

# KEYMARK CERTIFICATE

## SK08055421914

TUV CYPRUS LTD Certifies that the organization

### GSE INTEGRATION

**Address:** 155-159 Rue Du Docteur Bauer  
93400 Saint Ouen  
France

**Supplies:** PVT Air Heating Solar Collectors

**In compliance with:** EN 12975-1:2006+A1:2010 & EN ISO 9806:2017

**Certified Product:** Solar Hybrid Collector

**Trade Mark:** GSE QCELLS

**Test Results:** Annex to certificate

**Certification scheme:** In order to grant this certificate, TUV CYPRUS has visited the manufacturing site and verified the implementation of the quality management system. TUV CYPRUS performs these tasks periodically while the certificate has not been cancelled, in accordance with the Product Certification Regulations and the Rules for Authorization to use Conformity Mark for Solar Collectors.



SOLAR KEYMARK  
CERTIFICATION BODY  
CEN 033

Accredited by



Certificate No. 885

TUV CYPRUS (TUV NORD) LTD  
Certification Body



Nicosia , 27/07/2019  
Initial Certification : 27/07/2019  
Valid until : 26/03/2022





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<b>Annex to Solar Keymark Certificate</b>					<b>Licence Number</b>		SK08055421914							
<b>Summary of EN ISO 9806 Test Results</b>					<b>Issued</b>		2019-07-27							
<b>Collector test standard</b>		EN ISO 9806												
<b>Licence holder</b>		GSE INTEGRATION			<b>Country</b>		FRANCE							
<b>Brand (optional)</b>		QCELLS Q.PEAK BLK-G4.1 295			<b>Web</b>		www.gseintegration.com							
<b>Street, Number</b>		155-159 Rue Du Docteur Bauer			<b>E-mail</b>		contact@gseintegration.com							
<b>Postcode, City</b>		93400, Saint Ouen, France			<b>Tel</b>		+33 1 70 32 08 00							
<b>Collector Type</b>					Flat plate collector, unglazed									
<b>Collector name</b>	GSE QCELLS	<b>Gross area (A<sub>g</sub>)</b> m <sup>2</sup>	<b>Gross length</b> mm	<b>Gross width</b> mm	<b>Gross height</b> mm	<b>Power output per collector</b> G <sub>b</sub> = 850 W/m <sup>2</sup> ; G <sub>d</sub> = 150 W/m <sup>2</sup> ; θ <sub>m</sub> - θ <sub>a</sub> = 2K u (m/s)								
						1.0 W	1.5 W	3.0 W						
		1,67	1.670	1.000	32	740	718	649						
<b>Power output per m<sup>2</sup> gross area</b>						443	430	389						
<b>Performance parameters test method</b>					Steady state - indoor									
<b>Performance parameters (related to AG)</b>					η <sub>0,hem</sub>	b1	b2	bu	ε/α					
<b>Units</b>					-	W/(m <sup>2</sup> K)	Ws/(m <sup>2</sup> K)	s/m	-					
<b>Test results</b>					0,558	0,977	1,777	0,043	0,850					
<b>Incidence angle modifier test method</b>					Steady state - indoor									
<b>Bi-directional incidence angle modifiers</b>					No									
<b>Incidence angle modifier</b>					Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
<b>Transversal</b>					K <sub>GT, coll</sub>	0,98	0,97	0,94	0,91	0,85	0,76	0,62	0,38	0,00
<b>Longitudinal</b>					K <sub>GT, coll</sub>	0,98	0,97	0,94	0,91	0,85	0,76	0,62	0,38	0,00
<b>Fluid for testing</b>					Air									
<b>Flow rate for testing (per gross area, AG)</b>					dm/dt	0,030	kg/(sm <sup>2</sup> )							
<b>Maximum temperature difference for thermal performance calculations</b>					(θ <sub>m</sub> -θ <sub>a</sub> ) <sub>max</sub>	288	K							
<b>Standard stagnation temperature (G = 1000 W/m<sup>2</sup>; θ<sub>a</sub> = 30 °C)</b>					θ <sub>stg</sub>	82,7	°C							
<b>Effective thermal capacity (per gross area, AG)</b>					C/m <sup>2</sup>	10,1	kJ/(Km <sup>2</sup> )							
<b>Maximum operating temperature</b>					θ <sub>max, op</sub>	85	°C							
<b>Maximum operating pressure</b>					p <sub>max, op</sub>	5,4	kPa							
<b>Testing laboratory</b>					CTCV									
<b>Test report(s)</b>					Report 01/19		Report 02/19		http://www.ctcv.pt					
									Dated					
									9/10/2018					
									9/10/2018					
<b>Comments of testing laboratory</b>														
<i>Example comment</i>														
Thermal performance parameters are given for the PV-module working with max. electrical power output ('MPP mode')														
												<p>CTCV CENTRO TECNOLÓGICO DA CERÂMICA E DO VIDRO Rua Coronel Jorge Simão - 5026 - 302 COIMBRA</p>		

Datasheet version: 5.01, 2015-07-20

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Annex to Solar Keymark Certificate	Licence Number	SK08055421914
Supplementary Information	Issued	2019-07-27

Annual collector output in kWh/collector at mean fluid temperature $\vartheta_m$ , based on ISO 9806 Test Results													
Collector name	$\vartheta_m$	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
GSE QCELLS		751	334	148	571	317	167	402	209	107	456	245	136
Annual output per m <sup>2</sup> gross area		450	200	89	342	190	100	241	125	64	273	146	82
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m <sup>2</sup>			1714 kWh/m <sup>2</sup>			1166 kWh/m <sup>2</sup>			1244 kWh/m <sup>2</sup>		
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  $\vartheta_m$  (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 (July 2015). A detailed description of the calculations is available at [www.solarkeymark.org/scenocalc](http://www.solarkeymark.org/scenocalc)

Additional Information		
Collector heat transfer medium		Air
Hybrid Thermal and Photo Voltaic collector		Yes
The collector is deemed to be suitable for roof integration		Yes
The collector was tested successfully according to EN ISO 9806 under the following conditions:		
Climate class (A, B or C)	A	--
Positive Mechanical Load	2500	Pa
Negative Mechanical Load	-	Pa
Hail resistance using steel ball (maximum drop height)	1,4	m

Energy Labelling Information		
Reference Area, $A_{ref}$ (m <sup>2</sup> )	Data required for CDR (EU) No 811/2013 - Reference Area $A_{sol}$	
GSE QCELLS	1,67	Collector efficiency ( $\eta_{col}$ ) 42 %
<i>Remark: Collector efficiency (<math>\eta_{col}</math>) 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<sup>2</sup>, expressed in % and rounded to the nearest integer. Deviating from the regulation <math>\eta_{col}</math> is based on reference area (<math>A_{sol}</math>) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806.</i>		
Data required for CDR (EU) No 812/2013 - Reference Area $A_{sol}$		
	Zero-loss efficiency ( $\eta_0$ )	0,534 --
	First-order coefficient ( $a_1$ )	2,75 W/(m <sup>2</sup> K)
	Second-order coefficient ( $a_2$ )	0,000 W/(m <sup>2</sup> K <sup>2</sup> )
	Incidence angle modifier IAM (50°)	0,85 --
<i>Remark: The data given in this section are related to collector reference area (<math>A_{sol}</math>) 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>		