POLYUREA RAYSTON

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 EN 1504-2: 0370-CPR-2247

ETA (ETAG005): European Technical Assessment document Nº 16/0148

BBA certificate (roofing) number 18/5582

Radon diffusion coefficient according to ISO 11665-13

Applus (Independent laboratory):

- Drinking water certification (Migration test). 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
- DOP: 16 -750

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

External fire behaviour	NPA Roof (F)
Fire class	NPA (F)
Use life	W3
Climatic zone	S (Severe)
Use load	P4
Roof slope	S1 to S4
Minimum surface temperature	TL3
Maximum surface temperature	TH4
Hazardous components	Not declared

TECHNICAL DATA

INFORMATION ON THE PRODUCT BEFORE APPLICATION

	Component A	Component B
Chemical description	Polyamine	Aromatic isocyanate prepolymer
Physical state	Liquid	Liquid
Packaging **Note:** Pigment is delivered in a third container. See Pigment Spray data sheet for specific details.	Metal container 196 kg 18.5 kg Component C (pigment paste) Metal can (4 kg or 0.4 kg)	Metal container 220 kg 21.0 kg
Non-volatile content (%)	100%	100%
Lead content	(< 1 mg/kg)	
Flash point	>100ºC	>100ºC
Colour	Yellow (without pigment) (may darken along storage)	Yellow

Density	Temperature (ºC)	Density (g/cm³)	Temperature (ºC)	Density (g/cm³)
	20	1,02	20	1,12
	60	1.02	60	1,10

Viscosity Approximate values Brookfield	Temperature (ºC)	Viscosity (mPa.s)	Temperature (ºC)	Viscosity (mPa.s)
	20	600	20	2000
	30	200	30	1000
	50	60	50	400
	70	40	70	150

A/B mixing ratio	A=1, B=1.17 by weight A=1, B=1 by volume
Density and viscosity of the AB 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 Polyurea Rayston.
Curing performance	Gel time mixture A+B (20 g) 4 s at 25ºC 3 s at 60ºC Tack free time 30 s at 70ºC
Storage	Keep between 10ºC and 30ºC.
Use before	12 months after manufacturing date

KRYPTON CHEMICAL SL
C/ Martí iFranquès, 12 - Pol. Ind. les Tàpies
43890 - l'Hospitalet de l'Infant - Spain
Tel: +34 977 822 245 - Fax: +34 977 823 977
www.kryptonchemical.com – rayston@kryptonchemical.com

POLYUREA RAYSTON

Pure polyurea membrane for waterproofing in spray applications.

INFORMATION ON THE FINAL PRODUCT		
Final state	Elastomeric solid membrane	
Colour	Available Pigment Spray pastes are blue RAL 5015, gray RAL 7011. Tile red, Beige RAL 1001. Other pastes are available under request.	
Gloss (60º)	80-85%	
Hardness (shore)	87A 35D	
Mechanical properties	**Elongation (%)**	**Tensile strength (MPa)**
	50	9.8
	100	11
	200	13
	300	15.5
	324	16.2
	Maximum elongation: 324% Tensile strenght: 16,2 MPa (UNE EN ISO 527-1/3)	
Tear strength	69 N/mm (ISO 34-1, method B)	
UV resistance	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.	
Abrasion resistance	10 mg (Taber, 1000 c. CS-10, 1kg)	
Water permeability EN ISO 7783	0,9 g/m^2 * d Class II as per EN1504-2	
Liquid water permeability EN 1062-3;2008	0,002 kg/m^2 h^{0,5}	
Carbon dioxide permeability (EN ISO 7783:2012)	μ = 31419. Sd > 50 (if coating thickness larger than 1,6 mm	
Thermal resistance	Stable up to 200ºC (6-hour test). According to low temperature tests, (UNE_EN 495-2001), the membrane can be folded at -45ºC without cracking or breaks.	
External fire behaviour	B_{roof}(t1) and B_{roof}(t4) (EN 13501-5)	
Indentation	Polyurea Rayston gives, at 2-mm thickness, a resistance to indentation equivalent to a p4 level (approx 25 kg/cm^2) at TH4 (90ºC) as directed by EOTA guide ETAG 005. The combined liner of Polyurea Rayston + selected geotextiles gives an static indentation resistance higher than 4000 kN (UNE-EN ISO 12236:2007)	
Impact strength	24,5 N x m, Class III > 20 N x m (EN ISO 6272-1)	
Chemical resistance	Immersion test (0=not recommended, 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
Phosphoric acid (54%)	7d, 80ºC	4
Bleach	7d, 80ºC	4
Ammonia (3%)	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 1%	7d, 80ºC 21d, 80ºC	3
Engine oil	7d, 80ºC	5
Crude petroleum	21d, 23ºC	5
Sulfamic acid 85%	7d, 80ºC	4
Oleic acid	7d, 80ºC	0
Glycerine	7d, 80ºC	5
Ethanol/water 20/80 w/w	7d, 80ºC	4
Urea	24d, 80ºC	5
Ammonium nitrate	24d, 80ºC	5

Adhesion strength	**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 (150kg/m^3)	>1.5 foam failure
	Fibrous cement (with Impermax LY as a primer)	2.5 (cement failure)

Radon gas diffusion coefficient	2,6 x 10-11 m^2/s (ISO 11665-13)
Electric strength	19,9 KV/mm (IEC EN-60243-1:2013)

SUPPORT REQUIREMENTS

In order to achieve a good penetration and bonding, support must be:

1. Flat and leveled
2. Compact and cohesive (pull off test must show a minimum resistance of 1,4 N/mm^2).
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 10ºC and 40ºC. 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 10ºc and 40ºC. 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.

SUPPORT PREPARATION

Concrete substrates must be prepared mechanically using high pressure sand or abrasion, in order 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 spreaded over.

Metal subtrates 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 ºC - 30°C before loading.Stir and homogenise separately both components using suitable mixing equipment before being loaded into the machine. Add the required Pigment Spray to the A-component and stir before loading. Recirculate both components while heating up to the required application temperatures.

POLYUREA RAYSTON

Pure polyurea membrane for waterproofing in spray applications.

APPLICATION AND RECOMMENDED QUANTITIES

Polyurea Rayston must be applied using 2-component hot spraying equipment. Recommended temperatures are:

- Component A: 68ºC
- Component B: 70ºC
- Hose: 67ºC

Pressure must be adjusted to 140 bar.

During spraying, check coating thickness to ensure curing evolution is correct. Polyurea Rayston is applied at 1,5-2,0 kg/m^2, obtaining a 1,5-2 mm thickness.

Please contact Krypton Chemical for specific application details.

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, 25ºC 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 (25ºC, 50% rh), the membrane is rain-resistant after 10 minutes.

TOOL CLEANING

In order 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 throughly removed and replaced with this fluid.

FAQ

Problem	Question	Answer	Solution
Does not cure or remains sticky	Ratio AB 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^2 minimum. Mix and homogeneize pigment in component A before spraying
Gray colour darkens upon exposure to sun	Exposed?	Components react with UV light.	Apply an aliphatic topcoat afterwards (egImpertrans, Colodur)

CLEANING AND MAINTENANCE

A maintenance work must be carried out regulary 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, in order 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 maydamage the membrane. If this happens, the affected area has to 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 general rule, a good ventilation, protective clothing and respiratory protection is needed (combined organic vapor filtres+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 containes still have some material left, do not mix with other product with no knowledge of potential dangerous reactions. Component A and B may be mixed on a 1/1 ratio in order to get an inert material, but never do it in volumes larger than 5 litres in order to prevent a dangerous heat evolution.

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” in order 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.

KRYPTON CHEMICAL SL

C/ Martí iFranquès, 12 - Pol. Ind. les Tàpies

43890 - l'Hospitalet de l'Infant - Spain

Tel: +34 977 822 245 - Fax: +34 977 823 977

www.kryptonchemical.com – rayston@kryptonchemical.com