

# AENOR

## Keymark Certificate Solar thermal energy



078/000238

AENOR certifies that the organization

### CRSOLAR - UNIPessoal, L.D.A.

registered office RUA DA RIBEIRA, S/N - 7700-235 ROSÁRIO (Almodôvar - Portugal)

supplies Solar collectors

in compliance with UNE-EN 12975-1:2006 (EN 12975-1:2006)

Trade Mark CRS VS2.2, CRS VS2.6  
Technical information Specified in Annexes to the Certificate

Production site 606111-517470

Certification scheme In order to grant this Certificate, AENOR has tested the product and has verified the quality system implemented for its manufacture. AENOR performs these tasks periodically while the Certificate has not been cancelled, in accordance with Specific Rules RP 078.01.

This certificate supersedes 078/000238, dated 2015-05-13

First issued on 2015-05-13  
Modified on 2017-11-23  
Validity date 2020-05-13


Rafael GARCÍA MEIRO  
Chief Executive Officer

Original Electronic Certificate

AENOR INTERNACIONAL S.A.U.  
Génova, 6. 28004 Madrid. España  
Tel. 91 432 60 00.- www.aenor.com

Product certification body accredited by ENAC, number 01/C-PR002.078



Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate							Licence Number		078/000238		
							Issued		2017-11-23		
Company holding the				CRSOLAR - UNIPESOAL, L.D.A.			Country		Portugal		
Brand (optional)							Website				
Street, street number				DA RIBEIRA, S/N			E-mail		consprata@gmail.com		
Postal Code / City, province				7700-235 ROSÁRIO (Almodôvar - Portugal)			Tel/Fax		34 351968808079		
Collector Type (flat plate glazed/un-glazed; evacuate tubular)							Flat plate collector - glazed				
Thermal / photo voltaic hybrid collector? (PVT collector)							No				
Integration in the roof possible ? (manufacturers declaration)							Yes				
Collector name	Aperture area (Aa) m <sup>2</sup>	Gross length mm	Gross width mm	Gross height mm	Gross area (AG) m <sup>2</sup>	Power output per collector module					
						G = 1000 W/m <sup>2</sup>					
						Tm-Ta					
						0 K W	10 K W	30 K W	50 K W	70 K W	
CRS VS2.2	2,00	2.089	1.069	98	2,23	1.544	1.466	1.293	1.098	880	
CRS VS2.6	2,33	2.089	1.234	98	2,58	1.799	1.708	1.506	1.279	1.025	
Performance test method							Glazed liquid heating collector - steady state - indoor				
Performance parameters related to aperture							η <sub>0</sub> a <sub>1</sub> a <sub>2</sub>				
Units							- W/(m <sup>2</sup> K) W/(m <sup>2</sup> K <sup>2</sup> )				
Test results - Flow rate and fluid see note 1							0,772 3,762 0,014				
Bi-directional incidence angle							No <i>Kθ values are obligatory for 50°.</i>				
Incidence angle modifiers Kθ(θ)							Angle 10° 20° 30° 40° 50° 60° 70° 80° 90°				
							Kθ(θ) 0,96 0,00				
Incidence angle modifier not bi-directional - leave fields blank											
Stagnation temperature - Weather conditions see note 2							T <sub>stg</sub>		214,8 °C		
Effective thermal capacity							c <sub>eff</sub> = C/Ag		4,36 kJ/(m <sup>2</sup> K)		
Max. intended operation temperature - see note 3							T <sub>max,op</sub>		200 °C		
Max. operation pressure - see note 3							p <sub>max,op</sub>		1000 kPa		
Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m <sup>2</sup> aperture area											
Flow rate	kg/(s m <sup>2</sup> )	0,000	0,0133	0,0300	0,0450	0,0600	0,0767				
Pressure drop, ΔP	Pa	0	80	230	420	670	1000				
Optional weather data		Location				Link					
Testing Laboratory		Fundación CENER-CIEMAT, LEST									
Website		www.cener.com									
Test report id. number		30.2367.0 / 30.2367.0-4-1 30.2367.0-5-1 / 30.2367.0-6-1				Date of test report		2014/10/29			
During the test GDIF/GTOT was always between							0,2		0,21		0,2
Comments of testing laboratory:											
Note 1	Flow rate	0,033	kg/(s m <sup>2</sup> )	Fluid	Water						
Note 2	Irradiance, G = 1000 W/m <sup>2</sup> ; Ambient temperature, T <sub>a</sub> =30 °C										
Note 3	Given by manufacturer										
							 <b>CENER</b> <small>www.cener.com</small>				
							Datasheet version: 4.06, 2014-01-15				
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Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	078/000238
	Issued	2017-11-23

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		
CRS VS2.2	2.508	1.773	1.138	1.891	1.288	786	1.400	900	529	1.523	976	564		
CRS VS2.6	2.922	2.066	1.326	2.203	1.500	916	1.631	1.049	617	1.774	1.137	657		

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

Overview of locations				
Location	Latitude °	Gtot kWh/m <sup>2</sup>	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/m <sup>2</sup>
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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	ScenoCalc version: Ver. 4.06 (Jan, 2014)