

Annex to Solar Keymark Certificate					Licence Number		011-7S3013 R							
					Date issued		2021-04-23							
					Issued by		DIN CERTCO							
Licence holder		Metalco (Heaters) Ltd			Country		Cyprus							
Brand (optional)		Metalco			Web		www.metalcoheaters.com.cy							
Street, Number		44 propyleon street, PO Box 25520,			E-mail		info@metalcoheaters.com.cy							
Postcode, City		1310 Nicosia			Tel		+00357 22-425382							
Collector Type					Flat plate collector									
Collector name					Gross area (A_G) m ²	Gross length mm	Gross width mm	Gross height mm	Power output per collector G _b = 850 W/m ² , G _d = 150 W/m ² & u = 1.3 m/s $\vartheta_m - \vartheta_a$					
									0 K W	10 K W	30 K W	50 K W	70 K W	104 K W
ELCO/2.0(Black)					2.00	2,001	1,000	81	1,340	1,264	1,085	872	626	131
Power output per m² gross area					670	632	542	436	313	66				
Performance parameters test method		Quasi dynamic												
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		0.681	3.63	0.021	0.000	0.00	8,674	0.000	0.00	0.00	0.89			
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	0.99	0.97	0.95	0.91	0.83	-	0.00			
Longitudinal		K _{θL, coll}	1.00	0.99	0.99	0.97	0.95	0.91	0.83	-	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 during thermal performance test					$(\vartheta_m - \vartheta_a)_{max}$		74		K					
Standard stagnation temperature (G = 1000 W/m²; $\vartheta_a = 30$ °C)					ϑ_{stg}		152		°C					
Maximum operating temperature					$\vartheta_{max, op}$		100		°C					
Maximum operating pressure					$p_{max, op}$		1200		kPa					
Testing laboratory		Intertek Testing Services Shenzhen Ltd. Guangzhou Branch					http://www.intertek.com							
Test report(s)		210324030GZU-001					Dated		2021-04-23					
Comments of testing laboratory					Datasheet version: 6.1, 2019-09-26									
<i>No comment.</i>					<i>Stamp & signature of test lab</i>									
DIN CERTCO ● Alboinstraße 56 ● D-12103 Berlin 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	011-7S3013 R
	Issued	2021-04-23

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
ELCO/2.0(Black)		2,122	1,404	784	1,555	967	489	1,157	685	341	1,262	738	363
Annual output per m ² gross area		1,061	702	392	777	483	245	579	342	170	631	369	182
Annual efficiency, η_a		60%	40%	22%	48%	30%	15%	50%	29%	15%	51%	30%	15%
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		
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)	C		--
G (W/m ²) >	800	ϑ_a (°C) >	10
		H_x (MJ/m ²) >	420
Maximum tested positive load	2400		Pa
Maximum tested negative load	2400		Pa
Hail resistance using steel ball (maximum drop height)	--		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)
ELCO/2.0(Black)	2.00	9-VH-1234S-A:10.12,1873-C:22,1060	1.84

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})	49%	Zero-loss efficiency (η_0)	0.67
		First-order coefficient (a_1)	3.63
		Second-order coefficient (a_2)	0.021
		Incidence angle modifier IAM (50°)	0.93
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.		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.	