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Agrément Certificate
18/5582
Product Sheet 1

KRYPTON CHEMICAL ROOF WATERPROOFING SYSTEMS

POLYUREA RAYSTON SYSTEM

This Agrément Certificate Product Sheet(1) relates to the Polyurea Rayston System, a liquid-applied, hot spray, two-part polyurea, for use as a waterproofing layer on flat or pitched roofs with limited or pedestrian access.

(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

Weathertightness — the system will resist the passage of moisture into a building (see section 6).

Properties in relation to fire — the system can enable a roof to be unrestricted under the national Building Regulations (see section 7).

Adhesion — the system will resist the effects of any likely wind suction and the effects of thermal or other minor movement likely to occur in practice (see section 8).

Resistance to mechanical damage — the system will accept, without damage, the foot traffic and loads associated with installation, maintenance and pedestrian access (see section 9).

Durability — under normal service conditions, the system will provide a durable roof waterproofing with a service life in excess of 25 years (see section 11).

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 First issue: 24 October 2018

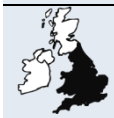
John Albon – Head of Approvals Construction Products

Claire Curtis-Thomas
Chief Executive

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 are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.
Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.

Regulations

In the opinion of the BBA, the Polyurea Rayston System, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



The Building Regulations 2010 (England and Wales) (as amended)

Requirement: **B4(2)** **External fire spread**
Comment: On a suitable substructure, the system can enable a roof to be unrestricted under this Requirement. See section 7 of this Certificate.

Requirement: **C2(b)** **Resistance to moisture**
Comment: The system will enable a roof to satisfy this Requirement. See section 6.1 of this Certificate.

Regulation: **7** **Materials and workmanship**
Comment: The system is acceptable. See section 11 and the *Installation* part of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation: **8(1)(2)** **Durability, workmanship and fitness of materials**
Comment: The system can satisfy this Regulation. See sections 10.1 and 11 and the *Installation* part of this Certificate.

Regulation: **9** **Building standards applicable to construction**
Standard: 2.8 Spread from neighbouring buildings
Comment: The system, when applied to a suitable substructure, is regarded as having a low vulnerability and will enable a roof to be unrestricted under this Standard, with reference to clause 2.8.1[(1)(2)]. See section 7 of this Certificate.

Standard: 3.10 Precipitation
Comment: The system will enable a roof to satisfy the requirements of this Standard, with reference to clauses 3.10.1[(1)(2)] and 3.10.7[(1)(2)]. See section 6.1 of this Certificate.

Standard: 7.1(a) Statement of sustainability
Comment: The system can contribute to meeting 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.

Regulation: **12** **Building standards applicable to conversions**
Comment: Comments in relation to the system under Regulation 9, Standards 1 to 6 also apply to this Regulation, with reference to clause 0.12.1[(1)(2)] and Schedule 6[(1)(2)].

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

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

Regulation: **23(a)(i)** **Fitness of materials and workmanship**
Comment: **(iii)(b)(i)** The system is acceptable. See section 11 and the *Installation* part of this Certificate.

Regulation: **28(b)** **Resistance to moisture and weather**
Comment: The system will enable a roof to satisfy the requirements of this Regulation. See section 6.1 of this Certificate.

Regulation:	**36(b)**	**External fire spread**
Comment:		On suitable substructures, the use of the system can enable a roof to be unrestricted under the requirements of this Regulation. See section 7 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 section: 3 *Delivery and site handling* of this Certificate.

Additional Information

NHBC Standards 2018

In the opinion of the BBA, the Polyurea Rayston System, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapter 7.1 *Flat Roofs and balconies*.

CE marking

The Certificate holder has taken the responsibility of CE marking the system, in accordance with ETA 16/0148, issued by the IETcc under ETAG 005 : 2004, Parts 1 and 6. 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 The Polyurea Rayston System is built up by applying the following components on site:

- Polyurea Rayston — a three-part polyurea, for use as the waterproofing layer, Part A amine-terminated compounds, Part B isocyanate and Part C pigmented paste
- Rayston Epoxy 100 — a low viscosity, solvent-free epoxy primer for surface preparation of porous and dry substrates
- Humidity Primer — a water dispersed epoxy primer for surface preparation of porous and slightly moist substrates
- Impertrans — a single component, moisture cured, aliphatic polyurethane UV protection coating. The coating is clear and can be pigmented using a colour paste at 20%
- Colodur — a single component, moisture cured, aliphatic polyurethane UV protection coating. It is supplied either pigmented for standard colours or clear for pigmentation with colour paste, at 20%, for non-standard colours
- Impertrans Eco — a two component, waterborne, aliphatic polyurethane UV protection coating.

1.2 The levels of Use Categories as defined in ETAG 005 : 2004 are given in Table 1 of this Certificate.

Table 1 Levels of Use Categories

Use Category	Categorisation
Categorisation by working life*	W3 (25 years)
Categorisation by climatic zone*	S (severe)
Categorisation by imposed loads*	P4
Categorisation by roof slope*	S1 to S4 (<5% to >30% of roof slope)
Categorisation by surface temperature* (°C)	
lowest temperature	TL3 (–20°C)
highest temperature	TH4 (+90°C)
Resistance to wind loads*	>50 kPa

1.3 Impermax QC (see Product Sheet 1 of this Certificate) is a one-component, liquid-applied, moisture cured, polyurethane, reinforced with Rayston Fiber 150 (a glass-fibre mat), for use for minor repairs and some details, for example, small hidden areas that are difficult to reach with a spraying gun.

2 Manufacture

2.1 The system components are manufactured by a batch-blending 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 operated by the manufacturer are being maintained.

2.3 The system components are manufactured by the Certificate holder in Spain and marketed in the UK by Krypton Chemicals UK Ltd, First Floor, 264 Manchester Road, Warrington , WA1 3RB, e-mail: enquiries@kryptonchemicals.co.uk, website: www.kryptonchemicals.com

3 Delivery and site handling

3.1 The liquid components of the system are delivered to site in sealed containers with labels bearing the Certificate holder's name, product description and the appropriate hazard and risk labels (see section 3.3). They have a storage life of 12 months and are available in the pack sizes detailed in Table 2.

Table 2 Pack sizes

Component	Pack sizes (kg)
Polyurea Rayston	
Component A	23.1 and 185
Component B	26.3 and 211
Component C (Pigment Paste)	0.6 and 4
Rayston Epoxy 100	
Component A	10
Component B	5
Humidity Primer	
Component A	1.4 and 5.2
Component B	3.6 and 12.8
Impertrans	4 and 20
Colodur	4 and 20 (clear) 5 and 25 (pigmented)
Impertrans Eco	
Component A	14
Component B	1

3.2 All containers must be stored under cover in a cool, dry, ventilated location away from other chemicals and any source of ignition. Storage temperatures should be between 10 and 30°C. Each container carries a label bearing the manufacturer's name, product name and health and safety information. The Certificate holder's product data sheets should be consulted for details.

3.3 The Certificate holder has taken the responsibility of classifying and labelling the system components under the *CLP 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 the Polyurea Rayston System.

Design Considerations

4 Use

4.1 Polyurea Rayston System is satisfactory for as a roof waterproofing on flat and pitched limited and pedestrian access roofs.

4.2 Flat roofs are defined for the purpose of this Certificate as those having a minimum finished fall of 1:80. For design purposes, twice the minimum finished fall should be assumed, unless a detailed analysis of the roof is available, including overall and local deflection and direction of falls, etc. Pitched roofs are defined for the purpose of this Certificate as those having a fall greater than 1:6.

4.3 Limited access roofs are defined for the purpose of this Certificate as those subjected only to pedestrian traffic for maintenance of the roof covering, cleaning of gutters, etc. Where traffic in excess of this is envisaged, additional protection to the membrane must be provided (see section 13.8).

4.4 Decks to which the system is to be applied must comply with the relevant requirements of BS 6229 : 2003 and, where appropriate, *NHBC Standards* 2018, Chapter 7.1.

4.5 The adhesion of the system has been assessed as suitable on the following substrates:

- concrete
- mortar
- ceramic
- wood
- metal
- polyurethane foam insulation with a density greater or equal to 50 $kg \cdot m^{-3}$.

4.6 Insulation materials to be used in conjunction with the system must be in accordance with the Certificate holder's instructions, and be the subject of a current BBA Certificate and used in accordance with, and within the scope of, that Certificate.

5 Practicability of installation

Installation of the system must only be carried out by installers who have been trained and approved by the Certificate holder.

6 Weathertightness

6.1 The system will adequately resist the passage of moisture into the building and will enable a roof to comply with the requirements of the national Building Regulations.

6.2 The system is impervious to water and will achieve a weathertight roof capable of accepting minor structural movement

7 Properties in relation to fire

7.1 When tested to DD CEN/TS 1187 : 2012 and classified in accordance with BS EN 13501-5 : 2016, a flat roof system comprising a 12 mm calcium silicate board substrate, a coat of Rayston Epoxy 100 primer applied at a coverage rate of 0.5 $kg \cdot m^{-2}$ (0.4 mm thick), a layer of Polyurea Rayston applied at a coverage rate of 2.0 $kg \cdot m^{-2}$ (1.9 mm thick) and a layer of pigmented Colodur at a coverage rate of 0.3 $kg \cdot m^{-2}$ (0.15 mm thick), was designated $B_{ROOF}(t4)$.

7.2 The designation of other specifications should be confirmed by:

England and Wales — test or assessment in accordance with Approved Document B (Volumes 1 and 2), Appendix A, clause A1
Scotland — test to conform to Mandatory Standard 2.8, clause 2.8.1
Northern Ireland — test or assessment by UKAS-accredited laboratory, or an independent consultant with appropriate experience.

8 Adhesion

The adhesion of the system is sufficient to resist the effects of wind suction, thermal cycling or other minor structural movement likely to occur in service.

9 Resistance to mechanical damage

The system can accept, without damage, foot traffic and light concentrated loads associated with installation, maintenance and pedestrian access. Reasonable care should be taken to avoid puncture by sharp objects or concentrated loads.

10 Maintenance

10.1 The Certificate holder recommends that installations are the subject of biannual inspections (in spring and autumn) and maintenance to ensure continued performance.

10.2 Maintenance should include checks and operations to ensure that the membrane and drainage outlets are free from the build-up of silt and other debris, and that protection layers, eg walkways, are in good condition.

10.3 In the event of the system being contaminated by oil, grease or other chemicals, the advice of the Certificate holder must be sought.

10.4 Damage to the system must be repaired as soon as possible (see section 14).

11 Durability

With adequate maintenance and repair, the system will have a service life in excess of 25 years.

Installation

12 General

12.1 Installation of the Polyurea Rayston System must be in accordance with the relevant clauses of BS 8000-0 : 2014, BS 8000-4 : 1989, BS 6229 : 2003, the Certificate holder's instructions and this Certificate.

12.2 Installation should not be carried out during inclement weather (eg rain, fog or snow), and the ambient temperature at the time of laying must be between 5 and 40°C, and the substrate temperature a minimum of 3 to 4°C above the dew point.

12.3 The wind speed must be such that it does not interfere with the application or cause overspray. No attempt to spray should be made if the wind speed exceeds 6.7 $m \cdot s^{-1}$ (15 mph), unless precautions such as the use of wind barriers are taken.

12.4 Substrates to which the system is to be applied must be sound, dry, clean and free from sharp projections such as nail heads and concrete nibs. The Certificate holder's advice should be sought for suitable cleaning procedures and the use of a proprietary surface cleaner/HSE approved fungicidal wash.

12.5 The system is not self-levelling and can only accommodate small changes in level, the Certificate holder's instructions on ensuring the substrate is suitably even should be followed.

12.6 The Certificate holder's recommendations for the preparation of substrates that contain more than 4% humidity should be followed.

12.7 When installing over porous substrates, Rayston Epoxy 100 is used to seal the surface prior to the application of the system in accordance with the Certificate holder's installation instructions.

12.8 The Certificate holder's installation instructions should be followed on detailing, for example, at upstands, around drains and other penetrations.

13 Procedure

13.1 Application of the system is carried out using hot spray equipment with the two components mixed in the spray equipment.

13.2 Pigment paste is added to the Component A and blended using a low shear mixer until homogenous, taking care to minimise entrapped air.

13.3 The pigmented Component A and B are connected to the spray apparatus and a test spray carried out, prior to application to the substrate, over a dry polyethylene film to ensure the two components are mixing at the correct proportions in the machine.

13.4 The machine parameters are set as follows:

Component A temperature	55 to 65°C
Component B temperature	65 to 70°C
Spray pressure	140 bar (14 MPa).

13.5 The product is applied at an application rate of 2.0 $kg \cdot m^{-2}$ giving a finished thickness of 1.9 mm. The gel time is three seconds, with a tack free time of a maximum of 20 seconds and the product achieves full physical properties 24 hours after application.

13.6 The membrane is protected with either bonded tiles installed in accordance with the Certificate holder's instructions or one of the following aliphatic surface finishes, cold hand-applied, at the recommended rate given in Table 3.

Table 3 Application rates

Surface finish	Application rate ($kg \cdot m^{-2}$)
Colodur (pigmented)	0.25 to 0.35 in one or two coats
Impertrans (pigmented)	0.25 to 0.35 in one or two coats
Impertrans Eco	0.25 to 0.35 in one or two coats

13.7 The aliphatic top coats are applied a minimum of half an hour, to a maximum of four hours, after the application of Polyurea Rayston. The protective coats are always used pigmented otherwise the polyurea is not protected from the effect of UV radiation, which discolours the membrane.

13.8 If required, an anti-skid finish can be achieved by the addition of an anti-slip additive to an additional thin layer of one of the aliphatic top coats.

13.9 The protective coats are completely dry after 24 hours, but it is recommended that the surface is not subjected to heavy traffic for seven days.

14 Repair

Minor repairs are carried out in accordance with the Certificate holder's instructions using Impermax QC, reinforced with Rayston Fiber 150. The Impermax QC is overlapped of minimum of 30 mm over the surrounding membrane. For

larger repairs the affected area is resprayed with the Polyurea Rayston System in accordance with the Certificate holder's instructions.

Technical Investigations

15 Tests

15.1 Tests on the Polyurea Rayston System were carried out and the results assessed to determine:

- tensile strength and elongation
- water vapour resistance
- water absorption
- watertightness
- tensile bond strength on concrete, steel, polyurethane foam and day joints
- dynamic indentation
- static indentation
- resistance to fatigue cycling
- resistance to crack-bridging
- resistance to low temperatures
- resistance to high temperatures
- heat ageing at 80˚C for 200 days
- resistance to UV ageing
- resistance to water exposure
- the effect of application temperatures.

15.2 Additional characterisation tests were carried out on the system components.

16 Investigations

16.1 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.

16.2 An assessment was made of fire data.

Bibliography

BS 6229 : 2003 *Flat roofs with continuously supported coverings — Code of practice*

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*

BS EN 13501-5 : 2016 *Fire classification of construction products and building elements — Classification using data from external fire exposure to roofs tests*

DD CEN/TS 1187 : 2012 *Test methods for external fire exposure to roofs*

ETAG 005 : 2004, Rev 2004 Part 1 *Guideline for European Technical Approval of Liquid Applied Roof Waterproofing Kits – General*
ETAG 005 : 2004, Rev 2004 Part 6 *Guideline for European Technical Approval of Liquid Applied Roof Waterproofing Kits – Specific Stipulations for Kits Based on Polyurethanes*

17 Conditions

17.1 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.

17.2 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.

17.3 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.

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

17.5 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.

17.6 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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