



CERTIFICATION LICENCE TO USE KEYMARK

Certificate No OEM 10093.3.2

DQS Hellas grants the present certificate to the enterprise:

FERROLI S.p.A.

Via Ritonda 78/A, 37047 San Bonifacio (VR) 37047, Italy

for the product:

Solar Systems Family

SOLEXTECH NAT 125/2.1, SOLEXTECH NAT 160/2.1, SOLEXTECH NAT 160/2.6, SOLEXTECH NAT 160/2.6H, SOLEXTECH NAT 200/2.1, SOLEXTECH NAT 200/2.6, SOLEXTECH NAT 200/2.6H, SOLEXTECH NAT 200/3, SOLEXTECH NAT 200/4.2, SOLEXTECH NAT 300/3, SOLEXTECH NAT 300/3H, SOLEXTECH NAT 300/4.2, SOLEXTECH NAT 300/5.2, SOLEXTECH NAT 300/6

Trademarks: LAMBORGHINI CALORECLIMA

which is produced in conformity with the normative document:

EN 12976-1:2017

EN 12976-2:2019

EN 12975-1:2011

EN ISO 9806:2017

at the following location:

Kyra Vrisi Korinthias, Korinthos



The present certificate is granted in accordance with:

- *the DQS Hellas General Rules for the Certification of Products,*
- *the Specific Rule for Certification EKIII.001 «Specific Rule for Certification of Solar Collectors, and Thermal Solar Heating Systems for Domestic Hot Water»,*
- *the Specific CEN Keymark Scheme Rules for Solar Thermal Products,*

and is ruled by the terms of the relevant contract between DQS Hellas and the enterprise.

Date of issue: **2024-05-30**

Date of valid: **2025-05-30**

Ioannis Alexiou
Head of Products Certification

Panagiotis Giannoutsos
Director of Certification



Summary of		EN12976-2	SOLAR SYSTEM test results		Licence Number		OEM 10093.3.2					
Annex to Solar KEYMARK Certificate					Issued		2023-04-20					
Company		FERROLI S.p.A.			Country		Italy					
Brand (optional)		SOLEXTech NAT			Website		www.ferroli.com					
Street		Via Ritonda 78/A			E-mail		info@ferroli.it					
Postal Code		37047	San Bonifacio (VR)		Tel. / Fax		+39 0456139411					
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)				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		FERROLI S.p.A.			Company		FERROLI S.p.A.					
Keymark lic.no. if available		OEM 10115.1.2			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								
		m ²	mm	mm			litres	mm	mm	mm	litres	kW
SOLEXTech 2.1 V		2,09	1696	1230	SOLEXTech NAT 125		118	1385	500		-	3,5
SOLEXTech 2.6 V		2,60	2111	1230	SOLEXTech NAT 160		151	1385	500		-	3,5
SOLEXTech 2.6 H		2,60	1230	2111	SOLEXTech NAT 200		192	1710	500		-	3,5
SOLEXTech 3 V		3,00	1996	1500	SOLEXTech NAT 300		295	2310	500		-	3,5
SOLEXTech 3 H		3,00	1500	1996								
Solar loop controller												
Keymark lic.no. if available		-			Recommended/required		Recommended					
Company		-			Company		-					
Name		-			Name		Calpak Fluid					
Solar loop pump - power range		- W to - W			Freezing point		-55 °C					
System family overview												
Collector name		Number of collectors in each configuration for each store										
		Store name										
		SOLEXTech NAT 125		SOLEXTech NAT 160		SOLEXTech NAT 200		SOLEXTech NAT 300				
SOLEXTech 2.1 V		1				1				2		
SOLEXTech 2.6 V					1				1			
SOLEXTech 2.6 H						1						
SOLEXTech 3 V							1			2		
SOLEXTech 3 H								1				
Testing Laboratory				NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB								
Website				www.solar.demokritos.gr								
Test report id. number				6121DE1, 6124DE1, 6124F1								
Date of test report				6/7/2021, 28/6/2021, 29/6/2021								
Comments of test lab				Stamp & signature of test lab								
Comments ...												



Summary of		EN12976-2	test results		Certification No.		OEM 10093.3.2											
Annex to Solar KEYMARK Certificate					Issued		2023-04-20											
Company	FERROLI S.p.A.				Country	Italy												
Brand (optional)	SOLEXTech NAT				Website	www.ferroli.com												
Street	Via Ritonda 78/A				E-mail	info@ferroli.it												
Postal Code	37047	San Bonifacio (VR)			Tel. / Fax	+39	0456139411											
System family overview																		
For each storage and collector size, give number of collectors																		
Collector name	SOLEXTech NAT 125	SOLEXTech NAT 160	SOLEXTech NAT 200	SOLEXTech NAT 300														
SOLEXTech 2.1 V	1		2															
SOLEXTech 2.6 V		1	1	2														
SOLEXTech 2.6 H		1	1															
SOLEXTech 3 V			1	2														
SOLEXTech 3 H				1														
Name of system configuration																		
					SOLEXTech NAT 125/2.1													
Collector name	SOLEXTech 2.1 V		No. Collectors	1		Storage name	SOLEXTech NAT 125											
Calculated annual results for "solar-only / preheat system"																		
Location	Q_{d,sh}	Daily drawoff				80	Q_{d,sh}	Daily drawoff				110	Q_{d,sh}	Daily drawoff				140
		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	-	4478	2652	-	59		6150	3311	-	54		7821	3721	-	48			
Würzburg DE	-	4289	2636	-	62		5897	3343	-	57		7506	3847	-	51			
Davos CH	-	4857	3974	-	82		6654	4920	-	74		8483	5550	-	66			
Athens GR	-	3343	3034	-	91		4573	3942	-	87		5834	4699	-	81			
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/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																
T _h	45 °C	Desired hot water temperature (mixing valve temperature).																
Max. operating press. - collector side		200	kPa	Max. operating press. - tank side		1000	kPa											
Testing Laboratory		NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB																
Website		www.solar.demokritos.gr																
Test report id. number		6121DE1, 6124DE1, 6124F1																
Date of test report		6/7/2021, 28/6/2021, 29/6/2021																
Test method		ISO 9459-5 (DST)																
Comments of test lab																		
Extrapolated																		
Stamp & signature of test lab																		

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

Central Offices: 2, Kalavriton, 145 64 kifisia, Athens, Tel: +30 210 6233493-4 , Fax: +30 210 6233495, <http://www.dqs.gr>, e-mail: i.alexiou@dqs.gr



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System family overview													
For each storage and collector size, give number of collectors													
Collector name	SOLEXTECH NAT 125		SOLEXTECH NAT 160		SOLEXTECH NAT 200		SOLEXTECH NAT 300						
SOLEXTECH 2.1 V	1		1		1	2	2						
SOLEXTECH 2.6 V			1		1		2						
SOLEXTECH 2.6 H			1		1								
SOLEXTECH 3 V					1		2						
SOLEXTECH 3 H						1							
Name of system configuration													
SOLEXTECH NAT 160/2.1					SOLEXTECH NAT 160/2.1								
Collector name		SOLEXTECH 2.1 V		No. Collectors		1		Storage name					
								SOLEXTECH NAT 160					
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff				Daily drawoff				Daily drawoff			
		110				140				170			
	Q _{d,hw} QL Q _{par} f _{sol}	Q _{d,hw} QL Q _{par} f _{sol}				Q _{d,hw} QL 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	3311	-	54	7821	3816	-	49	9492	4163	-	44
Würzburg DE	-	5897	3343	-	57	7506	3942	-	53	9114	4352	-	48
Davos CH	-	6654	4951	-	74	8483	5708	-	67	10281	6150	-	60
Athens GR	-	4573	3974	-	87	5834	4793	-	82	7064	5456	-	77
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/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											
T _h	45 °C	Desired hot water temperature (mixing valve temperature).											
Max. operating press. - collector side		200		kPa	Max. operating press. - tank side		1000		kPa				
Testing Laboratory		NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB											
Website		www.solar.demokritos.gr											
Test report id. number		6121DE1, 6124DE1, 6124F1											
Date of test report		6/7/2021, 28/6/2021, 29/6/2021											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
Extrapolated													
Stamp & signature of test lab													

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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Postal Code		37047		San Bonifacio (VR)		Tel. / Fax		+39 0456139411					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	SOLEXTECH NAT 125		SOLEXTECH NAT 160		SOLEXTECH NAT 200		SOLEXTECH NAT 300						
SOLEXTECH 2.1 V	1		1		1	2	2						
SOLEXTECH 2.6 V			1		1		2						
SOLEXTECH 2.6 H			1		1								
SOLEXTECH 3 V					1		2						
SOLEXTECH 3 H							1						
Name of system configuration						SOLEXTECH NAT 160/2.6							
Collector name		SOLEXTECH 2.6 V		No. Collectors		1		Storage name		SOLEXTECH NAT 160			
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh	Daily drawoff				Daily drawoff				Daily drawoff			
		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	3595	-	58	7821	4194	-	54	9492	4636	-	49
WürzburgDE	-	5897	3564	-	61	7506	4257	-	57	9114	4793	-	53
Davos CH	-	6654	5361	-	80	8483	6276	-	74	10281	6938	-	67
Athens GR	-	4573	4131	-	90	5834	5046	-	87	7064	5803	-	82
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								
	$\pm \Delta T_c$	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.											
ΔT_c	K	Seasonal variation of Tc											
Th	45 °C	Desired hot water temperature (mixing valve temperature).											
Max. operating press. - collector side		200		kPa		Max. operating press. - tank side		1000		kPa			
Testing Laboratory		NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB											
Website		www.solar.demokritos.gr											
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Test method		ISO 9459-5 (DST)											
Comments of test lab										Stamp & signature of test lab			
Extrapolated													

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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System family overview													
For each storage and collector size, give number of collectors													
Collector name	SOLEXTECH NAT 125		SOLEXTECH NAT 160		SOLEXTECH NAT 200		SOLEXTECH NAT 300						
SOLEXTECH 2.1 V	1		1		1	2	2						
SOLEXTECH 2.6 V			1		1		2						
SOLEXTECH 2.6 H			1		1								
SOLEXTECH 3 V					1		2						
SOLEXTECH 3 H						1							
Name of system configuration													
SOLEXTECH NAT 160/2.6H					SOLEXTECH NAT 160/2.6H								
Collector name	SOLEXTECH 2.6 H		No. Collectors	1		Storage name	SOLEXTECH NAT 160						
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh} MJ/y	Daily drawoff 110 l				Daily drawoff 140 l				Daily drawoff 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	%
Stockholm SE	-	6150	3595	-	58	7821	4194	-	54	9492	4636	-	49
Würzburg DE	-	5897	3564	-	61	7506	4257	-	57	9114	4793	-	53
Davos CH	-	6654	5361	-	80	8483	6276	-	74	10281	6938	-	68
Athens GR	-	4573	4131	-	90	5834	5046	-	87	7064	5803	-	82
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/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		200	kPa	Max. operating press. - tank side		1000	kPa						
Testing Laboratory		NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB											
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Comments of test lab													
Extrapolated													
Stamp & signature of test lab													

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SOLEXTECH 2.6 V			1		1		2						
SOLEXTECH 2.6 H			1		1								
SOLEXTECH 3 V					1		2						
SOLEXTECH 3 H							1						
Name of system configuration						SOLEXTECH NAT 200/2.1							
Collector name		SOLEXTECH 2.1 V		No. Collectors		1		Storage name		SOLEXTECH NAT 200			
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh	Daily drawoff				Daily drawoff				Daily drawoff			
		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	4226	-	46	11164	4510	-	40	13939	4730	-	34
WürzburgDE	-	9114	4415	-	49	10691	4762	-	44	13371	5077	-	38
Davos CH	-	10281	6213	-	60	12110	6559	-	54	15137	6843	-	45
Athens GR	-	7064	5519	-	78	8326	6086	-	73	10407	6812	-	65
Perf. indicators for the table above													
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Company		FERROLI S.p.A.				Country		Italy					
Brand (optional)		SOLEXTECH NAT				Website		www.ferroli.com					
Street		Via Ritonda 78/A				E-mail		info@ferroli.it					
Postal Code		37047		San Bonifacio (VR)		Tel. / Fax		+39 0456139411					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	SOLEXTECH NAT 125		SOLEXTECH NAT 160		SOLEXTECH NAT 200		SOLEXTECH NAT 300						
SOLEXTECH 2.1 V	1		1		1	2	2						
SOLEXTECH 2.6 V			1		1		2						
SOLEXTECH 2.6 H			1		1								
SOLEXTECH 3 V					1		1	2					
SOLEXTECH 3 H							1						
Name of system configuration													
Collector name		SOLEXTECH 2.6 V		No. Collectors		1		Storage name					
								SOLEXTECH NAT 200/2.6					
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff				Daily drawoff				Daily drawoff			
		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	4730	-	50	11164	5109	-	46	13939	5487	-	39
WürzburgDE	-	9114	4857	-	53	10691	5330	-	50	13371	5803	-	44
Davos CH	-	10281	7033	-	69	12110	7569	-	63	15137	8042	-	53
Athens GR	-	7064	5866	-	83	8326	6591	-	79	10407	7506	-	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/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		200		kPa		Max. operating press. - tank side		1000		kPa			
Testing Laboratory		NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB											
Website		www.solar.demokritos.gr											
Test report id. number		6121DE1, 6124DE1, 6124F1											
Date of test report		6/7/2021, 28/6/2021, 29/6/2021											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
Extrapolated													
Stamp & signature of test lab													

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.		OEM 10093.3.2						
Annex to Solar KEYMARK Certificate					Issued		2023-04-20						
Company		FERROLI S.p.A.			Country		Italy						
Brand (optional)		SOLEXTECH NAT			Website		www.ferroli.com						
Street		Via Ritonda 78/A			E-mail		info@ferroli.it						
Postal Code		37047 San Bonifacio (VR)			Tel. / Fax		+39 0456139411						
System family overview													
For each storage and collector size, give number of collectors													
Collector name	SOLEXTECH NAT 125		SOLEXTECH NAT 160		SOLEXTECH NAT 200		SOLEXTECH NAT 300						
SOLEXTECH 2.1 V	1		1		1	2	2						
SOLEXTECH 2.6 V			1		1		2						
SOLEXTECH 2.6 H			1		1								
SOLEXTECH 3 V						1	2						
SOLEXTECH 3 H						1							
Name of system configuration													
Collector name					SOLEXTECH NAT 200/2.6H								
No. Collectors					1								
Storage name					SOLEXTECH NAT 200								
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh	Daily drawoff				Daily drawoff				Daily drawoff			
		170				200				250			
	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	-	9492	4730	-	50	11164	5140	-	46	13939	5487	-	39
Würzburg DE	-	9114	4857	-	54	10691	5330	-	50	13371	5834	-	44
Davos CH	-	10281	7064	-	69	12110	7600	-	63	15137	8073	-	53
Athens GR	-	7064	5897	-	83	8326	6591	-	79	10407	7506	-	72
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								
	± 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		200		kPa	Max. operating press. - tank side		1000		kPa				
Testing Laboratory		NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB											
Website		www.solar.demokritos.gr											
Test report id. number		6121DE1, 6124DE1, 6124F1											
Date of test report		6/7/2021, 28/6/2021, 29/6/2021											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
Extrapolated													
Stamp & signature of test lab													

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

Central Offices: 2, Kalavriton, 145 64 kifisia, Athens, Tel: +30 210 6233493-4 , Fax: +30 210 6233495, <http://www.dqs.gr>, e-mail: i.alexiou@dqs.gr



Summary of		EN12976-2	test results		Certification No.		OEM 10093.3.2						
Annex to Solar KEYMARK Certificate					Issued		2023-04-20						
Company	FERROLI S.p.A.				Country	Italy							
Brand (optional)	SOLEXTech NAT				Website	www.ferroli.com							
Street	Via Ritonda 78/A				E-mail	info@ferroli.it							
Postal Code	37047	San Bonifacio (VR)			Tel. / Fax	+39	0456139411						
System family overview													
For each storage and collector size, give number of collectors													
Collector name	SOLEXTech NAT 125		SOLEXTech NAT 160		SOLEXTech NAT 200		SOLEXTech NAT 300						
SOLEXTech 2.1 V	1		1		1	2	2						
SOLEXTech 2.6 V			1		1		2						
SOLEXTech 2.6 H			1		1								
SOLEXTech 3 V					1		2						
SOLEXTech 3 H							1						
Name of system configuration					SOLEXTech NAT 200/3								
Collector name	SOLEXTech 3 V		No. Collectors	1		Storage name	SOLEXTech NAT 200						
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff				Daily drawoff				Daily drawoff			
		170				200				250			
		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	5109	-	54	11164	5550	-	50	13939	5992	-	43
Würzburg DE	-	9114	5235	-	57	10691	5740	-	54	13371	6307	-	47
Davos CH	-	10281	7663	-	75	12110	8262	-	68	15137	8799	-	58
Athens GR	-	7064	6150	-	87	8326	6875	-	83	10407	7884	-	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/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		200	kPa	Max. operating press. - tank side		1000	kPa						
Testing Laboratory		NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB											
Website		www.solar.demokritos.gr											
Test report id. number		6121DE1, 6124DE1, 6124F1											
Date of test report		6/7/2021, 28/6/2021, 29/6/2021											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
Tested													
Stamp & signature of test lab													

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Version 4.5, 2017-10-24

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Summary of		EN12976-2	test results		Certification No.		OEM 10093.3.2						
Annex to Solar KEYMARK Certificate					Issued		2023-04-20						
Company	FERROLI S.p.A.				Country	Italy							
Brand (optional)	SOLEXTech NAT				Website	www.ferroli.com							
Street	Via Ritonda 78/A				E-mail	info@ferroli.it							
Postal Code	37047	San Bonifacio (VR)			Tel. / Fax	+39	0456139411						
System family overview													
For each storage and collector size, give number of collectors													
Collector name	SOLEXTech NAT 125		SOLEXTech NAT 160		SOLEXTech NAT 200		SOLEXTech NAT 300						
SOLEXTech 2.1 V	1		1		2								
SOLEXTech 2.6 V			1		1		2						
SOLEXTech 2.6 H			1		1								
SOLEXTech 3 V					1		2						
SOLEXTech 3 H						1							
Name of system configuration					SOLEXTech NAT 200/4.2								
Collector name	SOLEXTech 2.1 V		No. Collectors	2		Storage name	SOLEXTech NAT 200						
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	5613	-	59	11164	6244	-	56	13939	7001	-	50
Würzburg DE	-	9114	5613	-	62	10691	6307	-	59	13371	7190	-	54
Davos CH	-	10281	8420	-	82	12110	9398	-	78	15137	10533	-	70
Athens GR	-	7064	6433	-	91	8326	7348	-	88	10407	8672	-	83
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/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											
T _h	45 °C	Desired hot water temperature (mixing valve temperature).											
Max. operating press. - collector side		200	kPa	Max. operating press. - tank side		1000	kPa						
Testing Laboratory		NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB											
Website		www.solar.demokritos.gr											
Test report id. number		6121DE1, 6124DE1, 6124F1											
Date of test report		6/7/2021, 28/6/2021, 29/6/2021											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
Extrapolated													
Stamp & signature of test lab													

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

Central Offices: 2, Kalavriton, 145 64 kifisia, Athens, Tel: +30 210 6233493-4 , Fax: +30 210 6233495, <http://www.dqs.gr>, e-mail: i.alexiou@dqs.gr



Summary of		EN12976-2		test results		Certification No.		OEM 10093.3.2					
Annex to Solar KEYMARK Certificate						Issued		2023-04-20					
Company		FERROLI S.p.A.				Country		Italy					
Brand (optional)		SOLEXTECH NAT				Website		www.ferroli.com					
Street		Via Ritonda 78/A				E-mail		info@ferroli.it					
Postal Code		37047		San Bonifacio (VR)		Tel. / Fax		+39 0456139411					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	SOLEXTECH NAT 125		SOLEXTECH NAT 160		SOLEXTECH NAT 200		SOLEXTECH NAT 300						
SOLEXTECH 2.1 V	1		1		1	2	2						
SOLEXTECH 2.6 V			1		1		2						
SOLEXTECH 2.6 H			1		1								
SOLEXTECH 3 V					1		1	2					
SOLEXTECH 3 H							1						
Name of system configuration													
						SOLEXTECH NAT 300/3							
Collector name		SOLEXTECH 3 V		No. Collectors		1		Storage name					
								SOLEXTECH NAT 300					
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff				Daily drawoff				Daily drawoff			
		250				300				400			
	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	%	
Stockholm SE	-	13939	6244	-	45	16746	6654	-	40	22327	7159	-	32
Würzburg DE	-	13371	6496	-	49	16052	7064	-	44	21413	7569	-	35
Davos CH	-	15137	9177	-	61	18165	9745	-	54	24220	10218	-	42
Athens GR	-	10407	8105	-	78	12488	9082	-	73	16651	10312	-	62
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/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											
T _h	45 °C	Desired hot water temperature (mixing valve temperature).											
Max. operating press. - collector side		200		kPa		Max. operating press. - tank side		1000		kPa			
Testing Laboratory		NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB											
Website		www.solar.demokritos.gr											
Test report id. number		6121DE1, 6124DE1, 6124F1											
Date of test report		6/7/2021, 28/6/2021, 29/6/2021											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
Extrapolated													
Stamp & signature of test lab													

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.		OEM 10093.3.2					
Annex to Solar KEYMARK Certificate						Issued		2023-04-20					
Company		FERROLI S.p.A.				Country		Italy					
Brand (optional)		SOLEXTECH NAT				Website		www.ferroli.com					
Street		Via Ritonda 78/A				E-mail		info@ferroli.it					
Postal Code		37047		San Bonifacio (VR)		Tel. / Fax		+39 0456139411					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	SOLEXTECH NAT 125		SOLEXTECH NAT 160		SOLEXTECH NAT 200		SOLEXTECH NAT 300						
SOLEXTECH 2.1 V	1		1		1	2		2					
SOLEXTECH 2.6 V			1		1			2					
SOLEXTECH 2.6 H			1		1								
SOLEXTECH 3 V					1		1	2					
SOLEXTECH 3 H							1						
Name of system configuration													
Collector name						SOLEXTECH NAT 300/3H							
No. Collectors						1							
Storage name						SOLEXTECH NAT 300							
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff				Daily drawoff				Daily drawoff			
		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	6276	-	45	16746	6686	-	40	22327	7159	-	32
WürzburgDE	-	13371	6528	-	49	16052	7096	-	44	21413	7569	-	35
Davos CH	-	15137	9209	-	61	18165	9776	-	54	24220	10249	-	42
Athens GR	-	10407	8136	-	78	12488	9082	-	73	16651	10344	-	62
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/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		200		kPa		Max. operating press. - tank side		1000		kPa			
Testing Laboratory		NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB											
Website		www.solar.demokritos.gr											
Test report id. number		6121DE1, 6124DE1, 6124F1											
Date of test report		6/7/2021, 28/6/2021, 29/6/2021											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
Extrapolated													
Stamp & signature of test lab													

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.		OEM 10093.3.2					
Annex to Solar KEYMARK Certificate						Issued		2023-04-20					
Company		FERROLI S.p.A.				Country		Italy					
Brand (optional)		SOLEXTECH NAT				Website		www.ferroli.com					
Street		Via Ritonda 78/A				E-mail		info@ferroli.it					
Postal Code		37047		San Bonifacio (VR)		Tel. / Fax		+39 0456139411					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	SOLEXTECH NAT 125		SOLEXTECH NAT 160		SOLEXTECH NAT 200		SOLEXTECH NAT 300						
SOLEXTECH 2.1 V	1		1		1	2	2						
SOLEXTECH 2.6 V			1		1		2						
SOLEXTECH 2.6 H			1		1								
SOLEXTECH 3 V					1		2						
SOLEXTECH 3 H							1						
Name of system configuration													
						SOLEXTECH NAT 300/4.2							
Collector name	SOLEXTECH 2.1 V		No. Collectors		2		Storage name		SOLEXTECH NAT 300				
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff				Daily drawoff				Daily drawoff			
		250	300				400						
	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	%	
Stockholm SE	-	13939	7379	-	53	16746	8073	-	48	22327	8988	-	40
Würzburg DE	-	13371	7506	-	56	16052	8389	-	52	21413	9429	-	44
Davos CH	-	15137	11038	-	73	18165	12078	-	67	24220	13087	-	54
Athens GR	-	10407	8925	-	86	12488	10186	-	82	16651	12078	-	73
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/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		200		kPa		Max. operating press. - tank side		1000		kPa			
Testing Laboratory		NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB											
Website		www.solar.demokritos.gr											
Test report id. number		6121DE1, 6124DE1, 6124F1											
Date of test report		6/7/2021, 28/6/2021, 29/6/2021											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
Extrapolated													

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.		OEM 10093.3.2					
Annex to Solar KEYMARK Certificate						Issued		2023-04-20					
Company		FERROLI S.p.A.				Country		Italy					
Brand (optional)		SOLEXTech NAT				Website		www.ferroli.com					
Street		Via Ritonda 78/A				E-mail		info@ferroli.it					
Postal Code		37047		San Bonifacio (VR)		Tel. / Fax		+39 0456139411					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	SOLEXTech NAT 125		SOLEXTech NAT 160		SOLEXTech NAT 200		SOLEXTech NAT 300						
SOLEXTech 2.1 V	1		1		1	2		2					
SOLEXTech 2.6 V			1		1			2					
SOLEXTech 2.6 H			1		1								
SOLEXTech 3 V					1		1	2					
SOLEXTech 3 H							1						
Name of system configuration													
Collector name		SOLEXTech 2.6 V		No. Collectors		2		Storage name					
								SOLEXTech NAT 300					
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff				Daily drawoff				Daily drawoff			
		250				300				400			
		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	8010	-	57	16746	8893	-	53	22327	10155	-	46
Würzburg DE	-	13371	8042	-	60	16052	9082	-	57	21413	10533	-	49
Davos CH	-	15137	11984	-	79	18165	13371	-	74	24220	15011	-	62
Athens GR	-	10407	9303	-	90	12488	10754	-	86	16651	13024	-	78
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		200		kPa		Max. operating press. - tank side		1000		kPa			
Testing Laboratory		NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB											
Website		www.solar.demokritos.gr											
Test report id. number		6121DE1, 6124DE1, 6124F1											
Date of test report		6/7/2021, 28/6/2021, 29/6/2021											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
Extrapolated													

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.		OEM 10093.3.2					
Annex to Solar KEYMARK Certificate						Issued		2023-04-20					
Company		FERROLI S.p.A.				Country		Italy					
Brand (optional)		SOLEXTECH NAT				Website		www.ferroli.com					
Street		Via Ritonda 78/A				E-mail		info@ferroli.it					
Postal Code		37047		San Bonifacio (VR)		Tel. / Fax		+39 0456139411					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	SOLEXTECH NAT 125		SOLEXTECH NAT 160		SOLEXTECH NAT 200		SOLEXTECH NAT 300						
SOLEXTECH 2.1 V	1		1		1	2	2						
SOLEXTECH 2.6 V			1		1		2						
SOLEXTECH 2.6 H			1		1								
SOLEXTECH 3 V					1		1	2					
SOLEXTECH 3 H							1						
Name of system configuration													
Collector name						SOLEXTECH NAT 300/6							
No. Collectors						2							
Storage name						SOLEXTECH NAT 300							
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff				Daily drawoff				Daily drawoff			
		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	8357	-	60	16746	9366	-	56	22327	10880	-	49
Würzburg DE	-	13371	8326	-	62	16052	9492	-	59	21413	11164	-	52
Davos CH	-	15137	12520	-	83	18165	14097	-	78	24220	16178	-	67
Athens GR	-	10407	9524	-	92	12488	11038	-	88	16651	13529	-	81
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		200		kPa		Max. operating press. - tank side		1000		kPa			
Testing Laboratory		NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB											
Website		www.solar.demokritos.gr											
Test report id. number		6121DE1, 6124DE1, 6124F1											
Date of test report		6/7/2021, 28/6/2021, 29/6/2021											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
Extrapolated													
Stamp & signature of test lab													