Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2497 F
	Issued	2015-04-09

Company holding the	Sunerg Solar s.r.l.		Country	Italy	
Brand (optional)	MODASUN		Website	www.sunergsolar.com	
Street, street number	Via Donnini 51, Cinquemiglia		E-mail	daniele@sunergsolar.com	
Postal Code / City, province	IT-06012	Citta di Castello	Tel/Fax	+39	075-8540018 /-8648105

Collector Type (flat plate glazed/un-glazed; evacuate tubular)	Flat plate collector - glazed
Thermal / photo voltaic hybid collector? (PVT collector)	No
Integration in the roof possible ? (manufacturers declaration)	No

Collector name	Aperture area (Aa)	Gross length	Gross width	Gross height	Gross area (AG)	Power output per collector module G = 1000 W/m², Tm-Ta 0 K	10 K	30 K	50 K	70 K
	m²	mm	mm	mm	m²	W	W	W	W	W
BLU	1.797	2'007	1'008	100	**2.023**	1'287	1'216	1'067	908	739
BLUx	2.305	2'005	1'290	102	**2.586**	1'650	1'560	1'368	1'165	948

Performance test method		Glazed liquid heating collector - steady state - outdoor								
Performance parameters related to aperture		η0	a1	a2						
Units		-	W/(m²K)	W/(m²K²)						
Test results - Flow rate and fluid see note 1		0.716	3.87	0.0069						
Bi-directional incidence angle	Yes	*Kϑ values are obligatory for 50°.*								
Incidence angle modifiers Kθ(θT)	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
transversal direction	Kθ(θT)	1.00	0.99	0.97	0.93	0.87	0.77	0.61	0.37	0.00
Incidence angle modifiers Kθ(θL)	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
longitudinal direction	Kθ(θL)	1.00	0.99	0.97	0.93	0.87	0.77	0.61	0.37	0.00

Stagnation temperature - Weather conditions see note 2	Tstg	192	°C
Effective thermal capacity	ceff = C/Ag	5.5	kJ/(m²K)
Max. intende operation temperature - see note 3	Tmax,op	180	°C
Max. operation pressure - see note 3	pmax,op	1000	kPa

Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m² aperture area											
Flow rate	kg/(s m²)	0.004	0.007	0.011	0.015	0.019	0.022	0.026	0.030	0.034	0.037
Pressure drop, ΔP	Pa	50	101	156	212	271	332	395	461	529	600

Optional weather data	Location		Link	
Testing Laboratory	SPF, CH-8640 Rapperswil			
Website	www.spf.ch			
Test report id. number	C795LPEN, C796LPEN, C796QPEN	Date of test reports	26.10.2006, 08.11.2006	
During the test GDIF/GTOT was always between	0.1	and	0.2	

Comments of testing laboratory:

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Note 1	**Flow rate**	0.015 kg/(s m²)	**Fluid**	Water-Glycole	
Note 2	**Irradiance, G = 1000 W/m²; Ambient temperature , Ta=30 °C**				
Note 3	**Given by manufacturer**				

Dr. Andreas Bohren

Datasheet version: 4.06, 2014-01-15

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2497 F
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Annual collector output kWh/module

Collector name	Location and collector temperature (Tm)											
	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
BLU	1'945	1'325	840	1'444	969	603	1'065	672	403	1'156	719	422
BLUx	2'495	1'700	1'078	1'852	1'243	774	1'366	862	516	1'483	922	542

Collector mounting: Fixed or tracking	Fixed; slope = latitude - 15° (rounded to nearest 5°)

Overview of locations

Location	Latitude °	Gtot kWh/m²	Ta °C	Collector orientation or tracking mode
Athens	38	1'765	18.5	South, 25°
Davos	47	1'714	3.2	South, 30°
Stockholm	59	1'166	7.5	South, 45°
Würzburg	50	1'244	9.0	South, 35°

Gtot	Annual total irradiation on collector plane	kWh/m²
Ta	Mean annual ambient air temperature	°C
Tm	Constant collector operating temperature (mean of in- and outlet temperatures)	°C

The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool ScenoCalc. The collector output is calculated hour by hour according to the efficiency parameters from the Keymark test using constant collector operating temperature (Tm). A detailed description of the calculations is available at http://www.sp.se/en/index/services/solar/ScenoCalc/Sidor/default.aspx.

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

Datasheet version: 4.06, 2014-01-15
ScenoCalc version: Ver. 4.06 (Jan, 2014)