

Annex to Solar Keymark Certificate						Licence Number			011-7S2954 F				
Supplementary Information						Issued			2019-09-23				
Annual collector output 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
UltraSol® 2-V		2,879	1,925	1,152	2,140	1,406	820	1,576	977	550	1,717	1,055	586
UltraSol® 2-H		2,879	1,925	1,152	2,140	1,406	820	1,576	977	550	1,717	1,055	586
Annual output per m ² gross area		1,138	761	455	846	556	324	623	386	218	679	417	232
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m ²			1714 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. 6.0 (October 2018). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc													
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									5600		Pa		
Maximum tested negative load									2718		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"/> Wind and/or infrared sensitive collector(s) (WISC)									
<input type="checkbox"/> Façade collector(s)													
Energy Labelling Information													
		Reference Area, A _{sol} (m ²)			Hydraulic Designation Code								
UltraSol® 2-V		2.53			1-V-1234S-A:9.3,14893-C:16.5,1226-D								
UltraSol® 2-H		2.53			1-H-1234S-A:9.3,12756-C:16.5,2126-D								
Data required for CDR (EU) No 811/2013 - Reference Area						Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}							
Collector efficiency (η_{col})		56%				Zero-loss efficiency (η_0)		0.74		--			
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)		3.86		W/(m ² K)			
						Second-order coefficient (a ₂)		0.013		W/(m ² K ²)			
						Incidence angle modifier IAM (50°)		0.90		--			
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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