Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	**Licence Number**	**OEM 9921/2/3**
	Issued	25/3/2016

Company holding the	TSAKIROGLOU ANTONIOS & SIA EE	**Country**	GREECE
Brand (optional)	Ecosystem, Heliosol	**Website**	http://www.ecosystem.com.gr
Street, street number	Olimpou 29	**E-mail**	ecosystemtsaki@gmail.com
Postal Code / City, province	57009 Kalochori, Thessaloniki	**Tel/Fax**	30 2310 570757 / 2310 570758

Collector Type (flat plate glazed/un-glazed; evacuate tubular)	Flat plate collector - glazed
Thermal / photo voltaic hybid collector? (PVT collector)	No
Integration in the roof possible ? (manufacturers declaration)	Yes

	Aperture area (Aa)	Gross length	Gross width	Gross height	Gross area (AG)	Power output per collector module G = 1000 W/m² Tm-Ta 0 K	10 K	30 K	50 K	70 K
Collector name	m²	mm	mm	mm	**m²**	W	W	W	W	W
EPI 20	1,30	1.517	1.019	90	1,55	997	949	837	703	545
EPI 12	1,61	1.517	1.247	90	1,89	1234	1175	1037	870	674
EPI 25	1,77	2.017	1.017	90	2,05	1353	1288	1136	953	739
EPI 16	2,00	1.917	1.197	90	2,30	1526	1454	1282	1076	834
EPI 54	2,26	2.017	1.277	90	2,58	1.729	1647	1453	1219	945

Performance test method		Glazed liquid heating collector - steady state - indoor								
Performance parameters related to aperture		η0	a1	a2						
Units		-	W/(m²K)	W/(m²K²)						
Test results - *Flow rate and fluid see note 1*		0,765	3,415	0,022						
Bi-directional incidence angle modifiers?	Yes	Kθ *values are obligatory for 50°.*								
Incidence angle modifiers Kθ(θT)	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
transversal direction	Kθ(θT)					0,89				0,00
Incidence angle modifiers Kθ(θL)	Angle									
longitudinal direction	Kθ(θL)									

Stagnation temperature - *Weather conditions see note 2*	T_{stg}	184	°C
Effective thermal capacity	$c_{eff} = C/A_g$	5,518	kJ/(m²K)
Max. intende operation temperature - *see note 3*	$T_{max,op}$		°C
Max. operation pressure - *see note 3*	$p_{max,op}$	1000	kPa

Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m² aperture area

Flow rate	kg/(s m²)										
Pressure drop, ΔP	Pa										

Optional weather data	Location		Link
Testing Laboratory	IZES gGmbH, TZSB an der HTW		
Website	www.izes.de/tzsb		
Test report id. number	KT08_03, KT08_04	**Date of test report**	2008/09/22

During the test G_{DIF}/G_{TOT} was always between 0,14 and 0,18

Comments of testing laboratory:

Example comment.

Note 1	**Flow rate**	0,020	kg/(s m²)	**Fluid**	Water
Note 2	**Irradiance, G = 1000 W/m²; Ambient temperature , T_a=30 °C**				
Note 3	**Given by manufacturer**				

Datasheet version: 4.06, 2014-01-15

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	OEM 9921/2/3
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Annual collector output kWh/module

Collector name	Location and collector temperature (Tm)											
	Athens			Davos			Stockholm			Würzburg		
	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
EPI 20	1.519	1.061	649	1.152	767	439	846	538	301	918	577	317
EPI 12	1.880	1.314	803	1.426	950	543	1.048	666	373	1.137	714	393
EPI 25	2.061	1.440	880	1.564	1.041	596	1.148	730	408	1.246	783	430
EPI 16	2.325	1.625	993	1.764	1.175	672	1.296	824	461	1.406	884	486
EPI 54	2.634	1.841	1.125	1.999	1.331	761	1.468	933	522	1.593	1.001	550

Collector mounting: Fixed or tracking	Fixed; slope = latitude - 15° (rounded to nearest 5°)

Overview of locations

Location	Latitude °	Gtot kWh/m²	Ta °C	Collector orientation or tracking mode
Athens	38	1.765	18,5	South, 25°
Davos	47	1.714	3,2	South, 30°
Stockholm	59	1.166	7,5	South, 45°
Würzburg	50	1.244	9,0	South, 35°

Gtot	Annual total irradiation on collector plane	kWh/m²
Ta	Mean annual ambient air temperature	°C
Tm	Constant collector operating temperature (mean of in- and outlet temperatures)	°C

The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool ScenoCalc. The collector output is calculated hour by hour according to the efficiency parameters from the Keymark test using constant collector operating temperature (Tm). A detailed description of the calculations is available at http://www.sp.se/en/index/services/solar/ScenoCalc/Sidor/default.aspx.

Central Offices: Kalavriton 4, 145 64 kifisia, Athens, Tel: +30 210 6233493-4 , Fax: +30 210 6233495, http://www.dqshellas.gr, e-mail: ioannisalexiou@dqshellas.gr

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ScenoCalc version: #ONOMA?