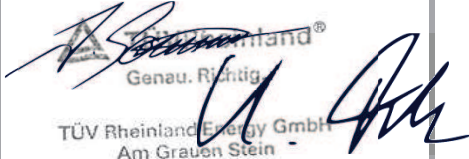




Summary of	EN12976-2	SOLAR SYSTEM test results	Licence Number	011-7S 2816 A						
Annex to Solar KEYMARK Certificate			Issued	2022-04-05						
Company	Bosch Solarthermie GmbH		Country	Germany						
Brand (optional)	Bosch, Buderus, Vulcano, Junkers		Website	www.bosch-thermotechnology.com						
Street	Prozessionsweg 10		E-mail	solarthermie@de.bosch.com						
Postal Code	48493	Wettingen	Tel. / Fax	- / -						
System classification										
Application(s)		Hot water								
Solar loop, circulation principle		Thermosyphon								
Direct solar loop / heat exchanger		Heat exchanger								
Open, vented or closed solar loop		Closed								
Drain back/down		Always filled (no drain)								
Store location		Outdoor								
Store orientation (of main axis)		Horizontal								
Type of auxiliary heating (internal back-up heat)		Electric (optional)								
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	Bosch Solarthermie GmbH		Company	Bosch Solarthermie GmbH						
Keymark lic.no. if available	011-7S2181 F*		Keymark lic.no. if available	-						
Collector name	Per module			Store name	Total nominal volume	Gross height	Gross width	Gross depth	Auxiliary heated volume	Electrical aux. heating power
	Gross Area (Ag)	Gross length	Gross width							
	m ²	mm	mm							
Bosch FCC220-2V	2.09	2026	1032	TS150-2E//TS150-2	145	1092	580	580	-	1.5
Buderus CKN 2.0-s	2.09	2026	1032	TS200-2E//TS200-2	195	1320	580	580	-	2.0
Vulcano FCC-2S	2.09	2026	1032	TS300-2E//TS300-2	275	1850	580	580	-	2.0/3.0
Junkers FCC-2S	2.09	2026	1032							
Solar loop controller		Solar loop fluid								
Keymark lic.no. if available	-		Recommended/required	Required						
Company Name	-		Company Name	-						
Solar loop pump - power range	- W to - W		Freezing point	-14 °C						
System family overview										
Collector name	Number of collectors in each configuration for each store									
	Store name									
	TS150-2E//TS150-2	TS200-2E//TS200-2	TS300-2E//TS300-2							
Bosch FCC220-2V	1	1	2							
Buderus CKN 2.0-s	1	1	2							
Vulcano FCC-2S	1	1	2							
Junkers FCC-2S	1	1	2							
Testing Laboratory		TÜV Rheinland Energy GmbH								
Website		www.tuv.com/st								
Test report id. number		21237826.002Rev01								
Date of test report		2020-11-12								
Comments of test lab										
These systems will also be distributed under the following brands: TSS150-2/FCC-2 Bosch; TSS200-2/FCC-2 JBosch; TSS300-2/FCC-2 Bosch; TSS150-2/FCC-2 Junkers; TSS200-2/FCC-2 Junkers; TSS300-2/FCC-2 Junkers; Freeze protection: According to the installation manual, no freeze protection necessary, if ambient temperature is permanently above +5°C; *Keymark lic.no. of the other brands 011-7S2182 F; 011-7S1924 F; 011-7S1925 F										
 TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln										



Summary of	EN12976-2	test results	Certification No.	011-7S 2816 A
Annex to Solar KEYMARK Certificate			Issued	2021-11-30

Company	Bosch Solarthermie GmbH	Country	Germany
Brand (optional)	Bosch, Buderus, Vulcano, Junkers	Website	www.bosch-thermotechnology.com
Street	Prozessionsweg 10	E-mail	solarthermie@de.bosch.com
Postal Code	48493	Wettringen	Tel. / Fax - -

Parameters for systems extrapolation (Annex D)

Collector of measured system		Storage tank of measured system	
$A_{ref} [m^2]$	1.94	Volume [l]	145
η_0	0.761	$A_{hx} [m^2]$	0.814
$a_1 [W/Km^2]$	4.083	Piping	
$a_2 [W/Km^2]$	0.012		
IAM (50°)	0.094	$U_{loop,p}$	1.11

System parameters

Name of System Configuration	Tested/Extrapolation	$A_c^* [m^2]$	$u_c^* [W/Km^2]$	$U_s [W/K]$	$C_s [MJ/K]$	$S_c [-]$	$D_L [-]$	$f_{aux} [-]$
TSS150-2E/FCC-2 Bosch		1.32	7.32	1.75	0.50	0.08	0.74	-
TSS200-2E/FCC-2 Bosch		1.34	7.51	2.06	0.67	0.08	0.74	-
TSS300-2E/FCC-2 Bosch		2.64	6.95	2.65	0.95	0.08	0.74	-

Testing Laboratory	TÜV Rheinland Energy GmbH
Website	www.tuv.com/st
Test report id. number	21237826.002Rev01
Date of test report	2020-11-12
Test method	ISO 9459-5 (DST)

Comments of test lab	
The system configuration TSS150-2E/FCC-2 Bosch was used for testing and as basis for scaling.	 TÜVRheinland® Genau. Richtig. TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln

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

Version 4.5, 2017-10-24

Summary of		EN12976-2		test results		Certification No.		011-7S 2816 A					
Annex to Solar KEYMARK Certificate						Issued		2021-11-30					
Company		Bosch Solarthermie GmbH				Country		Germany					
Brand (optional)		Bosch, Buderus, Vulcano, Junkers				Website		www.bosch-thermotechnology.com					
Street		Prozessionsweg 10				E-mail		solarthermie@de.bosch.com					
Postal Code		48493		Wettingen		Tel. / Fax		- -					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	TS150-2E		TS200-2E		TS300-2E								
Bosch FCC220-2V	1		1		2								
Buderus CKN 2.0-s	1		1		2								
Vulcano FCC-2S	1		1		2								
Junkers FCC-2S	1		1		2								
Name of system configuration													
						TSS150-2E/FCC-2 Bosch							
Collector name	Bosch FCC220-2V		No. Collectors		1		Storage name		TS150-2E				
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff 110 l				Daily drawoff 140 l				Daily drawoff 170 l			
		Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}
		MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	0	6150	2933	-	48	7821	3248	-	42	9492	3469	-	37
Würzburg DE	0	5897	3002	-	51	7506	3437	-	46	9114	3721	-	41
Davos CH	0	6654	4352	-	65	8483	4857	-	57	10281	5172	-	50
Athens GR	0	4573	3690	-	81	5834	4384	-	75	7064	4920	-	70
Rabat MA	0	5046	4857	-	97	6433	5960	-	93	7789	6749	-	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	Rabat MA							
	G	1 157	1 230	1 684	1 736	2 170							
	T _{a,ave}	7.5	9.0	3.2	18.5	17.4							
	T _{c,ave}	8.5	10.0	5.4	17.8	15.0							
	± 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		250		kPa		Max. operating press. - tank side		800		kPa			
Testing Laboratory		TÜV Rheinland Energy GmbH											
Website		www.tuv.com/st											
Test report id. number		21237826.002Rev01											
Date of test report		2020-11-12											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
 Genau. Richtig. TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln													

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.	011-7S 2816 A									
Annex to Solar KEYMARK Certificate			Issued	2021-11-30									
Company	Bosch Solarthermie GmbH		Country	Germany									
Brand (optional)	Bosch, Buderus, Vulcano, Junkers		Website	www.bosch-thermotechnology.com									
Street	Prozessionsweg 10		E-mail	solarthermie@de.bosch.com									
Postal Code	48493	Wettingen	Tel. / Fax	- / -									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	TS150-2E		TS200-2E										
Bosch FCC220-2V	1		1										
Buderus CKN 2.0-s	1		1										
Vulcano FCC-2S	1		1										
Junkers FCC-2S	1		1										
Name of system configuration													
TSS150-2E/CKN 2.0 Buderus													
Collector name	Buderus CKN 2.0-s	No. Collectors	1	Storage name									
TS150-2E													
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff 110 l				Daily drawoff 140 l				Daily drawoff 170 l			
		Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	0	6150	2933	-	48	7821	3248	-	42	9492	3469	-	37
Würzburg DE	0	5897	3002	-	51	7506	3437	-	46	9114	3721	-	41
Davos CH	0	6654	4352	-	65	8483	4857	-	57	10281	5172	-	50
Athens GR	0	4573	3690	-	81	5834	4384	-	75	7064	4920	-	70
Rabat MA	0	5046	4857	-	97	6433	5960	-	93	7789	6749	-	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	Rabat MA							
	G	1 157	1 230	1 684	1 736	2 170							
	T _{a,ave}	7.5	9.0	3.2	18.5	17.4							
	T _{c,ave}	8.5	10.0	5.4	17.8	15.0							
	± 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		250	kPa	Max. operating press. - tank side		800	kPa						
Testing Laboratory		TÜV Rheinland Energy GmbH											
Website		www.tuv.com/st											
Test report id. number		21237826.002Rev01											
Date of test report		2020-11-12											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
 TÜVRheinland® Genau. Richtig. TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln													

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.		011-7S 2816 A						
Annex to Solar KEYMARK Certificate					Issued		2021-11-30						
Company		Bosch Solarthermie GmbH			Country		Germany						
Brand (optional)		Bosch, Buderus, Vulcano, Junkers			Website		www.bosch-thermotechnology.com						
Street		Prozessionsweg 10			E-mail		solarthermie@de.bosch.com						
Postal Code		48493 Wettringen			Tel. / Fax		- -						
System family overview													
For each storage and collector size, give number of collectors													
Collector name	TS150-2E		TS200-2E		TS300-2E								
Bosch FCC220-2V	1		1		2								
Buderus CKN 2.0-s	1		1		2								
Vulcano FCC-2S	1		1		2								
Junkers FCC-2S	1		1		2								
Name of system configuration					TSS150-2E/FCC-2 Vulcano								
Collector name		Vulcano FCC-2S		No. Collectors		1		Storage name	TS150-2E				
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff 110 l				Daily drawoff 140 l				Daily drawoff 170 l			
		Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}
		MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	0	6150	2933	-	48	7821	3248	-	42	9492	3469	-	37
Würzburg DE	0	5897	3002	-	51	7506	3437	-	46	9114	3721	-	41
Davos CH	0	6654	4352	-	65	8483	4857	-	57	10281	5172	-	50
Athens GR	0	4573	3690	-	81	5834	4384	-	75	7064	4920	-	70
Rabat MA	0	5046	4857	-	97	6433	5960	-	93	7789	6749	-	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	Rabat MA							
	G	1 157	1 230	1 684	1 736	2 170							
	T _{a,ave}	7.5	9.0	3.2	18.5	17.4							
	T _{c,ave}	8.5	10.0	5.4	17.8	15.0							
	± 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		250 kPa		Max. operating press. - tank side		800 kPa							
Testing Laboratory		TÜV Rheinland Energy GmbH											
Website		www.tuv.com/st											
Test report id. number		21237826.002Rev01											
Date of test report		2020-11-12											
Test method		ISO 9459-5 (DST)											
Comments of test lab								 TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln					

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.	011-7S 2816 A
Annex to Solar KEYMARK Certificate			Issued	2021-11-30
Company	Bosch Solarthermie GmbH		Country	Germany
Brand (optional)	Bosch, Buderus, Vulcano, Junkers		Website	www.bosch-thermotechnology.com
Street	Prozessionsweg 10		E-mail	solarthermie@de.bosch.com
Postal Code	48493	Wettringen	Tel. / Fax	-

System family overview														
Collector name	For each storage and collector size, give number of collectors													
	TS150-2E//TS150-2				TS200-2E//TS200-2				TS300-2E//TS300-2					
Bosch FCC220-2V	1				1				2					
Buderus CKN 2.0-s	1				1				2					
Vulcano FCC-2S	1				1				2					
Junkers FCC-2S	1				1				2					

Name of system configuration			TSS150-2E/FCC-2 Junkers											
Collector name	Junkers FCC-2S	No. Collectors	1		Storage name	TS150-2E//TS150-2								

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	0	6150	2933	-	48	7821	3248	-	42	9492	3469	-	37	
Würzburg DE	0	5897	3002	-	51	7506	3437	-	46	9114	3721	-	41	
Davos CH	0	6654	4352	-	65	8483	4857	-	57	10281	5172	-	50	
Athens GR	0	4573	3690	-	81	5834	4384	-	75	7064	4920	-	70	
Rabat MA	0	5046	4857	-	97	6433	5960	-	93	7789	6749	-	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	Rabat MA		
	G	1 157	1 230	1 684	1 736	2 170		
	T _{a,ave}	7.5	9.0	3.2	18.5	17.4		
	T _{c,ave}	8.5	10.0	5.4	17.8	15.0		
	± 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
T _h	45 °C	Desired hot water temperature (mixing valve temperature).

Max. operating press. - collector side		250	kPa	Max. operating press. - tank side		800	kPa
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Testing Laboratory	TÜV Rheinland Energy GmbH
Website	www.tuv.com/st
Test report id. number	21237826.002Rev01
Date of test report	2020-11-12
Test method	ISO 9459-5 (DST)

Comments of test lab	
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Genau. Richtig.

TÜV Rheinland Energy GmbH
Am Grauen Stein
51105 Köln

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.		011-7S 2816 A					
Annex to Solar KEYMARK Certificate						Issued		2021-11-30					
Company		Bosch Solarthermie GmbH				Country		Germany					
Brand (optional)		Bosch, Buderus, Vulcano, Junkers				Website		www.bosch-thermotechnology.com					
Street		Prozessionsweg 10				E-mail		solarthermie@de.bosch.com					
Postal Code		48493		Wettringen		Tel. / Fax		- -					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	TS150-2E		TS200-2E		TS300-2E								
Bosch FCC220-2V	1		1		2								
Buderus CKN 2.0-s	1		1		2								
Vulcano FCC-2S	1		1		2								
Junkers FCC-2S	1		1		2								
Name of system configuration													
						TSS200-2E/FCC-2 Bosch							
Collector name	Bosch FCC220-2V		No. Collectors		1		Storage name		TS200-2E				
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff 170 l				Daily drawoff 200 l				Daily drawoff 250 l			
		Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}
		MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	0	9492	3532	-	37	11164	3721	-	33	13939	3942	-	28
Würzburg DE	0	9114	3784	-	42	10691	4037	-	38	13371	4194	-	31
Davos CH	0	10281	5235	-	51	12110	5519	-	46	15137	5676	-	38
Athens GR	0	7064	4983	-	70	8326	5456	-	66	10407	5897	-	57
Rabat MA	0	7789	6843	-	88	9177	7411	-	81	11479	7758	-	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	Rabat MA							
	G	1 157	1 230	1 684	1 736	2 170							
	T _{a,ave}	7.5	9.0	3.2	18.5	17.4							
	T _{c,ave}	8.5	10.0	5.4	17.8	15.0							
	± 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		250		kPa		Max. operating press. - tank side		800		kPa			
Testing Laboratory		TÜV Rheinland Energy GmbH											
Website		www.tuv.com/st											
Test report id. number		21237826.002Rev01											
Date of test report		2020-11-12											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
 Genau. Richtig. TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln													

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.		011-7S 2816 A						
Annex to Solar KEYMARK Certificate					Issued		2021-11-30						
Company		Bosch Solarthermie GmbH			Country		Germany						
Brand (optional)		Bosch, Buderus, Vulcano, Junkers			Website		www.bosch-thermotechnology.com						
Street		Prozessionsweg 10			E-mail		solarthermie@de.bosch.com						
Postal Code		48493 Wettringen			Tel. / Fax		- -						
System family overview													
For each storage and collector size, give number of collectors													
Collector name	TS150-2E		TS200-2E		TS300-2E								
Bosch FCC220-2V	1		1		2								
Buderus CKN 2.0-s	1		1		2								
Vulcano FCC-2S	1		1		2								
Junkers FCC-2S	1		1		2								
Name of system configuration													
					TSS200-2E/CKN 2.0 Buderus								
Collector name	Buderus CKN 2.0-s		No. Collectors		1		Storage name						
								TS200-2E					
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff 170 l				Daily drawoff 200 l				Daily drawoff 250 l			
		Q _{d,hw}		Q _L		Q _{d,hw}		Q _L		Q _{d,hw}		Q _L	
		Q _{par}	f _{sol}	Q _{par}	f _{sol}	Q _{par}	f _{sol}	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	0	9492	3532	-	37	11164	3721	-	33	13939	3942	-	28
Würzburg DE	0	9114	3784	-	42	10691	4037	-	38	13371	4194	-	31
Davos CH	0	10281	5235	-	51	12110	5519	-	46	15137	5676	-	38
Athens GR	0	7064	4983	-	70	8326	5456	-	66	10407	5897	-	57
Rabat MA	0	7789	6843	-	88	9177	7411	-	81	11479	7758	-	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	Rabat MA							
	G	1 157	1 230	1 684	1 736	2 170							
	T _{a,ave}	7.5	9.0	3.2	18.5	17.4							
	T _{c,ave}	8.5	10.0	5.4	17.8	15.0							
	± 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		250 kPa		Max. operating press. - tank side		800 kPa							
Testing Laboratory		TÜV Rheinland Energy GmbH											
Website		www.tuv.com/st											
Test report id. number		21237826.002Rev01											
Date of test report		2020-11-12											
Test method		ISO 9459-5 (DST)											
Comments of test lab								 TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln					

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.		011-7S 2816 A					
Annex to Solar KEYMARK Certificate						Issued		2021-11-30					
Company		Bosch Solarthermie GmbH				Country		Germany					
Brand (optional)		Bosch, Buderus, Vulcano, Junkers				Website		www.bosch-thermotechnology.com					
Street		Prozessionsweg 10				E-mail		solarthermie@de.bosch.com					
Postal Code		48493		Wettingen		Tel. / Fax		- / -					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	TS150-2E		TS200-2E		TS300-2E								
Bosch FCC220-2V	1		1		2								
Buderus CKN 2.0-s	1		1		2								
Vulcano FCC-2S	1		1		2								
Junkers FCC-2S	1		1		2								
Name of system configuration													
						TSS200-2E/FCC-2 Vulcano							
Collector name		Vulcano FCC-2S		No. Collectors		1		Storage name		TS200-2E			
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	0	9492	3532	-	37	11164	3721	-	33	13939	3942	-	28
Würzburg DE	0	9114	3784	-	42	10691	4037	-	38	13371	4194	-	31
Davos CH	0	10281	5235	-	51	12110	5519	-	46	15137	5676	-	38
Athens GR	0	7064	4983	-	70	8326	5456	-	66	10407	5897	-	57
Rabat MA	0	7789	6843	-	88	9177	7411	-	81	11479	7758	-	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	Rabat MA							
	G	1 157	1 230	1 684	1 736	2 170							
	T _{a,ave}	7.5	9.0	3.2	18.5	17.4							
	T _{c,ave}	8.5	10.0	5.4	17.8	15.0							
	± 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											
T _h	45 °C	Desired hot water temperature (mixing valve temperature).											
Max. operating press. - collector side		250		kPa		Max. operating press. - tank side		800		kPa			
Testing Laboratory		TÜV Rheinland Energy GmbH											
Website		www.tuv.com/st											
Test report id. number		21237826.002Rev01											
Date of test report		2020-11-12											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
 Genau. Richtig. TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln													

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Summary of		EN12976-2	test results		Certification No.		011-7S 2816 A						
Annex to Solar KEYMARK Certificate					Issued		2021-11-30						
Company		Bosch Solarthermie GmbH			Country		Germany						
Brand (optional)		Bosch, Buderus, Vulcano, Junkers			Website		www.bosch-thermotechnology.com						
Street		Prozessionsweg 10			E-mail		solarthermie@de.bosch.com						
Postal Code		48493	Wettringen		Tel. / Fax		- / -						
System family overview													
For each storage and collector size, give number of collectors													
Collector name	TS150-2E//TS150-2		TS200-2E//TS200-2		TS300-2E//TS300-2								
Bosch FCC220-2V	1		1		2								
Buderus CKN 2.0-s	1		1		2								
Vulcano FCC-2S	1		1		2								
Junkers FCC-2S	1		1		2								
Name of system configuration													
					TSS200-2E/FCC-2 Junkers								
Collector name		Junkers FCC-2S		No. Collectors		1		Storage name					
								TSS200-2E//TS200-2					
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff 170 l				Daily drawoff 200 l				Daily drawoff 250 l			
		Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}
		MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	0	9492	3532	-	37	11164	3721	-	33	13939	3942	-	28
Würzburg DE	0	9114	3784	-	42	10691	4037	-	38	13371	4194	-	31
Davos CH	0	10281	5235	-	51	12110	5519	-	46	15137	5676	-	38
Athens GR	0	7064	4983	-	70	8326	5456	-	66	10407	5897	-	57
Rabat MA	0	7789	6843	-	88	9177	7411	-	81	11479	7758	-	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	Rabat MA							
	G	1 157	1 230	1 684	1 736	2 170							
	T _{a,ave}	7.5	9.0	3.2	18.5	17.4							
	T _{c,ave}	8.5	10.0	5.4	17.8	15.0							
	± 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		250	kPa	Max. operating press. - tank side		800	kPa						
Testing Laboratory		TÜV Rheinland Energy GmbH											
Website		www.tuv.com/st											
Test report id. number		21237826.002Rev01											
Date of test report		2020-11-12											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
 Genau. Richtig. TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln													

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Version 4.5, 2017-10-24

Summary of		EN12976-2		test results		Certification No.		011-7S 2816 A					
Annex to Solar KEYMARK Certificate						Issued		2021-11-30					
Company		Bosch Solarthermie GmbH				Country		Germany					
Brand (optional)		Bosch, Buderus, Vulcano, Junkers				Website		www.bosch-thermotechnology.com					
Street		Prozessionsweg 10				E-mail		solarthermie@de.bosch.com					
Postal Code		48493		Wettringen		Tel. / Fax		- -					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	TS150-2E		TS200-2E		TS300-2E								
Bosch FCC220-2V	1		1		2								
Buderus CKN 2.0-s	1		1		2								
Vulcano FCC-2S	1		1		2								
Junkers FCC-2S	1		1		2								
Name of system configuration													
						TSS300-2E/FCC-2 Bosch							
Collector name	Bosch FCC220-2V		No. Collectors		2		Storage name		TS300-2E				
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff 250 l				Daily drawoff 300 l				Daily drawoff 400 l			
		Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}
		MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	0	13939	6276	-	45	16746	6812	-	41	22327	7474	-	34
Würzburg DE	0	13371	6686	-	50	16052	7316	-	46	21413	7852	-	37
Davos CH	0	15137	9587	-	63	18165	10281	-	57	24220	10785	-	45
Athens GR	0	10407	8262	-	80	12488	9335	-	75	16651	10565	-	64
Rabat MA	0	11479	10975	-	96	13750	12457	-	91	18354	14002	-	76
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	Rabat MA							
	G	1 157	1 230	1 684	1 736	2 170							
	T _{a,ave}	7.5	9.0	3.2	18.5	17.4							
	T _{c,ave}	8.5	10.0	5.4	17.8	15.0							
	± 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		250		kPa		Max. operating press. - tank side		800		kPa			
Testing Laboratory		TÜV Rheinland Energy GmbH											
Website		www.tuv.com/st											
Test report id. number		21237826.002Rev01											
Date of test report		2020-11-12											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
 Genau. Richtig. TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln													

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Summary of		EN12976-2		test results		Certification No.		011-7S 2816 A					
Annex to Solar KEYMARK Certificate						Issued		2021-11-30					
Company		Bosch Solarthermie GmbH				Country		Germany					
Brand (optional)		Bosch, Buderus, Vulcano, Junkers				Website		www.bosch-thermotechnology.com					
Street		Prozessionsweg 10				E-mail		solarthermie@de.bosch.com					
Postal Code		48493		Wettingen		Tel. / Fax		- -					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	TS150-2E		TS200-2E		TS300-2E								
Bosch FCC220-2V	1		1		2								
Buderus CKN 2.0-s	1		1		2								
Vulcano FCC-2S	1		1		2								
Junkers FCC-2S	1		1		2								
Name of system configuration													
						TSS300-2E/CKN 2.0 Buderus							
Collector name	Buderus CKN 2.0-s		No. Collectors		2		Storage name		TS300-2E				
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff 250 l				Daily drawoff 300 l				Daily drawoff 400 l			
		Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}
		MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	0	13939	6276	-	45	16746	6812	-	41	22327	7474	-	34
Würzburg DE	0	13371	6686	-	50	16052	7316	-	46	21413	7852	-	37
Davos CH	0	15137	9587	-	63	18165	10281	-	57	24220	10785	-	45
Athens GR	0	10407	8262	-	80	12488	9335	-	75	16651	10565	-	64
Rabat MA	0	11479	10975	-	96	13750	12457	-	91	18354	14002	-	76
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	Rabat MA							
	G	1 157	1 230	1 684	1 736	2 170							
	T _{a,ave}	7.5	9.0	3.2	18.5	17.4							
	T _{c,ave}	8.5	10.0	5.4	17.8	15.0							
	± 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		250		kPa		Max. operating press. - tank side		800		kPa			
Testing Laboratory		TÜV Rheinland Energy GmbH											
Website		www.tuv.com/st											
Test report id. number		21237826.002Rev01											
Date of test report		2020-11-12											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
 Genau. Richtig. TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln													

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Version 4.5, 2017-10-24

Summary of		EN12976-2	test results		Certification No.		011-7S 2816 A						
Annex to Solar KEYMARK Certificate					Issued		2021-11-30						
Company		Bosch Solarthermie GmbH			Country		Germany						
Brand (optional)		Bosch, Buderus, Vulcano, Junkers			Website		www.bosch-thermotechnology.com						
Street		Prozessionsweg 10			E-mail		solarthermie@de.bosch.com						
Postal Code		48493 Wettringen			Tel. / Fax		- -						
System family overview													
For each storage and collector size, give number of collectors													
Collector name	TS150-2E		TS200-2E		TS300-2E								
Bosch FCC220-2V	1		1		2								
Buderus CKN 2.0-s	1		1		2								
Vulcano FCC-2S	1		1		2								
Junkers FCC-2S	1		1		2								
Name of system configuration													
					TSS300-2E/FCC-2 Vulcano								
Collector name	Vulcano FCC-2S		No. Collectors		2		Storage name						
								TS300-2E					
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff 250 l				Daily drawoff 300 l				Daily drawoff 400 l			
		Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}
		MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	0	13939	6276	-	45	16746	6812	-	41	22327	7474	-	34
Würzburg DE	0	13371	6686	-	50	16052	7316	-	46	21413	7852	-	37
Davos CH	0	15137	9587	-	63	18165	10281	-	57	24220	10785	-	45
Athens GR	0	10407	8262	-	80	12488	9335	-	75	16651	10565	-	64
Rabat MA	0	11479	10975	-	96	13750	12457	-	91	18354	14002	-	76
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	Rabat MA							
	G	1 157	1 230	1 684	1 736	2 170							
	T _{a,ave}	7.5	9.0	3.2	18.5	17.4							
	T _{c,ave}	8.5	10.0	5.4	17.8	15.0							
	± 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		250 kPa		Max. operating press. - tank side		800 kPa							
Testing Laboratory		TÜV Rheinland Energy GmbH											
Website		www.tuv.com/st											
Test report id. number		21237826.002Rev01											
Date of test report		2020-11-12											
Test method		ISO 9459-5 (DST)											
Comments of test lab								 TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln					

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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Annex to Solar KEYMARK Certificate					Issued		2021-11-30						
Company		Bosch Solarthermie GmbH			Country		Germany						
Brand (optional)		Bosch, Buderus, Vulcano, Junkers			Website		www.bosch-thermotechnology.com						
Street		Prozessionsweg 10			E-mail		solarthermie@de.bosch.com						
Postal Code		48493 Wettringen			Tel. / Fax		- -						
System family overview													
For each storage and collector size, give number of collectors													
Collector name	TS150-2E//TS150-2		TS200-2E//TS200-2		TS300-2E//TS300-2								
Bosch FCC220-2V	1		1		2								
Buderus CKN 2.0-s	1		1		2								
Vulcano FCC-2S	1		1		2								
Junkers FCC-2S	1		1		2								
Name of system configuration					TSS300-2E/FCC-2 Junkers								
Collector name		Junkers FCC-2S		No. Collectors		2		Storage name					
								TS300-2E//TS300-2					
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff 250 l				Daily drawoff 300 l				Daily drawoff 400 l			
		Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}
		MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	0	13939	6276	-	45	16746	6812	-	41	22327	7474	-	34
Würzburg DE	0	13371	6686	-	50	16052	7316	-	46	21413	7852	-	37
Davos CH	0	15137	9587	-	63	18165	10281	-	57	24220	10785	-	45
Athens GR	0	10407	8262	-	80	12488	9335	-	75	16651	10565	-	64
Rabat MA	0	11479	10975	-	96	13750	12457	-	91	18354	14002	-	76
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	Rabat MA							
	G	1 157	1 230	1 684	1 736	2 170							
	T _{a,ave}	7.5	9.0	3.2	18.5	17.4							
	T _{c,ave}	8.5	10.0	5.4	17.8	15.0							
	± 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		250 kPa		Max. operating press. - tank side		800 kPa							
Testing Laboratory		TÜV Rheinland Energy GmbH											
Website		www.tuv.com/st											
Test report id. number		21237826.002Rev01											
Date of test report		2020-11-12											
Test method		ISO 9459-5 (DST)											
Comments of test lab								 TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln					

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.	011-7S 2816 A
Annex to Solar KEYMARK Certificate			Issued	2021-11-30

Company	Bosch Solarthermie GmbH		Country	Germany	
Brand (optional)	Bosch, Buderus, Vulcano, Junkers		Website	www.bosch-thermotechnology.com	
Street	Prozessionsweg 10		E-mail	solarthermie@de.bosch.com	
Postal Code	48493	Wettringen	Tel. / Fax	-	-

System family overview

Collector name	For each storage and collector size, give number of collectors															
	TS150-2E//TS150-2				TS200-2E//TS200-2				TS300-2E//TS300-2							
Bosch FCC220-2V	1				1				2							
Buderus CKN 2.0-s	1				1				2							
Vulcano FCC-2S	1				1				2							
Junkers FCC-2S	1				1				2							

Annual performance parameters in the frame of the EU regulation CDR 811, 812 and 813 dated 2013

Name of system configuration	TSS150-2E/FCC-2 Bosch				
Collector name	Bosch FCC220-2V	No. Collectors	1	Storage name	TS150-2E

Annual performance parameters in the frame of the EU regulation CDR 811, 812 and 813 dated 2013

Load profile	M	L	XL	XXL	
Annual heat demand (kWh)	1523	2799	4427	5626	
Auxiliary heat contribution	Q _{nonsol}				section 5.9.3.6, see note 1
Average climate (kWh)	565	1560	3004	4150	Strasbourg
Cold climate (kWh)	-	-	-	-	Helsinki
Hot climate (kWh)	-	-	-	-	Athens
Q _{aux} (kWh)	-	-	-	-	section 5.9.3.4, see note 1
Comply to the load profile (Yes/No)	-	-	-	-	section 5.10.6, see note 1
η _{wh_nonsol} (%)	-	-	-	-	section 5.9.3.5, see note 1
Q _{elec} (kWh)	-	-	-	-	section 5.9.3.5, see note 1
Q _{fuel} (kWh)	-	-	-	-	section 5.9.3.5, see note 1
V40, measured (l)	-	-	-	-	section 5.10.7, see note 1

Auxiliary thermostat setting	-	°C	Effective power of auxiliary heater	-	kW
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Note 1: Clause of EN 12976-2:2017

Testing Laboratory	TÜV Rheinland Energy GmbH
Website	www.tuv.com/st
Test report id. number	21237826.002Rev01
Date of test report	2020-11-12
Test method	ISO 9459-5 (DST)

Comments of test lab	
Results are also valid for the following Brands and their nomenclature: TSS150-2E/CKN 2.0 Buderus; TSS150-2E/FCC-2 Vulcano; TSS150-2E/FCC-2 Junkers; TSS150-2/FCC-2 Junkers;	 Genau. Richtig. TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln

Version 4.5, 2017-10-24

Summary of	EN12976-2	test results	Certification No.	011-7S 2816 A
Annex to Solar KEYMARK Certificate			Issued	2021-11-30

Company	Bosch Solarthermie GmbH		Country	Germany	
Brand (optional)	Bosch, Buderus, Vulcano, Junkers		Website	www.bosch-thermotechnology.com	
Street	Prozessionsweg 10		E-mail	solarthermie@de.bosch.com	
Postal Code	48493	Wettringen	Tel. / Fax	-	-

System family overview

Collector name	For each storage and collector size, give number of collectors															
	TS150-2E//TS150-2				TS200-2E//TS200-2				TS300-2E//TS300-2							
Bosch FCC220-2V	1				1				2							
Buderus CKN 2.0-s	1				1				2							
Vulcano FCC-2S	1				1				2							
Junkers FCC-2S	1				1				2							

Annual performance parameters in the frame of the EU regulation CDR 811, 812 and 813 dated 2013

Name of system configuration			TSS200-2E/FCC-2 Bosch		
Collector name	Bosch FCC220-2V	No. Collectors	1	Storage name	TS200-2E

Annual performance parameters in the frame of the EU regulation CDR 811, 812 and 813 dated 2013

Load profile	M	L	XL	XXL	
Annual heat demand (kWh)	1523	2799	4427	5626	
Auxiliary heat contribution		Q _{nonsol}			section 5.9.3.6, see note 1
Average climate (kWh)	565	1516	2951	4080	Strasbourg
Cold climate (kWh)	-	-	-	-	Helsinki
Hot climate (kWh)	-	-	-	-	Athens
Q _{aux} (kWh)	-	-	-	-	section 5.9.3.4, see note 1
Comply to the load profile (Yes/No)	-	-	-	-	section 5.10.6, see note 1
η _{wh_nonsol} (%)	-	-	-	-	section 5.9.3.5, see note 1
Q _{elec} (kWh)	-	-	-	-	section 5.9.3.5, see note 1
Q _{fuel} (kWh)	-	-	-	-	section 5.9.3.5, see note 1
V40, measured (l)	-	-	-	-	section 5.10.7, see note 1

Auxiliary thermostat setting	-	°C	Effective power of auxiliary heater	-	kW
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Note 1: Clause of EN 12976-2:2017

Testing Laboratory	TÜV Rheinland Energy GmbH
Website	www.tuv.com/st
Test report id. number	21237826.002Rev01
Date of test report	2020-11-12
Test method	ISO 9459-5 (DST)

Comments of test lab	
Results are also valid for the following Brands and their nomenclature: TSS200-2E/CKN 2.0 Buderus; TSS200-2E/FCC-2 Vulcano; TSS200-2E/FCC-2 Junkers; TSS200-2/FCC-2 Junkers;	 Genau. Richtig. TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln

Version 4.5, 2017-10-24

Summary of	EN12976-2	test results	Certification No.	011-7S 2816 A
Annex to Solar KEYMARK Certificate			Issued	2021-11-30

Company	Bosch Solarthermie GmbH		Country	Germany	
Brand (optional)	Bosch, Buderus, Vulcano, Junkers		Website	www.bosch-thermotechnology.com	
Street	Prozessionsweg 10		E-mail	solarthermie@de.bosch.com	
Postal Code	48493	Wettringen	Tel. / Fax	-	-

System family overview

Collector name	For each storage and collector size, give number of collectors															
	TS150-2E//TS150-2				TS200-2E//TS200-2				TS300-2E//TS300-2							
Bosch FCC220-2V	1				1				2							
Buderus CKN 2.0-s	1				1				2							
Vulcano FCC-2S	1				1				2							
Junkers FCC-2S	1				1				2							

Annual performance parameters in the frame of the EU regulation CDR 811, 812 and 813 dated 2013

Name of system configuration	TSS300-2E/FCC-2 Bosch				
Collector name	Bosch FCC220-2V	No. Collectors	2	Storage name	TS300-2E

Annual performance parameters in the frame of the EU regulation CDR 811, 812 and 813 dated 2013

Load profile	M	L	XL	XXL	
Annual heat demand (kWh)	1523	2799	4427	5626	
Auxiliary heat contribution			Q _{nonsol}		section 5.9.3.6, see note 1
Average climate (kWh)	349	968	2053	3068	Strasbourg
Cold climate (kWh)	-	-	-	-	Helsinki
Hot climate (kWh)	-	-	-	-	Athens
Q _{aux} (kWh)	-	-	-	-	section 5.9.3.4, see note 1
Comply to the load profile (Yes/No)	-	-	-	-	section 5.10.6, see note 1
η _{wh_nonsol} (%)	-	-	-	-	section 5.9.3.5, see note 1
Q _{elec} (kWh)	-	-	-	-	section 5.9.3.5, see note 1
Q _{fuel} (kWh)	-	-	-	-	section 5.9.3.5, see note 1
V40, measured (l)	-	-	-	-	section 5.10.7, see note 1

Auxiliary thermostat setting	-	°C	Effective power of auxiliary heater	-	kW
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Note 1: Clause of EN 12976-2:2017

Testing Laboratory	TÜV Rheinland Energy GmbH
Website	www.tuv.com/st
Test report id. number	21237826.002Rev01
Date of test report	2020-11-12
Test method	ISO 9459-5 (DST)

Comments of test lab	
Results are also valid for the following Brands and their nomenclature: TSS300-2E/CKN 2.0 Buderus; TSS300-2E/FCC-2 Vulcano; TSS300-2E/FCC-2 Junkers; TSS300-2/FCC-2 Junkers;	 TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln

Version 4.5, 2017-10-24