Summary of	EN12976-2	SOLAR SYSTEM test results	Licence Number	ICIM-CLS-00178
Annex to Solar KEYMARK Certificate			Issued	2023-11-20

Company	ATI DI MARIANI SRL		Country	Italy
Brand (optional)			Website	www.atimariani.it
Street	Via E. Mattei, 461, Z.ind.4 Torre del Moro		E-mail	info@atimariani.it
Postal Code	47522	Cesena (FC)	Tel. / Fax	+39 0547 609711

System classification	
Application(s)	Hot water
Solar loop, circulation principle	Other
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)	None
If other auxiliary/internal back-up heating, please specifiy:	
Solar+supplementary OR Solar-only / Solar pre-heat	Solar only / Solar preheat

Collector(s)

Company	ATI DI MARIANI SRL
Keymark lic.no. if available	--

Collector name	Per module: Gross Area (AG)	Per module: Gross length	Per module: Gross width
	m²	mm	mm
HYDROSOL 200	1,89	951	1890

Heat store(s)

Company	ATI DI MARIANI SRL
Keymark lic.no. if available	--

Store name	Total nominal volume	Gross height	Gross width	Gross depth	Auxiliary heated	Electrical aux. heating power
	litres	mm	mm	mm	litres	kW
HYDROSOL 200	193	262	951	1890	--	--

Solar loop controller			Solar loop fluid		
Keymark lic.no. if available	--		Recommended/required	No recommend./requirements	
Company	--		Company	--	
Name	--		Name	--	
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: HYDROSOL 200																																	
HYDROSOL 200	1																																		

Testing Laboratory	SPF Institute for Solar Technology
Website	www.spf.ch
Test report id. number	S285
Date of test report	2023-10-31

Comments of test lab
Integrated Storage Collector (ICS)

SPF INSTITUT FÜR SOLARTECHNIK

Version 4.5, 2017-10-24

Summary of	EN12976-2	test results	Certification No.	ICIM-CLS-00178
Annex to Solar KEYMARK Certificate			Issued	2023-11-20

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Parameters for systems extrapolation (Annex D)

Collector of measured system		Storage tank of measured system	
A_{ref} [m^2]	--	Volume [l]	193
η_0	--	A_{hx} [m^2]	--
a_1 [W/Km^2]	--	Piping	
a_2 [W/Km^2]	--		
IAM (50º)	--	$U_{loop,p}$	--

System parameters

Name of System Configuration	Tested/Extrapol	A_c* [m^2]	u_c* [W/Km^2]	U_s [W/K]	C_s [MJ/K]	S_c [-]	D_L [-]	f_{aux} [-]
HYDROSOL 200	Tested	1,25	0,04	8,80	0,7475	0,00	0,22	--

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Test report id. number	S285
Date of test report	2023-10-31
Test method	ISO 9459-5 (DST)

Comments of test lab

Integrated Storage Collector (ICS)

SPF INSTITUT FÜR SOLARTECHNIK

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

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Capitale Soc EUR. 260.000,00 int. versato ed esistente

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Postal Code	47522	Cesena (FC)	Tel. / Fax	+39	0547 609711

System family overview

Collector name	For each storage and collector size, give number of collectors				
	HYDROSOL 200				
HYDROSOL 200	1				

Name of system configuration				Storage name	
				HYDROSOL 200	
Collector name	HYDROSOL 200	No. Collectors	1	Storage name	HYDROSOL 200

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	0	9492	3417	0	36	11164	3628	0	33	13939	3805	0	27
WürzburgDE	0	9114	3655	0	40	10691	3870	36	0	13371	4092	0	31
Davos CH	0	10281	4801	0	47	12110	5062	0	42	15137	5328	0	35
Athens GR	0	7064	4761	0	67	8326	5245	0	63	10407	5776	0	56

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	600	kPa	Max. operating press. - tank side	600 kPa

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System family overview

Collector name	For each storage and collector size, give number of collectors																													
	HYDROSOL 200																													
HYDROSOL 200	1																													

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

Name of system configuration					HYDROSOL 200	
Collector name	HYDROSOL 200	No. Collectors	1	Storage name	HYDROSOL 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)	1523	2799	4427	5626	
Auxiliary heat contribution		Qnonsol			section 5.9.3.6, see note 1
Average climate (kWh)	749	1741	3095	4225	Strasbourg
Cold climate (kWh)	958	2026	3449	4597	Helsinki
Hot climate (kWh)	397	1226	2479	3584	Athens
Qaux (kWh)					section 5.9.3.4, see note 1
Comply to the load profile (Yes/No)					section 5.10.6 , see note 1
ηwh_nonsol (%)					section 5.9.3.5 , see note 1
Qelec (kWh)					section 5.9.3.5 , see note 1
Qfuel (kWh)					section 5.9.3.5 , see note 1
V40, measured (l)					section 5.10.7, see note 1

Auxiliary thermostat setting	--	ºC	Effective power of auxiliary heater	--	kW

Note 1: Clause of EN 12976-2:2017

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