



Certificate no.
Certificado nº **PSK – 004/2018**

Name and address of the certificate holder:
Nome e morada do titular do certificado: İstek Yenilenebilir Enerji Gün. En. Sis. San. Ve. Tic. Ltd. Şti.
Ataturk Mah. 31072 SOK. NO: 4/A
33170 Mezitli, Mersin
Turkey

Product:
Produto: Thermal solar collector
Coletor Solar Térmico

Type references:
Referências: ST-T 40/400

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

Technical characteristics:
Características técnicas: Summary of EN ISO 9806 Test Results: Registration No. PSK-004/2018,
(in annex)
*Resumo dos resultados dos ensaios realizados segundo a norma EN ISO 9806:
Registo Nº PSK-004/2018, (em anexo)*

This product is in conformity with:
Este produto está em conformidade com: 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:
Relatório(s) de ensaios nº(s) / emitido(s) por: 10.V3/LES/2017

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

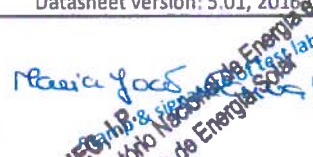
This certificate is valid until:
Este certificado é válido até: 2023-07-17
and supersedes certificate no:
e substitui o certificado nº: ---

Date of issue:
Data de emissão: 2018-07-18

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



Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		PSK-004/2018																		
					Date issued		2018-07-18																		
					Issued by		CERTIF																		
Licence holder			ISTEK YENILENEBİLİR ENERJİ GÜN. EN. SİS. SAN. VE TİC. LTD. ŞTİ.			Country		Turkey																	
Brand (optional)			ISTEK			Web		www.istek.com.tr																	
Street, Number			ATATURK MAH. 31072 SOK. NO: 4/A			E-mail		info@info.info																	
Postcode, City			33170 MEZITLI / MERSIN			Tel		+90 (324) 3583330																	
Collector Type						Flat plate collector, glazed																			
Collector name						Power output per collector																			
						Gb = 850 W/m ² ; Gd = 150 W/m ² ; u = 3 m/s																			
						θ _m - θ _a																			
						0 K		10 K		30 K		50 K		70 K		100 K									
						W		W		W		W		W		W									
ISTEK ST - T40/400						2,44		2 040		1 200		100		1 632		1 514		1 268		1 010		741		315	
Power output per m ² gross area						668		619		519		413		303		129									
Performance parameters test method						Quasi dynamic																			
Performance parameters (related to AG)						η _{0,b}		c1		c2		c3		c4		c6		Kd							
Units						-		W/(m ² K)		W/(m ² K ²)		J/(m ³ K)		-		s/m		-							
Test results						0,672		4,790		0,006								0,959							
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 _{θT, coll}		1,00		0,99		0,98		0,97		0,94		0,89		0,79		0,48		0,00	
Longitudinal						K _{θL, coll}		1,00		0,99		0,98		0,97		0,94		0,89		0,79		0,48		0,00	
Heat transfer medium for testing						Water																			
Flow rate for testing (per gross area, A _G)						dm/dt		0,020		kg/(sm ²)															
Maximum temperature difference for thermal performance calculations						(θ _m - θ _a) _{max}		100		K															
Standard stagnation temperature (G = 1000 W/m ² ; θ _a = 30 °C)						θ _{stg}		151		°C															
Effective thermal capacity, incl. fluid (per gross area, A _G)						C/m ²		9.6		kJ/(Km ²)															
Maximum operating temperature						θ _{max, op}		200		°C															
Maximum operating pressure						P _{max, op}		600		kPa															
Testing laboratory			LNEG			www.lneg.pt																			
Test report(s)			n. 10.V3/LES72017			Dated		15/07/2018																	
Comments of testing laboratory						Datashet version: 5.01, 2016-09-01																			
No Comments.						 <p>Maria João LNEG - Laboratório Nacional de Energias Limpas Laboratório Nacional de Energias Limpas</p>																			
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	PSK-004/2018
	Issued	2018-07-18

Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on ISO 9806:2013 test results													
Collector name	Standard Locations ϑ_m	Athens			Davos			Stockholm			Würzburg		
		25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
ISTEK ST - T40/400		2 600	1 604	880	1 815	1 086	561	1 365	763	383	1 500	823	407
Annual output per m ² gross area		1 064	656	360	743	444	229	558	312	157	614	337	167
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m ²			1714 kWh/m ²			1166 kWh/m ²			1244 kWh/m ²		
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 ϑ_m (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	No	
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:		
Climate class (A, B or C)	B	--
Maximum tested positive load	0	Pa
Maximum tested negative load	0	Pa
Hail resistance using steel ball (maximum drop height)	1,8	m

Energy Labelling Information

	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
ISTEK ST - T40/400	2,44	Collector efficiency (η_{col})	47 %
		<i>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.</i>	
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0,668 --
		First-order coefficient (a_1)	4,79 W/(m ² K)
		Second-order coefficient (a_2)	0,006 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0,94 --
		<i>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.</i>	