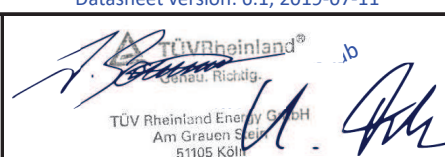


Annex to Solar Keymark Certificate					Licence Number		011-7S2462 R							
					Date issued		2020-10-12							
					Issued by		TÜV Rheinland Energy GmbH							
Licence holder		Bosch Thermotechnik GmbH			Country		Germany							
Brand (optional)		Buderus			Web		www.bosch-thermotechnik.de							
Street, Number		Sophienstr. 30-32			E-mail		solarthermie@de.bosch.com							
Postcode, City		35576 Wetzlar			Tel		49 (0)2557 9399-0 / -							
Collector Type					Evacuated tubular collector									
Collector name					Power output per collector									
					Gb = 850 W/m <sup>2</sup> , Gd = 150 W/m <sup>2</sup> & u = 1.3 m/s $\vartheta_m - \vartheta_a$									
					0 K	10 K	30 K	50 K	70 K	90 K				
					m <sup>2</sup>	mm	mm	mm	mm	mm	mm			
Buderus Logasol SKR10 CPC (2 Modules)					2.44	1 947	1 248	87	1 445	1 422	1 369	1 305	1 232	1 150
Power output per m <sup>2</sup> gross area					592	583	561	535	505	471				
Performance parameters test method		Quasi dynamic												
Performance parameters (related to A <sub>G</sub> )		$\eta_{0, b}$	a1	a2	a3	a4	a5	a6	a7	a8	Kd			
Units		-	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K <sup>2</sup> )	J/(m <sup>3</sup> K)	-	J/(m <sup>2</sup> K)	s/m	W/(m <sup>2</sup> K <sup>4</sup> )	W/(m <sup>2</sup> K <sup>4</sup> )	-			
Test results		0.595	0.90	0.005	0.000	0.00	18 836	0.000	0.00	0.0E+00	0.97			
Incidence angle modifier test method		Quasi dynamic - outdoor												
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°			
Transversal		K <sub>GT, coll</sub>	1.00	0.99	1.01	1.00	1.00	1.01	1.00	1.00	0.00			
Longitudinal		K <sub>GL, coll</sub>	1.00	0.98	0.95	0.90	0.83	0.72	0.56	0.33	0.00			
Heat transfer medium for testing					Water									
Flow rate for testing (per gross area, A <sub>G</sub> )					dm/dt	0.020	kg/(sm <sup>2</sup> )							
Maximum temperature difference during thermal performance test					( $\vartheta_m - \vartheta_a$ ) <sub>max</sub>	60	K							
Standard stagnation temperature (G = 1000 W/m <sup>2</sup> ; $\vartheta_a = 30$ °C)					$\vartheta_{stg}$	310	°C							
Maximum operating temperature					$\vartheta_{max, op}$	-	°C							
Maximum operating pressure					p <sub>max, op</sub>	1000	kPa							
Testing laboratory		TÜV Rheinland Energy GmbH			www.tuv.com/solarenergy									
Test report(s)		21249958.001			Dated		15.09.2020							
Comments of testing laboratory					Datasheet version: 6.1, 2019-07-11									
Because of product size 2 samples were combined for testing incl. additional CPC-element. Dimension of single element (l/w/h) [mm]: 1947 / 624 / 87 Areas of single element (Aa/Ag) [m <sup>2</sup> ]: 0.98 / 1.22 Due to the design that used single elements to enlarge final collector field area; combined with additional CPC-elements; the enclosed maximum power peak-values had been documented in test report.					 TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln									
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														

Annex to Solar Keymark Certificate		Licence Number											
Supplementary Information		011-7S2462 R											
		Issued											
		2020-10-12											
Annual collector output in kWh/collector at mean fluid temperature $\vartheta_m$													
	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
Buderus Logasol SKR10 CPC (2 Modules)		2 449	2 191	1 905	2 100	1 837	1 565	1 526	1 307	1 089	1 638	1 405	1 172
Annual output per m <sup>2</sup> gross area		1 004	898	781	861	753	642	625	536	446	671	576	480
Annual efficiency, $\eta_a$		57%	51%	44%	53%	46%	39%	54%	46%	38%	54%	46%	39%
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. 6.1 (July 2019). 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											No		
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		$H_x$ (MJ/m <sup>2</sup> ) >		600			
Maximum tested positive load											2700		Pa
Maximum tested negative load											2250		Pa
Hail resistance using ice balls (diameter)											25		mm
<b>Additional collector attribute(s)</b>													
<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)		
<b>Energy Labelling Information</b>						<b>Additional Informative Technical Data</b>							
						Reference Area, $A_{sol}$ (m <sup>2</sup> )		Hydraulic Designation Code			Aperture Area, $A_a$ (m <sup>2</sup> )		
Buderus Logasol SKR10 CPC (2 Modules)						2.44		1-V-1122S-A:6,21660-C:15.8,625			2.06		
<b>Data required for CDR (EU) No 811/2013 - Reference Area <math>A_{sol}</math></b>						<b>Data required for CDR (EU) No 812/2013 - Reference Area <math>A_{sol}</math></b>							
Collector efficiency ( $\eta_{col}$ )						55%		Zero-loss efficiency ( $\eta_0$ )			0.59		--
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 9806:2017.						First-order coefficient ( $a_1$ )			0.90		W/(m <sup>2</sup> K)		
						Second-order coefficient ( $a_2$ )			0.005		W/(m <sup>2</sup> K <sup>2</sup> )		
						Incidence angle modifier IAM (50°)			0.91		--		
						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.							
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>													