



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 KEYMARK	Registration No. Registernummer Num. d'enregistrement	SKM 9965/11
	Date / Datum / Date	30/10/2013

Company / Firma / Société Street / Straße / Rue Postal Code, Place / PLZ, Ort / Code postal, Place	NOBEL INTERNATIONAL EAD 48, VITOSHA BLV 2100 SOFIA BULGARIA	Country/Land/Pays Website E-mail Tel. / Fax	BULGARIA info1@nobel.gr +0359 2 4210232
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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 Keymark reg. no. (optional)					Company / Hersteller / Manufactuer					
NOBEL INTERNATIONAL					NOBEL INTERNATIONAL					
SKM 9965/8										
Model Bezeichnung Modèle	Per module / G / F				Model Bezeichnung Modèle	Total volume G F litres	Gross diameter/width Diam. / Breite (Außenmaß) Diam. / Largeur hors Tout	Gross length Länge (Außenmaß) longueur hors tout	Back-up heated volume G F litres	El. back-up power G F kW
	Aperture area (Aa) Aperturfäche (Aa) Superficie d'entrée (Aa)	Gross length Länge (Außenmaß) Longueur Hors tout	Gross width Breite (Außenmaß) Largeur hors Tout	No. modules G F min - max						
AEIOS ALS 1500	1,4	1,53	1,03	1 - - 1	120L	115	580	782	~	0 ~ 4
AEIOS ALS 2000	1,88	2,03	1,03	1 - - 1	160L	150	580	1053	~	0 ~ 4
AEIOS ALS 2600	2,37	2,03	1,28	1 - - 1	200L	190	580	1312	~	0 ~ 4
					320L	310	580	2072	~	0 ~ 4

Controller / G / F			Fluid / G / F		
Company/Hersteller/Manufacteur Model / Bezeichnung / Modèle			Company/Hersteller/Manufacteur Model / Bezeichnung / Modèle		
Functions G English F Deutsch Francais			Freezing point G -6 to F 10 °C		

System family overview / G / F												
Collector G F	No. collectors / G / F											
	Storage / G / F											
	120L	160L	200L	320L	0							
AEIOS ALS 1500		2	2									
AEIOS ALS 2000	1	1	1 2	2 3								
AEIOS ALS 2600		1	1									
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"- SOLAR & ENERGY SYSTEMS LAB www.solar.demokritos.gr 6028 DE2, 6035 DE2, 6035 F2 4/9/2013
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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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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 No. Registernummer Num. d'enregistrement Date / Datum / Date	SKM 9965/11 30/10/2013
	Company / Firma / Société NOBEL INTERNATIONAL EAD Street / Straße / Rue 48, VITOSHA BLV Postal Code, Place / PLZ, Ort / Code postal, Place 2100 SOFIA BULGARIA	
	Country/Land/Pays BULGARIA Website E-mail info1@nobel.gr Tel. / Fax +0359 2 4210232	

System family overview / G / F	
Collector type G F	Number of collectors / G / F Storage type / G / F
	120L 160L 200L 320L
AEIOS ALS 1500	2 2
AEIOS ALS 2000	1 1 2 2 3
AEIOS ALS 2600	1 1

Name of system konfiguration / G / F		AEIOS 120/2 ALS
Collector type G F	No. collectors G F	Storage type G F
AEIOS ALS 2000	1	120L

Calculated annual results / G / F												
Location G F	Daily draw-off litres/day / G / F /											
	80 110 140 80 110 140 80 110 140 80 110 140 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	1.244	1.708	2.172	721	874	964	58,1	51,2	44,6			
Würzburg, DE	1.191	1.638	2.085	702	867	981	59,0	53,0	47,1			
Davos, CH	1.349	1.848	2.356	1.007	1.209	1.332	74,9	65,4	56,4			
Athens, GR	929	1.270	1.621	841	1.086	1.288	91,0	85,6	79,6			

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

Ref. conditions G G F		Stockholm	Würzburg DE	Davos CH	Athens GR
	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	1.000 kPa
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Testing Laboratory / Prüflaboratorium / Laboratoire d'essais	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number / Prüberichtnummer / F	6028 DE2, 6035 DE2, 6035 F2
Date of test report / G / F	4/9/2013
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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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 No.	SKM 9965/11
	Registernummer	
	Num. d'enregistremen	
	Date / Datum / Date	30/10/2013

Company / Firma / Société	NOBEL INTERNATIONAL EAD	Country/Land/Pays	BULGARIA
Street / Straße / Rue	48, VITOSHA BLV	Website	
Postal Code, Place / PLZ, Ort / Code postal, Place	2100	SOFIA BULGARIA	E-mail
			info1@nobel.gr
		Tel. / Fax	+0359 2 4210232

System family overview / G / F												
Collector type	Number of collectors / G / F											
	Storage type / G / F											
	120L			160L			200L			320L		
G												
F												
AELIOS ALS 1500				2			2					
AELIOS ALS 2000	1			1			1	2		2	3	
AELIOS ALS 2600				1				1				

Name of system konfiguration / G / F												AELIOS 160/2 ALS	
Collector type	AELIOS ALS 2000			No. collectors			1			Storage type			160L
G													
F													

Calculated annual results / G / F																		
Location	Daily draw-off litres/day / G / F /																	
	110			140			170			110			140			170		
	l/d			l/d			l/d			l/d			l/d			l/d		
G																		
F																		
	Q _d kWh/y			Q _L kWh/y			f _{sol} %			Q _{par} kWh/y								
Stockholm, SE	1.708	2.172	2.637	885	999	1.077	52,1	46,2	40,9									
Würzburg, DE	1.638	2.085	2.532	876	1.007	1.095	53,8	48,5	43,3									
Davos, CH	1.848	2.356	2.856	1.235	1.375	1.463	66,5	58,3	51,1									
Athens, GR	1.270	1.621	1.962	1.095	1.314	1.472	86,3	81,0	75,1									
Perf. indicators	Q_d Heat demand / G / F																	
G	Q_L System output / G / F																	
F	f_{sol} QL/Q_d; solar fraction / G / F																	
	Q_{par} Elec. for pumps/controllers / G / F																	

Ref. conditions	G	Stockholm	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		
	F	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			Max. operating press. - tank side		
G	300	kPa	G	1.000	kPa
F			F		

Testing Laboratory / Prüflaboratorium / Laboratoire d'essais	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number / Prüberichtsnummer / F	6028 DE2, 6035 DE2, 6035 F2
Date of test report / G / F	4/9/2013
Test method / G / F	ISO 9459-5 (DST)

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



Summary of EN 12976 Test Results, annex to Solar KEYMARK Certificate		Registration							
Kurzfassung EN 12976 Test Ergebnisse, Anlage zum Solar KEYMARK-Zertifikat		Registernummer	SKM 9965/11						
Synthèse des résultats d'essais selon EN 12976, Annexe au certificat Solar		Num. d'enregistrement							
		Date / Datum / Date	30/10/2013						
Company / Firma / Société		Country/Land/Pays	BULGARIA						
Street / Straße / Rue		Website							
48, VITOSHA BLV									
Postal Code, Place / PLZ, Ort / Code postal, Place		E-mail							
2100 SOFIA BULGARIA		info1@nobel.gr							
		Tel. / Fax	+0359 2 4210232						
System family overview / G / F									
Collector type		Number of collectors / G / F							
G									
F									
		Storage type / G / F							
		120L 160L 200L 320L							
AELIOS ALS 1500		2							
AELIOS ALS 2000		1 2 2 3							
AELIOS ALS 2600		1 1							
Name of system configuration / G / F									
AELIOS 160/2.6 ALS									
Collector type		No. collectors	Storage type						
G AELIOS ALS 2600		G 1	G 160L						
F		F	F						
Calculated annual results / G / F									
Location		Daily draw-off litres/day / G / F /							
G		110 140 170 110 140 170 110 140 170 110 140 170							
F		l/d 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		1.708 2.172 2.637		990 1.139 1.244		58,1 52,6 47,1			
Würzburg, DE		1.638 2.085 2.532		964 1.130 1.253		59,2 54,4 49,7			
Davos, CH		1.848 2.356 2.856		1.384 1.586 1.717		74,9 67,4 60,0			
Athens, GR		1.270 1.621 1.962		1.156 1.410 1.621		91,3 87,1 82,5			
Perf. indicators		Q _d Heat demand / G / F							
G		Q _L System output / G / F							
F		f _{sol} QL/Q _d ; solar fraction / G / F							
		Q _{par} Elec. for pumps/controllers / G / F							
Ref. conditions		Stockholm SE		Würzburg DE		Davos CH		Athens GR	
G		1.156		1.226		1.682		1.717	
Ta		7,5		9,0		3,2		18,5	
F		8,5		10,0		5,4		17,8	
Tc		2.1 - 14.9		7.0 - 13.0		4.6 - 6.2		10.4 - 25.2	
ΔTc		kWh/m ² Annual irradiation South, 45° / G / F							
G		°C Annual mean air temp. / G / F							
Ta		°C Annual mean cold water temp. / G / F							
Tc		°C Seasonal variation of Tc / G / F							
ΔTc		45°C Desired (mix. valve) temp. / G / F							
Th									
Max. operating press. - collector side		300 kPa		Max. operating press. - tank side		1.000 kPa			
G				G					
F				F					
Testing Laboratory / Prüflaboratorium / Laboratoire d'essais		NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB							
Website		www.solar.demokritos.gr							
Test report id. number / Prüberichtsnummer / F		6028 DE2, 6035 DE2, 6035 F2							
Date of test report / G / F		4/9/2013							
Test method / G / F		ISO 9459-5 (DST)							
Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire		English Deutsch Français							



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	Date / Datum / Date	30/10/2013
	Company / Firma / Société NOBEL INTERNATIONAL EAD	
	Country/Land/Pays BULGARIA	

Street / Straße / Rue 48, VITOSHA BLV	Website
Postal Code, Place / PLZ, Ort / Code postal, Place 2100 SOFIA BULGARIA	E-mail info1@nobel.gr
	Tel. / Fax +0359 2 4210232

System family overview / G / F												
Collector type G F	Number of collectors / G / F											
	Storage type / G / F											
Storage type / G / F												
	120L	160L	200L	320L								
AELIOS ALS 1500		2		2								
AELIOS ALS 2000	1		1		1	2			2	3		
AELIOS ALS 2600			1			1						

Name of system konfiguration / G / F AELIOS 160/3 ALS

Collector type G F	AELIOS ALS 1500	No. collectors G F	2	Storage type G F	160L
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Calculated annual results / G / F

Location G F	Daily draw-off litres/day / G / F /											
	110	140	170	110	140	170	110	140	170	110	140	170
	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	1.708	2.172	2.637	1.025	1.200	1.323	60,1	55,2	50,2			
Würzburg, DE	1.638	2.085	2.532	990	1.174	1.323	60,7	56,5	52,3			
Davos, CH	1.848	2.356	2.856	1.437	1.673	1.840	77,6	70,9	64,3			
Athens, GR	1.270	1.621	1.962	1.174	1.437	1.664	92,4	88,8	84,9			

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 F	Stockholm	Würzburg DE	Davos CH	Athens GR				
	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	1.000	kPa
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Testing Laboratory / Prüflaboratorium / Laboratoire d'essais	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number / Prüberichtsnummer / F	6028 DE2, 6035 DE2, 6035 F2
Date of test report / G / F	4/9/2013
Test method / G / F	ISO 9459-5 (DST)

Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire English Deutsch Français	
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Street / Straße / Rue		48, VITOSHA BLV		Website
Postal Code, Place / PLZ, Ort / Code postal, Place		2100	SOFIA BULGARIA	E-mail info1@nobel.gr
		Tel. / Fax +0359 2 4210232		

System family overview / G / F					
Collector type G F	Number of collectors / G / F				
	Storage type / G / F				
	120L	160L	200L	320L	
AElios ALS 1500	2	2	2		
AElios ALS 2000	1	1	1 2	2 3	
AElios ALS 2600		1	1		

Name of system konfiguration / G / F					AELIOS 200/2 ALS
Collector type G F	AELIOS ALS 2000	No. collectors G F	1	Storage type G F	200L

Calculated annual results / G / F														
Location G F	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	l/d	
	Q _d kWh/y			Q _L kWh/y			f _{sol} %			Q _{par} kWh/y				
Stockholm, SE	2.637	3.101	3.881	1.095	1.165	1.235	41,7	37,5	31,9					
Würzburg, DE	2.532	2.970	3.714	1.113	1.183	1.253	44,0	39,7	33,8					
Davos, CH	2.856	3.364	4.205	1.489	1.559	1.638	52,0	46,3	38,9					
Athens, GR	1.962	2.313	2.891	1.489	1.629	1.761	76,0	70,4	61,0					
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		
	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				
Th	45°C	Desired (mix. valve) temp. / G F				

Max. operating press. - collector side		300	kPa	Max. operating press. - tank side		1.000	kPa
G				G			
F				F			

Testing Laboratory / Prüflaboratorium / Laboratoire d'essais	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
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Date of test report / G / F	4/9/2013
Test method / G / F	ISO 9459-5 (DST)

Comments of test lab / Kommentare des laboratorios / Commentaires du laboratoire	
English	
Deutsch	
Français	



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	Registernummer	
	Num. d'enregistremen	
	Date / Datum / Date	30/10/2013

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Street / Straße / Rue	48, VITOSHA BLV	Website	
Postal Code, Place / PLZ, Ort / Code postal, Place	2100 SOFIA BULGARIA	E-mail	info1@nobel.gr
		Tel. / Fax	+0359 2 4210232

System family overview / G / F												
Collector type G F	Number of collectors / G / F											
	Storage type / G / F											
	120L			160L			200L			320L		
AElios ALS 1500				2			2					
AElios ALS 2000	1				1			1	2		2	3
AElios ALS 2600					1				1			

Name of system konfiguration / G / F												AELIOS 200/2.6 ALS
Collector type	AELIOS ALS 2600			No. collectors	1			Storage type	200L			
G				G				G				
F				F				F				

Calculated annual results / G / F																		
Location G F	Daily draw-off litres/day / G / F /																	
	170			200			250			170			200			250		
	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	3.881	1.253	1.340	1.437	47,6	43,3	37,1									
Würzburg, DE	2.532	2.970	3.714	1.261	1.358	1.463	49,8	45,7	39,3									
Davos, CH	2.856	3.364	4.205	1.726	1.831	1.936	60,4	54,3	46,1									
Athens, GR	1.962	2.313	2.891	1.621	1.805	2.024	82,5	78,0	69,9									
Perf. indicators	Q_d Heat demand / G / F																	
G	Q_L System output / G / F																	
F	f_{sol} QL/Q_d; solar fraction / G / F																	
	Q_{par} Elec. for pumps/controllers / G / F																	

Ref. conditions		Stockholm	Würzburg DE	Davos CH	Athens GR			
	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	1.000	kPa
G			G		
F			F		

Testing Laboratory / Prüflaboratorium / Laboratoire d'essais	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number / Prüberichtsnummer / F	6028 DE2, 6035 DE2, 6035 F2
Date of test report / G / F	4/9/2013
Test method / G / F	ISO 9459-5 (DST)

Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire	
English	
Deutsch	
Français	



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 No. Registernummer Num. d'enregistremen Date / Datum / Date		SKM 9965/11 30/10/2013												
Company / Firma / Société Street / Straße / Rue Postal Code, Place / PLZ, Ort / Code postal, Place			NOBEL INTERNATIONAL EAD 48, VITOSHA BLV 2100 SOFIA BULGARIA			Country/Land/Pays Website E-mail Tel. / Fax		BULGARIA info1@nobel.gr +0359 2 4210232											
System family overview / G / F																			
Collector type		Number of collectors / G / F																	
G		Storage type / G / F																	
F		120L		160L		200L		320L											
AELIOS ALS 1500				2		2													
AELIOS ALS 2000		1				1 2		2 3											
AELIOS ALS 2600				1		1													
Name of system konfiguration / G / F							AELIOS 200/3 ALS												
Collector type		No. collectors			Storage type														
G		AELIOS ALS 1500			G		2		G										
F					F				F										
									200L										
Calculated annual results / G / F																			
Location		Daily draw-off litres/day / G / F /																	
G		170		200		250		170		200		250							
F		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		3.881		1.358		1.463		1.586		51,5		47,2		40,8	
Würzburg, DE		2.532		2.970		3.714		1.349		1.472		1.612		53,3		49,5		43,3	
Davos, CH		2.856		3.364		4.205		1.883		2.015		2.155		65,8		59,8		51,2	
Athens, GR		1.962		2.313		2.891		1.691		1.901		2.172		85,9		82,1		75,2	
Perf. indicators		Q _d		Heat demand / G / F															
G		Q _L		System output / G / F															
F		f _{sol}		Q_L/Q_d; solar fraction / G / F															
		Q _{par}		Elec. for pumps/controllers / G / F															
Ref. conditions				Stockholm		Würzburg DE		Davos CH		Athens GR									
G		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				300		kPa		Max. operating press. - tank side				1.000		kPa					
G								G											
F								F											
Testing Laboratory / Prüflaboratorium / Laboratoire d'essais					NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB														
Website					www.solar.demokritos.gr														
Test report id. number / Prüberichtsnummer / F					6028 DE2, 6035 DE2, 6035 F2														
Date of test report / G / F					4/9/2013														
Test method / G / F					ISO 9459-5 (DST)														
Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire																			
English Deutsch Francais																			
amp & signature of test lab																			



Summary of EN 12976 Test Results, annex to Solar KEYMARK Certificate				Registration No.		SKM 9965/11																						
Kurzfassung EN 12976 Test Ergebnisse, Anlage zum Solar KEYMARK-Zertifikat				Registernummer																								
Synthèse des résultats d'essais selon EN 12976, Annexe au certificat Solar				Num. d'enregistremen																								
				Date / Datum / Date		30/10/2013																						
Company / Firma / Société		NOBEL INTERNATIONAL EAD		Country/Land/Pays		BULGARIA																						
Street / Straße / Rue		48, VITOSHA BLV		Website																								
Postal Code, Place / PLZ, Ort / Code postal, Place		2100 SOFIA BULGARIA		E-mail		info1@nobel.gr																						
				Tel. / Fax		+0359 2 4210232																						
System family overview / G / F																												
Collector type		Number of collectors / G / F																										
G		Storage type / G / F																										
F		120L		160L		200L		320L																				
AELIOS ALS 1500		2		2																								
AELIOS ALS 2000		1		1		2		3																				
AELIOS ALS 2600				1		1																						
Name of system konfiguration / G / F								AELIOS 200/4 ALS																				
Collector type		AELIOS ALS 2000		No. collectors		2		Storage type																				
G				G				G																				
F				F				F																				
								200L																				
Calculated annual results / G / F																												
Location		Daily draw-off litres/day / G / F /																										
G		170			200			250			170			200			250											
F		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			3.881			1.524			1.673			1.848			57,8			54,0			47,7		
Würzburg, DE		2.532			2.970			3.714			1.480			1.647			1.857			58,7			55,4			50,0		
Davos, CH		2.856			3.364			4.205			2.129			2.330			2.567			74,4			69,4			61,1		
Athens, GR		1.962			2.313			2.891			1.787			2.032			2.400			90,8			88,0			82,9		
Perf. indicators		Q _d		Heat demand / G / F																								
G		Q _L		System output / G / F																								
F		f _{sol}		Q_L/Q_d; solar fraction / G / F																								
		Q _{par}		Elec. for pumps/controllers / G / F																								
Ref. conditions		Stockholm		Würzburg DE		Davos CH		Athens GR																				
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																								
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				300 kPa				Max. operating press. - tank side				1.000 kPa																
G								G																				
F								F																				
Testing Laboratory / Prüflaboratorium / Laboratoire d'essais						NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB																						
Website						www.solar.demokritos.gr																						
Test report id. number / Prüberichtsnummer / F						6028 DE2, 6035 DE2, 6035 F2																						
Date of test report / G / F						4/9/2013																						
Test method / G / F						ISO 9459-5 (DST)																						
Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire																												
English																												
Deutsch																												
Français																												



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 No. Registernummer Num. d'enregistremen Date / Datum / Date		SKM 9965/11 30/10/2013									
Company / Firma / Société		NOBEL INTERNATIONAL EAD		Country/Land/Pays BULGARIA									
Street / Straße / Rue		48, VITOSHA BLV		Website									
Postal Code, Place / PLZ, Ort / Code postal, Place		2100 SOFIA BULGARIA		E-mail info1@nobel.gr									
		Tel. / Fax		+0359 2 4210232									
System family overview / G / F													
Collector type		Number of collectors / G / F											
		Storage type / G / F											
		120L	160L	200L	320L								
G													
F													
AELIOS ALS 1500			2	2									
AELIOS ALS 2000		1	1	1 2	2 3								
AELIOS ALS 2600			1	1									
Name of system konfiguration / G / F AELIOS 320/4 ALS													
Collector type		No. collectors		Storage type									
G AELIOS ALS 2000		G 2		G 320L									
F		F		F									
Calculated annual results / G / F													
		Daily draw-off litres/day / G / F /											
Location		250	300	400	250	300	400	250	300	400	250	300	400
G		l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d	l/d
F		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		3.881	4.652	6.202	1.953	2.120	2.321	50,3	45,5	37,4			
Würzburg, DE		3.714	4.459	5.948	1.945	2.137	2.356	52,3	47,8	39,6			
Davos, CH		4.205	5.046	6.728	2.698	2.900	3.136	64,2	57,5	46,6			
Athens, GR		2.891	3.469	4.625	2.453	2.794	3.259	85,0	80,5	70,5			
Perf. indicators													
G		Q _d	Heat demand / G / F										
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			Stockholm	Würzburg DE	Davos CH	Athens GR							
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			300	kPa									
G													
F													
Max. operating press. - tank side													
G													
F													
Testing Laboratory / Prüflaboratorium / Laboratoire d'essais		NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB											
Website		www.solar.demokritos.gr											
Test report id. number / Prüberichtsnummer / F		6028 DE2, 6035 DE2, 6035 F2											
Date of test report / G / F		4/9/2013											
Test method / G / F		ISO 9459-5 (DST)											
Comments of test lab / Kommentare des laboratorios / Commentaires du laboratoire													
English													
Deutsch													
Français													



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 No. Registernummer Num. d'enregistremen Date / Datum / Date		SKM 9965/11 30/10/2013							
Company / Firma / Société		NOBEL INTERNATIONAL EAD		Country/Land/Pays		BULGARIA							
Street / Straße / Rue		48, VITOSHA BLV		Website									
Postal Code, Place / PLZ, Ort / Code postal, Place		2100 SOFIA BULGARIA		E-mail		info1@nobel.gr							
				Tel. / Fax		+0359 2 4210232							
System family overview / G / F													
Collector type		Number of collectors / G / F											
		Storage type / G / F											
		120L		160L		200L		320L					
G													
F													
AELIOS ALS 1500				2		2							
AELIOS ALS 2000		1		1		1	2		2 3				
AELIOS ALS 2600				1		1							
Name of system konfiguration / G / F						AELIOS 320/6 ALS							
Collector type		No. collectors			Storage type								
G		AELIOS ALS 2000			G								
F					F								
		3			320L								
Calculated annual results / G / F													
Location		Daily draw-off litres/day / G / F /											
G		250			300			400					
F		l/d			l/d			l/d					
		Q _d kWh/y			Q _L kWh/y			f _{sol} %			Q _{par} kWh/y		
Stockholm, SE		3.881			4.652			6.202			2.286		
Würzburg, DE		3.714			4.459			5.948			2.225		
Davos, CH		4.205			5.046			6.728			3.197		
Athens, GR		2.891			3.469			4.625			2.654		
Perf. indicators		Q_d Heat demand / G / F											
G		Q_L System output / G / F											
F		f_{sol} Q_L/Q_d; solar fraction / G / F											
		Q_{par} Elec. for pumps/controllers / G / F											
Ref. conditions		Stockholm			Würzburg DE			Davos CH			Athens GR		
G		1.156			1.226			1.682			1.717		
G		Ta			7,5			9,0			3,2		
F		Tc			8,5			10,0			5,4		
		ΔTc			2.1 - 14.9			7.0 - 13.0			4.6 - 6.2		
		10.4 - 25.2											
G		kWh/m² 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				Max. operating press. - tank side									
G		300		kPa		G		1.000		kPa			
F						F							
Testing Laboratory / Prüflaboratorium / Laboratoire d'essais						NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB							
Website						www.solar.demokritos.gr							
Test report id. number / Prüberichtsnummer / F						6028 DE2, 6035 DE2, 6035 F2							
Date of test report / G / F						4/9/2013							
Test method / G / F						ISO 9459-5 (DST)							
Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire													
English Deutsch Français													
amp & signature of test lab													