Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	Certificate No.	SKM 9965/6
	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
Integration in the roof possible ?	Yes

Collector name	Aperture area (Aa)	Gross length	Gross width	Gross height	Gross area (AG)	Power output per collector unit G = 1000 W/m² Tm-Ta : 0 K	10 K	30 K	50 K	70 K
	[m²]	[mm]	[mm]	[mm]	[m²]	[W]	[W]	[W]	[W]	[W]
AELIOS CuS 1500	1,40	1.530	1.030	80	1,58	1.024	970	848	708	552
AELIOS CuS 2000	1,88	2.030	1.030	80	2,09	1.375	1.301	1.138	951	741
AELIOS CuS 2600	2,37	2.030	1.285	80	2,60	1.733	1.641	1.434	1.199	934

Collector efficiency parameters related to aperture area (Aa) Note 1	η_{0a}	0,73	-
	a_{1a}	3,75	W/(m²K)
	a_{2a}	0,015	W/(m²K²)
Stagnation temperature - Note 2	t_{stg}	152	°C
Effective thermal capacity	$c_{eff} = C/A_a$	7,71	kJ/(m²K)
Max. operation pressure - Note 3	p_{max}	1000	kPa

Incidence angle modifiers $K_\theta(\theta)$	G_{DIF}/G_{TOT} min	G_{DIF}/G_{TOT} max	θ_T / θ_L	50°	*10°*	*20°*	*30°*	*40°*	*60°*	*70°*
			$K_\theta(\theta_T)$	0,85	*1,00*	*0,99*	*1,00*	*0,97*	*0,73*	*0,81*
	0,11	0,11	$K_\theta(\theta_L)$	0,85	*1,00*	*0,99*	*1,00*	*0,97*	*0,73*	*0,81*
G_{DIF}/G_{TOT}: min&max - while measuring					***Optional values***					

Testing Laboratory	Demokritos
Website	www.solar.demokritos.gr
Test report id. number	4077DE7, 4079DE8, 4085DQ8
Date of test report	13/11/2013
Perf. test method	EN 12975-2 6.1.4 (outdoor/außen/extérieu

Comments of testing laboratory :

Note 1	**Test conditions**	**Fluid**	Water	**Flow rate**	0,020	kg/s per m²	Stamp & signature of test lab
Note 2	**Irradiance, Gs=1000 W/m²** **Ambient temperature , Ta=30 °C**						
Note 3	**Given by manufacturer**						

VERSION 3.4, 30-11-2011

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Certificate No.	SKM 9965/6
	Issued	30/10/2013

Annual collector output kWh / Jährliche Kollektor Leistung kWh / Energie annuelle produite par le capteur

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	25°C	50°C	75°C
AELIOS CuS 1500	1.518	1.027	626	1.203	788	457	830	517	296	900	553	308			
AELIOS CuS 2000	2.038	1.379	840	1.615	1.058	613	1.115	695	397	1.209	742	414			
AELIOS CuS 2600	2.560	1.739	1.060	2.036	1.333	773	1.406	876	501	1.524	936	522			

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

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 (Tm). 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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Datasheet version:
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Calculation program version:
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