



Summary of		EN12976-2	SOLAR SYSTEM test results		Licence Number		SKM 10093.3					
Annex to Solar KEYMARK Certificate					Issued		2021-07-09					
Company		CICERO HELLAS S.A.			Country		Greece					
Brand (optional)		Mark4-F, Mark5, Solartherm, Giga XS, Giga, Giga zed, Giga +			Website		www.calpak.gr					
Street		9, Sygrou Ave.			E-mail		export@calpak.gr					
Postal Code		11743	Athens		Tel. / Fax		+30 210 9247250 / 9231616					
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		CICERO HELLAS S.A.			Company		CICERO HELLAS S.A.					
Keymark lic.no. if available		SKM 10115.1			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								
M5-210 (M4-210F)		2.09	1696	1230	M-125	118	1385	500			-	3.5
M5-260 (M4-260F)		2.60	2111	1230	M-160	151	1385	500			-	3.5
M5-260H (M4-260HF)		2.60	1230	2111	M-200	192	1710	500			-	3.5
M5-300 (M4-300F)		3.00	1996	1500	M-300	295	2310	500			-	3.5
M5-300H (M4-300HF)		3.00	1500	1996								
Solar loop controller					Solar loop fluid							
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												
Number of collectors in each configuration for each store												
Collector name	Store name											
	M-125			M-160			M-200			M-300		
M5-210 (M4-210F)	1			1			1		2		2	
M5-260 (M4-260F)				1			1			2		
M5-260H (M4-260HF)				1			1					
M5-300 (M4-300F)							1			2		
M5-300H (M4-300HF)								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												
Comments ...												
N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6544582 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece												



Summary of		EN12976-2		test results		Certification No.		SKM 10093.3					
Annex to Solar KEYMARK Certificate						Issued		2021-07-09					
Company		CICERO HELLAS S.A.				Country		Greece					
Brand (optional)		Mark4-F, Mark5, Solartherm, Giga XS, Giga, Giga zed, Giga +				Website		www.calpak.gr					
Street		9, Sygrou Ave.				E-mail		export@calpak.gr					
Postal Code		11743		Athens		Tel. / Fax		+30 210 9247250 / 9231616					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	M-125			M-160			M-200			M-300			
M5-210 (M4-210F)	1			1			1		2		2		
M5-260 (M4-260F)				1			1				2		
M5-260H (M4-260HF)				1			1						
M5-300 (M4-300F)									1		2		
M5-300H (M4-300HF)									1				
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh} MJ/y	Daily drawoff 170 l				Daily drawoff 200 l				Daily drawoff 250 l			
		Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %	Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %	Q_{d,hw} MJ/y	Q_L MJ/y	Q_{par} MJ/y	f_{sol} %
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													
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	G	Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	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													
Tested N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6544592 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece													

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.		SKM 10093.3					
Annex to Solar KEYMARK Certificate						Issued		2021-07-09					
Company		CICERO HELLAS S.A.				Country		Greece					
Brand (optional)		Mark4-F, Mark5, Solartherm, Giga XS, Giga, Giga zed, Giga +				Website		www.calpak.gr					
Street		9, Sygrou Ave.				E-mail		export@calpak.gr					
Postal Code		11743		Athens		Tel. / Fax		+30 210 9247250 / 9231616					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	M-125		M-160		M-200		M-300						
M5-210 (M4-210F)	1		1		1	2		2					
M5-260 (M4-260F)			1		1			2					
M5-260H (M4-260HF)			1		1								
M5-300 (M4-300F)					1		1	2					
M5-300H (M4-300HF)							1						
Name of system configuration													
						MARK5-125/2.1							
Collector name		M5-210 (M4-210F)		No. Collectors		1		Storage name		M-125			
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh	Daily drawoff				Daily drawoff				Daily drawoff			
		80				110				140			
		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	-	4478	2652	-	59	6150	3311	-	54	7821	3721	-	48
WürzburgDE	-	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								
	± 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													
N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6544582 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece													

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.	SKM 10093.3									
Annex to Solar KEYMARK Certificate			Issued	2021-07-09									
Company	CICERO HELLAS S.A.		Country	Greece									
Brand (optional)	Mark4-F, Mark5, Solartherm, Giga XS, Giga, Giga zed, Giga +		Website	www.calpak.gr									
Street	9, Sygrou Ave.		E-mail	export@calpak.gr									
Postal Code	11743	Athens	Tel. / Fax	+30 210 9247250 / 9231616									
System family overview													
	For each storage and collector size, give number of collectors												
Collector name	M-125	M-160	M-200	M-300									
M5-210 (M4-210F)	1	1	1	2									
M5-260 (M4-260F)		1	1	2									
M5-260H (M4-260HF)		1	1										
M5-300 (M4-300F)			1	2									
M5-300H (M4-300HF)				1									
Name of system configuration													
			MARK5-160/2.1										
Collector name	M5-210 (M4-210F)	No. Collectors	1	Storage name	M-160								
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	-	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											
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													
N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6544592 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece													

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.		SKM 10093.3					
Annex to Solar KEYMARK Certificate						Issued		2021-07-09					
Company		CICERO HELLAS S.A.				Country		Greece					
Brand (optional)		Mark4-F, Mark5, Solartherm, Giga XS, Giga, Giga zed, Giga +				Website		www.calpak.gr					
Street		9, Sygrou Ave.				E-mail		export@calpak.gr					
Postal Code		11743		Athens		Tel. / Fax		+30 210 9247250 / 9231616					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	M-125		M-160		M-200		M-300						
M5-210 (M4-210F)	1		1		1	2	2						
M5-260 (M4-260F)			1		1		2						
M5-260H (M4-260HF)			1		1								
M5-300 (M4-300F)					1		1	2					
M5-300H (M4-300HF)							1						
Name of system configuration													
Collector name						MARK5-160/2.6							
Collector name		M5-260 (M4-260F)		No. Collectors		1		Storage name		M-160			
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh	Daily drawoff				Daily drawoff				Daily drawoff			
		110 l				140 l				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	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	-	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													
Extrapolated													
N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6544582 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece													

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



Summary of		EN12976-2		test results		Certification No.		SKM 10093.3											
Annex to Solar KEYMARK Certificate						Issued		2021-07-09											
Company		CICERO HELLAS S.A.				Country		Greece											
Brand (optional)		Mark4-F, Mark5, Solartherm, Giga XS, Giga, Giga zed, Giga +				Website		www.calpak.gr											
Street		9, Sygrou Ave.				E-mail		export@calpak.gr											
Postal Code		11743		Athens		Tel. / Fax		+30 210 9247250 / 9231616											
System family overview																			
For each storage and collector size, give number of collectors																			
Collector name	M-125				M-160				M-200				M-300						
M5-210 (M4-210F)	1				1				1			2			2				
M5-260 (M4-260F)					1				1						2				
M5-260H (M4-260HF)					1				1										
M5-300 (M4-300F)									1				1			2			
M5-300H (M4-300HF)													1						
Name of system configuration										MARK5-160/2.6H									
Collector name		M5-260H (M4-260HF)		No. Collectors		1		Storage name		M-160									
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	-	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																	
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										N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6544582 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece									

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.		SKM 10093.3					
Annex to Solar KEYMARK Certificate						Issued		2021-07-09					
Company		CICERO HELLAS S.A.				Country		Greece					
Brand (optional)		Mark4-F, Mark5, Solartherm, Giga XS, Giga, Giga zed, Giga +				Website		www.calpak.gr					
Street		9, Sygrou Ave.				E-mail		export@calpak.gr					
Postal Code		11743		Athens		Tel. / Fax		+30 210 9247250 / 9231616					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	M-125		M-160		M-200		M-300						
M5-210 (M4-210F)	1		1		1	2	2						
M5-260 (M4-260F)			1		1		2						
M5-260H (M4-260HF)			1		1								
M5-300 (M4-300F)					1		1	2					
M5-300H (M4-300HF)							1						
Name of system configuration													
Collector name						Storage name							
M5-210 (M4-210F)						M-200							
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh	Daily drawoff				Daily drawoff				Daily drawoff			
		170	I	200	I	250	I						
	Qd,hw QL Qpar fsol	Qd,hw QL Qpar fsol	Qd,hw QL Qpar fsol	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
Würzburg DE	-	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											
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													
Extrapolated													
N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6544592 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece													

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



Summary of		EN12976-2		test results		Certification No.		SKM 10093.3					
Annex to Solar KEYMARK Certificate						Issued		2021-07-09					
Company		CICERO HELLAS S.A.				Country		Greece					
Brand (optional)		Mark4-F, Mark5, Solartherm, Giga XS, Giga, Giga zed, Giga +				Website		www.calpak.gr					
Street		9, Sygrou Ave.				E-mail		export@calpak.gr					
Postal Code		11743		Athens		Tel. / Fax		+30 210 9247250 / 9231616					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	M-125			M-160			M-200			M-300			
M5-210 (M4-210F)	1			1			1		2		2		
M5-260 (M4-260F)				1			1				2		
M5-260H (M4-260HF)					1			1					
M5-300 (M4-300F)								1			2		
M5-300H (M4-300HF)										1			
Name of system configuration										MARK5-200/2.6			
Collector name		M5-260 (M4-260F)		No. Collectors		1		Storage name		M-200			
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
Würzburg DE	-	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										N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6544592 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece			
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.	SKM 10093.3									
Annex to Solar KEYMARK Certificate			Issued	2021-07-09									
Company	CICERO HELLAS S.A.		Country	Greece									
Brand (optional)	Mark4-F, Mark5, Solartherm, Giga XS, Giga, Giga zed, Giga +		Website	www.calpak.gr									
Street	9, Sygrou Ave.		E-mail	export@calpak.gr									
Postal Code	11743	Athens	Tel. / Fax	+30 210 9247250 / 9231616									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	M-125		M-160										
M5-210 (M4-210F)	1		1										
M5-260 (M4-260F)		1		1									
M5-260H (M4-260HF)		1		1									
M5-300 (M4-300F)				1									
M5-300H (M4-300HF)				1									
Name of system configuration													
				MARK5-200/2.6H									
Collector name	M5-260H (M4-260HF)	No. Collectors	1	Storage name									
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	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													
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 N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6544592 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece													

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.		SKM 10093.3					
Annex to Solar KEYMARK Certificate						Issued		2021-07-09					
Company		CICERO HELLAS S.A.				Country		Greece					
Brand (optional)		Mark4-F, Mark5, Solartherm, Giga XS, Giga, Giga zed, Giga +				Website		www.calpak.gr					
Street		9, Sygrou Ave.				E-mail		export@calpak.gr					
Postal Code		11743		Athens		Tel. / Fax		+30 210 9247250 / 9231616					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	M-125		M-160		M-200		M-300						
M5-210 (M4-210F)	1		1		1	2		2					
M5-260 (M4-260F)			1		1			2					
M5-260H (M4-260HF)			1		1								
M5-300 (M4-300F)					1		1	2					
M5-300H (M4-300HF)							1						
Name of system configuration													
						MARK5-200/4.2							
Collector name		M5-210 (M4-210F)		No. Collectors		2		Storage name		M-200			
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff				Daily drawoff				Daily drawoff			
		170		I		200		I		250		I	
	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	-	9492	5613	-	59	11164	6244	-	56	13939	7001	-	50
WürzburgDE	-	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											
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													
N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6544582 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece													

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



Summary of		EN12976-2	test results		Certification No.		SKM 10093.3						
Annex to Solar KEYMARK Certificate					Issued		2021-07-09						
Company		CICERO HELLAS S.A.			Country		Greece						
Brand (optional)		Mark4-F, Mark5, Solartherm, Giga XS, Giga, Giga zed, Giga +			Website		www.calpak.gr						
Street		9, Sygrou Ave.			E-mail		export@calpak.gr						
Postal Code		11743 Athens			Tel. / Fax		+30 210 9247250 / 9231616						
System family overview													
For each storage and collector size, give number of collectors													
Collector name	M-125		M-160		M-200		M-300						
M5-210 (M4-210F)	1		1		1	2	2						
M5-260 (M4-260F)			1		1		2						
M5-260H (M4-260HF)			1		1								
M5-300 (M4-300F)					1		1	2					
M5-300H (M4-300HF)							1						
Name of system configuration													
Collector name					MARK5-300/3								
Collector name		M5-300 (M4-300F)		No. Collectors		1		Storage name					
								M-300					
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff				Daily drawoff				Daily drawoff			
		250 l				300 l				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}	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}	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	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											
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													
N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6544582 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece													

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: 4, 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.		SKM 10093.3					
Annex to Solar KEYMARK Certificate						Issued		2021-07-09					
Company		CICERO HELLAS S.A.				Country		Greece					
Brand (optional)		Mark4-F, Mark5, Solartherm, Giga XS, Giga, Giga zed, Giga +				Website		www.calpak.gr					
Street		9, Sygrou Ave.				E-mail		export@calpak.gr					
Postal Code		11743		Athens		Tel. / Fax		+30 210 9247250 / 9231616					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	M-125			M-160			M-200			M-300			
M5-210 (M4-210F)	1			1			1		2		2		
M5-260 (M4-260F)				1			1				2		
M5-260H (M4-260HF)					1			1					
M5-300 (M4-300F)								1			2		
M5-300H (M4-300HF)										1			
Name of system configuration										MARK5-300/3H			
Collector name		M5-300H (M4-300HF)		No. Collectors		1		Storage name		M-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
Würzburg DE	-	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										N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6844592 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece			
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.		SKM 10093.3					
Annex to Solar KEYMARK Certificate						Issued		2021-07-09					
Company		CICERO HELLAS S.A.				Country		Greece					
Brand (optional)		Mark4-F, Mark5, Solartherm, Giga XS, Giga, Giga zed, Giga +				Website		www.calpak.gr					
Street		9, Sygrou Ave.				E-mail		export@calpak.gr					
Postal Code		11743		Athens		Tel. / Fax		+30 210 9247250 / 9231616					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	M-125		M-160		M-200		M-300						
M5-210 (M4-210F)	1		1		1	2	2						
M5-260 (M4-260F)			1		1		2						
M5-260H (M4-260HF)			1		1								
M5-300 (M4-300F)					1		1	2					
M5-300H (M4-300HF)							1						
Name of system configuration													
Collector name						No. Collectors		Storage name					
M5-210 (M4-210F)						2		M-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	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											
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													
N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6544582 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece													

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.		SKM 10093.3																	
Annex to Solar KEYMARK Certificate						Issued		2021-07-09																	
Company		CICERO HELLAS S.A.				Country		Greece																	
Brand (optional)		Mark4-F, Mark5, Solartherm, Giga XS, Giga, Giga zed, Giga +				Website		www.calpak.gr																	
Street		9, Sygrou Ave.				E-mail		export@calpak.gr																	
Postal Code		11743		Athens		Tel. / Fax		+30 210 9247250 / 9231616																	
System family overview																									
For each storage and collector size, give number of collectors																									
Collector name	M-125			M-160			M-200			M-300															
M5-210 (M4-210F)	1			1			1		2		2														
M5-260 (M4-260F)				1			1				2														
M5-260H (M4-260HF)					1			1																	
M5-300 (M4-300F)								1			2														
M5-300H (M4-300HF)										1															
Name of system configuration						MARK5-300/5.2																			
Collector name		M5-260 (M4-260F)		No. Collectors		2		Storage name		M-300															
Calculated annual results for "solar-only / preheat system"																									
Location	Q_{d,sh}	Daily drawoff				250				Daily drawoff				300				Daily drawoff				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}	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	%	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/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 N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6844592 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece																							

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.		SKM 10093.3					
Annex to Solar KEYMARK Certificate						Issued		2021-07-09					
Company		CICERO HELLAS S.A.				Country		Greece					
Brand (optional)		Mark4-F, Mark5, Solartherm, Giga XS, Giga, Giga zed, Giga +				Website		www.calpak.gr					
Street		9, Sygrou Ave.				E-mail		export@calpak.gr					
Postal Code		11743		Athens		Tel. / Fax		+30 210 9247250 / 9231616					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	M-125		M-160		M-200		M-300						
M5-210 (M4-210F)	1		1		1	2	2						
M5-260 (M4-260F)			1		1		2						
M5-260H (M4-260HF)			1		1								
M5-300 (M4-300F)					1		1	2					
M5-300H (M4-300HF)							1						
Name of system configuration													
						MARK5-300/6							
Collector name		M5-300 (M4-300F)		No. Collectors		2		Storage name					
								M-300					
Calculated annual results for "solar-only / preheat system"													
Location	Q_{d,sh}	Daily drawoff				Daily drawoff				Daily drawoff			
		250 l				300 l				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	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/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													
N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6544582 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece													

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