



Certificate no.
Certificado nº **PSK-003/2023**

Name and address of the certificate holder:
Nome e morada do titular do certificado: **Royal Isi Sanayi Ve Ticaret Limited Şirketi**
Ataturk Mah. 31072 SOK. No: 4/A
33170 Mezitli, Mersin
Turkey

Product:
Produto: **Thermal solar collector**
Coletor Solar Térmico

Type references:
Referências: **SAC-400**

Trademark(s):
Marca(s) comercial(is): **ROYAL ISI**

Technical characteristics:
Características técnicas: **Annex to Solar Keymark Certificate No. PSK-003/2023**
Anexo ao Certificado Solar Keymark com Nº PSK-003/2023

This product is in conformity with:
Este produto está em conformidade com: **EN 12975-1:2006+A1:2010, EN ISO 9806:2017**
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: **08/V.1/LES/2023/ LNEG**

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

This certificate is valid until:
Este certificado é válido até: **2028-12-20**
and supersedes certificate no:
e substitui o certificado nº: -----

Date of issue:
Data de emissão: **2023-12-21**

Francisco Barroca
General Manager / *Diretor Geral*

IPAC
acreditação

C0004
ISO/IEC 17065
Produtos

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					Licence Number		PSK-003/2023																	
					Date issued		2023-12-21																	
					Issued by		CERTIF																	
Licence holder		ROYAL ISI SAN VE TIC. LTD. STI			Country		Türkiye																	
Brand (optional)		ROYAL ISI			Web		https://www.royalisi.com/																	
Street, Number		Atatürk Mah. 31072 Sk. No: 4/A			E-mail		merve@royalisi.com																	
Postcode, City		Mezitli, Mersin			Tel		+90 5326296096																	
Collector Type					Flat plate collector																			
Collector name					Gross area (A_G)		Gross length		Gross width		Gross height		Power output per collector											
					m ²		mm		mm		mm		$G_b = 850 \text{ W/m}^2, G_d = 150 \text{ W/m}^2 \text{ \& } u = 1.3 \text{ m/s}$ $\vartheta_m - \vartheta_a$											
SAC-400					2.32		1938		1199		80		0 K		10 K		30 K		50 K		70 K		100 K	
													W		W		W		W		W		W	
													0		0		0		0		0		0	

Annex to Solar Keymark Certificate Supplementary Information		Licence Number		PSK-003/2023									
		Issued		2023-12-21									
Gross Thermal Yield in kWh/collector at mean fluid temperature θ_m													
Collector name	Standard Locations	Athens			Davos			Stockholm			Würzburg		
	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
SAC-400		2 384	1 530	839	1 711	1 040	519	1 280	736	362	1 402	795	385
Gross Thermal Yield per m ² gross area		1 028	660	362	737	448	224	552	317	156	604	343	166
Annual efficiency, η_a		58%	37%	20%	45%	27%	14%	47%	27%	13%	49%	28%	13%
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m ²			1630 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 6.2 (13.01.2022). A detailed description of the calculations is available at http://www.estif.org/solarkeymarknew/													
Additional Information													
Collector heat transfer medium											Water-Glycole		
The collector is deemed to be suitable for roof integration											No		
The collector was tested successfully under the following conditions:													
Climate class (A+, A, B or C)											B		--
G (W/m ²) >		900		θ_a (°C) >		15		H_x (MJ/m ²) >		540			
Maximum tested positive load											1600		Pa
Maximum tested negative load											1600		Pa
Hail resistance using steel ball (maximum drop height)											2		m
Additional collector attribute(s)													
Using external power source(s) for normal operation				No		Active or passive measure(s) for self-protection				No			
Co-generating thermal and electrical power				No		Façade collector(s)				No			
Energy Labelling Information						Additional Informative Technical Data							
		Reference Area, A_{ref} (m ²)				Hydraulic Designation Code				Aperture Area, A_a (m ²)			
SAC-400		2.32				11-VH-12345-A:6.8,1775-C:20,1185				2.13			
Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}						Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}							
Collector efficiency (η_{col})		47%				Zero-loss efficiency (η_0)				0.65			
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/m ² , 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 2017.		First-order coefficient (a_1)				3.93				W/(m ² K)			
		Second-order coefficient (a_2)				0.016				W/(m ² K ²)			
		Incidence angle modifier IAM (50°)				0.92				--			
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.													
CERTIF Associação para a Certificação Rua José Afonso, 9E - 2810-237 Almada - Portugal													