

Summary of		EN12976-2	SOLAR SYSTEM test results		Licence Number		011-7S2612 A										
Annex to Solar KEYMARK Certificate					Issued		2016-12-08										
Company		Ariston Thermo S.p.A.			Country		Italy										
Brand (optional)		ARISTON KAIROS			Website		www.aristonthermo.com										
Street		Via A. Merloni 45			E-mail		public.relations@aristonthermo.com										
Postal Code		60044	Fabriano		Tel. / Fax		+39 02763209 -1 / -40										
System classification																	
Application(s)				Hot water													
Solar loop, circulation principle				Thermosyphon													
Direct solar loop / heat exchanger				Direct													
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													
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		Ariston Thermo S.p.A			Company		Ariston Thermo S.p.A										
Keymark lic.no. if available		011-7S2613 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													
		m²	mm	mm			litres	mm	mm	mm	litres	kW					
DR2.0		2.01	2004	1004	CNA 200 THERMO DR		200	1481	530	-	-	-					
DR 2.0 HR		2.01	1004	2004	CNA 200 THERMO DR-E		200	1481	530	-	-	2.0					
					CNA 300 THERMO DR		300	1953	530	-	-	-					
					CNA 300 THERMO DR-E		300	1953	530	-	-	2.0					
Solar loop controller				Solar loop fluid													
Keymark lic.no. if available		-			Recommended/required		Required										
Company		-			Company		-										
Name		-			Name		water										
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															
		CNA 200 THERMO DR			JA 200 THERMO DR-E 2K			CNA 300 THERMO DR			JA 300 THERMO DR-E 2K						
DR2.0		1			1			2			2						
DR 2.0 HR		1			1												
Testing Laboratory		TÜV Rheinland Energy GmbH															
Website		www.tuv.com/st															
Test report id. number		21229450.001; 21236356.001															
Date of test report		2015-12-02; 2016-12-08															
Comments of test lab													 TÜVRheinland® Genau. Richtig. TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln				
Because of reaching the limited faux value according to ISO 9459-5, a long term prediction as a solar plus supplementary system was not possible.																	

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Postal Code	60044	Fabriano	Tel. / Fax	+39 02763209 -1 / -40									
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For each storage and collector size, give number of collectors													
Collector name	CNA 200 THERMO DR	JA 200 THERMO DR-E 2K	CNA 300 THERMO DR	JA 300 THERMO DR-E 2K									
DR2.0	1	1	2	2									
DR 2.0 HR	1	1											
Name of system configuration ARISTON KAIROS THERMO DR 200-1													
Collector name	DR2.0	No. Collectors	1	Storage name CNA 200 THERMO DR									
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,sh}	Q_L	Q_{par}	f_{sol}	Q_{d,sh}	Q_L	Q_{par}	f_{sol}	Q_{d,sh}	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	9492	3658	-	39	11164	3879	-	35	13939	4068	-	29	
Würzburg DE	9114	3910	-	43	10691	4163	-	39	13371	4384	-	33	
Davos CH	10281	5361	-	52	12110	5613	-	46	15137	5866	-	39	
Athens GR	7064	5046	-	72	8326	5519	-	67	10407	6086	-	59	
Perf. indicators for the table above													
Q_{d,sh}	MJ/y	Not relevant for solar domestic hot water system											
Q_d	MJ/y	Annual heat demand for domestic hot water											
Q_L	MJ/y	Annual heat energy delivered by the solar system											
Q_{par}	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)											
f_{sol}=Q_L/Q_d	-	Solar fraction											
Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	G	1 157	1 230	1 684	1 736								
	T_{a,ave}	7.5	9.0	3.2	18.5								
	T_{c,ave}	8.5	10.0	5.4	17.8								
	± ΔT_c	6.4	3.0	0.8	7.4								
G	kWh/m²	Annual irradiation South, 45°											
T_{a,ave}	°C	Annual average outdoor air temperature											
T_{c,ave}	°C	Annual average mains cold water temp.											
ΔT_c	K	Seasonal variation of T _c											
Th	45 °C	Desired hot water temperature (mixing valve temperature).											
Max. operating press. - collector side		700	kPa	Max. operating press. - tank side		700	kPa						
Testing Laboratory		TÜV Rheinland Energy GmbH											
Website		www.tuv.com/st											
Test report id. number		21229450.001; 21236356.001											
Date of test report		2015-12-02; 2016-12-08											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
No comments													

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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DR 2.0 HR	1	1											
Name of system configuration ARISTON KAIROS THERMO DR-E 2KW 200-1													
Collector name	DR2.0	No. Collectors	1	Storage name CNA 200 THERMO DR-E 2KW									
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh	Daily drawoff 170 l				Daily drawoff 200 l				Daily drawoff 250 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		9492	3658	-	39	11164	3879	-	35	13939	4068	-	29
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Qd,sh	MJ/y	Not relevant for solar domestic hot water system											
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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		700	kPa	Max. operating press. - tank side		700	kPa						
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DR2.0	1	1	2	2									
DR 2.0 HR	1	1											
Name of system configuration ARISTON KAIROS THERMO DR 300-1													
Collector name	DR2.0	No. Collectors	2	Storage name CNA 300 THERMO DR									
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh MJ/y	Daily drawoff 250 l				Daily drawoff 300 l				Daily drawoff 400 l			
		Qd,hw MJ/y	QL MJ/y	Qpar MJ/y	fsol %	Qd,hw MJ/y	QL MJ/y	Qpar MJ/y	fsol %	Qd,hw MJ/y	QL MJ/y	Qpar MJ/y	fsol %
Stockholm SE		13939	6591	-	47	16746	7127	-	43	22327	7758	-	35
WürzburgDE		13371	6875	-	51	16052	7537	-	47	21413	8168	-	38
Davos CH		15137	9902	-	65	18165	10596	-	58	24220	11164	-	46
Athens GR		10407	8420	-	81	12488	9492	-	76	16651	10943	-	66
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								
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	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		700	kPa	Max. operating press. - tank side		700	kPa						
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DR2.0	1	1	2	2									
DR 2.0 HR	1	1											
Name of system configuration ARISTON KAIROS THERMO DR-E 2KW 300-1													
Collector name	DR2.0	No. Collectors	2	Storage name CNA 300 THERMO DR-E 2KW									
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh MJ/y	Daily drawoff 250 l				Daily drawoff 300 l				Daily drawoff 400 l			
		Qd,hw MJ/y	QL MJ/y	Qpar MJ/y	fsol %	Qd,hw MJ/y	QL MJ/y	Qpar MJ/y	fsol %	Qd,hw MJ/y	QL MJ/y	Qpar MJ/y	fsol %
Stockholm SE		13939	6591	-	47	16746	7127	-	43	22327	7758	-	35
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f _{sol} =Q _L /Q _d	-	Solar fraction											
Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	G	1 157	1 230	1 684	1 736								
	T _{a,ave}	7.5	9.0	3.2	18.5								
	T _{c,ave}	8.5	10.0	5.4	17.8								
	± ΔT _c	6.4	3.0	0.8	7.4								
G	kWh/m ²	Annual irradiation South, 45°											
T _{a,ave}	°C	Annual average outdoor air temperature											
T _{c,ave}	°C	Annual average mains cold water temp.											
ΔT _c	K	Seasonal variation of T _c											
Th	45 °C	Desired hot water temperature (mixing valve temperature).											
Max. operating press. - collector side		700	kPa	Max. operating press. - tank side		700	kPa						
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DR 2.0 HR	1	1											
Name of system configuration ARISTON KAIROS THERMO DR 200-1 HR													
Collector name	DR 2.0 HR	No. Collectors	1	Storage name CNA 200 THERMO DR									
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh	Daily drawoff 170 l				Daily drawoff 200 l				Daily drawoff 250 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE		9492	3690	-	39	11164	3879	-	35	13939	4037	-	29
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f _{sol} =Q _L /Q _d	-	Solar fraction											
Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR								
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