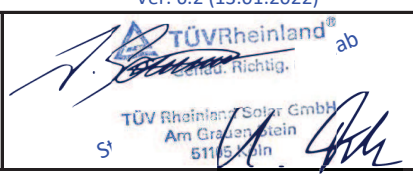


Annex to Solar Keymark Certificate					Licence Number		011-7S2243 F							
					Date issued		2023-05-16							
					Issued by		DINCERTCO							
Licence holder		Bosch Thermotechnik GmbH			Country		Germany							
Brand (optional)		Bosch			Web		www.bosch-thermotechnik.de							
Street, Number		Junkersstrasse 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					Power output per collector									
					G _b = 850 W/m ² , G _d = 150 W/m ² & u = 1.3 m/s θ _m - θ _a									
					0 K	10 K	30 K	50 K	70 K	115 K				
					m ²	mm	mm	mm	mm	mm	mm			
Bosch FKC-2S					2.37	2 017	1 175	87	1 705	1 619	1 427	1 211	970	339
Worcester Solar Lifestyle portrait					2.37	2 017	1 175	87	1 705	1 619	1 427	1 211	970	339
Power output per m ² gross area					720	683	602	511	409	143				
Performance parameters test method		Steady state - indoor												
Performance parameters (related to A _G)		η _{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		0.725	3.52	0.013	0.000	0.00	9 995	0.000	0.00	0.0E+00	0.95			
Incidence angle modifier test method		Quasi dynamic - outdoor												
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°			
Transversal		K _{θT, coll}	1.00	0.99	0.97	0.95	0.91	0.83	0.68	0.34	0.00			
Longitudinal		K _{θL, coll}	1.00	0.99	0.97	0.95	0.91	0.83	0.68	0.34	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		(θ _m -θ _a) _{max}	85	K										
Standard stagnation temperature (G = 1000 W/m ² ; θ _a = 30 °C)		θ _{stg}	210	°C										
Maximum operating temperature		θ _{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)		21249284.001					Dated		24.08.2020					
Comments of testing laboratory		Ver. 6.2 (13.01.2022)												
														
<p style="text-align: center;">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</p>														

Annex to Solar Keymark Certificate							Licence Number		011-7S2243 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-2S		2 712	1 904	1 210	2 040	1 378	835	1 506	965	565	1 644	1 045	602
Worcester Solar Lifestyle portrait		2 712	1 904	1 210	2 040	1 378	835	1 506	965	565	1 644	1 045	602
Gross Thermal Yield per m ² gross area		1 144	803	511	861	582	352	635	407	238	694	441	254
Annual efficiency, η_a		65%	46%	29%	53%	36%	22%	54%	35%	20%	56%	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									5400		Pa		
Maximum tested negative load									4000		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-2S	2.37			11-V-1234S-A:5.2,1865-C:16.6,1129				2.25					
Worcester Solar Lifestyle portrait	2.37			11-V-1234S-A:5.2,1865-C:16.6,1129				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})				56%			Zero-loss efficiency (η_0)			0.72		--	
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)			3.52		W/(m ² K)	
							Second-order coefficient (a_2)			0.013		W/(m ² K ²)	
							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.													
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