



<b>Annex to Solar Keymark Certificate Supplementary Information</b>	<b>Licence Number</b>	<b>011-7S3048 F</b>
	<b>Issued</b>	<b>2021-08-26</b>

Annual collector output in kWh/collector at mean fluid temperature $\vartheta_m$													
Collector name	Standard Locations $\vartheta_m$	Athens			Davos			Stockholm			Würzburg		
		25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
ETK2.0M		2,185	1,375	750	1,564	949	482	1,165	666	334	1,269	711	351
ETK2.5M		2,732	1,719	938	1,955	1,187	603	1,456	833	418	1,586	889	439
ETK2.7M		2,928	1,843	1,005	2,096	1,272	646	1,561	893	448	1,700	953	470
ETK3.0M		3,278	2,063	1,125	2,347	1,424	724	1,748	999	502	1,903	1,067	526
Annual output per m <sup>2</sup> gross area		1,093	688	375	782	475	241	583	333	167	634	356	175
Annual efficiency, $\eta_a$		62%	39%	21%	48%	29%	15%	50%	29%	14%	51%	29%	14%
Fixed or tracking collector													
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 <http://www.estif.org/solarkeymarknew/>

#### Additional Information

Collector heat transfer medium	Water
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)	B
G (W/m <sup>2</sup> ) >	900
$\vartheta_a$ (°C) >	15
$H_x$ (MJ/m <sup>2</sup> ) >	540
Maximum tested positive load	5900 Pa
Maximum tested negative load	3000 Pa
Hail resistance using steel ball (maximum drop height)	2 m

#### Additional collector attribute(s)

- Using external power source(s) for normal operation       Active or passive measure(s) for self-protection  
 Co-generating thermal and electrical power       Façade collector(s)

Energy Labelling Information		Additional Informative Technical Data	
	Reference Area, $A_{sol}$ (m <sup>2</sup> )	Hydraulic Designation Code	Aperture Area, $A_a$ (m <sup>2</sup> )
ETK2.0M	2.00	8-VH-1234S-A:10,1885-C22,1060-D	1.85
ETK2.5M	2.50	8-VH-1234S-A:10,1885-C22,1310-D	2.34
ETK2.7M	2.68	8-VH-1234S-A:10,1885-C22,1400-D	2.52
ETK3.0M	3.00	8-VH-1234S-A:10,1885-C22,1560-D	2.83

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 ( $\eta_{col}$ )	53%	Zero-loss efficiency ( $\eta_0$ )	0.73
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 ( $a_1$ )	4.52
		Second-order coefficient ( $a_2$ )	0.016
		Incidence angle modifier IAM (50°)	0.87
		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.	