



# APPLICATION GUIDE.

## **Rayston Proof PUA PARK System**

by Krypton Chemical

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## 1. General conditions

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### RECOMMENDATIONS

#### MANUFACTURER

The manufacturer of the products used in the work described in this specification shall demonstrate in writing that its Quality Assurance system complies with the requirements of Spanish Standard UNE-ISO 9001.

#### APPLICATOR

For the correct application of the systems specified in this report, it is recommended that the application company has successfully completed a training program on their installation or application and the appropriate methods for preparing the substrate. It must also have the necessary equipment for the correct application of the product. The application company must have the necessary means and equipment in suitable condition for the correct application of the system.

### APPLICATION EXECUTION:

#### ENVIRONMENTAL CONDITIONS

Before starting the work described in this specification, check that the environmental conditions, the site, and the substrate are suitable for application.

The final responsibility for any decision regarding the application of the system on site shall lie with the site manager, project manager, and/or builder, and in no case with the product supplier.

#### PREPARATION

Proper preparation of the substrate is vital for the correct application of the products. Therefore, the technical instructions recommended by the manufacturer must be followed.

#### APPLICATION

It is recommended that the products described in this report be applied or installed in accordance with the manufacturer's instructions and in compliance with current regulations.

#### PROTECTION SYSTEMS

Before starting the application work, the necessary measures must be taken to protect workers in terms of Occupational Risk Prevention, and the appropriate measures must be taken to ensure that personnel not involved in the work are not affected by the application.

## 2. Proposed solution

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This document is intended to assist you and the applicator during the application of the **RAYSTON PROOF PUA PARK** system. High-performance liquid waterproofing system, applied by hot spray machine on concrete, capable of withstanding light vehicle traffic on a parking deck.

To this end, the preliminary actions to be carried out on the surface must be defined in order to mitigate the risk of future damage. In addition, we will take into account the minimum properties that the substrate must meet in order to mitigate future risks.

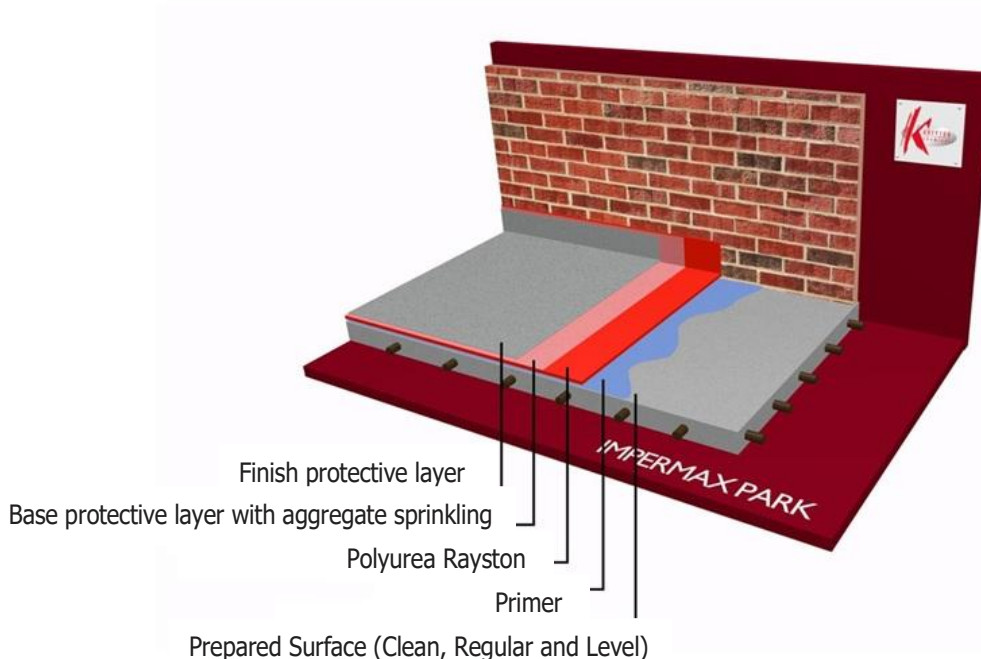
## 3. System steps

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The system must follow these steps:

- Primer: Rayston Epoxy 100.
- Sprayed membrane: Polyurea Rayston.
- Top coat: Colodur.

### [FT flashing](#)



## 4. Substrate requirements and treatment of details and specific points

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### 1 Substrate requirements

The concrete substrate must meet the following properties:

- Compressive strength (minimum 25 N/mm<sup>2</sup>)
- Minimum cohesion (resistance to tearing/traction) of 1.5 N/mm<sup>2</sup>.



- HR <4%
- No cracks
- Cohesive
- Uncontaminated
- Level

(Otherwise, the coating will highlight any existing irregularities)

### 2 Moisture content, ambient temperatures, and substrate.

It is important to monitor ambient temperatures and humidity throughout the application cycle to prevent accelerated reactions.

The substrate must be as dry as possible.

Recommended ambient temperature conditions: Min. +10°C, Max. +30°C.

Always apply (each layer of the treatment) to a substrate whose temperature is 3°C above the dew point (to avoid condensation of ambient humidity on the substrate).

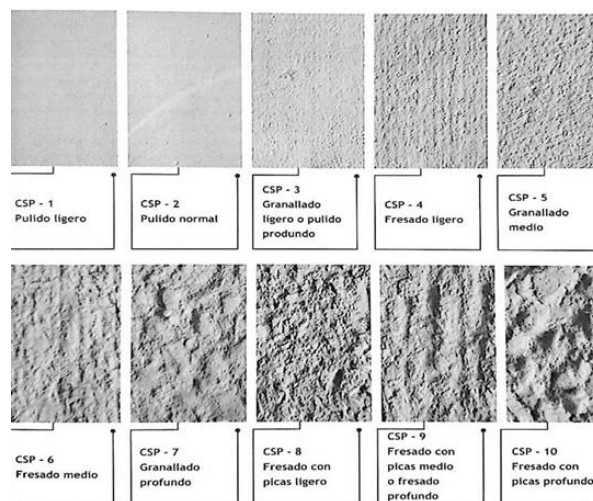
### 3 Substrate preparation:

To ensure good compatibility of the system with the existing substrate and to obtain good adhesion, it is very important that the substrate meets the minimum conditions and has the following properties:

1. Cohesive.
2. Regular and homogeneous.
3. Completely continuous.
4. Free of cracks, fissures, and cavities (which must be treated beforehand).
5. Clean and free of dust, grease, fluids, and any other type of chemical contaminant.
6. Completely cured.
7. Free of particles and other materials not completely adhered to the substrate.
8. As dry as possible (without risk of negative pressure).

The substrate must be washed with a high-pressure water jet to remove dirt (degreasing) and impurities. It is important that no material residues remain, as these can affect the adhesion of the membrane to the substrate.

The degree of roughness of the concrete must be CSP1-CSP3 according to Technical Guide No. 03732 of the ICRI (International Concrete Repair Institute) "Selection and Specification of Concrete Surface Preparation for Polymeric Coatings, Sealants, and Sealers."



To achieve this, sanding with a diamond machine is recommended to remove any grout residue and create a uniform, porous surface in order to provide an optimal base substrate for the system.

4 Treatment of damage and impact marks:

Before proceeding with the primer on the surface, local treatments should be carried out with dry mortar based on Rayston Epoxy 100 resin, with aggregate of 0.4 to 0.9 mm grain size or equivalent, or with R4-type cementitious repair mortar, ensuring complete aesthetic homogeneity with the existing treatment. Any cracks or small cavities will be filled with Rayston Flex polyurethane filler or equivalent.

5 Treatment of details and specific points:

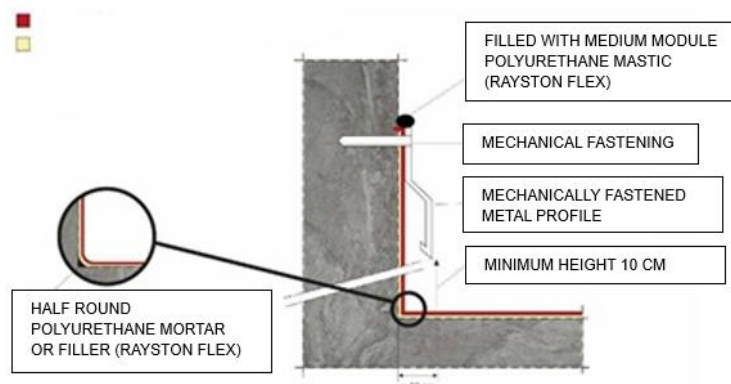
Details and specific points with **a lot of movement** can be treated with duct tape.

In **hidden areas** where it is difficult to apply Rayston Polyurea correctly with a spray gun, these points can be treated with a cold-applied single-component polyurethane resin (Impermax ST/QC) reinforced with Rayston Fiber 150.

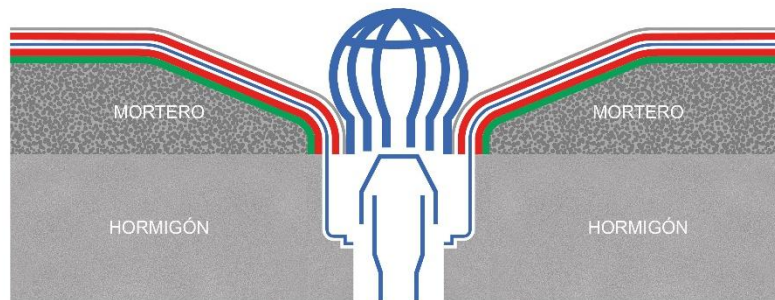
Right angles should be avoided at horizontal-vertical joints, corners, and other parts of the structure; in other words, it is advisable to round off these areas of the surface with mortar (**half-rounds**).



To **prevent delamination** of the polyurea membrane at the edges of the treatment, it should end about 15-20 cm from the floor on the vertical part. At this point, a groove will be cut with the help of a radial saw. The edge of the membrane will end inside this groove. This edge of the membrane must then be protected with a Rayston Flex-type polyurethane mastic. The installation of an aluminum protective profile will prevent possible detachment of the edge of the membrane in the medium and long term.



In **drains**: Remove the cover or gravel, clean with pressurized water, and once dry, apply the primer as a bonding bridge. Allow to cure, and spray the membrane, completely covering the drain wing and facilitating its entry into the water collection basin.



With regard to the **expansion joints** in the structure, if they have a movement greater than 50% of the size of the joint, mechanical joints must be installed (for example, a joint with a minimum width of 10 cm must be opened a maximum of 15 cm). To ensure the watertightness of the system, these mechanical joints must be installed following the manufacturer's specific recommendations.

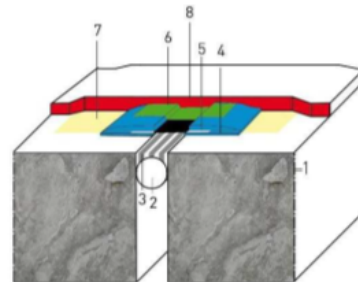
If the movement is smaller, they can be treated with Rayston Joint Geo high-elasticity tape, after filling them appropriately (polyethylene foam cylinder and Rayston Flex-type polyurethane mastic). Rayston Joint Geo adheres to the primed substrate thanks to an adhesive (PU 2K Adhesive) or an epoxy resin such as Rayston Epoxy 100 applied to the geotextile attached to the tape. Polyurea membranes do not adhere well to Rayston Flex Joint Geo tape, so if the joint moves, this movement will not be transferred to the polyurea membrane, or in any case the movement will be attenuated when it reaches the polyurea membrane, reducing the risk of cracking.

Rayston Joint Geo can be supplied in different widths; it is advisable to always use a strip of the appropriate width.

For small jobs, Rayston Flex 3040 single-component polyurethane mastic should be applied manually. For greater productivity, the highly elastic polyurea-based mastic (two-component, cures in a few seconds) Rayston Flex 70 can be applied as an alternative using the portable Rayston Spray Gun machine. If a large number of linear meters of joint need to be filled, application will be more efficient with the Rayston G-1 machine.

A similar treatment should be carried out on cracks larger than 2 mm or even smaller if there is a suspicion that they are moving and/or continuing to open over time (unstabilized cracks or fissures).

1. REGULAR, DRY AND FULLY CURED CONCRETE SURFACE.
2. JOINT BOTTOM: POLYURETHANE FOAM CYLINDER (PE).
3. RAYSTON FLEX 3040 / RAYSTON FLEX 70
4. PU 2K ADHESIVE OR RAYSTON EPOXY 100
5. RAYSTON FLEX JOINT GEO
6. SEPARATION STRIP (PE) - RAYSTON FLEX JOINT (OPTIONAL)
7. PRIMER
8. WATERPROOFING MEMBRANE APPLIED IN LIQUID FORM



***Important:*** Treatment carried out in winter (at the lowest possible temperatures) will always be more effective than treatment carried out in summer. In winter, at low temperatures, the materials will be contracted and the edges of the joint will be further apart. In summer, with high temperatures, the materials will be expanded and the edges of the joints will be closer together. If the treatment is carried out in summer, without leaving any slack in the membrane, when winter arrives and the temperature drops, the edges of the joints will separate and the membrane will become tense, with the risk of cracking.

## 5. Steps and application of the system

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### 5.1 Primer

**RAYSTON EPOXY 100** is a high-viscosity, high-solids epoxy system consisting of two pre-measured components. Depending on the porosity of the substrate, it can be diluted with Rayston solvent to improve liquid penetration and adhesion performance. Ideally applied in two stages to achieve maximum adhesion.

Apply 0.5 kg/m<sup>2</sup> of Rayston Epoxy 100 in two coats to achieve maximum adhesion and ensure that the system is a substrate for light vehicle traffic. The first coat of primer can be diluted with 10%–15% Rayston solvent to help it penetrate (bond) into the surface and aid consolidation. A total of 0.2 kg/m<sup>2</sup> should be applied in this first coat.

Once the first coat has cured, apply the second coat with a light sprinkling of fresh 0.4–0.8 mm aggregate. Apply a total of 0.3 kg/m<sup>2</sup> (1 kg/m<sup>2</sup> of quartz sand should be sufficient, although it is also possible to apply quartz sand until saturation).

For application, spread the material evenly, avoiding accumulations, and work within the product's useful life (see FT).

***Important:*** The primer is applied to seal the porosity of a surface and should never be applied when there is rising air, i.e., when there is direct sunlight on a porous exterior surface that is gradually heating up. The recommended product in this system, RAYSTON EPOXY 100, can only be used if the substrate moisture content is less than 4%.

***Note:*** If the surface moisture level exceeds 4%, Primer GC should be applied instead of Rayston Epoxy 100. Apply approximately 0.4–0.5 kg/m<sup>2</sup> of Primer GC (roller or rubber lip, one coat horizontally, several coats on slopes), sprinkle with fresh quartz sand (0.4–0.8 mm). When the resin dries, seal with 0.1 kg/m<sup>2</sup> (roller, airless) of single-component TP Flex Primer resin or two-component (roller, airless) Polyurea Flex Primer (for faster curing).

Application tools for Rayston Epoxy 100:



## 5.2 Main membrane

**Polyurea Rayston** is a highly elastic, fast-curing two-component polyurea resin for waterproofing roofs with a high crack bridging capacity on the substrate. For this project, it is recommended to apply a layer of resin at a rate of  $2 \text{ kg/m}^2$  (approximately 2 mm thick) using a hot spray machine (1:1 by volume). Rayston Polyurea is completely free of solvents and plasticizers and has a 100% solids content.

To ensure good adhesion between the daily overlaps (approximately 15 cm), rub vigorously with Rayston Solvent, allow the solvent to evaporate, and then begin to apply the polyurea again. If the overlaps are older (more than 24 hours), after cleaning with Rayston Solvent, allow the solvent to evaporate, apply  $0.1 \text{ Kg/m}^2$  of PU Activating Primer for non-porous surfaces, allow the solvent to evaporate, and immediately reapply the polyurea. Avoid applying in windy conditions. Avoid contaminating adjacent surfaces.

*Figure 1:* Application of Rayston Polyurea on a concrete surface already treated with two coats of Epoxy Primer 100 and sprinkled with quartz sand in the second coat:



## 5.3 Top coat

**Colodur** is a single-component, solvent-based polyurethane resin that is highly resistant to outdoor conditions, UV radiation, chemicals, abrasion, and scratching. For this system, it is recommended to apply  $0.5 \text{ kg/m}^2$  using a roller or airless spray in two coats of  $0.25 \text{ kg/m}^2$  each. The first coat must be applied no more than one hour after the application of the polyurea in order to ensure maximum adhesion between the two materials.

To achieve a non-slip finish (very important to prevent future accidents with vehicles), sprinkle 0.4-0.8 mm quartz sand at a rate of  $1 \text{ kg/m}^2$  over the first fresh coat of resin top coat. To achieve a class 3 non-slip finish, a larger amount of resin will be needed to completely cover the quartz sand.

Once this has cured, apply the second sealing layer.

Note: **With regard to access ramps**, it should be noted that the requirements in this area will be greater and the surface treatment and primer application will have to be much more rigorous, as described in this document. It is recommended that in this area, and in general in areas with higher traffic volume, a minimum of 3 top coats of aliphatic protective top coat (instead of two) be applied, always with a non-slip top coat (sprinkling of quartz sand between the first and second top coats of aliphatic protective top coat).

Colodur will need about 7 days to reach its final chemical and mechanical resistance, depending on environmental conditions.

As an alternative to Colodur when a shorter curing time and, especially, faster commissioning is required, **Impertop Fast 2K** can be used. Two-component aliphatic polyaspartic resin (cold-applied polyurea top coat) that cures to form a hard, flexible, and tough coating. Very good chemical, scratch, abrasion, outdoor, and UV resistance.

*Figure 2:* Final appearance of a parking deck treated with Rayston Polyurea and aliphatic top coat:



## 6. Certificates

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### Rayston Polyurea Certificates

ETA, European Technical Assessment, certificate (No. 16/148) & BBA, British Board of Agreement, (No. 18/5582) for roof waterproofing, demonstrating its ability to bridge cracks in the substrate and maintain the watertightness of the membrane between (-20° and 90°C), due to its thermosetting behavior. The user loads P4 to TH4 (90°C), which means that the membrane is a substrate for pedestrian traffic on it.

EPD (ISO 14025:2006 / EN 15804:2012+A2:2019/AC:2021).

Drinking water certificate according to Directive 98/83/EC (tested at 40°C) and WRAS (United Kingdom) certificate, tested at 60°C, APPROVAL NUMBER: 1709541, which demonstrates the chemical resistance of Rayston Polyurea in continuous contact with water at these temperatures. Furthermore, the chemical composition of the water is not altered by contact with the polyurea membrane at these temperatures.

CE marking under European standard EN-1504-2 for the protection of concrete surfaces.

### Colodur Certificates

The Colodur product has been thoroughly tested by the Applus Laboratory in the following tests:

- Adhesion resistance, UNE-EN 13892-8:2003
- Impact resistance, UNE-EN ISO 6272-1:2012
- BCA wear resistance, UNE-EN 13892-4:2003
- Determination of the slip resistance value of unpolished flooring (USRV). - UNE-ENV 12633:2003, Annex A.
- Abrasion resistance TABER s/n UNE 48250
- Scratch resistance s/n UNE EN ISO 1518
- Resistance to liquids (motor oil and diesel fuel) s/n UNE EN ISO 2812-3 and UNE EN ISO 2812-4
- Resistance to staining by contact with vulcanized rubber
- Determination of gloss s/n UNE EN ISO 2813
- Water vapor permeability, UNE EN ISO 778-1 and UNE EN ISO 7783-2

## 7. Maintenance

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It is advisable to maintain the installations and carry out periodic cleaning, removing surface residues and dirt before cleaning.

A minimum frequency of two visual inspections per year is recommended, one at the beginning of spring and the other at the beginning of autumn.

In addition, the roof should always be inspected after other professionals have carried out work such as construction, installation of new equipment, or repair of existing equipment.

## 8. Conclusions

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The **RAYSTON PROOF PUA PARK** system proposed by Krypton Chemical has been used in a large number of construction and roof renovation projects in Spain and other countries. It has a long track record of success.

This system is completely continuous (without joints), remains adhered to the treated surface, and offers great resistance over time. In addition, it is a system that easily and effectively resolves all the unique issues that can be encountered in an installation of this type.

This system, applied on site by a company approved by Krypton Chemical, has CE marking based on tests carried out by the APPLUS laboratory.

The proposed top coat system will improve performance, appearance, and aesthetics in the long term.

The information contained in this document, as well as the advice given by the professionals at Krypton Chemical, SL, whether in writing, orally, or through testing, is provided in good faith based on our experience and the results obtained through tests carried out by independent laboratories. However, it does not serve as a guarantee for the applicator, who should take it as a reference only and for informational purposes. We recommend that you study this information in depth before choosing, using, and applying any of these products. It is advisable to carry out tests on site to determine the suitability of a treatment in that location. Our recommendations do not exempt the applicator from the obligation to have in-depth knowledge of the correct method of application of these systems before proceeding with their use, as well as to carry out as many tests as necessary in case of doubt about their suitability for any work, installation, or repair, taking into account the specific circumstances in which the product will be used.

Krypton's obligations are those established by Law 38/1999 on Building Regulations in Article 15 in its capacity as a product supplier. Under no circumstances is it assumed that Krypton is assuming the responsibilities and obligations corresponding to the project manager, construction manager, and builder as established by said law.

The obligations enforceable against Krypton shall be solely those that can be claimed from a product supplier. Under no circumstances, through this or any other document, does Krypton assume the responsibilities and obligations corresponding to the project manager, the construction manager, or the builder.

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