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IGTE

Annex to Solar Keymark Certificate		Licence Number	011-7S2957 F
		Date issued	2019-11-18
		Issued by	DIN CERTCO

Licence holder	ABC SOLAR SA DE CV	Country	Mexico
Brand (optional)		Web	http://www.casolar.com.mx
Street, Number	Periférica Paseo de la Repúplica no. 1040	E-mail	ventas@casolar.com.mx
Postcode, City	Col. Hospitales de Don Vasco, Morelia, Michoacan	Tel	0052 (443)3150880

Collector Type	Flat plate collector

Collector name	Gross area (A_G)	Gross length	Gross width	Gross height	Power output per collector Gb = 850 W/m2, Gd = 150 W/m2 & u = 1.3 m/s $\vartheta_m - \vartheta_a$					
					0 K	10 K	30 K	50 K	70 K	107 K
	m²	mm	mm	mm	W	W	W	W	W	W
CASOLAR ABSOL HIGH SELECTIVE 2.0	1.95	1 884	1 035	77	1 339	1 263	1 097	915	715	301
Power output per m² gross area					687	648	563	469	367	154

Performance parameters test method	Quasi dynamic									
Performance parameters (related to A_G)	η0, b	a1	a2	a3	a4	a5	a6	a7	a8	Kd
Units	-	W/(m²K)	W/(m²K²)	J/(m³K)	-	J/(m²K)	s/m	W/(m²K⁴)	W/(m²K⁴)	-
Test results	0.695	3.80	0.011	0.000	0.00	28 820	0.000	0.00	0.0	0.92

Incidence angle modifier test method		Quasi dynamic - outdoor								
Incidence angle modifier	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal	$K_{\theta T,coll}$	0.99	0.98	0.97	0.96	0.93	0.85	0.60	0.30	0.00
Longitudinal	$K_{\theta L,coll}$	0.99	0.98	0.97	0.96	0.93	0.85	0.60	0.30	0.00

Heat transfer medium for testing		Water-Glycole	
Flow rate for testing (per gross area, A_G)		dm/dt	0.020 kg/(sm²)
Maximum temperature difference during thermal performance test		$(\vartheta_m-\vartheta_a)_{max}$	77 K
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)		ϑ_{stg}	200 °C
Maximum operating temperature		ϑ_{max_op}	150 °C
Maximum operating pressure		$p_{max,op}$	1000 kPa
Testing laboratory	Institut für Gebäudeenergetik, Thermotechnik und Energiespeicherung (IGTE)	http://www.igte.uni-stuttgart.de	
Test report(s)	18COL1431OEM01 17COL1372Q/1OEM01 18COL1430	Dated	18.11.2019 18.11.2019 14.11.2018

Comments of testing laboratory	Datasheet version: 6.1, 2019-09-26
Thermal performance parameters are given from 18COL1430	TZS Forschungs- und Testzentrum für Solaranlagen, Institut für Thermodynamik und Wärmetechnik, Universität Stuttgart, Pfaffenwaldring 6, 70550 Stuttgart (Vaihingen)

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Supplementary Information	Issued	2019-11-18

Annual collector output in kWh/collector at mean fluid temperature ϑ_m

Standard Locations	Athens			Davos			Stockholm			Würzburg		
Collector name / 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
CASOLAR ABSOL HIGH SELECTIVE 2.0	2 092	1 407	851	1 540	1 002	577	1 139	699	391	1 246	756	415
Annual output per m² gross area	1 073	722	437	790	514	296	584	358	200	639	388	213
Annual efficiency, η_a	61%	41%	25%	48%	32%	18%	50%	31%	17%	51%	31%	17%
Fixed or tracking collector	Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane	1765 kWh/m²			1630 kWh/m²			1166 kWh/m²			1244 kWh/m²		
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 ϑm (mean of in- and outlet temperatures). The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool Scenocalc Ver. 6.1 (September 2019). 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)				A	--
G (W/m²) >	1000	ϑ_a (°C) >	20	H_X (MJ/m²) >	600
Maximum tested positive load				3000	Pa
Maximum tested negative load				3000	Pa
Hail resistance using steel ball (maximum drop height)				1.2	m

Additional collector attribute(s)

- ☐ Using external power source(s) for normal operation
- ☐ Active or passive measure(s) for self-protection
- ☐ Co-generating thermal and electrical power
- ☐ Façade collector(s)

Energy Labelling Information

	Reference Area, A_{sol} (m²)
CASOLAR ABSOL HIGH SELECTIVE 2.0	1.95

Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}

Collector efficiency (η_{col})	52%

Remark: Collector efficiency (ηcol) 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/m², expressed in % and rounded to the nearest integer. Deviating from the regulation ηcol is based on reference area (Asol) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2017.

Additional Informative Technical Data

Hydraulic Designation Code	Aperature Area, A_a (m²)
8-VH-1234S-A:14,1745-C:20.6,1093-NoD	1.83

Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}

Zero-loss efficiency (η_0)	0.69	--
First-order coefficient (a_1)	3.80	W/(m²K)
Second-order coefficient (a_2)	0.011	W/(m²K²)
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.

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