



Summary of	EN12976-2	SOLAR SYSTEM test results	Licence Number	OEM 9965.12.1
Annex to Solar KEYMARK Certificate			Issued	2023-08-30

Company	BSG CALDAIE A GAS S.P.A.		Country	Italy	
Brand (optional)			Website		
Street	Via Pravalton 1/B		E-mail	supportotecnico@bsgcaldiae.it	
Postal Code	33170	Pordenone	Tel. / Fax	+039	434.238.341

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)	Other
Type of auxiliary heating (internal back-up heat)	Electric
If other auxiliary/internal back-up heating, please specify:	
Solar+supplementary OR Solar-only / Solar pre-heat	Solar only / Solar preheat

Collector(s)

Collector(s)				Heat store(s)						
Company		BSG CALDAIE A GAS S.P.A.		Company		BSG CALDAIE A GAS S.P.A.				
Keymark lic.no. if available		OEM 9965.9.1		Keymark lic.no. if available		StoreLicenceNumber				
Collector name	Per module			Store name	Total nominal volume	Gross height	Gross width	Gross depth	Auxiliary heated volume	Electrical aux. heating power
	Gross Area (A _g)	Gross length	Gross width							
	m ²	mm	mm		litres	mm	mm	mm	litres	kW
15 SOL BLACK	1,58	1530	1030	120 BLACK	115	782	580			0-4
20 SOL BLACK	2,09	2030	1030	160 BLACK	150	1053	580			0-4
26 SOL BLACK	2,60	2030	1280	200 BLACK	190	1312	580			0-4
				300 BLACK	290	1980	580			0-4
				320 BLACK	310	2072	580			0-4

Solar loop controller

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	-6 to 10 °C

System family overview

Collector name	Number of collectors in each configuration for each store																			
	Store name																			
	120 BLACK				160 BLACK				200 BLACK				300 BLACK				320 BLACK			
15 SOL BLACK	1				2				2											
20 SOL BLACK		1				1				2			2					2	3	
26 SOL BLACK						1				1				2						

Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6029 DE3, 6034 DE3, 6034 F6
Date of test report	2018-05-30

Comments of test lab	
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Stamp & signature of test lab



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Brand (optional)	0		Website	0
Street	Via Pravolton 1/B		E-mail	supportotecnico@bsgcaldaie.it
Postal Code	33170	Pordenone	Tel. / Fax	+039 434238341

System family overview

Collector name	For each storage and collector size, give number of collectors									
	120 BLACK		160 BLACK		200 BLACK		300 BLACK		320 BLACK	
15 SOL BLACK	1		2		2					
20 SOL BLACK		1		1		2		2	3	
26 SOL BLACK				1		1		2		

Name of system configuration	CN BLACK 120/1.5				
Collector name	15 SOL BLACK	No. Collectors	1	Storage name	120 BLACK

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		Qd,hw		QL		Qd,hw		QL	
		MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	-	4478	2097	-	47	6150	2416	-	39	7821	2570	-	33
WürzburgDE	-	4289	2163	-	50	5897	2535	-	43	7506	2731	-	36
Davos CH	-	4857	3084	-	64	6654	3500	-	53	8483	3690	-	43
Athens GR	-	3343	2674	-	80	4573	3280	-	72	5834	3721	-	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
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
Th	45 °C	Desired hot water temperature (mixing valve temperature).

Max. operating press. - collector side	300	kPa	Max. operating press. - tank side	1000	kPa
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Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6029 DE3, 6034 DE3, 6034 F6
Date of test report	2018-05-30
Test method	ISO 9459-5 (DST)

Comments of test lab	Stamp & signature of test lab
Extrapolate	

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

Central Offices: Kalavriton 2, 145 64 kifisia, Athens, Tel: +30 210 6233493-4, Fax: +30 210 6233495, <http://www.dqs.gr>, e-mail: i.alexou@dqs.gr



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Postal Code	33170	Pordenone	Tel. / Fax	+039 434238341

System family overview

Collector name	For each storage and collector size, give number of collectors														
	120 BLACK			160 BLACK			200 BLACK			300 BLACK			320 BLACK		
15 SOL BLACK	1			2			2			2			2		
20 SOL BLACK	1			1			2			2			2	3	
26 SOL BLACK				1			1			2					

Name of system configuration	CN BLACK 120/2				
Collector name	20 SOL BLACK	No. Collectors	1	Storage name	120 BLACK

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		Qd,hw		QL		Qd,hw		QL	
		MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	-	4478	2561	-	57	6150	3075	-	50	7821	3374	-	43
WürzburgDE	-	4289	2507	-	58	5897	3050	-	52	7506	3406	-	45
Davos CH	-	4857	3564	-	73	6654	4194	-	63	8483	4541	-	54
Athens GR	-	3343	3012	-	90	4573	3847	-	84	5834	4510	-	77

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
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	1000	kPa
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System family overview

Collector name	For each storage and collector size, give number of collectors									
	120 BLACK		160 BLACK		200 BLACK		300 BLACK		320 BLACK	
15 SOL BLACK	1		2		2					
20 SOL BLACK		1	1			2		2		2 3
26 SOL BLACK				1			1		2	

Name of system configuration	CN BLACK 160-1				
Collector name	20 SOL BLACK	No. Collectors	1	Storage name	160 BLACK

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

Location	Qd,sh	Daily drawoff 110 l				Daily drawoff 140 l				Daily drawoff 170 l			
		Qd,sh		f _{sol}		Qd,sh		f _{sol}		Qd,sh		f _{sol}	
		MJ/y	QL	Qpar	%	MJ/y	QL	Qpar	%	MJ/y	QL	Qpar	%
DEM 9965.9.		MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	-	6150	3132	-	51	7821	3500	-	45	9492	3753	-	40
WürzburgDE	-	5897	3106	-	53	7506	3500	-	47	9114	3784	-	42
Davos CH	-	6654	4289	-	64	8483	4730	-	56	10281	4983	-	48
Athens GR	-	4573	3879	-	85	5834	4604	-	79	7064	5140	-	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		Stockholm SE	Würzburg DE	Davos CH	Athens GR
	G		1.157	1.230	1.684
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
Th	45 °C	Desired hot water temperature (mixing valve temperature).

Max. operating press. - collector side	300	kPa	Max. operating press. - tank side	1000	kPa
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Postal Code	33170	Pordenone	Tel. / Fax	+039 434238341

System family overview

Collector name	For each storage and collector size, give number of collectors																							
	120 BLACK				160 BLACK				200 BLACK				300 BLACK				320 BLACK							
15 SOL BLACK	1				2				2				2				2				2	3		
20 SOL BLACK		1				1				2				2										
26 SOL BLACK										1				2										

Name of system configuration	CN BLACK 160/2.6				
Collector name	26 SOL BLACK	No. Collectors	1	Storage name	160 BLACK

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

Location	Qd,sh	Daily drawoff 110 l					Daily drawoff 140 l					Daily drawoff 170 l				
		Qd,sh		QL		Qpar	Qd,sh		QL		Qpar	Qd,sh		QL		Qpar
		MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%			
Stockholm SE	-	6150	3500	-	57	7821	4037	-	52	9492	4415	-	47			
WürzburgDE	-	5897	3437	-	58	7506	4005	-	53	9114	4447	-	49			
Davos CH	-	6654	4888	-	73	8483	5582	-	66	10281	6055	-	59			
Athens GR	-	4573	4131	-	90	5834	5014	-	86	7064	5771	-	82			

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
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	1000	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
Tested	

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Postal Code	33170	Pordenone	Tel. / Fax	+039 434238341

System family overview

Collector name	For each storage and collector size, give number of collectors														
	120 BLACK			160 BLACK			200 BLACK			300 BLACK			320 BLACK		
15 SOL BLACK	1			2			2			2			2	3	
20 SOL BLACK		1			1			2			2				
26 SOL BLACK					1			1			2				

Name of system configuration	CN BLACK 160/3				
Collector name	15 SOL BLACK	No. Collectors	2	Storage name	160 BLACK

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

Location	Qd,sh	Daily drawoff 110 l					Daily drawoff 140 l					Daily drawoff 170 l				
		Qd,sh		QL		Qpar	Qd,sh		QL		Qpar	Qd,sh		QL		Qpar
		MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%			
Stockholm SE	-	6150	3658	-	59	7821	4289	-	55	9492	4762	-	50			
WürzburgDE	-	5897	3595	-	61	7506	4226	-	56	9114	4730	-	52			
Davos CH	-	6654	5140	-	77	8483	5960	-	70	10281	6528	-	63			
Athens GR	-	4573	4226	-	92	5834	5172	-	89	7064	5960	-	84			

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
	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	1000	kPa
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Extrapolate	

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System family overview

Collector name	For each storage and collector size, give number of collectors																							
	120 BLACK				160 BLACK				200 BLACK				300 BLACK				320 BLACK							
15 SOL BLACK	1				2				2				2				2				2	3		
20 SOL BLACK		1				1				2				2										
26 SOL BLACK						1				1				2										

Name of system configuration	CN BLACK 200-1				
Collector name	26 SOL BLACK	No. Collectors	1	Storage name	200 BLACK

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		Qd,hw		QL		Qd,hw		QL	
		MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	-	9492	4384	-	46	11164	4667	-	42	13970	4951	-	35
WürzburgDE	-	9114	4384	-	48	10691	4699	-	44	13371	4983	-	37
Davos CH	-	10281	5929	-	58	12110	6244	-	52	15137	6528	-	43
Athens GR	-	7064	5708	-	81	8326	6307	-	76	10407	6969	-	67

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

Max. operating press. - collector side	300	kPa	Max. operating press. - tank side	1000	kPa
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Postal Code	33170	Pordenone	Tel. / Fax	+039 434238341

System family overview

Collector name	For each storage and collector size, give number of collectors									
	120 BLACK		160 BLACK		200 BLACK		300 BLACK		320 BLACK	
15 SOL BLACK	1		2		2		2		2	3
20 SOL BLACK		1		1		2		2		
26 SOL BLACK				1		1		2		

Name of system configuration	CN BLACK 200/3				
Collector name	15 SOL BLACK	No. Collectors	2	Storage name	200 BLACK

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		Qd,hw		QL		Qd,hw		QL	
		MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	-	9492	4762	-	50	11164	5109	-	46	13970	5456	-	39
WürzburgDE	-	9114	4730	-	52	10691	5109	-	48	13371	5519	-	41
Davos CH	-	10281	6528	-	63	12110	6938	-	57	15137	7316	-	48
Athens GR	-	7064	5960	-	84	8326	6686	-	80	10407	7537	-	72

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

Max. operating press. - collector side	300	kPa	Max. operating press. - tank side	1000	kPa
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Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6029 DE3, 6034 DE3, 6034 F6
Date of test report	2018-05-30
Test method	ISO 9459-5 (DST)

Comments of test lab	Stamp & signature of test lab
Extrapolate	

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

Central Offices: Kalavriton 2, 145 64 kifisia, Athens, Tel: +30 210 6233493-4, Fax: +30 210 6233495, http://www.dqs.gr, e-mail: i.alexou@dqs.gr



Summary of	EN12976-2	test results	Certification No.	OEM 9965.12.1
Annex to Solar KEYMARK Certificate			Issued	2023-08-30

Company	BSG CALDAIE A GAS S.P.A.		Country	Italy
Brand (optional)	0		Website	0
Street	Via Pravolton 1/B		E-mail	supportotecnico@bsgcaldaie.it
Postal Code	33170	Pordenone	Tel. / Fax	+039 434238341

System family overview

Collector name	For each storage and collector size, give number of collectors									
	120 BLACK		160 BLACK		200 BLACK		300 BLACK		320 BLACK	
15 SOL BLACK	1		2		2					
20 SOL BLACK		1		1	2		2		2	3
26 SOL BLACK				1		1		2		

Name of system configuration	CN BLACK 200-2				
Collector name	20 SOL BLACK	No. Collectors	2	Storage name	200 BLACK

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	%			
Stockholm SE	-	9492	5393	-	57	11164	5897	-	53	13970	6433	-	46			
WürzburgDE	-	9114	5267	-	58	10691	5803	-	54	13371	6465	-	48			
Davos CH	-	10281	7506	-	73	12110	8136	-	67	15137	8799	-	58			
Athens GR	-	7064	6370	-	90	8326	7222	-	87	10407	8420	-	81			

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
T _{a,ave}	°C	7,5	9,0	3,2	18,5
T _{c,ave}	°C	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°
T _{a,ave}	°C	Annual average outdoor air temperature
T _{c,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	1000	kPa
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Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6029 DE3, 6034 DE3, 6034 F6
Date of test report	2018-05-30
Test method	ISO 9459-5 (DST)

Comments of test lab	Stamp & signature of test lab
Extrapolate	

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

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Summary of	EN12976-2	test results	Certification No.	OEM 9965.12.1
Annex to Solar KEYMARK Certificate			Issued	2023-08-30

Company	BSG CALDAIE A GAS S.P.A.		Country	Italy
Brand (optional)	0		Website	0
Street	Via Pravolton 1/B		E-mail	supportotecnico@bsgcaldaie.it
Postal Code	33170	Pordenone	Tel. / Fax	+039 434238341

System family overview

Collector name	For each storage and collector size, give number of collectors									
	120 BLACK		160 BLACK		200 BLACK		300 BLACK		320 BLACK	
15 SOL BLACK	1		2		2					
20 SOL BLACK		1		1		2		2		2 3
26 SOL BLACK				1		1		2		

Name of system configuration	CN Black 300-4				
Collector name	20 SOL BLACK	No. Collectors	2	Storage name	300 BLACK

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		Qd,hw		QL		Qd,hw		QL	
		MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
DEM 9965.9.													
Stockholm SE	-	13939	6307	-	45	16746	6686	-	40	22327	7190	-	32
WürzburgDE	-	13371	6528	-	49	16052	7064	-	44	21413	7632	-	36
Davos CH	-	15137	9240	-	61	18165	9808	-	54	24220	10375	-	43
Athens GR	-	10407	8136	-	78	12488	9114	-	73	16651	10375	-	62

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
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	1000	kPa
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Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6029 DE3, 6034 DE3, 6034 F6
Date of test report	2018-05-30
Test method	ISO 9459-5 (DST)

Comments of test lab	Stamp & signature of test lab
Extrapolate	

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

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Summary of	EN12976-2	test results	Certification No.	OEM 9965.12.1
Annex to Solar KEYMARK Certificate			Issued	2023-08-30

Company	BSG CALDAIE A GAS S.P.A.		Country	Italy
Brand (optional)	0		Website	0
Street	Via Pravolton 1/B		E-mail	supportotecnico@bsgcaldaie.it
Postal Code	33170	Pordenone	Tel. / Fax	+039 434238341

System family overview

Collector name	For each storage and collector size, give number of collectors									
	120 BLACK		160 BLACK		200 BLACK		300 BLACK		320 BLACK	
15 SOL BLACK	1		2		2		2		2	3
20 SOL BLACK		1		1		2		2		
26 SOL BLACK				1		1		2		

Name of system configuration	CN BLACK 300-5.2				
Collector name	26 SOL BLACK	No. Collectors	2	Storage name	300 BLACK

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		Qd,hw		QL		Qd,hw		QL	
		MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	-	13939	7001	-	50	16746	7569	-	45	22327	8326	-	37
WürzburgDE	-	13371	7159	-	54	16052	7916	-	49	21413	8830	-	41
Davos CH	-	15137	10438	-	69	18165	11290	-	62	24220	12141	-	50
Athens GR	-	10407	8672	-	83	12488	9839	-	79	16651	11479	-	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
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	1000	kPa
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Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6029 DE3, 6034 DE3, 6034 F6
Date of test report	2018-05-30
Test method	ISO 9459-5 (DST)

Comments of test lab	Stamp & signature of test lab
Extrapolate	

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Summary of	EN12976-2	test results	Certification No.	OEM 9965.12.1
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Postal Code	33170	Pordenone	Tel. / Fax	+039 434238341

System family overview

Collector name	For each storage and collector size, give number of collectors														
	120 BLACK			160 BLACK			200 BLACK			300 BLACK			320 BLACK		
15 SOL BLACK	1			2			2			2			2		
20 SOL BLACK		1			1			2			2		2	3	
26 SOL BLACK					1			1			2				

Name of system configuration	CN Black 300-2				
Collector name	20 SOL BLACK	No. Collectors	2	Storage name	320 BLACK

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		Qd,hw		QL		Qd,hw		QL	
		MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	-	13970	6843	-	49	16746	7379	-	44	22327	7979	-	36
WürzburgDE	-	13371	6812	-	51	16052	7411	-	46	21413	8073	-	38
Davos CH	-	15137	9303	-	61	18165	9902	-	55	24220	10533	-	43
Athens GR	-	10407	8672	-	83	12488	9776	-	78	16651	11227	-	67

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
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	1000	kPa
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Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6029 DE3, 6034 DE3, 6034 F6
Date of test report	2018-05-30
Test method	ISO 9459-5 (DST)

Comments of test lab	Stamp & signature of test lab
Extrapolate	

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

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Summary of	EN12976-2	test results	Certification No.	OEM 9965.12.1
Annex to Solar KEYMARK Certificate			Issued	2023-08-30

Company	BSG CALDAIE A GAS S.P.A.		Country	Italy
Brand (optional)	0		Website	0
Street	Via Pravolton 1/B		E-mail	supportotecnico@bsgcaldaie.it
Postal Code	33170	Pordenone	Tel. / Fax	+039 434238341

System family overview

Collector name	For each storage and collector size, give number of collectors														
	120 BLACK			160 BLACK			200 BLACK			300 BLACK			320 BLACK		
15 SOL BLACK	1			2			2			2			2		
20 SOL BLACK		1			1			2			2		2	3	
26 SOL BLACK					1			1			2				

Name of system configuration	CN BLACK 300-3				
Collector name	20 SOL BLACK	No. Collectors	3	Storage name	320 BLACK

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		Qd,hw		QL		Qd,hw		QL	
		MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	-	13970	8073	-	58	16746	8988	-	54	22327	10092	-	45
WürzburgDE	-	13371	7884	-	59	16052	8830	-	55	21413	10123	-	47
Davos CH	-	15137	11290	-	75	18165	12425	-	68	24220	13750	-	57
Athens GR	-	10407	9461	-	91	12488	10943	-	88	16651	13308	-	80

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
T _{a,ave}	7,5	9,0	3,2	18,5	
T _{c,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°
T _{a,ave}	°C	Annual average outdoor air temperature
T _{c,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	1000	kPa
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Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
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Comments of test lab	Stamp & signature of test lab
Extrapolate	

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