



Certificate no. **PSK – 003/2018**
Certificado nº

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

AQUAFER, Lda
Rua Monte Lobar, N°436
4775-263 Viatodos
Portugal

Product:
Produto:

Thermal Solar Collector
Coletor Solar Térmico

Type references:
Referências:

AQR-2, AQR-2.2, AQR-2.4 and/ e AQR-2.6

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

Technical characteristics:
Características técnicas:

Summary of EN 12975 Test Results: Registration No. PSK-003/2018 (in annex)
Resumo dos resultados dos ensaios realizados segundo a norma EN 12975: Registo N° PSK-003/2018 (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) ref. / Issued by:
Relatório(s) de ensaios nº(s) / Emitido(s) por:

001/15/ CTCV, 17.V2/LES/2011 and/ e 4.V2/LES/2013/ LNEG

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

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

2021-12-31

and supersedes certificate no:
e substitui o certificado nº:


Date of issue:
Data de emissão:

2018-04-06

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-003/2018						
					Date issued		2018-04-06						
					Issued by		CERTIF						
Licence holder		AQUAFER, lda			Country		Portugal						
Brand (optional)					Web		www.aquafer.pt						
Street, Number		Rua Monte Lobar, N°436			E-mail		geral@aquafer.pt						
Postcode, City		4775-263 Viatodos			Tel		+351 252963543						
Collector Type					Flat plate collector, glazed								
Collector name	Gross area (A_G) m ²	Gross length mm	Gross width mm	Gross height mm	Power output per collector G _b = 850 W/m ² ; G _d = 150 W/m ² $\vartheta_m - \vartheta_a$								
					0 K W	10 K W	30 K W	50 K W	70 K W	50 K W			
AQR-2.2	2,13	2.055	1.037	68	1.564	1.464	1.255	1.031	794	1.029			
AQR-2.4	2,40	2.058	1.165	68	1.760	1.648	1.412	1.161	894	1.157			
AQR-2.6	2,65	2.057	1.290	68	1.947	1.823	1.562	1.284	989	1.280			
AQR-2	2,01	1.930	1.040	68	1.475	1.381	1.183	973	749	970			
Power output per m ² gross area					734	687	589	484	373	483			
Performance parameters test method				Steady state - indoor									
Performance parameters (related to AG)				$\eta_{0,hem}$	a1	a2							
Units				-	W/(m ² K)	W/(m ² K ²)							
Test results				0,734	4,600	0,008							
Incidence angle modifier test method				Steady state - indoor									
Bi-directional incidence angle modifiers				No									
Incidence angle modifier				Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal				$K_{RT, coll}$					0,91				0,00
Longitudinal				$K_{RL, coll}$					0,91				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					$(\vartheta_m - \vartheta_a)_{max}$	50,25	K						
Standard stagnation temperature ($G = 1000 \text{ W/m}^2$; $\vartheta_a = 30 \text{ }^\circ\text{C}$)					ϑ_{ste}	162,9	°C						
Effective thermal capacity, incl. fluid (per gross area, A_G)					C/m ²	8,3	kJ/(Km ²)						
Maximum operating temperature					$\vartheta_{max, op}$	-	°C						
Maximum operating pressure					$P_{max, op}$	600	kPa						
Testing laboratory		CTCV			www.ctcv.pt								
Test report(s)		001/15			Dated		10-07-2015						
Comments of testing laboratory					Datashet version: 5.01, 2016-03-01								
The performance test of AQR-2 was done under the EN ISO 9806 by CTCV. The test for the collectors AQR-2.2, AQR-2.4 and AQR-2.6 were performed by LNEG					 CENTRO TECNOLÓGICO DA CERÂMICA E DO VIDRO LSE - Laboratório de Sistemas de Energia								
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 Supplementary Information	Licence Number	PSK-003/2018
	Issued	2018-04-06

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
AQR-2.2		2.402	1.549	906	1.729	1.092	615	1.285	762	414	1.402	815	436
AQR-2.4		2.703	1.743	1.020	1.946	1.229	692	1.446	857	466	1.577	917	491
AQR-2.6		2.990	1.928	1.128	2.153	1.360	765	1.600	948	516	1.745	1.015	543
AQR-2		2.265	1.461	855	1.631	1.030	580	1.212	718	391	1.322	769	411
Annual output per m ² gross area		1.127	727	425	811	513	288	603	357	194	658	383	205
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
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)	C
Maximum tested positive load	1333 Pa
Maximum tested negative load	889 Pa
Hail resistance using steel ball (maximum drop height)	m

Energy Labelling Information

	Reference Area, A_{col} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
AQR-2.2	2,13	Collector efficiency (η_{col})	54 %
AQR-2.4	2,40	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 9806:2013.	
AQR-2.6	2,65		
AQR-2	2,01		
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0,734
		First-order coefficient (a_1)	4,60 W/(m ² K)
		Second-order coefficient (a_2)	0,008 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0,91
		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.	