



Annex to Solar Keymark Certificate Supplementary Information	Licence Number	OEM 10078.4
	Issued	2023-10-30

Gross Thermal Yield in kWh/collector at mean fluid temperature ϑ_m													
Collector name	ϑ_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
RED16		1.743	1.090	646	1.234	778	459	920	539	309	999	572	319
RED20		2.069	1.294	767	1.465	923	545	1.092	640	366	1.186	679	378
RED25		2.498	1.562	926	1.768	1.115	658	1.319	773	442	1.432	819	457
Gross Thermal Yield per m ² gross area		1.088	680	403	771	486	287	575	337	193	624	357	199
Annual efficiency, η_a		62%	39%	23%	47%	30%	18%	49%	29%	17%	50%	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. 6.2 (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) >	1000	ϑ_a (°C) >	20
		H_x (MJ/m ²) >	600
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)			
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)
RED16	1,60	9-VH-1234S-A:7, 1449-C:20.6, 1067-D	1,56
RED20	1,90	8-VH-1234S-A:7, 1850-C:20.6, 1016-D	1,85
RED25	2,30	11-VH-1234S-A:7, 1850-C:20.6, 1216-D	2,25

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})	56%	Zero-loss efficiency (η_0)	0,77
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)	5,09
		Second-order coefficient (a_2)	0,000
		Incidence angle modifier IAM (50°)	0,77
		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.	