

Pre-qualification Solar Water Heaters



SOLAR SYSTEMS MANUFACTURER







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SOLE S.A. COMPANY PROFILE MANUFACTURING / TRADING LICENCE ARAB-HELLENIC CHAMBER MEMBERSHIP ISO 9001:2008 CERTIFICATION **CERTIFICATES & TEST REPORTS PRODUCT BROCHURE INSTALLATION MANUAL PROJECT REFERENCE LIST MIDDLE EAST PROJECT REFERENCE LIST WORLDWIDE** GENERAL WARRANTEE



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SOLE S.A. COMPANY PROFILE

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ORMAN BUILDING MATERIAL TRADING L.L.C



COMPANY PROFILE

INTRODUCTION

Sole S.A. was the first Greek company to be involved in the renewable energy sources sector, since its foundation in 1974. Until today, it still maintains its leadership in the European solar water heater market exporting 70% of its production all over the world. Sole produces solar thermal collectors, thermosyphon solar water heaters, compact solar water heaters and undertakes projects for sanitary or process hot water, room heating, pool heating and Solar Air Conditioning.

QUALITY MANAGEMENT & CERTIFICATION

All SOLE products are manufactured under the Quality management system ISO 9001:2008 certified by the German Certification Body TUV.

All SOLE products are manufactured according to the European norms, they are tested for efficiency and reliability according to EN ISO9806:2013, EN 12975-2:2006 & EN 12976-2:2006 by international accredited laboratories and have been granted a numerous of international certificates such as Solar Keymark (E.U.), SRCC (U.S.A.), Dubai Municipality and the certificate from the Ministry of Industry, Energy and Tourism Government of Spain.

PHILOSOPHY

SOLE S.A. is the inspirer of quality in everyday life with the use of renewable sustainable energy. The company's staff is composed by a group of people, who share one common motto "quality in life begins from each one of us daily". Sole's production line, engineers and sales force are always influenced by the needs of the national and international market in order to satisfy the most demanding consumer.

RESEARCH AND DEVELOPMENT

Research and development of products, services, and new solar applications technologies is the key point for SOLE S.A. This sector is constantly evolving, since SOLE's know-how and experience in producing high quality products permits nothing less, than excellence. Our Technical department extends constant research for the presentation of new products, as well improvement of existing products.

Additionally in order to achieve excellence, all products have been tested and approved by most technologically advanced research institutes in the world. SOLE S.A. was one of the first companies in Greece to attain the international certificate of conformity ISO 9002 (back in 1995). This is equivalent for the recognition of the effective organization of administration and for the good quality of our products on an international basis.



SOLE S.A.

MANUFACTURING / TRADING

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Έχοντας υπόψη:

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1. Τις διατάξεις των Νύμων 6422/1934, 3200/1955, 1360/1983, του Ν.Λ. 1150/1949, του άρθρου 4 του Α.Ν. 207/1967, του από 15-10-22 Β.Λ., του από 16-3-1950 Β.Λ. όπως αυτό τρυποποιήθηκε και πυμπληρώθηκε με το από 24-11-53 B.Λ., του Π.Λ. 1180/1981, της ΚΥΑ 69269/1990, των Νόμων 2218/1994, 2240/1994, 2516/1997, το Π.Δ. 84/84 Την απόφαση του Νομάρχη Αν Αιτική. 1011. 29963/94.

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του απο 15.10.22 Β.Δ/τος «περί χορηγήσεως αδειών ιδρύσεως και λειτουργίας πάσης μηχανολογικής εγκατοατάσεως» και με τους εξής άρους:

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 Η Υπηρεσία μας επιφυλάσσει το δικαίωμα να επιβάλλει την εκτέλεση μεταρρυθμίσεων και περιορισμών στην ανωτέρω εγκατάσταση, σε κάθε περίπτωση που θα διαπιστωθεί ότι είναι αναγκαίο για να εκπληρωθεί ο σκοπός των ως άνω διατάξεων.
 Για την απαιτούμενη σύμφωνα με τις διατάξεις των σχετικών από 16-3-50 και 24-

11-53 Β.Δ. καθώς κι ι του 902/75 Π.Δ. υπεύθυνη επίβλεψη, λειτουργία και συντήρηση της εγκαταστάσεως πρέπει να προσλαμβάνεται πρόσωπο που να έχε. από τα προβλεπόμενα από τις διατάξεις αυτές και κάθε άλλη σχετική, προσόντα.

5. Η άδεια αυτή μεταβιβάζεται μόνον κατόπιν προηγούμενης εγκρίσεως του Νομάρχη Αθηνών, χωρίς αυτήν την έγκριση η επιχείρηση δεν μπορεί να λειτουργήσει στο άνομα φυσικού ή νομικού προσώπου άλλου, εκτός του ανωτέρω στο όνομα του οποίου εκδύθηκε.

7. Κατά της απόφασης αυτής επιτρέπεται η προσφυγή, για παράβαση νόμου, μέσα σε 30 ημέρες από της κοινοποιήσεώς της, κατά τις διατάξεις του άρθρου 8 του Ν. 3200/1995, από οποιονδήποτε που έχει έννομο συμφέρον δια μέσου της Υπηρεσίας μας ενώπιον του Γρνικού Εραμματών Πεσιφερώνας, της

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EΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ BIOTEXNIKO ΕΠΙΜΕΛΗΤΗΡΙΟ ΑΘΗΝΑΣ Ν.Π.Δ.Δ. Ακαδημίας 18, 106 71 Αθήνα Τηλ.: 210 3680.700 Fax: 210 3614726 E-mail: info@acsmi.gr Web site: www.acsmi.gov.gr AΘHNA : 18/12/2015 AP. ΠΡΩΤ. : 12770

ΠΙΣΤΟΠΟΙΗΤΙΚΟ

Το Βιοτεχνικό Επιμελητήριο Αθηνών πιστοποιεί ότι όπως προκύπτει από τα μητρώα που διατηρεί είναι γραμμένη σ΄ αυτά η πιο κάτω επιχείρηση με τα εξής στοιχεία:

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SOLE S.A. ISO 9001:2008 CERTIFICATION



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Certificate

Standard

ISO 9001:2008

Certificate Registr. No.

01 100 063635

Certificate Holder:



SOLE S.A. 1 LEFKTRON & LAIKON AGONON 136 71, ACHARNES, ATHENS GREECE

Scope:

Design, production, trade and technical support of solar systems, flat plate solar collectors, boilers and plastic vacuums

Proof has been furnished by means of an audit that the requirements of ISO 9001:2008 are met.

Validity:

www.tuv.com

The certificate is valid from 2016-01-18 until 2018-09-14. First certification 2007

2016-01-15

TÜV Rheimand Cert GmbH Am Grauen Stein · 51105 Köln





10/201 4.08 E A4 @ TUV, TUEV and TUV are registered trademarks. Utilisation and application requires prior approval



CERTIFICATES & TEST REPORTS



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Certificado

PRODUT

Certificate no. Certificado nº

art 1

PSK - 002/2016

Name and address of certificate holder: Nome e morada do titular do certificado:

Product: Produto:

Type references:

Referências:

Trademark(s): Marca(s) comercial(is):

Technical characteristics: Características técnicas:

This product is in conformity with: Este produto está em conformidade com: SOLE S. A. Lefktron and Laikon Agonon, Acharnai – 13671, Athens GREECE

Thermal solar system and components – Factory made system

Instalação solar térmica pré-fabricada e seus componentes

125-1-S150; 125-1-S200; 150-1-S200; 150-1-S230; 150-2-S150; 200-1-S200; 200-1-S230; 200-1-S260; 200-2-S200; 300-2-S200; 300-2-S230

EUROSTAR ECO, HELIOTHERMO ECO

Summary of EN 12976 Test Results: Registration No. PSK-002/2016, (in annex) Resumo dos resultados dos ensalos realizados segundo a norma EN 12976: Registo Nº PSK-002/2016, (em anexo)

EN 12976-1:2006, EN 12976-2:2006

Nº 6075DE2, 6076DE2, 6075F1 / DEMOKRITOS

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: Relatórios de ensalos nº(s) / emitidos por:

Additional information (if any): Informação adicional (se existir):

This certificate is valid until:2020-12-13Este certificado é válido até:2020-12-13and supersedes certificate no:PSK-025/2015e substitui o certificado nº:PSK-025/2015

Date of issue: Data de emissão: 2016-01-04

Francisco Barroca General Manager / Diretor Geral



This Certificate includes one Annex with 12 (twelve) pages Este Cartificado é constituído por um Anexo com 12 (doze) páginas







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Version 3.6, 2014-06-18

CERTIF Associação para a Certificação Rua José Afonso, 9E - 2810-237 Almada - Portugal Tel: +351 212 586 940 / Fax: +351 212 586 959 / mail@certif.pt / www.certif.pt







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Summar	y of	EN12	2976	6-2	tes	t res	sults							Ce	rtif	ica	tior	۱No.			PSK	(-0	02/20	16
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All values are subject to some uncertainty; e.g. the uncertainty on system output is typically in the range of ± 5 % to ± 15 %

CERTIF Associação para a Certificação

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Version 3.6, 2014-06-18







Page 3 of 12

Summar	y of	EN129	976-2	test	res	ults				-	Certif	icat	ion	No.		PSK-0	002/20	16
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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 3.6, 2014-06-18

CERTIF Associação para a Certificação Rua José Afonso, 9E - 2810-237 Almada - Portugal Tel: +351 212 586 940 / Fax: +351 212 586 959 / mail@certif.pt / www.certif.pt







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Qpar	MJ/y	Annu	ial par	asitic ene	rgy: (elec	tricity	for p	pum	ps/	con	trollers	5)							
f _{so} =Q _L /Q _d	-	Solar	fracti	on																
		1	Sto	ockholm SE	T wi	irzhi	irg DE	Г	Davo:	s CH		Athe	ns GR				1		-	-
		G		1,157		1,23			1,6		-		736				-			
Ref. condit	tions	Ta,avi		7.5	-	9.(3.				3.5	-						
nan oonan				8.5	-	10.			5.				7.8							
		$\frac{1c}{\pm}\Delta Tc$		6.4	+	3.(0.				.6							
G	kWh/m²		3	diation Sc	<u> </u>		~	i	0.	<u>ں</u>		/	.7	,			1		l	
	°C			erage outd		_			0						<u></u>	······································				
Ta,ave	°C	÷		erage outo erage mair															. <u></u>	
Tc,ave ΔTc	K	÷		ariation of		u wi	oret rg	mμ.												
	к 45 °С			t water te			ra lmis	ding	usb	in to	m	aratur	e)							
		-			he			_										1		1
Max. opera	ating press	coll	lector	side			250	kPa		Max	κ. ο	peratin	g pres	s t	ank	side			1000	kPa
Testing Lab	boratory					1	Solar 8	Ene	ergy	Sys	teл	is Laboi	ratory,	NCS	ir "D	EMOK	RITO5"			
Website						1	www.s	olar	.den	noki	rito	s.gr								
Test report	t id. numb	er				1	6075D	E2, 6	5076	DE2	2, 60	075F1								
Date of tes	st report					:	2015-1	2-03	3, 20)15-	12-	03, 201	5-10-2	0						
Test metho						Ī	ISO 94	59-5	(DS	T)										
Comments	of tost ini	1							-					T		=.				_
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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

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Page 6 of 12

Summar	y of	EN12	976-2	test re:	sults						Certif	ica	tion	No.		PSK-0	002/2)16
Annex to	o Solar K	EYMAR	K Certifica	te							issue	d				201	6-01-0)4
Company		SOLE S	4							T	Countr	у	GRE	EĈE				
Brand (opi	tional)	EUROS	TAR ECO, HEL	IOTHERN	IO ECO					1	Websit	te	ww	w.eur	ostar-so	lar.com	1	
Street			ON & LAIKON							1	E-mail		expo	ort@s	ole.com			
Postal Cod	le	13671	ACHA	RNAI, AT	HENS			-		1	Tel. / F	ax	+30	21	023895	00 /2		
					118	em fam	ilv e	wer	view	-			-	THE REAL PROPERTY.				
		1		For e	ach sto		<u> </u>	_		70.	. eive n	uml	ber o	f colle	ectors			
Collector r	name	-	125	1	150		T		200			I		300				
ECO S260				1				1	1					1	TT			TT
ECO 5230				1 1				1		+	-	-	2					++
ECO 5200		1		1			1	1		2		2					-	
ECO \$150		1			2		-	-		+		-						11
								1		1				-				11
Name of s	vstem con	figuratio	n	-	et ale		A	-		-		150	J-2-5	150		-		
Collector I			CO \$150	No Co	lectors		1	-	2	-	-	10		age n	ame		150	
Conceror I				ated anr			"sol	lar-c		pr.	eheat	evet.	_	SPC 11	unu		100	
					rawoff		-	1	_	-	awoff	130	14		Daily d	rawoff		170
Location			Qd,sh	Qd,hw	1	Qpar	-	sol	Qd,h		QL	0	par	fsol	Qd,hw	QL	Qpar	-
			MJ/y	MJ/v	MJ/y	MJ/v	-	%	MJ/	-	MJ/y	-	J/v	%	MJ/y	MJ/Y	MJ/y	_
Stockholm	SE		0	6150	2980	-	-	19	7821	- +	3311			43	9492	3564	-	38
Würzburg			٥	5897	3062	-	+	52	7506	-	3532			47	9114	3879	-	43
Davos CH			٥	6654	4447	-	6	57	8483		5014		- 1	59	10281	5393	-	52
Athens GR			0	4573	3753	-	8	32	5834		4447			76	7064	5014	-	71
												-		100			-	1
Perf. indic Qd,sh Qd	ators for t MJ/y MJ/y	Not rel	above evant for sol heat deman		_		-	em		_		_	_					
QL	MJ/y	-	heat energy				_	070	_	-						_		
Qpar	MJ/y	-	parasitic en						ntrolle	ers!	1	-						
	100/9	Solar fr	-	argy (cic		tor part			TEI OITE		,							
-301 -0 -0		1	Stockholm SE	Movel	ura DE	Dave	~ ~		A+1		is GR	-		-	1		T	
		-			ourg DE	-		-		_		-			1			
Ref. condi	tions	G	1,157		230		.2	-		18	36							
NEI. CONUI	00115	Ta,ave Tc,ave	8.5		D.0		.4	-	-	18 17								
		tc,ave	6.4		0.0		.4	-	-	7.							h	
G	kWh/m²		irradiation S					-		1.0	-1						1	
Ta,ave	°C		average out			ature				-								
Tc,ave	°C		average mai					-		-								
ΔΤς	ĸ		al variation o							-		-						
Th	45 °C		hot water t		ure ími:	xing val	ve t	em	perati	ire	el.		-					
Max. oper					250	kPa	in number of			nnim	g press		unit e	ide			1000	kPa
		s conec		_													1000	IVLG
Testing La	boratory					k Energy				or	atory, I	NCS	K "DI	MOK	RITOS"		_	
Website						iolar.de		_		_								
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Date of te						2-03, 2	_	-12-	US, 20	117	5-1U-2C	1						
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Comments		b				-												
	ents												C.S.					

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

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Page 7 of 12

Summar	ry of	EN12	976-2	test re	sults			- Halland		Cert	ifica	tion	No.		PSK-0	002/20:	l6
Annex te	o Solar K	EYMAR	RK Certifica	te						lssu	ed				201	6-01-04	F.
Company		SOLE S	A					-		Cour	try	GRE	ECE				
Brand (op	tional)	EUROS	TAR ECO, HEL	OTHERN	NO ECO					Web	site	ww	w.eur	ostar-so	lar.com	1	
Street		LEFKTR	ON & LAIKON	AGONC	N					E-ma	il	expo	rt@s	ole.com			
Postal Cod	de	13671	ACHA	RNAI, AT	THENS	-				Tel. /	Fax	+30	21	023895	00 /2		
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		T		For e	ach sto		<u> </u>			, give	num	ber o	fcolle	ectors			-
Collector	name		125	1	150		T		200		1		300				
ECO \$260						TT	+	1	1	TT		TT	T				
ECO \$230				1		11	1	1	T			2					
ECO \$200		1 1		1			1		2		2		1				
ECO \$150		1			2				11								
							1				-	\square	1				
Name of r	system con	figuratio					-			-	20	0-1-5	200			- Administra	NOT
Collector			CO \$200	No. Co	lectors	-	-	-	1			_	age n	ame		200	
eoncerer I		1		ated anr			r "sol	ar-4		rehea	t svet		-6×10			200	-
					lrawoff		-	1	Daily d			17		Daily d	rawoff	20	
Location			Qd,sh	Qd,hw	1	Qpar	-	sol	Qd,hw			par	fsol	Qd,hw	QL	Qpar	fsc
			MJ/y	MJ/y	MJ/y	MJ/v		%	MJ/y	MJ/	-	U/v	%	MJ/v	MJ/y	MJ/y	%
Stockholm	SE	-	0	7821	2804	-	-	16	9492	2980	_	-	31	11164	3106	-	28
Würzburg			0	7506	2986		4	10	9114	3217	-	-	35	10691	3406	~	32
Davos CH			0	8483	4100		4	18	10281	4384		-	43	12110	4573	-	38
Athens GR	1		0	5834	3974		ŧ	58	7064	4419		-	63	8326	4762	-	57
					-		1.000		1 10	-		-	-	1			
Perf. indi a Qd,sh	ators for t	Not re	evant for sol				*	em			1	1					
Qd	MJ/y	Annual	l heat deman	d for do	nestic h	lot wa	ter										
QL	MJ/y	1	heat energy							_							
Qpar	MJ/y	Annua	parasitic en	ergy: (ele	ectricity	for pu	mps/	/cor	ntroller	s)		_	-		_	_	
$f_{so} = Q_1/Q_d$	-	Solar fi	raction				_	_	_	_							_
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301 -0 -0			Stockholm SE	wurzi	ourg DE	Dav	vos Ch	н	Athe	ns GR	1						
301 -0 -0		G	Stockholm SE 1,157	-	230		vos CH ,684	4		ns GR 736							
Ref. condi	tions	G Ta,ave		1,	-	1	1000	H	1,7			_					
	tions	-	1,157	1,	230	1	,684	H	1,7	736		_					
		Ta,ave Tc,ave ±ΔTc	1,157 7.5 8.5 6.4	1, <u>9</u> 1	230 9.0 0.0 8.0	1	,684 3.2	H	1,7	736 8.5							
Ref. condi	tions kWh/m²	Ta,ave Tc,ave ±ΔTc	1,157 7.5 8.5	1, <u>9</u> 1	230 9.0 0.0 8.0	1	,684 3.2 5.4	H	1,7	736 8.5 7.8							
Ref. condi G	kWh/m² °C	Ta,ave Tc,ave ± ΔTc Annua Annua	1,157 7.5 8.5 6.4 I irradiation S average out	1, 9 1 3 outh, 45 door air	230 0.0 0.0 9.0 • • •	ature	,684 3.2 5.4	+	1,7	736 8.5 7.8							
Ref. condi G Ta,ave	kWh/m²	Ta,ave Tc,ave ± ΔTc Annua Annua	1,157 7.5 8.5 6.4 I irradiation S	1, 9 1 3 outh, 45 door air	230 0.0 0.0 9.0 • • •	ature	,684 3.2 5.4	+	1,7	736 8.5 7.8						2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
	kWh/m² °C °C K	Ta,ave Tc,ave ± ΔTc Annual Annual Season	1,157 7.5 8.5 6.4 I irradiation S I average out I average mai al variation o	1, 1 3 outh, 45 door air ns cold v	230 0.0 0.0 8.0 • temperator vater te	ature	,684 3.2 5.4 0.8		1,1 18 17 7	736 8.5 7.8 '.4							
Ref. condi G Ta,ave Tc,ave ΔTc	kWh/m² °C °C	Ta,ave Tc,ave ± ΔTc Annual Annual Season	1,157 7.5 8.5 6.4 I irradiation S average out I average mai	1, 1 3 outh, 45 door air ns cold v	230 0.0 0.0 8.0 • temperator vater te	ature	,684 3.2 5.4 0.8		1,1 18 17 7	736 8.5 7.8 '.4							
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Ref. condi G Ta,ave Tc,ave ΔTc Th Max. oper	kWh/m² °C °C K 45 °C rating pres	Ta,ave Tc,ave ± ΔTc Annual Annual Season Desired	1,157 7.5 8.5 6.4 I irradiation S I average out I average mainal variation of al variation of thot water t	1, 1 3 outh, 45 door air ns cold v	230 9.0 0.0 8.0 • tempera vater te ure (mi: 250	ature mp. king va	,684 3.2 5.4 0.8	em)	1,7 18 17 7 peratur	736 8.5 7.8 4.4 e).	_			RETOS"		1000	kPa
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All values are subject to some uncertainty; e.g. the uncertainty on system output is typically in the range of ± 5 % to ± 15 %

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NCSR "DEMOKRITOS" Solar & other Energy Systems Laboratory

Version 3.6, 2014-06-18

						INC	M	11.1			-			_					_		
\$ummar	y of	EN12	976-2	test re	esults						¢	ertif	lica	tior	No.		۱	PSK-C	Ю2,	/201	.6
Annex to	Solar K	EYMA	RK Certific	ate							1	ssue	d					201	6-0	1-04	
Company		SOLE S	A								C	ountr	y	GRE	ECE		_				_
Brand (opt	tional)	EUROS	TAR ECO, H	LIOTHER	MO ECC)						Vebsit	-	ww	w.eu	ostar-s	ola	r.com			
Street		LEFKTI	RON & LAIKO	N AGON	DN						E	-mail		exp	ort@s	ole.com	n				
Postal Cod	le	13671	ACH	ARNAI, A	THENS			_			T	el. / F	ax	+30	2:	02389	500	/2			
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1				For	each sto	orage	е ал	d co	llec	tor size	e, į	give n	um	ber d	of coll	ectors					
Collector r	name		125		150	_			_	200					300				_		
ECO \$260										1							1				
ECO \$230				1		-			1		-			2		++	-	_			-
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ECO \$150		1			2	-			_		-		-				+	_			+
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Forgriou			MJ/y	Qd,hv MJ/y		-	par IJ/y		6	Qd,hw MJ/y		MJ/y		par IJ/y	TSOI %	Qd,ht MJ/		QL MJ/y		par U/γ	TSD %
Stockholm	SE		0	7821	_	141	-	_	0	9492	+	3311	_	-	70	11164	_	3469	141	-	31
Würzburg			0	7506		1		_	4	9114	+	3564			39	10691		3784		-	35
Davos CH			0	8483	4573	1	-	5	4	10281	t	4920		-	48	12110		5172		- 1	43
Athens GR			0	5834	4257		-	7	3	7064	T	4762		-	67	8326		5203		-	62
Qd,sh Qd	ators for ti MJ/y MJ/y	Not re Annua	levant for so I heat dema	nd for do	mestic l	hot v	wate	: : r					_								
QL	MJ/y		l heat energ				_	•				-									
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		Tc,ave	8.5		10.0	-		.4		from a second	.7.8										
6	LAASE 1 2	± ΔTc	6.4		3.0	_	0.	.8			7.4										
G Ta,ave	kWh/m ² °C		l irradiation										-	_							
Tc,ave	°C		l average ou				*****		-			····	-								
ΔΤς	K		nal variation		-revews 64								-				_				
Th	45 °C		d hot water		ture (mi	ixing	, valv	/e to	emp	peratu	re).										
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All values are subject to some uncertainty; e.g. the uncertainty ansystem output is typically in the longe of ± 5 % to ± 15 %

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Rua José Afonso, 9E - 2810-237 Almada - Portugal Tel: +351 212 586 940 / Fax: +351 212 586 959 / mail@certif.pt / www.certif.pt



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Solar & other Energy Systems Laboratory Page 9 of 12

Summar	v of	EN12	2976-2	test	t res	ults						Cer	tifi	cat	ion	No.		1	P\$K	-00	2/20	16
			RK Certific			-						Issu						+			01-0	
Company		SOLE :	sΔ									Соці	ntru	r	GRE	ECE	-		,			
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Stockholm	SE		0	_	821	3138	IVLI į	Y I	40	+	492	337		1411	/ ¥	36	+-	11164	3595	-	IAI11 Å	32
Würzburgi				_	506	3280	-	+	44	+	114	359	-+		+	40	+-	10691	3816	-		36
Davos CH			0	_	483	4541		+	53	+	0281	485			-	47	+-	12110	5109	-		42
Athens GR			0	_	834	4257		+	73	+	2064	475	-		-+	67	+-	8326	5172	-+-		62
Athens on			u u		414	4237	-	+	14	+ "	004	470			\rightarrow	97	╀	0320	5172	+		
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G	kWh/m² °C		al irradiation																			
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Tc,ave			al average m		nd w	ater te	mp.															
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Testing Lab	oratory					Solar 8	Ene	rgy S	Syster	ns L	aboi	rator	γ, N	CSP	("D	ЕМОК	RIT	OS"				
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Date of tes	t report					2015-1	2-03	, 201	15-12	-03,	, 201	5-10-	-20						÷			
Test metho	······					ISO 94	5 9 -5	(DST)											1112		
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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

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Summar	y of	EN12	976-2	t	est	resu	ilts							Certif	icat	ion	No.		PSK	(-00	02/2	016	5
Annex to	o Solar K	EYMA	RK Certi	ficat	e									Issued	d			-	20)16	-01-	04	
Company		SOLE S	àA							-			٦	Countr	v	GRE	ECE						
Brand (opt	tional)		STAR ECO,	HELI	OTHE	RMC	ECO						-	Websit	<u> </u>			ostar-so	lar.co	m			
Street			RON & LAI										-	E-mail	_	exp	ort@s	ole.com					
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Würzburg	DE		1	0	750	6	3784	-		5	0	9114		4194			46	10691	451(0	-		42
Davos CH			1	0	848	13	5456			6	4	1028	1	5929	1.4		58	12130	6307	7	-	T	52
Athens GR			1	0	583	4	4667			8	0	7064		5330			75	8326	5897	7	•		71
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G	kWh/m²	Ta,ave Tc,ave ± ΔTc Annua	1,15 7.5 8.5 6.4 al irradiati	7 on So	uth,	1,23 9.0 10.0 3.0 45°	iO) D		1,6 3. 5. D.	.2 .4		1	.,7 18 17	36 3.5 7.8									
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G Ta,ave Tc,ave ∆Tc	kWh/m² °C °C K	Ta,ave Tc,ave ± ΔTc Annua Annua Seaso	1,15 7.5 8.5 6.4 al irradiati al average al average nal variati	7 on So outd main on of	outh, oor a is col	1,23 9.0 10.0 3.0 45° ir te d wa	i0)) mpera	aturo	1,6 3. 5. 0. e	.2 .4 .8		1	.,7 18 17 7.	36 3.5 7.8 .4									
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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 16, 2014-06-18

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Summai	wof	EN12	976-2 t	est res						To	orti	ice	tion	No.	1	DCK-	002/20	116
			RK Certificat		uits					+-	ssue		uon	INU.			6-01-0	
	o Solar K			e						1						201	6-01-r	14
Company		SOLE S									ounti	PPPPP.III	GRE					
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				Fore	ach sto	rage ar		olled		.e, e	give n	umi	oer o		ectors			
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			Qd,sh		rawoff		50	1	Daily		-		30		and an a state of the	Irawoff	<u> </u>	400 []
Location				Qd,hw		Qpar		sol	Qd,hv	- i	QL	<u> </u>	oar	fsol	Qd,hw	+	Qpar	
ا - بادام م				MJ/y	MJ/y 5456	MJ/y	÷	% 39	MJ/y		MJ/y 5771	L M	J/y	% 35	MJ/y 22327	MJ/y 6307	MJ/y	28
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Würzburg Davos CH	DE		u 0	15137	8105	-	+	44 54	18165		8641	-		48	24220	9177	-	31
		·	۵ ۵	10407	7537			54 73	12488	-	8389		-	67	16651	9429	-	57
Athens GF	{	·	u	10407	7537	-	+	/3	12488		8389			67	16651	9429		
						<u> </u>	╞			+		-	\rightarrow			<u> </u>		_
				-			┢			┝		-	\rightarrow		-	[
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Qpar	MJ/y	_	parasitic ener				_		itrolle	rs}								
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Nel, cond	110115	Ta,ave	7.5	+		· · · · · · · · · · · · · · · · · · ·				17.8								
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G	kWh/m²	± ΔΤc	6.4 Firradiation So			ļ).8		<u> </u>	7.4		I						
G Ta,ave	°C		average outd			atura												
Tc,ave	°C		l average outu															
ΔTc	K		al variation of		aler le	inh:												
Th	45 °C		d hot water te		ure (mi)	king val	ve t	em	oeratu	re)								^
		-		perati			-											lu e
Max. ope	rating pres	s colle	ctor side		250	kPa	-		operati								1000	kPa
Testing La	boratory				§					orai	tory,	NCS	R"D	EMOK	RITOS"			
Website						olar.de												
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All values are subject to some uncertainty; e.g. the uncertainty on system output is typically in the range of ± 5 % to ± 15 %

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Summar	y of	EN12976-2 test results					1	Certification No. PSK-002/20				201	6										
Annex to	o Solar K	EYMA	₹K Ce	rtificat	e								1	Issue	d	2016-01-04							
Company		SOLE S	A										T	Countr	у	GRE	ECE			- AV		and a local data	
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Street		LEFKT	RON &	LAIKON	AGON	101	V						T	E-mail		exp	ort@s	ole.con	n				
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00100				-			Syst	em í	ami	lv o	ver	view	w/ha	194								_	- reu
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Perf. indic	ators for t	he table	above		-	-		-	-		-		-		-	_			-		_		-
Qd,sh	MJ/y			for sola	r dom	ies	tic hot	wat	er sv	/ste	m		-										
Qd	MJ/y			demand								_					-						
QL	MJ/y					-			_		m		-		-			1010-00					_
Qpar	MJ/y									Annual heat energy delivered by the solar system Annual parasitic energy: (electricity for pumps/controllers)													_
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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

CERTIF Associação para a Certificação

Rua José Afonso, 9E - 2810-237 Almada - Portugal Tel: +351 212 586 940 / Fax: +351 212 586 959 / mail@certif.pt / www.certif.pt

Certificado

Certificate no. Certificado nº

pt1

PSK - 001/2016

Name and address of certificate holder: Nome e morada do litular do certificado:

Product: Produto:

Type references: Referências:

Trademark(s): Marca(s) comercial(is):

Technical characteristics: Características técnicas:

This product is in conformity with: Este produto está em conformidade com: SOLE S. A. Lefktron and Laikon Agonon, Acharnai – 13671, Athens GREECE

Thermal Solar Collector Coletor Solar Térmico

Nº 4151 DE4 / DEMOKRITOS

ECO \$150; ECO \$200; ECO \$230; ECO \$260

ECO

Summary of EN 12975 Test Results: Registration No. PSK-001/2016, (in annex) Resumo dos resultados dos ensaios realizados segundo a norma EN 12975: Registo Nº PSK-001/2016, (em anexo)

EN 12975-1:2006+A1:2010, EN ISO 9806:2013

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: Relatórios de ensaios nº(s) / emitidos por:

Additional information (if any): Informação adicional (se existir):

This certificate is valid until: Este certificado é válido até: and supersedes certificate no: e substitul o certificado nº:

Date of issue: Data de emissão:

Francisco Barroca General Manager / Diretor Geral



This Certificate includes one Annex with 2 (two) pages Este Certificado é constituído por um Anexo com 2 (duas) páginas





PSK-024/2015

2016-01-04



NCSR "DEMOKRITOS" Solar & other Energy Systems

iação para a Certificação Laboratory Page 1/2 Summary of EN 12975 Test Results. Licence Number PSK-001/2016 annex to Solar KEYMARK Certificate heuzel 2016-01-04 SOLE SA Countr GREECE **Company holding the** Website www.eurostar-solar.com Brand (optional) ECO Street, street number **LEFKTRON & LAIKON AGONON** E-mail export@sole.com Postal Code / City, 13671 ACHARNAI, ATHENS Tel/Fax 30 2102389500 / 2 Collector Type (flat plate glazed/un-glazed; evacuate tubular) Flat plate collector - glazed Thermal / photo voltaic hybid collector? (PVT collector) No Yes Integration in the roof possible ? (manufacturers declaration) Power output per collector module Aperture area (Aa) (**AG**) $G = 1000 W/m^2$ length height Gross Gross width Gross Gross area (Тт-Та 0 K 10 K 30 K 50 K 70 K Collector name m² mm mm mm m² W W W W W ECO 5260 2.52 2.64 1,923 1,789 1,518 1,244 968 2,135 1,238 81 2.17 ECO \$230 1,960 1,165 81 2.28 1,656 1,540 1,307 1,071 833 ECO \$200 1.78 1,960 960 81 1.88 1,358 1,263 1,072 879 683 ECO \$150 1.39 1,540 960 81 1.48 1,061 987 837 686 534 Glazed liquid heating collector - steady state - outdoor Performance test method Performance parameters related to aperture a2 ηĐ a1 W/(m²K) W/(m²K²) Units 5.310 Test results - Flow rate and fluid see note 1 0.763 0.002 **Bi-directional incidence angle** Kð values are obligatory for 50°. No Incidence angle modifiers K0(0) Angle 10° 20° 30° 40° 50° 60° 70° 80° 90° KB(B) 0.79 0.00 Incidence angle modifier not bidirectional - leave fields blank Stagnation temperature - Weather conditions see note 2 Tstg 164 °C **Effective thermal capacity** ceff = C/Ag kJ/(m^zK) 10.7 Max. intende operation temperature - see note 3 Tmax,op 150 °C 1000 kPa Max. operation pressure - see note 3 omax.op Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m² aperture area **Flow rate** kg/(s m²) 0.005 0.007 0.010 0.016 0.021 0.026 0.032 Pressure drop, ΔP 77 113 171 308 458 671 890 Pa Link **Optional weather data** Location Solar & Energy Systems Laboratory, NCSR "DEMOKRITOS" **Testing Laboratory** www.solar.demokritos.gr Website 2015/09/22 Test report id. number 4154 DE4 Date of test report During the test GDIF/GTOT was always between 0.1 0.2 and **Comments of testing laboratory:** ECO S150 was thermal performance tested. ECO 5260 was thermal performance tested and reliability and durability Test performed according to EN ISO9806:2013 which supersedes EN 12975-2:2006. N.C.S.R "DE MOKRIYOS" SOLAR CHEROV LABORATORY Mead. Dr.V. Washing Belessions (Marthall re: 1238 658316 - Sac 216 651000 (Marthall re: 1238 658316 - Sac 216 651000 (Marthall re: 1238 658316 - Sac 216 651000 (Marthall re: 1238 658316 - Sac 216 65100 (Marthall re: 1238 658316 - Sac 216 65100 (Marthall re: 1238 658316 - Sac 216 65100 (Marthall re: 1238 653316 - Sac 216 6510 (Marthall re: 1238 6510 (Marthall) (Marthall re: 1238 6510 (Marthall re: 1238 6510 (Marthall re: 1 0.020 kg/(s m²) Fluid Water Note J Flow rate Irradiance, G = 1000 W/m²; Ambient temperature , Ta=30 °C Note 2

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Note 3 Given by manufacturer

Rua José Afonso, 9E - 2810-237 Almada - Portugal

Datasheet version: 4.06, 2014-01-15

Tel: +351 212 586 940 / Fax: +351 212 586 959 / mail@certif.pt / www.certif.pt



Page 2/2

Annual collector output based on EN 12975 Test Results,	Licence Number	PSK-001/2016
annex to Solar KEYMARK Certificate	lssued	4/1/2016

		A	nnual	colle	ctor (outpu	it kW	h/ma	dule						
					Locat	ion an	d colle	ector t	empe	erature	≘ (Tm)		24		
	1	\then:	s		Davos		Ste	ockho	m	Würzburg					
Collector name	25°C	50°C	75°C	25°C	50°C	75°C	25*C	50°C	75°C	25°C	50°C	75"C			
ECO 5260	2,653	1,608	924	1,871	1,151	648	1,386	7 9 4	436	1,502	840	452			
ECO S230	2,284	1,384	795	1,611	991	558	1,193	684	375	1,293	723	389			
ECO \$200	1,874	1,136	652	1,321	813	458	979	561	308	1,061	593	319			
ECO S150	1,463	887	510	1,032	635	358	764	438	240	828	463	249			
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Collector mounting: Fixed or tracking

Fixed; slope = latitude - 15° (rounded to nearest 5°)

Location	Latitude °	Gtot kWh/m²	Ta ⁴C	Collector orientation or tracking mode
Athens	38	1,765	18.5	South, 25°
Davos	47	1,714	3.2	South, 30°
Stockholm	59	1,166	7.5	South, 45°
Würzburg	50	1,244	9.0	South, 35°

Gtot	Annual total irradiation on collector plane	kWh/m²
Ta	Mean annual ambient air temperature	°C
Tm	Constant collector operating temperature (mean of in- and outlet temperatures)	"C

The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool ScenoCalc. The collector output is calculated hour by hour according to the efficiency parameters from the Keymark test using constant collector operating temperature (Tm). A detailed description of the calculations is available at http://www.sp.se/en/index/services/solar/ScenoCalc/Sidor/default.aspx.

CERTIF Associação para a Certificação Rua José Afonso, 9E - 2810-237 Almada - Portugal Tel: +351 212 586 940 / Fax: +351 212 586 959 / mail@certif.pt / www.certif.pt Ver. 4.06 (Jan, 2014) HELLENIC ELECTRONICS EQUIPMENT QUALITY ASSURANCE CENTER H.E.E.Q.A.C. S.A.

NOTIFIED BODY (0848) FOR THE 2006/95/EC, 2004/108/EC & 2009/142/EC DIR. 103 KEFALLHNIAS STR, 112 51 ATHENS - GREECE TEL.: +30-210-8670588 - FAX: +30-210-8647510 e-mail: info@heeqac.gr, site: www.heeqac.gr

VERIFICATION OF CONFORMITY

VERIFICATION NUMBER	:	400304-1
DATE OF ISSUE	:	OCTOBER 10, 2015
VALID UP TO	:	OCTOBER 09, 2019
ISSUED TO	:	SOLE S.A., AMAROUSIOU CHALANDRIOU 26
		15125, MAROUSI, ATHENS, GREECE
TEST ITEM	:	HOT WATER BOILER
TYPE/MODEL	:	STS 150, STS 200, STS 300, SWH 120, SWH 150,
		SWH 200, SWH 300
MANUFACTURER	:	SOLE S.A.
APPLICABLE DIRECTIVE	:	LVD 2006/95/EC
APPLICABLE STANDARDS	:	EN 60335-1:2012 (IEC 60335-1:2010)
		EN 60335-2-21:2003 +A1:2004 +A2:2008
		(IEC 60335-2-21:2002 +A1:2004 +A2:2008)

STATEMENT : THE TEST ITEM COMPLIES WITH THE ABOVE MENTIONED APPLICABLE STANDARDS.

GENERAL REMARKS :

HEEDAL

- The test results apply only to the particular sample for which the HEEQAC'S test report S/N 503638-E dated September 29, 2011 was issued.
- This verification must be read in conjunction with the above mentioned test report.
- This verification replaces and therefore cancels the verification with No. 400304 issued on October 10, 2011.
- After preparation of the necessary technical documentation as well as the declaration of conformity and the verification for compliance with other Directives, the CE marking shown below can be affixed on this product.
- This verification is based on a single evaluation of the above mentioned product. It is therefore essential for the manufacturer to ensure that the quality of his production is always in accordance with the applicable standards.





TEST LABORATORY FOR H.E.E.Q.A.C. S.A. G. CHRYSANTHAKOPOULOS GENERAL MANAGER

DATE OF ISSUE: OCTOBER 10, 2015

FORM 1500 - ISSUE No 4 - FORMAT APPROVAL 31-05-02





DUBAI MUNICIPALITY

CERTIFICATE OF PRODUCT CONFORMITY

Dubai Central Laboratory Department (DCLD) of Dubai Municipality, hereby attests that the product(s):

THERMAL SOLAR SYSTEMS AND COMPONENTS - SOLAR COLLECTORS

(Details as per the attached Scope of Certification)

manufactured by:

SOLE S.A.

Lefktron and Laikon Agonon, Acharnai-Athens, Greece

have been assessed in accordance with DCLD Document Ref. No. RD-DP21-2001 (IC) "General Rules for DM third party product certification system through factory assessment" and the relevant Specific Rules, and were found in conformity with the standard specification:

BS EN 12975-1:2006+A1:2010

to affix the DCL Product Conformity Mark to the above-mentioned product(s). Accordingly, DCLD hereby authorizes the above manufacturer

Director, Dubai Central Laboratory Department SENGR. AMIN AHMED AMIN



Dubai Municipality



Valid Until: 22 February 2018 Certificate No: CL16020330

F-IC-2031 REV 9

Original Issue Date: 23 February 2016 Current Issue Date: 23 February 2017

The attached Scope of Certification bearing the same Certificate No. forms an integral part of this certificate.

This certificate is subject to the Terms and Conditions of the Product Certification System

and shall not be reproduced except in full.





DUBAI CENTRAL LABORATORY DEPARTMENT DCL PRODUCT CONFORMITY CERTIFICATION SCHEME

SCOPE OF CERTIFICATION FOR CERTIFICATE NO. CL16020330

Certificate Issued To:

SOLE S.A. Lefktron and Laikon Agonon, Acharnai-Athens, Greece

Applicable Standard Specification:

Applicable Specific Rules:

BS EN 12975-1:2006 +A1: 2010 – Thermal solar systems and components – Solar Collectors – Part 1: General requirements

RD-DP21-2178 (IC) – Specific Rules Certification of Solar Collectors as per BS EN 12975-1 Through Factory Assessment

RD-DP21-2084 (IC) – Guidelines for Factory Production control Plan for Solar Collector Manufacturers

S/N	PRODUCT DETAILS	BRAND NAME(S) / MODEL(S)	PRODUCT DESCRIPTION
1.	FLAT PLATE SOLAR COLLECTORS CLIMASOL FAMILY Absorber Materials: Copper full face sheet 0.20 mm thickness welded to copper pipes with ultrasonic or laser welding Absorber Coating: Sputtering blue selective surface Insulation Materials: 40 mm Rockwool with Density of 50 kg/m3 for back and 20 mm Glasswool with density of 30 kg/m3 for sides Cover: Tempered low iron prismatic glass 4 mm glass cover Frame: Aluminum profile epoxy coated & free of screws and rivets Sealing materials: EPDM rubber - silicone Use with anti-freeze thermal fluid Maximum operational pressure: 1000 kPa Maximum Working temperature: 150°C	"SOLE, EUROSTAR, AQUASOL, OLYMPUS, SUNLIT" BRANDS	CLIMASOL 175 Gross dimensions: 1760 x 1000 x 86 mm; Collector Area: 1.76 m2; Aperture Area: 1.59 m2; Absorber Area: 1.57 m2; Collector Weight: 38 kg; Fluid content: 1.30 liters CLIMASOL 200 Gross dimensions: 1970 x 970 x 86 mm; Collector Area: 1.91 m2; Aperture Area: 1.73 m2; Absorber Area: 1.71 m2; Collector Weight: 41 kg; Fluid content: 1.36 liters CLIMASOL 250 Gross dimensions: 1970 x 1175 x 86 mm; Collector Area: 2.31 m2; Aperture Area: 2.12 m2; Absorber Area: 2.09 m2; Collector Weight: 49 kg; Fluid content: 1.64 liters CLIMASOL 270 Gross dimensions: 2145 x 1248 x 86 mm; Collector Area: 2.68 m2; Aperture Area: 2.46 m2; Absorber Area: 2.42 m2; Collector Weight: 55 kg; Fluid content: 1.86 liters

F-IC-2032 R5





DUBAI CENTRAL LABORATORY DEPARTMENT DCL PRODUCT CONFORMITY CERTIFICATION SCHEME

SCOPE OF CERTIFICATION FOR CERTIFICATE NO. CL16020330

T.			
2.	FLAT PLATE SOLAR COLLECTORS WASCO FAMILY Absorber Materials: Aluminum full face sheet 0.50 mm thickness welded to copper pipes with laser welding Absorber Coating: Sputtering blue selective surface Insulation Materials: 40 mm Rockwool with Density of 50 kg/m3 for back and 20 mm Glasswool with density of 30 kg/m3 for sides Cover: Tempered low iron prismatic glass 4 mm glass cover Frame: Aluminum profile epoxy coated & free of screws and rivets Sealing materials: EPDM rubber - silicone Use with anti-freeze thermal fluid Maximum operational pressure: 600 kPa Maximum Working temperature: 160°C	"SOLE, EUROSTAR, AQUASOL, OLYMPUS, SUNLIT" BRANDS	WASCO 175 Gross dimensions: 1760 x 1000 x 86 mm; Collector Area: 1.76 m2; Aperture Area: 1.59 m2; Absorber Area: 1.57 m2; Collector Weight: 38 kg; Fluid content: 1.30 liters WASCO 200 Gross dimensions: 1970 x 970 x 86 mm; Collector Area: 1.91 m2; Aperture Area: 1.73 m2; Absorber Area: 1.71 m2; Collector Weight: 41 kg; Fluid content: 1.36 liters WASCO 250 Gross dimensions: 1970 x 1175 x 86 mm; Collector Area: 2.31 m2; Aperture Area: 2.12 m2; Absorber Area: 2.09 m2; Collector Weight: 49 kg; Fluid content: 1.64 liters WASCO 270 Gross dimensions: 2145 x 1248 x 86 mm; Collector Area: 2.68 m2; Aperture Area: 2.46 m2; Absorber Area: 2.42 m2; Collector Weight: 55 kg; Fluid content: 1.86 liters
3.	FLAT PLATE SOLAR COLLECTORS NON SELECTIVE (NS) FAMILY Absorber Materials: Aluminum full face sheet 0.40 mm thickness welded to copper pipes with laser welding Absorber Coating: Black paint non selective surface Insulation Materials: 40 mm Rockwool with Density of 50 kg.m3 for back and 20 mm Glasswool with density of 30 kg/m3 for sides Cover: Tempered low iron prismatic glass 4 mm glass cover Frame: Aluminum profile powder coated & free of screws and rivets Sealing materials: EPDM rubber - silicone Use with anti-freeze thermal fluid Maximum operational pressure: 600 kPa Maximum Working temperature: 150°C	"SOLE, EUROSTAR, AQUASOL, OLYMPUS, SUNLIT" BRANDS	NS 175 Gross dimensions: 1760 x 1000 x 86 mm; Collector Area: 1.76 m2; Aperture Area: 1.59 m2; Absorber Area: 1.57 m2; Collector Weight: 38 kg; Fluid content: 1.30 liters NS 200 Gross dimensions: 1970 x 970 x 86 mm; Collector Area: 1.91 m2; Aperture Area: 1.73 m2; Absorber Area: 1.71 m2; Collector Weight: 41 kg; Fluid content: 1.36 liters NS 250 Gross dimensions: 1970 x 1175 x 86 mm; Collector Area: 2.31 m2; Aperture Area: 2.12 m2; Absorber Area: 2.09 m2; Collector Weight: 49 kg; Fluid content: 1.64 liters NS 270





DUBAI CENTRAL LABORATORY DEPARTMENT DCL PRODUCT CONFORMITY CERTIFICATION SCHEME

SCOPE OF CERTIFICATION FOR CERTIFICATE NO. CL16020330

4.	FLAT PLATE SOLAR COLLECTORS ECO FAMILY Absorber Materials: Aluminum fins 0.50 mm thickness welded to copper pipes with laser welding Absorber Coating: Sputtering blue selective surface Insulation Materials: 40 mm Rockwool with Density of 50 kg.m3 for back and 20 mm Glasswool with density of 30 kg/m3 for sides Cover: Tempered low iron prismatic glass 3.2 mm glass cover Frame: Aluminum profile & free of screws and rivets Sealing materials: Acrylic foam - silicone Use with anti-freeze thermal fluid Maximum operational pressure: 1000 kPa Maximum Working temperature: 150°C	"ECO" BRAND	ECO S150 Gross dimensions: 1540 x 960 x 81 mm Collector Area: 1.48 m2; Aperture Area: 1.39 m2; Absorber Area: 1.33 m2; Collector Weight: 27.30 kg; Fluid content: 0.85 liter ECO S200 Gross dimensions: 1960 x 960 x 81 mm Collector Area: 1.88 m2; Aperture Area: 1.78 m2; Absorber Area: 1.70 m2; Collector Weight: 32.0 kg; Fluid content 0.95 liter ECO S230 Gross dimensions: 1960 x 1165 x 81 mm; Collector Area: 2.28 m2; Aperture Area: 2.17 m2; Absorber Area: 2.09 m Collector Weight: 38.80 kg; Fluid content: 1.20 liters ECO S260 Gross dimensions: 2135 x 1238 x 81 mm; Collector Area: 2.64 m2; Aperture Area: 2.52 m2; Absorber Area: 2.44 m Collector Weight: 44 kg; Fluid content 1.30 liters

NOTE 1: The above products shall bear the DCL Conformity Mark applied on each individual product. NOTE 2: This document forms part of the Certificate of Product Conformity bearing the same certificate number.

Original Issue Date Current Issue Date Valid Until : 23 February 2016 : 23 February 2017 : 22 February 2018

ARIF HUSAIN AL MARZOOQI Head of Products Conformity Assessment Section Dubai Central Laboratory Department





Apiθ. Epγou: 02.02.219 Project Nr.

<u>ΠΙΣΤΟΠΟΙΗΤΙΚΟ ΥΔΡΑΥΛΙΚΗΣ ΔΟΚΙΜΗΣ</u> <u>HYDRAULIC TEST CERTIFICATE</u>

1. Πελάτης/ Customer: SOLE S.A.

2. Στοιχεία εξοπλισμού /Description of equipment:

CLOSED SOLAR LOOP (Heat Exchanger, Solar Collector and interconnecting piping) of THERMAL SOLAR SYSTEMS & COMPONENTS EUROSTAR/HELIOTHERMO ECO.

KATASKEYASTHS/ MANUFACTURER	SOLE S.A.
MANOTAOTORER.	Lefktron & Laikon Agonon, Achamai – 13671, Athens Greece.
ΤΥΠΟΣ/ΤΥΡΕ :	EUROSTAR/HELIOTHERMO, ECO 80-1-S100; 100-1-S125; 125-1-S150; 125-1-S200; 150-1-S200, 150- 1-S230; 150-2-S150; 200-1-S200; 200-1-S230; 200-1-S260; 200-2- S200; 300-2-S200; 300-2-S230
HΜΕΡΟΜΗΝΙΑ ΚΑΤΑΣΚΕΥΗΣ/ DATE OF MANUFACTURE:	See below
AP. ΚΑΤΑΣΚΕΥΗΣ /SERIAL No. :	Solar Collectors (absorbers): ECO S260 / EMTF26016088070 / 04.08.2016 ECO S230 / EMTF23016088223 / 29.08.2016 ECO S200 / EMTF20016099481 / 05.09.2016 ECO S125 / EMTF12516033010 / 17.03.2016 ECO S150 / EMTF15015055086 / 06.05.2015 ECO S100 / EMTF10014044005 / 02.04.2014 Boilers: ECO 300 / EC30016066006 / 18.06.2016 ECO 200 / EC20016077101 / 27.07.2016 ECO 150 / EC15016099621 / 12.09.2016 ECO 125 / EC12516099124 / 07.09.2016 ECO 100 / EC10016099025 / 07/09.2016 ECO 80 / EC8016099001 / 12.09.2016



Headquarters: TÜV HELLAS (TÜV NORD) S.A. 24,El Venizelou Str, 153 41 Ag. Paraskevi, Greece Phone: +30-210-6540195, Fax ; +30-210-6528025 info@tuvhellas.gr www.tuvhellas.gr

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Αριθ. Εργου: 02.02.219 Project Nr.



ΣΧΕΔΙΟ/DRAWING No. :	 a. SWH ECO Series Parametrical Drawing of 1 Collector on Flat Roof / Complete System 2-sides View on Flat Roof (40°) / 08.09.2013 b. ECO 80-1-S125 / Complete System 2-sides View on Flat Roof (40°) / 08.09.2013 c. ECO 80-1-S100 / Complete System 2-sides View on Flat Roof (40°) / 08.09.2013 d. Boiler Eurostar ECO-300 Double Energy / Boiler Cross-section with internal view / 03.07.2013. e. Boiler Eurostar ECO-200 Double Energy / Boiler Cross-section with internal view / 03.07.2013. f. Boiler Eurostar ECO-150 Double Energy / Boiler Cross-section with internal view / 03.07.2013. g. Eurostar 125 AK – Inner Tank AK-125 / 03.07.2013 h. Eurostar 100 AK – Inner Tank AK-100 / 03.07.2013 i. Eurostar 80 AK – Inner Tank AK-80 / 03.07.2013 j. Absorber ECO S-260 Blue Selective / 2Φ18D-10Φ8 FINS / 02.10.2013 k. Absorber ECO S-200 Blue Selective / 2Φ18D-7Φ8 FINS / 02.10.2013 l. Absorber ECO S-150 Blue Selective / 2Φ18D-7Φ8 FINS / 24.11.2013 m. Absorber ECO S-150 Blue Selective / 2Φ18D-7Φ8 FINS / 24.11.2013 n. Absorber ECO S-150 Blue Selective / 2Φ18D-7Φ8 FINS / 24.11.2013 n. Absorber ECO S-150 Blue Selective / 2Φ18D-7Φ8 FINS / 24.11.2013 n. Absorber ECO S-150 Blue Selective / 2Φ18D-7Φ8 FINS / 24.11.2013 n. Absorber ECO S-125 Blue Selective / 2Φ18D-7Φ8 FINS / 24.11.2013 n. Absorber ECO S-125 Blue Selective / 2Φ18D-7Φ8 FINS / 24.11.2013 n. Absorber ECO S-100 Blue Selective / 2Φ18D-7Φ8 FINS / 24.11.2013 n. Absorber ECO S-100 Blue Selective / 2Φ18D-7Φ8 FINS / 24.11.2013 n. Absorber ECO S-100 Blue Selective / 2Φ18D-7Φ8 FINS / 20.05.2013
ΠΙΕΣΗ ΣΧΕΔΙΑΣΜΟΥ/ ΜΕΓ. ΠΙΕΣΗ ΛΕΙΤΟΥΕΓΙΑΣ DESIGN PRESSURE / MAX. WORKING PRESSURE :	1500 Kpa, as per manufacturer's declaration (Closed Solar Loop)
ΠΙΕΣΗ ΔΟΚΙΜΗΣ/ TEST PRESSURE.	2250 Kpa (22.5 bar)
EΞΩΤΕΡΙΚΗ ΔΙΑΜΕΤΡΟΣ/ OUTSIDE DIAMETER. :	See below
ΠΑΧΟΣ/WALL THICKNESS :	Solar Heat Exchanger : 70x30x3mm, material S235 (hollow section) Inteconnecting piping : Ø15x1mm, copper tube Solar Collector: Ø8x0.4mm / Ø18x0.7mm, copper tubes.
ΟΓΚΟΣ/CAPACITY :	4

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Αριθ. Εργου: 02.02.219 Project Nr.

3. Στοιχεία υδραυλικής δοκιμής / Pressure Test Data :

MEΓIΣΤΗ ΠΙΕΣΗ ΛΕΙΤΟΥΡΓΙΑΣ/MAX WORKING PRESSURE :	1500 Kpa – Closed Solar loop (Solar Collector and interconnecting piping and Solar Heat exchanger)
ΔΟΚΙΜΗ ΠΙΕΣΗΣ/TEST PRESSURE :	2250 Kpa (22.5 bar)
ΔΙΑΡΚΕΙΑ ΔΟΚΙΜΗΣ/TEST DURATION :	30 mins (min.)
MEΣO ΔΟΚΙΜΗΣ/TEST MEDIUM :	Water

5 -

- 4. Ημερομηνία δοκιμής / Date of Hydraulic Test: 13.09.2016
- 5. Επιθεωρητής / Inspector : Konstantinos Papagiannopoulos
- 6. Τόπος επιθεώρησης / Place of Inspection: Athens, Greece
- Αλλοι έλεγχοι/Other Inspections
- 8. Παρατηρήσεις/Remarks

: Manometer WIKA 213.53 – DL2672 Calibration Cert. DEKA S.A. No. P-57-14

> NSPECTOR apadiannopoulos

SIGNATURE

TUV HELLAGEA

15512 AM

9. Αποτελέσματα/ Results

: ACCEPTABLE

PLACE / DATE Athens 27.09.2016

Το παρόν πιστοποιητικό εκδίδεται μετά από εξέταση του εξοπλισμού ο οποίος βρέθηκε σε αποδεκτή κατάσταση σύμφωνα με τις απαιτήσεις και καταδεικνύει τα ευρήματα της επιθεώρησης στο συγκεκριμένο χώρο και χρόνο. Δεν αποτελεί εγγύηση καθ'οιανδήποτε έννοια. Δεν επιτρέπεται η μερική ή ολική ανατύπωσή του.

This certificate is issued after equipment examination and found in acceptable condition, according to the requirements and indicates the findings of the inspection at the certain location and time Does not constitute guarranty at any significance.Partial or total reproduction is not permitted

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Αρ. Έργου. : 02.02.219

Αρ. Πιστοποιητικού : Ι.12134/17

ΠΙΣΤΟΠΟΙΗΤΙΚΟ ΥΔΡΑΥΛΙΚΗΣ ΔΟΚΙΜΗΣ

1. Πελάτης: SOLE Α.Ε.

2. Στοιχεία εξοπλισμού:

Ηλιακοί Συλλέκτες Σειράς ECO - S260, S230, S200, S150, S125, S100.

COLE A.E. – BIOMHXANIA ΗΛΙΑΚΩΝ ΣΥΣΤΗΜΑΤΩΝ Δεύκτρων & Λαϊκών Αγώνων, Αχαρναί – 13671, Αθήνα. ΗΛΙΑΚΟΙ ΣΥΛΛΕΚΤΕΣ ΕCO 260, S230, S200, S150, S125, S100. Αλέπε παρακάτω CO S260 / EMTF26016088070 / 04.08.2016 CO S230 / EMTF23016088223 / 29.08.2016 CO S200 / EMTF20016099481 / 05.09.2016 CO S125 / EMTF12516033010 / 17.03.2016 CO S150 / EMTF15015055086 / 06.05.2015 CO S100 / EMTF10014044005 / 02.04.2014 Absorber ECO S-260 Blue Selective / 2Φ18D-10Φ8 FINS / 02.10.2013
260, S230, S200, S150, S125, S100. λέπε παρακάτω CO S260 / EMTF26016088070 / 04.08.2016 CO S230 / EMTF23016088223 / 29.08.2016 CO S200 / EMTF20016099481 / 05.09.2016 CO S125 / EMTF12516033010 / 17.03.2016 CO S150 / EMTF15015055086 / 06.05.2015 CO S100 / EMTF10014044005 / 02.04.2014 Absorber ECO S-260 Blue Selective / 2Φ18D-10Φ8 FINS / 02.10.2013
CO S260 / EMTF26016088070 / 04.08.2016 CO S230 / EMTF23016088223 / 29.08.2016 CO S200 / EMTF20016099481 / 05.09.2016 CO S125 / EMTF12516033010 / 17.03.2016 CO S150 / EMTF15015055086 / 06.05.2015 CO S100 / EMTF10014044005 / 02.04.2014 Absorber ECO S-260 Blue Selective / 2Φ18D-10Φ8 FINS / 02.10.2013
CO S230 / EMTF23016088223 / 29.08.2016 CO S200 / EMTF20016099481 / 05.09.2016 CO S125 / EMTF12516033010 / 17.03.2016 CO S150 / EMTF15015055086 / 06.05.2015 CO S100 / EMTF10014044005 / 02.04.2014 Absorber ECO S-260 Blue Selective / 2Φ18D-10Φ8 FINS / 02.10.2013
02.10.2013
 Absorber ECO S-230 Blue Selective / 2Φ18D-9Φ8 FINS / 02.10.2013 Absorber ECO S-200 Blue Selective / 2Φ18D-7Φ8 FINS / 24.11.2013 Absorber ECO S-150 Blue Selective / 2Φ18D-7Φ8 FINS / 24.11.2013 Absorber ECO S-125 Blue Selective / 2Φ18D-7Φ8 FINS / 17.05.2013 Absorber ECO S-100 Blue Selective / 2Φ18D-7Φ8 FINS / 20.05.2013
500 Kpa, από δήλωση του κατασκευαστή 250 Kpa (22.5 bar) λέπε παρακάτω διάμετρο σωλήνωσης συλλεκτών. αλκοσωλήνες Ø8x0.4mm / Ø18x0.7mm.

TÜV HELLAS (TÜV NORD) Α.Ε. Λεωφ. Μεσογείων 282, 155 62, Χολαργός Τηλ.: +30-210-6540195, Φαξ : +30-210-6528025 info@tuvhellas.gr www.tuvhellas.gr 15562 Athena Gr



Αρ. Πιστοποιητικού : Ι.12134/17

3. Στοιχεία υδραυλικής δοκιμής:

	ΜΕΓΙΣΤΗ ΠΙΕΣΗ ΛΕΙΤΟΥΡΓΙΑΣ:	1500 Κρα – (Ηλιακοί Συλλέκτες)
	ΠΙΕΣΗ ΔΟΚΙΜΗΣ:	2250 Kpa (22.5 bar)
	ΔΙΑΡΚΕΙΑ ΔΟΚΙΜΗΣ:	30 λεπτά
	ΜΕΣΟ ΔΟΚΙΜΗΣ:	NEPO
1	Ημ/νια Υδραυλικής Δοκιμής	: 13.09.2016
	Επιθεωρητής	: Κων/νος Παπαγιαννόπουλος
	Τόπος Επιθεώρησης	: Αθήνα
	Άλλοι Έλεγχοι	4.9
Ľ.	Παρατηρήσεις	: Μανόμετρο WIKA 213.53 – DL2672

- - 9. Αποτελέσματα

: Μανόμετρο WIKA 213.53 - DL2672 Πιστοποιητικό Διακρίβωσης DEKA S.A. No. P-57-14

: ΑΠΟΔΕΚΤΑ Δεν παρατηρήθηκαν παραμορφώσεις, διαρροές ή άλλου είδους αστοχίες.

ETTIGEWONTH (ων/νος, Παπαγιαννόπου λOC STUV 19562 Athens Greece

Υπογραφή

Τοποθεσία / Ημερομηνία Αθήνα 08.05.2017

Το παρόν πιστοποιητικό εκδίδεται μετά από εξέταση του εξοπλισμού ο οποίος βρέθηκε σε αποδεκτή κατάσταση σύμφωνα με τις απαιτήσεις και καταδεικνύει τα ευρήματα της επιθεώρησης στο συγκεκριμένο χώρο και χρόνο. Δεν αποτελεί εγγύηση καθ'οιανδήποτε έννοια. Δεν επιτρέπεται η μερική ή ολική ανατύπωσή του.

> ΤÜV HELLAS (TÜV NORD) Α.Ε. Λεωφ. Μεσογείων 282, 155 62, Χολαργός Τηλ.: +30-210-6540195, Φαξ : +30-210-6528025 info@tuvhellas.gr www.tuvhellas.gr

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Project Nr. : 02.02.219

Cert Nr..: I.12134/17

HYDRAULIC TEST CERTIFICATE

1. Customer: SOLE S.A.

1

2. Description of equipment:

Solar Collectors (Absorbers) ECO series - S260, S230, S200, S150, S125, S100.

MANUFACTURER :	SOLE S.A. Lefktron & Laikon Agonon, Acharnai – 13671, Athens Greece.
TYPE :	SOLAR COLLECTORS (Absorbers) ECO, S260, S230, S200, S150, S125, S100.
DATE OF MANUFACTURE:	See below
SERIAL No. :	ECO S260 / EMTF26016088070 / 04.08.2016 ECO S230 / EMTF23016088223 / 29.08.2016 ECO S200 / EMTF20016099481 / 05.09.2016 ECO S125 / EMTF12516033010 / 17.03.2016 ECO S150 / EMTF15015055086 / 06.05.2015 ECO S100 / EMTF10014044005 / 02.04.2014
DRAWING No. :	 a. Absorber ECO S-260 Blue Selective / 2Φ18D-10Φ8 FINS / 02.10.2013 b. Absorber ECO S-230 Blue Selective / 2Φ18D-9Φ8 FINS / 02.10.2013 c. Absorber ECO S-200 Blue Selective / 2Φ18D-7Φ8 FINS / 24.11.2013 d. Absorber ECO S-150 Blue Selective / 2Φ18D-7Φ8 FINS / 24.11.2013 e. Absorber ECO S-125 Blue Selective / 2Φ18D-7Φ8 FINS / 17.05.2013 f. Absorber ECO S-100 Blue Selective / 2Φ18D-7Φ8 FINS / 20.05.2013
DESIGN PRESSURE / MAX. WORKING PRESSURE :	1500 Kpa, as per manufacturer's declaration.
TEST PRESSURE. :	2250 Kpa (22.5 bar)
OUTSIDE DIAMETER. : WALL THICKNESS :	See below Copper tubes Ø8x0.4mm / Ø18x0.7mm.
CAPACITY :	- 28tonAu - 155 62 Athens Greece - 150

Headquarters: TÜV HELLAS (TÜV NORD) S.A. 24,EI Venizelou Str, 153 41 Ag. Paraskevi, Greece Phone: +30-210-6540195, Fax : +30-210-6528025 info@tuvhellas.gr www.tuvhellas.gr



Project Nr. : 02.02.219

Cert Nr ..: I.12134/17

3. Pressure Test Data :

MAX WORKING PRESSURE :	1500 Kpa – (Solar Collectors)	
TEST PRESSURE :	2250 Kpa (22.5 bar)	
TEST DURATION :	30 mins (min.)	
TEST MEDIUM :	Water	

- 4. Date of Hydraulic Test : 13.09.2016
- 5. Inspector : Konstantinos Papagiannopoulos

: -

- 6. Place of Inspection : Athens, Greece
- 7. Other Inspections
- 8. Remarks : Manometer WIKA 213.53 DL2672 Calibration Cert. DEKA S.A. No. P-57-14
- 9. Results

: ACCEPTABLE No deformations, leakages or other faliures were observed.

CTOF K. Papagiannopoulos tuv he 5 S.A. 15562 Athen SIGNATURE

PLACE / DATE Athens 08.05.2017

This certificate is issued after equipment examination and found in acceptable condition, according to the requirements and indicates the findings of the inspection at the certain location and time. Does not constitute guarranty at any significance. Partial or total reproduction is not permitted

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SOLE S.A. PRODUCTS' BROCHURES



Discover more at . www.orman.ae

Quality Solar Systems

Solar Water Heater

SOLE S.A. is the inventor of the closed circuit Solar Water Heater.

EUROST/R

Advantages

- Maximizes efficiency
- No need for refilling the solar loop
- Best aesthetic results. Low ver with hidden tank available
- Easy to inst
- Minimum maint
- Anode protection

Commitment to the Environment

Since its foundation in 1974 SOLE S.A. has been committed to the protection of the environment and the reduction of CO₂ emission.

استدامة

SOLE S.A. holds numerous prizes and environmental distinctions, contributing with its products to the improvement of environment in all 5 continents.

EUROST ECO

he new series of thermosiphon systems EUROSTAR ECO, have been designed in order to cope with the demands of any market all over the world specializing in very hot climates without the need for refilling the solar circuit.

> The EUROSTAR ECO solar water heater is manufactured in compliance with the International Standards for Quality Assurance ISO 9001:2008, is tested according to international standards EN12976-1-2.

ORMAN

BUILDING MATERIAL TRADING L.L.C AIRPORT STREET, AS AL KHAIMAH

Tel.: +97172277820 Fax: +97172277821 Email: INFO@ORMAN.AE WWW.ORMAN.AE





Durable withstanding 22,5 bar pressure!!!

Discrete

with a low version (hidden tank) for preserving architectural designs.

The collector's performance and reliability is tested according to EN 12975-2. The system has been granted with the Solar Keymark Certificate.



TÜV

TUV HELLAS

Eurostar **Eco**Collector



The EUROSTAR ECO collector casing is made of specially designed extruded aluminum profile, without any external connections, screws, nuts or rivets. The Rockwool insulation will maintain very high temperatures achieving an incredibly high efficiency.

The absorber is composed of Blue Selective Aluminum fins 0,50mm thickness, welded to copper pipes with laser welding.

The thermal liquid achieves maximum transfer of heat to the water while protecting the system against scaling, rusting, freezing and overheating.

Eurostar **Eco**Tank



The EUROSTAR ECO tank has a mild steel external casing, with high temperature oven powder coating for maximum protection from rain, sun and salty environment, ensuring durability and an elegant appearance.

The FREON FREE polyurethane insulation is casted under pressure in the tank, surrounding the cylinder and maintaining hot water for up to 48 hours.

The new revolutionary heat exchanger of the closed circuit assures instant hot water at very high temperature. The tank is made of low carbon steel with a double "enameling" coating (glass), oventreated at 860°C.

The magnesium anode effectively protects the cylinder from electrolysis. The backup electric heater ensures hot water even in very cloudy days.



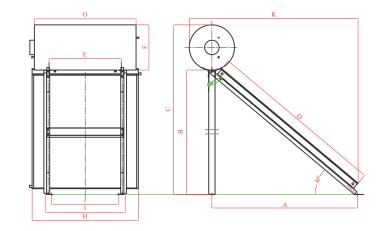
The eurostar eco is eco-friendly Thermosiphon solar water heater completely made from material that can be recycled.

2 100

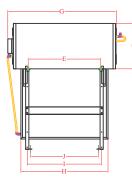
THERMOSIPHON SYSTEMS

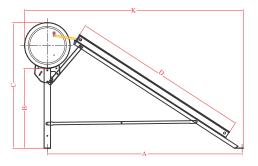
EUROSTAR ECO SPECIFICATIONS

ТҮРЕ	80-1-S100	100-1-5125			450 4 0000							
				150-1-S200 R COLLECTOR		200-1-5200	200-1-5230	200-1-S260	300-2-5200	300-2-5230		
NUMBER OF COLLECTORS	1	1	1	1	1	1	1	1	2	2		
AREA OF COLLECTORS m ²	0.99	1.23	1.48	1.88	2.28	1.88	2.28	2.64	3.76	4.56		
DIMENSIONS mm	1026x960x81	1280x960x81	1540x960x81	1960x960x81	1960x1165x81	1960x960x81	1960x1165x81	2135x1238x81	1960x960x81	1960x1165x81		
WEIGHT kg	20,00	22,00	24,00	29,50	35,50	29.50	35.50	40.00	59.00	71.00		
FRAME	Aluminum pr	ofile. Free of so	rews and rivet	s.								
COVER	Tempered lov	w iron prismati	c glass 3.2 mm.	90,5% transmi	ssion.							
SEALING	Acrylic foam	- Structural Silio	con					8			1	
INSULATION	Rockwool 40	mm (50kg/m ³)	back and Glass	wool 20 mm (3	80kg/m³) sides				TOU NO A			SOLE's respect for
ABSORBER MATERIAL	Blue Selective	e Aluminum fin	s 0,50mm thick	ness, welded t	o copper pipes	with laser wel	ding.		1	0	the second	
ABSORPTION (a)	95% (± 0.02)								Carlo I			the environment
EMISSIVITY (ε)	5% (±0.02)								1.000			
EFFICIENCY (ŋ₀)	0.763											starts at the
MAX. WORKING PRESSURE	1000kPa									10.00		
MAX. WORKING TEMPERATURE	150°C											production stage
				ΤΑΝΚ								production stage.
NOMINAL CAPACITY (It)	80	100	125	150	150	200	200	200	300	300	6	
WEIGHT EMPTY (kg)	32	41	49	55	55	61	61	61	95	95	Consumation.	
BOILER BODY			om USD 37.2 s									Elencer In
HEAT EXCHANGER	Internal heat	exchanger mad	de from 3.0 mm	n EN-10219 ste	el certified for	testing pressur	e at 22,5 bar &	operating pres	sure of 15 bar		MARK N	ECO
INSULATION		,	50mm (40kg/n	,						and a second	NO.	
EXTERNAL COVER	Steel sheet g	alvanized, pow	der coated, ove	n treated RAL	9006.				10	ACC.		
ANODE PROTECTION	0	od										
MAX. WORKING PRESSURE												
IAX. WORKING TEMP. OF SOLAR CIRCUIT												
AX. WORKING PRESS. OF SOLAR CIRCUIT												
TEST PRESSURE OF SOLAR CIRCUIT	22,5 bar											
											all se	J-4



AND		HEI	ЗНТ				mm	1			
								•			
	А	В	С	D	E	F	G	н	I	J	к
	897	776	1216	1026	480	440	870	960	565	425	1123
	1092	940	1380	1280	650	440	1030	960	735	595	1317
	1291	1107	1547	1540	800	440	1080	960	895	745	1516
	1613	1377	1877	1960	800	500	1195	960	895	745	1868
	1613	1377	1877	1960	800	500	1195	1165	895	745	1868
	1613	1377	1907	1960	800	530	1215	960	895	745	1883
	1613	1377	1907	1960	800	530	1215	1165	895	745	1883
	1747	1489	2019	2135	800	530	1215	1238	895	745	2017
	1613	1377	1907	1960	1345	530	1905	1980	1439	1289	1883
	1613	1377	1907	1960	1345	530	1905	2390	1439	1289	1883

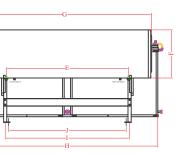


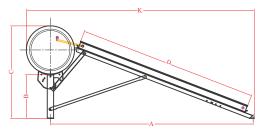


LOW HEIGHT DIMENSIONS mm.

ТҮРЕ	А	В	с	D	Е	F	G	н	I	J	К
150-1-S200	2147	878	1383	1960	800	500	1195	960	820	745	2411
200-1-5230	2147	878	1413	1960	800	530	1215	1165	820	745	2426
300-2-S200	2147	878	1413	1960	1345	530	1905	1980	1370	1295	2426

The new thermosiphon system of SOLE is also available in low height in three sizes, 150, 200 and 300ltr.





EXTRA LOW HEIGHT DIMENSIONS mm.											
ТҮРЕ	А	В	с	D	Е	F	G	н	I	ı	к
150-1-S200	2231	480	988	1960	800	500	1195	960	820	745	2495
200-1-S230	2231	480	1018	1960	800	530	1215	1165	820	745	2510
300-2-S200	2231	480	1018	1960	1345	530	1905	1980	1370	1295	2510



Solar Thermal Flat Plate Collectors Forced Circulation Kits



COLLECTOR ECO

ECO COLLECTOR

<u>Type</u>	ECO S150	ECO S200	ECO S230	ECO S260
Collector Surface	1.48 m ²	1.88 m ²	2.28m ²	2.64m ²
Aperture Surface	1.39m ²	1.78m ²	2.17m ²	2.52m ²
Absorber Surface	1.33 m ²	1.70 m ²	2.09m ²	2.44m ²
Dimensions	1540x960x81	1960x960x81	1960x1165x81mm	2135x1238x81mm
Weight	27,30kg	32,00kg	38,80kg	44,00kg
Fluid content	0,85 ltr	0,95 ltr	1,20ltr	1,30ltr

Technical Specifications	
Frame	Aluminum profile. Free of screws and rivets.
Cover	Tempered low iron prismatic glass 3.2 mm. 90,05% transmission.
Sealing	Acrylic foam - Silicon
Insulation	Rockwool 40mm (50kg/m3) back and Glass wool 20 mm (30kg/m3) sides
Absorber Material	Aluminum fins 0,50 mm thickness Welded to copper pipes with laser welding.
Absorber coating	Sputtering blue selective surface
Absorption (α)	95% (± 0.02)
Emissivity (ε)	5% (± 0.02)
Max. working pressure	1000kPa
Max. working temperature	150°C



MODEL
ECO SERIES
S150
S200
S230
S260

SOLE S.A. –LEFKTRON & LAIKON AGONON, 136 71 ACHARNAI-ATHENS-GR TEL: (+30210) 2389500 • FAX : (+30210) 2389502

e-mail: <u>export@sole.gr</u> •<u>www.eurostar-solar.com</u>

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INSTALLATION & USERS MANUAL



DOMESTIC SOLAR WATER HEATER

THERMOSIPHON SYSTEM

CLOSED CIRCUIT

MODELS EUROSTAR ECO LOW HEIGHT :

150-1-S200, 150-1-S230, 200-1-S230, 200-1-S260, 300-2-S200, 300-2-S230, 300-2-S260

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1. Observance of the instructions and standards.

1.1. It is very important to follow these installation, operating and maintenance instructions, in order to avoid danger of death, injury, property damages, and to have your device functioning properly in the long run. The company that manufactured and/or supplied this solar system has no liability for the installer and/or the user in case these instructions have not been followed carefully.

1.2. Whether further information or clarifications are needed, please contact the supplier of the product.

1.3. These solar systems have been manufactured and tested under the European standards:

ISO 9806:2013: Energy – Solar Thermal Collectors – Test methods EN 12975-1: Thermal solar systems and components – Solar collectors -part 1: General requirements. EN 12975-2: Thermal solar systems and components – Solar collectors – part 2 : Test methods. EN 12976-1: Thermal solar systems and components – Factory made systems - part 1: General requirements. EN 12976-2: Thermal solar systems and components – Factory made systems – part 2: Test methods.

1.4. These systems are in conformity with the applicable requirements of the following documents:

Ref. No.	Title
EN 60335-1:2012 +A11:2014	Household and similar electrical appliances — Safety —
(IEC 60335-1:2010)	Part 1: General requirement
EN 60335-2-21:2003 +A2:2008	Household and similar electrical appliances — Safety —
(IEC 60335-2-21:2002 +A2:2008)	Part 2-21: Particular requirements for storage water heaters
EN 60529:1991 +A1:2000 +A2:2013	Degrees of protection provided by enclosures (IP code)
(IEC 60529:1989 +A1:1999 +A2:2013)	
ENV 61024-1:1995	Protection of structures against lightning
(IEC 61024-1:1990)	Part 1: General principles

The manufacturer declares that the equipment named in this document have been designed to comply with the relevant sections of the above referenced specifications.

2. Description of solar system and components

2.1 General Description

This solar system is a closed loop thermosiphon unit which delivers hot water for domestic use. It consists from the collector, the accumulation tank, the support system, the hydraulic accessories and the thermo-convention liquid.

Four nominal sizes of accumulation tanks are combined with four different sizes of collectors as the table below:

MODEL	TAN	K NOMI SIZES	NAL	COLLECTOR NOMINAL SIZES			
	150 ltrs	200 ltrs	300 ltrs	2,00m ²	2,30m ²	2,60m ²	
150-1-200	1			1			
150-1-230	1				1		
200-1-230		1			1		
200-1-260		1				1	
300-2-200			1	2			
300-2-230			1		2		
300-2-260			1			2	

2.2. Collector

The collectors are manufactured in 3 sizes with nominal area of -2, $00m^2$ -2.30m² -2,60m². The absorbers of the collectors are made by copper tubes and the fins area by selective aluminum fins. The fins are welded to the tubes by laser welding. The frame of the collector is made by extruded aluminum epoxy oven painted to resist ambient conditions.

The glass cover is a "prismatic securit" glass of 3.2mm thickness for maximum penetration of solar irradiation. At the back and sides of the absorber there is sufficient insulation of rock wool and glass wool to minimize heat loses and to resist stagnation temperatures.

	١	Nominal size (m ²	²)
	2,00	2,30	2,60
Length (mm)	1960	1960	2135
Width (mm)	960	1165	1238
Depth (mm)	81	81	81
Weight (kg)	32,0	38,8	44

Technical data of collector as the table below:

Stagnation temperature: 164°C Test pressure: 22.5 bar Operating pressure: 15bar

2.3. Accumulation tank (cylinder)

The solar accumulation tank is an indirect (double circuit) hot water horizontal cylinder. The inner surface is enameled at 850°C to guarantee potable sanitary water for long life. Additionally it is protected against rusting with a large magnesium anode.

The ecologic polyurethane foam insulation guaranties minimum thermal loses even at very low ambient temperatures. The external cover of the tank can resist any extreme weather conditions for life. The internal heat exchanger with large surface guaranties the energy transfer to the domestic hot water.

The hot water exits from the hottest zone (level) of the tank. At the same time equal quantity of cold water enters the tank at the coldest zone (level). The solar tank can be optionally (accessory) equipped with immersion electric heater (electric element) for use only for emergency situations. The immersion electric heater is available in 2 kW or 3kW or 4 kW at 230 Volt. It is equipped with control thermostat set at 60° C and safety thermostat (thermal cut out) manually reset.

The safety valve only opens to discharge when the system pressure exceeds 10bar in the form of water. Technical Data of tanks as table below:

	No	ominal si	ze
	150	200	300
Length (mm)	1185	1215	1915
Diameter (mm)	500	530	530
Weight (kg)	46,7	50,8	83
Capacity (Itr)	142	170	276
(Incl. h.exchanger)	142	170	270
Test pressure (bar)	22.5	22.5	22.5
Operating pressure (bar)	15	15	15
Max temperature (°C)	90 °C	90 °C	90 °C
Cold & hot water connectors (male)	1/2"	1/2″	1⁄2″

2.4 Support system

The support system is made from galvanized pressed steel. It is designed for flat roof installation at 33°.

The support system can withstand wind velocity up to 97,2 km/hr. and weight of snow up to 64cm height.

In order to assembly the support system the following tools are needed.

- Spanner 10mm •
- Spanner 13mm

•

- 2 Spanners 17mm •
- analis onesan a la 2 X Screwdriver 1 X
- Drill Ø10 (for fastening the system on the roof)

			-	N	IODEL	-	-	
	Part		150-1-230	200-1-230	200-1-260	300-2-200	300-2-230	300-2-260
	SET OF SUPPORT	FRAM	E PAF	RTS				
01	A11-40 :profile in Π section 878mm	2	2	2	2	2	2	2
02	D13 :profile in Π section 2150mm	2	2	2	2	2	2	2
03	Tank support 280x195mm	2	2	2	2	2	2	2
04	H :bracket in П section 850mm	1	1	1	1	-	-	-
•••	H11 :bracket Π section1400mm	-	-	-	-	1	1	1
05	C :profile in П section 550mm	2	2	2	2	2	2	2
06	X2 :bracket 1667mm	2	2	2	2	2	2	2
07	E1 :angle Z shape 2000mm	-	-	-	-	2	-	-
	E2 :angle Z shape 2310mm	-	-	-	-	-	2	2
09	Insulated long pipe Ø15mm (for close loop cold water)	2.08m	2.05m	2.05m	2.21m	2.07m	2.06m	2.44m
10	Insulated short pipe Ø 15mm (for close loop hot water)	0.50m	0.41m	0.41m	0.28m	0.40m	0.54m	0,61m
	SET OF FI	TTING	S					
11	Compression Elbow Male ½″ x Ø15	2	2	2	2	2	2	2
• • •	Non return valve (for closed loop)	1	1	1	1	1	1	1
12	Compression Elbow Ø18 x Ø15	1	1	1	1	1	1	1
40	Compression Elbow Ø18 x Ø15	-	1	1	1	1	1	1
13	Compression Union Ø18 x Ø15	1	-	-	-	-	-	-
4.4	Tee connector female Ø15 x ½" x Ø15	1	1	1	1	1	1	1
14	Compression Elbow Female 1/2" x Ø15	1	1	1	-	1	-	-
15	End Cap male 1/2"	1	1	1	1	1	1	1
16	Copper Ring 1/2"	1	1	1	1	1	1	1
17	Compression End Cap Ø18	-	-	-	-	2	2	2
18	Compression Connector Ø18 x Ø18	-	-	-	-	2	2	2
19	Pressure Safety Valve 8 bar (for open loop)	1	1	1	1	1	1	1
	SET OF BOLTS	S AND	NUTS	1	1	1	1	1
20	Bolt M10x16 (DIN 933/8.8)	18	18	18	18	18	18	18
21	Nut M10 (DIN 934/8)	18	18	18	18	18	18	18
22	Bolt M6x20 (DIN 933/8.8)	4	4	4	4	8	8	8
23	Washer Ø6 (DIN 9021)	4	4	4	4	8	8	8
24	Anchored Bolt M8x60 (DIN 571)	4	4	4	4	4	4	4
25	Washer Ø8 (DIN 9021)	4	4	4	4	4	4	4
26	Plastic Rawlplugs D10	4	4	4	4	4	4	4
27	Cross Recess Counter Sunk Head Bolt	-	-	-	-	4	4	4
28	M8x20 (DIN 7969) Nut M8 (DIN 934/8)	-	-	_	-	4	4	4
20		-		I –				-

2.5. Thermo convention liquid

The thermal energy collected from the solar irradiation by the collector is transferred to the heat – exchanger of the tank by the thermo convention liquid, which is naturally re circulated by the thermosiphonic principle in the closed loop system. The heat exchanger is heating the domestic consumption water. The solution contains inhibitors for antirust protection and propylenoglycol for antifreeze protection up to -15°C. If lower temperature protection is needed please consult your supplier.

The solution is a non toxic, non-flammable chemical liquid; however normal protection measures should be taken during handling. Keep it away from children.

Eyes protection: Protective glasses must be used.

Skin protection: PVC or rubber gloves must be used.

- In case of contact with eyes, wash eyes with plenty of water for 15 minutes (with open eyelids)
- In case of contact with skin simply wash with water and soap.

Physical Properties:

Phase: liquid Color: Light red Odor: nearly odorless Specific gravity at 20°C : 1,03g/cm³ Freezing point: -15°C Boiling point: 106°C Packing: Containers of 2ltr. & 4ltr. ready for usage.

2.6. Packaging, Transport and Storage

The solar collectors and the solar tanks are supplied individually packaged, the collectors in carton boxes and the tanks with stretch film and expanding polystyrene. The collector model is indicated on the outside of each box and the tank model is indicated outside of each package. Depending on the number of units ordered, collectors can be supplied palletised in groups of up to 12 units. Collectors should always be during transport and storage placed in horizontal position with the glass facing on top, otherwise there is danger of water entering in the collectors from the ventilation holes at the back of the collector. They should not be stored or transported in piles of more than 12 units. The tanks can be supplied palletised in groups of up to 10 units. Alternatively, under request, the whole system can be palletised in individual pallets. The tanks should be always in vertical position during transportation and should not be stored or transported in piles of more than 2 units and should not be stored or transported in piles of more than 2 units. It is recommended to use special safety belts during transportation in order to avoid movements and/or falling.

3. Warnings

Before starting installation, the installer should read and observe carefully the following warnings in order to avoid danger of death, injury or property damages.

3.1. You may elevate on roof the parts of the solar system, ONLY when an internal staircase of enough width, exists in the building reaching the roof. Otherwise you must use a proper CRANE to elevate the parts. It is not allowed to stand at the edge of any roof (flat or inclined) and pull by ropes any part. DANGER OF DEATH. 3.2 The collectors have a large surface exposed to wind. NEVER install a system with strong winds. Choose a calm day. DANGER OF DEATH or heavy injury.

3.3. If the installation will be on an inclined roof (tiles), there is danger of slipping. Use always SAFETY BELTS (securely fastened) from a higher position of roof. DANGER OF DEATH.

3.4. After completion of the installation make sure that all bolts and nuts are fastened well and the whole system is securely fastened to the roof. The support system can withstand air velocities up to 97,2 km/hr. Make sure that the fastening on roof can withstand as well at least same air velocity. DANGER OF DEATH.

3.5. Frequently some parts of the support systems have sharp edges. Use always gloves when you are handling the support system, in order to avoid danger of injuring the hands. DANGER OF INJURY.

3.6. The collectors when exposed to solar irradiation during installation get very hot; above 120° C in 2-3 minutes. There is danger of burning the hands when touching the copper piping outlets. You must leave the carton package cover ON the glass until completion of the installation, or you must use thermo resistance gloves. DANGER OF INJURY.

3.7. If you are using hands to position the tank on the support system at least 2 people are needed for systems 120-150.

It is preferred to use a crane. In this case make sure that the pulling belts are on each side between the piping outlets of the boiler so that it cannot slip.

3.8. In cases where the solar system is large and the hot water consumption is low, the hot water in the solar tank may reach temperatures up to 90°C. In this case there is danger of burns for the user, especially for children.

It is strongly recommended to install a thermostatic mixing valve set at 55°C anywhere at the hot supply piping and before the hot outlets of the building (before taps, showers, e.t.c.)

3.9. If the solar system is equipped with the (optional) electric immersion heater, the electrical connection should be done by a fully licensed electrician following the national rules for electric installation.

The immersion heater is single phase 230 Volt of 2kW or 3 kW or 4 kW power.

There is an "earth point" on the flange of the heater which must be connected to the central "earth" of the building. In any case the support of the solar system must be "earthed" with copper wire of 16 mm² to the earthing grid of the building. This will also serve as lightning protection.

3.10 In a solar system equipped with the optional electric heater, after completion of electrical and plumbing installation test the operation of the electric heater and thermostat, ONLY AFTER FILLING the tank with city water. Otherwise the electric heater will be fused out. (destroyed)

3.11 Make sure that before filling the tank with city water the pressure safety non-return valve has been installed on the cold water inlet with the arrow pointing to the tank. This valve will open and release the pressure when by overheating or other reason it has exceeded 10 bar.

3.12. When handling the thermo-convention liquid make sure that you wear protective glasses for the eyes and gloves for the skin.

3.13. When temporarily leave the collectors on the roof during installation ALWAYS position them with glass facing the sky. Otherwise there is danger that water from rain may enter the collector from the back side through the ventilation holes. If this happens the insulation will be wet and the glass will have humidity on inside surface. Drying will take a very long time.

4. Recommendations

4.1 The cold water piping should withstand pressure of 10 bar. The hot water piping should withstand temperature of 95° C at pressure 10 bar.

4.2. The cold and hot water piping should be well insulated to eliminate heat losses and prevent as possible freezing. The insulation material should withstand weather conditions like rains, snow and solar irradiation.

4.3. On the hot water supply piping, install a reliable thermostatic mixing valve set at 55°C to prevent higher temperature hot water to reach the consumption points.

4.4. The system may only be installed in locations with lower values of s_K (snow load) 0.64m and v_m (average wind velocity) 97.2km/h

5. Flat roof

Assembly instructions for systems with 1 collector:

Models: 150-1-S200, 150-1-S230, 200-1-S230, 200-1-S260

Assembly steps:

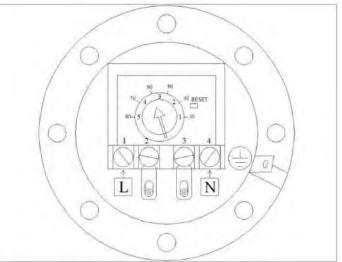
- 5.1. Open the pack of the support system. Identify the items from table (page 5) and the drawing next page.
- 5.2. Assembly the parts between themselves using the set of bolts and nuts included in the pack. At this stage <u>do not fasten tight</u> the bolts.
- 5.3. Fix collector on support as shown on drawing using the M6X20mm bolts and washers (No. 22-23). <u>Do</u> not fasten tight yet.
- 5.4. Position the tank on supports. Two people are needed to handle it from each end. <u>Fasten well</u> with the 2 bolts M10X30 the tank on the support system. (The 2 bolts are already mounted on the tank and have to be temporarily removed before placing the tank on the support).
- 5.5. Now, <u>fasten well</u> the collector on support and <u>then fasten well</u> all the parts of the support system among themselves.
- 5.6. Drill the "floor" with 10mm drill at the 4 fixing points, insert the raw-plugs provided, and fasten well the whole support system to the "floor". Make sure that the material of "floor" is suitable (concrete) for this kind of fixing, in order to withstand up to 97,2 Km/hr wind speed. If in doubt, consult your supplier, or your engineer for possible alternative way of fixing.
- 5.7. Connect the insulated copper (or plastic) pipe at closed loop system. The long pipe is for cold return to bottom of collector. The short pipe is for hot supply from top of collector. Make sure that you <u>fasten well</u> the "compression" fittings in order to tight the closed loop.
- 5.8. Connect the non-return pressure safety valve on the cold water inlet of tank, making sure that the arrow is pointing towards the tank (upwards) and the escape outlet is facing sideways parallel to the tank.
- 5.9. Connect cold water supply using always a shut-off water valve. (Make sure the pipes are well insulated)
- 5.10. Connect hot water outlet piping to consumption points. <u>It is strongly recommended</u> to install a thermostatic mixing valve set at 50-55°C on the hot water piping anywhere before the consumption points. (Make sure the pipes are well insulated).
- 5.11. Fill the tank with cold water. Leave open one "tap" of hot water, so that air will be flushed out and the tank will be completely filled up.
- 5.12. Fill up the closed loop system with thermo-convention liquid from the top pipe (point 15). Make sure that no air-bubbles are coming out so filling is completed.
- 5.13. Screw the bronze cap with the copper ring on the filling point to seal the closed loop system. The closed loop is permanently sealed.
- 5.14. Check for leakages on open or closed loop system.
- 5.15. The (optional) electric heater should be connected by a fully licensed electrician following the national standards for electric installations.

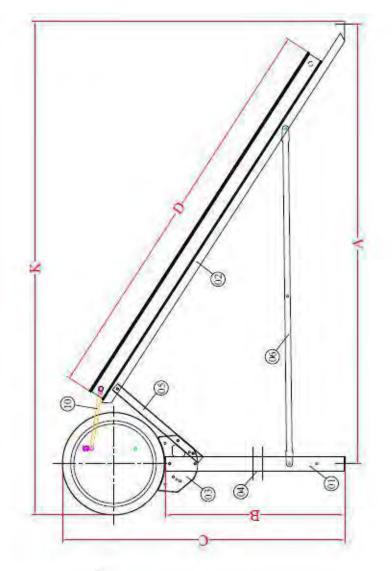
Connections points on thermostat:

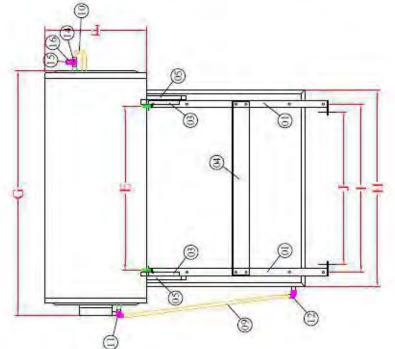
No 1 : Line L (220 volt) No 4 : Neutral N

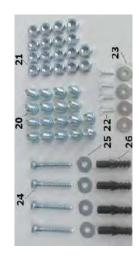
On metal flange:

: Earth











DIMENSION		ECO 150-1-230	ECO 150-1-200 ECO 150-1-230 ECO 200-1-230 ECO 200-1-260	ECO 200-1-260
A	2147mm	2147mm	2147mm	2147mm
В	878mm	878mm	878mm	878mm
C	1383mm	1383mm	1413mm	1413mm
D	1960mm	1960mm	1960mm	2135mm
Е	800mm	800mm	800mm	800mm
F	500mm	500mm	530mm	530mm
Ð	1195mm	1195mm	1215mm	1215mm
Н	960mm	1165mm	1165mm	1238mm
Ι	820mm	820mm	820mm	820mm
J	745mm	745mm	745mm	745mm
К	2411mm	2411mm	2426mm	2426mm

6. Flat roof

Assembly instructions for systems with 2 collectors:

Models: 300-2-S200, 300-2-S230, 300-2-S260

Assembly steps:

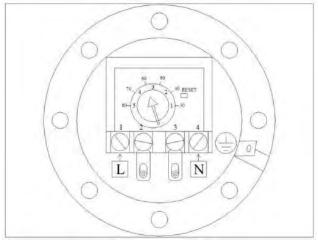
- 6.1. Open the pack of the support system. Identify the items from table (page 5) and the drawing next page.
- 6.2 Assembly the parts between themselves using the set of bolts and nuts included in the pack. At this stage <u>do not fasten tight</u> the bolts.
- 6.3. Fix collectors on support as shown on drawing using M6X20 bolts and washers (No 22 &23 at table) <u>Do not fasten tight yet.</u>
- 6.4. Position the tank on supports. Two people for 200 ltr and four people for 300 ltr are needed to handle it from each end. <u>Fasten well</u> with the 2 bolts M10X30 the tank on the support system. (The 2 bolts are already mounted on the tank and have to be temporarily removed before placing the tank on the support).
- 6.5. Now, <u>fasten well</u> the collectors on support and <u>then fasten well</u> all the parts of the support system among themselves.
- 6.6. Drill the "floor" with 10mm drill at the 4 fixing points, insert the raw-plugs provided, and fasten well the whole support system to the "floor". Make sure that the material of "floor" is suitable (concrete) for this kind of fixing, in order to withstand up to 97,2 Km/hr wind speed. If in doubt, consult your supplier, or your engineer for possible alternative way of fixing.
- 6.7. Connect the insulated copper (or plastic) pipe at closed loop system. The long pipe is for cold return to bottom of collector. The short pipe is for hot supply from top of collector. Make sure that you <u>fasten well</u> the "compression" fittings in order to tight the closed loop. Fix and <u>fasten well</u> the 2 compression end caps on the 2 remaining open ends of the collectors.
- 6.8 Connect the non-return pressure safety valve on the cold water inlet of boiler making sure that the arrow is pointing towards the tank (upwards) and the escape outlet is facing sideways parallel to the tank, in order to prevent harm or burning during steam escape.
- 6.9 Connect cold water supply using always a shut-off water valve. (Make sure the pipes are well insulated).
- 6.10 Connect hot water outlet piping to consumption points. <u>It is strongly recommended</u> to install a thermostatic mixing valve set at 50-55°C on the hot water piping anywhere before the consumption points. (Make sure the pipes are well insulated).
- 6.11 Fill the tank with cold water. Leave open one "tap" of hot water, so that air will be flushed out and the tank will be completely filled up.
- 6.12 Fill up the closed loop system with thermo-convention liquid from the top pipe (point 15). Make sure that no air-bubbles are coming out so filling is completed.
- 6.13 Screw the bronze cap with the copper ring on the filling point to seal the closed loop system. The closed loop is permanently sealed.
- 6.14 Check for leakages on open or closed loop system.
- 6.15 The (optional) electric heater should be connected by a fully licensed electrician following the national standards for electric installations.

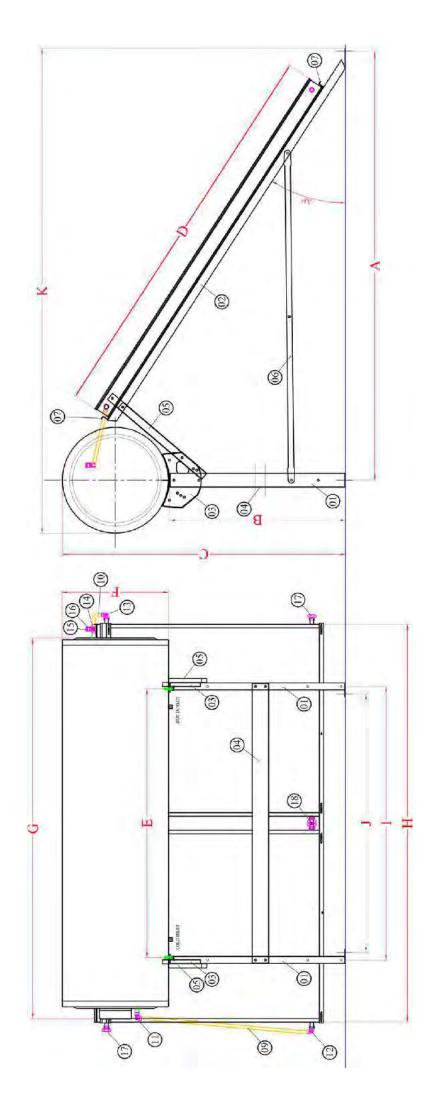
Connections points on thermostat:

No 1 : Line L (220 volt) No 4 : Neutral N

On metal flange:

Earth







DIMENSION	ECO 300-2-200	ECO 300-2-200 ECO 300-2-230 ECO 300-2-260	ECO 300-2-260
A	2147mm	2147mm	2147mm
В	878mm	878mm	878mm
U	1413mm	1413mm	1413mm
D	1960mm	1960mm	2135mm
Е	1345mm	1345mm	1345mm
μ	530mm	530mm	530mm
Ð	1905mm	1905mm	1905mm
Н	1980mm	2390mm	2536mm
1	1370mm	1370mm	1370mm
I	1295mm	1295mm	1295mm
K	2426mm	2426mm	2426mm

7. Check list for installer

Before leaving from the installation, make sure that:

- 1. Cold and hot insulated pipes of closed loop system have a continuous ascending slope to the tank. Small partitions of the piping are allowed to be horizontal, <u>but never descending</u> to the tank. This will allow the air bubbles to move towards the tank, in the internal expansion tank and would not obstruct recirculation.
- 2. The closed loop system is operating properly. This can be identified, after one hour of sun shine by touching the hand on the hot inlet of tank (from top of collector) and at the same time on the cold outlet (to bottom of collector). There must be a significant temperature difference which means that the natural recirculation is functioning.
- 3. There is no leakage at the closed loop or open loop circuit.
- 4. All bolts and nuts of the support system have been tightened very well and that the fixing on roof is made properly to withstand strong winds.
- 5. Cold supply and hot return piping are properly installed and secured so that the wind will not move them. They should be properly insulated with a certified insulation material of minimum thickness 9mm and maximum thermal conductivity of 0.037 W/m°K, and well finished in order to be resistant against rain and moisture.
- 6. The (optional) electric heater is functioning properly and the thermostat is set maximum at 55°C to 60°C
- 7. You have explained to the users the operation of their solar system and the capabilities of the installed model.
- 8. You have signed and delivered to the owner the guarantee.

8. Operation instructions

- Your solar heater is a two circuit system. The primary circuit recirculates from collectors to a heat exchanger inside the tank, thus transferring solar energy to the domestic water.
- Primary system contains antifreeze glycol for frost protection of collectors.
- Temperature of hot water depends on solar irradiation of the day, season of year, ambient temperature, cold water inlet temperature, time of day using hot water, quantity used.
- Best timing for use: 12.00 noon 3.00p.m. and 5.00 p.m. to 8.00 p.m.
- If you need hot water early in the morning, avoid excess consumption previous evening.
- For a shower, 30-60 ltr hot water is needed.
- For filling bathtub, 120-150 ltr hot water is needed.
- If your solar system is equipped with the optional electric heater, switch on only when needed for emergency situations and for 1 to 2 hours. <u>NEVER</u> leave electric heater permanently ON. The thermostat is adjusted to 55°C-60°C.
- In the event of any failure condition a specialist should be called in.

9. Maintenance instructions

For long-life of your solar heater follow below given instructions:

- At least once a year check for excessive dust on collectors. Wash with cold water at early morning before 10.00 a.m. when the glass is cold.
- Every two years replace magnesium protection anode. (contact your installer)
- Every 4 years check and paint if necessary with grey color primer the support frame.
- At extremely cold winter nights (below 0°C) leave a hot water tap inside house slightly open to prevent pipe freezing.
- If solar heater doesn't warm up with sunshine, check for leakage in primary circuit. Restore the leakage, add antifreeze. Check also for leakages in domestic hot water piping network. Restore if needed.
- When by any reason glass is broken, replace the soonest possible.
- When electric heater is not functioning check for burned fuse or for "safety" contact of thermostat activation. Press inside the button with the mark v to restore and adjust thermostat lower.

10.Decommissioning of the system

- If your product has electric backup, please turn off its power supply before dismantling the solar water heater.
- Drain down the hot water cylinder
- Cut the inlet pipe to the panel first and then the outlet pipe from the top of the panel to the top of the cylinder
- Remove the tank from supports. Two people are needed to handle it from each end.
- Unfasten the collectors of support and <u>then unfasten all</u> the parts of the support system among themselves.
- Release collectors from support and disassemble the parts among themselves, remove the support system from the roof.

Recommendations:

- Recycle or reuse its component materials if possible.
- Protect your hands and eyes
- Avoid decommissioning during sunlight
- If you need further technical support contact your local distributor

NOTES	

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GB

SOLAR COLLECTORS

INSTALLATION MANUAL



MODELS: 1,75 - 2,00 - 2,50 - 2,70

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1. Presentation

The present document demonstrates detailed installation instructions for the solar collectors using the support frames and accessories included in the supply.

Before proceeding with the installation of the collectors, read these instructions and make sure you have understood. If you have questions about the materials or on the assembly process described in this document, contact your supplier via telephone, fax or e-mail. Improper installation of the collectors may cause an unsatisfactory operation of the solar system, compromising its durability and even be dangerous for the people or the goods.

The instructions of this document do not exempt in any way the compliance with existing regulations and provisions of technical and administrative application at the place where the facility is located.

The installation of solar collectors without following the instructions in this document and / or regulations will invalidate the warranty of the product.

The installer will check before starting the installation that he has all the necessary parts and all the security measures have been taken in order to carry out the installation safely. The installer must use protective gloves to avoid any risk of burns or cuts during handling of collectors or its support frame.

2. Parts Included

The supply consists of:

One or more solar collectors One or more support frames Two or more fitting and connection (except for a single collector)

2.1. Solar Collectors

The solar collectors are supplied individually packaged in carton boxes. The collector model is indicated on the outside of each box. Depending on the number of units ordered, collectors can be supplied palletised in groups of up to 10 units. Collectors should always be during transport and storage placed with the glass facing on top, otherwise there is danger of water entering in the collectors from the ventilation holes at the back of the collector.

The main technical characteristics of the collectors are indicated below (figure no. 1)

	WEIG	iHT kg			DIMEN	SIONS		
TYPE	ALUM. ABSORBER	COPPER ABSORBER	А	В	С	D	E	F
1,75	37	38	1000	1760	1050	895	1668	2024
2,00	39.8	41	970	1970	1020	895	1878	2196
2,50	47.6	49	1175	1970	1225	895	1878	2294
2,70	54	55.1	1248	2145	1298	895	2053	2482

FIXING WITH SCREWS TO THE SUPPORT _FRAME 4XM6	A Detaile A F C Detaile A B C Detaile A Detaile A
Absorber	Copper tubes and copper or aluminum fin with selective or non selective coating.
Pressure test	9 bar
Pressure max. Isolation	6 bar Side: 20 mm glass wool back: 40 mm rock wool
Casing	Aluminium profile epoxy powder oven painted Free of bolts and rivets.
	Sea Water resistant.
Glass	Tempered low iron prismatic glass 4 mm.
Sealing	EPDM Rubber.
Connector	Compression union 22x22
Flow recommended	40 litres/h/m ²
Content of liquid	1.75 = 1,30ltr; 2.00 = 1,36 ltr; 2.50 = 1,64ltr; 2.70 = 1,86ltr

Figure 1. Characteristics of solar collector

The manufacturing of the solar collector follow strict quality criteria and is certified by ISO 9001:2008.

The collector is certified by the authorized national bodies of different countries and tested by several accredited laboratories (TUV, INETI, CSTB, Demokritos,). Our collectors are Solar Keymark, CSTBat and SRCC. Certified.

The figure below shows the characteristics of instantaneous energy efficiency curve of solar collector.

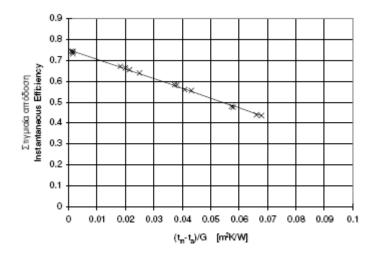


Figure 2. Efficiency curve of Selective Collector

2.2. Support Frame

There are two sets of support frames for a single collector (EST1) or for two collectors (EST2).

Depending on the bank of solar collectors chosen, the appropriate number of support frames will be provided for one or two collectors. Table 1 shows the sets of support frames necessary for different banks of solar collectors.

Nº of collectors in bank	1	2	3	4	5	6
EST1	1	-	1	-	1	-
EST2	-	1	1	2	2	3
Connectors	-	2	4	6	8	10

Table 1. The support frames and the connections provided depend on the number of collectors per bank

The support frames sets are composed of elements that are shown in Figures 3 and 4.

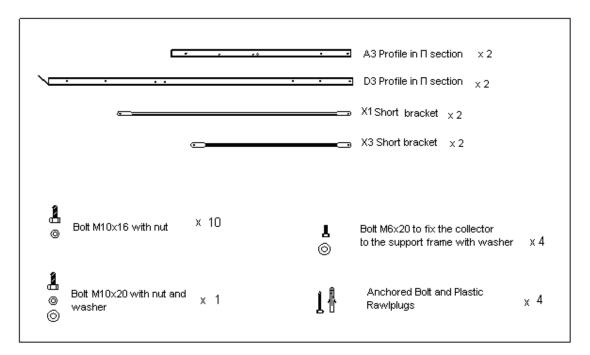


Figure 3. Support frame components EST1 for a single solar collector

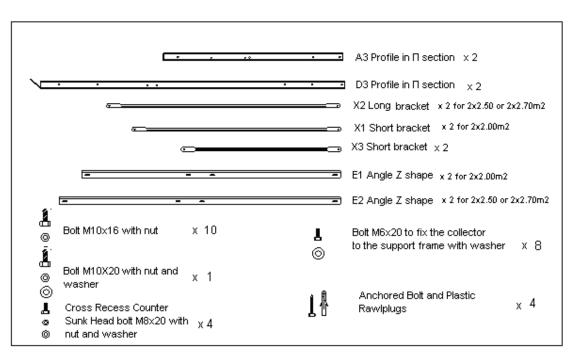


Figure 4. Support frame components EST2 for two solar collectors

The support frames allow the installation of the solar collectors with different inclinations (45, 40, 35 or 30 degrees) using the same profiles and accessories, by choosing properly the fixing holes.

2.3. Connectors

The connectors supplied are conical-type compression unions with metal ring and allow the connection of two or more solar collectors in a bank, joining the top and bottom of the collectors.

This way, the collectors are hydraulically connected between them in parallel.

The number of connections provided is determined by the number of collectors in the bank, according to Table 1 above.

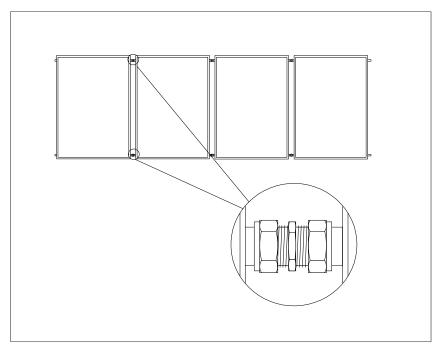


Figure 5. Connections

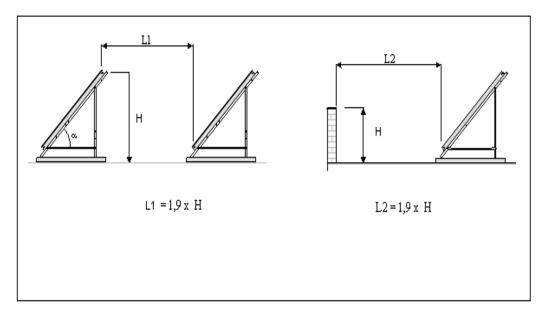
3. Placement of the Collectors

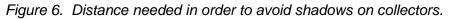
The choice of location, inclination and orientation of the solar collectors has to be determined at the design stage of the installation. The installation of the solar collectors in the building should be carried out respecting the instructions of the person in charge of the project, who should have taken into consideration the effect of the orientation, inclination and possible shadows in the calculation of benefits of the solar system.

Particular attention should be paid to the minimum distance maintained between two rows of solar collectors or between an obstacle in front of a group of solar collectors and them. During the calculation of this distance one should take into consideration the latitude of the place, the inclination of the terrain and the period of use of the facility. Failure to have a more detailed specification by the designer of the facility, the distance should not be less than that shown in Figure 6.

At the time of its installation, the solar collectors should be stored in a compound covered and kept in their original packaging. During the assembly phase, avoid

keeping the solar collectors outdoors with the cover glass facing down on wet surfaces, in order to prevent entry of humidity or water in the rear of the collector.





Once at work, in the event that the installer observes the existence of elements that can cause shadows on the solar collectors and have not be taken into account in the design of the system, as protection walls in terraces, fireplaces, outdoor air conditioning units or other elements, should inform the designer of the project or the owner of the property in order to revise or amend the calculations made for the location of the collectors, if necessary.

The system of fixing the support frame of the solar collectors to the building also must be determined in the design phase of the installation, for example by conducting benches built on a flat roof. In this case, the thickness and size of the bench should be sufficient to ensure stability of the whole in case of strong gusts of wind. In any case, the solution adopted should ensure the solidity and stability of the setting without compromising the watertight integrity of the deck. To facilitate the design of the fixing system, figures 7 to 13 show the distances between the support frames of the solar collectors.

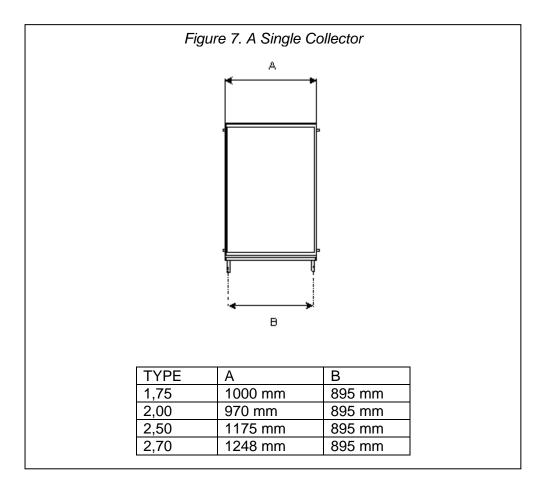
4. Banks of Collectors

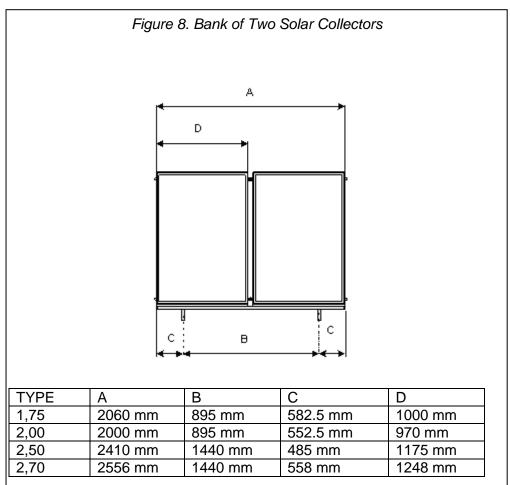
The solar collectors can be connected with each other to form banks of up to 6 units in parallel, connecting the top and bottom of the collectors through the fittings included in the set.

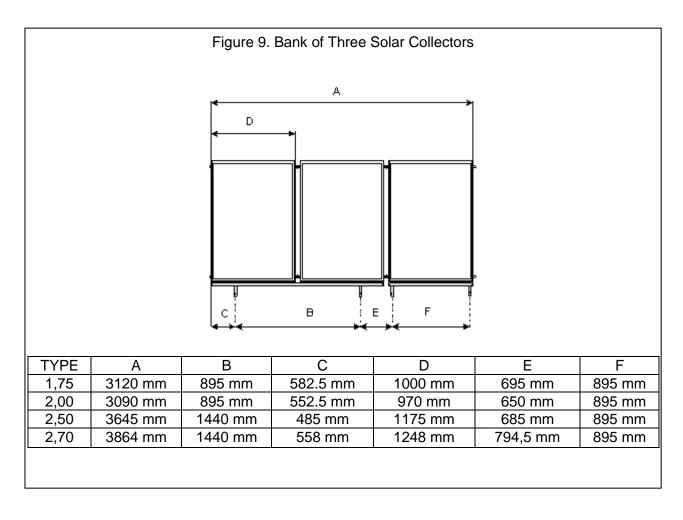
The dimensions of pipe connections for collector arrays up to 20m² is 22mm.

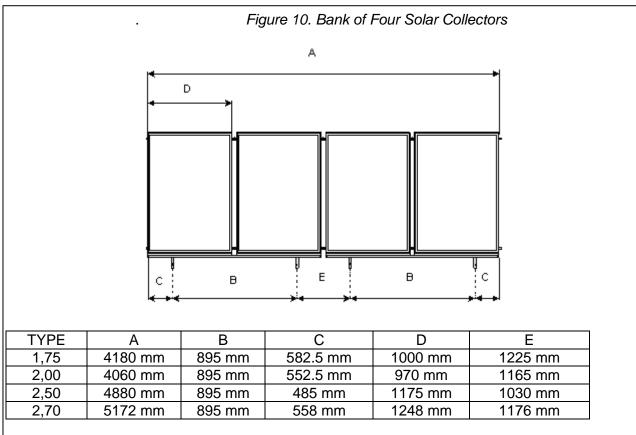
It is recommended that the connections between the different banks of collectors are also conducted in parallel. However, the connection of up to two banks of solar collectors in series is allowed.

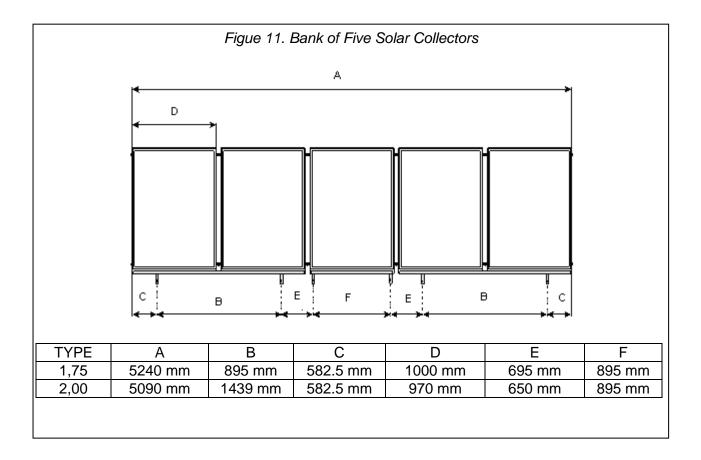
In the following figures from 6 to 13 shows the dimensions of the solar collectors from 1 to 6 units and for different angles of inclination. Additionally, there should be sufficient space around the banks of collectors to perform with comfort the hydraulic connections.

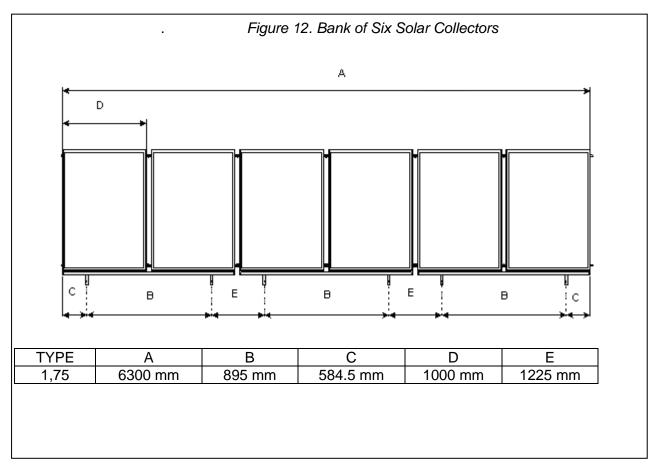












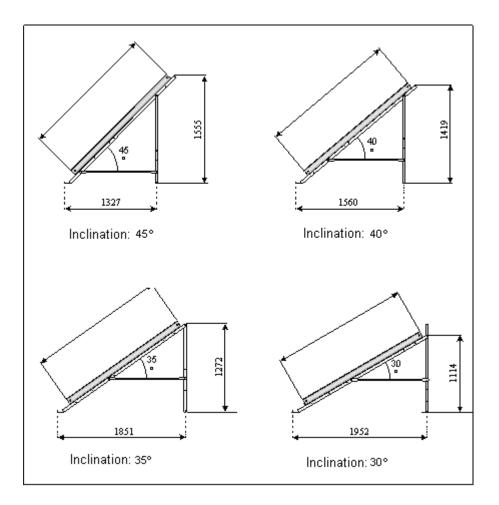


Figure 13. Dimensions of the banks of collectors depending on the inclination.(The above dimensions apply to all sizes of collectors)

5. Flat Roof Installation

Next it will be described the procedure for installing a bank of two solar collectors on a flat roof. The formation of more banks of collectors is done simply by adding the support frames EST1 or EST2 when necessary.

5.1. Installation of the longitudinal profiles D3 and the Z angles E1/E2

Place the two longitudinal profiles D3 on the floor, at the indicated distance, so that both profiles U remain outward-oriented. Place the two Z angles E1 or E2 over, in the correct position (Figure 14a, 14b & 14c).

Screw the lower Z angle E1 or E2 to the two longitudinal profiles D3 with two sunk head bolts M8x20 with their nuts and washers and tighten.

Screw the higher Z angle E1 or E2 to the two longitudinal profiles D3 with two sunk head bolts M8x20 with their nuts and washers, without tighten it yet in order to facilitate the subsequent placement of the collectors.

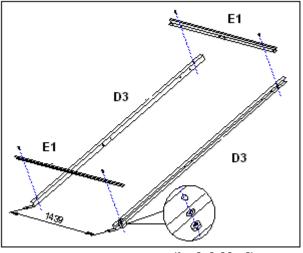


Figure 14 a (for 2x2,00m2)

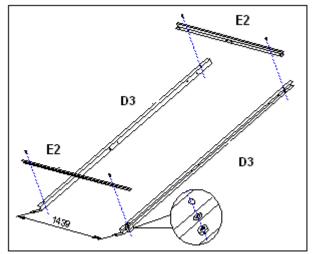


Figure 14 b (for 2x2,50m2)

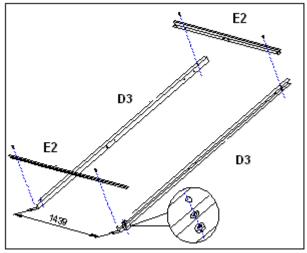


Figure 14 c (for 2x2,70 m2)

5.2. Installation of the vertical legs A3 and the Long cross pieces X1/X2

Place the two long crosspieces X1 or X2 forming an X, with the convex part of the profiles and link them into contact with each other through a bolt M10x20 with nut and washer, without tighten it yet.

Place the two vertical legs A3 parallel on the floor, so that both U profiles are oriented towards the interior. Screw the long crosspieces X1 or X2 as the cross-legged to the vertical legs A3 using four bolts M10x16 with its nuts. Tighten the four bolts at the ends and the bolt of the central X (Figure 15a and 15b).

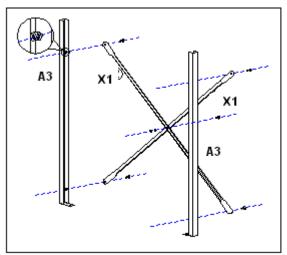


Figure 15a (for 2x2.00m2)

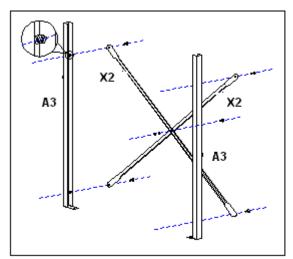


Figure 15b (for 2x2.50m2 or 2x2.70m2)

5.3. Installation of the vertical legs A3 and the longitudinal profiles D3

Lift the legs A3 coupled with the X formed with the long crosspieces X1 or X2 until you place them vertically.

Lift the rear part of the longitudinal profiles D3 coupled with the cross profiles E1 or E2 and join to the vertical legs A3, using two holes depending on the inclination that should be given to the collectors. Tighten with two bolts M10X16 with its nuts.

Join the short crosspieces X3 to the longitudinal profiles D3 (at its inner surface) and to the rear legs A3 (at its outer face), use the holes depending on the inclination that wants to be given to the collectors. Both profiles should be horizontal. Screw with the two bolts M10x16 in each profile, with its respective nuts.

Join the structure to the bench, using the raw plugs and anchored bolts supplied or with the fixing parts suitable to the characteristics of the support frame. In any case, the choice of the solution adopted should avoid compromising the watertight integrity of the roof. (Fig. 16).

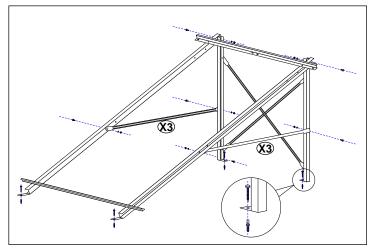
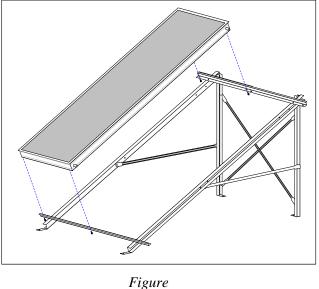


Figure 16.

5.4. Placement of Solar Collectors

Place one of the solar collectors in the support frame, place it first on the lower profile cross-E1 or E2 and then on the higher profile cross- E1 or E2. Adjust the position of the solar collector in the structure, so that matches the holes in the structure of the holes in the rear part of the collector (Figure 17).



^{17.}

Remove the protection caps of the collector lateral' connections and introduce the two compression union connectors (see fig. 5).

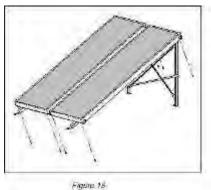
Remove the protection caps of the connections of the lateral of the second collector and place it on the structure, on the cross profiles E1 or E2 lower and upper.

Slide the second collector so that the end is introduced into the connector. Verify that the connection has been done correctly and that the holes in the structure match those holes back of the collectors. Adjust the position of the collectors if necessary.

Adjust the higher cross- E1 or E2 profile to the collectors and tighten the bolts that bind to the longitudinal profiles D3.

Screw the solar collectors to the structure, with the bolts M6x20 (four per collector) with their washers.

Make sure all bolts and the different elements of the structure are properly tightened and check the solidity of the whole and its correct fixing to the bench. The collectors and the support system can withstand wind velocity up to 120km/h and weight of snow up to 80cmheight at 45 degrees.



The bank of two solar collectors is ready to start the

hydraulic connections.

6. Tile roof installation

The assembly of solar collectors on a tile roof is done in a manner similar to that described above, with a different position of the vertical legs A3 that have to be placed horizontally underneath the E1/E2 in a parallel manner. The crosspieces X1 or X2 and X3 shorts are not needed for tile roof installation.

The profiles D3 longitudinal and transverse E1 or E2 have to be fixed to the roof with strength and without compromising its tightness. The fixing procedure will depend on the characteristics of the roof. With the installation fittings are supplied some perforated flexible metal strips to facilitate this fixation on certain roof configurations. (See fig. 19) The collectors and the support system can withstand wind velocity up to 120km/h and weight of snow up to 80cmheight at 45 degrees.

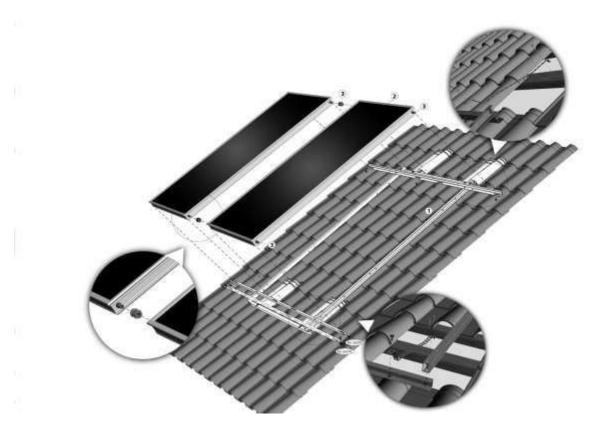


Figure 19.

7. Connections and Hydraulic Circuit

The collectors or different groups of solar collectors must be connected hydraulically to form a closed primary solar collection circuit. The use of copper pipes is recommended, with a wall minimum thickness of 1 mm and an adequate diameter for the circulation flow of each part.

The entry of liquid to the group of solar collectors will be from the end at the bottom of the collector. On the top end connection a plug must be installed. The output of liquid will be done by the top of collector's opposite end of each bank. On the top connection an end cap must be installed.

The route of the pipeline will be conducted so as to minimize the parts where the flow of the hot fluid runs (of the collectors towards the tank or to the interchange at the plant room).

In each group of solar collectors two stop valves should be installed at the entrance and exit to allow the hydraulic isolation of the rest of the circuit and a safety valve (figure 20).

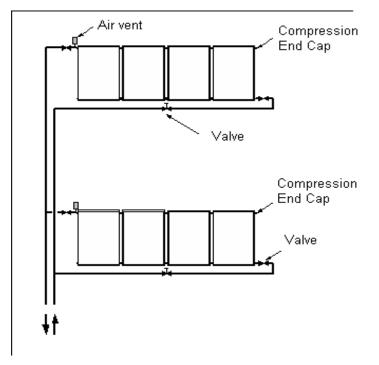


Figure 20. Group of collectors connection.

The solar collectors reach high temperatures, especially in periods of great sunshine and low energy consumption, which can cause significant expansion of the materials. The connection of various groups of solar collectors with each other and / or pipes of hydraulic circuit must be made so as to ensure that expansion does not cause excessive pressure (tensions) on the connections or on the collectors, for example by the use of flexible unions.

In all the high points of the primary circuit of the solar collectors, and particularly the output of each group of collectors, an air vent must be installed, automatic or manual. In any case, the air vent must be capable of withstanding temperatures of up to 150 ° C without deterioration. Once the air is drawn out from the circuit, the vents will remain closed.

A smooth distribution of flow between different groups of solar collectors must be ensured so that each group has a flow rate close to 100 litres / h for each collector that is part of this group (i.e. 400 litres / h for every group of 4 solar collectors). This can be achieved with appropriate design of the route of the pipeline or by installing a balancing valve in each group, properly adjusted. We recommend the second system. The pressure drop within each collector should be taken into account when selecting the appropriate pump. (figure 21 indicates the pressure drop)

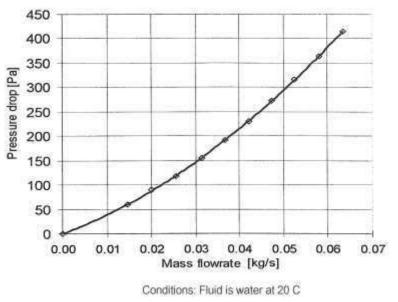


Figure 21.

The pipes must be insulated according to existing regulations. The thickness of the insulation material must be at least 30 mm for a material with conductivity equal to $0.040 \text{ W/m}^{\circ}\text{K}$. The insulation material must be capable of withstanding pipe surface temperatures higher than 120 ° C without deterioration.

The circulating fluid must contain a sufficient amount of antifreeze liquid to avoid any risk of freezing. The freezing temperature of the fluid circuit of the solar collector should be less than the minimum temperature recorded at the site of the facility. Propylene glycol makes an excellent choice for use as a heat transfer fluid in applications where contact with potable water, food or beverages might occur. Its low toxicity, low freezing point, corrosion-inhibiting composition and high boiling point make it uniquely applicable for use in such applications.

Below is a table showing the freezing temp. of propylene glycol – water fluid with respect to the ratio of pure glycol to the water.

	Freezing Point								
Propylene Glycol Solution (% by <u>mass</u>) 0 10 20 30 40 50 60						60			
Temperature	(°C)	0	-3	-8	-14	-22	-34	-48	

The primary circuit of the solar collectors must be in accordance with all the necessary security measures, particularly a safety valve correctly set, an expansion tank designed to even take into account the evaporation of liquid contained in the collectors and a system of protection against overheating (heat sink or similar), if necessary.

The primary circuit of the solar collectors must have at least a thermometer and a manometer to permit recording of the temperature and the pressure of the circuit.

Before the final filling of the primary circuit, internal washing with domestic water should be carried out to remove any dirt or rests and pressure test should be carried out to verify the sealing of all, without exceeding the maximum pressure allowed by solar collectors. This is to verify that the connections between solar collectors have no leaks. If that is so, the fittings should be tightened, using two keys, so as to avoid transmitting force (tortion) to the pipes of the absorbers of the solar collectors.

During the final filling of the solar system with antifreeze fluid it must be verified that the circuit is perfectly purged and pressurized. Once this operation is finalized, the air vents should be closed.

It should be avoided to carrying out operations such as washing and filling the primary circuit while or after the solar collectors are exposed to intense sun.

8. Lightning Protection

National norms and regulations over lightning protection should be closely followed. In any case the support(s) of the collectors must be "earthed" with copper wire of 16mm² to the ground grid of the building. This will serve as lightning protection. This guideline does not release in any way the installer from his responsibility against lightning protection requirements.

9. Permissible Wind and snow load

Permissible negative pressure for wind load is 1500 Pa Permissible positive pressure for snow load is 2000 Pa

10. Care and Maintenance Program

• The collectors should be subject to periodic visual inspections. If it appears that excessive dirt has been accumulated on the glass of the collectors, then it must be cleaned. This operation should take place during the morning, before 10:00 am or in the afternoon after the 18:00 pm, checking before that the collectors are not too hot. Otherwise, there might be a risk of damaging the collector, (especially when using a hose), or burning if manual cleaning is performed.

• If for some reason the collector's glass breaks, it should be replaced immediately. Otherwise, the interior of the collector may deteriorate due to rain, humidity or dirt.

• During each inspection, visually check the possible loss of tightness in the closedcircuit connections and the entry and exit of each collector and the connections between them. Fix if necessary or replace items (parts) in poor condition.

• The support of solar collector is made of highly resistant galvanized steel. As a precaution, check regularly their condition and repair if necessary. Verify also fixations to the tile or flat roof.

• In the event that an extended period without hot water consumption is foreseen (for example during holidays) it is recommended to cover the collectors with a blanket or a similar opaque material or empty the collectors circuit, so as to avoid unnecessary overheating. The cover of the collectors must be well fixed to avoid being gone by the wind.

• The closed circuit of the collectors should be suitably protected against frost with antifreeze liquid of the right characteristics. Particular attention should be given not to reduce the concentration of antifreeze mixture, for example by filling with water.

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SOLE S.A. SOLAR DOMESTIC APPLIANCES MANUFACTURER Lefktron & Laikon Agonon, 136 71 Acharnai – Athens – Greece Tel.: (+30210) 2389500 • Fax: (30210) 2389502 Email: <u>export@sole.gr</u> •www.eurostar-solar.com



SOLE S.A. PROJECT LIST IN MIDDLE EAST



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MAIN COLLECTIVE SOLAR INSTALLATIONS MADE BY sole IN MIDDLE EAST

	Name	Collectors type & size	Storage Capacity	Place	Year
1.	THE DUNES (U.S.A. EMPBASSY)	Flat plate collectors(150 m²)	16.000 ltr	Abu Dhabi	2003
2.	PUBLIC BATHS IN GONABAD Sanitary Hot Water	Flat plate collectors(150 m²) (1st of 140)	12.000 ltr	Iran	2004
3.	EUROPEAN BUSINESS CENTER Sanitary Hot Water	Flat plate collectors (108 m²)	16.200ltr	Dubai	2007
4.	BURJ KHALIFA TOWER – tallest building of the world over 828m Sanitary Hot Water	Flat plate collectors (1.020m ²)	80.0001tr	Dubai	2009
5.	DUBAI SPORTS COMPLEX Sanitary Hot Water and Swimming Pool Heating	Flat plate collectors (1.026m²)	16.000 ltr	Dubai	2010
6.	RAHA VILLAS Sanitary Hot Water	Flat plate collectors (730 m ²)	54.400ltr	Abu Dhabi	2012
7.	FISHING HARBOR Sanitary Hot Water	Flat plate collectors (244 m ²)	18.000ltr	Dubai	2012
8.	FUTURE SCHOOLS Sanitary Hot Water and Pool Heating	Flat plate collectors (270 m ²)	15.000ltr	Abu Dhabi	2012
9.	BLOOM GARDENS Sanitary Hot Water Abu Dhabi	Flat plate collectors (403 m ²)	23.900 ltr	U.A.E	2016
10.	MADINAH MUNAWWARAH VILLA Sanitary Hot Water and Pool Heating	Flat plate collectors (216 m ²)	3.000 ltr	S. Arabia	2016
11.	BURJEEL HOSPITAL MED CITY Sanitary Hot Water Abu Dhabi	Flat plate collectors (338 m ²)	24.800 ltr	U.A.E	2017

12.	FLORA AIRPORT HOTEL Sanitary Hot Water Dubai	Flat plate collectors (208 m ²)	15.000 ltr	U.A.E	2017
13.	SALAM CROWN PLAZA Sanitary Hot Water Jeddah	Flat plate collectors (208 m ²)	16.000 ltr	S. Arabia	2017
14.	AL FAYA COMPLEX - BLOOM GARDENS DEVELOPMENT Sanitary Hot Water Abu Dhabi	Flat plate collectors (433 m ²)	32.800 ltr	U.A.E	2017
15.	HSBC BANK HEADQUARTERS Sanitary Hot Water Abu Dhabi	Flat plate collectors (64 m ²)	4.500 ltr	U.A.E	2017



UAE PROJECT LIST

PROJECT NAME	DESCRIPTION OF SOLAR SYSTEM	YEAR	NAME OF THE CONTRACTOR	NAME OF CONSULTANT	PICTURE
THE DUNES (U.S.A. EMBASSY) ABU DHABI	320m ² Flat plate Selective collectors, support frames, pumps, expansion tank, control system storage tanks 16000ltr	MARCH 2003	J. A. JONES CONSTRUCTION CO. TEL: 00971 2 44 90 619 CONTACT NAME: Mr. Kevin	H.O.K. TEL: 00971 202 3388700 OBO (Overseas Building Organization U.S.A.) CONTACT NAME: Mr. Jay Warren	CLASSIFIED
EUROPEAN BUSINESS CENTER DUBAI	216m ² Flat plate Selective collectors, support frames, pumps, expansion tank, control system storage tanks 16200ltr (54 Eurostar thermosiphon solar water heatres)	SEPTEMBER 2007	Sensaire Services LLC TEL: 00971 42823713 CONTACT NAME: Mr. S. Han Baskar		
BURJ KHALIFA	1.020m ² Flat plate Selective collectors , support frames, pumps, expansion tank, control system	MAY 2009	Emirates Trading Agency - Voltas - Hitachi Plant Jv, TEL: 00971 4 3216627, CONTACT NAME: Mr. NAME: Satish G. Dandekar	HYDER CONSULTING, TEL: 00971 4 3242532, CONTACT NAME: Roy Samuels	
HAMDAN SPORTS COMPLEX	1.026m ² Flat plate selective collectors , support frames, pumps, 2 tanks (16.000 ltr), expansions tanks, control system	JULY 2010	SAUDI BIN LADIN GROUP, TEL: 00971 4 2660010, CONTACT NAME: CONTACT NAME:MR. LIJIN MOHAN	ARUP GULF LIMITED, TEL: 00971 4 550 7300, CONTACT NAME: MR. TONY LOVELL	
AI RAHA GARDENS	272 THERMOSIPHON SYSTEMS (200- 1-W270) 200ltr with 1 selective collector of 2,70m ²	APRIL 2012	AL SHAMAT Electromechanical (MEP) Cont. Est. TEL:00971 2 6223516, CONTACT NAME MR. CONTACT NAME: PAUL ANSELL		
FISHING HARBOR	244m ² Flat plate selective collectors, support frames, pumps, 10 tanks (18.000 ltr), expansions tanks, control system	AUGUST 2012	GENERAL CONTRACTING CO, TEL: 0097146725485, CONTACT NAME: NAME: MR. MICHEL PETRIDES	DESIGN & ARCHITECTURE BUREAU, TEL: 00971 4 2828800, CONTACT NAME: NAME: MR. BASHEER OSMAN	
FUTURE SCHOOLS	540m ² Flat plate selective collectors, support frames, 6 buffer+6 storage tanks (15.000ltr), pumps, expansions tanks, control systems	DECEMBER 2012	Al Sabbah Electro-Mechanical Contracting, TEL. 0097137825656, NAME: MR. JAYAPRABHU	KEO, INTERNATIONAL CONSULTANS TEL. 0097124173000, CONTACT	
BLOOM GARDENS	157 THERMOSIPHON SYSTEMS (150- 200-1-S260) 150-200ltr with 1 selective collector of 2,60m ²	SEPTEMBER 2016	EMIRATES LINK MALTAURO LLC Tel: (+971-2) 5536456 NAME: Mr. E. WEBHE	Khatib & Alami tel: (+971-4) 4252222 Mr. Ghassan Miari	

BURJEEL HOSPITAL MED CITY	338m ² Flat plate Selective collectors , 24.800 ltr storage, support frames, pumps, expansion tank, control system	MAY 2017	Commodore LLC Tel: +971 2 5509222 NAME: Mr. MARWAN HASAN	STH SOCIETY TECHNOLOGY HOUSE Tel: +971 2 6417627	
FLORA AIRPORT HOTEL L.L.C.	208m ² Flat plate Selective collectors , 15.000 ltr storage, support frames, pumps, expansion tank, control system	MAY 2017	Central Contracting LLC Tel: +971 4 3544460 NAME: Eng. BADAOUI HALABI	Eng. Adnan Saffarini Tel: +971 4 2222002 NAME: Mr. Ahmed Saffarini	
AL-FAYA COMPLEX- BLOOM GARDENS DEVELOPMENT	68 THERMOSIPHON SYSTEMS (200- -1-S260) & 64 THERMOSIPHON SYSTEMS (300-2-S200)	JULY 2017	EMIRATES LINK MALTAURO LLC Tel: (+971-2) 5536456 CONTACT NAME: Mr. E. WEBHE	Khatib & Alami tel: (+971-4) 4252222 NAME: Mr. Ghassan Miari	
HSBC BANK Headquarters	63m ² Flat plate Selective collectors , 4.500 ltr storage, support frames, pumps, expansion tank, control system	OCTOBER 2017	Plafond Tel: +971 4 5014800 CONTACT NAME: BERNARD SILVANO	CONIN Tel: +971 4 2662227 NAME: TARIQ QANDAH	



SOLE S.A. PROJECT LIST WORLDWIDE



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BIG PROJECT LIST PRESENTATION



	Name	Collectors type & size	Storage Capacity	Place	Year
1.	Calypso Bungalows Hotel	Flat plate collectors (100m ²)	5.000 ltr	Arkitsa	1975
2.	Marpounda Beach Hotel	Flat plate collectors (60m ²)	3.000 ltr	Alonissos Island	1976
3.	Galaxy Hotel	Flat plate collectors (70 m ²)	3.500 ltr	Alonissos Island	1975
4.	Skiathos Palace Hotel	Flat plate collectors (250 m ²)	12.500 ltr	Skiathos Island)	1976
5.	Eden Rock Hotel	Flat plate collectors (100 m ²)	5.000 ltr	Rhodes Island	1977
6.	Filoxenia Hotel	Flat plate collectors (75 m ²)	3.750 ltr	Kalamata	1977
7.	Marathon Beach Hotel	Flat plate collectors (275 m ²)	13.750 ltr	Nea Makri	1978
8.	Perandoni Hotel	Flat plate collectors (200 m ²)	10.000 ltr	Ierapetra – Crete	1978
9.	Galaxy Hotel	Flat plate collectors (50 m ²)	2.500 ltr	Zakinthos Island	1978
10.	Loukia Hotel	Flat plate collectors (80 m ²)	4.000 ltr	Chania – Crete	1978
11.	Venus Hotel	Flat plate collectors (80 m ²)	4.000 ltr	Milos Island	1978
12.	Posidon Camping	Flat plate collectors (60 m ²)	3.000 ltr	Platamonas	1979
13.	Economou Camping	Flat plate collectors (60 m ²)	3.000 ltr	Korinthos	1979
14.	Sterling Drug Hellas	Flat plate collectors (120 m ²)	6.000 ltr	Pallini	1979



	Name	Collectors type & size	Storage Capacity	Place	Year
15.	N.C.S.R. " DEMOKRITOS " Solar System Laboratory	Flat plate collectors (800 m²)	40.000 ltr	Athens	1979
16.	Valaki's Block of Flats	Flat plate collectors (100 m ²)	5.000 ltr	Athens	1980
17.	Patouna's Block of Flats	Flat plate collectors (80 m ²)	4.000 ltr	Athens	1980
18.	Tobazi's Residence Solar room and water heating	Flat plate collectors (25 m²)	1.250 ltr	Trapeza - AEGIO	1980
19.	Xenia – EOT Hotel	Flat plate collectors (90 m²)	4.500 ltr	Larissa	1980
20.	Olympic Stadium	Flat plate collectors (500 m ²)	25.000 ltr	Athens	1981
21.	Olympiaces Diakopes Hotel	Vacuum tube collectors (400 m²)	20.000 ltr	Kos Island	1989
22.	Santa Marina Hotel	Flat plate collectors (200 m ²)	10.000 ltr	Ag. Nikolaos – Crete	1983
23.	Santa Marina Hotel	Flat plate collectors (150 m ²)	7.500 ltr	Chania – Crete	1983
24.	Crete Hotel	Flat plate collectors (40 m²)	2.000 ltr	Chania – Crete	1983
25.	Daidalos Hotel	Flat plate collectors (400 m ²)	20.000 ltr	Kos Island	1989
26.	Daicos Hotel	Flat plate collectors (100 m ²)	5.000 ltr	Kalamata	1989
27.	Minavra Hotel	Flat plate collectors (60 m²)	3.000 ltr	Vouliagmeni	1989
28.	Saropoulos – Plomari	Flat plate collectors (50 m²)	2.500 ltr	Mitilini Island	1990



	Name	Collectors type & size	Storage Capacity	Place	Year
29.	Peace & Friendship Stadium Cres Subsidy	Flat plate collectors (300 m ²)	15.000 ltr	Athens	1992
30.	Allegro S.A. Children's Clothing Manufacturer Cres Subsidy	Flat plate collectors (70 m²)	3.500 ltr	Athens	1993
31	Tripou – Katsouris Leather Treatment Factory Cres Subsidy	Flat plate collectors (300 m²)	15.000 ltr	Athens	1993
32	Achaia Clauss Winery Cres Subsidy	Flat plate collectors (300 m²)	15.000 ltr	Patra	1994
33	Porto Paros Hotel (160 m ²) 80 ALPHA Systems	Flat plate collectors	8.000 ltr	Paros Island	1995
34	SARANTIS S.A. Solar Air – Conditioning 700kw	Flat plate collectors (blue selective) (2.664 m²)	9.000 ltr Buffer	Oinofita	1999
35	Aziza Hotel	Flat plate collectors (176 m²) & (300 m² s / p collectors)	15.000 ltr	Hamamet – Tunisia	1999
36	Mediteranee Hotel Swimming Pool & Hot Water Heating	Flat plate collectors (626 m²)	31.300 ltr	Hamamet – Tunisia	1999
37	El – Kanta Hotel Swimming Pool & Hot Water Heating	Flat plate collectors (674 m²)	33.700 ltr	Sousse – Tunisia	1999
38	Malia Bay Hotel	Flat plate collectors (120 m ²)	6.000 ltr	Malia – Crete	1999
39	Paros Filoxenia	Flat plate collectors (30 m ²)	1.500 ltr	Paros Island	1999
40	Rhoul Palace Hotel	Flat plate collectors (30 m ² & 100 m ² s / p collectors)	1.500 ltr	Marrakech - Maroccco	1999



	Name	Collectors type & size	Storage Capacity	Place	Year
41	CRES- Space heating	Air Collectors /32m ²		Greece	2000
42	Berber Palace	Flat plate collectors (550 m ²)	27.500 ltr	Ouarzazate – Marocco	2000
43	Sports Stadium Amor Doghamne	Flat plate collectors (28 m ²)	1.400 ltr	Gabes – Tunisia	2000
44	Rethymno Village Solar Air – Conditioning 105kw, Swimming Pool & Hot Water Heating	Flat plate collectors (blue selective) (440 m²)	8.000 ltr	Rethymno – Crete	2000
45	Arion Palace– Swimming Pool & Hot Water Heating	Flat plate collectors (blue selective) (100 m²)	5.000 ltr	lerapetra – Crete	2000
46	Vlamakis Villas– Swimming Pool & Hot Water Heating	Flat plate collectors (blue selective) (362 m²)	18.100 ltr	Chania – Crete	2000
47	Lentzakis Hotel Solar Air – Conditioning 105kw, Swimming Pool & Hot Water Heating	Flat plate collectors (blue selective) (448 m²)	4.000 ltr	Rethymno - Crete	2000
48	Club Med Hotel Hot Water Heating	Flat plate collectors (black chrome selective) (1,000m2)	55.000 ltr	TUNISIA	2001
49	Kalypso Hotel Hot Water Heating	Flat plate collectors (blue selective) (144 m²)	7.200 ltr	Plakias – Crete	2001
50	Europa Hotel– Swimming Pool & Hot Water Heating	Flat plate collectors (blue selective) (132 m²)	6.600 ltr	Panormos - Crete	2001
51	American Embassy Sanitary Hot Water	Flat plate collectors (blue selective) (320 m²)	16.000 ltr	Abu Dhabi	2002



	Name	Collectors type & size	Storage Capacity	Place	Year
52	European Center of Law	Air collectors/120m2 Compact SWH ALPHA/24m2	2.400 ltr	Sounio	2002
53	Public Baths in Gonabad Sanitary Hot Water	Flat plate collectors (150 m²) (1st of 140)	12.000 ltr	Iran	2004
54	CRES space heating	Flat plate collectors (13.5m2)		Greece	2005
55	Simien Park Lodges Hotel Floor Heating	Flat plate collectors (43.20 m ²)	3200ltr	Ethiopia	2005
56	European Business Center Sanitary Hot Water	Flat plate collectors (216 m ²)	16.200ltr	Dubai	2007
57	Spastics Society Athens Pool Heating	Polypropylene collectors (50 m²)		Athens	2007
58	Hydramis Palace Hotel Sanitary Hot Water	Flat plate collectors (1.215m ²)	70.000ltr	Crete	2007
59	German School of Athens Pool Heating	Polypropylene collectors (180 m²)		Athens	2008
60	Cavo Spada Hotel Sanitary Hot Water	Flat plate collectors (280m ²)	17.000ltr	Crete	2008
61	Tesco Super Market Solar Air – Conditioning 250kw	Flat plate collectors (1.036m ²)		Hungary	2009
62	BURJ KHALIFA TOWER tallest building of the world Sanitary Hot Water	Flat plate collectors (1.020m ²)	80.000ltr	Dubai	2009



	Name	Collectors type & size	Storage Capacity	Place	Year
63	HAMDAN SPORTS COMPLEX Sanitary Hot Water and Swimming Pool Heating	Flat plate collectors (1.026m ²)	16.000 ltr	Dubai	2010
64	US MILITARY BASE Pool Heating	Polypropylene collectors (260 m²)		Crete	2010
65	Princess of Libyan Sea Hotel Sanitary Hot Water	Flat plate collectors (120 m ²)	7.000ltr	Crete	2010
66	Avra Hotel Sanitary Hot Water	Flat plate collectors (675 m²)	40.000ltr	Crete	2010
67	Kolymbari Beach Hotel Sanitary Hot Water	Flat plate collectors (243 m ²)	15.000ltr	Crete	2010
68	Public sports complex Sanitary Hot Water and Pool Heating	Vacuum tube (40 m ²) & Polypropylene collectors (416 m ²)	3.000 ltr	Loutraki	2011
69	CRES Solar Air Conditioning 35kw	Flat plate collectors (160 m ²)	60.000ltr	Athens	2011
70	USJ – CAMPUS DE L'INNOVATION DE L'ECONOMIE ET DU SPORT (FRENCH UNIVERSITY) Sanitary Hot Water	Flat plate collectors (240 m²)	8.000ltr	Beirut	2011



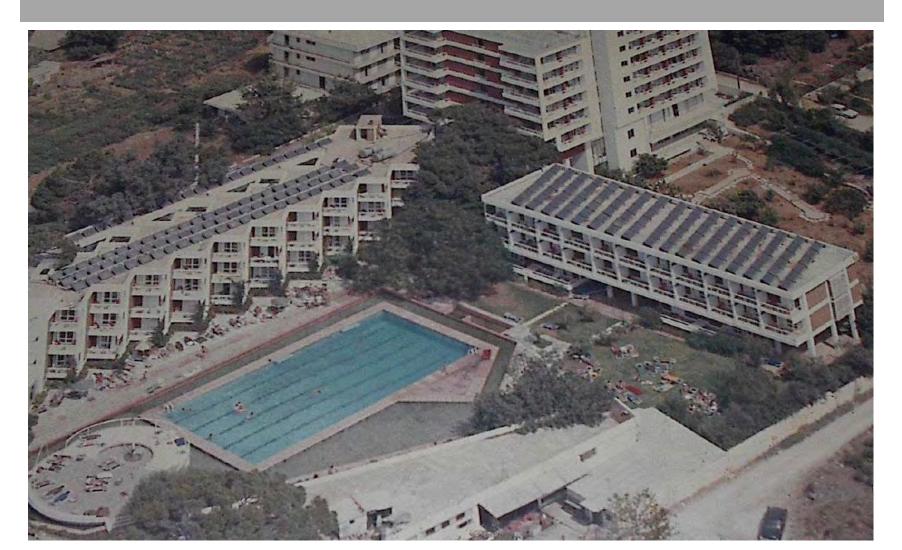
	Name	Collectors type & size	Storage Capacity	Place	Year
71	CALDERA BEACH HOTEL Sanitary Hot Water	Flat plate collectors (1040 m ²)	20.000ltr	Crete	2012
72	AL RAHA GARDENS VILLAS Sanitary Hot Water	Flat plate collectors (730 m ²)	54.400ltr	Abu Dhabi	2012
73	FISHING HARBOR VILLAGE Sanitary Hot Water	Flat plate collectors (244 m ²)	18.000ltr	Dubai	2012
74	FUTURE SCHOOLS Sanitary Hot Water and Pool Heating	Flat plate collectors (270 m ²)	15.000ltr	ALAIN - Abu Dhabi	2012
75	SWIMMING POOL COMPLEX OF AMALIADA MUNICIPALITY Sanitary Hot Water and Pool Heating	Flat plate collectors (551 m ²)	7.000ltr	Amaliada-Peloponesse	2013
76	KUALA LUMPUR AIRPORT Sanitary Hot Water	Flat plate collectors (65 m ²)	3.000ltr	Kuala Lumpur – Malaysia	2013
77	SULTAN GRADENS RESORT	Thermosiphon systems (104m ²)	15.600ltr	Sharm El Sheikh, Egypt	2014
78	NAVY OFFICERS SCHOOL Sanitary Hot Water	Flat plate collectors (162 m ²)	8.000ltr	Athens	2014
79	THE BAY HOTEL Sanitary Hot Water	Flat plate collectors (280 m ²)	21.000ltr	Zakynthos	2014



	Name	Collectors type & size	Storage Capacity	Place	Year
80	MEDITERRANEAN BEACH RESORT Sanitary Hot Water	Flat plate collectors (202 m ²)	9.000ltr	Zakynthos	2016
81	BLOOM GARDENS Sanitary Hot Water	Thermosiphon systems (408m²)	24.200ltr	Abu Dhabi, U.A.E	2016
82	AIRFORCE MILITARY BASE Sanitary Hot Water	Flat plate collectors (41,60m²)	2.500ltr	Marathon - GREECE	2016
83	BURJEEL HOSPITAL MED CITY Sanitary Hot Water	Flat plate collectors (338 m ²)	24.800 ltr	Abu Dhabi, U.A.E	2017
84	FLORA AIRPORT HOTEL Sanitary Hot Water	Flat plate collectors (208 m ²)	15.000 ltr	Dubai, U.A.E	2017
85	SALAM CROWN PLAZA Sanitary Hot Water	Flat plate collectors (208 m²)	16.000 ltr	Jeddah, S. Arabia	2017
86	AL FAYA COMPLEX – BLOOM GARDENS DEVELOPMENT Sanitary Hot Water	Thermosiphon systems (433 m²)	32.800 ltr	Abu Dhabi, U.A.E	2017
87	HSBC BANK Headquarters Sanitary Hot Water	Flat plate collectors (63 m ²)	4.500 ltr	Dubai, U.A.E	2017

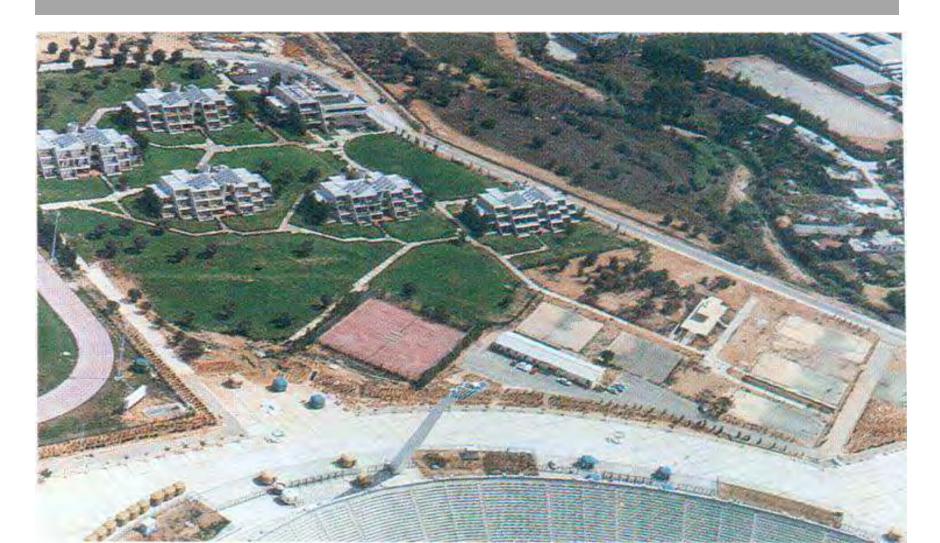


MARATHON BEACH HOTEL 1978 13.750LTR, FLAT PLATE COLLECTORS (275m²)



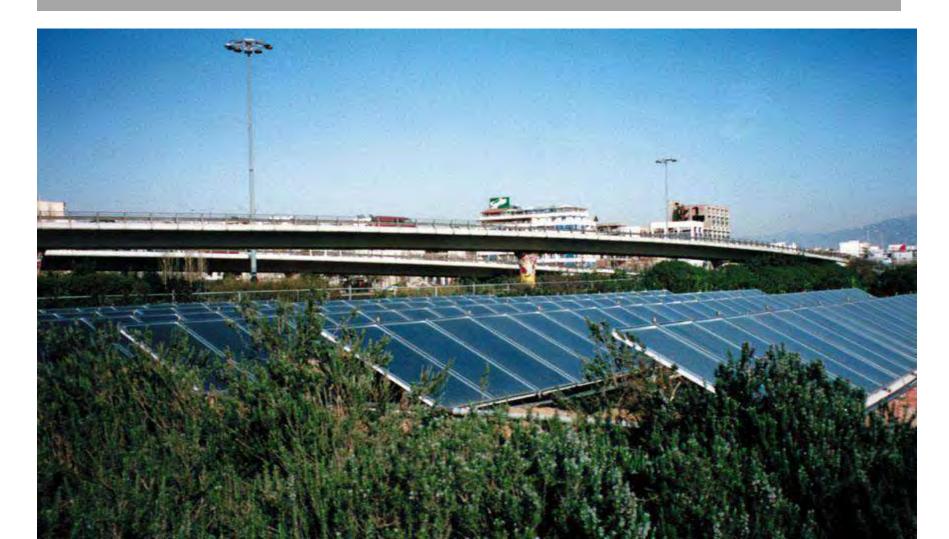


OLYMPIC ATHENS STADIUM, 1981 25.000LTR, FLAT PLATE COLLECTORS (500m²)



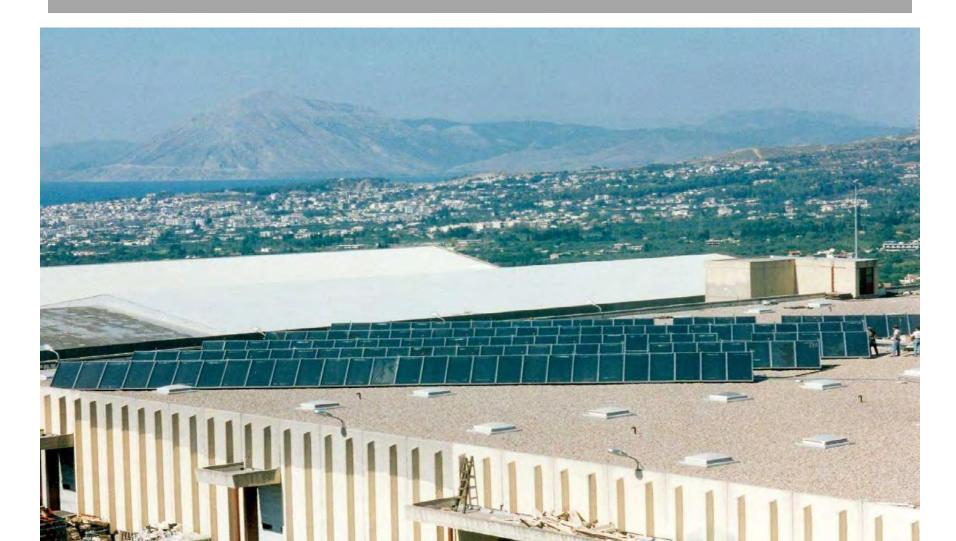


PEACE & FRIENDSHIP STADIUM, 1992 15.000LTR, FLAT PLATE COLLECTORS (300m²)





ACHAIA CLAUSS, 1994 15.000LTR, FLAT PLATE COLLECTORS (300m²)





SARANTIS S.A., 1999

SOLAR AIR CONDITIONING, FLAT PLATE COLLECTORS (2664m²), The solar field is the largest in Greece & the WORLD'S largest air conditioning project.

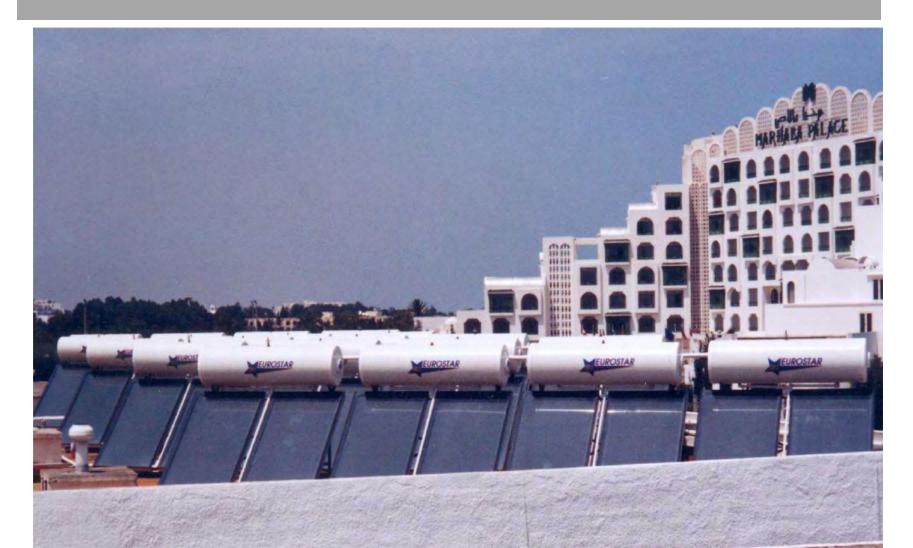


• CLIMASOL SELECTIVE COLLECTORS



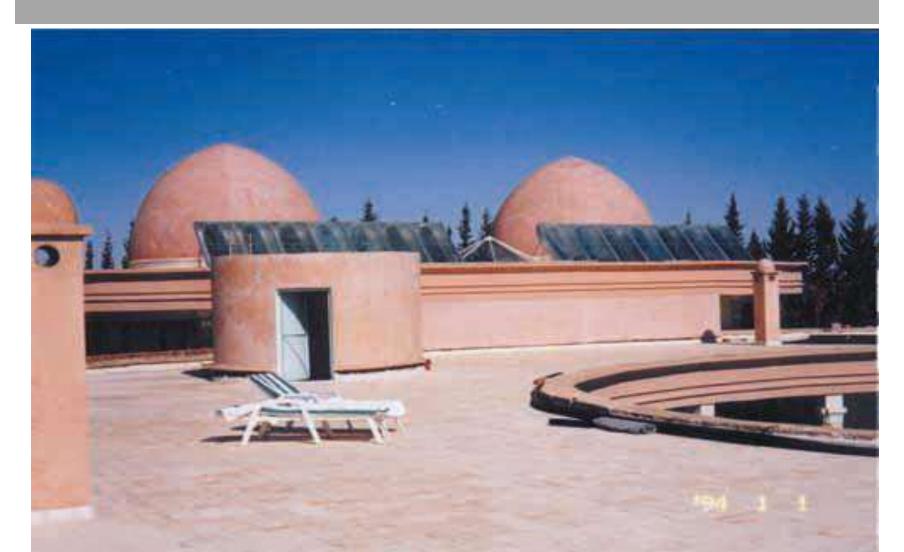


MEDITERANEE HOTEL HAMAMET, 1999 31.300LTR, FLAT PLATE COLLECTORS (626m²)





RHOUL PALACE HOTEL, 1999 1.500LTR, FLAT PLATE COLLECTORS (30m²)





RETHYMNO VILLAGE HOTEL, 2000 SOLAR AIR CONDITIONING & POOL HEATING 8.000LTR, FLAT PLATE COLLECTORS (440m²)





EUROPA HOTEL, 2001 6.600LTR, FLAT PLATE COLLECTORS (132m²)





SIMIEN PARK LODGES HOTEL, 2005 ETHIOPIA, FLOOR HEATING FLAT PLATE COLLECTORS (43.20m²)



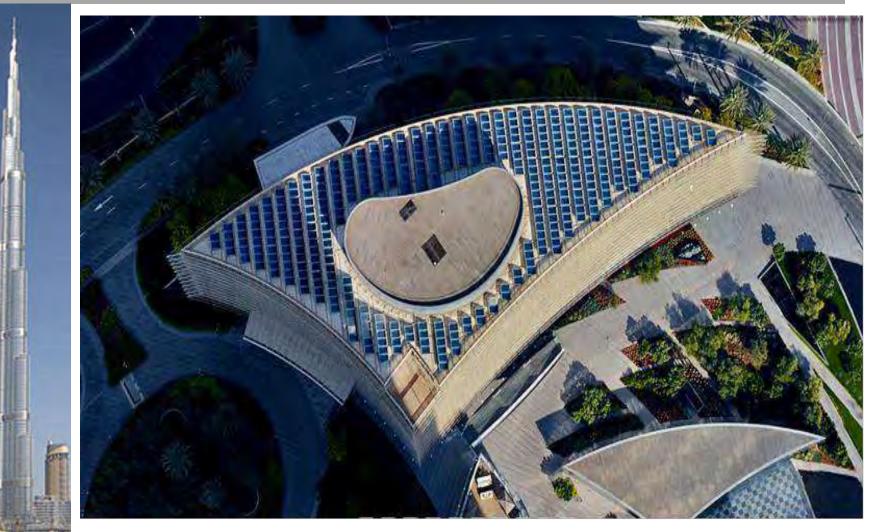


TESCO SUPER MARKET, 2009 BUDAPEST,SOLAR AIR CONDITIONING 250Kw, FLAT PLATE COLLECTORS (1.036m²)





BURJ KHALIFA TOWER, DUBAI, 2009 TALLEST BUILDING OF THE WORLD 80.000LTR, FLAT PLATE COLLECTORS (1.020m²)





HAMDAN SPORTS COMPLEX, 2010 DUBAI 16.600LTR, FLAT PLATE COLLECTORS (1.026m²)





KOLYMBARI BEACH HOTEL, 2010 CHANIA-CRETE SANITARY HOT WATER 15.000ltr FLAT PLATE COLLECTORS (243m²)





CALDERA BEACH HOTEL, 2012 CRETE, SANITARY HOT WATER 20.000ltr FLAT PLATE COLLECTORS (1.040m²)





FISHING HARBOR VILLAGE, 2012 DUBAI, SANITARY HOT WATER 18.000LTR, FLAT PLATE COLLECTORS (244m²)





FUTURE SCHOOLS, 2012 ABU DHABI, SANITARY HOT WATER & POOL HEATING 15.000LTR, FLAT PLATE COLLECTORS (270m²)





SWIMMING POOL COMPLEX OF AMALIADA MUNICIPALITY, 2013 SANITARY HOT WATER & POOL HEATING 7.000LTR, FLAT PLATE COLLECTORS (270m²)





SANITARY HOT WATER 15.600LTR, FLAT PLATE COLLECTORS (104m²)





THE BAY HOTEL, ZAKYNTHOS ISLAND, 2014 SANITARY HOT WATER 21.000LTR, FLAT PLATE COLLECTORS (280m²)





SOLE S.A. WARRANTEE



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SOLE S.A. guarantees the products against bad workmanship or faulty material for a period of 5 years from date of installation. In the case where a problem in one of the products is determined, DISTRIBUTOR must be contacted directly by the end user. DISTRIBUTOR will in turn send its service technicians to repair or replace the part or subassembly or the whole product according to instructions by **SOLE**. **SOLE**'s responsibility is limited to the supply of spare parts or subassemblies or whole products free of charge. DISTRIBUTOR or its local authorized dealers will offer the labor cost and the possible transportation costs to the customer free of charge.

DISTRIBUTOR must keep a sufficient quantity of spare parts in advance. In case of a replacement of a part, DISTRIBUTOR will execute the replacement from its stock of parts and *SOLE* will send to the DISTRIBUTOR the replacement at no charge with the next shipment of parts. DISTRIBUTOR is obliged to keep the replaced parts available at its premises until they have been inspected by an executive of *SOLE*. Those faulty parts can be destroyed after inspection and certification of defects.

The above warranty is valid under the following conditions:

The end user has replaced the magnesium rod (anode bar) with the electric heating element and thermostat at the latest 30 months from the date of purchase and in turn every 30 months from thereon. This is the only maintenance this product requires. This maintenance will be paid by the end user to DISTRIBUTOR and DISTRIBUTOR will purchase these spare parts from *SOLE* or any other supplier previously approved in writing by *SOLE*.

The end user ensures that glycol (antifreeze liquid) is filled in the closed circuit (heat exchanger and collectors) at all times, to protect the system against frost.

The operating pressure of the system does not exceed 10 bar.

Exemptions:

The electric element and the thermostat of the system are covered by warranty of 2 years.

The glass of the collectors is not covered by the warranty.

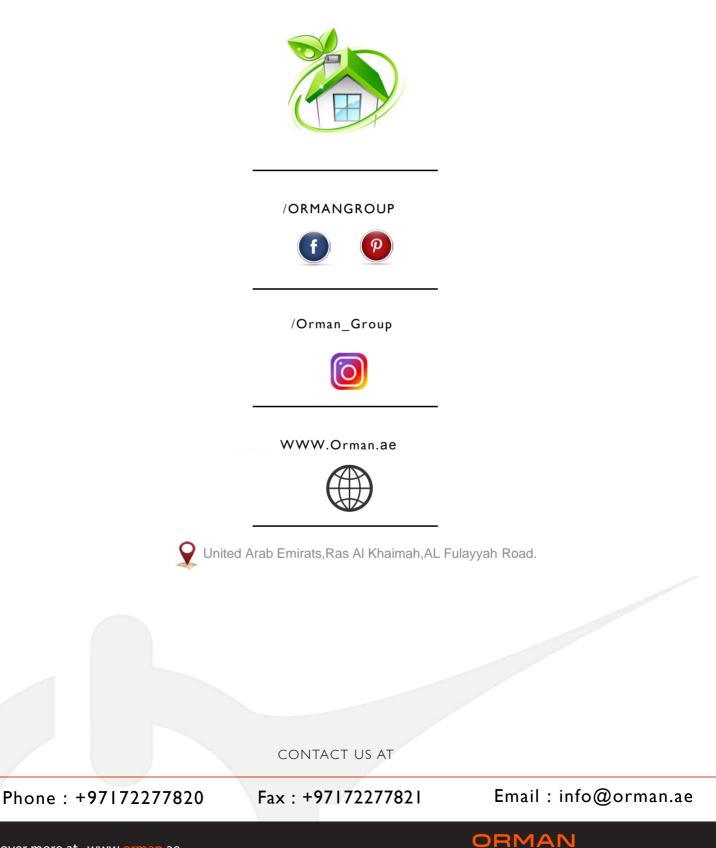
Damages caused from frost are not covered by the warranty.



DIGITAL PLATFORMS



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