



<b>Summary of EN 12976 Test Results,</b> annex to Solar KEYMARK Certificate Kurzfassung EN 12976 Test Ergebnisse, Anlage zum Solar KEYMARK-Zertifikat Synthèse des résultats d'essais selon EN 12976, Annexe au certificat Solar KEYMARK	<b>Registration No.</b>	<b>SKM 9916/1</b>
	Registernummer	
	Num. d'enregistrement	
	<b>Date / Datum / Date</b>	<b>10/2/2012</b>

<b>Company / Firma / Société</b>	HELIOAKMI S.A.	<b>Country/Land/Pays</b>	Greece
<b>Street / Straße / Rue</b>	Thesi Nea Zoi - Aspropyrgos, Attiki	<b>Website</b>	<a href="http://www.helioakmi.com">www.helioakmi.com</a>
<b>Postal Code, Place / PLZ, Ort / Code postal, Place</b>	19300 Aspropyrgos, Attiki	<b>E-mail</b>	<a href="mailto:megasun@helioakmi.com">megasun@helioakmi.com</a>
		<b>Tel. / Fax</b>	+030 210 5595625 / 210 55957

<b>System classification / G / F</b>	
<b>Flow principle / G / F</b>	Forced / G / F
<b>Direct / indirect / G / F</b>	Direct / G / F
<b>Press. principle / G / F</b>	Closed / G / F
<b>Drain back/down / G / F</b>	No drain (always filled) / G / F
<b>Storage location / G / F</b>	Indoor / G / F
<b>Storage position / G / F</b>	Vertical / G / F
<b>Int. back-up / G / F</b>	None / G / F
<b>If other: / G / F</b>	English / Deutsch / Francais
<b>EN12976 type / G / F</b>	Solar only / G / F

<b>Collector(s) / Kollektor(en) / Capteur(s)</b>					<b>Storage(s) / Akkumulator(en) / F</b>					
<b>Company / Hersteller / Manufactuer</b> HELIOAKMI S.A.					<b>Company / Hersteller / Manufactuer</b> HELIOAKMI S.A.					
Keymark reg. no. (optional) PSK - 073/2009										
<b>Model</b> Bezeichnung Modèle	<b>Per module / G / F</b>				<b>Model</b> Bezeichnung Modèle	<b>Total volume</b> G F litres	<b>Gross diameter/width</b> Diam. / Breite (Außenmaß) Diam. / Largeur hors Tout	<b>Höhe (Außenmaß)</b> Höhe (Außenmaß) épaisseur hors tout	<b>Back-up heated volume</b> G F litres	<b>El. back-up power</b> G F kW
	<b>Aperture area (Aa)</b> Aperturfläche (Aa) Superficie d'entrée (Aa)	<b>Gross length</b> Länge (Außenmaß) Longueur Hors tout	<b>Gross width</b> Breite (Außenmaß) Largeur hors Tout	<b>No. modules</b> G F min - max						
ST 2000	1.8	2.049	1.01	1 - 1	200 BL2	195	603	1400	~	~
ST 2500	2.35	2.049	1.273	1 - 1	300 BL2	275	603	1930	~	~
					500 BL2	495	730	1970	~	~

<b>Controller / G / F</b>		<b>Fluid / G / F</b>	
<b>Company/Hersteller/Manufacteur</b>	xxxxxxxxxxxxxxxx	<b>Company/Hersteller/Manufacteur</b>	
<b>Model / Bezeichnung / Modèle</b>	xxxxxxxxxxxxxxxx	<b>Model / Bezeichnung / Modèle</b>	Propylene glycol solution
<b>Functions</b>	English Deutsch Francais	<b>Freezing point</b>	-7 to -34 °C

<b>System family overview / G / F</b>						
<b>Collector</b> G F	<b>No. collectors / G / F</b>					
	<b>Storage / G / F</b>					
	200 BL2	300 BL2	500 BL2	0	0	
ST 2000 Selective	2		3			
ST 2500 Selective		2				
0						
0						
0						

<b>Testing Laboratory / Prüflaboratorium / Laboratoire d'essais</b>	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
<b>Website</b>	<a href="http://www.solar.demokritos.gr">www.solar.demokritos.gr</a>
<b>Test report id. number / Prüfberichtsnummer / F</b>	6002DE2, 6003DE2, 6004DE2, 6044DE1, 6045DE1
<b>Date of test report / Datum G / date F</b>	16/06/2008, 3/11/2011

<b>Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire</b>	 N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Head: Dr Vassilis Belesiotis Tel: +210 6503815 - Fax: +210 6544592 153 10 Ag. Paraskevi - Attiki - Greece
English	
Deutsch Francais	

<b>Summary of EN 12976 Test Results,</b> <b>annex to Solar KEYMARK Certificate</b> Kurzfassung EN 12976 Test Ergebnisse, Anlage zum Solar KEYMARK-Zertifikat Synthèse des résultats d'essais selon EN 12976, Annexe au certificat Solar KEYMARK	<b>Registration No.</b> Registernummer Num. d'enregistrement Date / Datum / Date	<b>SKM 9916/1</b>  10/2/2012
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<b>Company / Firma / Société</b> Street / Straße / Rue Postal Code, Place / PLZ, Ort / Code postal, Place	HELIOAKMI S.A. Thesi Nea Zoi - Aspropyrgos, Attiki 19300 Aspropyrgos, Attiki	<b>Country/Land/Pays</b> <b>Website</b> <b>E-mail</b> <b>Tel. / Fax</b>	Greece <a href="http://www.helioakmi.com">www.helioakmi.com</a> <a href="mailto:megasun@helioakmi.com">megasun@helioakmi.com</a> +99 210 5595625 / 210 55957
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System family overview / G / F	
Collector type G F	Number of collectors / G / F
	Storage type / G / F
	200 BL2      300 BL2      500 BL2
ST 2000 Selective	2           3
ST 2500 Selective	2

<b>Name of system konfiguration / G / F</b>		200 BL2 X 4.20 m <sup>2</sup>
<b>Collector type</b> G F	ST 2000 Selective G F	<b>No. collectors</b> G F
	2	<b>Storage type</b> G F
		200 BL2

Calculated annual results / G / F												
Location G F	Daily draw-off litres/day / G / F /											
	170 l/d	200 l/d	250 l/d	170 l/d	200 l/d	250 l/d	170 l/d	200 l/d	250 l/d	170 l/d	200 l/d	250 l/d
	Q <sub>d</sub> kWh/y			Q <sub>L</sub> kWh/y			f <sub>sol</sub> %			Q <sub>par</sub> kWh/y		
Stockholm, SE	2,630	3,094	3,867	1,426	1,593	1,817	54.2	51.5	47.0			
Würzburg, DE	2,521	2,966	3,708	1,523	1,696	1,908	60.4	57.2	51.4			
Davos, CH	2,853	3,357	4,196	2,142	2,380	2,673	75.1	70.9	63.7			
Athens, GR	1,960	2,306	2,882	1,574	1,797	2,133	80.3	77.9	74.0			


<b>Perf. indicators</b> G F	Q <sub>d</sub>	Heat demand / G / F
	Q <sub>L</sub>	System output / G / F
	f <sub>sol</sub>	Q <sub>L</sub> /Q <sub>d</sub> ; solar fraction / G / F
	Q <sub>par</sub>	Elec. for pumps/controllers / G / F

<b>Ref. conditions</b> G F		Stockholm	Würzburg DE	Davos CH	Athens GR
	G	1,156	1,226	1,682	1,717
	T <sub>a</sub>	7.5	9.0	3.2	18.5
	T <sub>c</sub>	8.5	10.0	5.4	17.8
	ΔT <sub>c</sub>	2.1 - 14.9	7.0 - 13.0	4.6 - 6.2	10.4 - 25.2

G	kWh/m <sup>2</sup>	Annual irradiation South, 45° / G / F
T <sub>a</sub>	°C	Annual mean air temp. / G / F
T <sub>c</sub>	°C	Annual mean cold water temp. / G / F
ΔT <sub>c</sub>	°C	Seasonal variation of T <sub>c</sub> / G / F
T <sub>h</sub>	45°C	Desired (mix. valve) temp. / G / F

<b>Max. operating press. - collector side</b> G F	700 kPa	<b>Max. operating press. - tank side</b> G F	600 kPa
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<b>Testing Laboratory / Prüflaboratorium / Laboratoire d'essais</b> <b>Website</b> <b>Test report id. number / Prüberichtsnummer / F</b> <b>Date of test report / G / F</b> <b>Test method / G / F</b>	Demokritos <a href="http://www.solar.demokritos.gr">www.solar.demokritos.gr</a> 6002DE2, 6003DE2, 6004DE2, 6044DE1, 6045DE1 16/06/2008, 3/11/2011 ISO 9459-2 (CSTG)
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<b>Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire</b> English Deutsch Français	N.C.S.R "DEMOKRITOS" SOLAR ENERGY LABORATORY Head: Dr Vassilis Belesiotis Tel: +210 6503815 - Fax: +210 6544599 153 10 Ag. Paraskevi - Attiki - Greece 
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System family overview / G / F									
Collector type	Number of collectors / G / F								
	200 BL2			300 BL2			500 BL2		
G									
F									
ST 2000 Selective	2						3		
ST 2500 Selective			2						

<b>Name of system konfiguration / G / F</b>				300 BL2 X 5.20 m <sup>2</sup>			
<b>Collector type</b> G F	ST 2500 Selective	<b>No. collectors</b> G F	2	<b>Storage type</b> G F	300 BL2		

Calculated annual results / G / F												
Location	Daily draw-off litres/day / G / F /											
	250	300	400	250	300	400	250	300	400	250	300	400
G												
F												
	Qd kWh/y			QL kWh/y			fsol %			Qpar kWh/y		
Stockholm, SE	3,867	4,641	6,188	1,928	2,273	2,585	49.8	49.0	41.8			
Würzburg, DE	3,708	4,450	5,933	2,036	2,399	2,697	54.9	53.9	45.5			
Davos, CH	4,196	5,035	6,713	2,842	3,333	3,680	67.7	66.2	54.8			
Athens, GR	2,882	3,458	4,611	2,200	2,629	3,170	76.3	76.0	68.7			

<b>Perf. indicators</b> G F	Q <sub>d</sub>	Heat demand / G / F										
	Q <sub>L</sub>	System output / G / F										
	f <sub>sol</sub>	QL/Q <sub>d</sub> ; solar fraction / G / F										
	Q <sub>par</sub>	Elec. for pumps/controllers / G / F										

<b>Ref. conditions</b> G F		Stockholm	Würzburg DE	Davos CH	Athens GR			
	G	1,156	1,226	1,682	1,717			
	Ta	7.5	9.0	3.2	18.5			
	Tc	8.5	10.0	5.4	17.8			
	ΔTc	2.1 - 14.9	7.0 - 13.0	4.6 - 6.2	10.4 - 25.2			
G	kWh/m <sup>2</sup>	Annual irradiation South, 45° / G / F						
Ta	°C	Annual mean air temp. / G / F						
Tc	°C	Annual mean cold water temp. / G / F						
ΔTc	°C	Seasonal variation of Tc / G / F						
Th	45°C	Desired (mix. valve) temp. / G / F						

<b>Max. operating press. - collector side</b> G F	700 kPa	<b>Max. operating press. - tank side</b> G F	600 kPa
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<b>Testing Laboratory / Prüflaboratorium / Laboratoire d'essais</b> <b>Website</b> <b>Test report id. number / Prüberichtsnummer / F</b> <b>Date of test report / G / F</b> <b>Test method / G / F</b>	Demokritos <a href="http://www.solar.demokritos.gr">www.solar.demokritos.gr</a> 6002DE2, 6003DE2, 6004DE2, 6044DE1, 6045DE1 16/06/2008, 3/11/2011 ISO 9459-2 (CSTG)
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System family overview / G / F												
Collector type	Number of collectors / G / F											
	Storage type / G / F											
G												
F	200 BL2			300 BL2			500 BL2					
ST 2000 Selective	2						3					
ST 2500 Selective			2									

Name of system configuration / G / F											500 BL2 X 6.30 m <sup>2</sup>
Collector type	ST 2000 Selective			No. collectors	3			Storage type	500 BL2		
G				G				G			
F				F				F			

Calculated annual results / G / F												
Location	Daily draw-off litres/day / G / F /											
	300	400	600	300	400	600	300	400	600	300	400	600
G	l/d			l/d			l/d			l/d		
F	Qd kWh/y			QL kWh/y			fsol %			Qpar kWh/y		
Stockholm, SE	4,641	6,188	9,281	2,212	2,746	3,313	47.7	44.4	35.7			
Würzburg, DE	4,450	5,933	8,899	2,334	2,878	3,460	52.5	48.5	38.9			
Davos, CH	5,035	6,713	10,070	3,299	4,013	4,695	65.5	59.8	46.6			
Athens, GR	3,458	4,611	6,916	2,518	3,240	4,317	72.8	70.3	62.4			

Perf. indicators	Qd	Heat demand / G / F										
	QL	System output / G / F										
	fsol	QL/Qd; solar fraction / G / F										
	Qpar	Elec. for pumps/controllers / G / F										
G												
F												

Ref. conditions	Stockholm SE					Würzburg DE					Davos CH					Athens GR					
	G	1,156					1,226					1,682					1,717				
G	Ta	7.5					9.0					3.2					18.5				
F	Tc	8.5					10.0					5.4					17.8				
	ΔTc	2.1 - 14.9					7.0 - 13.0					4.6 - 6.2					10.4 - 25.2				
G	kWh/m <sup>2</sup>	Annual irradiation South, 45° / G / F																			
Ta	°C	Annual mean air temp. / G / F																			
Tc	°C	Annual mean cold water temp. / G / F																			
ΔTc	°C	Seasonal variation of Tc / G / F																			
Th	45°C	Desired (mix. valve) temp. / G / F																			

Max. operating press. - collector side				700	kPa	Max. operating press. - tank side				600	kPa	
G					G					G		
F					F					F		

Testing Laboratory / Prüflaboratorium / Laboratoire d'essais	Demokritos
Website	<a href="http://www.solar.demokritos.gr">www.solar.demokritos.gr</a>
Test report id. number / Prüfberichtsnummer / F	6002DE2, 6003DE2, 6004DE2, 6044DE1, 6045DE1
Date of test report / G / F	16/06/2008, 3/11/2011
Test method / G / F	ISO 9459-2 (CSTG)

Comments of test lab / Commentaires des laboratoires / Commentaires du laboratoire	
English Deutsch Français	 N.C.S.R "DEMOKRITOS" SOLAR ENERGY LABORATORY Head: Dr Vassilis Belesiotis Tel: +210 6503815 - Fax: +210 6544599 153 10 Ag. Paraskevi - Attiki - Greece