




Summary of		EN12976-2		SOLAR SYSTEM test results		Licence Number		011-7S2833 A										
Annex to Solar KEYMARK Certificate						Issued		2017-02-01										
Company		Riello S.p.A.				Country		Italy										
Brand (optional)		BERETTA				Website		www.riello.com										
Street		Via Ing. Pilade Riello 7				E-mail		info@riello.com										
Postal Code		IT-37045		Legnago		Tel. / Fax		+39 0499 323911										
System classification																		
Application(s)					Hot water													
Solar loop, circulation principle					Thermosyphon													
Direct solar loop / heat exchanger					Heat exchanger													
Open, vented or closed solar loop					Closed													
Drain back/down					Always filled (no drain)													
Store location					Outdoor													
Store orientation (of main axis)					Horizontal													
Type of auxiliary heating (internal back-up heat)					None													
If other auxiliary/internal back-up heating, please specify:					N/A													
Solar+supplementary OR Solar-only / Solar pre-heat					Solar only / Solar preheat													
Collector(s)					Heat store(s)													
Company		Riello S.p.A.			Company		Riello S.p.A.											
Keymark lic.no. if available		011-7S2400 F			Keymark lic.no. if available		--											
Collector name		Per module			Store name		Total nominal volume litres	Gross height mm	Gross width mm	Gross depth mm	Auxiliary heated volume litres	Electrical aux. heating power kW						
		Gross Area (Ag) m²	Gross length mm	Gross width mm														
CP20TSS		1.89	1813	1044	150lt		153	1055	535	535	--	--						
					200lt		202	1420	535	535	--	--						
					220lt		223	1580	535	535	--	--						
					300lt		278	1905	535	535								
Solar loop controller					Solar loop fluid													
Keymark lic.no. if available		--			Recommended/required		Recommended											
Company		--			Company		--											
Name		--			Name		Water/Glycole											
Solar loop pump - power range		-- W to -- W			Freezing point		-- °C											
System family overview																		
Collector name		Number of collectors in each configuration for each store																
		Store name																
		150lt			200lt			220lt			300lt							
CP20TSS		1			1			2			2	3						
Testing Laboratory					Institut für Solartechnik SPF, CH-8640 Rapperswil													
Website					www.spf.ch													
Test report id. number					S233QPEN; S232EN													
Date of test report					2018-01-31													
Comments of test lab																		
The coding of the NB-SOL kits has the following structure NB-SOL 150/1 #: "#": TP for flat roof or TI tilted roof.																		
 INSTITUT FÜR SOLARTECHNIK 																		

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Brand (optional)	BERETTA		Website	www.riello.com									
Street	Via Ing. Pilade Riello 7		E-mail	info@riello.com									
Postal Code	IT-37045	Legnago	Tel. / Fax	+39 0499 323911									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	150lt	200lt	220lt	300lt									
CP20TSS	1	1	2	2 3									
Name of system configuration													
			NB-SOL 150/1 TP; NB-SOL 150/1 TI										
Collector name	CP20TSS	No. Collectors	1	Storage name									
				150lt									
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff				Daily drawoff				Daily drawoff			
		110 l				140 l				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	--	6150	2970	--	48	7821	3426	--	44	9492	3759	--	40
WürzburgDE	--	5897	3025	--	51	7506	3603	--	48	9114	4056	--	45
Davos CH	--	6654	4299	--	65	8483	4997	--	59	10281	5500	--	54
Athens GR	--	4573	3695	--	81	5834	4463	--	76	7064	5107	--	72
Perf. indicators for the table above													
Q _{d,sh}	MJ/y	Not relevant for solar domestic hot water system											
Q _d	MJ/y	Annual heat demand for domestic hot water											
Q _L	MJ/y	Annual heat energy delivered by the solar system											
Q _{par}	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)											
f _{sol} =Q _L /Q _d	-	Solar fraction											
Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	G	1'157	1'230	1'684	1'736								
	T _{a,ave}	7.5	9.0	3.2	18.5								
	T _{c,ave}	8.5	10.0	5.4	17.8								
	± ΔT _c	6.4	3.0	0.8	7.4								
G	kWh/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		1'000	kPa						
Testing Laboratory		Institut für Solartechnik SPF, CH-8640 Rapperswil											
Website		www.spf.ch											
Test report id. number		S233QPEN; S232EN											
Date of test report		2018-01-31											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
NB-SOL 150/1 TP was tested as the "medium" subtype under SPF Test Number S232.													

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

Version 3.6, 2014-06-18

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Postal Code					IT-37045					Legnago					Tel. / Fax					+39					0499 323911																								
System family overview																																																	
Collector name					For each storage and collector size, give number of collectors																																												
					150lt					200lt					220lt					300lt																													
CP20TSS					1					1						2							2	3																									
Name of system configuration															NB-SOL 200/1 TP; NB-SOL 200/1 TI																																		
Collector name					CP20TSS					No. Collectors					1					Storage name					200lt																								
Calculated annual results for "solar-only / preheat system"																																																	
Location					Qd,sh		Daily drawoff					170		I		Daily drawoff					200		I		Daily drawoff					250		I																	
							Qd,hw		QL		Qpar		fsol		Qd,hw		QL		Qpar		fsol		Qd,hw		QL		Qpar		fsol																				
					MJ/y		MJ/y		MJ/y		MJ/y		%		MJ/y		MJ/y		MJ/y		%		MJ/y		MJ/y		MJ/y		%																				
Stockholm SE					--		9492		3332		--		35				11164		3483		--		31		13939		3638		--		26																		
WürzburgDE					--		9114		3573		--		39				10691		3731		--		35		13371		3878		--		29																		
Davos CH					--		10281		4894		--		48				12110		5098		--		42		15137		5283		--		35																		
Athens GR					--		7064		4747		--		67				8326		5145		--		62		10407		5505		--		53																		
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/m²		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										250					kPa					Max. operating press. - tank side										1'000					kPa														
Testing Laboratory										Institut für Solartechnik SPF, CH-8640 Rapperswil																																							
Website										www.spf.ch																																							
Test report id. number										S233QPEN; S232EN																																							
Date of test report										2018-01-31																																							
Test method										ISO 9459-5 (DST)																																							
Comments of test lab																																																	
The SPF test number for the system subtype NB-SOL 200/1 TP is S232 ST1.The annual performance for the system subtype was calculated according to the Specific CEN Keymark Scheme Rules for system families.																																																	
																																																	

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

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Street	Via Ing. Pilade Riello 7		E-mail	info@riello.com									
Postal Code	IT-37045	Legnago	Tel. / Fax	+39 0499 323911									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	150lt		200lt										
CP20TSS	1	1	2	2 3									
Name of system configuration													
NB-SOL 220/2 TP; NB-SOL 220/2 TI													
Collector name	CP20TSS	No. Collectors	2	Storage name									
220lt													
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff 170 l				Daily drawoff 200 l				Daily drawoff 250 l			
		Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}	Q_{d,hw}	Q_L	Q_{par}	f_{sol}
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	--	9492	4955	--	52	11164	5392	--	48	13939	5826	--	42
Würzburg DE	--	9114	5122	--	56	10691	5613	--	53	13371	6231	--	47
Davos CH	--	10281	7526	--	73	12110	8174	--	68	15137	8840	--	58
Athens GR	--	7064	6089	--	86	8326	6835	--	82	10407	7878	--	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								
	G	1'157	1'230	1'684	1'736								
	T _{a,ave}	7.5	9.0	3.2	18.5								
	T _{c,ave}	8.5	10.0	5.4	17.8								
	± ΔT _c	6.4	3.0	0.8	7.4								
G	kWh/m²	Annual irradiation South, 45°											
T _{a,ave}	°C	Annual average outdoor air temperature											
T _{c,ave}	°C	Annual average mains cold water temp.											
ΔT _c	K	Seasonal variation of T _c											
T _h	45 °C	Desired hot water temperature (mixing valve temperature).											
Max. operating press. - collector side		300	kPa	Max. operating press. - tank side		1'000	kPa						
Testing Laboratory		Institut für Solartechnik SPF, CH-8640 Rapperswil											
Website		www.spf.ch											
Test report id. number		S233QPEN; S232EN											
Date of test report		2018-01-31											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
The SPF test number for the system subtype NB-SOL 220/2 TP is S232 ST2. The annual performance for the system subtype was calculated according to the Specific CEN Keymark Scheme Rules for system families.													

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Postal Code	IT-37045	Legnago	Tel. / Fax	+39 0499 323911									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	150lt		200lt										
CP20TSS	1	1	2	3									
Name of system configuration													
NB-SOL 300/2 TP; NB-SOL 300/2 TI													
Collector name	CP20TSS	No. Collectors	2	Storage name									
300lt													
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	MJ/y	%
Stockholm SE	--	13939	6091	--	44	16746	6497	--	39	22327	7011	--	31
Würzburg DE	--	13371	6472	--	48	16052	6966	--	43	21413	7366	--	34
Davos CH	--	15137	9173	--	61	18165	9682	--	53	24220	10124	--	42
Athens GR	--	10407	8045	--	77	12488	8967	--	72	16651	10174	--	61
Perf. indicators for the table above													
Q _{d,sh}	MJ/y	Not relevant for solar domestic hot water system											
Q _d	MJ/y	Annual heat demand for domestic hot water											
Q _L	MJ/y	Annual heat energy delivered by the solar system											
Q _{par}	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)											
f _{sol} =Q _L /Q _d	-	Solar fraction											
Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	G	1'157	1'230	1'684	1'736								
	T _{a,ave}	7.5	9.0	3.2	18.5								
	T _{c,ave}	8.5	10.0	5.4	17.8								
	± ΔT _c	6.4	3.0	0.8	7.4								
G	kWh/m²	Annual irradiation South, 45°											
T _{a,ave}	°C	Annual average outdoor air temperature											
T _{c,ave}	°C	Annual average mains cold water temp.											
ΔT _c	K	Seasonal variation of T _c											
T _h	45 °C	Desired hot water temperature (mixing valve temperature).											
Max. operating press. - collector side		250	kPa	Max. operating press. - tank side		1'000	kPa						
Testing Laboratory		Institut für Solartechnik SPF, CH-8640 Rapperswil											
Website		www.spf.ch											
Test report id. number		S233QPEN; S232EN											
Date of test report		2018-01-31											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
The SPF test number for the system subtype NB-SOL 300/2 TP is S232 ST3. The annual performance for the system subtype was calculated according to the Specific CEN Keymark Scheme Rules for system families.													

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

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[illegible]

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