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**European Technical Assessment ETA 24/ 1157
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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	MARISEAL® 460 SYSTEM
Product family to which the construction product belongs	Liquid Applied Roof Waterproofing Kit, based on polyurethane
Manufacturer	MARIS POLYMERS S.M.S.A Industrial Area of Inofyta Viotia, 32011, Greece
Manufacturing plant(s)	Industrial Area of Inofyta Viotia, 32011, Greece
This European Technical Assessment contains	6 pages Including annex 1. + Annex 2, that contains confidential information and is not included in the European Technical Assessment when that assessment is publicly disseminated
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

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Specific parts

1 Technical description of the product

The Liquid Applied Roof Waterproofing Kit (LARWK) "MARISEAL® 460 SYSTEM" is designed and installed in accordance with the manufacturer, design and installation instructions. This LARWK comprises the following components, which are factory produced by the manufacturer or a supplier.

Components		Trade name	Consumption
Primer	Concrete	MARISEAL® AQUA PRIMER	≥ 0,15 kg/m ²
		MARISEAL® 710	≥ 0,20 kg/m ²
	Steel	MARISEAL® AQUA PRIMER	≥ 0,15 kg/m ²
	PU foam	MARISEAL® AQUA PRIMER	≥ 0,15 kg/m ²
	Bituminous membranes	MARISEAL® AQUA PRIMER	≥ 0,15 kg/m ²
Waterproofing membrane		MARISEAL® 460	≥ 2,30 kg/m ²
Internal reinforcement mesh		MARISEAL® FABRIC 60	-----

MARISEAL® 460 is a one-component, liquid-applied, aliphatic polyurethane waterproofing membrane for roofs. MARISEAL® 460 SYSTEM is manufactured by the company MARIS POLYMERS S.M.S.A., and it consists of a suitable MARISEAL® primer, a polyurethane elastomeric membrane fully reinforced with internal mesh.

Once polymerized it forms an elastic membrane fully bonded to the support (concrete, steel, PU foam, bituminous membranes), and other waterproofing membranes like PVC, EPDM and TPO. For every kind of substrate, use the suitable primer recommended by the manufacturer.

The minimum thickness of the assembled waterproofing system must be 1,3 mm.

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 the System is the waterproofing of roofs. It is suitable for sloped roofs within categories S1 to S4 and supports user load class P1 to P4. The system is resistant to extreme low surface temperatures of -30°C (TL4) and high surface temperatures from +30°C to +90°C (TH1-TH4). It is intended for use in severe climatic zones (S) and offers an expected working life of up to 25 years (W3) (annex 1).

This LARWK fulfils the Basic Works Requirements nº 2 (Safety in case of fire), nº 3 (Hygiene, health and the environment) and nº 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 to its durability by providing enhanced protection against environmental conditions.

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 expected working life of 25 years from installation in the works, according to EAD 030350-00-0402, provided that the conditions required for the installation, packaging, transport, storage, as well as appropriate use, maintenance and repair, are met.

The indications given on the expected working life 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. The performance of the System complies with the EOTA requirements, according to the performance levels listed in Annex 1. In the MTD, the manufacturer provides information on the consumption and the application, which shall lead to a minimum thickness of ≥ 1.3 mm of the assembled waterproofing system.

Execution. Particularly, it is recommended to consider the:

- kit installation that has to be carried out by qualified installers and only the components of the kit indicated in this ETA can be used,
- minimum thickness of the kits can be ensured by supervision of the amount of material used (kg/m²) and visual control to check that each coating covers totally the one below,
- inspection of the roof surface (cleanliness and correct preparation) before applying the roof waterproofing,
- ambient and substrate temperature during application of the system to be assembled, must be between 5 °C and 35 °C and substrate humidity must be less than 5%. In other conditions, follow the manufacturer's instructions.

Before the installation of MARISEAL® 460 SYSTEM, it is recommended to read its Safety Data Sheet.

Use, maintenance and repair of the works. Roofs with deteriorated areas of waterproofing layers will be repaired following the installation instructions of the manufacturer. Further installation details are laid down in the MTD placed 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 "MARISEAL® 460 SYSTEM" according to the Basic Works Requirements (BWR) were carried out in compliance with EAD 030350-00-0402. The characteristics of the systems 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	2.2.1	Roof (t4): pitches $\leq 10^\circ$ and non-combustible support. For other type of supports and pitches: NPA
Reaction to fire	2.2.2	NPA

3.2 Hygiene, health and the 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	$\mu \approx 1904$		
Watertightness	2.2.5	Watertight		
Resistance to wind loads	2.2.6	Support + Primer + Membrane		
		Concrete	MARISEAL® Aqua Primer	> 50 kPa
			MARISEAL® 710	960
		Steel	MARISEAL® Aqua Primer	710
		PU foam	MARISEAL® Aqua Primer	100
		Bituminous membranes	MARISEAL® Aqua Primer	50



Resistance to mechanical damage (perforation)	2.2.7.1	Resistance to dynamic indentation (23 °C)				
		Support	Indentor (mm)	Resistance Level		
		Steel	6	I4		
		PU foam	10	I3		
	Bituminous membranes	6	I4			
	2.2.7.2	Resistance to static indentation (23 °C)				
		Support	Load (N)	Resistance Level		
Steel		250	L4			
PU foam		250	L4			
Bituminous membranes	250	L4				
Resistance to fatigue movement	2.2.8	Resistance to fatigue movement. W3: 1000 cycles (-10°C): Pass				
Resistance to the effects of low and high surface temperatures	2.2.9	Extreme low temperatures: TL4 All climatic zones - Severe high temperatures: TH1-TH4				
	2.2.9.1	Resistance to low temperatures (-30°C)				
		Support	Indentor (mm)	Resistance Level		
		Steel	6	I4		
		PU foam	20	I2		
	Bituminous membranes	6	I4			
	2.2.9.2	Crack bridging capability: Pass				
	2.2.9.3	Resistance to high temperatures (+30 °C to +90 °C)				
		+30 to +60	Temperature (°C)	Support	Load (N)	Resistance Level
			Steel	250	L4	
PU foam			250	L4		
+80 to +90		Steel	250	L4		
		PU foam	250	L4		
	Bituminous membranes	250	L4			
Resistance to ageing media (heat and water)	2.2.10.1	Resistance to heat ageing W3, S (Severe) 200 days at 80 °C				
		R. Dynamic Indentation at -30°C	Steel	6	I4	
			PU foam	20	I2	
			Bituminous membranes	6	I4	
	Fatigue movement (50 cycles) at -10°C: Pass					
	2.2.10.3	Tensile Properties (MPa / %)	Initial		7 / 40	
			200 days		8 / 34	
			Resistance to water ageing W3, S (Severe) (60 days and 180 days at 60°C)			
		R. Static Indentation 60 days	30 - 60°C	Steel	L4	
				PU foam	L3- L2	
Bituminous membranes				L4		
R. Static Indentation 180 days	30 - 60°C	Steel	L4			
		PU foam	L2			
		Bituminous membranes	L4			
R. Static Indentation 60 days	80 - 90°C	Steel	L4			
		PU foam	L2-L1			
		Bituminous membranes	L4			
R. Static Indentation 180 days	80 - 90°C	Steel	L4			
		PU foam	L1			
		Bituminous membranes	L4			



Resistance to ageing media (heat and water)	2.2.10.3	Resistance to delamination (kPa) at 23 °C	60 days	Concrete + P1	870	
				PU foam + P1	100	
				Bituminous membranes + P1	60	
				Concrete + P2	800	
			180 days	Concrete + P1	810	
				PU foam + P1	780	
				Bituminous membranes + P1	60	
				Concrete + P2	830	
Resistance to UV-radiation in the presence of moisture	2.2.10.2	W3: 5000 hours S (Severe)				
		R. Dynamic Indentation -10 C 5000 h	Support	Indentor (mm)	Resistance Level	
			Steel	6	14	
		Tensile Properties (MPa / %)	PU foam	30	11	
			Bituminous membranes	6	14	
		Initial		7 / 40		
5000 h		8 / 28				
Resistance to plant roots	2.2.11	NPA				
Effects of variations in kit components and site practices	2.2.12	Dynamic Indentation 23 °C	5 °C	PU foam	14	
			Steel	14		
		40 °C	PU foam	14		
			Steel	14		
		Tensile properties (MPa / %) 5 °C		NPA		
		Tensile properties (MPa / %) 35 °C		NPA		
Effects of day joints	2.2.13	0.7 MPa				

3.3 Safety 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

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 Commission¹, system 3 of assessment and verification of constancy of performance (see EC delegated regulation (EU) No 568/2014 amending Annex V to Regulation (EU) N° 305/2011) applies.

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



Product	Intended uses	Level or Classes	System
MARISEAL® 460 SYSTEM	Liquid Applied Roof Waterproofing Kit	Any	3

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 IETcc².

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By

Director

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

Annex 1.

Characteristics of the System “MARISEAL® 460 SYSTEM”

Minimum thickness	1.3 mm
Water vapour diffusion resistant factor	$\mu \approx 1904$
Resistance to wind loads	> 50 kPa
Resistance to plant roots	NPA
Statement on dangerous substances	NPA
Resistance to slipperiness	NPA

Performance levels according to the intended use

External fire performance	Broof (t4) : pitches $\leq 10^\circ$ and non-combustible support. For other type of supports and pitches: NPA	
Fire reaction	NPA	
Expected working life	W3 (25 years)	
Climatic zone of use	S (Severe Climate)	
User loads	Support: Concrete/Steel/Bituminous membranes P4: TH1-TH4, TL4	Support: PU foam P1: TH1-TH4, TL4
Roofs slopes	S1 - S4 (<5% - >30%)	
Minimum surface temperatures	TL4 (Extreme low temperature)	
Maximum surface temperatures	TH1 - TH4 (All climatic zones-Severe high temperature)	

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.

