



CERTIFICATION LICENCE TO USE KEYMARK

Certificate No OEM 10026.3

DQS Hellas grants the present certificate to the enterprise:

REQA S.R.L.

Corso Beniamino Mastroiacovo 7/C-D, 86029 Trivento (CB), Italy

for the product:

Solar Systems Family

**LOOP 120/1.95, LOOP 120/2.00, LOOP 150/2.00, LOOP 150/2.24, LOOP 150/2.53,
LOOP 170/2.00, LOOP 170/2.24, LOOP 170/2.53, LOOP 170/3.00, LOOP 200/2.00,
LOOP 200/2.53, LOOP 200/3.00, LOOP 200/4.00, LOOP 250/3.00, LOOP 250/4.00,
LOOP 250/4.48, LOOP 300/3.00, LOOP 300/4.00, LOOP 300/4.48**

which is produced in conformity with the normative document:

EN 12976-1:2017

EN 12976-2:2017

EN 12975-1:2006

ISO 9806:2013

at the following location:

Dervenochoria

32200 Viotia



E 31



The present certificate is granted in accordance with:

- *the DQS Hellas General Rules for the Certification of Products,*
- *the Specific Rule for Certification EKIII.001 «Specific Rule for Certification of Solar Collectors, and Thermal Solar Heating Systems for Domestic Hot Water»,*
- *the Specific CEN Keymark Scheme Rules for Solar Thermal Products,*

and is ruled by the terms of the relevant contract between DQS Hellas and the enterprise.

Date of issue: **2023-09-12**

Date of valid: **2024-09-20**

Ioannis Alexiou
Head of Products Certification

Panagiotis Giannoutsos
Director of Certification



Summary of	EN12976-2	SOLAR SYSTEM test results	Licence Number	OEM 10026.3
Annex to Solar KEYMARK Certificate			Issued	2023-09-12
Company	REQA S.R.L.		Country	Italy
Brand (optional)			Website	www.reqa.it
Street	Corso Beniamino Mastroiacovo 7/C-D		E-mail	amministrazione@reqa.it
Postal Code	86029	Trivento (CB)	Tel. / Fax	+39 0874 189 6895

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:	
Solar+supplementary OR Solar-only / Solar pre-heat	Solar only / Solar preheat

Collector(s)				Heat store(s)						
Company	REQA S.R.L.			Company	REQA S.R.L.					
Keymark lic.no. if available	OEM 10003.4			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							
	m ²	mm	mm		litres	mm	mm	mm	litres	kW
BASIC 155	1,51	1501	1009	LOOP 120	112	1120	500	-	~	~
BASIC 195	1,95	1500	1300	LOOP 150	140	1270	500	-	~	~
BASIC 200	2,00	2000	1000	LOOP 170	160	1200	580	-	~	~
BASIC 224	2,24	1900	1180	LOOP 200	189	1270	580	-	~	~
BASIC 253	2,53	2009	1258	LOOP 250	245	1700	580	-	~	~
				LOOP 300	295	1930	580	-	~	~

Solar loop controller		Solar loop fluid	
Keymark lic.no. if available		Recommended/required	Required
Company		Company	-
Name		Name	-
Solar loop pump - power range	W to W	Freezing point	-4 to -36 °C

System family overview																													
Collector name	Number of collectors in each configuration for each store																												
	Store name																												
	LOOP 120					LOOP 150					LOOP 170					LOOP 200					LOOP 250					LOOP 300			
BASIC 155											2					2					2								
BASIC 195	1																												
BASIC 200	1					1					1					1	2				2			2					
BASIC 224						1					1					1					2			2					
BASIC 253						1					1					1							2	3					

Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6102 DE1, 6103 DE1, 6103 F2
Date of test report	4/2/2019, 4/2/2019, 20/2/2019

Comments of test lab	
	Stamp & signature of test lab



Summary of	EN12976-2	test results	Certification No.	OEM 10026.3	
Annex to Solar KEYMARK Certificate			Issued	2023-09-12	
Company	REQA S.R.L.		Country	Italy	
Brand (optional)	0		Website	www.reqa.it	
Street	Corso Beniamino Mastroiacovo 7/C-D		E-mail	amministrazione@reqa.it	
Postal Code	86029	Trivento (CB)	Tel. / Fax	+39	0874 189 6895

System family overview																								
For each storage and collector size, give number of collectors																								
Collector name	LOOP 120				LOOP 150				LOOP 170				LOOP 200				LOOP 250				LOOP 300			
BASIC 155									2				2				2				2			
BASIC 195	1																							
BASIC 200	1				1				1				1	2			2				2			
BASIC 224					1				1				1				2				2			
BASIC 253					1				1				1								2	3		

Name of system configuration			LOOP 120/1.95		
Collector name	BASIC 195	No. Collectors	1	Storage name	LOOP 120

Calculated annual results for "solar-only / preheat system"													
Location	Q _{d,sh} MJ/y	Daily drawoff 80 l				Daily drawoff 110 l				Daily drawoff 140 l			
		Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %
Stockholm SE	-	4478	2580	0	58	6150	3248	0	53	7821	3658	0	47
Würzburg DE	-	4289	2576	0	60	5897	3280	0	56	7506	3784	0	50
Davos CH	-	4857	3847	0	79	6654	4793	0	72	8483	5361	0	63
Athens GR	-	3343	2999	0	90	4573	3910	0	86	5834	4636	0	79

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
Th	45 °C	Desired hot water temperature (mixing valve temperature).

Max. operating press. - collector side		200	kPa	Max. operating press. - tank side		800	kPa
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Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6102 DE1, 6103 DE1, 6103 F2
Date of test report	4/2/2019, 4/2/2019, 20/2/2019
Test method	ISO 9459-5 (DST)

Comments of test lab	Stamp & signature of test lab
Extrapolated Results	



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Postal Code	86029	Trivento (CB)	Tel. / Fax	+39 0874 189 6895

System family overview

Collector name	For each storage and collector size, give number of collectors																									
	LOOP 120				LOOP 150				LOOP 170				LOOP 200				LOOP 250				LOOP 300					
BASIC 155									2					2				2					2			
BASIC 195	1																									
BASIC 200	1					1				1				1	2				2					2		
BASIC 224						1				1				1					2					2		
BASIC 253						1				1				1									2	3		

Name of system configuration	LOOP 120/2.00				
Collector name	BASIC 200	No. Collectors	1	Storage name	LOOP 120

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

Location	Q _{d,sh} MJ/y	Daily drawoff 80 l				Daily drawoff 110 l				Daily drawoff 140 l			
		Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %
Stockholm SE	-	4478	2595	0	58	6150	3280	0	53	7821	3690	0	47
Würzburg DE	-	4289	2586	0	60	5897	3311	0	56	7506	3784	0	50
Davos CH	-	4857	3847	0	79	6654	4825	0	73	8483	5424	0	64
Athens GR	-	3343	3009	0	90	4573	3942	0	86	5834	4667	0	80

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
Th	45 °C	Desired hot water temperature (mixing valve temperature).

Max. operating press. - collector side	200	kPa	Max. operating press. - tank side	800	kPa
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System family overview

Collector name	For each storage and collector size, give number of collectors																							
	LOOP 120				LOOP 150				LOOP 170				LOOP 200				LOOP 250				LOOP 300			
BASIC 155									2				2				2				2			
BASIC 195	1																							
BASIC 200	1				1				1				1	2			2				2			
BASIC 224					1				1				1				2				2			
BASIC 253					1				1				1								2	3		

Name of system configuration				LOOP 150/2.00			
Collector name	BASIC 200	No. Collectors	1	Storage name	LOOP 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	3248	0	53		7821	3784	0	48		9492	4100	0	43	
Würzburg DE	-	5897	3280	0	56		7506	3879	0	52		9114	4257	0	47	
Davos CH	-	6654	4825	0	73		8483	5550	0	65		10281	5929	0	58	
Athens GR	-	4573	3942	0	86		5834	4730	0	81		7064	5361	0	76	

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/m ²	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	200	kPa	Max. operating press. - tank side	800	kPa
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Test method	ISO 9459-5 (DST)

Comments of test lab	Stamp & signature of test lab
Extrapolated Results	

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

Version 4.5, 2017-10-24



Summary of	EN12976-2	test results	Certification No.	OEM 10026.3
Annex to Solar KEYMARK Certificate			Issued	2023-09-12
Company	REQA S.R.L.		Country	Italy
Brand (optional)	0		Website	www.reqa.it
Street	Corso Beniamino Mastroiacovo 7/C-D		E-mail	amministrazione@reqa.it
Postal Code	86029	Trivento (CB)	Tel. / Fax	+39 0874 189 6895

System family overview

Collector name	For each storage and collector size, give number of collectors																							
	LOOP 120				LOOP 150				LOOP 170				LOOP 200				LOOP 250				LOOP 300			
BASIC 155									2				2				2				2			
BASIC 195	1																							
BASIC 200	1				1				1				1	2			2				2			
BASIC 224					1				1				1				2				2			
BASIC 253					1				1				1								2	3		

Name of system configuration	LOOP 150/2.24																							
Collector name	BASIC 224				No. Collectors				1				Storage name				LOOP 150							

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

Location	Q _{d,sh} MJ/y	Daily drawoff 110 l				Daily drawoff 140 l				Daily drawoff 170 l			
		Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %
Stockholm SE	-	6150	3406	0	55	7821	3974	0	51	9492	4384	0	46
Würzburg DE	-	5897	3406	0	58	7506	4068	0	54	9114	4510	0	49
Davos CH	-	6654	5046	0	76	8483	5897	0	70	10281	6402	0	62
Athens GR	-	4573	4037	0	88	5834	4888	0	84	7064	5582	0	79

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
Th	45 °C	Desired hot water temperature (mixing valve temperature).

Max. operating press. - collector side	200	kPa	Max. operating press. - tank side	800	kPa
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Comments of test lab	Stamp & signature of test lab
Extrapolated Results	



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Brand (optional)	0		Website	www.reqa.it
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Postal Code	86029	Trivento (CB)	Tel. / Fax	+39 0874 189 6895

System family overview

For each storage and collector size, give number of collectors

Collector name	LOOP 120	LOOP 150	LOOP 170	LOOP 200	LOOP 250	LOOP 300
BASIC 155			2	2	2	2
BASIC 195	1					
BASIC 200	1	1	1	1 2	2	2
BASIC 224		1	1	1	2	2
BASIC 253		1	1	1		2 3

Name of system configuration	LOOP 150/2.53				
Collector name	BASIC 253	No. Collectors	1	Storage name	LOOP 150

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

Location	Q _{d,sh} MJ/y	Daily drawoff 110 l					Daily drawoff 140 l					Daily drawoff 170 l				
		Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %		Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %		Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	
Stockholm SE	-	6150	3564	0	58		7821	4194	0	54		9492	4636	0	49	
Würzburg DE	-	5897	3532	0	60		7506	4226	0	56		9114	4762	0	52	
Davos CH	-	6654	5298	0	80		8483	6244	0	74		10281	6843	0	67	
Athens GR	-	4573	4131	0	90		5834	5046	0	86		7064	5771	0	82	

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					
Th	45 °C	Desired hot water temperature (mixing valve temperature).					

Max. operating press. - collector side	200	kPa	Max. operating press. - tank side	800	kPa
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Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
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Test method	ISO 9459-5 (DST)

Comments of test lab	Stamp & signature of test lab
Extrapolated Results	

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

Version 4.5, 2017-10-24



Summary of		EN12976-2	test results		Certification No.		OEM 10026.3						
Annex to Solar KEYMARK Certificate					Issued		2023-09-12						
Company		REQA S.R.L.			Country		Italy						
Brand (optional)		0			Website		www.reqa.it						
Street		Corso Beniamino Mastroiacovo 7/C-D			E-mail		amministrazione@reqa.it						
Postal Code		86029 Trivento (CB)			Tel. / Fax		+39 0874 189 6895						
System family overview													
For each storage and collector size, give number of collectors													
Collector name	LOOP 120		LOOP 150		LOOP 170		LOOP 200		LOOP 250		LOOP 300		
BASIC 155						2		2		2		2	
BASIC 195	1												
BASIC 200	1			1		1		1	2	2		2	
BASIC 224				1		1		1		2		2	
BASIC 253				1		1		1				2	
												3	
Name of system configuration									LOOP 170/2.00				
Collector name		BASIC 200		No. Collectors		1		Storage name		LOOP 170			
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh} MJ/y	Daily drawoff				Daily drawoff				Daily drawoff			
		Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %
Stockholm SE	-	7821	3753	0	48	9492	4131	0	44	11164	4352	0	39
Würzburg DE	-	7506	3847	0	51	9114	4320	0	47	10691	4573	0	43
Davos CH	-	8483	5487	0	65	10281	5992	0	58	12110	6213	0	51
Athens GR	-	5834	4730	0	81	7064	5393	0	76	8326	5897	0	71
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		200 kPa		Max. operating press. - tank side		800 kPa							
Testing Laboratory		NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB											
Website		www.solar.demokritos.gr											
Test report id. number		6102 DE1, 6103 DE1, 6103 F2											
Date of test report		4/2/2019, 4/2/2019, 20/2/2019											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
Extrapolated Results													
Stamp & signature of test lab													



Summary of		EN12976-2		test results		Certification No.		OEM 10026.3					
Annex to Solar KEYMARK Certificate						Issued		2023-09-12					
Company		REQA S.R.L.				Country		Italy					
Brand (optional)		0				Website		www.reqa.it					
Street		Corso Beniamino Mastroiacovo 7/C-D				E-mail		amministrazione@reqa.it					
Postal Code		86029		Trivento (CB)		Tel. / Fax		+39 0874 189 6895					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	LOOP 120		LOOP 150		LOOP 170		LOOP 200		LOOP 250				
BASIC 155						2		2					
BASIC 195	1												
BASIC 200	1			1		1	2		2				
BASIC 224				1		1			2				
BASIC 253				1		1				2 3			
Name of system configuration													
						LOOP 170/2.24							
Collector name		BASIC 224		No. Collectors		1		Storage name		LOOP 170			
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh} MJ/y	Daily drawoff 140 l				Daily drawoff 170 l				Daily drawoff 200 l			
		Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %	Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %	Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %
Stockholm SE	-	7821	3974	0	51	9492	4415	0	47	11164	4667	0	42
Würzburg DE	-	7506	4037	0	54	9114	4573	0	50	10691	4888	0	46
Davos CH	-	8483	5866	0	69	10281	6465	0	63	12110	6749	0	56
Athens GR	-	5834	4888	0	84	7064	5613	0	79	8326	6181	0	74
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}	°C	7,5	9,0	3,2	18,5								
T _{c,ave}	°C	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		200		kPa		Max. operating press. - tank side		800		kPa			
Testing Laboratory		NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB											
Website		www.solar.demokritos.gr											
Test report id. number		6102 DE1, 6103 DE1, 6103 F2											
Date of test report		4/2/2019, 4/2/2019, 20/2/2019											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
Extrapolated Results													

Stamp & signature of test lab



Summary of	EN12976-2	test results	Certification No.	OEM 10026.3
Annex to Solar KEYMARK Certificate			Issued	2023-09-12
Company	REQA S.R.L.		Country	Italy
Brand (optional)	0		Website	www.reqa.it
Street	Corso Beniamino Mastroiacovo 7/C-D		E-mail	amministrazione@reqa.it
Postal Code	86029	Trivento (CB)	Tel. / Fax	+39 0874 189 6895

System family overview

Collector name	For each storage and collector size, give number of collectors																							
	LOOP 120				LOOP 150				LOOP 170				LOOP 200				LOOP 250				LOOP 300			
BASIC 155									2				2				2				2			
BASIC 195	1																							
BASIC 200	1				1				1				1	2			2				2			
BASIC 224					1				1				1				2				2			
BASIC 253					1				1				1								2	3		

Name of system configuration			LOOP 170/2.53		
Collector name	BASIC 253	No. Collectors	1	Storage name	LOOP 170

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

Location	Q _{d,sh} MJ/y	Daily drawoff 140 l				Daily drawoff 170 l				Daily drawoff 200 l			
		Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %
Stockholm SE	-	7821	4289	0	55	9492	4793	0	50	11164	5140	0	46
Würzburg DE	-	7506	4352	0	58	9114	4951	0	54	10691	5330	0	50
Davos CH	-	8483	6402	0	75	10281	7127	0	69	12110	7506	0	62
Athens GR	-	5834	5109	0	88	7064	5897	0	83	8326	6559	0	79

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	200	kPa	Max. operating press. - tank side	800	kPa
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Testing Laboratory	NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6102 DE1, 6103 DE1, 6103 F2
Date of test report	4/2/2019, 4/2/2019, 20/2/2019
Test method	ISO 9459-5 (DST)

Comments of test lab	

Stamp & signature of test lab



Summary of		EN12976-2		test results		Certification No.		OEM 10026.3						
Annex to Solar KEYMARK Certificate						Issued		2023-09-12						
Company		REQA S.R.L.				Country		Italy						
Brand (optional)		0				Website		www.reqa.it						
Street		Corso Beniamino Mastroiacovo 7/C-D				E-mail		amministrazione@reqa.it						
Postal Code		86029		Trivento (CB)		Tel. / Fax		+39 0874 189 6895						
System family overview														
For each storage and collector size, give number of collectors														
Collector name		LOOP 120		LOOP 150		LOOP 170		LOOP 200		LOOP 250		LOOP 300		
BASIC 155						2		2				2		
BASIC 195		1												
BASIC 200		1		1		1		1 2		2		2		
BASIC 224				1		1		1		2		2		
BASIC 253				1		1		1				2 3		
Name of system configuration										LOOP 170/3.00				
Collector name		BASIC 155		No. Collectors		2		Storage name				LOOP 170		
Calculated annual results for "solar-only / preheat system"														
Location		Q_{d,sh} MJ/y	Daily drawoff 140 l				Daily drawoff 170 l				Daily drawoff 200 l			
			Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %	Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %	Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %
Stockholm SE		-	7821	4478	0	57	9492	5077	0	53	11164	5487	0	49
Würzburg DE		-	7506	4478	0	60	9114	5140	0	56	10691	5645	0	53
Davos CH		-	8483	6654	0	78	10281	7537	0	73	12110	8105	0	67
Athens GR		-	5834	5203	0	89	7064	6086	0	86	8326	6812	0	82
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			200 kPa		Max. operating press. - tank side			800 kPa						
Testing Laboratory			NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB											
Website			www.solar.demokritos.gr											
Test report id. number			6102 DE1, 6103 DE1, 6103 F2											
Date of test report			4/2/2019, 4/2/2019, 20/2/2019											
Test method			ISO 9459-5 (DST)											
Comments of test lab														
Extrapolated Results														
Stamp & signature of test lab														



Summary of	EN12976-2	test results	Certification No.	OEM 10026.3
Annex to Solar KEYMARK Certificate			Issued	2023-09-12
Company	REQA S.R.L.		Country	Italy
Brand (optional)	0		Website	www.reqa.it
Street	Corso Beniamino Mastroiacovo 7/C-D		E-mail	amministrazione@reqa.it
Postal Code	86029	Trivento (CB)	Tel. / Fax	+39 0874 189 6895

System family overview

Collector name	For each storage and collector size, give number of collectors																							
	LOOP 120				LOOP 150				LOOP 170				LOOP 200				LOOP 250				LOOP 300			
BASIC 155									2				2				2				2			
BASIC 195	1																							
BASIC 200	1				1				1				1	2			2				2			
BASIC 224					1				1				1				2				2			
BASIC 253					1				1				1								2	3		

Name of system configuration			LOOP 200/2.00		
Collector name	BASIC 200	No. Collectors	1	Storage name	LOOP 200

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

Location	Q _{d,sh} MJ/y	Daily drawoff 170 l				Daily drawoff 200 l				Daily drawoff 250 l			
		Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %
Stockholm SE	-	9492	4131	0	44	11164	4415	0	40	13939	4636	0	33
Würzburg DE	-	9114	4320	0	47	10691	4667	0	44	13371	4920	0	37
Davos CH	-	10281	5960	0	58	12110	6339	0	52	15137	6528	0	43
Athens GR	-	7064	5393	0	76	8326	5992	0	72	10407	6623	0	64

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	200	kPa	Max. operating press. - tank side	800	kPa
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Testing Laboratory	NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6102 DE1, 6103 DE1, 6103 F2
Date of test report	4/2/2019, 4/2/2019, 20/2/2019
Test method	ISO 9459-5 (DST)

Comments of test lab	Stamp & signature of test lab
Extrapolated Results	



Summary of	EN12976-2	test results	Certification No.	OEM 10026.3
Annex to Solar KEYMARK Certificate			Issued	2023-09-12
Company	REQA S.R.L.		Country	Italy
Brand (optional)	0		Website	www.reqa.it
Street	Corso Beniamino Mastroiacovo 7/C-D		E-mail	amministrazione@reqa.it
Postal Code	86029	Trivento (CB)	Tel. / Fax	+39 0874 189 6895

System family overview

Collector name	For each storage and collector size, give number of collectors																							
	LOOP 120				LOOP 150				LOOP 170				LOOP 200				LOOP 250				LOOP 300			
BASIC 155									2				2				2				2			
BASIC 195	1																							
BASIC 200	1				1				1				1	2			2				2			
BASIC 224					1				1				1				2				2			
BASIC 253					1				1				1								2	3		

Name of system configuration	LOOP 200/2.24																							
Collector name	BASIC 224				No. Collectors				1				Storage name				LOOP 200							

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

Location	Q _{d,sh} MJ/y	Daily drawoff 170 l				Daily drawoff 200 l				Daily drawoff 250 l			
		Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %
Stockholm SE	-	9492	4447	0	47	11164	4793	0	43	13939	5046	0	36
Würzburg DE	-	9114	4573	0	50	10691	4983	0	47	13371	5330	0	40
Davos CH	-	10281	6465	0	63	12110	6906	0	57	15137	7159	0	47
Athens GR	-	7064	5645	0	80	8326	6276	0	75	10407	7033	0	68

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	200	kPa	Max. operating press. - tank side	800	kPa
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Testing Laboratory	NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6102 DE1, 6103 DE1, 6103 F2
Date of test report	4/2/2019, 4/2/2019, 20/2/2019
Test method	ISO 9459-5 (DST)

Comments of test lab	Stamp & signature of test lab
Extrapolated Results	



Summary of	EN12976-2	test results	Certification No.	OEM 10026.3
Annex to Solar KEYMARK Certificate			Issued	2023-09-12
Company	REQA S.R.L.		Country	Italy
Brand (optional)	0		Website	www.reqa.it
Street	Corso Beniamino Mastroiacovo 7/C-D		E-mail	amministrazione@reqa.it
Postal Code	86029	Trivento (CB)	Tel. / Fax	+39 0874 189 6895

System family overview

Collector name	For each storage and collector size, give number of collectors																							
	LOOP 120				LOOP 150				LOOP 170				LOOP 200				LOOP 250				LOOP 300			
BASIC 155									2				2				2				2			
BASIC 195	1																							
BASIC 200	1				1				1				1	2			2				2			
BASIC 224					1				1				1				2				2			
BASIC 253					1				1				1								2	3		

Name of system configuration				LOOP 200/2.53		
Collector name	BASIC 253	No. Collectors	1	Storage name		LOOP 200

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

Location	Q _{d,sh}	Daily drawoff				I	Daily drawoff				I	Daily drawoff				I
		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	4730	0	50		11164	5140	0	46		13939	5487	0	39	
Würzburg DE	-	9114	4825	0	53		10691	5298	0	50		13371	5771	0	43	
Davos CH	-	10281	6938	0	67		12110	7506	0	62		15137	7884	0	52	
Athens GR	-	7064	5866	0	83		8326	6559	0	79		10407	7442	0	72	

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
Th	45 °C	Desired hot water temperature (mixing valve temperature).

Max. operating press. - collector side	200	kPa	Max. operating press. - tank side	800	kPa
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Testing Laboratory	NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6102 DE1, 6103 DE1, 6103 F2
Date of test report	4/2/2019, 4/2/2019, 20/2/2019
Test method	ISO 9459-5 (DST)

Comments of test lab	Stamp & signature of test lab
Extrapolated Results	



Summary of		EN12976-2		test results		Certification No.		OEM 10026.3						
Annex to Solar KEYMARK Certificate						Issued		2023-09-12						
Company		REQA S.R.L.				Country		Italy						
Brand (optional)		0				Website		www.reqa.it						
Street		Corso Beniamino Mastroiacovo 7/C-D				E-mail		amministrazione@reqa.it						
Postal Code		86029		Trivento (CB)		Tel. / Fax		+39 0874 189 6895						
System family overview														
For each storage and collector size, give number of collectors														
Collector name		LOOP 120		LOOP 150		LOOP 170		LOOP 200		LOOP 250		LOOP 300		
BASIC 155						2		2		2		2		
BASIC 195		1												
BASIC 200		1		1		1		1 2		2		2		
BASIC 224				1		1		1		2		2		
BASIC 253				1		1		1				2 3		
Name of system configuration										LOOP 200/3.00				
Collector name		BASIC 155		No. Collectors		2		Storage name				LOOP 200		
Calculated annual results for "solar-only / preheat system"														
Location		Q_{d,sh} MJ/y	Daily drawoff 170 l				Daily drawoff 200 l				Daily drawoff 250 l			
			Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %	Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %	Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %
Stockholm SE		-	9492	5109	0	54	11164	5645	0	51	13939	6150	0	44
Würzburg DE		-	9114	5172	0	57	10691	5771	0	54	13371	6402	0	48
Davos CH		-	10281	7600	0	74	12110	8326	0	69	15137	8956	0	59
Athens GR		-	7064	6118	0	87	8326	6938	0	83	10407	7979	0	77
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			200		kPa		Max. operating press. - tank side			800		kPa		
Testing Laboratory			NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB											
Website			www.solar.demokritos.gr											
Test report id. number			6102 DE1, 6103 DE1, 6103 F2											
Date of test report			4/2/2019, 4/2/2019, 20/2/2019											
Test method			ISO 9459-5 (DST)											
Comments of test lab														
Extrapolated Results														
Stamp & signature of test lab														



Summary of	EN12976-2	test results	Certification No.	OEM 10026.3
Annex to Solar KEYMARK Certificate			Issued	2023-09-12
Company	REQA S.R.L.		Country	Italy
Brand (optional)	0		Website	www.reqa.it
Street	Corso Beniamino Mastroiacovo 7/C-D		E-mail	amministrazione@reqa.it
Postal Code	86029	Trivento (CB)	Tel. / Fax	+39 0874 189 6895

System family overview

Collector name	For each storage and collector size, give number of collectors																												
	LOOP 120					LOOP 150					LOOP 170					LOOP 200					LOOP 250					LOOP 300			
BASIC 155											2					2					2								
BASIC 195	1																												
BASIC 200	1					1				1				1	2					2				2					
BASIC 224						1				1				1					2				2						
BASIC 253						1				1				1									2	3					

Name of system configuration	LOOP 200/4.00									
Collector name	BASIC 200	No. Collectors	2		Storage name	LOOP 200				

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

Location	Q _{d,sh} MJ/y	Daily drawoff 170 l				Daily drawoff 200 l				Daily drawoff 250 l			
		Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %
Stockholm SE	-	9492	5613	0	59	11164	6276	0	56	13939	7033	0	50
Würzburg DE	-	9114	5613	0	62	10691	6307	0	59	13371	7190	0	54
Davos CH	-	10281	8389	0	82	12110	9366	0	77	15137	10438	0	69
Athens GR	-	7064	6465	0	92	8326	7379	0	89	10407	8672	0	83

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
Th	45 °C	Desired hot water temperature (mixing valve temperature).

Max. operating press. - collector side	200	kPa	Max. operating press. - tank side	800	kPa
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Testing Laboratory	NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6102 DE1, 6103 DE1, 6103 F2
Date of test report	4/2/2019, 4/2/2019, 20/2/2019
Test method	ISO 9459-5 (DST)

Comments of test lab	Stamp & signature of test lab
Extrapolated Results	



Summary of		EN12976-2	test results		Certification No.		OEM 10026.3							
Annex to Solar KEYMARK Certificate					Issued		2023-09-12							
Company		REQA S.R.L.			Country		Italy							
Brand (optional)		0			Website		www.reqa.it							
Street		Corso Beniamino Mastroiacovo 7/C-D			E-mail		amministrazione@reqa.it							
Postal Code		86029	Trivento (CB)		Tel. / Fax		+39 0874 189 6895							
System family overview														
For each storage and collector size, give number of collectors														
Collector name	LOOP 120		LOOP 150		LOOP 170		LOOP 200		LOOP 250		LOOP 300			
BASIC 155						2		2		2				
BASIC 195	1													
BASIC 200	1			1		1		1	2	2		2		
BASIC 224				1		1		1		2		2		
BASIC 253				1		1		1				2	3	
Name of system configuration													LOOP 250/3.00	
Collector name		BASIC 155		No. Collectors		2		Storage name		LOOP 250				
Calculated annual results for "solar-only / preheat system"														
Location	Q_{d,sh} MJ/y	Daily drawoff 200 l				Daily drawoff 250 l				Daily drawoff 300 l				
		Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %	Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %	Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %	
Stockholm SE	-	11164	5613	0	50	13939	6339	0	45	16746	6717	0	40	
Würzburg DE	-	10691	5740	0	54	13371	6559	0	49	16052	7064	0	44	
Davos CH	-	12110	8262	0	68	15137	9209	0	61	18165	9650	0	53	
Athens GR	-	8326	6938	0	83	10407	8136	0	78	12488	9019	0	72	
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		200	kPa		Max. operating press. - tank side		800	kPa						
Testing Laboratory		NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB												
Website		www.solar.demokritos.gr												
Test report id. number		6102 DE1, 6103 DE1, 6103 F2												
Date of test report		4/2/2019, 4/2/2019, 20/2/2019												
Test method		ISO 9459-5 (DST)												
Comments of test lab														
Extrapolated Results														

Stamp & signature of test lab



Summary of		EN12976-2	test results		Certification No.		OEM 10026.3						
Annex to Solar KEYMARK Certificate					Issued		2023-09-12						
Company		REQA S.R.L.			Country		Italy						
Brand (optional)		0			Website		www.reqa.it						
Street		Corso Beniamino Mastroiacovo 7/C-D			E-mail		amministrazione@reqa.it						
Postal Code		86029	Trivento (CB)		Tel. / Fax		+39 0874 189 6895						
System family overview													
For each storage and collector size, give number of collectors													
Collector name	LOOP 120		LOOP 150		LOOP 170		LOOP 200		LOOP 250		LOOP 300		
BASIC 155						2		2		2		2	
BASIC 195	1												
BASIC 200	1			1		1		1	2	2		2	
BASIC 224				1		1		1		2		2	
BASIC 253				1		1		1				2	3
Name of system configuration													
										LOOP 250/4.00			
Collector name		BASIC 200		No. Collectors		2		Storage name		LOOP 250			
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh} MJ/y	Daily drawoff 200 l				Daily drawoff 250 l				Daily drawoff 300 l			
		Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %	Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %	Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %
Stockholm SE	-	11164	6307	0	56	13939	7285	0	52	16746	7916	0	47
Würzburg DE	-	10691	6339	0	59	13371	7411	0	55	16052	8168	0	51
Davos CH	-	12110	9398	0	78	15137	10785	0	71	18165	11637	0	64
Athens GR	-	8326	7411	0	89	10407	8830	0	85	12488	9997	0	80
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}	°C	7,5	9,0	3,2	18,5								
T _{c,ave}	°C	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		200	kPa	Max. operating press. - tank side		800	kPa						
Testing Laboratory		NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB											
Website		www.solar.demokritos.gr											
Test report id. number		6102 DE1, 6103 DE1, 6103 F2											
Date of test report		4/2/2019, 4/2/2019, 20/2/2019											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
Extrapolated Results													

Stamp & signature of test lab



Summary of		EN12976-2		test results		Certification No.		OEM 10026.3						
Annex to Solar KEYMARK Certificate						Issued		2023-09-12						
Company		REQA S.R.L.				Country		Italy						
Brand (optional)		0				Website		www.reqa.it						
Street		Corso Beniamino Mastroiacovo 7/C-D				E-mail		amministrazione@reqa.it						
Postal Code		86029		Trivento (CB)		Tel. / Fax		+39 0874 189 6895						
System family overview														
For each storage and collector size, give number of collectors														
Collector name		LOOP 120		LOOP 150		LOOP 170		LOOP 200		LOOP 250		LOOP 300		
BASIC 155						2		2		2		2		
BASIC 195		1												
BASIC 200		1		1		1		1 2		2		2		
BASIC 224				1		1		1		2		2		
BASIC 253				1		1		1				2 3		
Name of system configuration										LOOP 250/4.48				
Collector name		BASIC 224		No. Collectors		2		Storage name				LOOP 250		
Calculated annual results for "solar-only / preheat system"														
Location		Q_{d,sh} MJ/y	Daily drawoff 200 l				Daily drawoff 250 l				Daily drawoff 300 l			
			Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %	Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %	Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %
Stockholm SE		-	11164	6528	0	58	13939	7600	0	55	16746	8357	0	50
Würzburg DE		-	10691	6528	0	61	13371	7695	0	58	16052	8578	0	53
Davos CH		-	12110	9776	0	81	15137	11321	0	75	18165	12362	0	68
Athens GR		-	8326	7569	0	91	10407	9051	0	87	12488	10344	0	83
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		200		kPa		Max. operating press. - tank side		800		kPa				
Testing Laboratory		NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB												
Website		www.solar.demokritos.gr												
Test report id. number		6102 DE1, 6103 DE1, 6103 F2												
Date of test report		4/2/2019, 4/2/2019, 20/2/2019												
Test method		ISO 9459-5 (DST)												
Comments of test lab														
Extrapolated Results														

Stamp & signature of test lab



Summary of	EN12976-2	test results	Certification No.	OEM 10026.3
Annex to Solar KEYMARK Certificate			Issued	2023-09-12
Company	REQA S.R.L.		Country	Italy
Brand (optional)	0		Website	www.reqa.it
Street	Corso Beniamino Mastroiacovo 7/C-D		E-mail	amministrazione@reqa.it
Postal Code	86029	Trivento (CB)	Tel. / Fax	+39 0874 189 6895

System family overview

Collector name	For each storage and collector size, give number of collectors																							
	LOOP 120				LOOP 150				LOOP 170				LOOP 200				LOOP 250				LOOP 300			
BASIC 155									2				2				2				2			
BASIC 195	1																							
BASIC 200	1				1				1				1	2			2				2			
BASIC 224					1				1				1				2				2			
BASIC 253					1				1				1								2	3		

Name of system configuration	LOOP 300/3.00																							
Collector name	BASIC 155				No. Collectors				2				Storage name				LOOP 300							

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

Location	Q _{d,sh} MJ/y	Daily drawoff 250 l				Daily drawoff 300 l				Daily drawoff 400 l			
		Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %
Stockholm SE	-	13939	6244	0	45	16746	6749	0	40	22327	7127	0	32
Würzburg DE	-	13371	6465	0	48	16052	7096	0	44	21413	7569	0	35
Davos CH	-	15137	9019	0	60	18165	9650	0	53	24220	10060	0	42
Athens GR	-	10407	8073	0	78	12488	9082	0	73	16651	10281	0	62

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	200	kPa	Max. operating press. - tank side	800	kPa
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Testing Laboratory	NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6102 DE1, 6103 DE1, 6103 F2
Date of test report	4/2/2019, 4/2/2019, 20/2/2019
Test method	ISO 9459-5 (DST)

Comments of test lab	Stamp & signature of test lab
Extrapolated Results	



Summary of	EN12976-2	test results	Certification No.	OEM 10026.3
Annex to Solar KEYMARK Certificate			Issued	2023-09-12
Company	REQA S.R.L.		Country	Italy
Brand (optional)	0		Website	www.reqa.it
Street	Corso Beniamino Mastroiacovo 7/C-D		E-mail	amministrazione@reqa.it
Postal Code	86029	Trivento (CB)	Tel. / Fax	+39 0874 189 6895

System family overview

Collector name	For each storage and collector size, give number of collectors																												
	LOOP 120					LOOP 150					LOOP 170					LOOP 200					LOOP 250					LOOP 300			
BASIC 155											2					2					2								
BASIC 195	1																												
BASIC 200	1					1				1				1	2			2				2							
BASIC 224						1				1				1				2				2							
BASIC 253						1				1				1								2	3						

Name of system configuration	LOOP 300/4.00									
Collector name	BASIC 200		No. Collectors		2		Storage name		LOOP 300	

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

Location	Q _{d,sh} MJ/y	Daily drawoff 250 l				Daily drawoff 300 l				Daily drawoff 400 l			
		Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %
Stockholm SE	-	13939	7253	0	52	16746	8010	0	48	22327	8799	0	39
Würzburg DE	-	13371	7379	0	55	16052	8262	0	51	21413	9240	0	43
Davos CH	-	15137	10691	0	71	18165	11763	0	65	24220	12583	0	52
Athens GR	-	10407	8830	0	85	12488	10092	0	81	16651	11858	0	71

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
Th	45 °C	Desired hot water temperature (mixing valve temperature).

Max. operating press. - collector side	200	kPa	Max. operating press. - tank side	800	kPa
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Testing Laboratory	NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6102 DE1, 6103 DE1, 6103 F2
Date of test report	4/2/2019, 4/2/2019, 20/2/2019
Test method	ISO 9459-5 (DST)

Comments of test lab	Stamp & signature of test lab
Extrapolated Results	



Summary of		EN12976-2		test results		Certification No.		OEM 10026.3																			
Annex to Solar KEYMARK Certificate						Issued		2023-09-12																			
Company		REQA S.R.L.				Country		Italy																			
Brand (optional)		0				Website		www.reqa.it																			
Street		Corso Beniamino Mastroiacovo 7/C-D				E-mail		amministrazione@reqa.it																			
Postal Code		86029		Trivento (CB)		Tel. / Fax		+39 0874 189 6895																			
System family overview																											
For each storage and collector size, give number of collectors																											
Collector name		LOOP 120		LOOP 150		LOOP 170		LOOP 200		LOOP 250		LOOP 300															
BASIC 155						2		2		2		2															
BASIC 195		1																									
BASIC 200		1		1		1		1 2		2		2															
BASIC 224				1		1		1		2		2															
BASIC 253				1		1		1				2 3															
Name of system configuration										LOOP 300/4.48																	
Collector name		BASIC 224		No. Collectors		2		Storage name		LOOP 300																	
Calculated annual results for "solar-only / preheat system"																											
Location		Q_{d,sh}		Daily drawoff				250				Daily drawoff				300				Daily drawoff				400			
		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		-		13939		7600		0		55		16746		8483		0		51		22327		9461		0		42	
Würzburg DE		-		13371		7663		0		57		16052		8672		0		54		21413		9871		0		46	
Davos CH		-		15137		11290		0		75		18165		12520		0		69		24220		13655		0		56	
Athens GR		-		10407		9051		0		87		12488		10407		0		83		16651		12425		0		75	
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										200		kPa		Max. operating press. - tank side										800		kPa	
Testing Laboratory										NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB																	
Website										www.solar.demokritos.gr																	
Test report id. number										6102 DE1, 6103 DE1, 6103 F2																	
Date of test report										4/2/2019, 4/2/2019, 20/2/2019																	
Test method										ISO 9459-5 (DST)																	
Comments of test lab																											
Extrapolated Results																											

Stamp & signature of test lab



Summary of		EN12976-2		test results		Certification No.		OEM 10026.3					
Annex to Solar KEYMARK Certificate						Issued		2023-09-12					
Company		REQA S.R.L.				Country		Italy					
Brand (optional)		0				Website		www.reqa.it					
Street		Corso Beniamino Mastroiacovo 7/C-D				E-mail		amministrazione@reqa.it					
Postal Code		86029		Trivento (CB)		Tel. / Fax		+39 0874 189 6895					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	LOOP 120		LOOP 150		LOOP 170		LOOP 200		LOOP 250				
BASIC 155						2		2					
BASIC 195	1												
BASIC 200	1			1		1		1	2				
BASIC 224				1		1		1		2			
BASIC 253				1		1		1		2			
										3			
Name of system configuration													
						LOOP 300/5.06							
Collector name		BASIC 253		No. Collectors		2		Storage name		LOOP 300			
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh} MJ/y	Daily drawoff 250 l				Daily drawoff 300 l				Daily drawoff 400 l			
		Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %	Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %	Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %
Stockholm SE	-	13939	7947	0	57	16746	8925	0	53	22327	10123	0	45
Würzburg DE	-	13371	7979	0	60	16052	9051	0	56	21413	10501	0	49
Davos CH	-	15137	11858	0	78	18165	13277	0	73	24220	14790	0	61
Athens GR	-	10407	9303	0	89	12488	10754	0	86	16651	12993	0	78
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}	°C	7,5	9,0	3,2	18,5								
T _{c,ave}	°C	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 200 kPa Max. operating press. - tank side 800 kPa													
Testing Laboratory NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB													
Website www.solar.demokritos.gr													
Test report id. number 6102 DE1, 6103 DE1, 6103 F2													
Date of test report 4/2/2019, 4/2/2019, 20/2/2019													
Test method ISO 9459-5 (DST)													
Comments of test lab													
Extrapolated Results													

Stamp & signature of test lab



Summary of	EN12976-2	test results	Certification No.	OEM 10026.3
Annex to Solar KEYMARK Certificate			Issued	2023-09-12
Company	REQA S.R.L.		Country	Italy
Brand (optional)	0		Website	www.reqa.it
Street	Corso Beniamino Mastroiacovo 7/C-D		E-mail	amministrazione@reqa.it
Postal Code	86029	Trivento (CB)	Tel. / Fax	+39 0874 189 6895

System family overview

Collector name	For each storage and collector size, give number of collectors					
	LOOP 120	LOOP 150	LOOP 170	LOOP 200	LOOP 250	LOOP 300
BASIC 155			2	2	2	2
BASIC 195	1					
BASIC 200	1	1	1	1 2	2	2
BASIC 224		1	1	1	2	2
BASIC 253		1	1	1		2 3

Name of system configuration			LOOP 300/7.59		
Collector name	BASIC 253	No. Collectors	3	Storage name	LOOP 300

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

Location	Q _{d,sh} MJ/y	Daily drawoff 250 l				Daily drawoff 300 l				Daily drawoff 400 l			
		Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %	Q _{d,hw} MJ/y	Q _L MJ/y	Q _{par} MJ/y	f _{sol} %
Stockholm SE	-	13939	8893	0	64	16746	10186	0	61	22327	12078	0	54
Würzburg DE	-	13371	8799	0	66	16052	10123	0	63	21413	12236	0	57
Davos CH	-	15137	13245	0	88	18165	15232	0	84	24220	18007	0	74
Athens GR	-	10407	9839	0	95	12488	11542	0	92	16651	14380	0	86

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
Th	45 °C	Desired hot water temperature (mixing valve temperature).

Max. operating press. - collector side	200	kPa	Max. operating press. - tank side	800	kPa
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Testing Laboratory	NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6102 DE1, 6103 DE1, 6103 F2
Date of test report	4/2/2019, 4/2/2019, 20/2/2019
Test method	ISO 9459-5 (DST)

Comments of test lab	Stamp & signature of test lab
Extrapolated Results	