Summary of EN 12976 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S1372 A
	Issued	2012.05.10

Company holding licence	HELIONAL		**Country**	Greece	
Street	Oreokastro Industrial Park,P.O.Box 89		**Website**	www.helional.com	
Postal Code	57013	Thessaloniki	**E-mail**	info@helional.com	
			Tel. / Fax	+30	2310 783 -691/-498

System classification / Systemeigenschaften / Caractéristiques du système	
Flow principle	Thermosyphon
Direct/indirect	Indirect
Press. principle	Closed
Drain back/down	Always filled (no drain)
Storage location	Outdoor
Storage position	Horizontal
Internal back-up	None
If other internal back-up, please specifiy:	
EN12976 type	Solar only

Collector(s)

Company	HELIONAL
Keymark reg, no (if available)	*84/01. 19/2*

Model	Per module/ Aperture area (Aa)	Gross length	Gross width	Number of modules		
	m²	m	m	min	-	max
FPS 2.0	1.78	1.992	0.992	2	-	3
					-	
					-	
					-	
					-	

Storage(s)

Company	HELIONAL
Keymark reg, no. (if available)	

Model	Total volume	Gross diameter/width	Gross length	Back-up heated volume	El. back-up power
	litres	mm	mm	litres	kW
HFPS 120/2	120	550	1065	0	--
HFPS 150/2	150	550	1260	0	--
HFPS 200/4	200	590	1420	0	--
HFPS 250/4	250	590	1640	0	--

Controller	
Company	n/a
Model	n/a

Fluid		
Company	HOLTCHIM	
Model	Propyleneglycol	
	n/a	°C

System family overview

Collector name	Number of collectors / Storage																							
	HFPS 120/2						HFPS 150/2						HFPS 200/4						HFPS 250/4					
FPS 2.0	1						1						2						2					

Testing Laboratory	Institut für Solartechnik SPF, CH-8640 Rapperswi
Website	www.solarenergy.ch
Test report id. number	S139EN / S140QPEN
Date of test report	31.08.2010

Comments of test lab

SPF Solartechnik Prüfung Forschung

C. Vassella

All values are subject to some uncertainty; e.g. the uncertainty on system output is typically in the range of ± 5 % to ± 15 %

Version 2.1, 2012-02-08

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	Issued	10.05.2012

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Street	Oreokastro Industrial Park,P.O.Box 89		Website	www.helional.com
Postal Code	57013	Thessaloniki	E-mail	info@helional.com
			Tel. / Fax	+30 2310 783 -691/-498

System family overview

Collector name	For each storage and collector size, give number of collectors			
	HFPS 120/2	HFPS 150/2	HFPS 200/4	HFPS 250/4
FPS 2.0	1	1	2	2

Name of system konfiguration				HFPS 120/2	
Collector name	FPS 2.0	No. Collectors	1	Storage name	HFPS 120/2

Calculated annual results

Location	Daily draw-off (litres/day)											
	50	80	110	50	80	110	50	80	110	50	80	110
	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	775	1'244	1'708	458	628	764	59.1	50.5	44.7	0	0	0
Würzburg, DE	744	1'191	1'638	458	640	791	61.6	53.7	48.3	0	0	0
Davos, CH	841	1'349	1'848	689	938	1'120	81.9	69.5	60.6	0	0	0
Athens, GR	577	929	1'270	534	781	987	92.5	84.1	77.7	0	0	0

Perf. indicators for the table above

Q_d	kWh/y	**Heat demand**
Q_L	kWh/y	**Back-up heating needed**
Q_{par}	kWh/y	**Electricity for pumps/controllers**

Ref. conditions	Stockholm SE	Würzburg DE	Davos CH	Athens GR
G	1'157	1'230	1'684	1'718
Ta	7.5	9.0	3.2	18.5
Tc	8.5	10.0	5.4	17.8
± ΔTc	6.4	3.0	0.8	7.4

G	kWh/m²	**Annual irradiation South, 45°**
Ta	°C	**Annual mean air temperature**
Tc	°C	**Annual mean cold water temp.**
ΔTc	°C	**Seasonal variation of Tc**
Th	45 °C	**Desired hot water temperature (mixing valve temperature).**

Max. operating press. - collector side	300	kPa	Max. operating press. - tank side	1'000	kPa

Testing Laboratory	Institut für Solartechnik SPF, CH-8640 Rapperswil
Website	www.solarenergy.ch
Test report id. number	S139EN / S140QPEN
Date of test report	2010.08.31
Test method	ISO 9459-5 (DST)

Comments of test lab

HFPS 120/2 was tested as the "medium" subtype.

SPF Solartechnik Prüfung Forschung

C. Vassella

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Version 2.1, 2012-02-08

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Postal Code	57013	Thessaloniki	E-mail	info@helional.com
			Tel. / Fax	+30 2310 783 -691/-498

System family overview

Collector name	For each storage and collector size, give number of collectors			
	HFPS 120/2	HFPS 150/2	HFPS 200/4	HFPS 250/4
FPS 2.0	1	1	2	2

Name of system konfiguration				HFPS 150/2	
Collector name	FPS 2.0	No. Collectors	1	Storage name	HFPS 150/2

Calculated annual results

Location	Daily draw-off (litres/day)											
	80 l/d	110 l/d	140 l/d	80 l/d	110 l/d	140 l/d	80 l/d	110 l/d	140 l/d	80 l/d	110 l/d	140 l/d
	Q_d kWh/y			Q_L kWh/y			f_{sol} %			Q_{par} kWh/y		
Stockholm, SE	1'244	1'708	2'173	627	745	828	50.4	43.6	38.1	0	0	0
Würzburg, DE	1'191	1'638	2'085	648	775	884	54.4	47.3	42.4	0	0	0
Davos, CH	1'349	1'848	2'356	953	1'093	1'225	70.6	59.1	52.0	0	0	0
Athens, GR	929	1'270	1'621	797	976	1'154	85.8	76.8	71.2	0	0	0

Perf. indicators for the table above

Q_d	kWh/y	**Heat demand**
Q_L	kWh/y	**Back-up heating needed**
Q_{par}	kWh/y	**Electricity for pumps/controllers**

Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR
	G	1'157	1'230	1'684	1'718
	Ta	7.5	9.0	3.2	18.5
	Tc	8.5	10.0	5.4	17.8
	± ΔTc	6.4	3.0	0.8	7.4

G	kWh/m²	**Annual irradiation South, 45°**
Ta	°C	**Annual mean air temperature**
Tc	°C	**Annual mean cold water temp.**
ΔTc	°C	**Seasonal variation of Tc**
Th	45 °C	**Desired hot water temperature (mixing valve temperature).**

Max. operating press. - collector side	300	kPa	Max. operating press. - tank side	1'000	kPa

Testing Laboratory	Institut für Solartechnik SPF, CH-8640 Rapperswil
Website	www.solarenergy.ch
Test report id. number	S139EN / S140QPEN
Date of test report	40421
Test method	ISO 9459-5 (DST)

Comments of test lab

The SPF test number for the system subtype HFPS 200/3 is S139 ST1.The annual performance for the system subtype was calculated according to the Specific CEN Keymark Scheme Rules for system families.

SPF Solartechnik Prüfung Forschung

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Version 2.1, 2012-02-08

Summary of EN 12976 Test Results, annex to Solar KEYMARK Certificate	Certification No.	011-7S1372 A
	Issued	10.05.2012

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Street	Oreokastro Industrial Park,P.O.Box 89		Website	www.helional.com
Postal Code	57013	Thessaloniki	E-mail	info@helional.com
			Tel. / Fax	+30 2310 783 -691/-498

System family overview

Collector name	For each storage and collector size, give number of collectors																							
	HFPS 120/2						HFPS 150/2						HFPS 200/4						HFPS 250/4					
FPS 2.0	1						1						2						2					

Name of system konfiguration						HFPS 200/4	
Collector name	FPS 2.0	No. Collectors	2	Storage name	HFPS 200/4		

Calculated annual results

Location	Daily draw-off (litres/day)											
	110 l/d	140 l/d	170 l/d	110 l/d	140 l/d	170 l/d	110 l/d	140 l/d	170 l/d	110 l/d	140 l/d	170 l/d
	Q_d kWh/y			Q_L kWh/y			f_{sol} %			Q_{par} kWh/y		
Stockholm, SE	1'708	2'173	2'637	993	1'167	1'313	58.1	53.7	49.8	0	0	0
Würzburg, DE	1'638	2'085	2'532	1'001	1'199	1'372	61.1	57.5	54.2	0	0	0
Davos, CH	1'848	2'356	2'856	1'492	1'774	2'005	80.7	75.3	70.2	0	0	0
Athens, GR	1'270	1'621	1'962	1'161	1'426	1'658	91.4	88.0	84.5	0	0	0

Perf. indicators for the table above

Q_d	kWh/y	**Heat demand**
Q_L	kWh/y	**Back-up heating needed**
Q_{par}	kWh/y	**Electricity for pumps/controllers**

Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR
	G	1'157	1'230	1'684	1'718
	Ta	7.5	9.0	3.2	18.5
	Tc	8.5	10.0	5.4	17.8
	± ΔTc	6.4	3.0	0.8	7.4

G	kWh/m²	**Annual irradiation South, 45°**
Ta	°C	**Annual mean air temperature**
Tc	°C	**Annual mean cold water temp.**
ΔTc	°C	**Seasonal variation of Tc**
Th	45 °C	**Desired hot water temperature (mixing valve temperature).**

Max. operating press. - collector side	300	kPa	Max. operating press. - tank side	1'000	kPa

Testing Laboratory	Institut für Solartechnik SPF, CH-8640 Rapperswil
Website	www.solarenergy.ch
Test report id. number	S139EN / S140QPEN
Date of test report	2010.08.31
Test method	ISO 9459-5 (DST)

Comments of test lab

The system model HFPS 200/4 is the subtype with the highest ratio of collector aperture area to the total store volume (A/V-ratio). In accordance to the Specific CEN Keymark Scheme Rules for Solar Thermal Products, high temperature and safety tests were performed unter SPF test number S140QP on this system. The performace data fot this subtype was extrapolated unter SPF Test-No. S139 ST2.

SPF Solartechnik Prüfung Forschung

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			Tel. / Fax	+30 2310 783 -691/-498

System family overview

Collector name	For each storage and collector size, give number of collectors																							
	HFPS 120/2						HFPS 150/2						HFPS 200/4						HFPS 250/4					
FPS 2.0	1						1						2						2					

Name of system konfiguration						HFPS 250/4					
Collector name	FPS 2.0		No. Collectors	2		Storage name	HFPS 250/4				
Calculated annual results											
Location	Daily draw-off (litres/day)										
	140	170	200	140	170	200	140	170	200	140	170	200
	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	2'173	2'637	3'101	1'193	1'339	1'470	54.9	50.8	47.4	0	0	0
Würzburg, DE	2'085	2'532	2'970	1'201	1'375	1'526	57.6	54.3	51.4	0	0	0
Davos, CH	2'356	2'856	3'364	1'772	2'005	2'200	75.2	70.2	65.4	0	0	0
Athens, GR	1'621	1'962	2'313	1'426	1'660	1'878	88.0	84.6	81.2	0	0	0

Perf. indicators for the table above

Q_d	kWh/y	**Heat demand**
Q_L	kWh/y	**Back-up heating needed**
Q_{par}	kWh/y	**Electricity for pumps/controllers**

Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR
	G	1'157	1'230	1'684	1'718
	Ta	7.5	9.0	3.2	18.5
	Tc	8.5	10.0	5.4	17.8
	± ΔTc	6.4	3.0	0.8	7.4

G	kWh/m²	**Annual irradiation South, 45°**
Ta	°C	**Annual mean air temperature**
Tc	°C	**Annual mean cold water temp.**
ΔTc	°C	**Seasonal variation of Tc**
Th	45 °C	**Desired hot water temperature (mixing valve temperature).**

Max. operating press. - collector side	300	kPa	Max. operating press. - tank side	1'000	kPa

Testing Laboratory	Institut für Solartechnik SPF, CH-8640 Rapperswil
Website	www.solarenergy.ch
Test report id. number	S139EN / S140QPEN
Date of test report	2010.08.31
Test method	ISO 9459-5 (DST)

Comments of test lab

The SPF test number for the system subtype HFPS 250/4 is S139 ST3.The annual performance for the system subtype was calculated according to the Specific CEN Keymark Scheme Rules for system families.

SPF Solartechnik Prüfung Forschung

All values are subject to some uncertainty; e.g. the uncertainty on system output is typically in the range of ± 5 % to ± 15 %

Version 2.1, 2012-02-08