

Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	Certificate No.	SKM 9965/7
	Date of issue	30/10/2013

Company	NOBEL INTERNATIONAL EAD	Country	BULGARIA
Brand (optional)		Website	
Street, number	48, VITOSHA BLV	E-mail	info1@nobel.gr
Postal Code	2100	Tel.	+0359 2 4210232
City	SOFIA BULGARIA	Fax	+0359

Collector Type (flat plate / evacuate tubular / un-glazed)	Flat plate collector
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Integration in the roof possible ?	Yes
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Collector name	Aperture area (Aa) [m ²]	Gross length [mm]	Gross width [mm]	Gross height [mm]	Gross area (Ag) [m ²]	Power output per collector unit G = 1000 W/m ² Tm-Ta :				
						0 K	10 K	30 K	50 K	70 K
						[W]	[W]	[W]	[W]	[W]
AEIOS CuB 1500	1,40	1.530	1.030	80	1,58	938	880	753	613	459
AEIOS CuB 2000	1,88	2.030	1.030	80	2,09	1.260	1.181	1.011	823	616
AEIOS CuB 2600	2,37	2.030	1.285	80	2,60	1.588	1.489	1.275	1.037	777

Collector efficiency parameters related to aperture area (Aa) Note 1	η_{0a}	0,67	-
	a_{1a}	4,05	W/(m ² K)
	a_{2a}	0,012	W/(m ² K ²)

Stagnation temperature - Note 2	tstg	130	°C
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Effective thermal capacity	Ceff = C/Aa	7,68	kJ/(m ² K)
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Max. operation pressure - Note 3	pmax	1000	kPa
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Incidence angle modifiers $K_{\theta}(\theta)$	G_{DIF}/G_{TOT}		θ_T / θ_L	50°	10°	20°	30°	40°	60°	70°	
	min	max									$K_{\theta}(\theta_T)$
	G_{DIF}/G_{TOT} : min&max - while measuring			$K_{\theta}(\theta_L)$	0,86	1,00	0,99	1,00	0,97	0,73	0,81
					0,86	1,00	0,99	1,00	0,97	0,73	0,81
Optional values											

Testing Laboratory	Demokritos
Website	www.solar.demokritos.gr
Test report id. number	4081DE, 4083DE, 4087DQ
Date of test report	5/9/2013
Perf. test method	EN 12975-2 6.1.4 (outdoor/außen/extérieur)

Comments of testing laboratory :
[Example data sheet](#)

Note 1	Test conditions	Fluid	Water	Flow rate	0,020	kg/s per m ²	<i>Stamp & signature of test lab</i>
Note 2	Irradiance, Gs=1000 W/m ² Ambient temperature , Ta=30 °C						
Note 3	Given by manufacturer						



Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Certificate No.	SKM 9965/7
	Issued	30/10/2013

Collector name	Location and collector temperature (T _m)														
	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	25°C	50°C	75°C
AELIOS CuB 1500	1.391	891	511	1.072	666	361	743	438	235	808	468	246			
AELIOS CuB 2000	1.869	1.197	687	1.440	895	485	998	588	316	1.086	628	330			
AELIOS CuB 2600	2.356	1.509	865	1.815	1.128	612	1.259	742	398	1.368	792	416			

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

Overview of locations				
Location	Latitude °	Gtot kWh/m ²	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/m ²
Ta	Mean annual ambient air temperature	°C
Tm	Constant collector operating temperature (mean of in- and outlet temperatures)	°C

Calculation of the annual collector performance is done by the official Solar Keymark spreadsheet tool. Hour by hour the collector output is calculated according to the efficiency parameters from the Keymark test using constant collector operating temperature (T_m). Detailed description with all equations used is available from the Solar Keymark web site (direct link: <http://www.estif.org/solarkeymark/annexb1.php>)

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