



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



E 31



at the following location:

Kyra Vrisi Korinthias, P.O.Box 25 - 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: 2023-04-20

Date of valid: 2024-05-30

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.												
<i>Keymark lic.no. if available</i>		OEM 10115.1.2			<i>Keymark lic.no. if available</i>														
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									litres	mm	mm	mm	litres	kW	
		m ²	mm	mm															
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					Solar loop fluid														
<i>Keymark lic.no. if available</i>					-														
Company					-														
Name					-														
Solar loop pump - power range					- W to - W														
					Recommended/required		Recommended												
					Company		-												
					Name		Calpak Fluid												
					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			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							
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					
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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	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 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	Qd,sh MJ/y	Daily drawoff 80 l				Daily drawoff 110 l				Daily drawoff 140 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	-	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													
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								
	± ΔTc	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.											
ΔTc	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											
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										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 ± 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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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 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	Qd,sh MJ/y	Daily drawoff 110				Daily drawoff 140				Daily drawoff 170			
		Qd,hw MJ/y	QL MJ/y	Qpar MJ/y	f _{sol} %	Qd,hw MJ/y	QL MJ/y	Qpar MJ/y	f _{sol} %	Qd,hw MJ/y	QL MJ/y	Qpar MJ/y	f _{sol} %
Stockholm SE	-	6150	3311	-	54	7821	3816	-	49	9492	4163	-	44
WürzburgDE	-	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													
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											
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											Stamp & signature of test lab		
Extrapolated													

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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	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 110 				Daily drawoff 140 				Daily drawoff 170 			
	MJ/y	Qd,hw	QL	Qpar	f _{sol}	Qd,hw	QL	Qpar	f _{sol}	Qd,hw	QL	Qpar	f _{sol}
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								
	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										Stamp & signature of test lab			
Extrapolated													

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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		1	2					
SOLEXTECH 3 H							1						
Name of system configuration						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	Qd,sh	Daily drawoff 110				Daily drawoff 140				Daily drawoff 170			
		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	-	68
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								
	T _{a,ave}	7,5	9,0	3,2	18,5								
	T _{c,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°											
T _{a,ave}	°C	Annual average outdoor air temperature											
T _{c,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		200		kPa		Max. operating press. - tank side		1000		kPa			
Testing Laboratory		NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB											
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Test method		ISO 9459-5 (DST)											
Comments of test lab										Stamp & signature of test lab			
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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	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 MJ/y	Daily drawoff 170				Daily drawoff 200				Daily drawoff 250			
		Qd,hw MJ/y	QL MJ/y	Qpar MJ/y	f _{sol} %	Qd,hw MJ/y	QL MJ/y	Qpar MJ/y	f _{sol} %	Qd,hw MJ/y	QL MJ/y	Qpar MJ/y	f _{sol} %
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													
Qd,sh	MJ/y	Not relevant for solar domestic hot water system											
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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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	± 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							
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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 200/2.6							
Collector name		SOLEXTECH 2.6 V		No. Collectors		1		Storage name		SOLEXTECH NAT 200			
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh	Daily drawoff 170				Daily drawoff 200				Daily drawoff 250			
		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	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													
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								
± ΔTc	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.											
ΔTc	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											
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										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 ± 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						SOLEXTECH NAT 200/2.6H							
Collector name		SOLEXTECH 2.6 H		No. Collectors		1		Storage name		SOLEXTECH NAT 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	4730	-	50	11164	5140	-	46	13939	5487	-	39
WürzburgDE	-	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										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 ± 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														
Collector name	For each storage and collector size, give number of collectors													
	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 200/3										
Collector name	SOLEXTECH 3 V	No. Collectors	1	Storage name	SOLEXTECH NAT 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 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	5109	-	54	11164	5550	-	50	13939	5992	-	43	
WürzburgDE	-	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														
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									
	± ΔTc	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.												
ΔTc	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												
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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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							
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 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	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	%	
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													
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								
± ΔTc	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.											
ΔTc	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											
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													

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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	Qd,sh	Daily drawoff 250				Daily drawoff 300				Daily drawoff 400			
		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	6244	-	45	16746	6654	-	40	22327	7159	-	32
WürzburgDE	-	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													
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								
	± ΔTc	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.											
ΔTc	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											
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										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 ± 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						SOLEXTECH NAT 300/3H							
Collector name		SOLEXTECH 3 H		No. Collectors		1		Storage name		SOLEXTECH NAT 300			
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh	Daily drawoff 250				Daily drawoff 300				Daily drawoff 400			
		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	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													
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								
± ΔTc	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.											
ΔTc	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									
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										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 ± 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						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 250 l				Daily drawoff 300 l				Daily drawoff 400 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	-	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										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 ± 5 % to ± 15 %

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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		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 300/5.2							
Collector name		SOLEXTECH 2.6 V		No. Collectors		2		Storage name		SOLEXTECH NAT 300			
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh	Daily drawoff 250				Daily drawoff 300				Daily drawoff 400			
		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	8010	-	57	16746	8893	-	53	22327	10155	-	46
WürzburgDE	-	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													
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								
± ΔTc	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.											
ΔTc	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									
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										Stamp & signature of test lab			
Extrapolated													

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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 300/6							
Collector name		SOLEXTECH 3 V		No. Collectors		2		Storage name		SOLEXTECH NAT 300			
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh	Daily drawoff 250				Daily drawoff 300				Daily drawoff 400			
		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	8357	-	60	16746	9366	-	56	22327	10880	-	49
WürzburgDE	-	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													
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											
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f _{sol} =Q _l /Q _d	-	Solar fraction											
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