COLD LIQUID APPLIED RESINS FROM KRYPTON CHEMICAL, SL

January 2.016

Xavier Cros

Product Manager

Cold liquid-aplied waterproofing systems

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Krypton Chemical
About us

- KRYPTON CHEMICAL, SL. starts its activities in 1.999.
- International company specialized on the development, manufacture and sales of liquid resins that are used as coatings in the building and construction markets, ***designed to be applied just by professionals***.
- Product families:
  - Liquid waterproofing, roofs and water tanks
  - Floor coatings based on epoxy and PU resins
  - Hydro Active grouts to stop liquid water leaks
  - Binders for rubber and decorative aggregates

Krypton Chemical

About us

- More than 50% of sales outside Spain
- Largest Spanish manufacturer of polyurethane resins of coatings for building and construction
- Sales subsidiaries in France (2.007), Chilli (2.011), Brazil (2.012), Italy (2.013).
- Sales and projects in Europe, including Russia and former Soviet republics, Africa (north and sub-saharian countries), Middle East, South East of Asia and Central and South America.

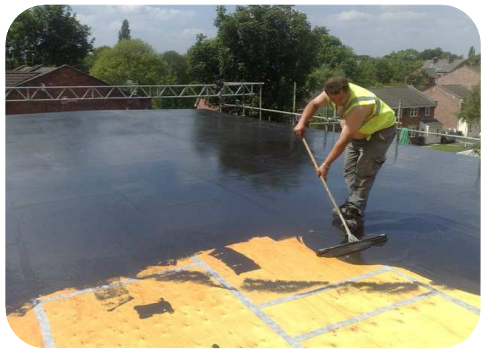
Liquid waterproofing

Definition

1. Liquid waterproofing aims to create a jointless, continuous thick waterproofing membrane by the application of a liquid resin that cures (gets dry) directly over the surface to be protected.

2. Can be applied on roofs, stadiums, foundations of a building, wet-rooms, bridges, swimming-pools, ponds channels, water tanks containing liquids even drinking water or wastewater…

3. New buildings and refurbishment of old ones.



Liquid waterproofing

Advantages over the traditional systems

1. Set up an elastic, continuous, jointless, without overlaps, thick waterproofing membrane able to bridge over fissures and movements of the substrate.

2. Fully adhered systems, water cannot flow between layers.

3. Details and singular points are easily solved and completely watertight.

4. Versatile. Over different types of surfaces and materials. Accepts many different finishes. Exposed/non exposed.

Liquid waterproofing

Properties of the waterproofing membrane

1. Properties depend on the nature of the material and the thickness
2. Different properties will be requested for each project
3. Most important properties included in the ETA and BBA certificates
4. Highlights:

Water tightness/Vapor Permeability
External fire performance/Reaction to fire
Mechanical properties (bridge over fissures)
UV resistance/ Weatherability
Resistance against continuous contact with water
Chemical resistance (concrete basicity)
Resistance high/low temperature cycles
FREE OF HAZARDOUS SUBSTANCES

Durability: Objective is to create a membrane able to keep watertightness at short, mid and long term.

Liquid waterproofing
Types

1. **Cold applied**:
   - Bituminous solutions (Ancient technology, Noah's Ark times!!!)
   - Acrylic rubber (No ponding resistant !!!)
   - PMMA (Nasty odour, low permeability, cost !!!)
   - ***Polyurethanes (single and two components)***
2. **Hot spray applied**:
   - ***Polyurethanes, Polyureas (pure and hybrid)***

Cold applied liquid waterproofing
Acrylic rubber - Acrimper

1. Waterborne. Gets dry by the evaporation of water. Whereas PU's and Polyureas gets dry by chemical reaction
2. No resistance against continuous contact with water. Ponding must be avoided, slightly slopped surfaces. Should be always left exposed
3. Recommended to be applied reinforced (Geomax) to compensate for lower properties
4. Drying is difficult and very slow at low temperatures. Coating takes long time to be rainproof after its application
5. Aliphatic top coats from Krypton (mainly the waterborne Impertrans ECO) can be used as a thin protective top coats to improve its performances
6. Lower properties compared with polyureas and polyurethanes, normally without ETA certificate
7. Typical Applications: Slopped roof waterproofing (possible over damp surface). Protective top coat for PU foam. Anti-carbonation coating (concrete). Wall protection.
8. **Not really designed for professionals, used by small repairs in private homes.**

Liquid waterproofing

Hot spray and cold applied coatings (Roofs)

COLD APPLIED PU: IMPERMAX	HOT SPRAY APPLIED PU: IMPERMAX 2K
Single component, solvent based	Two component, free of solvents
Applied with a roller, trowel, airless machine	Applied always with a two component hot spray machine
2 kg/m2 in 2 layers, ETA for 25 years	2 kg/m2 in 1 layer, ETA for 25 years
Price Euros/kg lower	Price Euros/kg higher. More skilled, trained and expensive workers. Energy cost. Payback the full equipment. Spare parts.
Properties can be easily changed with additives and reinforcements	Properties cannot be changed
Environmental conditions (Temperature, RH%, direct sun…) may affect curing time	Coating gets dry in seconds (problems: lack of levelling, so no good surface appearance and poor adhesion)
Details: membrane reinforced and totally adhered	Details: membrane that is able to move freely
Used to repair hot spray applied coatings!	*Wind!. High risk of messing up nearby surfaces. High risk of overconsumption.*

Lots of small projects (hundreds m2 per project) versus few very large projects (thousands m2 per project).

Liquid waterproofing

Table of liquid applied membranes from Krypton

	ACRILIC RUBBER	COLD POLYURETHANE: SINGLE COMPONENT	COLD POLYURETHANE: BICOMPONENT	POLYUREA/POLYURETHANE HOT SPRAY APPLIED
ROOFS	ACRIMPER (just if exposed!!!)	**IMPERMAX**, IMPERMAX ST, IMPERMAX QC, IMPERMAX TIXO, IMPERMAX A	IMPERMAX COLD POLYUREA, IMPERMAX 2K M, IMPERMAX B 2K	IMPERMAX 2K, IMPERMAX POLYUREA H, IMPERMAX POLYUREA H FLEX
LAKES, PONDS, FOUNTAINS, CHANNELS…		IMPERMAX ST, IMPERMAX QC	IMPERMAX COLD POLYUREA	POLYUREA RAYSTON
CLOSED WATER TANKS (INCLUDING WASTE WATER AND DRINKING WATER)			IMPERMAX AQUA 2K	POLYUREA RAYSTON

Liquid waterproofing

Table of complementary products

	REFERENCE	DESCRIPTION AND USE
PRIMERS AND CARRIERS	RAYSTON VEL	Carrier as a base of liquid waterproofing for uneven and non well –repaired surfaces
	TECNOCEM	Cemetitious Epoxy over wet surfaces and negative pressure
	PU PRIMER	Adhesion promoter over non porous surfaces
	POROSITY SEALER	Single component PU, solvent based over well dry and hard porous surfaces
	POROSITY SEALER FLEX	Single component PU, solvent based over well dry and soft surfaces
	HUMIDITY PRIMER	Two component, waterborne, epoxy over surfaces with little remains of moisture
	RAYSTON EPOXY 100;EPOXY 100 SPRAY PRIMER	Two component, very low viscosity, solvent free epoxy resin. Standard for hot applied.
	KRYPTANATE M, KRYPTANATE SPRAY	Very fast curing floor top coat and also primer, two component, solvent based.
	RAYSTON SPRAY PRIMER 150	High density PU foam over uneven surfaces
ALIPHATIC TOP COATS	COLODUR	Single component PU, solvent based, flexible and scratch resistant
	IMPERTRANS	Single component PU, solvent based, elastic and flexible
	IMPERTRANS ECO	Two component, waterborne, flexible and scratch resistant
	PAINTCHLORE	Single component PU, solvent based, highly resistant against chlorine
REINFORCEMENTS	RAYSTON FIBER 30 GRAMS/M2	Reinforcement based on fibreglass for clear membranes
	RAYSTON FIBER 150 GRAMS/M2	Reinforcement based on fibreglass.
	BUTYL TEX	Self-adhesive reinforcement for quick execution and aesthetical finish
	GEOMAX 80 GRAMS/M2	Based on non-woven polyester

Impermax
Definition

IMPERMAX is a liquid cold-applied, elastic membrane based on a single component PU resin, moisture cured, resistant to UV radiation (but not its colour) that can bridge over fissures and absorb movements of the substrate. Can be applied with a roller and/or an airless machine.

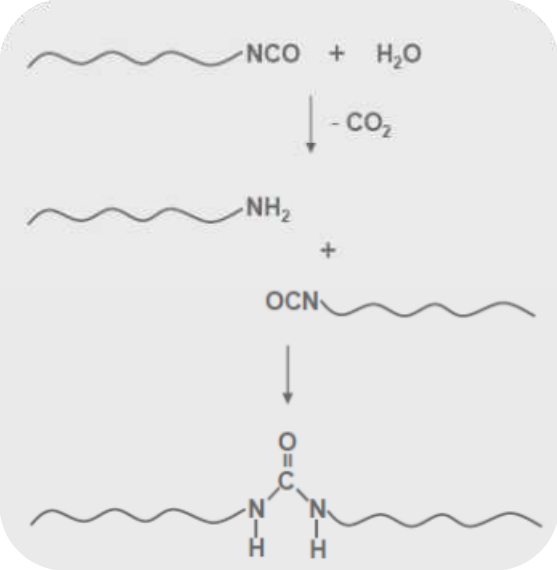
CERTIFICATES ISSUED BY INDEPENDENT LABORATORIES

ETA FOR 10 AND 25 YEARS (CE MARK).
BBA FOR 25 YEARS.
ROOT RESISTANCE CERTIFICATE WITH & WITHOUT REINFORCEMENT
EXTERNAL FIRE PERFORMANCE (BroofT1) SLOPES +/- 20º
DRINKING WATER (98/83/CE)
TABER ABRASION RESISTANCE
RESISTANCE AGAINST HOT ASPHALT
FIRE RESISTANCE (BRITISH RULES)
CAHIER DES CLAUSES TECHNIQUES (FRANCE)

Impermax
Chemistry

IMPERMAX cures by a chemical reaction with the moisture of the air

It consists of a branched polyurethane pre-polymer with free isocyanate reactive groups
It is supplied as a mixture than contains also a mineral extender, viscosity-adjusting solvent and a set of additives and specific pigments.



The bond between the two chain ends have the effect of uniting all chains in single three-dimensional mesh, in the form of a thermoset polymer, that because of the crosslinking, can not become liquid again without breaking the junctions of the mesh

Impermax
Certificates ETA & BBA

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Member of EOTA www.eota.eu

European Technical Assessment — **ETA 06/ 0263 of 09/ 03/ 2015**

English translation prepared by IETcc. Original version in Spanish language

General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) Nº305/2011:	Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc)
Trade name of the construction product	**IMPERMAX**
Product family to which the construction product belongs	Liquid Applied Roof Waterproofing Kit, based on pure Polyurethane
Manufacturer	**KRYPTON CHEMICAL, S.L.** C/ Martí Franques nº 12. Pol. Ind. Les Tápies 43890 L´Hospitalet de l´infant. Tarragona, Spain
Manufacturing plant(s)	C/ Martí Franques nº 12. Pol. Ind. Les Tápies 43890 L´Hospitalet de l´infant. Tarragona, Spain
This European Technical Assessment contains	9 pages including 1 Annex which form an integral part of this assessment. Annex 2. Contain confidential information and is not included in the ETA when that assessment is publicly available
This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of	Guideline for European Technical Approval (ETAG) nº 005, part 1-6 ed. 2004, used as European Assessment Document (EAD)
This version replaces	ETA 06/0263 issued on 14/ 01/ 2013

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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
11/4836
Product Sheet 1

KRYPTON CHEMICAL ROOF WATERPROOFING SYSTEM

IMPERMAX 25 ROOF WATERPROOFING SYSTEM

This Agrément Certificate Product Sheet[1] relates to the Impermax 25 Roof Waterproofing System, a liquid-applied polyurethane membrane for use as a waterproofing layer on flat or pitched roofs with limited access and for waterproofing balconies, terraces and podiums.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.

KEY FACTORS ASSESSED

Weathertightness — the system will resist the passage of moisture into a building (see section 6).
Properties in relation to fire — the system will enable a roof to be unrestricted under the Building Regulations (see section 7).
Adhesion — the system will resist the effects of any likely wind suction acting on the roof (see section 8).
Resistance to foot traffic — the system will accept the limited foot traffic and loads associated with installation and maintenance (see section 9).
Durability — under normal service conditions the system will provide a durable roof waterproofing with a service life in excess of 25 years (see section 11).

The BBA has awarded this Certificate to the company named above for the system described herein. This system has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of Third issue: 12 February 2015 — John Albon — Head of Approvals, Construction Products — Claire Curtis-Thomas — Chief Executive

Originally certificated on 25 May 2011

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

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Impermax
Certificate ETA

Annex 1.

Characteristics of the System "IMPERMAX"

Minimum thickness	1,4 mm (W2) 1,6 mm (W3) 2,2 mm (W3): 3 kg/m^2 + GEOMAX 1,6 mm (W3) : 2 kg/m^2 + RAYSTON FIBER 150
Water vapour diffusion resistant factor	μ = 1485
Resistance to wind loads	> 50 KPa
Resistance to plant roots	NPD
Statement on dangerous substances	Without dangerous substances
Resistance to slipperiness	NPD

Performance levels according to the intended use

Levels	1,6 kg/m^2	2 kg/m^2	3 kg/m^2 + GEOMAX	2 kg/m^2 + RAYSTON FIBER
External fire performance	Broof (t1) roof slope < 20° and support A1-A2// NPD for support no A1-A2			
Reaction to fire	F			
Working life	W2 (10 years)	W3 (25 years)		
Climatic zone	S (Severo)			
User load	P3: TH2 P2: TH3 P1:TH4	P3: TH2, P3: TH3 P2:TH4	P4: TH2 P3: TH3 P3:TH4	P4: TH2, TH3 P3: TH4
Roof slope	S1-S4			
Minimun surface temperature	TL3 (- 20 °C)			
Maximun surface temperature	TH4 (90ºC) // TH3 (80ºC) // TH2 (60ºC)			

NOTE: For a polyurethane foam support, the system has been only test for a working life of 10 years (W2) and 2 2kg/m^2 of IMPERMAX, with a User load of P1

Impermax

Product features and benefits

1. SINGLE COMPONENT – EASY TO APPLY.
2. GETS CURED BY A CHEMICAL REACTION WITH THE MOISTURE IN THE AIR
3. ABLE TO RESIST CONTINUOUS CONTACT WITH WATER
4. PEDESTRIAN TRAFFIC IS ALLOWED
5. VERSATILE (DIFFERENT TYPES OF FINISHINGS)
6. ABLE TO BRIDGE OVER FISSURES (COHESION > ADHESION)
7. UV RESISTANT, HOWEVER NOT ITS COLOUR
8. CAN BE REINFORCED EITHER WITH A FIBREGLASS OR A NON WOVEN GEOTEXTILE
9. ETA CERTIFICATE FOR ROOFING (CE MARK), AMONG OTHER CERTIFICATES

Set of products Impermax cold applied

Single component references

			RHEOLOGY		
			Self-levelling	Semi-Tixotropic	Tixotropic paste, high viscosity
AROMATIC	CURING TIME	Standard	IMPERMAX	IMPERMAX ST	IMPERMAX TIXO
		Accelerated		IMPERMAX QC	
ALIPHATIC	Moisture triggered curing system		IMPERMAX A		

Set of products
Impermax cold applied
Two component references

		COMPOSITION	
		Solvent Free	Solvent based & Accelerated
MAIN APPLICATION	Roofs	IMPERMAX 2K M	IMPERMAX COLD POLYUREA
	Others	IMPERMAX AQUA 2K (Closed tanks, sewage tanks, drinking water tanks…)	IMPERMAX B 2K (Foundations)

Set of products
Impermax cold applied
Advantages of two component products

1- Cured by the chemical reaction between the two parts, so curing time is always less dependant on environmental conditions.
2- 2 kg/m2 or even more, can be applied in a single layer.
3- In most of the cases are solvent-free.

However: Mixing between the two parts is required, which if done poorly can affect the cure of the product and the final properties of the membrane.

Set of products Impermax cold applied

Advantages of each reference

ADVANTAGE	REFERENCES
Single component	Impermax, Impermax ST, Impermax QC, Impermax Tixo, Impermax A
Solvent Free	Impermax 2K M, Impermax Aqua 2K
Reduced curing time (if applied at low temperatures)	Impermax QC, Impermax Cold Polyurea
Wet on wet system	Impermax 2K M, Impermax Aqua 2K
Thick coat in just one layer	Impermax 2K M, Impermax Aqua 2K, Impermax Cold Polyurea
Drinking water certificate	Impermax, Impermax Aqua 2K
Chemical Resistance	Impermax Aqua 2K
Aliphatic, rainpoof and waterproof immediately after application. No undesirable blistering.	Impermax A

Impermax A (white)

Product features and benefits

1. SINGLE COMPONENT ALIPHATIC PU RESIN, ALREADY COLOURED
2. GETS CURED BY A CHEMICAL REACTION INDUCED BY THE MOISTURE IN THE AIR
3. VERY GOOD UV AND OUTDOORS RESISTANCE
4. NO CO_2 IS RELEASED, LOWER RISK OF UNDESIRABLE BLISTERING
5. COATING IS RAINPROOF AND WATERPROOF SHORTLY AFTER APPLICATION
6. SECOND LAYER AND PROTECTIVE TOP COAT AT THE SAME TIME
7. COMBINED WITH IMPERMAX QC (FIRST LAYER) ALLOWS A VERY FAST IMPLEMENTATION
8. CAN BE ALSO USED AS A PROTECTIVE THIN TOP COAT LAYER OVER A COLD OR HOT APPLIED WATERPROOFING MEMBRANE

Impermax 2K M

Product features and benefits

1. TWO COMPONENT, GREY COLOUR, SOLVENT FREE PU RESIN
2. GETS CURED BY A CHEMICAL REACTION BETWEN THE TWO COMPONENTS
3. WET-ON-WET SYSTEM, 2 kg/m2 IN A SINGLE LAYER
4. NORMALLY REINFORCED WITH A NON WOVEN GEOTEXTILE (GEOMAX)
5. SELF-LEVELLING. THICKENING ADDITIVE (POWDER) CAN BE USED TO INCREASE ITS THIXOTROPY
6. PRODUCT CAN BE ACCELERATED (MAINLY FOR AIR TEMPERATURES LOWER THAN 10ºC). HOWEVER POT LIFE IS ALSO REDUCED
7. RECOMMENDED TOP COAT IF EXPOSED: IMPERTRANS ECO (WATERBORNE)

EXAMPLES OUTSTANDING EXPOSED SYSTEMS FOR ROOFS

(Including aliphatic protective top coat/finish)

Step	Standard	Fast Curing System	Fast Curing System	Solvent Free/Low VOC
0	CLEAN & TREATMENT OF THE SURFACE, REPAIR CRACKS (RAYSTON FLEX), FILL UP HOLES, DIAMOND GRINDING…			
1	PRIMER (HUMIDITY PRIMER, POROSITY SEALER, PU PRIMER, KRYPTANATE M…)			
2	DETAILS (RESIN + GEOMAX)			
3	IMPERMAX/IMPERMAX ST, QC (reinforced Y/N), 1 kg/m2	IMPERMAX QC (reinforced), 1 kg/m2	IMPERMAX COLD POLYUREA (reinforced Y/N), 2 kg/m2	IMPERMAX 2K M + GEOMAX (wet-on-wet), 2 kg/m2
4	IMPERMAX/IMPERMAX ST, QC, 1 kg/m2	IMPERMAX A, 1 kg/m2	IMPERTRANS/COLODUR + Colour Paste; 0,2 kg/m2	IMPERTRANS ECO; 0,2 kg/m2
5	IMPERTRANS/COLODUR + Colour Paste; 0,2 kg/m2			

Set of products Impermax cold applied

Table of aditives and suplementary materials

	PRODUCT	COMMENTS
Thixotropy modifiers	Thixotropy Additive	Liquid form
	Thickening Additive	Powder form
Viscosity modifiers	Rayston PU solvent & Slow solvent PU	Specially designed for single component, without moisture and alcohols
Curing time modifiers	Pur CAT Additive	Catalyst (chemical reaction is not modified)
	Super Acelerator PU	Chemical reaction is modified, the system becomes a two component system
	Slow solvent PU	Skin formation is delayed under direct sun and hot air temperatures
Reinforcements	Rayston Fiber	Easy donning
	Geomax (Geotextil, non woven)	Reduced loss of elasticity. Be careful with the wrinkles!!!
	Butyl Tex	Just for details, quicker execution and aesthetical finish

Note: Not all the materials in this chart can be used altogether with all the cold-applied PU coatings of Krypton.

About primers (IMPERMAX)

1. ***Over a porous surface*** (concrete, for example) the main role of the primer is to seal the porosity of the surface: Porosity Sealer (Single component PU) for a well dry surface. Humidity Primer (two component waterborne resin) for a surface with moisture even higher than 4%.
2. ***Over a non porous and very smooth surface*** (PVC, old PU/Polyurea coating, for example) the role of the primer is to increase the adhesion: Abrade and clean the surface with a strong solvent (Xylene, MEK...) and apply PU Primer (single component, solvent based, no-film forming primer for just non porous surfaces).
3. ***Over a damp porous surface***, in order to avoid the formation of blisters some time after the application (exposed membrane under strong sun, very high temperatures...), the use of TECNOCEM is recommended. TECNOCEM is a three component epoxy-cement, self-levelling or thixotropic, able to resist negative pressures up to 1.000 KPa (2 kg/m2).

About primers (IMPERMAX)

Table of the most suitable primers depending on the type of surface

SCENARIO (TYPE OF SURFACE)	EXAMPLE	RECOMMENDED PRIMER FOR IMPERMAX
Non porous surface. Rough surface	Old torch on membrane	Normally not needed
Non porous surface. Smooth surface	Old PVC membrane. Old PU/Polyurea coating. Glass	Rayston Solvent + PU Primer
Completely dry porous surface.	Concrete	Porosity Sealer or Humidity Primer
Porous surface with a slight moisture content (lower than 6%)	Concrete	Humidity Primer
Porous surface with a high moisture content. Negative pressure.	Concrete	Tecnocem + Humidity Primer

The most appropriate primer for each individual project depends on the type of surface, specifications and requirements of that project.
Adhesion tests are always recommended for each project. Compatibility between the primer and the surface material have to be checked. (For example Humidity Primer cannot be applied over a surface that was previously treated with hydrophobic additives).
Previous treatment of the surface always recommended (diamond grinding, abrade a smooth surface…)

About primers (IMPERMAX)

Alternative on a wet surface

Install ventilation systems (normally temporary) that allow moisture escape slowly from the surface.

About reinforcements

Geomax & Rayston Fiber 150

1. Avoids sagging over slopped surfaces.
2. Permits to set up a waterproofing membrane with an homogeneous thickness, so more resistant at long term. Visual check of the membrane thickness.
3. Tailoring the properties of the membrane to the requirements of each project:

	IMPERMAX + GEOMAX	IMPERMAX + RAYSTON FIBER 150
Elasticity	-	- -
Tensile Strenght	+	+ +
Tear Strenght	+	+ +
Shore A	+	+
Puncture Resistance	+ +	+ +

Attention: Both sides of the reinforcement are Different!!!

About IMPERMAX curing

Environmental conditions to prevent the formation of bubbles.

1- APPLY AT LEAST 3º ABOVE THE DEW POINT (NO RISK OF CONDENSATION OVER THE SURFACE)

2- AVOID THE APPLICATION WHEN THERE IS ASCENDING AIR OVER A POROUS SURFACE.

3- KEEP THE BALANCE BETWEEN CHEMICAL REACTION AND SOLVENT EVAPORATION (AVOID SKIN FORMATION).

Solvent must be completely evaporated before the chemical reaction has been finished

SCENARIOS:
Low temperature (> 5ºC) / low humidity: use PUR CAT Additive.
Low temperature (< 5ºC) / no humidity in the air: Use SUPER ACCELERATOR
Low temperature / high humidity: OK.
High temperature / low humidity: Add Slow solvent.
High temperature / high humidity: OK.

About IMPERMAX application

Application with single component airless spraying machine

1- Impermax is a high viscous resin. Its viscosity changes a lot with temperature.

If the airless machine is not powerful enough to spray IMPERMAX, its viscosity must be reduced either by adding solvent (Rayston Solvent, 5-10%) or by heating the product (heating belts, keep the pails in a warm warehouse during the night…).

Impermax Cold Polyurea is less viscous than IMPERMAX, so easier to spray with airless.

2- In order to avoid that air will be trapped inside the resin, thinner layers should be applied.

2 kg/m2 will be applied in about 3 layers of 0,7 kg/m2.
If solvent should be added, 2 kg/m2 will be applied in about 4 layers of 0,5 kg/m2

Standard Systems

of liquid waterproofing of roofs with IMPERMAX

IMPERMAX BASIC

IMPERMAX PLUS

IMPERMAX DECOR

IMPERMAX PARK

IMPERMAX STRAT

GREEN ROOF SYSTEM

Note: *Normally these systems can be build up with any of the liquid applied coatings from Krypton, either cold or hot spray applied.*

Liquid waterproofing

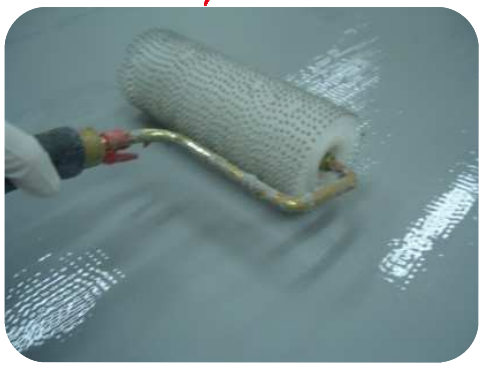
Steps of the standard system

1. Treatment of the surface. Should be clean, repaired and dry.
2. Primer. Reference depends on surface condition, its nature and the requirements of the project.
3. Detailing (Normally Impermax + Geomax).
4. Application of the main liquid waterproofing. Normally 2 kg/m2 in one/two or even more layers, following ETA certificates. Spiked roller (cold applied systems).
5. Top coat: protective/decorative (Clear coat without colour paste doesn't give UV protection to the aromatic underneath coat!).

Treatment between two successive layers?

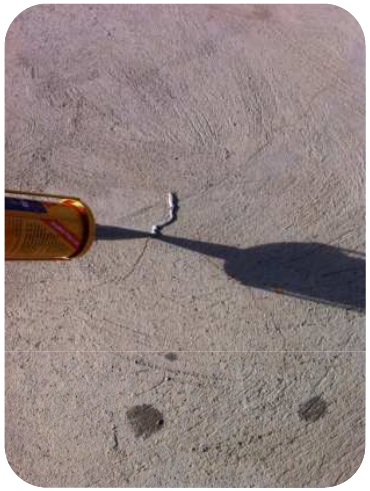
(Primer/Impermax, Impermax/Impermax, Impermax/Top Coat)

Effects of dirt, dust, pollen, pollution, rain, time between layers...



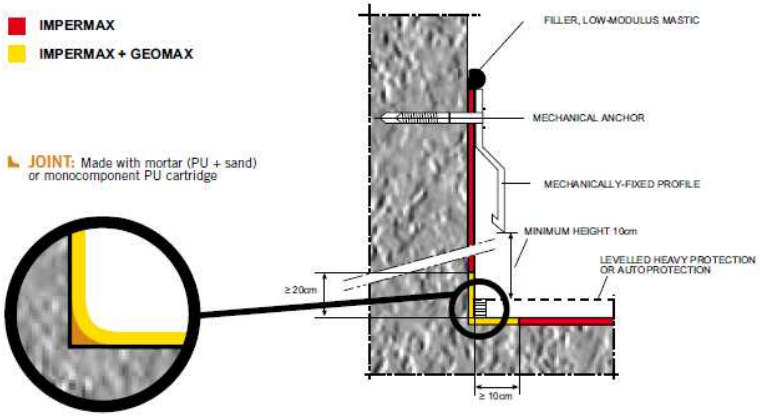
Liquid waterproofing

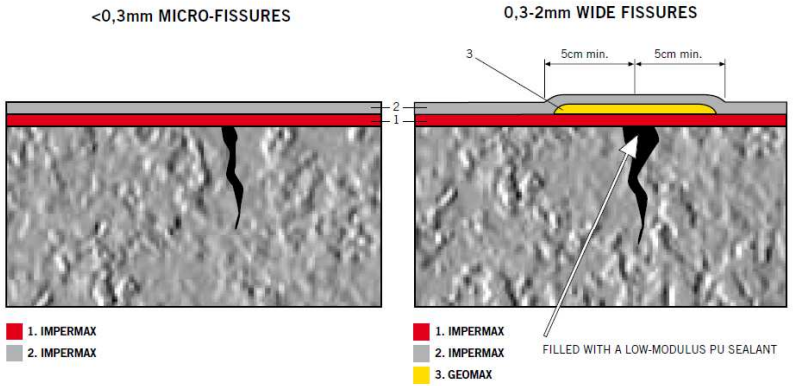
Treatment of the surface: concrete fissures

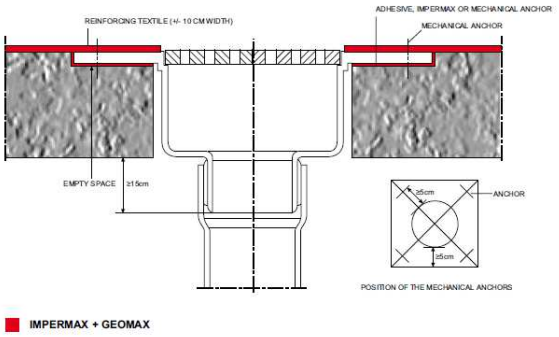


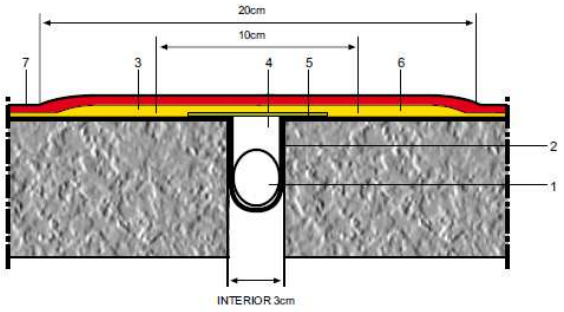
Liquid waterproofing with Impermax

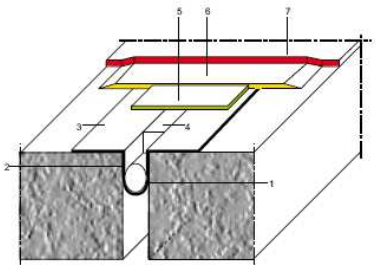
Examples diagrams of details with Geomax











1. Backer rod (PE foam)
2. GEOMAX
3. IMPERMAX + GEOMAX
4. Low modulus PU sealant
5. Spacer (PE)
6. IMPERMAX + GEOMAX
7. IMPERMAX

Liquid waterproofing with Impermax

Examples details with Geomax I

Liquid waterproofing with Impermax

Example details with Geomax II

Liquid waterproofing with Impermax

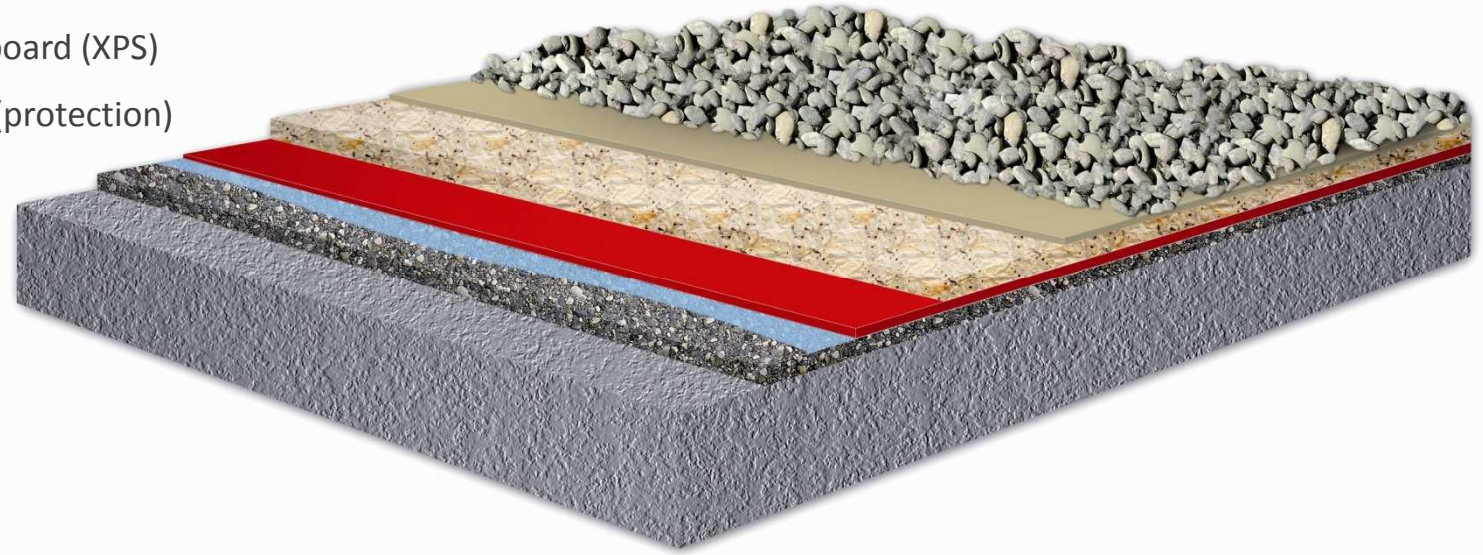
Examples details with Geomax III

Impermax Basic system

FLAT INVERTED ROOF, LIMITED PEDESTRIAN CIRCULATION

GRAVEL AS HEAVY PROTECTION

1. Resistant support
2. Slope formation
3. Primer
4. **Impermax** (10 or 25 years)
5. Insulating board (XPS)
6. Geotextile (protection)
7. Gravel



Impermax Basic system

FLAT INVERTED ROOF, LIMITED PEDESTRIAN CIRCULATION

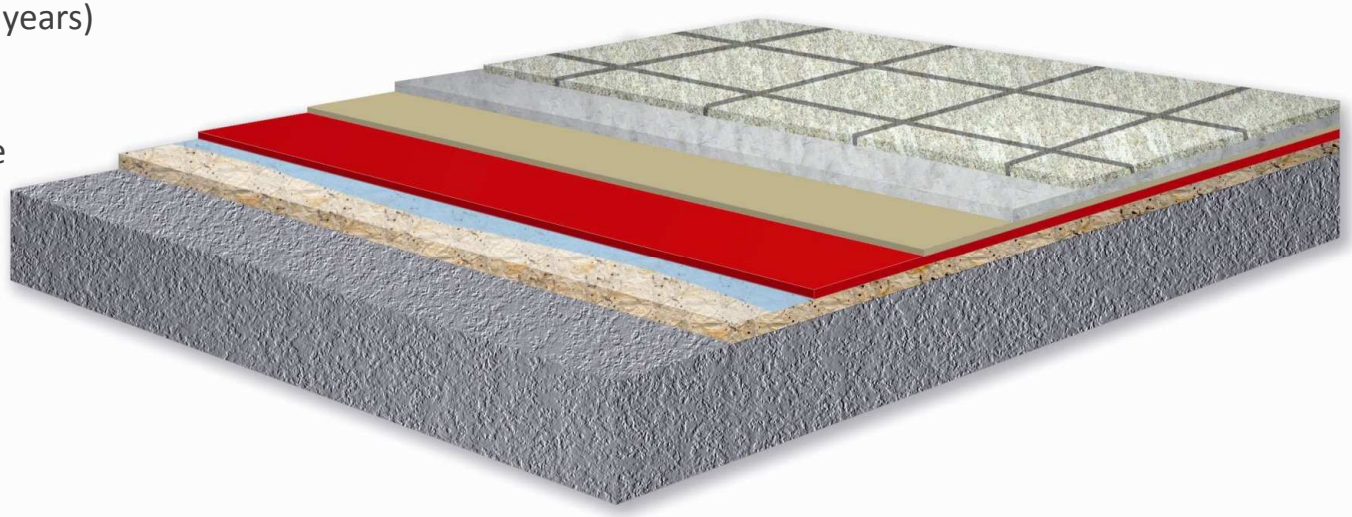
GRAVEL AS HEAVY PROTECTION

Impermax Basic system

TRADICIONAL ROOF

COVERED WITH CERAMIC TILES

1. Resistant support
2. Slope formation
3. Primer
4. **Impermax** (10 or 25 years)
5. Anti –slip finish
6. Flexible tile adhesive
7. Tiles



Impermax Basic system

Impermax Basic system

Use of the self-adhesive Butyl Tex (reinforcement)

Impermax Basic system

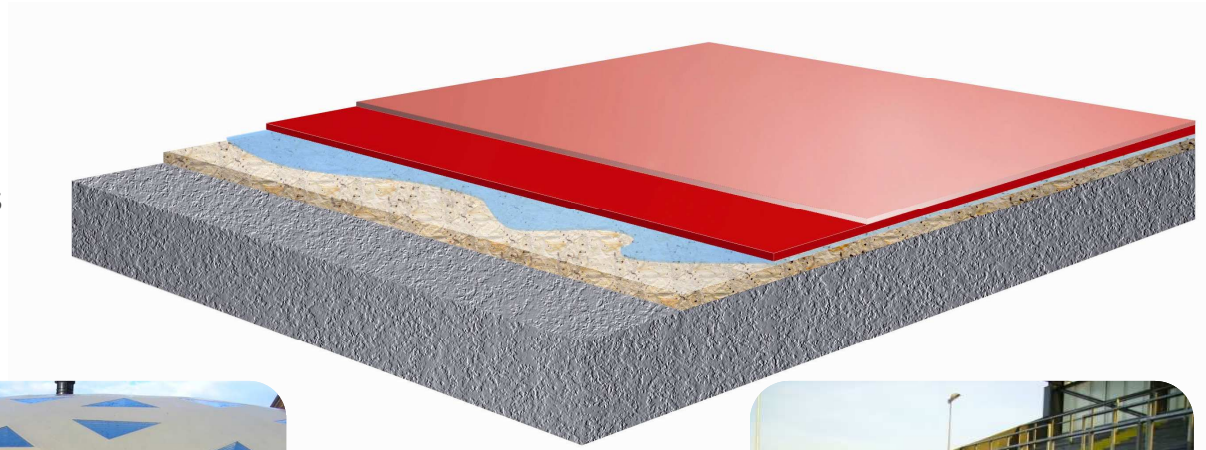
Wet room

Impermax Plus system

EXPOSED COATING

ALLOWS PEDESTRIAN TRAFFIC DEPENDING ON SUPPORT AND TOP COAT

1. Resistant support
2. Slope formation
3. Primer
4. **Impermax** (10 or 25 years)
5. Protective TOP COAT: Impertrans or Colodur + Colour Paste

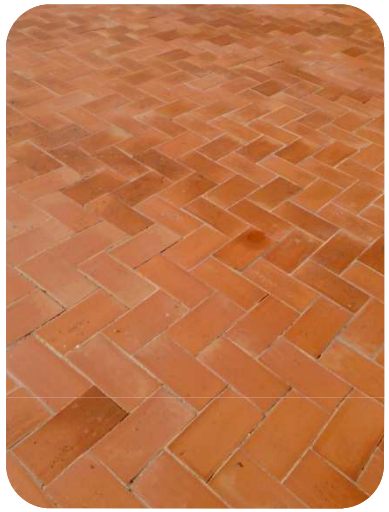


Impermax Plus system

Table of aliphatic protective top coats available

	BRIEF DESCRIPTION OF THE RESIN	EXAMPLES OF USE
Colodur	Clear single component PU resin, solvent based. Can be colored with a color paste. Forms a flexible, slightly elastic and quite hard coat, with very good chemical, scratch and wear resistance. Certificate as a top coat for a car park	Top coat over a waterproofing membrane when resistance against heavy loads is required (pedestrian or car traffic). Cool roof system with SRI certificate
Impertrans	Clear single component PU resin, solvent based. Can be colored with color paste. Forms a flexible, soft and elastic coat. Drinking water certificate	Top coat over a waterproofing membrane when resistance against heavy loads is not required. Drinking water certificate required
Impertrans Eco	Two-component, waterborne, solvent free, already colored. Forms a flexible, slightly elastic and slightly hard coat. Semi-gloss finish	Totally solvent free systems (over Impermax 2K M or hot spray applied systems)
Paintchlore	Similar to Colodur, however with improved chemical resistance, specially against the chlorine in a swimming-pool	Continuous contact with salty or chlorinated water (swimming-pools)
Impermax A	Already colored (white) single component PU resin, solvent based. May be used either as a thin protective top coat or as a thick second layer over Impermax system	Especially for large projects, when avoid mix the resin with the color paste it involves a large increase on productivity and lower cost for the top coat. Cool roof system with SRI certificate

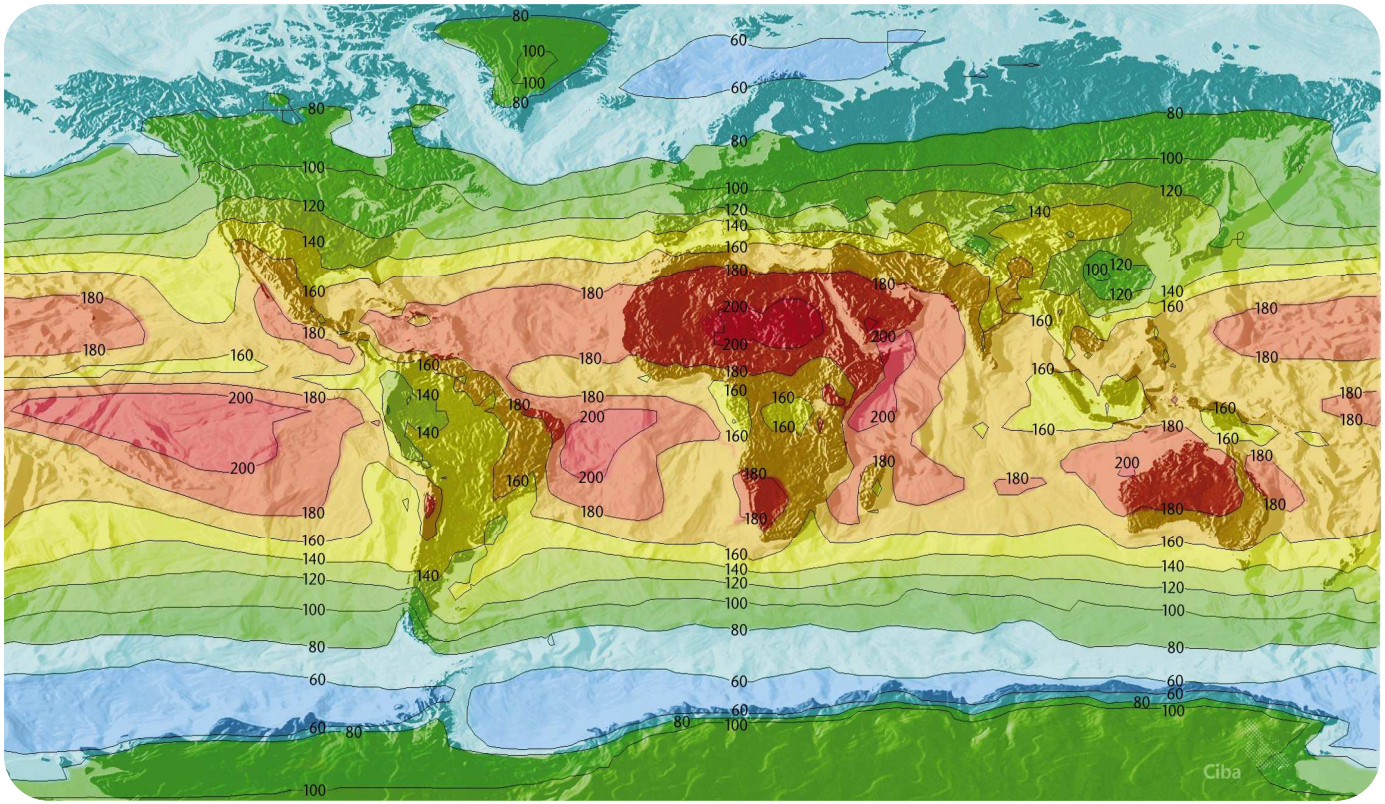
Impermax Plus system



Impermax Plus system

(Over PU Foam)

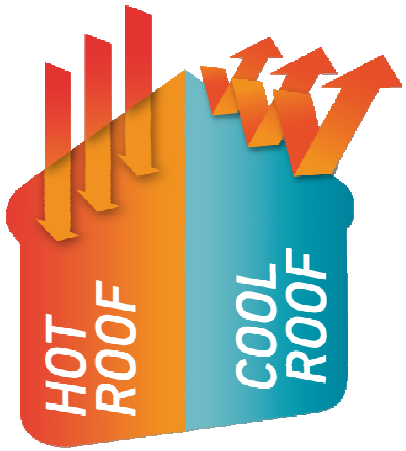
Solar radiation map



AVERAGE SOLAR RADIATION IN KILOLANGLEYS, Kcal/cm2/year

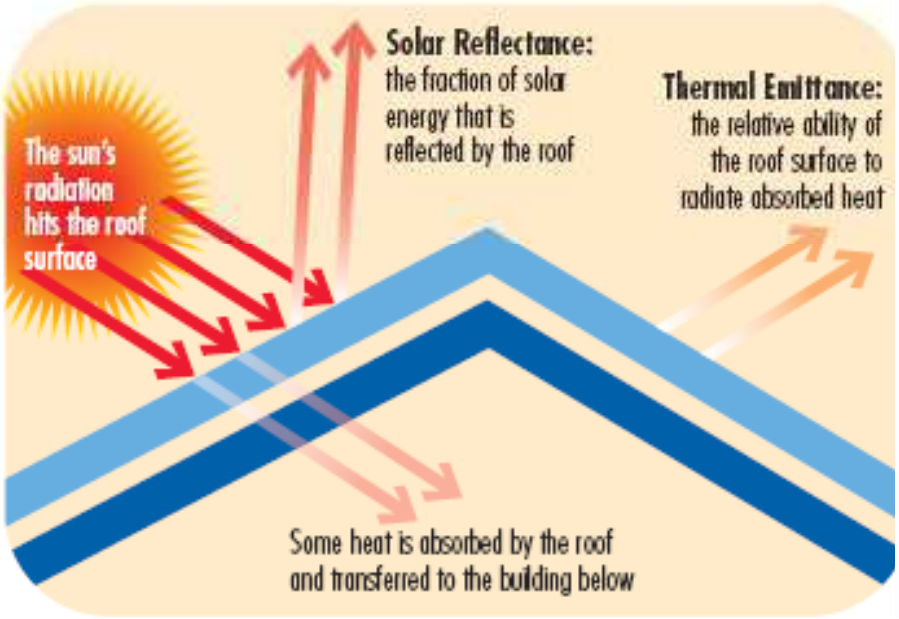
Impermax Plus system
Cool roof

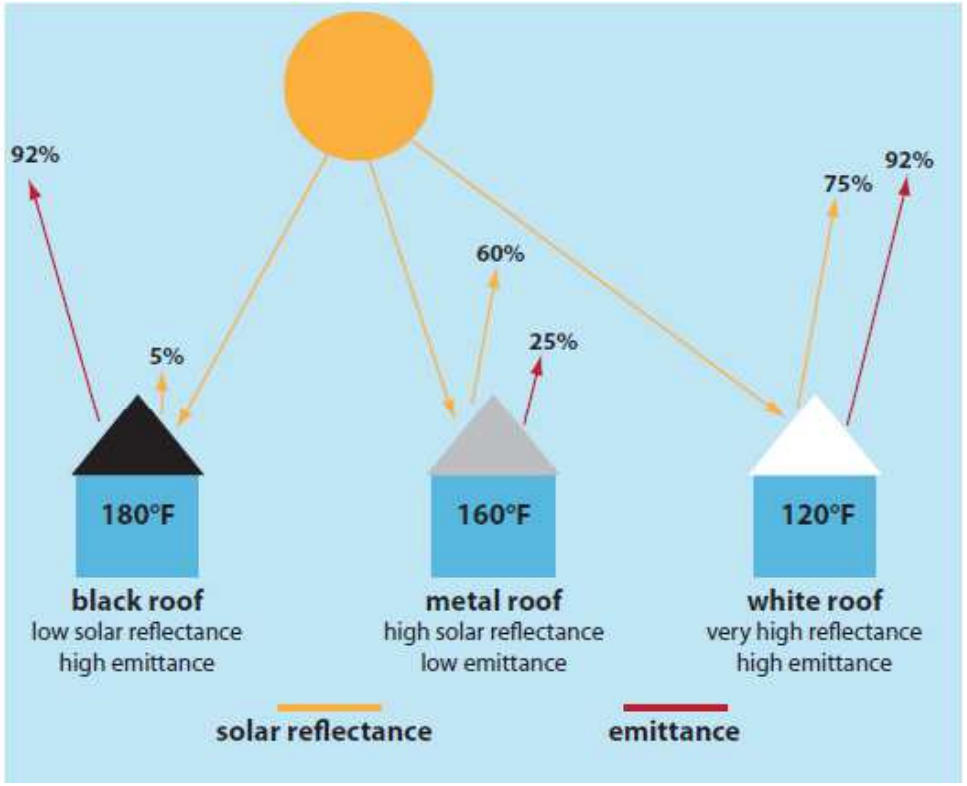
1. A **COOL ROOF** reflects and emits the sun's heat back to the sky instead of transferring it to the building below
2. Increase of occupant comfort by keeping the building cooler during hot summer months.
3. Cut costs by reducing the need of air conditioning, extending the life of cooling equipment.
4. Temperature of the coating surface is reduced, the coating last longer.
5. Reduction of "Urban Heat Island Effect"



Impermax Plus system

Cool roof





On a hot, sunny, summer day, early afternoon, a black roof that reflects 5% of the sun's energy and emits more than 90% of the heat it absorbs, can reach 180ºF (82ºC). A metal roof will reflect the majority of the sun's energy while releasing about a fourth of the heat that it absorbs and can warm to 160ºF (71ºC). A cool roof will reflect and emit the majority of the sun´s energy and reach a peak temperature of 120ºF (49ºC).

Impermax Plus system

Cool roof

Coolness is measured by the SRI that is the ratio between two surface properties, solar reflectance and thermal emitance:

SRI (Solar Reflectance Index) = $\frac{\text{Solar Reflectance (\%)}}{\text{Thermal emitance}}$

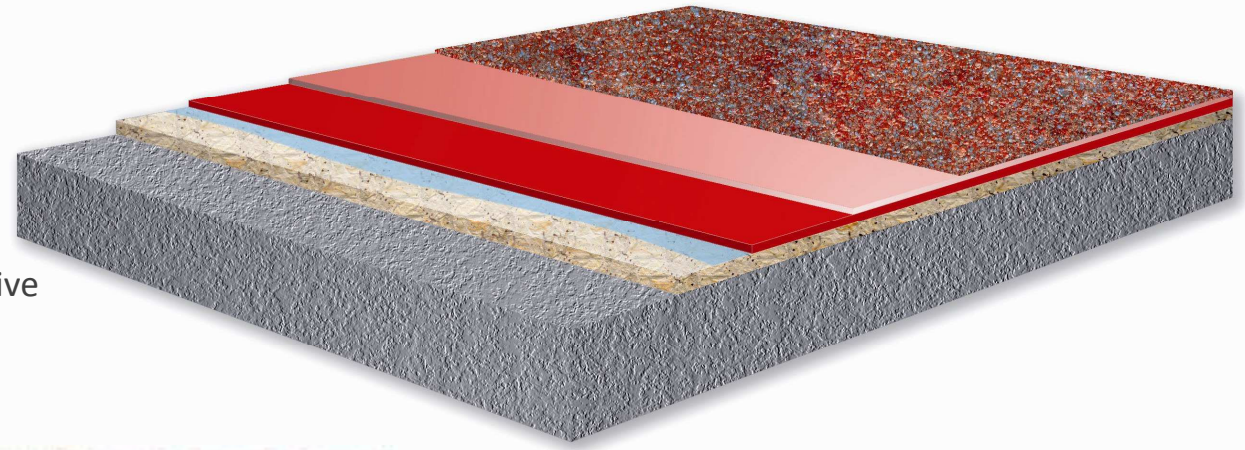
Colodur + white Colour Paste, SRI = 105. Impermax A, SRI = 100

Impermax Decor system

EXPOSED COATING. DECORATIVE FINISHING

ALLOWS HEAVY PEDESTRIAN TRAFFIC

1. Resistant substrate
2. Slope formation
3. Primer
4. **Impermax** (10 or 25 years)
5. Colodur + Colour Paste
6. Coloured quartz sand/Decorative Flakes
7. Colodur Top Coat (clear)



Impermax Decor system

EXPOSED COATING. DECORATIVE FINISHING

ALLOWS HEAVY PEDESTRIAN TRAFFIC

Impermax Decor system

Table of types of decorative finishes

	BRIEF DESCRIPTION OF THE SYSTEM
Coloured quartz sand	**IMPERMAX** + **Base resin** (Colodur & Color Paste) + Broadcast of **Colored Quartz Sand** until saturation + abrasion of the surface, if desired, depending on anti skid finish required + Clear **protective top coat** (Colodur).
Decorative flakes	**IMPERMAX** + **Base resin** (Colodur & Color Paste) + Broadcast of **decorative flakes** + Clear **protective top coat**, Colodur
Pavistone (decorative aggregates with binder. Draining surface)	**IMPERMAX** + **Base resin** (Colodur & Colour Paste) and slight broadcast of quartz sand to increase the adhesion + **Decorative aggregates** binded with Pavistone 1K + Clear **protective top coat** (Colodur).

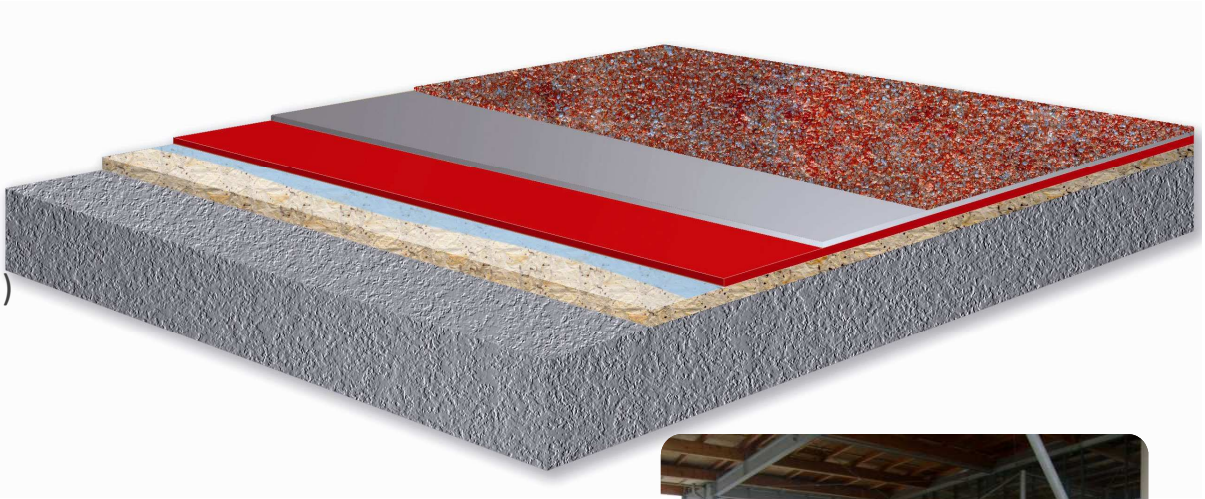
Note: Pavistone 1K is a pure single component aliphatic PU resin, solvent free, 100% resin.

Impermax Park system

EXPOSED COATING

ALLOWS VEHICLE TRAFFIC

1. Resistant substrate
2. Slope formation
3. Primer
4. **Impermax** (10 or 25 years)
5. Paviflex + Quartz sand (0,4-0,9mm)
6. Colodur + Colour Paste



Impermax Park system

EXPOSED COATING

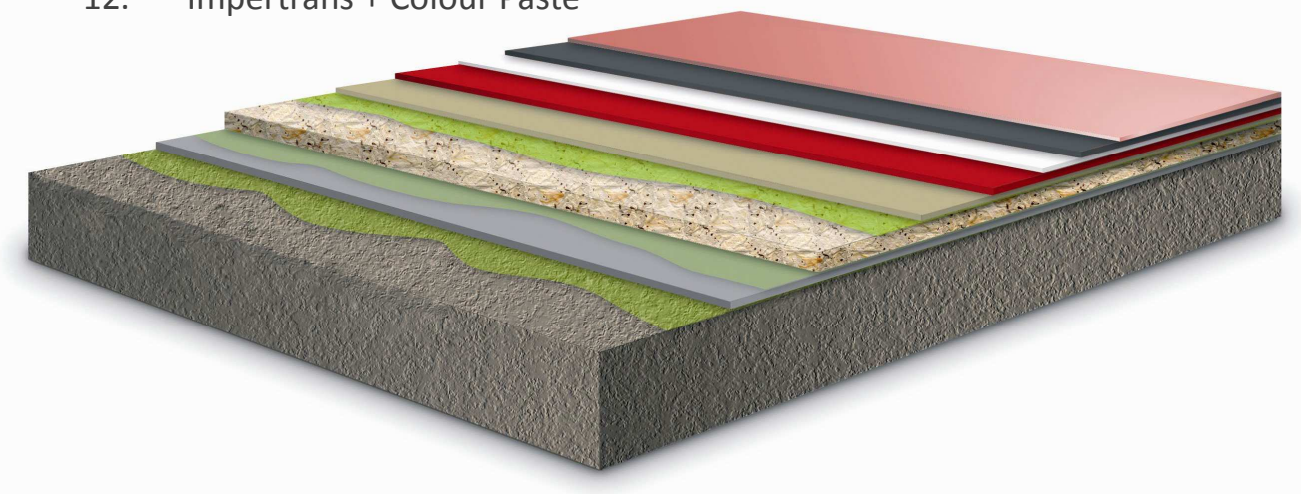
ALLOWS VEHICLE TRAFFIC

Impermax Strat system

INTEGRAL SYSTEM (WATERPROOFING+INSULATION)

ALLOWS MAINTENACE CIRCULATION

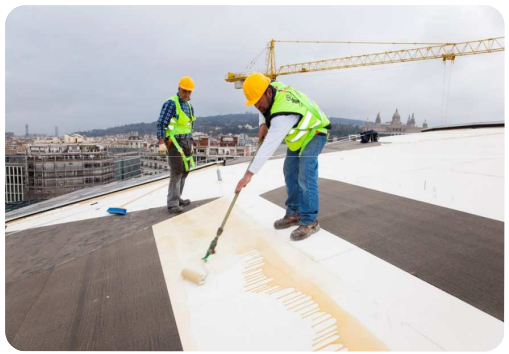
1. Resistant substrate
2. Slope formation
3. Cold Applied PU Adhesive
4. RAYSTON VEL ALUM Sheet (if needed)
5. Cold Applied PU Adhesive
6. PIR boards (insulation)
7. Cold Applied PU Adhesive
8. RAYSTON VEL Sheet
9. **Impermax**
10. Rayston FIBER 150
11. **Impermax**
12. Impertrans + Colour Paste



Impermax Strat system

INTEGRAL SYSTEM (WATERPROOFING+INSULATION)

ALLOWS MAINTENACE CIRCULATION



Green roof system

FLAT ROOF, NO PEDESTRIAN CIRCULATION

WATERPROOFING MEMBRANE, DRAINING SHEET, SOIL & PLANTS

1. Resistant substrate
2. Slope formation
3. Primer
4. **Impermax**
5. Protective geotextile
6. Draining sheet
7. Geotextil protector
8. Soil
9. Plants

Green roof system

FLAT ROOF, NO PEDESTRIAN CIRCULATION

WATERPROOFING MEMBRANE, DRAINING SHEET, SOIL & PLANTS

Impermax holds a resistance to root penetration certificate with reinforcement (GEOMAX) and without reinforcement

Refurbishment over an old bituminous sheet with IMPERMAX

1. Save costs of dismantling and waste disposal in a landfill.
2. IMPERMAX always reinforced (Rayston Fiber 150).
3. In most of the cases a primer is not needed.
4. Possibility to improve the insulation (PU Foam) and solve leaks problems in a single process.

Small repairs and flashing

Impermax QC and Impermax Tixo

Small repairs and flashing

Impermax QC and Impermax Tixo

Clear membranes

with Impertrans/Colodur reinforced (Rayston Fiber 30)

Quality control thickess Impermax membrane

1. ***When the liquid resin is applied***

   Tracking the consumption of resin and its application following ETA certificate, with the help of a template

   Measurement of the wet film thickness by a notched gauge

2. ***When the resin is already totally cured***

   Destructive method: Cut and measure

   Non destructive method: Electronic thickness gauge

Measurement with a Durometer (Shore A) permits check that the membrane has reached the final required strength

Quality control

Model control form/guarantee certificate

CONTROL OF APPLICATION | OF JOB

NAME CLIENT OF KRYPTON	
INSTALLATOR / APPLICATOR	
OWNER (where did the job)	
COMPLETE ADDRESS OF JOB	
TYPE OF JOB (roof..)	
DATE COMPLETED	
DURATION OF CERTIFICATE	
REFERENCE DELIVERY NOTE / INVOICE (where it appears the products sold by Krypton)	

SIZE OF JOB / M2

WIDTH	LENGTH	PARTIAL SIZE
	TOTAL M2 OF JOB	

CONSUMER PRODUCTS

PRODUCT	DESCRIPTION	QUANTITY APPLIED
SINGULAR POINT TREATMENT Raystonflex / Backer rod (Rayfond)/ Geomax / Butyltex	Specify product and use	
PRIMER Activator PU / Imp. H / Porosity sealer / Epoxy 100 / EP EPOXY 100 Binder / EP Aquaprimer	Specify type of primer used	
WATERPROOFING Impermax / Impermax 2k / Poliurea / Poliurea H	Specify product and colour of each layer Layer 1: Layer 2: Layer 3:	
REINFORCEMENT Geomax / Rayston Fiber / Butytex	Specify product and use	
FLOORING • Colodur / Impertrans / Colodur Eco / Pavidur / Kryptanate M / EP Aquacoat. • Pavifloor / EP Aquanivel / EP Nivel / Paviflex • EP Multilayer / EP Multilayer Aqua / Kryptanate Multilayer • Pavistone / Rubber crumb binder	Specify product and colour	

NAME + SIGNATURE + STAMP OF APPLICATOR	NAME + SIGNATURE + STAMP OF CLIENTE OF KRYPTON (in case it is different)

KRYPTON CHEMICAL SL
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rayston@kryptonchemical.com • www.raystonpu.com

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Tel + 34 977 82 08 40
Fax + 34 977 56 90 10
e-mail: kryptonchemical@yahoo.com

CERTIFICATE OF GUARANTEE.

D. , as legal representative of company KRYPTON CHEMICAL, S.L. with address in C/ Martí Franqués, 12 Polígono Industrial Les Tapies, L'Hospitalet de l'Infant (TARRAGONA), extends the following **CERTIFCATE OF GUARANTEE** in favour of: (*FINAL CUSTOMER*)

For the application of IMPERMAX waterproofing membrane in: (*BUILDING OR PREMISES CONCERNED*)

According to description issued by: (*NAME OF ARCHITECT*)

This guarantee includes only the engagement by the company to repair free of charge such parts of the membrane through which there might have been leakage.

This guarantee is subject to the following conditions:

- It has a validity period of 25 years, starting in:
- It does not cover any auxiliary or masonry works or any other which might be needed to conduct the repairs.
- It will not be valid if the membrane is damaged by improper use, building construction defects, catastrophic damages or "force majeure", or if the surface has been manipulated or repaired without agreement from the approved installer.
- In case of observing any anomaly it must be notified to Fax nº 00 34 977 823 977 / Address: Pol. Ind. Les Tapies, C/ Marti Franques, 12.43890n L'Hospitalet de l'Infant (TARRAGONA).
- This guarantee will only be valid if the works have been fully paid.
- Application will have to be conducted according to Krypton Chemical specifications, specially in regard to product consumption per sq.m, system of application and other variables which might affect or condition the quality of this treatment.
- In case of any discrepancies about the causes or origin of any leakages or regarding the best way to conduct the appropriate repairs, both parties will accept the advice of an independent advisor designated by KRYPTON CHEMICAL, S.L.

Stamped and signed,,

References special projects

Plywood roof

Shopping mall Les Arenes
Barcelona
Impermax Strat system. 4.500 m²
Arq. Richard Rogers / Alonso Balaguer

References special projects

Playwood roof

Golf course
Nearby Moscow (Russia)
1.300 m2
Impermax plus system (Cool Roof)
Over Plywood

References special projects

Bridge

Passerelle Debilly (1.899)
Paris
300 m2
Impermax 2K system
Finished with tarmac

References special projects

Airport

Metallic roof refurbishment
Terminal T-2
Barcelona Airport
18.500 m2
Impermax plus system

References special projects

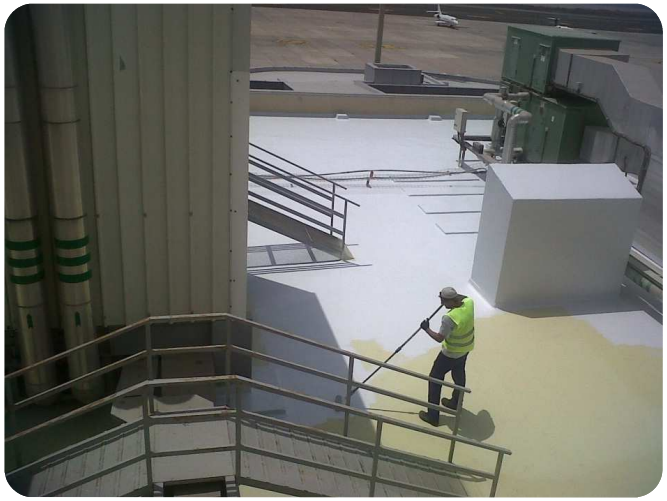
Airport

Sevilla airport
Roof Refurbishment
25.000 m^2
Impermax 2K Plus system

References special projects

Airport

Tenerife airport
Roof refurbishment
12.000 m2
Impermax 2K Plus system



References special projects

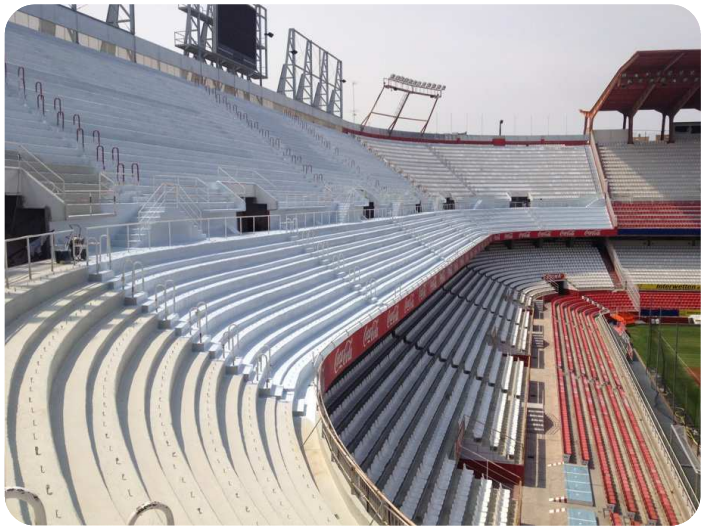
Car Park Deck

Car Park Deck
Shopping Mall
Chili
15.500 m2
Impermax 2K Plus system

References special projects

Football stadium

Sevilla Stadium
Restoration of the stands
16.000 m2
Impermax 2K Plus system



References special projects

Car park deck

Renovation Hospital entrance
Usti Nab Labem (Czech Republic)
1.450 m2
Impermax Park System

References special projects

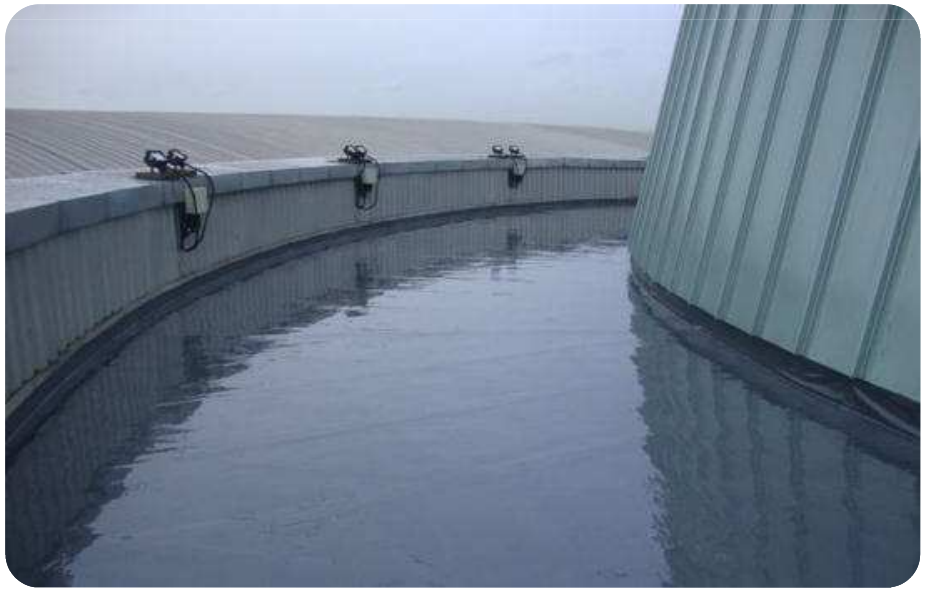
Renovation terraces and car park

Foster Wheeler European Headquarters (UK)
Renovation terraces and car park
1.500 m2
Impermax Basic system (finished by tiles)

References special projects

Refurbishment roof over PVC and bitumen entertainment complex

Star City, Entertainment and Recreation Complex, Birmingham (UK)
Refurbishment roofs
20.000 m2
Impermax Basic system (reinforced with fibreglass)



Refererences special projects

Roof refurbishment

Roof, office building
Bahrain island
475 m2
Impermax Plus system (reinforced with fibreglass)

References special projects

Drinking water tank

Waterproofing drinking water tank
Lugo (North-west of Spain)
21.500 m2
Impermax Basic system

References special projects

Clear coating paperboard columns ephemeral building

Gorky Park
Moscow (Russia)
1.800 m2
COLODUR system
TEMPORARY PAVILLION FOR ART GALLERY

Krypton Chemical

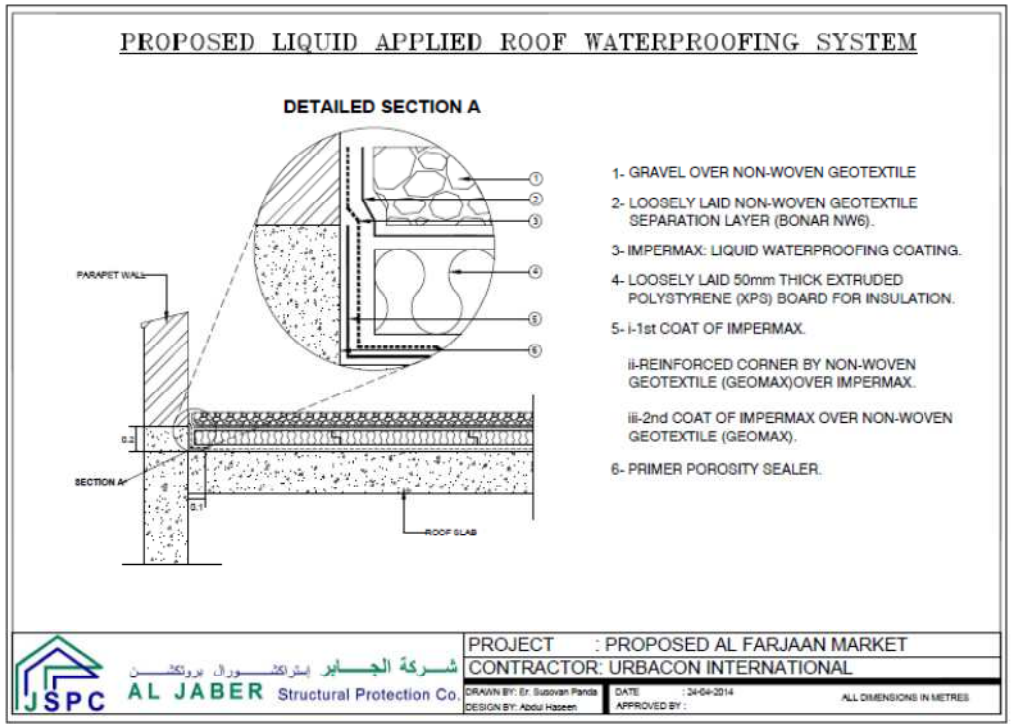
Conclusions

- Krypton Chemical, S.L. offers full solution packages (complete systems) to its professional clients, not just single products. Thanks to the long experience of Krypton, all these solutions can be easily adapted to the requirements of each project.
- Krypton Chemical, S.L. offers a relatively reduced range of products and technologies to the market. That allows a high level of expertise, knowledge and experience in all the proposed systems, either those cold or hot spray applied.
- International presence and many projects successfully finished all around the world, permits offer to our clients the very latest developments and technologies in liquid applied waterproofing coatings.

Krypton Chemical

Conclusions

Krypton Chemical, S.L. will help you to find the best solution for your liquid applied waterproofing projects



MANY THANKS

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