




Annex to Solar Keymark Certificate					Licence Number		MIRTEC1-01-2983CER 24012000001																	
					Date issued		2020-01-22																	
					Issued by		MIRTEC S.A																	
Licence holder		BARTEC S.A.			Country		Greece																	
Brand (optional)		SOLBAR			Web		http://www.bartec.gr																	
Street, Number		12 Km of Athens-Chalkidona Road			E-mail		info@info.bartec.gr																	
Postcode, City		57008 Thessaloniki			Tel		+30 2310 722901																	
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																			
					Gross area (A _G)		Gross length		Gross width		Gross height		0 K		10 K		30 K		50 K		70 K		81 K	
					m ²		mm		mm		mm		W		W		W		W		W			
SOLBAR size A					1.50		1,480		1,010		80		972		916		794		656		505		415	
SOLBAR size B					2.00		1,980		1,010		83		1,296		1,222		1,058		875		673		554	
SOLBAR size C					2.44		1,980		1,230		83		1,581		1,490		1,291		1,068		821		676	
Power output per m ² gross area					648		611		529		438		337		277									
Performance parameters test method					Steady state - outdoor																			
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					0.653		3.61		0.012		0.000		0.00		0		0.000		0.00		0.0E+00		0.95	
Incidence angle modifier test method					Steady state - outdoor																			
Incidence angle modifier					Angle		10°		20°		30°		40°		50°		60°		70°		80°		90°	
Transversal					K _{BT, coll}		1.00		1.00		1.00		0.99		0.95		0.90		0.77		0.52		0.00	
Longitudinal					K _{BL, coll}		1.00		1.00		1.00		0.99		0.95		0.90		0.77		0.52		0.00	
Heat transfer medium for testing					Water																			
Flow rate for testing (per gross area, A _G)					dm/dt		0.021		kg/(sm ²)															
Maximum temperature difference during thermal performance test					(ϑ _m -ϑ _a) _{max}		51		K															
Standard stagnation temperature (G = 1000 W/m ² ; ϑ _a = 30 °C)					ϑ _{stg}		140		°C															
Maximum operating temperature					ϑ _{max, op}		140		°C															
Maximum operating pressure					p _{max, op}		1000		kPa															
Testing laboratory					DEMOKRITOS							http://www.solar.demokritos.gr												
Test report(s)					4262 DQ1 4261 DE1 4260 DE1							Dated		16/9/2019 16/9/2019 16/9/2019										
Comments of testing laboratory					Datasheet version: 6.1, 2019-09-26							 N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6544592 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece												
Head office: A' Industrial Area, P.O.Box 13, GR 385 00 Volos, Tel.:+30 24210 95340-2, email: volos.office@mirtec.gr,												Athens office: M.Merkouri 76, GR 173 42 Athens Tel.:+30 210 9961408, email:athens.office@mirtec.gr http://www.mirtec.gr												



Annex to Solar Keymark Certificate		Licence Number		MIRTEC1-01-2983CER 2401200001									
Supplementary Information		Issued		2020-01-22									
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
SOLBAR size A		1,573	1,063	641	1,159	753	429	860	526	290	940	570	309
SOLBAR size B		2,098	1,418	855	1,545	1,004	572	1,146	702	387	1,253	760	412
SOLBAR size C		2,559	1,730	1,043	1,885	1,225	698	1,398	856	472	1,528	928	503
Annual output per m ² gross area		1,049	709	428	773	502	286	573	351	193	626	380	206
Annual efficiency, η_a		59%	40%	24%	47%	31%	18%	49%	30%	17%	50%	31%	17%
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)		A										--	
G (W/m ²) >		1000		ϑ_a (°C) >		20		H _x (MJ/m ²) >		600			
Maximum tested positive load		2400										Pa	
Maximum tested negative load		2400										Pa	
Hail resistance using steel ball (maximum drop height)		2										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)			
SOLBAR size A		1.50				8-VH-1234S-A:7.2,1380-C:20.6,1020-D				1.37			
SOLBAR size B		2.00				-				1.83			
SOLBAR size C		2.44				10-VH-1234S-A:7.2,1880-C:20.6,1240-D				2.27			
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})		48%				Zero-loss efficiency (η_0)				0.65			
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)				3.61			
						Second-order coefficient (a ₂)				0.012			
						Incidence angle modifier IAM (50°)				0.97			
										--			
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.													
Head office: A' Industrial Area, P.O.Box 13, GR 385 00 Volos, Tel.:+30 24210 95340-2, email: volos.office@mirtec.gr, Athens office: M.Merkouri 76, GR 173 42 Athens Tel.:+30 210 9961408, email:athens.office@mirtec.gr http://www.mirtec.gr													