

Annex to Solar Keymark Certificate		Licence Number												
Supplementary Information		011-7S2403 R												
		Issued												
		2024-07-10												
Gross Thermal Yield in kWh/collector at mean fluid temperature ϑ_m														
Collector name	Standard Locations	Athens			Davos			Stockholm			Würzburg			
	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	
R10		1,273	1,031	746	1,035	788	534	760	564	375	822	612	401	
R15		1,851	1,499	1,086	1,506	1,146	776	1,105	821	545	1,195	891	584	
R20		2,429	1,967	1,425	1,975	1,504	1,018	1,450	1,077	715	1,568	1,169	766	
R30		3,587	2,906	2,104	2,917	2,221	1,504	2,141	1,590	1,057	2,316	1,726	1,131	
Gross Thermal Yield per m ² gross area		744	603	436	605	461	312	444	330	219	480	358	235	
Annual efficiency, η_a		42%	34%	25%	37%	28%	19%	38%	28%	19%	39%	29%	19%	
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 Draft Ver. 6.2 (22.09.2021). 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)											C		--	
G (W/m ²) >		800		ϑ_a (°C) >		10		H _x (MJ/m ²) >		420				
Maximum tested positive load											2400		Pa	
Maximum tested negative load											2400		Pa	
Hail resistance using steel ball (maximum drop height)											1		m	
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)					
R10		1.71			1-H-12S-C:20,942-D				0.93					
R15		2.49			1-H-12S-C:20,1332-D				1.40					
R20		3.26			1-H-12S-C:20,1722-D				1.86					
R30		4.82			1-H-12S-C:20,2502-D				2.79					
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})		33%			Zero-loss efficiency (η_0)				0.40					
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)				1.06					W/(m ² K)			
		Second-order coefficient (a_2)				0.014					W/(m ² K ²)			
		Incidence angle modifier IAM (50°)				1.17					--			
		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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