

Annex to Solar Keymark Certificate					Licence Number		011-7S3012 F							
					Date issued		2021-04-20							
					Issued by		ISFH CalTeC							
Licence holder		Vistacon Energietechnik GmbH			Country		Germany							
Brand (optional)					Web		www.vistacon.de							
Street, Number		Jellinghausstrasse 102			E-mail		info@vistacon.de							
Postcode, City		D- 32139 Spenge			Tel		+49 5225/8749098							
Collector Type					Flat plate collector									
Collector name					Power output per collector									
					$G_b = 850 \text{ W/m}^2, G_d = 150 \text{ W/m}^2 \text{ \& } u = 1.3 \text{ m/s}$ $\vartheta_m - \vartheta_a$									
					0 K	10 K	30 K	50 K	70 K	99 K				
					m ²	mm	mm	mm	mm	mm				
VISTAcollect flat 2.4					2.34	2 043	1 143	80	1 759	1 663	1 460	1 244	1 014	656
Power output per m² gross area					753	712	625	533	434	281				
Performance parameters test method		Quasi dynamic												
Performance parameters (related to A_G)		η_0, b	a1	a2	a3	a4	a5	a6	a7	a8	Kd			
Units		-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	J/(m ² K)	s/m	W/(m ² K ⁴)	W/(m ² K ⁴)	-			
Test results		0.754	4.05	0.007			5 404				0.99			
Incidence angle modifier test method		Quasi dynamic - outdoor												
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°			
Transversal		K _{θT, coll}	1.00	0.99	0.98	0.96	0.92	0.86	0.73	0.33	0.00			
Longitudinal		K _{θL, coll}	1.00	0.99	0.98	0.96	0.92	0.86	0.73	0.33	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 during thermal performance test					$(\vartheta_m - \vartheta_a)_{max}$		69		K					
Standard stagnation temperature (G = 1000 W/m²; $\vartheta_a = 30 \text{ }^\circ\text{C}$)					ϑ_{stg}		177		°C					
Maximum operating temperature					$\vartheta_{max, op}$		-		°C					
Maximum operating pressure					p _{max, op}		1000		kPa					
Testing laboratory		ISFH CalTeC			http://www.isfh.de									
Test report(s)		10COL871 (ITW report) 046-21/B			Dated		11.10.2010 20.04.2021							
Comments of testing laboratory					Datasheet version: 6.1, 2019-07-11									
The tests have been performed according to EN 12975-2:2006.					Institut für Solarenergieforschung GmbH Am Ohrberg 1 D-31880 Emmelriede Tel.: 05151/999-100 Fax: 05151/999-500									
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Supplementary Information		011-7S3012 F											
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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
VISTAcollect flat 2.4		2 843	1 978	1 278	2 118	1 436	898	1 566	1 000	600	1 716	1 087	641
Annual output per m ² gross area		1 217	847	547	907	615	384	671	428	257	735	465	275
Annual efficiency, η_a		69%	48%	31%	56%	38%	24%	58%	37%	22%	59%	37%	22%
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m ²			1630 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. 6.1 (July 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)		B										--	
G (W/m ²) >	900	ϑ_a (°C) >		15	H_x (MJ/m ²) >			540					
Maximum tested positive load		3000										Pa	
Maximum tested negative load		2000										Pa	
Hail resistance using steel ball (maximum drop height)		2										m	
Additional collector attribute(s)													
<input type="checkbox"/> Using external power source(s) for normal operation <input type="checkbox"/> Active or passive measure(s) for self-protection <input type="checkbox"/> Co-generating thermal and electrical power <input type="checkbox"/> Façade collector(s)													
Energy Labelling Information						Additional Informative Technical Data							
	Reference Area, A_{sol} (m ²)	Hydraulic Designation Code					Aperture Area, A_a (m ²)						
VISTAcollect flat 2.4	2.34	1-VH-12S-A:11.3,16250					2.13						
Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}						Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}							
Collector efficiency (η_{col})	58%					Zero-loss efficiency (η_0)	0.75					--	
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 9806:2017.						First-order coefficient (a_1)	4.05					W/(m ² K)	
						Second-order coefficient (a_2)	0.007					W/(m ² K ²)	
						Incidence angle modifier IAM (50°)	0.93					--	
						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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