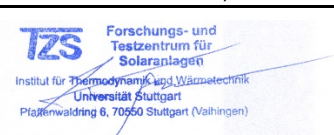


Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		011-7S2825 F							
					Date issued		2018-05-18							
					Issued by		DIN CERTCO							
Licence holder		Bural Solar San. Ve Tic. Ltd. Sti.			Country		Turkey							
Brand (optional)		-			Web		http://www.bural.com.tr							
Street, Number		Serbest Bolge 12. Cadde No: 24-A			E-mail		info@bural.com.tr							
Postcode, City		38070 Melikgazi Kayseri			Tel		+90 352 225 71 01							
Collector Type					Flat plate collector, glazed									
Collector name					Power output per collector Gb = 850 W/m ² ; Gd = 150 W/m ² ; u = 3 m/s ̑m - ̑a									
					0 K	10 K	30 K	50 K	70 K	106 K				
					W	W	W	W	W	W				
ST180					1 202	1 122	949	757	547	123				
ST200					1 366	1 275	1 078	860	621	139				
ST210					1 414	1 320	1 116	890	643	144				
ST230					1 578	1 473	1 245	993	718	161				
ST240					1 632	1 524	1 288	1 028	743	167				
ST270					1 817	1 696	1 434	1 144	827	185				
Power output per m ² gross area					683	638	539	430	311	70				
Performance parameters test method					Quasi dynamic									
Performance parameters (related to AG)					̑0,b	c1	c2	c3	c4	c6	Kd			
Units					-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	s/m	-			
Test results					0.686	4.407	0.013	0.000	0.000	0.000	0.970			
Incidence angle modifier test method					Quasi dynamic - outdoor									
Bi-directional incidence angle modifiers					No									
Incidence angle modifier					Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal					K _{̑T, coll}	1.00	0.99	0.98	0.94	0.88	0.73	0.51	0.26	0.00
Longitudinal					K _{̑L, coll}	1.00	0.99	0.98	0.94	0.88	0.73	0.51	0.26	0.00
Heat transfer medium for testing					Water									
Flow rate for testing (per gross area, A _G)					dm/dt	0.020	kg/(sm ²)							
Maximum temperature difference for thermal performance calculations					(̑ _m -̑ _a) _{max}	106	K							
Standard stagnation temperature (G = 1000 W/m ² ; ̑ _a = 30 °C)					̑ _{stg}	166	°C							
Effective thermal capacity, incl. fluid (per gross area, A _G)					C/m ²	11.64	kJ/(Km ²)							
Maximum operating temperature					̑ _{max, op}	100	°C							
Maximum operating pressure					p _{max, op}	1000	kPa							
Testing laboratory					TZS, ITW University Stuttgart			www.itw.uni-stuttgart.de						
Test report(s)					17COL1402 17COL1403 17COL1403Q			Dated		11.01.2018 11.01.2018 11.01.2018				
Comments of testing laboratory					Datashet version: 5.01, 2016-03-01									
This data sheet replaces the data sheet issued on 14.02.2018. Documented performance parameters are taken from test report 17COL1402 (ST180). The values related to 1.62m ² aperture area are: ̑ _{0a} =0.745; c _{1a} = 4.788; c _{2a} =0.014.														
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 Supplementary Information	Licence Number	011-7S2825 F
	Issued	2018-05-18

Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on ISO 9806:2013 test results

Standard Locations Collector name	ϑ_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
ST180		1 879	1 184	649	1 335	806	408	996	566	283	1 096	614	301
ST200		2 136	1 345	737	1 517	916	464	1 132	643	322	1 246	698	342
ST210		2 210	1 392	763	1 570	948	480	1 171	666	333	1 289	722	354
ST230		2 467	1 553	851	1 752	1 058	536	1 307	743	372	1 439	806	395
ST240		2 552	1 607	881	1 813	1 095	555	1 352	769	385	1 489	834	408
ST270		2 840	1 789	980	2 018	1 219	617	1 505	856	428	1 657	928	454
Annual output per m ² gross area		1 068	673	369	759	458	232	566	322	161	623	349	171
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m ²			1714 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. 5.01 (March 2016). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc

Additional Information

Collector heat transfer medium	Water-Glycole
Hybrid Thermal and Photo Voltaic collector	No
The collector is deemed to be suitable for roof integration	Yes
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	2750 Pa
Maximum tested negative load	2500 Pa
Hail resistance using steel ball (maximum drop height)	2 m

Energy Labelling Information

	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
ST180	1.76	Collector efficiency (η_{col})	49 %
ST200	2.00	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 9806:2013.	
ST210	2.07		
ST230	2.31		
ST240	2.39		
ST270	2.66		
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.683
		First-order coefficient (a_1)	4.41 W/(m ² K)
		Second-order coefficient (a_2)	0.013 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.88
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.			