Certificado

Certificate no.
Certificado nº **PSK – 005/2017**

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:

ES2000A

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

SOLARIZER

Technical characteristics:
Características técnicas:

Summary of EN 12975 Test Results: Registration No. PSK–005/2017 (in annex)
Resumo dos resultados dos ensaios realizados segundo a norma EN 12975: Registo Nº PSK-005/2017 (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:

30.1842.0-3-1, 30.1842.0-4-1and */e* 30.1842.0 / CENER

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

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

2022-06-28

and supersedes certificate no:
e substitui o certificado nº:

Date of issue:
Data de emissão:

2017-06-29

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

Certif – Associação para a Certificação
Rua José Afonso, 9 E – 2810-237 Almada – Portugal – Tel.: 351. 21 258 69 40 – Fax: 351. 21 258 69 59

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

Licence Number	PSK-005/2017
Date issued	2017-06-29
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 Lashmaiah Block, Ganganagar	E-mail	srinath.t@emmbee.in
Postcode, City	560024 BANGALORE	Tel	+91 80 4323 3442 / 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	56 K
	m²	mm	mm	mm	W	W	W	W	W	W
ES2000A	2,10	2.044	1.027	105	1.386	1.323	1.177	1.007	811	949
Power output per m² gross area					660	630	561	480	386	452

Performance parameters test method	Steady state - indoor		
Performance parameters (related to AG)	η0,hem	a1	a2
Units	-	W/(m²K)	W/(m²K²)
Test results	0,660	2,860	0,015

Incidence angle modifier test method	Steady state - outdoor									
Bi-directional incidence angle modifiers	No									
Incidence angle modifier	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal	$K_{\theta T,coll}$					0,84				0,00
Longitudinal	$K_{\theta L,coll}$					0,84				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	$(\vartheta_m-\vartheta_a)_{max}$	56,19	K
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)	ϑ_{stg}	216	°C
Effective thermal capacity, incl. fluid (per gross area, A_G)	C/m²	5,652	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)	30.1842.0-3-1	Dated	12/06/2012
	30.1842.0-4-1		14/06/2012
	30.1842.0 Technical annex		22/06/2012

Comments of testing laboratory

This collector was tested according to EN 12975-2 in 2012.

Datasheet version: 5.01, 2016-03-01

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Annex to Solar Keymark Certificate	Licence Number	PSK-005/2017
Supplementary Information	Issued	2017-06-29

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
ES2000A	2.029	1.433	913	1.554	1.063	648	1.134	740	440	1.226	789	459
Annual output per m² gross area	966	682	435	740	506	309	540	352	209	584	376	219
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}		
ES2000A	2,10	Collector efficiency (η_{col})	52	%
		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)	0,660	--
		First-order coefficient (a_1)	2,86	W/(m²K)
		Second-order coefficient (a_2)	0,015	W/(m²K²)
		Incidence angle modifier IAM (50°)	0,84	--
		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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