


<b>Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results</b>					Licence Number		011-7S2848 F							
					Date issued		2018-03-22							
					Issued by									
Licence holder		Riello S.p.A.			Country		Italy							
Brand (optional)		Beretta			Web		marketing@berettaclima.it							
Street, Number		Via Ing. Pilade Riello, 7			E-mail		www.berettaclima.it							
Postcode, City		IT-37045 Legnago (VR)			Tel		+39 0341 277111							
Collector Type					Flat plate collector, glazed									
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> θ <sub>m</sub> - θ <sub>a</sub>									
					0 K	10 K	30 K	50 K	70 K	130 K				
					m <sup>2</sup>	mm	mm	mm	W	W	W	W	W	W
<b>SCF-25/4 B</b>					2.30	2'004	1'148	85	1'726	1'632	1'437	1'231	1'014	296
Power output per m <sup>2</sup> gross area					750	709	625	535	441	129				
Performance parameters test method					Steady state - outdoor									
Performance parameters (related to AG)					η <sub>0,hem</sub>	a <sub>1</sub>	a <sub>2</sub>							
Units					-	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K <sup>2</sup> )							
Test results					0.750	4.000	0.006							
Incidence angle modifier test method					Steady state - outdoor									
Bi-directional incidence angle modifiers					Yes									
Incidence angle modifier					Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal					K <sub>GT, coll</sub>	1.00	1.00	0.99	0.98	0.94	0.87	0.74	0.48	0.00
Longitudinal					K <sub>θL, coll</sub>	1.00	1.00	0.99	0.98	0.95	0.88	0.75	0.49	0.00
Heat transfer medium for testing					Water-Glycole									
Flow rate for testing (per gross area, A <sub>G</sub> )					dm/dt		0.020	kg/(sm <sup>2</sup> )						
Maximum temperature difference for thermal performance calculations					(θ <sub>m</sub> -θ <sub>a</sub> ) <sub>max</sub>		130	K						
Standard stagnation temperature (G = 1000 W/m <sup>2</sup> ; θ <sub>a</sub> = 30 °C)					θ <sub>stg</sub>		197	°C						
Effective thermal capacity, incl. fluid (per gross area, A <sub>G</sub> )					C/m <sup>2</sup>		5.48	kJ/(Km <sup>2</sup> )						
Maximum operating temperature					θ <sub>max, op</sub>		--	°C						
Maximum operating pressure					P <sub>max, op</sub>		1000	kPa						
Testing laboratory					SPF, CH-8640 Rapperswil				www.spf.ch					
Test report(s)					C1755LPEN C1755QPEN				Dated		21.03.2018			
											21.03.2018			
Comments of testing laboratory					Datasheet version: 5.01, 2016-03-01									
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<b>Annex to Solar Keymark Certificate Supplementary Information</b>	<b>Licence Number</b>	<b>011-7S2848 F</b>
	<b>Issued</b>	<b>2018-03-22</b>

<b>Annual collector output in kWh/collector at mean fluid temperature <math>\vartheta_m</math>, based on EN ISO 9806:2013 test results</b>													
Standard Locations		Athens			Davos			Stockholm			Würzburg		
Collector name	$\vartheta_m$	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
SCF-25/4 B		2'751	1'919	1'257	2'060	1'415	909	1'517	978	600	1'652	1'055	638
Annual output per m <sup>2</sup> gross area		1'195	834	546	895	615	395	659	425	261	718	458	277
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m <sup>2</sup>			1714 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. 5.01 (March 2016). A detailed description of the calculations is available at [www.solarkeymark.org/scenocalc](http://www.solarkeymark.org/scenocalc)

#### Additional Information

Collector heat transfer medium	Water-Glycole	
Hybrid Thermal and Photo Voltaic collector	No	
The collector is deemed to be suitable for roof integration	Yes	
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:		
Climate class (A, B or C)	A	--
Maximum tested positive load	2400	Pa
Maximum tested negative load	2400	Pa
Hail resistance using ice balls (diameter)	45	mm

#### Energy Labelling Information

	Reference Area, $A_{sol}$ (m <sup>2</sup> )	Data required for CDR (EU) No 811/2013 - Reference Area $A_{sol}$	
SCF-25/4 B	2.30	Collector efficiency ( $\eta_{col}$ )	58 %
		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 ( $A_{sol}$ ) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2013.	
		Data required for CDR (EU) No 812/2013 - Reference Area $A_{sol}$	
		Zero-loss efficiency ( $\eta_0$ )	0.750 --
		First-order coefficient ( $a_1$ )	4.00 W/(m <sup>2</sup> K)
		Second-order coefficient ( $a_2$ )	0.006 W/(m <sup>2</sup> K <sup>2</sup> )
		Incidence angle modifier IAM (50°)	0.96 --
		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.	