


Annex to Solar Keymark Certificate				Licence Number		011-7S2310 R								
				Date issued		2019-10-09								
				Issued by		CB								
Licence holder		solardirekt24 GmbH			Country		Germany							
Brand (optional)					Web		http://www.solardirekt24.de							
Street, Number		Spiesheimerweg 22			E-mail		info@solardirekt24.de							
Postcode, City		55286 Wörrstadt			Tel		+49 (0)6732 6089999 / 6089998							
Collector Type				Evacuated tubular collector										
Collector name					Power output per collector									
					Gb = 850 W/m ² , Gd = 150 W/m ² & u = 1.3 m/s $\vartheta_m - \vartheta_a$									
					0 K	10 K	30 K	50 K	70 K	100 K				
					m ²	mm	mm	mm	mm	mm				
EUROTHERM SOLAR 20R					3,11	1.980	1.570	125	1.205	1.174	1.090	975	831	559
EUROTHERM SOLAR 30R					4,55	1.980	2.300	125	1.764	1.718	1.594	1.427	1.216	817
Power output per m² gross area					388	378	350	314	267	180				
Performance parameters test method		Steady state - outdoor												
Performance parameters (related to A_G)		$\eta_{0, b}$	a1	a2	a3	a4	a5	a6	a7	a8	Kd			
Units		-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	J/(m ² K)	s/m	W/(m ² K ⁴)	W/(m ² K ⁴)	-			
Test results		0,383	0,88	0,012	0,000	0,00	15	0,000	0,00	0,0E+00	1,08			
Incidence angle modifier test method		Steady state - outdoor												
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°			
Transversal		$K_{\theta T, coll}$	1,00	1,00	0,99	0,96	0,92	0,84	0,69	0,44	0,00			
Longitudinal		$K_{\theta L, coll}$	1,01	1,06	1,15	1,29	1,43	1,49	1,35	0,00	0,00			
Heat transfer medium for testing		Water-Glycole												
Flow rate for testing (per gross area, A_G)		dm/dt	0,020	kg/(sm ²)										
Maximum temperature difference during thermal performance test		$(\vartheta_m - \vartheta_a)_{max}$	70	K										
Standard stagnation temperature (G = 1000 W/m²; $\vartheta_a = 30^\circ\text{C}$)		ϑ_{stg}	221	°C										
Maximum operating temperature		$\vartheta_{max, op}$	100	°C										
Maximum operating pressure		$p_{max, op}$	1200	kPa										
Testing laboratory		TestLab Solar Thermal Systems, Fraunhofer ISE						http://www.collectortest.com						
Test report(s)		KTB n2011-33-c KTB 2011-34-c						Dated		27.01.2014 27.01.2014				
Comments of testing laboratory		The efficiency measurement has been performed according to EN 12975-2:2006. The given efficiency parameters has been recalculated from EN 12975-2:2006 to ISO 9806:2017, according to the Solar Keymark regulations.						Datasheet version: 6.1, 2019-09-26  TestLab Solar Thermal Systems Heidenhofstraße D-79110 Freiburg Tel: +49 (0)761 4588 5354						
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														

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Supplementary Information		Issued		2019-10-09											
Annual collector output in kWh/collector at mean fluid temperature ϑ_m															
	Standard Locations	Athens			Davos			Stockholm			Würzburg				
Collector name	ϑ_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		
EUROTHERM SOLAR 20R		2.141	1.766	1.312	1.798	1.400	985	1.266	952	637	1.388	1.054	706		
EUROTHERM SOLAR 30R		3.133	2.583	1.920	2.630	2.049	1.441	1.852	1.392	932	2.031	1.542	1.033		
Annual output per m ² gross area		688	568	422	578	450	317	407	306	205	446	339	227		
Annual efficiency, η_a		39%	32%	24%	35%	28%	19%	35%	26%	18%	36%	27%	18%		
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. 6.1 (September 2019). 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)											B		--		
G (W/m ²) >		900		ϑ_a (°C) >		15		H _x (MJ/m ²) >		540					
Maximum tested positive load											1200		Pa		
Maximum tested negative load											0		Pa		
Hail resistance using steel ball (maximum drop height)											-		m		
Additional collector attribute(s)															
<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)				
Energy Labelling Information					Additional Informative Technical Data										
	Reference Area, A _{sol} (m ²)				Hydraulic Designation Code					Aperture Area, A _a (m ²)					
EUROTHERM SOLAR 20R	3,11				{1}-{V}-{20S}-{8:Ø,1700}-{35:Ø,1570}-					1,88					
EUROTHERM SOLAR 30R	4,55				{1}-{V}-{30S}-{8:Ø,1700}-{35:Ø,2300}-					2,82					
Data required for CDR (EU) No 811/2013 - Reference Area					Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}										
Collector efficiency (η_{col})					33%				Zero-loss efficiency (η_0)			0,39		--	
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)			0,88		W/(m ² K)		
								Second-order coefficient (a ₂)			0,012		W/(m ² K ²)		
								Incidence angle modifier IAM (50°)			1,21		--		
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.															
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