Certificado

Certificate no.
Certificado nº **PSK – 023/2015**

Name and address of certificate holder: *Nome e morada do titular do certificado:*	AQUAFER, Lda. Rua Monte Lobar, Nº436 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–023/2015 (in annex) *Resumo dos resultados dos ensaios realizados segundo a norma EN 12975: Registo Nº PSK-023/2015 (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:*	2018-04-07
and supersedes certificate no: *e substitui o certificado nº:*	-----
Date of issue: *Data de emissão:*	2015-10-14

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

Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	PSK-023/2015
	Issued	2015-10-14

Company holding the	AQUAFER, lda	Country	Portugal	
Brand (optional)		Website	www.aquafer.pt	
Street, street number	Rua Monte Lobar, Nº436	E-mail	geral@aquafer.pt	
Postal Code / City, province	4775-263 Viatodos	Tel/Fax	351	252.963.543

Collector Type (flat plate glazed/un-glazed; evacuate tubular)	Flat plate collector - glazed
Thermal / photo voltaic hybid collector? (PVT collector)	No
Integration in the roof possible ? (manufacturers declaration)	No

Collector name	Aperture area (Aa)	Gross length	Gross width	Gross height	Gross area (AG)	Power output per collector module G = 1000 W/m² Tm-Ta 0 K	10 K	30 K	50 K	70 K
	m²	mm	mm	mm	m²	W	W	W	W	W
AQR-2.2	2,02	2.055	1.037	68	2,13	1.480	1.386	1.188	976	752
AQR-2.4	2,32	2.058	1.165	68	2,40	1.704	1.595	1.367	1.123	865
AQR-2.6	2,53	2.057	1.290	68	2,65	1.854	1.736	1.487	1.223	942
AQR-2	1,90	1.930	1.040	68	2,01	1.395	1.306	1.119	920	708

Performance test method	Glazed liquid heating collector - steady state - indoor		
Performance parameters related to aperture area	η0	a1	a2
Units	-	W/(m²K)	W/(m²K²)
Test results - Flow rate and fluid see note 1	0,734	4,600	0,008

Bi-directional incidence angle modifiers?	No	*Kϑ values are obligatory for 50°.*								
Incidence angle modifiers Kθ(θ)	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
	Kθ(θ)					0,91				0,00
Incidence angle modifier not bi-directional - leave fields blank										

Stagnation temperature - Weather conditions see note 2	Tstg	162,9	°C
Effective thermal capacity	ceff = C/Ag	8,3	kJ/(m²K)
Max. intende operation temperature - see note 3	Tmax,op		°C
Max. operation pressure - see note 3	pmax,op	600	kPa

Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m² aperture area												
Flow rate	kg/(s m²)	0	45	102	159	216	273	-	-	-	-
Pressure drop, ΔP	Pa	0	59	186	352	558	802	-	-	-	-

Optional weather data	Location		Link	
Testing Laboratory	CTCV			
Website	www.ctcv.pt			
Test report id. number	001/15	Date of test report	2015-07-10	
During the test GDIF/GTOT was always between	-	and	-	

Comments of testing laboratory:

The performance test of AQR-2 was done under the EN ISO 9806 by CTCV.

The test for the colectors AQR-2.2, AQR-2.4 and AQR-2.6 were performed by LNEG

Note 1	Flow rate	0,020	kg/(s m²)	Fluid	Water
Note 2	Irradiance, G = 1000 W/m²; Ambient temperature , Ta=30 °C				
Note 3	Given by manufacturer				

CTCV LSE

CENTRO TECNOLÓGICO DA CERÂMICA E DO VIDRO

LSE - Laboratório de Sistemas de Energia

Datasheet version: 4.06, 2014-01-15

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	PSK-023/2015
	Issued	14-10-2015

Annual collector output kWh/module

Collector name	Location and collector temperature (Tm)											
	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	2.273	1.466	858	1.637	1.034	582	1.216	721	392	1.327	772	413
AQR-2.4	2.616	1.687	987	1.883	1.190	670	1.400	830	451	1.527	888	475
AQR-2.6	2.847	1.836	1.074	2.050	1.295	729	1.523	903	491	1.662	966	517
AQR-2	2.141	1.381	808	1.542	974	548	1.146	679	369	1.250	727	389

Collector mounting: Fixed or tracking	Fixed; slope = latitude - 15° (rounded to nearest 5°)

Overview of locations

Location	Latitude °	Gtot kWh/m²	Ta °C	Collector orientation or tracking mode
Athens	38	1.765	18,5	South, 25°
Davos	47	1.714	3,2	South, 30°
Stockholm	59	1.166	7,5	South, 45°
Würzburg	50	1.244	9,0	South, 35°

Gtot	Annual total irradiation on collector plane	kWh/m²
Ta	Mean annual ambient air temperature	°C
Tm	Constant collector operating temperature (mean of in- and outlet temperatures)	°C

The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool ScenoCalc. The collector output is calculated hour by hour according to the efficiency parameters from the Keymark test using constant collector operating temperature (Tm). A detailed description of the calculations is available at http://www.sp.se/en/index/services/solar/ScenoCalc/Sidor/default.aspx.

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Datasheet version: 4.06, 2014-01-15
ScenoCalc version: Ver. 4.06 (Jan, 2014)