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XTRATHERM SAFE-R INSULATION

XTRATHERM SAFE-R SOFFIT (SR/ST) AND SAFE-R SOFFIT PLUS (SR/STP)

This Agrément Certificate Product Sheet⁽¹⁾ relates to Xtratherm Safe-R Soffit (SR/ST) and Safe-R Soffit Plus (SR/STP), rigid phenolic foam boards with a composite foilfacing on both sides, adhesively bonded to a magnesium oxide board (Safe-R Soffit Plus (SR/STP) only), for use in new and existing buildings as soffit insulation in exposed concrete floor decks in car parks, storage areas, loading bays and similar areas beneath habitable buildings. (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 declared thermal conductivities* (λ_D) of 0.021 or 0.020 W·m⁻¹·K⁻¹, depending on their insulation thickness (see section 6).

Behaviour in relation to fire — the use of the products is unrestricted by the national Building Regulations (see section 7).

Mechanical resistance and stability — the products have sufficient strength to resist the loads likely to be encountered in service (see section 8).

Condensation risk — the products can contribute to limiting the risk of condensation (see section 9).

Durability — the products will have adequate resistance to damage and remain effective as an insulating material for the life of the building (see section 12).

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.

(earra)

On behalf of the British Board of Agrément

Date of First issue: 17 June 2019

John Albon **Chief Scientific Officer**

The BBA is a UKAS accredited certification body – Number 113.
urrent 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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Agrément Certificate

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Product Sheet 5



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Claire Curtis-Thomas

Chief Executive

Regulations

In the opinion of the BBA, Xtratherm Safe-R Soffit (SR/ST) and Safe-R Soffit Plus (SR/STP), 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 Bui	lding Regulations 2010 (England and Wales) (as amended)
Requirement: Comment:	A1	Loading The products can contribute to satisfying this Requirement. See section 8.5 of this Certificate.
Requirement: Comment:	B2(1)	Internal fire spread (linings) Use of these products is unrestricted under this Requirement. See sections 7.1 and 7.2 of this Certificate.
Requirement: Comment:	C2(c)	Resistance to moisture The products can contribute to satisfying this Requirement. See sections 9.1 and 9.2 of this Certificate.
Requirement: Comment:	L1(a)(i)	Conservation of fuel and power The products can contribute to satisfying this Requirement. See sections 6.1 and 6.2 of this Certificate.
Regulation:	7 7(1)	Materials and workmanship (applicable to Wales only) Materials and workmanship (applicable to England only)
Comment:	/(1)	The products are acceptable. See section 12 and the <i>Installation</i> part 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; however, compensating
		ability services measures may be required. See sections 6.1 and 6.2 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation: Comment:	8(1)	Durability, workmanship and fitness of materials The products are acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
Regulation: Standard: Comment:	9 1.1	Building standards applicable to construction Structure The products can contribute to satisfying this Standard, with reference to clauses $1.1.1^{(1)(2)}$ and $1.1.3^{(1)(2)}$. See section 8.5 of this Certificate.
Standard: Comment:	2.5	Internal linings Use of these products is unrestricted under this Standard, with reference to clause 2.5.1 ⁽¹⁾⁽²⁾ . See sections 7.1 and 7.2 of this Certificate.
Standard: Comment:	3.15	Condensation The products can contribute to satisfying this Standard, with reference to clauses $3.15.1^{(1)(2)}$, $3.15.4^{(1)(2)}$ and $3.15.5^{(1)(2)}$. See sections 9.1 and 9.3 of this Certificate.

Standard:	6.1(b)	Carbon dioxide emissions
Comment:	6.2	Building insulation envelope The products can contribute to satisfying these Standards, with reference to clauses, or parts of, $6.1.1^{(1)}$, $6.1.2^{(2)}$, $6.1.6^{(1)}$, $6.2.1^{(1)(2)}$, $6.2.3^{(1)}$, $6.2.4^{(2)}$, $6.2.5^{(2)}$, $6.2.6^{(1)}$, $6.2.7^{(1)}$, $6.2.8^{(1)(2)}$ to $6.2.11^{(1)(2)}$, $6.2.12^{(2)}$ and $6.2.13^{(1)(2)}$. See sections 6.1 and 6.2 of this Certificate.
Standard: Comment:	7.1(a)(b)	Statement of sustainability 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. In addition, the products can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4 ⁽¹⁾⁽²⁾ [Aspects 1 ⁽¹⁾⁽²⁾ and 2 ⁽¹⁾], 7.1.6 ⁽¹⁾⁽²⁾ [Aspects 1 ⁽¹⁾⁽²⁾ and 2 ⁽¹⁾] and 7.1.7 ⁽¹⁾⁽²⁾ [Aspect 1 ⁽¹⁾⁽²⁾]. See section 6.1 of this Certificate.
Regulation: Comment:	12	 Building standards applicable to conversions Comments made in relation to 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 Bui	Iding Regulations (Northern Ireland) 2012 (as amended)
Regulation:	23	Fitness of materials and workmanship
Comment:		The products are acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
Regulation: Comment:	29	Condensation The products can contribute to satisfying this Regulation. See section 9.1 of this Certificate.
Regulation: Comment:	30	Stability The products can contribute to satisfying this Regulation. See section 8.5 of this Certificate.
Regulation: Comment:	34	Internal fire spread – linings The products can contribute to satisfying this Regulation. See sections 7.1 and 7.2 of this Certificate.
Regulation: Regulation: Comment:	39(a)(i) 40(2)	Conversation measures Target carbon dioxide emission rate The products can contribute to satisfying these Regulations. 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 (1.2) and 3 Delivery and site handling (3.3 and 3.4) of this Certificate.

Additional Information

NHBC Standards 2019

In the opinion of the BBA, Xtratherm Safe-R Soffit (SR/ST) and Safe-R Soffit Plus (SR/STP), 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 2.1 *The Standards and Technical Requirements*, Technical Requirement R3, *Material Requirements*.

CE marking

The Certificate holder has taken the responsibility of CE marking the Xtratherm Safe-R Soffit (SR/ST) product in accordance with harmonised European Standard BS EN 13166 : 2012. An asterisk (*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 Xtratherm Safe-R Soffit (SR/ST) and Safe-R Soffit Plus (SR/STP) are rigid phenolic boards, faced on both sides with a composite foil. The Safe-R Soffit Plus (SR/STP) has, in addition, a 6 mm magnesium oxide board adhesively bonded to it on one side.

1.2 The products have the nominal characteristics shown in Table 1.

Table 1 Nominal characteristics	
Length* (mm)	2400
Width* (mm)	1200
Insulation thickness* (mm)	40 to 125 (in 5 mm increments)
Minimum compressive strength at 10% compression* (kPa)	120
Edge profile	square

1.3 Ancillary items outside the scope of this Certificate:

- proprietary products for edge protection
- mechanical fixings.

2 Manufacture

2.1 For the insulation board, raw materials are injected onto the lower foil-facer on a conveyor belt. The exothermic reaction expands the foam, which then comes into contact with the upper foil-facer. An automated process cures the products and cuts them to the required size. For the Xtratherm Safe-R Soffit Plus (SR/STP) product, the magnesium oxide board is adhered to the insulation board to complete the process.

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 being operated by the manufacturer are being maintained.

2.3 The management system of Xtratherm UK Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 and BS EN ISO 14001 : 2015 by BRE Certification Ltd (Certificates 718QMS and 718EMS).

3 Delivery and site handling

3.1 The products are delivered to site in polythene-wrapped packs. Each pack contains a label bearing the manufacturer's name, the board dimensions and the BBA logo incorporating the number of this Certificate.

3.2 The products must be protected from prolonged exposure to sunlight, and stored dry, flat and raised above ground level (to avoid contact with ground moisture). Where possible, packs should be stored inside. If stored outside, the products should be under cover or protected by opaque polythene sheeting. Any wet or damaged boards should be discarded.

3.3 The products must not be exposed to a naked flame or other ignition sources, or to organic solvents or other chemicals.

3.4 When using power saws and sanders for cutting, dust-extraction equipment must be used to control dust levels. The magnesium oxide board's occupational exposure $limit^{(1)}$ must not exceed 10 mg·m⁻³ for inhalable dust and 4 mg·m⁻³ for fume and respirable dust.

(1) EH40/2005: Workplace exposure limits.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Xtratherm Safe-R Soffit (SR/ST) and Safe-R Soffit Plus (SR/STP).

Design Considerations

4 Use

4.1 Xtratherm Safe-R Soffit (SR/ST) and Safe-R Soffit Plus (SR/STP) boards are satisfactory for use as soffit insulation and are effective in reducing the thermal transmittance (U value) of new or existing exposed concrete floor decks in car parks, storage areas, loading bays and other similar areas, beneath habitable buildings.

4.2 Existing constructions must be in a good state of repair. Defects must be made good prior to installation.

5 Practicability of installation

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

6 Thermal performance



6.1 Calculations of thermal transmittance (U values) should be carried out in accordance with BS EN ISO 6946 : 2017 and BRE Report BR 443 : 2006, using the declared thermal conductivity (λ_D) value shown in Table 2 for the insulation, and a thermal resistance value of 0.033 m²·K·W⁻¹ for the magnesium oxide board.

Table 2 Declared thermal conductivity value			
Insulation thickness (mm)	Thermal conductivity (W·m ⁻¹ ·K ⁻¹)		
40 to 99	0.021		
100 to 125	0.020		

6.2 The U value of a completed wall construction will depend on the insulation thickness, number and type of fixings, the insulating value of the substrate and its internal finish. Calculated U values for example constructions are given in Table 3.

Table 3 Example floor U values ⁽¹⁾					
U value requirement ⁽²⁾ (W·m ⁻² ·K ⁻¹)	Safe-R Soffit (SR/ST) insulation thickness (mm) ⁽²⁾⁽³⁾	Safe-R Soffit Plus (SR/STP) insulation thickness (mm) ⁽³⁾⁽⁴⁾			
0.13	—	—			
0.15	_	_			
0.20	115	116 ⁽⁵⁾			
0.22	100	106 ⁽⁵⁾			
0.25	90	96 ⁽⁵⁾			

(1) Values include reduction due to a 0.01 W·m⁻²·K⁻¹ gap correction and the mechanical fixings causing bridging $-\Delta U/U > 3\%$ of U value. 4.2 fixings per m², $\lambda = 17$ W·m⁻¹·K⁻¹ and cross-sectional diameter of 8 mm.

(2) Construction (internal to external): 150 mm concrete and Xtratherm Safe-R Soffit (SR/ST).

(3) Nearest available thickness.

(4) Construction (internal to external): 150 mm concrete and Xtratherm Safe-R Soffit Plus (SR/STP).

(5) Includes the 6 mm magnesium oxide board.

6.3 Designers must limit excessive heat loss at junctions between the wall and the structural floor.

7 Behaviour in relation to fire



7.1 The composite product with the magnesium oxide board forming the exposed face of the product (Safe-R Soffit Plus [SR/STP]) achieved a reaction to fire rating* of B-s1, d0⁽¹⁾ and the underlying faced phenolic insulation material (Safe-R Soffit [SR/ST]), a rating of B-s1, d0⁽²⁾ (for thicknesses between 40 and 125 mm) when classified to BS EN 13501-1 : 2007.

7.2 The use of the products as soffit insulation for exposed floor decks is therefore unrestricted by the national Building Regulations in relation to internal fire spread.

(1) CREPIM, report ref 2545/14/093 A&B, 10 July 2016. Copies can be obtained from the Certificate holder.

(2) CREPIM, report ref 2545/09/332 B, issue 01, 30 January 2018. Copies can be obtained from the Certificate holder.

7.3 If the products are painted or covered, the fire performance of particular coatings is outside the scope of this Certificate and should be the subject of assessment and/or test by a UKAS-accredited fire testing laboratory.

7.4 All fixings should be of a non-combustible type, to resist the increased duty that may be required in a fire.

8 Mechanical resistance and stability

8.1 The products are mechanically fixed to the structural floor with a minimum of 12 fixings per board, with the fixing pattern as shown in Figure 1.

8.2 When attached to a suitable structural floor with an appropriate number of fixings, the products can adequately resist design loads applicable in the UK.

8.3 Positive wind load (pressure) is transferred to the substrate structural floor directly via bearing and compression of the products.

8.4 Negative wind pressure (suction) is resisted by the fixings which retain the products.



8.5 The wind loads on the structural floor should be calculated by a suitably competent and experienced individual in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex. Special consideration should be given to locations with high wind-load pressure coefficients as additional fixings may be necessary. In accordance with BS EN 1990 : 2002 and its National Annex, it is recommended that a partial load factor of 1.5 is used to determine the ultimate wind load to be resisted by the products.

8.6 Assessment of structural performance for individual buildings must be carried out by a suitably qualified and experienced individual to confirm that:

- the structural floor is suitable for receiving fixings and has adequate strength to resist any additional loads that may be applied as a result of installing the product. The floor designer should be consulted.
- the proposed product and associated fixing layout provides adequate resistance to negative wind loads (based on the results of the site-specific investigation)
- an appropriate number of site-specific pull-out tests are conducted on the substrate of the building to determine the minimum resistance to failure of the fixings. The characteristic pull-out resistance should be determined in accordance with the guidance given in EOTA Technical Report TR051 : 2018.

8.7 The number and centres of fixings should be determined by a suitably experienced and competent individual. Provided the structural floor is suitable and an appropriate fixing and depth of embedment is selected, the mechanical fixings will transfer the weight of the product to the structural floor.

8.8 The resistance forces data given in Table 4 are the results of calculations based upon pull-through resistances determined by the BBA from tests on a polypropylene render fixing with a 50 mm diameter head and a glass-reinforced plastic nail.

Factor (unit)	Safe-R Soffit (SR/ST) ⁽¹⁾		Safe-R	Soffit Plus (SR	:/STP) ⁽¹⁾	
Product thickness (m)	All product thicknesses			All product thicknesses		
Fixing position	Centre	Edge	Corner	Centre	Edge	Corner
Characteristic pull-through resistance ⁽²⁾ (per anchor) (N)	558	625	375	619	530	704
Factor of safety	3	3	3	3	3	3
Design pull-through resistance ⁽³⁾ (N)	186	208	125	206	177	235

Table 4 Data for calculation of wind load capacity

(1) Calculation based on insulation board 2.4 by 1.2 m (total area 2.88 m²) attached by 12 fixings (ie, 4.16 fixings per m²).

(2) Pull-through resistance of the product over the head of the fixing (see section 1.3).

(3) The safety factor of 3 is applied and based on the assumption that all boards are quality control tested to ensure consistency of the tensile strength perpendicular to the face of the board.

9 Condensation risk

Interstitial condensation



9.1 Floors incorporating the product can limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2011, Annex F and the relevant guidance. When designing buildings with a higher humidity class than 'humidity class 3', a site-specific assessment should be made in accordance with BS EN 15026 : 2007, using the values in Table 5. The calculation will be sensitive to the water vapour resistance of the concrete slab above the product and to the overall floor construction.

Table 5 Material properties		
Material	Water vapour resistance (MN∙s•g ⁻¹)	Water vapour resistivity (MN·s·g ⁻¹ ·m ⁻¹)
Phenolic foam	-	171
Composite foil facing	4.77	-
Magnesium oxide	1.7	-

Surface condensation



9.2 Floors will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 0.7 $W \cdot m^{-2} \cdot K^{-1}$ at any point.



9.3 Floors 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.

10 Materials in contact — wiring installations

10.1 De-rating of electric cables should be considered in areas where the product restricts the flow of air.

10.2 Recessed lighting must not be used with this form of insulation.

11 Maintenance

The products do not require maintenance. Minor surface damage can be repaired with proprietary fillers – further advice should be sought from the Certificate holder. Major damage may require the replacement of the products.

12 Durability



The products will remain effective as soffit insulation for the life of the building providing major damage does not occur during service.

Installation

13 General

13.1 Installation of Xtratherm Safe-R Soffit (SR/ST) and Safe-R Soffit Plus (SR/STP) must be in accordance with the Certificate holder's installation instructions and the requirements of this Certificate.

13.2 The product is fixed directly to a concrete soffit.

13.3 The product may be cut using a fine-toothed saw with a hardened blade.

- 13.4 Board joints should preferably be staggered.
- 13.5 The board should be fixed to the soffit using a minimum of 12 approved fasteners. See example layout in Figure 1.



13.6 The distance between the fixings and the panel edge should not be less than 50 mm, or greater than 100 mm.

13.7 The fasteners must penetrate into the concrete soffit to the minimum distance as recommended by the fixing manufacturer for the installation in question (see section 8).

13.8 Care should be taken in the detailing of the products at the floor perimeter to ensure adequate protection against precipitation. Proprietary products must be used to adequately seal the product edges from precipitation (outside the scope of this Certificate).

Technical Investigations

14 Tests

Results of tests were assessed, to determine:

- water vapour permeability of the magnesium oxide board
- water impermeability of the magnesium oxide board
- laminate bond strength between the insulation and the magnesium oxide board
- thermal conductivity
- board flexural strength
- impact resistance
- pull-through strength of the specified fixing.

15 Investigations

- 15.1 Existing data on durability and properties in relation to fire were evaluated.
- 15.2 A calculation was undertaken to confirm the declared thermal conductivity (λ_D).
- 15.3 A series of U value calculations was carried out.
- 15.4 A condensation risk analysis was carried out.
- 15.5 A series of wind suction resistance calculations was carried out.

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

Bibliography

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 1990 : 2002 Eurocode — Basis of structural design NA to BS EN 1990 : 2002 UK National Annex for Eurocode : Basis of structural design

BS EN 1991-1-4 : 2005 Eurocode 1 : Actions on structures — General actions — Wind actions NA to BS EN 1991-1-4 : 2005 UK National Annex to Eurocode 1 : Actions on structures — General actions — Wind actions

BS EN 13166 : 2012 + A2 : 2016 Thermal insulation products for buildings — Factory made phenolic foam (PF) products — Specification

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 15026 : 2007 Hygrothermal performance of building components and building elements — Assessment of moisture transfer by numerical simulation

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

BS EN ISO 14001 : 2015 Environmental Management systems — Requirements with guidance for use

EOTA Technical Report TR051 : 2018 Recommendations for job-site tests of plastic anchors and screws

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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