APPLICATION GUIDE.

Rayston Proof PUA Plus System

by Krypton Chemical

Contents

1. General conditions

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 PROCEDURE:

ENVIRONMENTAL CONDITIONS

Before starting the work described in this specification, check that the environmental conditions, the work 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. The technical instructions recommended by the manufacturer must therefore 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 accordance with Occupational Risk Prevention regulations, and to ensure that personnel not involved in the work are not affected by the application.

2. Proposed solution

This document is intended to assist you and the applicator during the application of the **RAYSTON PROOF PUA PLUS** system. High-performance liquid waterproofing system, applied by hot spray machine on concrete.

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

3. System steps

The system must follow these steps:

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

FT flashing

4. Substrate requirements and treatment of details and specific points

1 Substrate requirements

The cementitious mortar substrate must meet the following properties:

- Compressive strength (minimum 25 N/mm^2)
- Minimum cohesion (pull-out/pull-off strength) of 1.5 N/mm^2 .

- 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. + 10ºC, Max. +30ºC.

Always apply (each coat of the treatment) to a substrate whose temperature is 3ºC above the dew point (to prevent condensation of ambient humidity on the substrate).

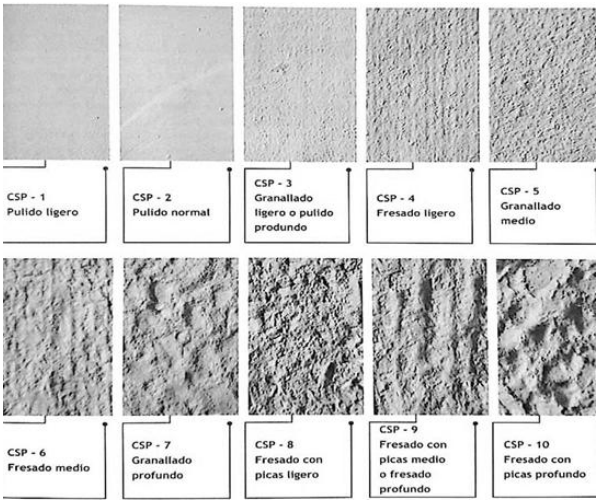
3 Substrate preparation:

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 contaminating chemical agent.
6. Completely cured.
7. Free of particles and other materials not completely adhered to the substrate.
8. As dry as possible (no risk of negative pressure).

The substrate must be washed with a high-pressure water machine to remove dirt (degreasing) and impurities. It is important that no material residues remain, as these may 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 Overcoats."



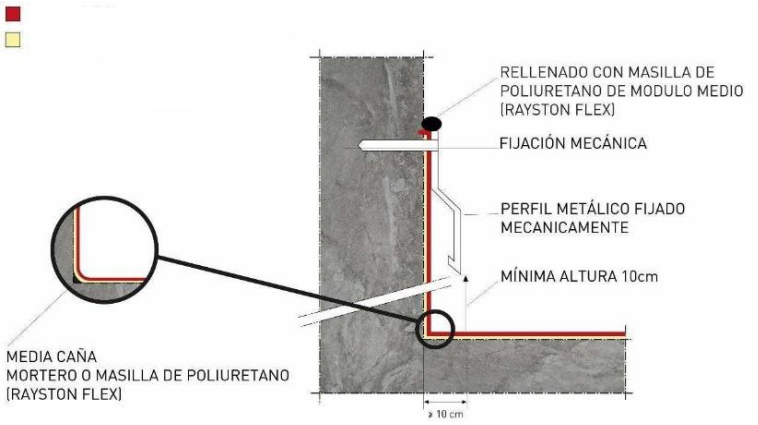
4 Treatment of damage and impact:

Before priming the surface, local treatments shall 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 shall be filled with Rayston Flex polyurethane filler or equivalent.

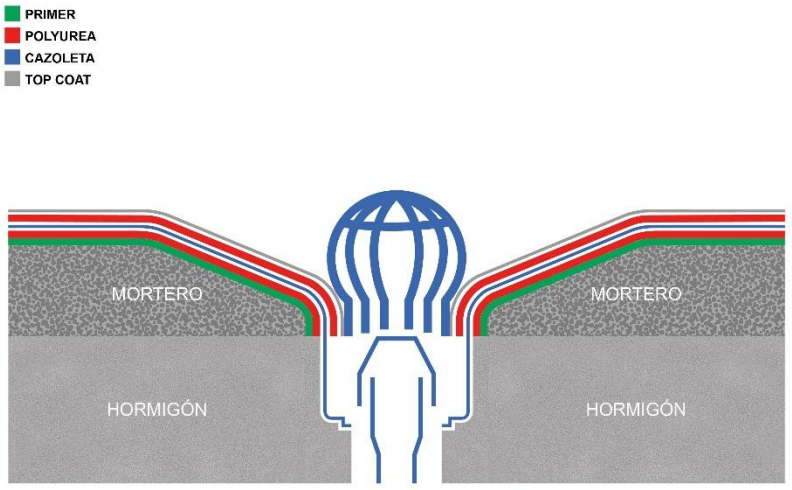
5 Treatment of details and specific points:

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

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 should 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 the membrane edge from coming loose 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 tray.



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 in accordance with the manufacturer's specific recommendations.

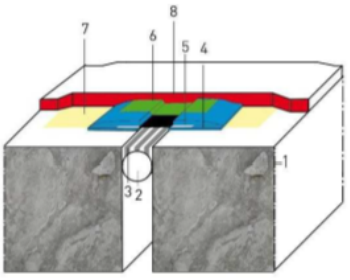
If the movement is smaller, they can be treated with Rayston Joint Geo high elasticity tape, after filling them appropriately (polyethylene foam cylinder and Rayston Flex type polyurethane mastic). Rayston Joint Geo adheres to the primed substrate using an adhesive (2K PU adhesive) or an epoxy resin such as Rayston Epoxy 100 applied to the geotextile attached to the strip. 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 before reaching the polyurea membrane, reducing the risk of cracking.

Rayston Joint Geo can be supplied in different widths; it is always advisable to 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 Rayston Spray Gun portable 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 they are suspected of 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 environment cools down, 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

5.1 Primer

RAYSTON EPOXY 100 is a high viscosity, high solids epoxy system consisting of 2 pre-dosed 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^2 of Rayston Epoxy 100 in two coats. The first coat of primer can be diluted with 10%-15% Rayston Solvent to help it penetrate (anchor) into the surface and aid consolidation. A total of 0.2 kg/m^2 should be applied in this first coat.

Once the first coat has cured, apply the second coat with a light dusting of 0.3-0.8 mm aggregate while still damp. Apply a total of 0.3 kg/m^2.

To apply, spread the material evenly, avoiding accumulations, and work within the product's pot life (see FT) using a rubber trowel or roller.

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%. (If it is higher, ask the technical office for a list of primers).

Application tools Rayston Epoxy 100:

5.2 Main membrane

Rayston Polyurea is a pure resin (without mineral fillers) that has elastomeric and thermostable properties. The amount required for this system is 2 kg/m^2.

Rayston Polyurea (approximately 2 mm thick) should be applied using a hot spray machine. The machine settings (temperatures, pressures, etc.) are specified in the resin's technical data sheet.

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, we recommend applying 0.5 kg/m² using a roller or airless spray in two coats of 0.25 kg/m² each.

If a non-slip and low-abrasive top coat is required, the resin can be mixed with the Anti-Slip Additive (fine or coarse). A more non-slip but also more abrasive top coat can be obtained by sprinkling 0.3-0.8 mm quartz sand at a rate of 1-2 kg/m^{2}onto the first fresh coat of resin.

Once this has cured, apply the second sealing coat.

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

Note: Use white pigmentation to achieve the "Cool Roof" effect and obtain an SRI of 105.

6. Certificates

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 (-20º and 90ºC), therefore demonstrating its thermosetting behavior. The user loads P4 to TH4 (90ºC), which means that the membrane can withstand 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. This 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
slip/sliding resistance 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) s/n UNE EN ISO 2812-3 and UNE EN ISO 2812-4
- Resistance to staining by contact with vulcanized rubber
- Gloss determination s/n UNE EN ISO 2813
- Water vapor permeability, UNE EN ISO 778-1 and UNE EN ISO 7783-2

7. Maintenance

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

The **RAYSTON PROOF PUA PLUS** 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 solves all the unique issues that may be encountered in a facility 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.

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