



Summary of EN 12976 Test Results, 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	Registration Registernummer SKM 9931/4
	Num. d'enregistrement Date / Datum / Date 31/12/2012

Company / Firma / Société Street / Straße / Rue Postal Code, Place / PLZ, Ort / Code postal, Place	HELIOAKMI S.A. Thesi Nea Zoi - Aspropyrgos, Attiki 193 00 Aspropyrgos, Attiki	Country/Land/Pays Website E-mail Tel. / Fax	Greece www.helioakmi.com megasun@helioakmi.com +030 210 5595625 / 210 5595626
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System classification / G / F	
Flow principle / G / F	Thermosyphon / G / F
Direct / indirect / G / F	Direct / G / F
Press. principle / G / F	Closed / G / F
Drain back/down / G / F	No drain (always filled) / G / F
Storage location / G / F	Outdoor / G / F
Storage position / G / F	Horizontal / G / F
Int. back-up / G / F	None / G / F
If other: / G / F	English / Deutsch / Francais
EN12976 type / G / F	Solar only / G / F

Collector(s) / Kollektor(en) / Capteur(s)					Storage(s) / Akkumulator(en) / F									
Company / Hersteller / Manufactuer HELIOAKMI S.A. Keymark reg. no. (optional) SKM 9926/3					Company / Hersteller / Manufactuer HELIOAKMI S.A.									
Model Bezeichnung Modèle	Per module / G / F				No. modules G F	Model Bezeichnung Modèle	Total volume G F		Gross diameter/width Diam. / Breite (Außenmaß) Diam. / Largeur hors Tout	Gross length Länge (Außenmaß) longueur hors tout	Back-up heated volume G F		El. back-up power G F	
	Aperture area (A_a) Aperturfläche (A _a) Superficie d'entrée (A _a)	Gross length Länge (Außenmaß) Longueur Hors tout	Gross width Breite (Außenmaß) Largeur hors tout	min - max			litres	mm			mm	litres	kW	
MEGASUN ST-ALSEL 2000	1,8	2,05	1,01	1 - 1	160	155	530	1300	~	~				
MEGASUN ST-ALSEL 2500	2,33	2,05	1,28	1 - 1	200	187	570	1300	~	~				
					300	290	570	2050	~	~				

Controller / G / F				Fluid / G / F			
Company/Hersteller/Manufacteur none Model / Bezeichnung / Modèle none				Company/Hersteller/Manufacteur Model / Bezeichnung / Modèle Propylene glycol solution			
Functions G English F Deutsch Francais				Freezing point G -5 to F 36 °C			

System family overview / G / F						
Collector G F	No. collectors / G / F					
	Storage / G / F					
	SP-KK 160	SP-KK 200	SP-KK 300	0	0	
MEGASUN ST-ALSEL 2000	1		2			
MEGASUN ST-ALSEL 2500		1				
0						
0						
0						

Testing Laboratory / Prüflaboratorium / Laboratoire d'essais Website Test report id. number / Prüberichtsnummer / F Date of test report / Datum G / date F	NCSR DEMOKRITOS www.solar.demokritos.gr 6052F1, 6050DE1, 6052DE1 30/7/2012
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Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire English Deutsch Francais	Stamp & signature of test lab
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	Date / Datum / Date	31/12/2012

Company / Firma / Société Street / Straße / Rue Postal Code, Place / PLZ, Ort / Code postal, Place	HELIOAKMI S.A. Thesi Nea Zoi - Aspropyrgos, Attiki 193 00 Aspropyrgos, Attiki	Country/Land/Pays Website E-mail Tel. / Fax	Greece www.helioakmi.com megasun@helioakmi.com +99 210 5595625 / 210 55957
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System family overview / G / F						
Collector type	Number of collectors / G / F					
	Storage type / G / F					
	SP-KK 160	SP-KK 200	SP-KK 300			
MEGASUN ST-ALSEL 2000	1		2			
MEGASUN ST-ALSEL 2500		1				

Name of system konfiguration / G / F				HELIOAKMI SP-160 (L)	
Collector type G F	MEGASUN ST-ALSEL 2000	No. collectors G F	1	Storage type G F	SP-KK 160

Calculated annual results / G / F												
Location	Daily draw-off litres/day / G / F /											
	140	170	200	140	170	200	140	170	200	140	170	200
	Q _d kWh/y			Q _L kWh/y			f _{sol} %			Q _{par} kWh/y		
	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d
Stockholm, SE	2.172	2.637	3.101	874	929	955	40,3	35,2	30,9			
Würzburg, DE	2.085	2.532	2.970	920	990	1.025	44,2	39,1	34,4			
Davos, CH	2.356	2.856	3.364	1.261	1.332	1.367	53,7	46,6	40,6			
Athens, GR	1.621	1.962	2.313	1.174	1.314	1.410	72,8	66,8	61,0			
Optional location 1												
Optional location 2												
Optional location 3												

Ref. conditions	Stockholm SE Würzburg DE Davos CH Athens GR Optional loc 1 Optional loc 2 Optional loc 3							
	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 ²	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 G F	300 kPa	Max. operating press. - tank side G F	700 kPa
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Testing Laboratory / Prüflaboratorium / Laboratoire d'essais Website Test report id. number / Prüberichtsnummer / F Date of test report / G / F Test method / G / F	NCSR DEMOKRITOS www.solar.demokritos.gr 6052F1, 6050DE1, 6052DE1 30/7/2012 ISO 9459-5 (DST)
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Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire English Deutsch Français	Stamp & signature of test lab
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Summary of EN 12976 Test Results, annex to Solar KEYMARK Certificate		Registration	
Kurzfassung EN 12976 Test Ergebnisse, Anlage zum Solar KEYMARK-Zertifikat		Registernummer	SKM 9931/4
Synthèse des résultats d'essais selon EN 12976, Annexe au certificat Solar KEYMARK		Num. d'enregistrement	
		Date / Datum / Date	31/12/2012

Company / Firma / Société	HELIOAKMI S.A.	Country/Land/Pays	Greece
Street / Straße / Rue	Thesi Nea Zoi - Aspropyrgos, Attiki	Website	www.helioakmi.com
Postal Code, Place / PLZ, Ort / Code postal, Place	193 00 Aspropyrgos, Attiki	E-mail	megasun@helioakmi.com
		Tel. / Fax	+99 210 5595625 / 210 55957

System family overview / G / F						
Collector type	Number of collectors / G / F					
	Storage type / G / F					
	SP-KK 160	SP-KK 200	SP-KK 300			
MEGASUN ST-ALSEL 2000	1			2		
MEGASUN ST-ALSEL 2500		1				

Name of system konfiguration / G / F					HELIOAKMI SP-200 (L)
Collector type	MEGASUN ST-ALSEL 2500	No. collectors	1	Storage type	SP-KK 200
G		G		G	
F		F		F	

Calculated annual results / G / F												
Location	Daily draw-off litres/day / G / F /											
	170	200	250	170	200	250	170	200	250	170	200	250
	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d
	Q _d kWh/y			Q _L kWh/y			f _{sol} %			Q _{par} kWh/y		
Stockholm, SE	2.637	3.101	3.872	1.113	1.174	1.218	42,2	37,9	31,4			
Würzburg, DE	2.532	2.970	3.714	1.174	1.244	1.296	46,4	41,9	34,9			
Davos, CH	2.856	3.364	4.205	1.621	1.691	1.734	56,7	50,3	41,3			
Athens, GR	1.962	2.313	2.891	1.472	1.612	1.778	75,0	69,7	61,5			
Optional location 1												
Optional location 2												
Optional location 3												

Perf. indicators	Q _d	Heat demand / G / F
	Q _L	System output / G / F
	f _{sol}	QL/Q_d; solar fraction / G / F
	Q _{par}	Elec. for pumps/controllers / G / F
G		
F		

Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR	Optional loc 1	Optional loc 2	Optional loc 3
	G	1.156	1.226	1.682	1.717			
	G	T _a	7,5	9,0	3,2	18,5		
	F	T _c	8,5	10,0	5,4	17,8		
		ΔT _c	2.1 - 14.9	7.0 - 13.0	4.6 - 6.2	10.4 - 25.2		

G	kWh/m ²	Annual irradiation South, 45° / G / F
T _a	°C	Annual mean air temp. / G / F
T _c	°C	Annual mean cold water temp. / G / F
ΔT _c	°C	Seasonal variation of T_c / G / F
T _h	45°C	Desired (mix. valve) temp. / G / F

Max. operating press. - collector side		300	kPa	Max. operating press. - tank side		700	kPa
G				G			
F				F			

Testing Laboratory / Prüflaboratorium / Laboratoire d'essais	NCSR DEMOKRITOS
Website	www.solar.demokritos.gr
Test report id. number / Prüfberichtsnummer / F	6052F1, 6050DE1, 6052DE1
Date of test report / G / F	30/7/2012
Test method / G / F	ISO 9459-5 (DST)

Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire	
English Deutsch Francais	Stamp & signature of test lab



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System family overview / G / F												
Collector type	Number of collectors / G / F											
	Storage type / G / F											
	SP-KK 160			SP-KK 200			SP-KK 300					
G												
F												
MEGASUN ST-ALSE	1						2					
MEGASUN ST-ALSE				1								

Name of system konfiguration / G / F				HELIOAKMI SP-300 (L)			
Collector type G F	MEGASUN ST-ALSEL 2000	No. collectors G F	2	Storage type G F	SP-KK 300		

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
	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d
	Q _d kWh/y			Q _L kWh/y			f _{sol} %			Q _{par} kWh/y		
Stockholm, SE	3.872	4.652	6.202	1.708	1.822	1.953	44,1	39,2	31,5			
Würzburg, DE	3.714	4.459	5.948	1.778	1.936	2.059	47,9	43,4	34,6			
Davos, CH	4.205	5.046	6.728	2.497	2.654	2.777	59,4	52,6	41,3			
Athens, GR	2.891	3.469	4.625	2.225	2.488	2.829	77,0	71,7	61,2			
Optional location 1												
Optional location 2												
Optional location 3												

Perf. indicators G F	Q _d	Heat demand / G / F										
	Q _L	System output / G / F										
	f _{sol}	Q _L /Q _d ; solar fraction / G / F										
	Q _{par}	Elec. for pumps/controllers / G / F										

Ref. conditions G G F		Stockholm	Würzburg DE	Davos CH	Athens GR	Optional loc 1	Optional loc 2	Optional loc 3
	G	1.156	1.226	1.682	1.717			
	T _a	7,5	9,0	3,2	18,5			
	T _c	8,5	10,0	5,4	17,8			
	ΔT _c	2.1 - 14.9	7.0 - 13.0	4.6 - 6.2	10.4 - 25.2			

G	kWh/m ²	Annual irradiation South, 45° / G / F										
T _a	°C	Annual mean air temp. / G / F										
T _c	°C	Annual mean cold water temp. / G / F										
ΔT _c	°C	Seasonal variation of T _c / G / F										
T _h	45°C	Desired (mix. valve) temp. / G / F										

Max. operating press. - collector side G F	300 kPa	Max. operating press. - tank side G F	700 kPa
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Testing Laboratory / Prüflaboratorium / Laboratoire d'essais Website Test report id. number / Prüberichtsnummer / F Date of test report / G / F Test method / G / F	NCSR DEMOKRITOS www.solar_demokritos.gr 6052F1, 6050DE1, 6052DE1 30/7/2012 ISO 9459-5 (DST)
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Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire English Deutsch Francais	Stamp & signature of test lab
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