Summary of	EN12976-2	SOLAR SYSTEM test results	Licence Number	OEM 9915/5
Annex to Solar KEYMARK Certificate			Issued	2018-04-20

Company	ANDREAS VIOLARIS ¨SOL¨		Country	Greece	
Brand (optional)	SOL-VIOLARIS		Website	www.sol-violaris.com	
Street	OSSAS 4		E-mail	info@sol-violaris.com	
Postal Code	15344	GERAKAS	Tel. / Fax	+30	210 6613143

System classification	
Application(s)	Hot water
Solar loop, circulation principle	Thermosyphon
Direct solar loop / heat exchanger	Heat exchanger
Open, vented or closed solar loop	Closed
Drain back/down	Always filled (no drain)
Store location	Outdoor
Store orientation (of main axis)	Horizontal
Type of auxiliary heating (internal back-up heat)	Electric
If other auxiliary/internal back-up heating, please specifiy:	
Solar+supplementary OR Solar-only / Solar pre-heat	Solar only / Solar preheat

Collector(s)				Heat store(s)									
Company	DIMAS S.A.			Company	ANDREAS VIOLARIS ¨SOL¨								
Keymark lic.no. if available	*011-7S1491 F*			*Keymark lic.no. if available*									
	Per module												
Collector name	Gross Area (AG)	Gross length	Gross width	Store name	Total nominal volume	Gross height	Gross width	Gross depth	Auxiliary heated volume	Electrical aux. heating power			
	m²	mm	mm		litres	mm	mm	mm	litres	kW			
ENERGY+EVO 15	1,51	1501	1007	SOL-Violaris 120	110	1000	500	-	-	3,5			
ENERGY+EVO 17	1,68	1420	1183	SOL-Violaris 150	136	1250	500	-	-	3,5			
ENERGY+EVO 19	1,96	1503	1305	SOL-Violaris 170	154	1250	540	-	-	3,5			
ENERGY+EVO 20	2,02	2006	1007	SOL-Violaris 200	190	1250	580	-	-	3,5			
ENERGY+EVO 23	2,24	1893	1183	SOL-Violaris 250	230	1520	580	-	-	3,5			
ENERGY+EVO 25	2,53	2008	1258	SOL-Violaris 300	276	1760	580	-	-	3,5			
ENERGY+EVO 27	2,67	2260	1183										
ENERGY+EVO 29	2,93	2007	1458										

Solar loop controller				Solar loop fluid		
Keymark lic.no. if available				Recommended/required	Required	
Company				Company		
Name				Name	Propylenoglycol	
Solar loop pump - power range	W	to	W	Freezing point	-36 ÷ 3.5	°C

System family overview						
Collector name	Number of collectors in each configuration for each store					
	Store name					
	SOL-Violaris 120	SOL-Violaris 150	SOL-Violaris 170	SOL-Violaris 200	SOL-Violaris 250	SOL-Violaris 300
ENERGY+EVO 15	1	2	2	2	2	
ENERGY+EVO 17	1					
ENERGY+EVO 19			1			
ENERGY+EVO 20		1		1 2		2
ENERGY+EVO 23		1				
ENERGY+EVO 25		1	1	1	1	
ENERGY+EVO 27				1		
ENERGY+EVO 29						2

Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6077 DE3, 6077 F3, 6078 DE3
Date of test report	2015-12-22

Comments of test lab

Comments ...

DQS HELLAS Ltd, Central Offices: Kalavriton 4, 145 64 kifisia, Athens, Tel: +301 6233493-4 , Fax: +301 6233495, http://www.dqshellas.gr, e-mail: ioannisalexiou@dqshellas.gr

Summary of	EN12976-2	test results	Certification No.	OEM 9915/5
Annex to Solar KEYMARK Certificate			Issued	2018-04-20

Company	ANDREAS VIOLARIS ¨SOL¨		Country	Greece	
Brand (optional)	SOL-VIOLARIS		Website	www.sol-violaris.com	
Street	OSSAS 4		E-mail	info@sol-violaris.com	
Postal Code	15344	GERAKAS	Tel. / Fax	+30	210 6613143

System family overview

For each storage and collector size, give number of collectors

Collector name	SOL-Violaris 120	SOL-Violaris 150	SOL-Violaris 170	SOL-Violaris 200	SOL-Violaris 250	SOL-Violaris 300
ENERGY+EVO 15	1	2	2	2	2	
ENERGY+EVO 17	1					
ENERGY+EVO 19			1			
ENERGY+EVO 20		1		1 2		2
ENERGY+EVO 23		1				
ENERGY+EVO 25		1	1	1	1	
ENERGY+EVO 27				1		
ENERGY+EVO 29						2

Name of system configuration				Storage name	
	SOL-Violaris 120.1.15				
Collector name	ENERGY+EVO 15	No. Collectors	1		SOL-Violaris 120

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff 80 l				Daily drawoff 110 l				Daily drawoff 140 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		4478	1813	0	40	6150	2179	0	35	7821	2343	0	30
WürzburgDE		4289	1883	0	44	5897	2277	0	39	7506	2406	0	32
Davos CH		4857	2602	0	54	6654	3087	0	46	8483	3217	0	38
Athens GR		3343	2435	0	73	4573	3046	0	67	5834	3374	0	58

Perf. indicators for the table above

Qd,sh	MJ/y	**Not relevant for solar domestic hot water system**
Qd	MJ/y	**Annual heat demand for domestic hot water**
QL	MJ/y	**Annual heat energy delivered by the solar system**
Qpar	MJ/y	**Annual parasitic energy: (electricity for pumps/controllers)**
$f_{sol}=Q_l/Q_d$	-	**Solar fraction**

Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR
	G	1.157	1.230	1.684	1.736
	Ta,ave	7,5	9,0	3,2	18,5
	Tc,ave	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,ave	°C	**Annual average outdoor air temperature**
Tc,ave	°C	**Annual average mains cold water temp.**
ΔTc	K	**Seasonal variation of Tc**
Th	45 °C	**Desired hot water temperature (mixing valve temperature).**

Max. operating press. - collector side	340	kPa	Max. operating press. - tank side	1.000	kPa

Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6077 DE3, 6077 F3, 6078 DE3
Date of test report	2015-12-22
Test method	ISO 9459-5 (DST)

Comments of test lab

No comments

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

Version 3.6, 2014-06-18

Summary of	EN12976-2	test results	Certification No.	OEM 9915/5
Annex to Solar KEYMARK Certificate			Issued	2018-04-20

Company	ANDREAS VIOLARIS ¨SOL¨		Country	Greece	
Brand (optional)	SOL-VIOLARIS		Website	www.sol-violaris.com	
Street	OSSAS 4		E-mail	info@sol-violaris.com	
Postal Code	15344	GERAKAS	Tel. / Fax	+30	210 6613143

System family overview

For each storage and collector size, give number of collectors

Collector name	SOL-Violaris 120	SOL-Violaris 150	SOL-Violaris 170	SOL-Violaris 200	SOL-Violaris 250	SOL-Violaris 300
ENERGY+EVO 15	1	2	2	2	2	
ENERGY+EVO 17	1					
ENERGY+EVO 19			1			
ENERGY+EVO 20		1		1 2		2
ENERGY+EVO 23		1				
ENERGY+EVO 25		1	1	1	1	
ENERGY+EVO 27				1		
ENERGY+EVO 29						2

Name of system configuration				Storage name	SOL-Violaris 120.1.20
Collector name	ENERGY+EVO 17	No. Collectors	1		SOL-Violaris 150

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff 80 l				Daily drawoff 110 l				Daily drawoff 140 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		4478	1924	0	43	6150	2327	0	38	7821	2513	0	32
WürzburgDE		4289	1984	0	46	5897	2428	0	41	7506	2583	0	34
Davos CH		4857	2785	0	57	6654	3311	0	50	8483	3500	0	41
Athens GR		3343	2526	0	76	4573	3185	0	70	5834	3564	0	61

Perf. indicators for the table above

Qd,sh	MJ/y	**Not relevant for solar domestic hot water system**
Qd	MJ/y	**Annual heat demand for domestic hot water**
QL	MJ/y	**Annual heat energy delivered by the solar system**
Qpar	MJ/y	**Annual parasitic energy: (electricity for pumps/controllers)**
$f_{sol}=Q_L/Q_d$	-	**Solar fraction**

Ref. conditions	Stockholm SE	Würzburg DE	Davos CH	Athens GR
G	1.157	1.230	1.684	1.736
Ta,ave	7,5	9,0	3,2	18,5
Tc,ave	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,ave	°C	**Annual average outdoor air temperature**
Tc,ave	°C	**Annual average mains cold water temp.**
ΔTc	K	**Seasonal variation of Tc**
Th	45 °C	**Desired hot water temperature (mixing valve temperature).**

Max. operating press. - collector side	340	kPa	Max. operating press. - tank side	1.000	kPa

Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6077 DE3, 6077 F3, 6078 DE3
Date of test report	2015-12-22
Test method	ISO 9459-5 (DST)

Comments of test lab

No comments

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

Version 3.6, 2014-06-18

Summary of	EN12976-2	test results	Certification No.	OEM 9915/5
Annex to Solar KEYMARK Certificate			Issued	2018-04-20

Company	ANDREAS VIOLARIS ¨SOL¨		Country	Greece	
Brand (optional)	SOL-VIOLARIS		Website	www.sol-violaris.com	
Street	OSSAS 4		E-mail	info@sol-violaris.com	
Postal Code	15344	GERAKAS	Tel. / Fax	+30	210 6613143

System family overview

Collector name	For each storage and collector size, give number of collectors																							
	SOL-Violaris 120						SOL-Violaris 150						SOL-Violaris 170						SOL-Violaris 200						SOL-Violaris 250						SOL-Violaris 300					
ENERGY+EVO 15	1						2						2						2						2											
ENERGY+EVO 17	1																																			
ENERGY+EVO 19													1																							
ENERGY+EVO 20							1												1	2											2					
ENERGY+EVO 23							1																													
ENERGY+EVO 25							1						1						1						1											
ENERGY+EVO 27																			1																	
ENERGY+EVO 29																															2					

Name of system configuration					SOL-Violaris 150.1.20		
Collector name	ENERGY+EVO 20	No. Collectors	1		Storage name		SOL-Violaris 150

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff		110 l		Daily drawoff		140 l		Daily drawoff		170 l	
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		6150	2548	0	41	7821	2822	0	36	9492	3012	0	32
WürzburgDE		5897	2640	0	45	7506	3043	0	41	9114	3185	0	35
Davos CH		6654	3658	0	55	8483	4163	0	49	10281	4384	0	43
Athens GR		4573	3374	0	74	5834	4005	0	69	7064	4447	0	63

Perf. indicators for the table above		
Qd,sh	MJ/y	**Not relevant for solar domestic hot water system**
Qd	MJ/y	**Annual heat demand for domestic hot water**
QL	MJ/y	**Annual heat energy delivered by the solar system**
Qpar	MJ/y	**Annual parasitic energy: (electricity for pumps/controllers)**
$f_{sol}=Q_L/Q_d$	-	**Solar fraction**

Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR
	G	1.157	1.230	1.684	1.736
	Ta,ave	7,5	9,0	3,2	18,5
	Tc,ave	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,ave	°C	**Annual average outdoor air temperature**
Tc,ave	°C	**Annual average mains cold water temp.**
ΔTc	K	**Seasonal variation of Tc**
Th	45 °C	**Desired hot water temperature (mixing valve temperature).**

Max. operating press. - collector side	340	kPa	Max. operating press. - tank side	1.000	kPa

Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6077 DE3, 6077 F3, 6078 DE3
Date of test report	2015-12-22
Test method	ISO 9459-5 (DST)

Comments of test lab

No comments

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Version 3.6, 2014-06-18

Summary of	EN12976-2	test results	Certification No.	OEM 9915/5
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Street	OSSAS 4		E-mail	info@sol-violaris.com	
Postal Code	15344	GERAKAS	Tel. / Fax	+30	210 6613143

System family overview

For each storage and collector size, give number of collectors

Collector name	SOL-Violaris 120	SOL-Violaris 150	SOL-Violaris 170	SOL-Violaris 200	SOL-Violaris 250	SOL-Violaris 300
ENERGY+EVO 15	1	2	2	2	2	
ENERGY+EVO 17	1					
ENERGY+EVO 19			1			
ENERGY+EVO 20		1		1 2		2
ENERGY+EVO 23		1				
ENERGY+EVO 25		1	1	1	1	
ENERGY+EVO 27				1		
ENERGY+EVO 29						2

Name of system configuration				Storage name	SOL-Violaris 150.1.25
Collector name	ENERGY+EVO 23	No. Collectors	1		

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff 110 l				Daily drawoff 140 l				Daily drawoff 170 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		6150	2699	0	44	7821	3009	0	38	9492	3217	0	34
WürzburgDE		5897	2781	0	47	7506	3248	0	43	9114	3437	0	38
Davos CH		6654	3910	0	59	8483	4478	0	53	10281	4699	0	46
Athens GR		4573	3500	0	77	5834	4194	0	72	7064	4667	0	66

Perf. indicators for the table above

Qd,sh	MJ/y	**Not relevant for solar domestic hot water system**
Qd	MJ/y	**Annual heat demand for domestic hot water**
QL	MJ/y	**Annual heat energy delivered by the solar system**
Qpar	MJ/y	**Annual parasitic energy: (electricity for pumps/controllers)**
$f_{sol}=Q_L/Q_d$	-	**Solar fraction**

Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR			
	G	1.157	1.230	1.684	1.736			
	Ta,ave	7,5	9,0	3,2	18,5			
	Tc,ave	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,ave	°C	**Annual average outdoor air temperature**
Tc,ave	°C	**Annual average mains cold water temp.**
ΔTc	K	**Seasonal variation of Tc**
Th	45 °C	**Desired hot water temperature (mixing valve temperature).**

Max. operating press. - collector side	340	kPa	Max. operating press. - tank side	1.000	kPa

Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6077 DE3, 6077 F3, 6078 DE3
Date of test report	2015-12-22
Test method	ISO 9459-5 (DST)

Comments of test lab

No comments

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

Version 3.6, 2014-06-18

Summary of	EN12976-2	test results	Certification No.	OEM 9915/5
Annex to Solar KEYMARK Certificate			Issued	2018-04-20

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Street	OSSAS 4		E-mail	info@sol-violaris.com	
Postal Code	15344	GERAKAS	Tel. / Fax	+30	210 6613143

System family overview

For each storage and collector size, give number of collectors

Collector name	SOL-Violaris 120	SOL-Violaris 150	SOL-Violaris 170	SOL-Violaris 200	SOL-Violaris 250	SOL-Violaris 300
ENERGY+EVO 15	1	2	2	2	2	
ENERGY+EVO 17	1					
ENERGY+EVO 19			1			
ENERGY+EVO 20		1		1 2		2
ENERGY+EVO 23		1				
ENERGY+EVO 25		1	1	1	1	
ENERGY+EVO 27				1		
ENERGY+EVO 29						2

Name of system configuration				Storage name	
Collector name	ENERGY+EVO 25	No. Collectors	1		SOL-Violaris 150.2.30

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff 110 l				Daily drawoff 140 l				Daily drawoff 170 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		6150	2860	0	47	7821	3217	0	41	9492	3469	0	37
WürzburgDE		5897	2923	0	50	7506	3437	0	46	9114	3658	0	40
Davos CH		6654	4194	0	63	8483	4825	0	57	10281	5109	0	50
Athens GR		4573	3627	0	79	5834	4352	0	75	7064	4888	0	69

Perf. indicators for the table above

Qd,sh	MJ/y	**Not relevant for solar domestic hot water system**
Qd	MJ/y	**Annual heat demand for domestic hot water**
QL	MJ/y	**Annual heat energy delivered by the solar system**
Qpar	MJ/y	**Annual parasitic energy: (electricity for pumps/controllers)**
$f_{sol}=Q_L/Q_d$	-	**Solar fraction**

Ref. conditions	Stockholm SE	Würzburg DE	Davos CH	Athens GR
G	1.157	1.230	1.684	1.736
Ta,ave	7,5	9,0	3,2	18,5
Tc,ave	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,ave	°C	**Annual average outdoor air temperature**
Tc,ave	°C	**Annual average mains cold water temp.**
ΔTc	K	**Seasonal variation of Tc**
Th	45 °C	**Desired hot water temperature (mixing valve temperature).**

Max. operating press. - collector side	340	kPa	Max. operating press. - tank side	1.000	kPa

Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6077 DE3, 6077 F3, 6078 DE3
Date of test report	2015-12-22
Test method	ISO 9459-5 (DST)

Comments of test lab

No comments

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Version 3.6, 2014-06-18

Summary of	EN12976-2	test results	Certification No.	OEM 9915/5
Annex to Solar KEYMARK Certificate			Issued	2018-04-20

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Postal Code	15344	GERAKAS	Tel. / Fax	+30 210 6613143

System family overview

For each storage and collector size, give number of collectors

Collector name	SOL-Violaris 120	SOL-Violaris 150	SOL-Violaris 170	SOL-Violaris 200	SOL-Violaris 250	SOL-Violaris 300
ENERGY+EVO 15	1	2	2	2	2	
ENERGY+EVO 17	1					
ENERGY+EVO 19			1			
ENERGY+EVO 20		1		1 2		2
ENERGY+EVO 23		1				
ENERGY+EVO 25		1	1	1	1	
ENERGY+EVO 27				1		
ENERGY+EVO 29						2

Name of system configuration				Storage name	
Collector name	ENERGY+EVO 15	No. Collectors	2		SOL-Violaris 150.2.40

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff 110 l				Daily drawoff 140 l				Daily drawoff 170 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		6150	3068	0	50	7821	3500	0	45	9492	3784	0	40
WürzburgDE		5897	3100	0	53	7506	3690	0	49	9114	4005	0	44
Davos CH		6654	4541	0	68	8483	5298	0	62	10281	5645	0	55
Athens GR		4573	3784	0	83	5834	4573	0	78	7064	5203	0	74

Perf. indicators for the table above

Qd,sh	MJ/y	**Not relevant for solar domestic hot water system**
Qd	MJ/y	**Annual heat demand for domestic hot water**
QL	MJ/y	**Annual heat energy delivered by the solar system**
Qpar	MJ/y	**Annual parasitic energy: (electricity for pumps/controllers)**
$f_{sol}=Q_L/Q_d$	-	**Solar fraction**

Ref. conditions	Stockholm SE	Würzburg DE	Davos CH	Athens GR
G	1.157	1.230	1.684	1.736
Ta,ave	7,5	9,0	3,2	18,5
Tc,ave	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,ave	°C	**Annual average outdoor air temperature**
Tc,ave	°C	**Annual average mains cold water temp.**
ΔTc	K	**Seasonal variation of Tc**
Th	45 °C	**Desired hot water temperature (mixing valve temperature).**

Max. operating press. - collector side	340	kPa	Max. operating press. - tank side	1.000	kPa

Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
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Test method	ISO 9459-5 (DST)

Comments of test lab

No comments

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Version 3.6, 2014-06-18

Summary of	EN12976-2	test results	Certification No.	OEM 9915/5
Annex to Solar KEYMARK Certificate			Issued	2018-04-20

Company	ANDREAS VIOLARIS ¨SOL¨		Country	Greece	
Brand (optional)	SOL-VIOLARIS		Website	www.sol-violaris.com	
Street	OSSAS 4		E-mail	info@sol-violaris.com	
Postal Code	15344	GERAKAS	Tel. / Fax	+30	210 6613143

System family overview

For each storage and collector size, give number of collectors

Collector name	SOL-Violaris 120	SOL-Violaris 150	SOL-Violaris 170	SOL-Violaris 200	SOL-Violaris 250	SOL-Violaris 300
ENERGY+EVO 15	1	2	2	2	2	
ENERGY+EVO 17	1					
ENERGY+EVO 19			1			
ENERGY+EVO 20		1		1 2		2
ENERGY+EVO 23		1				
ENERGY+EVO 25		1	1	1	1	
ENERGY+EVO 27				1		
ENERGY+EVO 29						2

Name of system configuration				Storage name	SOL-Violaris 170.1.25
Collector name	ENERGY+EVO 19	No. Collectors	1		

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff 110 l				Daily drawoff 140 l				Daily drawoff 170 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		6150	2526	0	41	7821	2819	0	36	9492	3031	0	32
WürzburgDE		5897	2617	0	44	7506	3034	0	40	9114	3343	0	37
Davos CH		6654	3627	0	55	8483	4131	0	49	10281	4510	0	44
Athens GR		4573	3374	0	74	5834	4005	0	69	7064	4541	0	64

Perf. indicators for the table above

Qd,sh	MJ/y	**Not relevant for solar domestic hot water system**
Qd	MJ/y	**Annual heat demand for domestic hot water**
QL	MJ/y	**Annual heat energy delivered by the solar system**
Qpar	MJ/y	**Annual parasitic energy: (electricity for pumps/controllers)**
$f_{sol}=Q_L/Q_d$	-	**Solar fraction**

Ref. conditions	Stockholm SE	Würzburg DE	Davos CH	Athens GR
G	1.157	1.230	1.684	1.736
Ta,ave	7,5	9,0	3,2	18,5
Tc,ave	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,ave	°C	**Annual average outdoor air temperature**
Tc,ave	°C	**Annual average mains cold water temp.**
ΔTc	K	**Seasonal variation of Tc**
Th	45 °C	**Desired hot water temperature (mixing valve temperature).**

Max. operating press. - collector side	340	kPa	Max. operating press. - tank side	1.000	kPa

Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6077 DE3, 6077 F3, 6078 DE3
Date of test report	2015-12-22
Test method	ISO 9459-5 (DST)

Comments of test lab

No comments

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

DQS HELLAS Ltd, Central Offices: Kalavriton 4, 145 64 kifisia, Athens, Tel: +301 6233493-4 , Fax: +301 6233495, http://www.dqshellas.gr, e-mail: ioannisalexiou@dqshellas.gr

Summary of	EN12976-2	test results	Certification No.	OEM 9915/5
Annex to Solar KEYMARK Certificate			Issued	2018-04-20

Company	ANDREAS VIOLARIS ¨SOL¨		Country	Greece	
Brand (optional)	SOL-VIOLARIS		Website	www.sol-violaris.com	
Street	OSSAS 4		E-mail	info@sol-violaris.com	
Postal Code	15344	GERAKAS	Tel. / Fax	+30	210 6613143

System family overview

For each storage and collector size, give number of collectors

Collector name	SOL-Violaris 120	SOL-Violaris 150	SOL-Violaris 170	SOL-Violaris 200	SOL-Violaris 250	SOL-Violaris 300
ENERGY+EVO 15	1	2	2	2	2	
ENERGY+EVO 17	1					
ENERGY+EVO 19			1			
ENERGY+EVO 20		1		1 2		2
ENERGY+EVO 23		1				
ENERGY+EVO 25		1	1	1	1	
ENERGY+EVO 27				1		
ENERGY+EVO 29						2

Name of system configuration					SOL-Violaris 170.2.30
Collector name	ENERGY+EVO 25	No. Collectors	1	Storage name	SOL-Violaris 170

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff 110 l				Daily drawoff 140 l				Daily drawoff 170 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		6150	2870	0	47	7821	3248	0	42	9492	3532	0	37
WürzburgDE		5897	2933	0	50	7506	3469	0	46	9114	3879	0	43
Davos CH		6654	4194	0	63	8483	4857	0	57	10281	5361	0	52
Athens GR		4573	3658	0	80	5834	4384	0	75	7064	5046	0	71

Perf. indicators for the table above

Qd,sh	MJ/y	**Not relevant for solar domestic hot water system**
Qd	MJ/y	**Annual heat demand for domestic hot water**
QL	MJ/y	**Annual heat energy delivered by the solar system**
Qpar	MJ/y	**Annual parasitic energy: (electricity for pumps/controllers)**
$f_{sol}=Q_L/Q_d$	-	**Solar fraction**

Ref. conditions	Stockholm SE	Würzburg DE	Davos CH	Athens GR
G	1.157	1.230	1.684	1.736
Ta,ave	7,5	9,0	3,2	18,5
Tc,ave	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,ave	°C	**Annual average outdoor air temperature**
Tc,ave	°C	**Annual average mains cold water temp.**
ΔTc	K	**Seasonal variation of Tc**
Th	45 °C	**Desired hot water temperature (mixing valve temperature).**

Max. operating press. - collector side	340	kPa	Max. operating press. - tank side	1.000	kPa

Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6077 DE3, 6077 F3, 6078 DE3
Date of test report	2015-12-22
Test method	ISO 9459-5 (DST)

Comments of test lab

No comments

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

Version 3.6, 2014-06-18

Summary of	EN12976-2	test results	Certification No.	OEM 9915/5
Annex to Solar KEYMARK Certificate			Issued	2018-04-20

Company	ANDREAS VIOLARIS ¨SOL¨		Country	Greece
Brand (optional)	SOL-VIOLARIS		Website	www.sol-violaris.com
Street	OSSAS 4		E-mail	info@sol-violaris.com
Postal Code	15344	GERAKAS	Tel. / Fax	+30 210 6613143

System family overview

For each storage and collector size, give number of collectors

Collector name	SOL-Violaris 120	SOL-Violaris 150	SOL-Violaris 170	SOL-Violaris 200	SOL-Violaris 250	SOL-Violaris 300
ENERGY+EVO 15	1	2	2	2	2	
ENERGY+EVO 17	1					
ENERGY+EVO 19			1			
ENERGY+EVO 20		1		1 2		2
ENERGY+EVO 23		1				
ENERGY+EVO 25		1	1	1	1	
ENERGY+EVO 27				1		
ENERGY+EVO 29						2

Name of system configuration				Storage name	
Collector name	ENERGY+EVO 15	No. Collectors	2		SOL-Violaris 170.2.40

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff 110 l				Daily drawoff 140 l				Daily drawoff 170 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		6150	3087	0	50	7821	3532	0	45	9492	3879	0	41
WürzburgDE		5897	3116	0	53	7506	3721	0	50	9114	4226	0	46
Davos CH		6654	4573	0	69	8483	5361	0	63	10281	5960	0	58
Athens GR		4573	3816	0	83	5834	4636	0	79	7064	5330	0	75

Perf. indicators for the table above

Qd,sh	MJ/y	**Not relevant for solar domestic hot water system**
Qd	MJ/y	**Annual heat demand for domestic hot water**
QL	MJ/y	**Annual heat energy delivered by the solar system**
Qpar	MJ/y	**Annual parasitic energy: (electricity for pumps/controllers)**
$f_{sol}=Q_L/Q_d$	-	**Solar fraction**

Ref. conditions	Stockholm SE	Würzburg DE	Davos CH	Athens GR
G	1.157	1.230	1.684	1.736
Ta,ave	7,5	9,0	3,2	18,5
Tc,ave	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,ave	°C	**Annual average outdoor air temperature**
Tc,ave	°C	**Annual average mains cold water temp.**
ΔTc	K	**Seasonal variation of Tc**
Th	45 °C	**Desired hot water temperature (mixing valve temperature).**

Max. operating press. - collector side	340	kPa	Max. operating press. - tank side	1.000	kPa

Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6077 DE3, 6077 F3, 6078 DE3
Date of test report	2015-12-22
Test method	ISO 9459-5 (DST)

Comments of test lab

No comments

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

Version 3.6, 2014-06-18

Summary of	EN12976-2	test results	Certification No.	OEM 9915/5
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Brand (optional)	SOL-VIOLARIS		Website	www.sol-violaris.com	
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Postal Code	15344	GERAKAS	Tel. / Fax	+30	210 6613143

System family overview

For each storage and collector size, give number of collectors

Collector name	SOL-Violaris 120	SOL-Violaris 150	SOL-Violaris 170	SOL-Violaris 200	SOL-Violaris 250	SOL-Violaris 300
ENERGY+EVO 15	1	2	2	2	2	
ENERGY+EVO 17	1					
ENERGY+EVO 19			1			
ENERGY+EVO 20		1		1 2		2
ENERGY+EVO 23		1				
ENERGY+EVO 25		1	1	1	1	
ENERGY+EVO 27				1		
ENERGY+EVO 29						2

Name of system configuration				Storage name	SOL-Violaris 200.1.25
Collector name	ENERGY+EVO 20	No. Collectors	1		

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff 170 l				Daily drawoff 200 l				Daily drawoff 250 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		9492	2999	0	32	11164	3150	0	28	13939	3406	0	24
WürzburgDE		9114	3280	0	36	10691	3532	0	33	13371	3658	0	27
Davos CH		10281	4415	0	43	12110	4730	0	39	15137	4857	0	32
Athens GR		7064	4478	0	63	8326	4951	0	59	10407	5203	0	50

Perf. indicators for the table above

Qd,sh	MJ/y	**Not relevant for solar domestic hot water system**
Qd	MJ/y	**Annual heat demand for domestic hot water**
QL	MJ/y	**Annual heat energy delivered by the solar system**
Qpar	MJ/y	**Annual parasitic energy: (electricity for pumps/controllers)**
$f_{sol}=Q_L/Q_d$	-	**Solar fraction**

Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR
	G	1.157	1.230	1.684	1.736
	Ta,ave	7,5	9,0	3,2	18,5
	Tc,ave	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,ave	°C	**Annual average outdoor air temperature**
Tc,ave	°C	**Annual average mains cold water temp.**
ΔTc	K	**Seasonal variation of Tc**
Th	45 °C	**Desired hot water temperature (mixing valve temperature).**

Max. operating press. - collector side	340	kPa	Max. operating press. - tank side	1.000	kPa

Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6077 DE3, 6077 F3, 6078 DE3
Date of test report	2015-12-22
Test method	ISO 9459-5 (DST)

Comments of test lab

No comments

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

Version 3.6, 2014-06-18

Summary of	EN12976-2	test results	Certification No.	OEM 9915/5
Annex to Solar KEYMARK Certificate			Issued	2018-04-20

Company	ANDREAS VIOLARIS ¨SOL¨		Country	Greece	
Brand (optional)	SOL-VIOLARIS		Website	www.sol-violaris.com	
Street	OSSAS 4		E-mail	info@sol-violaris.com	
Postal Code	15344	GERAKAS	Tel. / Fax	+30	210 6613143

System family overview

For each storage and collector size, give number of collectors

Collector name	SOL-Violaris 120	SOL-Violaris 150	SOL-Violaris 170	SOL-Violaris 200	SOL-Violaris 250	SOL-Violaris 300
ENERGY+EVO 15	1	2	2	2	2	
ENERGY+EVO 17	1					
ENERGY+EVO 19			1			
ENERGY+EVO 20		1		1 2		2
ENERGY+EVO 23		1				
ENERGY+EVO 25		1	1	1	1	
ENERGY+EVO 27				1		
ENERGY+EVO 29						2

Name of system configuration					
Collector name	ENERGY+EVO 25	No. Collectors	1	Storage name	SOL-Violaris 200

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff 170 l				Daily drawoff 200 l				Daily drawoff 250 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		9492	3469	0	37	11164	3690	0	33	13939	4005	0	29
WürzburgDE		9114	3784	0	42	10691	4131	0	39	13371	4289	0	32
Davos CH		10281	5203	0	51	12110	5613	0	46	15137	5803	0	38
Athens GR		7064	4983	0	71	8326	5519	0	66	10407	6023	0	58

Perf. indicators for the table above

Qd,sh	MJ/y	**Not relevant for solar domestic hot water system**
Qd	MJ/y	**Annual heat demand for domestic hot water**
QL	MJ/y	**Annual heat energy delivered by the solar system**
Qpar	MJ/y	**Annual parasitic energy: (electricity for pumps/controllers)**
$f_{sol}=Q_L/Q_d$	-	**Solar fraction**

Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR
	G	1.157	1.230	1.684	1.736
	Ta,ave	7,5	9,0	3,2	18,5
	Tc,ave	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,ave	°C	**Annual average outdoor air temperature**
Tc,ave	°C	**Annual average mains cold water temp.**
ΔTc	K	**Seasonal variation of Tc**
Th	45 °C	**Desired hot water temperature (mixing valve temperature).**

Max. operating press. - collector side	340	kPa	Max. operating press. - tank side	1.000	kPa

Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6077 DE3, 6077 F3, 6078 DE3
Date of test report	2015-12-22
Test method	ISO 9459-5 (DST)

Comments of test lab

No comments

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

Version 3.6, 2014-06-18

Summary of	EN12976-2	test results	Certification No.	OEM 9915/5
Annex to Solar KEYMARK Certificate			Issued	2018-04-20

Company	ANDREAS VIOLARIS ¨SOL¨		Country	Greece	
Brand (optional)	SOL-VIOLARIS		Website	www.sol-violaris.com	
Street	OSSAS 4		E-mail	info@sol-violaris.com	
Postal Code	15344	GERAKAS	Tel. / Fax	+30	210 6613143

System family overview

For each storage and collector size, give number of collectors

Collector name	SOL-Violaris 120	SOL-Violaris 150	SOL-Violaris 170	SOL-Violaris 200	SOL-Violaris 250	SOL-Violaris 300
ENERGY+EVO 15	1	2	2	2	2	
ENERGY+EVO 17	1					
ENERGY+EVO 19			1			
ENERGY+EVO 20		1		1 2		2
ENERGY+EVO 23		1				
ENERGY+EVO 25		1	1	1	1	
ENERGY+EVO 27				1		
ENERGY+EVO 29						2

Name of system configuration				Storage name	
Collector name	ENERGY+EVO 27	No. Collectors	1		SOL-Violaris 200.2.30

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff 170 l				Daily drawoff 200 l				Daily drawoff 250 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		9492	3595	0	38	11164	3816	0	34	13939	4163	0	30
WürzburgDE		9114	3910	0	43	10691	4289	0	40	13371	4478	0	33
Davos CH		10281	5424	0	53	12110	5834	0	48	15137	6023	0	40
Athens GR		7064	5077	0	72	8326	5676	0	68	10407	6213	0	60

Perf. indicators for the table above

Qd,sh	MJ/y	**Not relevant for solar domestic hot water system**
Qd	MJ/y	**Annual heat demand for domestic hot water**
QL	MJ/y	**Annual heat energy delivered by the solar system**
Qpar	MJ/y	**Annual parasitic energy: (electricity for pumps/controllers)**
$f_{sol}=Q_L/Q_d$	-	**Solar fraction**

Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR
	G	1.157	1.230	1.684	1.736
	Ta,ave	7,5	9,0	3,2	18,5
	Tc,ave	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,ave	°C	**Annual average outdoor air temperature**
Tc,ave	°C	**Annual average mains cold water temp.**
ΔTc	K	**Seasonal variation of Tc**
Th	45 °C	**Desired hot water temperature (mixing valve temperature).**

Max. operating press. - collector side	340	kPa	Max. operating press. - tank side	1.000	kPa

Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6077 DE3, 6077 F3, 6078 DE3
Date of test report	2015-12-22
Test method	ISO 9459-5 (DST)

Comments of test lab

No comments

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

Version 3.6, 2014-06-18

Summary of	EN12976-2	test results	Certification No.	OEM 9915/5
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Company	ANDREAS VIOLARIS ¨SOL¨		Country	Greece	
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Street	OSSAS 4		E-mail	info@sol-violaris.com	
Postal Code	15344	GERAKAS	Tel. / Fax	+30	210 6613143

System family overview

Collector name	For each storage and collector size, give number of collectors																							
	SOL-Violaris 120						SOL-Violaris 150						SOL-Violaris 170						SOL-Violaris 200						SOL-Violaris 250						SOL-Violaris 300					
ENERGY+EVO 15	1						2						2						2						2											
ENERGY+EVO 17	1																																			
ENERGY+EVO 19													1																							
ENERGY+EVO 20							1												1	2											2					
ENERGY+EVO 23							1																													
ENERGY+EVO 25							1						1						1						1											
ENERGY+EVO 27																			1																	
ENERGY+EVO 29																															2					

Name of system configuration			SOL-Violaris 200.2.40
Collector name	ENERGY+EVO 15	No. Collectors	2
Storage name			SOL-Violaris 200

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff				170 l				Daily drawoff				200 l				Daily drawoff				250 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol												
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%												
Stockholm SE		9492	3753	0	40	11164	3942	0	35	13939	4163	0	30												
WürzburgDE		9114	4037	0	44	10691	4289	0	40	13371	4447	0	33												
Davos CH		10281	5613	0	55	12110	5897	0	49	15137	6055	0	40												
Athens GR		7064	5172	0	73	8326	5676	0	68	10407	6181	0	59												

Perf. indicators for the table above

Qd,sh	MJ/y	**Not relevant for solar domestic hot water system**
Qd	MJ/y	**Annual heat demand for domestic hot water**
QL	MJ/y	**Annual heat energy delivered by the solar system**
Qpar	MJ/y	**Annual parasitic energy: (electricity for pumps/controllers)**
$f_{sol}=Q_L/Q_d$	-	**Solar fraction**

Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR
	G	1.157	1.230	1.684	1.736
	Ta,ave	7,5	9,0	3,2	18,5
	Tc,ave	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,ave	°C	**Annual average outdoor air temperature**
Tc,ave	°C	**Annual average mains cold water temp.**
ΔTc	K	**Seasonal variation of Tc**
Th	45 °C	**Desired hot water temperature (mixing valve temperature).**

Max. operating press. - collector side	340	kPa	Max. operating press. - tank side	1.000	kPa

Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6077 DE3, 6077 F3, 6078 DE3
Date of test report	2015-12-22
Test method	ISO 9459-5 (DST)

Comments of test lab

No comments

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

Version 3.6, 2014-06-18

Summary of	EN12976-2	test results	Certification No.	OEM 9915/5
Annex to Solar KEYMARK Certificate			Issued	2018-04-20

Company	ANDREAS VIOLARIS ¨SOL¨		Country	Greece	
Brand (optional)	SOL-VIOLARIS		Website	www.sol-violaris.com	
Street	OSSAS 4		E-mail	info@sol-violaris.com	
Postal Code	15344	GERAKAS	Tel. / Fax	+30	210 6613143

System family overview

For each storage and collector size, give number of collectors

Collector name	SOL-Violaris 120	SOL-Violaris 150	SOL-Violaris 170	SOL-Violaris 200	SOL-Violaris 250	SOL-Violaris 300
ENERGY+EVO 15	1	2	2	2	2	
ENERGY+EVO 17	1					
ENERGY+EVO 19			1			
ENERGY+EVO 20		1		1 **2**		2
ENERGY+EVO 23		1				
ENERGY+EVO 25		1	1	1	1	
ENERGY+EVO 27				1		
ENERGY+EVO 29						2

Name of system configuration					
Collector name	ENERGY+EVO 20	No. Collectors	2	Storage name	SOL-Violaris 200

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff 170 l				Daily drawoff 200 l				Daily drawoff 250 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		9492	4415	0	47	11164	4762	0	43	13939	5298	0	38
WürzburgDE		9114	4699	0	52	10691	5235	0	49	13371	5676	0	42
Davos CH		10281	6780	0	66	12110	7474	0	62	15137	7884	0	52
Athens GR		7064	5740	0	81	8326	6528	0	78	10407	7348	0	71

Perf. indicators for the table above

Qd,sh	MJ/y	**Not relevant for solar domestic hot water system**
Qd	MJ/y	**Annual heat demand for domestic hot water**
QL	MJ/y	**Annual heat energy delivered by the solar system**
Qpar	MJ/y	**Annual parasitic energy: (electricity for pumps/controllers)**
$f_{sol}=Q_L/Q_d$	-	**Solar fraction**

Ref. conditions	Stockholm SE	Würzburg DE	Davos CH	Athens GR
G	1.157	1.230	1.684	1.736
Ta,ave	7,5	9,0	3,2	18,5
Tc,ave	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,ave	°C	**Annual average outdoor air temperature**
Tc,ave	°C	**Annual average mains cold water temp.**
ΔTc	K	**Seasonal variation of Tc**
Th	45 °C	**Desired hot water temperature (mixing valve temperature).**

Max. operating press. - collector side	340	kPa	Max. operating press. - tank side	1.000	kPa

Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6077 DE3, 6077 F3, 6078 DE3
Date of test report	2015-12-22
Test method	ISO 9459-5 (DST)

Comments of test lab

No comments

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

Version 3.6, 2014-06-18

Summary of	EN12976-2	test results	Certification No.	OEM 9915/5
Annex to Solar KEYMARK Certificate			Issued	2018-04-20

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Postal Code	15344	GERAKAS	Tel. / Fax	+30	210 6613143

System family overview

For each storage and collector size, give number of collectors

Collector name	SOL-Violaris 120	SOL-Violaris 150	SOL-Violaris 170	SOL-Violaris 200	SOL-Violaris 250	SOL-Violaris 300
ENERGY+EVO 15	1	2	2	2	2	
ENERGY+EVO 17	1					
ENERGY+EVO 19			1			
ENERGY+EVO 20		1		1 2		2
ENERGY+EVO 23		1				
ENERGY+EVO 25		1	1	1	1	
ENERGY+EVO 27				1		
ENERGY+EVO 29						2

Name of system configuration				Storage name	SOL-Violaris 250.2.40
Collector name	ENERGY+EVO 25	No. Collectors	1		

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff 200 l				Daily drawoff 250 l				Daily drawoff 300 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		11164	3721	0	33	13939	4005	0	29	16746	4289	0	26
WürzburgDE		10691	4068	0	38	13371	4510	0	34	16052	4573	0	28
Davos CH		12110	5487	0	45	15137	6023	0	40	18165	6086	0	34
Athens GR		8326	5456	0	66	10407	6244	0	60	12488	6496	0	52

Perf. indicators for the table above

Qd,sh	MJ/y	**Not relevant for solar domestic hot water system**
Qd	MJ/y	**Annual heat demand for domestic hot water**
QL	MJ/y	**Annual heat energy delivered by the solar system**
Qpar	MJ/y	**Annual parasitic energy: (electricity for pumps/controllers)**
$f_{sol}=Q_L/Q_d$	-	**Solar fraction**

Ref. conditions	Stockholm SE	Würzburg DE	Davos CH	Athens GR
G	1.157	1.230	1.684	1.736
Ta,ave	7,5	9,0	3,2	18,5
Tc,ave	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,ave	°C	**Annual average outdoor air temperature**
Tc,ave	°C	**Annual average mains cold water temp.**
ΔTc	K	**Seasonal variation of Tc**
Th	45 °C	**Desired hot water temperature (mixing valve temperature).**

Max. operating press. - collector side	340	kPa	Max. operating press. - tank side	1.000	kPa

Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6077 DE3, 6077 F3, 6078 DE3
Date of test report	2015-12-22
Test method	ISO 9459-5 (DST)

Comments of test lab

No comments

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Version 3.6, 2014-06-18

Summary of	EN12976-2	test results	Certification No.	OEM 9915/5
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Postal Code	15344	GERAKAS	Tel. / Fax	+30	210 6613143

System family overview

For each storage and collector size, give number of collectors

Collector name	SOL-Violaris 120	SOL-Violaris 150	SOL-Violaris 170	SOL-Violaris 200	SOL-Violaris 250	SOL-Violaris 300
ENERGY+EVO 15	1	2	2	2	2	
ENERGY+EVO 17	1					
ENERGY+EVO 19			1			
ENERGY+EVO 20		1		1 2		2
ENERGY+EVO 23		1				
ENERGY+EVO 25		1	1	1	1	
ENERGY+EVO 27				1		
ENERGY+EVO 29						2

Name of system configuration				Storage name	
	SOL-Violaris 250.2.50				
Collector name	ENERGY+EVO 15	No. Collectors	2		SOL-Violaris 250

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff 200 l				Daily drawoff 250 l				Daily drawoff 300 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		11164	4163	0	37	13939	4478	0	32	16746	4825	0	29
WürzburgDE		10691	4510	0	42	13371	5046	0	38	16052	5140	0	32
Davos CH		12110	6181	0	51	15137	6843	0	45	18165	6938	0	38
Athens GR		8326	5897	0	71	10407	6780	0	65	12488	7222	0	58

Perf. indicators for the table above		
Qd,sh	MJ/y	**Not relevant for solar domestic hot water system**
Qd	MJ/y	**Annual heat demand for domestic hot water**
QL	MJ/y	**Annual heat energy delivered by the solar system**
Qpar	MJ/y	**Annual parasitic energy: (electricity for pumps/controllers)**
$f_{sol}=Q_L/Q_d$	-	**Solar fraction**

Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR
	G	1.157	1.230	1.684	1.736
	Ta,ave	7,5	9,0	3,2	18,5
	Tc,ave	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,ave	°C	**Annual average outdoor air temperature**
Tc,ave	°C	**Annual average mains cold water temp.**
ΔTc	K	**Seasonal variation of Tc**
Th	45 °C	**Desired hot water temperature (mixing valve temperature).**

Max. operating press. - collector side	340	kPa	Max. operating press. - tank side	1.000	kPa

Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6077 DE3, 6077 F3, 6078 DE3
Date of test report	2015-12-22
Test method	ISO 9459-5 (DST)

Comments of test lab

No comments

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System family overview

For each storage and collector size, give number of collectors

Collector name	SOL-Violaris 120	SOL-Violaris 150	SOL-Violaris 170	SOL-Violaris 200	SOL-Violaris 250	SOL-Violaris 300
ENERGY+EVO 15	1	2	2	2	2	
ENERGY+EVO 17	1					
ENERGY+EVO 19			1			
ENERGY+EVO 20		1		1 2		2
ENERGY+EVO 23		1				
ENERGY+EVO 25		1	1	1	1	
ENERGY+EVO 27				1		
ENERGY+EVO 29						2

Name of system configuration				Storage name	
Collector name	ENERGY+EVO 20	No. Collectors	2		SOL-Violaris 300.2.40

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff 250 l				Daily drawoff 300 l				Daily drawoff 400 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		13939	5393	0	39	16746	5897	0	35	22327	6654	0	30
WürzburgDE		13371	5960	0	45	16052	6559	0	41	21413	7001	0	33
Davos CH		15137	8294	0	55	18165	8988	0	49	24220	9429	0	39
Athens GR		10407	7663	0	74	12488	8641	0	69	16651	9587	0	58

Perf. indicators for the table above

Qd,sh	MJ/y	**Not relevant for solar domestic hot water system**
Qd	MJ/y	**Annual heat demand for domestic hot water**
QL	MJ/y	**Annual heat energy delivered by the solar system**
Qpar	MJ/y	**Annual parasitic energy: (electricity for pumps/controllers)**
$f_{sol}=Q_L/Q_d$	-	**Solar fraction**

Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR
	G	1.157	1.230	1.684	1.736
	Ta,ave	7,5	9,0	3,2	18,5
	Tc,ave	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,ave	°C	**Annual average outdoor air temperature**
Tc,ave	°C	**Annual average mains cold water temp.**
ΔTc	K	**Seasonal variation of Tc**
Th	45 °C	**Desired hot water temperature (mixing valve temperature).**

Max. operating press. - collector side	340	kPa	Max. operating press. - tank side	1.000	kPa

Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
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Date of test report	2015-12-22
Test method	ISO 9459-5 (DST)

Comments of test lab

No comments

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System family overview

For each storage and collector size, give number of collectors

Collector name	SOL-Violaris 120	SOL-Violaris 150	SOL-Violaris 170	SOL-Violaris 200	SOL-Violaris 250	SOL-Violaris 300
ENERGY+EVO 15	1	2	2	2	2	
ENERGY+EVO 17	1					
ENERGY+EVO 19			1			
ENERGY+EVO 20		1		1 2		2
ENERGY+EVO 23		1				
ENERGY+EVO 25		1	1	1	1	
ENERGY+EVO 27				1		
ENERGY+EVO 29						2

Name of system configuration				Storage name	
Collector name	ENERGY+EVO 29	No. Collectors	2		SOL-Violaris 300.2.50

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh	Daily drawoff 250 l				Daily drawoff 300 l				Daily drawoff 400 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		13939	6559	0	47	16746	7316	0	44	22327	8389	0	38
WürzburgDE		13371	7001	0	52	16052	7884	0	49	21413	8799	0	41
Davos CH		15137	10218	0	68	18165	11290	0	62	24220	12173	0	50
Athens GR		10407	8546	0	82	12488	9839	0	79	16651	11384	0	68

Perf. indicators for the table above		
Qd,sh	MJ/y	**Not relevant for solar domestic hot water system**
Qd	MJ/y	**Annual heat demand for domestic hot water**
QL	MJ/y	**Annual heat energy delivered by the solar system**
Qpar	MJ/y	**Annual parasitic energy: (electricity for pumps/controllers)**
$f_{sol}=Q_L/Q_d$	-	**Solar fraction**

Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR
	G	1.157	1.230	1.684	1.736
	Ta,ave	7,5	9,0	3,2	18,5
	Tc,ave	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,ave	°C	**Annual average outdoor air temperature**
Tc,ave	°C	**Annual average mains cold water temp.**
ΔTc	K	**Seasonal variation of Tc**
Th	45 °C	**Desired hot water temperature (mixing valve temperature).**

Max. operating press. - collector side	340	kPa	Max. operating press. - tank side	1.000	kPa

Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
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Comments of test lab

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