



# APPLICATION GUIDE.

## Rayston Proof

# PUA Radon Gas Shield 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.

### EXECUTION OF THE APPLICATION:

#### 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 GAS SHIELD** system. High-performance adhered or floating liquid waterproofing system, applied by hot spray machine on concrete. It is an ideal option for achieving a barrier capable of containing the entry of **radon gas** in compliance with the CTE DB-HS-6 standard. Point 3.1 - Characteristics of barriers.

To this end, the preliminary actions to be carried out on the wall 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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Depending on whether it is bonded or floating, the system must follow these steps:

Adhered system:

- Primer: Rayston Epoxy 100.
- Sprayed membrane: Rayston Spray D50.

Floating system:

- Geotextile: Geomax Spray NMDC.
- Sprayed membrane: Rayston Spray D50.

## 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 prevent condensation of ambient humidity on the substrate).

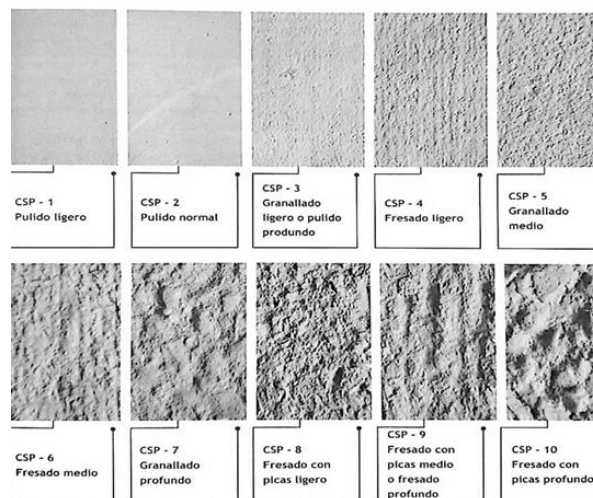
### 3 Substrate preparation:

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 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 in 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 Linings."



#### 4 Treatment of damage and impact marks:

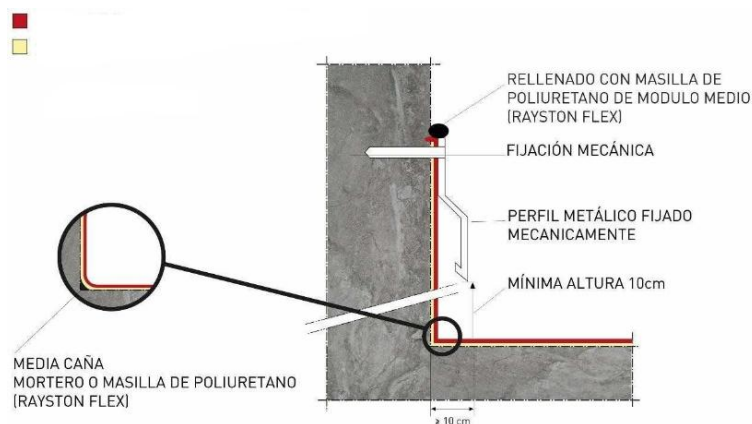
Before proceeding with the primer on the surface, local treatments will be carried out with dry mortar based on Rayston Epoxy 100 resin, with aggregate of 0.4 to 0.9 mm grain size or equivalent, or with R4-type cementitious repair mortar, ensuring complete aesthetic homogeneity with the existing treatment.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



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.

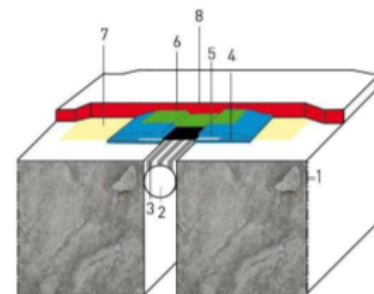
If the movement is smaller, it can be treated with Rayston Joint Geo high elasticity tape, after filling it appropriately (polyethylene foam cylinder and Rayston Flex type polyurethane putty). Rayston Joint Geo adheres to the primed substrate thanks to an adhesive (2K PU Adhesive) or an epoxy resin such 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 (bonded)

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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. 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<sup>2</sup> will be applied in this first coat.

Once the first coat has cured, apply the second coat with a light wet sprinkling of 0.3-0.8 mm aggregate. Apply a total of 0.3 kg/m<sup>2</sup>.

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 Spray D50** is a two-component polyurea resin that cures into a high-hardness membrane with very good chemical, puncture, and compression properties. The amount required for this project will be 2.5 kg/m<sup>2</sup>.

Rayston Spray D50 should be applied using a spray machine. The parameters of the dosing machine (temperatures, pressures, etc.) are specified in the resin's technical data sheet.

To ensure optimum adhesion at daily overlaps and total continuity of the membrane, clean the surface with Rayston Solvent or MEK, which will clean/degrease and activate the surface, allow the solvent to evaporate, then apply with a roller or rub with a soaked cloth 0.1 kg/m<sup>2</sup> of PU Primer (transparent, non-film-forming adhesion promoter for non-porous surfaces). Once the primer has dried, begin applying the polyurea.

## 6. Steps and application of the system (Floating)

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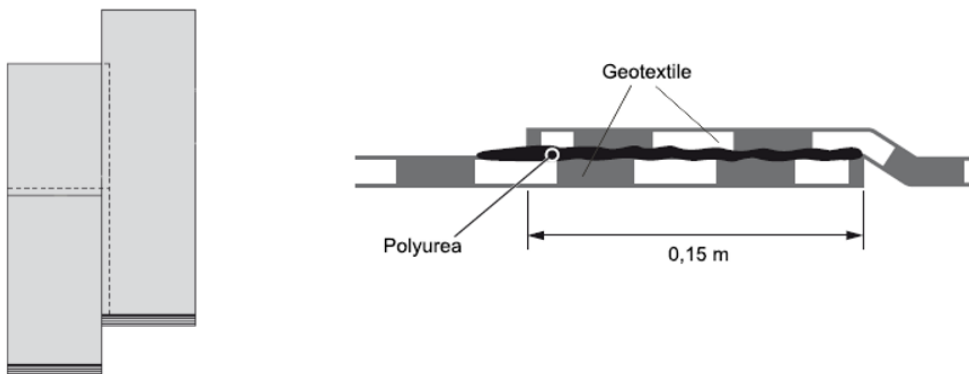
### 6.1 Geotextile

The system is based on the use of Rayston Spray D50 sprayed waterproof membrane on **Geomax Spray NMDC** non-woven geotextile, a geotextile used as reinforcement for the polyurea coating.

To anchor the geotextile, unroll the geotextile panels onto the surface. Care should be taken to position the geotextile to conform to surface irregularities as much as possible. Uniform wrinkling of the geotextile is considered normal and acceptable; however, excessive wrinkling should be avoided.

The geotextile panels should be anchored in place every 1.5-2 m. The anchoring nails can be U-shaped or straight pins and should be long enough to secure the coating. On vertical surfaces, mechanically anchor the geotextile.

Adjacent panels should overlap by at least 0.15 m and be bonded with polyurea.



NOTE: Geotextile panels are 4.5 or 5.4 m wide and 100 m long. Geotextile rolls must remain covered and protected from the elements until they are ready for installation. Only geotextile panels for daily fumigation will be laid out. Do not place or roll on damp substrates at any time.

## 6.2 Primary Membrane

After laying, anchoring, and bonding an area of geotextile, a coating of **Rayston Spray D50** polyurea can be applied.

Rayston Spray D50 is a 2-component polyurea resin that cures into a high-hardness membrane with very good chemical, puncture, and compression properties. The amount required for this project will be 2.5 kg/m<sup>2</sup>.

Rayston Spray D50 will be applied using a spray machine. The parameters of the dosing machine (temperatures, pressures, etc.) are specified in the resin's technical data sheet.

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## 7. Certificates

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### Rayston Spray D50 Certificates

Determination of adhesion by direct traction, UNE-EN 1542:1999

Determination of water vapor permeability, UNE-EN ISO 7783:2012

Determination of liquid water permeability, UNE-EN 1062-3:2008

Determination of radon diffusion coefficient

Determination of carbon dioxide permeability. UNE-EN 1062-6:2003

Determination of methane permeability DIN 53380 / ISO 15105

## 8. 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 fall.

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.

## 9. Conclusions

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The **RAYSTON PROOF PUA RADON GAS SHIELD** system proposed by Krypton Chemical has been used in a large number of construction and 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 may 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 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 mere reference and strictly 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 site manager, construction manager, and builder as established by said law.

The obligations enforceable against Krypton shall only be 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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