# RAYSTON SPRAY D50

Pure polyurea membrane, for special waterproofing projects. Applied with a proportioning machine. Gas radon barrier. Methane barrier.

## DESCRIPTION

Rayston Spray D50 is a pure polyurea resin, totally free of solvents and mineral fillers. Spray applied with a proportioning machine. Once cured, it forms a continuous and seamless high performant membrane, chemical and outdoors resistant, that has got a thermosetting and elastomeric behaviour (hard and elastic at the same time). The membrane cures in a few seconds and returned to service in a matter of hours.

## APPLICATION

- Waterproofing of water tanks containing aggressive chemicals (primary containment). Waste water treatment plants. Biogas digesters.
- Waterproofing of secondary containment tanks, resistant to punctual spills of aggressive chemicals.
- Waterproofing of foundations (membrane resistant to root penetration), especially when an effective barrier to radon, methane and other harmful pollutants from the soil is required.
- Protective coating and efficient barrier to methane gas: LNG tanks, structures where biogas is generated, stored or transported (wastewater or organic waste digesters), barriers against methane gas from the soil that contains hydrocarbons.
- Protection of concrete against carbonation.

## PROPERTIES

- Fully continuous membrane, very hard, elastic, and flexible. High puncture, impact, and compression resistant, able to bridge over cracks in the support.
- Very good chemical resistance. (Even in continuous contact with aqueous solutions containing hydrogen sulphide, $H_2S$ and biogenic sulphuric acid, BSA, $H_2SO_4$, in wastewater treatment plants).
- Very low permeability to Radon, methane, and carbon dioxide gas.
- Excellent electrical insulation behaviour.

## CERTIFICATES

- CE marking, EN-1504-2 protection, and repair of concrete structures. Certificate number 0370-CPR-2247.

CE

- Roof resistance according to CEN/TS 14416:2014

## TECHNICAL DATA

| INFORMATION ON THE PRODUCT BEFORE APPLICATION | | |
|---|---|---|
| | **Component A** | **Component B** |
| **Chemical description** | Polyamine | Aromatic isocyanate prepolymer |
| **Physical state** | Liquid | Liquid |
| **Packaging** | Metal container (without pigment)<br>196 kg<br>18.6 kg<br><br>Component C (pigment paste)<br>Metal can (4 kg or 0.4 kg) | Metal container<br>220 kg<br>21 kg |
| **Non-volatile content** | approx 100% | 100% |
| **Lead content** | (< 1 mg/kg) | |
| **Flash point** | >100ºC | >100ºC |
| **Colour** | Dark yellow | Slightly yellow |
| **Density** | 1.01 g/cm³ 20ºC<br>0.98 g/cm³ 60ºC | 1.14 g/cm³ 20ºC<br>1.10 g/cm³ 60ºC |
| **Viscosity** | 425 mPa.s 20ºC<br>60 mPa.s 60ºC | 800 mPa.s 20ºC<br>120 mPa.s 60ºC |
| **Mixing ratio A/B** | A=1, B=1,13 by weight<br>A=1, B=1 by volume | |
| **Density and viscosity of the mixture** | Fast polymerization. See Pot life data | |
| **Colour** | Dark yellow, but component A is pigmented by addition of pigment paste (Pigment Spray) delivered with each kit of Rayston Spray D50. | |
| **Pot life approximate** | Gel time mixture A+B (20 g)<br>4 s at 25ºC<br>3 s at 60ºC | |
| **Storage** | Keep between 10º y 30ºC. | |
| **Use before** | 12 months after manufacture date, provided it is kept in its sealed container. | |

| INFORMATION ON THE FINAL PRODUCT | | |
|---|---|---|
| **Final state** | Solid elastomeric membrane | |
| **Colour** | Available colours: light grey, dark grey, rust red, blue (may darken during storage and exposure to sunlight). Other colours under request. | |
| **Hardness (Shore)** | 55D (ISO 868) | |
| **Mechanical properties** | Elongation at break: 500%<br>Tensile strength: 26 MPa<br>(UNE EN ISO 527-1/3)<br>Compression modulus: 130 MPa<br>The membrane does not fail to compression under the test conditions (EN-ISO-604). | |
| **Tear strength** | 110 N/mm (ISO 34-1)<br>400 N (EN-ISO-12310-2) | |
| **Water vapour resistance factor** | μ = 2.957 (EN-ISO 7783:2012) | |
| **Liquid water permeability** | W = 0,0008 kg/m² x $h^{0.5}$ (EN-1062-3:2018) | |
| **Gas Radon diffusion coefficient** | 8 x $10^{-12}$ m²/s (ISO/DTS 11665-13) | |
| **Methane permeation coefficient** | 140 Ncm³ x mm / m² x day x bar<br>(DIN 53380/ISO 15105-1) | |
| **Carbon dioxide permeability** | μ = 50484. Sd > 50<br>(if coating thickness larger than 1 mm.)<br>(EN 1062-6:2003) | |
| **Adhesion strength** | **Surface**: Concrete | **Adhesion (MPa)**: 2.5 |
| **UV resistance** | Good resistance to UV-induced degradation. Aromatic polyureas undergo change of colour under sunlight. This change does not affect its mechanical properties. Additional UV protection can be achieved by application of an Impertrans or Colodur pigmented topcoats. In that case, please ask before the Technical Assistance Supports of Krypton Chemical, S.L. Due to the high cross-linking of the polymer chains in Rayston Spray D50, the adhesion of the aliphatic topcoats over this reference, once cured, is lower compared to that obtained over other pure polyureas with lower surface hardness. | |
| **Abrasion resistance** | Taber, CS10, 1000 c, 1 kg: 20 mg | |
| **Electric strength** | 29,3 KV/mm (IEC EN-60243-1:2013) | |

# RAYSTON SPRAY D50

Pure polyurea membrane, for special waterproofing projects. Applied with a proportioning machine. Gas radon barrier. Methane barrier.

| | |
|---|---|
| **Surface resistivity** | 1,30 x $10^{14}$ Ω/$cm^2$ (ASTM D257-14) |
| **Volume resistivity** | 1,30 x $10^{14}$ Ω x cm (ASTM D257-14) |
| **Foldability at low temperature (-45ºC)** | Does not break or crack (EN-495-5) |
| **Glass transition temperature** | -57ºC (EN-6041) |
| **Impact resistance** | 24,5 N x m, Class III > 20 N x m (EN ISO 6272-1) |
| **Watertightness (5 bars, 50 meters of water column)** | Watertight (EN-12390-8) |
| **Watertightness (100 kPa, 10 meters of water column)** | Watertight (EN-1928) |
| **Crack bridging properties (static)** | Class A5, -10ºC (EN-1062-7, Method A) |
| **Crack bridging properties (dynamic)** | Class B4.2, -20ºC (EN-1062-7, Method B) |
| **Onset decomposition temperature (TGA test)** | 287,7ºC |
| **Vicat softening temperature** | 130ºC (EN-ISO-306) |
| **Thermal conductivity (λ)** | 0,1847 W/m x K (22ºC, EN 22007-2) |
| **Heavy metal content (mg/kg)** | Antimony (Sb): <1<br>Arsenic (As): <1<br>Lead (Pb): <1<br>Cadmium (Cd): <0.1<br>Chromium (Cr): <1<br>Nickel (Ni): <1<br>Mercury (Hg): <0.1<br>Selenium (Se): <1<br>Cobalt (Co): <1 |
| **Reaction to fire** | Class E (EN 13501-1) |
| **Chloride ion ingress** | ≤ 0,03 %, at 10 mm. depth. (EN 13396:2005) |

## CHEMICAL RESISTANCE

Immersion test; (0=worst, 5=best)

| Chemical | Conditions | Result |
|---|---|---|
| Water | 15d, 80ºC | 5 |
| Salt water (saturation) | 15d, 80ºC | 5 |
| Xylene | 7d, 80ºC | 2 |
| Ethyl acetate | 7d, 80ºC | 1 |
| Isopropyl alcohol | 7d, 80ºC | 0 |
| Sodium hydroxide 50% | 7d, 80ºC | 5 |
| Hydrogen peroxide 33% | 7d, 25ºC | 4 |
| Sulphuric acid 10% | 7d, 80ºC | 5 |
| Sulphuric acid 30% | 30d, 80ºC | 4 |
| Bleach | 7d, 80ºC | 4 |
| Ammonia | 7d, 80ºC | 5 |
| Diesel | 16d, 80ºC | 5 |
| Hydrochloric acid 12M 37% | 7d, 80ºC | 0 |
| Hydrochloric acid 6M 18% | 7d, 80ºC | 1 |
| Hydrochloric acid 3M 9% | 7d, 80ºC | 4 |
| Hydrochloric acid 0.75M 2% | 7d, 80ºC | 5 |
| Sodium hypochlorite 15% | 7d, 80ºC | 4 |
| Engine oil | 7d, 80ºC | 5 |
| Crude petroleum | 21d, 20ºC | 5 |
| Sulfamic acid 85% | 7d, 60ºC | 4 |
| Oleic acid | 7d, 80ºC | 0 |
| Glycerine | 7d, 80ºC | 5 |
| Kerosene | 7d, 80ºC | 3 |

## SUPPORT REQUIREMENTS

If a fully adhered system is applied, the support must be free of contaminants (fats, oils, and silicones), dust and loose materials. The support must be smooth, regular, homogeneous, continuous, cohesive, in case of concrete it must be totally cured and free of any rest of laitance.

Irregularities pointed or protruding from the rest of the surface should be eliminated. Ideally a concrete support must be completely dry, in this case it will be primed with the Epoxy 100 or Epoxy Gel Primer.

Epoxy Gel applied especially on vertical surfaces, not properly regularized in tanks. If the concrete support has a humidity level higher than 4%, it will be primed with the Primer GC.

In case of water tanks with negative pressures, a previous treatment with Tecnocem should be done. Tecnocem (a three-component waterborne epoxy-cement system) is resistant against negative pressures.

In case of a base support with a high moisture content, irregular or not fully cured concrete, the alternative is a non-adhered system.

The special non-woven geotextile Geomax Spray 200 should be laid on the support (concrete or even directly over the soil) and then the Rayston Spray D50 will be applied, always creating a totally continuous waterproofing / barrier membrane.

## RECOMMENDED ENVIRONMENTAL CONDITIONS

The temperature of the support should be between 5ºC and 40ºC. Anyway, it should always be 3ºC above the dew point temperature, to avoid condensation on the surface.

## MIXING

Stir and homogenise component A using suitable mixing equipment before being loaded into the machine. Add the required Pigment Spray to the A component and keep mixing before loading. Recirculate both components while heating up to the required application temperatures.

## APPLICATION GUIDELINES

Rayston Spray D50 must be applied using a 2-component hot spraying equipment. The use of a compressed air dryer (refrigeration dryer) or compressed air-drying filters is recommended.

Recommended temperatures are:

- Component A: 65ºC
- Component B: 70ºC
- Hose: 65ºC

Pressure should be at least 130 bar while spraying.

During application, check layer thickness and curing speed. Apply Rayston Spray D50 at minimum 2 kg/$m^2$.

# RAYSTON SPRAY D50

Pure polyurea membrane, for special waterproofing projects. Applied with a proportioning machine. Gas radon barrier. Methane barrier.

Thicker coating will permit improve the chemical resistance, especially in very aggressive environments and the efficiency as a barrier to radon gas.

Wind speeds more than 25 km/h may result in excessive loss of exotherm and interfere with the mixing efficiency of the spray gun affecting polyurea surface texture, cure, and physical properties and will cause overspray issues. Contact Krypton Chemical for more detailed technical information.

## CURING TIME

Approximate hardness values are provided as reference only (2 mm, polypropylene support, 20ºC 50% RH)

| Time | Hardness (Shore D) |
|---|---|
| 5 min | 35 |
| 45 min | 43 |
| 6 hours | 48 |
| 24 hours | 50 |

## REAPPLICATION

Usually, necessary thickness can be obtained in one single coat. If necessary, a second coat can be applied immediately afterwards. In any case, do not wait more than 2 hours for a second coat. If spraying over a previously applied epoxy primer, ensure the primer is completely cured (circa 8 hours).

## RETURN TO SERVICE

Under most usual conditions (25ºC, 50% rh), the membrane is resistant to rain droplets after 5 minutes, and able to resist light pedestrian traffic in 1 hour. After 1 day, more than 90% of the final properties are reached.

## TOOL CLEANING

Solvent use for machine component cleaning is discouraged. A cleaning plasticizer fluid like Rayston Fluid is suitable. Component B must be completely removed from all air-exposed parts and replaced with this cleaning fluid. A maintenance work should be carried out regularly on the treated surfaces according to the intended use.

## FAQs

| Problem | Question | Cause | Solution |
|---|---|---|---|
| Product does not cure | A/B ratio is correct? | Pressure differences | Check and correct machine operation |
| Bubbles or open pores | Porous support? | No primer | Apply suitable primer before Rayston Spray D50 |
| No hiding power | Horizontal? | Too little product<br>Too little pigment | Apply 1 kg/m$^2$<br>Ensure full A+pigment homogeneization |
| Colour change | Exposed to sunlight? | UV-reaction | Use a last coat in dark grey or red |
| | Can it be applied without pigmentation? | | Rayston Spray D50 is always delivered with the pigment of choice. Use of pigment helps to obtain a uniform appearance. |

## SAFETY

Component B contains isocyanates. Always follow the safety instructions in the Material Safety Data Sheet. As a rule, a good ventilation and/or respiratory protection is needed (combined organic vapor filtres+particles) along with protective clothing. This product must be used only for the applications here described. This product is intended for industrial and professional use. It is not suitable for DIY-type applications.

## ENVIRONMENTAL PRECAUTIONS

LEED-requirements compliant. EQ Credit 4.2, Low emission materials: Paints and Coatings. Empty containers must be handled with the same precautions as if they were full. Treat empty containers as hazardous waste and transfer them to an authorized waste manager. If the contains still have some material left, do not mix with other product with no knowledge of potentially dangerous reactions. Component A and B may be mixed on a 1/1 ratio to get an inert material, but never do it in volumes larger than 5 litres to prevent a dangerous heat evolution.

## RECYCLABILITY

The coating, once cured, is inert, free of hazardous materials and heavy metals, so it is fully recyclable at the end of its useful life, for example, as a filler for lightened concrete or mortars.

## OTHER INFORMATION

The information contained in this Technical Data Sheet, as well as our advice, both written as verbal or provided through testing, are based on our experience, and they do not constitute any product guarantee for the installer, who must consider them as simple information.

We recommend to study deeply all information provided before proceeding to the use or application of any of our products and strongly advise to conduct tests “on-site” to determine their convenience for a specific project.

Our recommendations do not exempt of the obligation of installers to deeply study the right application method for these systems before use, as well as to conduct as many preliminary tests as possible should any doubt arise.

The application, use and processing of our products are beyond our control, and therefore under the exclusive responsibility of the installer.

In consequence, the installer will be the only responsible of any damage derived from the partial or total in-observation of our indications, and in general, of the inappropriate use or application of these materials.

***This Technical Data Sheet supersedes previous versions.***