

# POLYUREA RAYSTON

RAYSTON  
products



Pure polyurea membrane for waterproofing in spray applications.

## DESCRIPTION

Polyurea Rayston is a 2-component polyurea system for elastic membrane application with crack-bridging capability. It is an extra fast-curing system that can only be applied by hot mechanical spraying equipment. Polyurea Rayston can be combined with different geotextiles to obtain on site applied, seamless liners.



## APPLICATIONS

- Waterproofing of concrete structures.
- Waterproofing of foundations, especially those designed as barriers to Radon gas. Roof waterproofing. Sewage and wastewater treatment structures. On-site applied liners, totally seamless, for secondary containment applications, ponds, landfills, tunnels, canals, dam repairing.
- Protective coating for metallic structures
- Polyurea Rayston can be completed with an aliphatic polyurethane topcoat to ensure UV protection.



## PROPERTIES

- Crack-bridging capability. Highly elastic membrane.
- Very fast curing, using two-component spraying equipment.
- It can be pigmented.



## CERTIFICATIONS

CE marking according to EN 1504-2: 0370-CPR-2247  
ETA (ETAG005): European Technical Assessment, Nº 16/0148  
BBA certificate (UK) for roofing, nº18/5582  
Radon diffusion coefficient according to ISO 11665-13  
Root resistance according to CEN/TS 14416:2014



**Applus** (Independent laboratory):

- Drinking water certification (Migration test): nº 928/09/8505
- Contact with alcoholic beverages. Simulation C as per regulation EU 10/2011 (EN 1186): pass. Certificate 928/11/4106 M1
- Low-temperature foldability: 11/2855-1313
- Mechanical properties: 11/2855-1314
- Dynamic and Static indentation test according to EOTA. 11/2855-1315
- Contact with fuel products (UNE 48307:2011) Exp 13/6620-457
- External fire resistance EN 13501-5:2005+A1 :2010



**AITEX** (Independent laboratory):

- Mechanical properties EN ISO 527-1/3.
- Static indentation/CBR UNE-EN-ISO 12236:2007.
- Tear, according to UNE-EN ISO 34-1:2011

Water Regulations Advisory Scheme LTD. (WRAS) Material Approval (United Kingdom, contact with water intended for human consumption). Approval number 1709541



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## TECHNICAL DATA

### INFORMATION ON THE PRODUCT BEFORE APPLICATION

	Component A	Component B
<b>Chemical description</b>	Polyamine	Aromatic isocyanate prepolymer
<b>Physical state</b>	Liquid	Liquid
<b>Packaging</b>	Metal container	Metal container
<b>Note:</b> Pigment is delivered in a third container. See Pigment Spray data sheet for specific details.	196 kg 18.5 kg	220 kg 21.0 kg
<b>Non-volatile content</b>	100%	100%
<b>Flash point</b>	>100°C	>100°C
<b>Colour</b>	Yellow	Yellow
<b>Density</b>	Temperature (°C) 20 60	Density (g/cm <sup>3</sup> ) 1,02 0.99
<b>Viscosity</b>	Temperature (°C) 20 60	Viscosity (mPa.s) 600 50
<b>A/B mixing ratio</b>	A=1, B=1.17 by weight A=1, B=1 by volume	
<b>Density and viscosity of the AB mixture</b>	Fast polymerization (see pot life data)	
<b>Colour</b>	Dark yellow, but component A is pigmented by addition of pigment paste (Pigment Spray) delivered with each kit of Polyurea Rayston.	
<b>Curing performance</b>	Gel time mixture A+B (20 g): 4 s at 25°C 3 s at 60°C Tack free time: 30 s at 70°C	
<b>Storage</b>	Keep between 10°C and 30°C	
<b>Use before</b>	12 months after manufacturing date.	

### INFORMACIÓN SOBRE EL PRODUCTO FINAL

<b>Final state</b>	Solid elastomeric membrane
<b>Colour</b>	Available colours: light grey, dark grey, rust red, blue (may darken during storage and exposure to sunlight). Other colours under request.
<b>Gloss (60°)</b>	80-85%
<b>Hardness (Shore)</b>	87A/35D (ISO 868)
<b>Mechanical properties</b>	Maximum elongation: 324% Tensile strength: 16,2 (UNE EN ISO 527-1/3)
<b>Tear strength</b>	69 N/mm (ISO 34-1 method B)
<b>UV resistance</b>	Polyurea Rayston is an aromatic isocyanate-based product. A colour change is to be expected under sunlight. This change does not affect its mechanical properties. An additional UV protection can be provided with an Impertrans/Colodur topcoat.
<b>Abrasion resistance</b>	10 mg (Taber, CS-10, 1000 c, 1 kg)

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<b>Water vapour resistance factor</b>	$\mu = 1.500$ (EN-ISO 7783:2012)												
<b>Liquid water permeability</b>	$0,002 \text{ kg/m}^2 \text{ h}^{0.5}$ (EN 1062-3:2008)												
<b>Carbon dioxide permeability</b>	$\mu = 31419$ . Sd > 50 (if coating thickness larger than 1,6 mm (EN ISO 7783:2012)												
<b>Thermal resistance</b>	Stable up to 200°C (6-hour test). According to low temperature tests, (UNE_EN 495-2001), the membrane can be folded at -45°C without cracking or breaks.												
<b>Glass transition temperature</b>	-47°C (EN-6041)												
<b>External fire behaviour</b>	B <sub>roof</sub> (t1) and B <sub>roof</sub> (t4) (EN 13501-5)												
<b>Reaction to fire</b>	Class E (EN 13501-1)												
<b>Indentation</b>	Polyurea Rayston gives, at 2-mm thickness, a resistance to indentation equivalent to a p4 level (approx. 25 kg/cm <sup>2</sup> ) at TH4 (90°C) as directed by EOTA guide ETAG 005. The combined liner of Polyurea Rayston + selected geotextiles give a static indentation resistance higher than 4000 kN (UNE-EN ISO 12236:2007)												
<b>Impact strength</b>	24,5 N x m, Class III > 20 N x m (EN ISO 6272-1)												
<b>Adhesion strength</b>	<table border="1"> <thead> <tr> <th>Surface</th> <th>Adhesion strength (MPa)</th> </tr> </thead> <tbody> <tr> <td>Concrete (with epoxy primer)</td> <td>4.0</td> </tr> <tr> <td>Plywood (with epoxy primer)</td> <td>1.6 (cohesive wood failure)</td> </tr> <tr> <td>Steel (PU primer)</td> <td>5.3</td> </tr> <tr> <td>High density PU foam (150 kg/m<sup>3</sup>)</td> <td>&gt;1.5 (foam failure)</td> </tr> <tr> <td>Fibrous cement (with Impermax LY as a primer)</td> <td>2.5 (cement failure)</td> </tr> </tbody> </table>	Surface	Adhesion strength (MPa)	Concrete (with epoxy primer)	4.0	Plywood (with epoxy primer)	1.6 (cohesive wood failure)	Steel (PU primer)	5.3	High density PU foam (150 kg/m <sup>3</sup> )	>1.5 (foam failure)	Fibrous cement (with Impermax LY as a primer)	2.5 (cement failure)
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<b>Radon gas difusión coefficient</b>	$2,6 \times 10^{-11} \text{ m}^2/\text{s}$ (ISO 11665-13)												
<b>Electric strength</b>	19,9 KV/mm (IEC EN-60243-1:2013)												
<b>Crack bridging properties (static)</b>	Class A5, -10°C (EN-1062-7, method A)												
<b>Crack bridging properties (dynamic)</b>	Class B4.2, 23°C y -20°C (EN-1062-7, method B)												
<b>Thermal conductivity (<math>\lambda</math>)</b>	0,1938 W/m x K (22°C, EN 22007-2)												
<b>Heavy metal content (mg/kg)</b>	Antimony (Sb): <1 Arsenic (As): <1 Lead (Pb): <1 Cadmium (Cd): <0.1 Chromium (Cr): <1 Nickel (Ni): <1 Mercury (Hg): <0.1 Selenium (Se): <1 Cobalt (Co): <1												

## CHEMICAL RESISTANCE

Immersion test (0=not recommended, 5=best)

Chemical	Conditions	Result
Water	15d, 80°C	5
Salt water (saturation)	15d, 80°C	5
Xylene	7d, 80°C	2
Ethyl acetate	7d, 80°C	1
Isopropyl alcohol	7d, 80°C	0
Sodium hydroxide (50%)	7d, 80°C	5
Hydrogen peroxide (33%)	7d, 25°C	4
Sulphuric acid (10%)	7d, 80°C	5
Sulphuric acid (30%)	30d, 80°C	4
Phosphoric acid (54%)	7d, 80°C	4
Bleach	7d, 80°C	4
Ammonia (3%)	7d, 80°C	5
Diesel	16d, 80°C	5
Hydrochloric acid 12M (37%)	7d, 80°C	0
Hydrochloric acid 6M (18%)	7d, 80°C	1
Hydrochloric acid 3M (9%)	7d, 80°C	4
Hydrochloric acid 0.75M (2%)	7d, 80°C	5
Sodium hypochlorite 1%	7d, 80°C	3
Engine oil	21d, 80°C	5
Crude petroleum	7d, 80°C	5
Sulfamic acid 85%	21d, 23°C	5
Oleic acid	7d, 80°C	4
Glycerine	7d, 80°C	0
Ethanol/water 20/80 w/w	7d, 80°C	5
Urea	7d, 80°C	4
Ammonium nitrate	24d, 80°C	5
	24d, 80°C	5

## SUPPORT REQUIREMENTS

To achieve a good penetration and bonding, support must be:

1. Flat and levelled.
2. Compact and cohesive (pull off test must show a minimum resistance of 1,4 N/mm<sup>2</sup>).
3. Even and regular surface.
4. Free from cracks and fissures. If any, they must be previously repaired.
5. Clean and dry, free of dust, loose particles, oils, organic residues, or laitance

Support temperature must be between 10°C and 40°C. Support moisture must be less than 4%.

Higher humidities do not prevent correct polymerization but may make adhesion increasingly difficult to substrates.

Metal substrates must be clean and free of rust, oils, greases, or other loose material.

## TEMPERATURE AND HUMIDITY CONDITIONS

Air temperature should be between 10°C and 40°C. Relative air humidity should be less than 85%. Higher humidities do not prevent correct polymerization but may make adhesion increasingly difficult to substrates because of condensation on surfaces.



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## SUPPORT PREPARATION

Concrete substrates must be prepared mechanically using high pressure sand or abrasion, to remove the surface and obtain an open pore. Substrates must be primed and levelled until a regular surface is obtained. Sharp irregularities are eliminated using an abrading disc machine. Eliminate all dust and loose particles from the substrate by brushing or vacuum cleaning. If underlying moisture is suspected, it is recommended to apply 2 coats of epoxy (Rayston Epoxy primer). First one as such and the second one with quartz sand spreader over. Metal substrates should be cleaned and primed with Primer PU prior to application.

## MIXING

Both the component A side and the component B side should be preconditioned between 25 °C - 30°C before loading. 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 AND RECOMMENDED QUANTITIES

Polyurea Rayston must be applied using 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: 65°C
- Component B: 75°C
- Hose: 65°C

Pressure should be at least 140 bar while spraying.

During spraying, check coating thickness to ensure curing evolution is correct.

Polyurea Rayston is applied at 1,5-2,0 kg/m<sup>2</sup>, obtaining a 1,5-2 mm thickness.

## CURING TIME

Polyurea Rayston cures to touch after a few minutes after application. Approximate hardness values are provided here as reference only (1 mm, polypropylene support, 25°C 50% RH)

Time	Hardness (Shore A)
5 min	28
10min	40
20 min	55
1 hr	70
24 hrs	80
4 days	88

## RECOATING

It is recommended to obtain the right thickness with a single application. Where an epoxy primer has been previously applied, spray Polyurea Rayston Fast only after the primer is fully cured.

## RETURN TO SERVICE

Under most conditions (25°C, 50% rh), the membrane is rain-resistant after 10 minutes.

## TOOL CLEANING

To keep equipment in good conditions (spraying gun, gaskets), it is recommended not to use solvents. A cleaning fluid like Rayston Fluid can be used instead. Component B must be thoroughly removed and replaced with this fluid.

## FAQ

Problem	Question	Answer	Solution
Does not cure or remains sticky	Ratio A/B correct?	Different pressure	Check and correct pumping equipment
Bubbles or open holes in the membrane	Porous substrate?	No primer	Apply an Epoxy-type primer before Polyurea. Open holes are frequent with fast-curing polyurea
Not enough hiding power	Horizontal?	Too few No pigment	Use 1 kg/m <sup>2</sup> minimum. Mix and homogenize pigment in component A before spraying
Gray colour darkens upon exposure to sun	Exposed?	Components react with UV light.	Apply an aliphatic topcoat afterwards (eg: Impertrans, Colodur)

## CLEANING AND MAINTENANCE

A maintenance work must be carried out regularly on the treated roofs according to the intended use. This work includes the following tasks:

- Leaf removal
- Grass, dirt, moss, and other vegetation removal
- Keeping storm water system in good working order.
- Ensure gratings are in place, to prevent gutter obstructions.
- Check proper condition of several structures (flashing, seams, retaining walls...)
- Verification of possible damages due to improper use.

If aesthetic appearance of the roof is an important issue, it is essential to regularly clean the surface with water (some mild detergent may be added), according to the use. It may be necessary to reapply decorative layers (Impertrans, Colodur) if they are worn out due to traffic, weather, corrosion, etc.

For stain removal, a surface treatment with Rayston solvent or isopropyl alcohol may be attempted. Strong acids are totally inadequate. Some solvents may damage the membrane. If this happens, the affected area must be cut and repaired with a new Polyurea Rayston application.

## SAFETY

Component B of Polyurea Rayston contains isocyanates and Component A contains corrosive polyamines that can cause burns. Always follow the safety instructions in the Material Safety Data Sheet. As a rule, a good ventilation, protective clothing, and respiratory protection is needed (combined organic vapor filters+particles A2P). 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

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.



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## **OTHER INFORMATION**

The information contained in this 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 data sheet supersedes previous versions.**



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