



Annex to Solar Keymark Certificate						Licence Number		011-7S2858 R					
Supplementary Information						Issued		2020-02-03					
Annual collector output in kWh/collector at mean fluid temperature $\vartheta_m$													
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
ONS-AC-10		1 203			976			719			780		
ONS-AC-20		2 213			1 796			1 323			1 435		
ONS-AC-25		2 721			2 208			1 627			1 764		
ONS-AC-30		3 229			2 620			1 931			2 094		
Annual output per m <sup>2</sup> gross area		643	--	--	522	--	--	385	--	--	417	--	--
Annual efficiency, $\eta_a$		36%	--	--	32%	--	--	33%	--	--	34%	--	--
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 <a href="http://www.estif.org/solarkeymarknew/">http://www.estif.org/solarkeymarknew/</a>													
<b>Additional Information</b>													
Collector heat transfer medium											Air		
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)											C		--
G (W/m <sup>2</sup> ) >		800		$\vartheta_a$ (°C) >		10		$H_x$ (MJ/m <sup>2</sup> ) >		540			
Maximum tested positive load											2400		Pa
Maximum tested negative load											2400		Pa
Hail resistance using steel ball (maximum drop height)											0.4		m
<b>Additional collector attribute(s)</b>													
<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)		
<b>Energy Labelling Information</b>						<b>Additional Informative Technical Data</b>							
						Reference Area, $A_{sol}$ (m <sup>2</sup> )		Hydraulic Designation Code		Aperture Area, $A_a$ (m <sup>2</sup> )			
ONS-AC-10						1.87		not applicable for coaxial air collectors		0.94			
ONS-AC-20						3.44		not applicable for coaxial air collectors		1.88			
ONS-AC-25						4.23		not applicable for coaxial air collectors		3.05			
ONS-AC-30						5.02		not applicable for coaxial air collectors		2.81			
<b>Data required for CDR (EU) No 811/2013 - Reference Area <math>A_{sol}</math></b>						<b>Data required for CDR (EU) No 812/2013 - Reference Area <math>A_{sol}</math></b>							
Collector efficiency ( $\eta_{col}$ )						28%		Zero-loss efficiency ( $\eta_0$ )		0.32		--	
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 9806:2017.						First-order coefficient ( $a_1$ )		1.04		W/(m <sup>2</sup> K)			
						Second-order coefficient ( $a_2$ )		0.003		W/(m <sup>2</sup> K <sup>2</sup> )			
						Incidence angle modifier IAM (50°)		1.28		--			
						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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