



Annex to Solar Keymark Certificate		Licence Number		011-7S 2181F									
Supplementary Information		Issued		2022-03-10									
Gross Thermal Yield 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
Bosch FCC220-2V		2 310	1 584	974	1 710	1 126	653	1 270	789	443	1 389	857	473
Worcester Solar Lito		2 310	1 584	974	1 710	1 126	653	1 270	789	443	1 389	857	473
Gross Thermal Yield per m ² gross area		1 105	758	466	818	539	313	608	377	212	664	410	226
Annual efficiency, η_a		63%	43%	26%	50%	33%	19%	52%	32%	18%	53%	33%	18%
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. 6.2 (13.01.2022). 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 ²) >		1100		ϑ_a (°C) >		40		H_x (MJ/m ²) >		700			
Maximum tested positive load										4000		Pa	
Maximum tested negative load										3000		Pa	
Hail resistance using ice balls (diameter)										35		mm	
Additional collector attribute(s)													
Using external power source(s) for normal operation				No		Active or passive measure(s) for self-protection				No			
Co-generating thermal and electrical power				No		Façade collector(s)				No			
Energy Labelling Information						Additional Informative Technical Data							
		Reference Area, A_{sol} (m ²)		Hydraulic Designation Code				Aperture Area, A_a (m ²)					
Bosch FCC220-2V		2.09		8-VH-1234S-A:5.2,1866-C:16.6,1070				1.95					
Worcester Solar Lito		2.09		8-VH-1234S-A:5.2,1866-C:16.6,1070				1.95					
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})		52%		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)				3.64		W/(m ² K)					
		Second-order coefficient (a_2)				0.012		W/(m ² K ²)					
		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.													
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