APPLICATION GUIDE.

Rayston Proof PU Pool 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 PERFORMANCE:

ENVIRONMENTAL CONDITIONS

Before starting the work described in this specification, check that the environmental conditions, the site, and the substrate are suitable for the application.
The final responsibility for any decision regarding the application of the system on site shall lie with the site manager, construction 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

This document is intended to assist you and the applicator during the application of the **RAYSTON PROOF PU POOL** system. High-performance liquid waterproofing system for chlorinated water swimming pools (whether exposed or tiled), applied cold to concrete.

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

The system must follow these steps:

- Primer: Rayston Epoxy 100.
- Main membrane: Impermax ST.
- Top coat: Paintchlore 2K or Impermax ST + tiles/mosaic tiles.

FT sealing

4. Substrate requirements and treatment of details and specific points

1 Substrate requirements

The concrete substrate must meet the following properties:

- Compressive strength (minimum 25 N/mm^2)
- Minimum cohesion (resistance to tearing/traction) 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. +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).

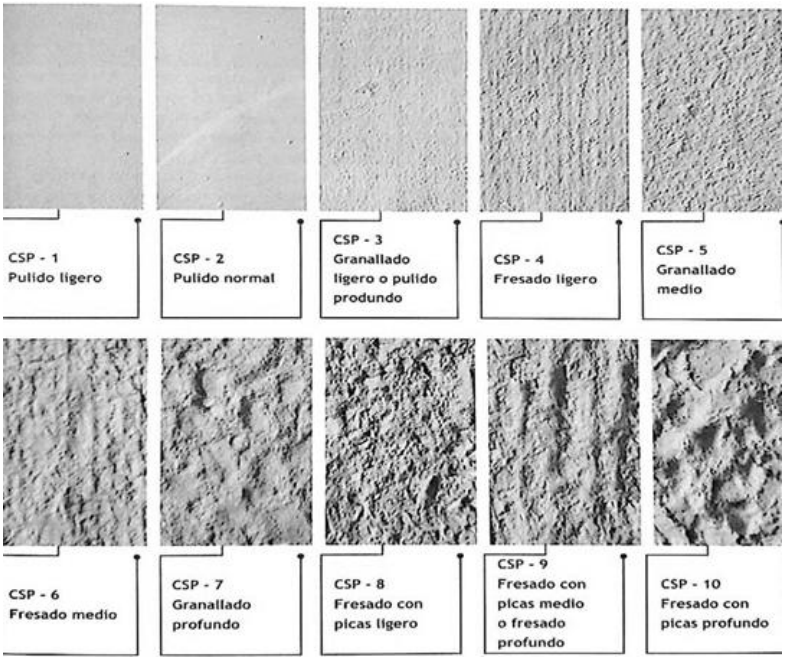
3 Substrate preparation:

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 consistent.
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. Fully 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.

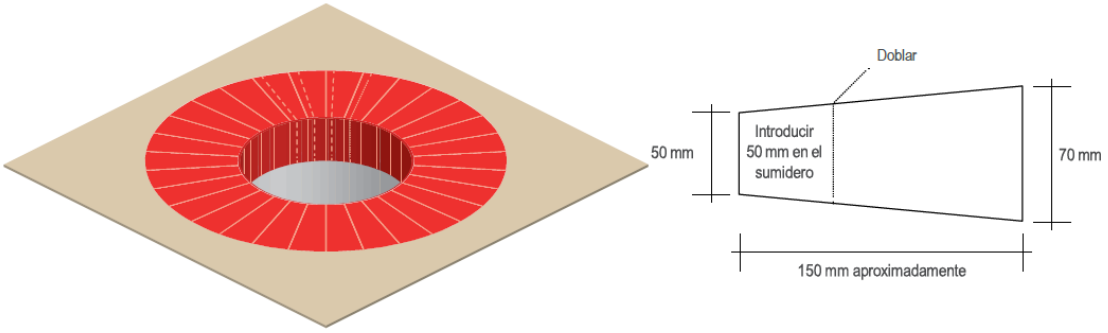
5 Treatment of details and specific points:

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)**.

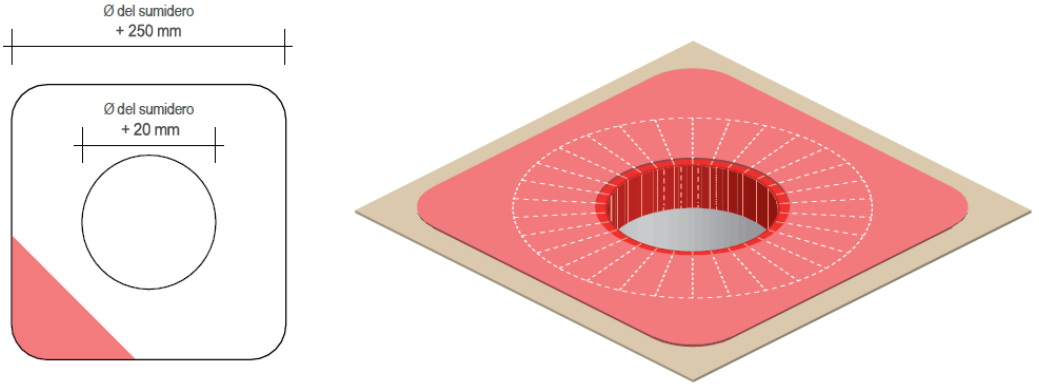
To **prevent delamination** of the polyurethane membrane, it should end at the cornice, completely away from water. At this point, a groove will be cut with the help of a radial saw. The edge of the membrane will end inside this groove. This edge of the membrane must then be protected with a Rayston Flex-type polyurethane mastic. Finally, to achieve an aesthetic and functional appearance for entering/exiting the pool, the coping (artificial stone, ceramic, non-slip natural stone, etc.) must be applied.

The following steps must be followed for the **drains**:

1. Cut enough wedge-shaped reinforcement strips to cover the drain in overlapping layers.
2. Dip the individual strips in waterproofing resin, ensuring that each one is saturated.
3. Apply waterproofing resin to the top and inside of the drain, making sure that no resin drips down the drain.



4. Remove any excess resin from the strips and place them in an overlapping pattern until the entire outlet is covered.
5. Remove any air bubbles or wrinkles and apply additional resin to the reinforcement (if necessary), taking care to peel back the overlapping edges.
6. Cut a square piece of reinforcement with rounded corners, cut a circular hole in the middle of the piece with a diameter = drain diameter + 20mm, and saturate it with waterproofing resin, then squeeze out the excess resin and place it over the drain, making sure the hole in the piece is directly over the drain.
7. Use a brush or roller to remove any air bubbles or wrinkles and to ensure that the square reinforcement piece is completely saturated and pressed down firmly.



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.

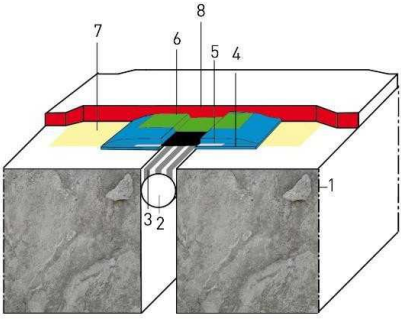
If the movement is smaller, it can be treated with Rayston Joint Geo high elasticity tape, after filling it appropriately (polyethylene foam cylinder and Rayston Flex type polyurethane putty). Rayston Joint Geo adheres to the primed substrate thanks to an adhesive (2K PU Adhesive) or an epoxy resin such 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 alternatively with 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 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 two-component epoxy resin, transparent, free of mineral fillers and plasticizers, 100% epoxy resin with very low viscosity. It is applied as a primer on porous concrete in order to seal the porosity of the surface before applying Rayston Polyurea.

It can be applied to surfaces with moisture content of up to 3-4%. It can be accelerated to reduce its curing time at low temperatures (epoxy accelerator). Apply with a roller or airless sprayer. Once cured, the surface of the coating should have a glossy top coat. If it is matte, it means that the porosity of the surface is not properly sealed, and an additional coat of resin should be applied.

In the case of a completely dry and cured porous concrete surface (surface moisture up to 4%), apply a total of 0.5 kg/m² of Rayston Epoxy 100 in two coats of approximately 0.25 kg/m² each.

In the case of a porous concrete surface (surface moisture above 8%), apply one coat of **GC Primer** approximately 0.5 kg/m².

Note: Primer GC is used when there is residual moisture after rain. It must be verified that it is not constant moisture.

If the moisture is due to negative hydrostatic pressure or with a surface moisture content greater than 6-8%, use **Tecnocem**. Tecnocem is a three-component water-based epoxy-cement system designed to be applied to porous surfaces (concrete) with high moisture content or to surfaces with negative hydrostatic pressure. The purpose of this coating is to obtain a smooth, even base that offers protection against negative hydrostatic pressure.

Tecnocem is a self-leveling product and must be applied to vertical surfaces with a thickening additive (around 1%). The minimum coverage for a single coat is 2 kg/m² (1.5 mm thick), capable of withstanding up to 10 bar.

The use of the thickening additive (1%) will prevent sagging on vertical surfaces. Then apply a coat of Primer GC at a rate of 0.5 kg/m².

A second option that is easy to apply to vertical surfaces when there is moisture due to negative hydrostatic pressure is to apply **Rayston Epoxy Gel** surface regulator/primer at a rate of 2 kg/m².

This resin is particularly suitable for waterproofing water containment structures, mainly for vertical surfaces. Its high thixotropy allows the resin to be applied to a completely dry porous concrete substrate vertically, in a thick layer, without sagging. Rayston Epoxy 100 Gel can be used as an adhesion primer and to seal the porosity of the substrate. In other words, it allows the substrate to be leveled and primed in a single step. When used to level vertical substrates, the amount required may increase considerably depending on the condition of the substrate.

On non-porous surfaces other than concrete (metal, fiberglass-reinforced polyester, tiles, etc.), other primers may be used.

Note: Primers applied to seal the porosity of a surface should never be applied when there is rising air or when direct sunlight is gently heating an exterior surface.

Application tolls:

5.2 Main membrane

Impermax ST is a single-component, aromatic, solvent-based, semi-thixotropic liquid waterproofing system. It can be applied with a trowel, roller, or brush.

We will divide the application into two parts, depending on whether the surface is vertical or horizontal. We will begin applying the coating on the vertical part:

- Vertical surface: 3 coats of 0.7 kg/m^2each. Reinforce the first coat of resin over the entire surface with Rayston Fiber 150 fiberglass. This will prevent it from sagging and help create a more uniform thickness membrane and higher quality waterproofing, especially if the surface is very uneven.

- Horizontal surface: 2 coats of 1 kg/m^2each. Reinforce the first coat of resin over the entire surface with Rayston Fiber 150 fiberglass. This will help create a more uniform membrane thickness and higher quality waterproofing, especially if the surface is very uneven.

Always use a spiked roller after applying the resin (unreinforced layer) in order to release trapped gas and prevent blistering.

5.3 Exposed top coat

Paintchlore 2K is a two-component aliphatic polyurethane resin which, once cured, offers high resistance to abrasion, scratching, outdoor conditions (UV radiation), and continuous contact with aggressive chemicals (chlorine combined with a slightly basic pH in a swimming pool).

Paintchlore 2K is only available in blue or white and is applied by roller and/or airless spray to achieve a gloss top coat.

This exposed top coat option requires a total application of 0.5 kg/m² in two coats of 0.25 kg/m² each.

Note: It can be mixed with Anti-Slip Additive (fine or coarse) to obtain a non-slip top coat.

5.4 Non-exposed top coat

If the waterproofing membrane is covered with **tiles or mosaic tiles**, a final coat of **Impermax ST** (depending on the ambient temperature) of approximately 0.3 kg/m² should be applied to increase adhesion to this surface.

Then sprinkle quartz sand (0.3-0.8 mm) until saturated (1-2 kg/m²).

Excess quartz sand should be removed with a brush or, preferably, a vacuum cleaner after the resin has completely cured. This will create a rough surface that will allow for good adhesion of the subsequent top coat.

A flexible C2-type cementitious adhesive is recommended for bonding tiles or mosaic tiles.

6. Additional tips

Do not apply (especially the top coats of the protective finish) at very high ambient temperatures or when the surfaces to be coated are too hot.

During application (whether of the top coat, primer, or membrane), the surface must always be 3°C above the dew point to prevent condensation of water vapor from the air on the surfaces.

Wait about 7 days before filling the pool with water if it has a PAINTCHLORE 2K top coat.
Protect against wind, pollen, air pollution, and dust, especially for the first 2-4 hours (if PAINTCHLORE 2K is applied as a top coat).

Do not use chlorine in powder or tablet form placed directly on the bottom of the pool. It is better to use skimmers. Chlorine must be added to the pool already perfectly diluted in water.

Always keep the pool full of water (if the membrane is exposed).

Excessive chlorine concentration in the water can attack the colors of the Paintchlore 2K top coat and cause some discoloration. Krypton Chemical cannot accept any complaints for discoloration due to chemical attack from excessive chlorine concentration in the water. Therefore, a white top coat is recommended whenever possible.

7. Certificates

Impermax ST/QC

ETE certificate for roof waterproofing number 06/0263 dated 09/14/2018, issued by the Torroja Institute, the reference laboratory for construction products in Spain. The certificate lists several systems with different performance levels. The performance levels of the system proposed in this document are W3, S, and P4 to TH3 (above the minimum requirement of P4 to TH2).

British BBA (UK) certificate for roof waterproofing number 11/4836.

Performance in an external fire Broof(t1) and Broof(t4), with Broof(t4) being much more demanding than Broof(t1) and Broof(t1) being the minimum required by the CTE in Spain for roof coverings.

Certificate of resistance to root penetration according to Spanish standard UNE-53420.

Colodur

The Colodur product has been exhaustively 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

8. Maintenance

It is advisable to maintain the facilities 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 pool 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

The **RAYSTON PROOF PU POOL** system proposed by Krypton Chemical has been used in a large number of pool 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 can be found in a facility of this type. It has an aliphatic top coat.

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

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