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 Pravolton 1/B		E-mail	supporto_tecnico@bsgspa.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 specifiy:	
Solar+supplementary OR Solar-only / Solar pre-heat	Solar only / Solar preheat

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 (AG)	Gross length	Gross width							
	m²	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 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					
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	
	Stamp & signature of test lab

Central Offices: Kalavriton 2, 145 64 kifisia, Athens, Tel: +30 210 6233493-4 , Fax: +30 210 6233495, http://www.dqs.gr, e-mail: i.alexiou@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	supporto_tecnico@bsgspa.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 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	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	OEM 9965.9.	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	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	1000	kPa

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

Extrapolate

Stamp & signature of test lab

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 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	supporto_tecnico@bsgspa.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 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	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	OEM 9965.9.	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
	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	1000	kPa

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	
Extrapolate	Stamp & signature of test lab

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

Central Offices: Kalavriton 2, 145 64 kifisia, Athens, Tel: +30 210 6233493-4 , Fax: +30 210 6233495, http://www.dqs.gr, e-mail: i.alexiou@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	supporto_tecnico@bsgspa.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 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,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	OEM 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	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	1000	kPa

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	
Extrapolate	Stamp & signature of test lab

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

Central Offices: Kalavriton 2, 145 64 kifisia, Athens, Tel: +30 210 6233493-4 , Fax: +30 210 6233495, http://www.dqs.gr, e-mail: i.alexiou@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	supporto_tecnico@bsgspa.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 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,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	OEM 9965.9.	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			
	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	1000	kPa

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	
Tested	Stamp & signature of test lab

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 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	supporto_tecnico@bsgspa.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 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,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	OEM 9965.9.	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			
	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	1000	kPa

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	
Extrapolate	Stamp & signature of test lab

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 9965.12.1
Annex to Solar KEYMARK Certificate			Issued	2023-08-30

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Brand (optional)	0		Website	0	
Street	Via Pravolton 1/B		E-mail	supporto_tecnico@bsgspa.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 200-1		
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	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	OEM 9965.9.	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	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	1000	kPa

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	
Extrapolate	Stamp & signature of test lab

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 9965.12.1
Annex to Solar KEYMARK Certificate			Issued	2023-08-30

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Brand (optional)	0		Website	0	
Street	Via Pravolton 1/B		E-mail	supporto_tecnico@bsgspa.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 200/3	
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	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	EM 9965.9.	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	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	1000	kPa

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

Extrapolate

Stamp & signature of test lab

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 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	supporto_tecnico@bsgspa.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
	OEM 9965.9.	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	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	1000 kPa

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

Extrapolate

Stamp & signature of test lab

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Version 4.5, 2017-10-24

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	supporto_tecnico@bsgspa.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					
Collector name	20 SOL BLACK	No. Collectors	2	Storage name	300 BLACK

CN Black 300-2

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
	OEM 9965.9.	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
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
	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	1000	kPa

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

Extrapolate

Stamp & signature of test lab

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 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	supporto_tecnico@bsgspa.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 300-5.2		
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	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	OEM 9965.9.	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			
	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	1000	kPa

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

Extrapolate

Stamp & signature of test lab

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Version 4.5, 2017-10-24

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	supporto_tecnico@bsgspa.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					
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	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	OEM 9965.9.	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			
	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	1000	kPa

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

Extrapolate

Stamp & signature of test lab

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 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	supporto_tecnico@bsgspa.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 300-3
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	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	OEM 9965.9.	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
	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	1000 kPa

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

Extrapolate

Stamp & signature of test lab

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