


**Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results**

Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		SKM 10014/1												
					Date issued		2018-08-10												
					Issued by		DQS Hellas												
Licence holder		EBIL SA			Country		Greece												
Brand (optional)		EBIL			Web		www.ebil.gr												
Street, Number		1km N.R Katerini – Thessaloniki			E-mail		info@ebil.gr												
Postcode, City		60100 Katerini			Tel		+30 2351037257												
Collector Type					Flat plate collector, glazed														
Collector name					Gross area (A_G)		Gross length		Gross width		Gross height		Power output per collector $G_b = 850 \text{ W/m}^2$; $G_d = 150 \text{ W/m}^2$ $\vartheta_m - \vartheta_a$						
					m ²	mm	mm	mm	0 K	10 K	30 K	50 K	70 K	66 K					
EBIL-BLUE AL-MT 1,36					1.36	1,472	926	85	960	920	833	738	634	655					
EBIL-BLUE-AL-MT 1,83					1.83	1,975	925	85	1,292	1,238	1,121	993	853	882					
EBIL-BLUE-AL-MT 2,00					2.00	1,975	1,030	85	1,412	1,353	1,225	1,085	932	963					
EBIL-BLUE AL-MT 2,3					2.31	1,976	1,170	85	1,631	1,563	1,415	1,253	1,076	1,113					
Power output per m ² gross area									706	677	613	543	466	482					
Performance parameters test method					Steady state - outdoor														
Performance parameters (related to AG)					$\eta_{0,hem}$	a1	a2												
Units					-	W/(m ² K)	W/(m ² K ²)												
Test results					0.706	2.870	0.008												
Incidence angle modifier test method					Steady state - outdoor														
Bi-directional incidence angle modifiers					No														
Incidence angle modifier					Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°					
Transversal					$K_{GT, coll}$					0.88				0.00					
Longitudinal					$K_{GL, coll}$					0.88				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					$(\vartheta_m - \vartheta_a)_{max}$	66	K												
Standard stagnation temperature ($G = 1000 \text{ W/m}^2$; $\vartheta_a = 30^\circ\text{C}$)					ϑ_{str}	188	°C												
Effective thermal capacity, incl. fluid (per gross area, A_G)					C/m ²	7.65	kJ/(Km ²)												
Maximum operating temperature					$\vartheta_{max, op}$		°C												
Maximum operating pressure					$p_{max, op}$	1000	kPa												
Testing laboratory					NCSR "DEMOKRITOS"			www.solar.demokritos.gr											
Test report(s)					1252 DE1 1253 DE1 4203 DQ1 4203 DQ2			Dated		11/12/2017 12/12/2017 7/2/2018									
Comments of testing laboratory					Datasheet version: 5.01, 2016-03-01														
					 N.C.S.R "DEMOKRITOS" SOLAR ENERGY LABORATORY Head: Dr Vassilis Belesiotis Tel: +210 9503815 - Fax: +210 6544500 153 10 Ag. Paraskevi - Attiki - Greece														

Annex to Solar Keymark Certificate Supplementary Information		Licence Number		SKM 10014/1									
		Issued		2018-08-10									
Annual collector output in kWh/collector at mean fluid temperature ϑ_m, based on ISO 9806:2013 test results													
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
EBIL-BLUE AL-MT 1,36		1,454	1,079	757	1,135	829	573	825	573	380	892	613	401
EBIL-BLUE-AL-MT 1,83		1,956	1,452	1,018	1,527	1,116	771	1,110	771	512	1,200	825	540
EBIL-BLUE-AL-MT 2,00		2,138	1,587	1,113	1,669	1,219	843	1,213	843	559	1,312	902	590
EBIL-BLUE AL-MT 2,3		2,470	1,833	1,285	1,928	1,408	973	1,401	974	646	1,515	1,042	681
Annual output per m ² gross area		1,069	793	556	835	610	421	606	421	280	656	451	295
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											No		
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											2400		Pa
Maximum tested negative load											3000		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}											
EBIL-BLUE AL-MT 1,36	1.36	Collector efficiency (η_{col})								58		%	
EBIL-BLUE-AL-MT 1,83	1.83	<i>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/m², 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.</i>											
EBIL-BLUE-AL-MT 2,00	2.00												
EBIL-BLUE AL-MT 2,3	2.31												
		Data required for CDR (EU) No 812/2013 - Reference Area A _{sol}											
		Zero-loss efficiency (η_0)								0.706		--	
		First-order coefficient (a ₁)								2.87		W/(m ² K)	
		Second-order coefficient (a ₂)								0.008		W/(m ² K ²)	
		Incidence angle modifier IAM (50°)								0.88		--	
		<i>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.</i>											
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