

TCB ANTI-CORROSION PROTECTIVE COATING

GREENKOTE

This HAPAS Certificate Product Sheet⁽¹⁾ is issued by the British Board of Agrément (BBA), supported by Highways England (HE) (acting on behalf of the Overseeing Organisations of the Department for Transport; Transport Scotland; the Welsh Government and the Department for Infrastructure, Northern Ireland), the Association of Directors of Environment, Economy, Planning and Transport (ADEPT), the Local Government Technical Advisers Group and industry bodies. HAPAS Certificates are normally each subject to a review every three years.

(1) Hereinafter referred to as 'Certificate'.

This Certificate relates to Greenkote⁽¹⁾, an anti-corrosion protective coating factory-applied to steel fixings used on steel highways structures which are painted after installation with one of three specified Highways England paint systems. The mechanical performance of the fixings is outside the scope of this Certificate.

(1) Greenkote is a registered trade mark.

CERTIFICATION INCLUDES:

- factors relating to compliance with HAPAS requirements
- factors relating to compliance with Regulations 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

Corrosion resistance — painted fixings coated with the product have comparable corrosion resistance to painted fixings protected by galvanizing to a thickness of 85 to 100 µm (see section 6).

Resistance to mechanical damage — any scratches on the fixing will be sacrificially protected by the zinc in the coating, provided that any damage sustained to the organic coating in service is repaired as soon as is practicable (see section 7).

Mechanical properties — application of the product will not significantly affect the integrity of the steel fixing (see section 8).

Compatibility with other materials — the product is compatible with the materials likely to be found in steel highways structures (see section 9).

Durability — when painted as described in this Certificate, the coating will perform satisfactorily as an anti-corrosive treatment for a period at least equivalent to that achieved by galvanizing to a thickness of 85 to 100 µm (see section 11).

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

On behalf of the British Board of Agrément

Date of Fourth issue: 26 July 2021

Originally certificated on 21 June 2007



Hardy Giesler
Chief Executive Officer

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

*The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk
Readers MUST check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.
Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.*

Requirements

The Highways Technical Advisory Committee (HiTAC) has agreed with the BBA the aspects of performance to be used by the BBA in assessing the compliance of paints and similar protective coatings as set out in the following documents:

- the *Manual of Contract Documents for Highways Works* (MCHW)⁽¹⁾, Volume 1 (Paints), Series 1900 and 5000
- the MCHW, Volume 2, Series NG 1900 and NG 5000
- the Design manual for Roads and Bridges (DMRB), CG 303
- the DMRB, CM 431.

(1) The MCHW is operated by the Overseeing Organisations: Highways England (HE), Transport Scotland, the Welsh Assembly Government and the Department for Infrastructure (Northern Ireland).

Regulations

Construction (Design and Management) Regulations 2015

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

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

See section: *3 Delivery and site handling* (3.1 and 3.2) of this Certificate.

Technical Specification

1 Description

1.1 Greenkote is a factory-applied, zinc/aluminium, anti-corrosive protective coating for use on steel fixings (including nuts, washers and tension control bolts) intended for use on steel highways structures where galvanizing would normally be used. The mechanical performance of the fixings is outside the scope of this Certificate.

1.2 The product is available to a single formulation and a minimum local coating thickness of 25 µm.

2 Manufacture

2.1 The product is factory-applied to the fixings in a thermo-chemical-surface modification (TCSM) process after cleaning and abrasive shot blasting of the steel substrate. The manufacturing process does not involve conditions likely to cause hydrogen embrittlement and does not have an adverse effect on the integrity of the substrate steel.

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 Tension Control Bolts Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by BSI (Certificate FS 86045).

3 Delivery and site handling

3.1 Coated fixings are delivered to site in either 25 kg polypropylene bags or steel kegs of up to 80 kg. All packs are marked with a product description, quantity and, for the bolts, a lot number.

3.2 Steel kegs must be handled in accordance with the Manual Handling Regulations 1992.

3.3 Prior to installation, the fixings must be stored under cover and protected from damp ingress or other contamination, to ensure that they are installed and painted in as-delivered condition.

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

Assessment and Technical Investigations

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

Design Considerations

4 Use

4.1 Greenkote is satisfactory for use on bolts (including tension control bolts), nuts and washers intended for use on steel highways structures where galvanizing would normally be used. The mechanical performance of the bolts is outside the scope of this Certificate.

4.2 The installed fixings are subsequently painted on site with products covered by BBA/HAPAS Certificates. The product has been assessed for use with the following systems as defined in CG 303:

- Item No. 110, Item No. 123 and Item No. 168
- Item No. 111, Item No. 112 and Item No. 168
- Item No. 115, Item No. 116 and Item No. 168.

4.3 These systems must be applied strictly in accordance with the Certificate holder's instructions and the relevant BBA/HAPAS Certificate. In particular, care must be taken to ensure that the surfaces are clean and dry prior to application of the paint system.

4.4 When used on tension control bolts, particular care is required when painting the unprotected surface created by the designed shearing process on tightening, to ensure that the overall corrosion protection is maintained.

5 Practicability of installation

The product is designed to be applied by operatives familiar with this type of product.

6 Corrosion resistance

In accelerated corrosion testing, the performance of Greenkote-coated fixings painted with the systems specified in section 4.2 demonstrated that the product has comparable corrosion resistance to painted fixings protected with an 85 to 100 µm thickness of galvanizing.

7 Resistance to mechanical damage

7.1 The possibility of mechanical damage during installation must be minimised by use of the correct tools in good condition.

7.2 Any scratches on the fixing will be sacrificially protected by the zinc in the coating. However, as with galvanized steel, any damage sustained by the organic coating in service should be repaired as soon as is practicable.

8 Mechanical properties

Although the specific mechanical properties of the treated fixings are outside the scope of this Certificate, the process has no significant effect on the properties of the steel substrate.

9 Compatibility with other materials

The product is compatible with the materials with which it is likely to be in contact in steel highways structures.

10 Maintenance and repair

10.1 Damage caused to a paint system (see section 4.2) should be repaired as soon as practicable, using the materials and techniques described in the MCHW, Volume 1 (Paints), Series 5000, and Volume 2, Series NG 5000.

10.2 When the service life of the paint system has been reached, as for galvanized steel, maintenance painting of the fixings should be carried out as described in section 10.1.

11 Durability

The product, when applied to the specification given in this Certificate and painted as described in sections 4.2 and 4.3, will perform satisfactorily as an anti-corrosive treatment for fixings used in steel highway constructions for a period at least equivalent to that achieved by 85 to 100 µm of galvanizing.

Installation

12 General

12.1 Greenkote-coated fixings are installed on site following the Certificate holder's instructions and in accordance with conventional good practice, using the correct tools in good condition, including shear wrenches where appropriate.

12.2 On completion of the installation, the fixings are painted using one of the systems listed in section 4.2 in accordance with the requirements of the MCHW, Volume 1 (Paints), Series 1900 and 5000, and Volume 2, Series NG 1900 and NG 5000, ensuring complete and even coverage of each coat to the manufacturer's specification.

12.3 Damage to the coating system is repaired as described in section 10.1. If this is not possible the fixings must be replaced.

Technical Investigations

13 Tests

13.1 Tests were conducted on both samples of Greenkote-coated steel and 85 to 100 µm galvanized steel, and the results assessed to determine:

- thickness of coating
- adhesion to substrate
- resistance to salt spray.

13.2 Tests were conducted on both Greenkote-coated steel and 85 to 100 µm galvanized steel, painted with each system listed in section 4.2⁽¹⁾, to determine:

- adhesion of the coating systems to the product
- resistance to salt spray
- resistance to artificial weathering
- resistance to humidity
- resistance to sulphur dioxide.

(1) For the resistance to corrosion tests above, the coating systems were scored to expose the substrate steel prior to testing.

14 Investigations

14.1 An evaluation was made of test data relating to the effect of the treatment on the mechanical properties of the substrate steel and of the torque required to tighten fixings.

14.2 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.

14.3 A survey of known installations of Greenkote was carried out to investigate the performance of the product in service.

Bibliography

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

CG 303 *Design Manual for Roads and Bridges, Highways Structures & Bridges, General Information. Quality assurance scheme for paints and similar protective coatings*

CM 431 *Design Manual for Roads and Bridges, Highways Structures & Bridges, Maintenance & Operation. Maintenance painting of Steelwork*

Manual of Contract Documents for Highway Works, Volume 1 *Specification for Highway Works, Series 1900 Protection of steelwork against corrosion*

Manual of Contract Documents for Highway Works, Volume 1 *Specification for Highway Works, Series 5000 Maintenance painting of steelwork*

Manual of Contract Documents for Highway Works, Volume 2 *Notes for Guidance on the Specification for Highway Works, Series 1900 Protection of steelwork against corrosion*

Manual of Contract Documents for Highway Works, Volume 2 *Notes for Guidance on the Specification for Highway Works, Series 5000 Maintenance painting of steelwork*

15 Conditions

15.1 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.

15.2 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.

15.3 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.

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

15.5 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.

15.6 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.