



ΠΙΣΤΟΠΟΙΗΤΙΚΟ ΣΥΜΜΟΡΦΩΣΗΣ

Αρ. Πιστοποιητικού SKM 10160

Η DQS Hellas χορηγεί το παρόν Πιστοποιητικό στην επιχείρηση:

ΗΟΝΑΤ ΜΟΝΟΠΡΟΣΩΠΗ Ε.Π.Ε.

για το προϊόν:

Τύπος οικογένειας Ηλιακών Συστημάτων:

**ΗΟΝ120-1.50, ΗΟΝ120-2.00, ΗΟΝ160-2.00, ΗΟΝ160-2.30, ΗΟΝ160-2.50, ΗΟΝ160-3.00,
ΗΟΝ200-3.00, ΗΟΝ200-4.00, ΗΟΝ300-4.00, ΗΟΝ300-4.60**

το οποίο παράγεται σύμφωνα με τα τυποποιητικά έγγραφα:

**EN 12976-1:2017
EN 12976-2:2019
EN 12975-1:2011
EN ISO 9806:2017**

στην ακόλουθη θέση:

**Θέση Στεφάνι, Παραλία Ασπροπύργου
19300 Ασπρόπυργος**



Το παρόν Πιστοποιητικό χορηγείται σύμφωνα με:

- το Γενικό Κανονισμό Πιστοποίησης Προϊόντων της DQS Hellas,
- τον Ειδικό Κανονισμό Πιστοποίησης ΕΚΠΠ.001 «Ειδικός Κανονισμός Πιστοποίησης Ηλιακών Συλλεκτών, και Οικιακών Ηλιακών Συστημάτων Θέρμανσης Νερού»

και διέπεται από τους όρους της αντίστοιχης σύμβασης μεταξύ της DQS Hellas και της επιχείρησης

Ημερομηνία Έκδοσης: **2023-10-20**

Ημερομηνία Λήξεως: **2026-10-20**

Παναγιώτης Γιαννούτσος
Διευθυντής Πιστοποίησης

Dr. Εμμανουήλ Δεληγιαννάκης
Γενικός Διευθυντής



Πιστοποίηση Προϊόντων

Αρ. Πιστ.: 735

Διαπιστευμένος Φορέας: Καλαβρύτων 2, 14564 Κηφισιά – Αθήνα

ΓΚΠΠ-08 – 15/12/2014



CERTIFICATE OF CONFORMITY

Certificate No SKM 10152

DQS Hellas grants the present certificate to the enterprise:

HOVAT M. Ltd

for the product:

Type of Solar Systems Family:

**HOV120-1.50, HOV120-2.00, HOV160-2.00, HOV160-2.30, HOV160-2.50, HOV160-3.00,
HOV200-3.00, HOV200-4.00, HOV300-4.00, HOV300-4.60**

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:

**Location Stefani
19300 Aspropyrgos**



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»,*

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

Date of issue: 2023-10-20

Date of valid: 2026-10-20

Panagiotis Giannoutsos
Director of Certification

Dr. Emmanuel Deliyannakis
Managing Director



Products Certification
Cert. No: 735

Accredited Body: 2, Kalavriton Street, 14564 Kifissia - Athens, Greece

ΓΚIII-08 – 15/12/2014



ΠΙΣΤΟΠΟΙΗΤΙΚΟ ΑΔΕΙΑ ΧΡΗΣΕΩΣ KEYMARK

Αρ. Πιστοποιητικού SKM 10160

Η DQS Hellas χορηγεί την παρούσα άδεια στην επιχείρηση:

ΗΟΝΑΤ ΜΟΝΟΠΡΟΣΩΠΗ Ε.Π.Ε.

για το προϊόν:

Τύπος οικογένειας Ηλιακών Συστημάτων:

**HOV120-1.50, HOV120-2.00, HOV160-2.00, HOV160-2.30, HOV160-2.50, HOV160-3.00,
HOV200-3.00, HOV200-4.00, HOV300-4.00, HOV300-4.60**

το οποίο παράγεται σύμφωνα με τα τυποποιητικά έγγραφα:

EN 12976-1:2017
EN 12976-2:2019
EN 12975-1:2011
EN ISO 9806:2013



στην ακόλουθη θέση:

**Θέση Στεφάνι, Παραλία Ασπροπύργου
19300 Ασπρόπυργος**

Η παρούσα Άδεια χορηγείται σύμφωνα με:

- το Γενικό Κανονισμό Πιστοποίησης Προϊόντων της DQS Hellas,
- τον Ειδικό Κανονισμό Πιστοποίησης ΕΚΠΠ.001 «Ειδικός Κανονισμός Πιστοποίησης Ηλιακών Συλλεκτών, και Οικιακών Ηλιακών Συστημάτων Θέρμανσης Νερού»,
- τον Ειδικό Κανονισμό της CEN Σχήματος SOLAR KEYMARK για ηλιακά θερμικά προϊόντα,

και διέπεται από τους όρους της αντίστοιχης σύμβασης μεταξύ της DQS Hellas και της επιχείρησης.

Ημερομηνία Έκδοσης: **2023-10-20**

Ημερομηνία Λήξεως: **2026-10-20**

Παναγιώτης Γιαννούτσος
Διευθυντής Πιστοποίησης

Dr. Εμμανουήλ Δεληγιαννάκης
Γενικός Διευθυντής



CERTIFICATION LICENCE TO USE KEYMARK

Certificate No SKM 10160

DQS Hellas grants the present certificate to the enterprise:

HOVAT M. Ltd

for the product:

Type of Solar Systems Family:

**HOV120-1.50, HOV120-2.00, HOV160-2.00, HOV160-2.30, HOV160-2.50, HOV160-3.00,
HOV200-3.00, HOV200-4.00, HOV300-4.00, HOV300-4.60**

which is produced in conformity with the normative document:

**EN 12976-1:2017
EN 12976-2:2019
EN 12975-1:2011
EN ISO 9806:2013**

at the following location:

**Location Stefani
19300 Aspropyrgos**



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.

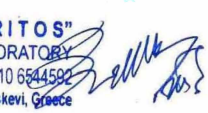
Date of issue: 2023-10-20

Date of valid: 2026-10-20

Panagiotis Giannoutsos
Director of Certification

Dr. Emmanuel Deliyannakis
Managing Director



Summary of	EN12976-2	SOLAR SYSTEM test results		Licence Number	SKM 10160					
Annex to Solar KEYMARK Certificate				Issued	2023-10-20					
Company	HOVAT M. Ltd			Country	Greece					
Brand (optional)				Website	www.hovat.gr					
Street	Thesi Stefani			E-mail	info@hovat-mepe.gr					
Postal Code	19300	Aspropyrgos		Tel. / Fax	+30	2105570893-4				
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)	Other									
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	HOVAT M. Ltd			Company	HOVAT M. Ltd					
Keymark lic.no. if available	OEM 10061.7			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							
HOV-1.5	1.50	1485	1010	HOV120	116	1050	520	-	~	~3,5
HOV-1.75	1.75	1730	1010	HOV160	156	1300	520	-	~	~3,5
HOV-2.0	2.00	1980	1010	HOV200	192	1300	580	-	~	~3,5
HOV-2.3	2.30	1980	1160	HOV300	296	1800	580	-	~	~3,5
HOV-2.5	2.46	1990	1235							
Solar loop controller				Solar loop fluid						
Keymark lic.no. if available				Recommended/required	Required					
Company Name				Company Name	-					
Solar loop pump - power range	- W	to	- W	Freezing point	-49	°C				
System family overview										
Collector name	Number of collectors in each configuration for each store									
	Store name									
	HOV120		HOV160		HOV200		HOV300			
HOV-1.5	1		2		2					
HOV-1.75										
HOV-2.0	1		1		2		2			
HOV-2.3			1				2			
HOV-2.5			1							
Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB									
Website	www.solar.demokritos.gr									
Test report id. number	6131 DE1, 6132 DE1, 6131 F1									
Date of test report	23/6/2023, 26/6/2023									
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						




Summary of	EN12976-2	test results	Certification No.	SKM 10160															
Annex to Solar KEYMARK Certificate			Issued	2023-10-20															
Company	HOVAT M. Ltd		Country	Greece															
Brand (optional)	0		Website	www.hovat.gr															
Street	Thesi Stefani		E-mail	info@hovat-mepe.gr															
Postal Code	19300	Aspropyrgos	Tel. / Fax	+30 2105570893-4															
System family overview																			
Collector name	For each storage and collector size, give number of collectors																		
	HOV120				HOV160				HOV200				HOV300						
HOV-1.5	1			2			2												
HOV-1.75																			
HOV-2.0	1			1			2			2									
HOV-2.3				1						2									
HOV-2.5				1															
Name of system configuration			HOV120-1.50																
Collector name	HOV-1.5			No. Collectors				1				Storage name				HOV120			
Calculated annual results for "solar-only / preheat system"																			
Location	Qd,sh	Daily drawoff 80 l				Daily drawoff 110 l				Daily drawoff 140 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	-	4478	1977	-	44	6150	2346	-	38	7821	2517	-	32						
WürzburgDE	-	4289	2031	-	47	5897	2457	-	42	7506	2668	-	36						
Davos CH	-	4857	2841	-	59	6654	3311	-	50	8483	3564	-	42						
Athens GR	-	3343	2567	-	77	4573	3217	-	70	5834	3627	-	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														
	Ta,ave	7.5	9.0	3.2	18.5														
	Tc,ave	8.5	10.0	5.4	17.8														
	$\pm \Delta Tc$	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.																	
ΔTc	K	Seasonal variation of Tc																	
Th	45 °C	Desired hot water temperature (mixing valve temperature).																	
Max. operating press. - collector side				300	kPa	Max. operating press. - tank side				1000	kPa								
Testing Laboratory				NCSR "DEMOKRITOS" - SOLAR & ENERGY SYSTEMS LAB															
Website				www.solar.demokritos.gr															
Test report id. number				6131 DE1, 6132 DE1, 6131 F1															
Date of test report				23/6/2023, 26/6/2023															
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 $\pm 5\%$ to $\pm 15\%$

Version 4.5, 2017-10-24




Summary of	EN12976-2	test results	Certification No.	SKM 10160									
Annex to Solar KEYMARK Certificate			Issued	2023-10-20									
Company	HOVAT M. Ltd		Country	Greece									
Brand (optional)	0		Website	www.howat.gr									
Street	Thesi Stefani		E-mail	info@hovat-mepe.gr									
Postal Code	19300	Aspropyrgos	Tel. / Fax	+30 2105570893-4									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	HOV120	HOV160	HOV200	HOV300									
HOV-1.5	1	2	2										
HOV-1.75													
HOV-2.0	1	1	2	2									
HOV-2.3		1		2									
HOV-2.5		1											
Name of system configuration			HOV120-2.00										
Collector name	HOV-2.0	No. Collectors	1	Storage name	HOV120								
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh MJ/y	Daily drawoff 80				Daily drawoff 110				Daily drawoff 140			
		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	2277	-	51	6150	2797	-	45	7821	3065	-	39
WürzburgDE	-	4289	2296	-	54	5897	2867	-	49	7506	3217	-	43
Davos CH	-	4857	3343	-	69	6654	4068	-	61	8483	4415	-	52
Athens GR	-	3343	2794	-	84	4573	3595	-	79	5834	4163	-	71
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	G	Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	T _{a,ave}	1,157	1,230	1,684	1,736								
	T _{c,ave}	7.5	9.0	3.2	18.5								
	± ΔT _c	8.5	10.0	5.4	17.8								
		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		300	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		6131 DE1, 6132 DE1, 6131 F1											
Date of test report		23/6/2023, 26/6/2023											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
Extrapolated													
<p style="text-align: right;">N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6544592 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece</p> 													

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 10160									
Annex to Solar KEYMARK Certificate			Issued	2023-10-20									
Company	HOVAT M. Ltd		Country	Greece									
Brand (optional)	0		Website	www.hovat.gr									
Street	Thesi Stefani		E-mail	info@hovat-mepe.gr									
Postal Code	19300	Aspropyrgos	Tel. / Fax	+30 2105570893-4									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	HOV120	HOV160	HOV200	HOV300									
HOV-1.5	1	2	2										
HOV-1.75													
HOV-2.0	1	1	2	2									
HOV-2.3		1		2									
HOV-2.5		1											
Name of system configuration			HOV160-2.00										
Collector name	HOV-2.0	No. Collectors	1	Storage name	HOV160								
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh MJ/y	Daily drawoff 140				Daily drawoff 170				Daily drawoff 200			
		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	-	7821	3154	-	40	9492	3374	-	36	11164	3500	-	31
WürzburgDE	-	7506	3311	-	44	9114	3595	-	39	10691	3753	-	35
Davos CH	-	8483	4573	-	54	10281	4857	-	47	12110	5014	-	41
Athens GR	-	5834	4257	-	73	7064	4762	-	67	8326	5140	-	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	G	Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	T _{a,ave}	1,157	1,230	1,684	1,736								
	T _{c,ave}	7.5	9.0	3.2	18.5								
	± ΔT _c	8.5	10.0	5.4	17.8								
		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		300	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		6131 DE1, 6132 DE1, 6131 F1											
Date of test report		23/6/2023, 26/6/2023											
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 10160									
Annex to Solar KEYMARK Certificate			Issued	2023-10-20									
Company	HOVAT M. Ltd		Country	Greece									
Brand (optional)	0		Website	www.hovat.gr									
Street	Thesi Stefani		E-mail	info@hovat-mepe.gr									
Postal Code	19300	Aspropyrgos	Tel. / Fax	+30 2105570893-4									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	HOV120		HOV160										
	HOV200		HOV300										
HOV-1.5	1		2										
HOV-1.75													
HOV-2.0	1		2	2									
HOV-2.3		1		2									
HOV-2.5		1											
Name of system configuration			HOV160-2.30										
Collector name	HOV-2.3	No. Collectors	1	Storage name									
				HOV160									
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh	Daily drawoff 140				Daily drawoff 170				Daily drawoff 200			
		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	-	7821	3437	-	44	9492	3721	-	39	11164	3879	-	35
WürzburgDE	-	7506	3595	-	48	9114	3942	-	43	10691	4131	-	39
Davos CH	-	8483	5046	-	59	10281	5393	-	52	12110	5582	-	46
Athens GR	-	5834	4510	-	77	7064	5077	-	72	8326	5519	-	66
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	G	Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	T _{a,ave}	1,157	1,230	1,684	1,736								
	T _{c,ave}	7.5	9.0	3.2	18.5								
	± ΔT _c	8.5	10.0	5.4	17.8								
		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		300	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		6131 DE1, 6132 DE1, 6131 F1											
Date of test report		23/6/2023, 26/6/2023											
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 10160									
Annex to Solar KEYMARK Certificate			Issued	2023-10-20									
Company	HOVAT M. Ltd		Country	Greece									
Brand (optional)	0		Website	www.hovat.gr									
Street	Thesi Stefani		E-mail	info@hovat-mepe.gr									
Postal Code	19300	Aspropyrgos	Tel. / Fax	+30 2105570893-4									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	HOV120		HOV160										
	HOV200		HOV300										
HOV-1.5	1	2	2										
HOV-1.75													
HOV-2.0	1	1	2	2									
HOV-2.3		1		2									
HOV-2.5		1											
Name of system configuration			HOV160-2.50										
Collector name	HOV-2.5	No. Collectors	1	Storage name									
				HOV160									
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh	Daily drawoff 140				Daily drawoff 170				Daily drawoff 200			
		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	-	7821	3564	-	46	9492	3847	-	41	11164	4037	-	36
WürzburgDE	-	7506	3690	-	49	9114	4068	-	45	10691	4320	-	40
Davos CH	-	8483	5235	-	62	10281	5645	-	55	12110	5866	-	48
Athens GR	-	5834	4604	-	79	7064	5203	-	74	8326	5676	-	68
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	G	Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	T _{a,ave}	1,157	1,230	1,684	1,736								
	T _{c,ave}	7.5	9.0	3.2	18.5								
	± ΔT _c	8.5	10.0	5.4	17.8								
		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		300	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		6131 DE1, 6132 DE1, 6131 F1											
Date of test report		23/6/2023, 26/6/2023											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
Tested													
<p style="text-align: right;">N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6544592 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece</p> 													

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 10160						
Annex to Solar KEYMARK Certificate					Issued		2023-10-20						
Company	HOVAT M. Ltd				Country	Greece							
Brand (optional)	0				Website	www.hovat.gr							
Street	Thesi Stefani				E-mail	info@hovat-mepe.gr							
Postal Code	19300	Aspropyrgos		Tel. / Fax	+30	2105570893-4							
System family overview													
For each storage and collector size, give number of collectors													
Collector name	HOV120		HOV160		HOV200		HOV300						
HOV-1.5	1		2		2								
HOV-1.75													
HOV-2.0	1		1		2		2						
HOV-2.3			1				2						
HOV-2.5			1										
Name of system configuration					HOV160-3.00								
Collector name	HOV-1.5		No. Collectors		2		Storage name		HOV160				
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh	Daily drawoff 140 l				Daily drawoff 170 l				Daily drawoff 200 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	-	7821	3942	-	50	9492	4320	-	46	11164	4573	-	41
Würzburg DE	-	7506	4005	-	53	9114	4510	-	49	10691	4857	-	45
Davos CH	-	8483	5834	-	69	10281	6433	-	63	12110	6780	-	56
Athens GR	-	5834	4857	-	83	7064	5582	-	79	8326	6181	-	74
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			300	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					6131 DE1, 6132 DE1, 6131 F1								
Date of test report					23/6/2023, 26/6/2023								
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 10160									
Annex to Solar KEYMARK Certificate			Issued	2023-10-20									
Company	HOVAT M. Ltd		Country	Greece									
Brand (optional)	0		Website	www.hovat.gr									
Street	Thesi Stefani		E-mail	info@hovat-mepe.gr									
Postal Code	19300	Aspropyrgos	Tel. / Fax	+30 2105570893-4									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	HOV120	HOV160	HOV200	HOV300									
HOV-1.5	1	2	2										
HOV-1.75													
HOV-2.0	1	1	2	2									
HOV-2.3		1		2									
HOV-2.5		1											
Name of system configuration			HOV200-3.00										
Collector name	HOV-1.5	No. Collectors	2	Storage name	HOV200								
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	4289	-	45	11164	4636	-	42	13939	4951	-	36
WürzburgDE	-	9114	4478	-	49	10691	4888	-	46	13371	5298	-	40
Davos CH	-	10281	6339	-	62	12110	6780	-	56	15137	7159	-	47
Athens GR	-	7064	5582	-	79	8326	6213	-	75	10407	7001	-	67
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	G	Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	T _{a,ave}	1,157	1,230	1,684	1,736								
	T _{c,ave}	7.5	9.0	3.2	18.5								
	± ΔT _c	8.5	10.0	5.4	17.8								
		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		300	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		6131 DE1, 6132 DE1, 6131 F1											
Date of test report		23/6/2023, 26/6/2023											
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 10160									
Annex to Solar KEYMARK Certificate			Issued	2023-10-20									
Company	HOVAT M. Ltd		Country	Greece									
Brand (optional)	0		Website	www.hovat.gr									
Street	Thesi Stefani		E-mail	info@hovat-mepe.gr									
Postal Code	19300	Aspropyrgos	Tel. / Fax	+30 2105570893-4									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	HOV120	HOV160	HOV200	HOV300									
HOV-1.5	1	2	2										
HOV-1.75													
HOV-2.0	1	1	2	2									
HOV-2.3		1		2									
HOV-2.5		1											
Name of system configuration			HOV200-4.00										
Collector name	HOV-2.0	No. Collectors	2	Storage name	HOV200								
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	4888	-	51	11164	5393	-	48	13939	5866	-	42
WürzburgDE	-	9114	4983	-	55	10691	5550	-	52	13371	6181	-	46
Davos CH	-	10281	7316	-	71	12110	8010	-	66	15137	8704	-	58
Athens GR	-	7064	5992	-	85	8326	6780	-	81	10407	7852	-	75
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	G	Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	T _{a,ave}	1,157	1,230	1,684	1,736								
	T _{c,ave}	7.5	9.0	3.2	18.5								
	± ΔT _c	8.5	10.0	5.4	17.8								
		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		300	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		6131 DE1, 6132 DE1, 6131 F1											
Date of test report		23/6/2023, 26/6/2023											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
Extrapolated													
<p style="text-align: right;">N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6544592 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece</p> 													

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: Kalavriton 2, 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 10160									
Annex to Solar KEYMARK Certificate			Issued	2023-10-20									
Company	HOVAT M. Ltd		Country	Greece									
Brand (optional)	0		Website	www.hovat.gr									
Street	Thesi Stefani		E-mail	info@hovat-mepe.gr									
Postal Code	19300	Aspropyrgos	Tel. / Fax	+30 2105570893-4									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	HOV120	HOV160	HOV200	HOV300									
HOV-1.5	1	2	2										
HOV-1.75													
HOV-2.0	1	1	2	2									
HOV-2.3		1		2									
HOV-2.5		1											
Name of system configuration			HOV300-4.00										
Collector name	HOV-2.0	No. Collectors	2	Storage name	HOV300								
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	6307	-	45	16746	6749	-	40	22327	7253	-	32
WürzburgDE	-	13371	6528	-	49	16052	7127	-	44	21413	7695	-	36
Davos CH	-	15137	9209	-	61	18165	9839	-	54	24220	10407	-	43
Athens GR	-	10407	8136	-	78	12488	9145	-	73	16651	10438	-	63
Perf. indicators for the table above													
Qd,sh	MJ/y	Not relevant for solar domestic hot water system											
Qd	MJ/y	Annual heat demand for domestic hot water											
QL	MJ/y	Annual heat energy delivered by the solar system											
Qpar	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)											
f _{sol} =Q _l /Q _d	-	Solar fraction											
Ref. conditions	G	Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	T _{a,ave}	1,157	1,230	1,684	1,736								
	T _{c,ave}	7.5	9.0	3.2	18.5								
	± ΔT _c	8.5	10.0	5.4	17.8								
		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		300	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		6131 DE1, 6132 DE1, 6131 F1											
Date of test report		23/6/2023, 26/6/2023											
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 10160									
Annex to Solar KEYMARK Certificate			Issued	2023-10-20									
Company	HOVAT M. Ltd		Country	Greece									
Brand (optional)	0		Website	www.hovat.gr									
Street	Thesi Stefani		E-mail	info@hovat-mepe.gr									
Postal Code	19300	Aspropyrgos	Tel. / Fax	+30 2105570893-4									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	HOV120		HOV160										
	HOV200		HOV300										
HOV-1.5	1	2	2										
HOV-1.75													
HOV-2.0	1	1	2	2									
HOV-2.3		1		2									
HOV-2.5		1											
Name of system configuration			HOV300-4.60										
Collector name	HOV-2.3	No. Collectors	2	Storage name									
				HOV300									
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh MJ/y	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	%
Stockholm SE	-	13939	6780	-	49	16746	7316	-	44	22327	8010	-	36
WürzburgDE	-	13371	6969	-	52	16052	7695	-	48	21413	8452	-	39
Davos CH	-	15137	10028	-	66	18165	10817	-	60	24220	11542	-	48
Athens GR	-	10407	8515	-	82	12488	9618	-	77	16651	11195	-	67
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} =QL/Q _d	-	Solar fraction											
Ref. conditions	G	Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	T _{a,ave}	1,157	1,230	1,684	1,736								
	T _{c,ave}	7.5	9.0	3.2	18.5								
	± ΔT _c	8.5	10.0	5.4	17.8								
		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		300	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		6131 DE1, 6132 DE1, 6131 F1											
Date of test report		23/6/2023, 26/6/2023											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
Extrapolated													
<p style="text-align: right;">N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6504580 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece</p> 													

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