


Annex to Solar Keymark Certificate					Licence Number		011-7S2707 F				
					Date issued		2021-09-15				
					Issued by		DIN CERTCO				
Licence holder		Fondital S.p.A.			Country		Italia				
Brand (optional)					Web		www.fondital.com				
Street, Number		Via Cerreto, 40			E-mail		info@fondital.it				
Postcode, City		25079 Vobarno			Tel		+39 0365 878 625				
Collector Type					Flat plate collector						
Collector name					Power output per collector						
					$G_b = 850 \text{ W/m}^2$, $G_d = 150 \text{ W/m}^2$ & $u = 1.3 \text{ m/s}$ $\vartheta_m - \vartheta_a$						
					0 K	10 K	30 K	50 K	70 K	110 K	
					m ²	mm	mm	mm	W	W	W
VLC 25					2.570	2077	1238	100	1746	1658	1464
Power output per m² gross area					679	645	569	484	389	171	
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		0.684	3.307	0.012	0.000	0.00	10350	0.000	0.00	0.0	0.956
Incidence angle modifier test method		Quasi dynamic - outdoor									
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal		$K_{\theta T, coll}$	1.00	1.00	0.99	0.97	0.93	0.84	0.64	0.32	0.00
Longitudinal		$K_{\theta L, coll}$	1.00	1.00	0.99	0.97	0.93	0.84	0.64	0.32	0.00
Heat transfer medium for testing					Water						
Flow rate for testing (per gross area, A_G)					dm/dt		0.020		kg/(sm²)		
Maximum temperature difference during thermal performance test					$(\vartheta_m - \vartheta_a)_{max}$		80		K		
Standard stagnation temperature (G = 1000 W/m²; $\vartheta_a = 30 \text{ }^\circ\text{C}$)					ϑ_{stg}		190		°C		
Maximum operating temperature					$\vartheta_{max, op}$		n.a.		°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)		17COL1386OEM02 17COL1387QOEM02					Dated		08.09.2021 08.09.2021		
Comments of testing laboratory					Datasheet version: 6.1, 2019-09-26						
Documented performance parameters are taken from test report 17COL1386OEM02					 TzS Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 6, 70560 Stuttgart (Vaihingen)						
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	011-7S2707 F
	Issued	2021-09-08

Annual collector output in kWh/collector at mean fluid temperature ϑ_m													
Collector name	Standard Locations	Athens			Davos			Stockholm			Würzburg		
	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
VLC 25		2 812	1 987	1 277	2 126	1 450	893	1 563	1 010	599	1 707	1 095	640
Annual output per m ² gross area		1 094	773	497	827	564	347	608	393	233	664	426	249
Annual efficiency, η_a		62%	44%	28%	51%	35%	21%	52%	34%	20%	53%	34%	20%
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 (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	Yes				
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			2750	Pa	
Maximum tested negative load			2250	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)
VLC 25	2.57	6,6-V-12S-A:7.2,1910-C:20.4,1258	2.30

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})	53%	Zero-loss efficiency (η_0)	0.68
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)	3.31
		Second-order coefficient (a_2)	0.012
		Incidence angle modifier IAM (50°)	0.94
		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.	