


Summary of	EN12976-2	SOLAR SYSTEM test results	Licence Number	ICIM-CLS-000176						
Annex to Solar KEYMARK Certificate			Issued	2021-07-20						
Company	ARISTON THERMO S.p.A.		Country	Italy						
Brand (optional)	Chaffoteaux		Website	www.aristonthermo.com						
Street	Viale Aristide Merloni, 45		E-mail	info@aristonthermo.com						
Postal Code	IT-60044	Fabriano (AN)	Tel. / Fax	+39	(0) 732 6011					
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:	--									
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	ICIM-CLS-000172		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							
VN 2.2-2	2,20	1100	1995	SOLAR ENAMELED TANK 200	190	580	1285	580	--	--
Solar loop controller										
Keymark lic.no. if available	--									
Company	--									
Name	--									
Solar loop pump - power range	-- W to -- W									
Solar loop fluid										
Recommended/required	Required									
Company	--									
Name	Water or Water/Glycol									
Freezing point	-- °C									
System family overview										
Collector name	Number of collectors in each configuration for each store									
	Store name									
	SOLAR ENAMELED TANK 200									
VN 2.2-2	2									
Testing Laboratory										
Institut für Solartechnik SPF, CH-8640 Rapperswil										
Website										
www.spf.ch										
Test report id. number										
S274EN										
Date of test report										
2021-07-15										
SPF INSTITUT FÜR SOLARTECHNIK										

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Parameters for systems extrapolation (Annex D)

Collector of measured system		Storage tank of measured system	
A_{ref} [m ²]	2,01	Volume [l]	190
η_0	0,77	A_{hx} [m ²]	--
a_1 [W/Km ²]	3,91	Piping	
a_2 [W/Km ²]	0,0040	$U_{loop,p}$	--
IAM (50°)	0,960		

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} [-]
ZELIOS THERMO HF-2 200-2	Tested	2,31	8,25	2,22	0,79	0,22	0,04	--

Testing Laboratory	Institut für Solartechnik SPF, CH-8640 Rapperswil
Website	www.spf.ch
Test report id. number	S274EN
Date of test report	2021-07-15
Test method	ISO 9459-5 (DST)

Comments of test lab	 
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 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

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System family overview

Collector name	For each storage and collector size, give number of collectors													
	SOLAR ENAMELED TANK 200													
VN 2.2-2	2													

Name of system configuration	ZELIOS THERMO HF-2 200-2														
Collector name	VN 2.2-2	No. Collectors	2								Storage name	SOLAR ENAMELED TANK 200			

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

Location	Qd,sh MJ/y	Daily drawoff 170 l					Daily drawoff 200 l					Daily drawoff 250 l				
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol			
		MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%			
Stockholm SE	--	9492	5287	0	56	11164	5816	0	52	13939	6356	0	46			
WürzburgDE	--	9114	5323	0	58	10691	5901	0	55	13371	6592	0	49			
Davos CH	--	10281	7885	0	77	12110	8659	0	72	15137	9400	0	62			
Athens GR	--	7064	6294	0	89	8326	7127	0	86	10407	8190	0	79			

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/m ²	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	1.000 kPa
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Test method	ISO 9459-5 (DST)

Comments of test lab	 
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System family overview

Collector name	For each storage and collector size, give number of collectors									
	SOLAR ENAMELED TANK 200									
VN 2.2-2	2									

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

Name of system configuration			ZELIOS THERMO HF-2 200-2		
Collector name	VN 2.2-2	No. Collectors	2	Storage name	SOLAR ENAMELED TANK 200

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)	1542	2829	4468	5685	
Auxiliary heat contribution	Q _{nonsol}				section 5.9.3.6, see note 1
Average climate (kWh)	348	954	2055	3116	Strasbourg
Cold climate (kWh)	627	1418	2676	3781	Helsinki
Hot climate (kWh)	66	362	1126	2069	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
V ₄₀ , 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

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