Summary of EN 12976 Test Results, annex to Solar KEYMARK Certificate Kurzfassung EN 12976 Test Ergebnisse, Anlage zum Solar KEYMARK-Zertifikat Synthèse des résultas d'essais selon EN 12976, Annexe au certificat Solar KEYMARK	**Registration** Registernummer Num. d'enregistremen	**SKM 9965/15**
	Date / Datum / Date	30/12/2013

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 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	Electric / G / F
If other: / G / F	English / Deutsch / Francais
EN12976 type / G / F	Solar only / G / F

Collector(s) / Kollektor(en) / Capteur(s)

Company / Hersteller / Manufactuer	NOBEL INTERNATIONAL
Keymark reg, no. (optional)	*SKM 9965/1*

Model Bezeichnung Modéle	**Per module** / 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	**No. modules** G F		
	m²	m	m	min - max		
APOLLON AL 2000	1,82	2,01	1,01	1	-	1
APOLLON AL 2600	2,33	2,05	1,266	1	-	1

Storage(s) / Akkumulator(en) / F

Company / Hersteller / Manufactuer	NOBEL INTERNATIONAL

Model Bezeichnung Modéle	**Total volume** G F	**Gross diameter/width** Diam. / Breite (Außenmaß) Diam. / Largeur hors Tout	**Gross length** Länge (Außenmaß) longeur hors tout	**Back-up heated volume** G F	**El. back-up power** G F
	litres	mm	mm	litres	kW
APOLLON / HYPERION 160L	150	585	1156	~	0 ~ 4
APOLLON / HYPERION 200L	190	585	1425	~	0 ~ 4
APOLLON / HYPERION 320L	310	585	2230	~	0 ~ 4

Controller / G / F		**Fluid** / G / F		
Company/Hersteller/Manufacteur		**Company**/Hersteller/Manufacteur	Eldons Aebe	
Model / Bezeichnung / Modéle		**Model** / Bezeichnung / Modéle	Propylene glycol	
Functions G F	English Deutsch Francais	**Freezing point** G F	-6 to 25	°C

System family overview / G / F

Collector G F	**No. collectors** / G / F **Storage** / G / F OLLON / HYPERION 1	OLLON / HYPERION 2	APOLLON / HYPERION 320L	0	0
APOLLON AL 2000	1		2		
APOLLON AL 2600		1			
0					
0					
0					

Testing Laboratory / Prüflaboratorium / Laboratoire d'essais	Fraunhofer ISE, Test Lab Solar Thermal Systems
Website	www.kollektortest.de
Test report id. number / Prüberichtsnummer / F	STB Nr. 2010-03-k2, STB Nr. 2010-04-k2, STB Nr. 2010-05-k2
Date of test report / Datum G / date F	3/6/2011

Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire

English
Deutsch
Francais

Central Offices: Dragoumi 6, 145 61 kifisia, Athens, Tel: +301 6233493-4 , Fax: +301 6233495, http://www.dqshellas.gr, e-mail: ioannisalexiou@dqshellas.gr

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Postal Code, Place / PLZ, Ort / Code postal, Place	2100	SOFIA BULGARIA	**E-mail**	info1@nobel.gr
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System family overview / G / F

Collector type G / F	**Number of collectors** / G / F **Storage type** / G / F																											
	OLLON / HYPERION 1						OLLON / HYPERION 2						OLLON / HYPERION 3															
APOLLON AL 2000						**1**												**2**										
APOLLON AL 2600												**1**																

Name of system konfiguration / G / F						APOLLON / HYPERION 160L/2 m²
Collector type G / F	APOLLON AL 2000	**No. collectors** G / F	1	**Storage type** G / F	APOLLON / HYPERION 160L	

Calculated annual results / G / F

Location G / F	**Daily draw-off litres/day** / G / F /											
	80 l/d	170 l/d	250 l/d	80 l/d	170 l/d	250 l/d	80 l/d	170 l/d	250 l/d	80 l/d	170 l/d	250 l/d
	Q_d kWh/y			Q_L kWh/y			f_{sol} %			Q_{par} kWh/y		
Stockholm, SE	1.242	2.646	3.892	729	1.027	1.070	0,6	0,4	0,3			
Würzburg, DE	1.189	2.532	3.713	756	1.132	1.184	0,6	0,4	0,3			
Davos, CH	1.344	2.870	4.213	1.114	1.344	1.344	0,8	0,5	0,4			
Athens, GR	925	1.971	2.894	873	1.518	1.676	0,9	0,8	0,6			

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 SE	Würzburg DE	Davos CH	Athens GR			
	G	1.113	1.230	1.684	1.718			
	Ta	6,9	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/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 G / F	350	kPa	**Max. operating press. - tank side** G / F	800	kPa

Testing Laboratory / Prüflaboratorium / Laboratoire d'essais	Fraunhofer ISE, Test Lab Solar Thermal Systems
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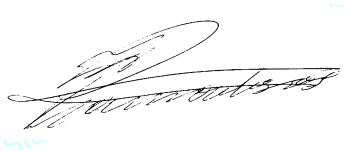
Test report id. number / Prüberichtsnummer / F	STB Nr. 2010-03-k2, STB Nr. 2010-04-k2, STB Nr. 2010-05-k2
Date of test report / G / F	3/6/2011
Test method / G / F	ISO 9459-5 (DST)

Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire

English
Deutsch
Francais



Version 0.5, 04-02-2008

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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																																	
	OLLON / HYPERION 1						OLLON / HYPERION 2						OLLON / HYPERION 3																							
APOLLON AL 2000						1												2																	
APOLLON AL 2600												1																							

Name of system konfiguration / G / F						APOLLON / HYPERION 200L/2,6 m²
Collector type G F	APOLLON AL 2600	**No. collectors** G F	1	**Storage type** G F		APOLLON / HYPERION 200L

Calculated annual results / G / F

Location G F	**Daily draw-off litres/day** / G / F /											
	110 l/d	200 l/d	300 l/d	110 l/d	200 l/d	300 l/d	110 l/d	200 l/d	300 l/d	110 l/d	200 l/d	300 l/d
	Q_d kWh/y			Q_L kWh/y			f_{sol} %			Q_{par} kWh/y		
Stockholm, SE	1.713	3.098	4.674	939	1.307	1.430	0,5	0,4	0,3			
Würzburg, DE	1.631	2.974	4.474	974	1.421	1.579	0,6	0,5	0,4			
Davos, CH	1.857	3.367	5.049	1.439	1.983	2.141	0,8	0,6	0,4			
Athens, GR	1.274	2.316	3.471	1.167	1.860	2.211	0,9	0,8	0,6			

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 SE	Würzburg DE	Davos CH	Athens GR			
	G	1.113	1.230	1.684	1.718			
	Ta	6,9	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/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 G F	350	kPa	**Max. operating press. - tank side** G F	800	kPa

Testing Laboratory / Prüflaboratorium / Laboratoire d'essais	Fraunhofer ISE, Test Lab Solar Thermal Systems
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Date of test report / G / F	3/6/2011
Test method / G / F	ISO 9459-5 (DST)

Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire

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System family overview / G / F

Collector type G F	**Number of collectors** / G / F																							
	Storage type / G / F																							
	OLLON / HYPERION 1						OLLON / HYPERION 2						OLLON / HYPERION 3											
APOLLON AL 2000						1											2							
APOLLON AL 2600												1												

Name of system konfiguration / G / F						APOLLON / HYPERION 320L/4 m²
Collector type G F	APOLLON AL 2000	**No. collectors** G F	2	**Storage type** G F		APOLLON / HYPERION 320L

Calculated annual results / G / F

Location G F	**Daily draw-off litres/day** / G / F /											
	170 l/d	300 l/d	500 l/d	170 l/d	300 l/d	500 l/d	170 l/d	300 l/d	500 l/d	170 l/d	300 l/d	500 l/d
	Q_d kWh/y			Q_L kWh/y			f_{sol} %			Q_{par} kWh/y		
Stockholm, SE	2.641	4.666	7.752	1.527	2.053	2.264	0,5	0,4	0,3			
Würzburg, DE	2.537	4.475	7.442	1.588	2.229	2.501	0,6	0,5	0,3			
Davos, CH	2.864	5.048	8.426	2.334	3.115	3.395	0,8	0,6	0,4			
Athens, GR	1.964	3.473	5.792	1.843	2.869	3.527	0,9	0,8	0,6			

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 SE	Würzburg DE	Davos CH	Athens GR			
	G	1.113	1.230	1.684	1.718			
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	Tc	8,5	10,0	5,4	17,8			
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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 G F	350	kPa	**Max. operating press. - tank side** G F	800	kPa

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Date of test report / G / F	3/6/2011
Test method / G / F	ISO 9459-5 (DST)

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