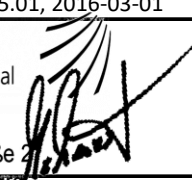


Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results							Licence Number		<b>011-7S2879 F</b>							
							Date issued		<b>2018-08-20</b>							
							Issued by		<b>Din Certco</b>							
Licence holder		<b>Etapart Energietechnik GmbH</b>					Country	Deutschland								
Brand (optional)							Web	www.etapart.de								
Street, Number		Etapartstr. 1					E-mail	uwe.strobel@etapart.de								
Postcode, City		3253, Tröbitz					Tel/Fax	+49 (0)7472-925-115 / +49 (0)7472-925-199								
Collector Type							Flat plate collector, unglazed									
Collector name							Power output per collector unit [W]									
							wind speed, u = 1,3 m/s									
							Air flow rate [kg/h]		Net irradiance, G'' [W/m <sup>2</sup> ]							
									400	700	1000					
ETAWall							245		734	1193	1651					
							486		1089	1769	2450					
							731		1249	2029	2809					
Maximum power output per m <sup>2</sup> gross area											442					
Performance parameters test method							Steady state - outdoor									
Performance parameters (related to AG)							m	η <sub>0,hem</sub>	b1	b2	bu	ε/α				
Units							kg/h	kg/h	W/(m <sup>2</sup> K)	Ws/(m <sup>3</sup> K)	s/m	-				
Test							245	0,347	-	-	0,045	-				
							486	0,489	-	-	0,046	-				
							731	0,551	-	-	0,046	-				
Incidence angle modifier test method							Steady state - outdoor									
Bi-directional incidence angle modifiers							No									
Incidence angle modifier							Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal							K <sub>θT, coll</sub>	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	0,00
Longitudinal							K <sub>θL, coll</sub>	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	0,00
Heat transfer medium for testing							Air									
Maximum flow rate for testing (per gross area, A <sub>G</sub> )							dm/dt	0,032	kg/(sm <sup>2</sup> )							
Maximum temperature difference for thermal performance calculations							(θ <sub>m</sub> -θ <sub>a</sub> ) <sub>max</sub>	12	K							
Standard stagnation temperature (G = 1000 W/m <sup>2</sup> ; θ <sub>a</sub> = 30 °C)							θ <sub>stg</sub>	66	°C							
Effective thermal capacity, incl. fluid (per gross area, A <sub>G</sub> )							C/m <sup>2</sup>	17,4	kJ/(Km <sup>2</sup> )							
Maximum operating temperature							θ <sub>max, op</sub>	70	°C							
Maximum operating pressure							p <sub>max, op</sub>	-	kPa							
Testing laboratory		TestLab Solar Thermal Systems, Fraunhofer ISE					http://www.collectortest.com									
Test report(s)		KTB Nr.: 2018-03					Dated		16.08.2018							
Comments of testing laboratory							Datasheet version: 5.01, 2016-03-01									
<p><i>Note: Scenocalc results and energy labeling information (see p.2) is not applicable for solar air heating collectors which can only be measured in open to ambient operation. The performance parameters are given as instantaneous efficiency points.</i></p>							<p><b>TestLab</b> Solar Thermal Systems</p>  <p>Heidenhofstraße 2 D-79110 Freiburg Tel: +49 (0)761 4588 5354</p>									
DIN CERTCO • Alboinstraße 56 • 12103 Berlin, Germany Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de																

<b>Annex to Solar Keymark Certificate Supplementary Information</b>	<b>Licence Number</b>	<b>011-7S2879 F</b>
	<b>Issued</b>	<b>2018-08-20</b>

**Annual collector output in kWh/collector at mean fluid temperature  $\vartheta_m$ , based on EN 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
ETAWall		See note on p.1											
Annual output per m <sup>2</sup> gross area	#WERT!												
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 [www.solarkeymark.org/scenocalc](http://www.solarkeymark.org/scenocalc)

**Additional Information**

Collector heat transfer medium	Air	
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)	A	--
Maximum tested positive load	2400	Pa
Maximum tested negative load	see test report	Pa
Hail resistance using ice balls (diameter)	25	mm

**Energy Labelling Information**

	Reference Area, $A_{sol}$ (m <sup>2</sup> )	Data required for CDR (EU) No 811/2013 - Reference Area $A_{sol}$	
ETAWall	6,35	Collector efficiency ( $\eta_{col}$ )	See note on p.1 %
		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 ( $\eta_0$ )	See note on p.1 --
		First-order coefficient ( $a_1$ )	See note on p.1 W/(m <sup>2</sup> K)
		Second-order coefficient ( $a_2$ )	See note on p.1 W/(m <sup>2</sup> K <sup>2</sup> )
		Incidence angle modifier IAM (50°)	See note on p.1 --
		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.	