Certificado

Certificate no.
Certificado nº **PSK-009/2018**

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

EMMVEE SOLAR SYSTEMS PRIVATE LIMITED
Solar Tower # 55, 6 TH Main, 11 TH Cross
Lakshmaiah Block, Ganganagar
Bangalore – 560024, INDIA

Product:
Produto:

Thermal solar collector
Coletor solar térmico

Type references:
Referências:

ES2000BX

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

SOLARIZER

Technical characteristics:
Características técnicas:

Summary of EN 12975 Test Results: Registration No. PSK-009/2018 (in annex)
Resumo dos resultados dos ensaios realizados segundo a norma EN 12975: Registo Nº PSK-009/2018 (em anexo)

This product is in conformity with:
Este produto está em conformidade com:

EN 12975-1:2006+A1:2010, EN 12975-2:2006

and with the Specific Keymark Scheme Rules for Solar Thermal Products
e com as Regras Particulares do CEN Keymark Scheme para Produtos Solares Térmicos.

Test report(s) no. / issued by:
Relatório(s) de ensaios nº(s) / emitido(s) por:

30.1842.0-1-1, 30.1842.0-2-1 and /e 30.2153.1 / CENER

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

This certificate is valid until:
Este certificado é válido até:

2023-10-30

and supersedes certificate no:
e substitui o certificado nº:

Date of issue:
Data de emissão:

2018-10-31

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

IPAC acreditação C0004 ISO/IEC 17065 Produtos

Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results

Licence Number	PSK-009/2018
Date issued	2018-10-31
Issued by	CERTIF

Licence holder	EMMVEE Solar Systems Private Limited	Country	INDIA
Brand (optional)	SOLARIZER	Web	http://www.emmvee.com
Street, Number	Solar Tower # 55, 6 TH MAIN, 11 TH Cross	E-mail	srinath.t@emmvee.in
Postcode, City	560024 BANGALORE	Tel	+91 80 4323 3442 / 80 2333 2060

Collector Type	Flat plate collector, glazed

Collector name	Gross area (A_G)	Gross length	Gross width	Gross height	Power output per collector Gb = 850 W/m²; Gd = 150 W/m² ϑm - ϑa: 0 K	10 K	30 K	50 K	70 K	53 K
	m²	mm	mm	mm	W	W	W	W	W	W
ES2000BX	2,11	2.045	1.032	115	1.443	1.368	1.211	1.046	872	1.020
Power output per m² gross area					684	648	574	496	413	484

Performance parameters test method	Steady state - indoor									
Performance parameters (related to AG)	η0,hem	a1	a2							
Units	-	W/(m²K)	W/(m²K²)							
Test results	0,684	3,517	0,005							

Incidence angle modifier test method	Quasi dynamic - outdoor									
Bi-directional incidence angle modifiers	No									
Incidence angle modifier	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal	$K_{\theta T,coll}$					0,87				0,00
Longitudinal	$K_{\theta L,coll}$					0,87				0,00

Heat transfer medium for testing	Water		
Flow rate for testing (per gross area, A_G)	dm/dt	0,020	kg/(sm²)
Maximum temperature difference for thermal performance calculations	$(\vartheta_m-\vartheta_a)_{max}$	53	K
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)	ϑ_{stg}	209,1	°C
Effective thermal capacity, incl. fluid (per gross area, A_G)	C/m²	5,064	kJ/(Km²)
Maximum operating temperature	ϑ_{max_op}	85	°C
Maximum operating pressure	$p_{max,op}$	800	kPa

Testing laboratory	Fundación CENER-CIEMAT	http://www.cener.com	
Test report(s)	30.2153.0-3-1	Dated	07/08/2013
	30.2153.0-4-1		24/07/2013
	30.2153.1		30/08/2013

Comments of testing laboratory

Datasheet version: 5.01, 2016-03-01

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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

Annex to Solar Keymark Certificate	Licence Number	PSK-009/2018
Supplementary Information	Issued	2018-10-31

Annual collector output in kWh/collector at mean fluid temperature ϑ_m, based on ISO 9806:2013 test results

Standard Locations	Athens			Davos			Stockholm			Würzburg		
Collector name ϑ_m	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
ES2000BX	2.157	1.498	985	1.622	1.119	728	1.188	773	482	1.289	825	506
Annual output per m² gross area	1.022	710	467	769	530	345	563	366	229	611	391	240
Fixed or tracking collector	Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane	1765 kWh/m²			1714 kWh/m²			1166 kWh/m²			1244 kWh/m²		
Mean annual ambient air temperature	18,5°C			3,2°C			7,5°C			9,0°C		
Collector orientation or tracking mode	South, 25°			South, 30°			South, 45°			South, 35°		

The collector is operated at constant temperature ϑm (mean of in- and outlet temperatures). The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool Scenocalc Ver. 5.01 (March 2016). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc

Additional Information

Collector heat transfer medium	Water-Glycole	
Hybrid Thermal and Photo Voltaic collector	No	
The collector is deemed to be suitable for roof integration	Yes	
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:		
Climate class (A, B or C)	C	--
Maximum tested positive load	1000	Pa
Maximum tested negative load	1000	Pa
Hail resistance using ice balls (diameter)	25	mm

Energy Labelling Information

	Reference Area, A_{sol} (m²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}		
ES2000BX	2,11	Collector efficiency (η_{col})	54	%

Remark: Collector efficiency (η_{col}) is defined in CDR (EU) No 811/2013 as collector efficiency of the solar collector at a temperature difference between the solar collector and the surrounding air of 40 K and a global solar irradiance of 1000 W/m², expressed in % and rounded to the nearest integer. Deviating from the regulation η_{col} is based on reference area (A_{sol}) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2013.

Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}		
Zero-loss efficiency (η_0)	0,684	--
First-order coefficient (a_1)	3,52	W/(m²K)
Second-order coefficient (a_2)	0,005	W/(m²K²)
Incidence angle modifier IAM (50°)	0,87	--

Remark: The data given in this section are related to collector reference area (A_{sol}) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806. Consistent data sets for either aperture or gross area can be used in calculations like in the regulation 811 and 812 and simulation programs.

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