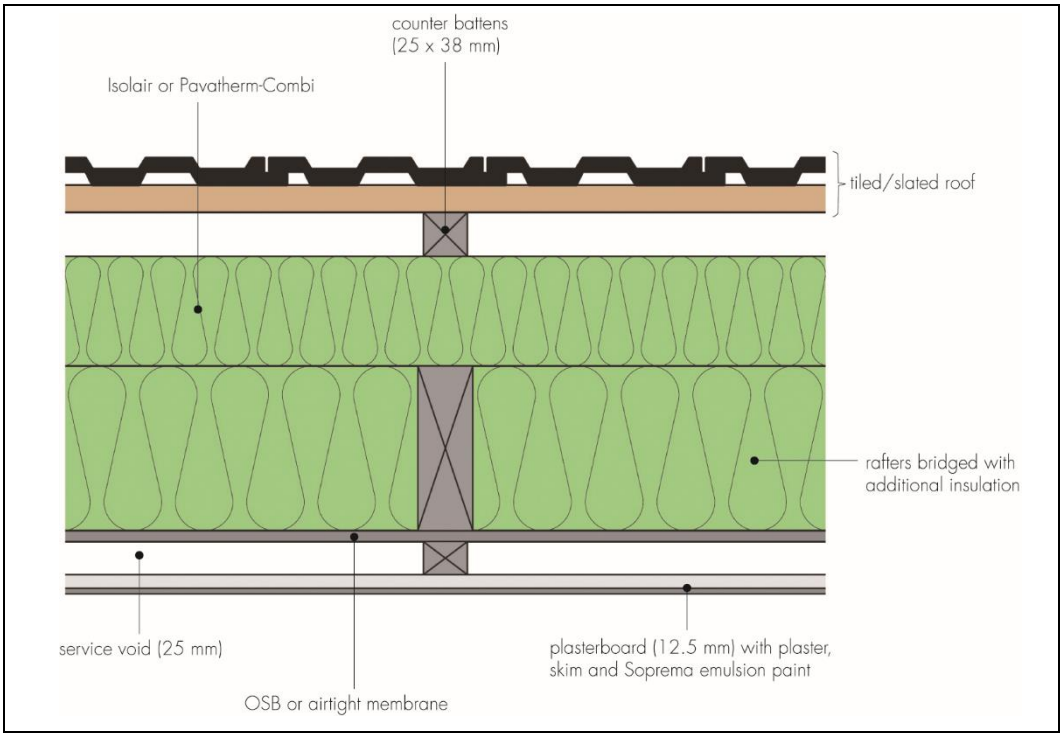
The products comprise wood-fibre that can be recycled.

Installation

12 General

12.1 Installation of Isolair and Pavatherm-Combi Sarking Boards must be in accordance with the relevant clauses of BS 5534 : 2014 and the Certificate holder's instructions (see Figure 1).

Figure 1 Cross section of installed sarking in pitched roof



12.2 The products must be handled with care (see Table 1 for the relevant densities) and some handling difficulties may be experienced in windy conditions. Care must be taken during installation and tiling in accordance with *The Work at Height Regulations*, 2005.

12.3 The products can be cut using a fine-toothed saw or a circular jug saw with a serrated, non-toothed blade, with effective extraction. Care must be taken to prevent damage, particularly to edges. Damaged boards should not be used.

12.4 When cutting the products, an appropriate mask should always be used to avoid inhalation of wood-dust.

12.5 It is important to ensure a tight fit between boards, boards and rafters, and other detailed elements. At ridges and verges, boards should be cut to achieve tightly butted joints, and junctions sealed with primer and Pavatape.

12.6 Boards are fixed to rafters by mechanically fixing through a counter batten, to provide a ventilation space under the roof covering.

12.7 For installation of roof tiles or slates and internal lining boards, see section 4.1 of this Certificate.

13 Procedure

13.1 It is recommended that a sprocket is fixed to each rafter end to secure a retaining batten parallel to the eaves, the same thickness as the sarking board, to resist sliding load and to simplify fixing. The initial course of boards should be tightly butted against the retaining timber.

13.2 The products are laid with the tongue uppermost (towards the ridge) and parallel with the eaves.

13.3 Subsequent boards should be laid, ensuring a tight fit by locating the end tongue, sliding the next board into position (secured by one fixing per board per rafter), and securing by counter battens.

13.4 Joints in the vertical plane should be staggered, to prevent joints falling within the same rafter space. An expansion joint is required for every 15 m of eave.

13.5 Where boards are butt-edge-jointed with the groove still intact, wood-fibre offcuts should be used to fill voids, and the board primed and taped to ensure integrity.

13.6 Where additional roof insulation is required, the relevant manufacturer's instructions should be followed to install between the rafters; the insulation is held in place by the timber battens.

13.7 Fixings used must be in accordance with the Certificate holder's installation instructions.

13.8 Tiling battens are nailed into the counter battens parallel to the eaves at the required gauge in accordance with BS 5534 : 2014.

Technical Investigations

14 Tests

Results of tests were assessed to determine:

- thermal conductivity
- density
- dimensional accuracy
- water vapour resistance
- compressive stress at 10% deformation
- flexural strength
- water absorption
- dimensional stability at 70°C
- reaction to fire.

15 Investigations

15.1 The declared thermal conductivity (λ_D) was determined.

15.2 U value calculations were carried out.

15.3 A condensation risk analysis was carried out.

15.4 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.

Bibliography

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

BS 5534 : 2014 + A1 : 2015 *Slating and tiling for pitched roofs and vertical cladding — Code of practice*

BS EN 1995-1-1 : 2004 + A2 : 2014 *Eurocode 5 : Design of timber structures — General — Common rules and rules for buildings*
NA to BS EN 1995-1-1 : 2004 + A2 : 2014 UK National Annex to *Eurocode 5 : Design of timber structures — General — Common rules and rules for buildings*

BS EN 13171 : 2012 + A1 : 2015 *Thermal insulation products for buildings — Factory made wood fibre (WF) products — Specification*

BS EN 13501-1 : 2018 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*

BS EN 14964 : 2006 *Rigid underlays for discontinuous roofing — Definitions and characteristics*

BS EN ISO 6946 : 2017 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

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

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

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

16 Conditions

16.1 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.

16.2 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.

16.3 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.

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

16.5 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.

16.6 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.

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