



Annex to Solar Keymark Certificate	Licence Number	OEM 9926/3/1
Supplementary Information	Issued	2021-08-04

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
ESPS150		1.552	1.047	646	1.144	754	450	846	524	301	922	564	318
ESPS210		2.059	1.390	858	1.518	1.000	597	1.123	695	399	1.223	748	422
ESPS260		2.606	1.759	1.086	1.922	1.266	756	1.421	880	505	1.548	947	535
Annual output per m ² gross area		995	671	414	733	483	288	542	336	193	591	361	204
Annual efficiency, η_a		56%	38%	23%	45%	30%	18%	47%	29%	17%	48%	29%	16%
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 (September 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)	A+ --
G (W/m ²) >	1100 ϑ_a (°C) >
	40 H_v (MJ/m ²) >
Maximum tested positive load	2400 Pa
Maximum tested negative load	2400 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_{ref} (m ²)	Hydraulic Designation Code	Aperture Area, A_s (m ²)
ESPS150	1,56	8-VH-1234S-A:9,1410-C:20,1043-D	1,34
ESPS210	2,07	-	-
ESPS260	2,62	10-VH-1234S-A:9,1923-C:20,1304-D	2,32

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})	48%
Zero-loss efficiency (η_0)	0,63 --
First-order coefficient (a_1)	3,57 W/(m ² K)
Second-order coefficient (a_2)	0,008 W/(m ² K ²)
Incidence angle modifier IAM (50°)	0,93 --
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.	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.