

Summary of		EN12976-2	SOLAR SYSTEM test results		Licence Number		011-7S2775 A												
Annex to Solar KEYMARK Certificate					Issued		2017-06-26												
Company		Cirelius, Lda.			Country		Portugal												
Brand (optional)		--			Website		www.solius.pt												
Street		Rua Inocencio Osorio L. Gondim, 103; ZI Avintes			E-mail		info@solius.pt												
Postal Code		PT-4430-662 Avintes			Tel. / Fax		+35 1227843817												
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)					None														
If other auxiliary/internal back-up heating, please specify:					Optional internal back-up heating (not tested)														
Solar+supplementary OR Solar-only / Solar pre-heat					Solar only / Solar preheat														
Collector(s)					Heat store(s)														
Company		Cirelius, Lda.			Company		Cirelius, Lda.												
Keymark lic.no. if available		011-7S2744 F			Keymark lic.no. if available		--												
Collector name		Per module			Store name		Total nominal volume		Gross height	Gross width	Gross depth	Auxiliary heated volume	Electrical aux. heating power						
		Gross Area (Ag)	Gross length	Gross width															
		m²	mm	mm			litres	mm	mm	mm	litres	kW							
Solius SilverSol3		2.11	2037	1036	SL160		160	1055	580	580	--	--							
Solius SilverSol3 XL		2.52	2037	1235	SL200		200	1324	580	580	--	--							
					SL300		300	1764	580	580	--	--							
Solar loop controller					Solar loop fluid														
Keymark lic.no. if available		--			Recommended/required		Recommended												
Company		--			Company		--												
Name		--			Name		Water/Glycole												
Solar loop pump - power range		-- W to -- W			Freezing point		-- °C												
System family overview																			
Collector name		Number of collectors in each configuration for each store																	
		Store name																	
		SL160				SL200				SL300									
Solius SilverSol3		1					1	2				2							
Solius SilverSol3 XL			1					1											
Testing Laboratory					Institut für Solartechnik SPF, CH-8640 Rapperswil														
Website					www.spf.ch														
Test report id. number					S219QPEN; S220EN														
Date of test report					2017-06-14														
Comments of test lab					 INSTITUT FÜR SOLARTECHNIK 														
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Brand (optional)	--		Website	www.solius.pt									
Street	Rua Inocencio Osorio L. Gondim, 103; ZI Avintes		E-mail	info@solius.pt									
Postal Code	PT-4430-662	Avintes	Tel. / Fax	+35 1227843817									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	SL160	SL200	SL300										
Solius SilverSol3	1	1	2										
Solius SilverSol3 XL	1	1											
Name of system configuration													
Solius SilverSol3			Solius Ecolit 160L										
Collector name	Solius SilverSol3	No. Collectors	1	Storage name									
		SL160											
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff				Daily drawoff				Daily drawoff			
		140				170				200			
	Q _{d,hw}	Q _L	Q _{par}	f _{sol}	Q _{d,hw}	Q _L	Q _{par}	f _{sol}	Q _{d,hw}	Q _L	Q _{par}	f _{sol}	
	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	
Stockholm SE	--	7821	3386	--	43	9492	3664	--	39	11164	3829	--	34
WürzburgDE	--	7506	3543	--	47	9114	3892	--	43	10691	4084	--	38
Davos CH	--	8483	4954	--	58	10281	5315	--	52	12110	5534	--	46
Athens GR	--	5834	4451	--	76	7064	5015	--	71	8326	5487	--	66
Perf. indicators for the table above													
Q _{d,sh}	MJ/y	Not relevant for solar domestic hot water system											
Q _d	MJ/y	Annual heat demand for domestic hot water											
Q _L	MJ/y	Annual heat energy delivered by the solar system											
Q _{par}	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								
	T _{a,ave}	7.5	9.0	3.2	18.5								
	T _{c,ave}	8.5	10.0	5.4	17.8								
	± ΔT _c	6.4	3.0	0.8	7.4								
G	kWh/m ²	Annual irradiation South, 45°											
T _{a,ave}	°C	Annual average outdoor air temperature											
T _{c,ave}	°C	Annual average mains cold water temp.											
ΔT _c	K	Seasonal variation of T _c											
T _h	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.spf.ch											
Test report id. number		S219QPEN; S220EN											
Date of test report		2017-06-14											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
The SPF test number for the system subtype Solius Ecolit 160L is S220 ST1. The annual performance for the system subtype was calculated according to the Specific CEN Keymark Scheme Rules for system families.													

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

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Street	Rua Inocencio Osorio L. Gondim, 103; ZI Avintes		E-mail	info@solius.pt									
Postal Code	PT-4430-662	Avintes	Tel. / Fax	+35 1227843817									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	SL160		SL200										
Solius SilverSol3	1	2	2										
Solius SilverSol3 XL	1	1											
Name of system configuration													
Solius SilverSol3 XL			Solius Ecokit 160XL										
Collector name	Solius SilverSol3 XL		No. Collectors	1									
			Storage name	SL160									
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff 140 l				Daily drawoff 170 l				Daily drawoff 200 l			
		Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	--	7821	3762	--	48	9492	4167	--	44	11164	4477	--	40
WürzburgDE	--	7506	3880	--	52	9114	4366	--	48	10691	4725	--	44
Davos CH	--	8483	5573	--	66	10281	6127	--	60	12110	6515	--	54
Athens GR	--	5834	4761	--	82	7064	5446	--	77	8326	6044	--	73
Perf. indicators for the table above													
Q_{d,sh}	MJ/y	Not relevant for solar domestic hot water system											
Q_d	MJ/y	Annual heat demand for domestic hot water											
Q_L	MJ/y	Annual heat energy delivered by the solar system											
Q_{par}	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								
	T_{a,ave}	7.5	9.0	3.2	18.5								
	T_{c,ave}	8.5	10.0	5.4	17.8								
	± ΔT_c	6.4	3.0	0.8	7.4								
G	kWh/m²	Annual irradiation South, 45°											
T_{a,ave}	°C	Annual average outdoor air temperature											
T_{c,ave}	°C	Annual average mains cold water temp.											
ΔT_c	K	Seasonal variation of T _c											
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.spf.ch											
Test report id. number		S219QPEN; S220EN											
Date of test report		2017-06-14											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
The SPF test number for the system subtype Solius Ecokit 160XL is S220 ST2. The annual performance for the system subtype was calculated according to the Specific CEN Keymark Scheme Rules for system families.													

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Brand (optional)	--		Website	www.solius.pt									
Street	Rua Inocencio Osorio L. Gondim, 103; ZI Avintes		E-mail	info@solius.pt									
Postal Code	PT-4430-662	Avintes	Tel. / Fax	+35 1227843817									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	SL160		SL200										
Solius SilverSol3	1	1	2	2									
Solius SilverSol3 XL	1	1											
Name of system configuration													
Solius SilverSol3			Solius Ecokit 200L										
Collector name	Solius SilverSol3		No. Collectors	1									
			Storage name	SL200									
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff 170 l				Daily drawoff 200 l				Daily drawoff 250 l			
		Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	--	9492	3626	--	38	11164	3851	--	35	13939	4056	--	29
WürzburgDE	--	9114	3855	--	42	10691	4105	--	38	13371	4359	--	33
Davos CH	--	10281	5223	--	51	12110	5522	--	46	15137	5813	--	38
Athens GR	--	7064	4980	--	71	8326	5503	--	66	10407	6088	--	59
Perf. indicators for the table above													
Q_{d,sh}	MJ/y	Not relevant for solar domestic hot water system											
Q_d	MJ/y	Annual heat demand for domestic hot water											
Q_L	MJ/y	Annual heat energy delivered by the solar system											
Q_{par}	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)											
f_{sol}=Q_L/Q_d	-	Solar fraction											
Ref. conditions	G	Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	T_{a,ave}	7.5	9.0	3.2	18.5								
	T_{c,ave}	8.5	10.0	5.4	17.8								
	± ΔT_c	6.4	3.0	0.8	7.4								
	G	kWh/m ²	Annual irradiation South, 45°										
T_{a,ave}	°C	Annual average outdoor air temperature											
T_{c,ave}	°C	Annual average mains cold water temp.											
ΔT_c	K	Seasonal variation of T _c											
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.spf.ch											
Test report id. number		S219QPEN; S220EN											
Date of test report		2017-06-14											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
The SPF test number for the system subtype Solius Ecokit 200L is S220 ST3. The annual performance for the system subtype was calculated according to the Specific CEN Keymark Scheme Rules for system families.													

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Postal Code	PT-4430-662	Avintes	Tel. / Fax	+35 1227843817									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	SL160		SL200										
Solius SilverSol3	1		1	2									
Solius SilverSol3 XL	1		1										
Name of system configuration													
Collector name			Storage name										
Solius SilverSol3 XL			Solius Ecolit 200XL										
No. Collectors			SL200										
1													
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff 170 l				Daily drawoff 200 l				Daily drawoff 250 l			
		Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	--	9492	4091	--	43	11164	4387	--	39	13939	4670	--	34
WürzburgDE	--	9114	4293	--	47	10691	4650	--	44	13371	5001	--	37
Davos CH	--	10281	5983	--	58	12110	6382	--	53	15137	6751	--	45
Athens GR	--	7064	5383	--	76	8326	5986	--	72	10407	6754	--	65
Perf. indicators for the table above													
Q_{d,sh}	MJ/y	Not relevant for solar domestic hot water system											
Q_d	MJ/y	Annual heat demand for domestic hot water											
Q_L	MJ/y	Annual heat energy delivered by the solar system											
Q_{par}	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)											
f_{sol}=Q_L/Q_d	-	Solar fraction											
Ref. conditions	G	Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	T_{a,ave}	7.5	9.0	3.2	18.5								
	T_{c,ave}	8.5	10.0	5.4	17.8								
	± ΔT_c	6.4	3.0	0.8	7.4								
	G	kWh/m ²	Annual irradiation South, 45°										
T_{a,ave}	°C	Annual average outdoor air temperature											
T_{c,ave}	°C	Annual average mains cold water temp.											
ΔT_c	K	Seasonal variation of T_c											
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.spf.ch											
Test report id. number		S219QPEN; S220EN											
Date of test report		2017-06-14											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
The SPF test number for the system subtype Solius Ecolit 200XL is S220 ST4. The annual performance for the system subtype was calculated according to the Specific CEN Keymark Scheme Rules for system families.													

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Street	Rua Inocencio Osorio L. Gondim, 103; ZI Avintes	E-mail	info@solius.pt
Postal Code	PT-4430-662 Avintes	Tel. / Fax	+35 1227843817

System family overview																
Collector name	For each storage and collector size, give number of collectors															
	SL160				SL200				SL300							
Solius SilverSol3	1				1	2			2							
Solius SilverSol3 XL		1				1										

Name of system configuration	Solius Ecokit 200XXL															
Collector name	Solius SilverSol3				No. Collectors				2				Storage name			
													SL200			

Calculated annual results for "solar-only / preheat system"																
Location	Qd,sh MJ/y	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	%			
Stockholm SE	--	9492	5192	--	55	11164	5749	--	52	13939	6384	--	46			
WürzburgDE	--	9114	5268	--	58	10691	5869	--	55	13371	6686	--	50			
Davos CH	--	10281	7793	--	76	12110	8622	--	71	15137	9582	--	63			
Athens GR	--	7064	6245	--	88	8326	7093	--	85	10407	8263	--	79			

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	300	kPa	Max. operating press. - tank side	1'000	kPa
Testing Laboratory	Institut für Solartechnik SPF, CH-8640 Rapperswil				
Website	www.spf.ch				
Test report id. number	S219QPEN; S220EN				
Date of test report	2017-06-14				
Test method	ISO 9459-5 (DST)				

Comments of test lab	The system Solius Ecokit 200XXL is the subtype with the highest ratio of collector aperture area to the total store volume. In accordance to the Keymark Scheme Rules for Solar Thermal Products, high temperature and safety tests were performed under SPF test number S219QPEN on this system.				
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Postal Code	PT-4430-662	Avintes	Tel. / Fax	+35 1227843817									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	SL160		SL200										
Solius SilverSol3	1		1	2									
Solius SilverSol3 XL	1		1										
Name of system configuration													
Solius SilverSol3			Solius Ecokit 300L										
Collector name	Solius SilverSol3		No. Collectors	2									
Storage name			SL300										
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	6760	--	49	16746	7335	--	44	22327	7882	--	35
WürzburgDE	--	13371	6940	--	52	16052	7641	--	48	21413	8330	--	39
Davos CH	--	15137	9915	--	66	18165	10645	--	59	24220	11238	--	46
Athens GR	--	10407	8481	--	82	12488	9529	--	76	16651	12073	--	73
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	G	Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	T_{a,ave}	7.5	9.0	3.2	18.5								
	T_{c,ave}	8.5	10.0	5.4	17.8								
	± ΔT_c	6.4	3.0	0.8	7.4								
	G	kWh/m ²	Annual irradiation South, 45°										
T_{a,ave}	°C	Annual average outdoor air temperature											
T_{c,ave}	°C	Annual average mains cold water temp.											
ΔT_c	K	Seasonal variation of T_c											
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.spf.ch											
Test report id. number		S219QPEN; S220EN											
Date of test report		2017-06-14											
Test method		ISO 9459-5 (DST)											
Comments of test lab		Solius Ecokit 300L was tested as the "medium" subtype under SPF Test Number S212.											