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Agrément Certificate

03/4018

Product Sheet 4 Issue 4

WAVIN AQUACELL ATTENUATION AND INFILTRATION SYSTEMS

AQUACELL ECO GEOCELLULAR UNIT

This Agrément Certificate Product Sheet⁽¹⁾ relates to the AquaCell Eco Geocellular Unit, comprising polypropylene geocellular boxes, for use as below-ground water storage attenuation tanks or soakaways to manage stormwater run-off from impermeable surfaces.

(1) Hereinafter referred to as 'Certificate'.

The assessment includes

Product factors:

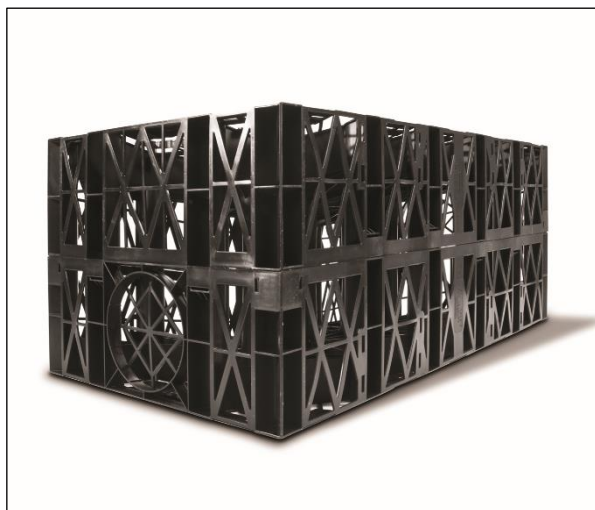
- compliance with Building Regulations
- compliance with additional regulatory or non-regulatory information where applicable
- evaluation against technical specifications
- assessment criteria and technical investigations
- uses and design considerations

Process factors:

- compliance with Scheme requirements
- installation, delivery, handling and storage
- production and quality controls
- maintenance and repair

Ongoing contractual Scheme elements†:

- regular assessment of production
- formal 3-yearly review



KEY FACTORS ASSESSED

- Section 1. Mechanical resistance and stability
- Section 2. Safety in case of fire
- Section 3. Hygiene, health and the environment
- Section 4. Safety and accessibility in use
- Section 5. Protection against noise
- Section 6. Energy economy and heat retention
- Section 7. Sustainable use of natural resources
- Section 8. Durability

The BBA has awarded this Certificate to the company named above for the system described herein. This system 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: 14 August 2024

Hardy Giesler

Originally certified on 15 June 2012

Chief Executive Officer

This BBA Agrément Certificate is issued under the BBA's Inspection Body accreditation to ISO/IEC 17020. Sections marked with † are not issued under accreditation.

The BBA is a UKAS accredited Inspection Body (No. 4345), Certification Body (No. 0113) and Testing Laboratory (No. 0357).

Readers MUST check that this is the latest issue of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.

The Certificate should be read in full as it may be misleading to read clauses in isolation.

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

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SUMMARY OF ASSESSMENT AND COMPLIANCE

This section provides a summary of the assessment conclusions; readers should refer to the later sections of this Certificate for information about the assessments carried out.

Compliance with Regulations

Having assessed the key factors, the opinion of the BBA is that the AquaCell Eco Geocellular Unit, 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 Building Regulations 2010 (England and Wales) (as amended)

Requirement:	H3(3)	Rainwater drainage
Comment:		The system can contribute to satisfying this Requirement. See section 9 of this Certificate.
Regulation:	7(1)	Materials and workmanship
Comment:		The system is acceptable. See sections 8 and 9 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The system can contribute to satisfying this Regulation. See sections 8 and 9 of this Certificate.
Regulation:	9	Building standards – construction
Standard:	3.6	Surface water drainage
Comment:		The system can contribute to satisfying this Standard, with reference to clauses 3.6.1 ⁽¹⁾⁽²⁾ to 3.6.5 ⁽¹⁾⁽²⁾ . See section 9 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The system 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.

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



The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	23(1)(a)(i)	Fitness of materials and workmanship
Comment:	(iii)(b)(i)	The system is acceptable. See sections 8 and 9 of this Certificate.
Regulation:	82	Rainwater drainage
Comment:		The system can contribute to satisfying this Regulation. See section 9 of this Certificate.

Additional Information

NHBC Standards 2024

In the opinion of the BBA, the AquaCell Eco Geocellular Unit, 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 5.3 *Drainage below ground*.

Fulfilment of Requirements

The BBA has judged the AquaCell Eco Geocellular Unit to be satisfactory for use as described in this Certificate. The system has been assessed as a below-ground water storage attenuation tank or soakaway to manage stormwater runoff from impermeable surfaces.

ASSESSMENT

Product description and intended use

The Certificate holder provided the following description for the system under assessment. The AquaCell Eco Geocellular Unit consists of black recycled polypropylene (PP) injection-moulded components:

- two halves assembled to make one unit (6LB025), clipped together on site to form a tank
- shear connectors (6LB102) to hold the units together vertically
- clips (6LB105) to hold the units together horizontally.

160 mm diameter inlet/outlet pipework can be fitted directly to the unit using the connection plate with the 160 mm diameter socket. An adaptor is required for all other pipework.

The system has the characteristics given in Table 1.

Characteristic	Value
Dimensions (mm) (L x W x H)	1000 x 500 x 400
Volume (m ³)	0.20
Storage volume (m ³)	0.19
Void ratio (%)	95
Mass (kg)	7

Ancillary items

The following ancillary items are essential to use with the system and have been assessed with the system:

- Flange adaptor — to connect pipework, with diameters other than a standard DN 160 inlet, into the side plates.

The Certificate holder recommends the following ancillary items for use within the system, but these materials have not been assessed by the BBA and are outside the scope of this Certificate:

- connecting pipework
- access/inspection provision
- outlet flow control device (orifice plate, vortex control or small pipe)
- project-specific geotextiles conforming
- project-specific geomembrane, and protective fleece
- adhesive or double-sided tape
- air vent connection
- silt trap or sediment removal separator.

Definitions for products and applications inspected

Geocellular units are thermoplastic cuboid shaped elements, with or without sidewalls, used to create a modular system made of repeating boxes.

The system is intended for use in the following situations:

- for landscape areas, as defined in CIRIA C680 : 2008, Table 4.2:
 - small gardens or landscaped areas with no vehicle access, such as soakaways for individual house roof drainage. When the system is installed below a garden, it should be a minimum of 5 m from the building and with minimum cover depth of 0.5 m

- landscaped areas where drive-on mowers are used. Minimum cover depth is 0.5 m.
- management of rainwater run-off from impermeable surfaces, as follows:
 - infiltration system (mostly wrapped in geotextiles) — water is stored within the system during rainfall and allowed to drain away by infiltrating into the surrounding ground over a substantial period after the rain has stopped
 - attenuation system (wrapped in geomembranes and/or geotextiles) — water is stored within the system during rainfall and released at a reduced flow rate through a flow control device into an appropriate outfall. This reduces peak flows in the watercourse and, therefore, minimises the risk of flooding
 - a combination of infiltration and attenuation systems
 - rainwater harvesting (wrapped in geomembranes) — water is stored in the tank until required.

Any other applications are outside the scope of this Certificate.

Product assessment – key factors

The system was assessed for the following key factors, and the outcome of the assessment is shown below. Conclusions relating to the Building Regulations apply to the whole of the UK unless otherwise stated.

1 Mechanical resistance and stability

Data were assessed for the following characteristics.

1.1 Strength and stability

1.1.1 Results of short-term compression tests are given in Table 2.

Table 2 Characteristics for strength and stability

System assessed	Assessment method	Requirement	Result
Single unit	Short-term compression strength (as ultimate strength) to Appendix 2 of CIRIA C680 : 2008	Value declared	Vertical: 213 kN·m ⁻² Lateral: 52 kN·m ⁻²
	Short-term elastic deflection to Appendix 2 of CIRIA C680 : 2008 (applied load)		Vertical: 1 mm per 29 kN·m ⁻² Lateral: 1 mm per 9 kN·m ⁻²

1.1.2 On the basis of data assessed, the system is deemed to be fit for purpose for resistance to soil load including traffic load, both during and after installation.

1.1.3 The short-term compression results must not be used to derive design strength directly. Ultimate strength is the maximum recorded strength or the resistance recorded at strain amplitude of 6%, whichever occurs first.

1.1.4 The partial load and material factors defined in CIRIA C680 : 2008, Tables 4.5 and 4.6, may be used in an ultimate limit state design. Where applicable, additional factors must be considered for dynamic and material factors for creep/fatigue.

2 Safety in case of fire

Not applicable.

3 Hygiene, health and the environment

Not applicable.

4 Safety and accessibility in use

Not applicable.

5 Protection against noise

Not applicable.

6 Energy economy and heat retention

Not applicable.

7 Sustainable use of natural resources

The system is manufactured from polypropylene, which can be recycled.

8 Durability

8.1 The potential mechanisms for degradation and the known performance characteristics of the materials in this system were assessed.

8.2 Specific test data were assessed for the following.

Table 3 Characteristics for durability

System assessed	Assessment method	Requirement	Result
Single unit	Long-term deflection to CIRIA C680 : 2008, Annex A2	Declared equation for deflection at defined load at 20°C	Equation for vertical deflection: <ul style="list-style-type: none">• $0.1069 \text{ in } [\text{time}^{(1)}] + 1.2561$ for loads up to $52 \text{ kN}\cdot\text{m}^{-2}$ Equation for horizontal deflection: <ul style="list-style-type: none">• $0.9344 \text{ in } [\text{time}^{(1)}] + 1.3841$ for loads up to $13\text{kN}\cdot\text{m}^{-2}$
PP material	Resistance to chemicals to BS EN 13476-1 : 2018, A.3. For guidance: PD ISO/TR 10358 : 2021	System used for rainwater management	Pass

(1) Time in days

8.2.1 The equations (see Table 3) have been established from creep tests. These can be used to estimate the long-term deflection for periods up to 10 years at 20°C. In locations where settlement is not a concern, designs of up to 50 years can be considered.

8.2.2 On the basis of data assessed, the system is deemed to be suitably resistant to soil and traffic loads, both during and after installation, as well as to the chemicals with which it is likely to come into contact in service.

8.2.3 The system has suitable resistance to the chemicals likely to be encountered in service subject to the water discharged being rainwater, surface water or ground water, excluding chemically contaminated wastewaters, such as industrial discharges. In situations where the system is to be exposed to the excluded influents, specific chemical and temperature resistance must be taken into account by a suitably experienced and competent individual.

8.3 Service life

Under normal service conditions, the system will have a life up to 10 or 50 years (see section 8.2.1), provided it is designed, installed and maintained in accordance with this Certificate and the Certificate holder's instructions.

PROCESS ASSESSMENT

Information provided by the Certificate holder was assessed for the following factors:

9 Design, installation, workmanship and maintenance

9.1 Design

9.1.1 The design process was assessed by the BBA, and the following requirements apply in order to meet the performance assessed in this Certificate:

Guidance on the design and application of Sustainable Drainage Systems (SUDS) must be followed as given in:

- CIRIA C680 : 2008 and CIRIA C753 : 2015
- flood risk and coastal change guidance.

9.1.2 The design of each project must be preceded by a detailed audit of the proposed site to establish:

- existing factors and considerations applicable to the site (eg soil type, presence of groundwater)
- predicted factors relating to the site's use following the planned development, and the parameters within which the installation is required to function (eg depth cover, surface finishing, type of loading)
- the type of function of application suggested by the audit.

9.1.3 Once the specific project criteria have been established from the site audit, the following design criteria must be established:

9.1.3.1 Hydraulic design

9.1.3.1.1 The outflow from the tank must be controlled to comply with the discharge-rate consent of the site. If the anticipated design flow is greater than the hydraulic capacity of a single connection pipe, the flow may be split between a number of pipes from an adjacent manhole. The system designer must ensure that the number and size of the pipe connections is sufficient to convey the anticipated design flow without restriction.

9.1.3.1.2 For infiltration (soakaways) application, either CIRIA Report 156 : 1996 or BRE Digest 365 : 2016 calculations must be followed. In addition, the soil underlying the installation must have adequate permeability and the seasonally high-water table must be a minimum of 1 m below the base of the installation.

9.1.3.1.3 For attenuation (storage) application, the anticipated total run-off volume from the site must be estimated in the calculation, using the Wallingford Procedure or another acceptable method. The allowable discharge rate from the site to an appropriate outfall must be established, but will normally be set by the Environment Agency, Scottish Environmental Protection Agency or Planning Authorities. Furthermore, for sites with a groundwater or high-water table, susceptibility of the tank to float must be taken into consideration.

9.1.3.2 Structural design

9.1.3.2.1 The structural design of each installation incorporating the system must be carried out by a suitably experienced and competent engineer.

9.1.3.2.2 Consideration must be given to the effects of cumulative deflection in systems comprising several layers of units, and care must be taken when the system is used below trafficked areas and close to structures. It is important to ensure that the infiltrating water will not soften the soils or cause loss of fines and subsequent settlement.

9.1.3.2.3 The engineer responsible for the design of the installation must confirm that the allowable ground-bearing capacity at the formation level is sufficient for the proposed operational loads. In areas of weak or compressible soils, advice should be sought from a geotechnical engineer, but such advice is outside the scope of this Certificate.

9.1.3.2.4 When the tank is wrapped in an impermeable geomembrane and placed below the groundwater table, flotation may occur. To prevent this, the weight of the soil over the top of the unit must be greater than the uplift force caused by the unit's buoyancy in the water. This can be achieved with most types of fills if the depth of cover fill is equal to, or greater than, the depth of penetration of the units below groundwater level.

9.2 Installation

9.2.1 Installation instructions provided by the Certificate holder were assessed and judged to be appropriate and adequate.

9.2.2 Installation must be carried out in accordance with this Certificate and the Certificate holder's instructions. A summary of instructions and guidance is provided in Annex A of this Certificate.

9.2.3 To achieve the performance described in this Certificate, the system must be installed and tested in accordance with PD CEN/TR 17179 : 2018 and CIRIA C680 : 2008.

9.2.4 Special attention must be paid to temporary work requirements in excavations. The base must be inspected for soft spots in the formation, and any present must be excavated and replaced with compacted granular fill material. The construction of final cover layers, such as concrete, bituminous or blockwork surfacing, and other finishes must be delayed as much as possible.

9.2.5 Adequate venting must be provided to the tank, through high level pipe connections, direct venting to the atmosphere or via access chambers. One 110 mm diameter air vent is required per 7500 m² impermeable catchment area to be drained.

9.3 Workmanship

9.3.1 Practicability of installation was assessed by the BBA, on the basis of the Certificate holder's information and a site visit to witness an installation in progress. To achieve the performance described in this Certificate, installation of the system must be carried out by a competent general builder, or a contractor, experienced with this type of system.

9.4 Maintenance and repair

9.4.1 Ongoing satisfactory performance of the system in use requires that it is suitably maintained. The guidance provided by the Certificate holder was assessed by the BBA and found to be appropriate and adequate.

9.4.2 The following requirements apply in order to satisfy the performance assessed in this Certificate:

The owner of the structure is responsible for its maintenance. For soakaways to individual houses, the only necessary maintenance of the tank is to keep all gullies clear of debris. For large installations or where the receiving waters are environmentally sensitive, a programme of regular inspections and cleaning of all traps and sumps must be established to prevent siltation of the tank and to ensure its correct performance. Paved surface areas above an installation must be inspected at the same time to ensure they continue to provide the required structural support. The tank must also be inspected after every major storm event.

10 Manufacture

10.1 The production processes for the system have been assessed, and provide assurance that the quality controls are satisfactory according to the following factors:

10.1.1 The manufacturer has provided documented information on the materials, processes, testing and control factors.

10.1.2 The quality control operated over batches of incoming materials has been assessed and deemed appropriate and adequate.

10.1.3 The quality control procedures and system testing to be undertaken have been assessed and deemed appropriate and adequate.

10.1.4 The process for management of non-conformities has been assessed and deemed appropriate and adequate.

10.1.5 An audit of each production location was undertaken, and it was confirmed that the production process was in accordance with the documented process, and that equipment has been properly tested and calibrated.

†10.2 The BBA has undertaken to review 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.

11 Delivery and site handling

11.1 The Certificate holder stated that the system is delivered to site in packaging bearing the system name, part number, Certificate holder name, batch number and date of manufacture. The units are supplied in stacks of 12 or 15 units together with 16 or 20 shear connectors, secured with straps and with plastic feet clipped to the bottom of the stack to enable placing and movement by a forklift.

11.2 Delivery and site handling must be performed in accordance with the Certificate holder's instructions and this Certificate, including:

11.2.1 Requirements for transportation, handling and storage at depots and sites in accordance with PD CEN/TR 17179 : 2018.

11.2.2 The pallets must be carefully placed on level ground and not be stacked on site.

11.2.3 The system must be protected from direct sunlight if long-term storage is envisaged.

11.2.4 The system is resistant to damage that could occur with normal handling. However, it must be stored in locations where impact from vehicles and other construction plant activities will be avoided.

11.2.5 Prior to installation, all components of the system must be checked for damage. Damaged or defective components must not be installed.

Supporting information in this Annex is relevant to the system but has not formed part of the material assessed for the 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.

Management Systems Certification for production

The management system of the manufacturer has been assessed and registered as meeting the requirements of ISO/IEC 9001 : 2015 by SGS UK Ltd (Certificate GB13/88913).

Additional information on installation

A.1 The hole or trench is excavated to the required depth, dimensions and levels. It must be ensured that the plan area is sufficient (minimum 500 mm is recommended) to allow access around the tank to compact backfill material. The base must be smooth and level without sharp drops or humps. Slopes must be cut to a safe angle or adequately supported, and safe access must be provided to allow personnel to enter the excavation. Excavation must be carried out in accordance with BS 6031 : 2009, with particular attention paid to safety procedures.

A.2 The impermeable geomembrane (and geotextile and fleece, if additional protection is required) in the attenuation system and geotextile in the infiltration system are laid over the sand bedding layer and up the sides of the excavation. Joints between adjacent sheets of impermeable membrane must be sealed correctly using proprietary techniques recommended by the manufacturer and in line with PD CEN/TR 17179 : 2018. Jointing with tape is not recommended as the seal becomes reliant on the mechanical properties of the tape to maintain its integrity. The geomembrane is inspected for damage and all welds are tested as required.

A.3 Drainage connections are made to the installation using proprietary adaptors. Pre-formed socket positions for pipe connections must be located at the correct position for receiving pipework. Alternatively, flange adaptors attached to the units with adhesive tape and self-tapping screws are used (flange adaptors cannot be used at the invert of the units into the pre-formed socket). It is recommended that all connections into air vent and storage applications (using a geomembrane) are made using a flange adaptor. Adhesive or double-sided tape must be used between the geomembrane and flange adaptor to ensure a watertight seal. Alternatively, drainage connections are sealed into a pre-formed socket using proprietary seals approved by the geomembrane manufacturer.

A.4 The installation is backfilled with Type 1 or 2 sub-base or Class 6P (side fill only) selected granular material in accordance with the *Manual of Contract Documents for Highway Works* (MCHW), Volume 1 *Specification for Highway Works* (SHW). The backfill is compacted in 150 mm thick layers.

A.5 A coarse sand protection layer, 100 mm thick, should be placed over the top of the units that have been wrapped. Backfilling is continued with:

- trafficked areas (eg car parks) — Type 1 or 2 sub-base material compacted in 150 mm layers in accordance with the MCHW, Volume 1. The mass of compaction plant over the top of the units must not exceed 2300 kg per metre width of roll
- landscaped and non-trafficked areas — selected as-dug material, with size of pieces less than 75 mm, compacted to 90% maximum dry density.

Additional information on maintenance

A.6 It is recommended that a silt trap or sediment removal separator is installed upstream of the inlet pipework to the system and access (via manhole or similar) to the location of flow control devices is incorporated.

A.7 Further guidance on operation and maintenance of the installation may be obtained from CIRIA C753 : 2015.

Bibliography

BRE Digest 365 : 2016 *Soakaway Design*

BS 6031 : 2009 *Code of practice for earthworks*

BS EN 13476-1 : 2018 *Plastics piping systems for non-pressure underground drainage and sewerage — Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) — General requirements and performance characteristics*

CIRIA C680 : 2008 *Structural design of modular geocellular drainage tanks*

CIRIA C753 : 2015 *The SuDS Manual*

CIRIA Report 156 : 1996 *Infiltration drainage — Manual of good practice*

Flood risk and coastal change guidance — *National Planning Policy Framework — August 2022*

ISO/IEC 9001 : 2015 *Quality management systems — Requirements*

Manual of Contract Documents for Highway Works (MCHW), Volume 1 *Specification for Highway Works, Series 0500, Drainage and Service Ducts (02/20)*

PD CEN/TR 17179 : 2018 *Thermoplastics piping and ducting systems — Rainwater infiltration and storage attenuation systems — Practices for underground installation (02/20)*

PD ISO/TR 10358 : 2021 *Plastics pipes and fittings for industrial applications — Collection of data on combined chemical-resistance*

Conditions of Certificate

Conditions

1 This Certificate:

- relates only to the product 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.

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.

3 This Certificate will be displayed on the BBA website, and the Certificate Holder is entitled to use the Certificate and Certificate logo, provided that the product 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.

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

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

6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product which is contained or referred to in this Certificate is the minimum required to be met when the product 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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