Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	**Certificate No.**	**SKM 9965/8**
	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)** [m²]	**Gross length** [mm]	**Gross width** [mm]	**Gross height** [mm]	**Gross area (AG)** [m²]	**Power output per collector unit** G = 1000 W/m² Tm-Ta : 0 K [W]	10 K [W]	30 K [W]	50 K [W]	70 K [W]
AELIOS AIS 1500	1,40	1.530	1.030	80	1,58	1.017	950	811	667	517
AELIOS AIS 2000	1,88	2.030	1.030	80	2,09	1.365	1.275	1.089	895	694
AELIOS AIS 2600	2,37	2.030	1.283	80	2,60	1.721	1.608	1.373	1.129	875

Collector efficiency parameters related to aperture area (Aa) Note 1	η_{0a}	0,73	-
	a_{1a}	4,74	W/(m²K)
	a_{2a}	0,005	W/(m²K²)
Stagnation temperature - Note 2	t_{stg}	153	°C
Effective thermal capacity	$c_{eff} = C/A_a$	10,67	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°*
	0,28	0,54	$K_\theta(\theta_T)$	0,85	*1,00*	*0,99*	*1,00*	*0,97*	*0,73*	*0,81*
			$K_\theta(\theta_L)$	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	4076DE2, 4078DE2, 4084DQ2
Date of test report	5/9/2013
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
Note 2	**Irradiance, Gs=1000 W/m²** **Ambient temperature , Ta=30 °C**					
Note 3	**Given by manufacturer**					

Stamp & signature of test lab

VERSION 3.4, 30-11-2011

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Certificate No.	SKM 9965/8
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Annual collector output kWh / Jährliche Kollektor Leistung kWh / Energie annuelle produite par le capteur

	Location and collector temperature (Tm)														
	Athens			Davos			Stockholm			Würzburg					
Collector name	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 AIS 1500	1.495	945	555	1.138	712	407	791	466	261	860	496	272			
AELIOS AIS 2000	2.007	1.269	746	1.529	957	547	1.062	625	350	1.155	667	365			
AELIOS AIS 2600	2.530	1.599	940	1.927	1.206	690	1.339	788	441	1.456	840	460			

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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