

Annex to Solar Keymark Certificate											Licence Number			011-7S3091 F		
Supplementary Information											Issued			2021-12-13		
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			
KHS-Kollektor		2 820	2 028	1 332	2 154	1 497	942	1 584	1 044	633	1 721	1 128	673			
Annual output per m ² gross area		1 217	876	575	930	646	407	684	451	273	743	487	290			
Annual efficiency, η_a		69%	50%	33%	57%	40%	25%	59%	39%	23%	60%	39%	23%			
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. 6.1 (July 2019). 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)											B		--			
G (W/m ²) >		900		ϑ_a (°C) >		15		H _x (MJ/m ²) >		540						
Maximum tested positive load											3000		Pa			
Maximum tested negative load											2000		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"/> Façade collector(s)																
Energy Labelling Information							Additional Informative Technical Data									
Reference Area, A _{sol} (m ²)							Hydraulic Designation Code				Aperture Area, A _a (m ²)					
KHS-Kollektor							2-VH-12S-A:11.3,8474-C:16,100				2.13					
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})							Zero-loss efficiency (η_0)				0.76			--		
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)				3.45			W/(m ² K)		
							Second-order coefficient (a ₂)				0.014			W/(m ² K ²)		
							Incidence angle modifier IAM (50°)				0.93			--		
							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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