Certificado

Certificate no.
Certificado nº **PSK – 017/2016**

Name and address of certificate holder: *Nome e morada do titular do certificado:*	Thermic Ltd. 26th km. Old National Road Athens-Thiva – Gefyra plc 19600 Mandra Greece
Product: *Produto:*	Thermal solar system and components – Factory made system *Instalação solar térmica pré-fabricada e seus componentes*
Type references: *Referências:*	TS160, TS200, TS200/3 e / *and* TS300
Trademark(s): *Marca(s) comercial(is):*	Thermicsol
Technical characteristics: *Características técnicas:*	Summary of EN 12976 Test Results: Registration No. PSK–017/2016 (in annex) *Resumo dos resultados dos ensaios realizados segundo a Norma EN 12976 Registo N.º PSK-017/2016 (em anexo)*
This product is in conformity with: *Este produto está em conformidade com:*	EN 12976-1:2006, EN 12976-2:2006
and with the Specific Keymark Scheme Rules for Solar Thermal Products *e com as Regras Particulares do CEN Keymark Scheme para Produtos Solares Térmicos.*	
Test report(s) no. / Issued by: *Relatório(s) de ensaios nº(s) / emitido(s) por:*	16.V2/DER-LECS/2009, 17.V3/DER-LECS/2009 and / *e* 3.V1/LES/2013 / LNEG; 6036DE1/2011 / DEMOKRITOS
Additional information (if any): *Informação adicional (se existir):*	-----
This certificate is valid until: *Este certificado é válido até:*	2020-09-03
and supersedes certificate no: *e substitui o certificado nº:*	PSK-014/2015
Date of issue: *Data de emissão:*	2016-07-14

Francisco Barroca
General Manager / *Diretor Geral*

This Certificate includes one Annex with 5 (five) pages
Este Certificado é constituído por um Anexo com 5 (cinco) páginas

Summary of	EN12976-2	SOLAR SYSTEM test results	Licence Number	PSK-017/2016
Annex to Solar KEYMARK Certificate			Issued	2016-07-14

Company	Thermic, LTD.		Country	Greece	
Brand (optional)	Thermicsol		Website	www.thermyk.gr	
Street	26th km. Old National Road Athens-Thiva - Gefyra plc.		E-mail	info@thermicsol.com	
Postal Code	19600	Mandra	Tel. / Fax	+30	210 5555 523 / -668

System classification	
Application(s)	Hot water
Solar loop, circulation principle	Thermosyphon
Direct solar loop / heat exchanger	Heat exchanger
Open, vented or closed solar loop	Closed
Drain back/down	Always filled (no drain)
Store location	Outdoor
Store orientation (of main axis)	Horizontal
Type of auxiliary heating (internal back-up heat)	None
If other auxiliary/internal back-up heating, please specify:	
Solar+supplementary OR Solar-only / Solar pre-heat	Solar only / Solar preheat

Collector(s)				Heat store(s)						
Company	THERMIC LTD.			Company	THERMIC LTD					
Keymark lic.no. if available	*PSK-012/2015*			*Keymark lic.no. if available*	---					
	Per module									
Collector name	Gross Area (AG)	Gross length	Gross width	Store name	Total nominal volume	Gross height	Gross width	Gross depth	Auxiliary heated volume	Electrical aux. heating power
	m²	mm	mm		litres	mm	mm	mm	litres	kW
TS1,5	1,32	1493	990	160	154	1300	540	540	---	---
TS2	1.82	2000	1000	200	185	1300	580	580	---	---
TS2,5	2.30	2000	1260	300	275	2000	580	580	---	---

Solar loop controller		Solar loop fluid	
Keymark lic.no. if available	---	Recommended/required	Recommended
Company	---	Company	TYFOROP CHEMIE, GmbH
Name	---	Name	FluidName
Solar loop pump - power range	--- W to --- W	Freezing point	-17 °C

System family overview

Collector name	Number of collectors in each configuration for each store					
	Store name					
	160	200	300			
TS1,5		2				
TS2			2			
TS2,5	1	1				

Testing Laboratory	LNEG
Website	www.lneg.pt
Test report id. number	see comments
Date of test report	see comments

Comments of test lab
Test reports / date: nº16.V2/LES/2009 / 12.04.2010 nº17.V3/LES/2009 / 25.08.2010 nº6036DE1 / 2011 (Test Laboratory: Demokritos) nº3.V1/LES/2013 / 29.01.2013

LNEG, I.P. Laboratório Nacional de Energia e Geologia
Laboratório de Energia Solar

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Rua José Afonso, 9E - 2810-237 Almada - Portugal
Tel: +351 212 586 940 / Fax: +351 212586959 / mail@certif.pt / www.certif.pt

Summary of	EN12976-2	test results	Certification No.	PSK-017/2016
Annex to Solar KEYMARK Certificate			Issued	2016-07-14

Company	Thermic, LTD.		Country	Greece	
Brand (optional)	Thermicsol		Website	www.thermyk.gr	
Street	26th km. Old National Road Athens-Thiva - Gefyra plc.		E-mail	info@thermicsol.com	
Postal Code	19600	Mandra	Tel. / Fax	+30	210 5555 523 / -668

System family overview

Collector name	For each storage and collector size, give number of collectors		
	160	200	300
TS1,5		2	
TS2			2
TS2,5	1	1	

Name of system configuration				TS160	
Collector name	TS2,5	No. Collectors	1	Storage name	160

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	3690	---	47.2	9492	3942	---	41.7	11164	4100	---	36.6
WürzburgDE	---	7506	3784	---	50.7	9114	4131	---	45.5	10691	4320	---	40.4
Davos CH	---	8483	5424	---	64.1	10281	5771	---	56.0	12110	5929	---	48.8
Athens GR	---	5834	4667	---	80.3	7064	5235	---	74.2	8326	5676	---	68.4

Perf. indicators for the table above

Qd,sh	MJ/y	Not relevant for solar domestic hot water system
Qd	MJ/y	Annual heat demand for domestic hot water
QL	MJ/y	Annual heat energy delivered by the solar system
Qpar	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)
$f_{sol}=Q_L/Q_d$	-	Solar fraction

Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR
	G	1 157	1 230	1 684	1 736
	Ta,ave	7.5	9.0	3.2	18.5
	Tc,ave	8.5	10.0	5.4	17.8
	± ΔTc	6.4	3.0	0.8	7.4

G	kWh/m²	Annual irradiation South, 45°
Ta,ave	°C	Annual average outdoor air temperature
Tc,ave	°C	Annual average mains cold water temp.
ΔTc	K	Seasonal variation of Tc
Th	45 °C	Desired hot water temperature (mixing valve temperature).

Max. operating press. - collector side	150	kPa	Max. operating press. - tank side	800 kPa

Testing Laboratory	LNEG
Website	www.lneg.pt
Test report id. number	see comments
Date of test report	see comments
Test method	ISO 9459-5 (DST)

Comments of test lab

Test reports / date: nº16.V2/LES/2009 / 12.04.2010
nº17.V3/LES/2009 / 25.08.2010
nº6036DE1 / 2011 (Test Laboratory: Demokritos)
nº3.V1/LES/2013 / 29.01.2013

LNEG, I.P. Laboratório Nacional de Energia e Geologia Laboratório de Energia Solar

All values are subject to some uncertainty, e.g. the uncertainty on system output is typically in the range of ± 5 % to ± 15 % *Version 3.6, 2014-06-18*

Summary of	EN12976-2	test results	Certification No.	PSK-017/2016
Annex to Solar KEYMARK Certificate			Issued	2016-07-14

Company	Thermic, LTD.		Country	Greece	
Brand (optional)	Thermicsol		Website	www.thermyk.gr	
Street	26th km. Old National Road Athens-Thiva - Gefyra plc.		E-mail	info@thermicsol.com	
Postal Code	19600	Mandra	Tel. / Fax	+30	210 5555 523 / -668

System family overview

Collector name	For each storage and collector size, give number of collectors		
	160	200	300
TS1,5		2	
TS2			2
TS2,5	1	1	

Name of system configuration				TS200	
Collector name	TS2,5	No. Collectors	1	Storage name	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	4005	---	42.1	11164	4194	---	35.7	13939	4320	---	31.0
WürzburgDE	---	9114	4194	---	46.0	10691	4415	---	41.3	13371	4604	---	34.3
Davos CH	---	10281	5803	---	56.4	12110	6023	---	49.8	15137	6181	---	40.9
Athens GR	---	7064	5267	---	74.6	8326	5771	---	69.4	10407	6339	---	61.0

Perf. indicators for the table above

Qd,sh	MJ/y	Not relevant for solar domestic hot water system
Qd	MJ/y	Annual heat demand for domestic hot water
QL	MJ/y	Annual heat energy delivered by the solar system
Qpar	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)
$f_{sol}=Q_L/Q_d$	-	Solar fraction

Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR
	G	1 157	1 230	1 684	1 736
	Ta,ave	7.5	9.0	3.2	18.5
	Tc,ave	8.5	10.0	5.4	17.8
	± ΔTc	6.4	3.0	0.8	7.4

G	kWh/m²	Annual irradiation South, 45°
Ta,ave	°C	Annual average outdoor air temperature
Tc,ave	°C	Annual average mains cold water temp.
ΔTc	K	Seasonal variation of Tc
Th	45 °C	Desired hot water temperature (mixing valve temperature).

Max. operating press. - collector side	150 kPa	Max. operating press. - tank side	800 kPa

Testing Laboratory	LNEG
Website	www.lneg.pt
Test report id. number	see comments
Date of test report	see comments
Test method	ISO 9459-5 (DST)

Comments of test lab

Test reports / date: nº16.V2/LES/2009 / 12.04.2010
nº17.V3/LES/2009 / 25.08.2010
nº6036DE1 / 2011 (Test Laboratory: Demokritos)
nº3.V1/LES/2013 / 29.01.2013

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Version 3.6, 2014-06-18

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Brand (optional)	Thermicsol		Website	www.thermyk.gr	
Street	26th km. Old National Road Athens-Thiva - Gefyra plc.		E-mail	info@thermicsol.com	
Postal Code	19600	Mandra	Tel. / Fax	+30	210 5555 523 / -668

System family overview

Collector name	For each storage and collector size, give number of collectors		
	160	200	300
TS1,5		2	
TS2			2
TS2,5	1	1	

Name of system configuration					TS200/3	
Collector name	TS1,5	No. Collectors	2	Storage name	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	4352	---	45.9	11164	4604	---	41.3	13939	4793	---	34.4
WürzburgDE	---	9114	4510	---	49.5	10691	4825	---	45.1	13371	5077	---	38.0
Davos CH	---	10281	6402	---	62.2	12110	6717	---	55.3	15137	6906	---	45.7
Athens GR	---	7064	5582	---	78.8	8326	6118	---	73.7	10407	6843	---	65.7

Perf. indicators for the table above

Qd,sh	MJ/y	Not relevant for solar domestic hot water system
Qd	MJ/y	Annual heat demand for domestic hot water
QL	MJ/y	Annual heat energy delivered by the solar system
Qpar	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)
$f_{sol}=Q_L/Q_d$	-	Solar fraction

Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR
	G	1 157	1 230	1 684	1 736
	Ta,ave	7.5	9.0	3.2	18.5
	Tc,ave	8.5	10.0	5.4	17.8
	± ΔTc	6.4	3.0	0.8	7.4

G	kWh/m²	Annual irradiation South, 45°
Ta,ave	°C	Annual average outdoor air temperature
Tc,ave	°C	Annual average mains cold water temp.
ΔTc	K	Seasonal variation of Tc
Th	45 °C	Desired hot water temperature (mixing valve temperature).

Max. operating press. - collector side	150	kPa	Max. operating press. - tank side	800	kPa

Testing Laboratory	LNEG
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Comments of test lab

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Brand (optional)	Thermicsol		Website	www.thermyk.gr	
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Postal Code	19600	Mandra	Tel. / Fax	+30	210 5555 523 / -668

System family overview

Collector name	For each storage and collector size, give number of collectors		
	160	200	300
TS1,5		2	
TS2			2
TS2,5	1	1	

Name of system configuration						TS300	
Collector name	TS2	No. Collectors	2	Storage name	300		

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

Location	Qd,sh	Daily drawoff 250 l				Daily drawoff 300 l				Daily drawoff 400 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	---	13939	5708	---	40.9	16746	5992	---	35.9	22327	6213	---	27.8
WürzburgDE	---	13371	5992	---	44.7	16052	6370	---	39.6	21413	6591	---	30.8
Davos CH	---	15137	8262	---	54.6	18165	8641	---	47.5	24220	8862	---	36.6
Athens GR	---	10407	7632	---	73.3	12488	8420	---	67.5	16651	9303	---	55.9

Perf. indicators for the table above

Qd,sh	MJ/y	Not relevant for solar domestic hot water system
Qd	MJ/y	Annual heat demand for domestic hot water
QL	MJ/y	Annual heat energy delivered by the solar system
Qpar	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)
$f_{sol}=Q_L/Q_d$	-	Solar fraction

Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR
	G	1 157	1 230	1 684	1 736
	Ta,ave	7.5	9.0	3.2	18.5
	Tc,ave	8.5	10.0	5.4	17.8
	± ΔTc	6.4	3.0	0.8	7.4

G	kWh/m²	Annual irradiation South, 45°
Ta,ave	°C	Annual average outdoor air temperature
Tc,ave	°C	Annual average mains cold water temp.
ΔTc	K	Seasonal variation of Tc
Th	45 °C	Desired hot water temperature (mixing valve temperature).

Max. operating press. - collector side	150	kPa	Max. operating press. - tank side	800	kPa

Testing Laboratory	LNEG
Website	www.lneg.pt
Test report id. number	see comments
Date of test report	see comments
Test method	ISO 9459-5 (DST)

Comments of test lab

Test reports / date: nº16.V2/LES/2009 / 12.04.2010
nº17.V3/LES/2009 / 25.08.2010
nº6036DE1 / 2011 (Test Laboratory: Demokritos)
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LNEG, I.P. Laboratório Nacional de Energia e Geologia Laboratório de Energia Solar

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