



Annex to Solar Keymark Certificate						Licence Number		011-7S538 F					
Supplementary Information						Issued		2022-10-24					
<b>Gross Thermal Yield in kWh/collector at mean fluid temperature <math>\vartheta_m</math></b>													
Standard Locations		Athens			Davos			Stockholm			Würzburg		
Collector name	$\vartheta_m$	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
FK8201N 4H		2 381	1 645	1 023	1 775	1 179	695	1 310	823	468	1 436	895	502
FK8231N 4H		2 758	1 905	1 185	2 056	1 366	805	1 518	953	543	1 663	1 037	581
Gross Thermal Yield per m <sup>2</sup> gross area		1 179	814	506	879	584	344	649	407	232	711	443	248
Annual efficiency, $\eta_a$		67%	46%	29%	54%	36%	21%	56%	35%	20%	57%	36%	20%
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
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. 6.2 (13.01.2022). A detailed description of the calculations is available at <a href="http://www.estif.org/solarkeymarknew/">http://www.estif.org/solarkeymarknew/</a>													
<b>Additional Information</b>													
Collector heat transfer medium										Water-Glycole			
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)										A		--	
G (W/m <sup>2</sup> ) >		1000		$\vartheta_a$ (°C) >		20		H <sub>x</sub> (MJ/m <sup>2</sup> ) >		600			
Maximum tested positive load										3000		Pa	
Maximum tested negative load										2500		Pa	
Hail resistance using steel ball (maximum drop height)										2		m	
<b>Additional collector attribute(s)</b>													
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	
<b>Energy Labelling Information</b>						<b>Additional Informative Technical Data</b>							
		Reference Area, A <sub>sol</sub> (m <sup>2</sup> )				Hydraulic Designation Code				Aperture Area, A <sub>a</sub> (m <sup>2</sup> )			
FK8201N 4H		2.02				12-V-1234S-7.2,1570-16.6,1215-D				1.93			
FK8231N 4H		2.34				12-V-1234S-7.2,1840-16.6,1215-D				2.23			
<b>Data required for CDR (EU) No 811/2013 - Reference Area A<sub>sol</sub></b>						<b>Data required for CDR (EU) No 812/2013 - Reference Area A<sub>sol</sub></b>							
Collector efficiency ( $\eta_{col}$ )		55%				Zero-loss efficiency ( $\eta_0$ )		0.72		--			
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 <sub>sol</sub> ) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2017.		First-order coefficient (a <sub>1</sub> )		3.81		W/(m <sup>2</sup> K)							
		Second-order coefficient (a <sub>2</sub> )		0.013		W/(m <sup>2</sup> K <sup>2</sup> )							
		Incidence angle modifier IAM (50°)		0.98		--							
		Remark: The data given in this section are related to collector reference area (A <sub>sol</sub> ) 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.											
DIN CERTCO • Alboinstraße 56 • 12103 Berlin, Germany													
Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: <a href="mailto:info@dincertco.de">info@dincertco.de</a> • <a href="http://www.dincertco.de">www.dincertco.de</a>													