



Annex to Solar Keymark Certificate					Licence Number		OEM 10093.2.3							
					Date issued		2022-10-10							
					Issued by		DQS Hellas							
Licence holder		RIELLO S.p.A			Country		Italy							
Brand (optional)		SYLBER			Web		www.riello.com							
Street, Number		Via Ing. Pilade Riello, 7			E-mail									
Postcode, City		37045, Legnago (VR)			Tel		+39 0442 630279							
Collector Type					Flat plate collector									
Collector name					Power output per collector									
					G <sub>b</sub> = 850 W/m <sup>2</sup> , G <sub>d</sub> = 150 W/m <sup>2</sup> & u = 1.3 m/s θ <sub>m</sub> - θ <sub>a</sub>									
					0 K	10 K	30 K	50 K	70 K	85 K				
					m <sup>2</sup>	mm	mm	mm	mm	mm	mm			
CFS-20/4 A					2,00	1.625	1.235	85	1.524	1.459	1.296	1.090	841	624
CFS-25/4 A					2,50	2.020	1.235	85	1.905	1.823	1.620	1.363	1.052	780
Power output per m <sup>2</sup> gross area					762	729	648	545	421	312				
Performance parameters test method		Steady state - outdoor												
Performance parameters (related to A <sub>G</sub> )		η <sub>0, b</sub>	a1	a2	a3	a4	a5	a6	a7	a8	Kd			
Units		-	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K <sup>2</sup> )	J/(m <sup>3</sup> K)	-	J/(m <sup>2</sup> K)	s/m	W/(m <sup>2</sup> K <sup>4</sup> )	W/(m <sup>2</sup> K <sup>4</sup> )	-			
Test results		0,777	2,99	0,027	0,000	0,00	0	0,000	0,00	0,0E+00	0,87			
Incidence angle modifier test method		Steady state - outdoor												
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°			
Transversal		K <sub>θT, coll</sub>	1,00	1,00	0,98	0,96	0,91	0,82	0,68	0,43	0,00			
Longitudinal		K <sub>θL, coll</sub>	1,00	1,00	0,98	0,96	0,91	0,82	0,68	0,43	0,00			
Heat transfer medium for testing					Water									
Flow rate for testing (per gross area, A <sub>G</sub> )					dm/dt	0,020	kg/(sm <sup>2</sup> )							
Maximum temperature difference during thermal performance test					(θ <sub>m</sub> -θ <sub>a</sub> ) <sub>max</sub>	55,14	K							
Standard stagnation temperature (G = 1000 W/m <sup>2</sup> ; θ <sub>a</sub> = 30 °C)					θ <sub>stg</sub>	180	°C							
Maximum operating temperature					θ <sub>max op</sub>	-	°C							
Maximum operating pressure					p <sub>max, op</sub>	1000	kPa							
Testing laboratory		NCSR Demokritos / Solar & other Energy System					www.solar.demokritos.gr							
Test report(s)		4272 DE1 4273 DE1 4274 DQ1					Dated		20/7/2020 20/7/2020 6/8/2020					
Comments of testing laboratory					Datasheet version: 6.1, 2019-09-26									
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	OEM 10093.2.3
	Issued	2022-10-10

Annual collector output in kWh/collector at mean fluid temperature $\vartheta_m$													
Collector name	Standard Locations	Athens			Davos			Stockholm			Würzburg		
	$\vartheta_m$	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
CFS-20/4 A		2.393	1.723	1.068	1.845	1.248	714	1.355	878	492	1.470	947	522
CFS-25/4 A		2.991	2.154	1.335	2.306	1.560	893	1.694	1.097	615	1.837	1.184	652
Annual output per m <sup>2</sup> gross area		1.197	862	534	923	624	357	677	439	246	735	474	261
Annual efficiency, $\eta_a$		68%	49%	30%	57%	38%	22%	58%	38%	21%	59%	38%	21%
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m <sup>2</sup>			1630 kWh/m <sup>2</sup>			1166 kWh/m <sup>2</sup>			1244 kWh/m <sup>2</sup>		
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  $\vartheta_m$  (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	No				
The collector was tested successfully under the following conditions:					
Climate class (A+, A, B or C)	A		--		
G (W/m <sup>2</sup> ) >	1000	$\vartheta_a$ (°C) >	20	H <sub>x</sub> (MJ/m <sup>2</sup> ) >	600
Maximum tested positive load	3000		Pa		
Maximum tested negative load	3000		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 <sub>sol</sub> (m <sup>2</sup> )	Hydraulic Designation Code	Aperture Area, A <sub>a</sub> (m <sup>2</sup> )
CFS-20/4 A	2,00	12-VH-1234S-A:7.2,1525-C:20.6,1255-	1,91
CFS-25/4 A	2,50	12-VH-1234S-A:7.2,1920-C:20.6,1255-	2,39

Data required for CDR (EU) No 811/2013 - Reference Area A <sub>sol</sub>		Data required for CDR (EU) No 812/2013 - Reference Area A <sub>sol</sub>	
Collector efficiency ( $\eta_{col}$ )	60%	Zero-loss efficiency ( $\eta_0$ )	0,76
Remark: Collector efficiency ( $\eta_{col}$ ) 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 <sup>2</sup> , expressed in % and rounded to the nearest integer. Deviating from the regulation $\eta_{col}$ is based on reference area (A <sub>sol</sub> ) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2017.		First-order coefficient (a <sub>1</sub> )	2,99
		Second-order coefficient (a <sub>2</sub> )	0,027
		Incidence angle modifier IAM (50°)	0,91
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Remark: The data given in this section are related to collector reference area (A <sub>sol</sub> ) 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.			