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European Technical Assessment ETA 06/ 0263 of 09/ 10/ 2023

English translation prepared by IETcc. Original version in Spanish language

General Part

Technical Assessment Body issuing the European Technical Assessment:	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 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	8 pages including 2 Annex. Annex 2 contains confidential information and is not included in this ETA
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	EAD 030350-00-0402 Liquid applied roof waterproofing kits
This version replaces	ETA 06/0263 issued on 14/09/2018

Specific parts

1. Technical description of the product

1 Technical description of the product

The Liquid Applied Roof Waterproofing Kit (LARWK) "IMPERMAX" is designed and installed in accordance with the manufacturer, design and installation instructions, deposited at the IETcc. This LARWK comprises the following components, which are factory produced by the manufacturer or a supplier.

Components	Trade name	Consumption
Primer	RAYSTON EPOXY 100 (epoxy)	0.3 – 0,5 kg/m^2
	HUMIDITY PRIMER (epoxy primer in water dispersion)	0,3 – 0,5 kg/m^2
	POROSITY SEALER / PRIMAIRE R4	0,15 – 0,25 kg/m^2
	POROSITY SEALER FLEX	0,15 – 0,25 kg/m^2
	POROSITY SEALER FLEX 100	0,15 – 0,25 kg/m^2
	POLYUREA PRIMER	0,15 – 0,25 kg/m^2
	POLYUREA PRIMER FLEX	0,15 – 0,25 kg/m^2
Internal reinforcement	GEOMAX (Geotextile non-woven) RAYSTON FIBER 150 (Glass fibre mat)	------
Waterproofing membrane	IMPERMAX	≥ 1,6 kg/m^2
	IMPERMAX QC. Alternative version to IMPERMAX, it has same formulation with <1000 ppm of a moisture-triggering cure catalyst and thixotropic adjustment added after manufacturing and prior to delivery. This helps to improve curing under difficult (cold, dry) conditions	
	IMPERMAX ST (<2%). Alternative version to IMPERMAX, it has the same formulation however with a thixotropic adjustment added after manufacturing and prior to delivery that lets the resin to be applied over sloped surfaces.	
	IMPERMAX TIXO. Alternative version to IMPERMAX, it has the same formulation however, with a thixotropy adjustment (< 3%) added after manufacturing and prior to delivery that lets the resin to be applied over sloped surfaces.	
	IMPERMAX/IMPERMAX QC/ IMPERMAX ST/ IMPERMAX TIXO + IMPERMAX A.	≥ 2,2 kg/m^2

This kit can be used for different working life depending mainly of this thickness:

Working life	Minimum quantity consumed	Minimum thickness (mm)
10	IMPERMAX/IMPERMAX QC/ IMPERMAX ST/ IMPERMAX TIXO 1,6 kg/m^2	1,4
25	IMPERMAX/IMPERMAX QC/ IMPERMAX ST/ IMPERMAX TIXO 2 kg/m^2	1,6
	IMPERMAX/IMPERMAX QC/ IMPERMAX ST/ IMPERMAX TIXO 2 kg/m^2 + RAYSTON FIBER 150 IMPERMAX/IMPERMAX QC/ IMPERMAX ST/ IMPERMAX TIXO 1,5 kg/m^2 + RAYSTON FIBER 150 + IMPERMAX A (0,7 kg/m^2)	1,8
25	IMPERMAX/IMPERMAX QC/ IMPERMAX ST/ IMPERMAX TIXO 3 kg/m^2 + GEOMAX	2,2

IMPERMAX is a liquid applied roof waterproofing kits based on pure polyurethane, manufactured by the company KRYPTON CHEMICAL, S.L. It consists of a polyurethane resin, liquid-applied, mono-component, elastomeric with or without internal protection layer. IMPERMAX/ST/QC/TIXO reacts with the environmental humidity (direct reaction). IMPERMAX A is moisture triggered cured (indirect reaction).

Once polymerised they conform an elastic lining, in form of a layer completely bonded to different supports (steel and other types of metals, concrete, mortar, ceramic, timber, polyurethane foam and other waterproofing membranes like PVC, EPDM and bituminous). Depending on support condition, other type of primer may be advisable.

2. Specification of the intended use in accordance with the applicable European Assessment Document (hereinafter EAD)

2.1 Intended use(s)

The intended use of this System is the waterproofing of roof against the water, as in liquid as vapour form, with any slope between 0 and >30 % (S1-S4), for any type of categorisation of user load between P1 a P4 (annex 1) and resists the effects of low surface temperatures of –20 ºC (TL3) and high temperatures of 60 (TH2) -90 ºC (TH4). This LARWK fulfils the Basic works requirements n.º 2 (Safety in case of fire), n.º 3 (Hygiene, health and the environment) and n.º 4 (Safety in use) of the European Regulation 305/11.

This LARWK is made of non load-bearing construction elements. It does not contribute directly to the stability of the roof on which is installed, but it can contribute its durability by providing enhanced protection from the effect of weathering.

This LARWK can be used on new or existing (retrofit) roofs. It can also be used on vertical surfaces (singular details).

2.2 Relevant general conditions for the use of the kit

The provisions made in this European Technical Assessment are based on an assumed working life of 10-25 years from installation in the works, according to EAD030350-00-0402, provided that the conditions lay down for the installation, packaging, transport and storage as well as appropriate use, maintenance and repair are met. In this respect.

The indications given on the working life (W2-W3) cannot be interpreted as a guarantee given neither by the product manufacturer nor by EOTA nor by the Technical Assessment Body issuing this ETA, but are regarded only as a means for choosing the right product in relation to the expected economically reasonable working life of the works.

Installation. The Kit is installed on site. It is the responsibility of the manufacturer to guarantee that the information about design and installation of this system is effectively communicated to the concerned people. This information can be given using reproductions of the respective parts of this ETA. Besides, all the data concerning the execution shall be clearly indicated on the packaging and/or the enclosed instruction sheets using one or several illustrations.

Design. In the MTD the manufacture gives information on the quantities consumed and the processing, which shall lead to a thickness of the roof waterproofing ≥ 1.4 mm.

Execution. Particularly, it is recommended to consider:

- The kit installation has to be carried out by qualified installers,
- it can only be used the components of the kit indicated in this ETA,
- the supervision of the amount of material used (kg/m^2) and the control visual to check that each coat covers totally the one below, can ensure the minimum thickness of the kits,
- inspection of the roof surface (cleanliness and correct preparation) before applying the roof waterproofing,
- the recommended temperature of the product to be assembled will be between 0 ºC and 40 ºC and it will be not admitted support temperatures upper to 45 ºC. In other conditions, it will need to follow the manufacturer's instructions

Before, the installation of IMPERMAX, it is recommended to read its security card.

Use, maintenance and repair of the works. In those roofs with deteriorated areas of the waterproof layers, they will be repaired carrying out some light grinding to open the pore of the deteriorated layers. Afterwards, the new product will be assembled following the installation instruction and the new coats must overlap, at least 10 cm, to the coat no deteriorated. Further installation details are laid down in the MTD place at IETcc.

3 Performance of the product and references to the methods used for its assessment

The identification tests and the assessment for the intended use of "IMPERMAX" according to the Basic Work Requirements (BWR) were carried out in compliance with EAD 030350-00-0402. The characteristics of each system shall correspond to the respective values laid down in following tables of this ETA, checked by IETcc.

Methods of verification and of assessing and judging are listed afterwards.

3.1 Safety in case of fire (BWR 2)

Basic requirement for construction works 2: Safety in case of fire		
Essential characteristic	**Relevant clause in EAD**	**Performance**
External fire performance of roofs	2.2.1	Broof(t1) supports with fire classification A1-A2, NPA. For support with no A1-A2 fire classification
Reaction to fire	2.2.2	NPA

3.2 Hygiene, health and environment (BWR 3)

Basic requirement for construction works 3: Hygiene, health, and the environment			
Essential characteristic	**Relevant clause in EAD**	**Performance**	
Content, emission and/or release of dangerous substances	2.2.3	NPA	
Resistance to water vapour	2.2.4	μ = 1485 (1.4 mm thickness)	
Watertightness	2.2.5	Watertight	
Resistance to wind loads	2.2.6	Delamination strength: **Support + primer + membrane**	Pass **≥ 50 kPa** (kPa)
		Concrete + without primer	2000
		Concrete + Rayston epoxy 100	2000
		Concrete + Humidity primer	2000
		Concrete + Porosity Sealer / Primaire R4	1000
		Concrete + Porosity Sealer Flex	700
		Concrete + POROSITY SEALER FLEX 100	840
		Concrete + Polyurea Primer Flex	900
		Concrete + Polyurea Primer	600
		Steel + without primer	2600
		Steel + Rayston epoxy 100	2600
		Steel + Humidity primer	2600
		Steel + Porosity Sealer / Primaire R4	1000
		Steel + Porosity Sealer Flex	900
		Steel + POROSITY SEALER FLEX 100	800
		Steel + Polyurea Primer Flex	900
		Steel + Polyurea Primer	900
		PU foam + any primer	200
		The failure mode was between support and membrane on concrete – steel support, on the PU support collapse the support	
Resistance to mechanical damage (perforation)	2.2.7	**P1 - P4** (annex 1)	
	2.2.7.1	Resistance to static indentation (23 ºC)	
		2 kg/m^2 (without internal mesh)	Steel: I4 (6 mm)
			PU: I4 (6 mm)
		1,6 kg/m^2	Steel: I4 (6 mm)
			PU: NPA
		1.5 kg/m^2 IMPERMAX + 0. 7 kg/m^2 IMPERMAX A + RAYSTON FIBER	Steel: I4 (6 mm)
			PU: I4 (6 mm)
	2.2.7.2	Resistance to static indentation (23 ºC)	
		2 kg/m^2 (without internal mesh)	Steel: L4 (25 kg)
			PU: L3 (20 kg)
		1,6 kg/m^2	Steel: L3 (20 kg)
			PU: NPA
		1.5 kg/m^2 IMPERMAX + 0. 7 kg/m^2 IMPERMAX A + RAYSTON FIBER	Steel: L4 (25 kg)
			PU: L4 (25 kg)

Resistance to fatigue movement	2.2.8	W3 1000 cycles (-10 ºC) with any mesh- 2 kg/m²	
		W2: 500 cycles (-10 ºC) without mesh -1.6 kg/m²	
Resistance to the effects of low and high surface temperatures	2.2.9	**Low temperatures:TL3 High temperatures: TH2 -TH4**	
	2.2.9.1	R. Dynamic Indentation at TL3	
		2 kg/m² (without internal mesh)	Steel: I4 (6 mm) at -20 ºC
			PU: I4 (6 mm) at -20 ºC
		1,6 kg/m²	Steel: I4 (6 mm) at -20 ºC
			On PU: NPA
		1.5 kg/m² IMPERMAX + 0. 7 kg/m² IMPERMAX A + RAYSTON FIBER	Steel: I4 (6 mm) at -20 ºC
			PU: I4 (6 mm) at -20 ºC
	2.2.9.3	R. Static indentation (60 – 90 ºC)	
		2 kg/m² (without internal mesh)	Steel: L2 (15 kg) at 90 ºC
			Steel: L3 (20 kg) at 80 ºC
			Steel: L4 (25 kg) at 60 ºC
			PU: L1 (7 kg) at 60 ºC
		1,6 kg/m²	Steel: L3 (20 kg) at 80 ºC
			Steel: L1(7 kg) at 90 ºC
			PU: NPA
		2 kg/m² With Internal reinforcement (+ RAYSTON FIBER)	Steel: L3 (20 kg) at 90 ºC
			Steel: L4 (25 kg) at 80 ºC
			PU: NPA
		3 kg/m² With Internal reinforcement (+ GEOMAX)	Steel: L3 (20 kg) at 90 ºC
			Steel: L4 (25 kg) at 90 ºC
			PU: NPA
		1.5 kg/m² IMPERMAX + 0. 7 kg/m² IMPERMAX A + RAYSTON FIBER	Steel: L4 (25 kg) at 90 ºC
			PU. L3 (20 kg) at 90 ºC
Resistance to ageing media (heat and water)	2.2.10.1	**Resistance to heat ageing W2- W3, S (severe)** (100 - 200 days at 80 ºC)	
		R. Dynamic Indentation (-20 ºC) W3	
		2 kg/m² (without internal mesh)	Steel: I4 (6 mm) at -20 ºC
			PU: I4 (6 mm) at -20 ºC
		1,6 kg/m²	Steel: I4 (6 mm) at -20 ºC
			PU: NPA
		1.5 kg/m² IMPERMAX + 0. 7 kg/m² IMPERMAX A + RAYSTON FIBER	Steel: I4 (6 mm) at -20 ºC
			PU: I3 (10 mm) at -20 ºC
		Fatigue movement (50 cycles) at -10 ºC: Pass	
		Tensile properties (MPa / %)	
		1.6 kg/m² W2 (without internal mesh)	Initial: 3.5 / 694
		2 kg/m² W3 (without internal mesh)	Initial: 2.4 / 460
			Ageing: 3.3 / 192
		3 kg/m² W3 (without internal mesh)	Initial: 5.4 / 690
			Ageing: 5.5 / 860
		3 kg/m² W3 + GEOMAX	Initial: 5.6 / 48
			Ageing: 5.8 / 40
		2 kg/m² W3 + RAYSTON FIBER	Initial: 6 / 6
		1.5 kg/m² IMPERMAX + 0. 7 kg/m² IMPERMAX A + RAYSTON FIBER	Initial: 4 / 685
			Ageing: 6 / 110
	2.2.10.3	**Resistance to water ageing W2 –W3, S1-S2, P4** (30 – 60 -180 days at 60 ºC)	
		R. Static indentation	
		2 kg/m² - 60d (without internal mesh)	90 ºC -Steel: L2 (15 kg)
			80 ºC -Steel: L3 (20 kg)
			60 ºC -Steel: L4 (25 kg)
		1,6 kg/m² – 30d	90 ºC -Steel: L1 (7 kg)
			80 ºC -Steel: L2 (15 kg)
			60 ºC -Steel: L3 (20 kg)
		2 kg/m² + RAYSTON FIBER - 60d	60 -90 ºC -Steel: L3 (20 kg)
		3 kg/m² + GEOMAX - 60d	80- 90 ºC -Steel: L3 (20 kg)
			60 ºC -Steel: L4 (25 kg)
		1.5 kg/m² IMPERMAX + 0. 7 kg/m² IMPERMAX A + RAYSTON FIBER - 60d	60 - 90 ºC -Steel: L4 (25 kg)
			PU: L3 (20 kg)
		1.5 kg/m² IMPERMAX + 0. 7 kg/m² IMPERMAX A + RAYSTON FIBER - 180d	Steel: L4 (25 kg)
			PU: L1 (7 kg)

Resistance to ageing media (heat and water)		Resistance to delamination (kPa) **≥ 50 kPa** (60 / 180 days)	
		Concrete + without primer	NPA
		Concrete + Rayston epoxy 100	3000 / 2000
		Concrete + Humidity primer	3000 / 2000
		Concrete + Porosity Sealer / Primaire R4	1000 / 700
		Concrete + Porosity Sealer Flex	500 / 300
		Concrete + POROSITY SEALER FLEX 100	500 / 700
		Concrete + Polyurea Primer Flex	600 / 800
		Concrete + Polyurea Primer	500 / 500
Resistance to UV radiation in the presence of moisture	2.2.10.2	W3-W2, S (severe), 5000-2000 hours without finishing layers	
		R. Dynamic Indentation (-20 ºC) W3	
		2 kg/m^2 (without internal mesh)	Steel: I4 (6 mm)
			PU: I4 (6 mm)
		1,6 kg/m^2	Steel: I4 (6 mm)
			PU: NPA
		1.5 kg/m^2 IMPERMAX + 0. 7 kg/m^2 IMPERMAX A + RAYSTON FIBER	Steel: I4 (6 mm)
			PU: I2 (50 mm)
		Tensile properties (MPa / %)	
		2 kg/m^2 W2 (without internal mesh)	Initial: 2.4 / 460
			Ageing: 3.1 / 193
		3 kg/m^2 W3 (without internal mesh)	Initial: 5.4 / 690
			Ageing: 2.0 / 180
		3 kg/m^2 W3 + GEOMAX	Initial: 5.6 / 48
			Ageing: 7 / 46
		1.5 kg/m^2 IMPERMAX + 0. 7 kg/m^2 IMPERMAX A + RAYSTON FIBER. W3	Initial: 4 / 685
			Ageing: 7 / 162
Resistance to plant roots	2.2.11	NPA	
Effects of variations in kit components and site practices	2.2.12	2 kg/m^2 (without internal mesh)	
		0 ºC. Tensile properties (MPa / %)	4 /384
		40 ºC. Tensile properties (MPa / %)	3 / 240
		0 ºC. R. Dynamic Indentation	Steel: I4 (6 mm) at 23 ºC
		40 ºC. R. Dynamic Indentation	Steel: I4 (6 mm) at 23 ºC
Effects of the days joint	2.2.13	Delamination strength: 1800 kPa	

3.3 Safety and accessibility in use (BWR 4)

Basic requirement for construction works 4: Safety and accessibility in use		
Essential characteristic	**Relevant clause in EAD**	**Performance**
Slipperiness	2.2.14	NPA

4 Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base

4.1 System of assessment and verification of constancy of performance

According to the decision 98/599/EC of October 1998, Official Journal of the European Communities N.° L 287, 24.10.1998) of the European Commission[1], system 3 of assessment and verification of constancy of performance (see EC delegated regulation (EU) No 568/2014 amending Annex V to Regulation (EU) Nº 305/2011) applies.

Product	Intended uses	Level or Classes	System
IMPERMAX	Liquid Applied Roof Waterproofing Kit	Any	3

[1] Published in the Official Journal of the European Union (OJEU) L 262, 14/10/2003 P. 0034 - 0036.
See www.new.eur-lex.europa.eu/oj/direct-access.html

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan which is deposited at IETcc[2].

5.1 Tasks of the manufacturer

Factory production control. The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall ensure that the product is in conformity with this ETA.

The manufacturer may only use components stated in the technical documentation of this ETA including Control Plan. The incoming raw materials are subjected to verifications by the manufacturer before acceptance.

The factory production control shall be in accordance with the Control Plan. The results of factory production control shall be recorded and evaluated in accordance with the provisions of the Control Plan

Other tasks of the manufacturer. The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of this ETA.

5.2 Tasks of notified bodies.

Initial type-testing of the product. For type testing, the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases, the necessary type testing has to be agreed between IETcc and the notified body.

The initial type-testing have been conducted by the IETcc to issue this ETA in accordance with the EAD 030350-00-0402 “Liquid applied roof waterproofing kits”. The verifications underlying this ETA have been furnished on samples from the current production.

Issued in Madrid on 9 of October 2023

By

Director
on behalf of Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc – CSIC)

[2] The Control Plan is a confidential part of the ETA and only handed over to the notified certification body involved in the assessment and verification of constancy of performance.

Annex 1.

Resistance to mechanical damage (perforation) "IMPERMAX"

Levels	1,6 kg/m²	2 kg/m²	3 kg/m² + GEOMAX	2 kg/m² + RAYSTON FIBER	IMPERMAX (+ RAYSTON FIBER) + IMPERMAX A
Working life	W2 (10 years)	W3 (25 years)			
Climatic zone	S (Severe)				
	Concrete / steel				P4: TH4 on concrete P2: TH4 on PU foam
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	

NOTE: For a polyurethane foam support, the system has been only test for a working life of 10 years (W2) and 2 kg/m² of IMPERMAX with a User load of P1