

<b>Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results</b>					<b>Licence Number</b>		<b>011-7S2832 F</b>							
					<b>Date issued</b>		<b>2018-02-19</b>							
					<b>Issued by</b>		<b>DIN CERTCO</b>							
<b>Licence holder</b>		<b>Carl Capito Heiztechnik GmbH</b>			<b>Country</b>		<b>Deutschland</b>							
<b>Brand (optional)</b>					<b>Web</b>		<b>www.capito-gmbh.de</b>							
<b>Street, Number</b>		<b>Mühlenbergstr. 12</b>			<b>E-mail</b>		<b>heiztechnik@capito-gmbh.de</b>							
<b>Postcode, City</b>		<b>57290</b>	<b>Neunkirchen</b>		<b>Tel</b>		<b>+49 2735-760176</b>							
<b>Collector Type</b>					<b>Flat plate collector, glazed</b>									
<b>Collector name</b>					<b>Gross area (A<sub>G</sub>)</b>	<b>Gross length</b>	<b>Gross width</b>	<b>Gross height</b>	<b>Power output per collector</b> G <sub>b</sub> = 850 W/m <sup>2</sup> ; G <sub>d</sub> = 150 W/m <sup>2</sup> ; u = 3 m/s ϑ <sub>m</sub> - ϑ <sub>a</sub>					
					m <sup>2</sup>	mm	mm	mm	0 K	10 K	30 K	50 K	70 K	110 K
<b>CC-MLF 2018</b>					2.05	1 951	1 051	80	1 548	1 469	1 298	1 109	902	433

<b>Annex to Solar Keymark Certificate</b> <b>Supplementary Information</b>	<b>Licence Number</b>	<b>011-7S2832 F</b>
	<b>Issued</b>	<b>2018-02-19</b>

Annual collector output in kWh/collector at mean fluid temperature $\vartheta_m$ , based on ISO 9806:2013 test results													
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
CC-MLF 2018		2 515	1 782	1 160	1 894	1 299	811	1 400	907	544	1 529	986	582
Annual output per m <sup>2</sup> gross area		1 227	869	566	924	634	395	683	442	265	746	481	284
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m <sup>2</sup>			1714 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. 5.01 (March 2016). A detailed description of the calculations is available at <a href="http://www.solarkeymark.org/scenocalc">www.solarkeymark.org/scenocalc</a>													

Additional Information		
Collector heat transfer medium	Water-Glycole	
Hybrid Thermal and Photo Voltaic collector	No	
The collector is deemed to be suitable for roof integration	No	
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:		
Climate class (A, B or C)	B	--
Maximum tested positive load	3000	Pa
Maximum tested negative load	2000	Pa
Hail resistance using steel ball (maximum drop height)	n.a.	m

Energy Labelling Information			
	Reference Area, $A_{sol}$ (m <sup>2</sup> )	Data required for CDR (EU) No 811/2013 - Reference Area $A_{sol}$	
CC-MLF 2018	2.05	Collector efficiency ( $\eta_{col}$ )	59 %
		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 9806:2013.	
		Data required for CDR (EU) No 812/2013 - Reference Area $A_{sol}$	
		Zero-loss efficiency ( $\eta_0$ )	0.755 --
		First-order coefficient ( $a_1$ )	3.73 W/(m <sup>2</sup> K)
		Second-order coefficient ( $a_2$ )	0.011 W/(m <sup>2</sup> K <sup>2</sup> )
		Incidence angle modifier IAM (50°)	0.94 --
		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.	