Data: 16/07/2021

AUTOCERTIFICAZIONE DEL COSTRUTTORE

(ai sensi del D.M. 16 febbraio 2016 e del D.P.R. n. 445/2000)

La sottoscritta società ARISTON THERMO S.p.A., dichiara che gli apparecchi della seguente tipologia[1]: 2.C Solare termico, elencati in allegato e immessi sul mercato dalla stessa, soddisfano:

- i requisiti di cui all'Allegato I del DM 16 Febbraio 2016 per l'accesso al Catalogo degli apparecchi domestici;

- i requisiti tecnici, richiesti nel DM 16 Febbraio 2016**, misurati secondo le metodologie previste dalla specifica normativa tecnica di riferimento:**

1.C) Generatori di calore		
- Generatori di calore a condensazione	UNI EN 15502	☐
- Generatori di calore a condensazione ad aria	UNI EN 1020	☐
2.A) Pompe di calore		
- Pompe di calore elettriche	UNI EN 14511	☐
- Pompe di calore a gas ad assorbimento	UNI EN 12309	☐
- Pompe di calore a gas a motore endotermico	UNI EN 14511	☐
2.B) Generatori a biomassa[2]		
- Caldaie a biomassa	UNI EN 303-5 classe 5 (η; PP; CO)	☐
- Stufe e termocamini a pellet	UNI EN 14785 (η; CO) / UNI CEN/TS 15883(PP)	☐
- Termocamini a legna	UNI EN 13229 (η; CO) / UNI CEN/TS 15883(PP)	☐
- Stufe a legna	UNI EN 13240 (η; CO) / UNI CEN/TS 15883(PP)	☐
2.C) Solare termico		
- Collettori solari	UNI EN ISO 9806	☐
- Impianti prefabbricati Factory Made	UNI EN 12976	☒
2.D) Scaldacqua a pompa di calore	UNI EN 16147	☐
2.E) Sistemi ibridi a pompa di calore		
- Generatore di calore a condensazione + + Pompa di calore elettrica	UNI EN 15502 / UNI EN 14511	☐

[1] Indicare solo una delle tipologie sopra elencate, specificando: tipo di intervento - tipo di apparecchio (esempi: 2.A - Pompe di calore elettriche; 2.C - Impianti prefabbricati Factory Made; 2.B - Caldaie a biomassa)

[2] Le emissioni di particolato primario (PP) e di monossido di carbonio (CO) sono determinate con i metodi previsti dalle norme tecniche specifiche per ogni tipologia 2.B, in riferimento al 13% di O_2. η è il rendimento.

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- Generatore di calore a condensazione + + Pompa di calore a gas ad assorbimento — UNI EN 15502 / UNI EN 12309 ☐
- Generatore di calore a condensazione + + Pompa di calore a gas a motore endotermico — UNI EN 15502 / UNI EN 14511 ☐

Rappresentante legale: **ANGELO MANCINI**

Firma:

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Società con socio unico soggetta alla direzione e al coordinamento di Ariston Thermo Holding S.p.A., viale Aristide Merloni, 45 60044 Fabriano (AN), Registro Imprese delle Marche, C.F e P.I 01026940427

Data: 16/07/2021

ELENCO SISTEMI SOLARI TERMICI DELL'AZIENDA

ARISTON THERMO

CONTIENE LE INFORMAZIONI RICHIESTE PER LA VERIFICA DELLA CONFORMITA' DEI PRODOTTI AI REQUISITI DEL CONTO TERMICO 2.0 PER LE TIPOLOGIE D'INTERVENTO 2.C

Marca	Modello	Area A_G [m²] Totale sistema	Area A_a [m²] Totale sistema	Energia Q_L [MJ/anno]	Producibilità Specifica per i requisiti d'accesso [kWht/m2anno]
Ariston	KAIROS THERMO HF-2 150-1 TT	2.2	2.01	3940	544.50
Ariston	KAIROS THERMO HF-2 150-1 TR	2.2	2.01	3940	544.50
Ariston	KAIROS THERMO HF-2 200-1 TT	2.2	2.01	4533	626.45
Ariston	KAIROS THERMO HF-2 200-1 TR	2.2	2.01	4533	626.45
Ariston	KAIROS THERMO HF-2 200-2 TT	4.4	4.02	5901	407.75
Ariston	KAIROS THERMO HF-2 200-2 TR	4.4	4.02	5901	407.75
Ariston	KAIROS THERMO HF-2 300-2 TT	4.4	4.02	8042	555.69
Ariston	KAIROS THERMO HF-2 300-2 TR	4.4	4.02	8042	555.69
Ariston	KAIROS THERMO HF 150-1 TT	2.2	2.01	3307	457.02
Ariston	KAIROS THERMO HF 150-1 TR	2.2	2.01	3307	457.02
Ariston	KAIROS THERMO HF 200-1 TT	2.2	2.01	3743	517.27
Ariston	KAIROS THERMO HF 200-1 TR	2.2	2.01	3743	517.27
Ariston	KAIROS THERMO HF 200-2 TT	4.4	4.02	6105	421.85
Ariston	KAIROS THERMO HF 200-2 TR	4.4	4.02	6105	421.85
Ariston	KAIROS THERMO HF 300-2 TT	4.4	4.02	7242	500.42
Ariston	KAIROS THERMO HF 300-2 TR	4.4	4.02	7242	500.42
Ariston	KAIROS THERMO CF-1 150-1 TT	2.0	1.82	3248	495.73
Ariston	KAIROS THERMO CF-1 150-1 TR	2.0	1.82	3248	495.73
Ariston	KAIROS THERMO CF-1 200-1 TT	2.0	1.82	3721	514,20
Ariston	KAIROS THERMO CF-1 200-1 TR	2.0	1.82	3721	514,20
Ariston	KAIROS THERMO CF-1 300-2 TT	4.0	3.64	6969	481,52
Ariston	KAIROS THERMO CF-1 300-2 TR	4.0	3.64	6969	481,52
Ariston	KAIROS THERMO CF-2 150-1 TR	1.96	1.77	3633	570,15
Ariston	KAIROS THERMO CF-2 150-1 TT	1.96	1.77	3633	570,15
Ariston	KAIROS THERMO CF-2 200-1 TR	1.96	1.77	4052	635,90
Ariston	KAIROS THERMO CF-2 200-1 TT	1.96	1.77	4052	635,90
Ariston	KAIROS THERMO CF-2 300-2 TR	3.92	3.54	7946	623,51
Ariston	KAIROS THERMO CF-2 300-2 TT	3.92	3.54	7946	623,51
Ariston	KAIROS THERMO CF-2 200-2 TR	3.92	3.54	6446	505,80
Ariston	KAIROS THERMO CF-2 200-2 TT	3.92	3.54	6446	505,80
Ariston	KAIROS THERMO CF-GR 150/1 TR	2.01	1.83	3532	536,13
Ariston	KAIROS THERMO CF-GR 150/1 TT	2.01	1.83	3532	536,13
Ariston	KAIROS THERMO CF-GR 200/1 TR	2.01	1.83	4163	631,91
Ariston	KAIROS THERMO CF-GR 200/1 TT	2.01	1.83	4163	631,91
Ariston	KAIROS THERMO CF-GR 200/2 TR	4.02	3.66	5897	447,56
Ariston	KAIROS THERMO CF-GR 200/2 TT	4.02	3.66	5897	447,56
Ariston	KAIROS THERMO CF-GR 300/2 TR	4.02	3.66	7537	572,02
Ariston	KAIROS THERMO CF-GR 300/2 TT	4.02	3.66	7537	572,02

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C.F./P. IVA e Iscriz. Reg. Imprese di Milano n. 12908230159 - R.E.A. n. 1596292

Summary of	EN12976-2	SOLAR SYSTEM test results	Licence Number	ICIM-CLS-000169
Annex to Solar KEYMARK Certificate			Issued	2021-05-27

Company	ARISTON THERMO S.p.A.		Country	Italy	
Brand (optional)	Ariston		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 specifiy:	--
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-000168*			*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
VN 2.2-2	2,20	1100	1995	SOLAR ENAMELED TANK 150	136	500	1785	500	--	--
				SOLAR ENAMELED TANK 200	190	580	1285	580		
				SOLAR ENAMELED TANK 300	276	580	1785	580		

Solar loop controller		Solar loop fluid	
Keymark lic.no. if available	--	Recommended/required	Required
Company	--	Company	--
Name	--	Name	Water or Water/Glycol
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		
	SOLAR ENAMELED TANK 150	SOLAR ENAMELED TANK 200	SOLAR ENAMELED TANK 300
VN 2.2-2	1	1	2

Testing Laboratory	Institut für Solartechnik SPF, CH-8640 Rapperswil
Website	www.spf.ch
Test report id. number	S273EN
Date of test report	2021-03-25

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SPF INSTITUT FÜR SOLARTECHNIK

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

Summary of	**EN12976-2**	**test results**	**Certification No.**	**ICIM-CLS-000169**
Annex to Solar KEYMARK Certificate			**Issued**	2021-05-27

Company	ARISTON THERMO S.p.A.		**Country**	Italy	
Brand (optional)	Ariston		**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

Parameters for systems extrapolation (Annex D)

Collector of measured system		**Storage tank of measured system**	
A_{ref} [m^2]	2,01	**Volume [l]**	136
η_0	0,77	A_{hx} [m^2]	0,57
a_1 [W/Km^2]	3,91	**Piping**	
a_2 [W/Km^2]	0,0040		
IAM (50º)	0,960	$U_{loop,p}$	1,28

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} [-]
KAIROS THERMO HF-2 150-1 TR/TT	Tested	1,39	4,72	3,10	0,58	0,11	0,08	--
KAIROS THERMO HF-2 200-1 TR/TT	Extrapol	1,48	6,37	3,71	0,82	0,13	0,11	--
KAIROS THERMO HF-2 300-2 TR/TT	Extrapol	2,97	6,26	4,91	1,19	0,13	0,11	--

Testing Laboratory	Institut für Solartechnik SPF, CH-8640 Rapperswil
Website	www.spf.ch
Test report id. number	S273EN
Date of test report	2021-03-25
Test method	ISO 9459-5 (DST)

Comments of test lab

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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

Summary of	**EN12976-2**	**test results**	**Certification No.**	**ICIM-CLS-000169**
Annex to Solar KEYMARK Certificate			**Issued**	2021-05-27

Company	ARISTON THERMO S.p.A.		**Country**	Italy	
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Postal Code	IT-60044	Fabriano (AN)	**Tel. / Fax**	+39	(0) 732 6011

System family overview

Collector name	For each storage and collector size, give number of collectors																											
	SOLAR ENAMELED TANK 150						SOLAR ENAMELED TANK 200						SOLAR ENAMELED TANK 300															
VN 2.2-2	1						1						2															

Name of system configuration				**KAIROS THERMO HF-2 150-1 TR/TT**	
Collector name	VN 2.2-2	**No. Collectors**	1	**Storage name**	SOLAR ENAMELED TANK 150

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

Location	Qd,sh	Daily drawoff		110 l		Daily drawoff		140 l		Daily drawoff		170 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	--	6150	3321	0	54	7821	3824	0	49	9492	4148	0	44
WürzburgDE	--	5897	3344	0	57	7506	3940	0	53	9114	4338	0	48
Davos CH	--	6654	4904	0	74	8483	5650	0	67	10281	6045	0	59
Athens GR	--	4573	3992	0	87	5834	4790	0	82	7064	5390	0	76

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	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	S273EN
Date of test report	2021-03-25
Test method	ISO 9459-5 (DST)

Comments of test lab

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

Summary of	**EN12976-2**	**test results**	**Certification No.**	**ICIM-CLS-000169**
Annex to Solar KEYMARK Certificate			**Issued**	2021-05-27

Company	ARISTON THERMO S.p.A.	**Country**	Italy
Brand (optional)	Ariston	**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 family overview

Collector name	**For each storage and collector size, give number of collectors**		
	SOLAR ENAMELED TANK 150	SOLAR ENAMELED TANK 200	SOLAR ENAMELED TANK 300
VN 2.2-2	1	1	2

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

Name of system configuration				KAIROS THERMO HF-2 150-1 TR/TT
Collector name	VN 2.2-2	**No. Collectors**	1	**Storage name** SOLAR ENAMELED TANK 150

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		**Qnonsol**			section 5.9.3.6, see note 1
Average climate (kWh)	**507**	**1415**	**2832**	**4008**	Strasbourg
Cold climate (kWh)	**763**	**1774**	**3243**	**4429**	Helsinki
Hot climate (kWh)	**182**	**855**	**2162**	**3320**	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

Testing Laboratory	Institut für Solartechnik SPF, CH-8640 Rapperswil
Website	www.spf.ch
Test report id. number	S264EN
Date of test report	2021-01-28
Test method	ISO 9459-5 (DST)

Comments of test lab

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SPF INSTITUT FÜR SOLARTECHNIK

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Summary of	**EN12976-2**	**test results**	**Certification No.**	**ICIM-CLS-000169**
Annex to Solar KEYMARK Certificate			**Issued**	2021-05-27

Company	ARISTON THERMO S.p.A.		**Country**	Italy	
Brand (optional)	Ariston		**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 family overview

Collector name	For each storage and collector size, give number of collectors		
	SOLAR ENAMELED TANK 150	SOLAR ENAMELED TANK 200	SOLAR ENAMELED TANK 300
VN 2.2-2	1	1	2

Name of system configuration			KAIROS THERMO HF-2 200-1 TR/TT	
Collector name	VN 2.2-2	**No. Collectors**	1	**Storage name**	SOLAR ENAMELED TANK 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	--	9492	4006	0	42	11164	4276	0	38	13939	4502	0	32
WürzburgDE	--	9114	4202	0	46	10691	4533	0	42	13371	4800	0	36
Davos CH	--	10281	5798	0	56	12110	6152	0	51	15137	6418	0	42
Athens GR	--	7064	5291	0	75	8326	5861	0	70	10407	6546	0	63

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	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	S273EN
Date of test report	2021-03-25
Test method	ISO 9459-5 (DST)

Comments of test lab

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

Summary of	**EN12976-2**	**test results**	**Certification No.**	**ICIM-CLS-000169**
Annex to Solar KEYMARK Certificate			**Issued**	2021-05-27

Company	ARISTON THERMO S.p.A.	**Country**	Italy
Brand (optional)	Ariston	**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 family overview

Collector name	**For each storage and collector size, give number of collectors**		
	SOLAR ENAMELED TANK 150	SOLAR ENAMELED TANK 200	SOLAR ENAMELED TANK 300
VN 2.2-2	1	1	2

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

Name of system configuration			KAIROS THERMO HF-2 200-1 TR/TT
Collector name	VN 2.2-2	**No. Collectors**	1	**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			**Qnonsol**		section 5.9.3.6, see note 1
Average climate (kWh)	**555**	**1429**	**2810**	**3963**	Strasbourg
Cold climate (kWh)	**813**	**1808**	**3252**	**4417**	Helsinki
Hot climate (kWh)	**219**	**835**	**2077**	**3189**	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

Testing Laboratory	Institut für Solartechnik SPF, CH-8640 Rapperswil
Website	www.spf.ch
Test report id. number	S264EN
Date of test report	2021-01-28
Test method	ISO 9459-5 (DST)

Comments of test lab

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SPF INSTITUT FÜR SOLARTECHNIK

ICIM S.p.A.
Piazza Don Enrico Mapelli, 75 - 20099 Sesto San Giovanni (MI)
Tel. 02/72534.1 - Fax 02/72002098 - e-mail: info@icim.it – www.icim.it
Capitale Soc EUR. 260.000,00 int. versato ed esistente

Summary of	**EN12976-2**	**test results**	**Certification No.**	**ICIM-CLS-000169**
Annex to Solar KEYMARK Certificate			**Issued**	2021-05-27

Company	ARISTON THERMO S.p.A.		**Country**	Italy	
Brand (optional)	Ariston		**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 family overview

Collector name	For each storage and collector size, give number of collectors		
	SOLAR ENAMELED TANK 150	SOLAR ENAMELED TANK 200	SOLAR ENAMELED TANK 300
VN 2.2-2	1	1	2

Name of system configuration			KAIROS THERMO HF-2 300-2 TR/TT	
Collector name	VN 2.2-2	**No. Collectors**	2	**Storage name**	SOLAR ENAMELED TANK 300

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

Location	Qd,sh	Daily drawoff 250 l				Daily drawoff 300 l				Daily drawoff 400 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	--	13939	7067	0	51	16746	7737	0	46	22328	8507	0	38
WürzburgDE	--	13371	7207	0	54	16052	8042	0	50	21413	8951	0	42
Davos CH	--	15137	10475	0	69	18165	11462	0	63	24220	12255	0	51
Athens GR	--	10407	8752	0	84	12488	9928	0	80	16651	11622	0	70

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	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	S273EN
Date of test report	2021-03-25
Test method	ISO 9459-5 (DST)

Comments of test lab

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

Summary of	**EN12976-2**	**test results**	**Certification No.**	**ICIM-CLS-000169**
Annex to Solar KEYMARK Certificate			**Issued**	2021-05-27

Company	ARISTON THERMO S.p.A.		**Country**	Italy	
Brand (optional)	Ariston		**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 family overview

Collector name	For each storage and collector size, give number of collectors			
	SOLAR ENAMELED TANK 150	SOLAR ENAMELED TANK 200	SOLAR ENAMELED TANK 300	
VN 2.2-2	1	1	2	

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

Name of system configuration				KAIROS THERMO HF-2 300-2 TR/TT	
Collector name	VN 2.2-2	**No. Collectors**	2	**Storage name**	SOLAR ENAMELED TANK 300

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		**Qnonsol**			section 5.9.3.6, see note 1
Average climate (kWh)	**365**	**914**	**1863**	**2797**	Strasbourg
Cold climate (kWh)	**649**	**1392**	**2533**	**3548**	Helsinki
Hot climate (kWh)	**72**	**323**	**916**	**1649**	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

Testing Laboratory	Institut für Solartechnik SPF, CH-8640 Rapperswil
Website	www.spf.ch
Test report id. number	S264EN
Date of test report	2021-01-28
Test method	ISO 9459-5 (DST)

Comments of test lab	
--	SPF INSTITUT FÜR SOLARTECHNIK

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

PRD N° 004 B

Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

Solar Keymark
Certification Body
CEN 025

Certificazione di Prodotto
Product Certification

Certificato N. / *Certificate No.* **ICIM-CLS-000169**

ALL'AZIENDA / *TO THE FIRM*

Ariston Thermo S.p.A.

Viale Aristide Merloni, 45
60044 Fabriano (AN) - IT

UNITÀ OPERATIVE / *OPERATIVES UNITS*

Strada Provinciale 256 Muccese, 37,
60044 Albacina-Borgo Tufico (AN)

PER I SEGUENTI PRODOTTI / *FOR THE FOLLOWING PRODUCTS*

Sistemi solari prefabbricati
Factory made solar system

CON DENOMINAZIONE COMMERCIALE / *WITH TRADE NAME/S*

Ariston
KAIROS THERMO HF-2 150-1 TR/TT
KAIROS THERMO HF-2 200-1 TR/TT
KAIROS THERMO HF-2 300-2 TR/TT

Caratteristiche: vedi Allegato / *Characteristics: see Annex*

CONFORMEMENTE ALLA NORMA ED AL DOCUMENTO NORMATIVO ICIM
IN COMPLIANCE WITH THE STANDARD AND WITH ICIM NORMATIVE DOCUMENT

UNI EN 12976-1:2017, UNI EN 12976-2:2019
Specific CEN Keymark Scheme Rules for Solar Thermal Products, ICIM 0062CS

RAPPORTI DI PROVA ACCREDITATI EN 17025 / *REFERENCE TEST REPORT ACCREDITED EN 17025*

S273EN

Il presente Certificato è da ritenersi valido solo se accompagnato dal relativo Allegato / *This Certificate is valid only with the relative Annex*

Vincenzo Delacqua
Rappresentante Direzione / Management Representative
ICIM S.p.A.

PRIMA EMISSIONE *FIRST ISSUE*	EMISSIONE CORRENTE *CURRENT ISSUE*	DATA DI SCADENZA *EXPIRING DATE*
27/05/2021	**27/05/2021**	**26/05/2024**

ACCREDIA
L'ENTE ITALIANO DI ACCREDITAMENTO

PRD N° 004 B

Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

ICIM

Solar Keymark
Certification Body
CEN 025

Certificazione di Prodotto
Product Certification

ALLEGATO AL / *ANNEX TO*

Certificato N.
Certificate No. **ICIM-CLS-000169**

DATI TECNICI / TECHNICAL DATA			
Classificazione *Classification*	Thermosiphon, indirect, closed, close-couple system		
Volume serbatoio *Tank volume*	150 l (136 l) 200 l (190 l) 300 l (276 l)	*Rivestimento* *Coating*	Liquid enamel
Tipo di isolamento *Insulation*	Polyurethane	*Spessore isolante* *Insulation thickness*	35-50 mm
Tipo di scambiatore *Heat exchanger*	Jacket	*Materiale struttura* *Frame material*	Steel, galvanized zinc-magnesium
Tipo di collettore *Collector type*	Flat plate	*Materiale copertura* *Covering material*	Glass
Numero collettori *Number of collectors*	1 1 2	*Spessore copertura* *Covering thickness*	3,2 mm
Numero coperture *Number of Coverings*	1	*Area dell'assorbitore* *Absorber area*	2,01 m^2
Area totale *Gross area*	2,20 m^2	*Area apertura Aperture area*	2,01 m^2
Materiale assorbitore *Absorber material*	Aluminium sheetbar	*Trattam. Superficiale* *Coating*	Selective coating
Materiale isolante *Thermal insulation*	Glass Fiber	*Spessore* *Thickness*	30 mm
Fluido termovettore *Heat transfer fluid*	Water	*Fluido alternativo* *Alternate fluid*	Water Glycol
Temperat. nominale *Nom. temperature*	-- °C	*Pressione nominale* *Nominal pressure*	3/10 bar (collector/tank)

Vincenzo Delacqua
Rappresentante Direzione / Management Representative
ICIM S.p.A.

PRIMA EMISSIONE *FIRST ISSUE*	EMISSIONE CORRENTE *CURRENT ISSUE*	DATA DI SCADENZA *EXPIRING DATE*
27/05/2021	**27/05/2021**	**26/05/2024**

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Capitale Soc EUR. 260.000,00 int. versato ed esistente
C.F./P. IVA e Iscriz. Reg. Imprese di Milano n. 12908230159 - R.E.A. n. 1596292

Summary of	EN12976-2	SOLAR SYSTEM test results	Licence Number	ICIM-CLS-000175
Annex to Solar KEYMARK Certificate			Issued	2021-07-20

Company	ARISTON THERMO S.p.A.	Country	Italy
Brand (optional)	Ariston	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 specifiy:	--
Solar+supplementary OR Solar-only / Solar pre-heat	Solar only / Solar preheat

Collector(s)

Company	ARISTON THERMO S.p.A.
Keymark lic.no. if available	*ICIM-CLS-000168*

Collector name	Per module: Gross Area (AG)	Per module: Gross length	Per module: Gross width
	m²	mm	mm
VN 2.2-2	2,20	1100	1995

Heat store(s)

Company	ARISTON THERMO S.p.A.
Keymark lic.no. if available	--

Store name	Total nominal volume	Gross height	Gross width	Gross depth	Auxiliary heated volume	Electrical aux. heating power
	litres	mm	mm	mm	litres	kW
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	Store name	Store name	Store name
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

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SPF INSTITUT FÜR SOLARTECHNIK

ICIM S.p.A.
Piazza Don Enrico Mapelli, 75 - 20099 Sesto San Giovanni (MI)
Tel. 02/72534.1 - Fax 02/72002098 - e-mail: info@icim.it – www.icim.it
Capitale Soc EUR. 260.000,00 int. versato ed esistente

Summary of	**EN12976-2**	**test results**	**Certification No.**	**ICIM-CLS-000175**
Annex to Solar KEYMARK Certificate			**Issued**	2021-07-20

Company	ARISTON THERMO S.p.A.		**Country**	Italy	
Brand (optional)	Ariston		**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

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		
IAM (50º)	0,960	$U_{loop,p}$	--

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} [-]
KAIROS 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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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

Summary of	**EN12976-2**	**test results**	**Certification No.**	**ICIM-CLS-000175**
Annex to Solar KEYMARK Certificate			**Issued**	2021-07-20

Company	ARISTON THERMO S.p.A.	**Country**	Italy
Brand (optional)	Ariston	**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 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			KAIROS 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	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	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/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	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	S274EN
Date of test report	2021-07-15
Test method	ISO 9459-5 (DST)

Comments of test lab

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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Summary of	EN12976-2	test results	Certification No.	ICIM-CLS-000175
Annex to Solar KEYMARK Certificate			Issued	2021-07-20

Company	ARISTON THERMO S.p.A.		Country	Italy	
Brand (optional)	Ariston		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 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					KAIROS 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		Qnonsol			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
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

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	
--	SPF INSTITUT FÜR SOLARTECHNIK

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