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Agrément Certificate
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Product Sheet 5 Issue 3

TRIFLEX COLD LIQUID APPLIED WATERPROOFING AND SURFACING SYSTEMS

TRIFLEX TOWERSAFE SOLVENT-FREE WIND TURBINE FOUNDATION AND JOINT WATERPROOFING SYSTEM

This Agrément Certificate Product Sheet(1) relates to the Triflex Towersafe Solvent-Free Wind Turbine Foundation and Joint Waterproofing System, for use in waterproofing the foundations of wind turbine towers and wind turbine tower joints.

(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 Third issue: 10 December 2025
Originally certified on 20 November 2013

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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

In the opinion of the BBA, the Triflex Towersafe Solvent-Free Wind Turbine Foundation and Joint Waterproofing System is not subject to the national Building Regulations.

Fulfilment of Requirements

The BBA has judged the Triflex Towersafe Solvent-Free Wind Turbine Foundation and Joint Waterproofing System to be satisfactory for use as described in this Certificate. The system has been assessed for use in waterproofing the foundations of wind turbine towers and wind turbine tower joints.

ASSESSMENT

Product description and intended use

The Certificate holder provided the following description for the system under assessment. The Triflex Towersafe Solvent-Free Wind Turbine Foundation and Joint Waterproofing System is based on a reinforced, two-component, solvent-free, liquid-applied polymethylmethacrylate membrane consisting of:

- Triflex Towersafe — a polymethylmethacrylate resin
- Triflex Catalyst — a benzoyl peroxide catalyst
- Triflex 110 g Reinforcement — a polyester fleece with a nominal mass per unit area of 110 $g \cdot m^{-2}$.

Ancillary Items

The following ancillary items are recommended for use with the system and have been assessed with the system:

- Triflex Towersafe Primer — a two-component, polymethylmethacrylate primer for use on porous substrates such as concrete and cementitious screeds
- Triflex Towersafe Finish — a two-component, polymethylmethacrylate-based finish available in a range of colours
- Triflex Reinforced Tape — for use over joints to act as a de-bonding tape
- Graded quartz aggregate (0.7 to 1.2 mm) - for incorporating into the system for anti-slip properties
- Triflex Cleaner — a cleaner used for cleaning tools, cleaning substrates and the reactivation of the cured Triflex Towersafe membrane prior to overcoating when work is interrupted for periods in excess of 12 hours.

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

- primers and pre-treatments for open textured and porous cementitious substrates, metals and coated metals
- anti-corrosion and etch primers for metals
- compounds for small and large scale filling, levelling and repair
- fibre-reinforced detailing resin for complex, less critical and difficult-to-access details.

Applications

The system has been assessed for use on concrete or cementitious screeds primed with Triflex Towersafe Primer and unprimed steel(1).

(1) The Certificate holder can be consulted for advice on the preparation and priming of other substrates, but these substrates and advice 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 assessments is shown below.

1 Mechanical resistance and stability

Not applicable.

2 Safety in case of fire

Not applicable.

3 Hygiene, health and the environment

Data were assessed for the following characteristics.

3.1 Weathertightness

3.1.1 Results of weathertightness tests are given in Table 1.

Table 1 Weathertightness

System assessed	Assessment method	Requirement	Result
Triflex Towersafe	Water vapour transmission rate to prEN 495-4 : 1991	Value achieved	1.44 $g \cdot m^{-2} \cdot day^{-1}$
Triflex Towersafe	Watertightness under 10 kPa pressure to EOTA TR-003 : 2004	No leakage	Pass
Triflex Towersafe	Resistance to delamination to EOTA TR-004 : 2004	≥ 50 kPa	
- on concrete	Tested at 23°C		Pass
	Tested at 40°C		Pass
- on steel	Tested at 23°C		Pass
	Tested at 40°C		Pass

3.1.2 On the basis of data assessed, the system will adequately resist the passage of moisture into the interior of a structure.

3.1.3 The adhesion of the system is sufficient to resist the effects of wind suction, elevated temperature and thermal shock conditions likely to occur in practice and remain weathertight.

3.2 Resistance to mechanical damage

3.2.1 Results of resistance to mechanical damage tests are given in Table 2.

Table 2 Resistance to mechanical damage

System assessed	Assessment method	Requirement	Result
Triflex Towersafe	Resistance to dynamic indentation to EOTA TR-006 : 2004	Value achieved	
- on concrete	Tested at 23°C		I_4
	Tested at –30°C		I_4
- on steel	Tested at 23°C		I_4
	Tested at –30°C		I_4
Triflex Towersafe	Resistance to static indentation to EOTA TR-007 : 2004	Value achieved	
- on concrete	Tested at 23°C		L_4
	Tested at 90°C		L_4
- on steel	Tested at 23°C		L_4
	Tested at 90°C		L_4
Triflex Towersafe	Resistance to fatigue movement to EOTA TR-008 : 2004 (1000 cycles at –10°C)	Watertight and less than 75 mm delamination from substrate	Pass

3.2.2 On the basis of data assessed, the system can accept, without damage, light concentrated loads associated with installation and maintenance and the effects of minor movement likely to occur in practice while remaining weathertight.

3.2.3 In areas of heavy traffic, an additional coat of Triflex Towersafe resin can be applied, filled with aggregate and sealed with a coat of Triflex Towersafe Finish.

3.3 Resistance to root penetration

3.3.1 Results of a resistance to root penetration test is given in Table 3.

Table 3 Resistance to root penetration

System assessed	Assessment method	Requirement	Result
Triflex Towersafe	Resistance to root penetration to FLL Method (1999)	No penetrated roots or rhizomes after 2 years	Pass

3.3.2 On the basis of data assessed, the system will resist the penetration by plant roots and rhizomes.

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

Not applicable.

8 Durability

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

8.2 Specific test data were assessed as given in Table 4.

Table 4 Durability

System assessed	Assessment method	Requirement	Result
Triflex Towersafe	Resistance to fatigue movement to EOTA TR-008 : 2004 after heat ageing to for 200 days at 80°C to EOTA TR-011 : 2004 (500 cycles at –10°C)	Watertight and less than 75 mm delamination from substrate	Pass
Triflex Towersafe - on concrete	Resistance to delamination to EOTA TR-004 : 2004 after exposure to water for 180 days at 60°C to EOTA TR-012 : 2004	≥ 50 kPa	Pass
Triflex Towersafe	Dynamic indentation to	Value achieved	
- on concrete	EOTA TR-006 : 2004		I_4
- on steel	after heat ageing for 200 days at 80°C to EOTA TR-011 : 2004 (tested at –30°C)		I_4
- on concrete	after UV ageing for 1000 MJ·m^{-2} at 60°C to		I_4
- on steel	EOTA TR-010 : 2004(tested at –10°C)		I_4
Triflex Towersafe	Static indentation to	Value achieved	
- on concrete	EOTA TR-007 : 2004		L_4
- on steel	after exposure to water for 180 days at 60°C to EOTA TR-012 : 2004 (tested at 90°C)		L_4
Triflex Towersafe	Tensile strength to EN ISO 527-1 : 1993 after heat ageing for 200 days at 80°C to EOTA TR-011 : 2004	No significant change against control	
	Longitudinal direction		Pass
	Transverse direction		Pass
	after UV ageing for 1000 MJ·m^{-2} at 60°C to EOTA TR-010 : 2004		
	Longitudinal direction		Pass
	Transverse direction		Pass
Triflex Towersafe	Elongation to EN ISO 527-1 : 1993 after heat ageing for 200 days at 80°C to EOTA TR-011 : 2004	No significant change against control	
	Longitudinal direction		Pass
	Transverse direction		Pass
	after UV ageing for 1000 MJ·m^{-2} at 60°C to EOTA TR-010 : 2004		
	Longitudinal direction		Pass
	Transverse direction		Pass

8.3 Service life

Under normal service conditions, the system will have a life in excess of 25 years, 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 satisfy the performance assessed in this Certificate.

9.1.2 The substrate to which the system is to be applied must be structurally sound, clean, dry and free from laitance and other contamination that could affect the adhesion of the system.

9.1.3 The suitability of the substrate must be confirmed on a case-by-case basis by the Certificate holder, but such advice is outside the scope of this Certificate.

9.1.4 The design of the joint detailing must be confirmed on a case-by-case basis. The Certificate holder must be consulted with regard to suitable recommendations, but such advice is outside the scope of this Certificate.

9.1.5 Measures must be taken to prevent moisture reaching the system from below. The Certificate holder must be consulted for suitable methods, but such advice is outside the scope of this Certificate.

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 the relevant clauses of BS 8000-0 : 2014, BS 8000-4 : 1989, the Certificate holder's instructions and this Certificate.

9.2.3 Installation must not be carried out during inclement weather, eg rain, fog or snow, and the ambient air and substrate temperature must be between -5 and 40°C and at least 3°C above the dew point.

9.2.4 Substrates to which the system is to be applied must be sound, clean, frost-free, dry and free from sharp projections. The Certificate holder's advice must be sought with regard to the suitability of the substrate to receive the system, suitable cleaning procedures and the use of a proprietary surface cleaner/HSE approved fungicidal wash where required, but such advice is outside the scope of this Certificate.

9.2.5 Previously coated areas must be checked for integrity and adequate adhesion to the substrate. Defects such as cracks and blisters must be repaired prior to application of the system in accordance with the Certificate holder's instructions.

9.2.6 Adhesion checks must be carried out to ensure that the system is compatible with the existing surfaces. The Certificate holder must be consulted for details of suitable test methods and requirements before use, but such advice is outside the scope of this Certificate.

9.2.7 All equipment must be cleaned with Triflex Cleaner.

9.2.8 Joints and details must be pre-treated prior to the final waterproofing layer being applied.

9.2.9 Transition joints between the tower and the foundation and other component joints may be sealed with a suitable joint sealant, if required, but must be taped over with Triflex Reinforced Tape as a minimum.

9.2.10 The Triflex Towersafe base component is mixed thoroughly using a slow speed agitator fitted with a suitable mixing paddle. The required quantity of catalyst is added and stirring is continued until the mixture is lump-free, and in any event for at least two minutes. The amount of catalyst required will depend on the ambient temperature, and the Certificate holder's technical data sheet/product label must be consulted for the required amount.

9.2.11 A layer of the mixed Triflex Towersafe is applied with a lambswool roller to the clean, prepared and, if required, primed substrate at a minimum application rate of 2.0 $kg \cdot m^{-2}$.

9.2.12 Triflex 110 g Reinforcement is rolled and embedded into the wet coating, avoiding creasing and trapped air. Adjacent lengths of the reinforcement must overlap by a minimum of 50 mm (100 mm if left over 12 hours) ensuring that there is sufficient coating to fully encapsulate it. Additional coating is applied if required.

9.2.13 A second coat of mixed Triflex Towersafe resin is applied, wet on wet, by roller at a minimum application rate of 1.0 $kg \cdot m^{-2}$.

9.2.14 At each stage a check must be made to ensure that the system has been applied to the minimum consumption. If a localised area has been applied below the minimum consumption, the affected area must be removed and reapplied to the specification.

9.2.15 The entire area is coated with Triflex Towersafe resin as described in sections 9.2.11 to 9.2.13, ensuring a minimum 50 mm overlap (100 mm if left over 12 hours) of adjacent sheets of Triflex 110 g Reinforcement.

9.2.16 Where a heavy duty anti-slip finish is required, another layer of Triflex Towersafe resin is applied at a rate of 1.0 kg·m^{-2} and immediately broadcast with (0.7 – 1.2 mm) graded quartz sand at an approximate rate of 7 kg·m^{-2}, ensuring that the areas around joints are avoided. Once cured, excess quartz is removed and a layer of Triflex Towersafe Finish is applied at a coverage rate of 0.6 kg·m^{-2}.

9.2.17 If work is interrupted for periods in excess of 12 hours, the cured membrane must be reactivated by wiping with Triflex Cleaner. Overcoating must proceed after evaporation of the cleaner has occurred (approximately 20 minutes), but within 60 minutes, otherwise the process must be repeated.

9.3 Workmanship

Practicability of installation was assessed by the BBA on the basis of the Certificate holder's information. To achieve the performance described in this Certificate, installation of the system must be carried out by installers who have been trained and authorised by the Certificate holder.

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:

9.4.2.1 The system must be periodically inspected for damage to ensure continued performance.

9.4.2.2 Maintenance must include checks and operations to ensure that the build-up of silt and other debris does not occur.

9.4.2.3 Any damage to the system must be repaired as soon as possible to ensure that the integrity of the waterproofing is maintained. Repairs must be carried out to reinstate the damaged area to the original specification in accordance with the Certificate holder's instructions.

9.4.2.4 Where damage has occurred, the system must be repaired at the earliest opportunity in accordance with the Certificate holder's instructions and the following:

- areas of damaged system must be cut back to sound, well-adhering material and cleaned with Triflex Cleaner
- after the cleaner has evaporated, the system is installed as described in section 9.2, ensuring that there is at least a 100 mm overlap over the existing sound material.

9.4.2.5 In the event of the system being contaminated by oil, grease or other chemicals, the advice of the Certificate holder must be sought, but such advice is outside the scope of this Certificate.

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 product 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 packs consisting of liquid base resin and powder catalyst components. The packs bear a label that includes the component name, health and safety information, and batch number. The components are available in the pack sizes detailed in Table 5.

Table 5 Pack sizes

Component	Pack sizes
Triflex Towersafe	15 kg
Triflex Towersafe Finish	10 kg, 980 kg
Triflex Catalyst	100 g, 1 kg (bags), 25 kg (box)
Triflex Towersafe Primer	10 kg, 910 kg
Triflex Cleaner	9 litre, 27 litre
Triflex 110 g Reinforcement	50 m (length) x 15, 20, 26.25, 35, 52.5, 70 or 105 cm (widths) rolls

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

11.2.1 The system components must be stored in a cool, dry location and protected from freezing temperatures and direct sunlight.

11.2.2 Rolls of Triflex 110 g Reinforcement must be stored vertically in a dry, clean environment and protected from moisture.

11.2.3 Triflex Catalyst must be stored at a temperature below 30°C in closed containers, away from sources of ignition and protected from direct sunlight.

†ANNEX A – SUPPLEMENTARY INFORMATION

Supporting information in this Annex is relevant to the product 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.

CLP Regulations

The Certificate holder has taken the responsibility of classifying and labelling the system components under the *GB CLP Regulation* and *CLP Regulation (EC) No 1272/2008 - classification, labelling and packaging of substances and mixtures*. Users must refer to the relevant Safety Data Sheet(s).

UKCA marking

The Certificate holder has taken the responsibility of UKCA marking the system in accordance with UKAD 030350-00-0402.

CE marking

The Certificate holder has taken the responsibility of CE marking the system in accordance with EAD 030350-00-0402.

Management Systems Certification for production

The management system of the manufacturer has been assessed and registered as meeting the requirements of EN ISO 9001 : 2015, EN ISO 14001 : 2015 and EN ISO 50001 : 2011 by DEKRA (Certificates 80408283/4, 170408038/3 and 1800414009 respectively).

Bibliography

BS 8000-0 : 2014 *Workmanship on construction sites — Introduction and general principles*
BS 8000-4 : 1989 *Workmanship on building sites — Code of practice for waterproofing*

EAD 030350-00-0402 *Liquid applied roof waterproofing kits*

EN ISO 527-1 : 1993 *Plastics — Determination of tensile properties — General principles*

EN ISO 9001 : 2015 *Quality managements systems — Requirements*

EN ISO 14001 : 2015 *Environmental management systems — Requirements*

EN ISO 50001 : 2011 *Energy management systems — Requirements with guidance for use*

EOTA TR-003 : 2004 *Determination of the watertightness*
EOTA TR-004 : 2004 *Determination of the resistance to delamination*
EOTA TR-006 : 2004 *Determination of the resistance to dynamic indentation*
EOTA TR-007 : 2004 *Determination of the resistance of static indentation*
EOTA TR-008 : 2004 *Determination of the resistance of fatigue movement*
EOTA TR-010 : 2004 *Exposure procedure for artificial weathering*
EOTA TR-011 : 2004 *Exposure procedure for accelerated ageing by heat*
EOTA TR-012 : 2004 *Exposure procedure for accelerated ageing by hot water*

FLL Method (1999) *Forschungsgesellschaft Landschaftsentwicklung und Landschaftsbau Method for testing root penetration resistant materials*

prEN 495-4 : 1991 *Thermoplastic and elastomeric roofing and sealing sheets — Determination of water vapour transmission properties*

UKAD 030350-00-0402 *Liquid applied roof waterproofing kits*

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
- 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
- and any matter arising out of or in connection with it or its subject matter (including non-contractual disputes or claims) is governed by and construed in accordance with the law of England and Wales.
- the courts of England and Wales shall have exclusive jurisdiction to settle any matter arising out of or in connection with this Certificate or its subject matter (including non-contractual disputes or claims).

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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