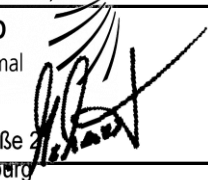


Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		011-7S922 R						
					Date issued		2016-09-05						
					Issued by		Din Certco						
Licence holder		Eco2all B.V.			Country		Netherlands						
Brand (optional)					Web		http://www.eco2all.nl/						
Street, Number		Fabrieksweg 40			E-mail		info@eco2all.nl						
Postcode, City		5683 PP Best			Tel/Fax		+31 (0)499 37 83 08						
Collector Type					Evacuated tubular collector								
Collector name	Gross area (A _G) m ²	Gross length mm	Gross width mm	Gross height mm	Power output per collector ¹ G _b = 850 W/m ² ; G _d = 150 W/m ² ϑ _m - ϑ _a								
					0 K	10 K	30 K	50 K	70 K	80 K			
					W	W	W	W	W	W			
Eco-bp10	1,66	1.950	852	189	690	674	633	580	516	479			
Eco-bp15	2,42	1.950	1.242	189	1.006	983	923	846	752	698			
Eco-bp20	3,18	1.950	1.632	189	1.322	1.291	1.213	1.112	988	917			
Eco-bp30	4,70	1.950	2.412	189	1.954	1.909	1.793	1.644	1.460	1.355			
Power output per m ² gross area					416	406	382	350	311	288			
Performance parameters test method				Steady state - outdoor									
Performance parameters (related to AG)				η _{0,hem}	a ₁	a ₂							
Units				-	W/(m ² K)	W/(m ² K ²)							
Test results				0,416	0,87	0,009							
Incidence angle modifier test method				Steady state - outdoor									
Bi-directional incidence angle modifiers				Yes									
Incidence angle modifier				Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal				K _{θT, coll}	1,00	1,03	1,11	1,25	1,37	1,36	1,11	0,70	0,05
Longitudinal				K _{θL, coll}	1,00	1,00	0,99	0,96	0,92	0,84	0,69	0,44	0,00
Heat transfer medium for testing				Water									
Flow rate for testing (per gross area, A _G)				dm/dt	0,011	kg/(sm ²)							
Maximum temperature difference for thermal performance calculations				(ϑ _m -ϑ _a) _{max}	80	K							
Standard stagnation temperature (G = 1000 W/m ² ; ϑ _a = 30 °C)				ϑ _{stg}	200	°C							
Effective thermal capacity, incl. fluid (per gross area, A _G)				C/m ²	8,8	kJ/(Km ²)							
Maximum operating temperature				ϑ _{max, op}	95	°C							
Maximum operating pressure				p _{max, op}	1000	kPa							
Testing laboratory				TestLab Solar Thermal Systems, Fraunhofer ISE				http://www.collectortest.com					
Test report(s)				ktb-2007-07-aac-en				Dated		01.09.2009			
Comments of testing laboratory				Datashet version: 5.01, 2016-03-01									
<p>The collector was tested according to EN 12975-1,2:2006.</p> <p>¹ According to Scenocalc v5.01 the power output per collector unit of a steady state performance test does not consider the fraction of the diffuse irradiance, but it is calculated based on η_{0,hem} for a global hemispherical irradiance of 1000 W/m².</p> <p>² In 2006 the tests were not performed by means of implementing pressure. The collector was visually observed and the structur was checked from a technical point of view.</p>				<p>TestLab Solar Thermal Systems</p> <p>Heidenhofstraße D-79110 Freiburg</p> <p>Tel: +49 (0)761 4588 5354</p> 									
<p>DIN CERTCO • Alboinstraße 56 • 12103 Berlin, Germany</p> <p>Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de</p>													

Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S922 R
	Issued	2016-09-05

Annual collector output in kWh/collector at mean fluid temperature ϑ_m, based on EN 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
Eco-bp10		1.288	1.101	880	1.076	881	677	786	630	471	847	681	508
Eco-bp15		1.878	1.605	1.283	1.569	1.285	987	1.146	919	687	1.235	993	741
Eco-bp20		2.467	2.109	1.686	2.062	1.689	1.298	1.506	1.207	903	1.623	1.305	973
Eco-bp30		3.647	3.118	2.492	3.048	2.496	1.918	2.226	1.785	1.335	2.399	1.929	1.438
Annual output per m ² gross area		776	663	530	648	531	408	474	380	284	510	410	306
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)	EN 12975-2	--
Maximum tested positive load	see comment ²	Pa
Maximum tested negative load	see comment ²	Pa
Hail resistance using ice balls (diameter)	0	mm

Energy Labelling Information			
	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
Eco-bp10	1,66	Collector efficiency (η_{col})	37 %
Eco-bp15	2,42	<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>	
Eco-bp20	3,18		
Eco-bp30	4,70		
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0,416 --
		First-order coefficient (a_1)	0,87 W/(m ² K)
		Second-order coefficient (a_2)	0,009 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	1,20 --
		<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>	