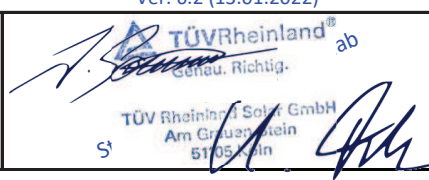


Annex to Solar Keymark Certificate					Licence Number		011-7S2215 F																	
					Date issued		2023-05-16																	
					Issued by		DINCERTCO																	
Licence holder		Bosch Thermotechnik GmbH			Country		Germany																	
Brand (optional)		Bosch			Web		www.bosch-thermotechnik.de																	
Street, Number		Junkersstrasse 20-24			E-mail		solarthermie@de.bosch.com																	
Postcode, City		73249 Wernau			Tel		+49 (0)2557 9399-0 / -																	
Collector Type					Flat plate collector																			
Collector name					Gross area (A_G)		Gross length		Gross width		Gross height		Power output per collector $G_b = 850 \text{ W/m}^2$, $G_d = 150 \text{ W/m}^2$ & $u = 1.3 \text{ m/s}$ $\vartheta_m - \vartheta_a$											
					m ²		mm		mm		mm		0 K		10 K		30 K		50 K		70 K		115 K	
Bosch FKC-2W					2.37		1 175		2 017		87		1 723		1 627		1 419		1 191		942		305	
Worcester Solar Lifestyle landscape					2.37		1 175		2 017		87		1 723		1 627		1 419		1 191		942		305	
Power output per m ² gross area					727		686		599		503		397		129									
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					0.727		3.94		0.011		0.000		0.00		12 917		0.000		0.00		0.0E+00		1.00	
Incidence angle modifier test method					Quasi dynamic - outdoor																			
Incidence angle modifier					Angle		10°		20°		30°		40°		50°		60°		70°		80°		90°	
Transversal					$K_{\theta T, coll}$		1.00		0.99		0.98		0.96		0.92		0.86		0.72		0.36		0.00	
Longitudinal					$K_{\theta L, coll}$		1.00		0.99		0.98		0.96		0.92		0.86		0.72		0.36		0.00	
Heat transfer medium for testing					Water																			
Flow rate for testing (per gross area, A_G)					dm/dt		0.022		kg/(sm ²)															
Maximum temperature difference during thermal performance test					$(\vartheta_m - \vartheta_a)_{max}$		85		K															
Standard stagnation temperature ($G = 1000 \text{ W/m}^2$; $\vartheta_a = 30 \text{ °C}$)					ϑ_{stg}		210		°C															
Maximum operating temperature					$\vartheta_{max, op}$		n.n.		°C															
Maximum operating pressure					$p_{max, op}$		600		kPa															
Testing laboratory					TÜV Rheinland Energy GmbH							www.tuv.com/solar												
Test report(s)					21249400.011 21250753.001							Dated		24.08.2020 01.10.2020										
Comments of testing laboratory					Ver. 6.2 (13.01.2022)																			
					 <p>TÜVRheinland® ab Genau. Richtig. TÜV Rheinland Solar GmbH Am Grubenstein 51105 Köln</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																								

Annex to Solar Keymark Certificate		Licence Number		011-7S2215 F									
Supplementary Information		Issued		2023-05-16									
Gross Thermal Yield 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
Bosch FKC-2W		2 786	1 914	1 191	2 064	1 366	808	1 530	956	546	1 678	1 040	584
Worcester Solar Lifestyle landscape		2 786	1 914	1 191	2 064	1 366	808	1 530	956	546	1 678	1 040	584
Gross Thermal Yield per m ² gross area		1 176	808	503	871	576	341	646	403	231	708	439	247
Annual efficiency, η_a		67%	46%	28%	53%	35%	21%	55%	35%	20%	57%	35%	20%
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. 6.2 (13.01.2022). 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										Yes			
The collector was tested successfully under the following conditions:													
Climate class (A+, A, B or C)										A		--	
G (W/m ²) >		1000		ϑ_a (°C) >		20		H _x (MJ/m ²) >		600			
Maximum tested positive load										4000		Pa	
Maximum tested negative load										3000		Pa	
Hail resistance using ice balls (diameter)										35		mm	
Additional collector attribute(s)													
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			
Energy Labelling Information						Additional Informative Technical Data							
		Reference Area, A _{sol} (m ²)		Hydraulic Designation Code				Aperture Area, A _a (m ²)					
Bosch FKC-2W		2.37		22-H-1234S-A:5.2,1022-C:16.6,1971				2.25					
Worcester Solar Lifestyle landscape		2.37		22-H-1234S-A:5.2,1022-C:16.6,1971				2.25					
Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}						Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}							
Collector efficiency (η_{col})		55%		Zero-loss efficiency (η_0)				0.73		--			
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)				3.94		W/(m ² K)					
		Second-order coefficient (a ₂)				0.011		W/(m ² K ²)					
		Incidence angle modifier IAM (50°)				0.93		--					
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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