



Annex to Solar Keymark Certificate					Licence Number		011-7S3133 P							
					Date issued		2022-09-01							
					Issued by		DIN CERTCO							
Licence holder			Logic Swiss AG		Country		Switzerland							
Brand (optional)					Web		logic.swiss							
Street, Number			Seestrasse 61		E-mail		contact@logic.swiss							
Postcode, City			6052 Hergiswil		Tel		+41 41 632 45 88							
Collector Type					WISC (Wind and/or infrared sensitive collector)									
Collector name					Gross area (A_G)	Gross length	Gross width	Gross height	Power output per collector					
									$G_b = 850 \text{ W/m}^2, G_d = 150 \text{ W/m}^2 \text{ \& } u = 1.3 \text{ m/s}$ $\vartheta_m - \vartheta_a$					
					m ²	mm	mm	mm	0 K	10 K	30 K	50 K	70 K	100 K
									W	W	W	W	W	W
hero.flat					0.21	560	380	45	98	57	0	0	0	0
Power output per m ² gross area									465	272	0	0	0	0
Performance parameters test method			Steady state - outdoor											
Performance parameters (related to A_G)			$\eta_{0,b}$	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			0.659	20.51	0.132	1.511	2.05	9'668	0.092	0.82	0.0E+00	0.94		
Incidence angle modifier test method			Steady state - outdoor											
Incidence angle modifier			Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°		
Transversal			$K_{\theta T, coll}$	1.00	1.00	1.00	0.99	0.98	0.94	0.83	0.59	0.00		
Longitudinal			$K_{\theta L, coll}$	1.00	1.00	1.00	0.99	0.98	0.94	0.83	0.59	0.00		
Heat transfer medium for testing			Water-Glycole											
Flow rate for testing (per gross area, A_G)			dm/dt			0.020		kg/(sm ²)						
Maximum temperature difference during thermal performance test			$(\vartheta_m - \vartheta_a)_{max}$			29		K						
Standard stagnation temperature ($G = 1000 \text{ W/m}^2; \vartheta_a = 30 \text{ °C}$)			ϑ_{stg}			70		°C						
Maximum operating temperature			$\vartheta_{max, op}$			70		°C						
Maximum operating pressure			$p_{max, op}$			25		kPa						
Testing laboratory			SPF Testing, CH-8640 Rapperswil, Switzerland					https://www.spf.ch						
Test report(s)			C1890 21-019/A-REP1-rev0					Dated		26.08.2022 15.01.2022				
Comments of testing laboratory			Draft Ver. 6.2 (22.09.2021)											
<p>Due to the size of a single element, an array of six collectors connected in series was used for all testing. The parameters are indicated for single elements operating in MPP mode. The collectors have to be installed solely in a specific draining system providing protection from high pressure and from freezing.</p>			 INSTITUT FÜR SOLARTECHNIK 											
DIN CERTCO • Alboinstraße 56 • 12103 Berlin, Germany Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de														

Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S3133 P
	Issued	2022-09-01

Gross Thermal Yield 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
hero.flat		84			16			22			24		
Gross Thermal Yield per m ² gross area		401			75			106			116		
Annual efficiency, η_a		23%			5%			9%			9%		
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 Draft Ver. 6.2 (22.09.2021). A detailed description of the calculations is available at http://www.estif.org/solarkeymarknew/													

Additional Information			
Collector heat transfer medium	Water		
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/m ²) >	1000	ϑ_a (°C) >	20
		H_x (MJ/m ²) >	600
Maximum tested positive load	2400		Pa
Maximum tested negative load	2400		Pa
Hail resistance using ice balls (diameter)	35		mm

Additional collector attribute(s)			
Using external power source(s) for normal operation	No	Active or passive measure(s) for self-protection	Yes
Co-generating thermal and electrical power	Yes	Façade collector(s)	Yes

Energy Labelling Information		Additional Informative Technical Data	
	Reference Area, A_{sol} (m ²)	Hydraulic Designation Code	Aperture Area, A_a (m ²)
hero.flat	0.21	40-V-1234S-A:8,452-17.5,380-D	0.21

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})	-46%	Zero-loss efficiency (η_0)	0.47
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)	17.94
		Second-order coefficient (a_2)	0.132
		Incidence angle modifier IAM (50°)	0.97
		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.	