

KEYMARK CERTIFICATE

SK08055391501

TUV CYPRUS LTD Certifies that the organization

VESTA SOLAR HEATERS LTD

Address: Spyrou Kyprianou 15
Ergates Industrial Area, 2643 Nicosia

Supplies: Solar thermal collectors

In compliance with: EN 12975-1:2006+A1:2010 & EN 12975-2:2006

Certified Product: Solar Collector

Model / Type ref: DEDALOS 1.50
DEDALOS 1.70
DEDALOS 2.00
DEDALOS 2.50

Test Results: Annex to certificate

Certification scheme: The initial Certificate with number 126BN/0 of Solar Keymark Certification Body CEN025 was issued on 20/12/2013. In order to grant this certificate, TUV CYPRUS has visited the manufacturing site and verified the implementation of the quality management system. TUV CYPRUS performs these tasks periodically while the certificate has not been cancelled, in accordance with the Product Certification Regulations and the Rules for Authorization to use Conformity Mark for Solar Collectors.



SOLAR KEYMARK
CERTIFICATION BODY
CEN 033

Accredited by



Certificate No. 885





TUV CYPRUS (TUV NORD) LTD
Certification Body

Nicosia , **20/11/2020**
Initial Certification : **20/12/2013**
Valid until : **27/05/2023**





Annex to Solar Keymark Certificate		Licence Number	SK08055391501								
		Date issued	2020-11-20								
		Issued by	TUV Cyprus								
Licence holder	Vesta Solar Heaters Ltd		Country	Cyprus							
Brand (optional)			Web	http://www.vestasolar.com							
Street, Number	15 Spyrou Kyprianou, Ergates Industrial Area		E-mail	info@vestasolar.com							
Postcode, City	2643, Nicosia		Tel	+357 22351821							
Collector Type			Flat plate collector								
Collector name	Gross area (A _G) m ²	Gross length mm	Gross width mm	Gross height mm	Power output per collector G _b = 850 W/m ² , G _d = 150 W/m ² & u = 1.3 m/s θ _m - θ _a						
					0 K W	10 K W	30 K W	50 K W	70 K W	80 K W	
Dedalos 1.5	1,52	1.506	1.007	85	932	873	747	609	459	380	
Dedalos 1.7	1,66	1.750	950	85	1.018	953	815	665	501	415	
Dedalos 2.0	2,00	2.000	1.000	85	1.226	1.149	982	801	604	500	
Dedalos 2.5	2,52	2.007	1.256	85	1.545	1.447	1.238	1.009	761	630	
Power output per m ² gross area					613	574	491	400	302	250	
Performance parameters test method		Steady state - outdoor									
Performance parameters (related to A _G)		η ₀ , b	a1	a2	a3	a4	a5	a6	a7	a8	Kd
Units		-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	J/(m ² K)	s/m	W/(m ² K ⁴)	W/(m ² K ⁴)	-
Test results		0,629	3,77	0,010	0,000	0,00	8	0,000	0,00	0,0E+00	0,83
Incidence angle modifier test method		Steady state - outdoor									
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal		K _{GT, coll}	1,00	0,99	0,97	0,93	0,86	0,76	0,60	0,36	0,00
Longitudinal		K _{GL, coll}	1,00	0,99	0,97	0,93	0,86	0,76	0,60	0,36	0,00
Heat transfer medium for testing		Water									
Flow rate for testing (per gross area, A _G)		dm/dt	0,020		kg/(sm ²)						
Maximum temperature difference during thermal performance test		(θ _m - θ _a) _{max}	50		K						
Standard stagnation temperature (G = 1000 W/m ² ; θ _a = 30 °C)		θ _{stg}	165		°C						
Maximum operating temperature		θ _{max, op}	165		°C						
Maximum operating pressure		p _{max, op}	1000		kPa						
Testing laboratory		AELAB - Applied Energy Laboratory						www.aelab.gov.cy			
Test report(s)		Σ.11.03.13.01 Σ.11.03.13.02 Σ.08.07.13.01						Dated 04/09/2013 04/09/2013 04/09/2013			
Comments of testing laboratory		Datasheet version: 6.1, 2019-09-26									
											
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CEN 033

Annex to Solar Keymark Certificate		Licence Number		SK08055391501			
Supplementary Information		Issued		2020-11-20			
Annual collector output in kWh/collector at mean fluid temperature $\bar{\theta}_m$							
Standard Locations		Athens		Davos			
$\bar{\theta}_m$		25°C	50°C	75°C	25°C	50°C	
Collector name		Stockholm		Würzburg			
		25°C	50°C	75°C	25°C	50°C	
Dedalos 1.5		1.395	891	507	1.003	624	
Dedalos 1.7		1.524	973	554	1.095	682	
Dedalos 2.0		1.836	1.172	667	1.319	821	
Dedalos 2.5		2.313	1.477	840	1.662	1.035	
		561	1.236	723	383	1.346	
		772	401				
Annual output per m ² gross area		918	586	333	660	411	
Annual efficiency, η_a		52%	33%	19%	40%	25%	
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)				14%	42%
Annual irradiation on collector plane		1765 kWh/m ²		1630 kWh/m ²		1166 kWh/m ²	
Mean annual ambient air temperature		18,5°C		3,2°C		7,5°C	
Collector orientation or tracking mode		South, 25°		South, 30°		South, 45°	
						South, 35°	
The collector is operated at constant temperature $\bar{\theta}_m$ (mean of in- and outlet temperatures). The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool Scenocalc Ver. 6.1 (September 2019). A detailed description of the calculations is available at http://www.estif.org/solarkeymarknew/							
Additional Information							
Collector heat transfer medium				Water			
The collector is deemed to be suitable for roof integration				No			
The collector was tested successfully under the following conditions:							
Climate class (A+, A, B or C)				B			
G (W/m ²) >		900		$\bar{\theta}_a$ (°C) >			
		15		H _x (MJ/m ²) >			
Maximum tested positive load		1002		540			
Maximum tested negative load		1001		Pa			
Hail resistance using steel ball (maximum drop height)		n/a		m			
Additional collector attribute(s)							
<input type="checkbox"/> Using external power source(s) for normal operation		<input type="checkbox"/> Active or passive measure(s) for self-protection					
<input type="checkbox"/> Co-generating thermal and electrical power		<input type="checkbox"/> Façade collector(s)					
Energy Labelling Information			Additional Informative Technical Data				
	Reference Area, A _{ref} (m ²)	Hydraulic Designation Code		Aperture Area, A ₃ (m ²)			
Dedalos 1.5	1,52	{8}-[V]-{12345}-[A:14,1365]-		1,32			
Dedalos 1.7	1,66	{8}-[V]-{12345}-[A:14,1600]-		1,53			
Dedalos 2.0	2,00	{8}-[V]-{12345}-[A:14,1845]-		1,85			
Dedalos 2.5	2,52	{10}-[V]-{12345}-[A:14,1845]-		2,26			
Data required for CDR (EU) No 811/2013 - Reference Area A _{ref}			Data required for CDR (EU) No 812/2013 - Reference Area A _{ref}				
Collector efficiency (η_{col})		45%		Zero-loss efficiency (η_0)			
				0,61			
Remark: Collector efficiency (η_{col}) is defined in CDR (EU) No 811/2013 as collector efficiency of the solar collector at a temperature difference between the solar collector and the surrounding air of 40 K and a global solar irradiance of 1000 W/m ² , expressed in % and rounded to the nearest integer. Deviating from the regulation η_{col} is based on reference area (A _{ref}) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2017.		First-order coefficient (a ₁)		3,77			
		Second-order coefficient (a ₂)		0,010			
		Incidence angle modifier IAM (50°)		0,86			
		Remark: The data given in this section are related to collector reference area (A _{ref}) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806. Consistent data sets for either aperture or gross area can be used in calculations like in the regulation 811 and 812 and simulation programs.					
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