

Unique identification code of the product:**MARMOLINE MONOSIS ENERGY SAVING SYSTEM ETICS**

External thermal insulation composite system (ETICS) with EPS, XPS or MW insulation boards.

This Declaration concerns the external thermal insulation systems «MARMOLINE MONOSIS», which consist of individual components mentioned in this statement.

Intended uses:

External Thermal Insulation Composite System with rendering for use as external insulation of building walls.

This ETICS is intended to be used as external insulation to the walls of buildings made of masonry (bricks, blocks, stones...) or concrete (cast on site or as prefabricated panels) with and without rendering. It has been designed to give a satisfactory thermal insulation to the wall on which it is applied.

The ETICS is non load-bearing construction element. It does not directly contribute to the stability of the wall on which it is mounted, but it can contribute to its lifetime by providing it with enhanced protection against the effects of weathering.

The ETICS can be applied to new or existing (retrofitted) vertical walls.

The ETICS is not intended to ensure the airtightness of the building structure.

The choice of fastening method depends on the characteristics of the substrate, which may need proper preparation.

Manufacturer /Distributor:

NORDIA S.A.

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Manufacturing plant: 1st klm of provincial road Markopoulo-Oropos, 19014 Polydendri Attikis/ Greece

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Systems of AVCP: 1 (ETAG 004)**European Assessment Document:** ETAG 004 :2013**European Technical Assessment :**

- MARMOLINE MONOSIS with EPS boards: TZUS (Technical and Test Institute for Construction Prague). ETA 17/0100 (ETAG 004:2013). Issue: 28/8/2017 (according to regulation EU 305/2011).
- MARMOLINE MONOSIS with XPS boards: TZUS (Technical and Test Institute for Construction Prague). ETA 14/0214 (ETAG 004:2013). Issue: 23/11/2016 (according to regulation EU 305/2011).
- MARMOLINE MONOSIS with MW boards: TZUS (Technical and Test Institute for Construction Prague). ETA 14/0213 (ETAG 004:2013). Issue: 23/11/2016 (according to regulation EU 305/2011)

Technical Assessment Bodies:

TECHNICKY A ZKUSEBNI USTAV STAVEBNI PRAHA S. P. (TZUS)

Notified Body:

TUV HELLAS S.A. (0654) Certificate of Constancy of Performance: 0654-CPR-0133

Declared performance /s:

Essential characteristics	Performance				Technical spec.
MARMOLINE MONOSIS ENERGY SAVING SYSTEM ETICS with EPS boards TZUS (Technical and Test Institute for Construction Prague) ETA-17/0100 (ETAG 004:2013) Issue: 28/8/2017 Bonded ETICS with supplementary anchors.					
Reaction to fire (EPS density $\leq 33 \text{ kg/m}^3$):	Base coat MARMOLINE FK 202		B – s1, d0		ETAG 004 :2013
	Base coat MARMOLINE FK 202 Organic		F		
Water tightness:	It covers the requirements of ETAG 004				
Water absorption (after 24 hours):	$< 0.5 \text{ kg/m}^2$				
	<i>Base coat reinforced with fiberglass mesh 160 gr/m²</i>	<i>Total thickness</i>	<i>+ Decorative render</i>	<i>Performance</i>	
Impact resistance:	MARMOLINE FK 202 + fiberglass mesh	3 mm	MARMOLINE SVR MARMOLINE SVR Silicone	II	
	MARMOLINE FK 202 Organic + fiberglass mesh	2.5mm	MARMOLINE SVR MARMOLINE SVR Silicone		
Water vapour permeability:	MARMOLINE FK 202 + fiberglass mesh	5 mm	MARMOLINE SVR	$S_d \leq 0.51\text{m}$	
			MARMOLINE SVR Silicone	$S_d \leq 0.40\text{m}$	
	MARMOLINE FK 202 Organic + fiberglass mesh	3.5 mm	MARMOLINE SVR	$S_d \leq 0.24\text{m}$	
			MARMOLINE SVR Silicone	$S_d \leq 0.14\text{m}$	
Release of dangerous substances:	Not contained (EOTA TR 034)				
Fixing strength: Displacement corresponding to the elasticity limit U_e :	Test not required. The ETICS system satisfies the criteria of §5.1.4.2. of ETAG 004. There's no limitation to the length of the ETICS				
Bond strength between base coat and insulation product (EPS):	$\geq 0,080 \text{ MPa}$ (cohesive failure in the insulation product) After hygrothermal cycles: $\geq 0,080 \text{ MPa}$ (cohesive failure in the insulation product)				
Bond strength between adhesive and substrate/insulation product (EPS):	See table 1				
Wind load resistance:	See table 2				
Thermal resistance:	See table 3				

Essential characteristics	Performance				Technical spec.
MARMOLINE MONOSIS ENERGY SAVING SYSTEM ETICS with XPS boards TZUS (Technical and Test Institute for Construction Prague) ETA-14/0214 (ETAG 004:2013) Issue: 23/11/2016 Bonded ETICS with supplementary anchors.					
Reaction to fire (XPS density $\leq 33 \text{ kg/m}^3$):	Base coat MARMOLINE FK 202		B – s1, d0		Οδηγία ETAG 004 :2013
	Base coat MARMOLINE FK 202 Organic		F		
Water tightness:	It covers the requirements of ETAG 004				
Water absorption (after 24 hours):	$< 0.5 \text{ kg/m}^2$				
Impact resistance:	<i>Base coat reinforced with fiberglass mesh 160 gr/m²</i>	<i>Total thickness</i>	<i>+ Decorative render</i>	<i>Performance</i>	
	MARMOLINE FK 202 + fiberglass mesh	3 mm	MARMOLINE SVR	II	
			MARMOLINE SVR Silicone	III	
	MARMOLINE FK 202 + fiberglass mesh in double layer	5 mm	MARMOLINE SVR	II	
			MARMOLINE SVR Silicone		
	MARMOLINE FK 202 Organic + fiberglass mesh	2.5mm	MARMOLINE SVR	II	
			MARMOLINE SVR Silicone		
	MARMOLINE FK 202 Organic + fiberglass mesh in double layer	3.5 mm	MARMOLINE SVR	I	
MARMOLINE SVR Silicone					
Water vapour permeability:	MARMOLINE FK 202 + fiberglass mesh	3 mm	MARMOLINE SVR	$S_d \leq 0.32\text{m}$	
			MARMOLINE SVR Silicone	$S_d \leq 0.25\text{m}$	
		5 mm	MARMOLINE SVR	$S_d \leq 0.51\text{m}$	
			MARMOLINE SVR Silicone	$S_d \leq 0.40\text{m}$	
	MARMOLINE FK 202 Organic + fiberglass mesh	3.5 mm	MARMOLINE SVR	$S_d \leq 0.24\text{m}$	
			MARMOLINE SVR Silicone	$S_d \leq 0.14\text{m}$	
Release of dangerous substances:	Not contained (EOTA TR 034)				
Fixing strength: Displacement corresponding to the elasticity limit U_e :	Test not required. The ETICS system satisfies the criteria of §5.1.4.2. of ETAG 004. There's no limitation to the length of the ETICS				
Bond strength between base coat and insulation product (XPS):	$\geq 0,080 \text{ MPa}$ (cohesive failure in the insulation product) After hygrothermal cycles: $\geq 0,080 \text{ MPa}$ (cohesive failure in the insulation product)				
Bond strength between adhesive and substrate/insulation product (XPS):	See table 1				
Wind load resistance:	See table 2				
Thermal resistance:	See table 3				

Essential characteristics	Performance				Technical spec.
MARMOLINE MONOSIS ENERGY SAVING SYSTEM ETICS with MW boards TZUS (Technical and Test Institute for Construction Prague) ETA-14/0213 (ETAG 004:2013) Issue: 23/11/2016 Bonded ETICS with supplementary anchors.					
Reaction to fire (MW density $\leq 120 \text{ kg/m}^3$):	Base coat MARMOLINE FK 202 or FK 202 Organic			A2 – s2, d0	
Water tightness:	It covers the requirements of ETAG 004				
Water absorption (after 24 hours):	$< 0.5 \text{ kg/m}^2$				
Impact resistance:	<i>Base coat reinforced with fiberglass mesh 160 gr/m²</i>	<i>Total thickness</i>	<i>+ Decorative render</i>	<i>Performance</i>	
	MARMOLINE FK 202 + fiberglass mesh	3 mm	MARMOLINE SVR	II	
	MARMOLINE FK 202 Organic + fiberglass mesh	5 mm	MARMOLINE SVR	I	
	Water vapour permeability:	MARMOLINE FK 202 + fiberglass mesh	3 mm	MARMOLINE SVR	$S_d \leq 0.32\text{m}$
MARMOLINE SVR Silicone				$S_d \leq 0.25\text{m}$	
MARMOLINE FK 202 Organic + fiberglass mesh		5 mm	MARMOLINE SVR	$S_d \leq 0.51\text{m}$	
			MARMOLINE SVR Silicone	$S_d \leq 0.40\text{m}$	
MARMOLINE FK 202 Organic + fiberglass mesh		3.5 mm	MARMOLINE SVR	$S_d \leq 0.24\text{m}$	
			MARMOLINE SVR Silicone	$S_d \leq 0.14\text{m}$	
Release of dangerous substances:	Not contained (EOTA TR 034)				
Fixing strength: Displacement corresponding to the elasticity limit U_e :	Test not required. The ETICS system satisfies the criteria of §5.1.4.2. of ETAG 004. There's no limitation to the length of the ETICS				
Bond strength between base coat and insulation product (MW):	$\geq 0,010 \text{ MPa}$ (cohesive failure in the insulation product) After hygrothermal cycles: $\geq 0,004 \text{ MPa}$ (cohesive failure in the insulation product)				
Bond strength between adhesive and substrate/insulation product (MW):	See table 1				
Wind load resistance:	See table 2				
Thermal resistance:	See table 3				

Οδηγία
ETAG 004
:2013

Components of “MARMOLINE MONOSIS” ETICS:

Components	Additional information	Technical specification/ description	Coverage [kg/m ²]	Thickness [mm]
1a. Insulation product: Factory-prefabricated expanded polystyrene (EPS)	Either standard (white), or with reduced thermal conductivity, by addition of graphite (gray)	EN 13163 :2012+A1:2015	-	50 - 300
According to the relevant ETA, the EPS boards should bear the following classes / features:				
Reaction to fire (EN 13501-1:2007)		Class E (density ≤ 33 kg/m ³)		
Thermal resistance		As declared in the supplier's Declaration of Performance (based on EN 13163)		
Length tolerances (EN 822):		± 3 mm, class L(3)		
Width tolerances (EN 822):		± 2 mm, class W(2)		
Thickness tolerances (EN 823):		± 1 mm, class T(1)		
Squareness tolerances (EN 824):		± 2 mm/m, class S(2)		
Flatness tolerances (EN 825):		5 mm, class P(5)		
Dimensional stability under specified temperature and humidity conditions (EN 1604):		1%, DS(70,-) 1%, DS(70,90)		
Dimensional stability under laboratory conditions (EN 1603)		0.2% DS(N)2		
Water absorption with partial immersion (EN 1609):		< 1 kg/m ²		
Water vapour permeability diffusion factor (μ) (EN 13163):		20 – 70, MU 20-40 MU 30-70		
Tensile strength perpendicular to faces (EN 1607):		≥ 100 kPa, TR 100		
Shear strength (EN 12090):		≥ 20 kPa, SS20		
Shear modulus (EN 12090):		≥ 1000 kPa, GM1000		
<p>The EPS boards should bear a CE label and Declaration of performance, according to the previously mentioned EN standard, following the requirements of 305/2011 EU regulation.</p> <p>The EPS boards proposed by NORDIA are:</p> <p>MARMOLINE boards (MARMOLINE EPS) or Boards of company RIZAKOS S.A. /GREECE (ISOPOR THP EPS, NEOCOAT THP EPS), Boards of company MONOSI – SYSKEVASIA S.A./GREECE (Airpop Bianco, R-THERMO) or Boards of another producer, which meet the above mentioned requirements.</p>				

Components	Additional information	Technical specification/ description	Coverage [kg/m ²]	Thickness [mm]
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1b. Insulation product: Factory-prefabricated extruded polystyrene (XPS)	-	EN 13164 :2012	-	40 - 300
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According to the relevant ETA, the XPS boards should bear the following classes / features:

Reaction to fire (EN 13501)	Class E (density $\leq 33 \text{ kg/m}^3$)
Thermal Resistance:	As declared in the supplier's Declaration of Performance (based on EN 13164)
Length tolerances (EN 822):	$\pm 8 \text{ mm}$
Width tolerances (EN 822):	$\pm 8 \text{ mm}$
Thickness tolerances (EN 823):	$\pm 1 \text{ mm}$, T(3)
Squareness tolerances (EN 824):	$\leq 5 \text{ mm/m}$
Flatness tolerances (EN 825):	$\leq 6 \text{ mm}$
Dimensional stability under specified temperature and humidity conditions (EN 1604)	1%, DS(70,-) 1%, DS(70,90)
Water absorption with partial immersion (EN 1609):	$< 1 \text{ kg/m}^2$
Water vapour permeability diffusion factor (μ) (EN 13164):	$\mu \leq 50$, MU 50
Tensile strength perpendicular to faces (EN 1607):	$\geq 400 \text{ kPa}$, TR 400
Shear strength (EN 12090):	$\geq 0.24 \text{ MPa}$, SS24
Shear modulus (EN 12090):	$\geq 6.7 \text{ MPa}$

The XPS boards should bear a CE label and Declaration of performance, according to the previously mentioned EN standard, following the requirements of 305/2011 EU regulation.

The XPS boards proposed by NORDIA are:

MARMOLINE boards (**MARMOLINE XPS**)

or

Boards of company RAVATHERM HELLAS S.A./GREECE (**FIBROSTIR XPS GF, FIBROSTIR XPS WRS**)

Boards of company FIBRAN S.A. /GREECE (**FIBRAN XPS ETICS GF**)

or

Boards of another producer, which meet the above mentioned requirements.

Components	Additional information	Technical specification/ description	Coverage [kg/m ²]	Thickness [mm]
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1c. Insulation product: Factory-prefabricated mineral wool (MW)	-	EN 13162 :2012+A1:2015	-	50 - 200
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According to the relevant ETA, the MW boards should bear the following classes / features:

Reaction to fire (EN 13501-1)	Class A1 (density $\leq 120 \text{ kg/m}^3$)
Thermal Resistance	As declared in the supplier's Declaration of Performance (based on EN 13162)
Length tolerances (EN 822):	$\pm 2 \%$
Width tolerances (EN 822):	$\pm 1.5\%$
Thickness tolerances (EN 823):	-1% $\dot{\eta}$ -1mm, +3mm T5
Squareness tolerances (EN 824):	$\leq 5 \text{ mm/m}$
Flatness tolerances (EN 825):	$\leq 6 \text{ mm}$
Surface	No additional treatment (homogenous, without coating)
Dimensional stability specified temperature and humidity conditions (EN 1604)	1% DS(70,90)
Water absorption	Short term water absorption (EN 1609) $\leq 1 \text{ kg/m}^2$ WS
	Long term water absorption (EN 12087) $\leq 3 \text{ kg/m}^2$ WL(P)
Water vapour permeability diffusion factor (μ) (EN 12086):	≤ 1 MU1
Tensile strength perpendicular to faces, under dry conditions (EN 1607):	$\geq 10 \text{ kPa}$, TR10
Dynamic stiffness (EN 29052-1)	SD20
Air flow resistance (EN 29053)	AF,60

The MW boards should also bear a CE label and Declaration of performance, according to the previously mentioned EN standard, following the requirements of 305/2011 EU regulation.

The MW boards proposed by NORDIA are:

Boards of company FIBRAN S.A. /GREECE (FIBRAN geo BP ETICS)

or

Boards of another producer, which meet the above mentioned requirements

2. Adhesive: MARMOLINE FK 201 (cementitious grey mortar reinforced with fibers and polymer ingredients)	Mixing ratio: About 6 kg (lt) of water per bag of 25 kg. Minimal bonded surface area: 40%	ETAG 004	3.0 – 4.0 (powder)	-
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Components	Additional information	Technical specification/ description	Coverage [kg/m ²]	Thickness [mm]
3. Anchors for insulation boards:		ETAG 014 or EAD 330196-00-0604, EAD 330196-01-0604		
According to the ETAs, the anchors should have the following characteristics:				
Plate diameter	≥ 60 mm			
Plate stiffness	Surface assembly	≥ 0.3 kN/mm		
	Countersunk assembly	$\geq 0,6$ kN/mm		
Load at plate rupture	≥ 0.8 kN			
Countersunk depth	≤ 50 mm			
The anchors should bear an ETA based on the above mention ETAG /EAD, Declaration of Performance and FPC certificate, issued by a notified body under system 2+, according to EU 305/2011 regulation. The anchors used and supplied by NORDIA are:				
RAWLPLUG - KOELNER Series KI-10 Plastic	Point thermal transmittance χ_p : 0.000 W/K Plate stiffness: 0.5 kN/mm Substrates: A,B,C,D,E	EAD 330196-01-0604 ETA-07/0291		
RAWLPLUG - KOELNER Series RTFIX-8M Plastic head – galvanized steel nail	Point thermal transmittance χ_p : 0.001 W/K Plate stiffness: 1.0 kN/mm Substrates: A,B,C,D	EAD 330196-01-0604 ETA-17/0592		
or anchors of another producer which cover the above mentioned specifications.				
4a. Base coat: MARMOLINE FK 202 (cementitious white mortar reinforced with fibers and polymer ingredients)	Mixing ratio: About 6 kg (lt) of water per bag of 25 kg	-	3.0 – 5.0 (powder)	3.0 – 5.0
4b. Base coat: MARMOLINE FK 202 Organic (acrylic paste)	Ready to use	-	2.2 – 4.0	2.5 – 3.5
5. Fiberglass mesh for the reinforcement of the base coat (in single or double layer):		ETAG 004		
According to the ETAs, the fiberglass mesh should bear the following characteristics:				
Average value of the tensile strength after artificial ageing	> 20 N/mm			
Residual strength after artificial ageing	$> 50\%$			
Mesh size	3.5-4.0 x 3.5-4.0 mm			
Alkali resistant				
The fiberglass mesh bears an ETA based on the above mention ETAG, Declaration of Performance and FPC certificate, issued by a notified body under system 2+, according to EU 305/2011 regulation. The fiberglass meshes used and supplied by NORDIA, are:				
SAINT-GOBAIN ADFORS M160	Alkali resistant Mass : 160 g/m ² Mesh: 3,5 x 4,0 mm			
SAINT-GOBAIN ADFORS R131 A101	Alkali resistant Mass : 160 g/m ² Mesh: 3,5 x 3,8 mm			
or fiberglass mesh of another producer which cover the above mentioned specifications.				

Components	Additional information	Technical specification/ description	Coverage [kg/m ²]	Thickness [mm]
6. Priming, before finishing coat: MARMOLINE MST 11 Acrylic water based primer	-	-	0.10 l/m ²	-
7a. Finishing coat: MARMOLINE SVR Coloured dispersion plaster. Reaction to fire class A2-s2, d0 (EN 13501-1)	Grading: 1.0 – 1.5 – 2.0 – 3.0 mm	EN 15824	1.7 – 4.1	1.0 – 3.0 (according to the plaster's grading)
7b. Finishing coat: MARMOLINE SVR SILICONE Coloured silicone plaster. Reaction to fire class A2-s2, d0 (EN 13501-1)	Grading: 1,0 - 1.5 mm	EN 15824	1.8 – 2.3	1.0 – 1.5 (according to the plaster's grading)
8. Ancillary material: The rest of the material (rail systems, corner beads, drain strips etc ...) are not subject of the ETA				

Table 1: Bond strength between the adhesive (MARMOLINE FK 201) and the substrate / insulation product:

Insulation board	Adhesion with	Initial state	After 2 days immersion in water + 2 hours drying	After 2 days immersion in water + 7 days drying
EPS - XPS - MW	Concrete (substrate)	≥ 0.25 MPa	≥ 0.08 MPa	≥ 0.25 MPa
EPS - XPS	Insulation material	≥ 0.08 MPa	≥ 0.03 MPa	≥ 0.08 MPa
MW (TR10)		≥ 0.08 MPa	≥ 0.03 MPa	≥ 0.08 MPa

Table 2: ETICS wind load resistance:

EPS: Thickness ≥ 50 mm (see 1a.) Anchors: With plate diameter ≥ 60 mm (see 3.)	Failure load (kN): Min: 0,44 Average: 0,47
With anchors placed on panel bodies (R_{panel}):	
With anchors placed at the panel joints (R_{joint}):	
XPS: Thickness ≥ 50 mm (see 1b.) Anchors: With plate diameter ≥ 60 mm (see 3.)	Failure load (kN): Min: 1,27 Average: 1,29
With anchors placed on panel bodies (R_{panel}):	
With anchors placed at the panel joints (R_{joint}):	
	Min: 1,01 Average: 1,02

MW: Thickness ≥ 50 mm (see 1c.) Anchors: With plate diameter ≥ 60 mm (see 3.)		Failure load (kN):
With anchors placed on panel bodies (R_{panel}):	Dry condition	Min: 0,30 Average: 0,32
	Wet condition	Min: 0,24 Average: 0,25
With anchors placed at the panel joints (R_{joint}):	Dry condition	Min: 0,26 Average: 0,27
	Wet condition	Min: 0,20 Average: 0,22

The wind load resistance R_d of the ETICS is calculated as follows

$$R_d = \frac{R_{panel} \cdot n_{panel} + R_{joint} \cdot n_{joint}}{\gamma}$$

n_{panel} : number of anchors (per m²) not placed at the panel joints
 n_{joint} : number of anchors (per m²) placed at the panel joint
 γ : national safety factor (see national regulation)

Table 3: Thermal Resistance of the ETICS surface:

The thermal transmittance of the substrate wall covered by the ETICS is calculated in accordance with the standard EN ISO 6946:

$$U_c = U + \chi_p \times n$$

where:

U : The thermal transmittance W/(m².K) of the current part of the wall covered with ETICS (excluding thermal bridges of the anchors), is determined as follows:

$$U = \frac{1}{R_i + R_{render} + R_{substrate} + R_{se} + R_{si}}$$

R_i : Thermal resistance of the insulation product (according to the declaration of performance of its manufacturer) in (m².K)/W
 R_{render} : Thermal resistance of the rendering system. Is considered 0.02 (m².K)/W or determined by test according to EN 12667 or EN 12664
 $R_{substrate}$: Thermal resistance of the substrate of the building (concrete, brick etc) in (m².K)/W
 R_{se} : External superficial thermal resistance, in (m².K)/W
 R_{si} : Internal superficial thermal resistance, in (m².K)/W

n : Number of anchors placed on the insulation boards, per m^2

χ_p : Local influence of thermal bridge caused by an anchor. The values listed below can be taken into account if not specified in the anchor's ETA, supplied by the manufacturer.

= 0.002W/K for anchors with a stainless steel screw covered by plastic anchors and for anchors with an air gap at the head of the screw ($\chi_p \times n$ negligible for $n < 20$)

= 0.004W/K for anchors with a galvanized steel screw with the head covered by a plastic material ($\chi_p \times n$ negligible for $n < 10$)

= negligible for anchors with plastic nails (reinforced or not with glass fibres ...)

$\chi_p \times n$: Has only to be taken into account if it is greater than 0.04 W/($m^2 \cdot K$)

The calculation of the thermal resistance R or the thermal transmittance U ($U=1/R$) of the walls of a structure covered with ETICS, is performed by the engineer who undertakes the construction.

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) 305/2011, under the sole responsibility of the manufacturer identified above. Signed for and on behalf of the manufacturer by:

Polydendri, 17/3/2020

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