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Designated according to Article29 of Regulation (EU) Nº 305/2011

Member of EOTA
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European Technical Assessment

ETA 17/ 0401
of 12/ 12/ 2017

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	**DANOCOAT**
Product family to which the construction product belongs	Liquid Applied Roof Waterproofing Kit, based on Pure Polyurea
Manufacturer	DERIVADOS ASFALTICOS NORMALIZADOS (DANOSA), S.A c/ La Granja nº 3. 28108 ALCOBENDAS MADRID, Spain.
Manufacturing plant(s)	Planta de Laúndos. Parque Industrial de Laúndos, Lote 30 4570-311 Laúndos. Portugal.
This European Technical Assessment contains	7 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)

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SPECIFIC PARTS OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of the product

The Liquid Applied Roof Waterproofing Kit (LARWK) "DANOCOAT" is designed and installed in accordance with the manufacturer, design and installation instructions, deposited at the IETcc[(1)]. This LARWK comprises the following components, which are factory produced by the manufacturer.

Components	Trade name	Consumption
Primer (concrete)	DANOPRIMER EP (epoxi)	≥ 0,250 kg/m^2
Primer (Steel & XPS)	DANOPRIMER PU - PU2K (polyurethane)	≥ 0,100 kg/m^2
Waterproofing membrane	DANOCOAT 250	≥ 1,7 kg/m^2
UV Protection (Top Coat polyaspartic)	DANOCOAT PAS 700	≥ 0,250 kg/m^2
Non-Slip additive	DANOCOAT NON-SLIP	5% - 10% weight mixed PAS 700

This kit shows the following working life (25 years):

Product	Working life	Minimum thickness (mm)
DANOCOAT 250	25	1,7

DANOCOAT 250 is a liquid applied roof waterproofing based on 100% Pure Polyurea, manufactured by the company DANOSA, consists of a Pure Polyurea resins, bi-component, elastomeric without internal protection layer; which once polymerised conforms a jointless elastic lining, in form of a layer completely bonded to the support (concrete, mortar, ceramic, wood, metal, bituminous & PVC membranes, and polystyrene extruded (XPS).

Depending on support condition, different type of primer may be advisable. DANOPRIMER EP, PU or PU2K. The system includes an aliphatic top-coat for sealing and protection against UV radiation, DANOCOAT PAS 700, based on polyaspartic resin.

2 Specification of the intended use in accordance with the applicable EAD

The intended use of this System is the waterproofing of roof against the water, as in liquid as vapour form. This LARWK fulfils the Essential 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 its durability by providing enhanced protection from the effect of weathering.

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

The performance levels of this System according to the Guide ETAG 005 Part.1 and 6 are included in the annex 1. The provisions made in this European Technical Approval (ETA) are based on an assumed intended working life of the system of 25 years (W3).The indication given on the working life cannot be interpreted as a guarantee given by the manufacturer, but are only to be regarded as a means for choosing the right products in relation to the expected economically reasonable working life of the works. "Assumed intended working life" means that, when an assessment following the ETAG provisions is made, and when this working life has elapsed, the real working life may be, in normal use conditions, considerably longer without major degradation affecting the Essential Requirements.

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 LARWK is effectively communicated to the concerned people. This information can be given using reproductions of the respective parts of this European Technical Assessment. 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 fitness of the respective use for the levels of performance of this System stated in Annex 1 complies with the Spanish national requirements. In the MTD the manufacturer gives information on the quantities consumed and the processing, which shall lead to a thickness of the roof waterproofing ≥1.7 mm.

Execution.. Particularly, it is recommended to consider:

- The kit installation has to be carried out by qualified installers,

(1) The technical documentation of this ETA is deposited at IETcc and, as far as relevant for the tasks of the approved bodies involved in the attestation of conformity procedure, is handed over to the approved bodies.

- 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 cover 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,
- It is applied by a hot spray applied machines. Temperatures: component A, 70-80ºC. Component B, 65-75ºC. Hoses 70-75ºC. Pressure between 160-200 bars.

Before, the installation of DANOCOAT 250, it is recommended to read its security card and technical data sheets, available in site www.danosa.com

Use, maintenance and repair of the works. In those roofs with deteriorated areas of the waterproof layers, they will be repaired removing all the deteriorated layers. Afterwards, the new product will be assembled following the installation instruction and the new coats must overlap, at least 20 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 this LARWK according to the Essential Requirements were carried out in compliance with the ETA Guidance n.005: Guideline for European Technical Approval of Liquid applied roof waterproofing kits, ETAG 005, edition 2004, Part 1 "General" and Part 6 "Specific stipulations for kits based on Polyurethane" (called ETAG 005, in this ETA).

3.1 LARWK Characteristics

Safety in case of fire ((BWR 2)

External fire performance. Classification Broof(t1) according EN13501-5: "Fire classification of construction products and building elements. Classification using data from external fire exposure to roofs test", for supports non-combustible with a roof slope <20º.

Reaction to fire (EN 11925-2). Classification E/E_{fl} (EN 13501). for supports with fire classification A1 and A2-s1, d0.

Hygiene, health and environment (BWR 3)

Resistance to water vapour (EN 1931). μ = 1900

Watertightness (EOTA TR-003). Watertight

Statement of dangerous substances. According to the manufacturer's declaration taking account of EOTA TR 034, the product installed does not contain and release any dangerous substance.

Resistance to wind loads(EOTA TR-4). Pass (>50 kPa)

Resistance to dynamic indentation (EOTA TR- 6).

Substrate	Diameter (mm)	Level resistance
Steel	6	I4
XPS	10	I3

Resistance to static indentation(EOTA TR-7). Resistance Level: L_4

Resistance to fatigue movement (1000 cycles) (EOTA TR-8). Pass

Resistance to low temperatures effects (-20ºC). Dynamic indentation

Substrate	Diameter (mm)	Level resistance
Steel	6	I4
XPS	10	I3

Resistance to high temperatures effects. Static indentation

Maximum surface temperature	Substrate	Load (N)	Level resistance
80ºC / 60ºC / 90ºC	Steel	250	L4
	XPS	250	L4

Resistance to heat ageing (EOTA TR-11). The samples are exposed to 80ºC during 200 days.

Tests	DANOCOAT 250
Fatigue movement	Apt
Dynamic indentation (-20ºC) (XPS/ steel)	I3 / I4
Tensile strength (MPa) (EN-ISO 527-3) (initial/ ageing)	13 / 24
Tensile elongation (%) (EN-ISO 527-3) (initial/ ageing)	389 / 366

Resistance to UV-radiation in the presence of moisture (EOTA TR- 10). The samples are exposed 5000 hours to UV-radiation with Top-Coat.

Tests	DANOCOAT 250 + DANOCOAT PAS
Dynamic indentation (-20ºC) (XPS/ steel)	I3 / I4
Tensile strength (MPa) (EN-ISO 527-3) (initial/ ageing)	16 / 11
Tensile elongation (%) (EN-ISO 527-3) (initial/ ageing)	350 / 308

Resistance to hot water ageing (EOTA TR-12). The samples are kept in touch with water at 60ºC over 60 and 180 days(W3). The Delamination strength (kPa) (Concrete): Apt (> 50 kPa) and Static indentation.

TºC	Ageing	Support	Load (N)	Resistance level
90º / 80º / 60º / 30º	60 / 180 d	Steel	250	L4
		XPS	250	L4

Resistance to plant roots(EN 13948). NPA[2]

Safety in use(BWR 4)

Slipperiness (ENV 12633:2003 Annex A).The kit with DANOCOAT 250 + DANOCOAT PAS + 10% weight mixed of non-slip additive DANOCOAT NON-SLIP, shows a Rd= 52.. According to EN 13893: NPA

Related aspects of serviceability

Effect of weather conditions. The system does show changes in its tensile properties, when the system is assembled and cured under two temperature conditions of 5ºC and 40ºC, but these values obtained complied with the manufacturer's specifications (pass).

Effect of day joints. The delamination strength test performed on a layer assembled over other one, it shows a good delamination strength, being upper to required value of 50 kPa (pass).

3.2 Characteristics of the components

The characteristics of the components of this System show the following values, which compliance with their respective tolerances stated in the Manufacture Technical Dossier (MTD).

Pure Polyurea membrane DANOCOAT 250. Waterproofing liquid constituted by polyamine and Isocyanate. Containing also a small quantity of pigments and additives. The main characteristics of this waterproof liquid:

Properties	Component A	Component B
Density (g/cm³) (ISO 1675)	1,11 ±0,02	1,05 ±0,02
Dry extract (105ºC) (% weight) (EN 1768)	100%	100%
Ash content (450°C) (% weight) (EN 1879)	≤ 1%	≤ 1%
Viscosity (cps), (S63, 100 rpm, 25ºC) (EN ISO 2555)	750 ±150	550 ±100

Primers. DANOPRIMER EP, epoxy bicomponent, without solvent and fast drying at low temperatures. **DANOPRIMER PU**, polyurethane monocomponent without solvent and **DANOPRIMER PU2K**, polyurethane bicomponent, without solvent.

Properties	DANOPRIMER EP		DANOPRIMER PU	DANOPRIMER PU2K	
	Comp. A	Comp. B		Comp. A	Comp. B
Density (g/cm³) (ISO 1675)	1,10 ±0,02	1,03 ±0,02	1,16 ±0,02	0,97 ±0,02	1,22 ±0,02
Dry Extract 105ºC (% weight) (ISO 1768)	100%	75%	75%	100%	100%
Ash content 450°C, (% weight) (EN 1879)	≤ 1%	≤ 1%	≤ 1%	≤ 1%	≤ 1%
Viscosity (cps), (S63, 30 rpm, 25ºC) (ISO 2555)	550 ±100	1000 ±400	425 ±100	620 ±100	60 ±30

External protection. DANOCOAT PAS 700. Bicomponent elastic polyaspartic resin, with >95% solid content, aliphatic, UV ray resistant, for sealing and finishing of DANOCOAT 250 systems. It may be coloured in different RAL colours. White colour has a SRI index of 107.

[2] The Determination of resistance to plant roots penetration of the roof waterproofing system is being tested in accordance with EN 13948 and the test will finish in march 2019. Nowadays the system passes the test (9 months of test).

Properties	Comp. A	Comp. B
Density (g/cm³) (ISO 1675)	1,59 ±0,05	1,14 ±0,05
Dry extract (105ºC) (% weight) (EN 1768)	> 85%	100%
Ash content (450°C) (% weight) (EN 1879)	≤ 1%	≤ 1%
Viscosity (cps), (S63, 30 rpm, 25ºC) (ISO 2555)	660 ±100	1250 ±250

Film Slipperiness DANOCOAT NON-SLIP (10%)

Properties	Values
Nature	Polyester
Form	Grind particles
Specific gravity	1,28 g/cm^3
Particle size (µm)	390±70

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

System of Attestation of Conformity. The European Commission according to her decision (98/599/EC of October 1998, Official Journal of the European Communities N° L 287, 24.10.1998) on the procedure of attestation of conformity for the procedure of attestation of conformity (Annex III, clause 2(ii) second possibility of EU Regulation 305/2011) for liquid applied roof waterproofing kitshas laid down for this type of material.

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

According to this decision, system 3 of Attestation of Conformity also applies with regard to external fire performance.The system 3 provides:Tasks for the manufacturer: Factory production control and Tasks for the approved body: Initial type-testing of the product.

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

The ETA is issued for this kit on the basis of agreed data/information, deposited at IETcc, which identifies the product that has been assessed and judged. It is the manufacturer's responsibility to make sure that all those who use the kit are appropriately informed of specific conditions according to sections 1, 2, 4 and 5 including the annexes of this ETA. Changes to kit, the components or their production process, which could result in this deposited data/information being incorrect, should be notified to the IETcc before the changes are introduced. IETcc will decide whether or not such changes affect the ETA and if so whether further assessment or alterations to the ETA shall be necessary.

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 material is subjected to verifications by the manufacturer before acceptance.

The factory production controlshall be in accordance with the Control Plan[(3)] which is part of the Technical Documentation of this ETA. The Control Plan has been agreed between the manufacturer and the IETcc and is laid down in the context of the factory production control system operated by the manufacturer and deposited at the IETcc. 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, on the basis of a contract, involve a body which is notified for the tasks referred to in section 4 in the field of LARWK in order to undertake the actions laid down in this clause. For this purpose, the control plan shall be handed over by the manufacturer to the notified bodies involved.

(3) The control plan is a confidential part of this European Technical Assessment and only handed over to the notified body involved in the procedure of attestation of conformity. See section 3.2.2.

For initial type – testing, the results of the tests performed, as part of the assessment for the ETA shall be used unless there are changes in the production line or plant. In such cases the necessary initial type- testing has to be agreed with the IETcc.

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. The notified body shall perform

Initial type-testing of the product.The initial type-testing have been conducted by the IETcc to issued this ETA in accordance with chapter 5 of the guideline "Liquid applied roof waterproofing kits" (ETAG 005) part 1and 6.The verifications underlying this ETA have been furnished on samples from the current production; these will replace the initial type-testing carried out by the manufacturer. The IETcc has assessed the results of these tests in accordance with chapter 6 of this ETA –Guideline, as part of the ETA issuing procedure.

Issued in Madrid on 12 december 2017
by

Instituto de Ciencias de la Construcción Eduardo Torroja

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On behalf of the Instituto de Ciencias de la Construcción Eduardo Torroja

Marta Castellote
Director

Annex 1.

Characteristics of the "DANOCOAT"

Minimum thickness	1,7 mm (DANOCOAT 250)
Water vapour diffusion resistant factor	μ = 1.900
Resistance to wind loads	> 50 kPa
Resistance to plant roots	NPA
Statement on dangerous substances	Without dangerous substances
Resistance to slipperiness	Rd=52

Performance levels according to the intended use

External fire performance	Broof(t1), for supports non-combustible with a roof slope <20º.
Fire reaction	E/Efl
Expected working life	W3
Climatic zone of use	S
User loads	P4 on concrete/steel P3 on XPS
Roofs slopes	S1 – S4
Minimum surface temperatures	TL3
Maximum surface temperatures	TH4-TH1