


Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate						Licence Number		011-7S2334 F				
						Issued		2014-03-21				
Company holding the			Orange Energy GmbH & Co. KG			Country		Deutschland				
Brand (optional)						Website		www.orange-energy.de				
Street, street number			Loipertshausener Str. 2			E-mail		r.woerl@orange-energy.de				
Postal Code / City, province			D-85301	Schweitenkirchen		Tel/Fax		+49 84 44 / 92 74 -14				
Collector Type (flat plate glazed/un-glazed; evacuate tubular)						Flat plate collector - glazed						
Thermal / photo voltaic hybrid 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 (A _G)	Power output per collector module					
							G = 1000 W/m ² T _m -T _a					
		0 K	10 K	30 K	50 K	70 K						
		m ²	mm	mm	mm	m ²	W	W	W	W	W	
SUN2		2,38	2.198	1.168	100	2,57	1.950	1.872	1.696	1.496	1.265	
SUN2Q		2,38	1.168	2.198	100	2,57	1.966	1.878	1.677	1.441	1.169	
Performance test method			Glazed liquid heating collector - steady state - outdoor									
Performance parameters related to aperture			η ₀	a ₁	a ₂							
Units			-	W/(m ² K)	W/(m ² K ²)							
Test results - Flow rate and fluid see note 1			0,825	3,490	0,0184							
Bi-directional incidence angle			Yes	Kθ values are obligatory for 50°.								
Incidence angle modifiers Kθ(θT) transversal direction			Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Kθ(θT)			1,00	1,00	0,99	0,97	0,93	0,86	0,72	0,47	0,00	
Incidence angle modifiers Kθ(θL) longitudinal direction			Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Kθ(θL)			1,00	1,00	0,99	0,97	0,93	0,86	0,72	0,47	0,00	
Stagnation temperature - Weather conditions see note 2									T _{stg}	217	°C	
Effective thermal capacity									c _{eff} = C/A _z	7,421	kJ/(m ² K)	
Max. intended operation temperature - see note 3									T _{max,op}	130	°C	
Max. operation pressure - see note 3									p _{max,on}	2,5	kPa	
Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m ² aperture area												
Flow rate	kg/(s m ²)	0,007	0,014	0,021	0,028	0,042	0,056	0,070	0,072			
Pressure drop, ΔP	Pa	921	2054	4988	8278	16790	27736	41033	43535			
Optional weather data	Location							Link				
Testing Laboratory	ASi C (Austria Solar Innovation Center)											
Website	www.asic.at											
Test report id. number	P-201305001_1-OEM2;						Date of test report	19.03.2014;				
	201305001_2_PC-OEM2							19.03.2014				
During the test G _{DIF} /G _{TOT} was always between			0,1	and	0,2							
Comments of testing laboratory:												
Note 1	Flow rate	0,032	kg/(s m ²)	Fluid	Water							 Austria Solar Innovation Center Roseggerstraße 12 A-4600 Wals Tel: ++43 (0) 7242 / 9396 5560 Fax: ++43 (0) 7242 7 9396 49 5560 Datasheet version: 4-05, 2013-11-07
Note 2	Irradiance, G = 1000 W/m ² ; Ambient temperature, T _a = 30 °C											
Note 3	Given by manufacturer											



Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2334 F
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Annual collector output kWh/module													
Collector name	Location and collector temperature (T _m)												
	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	
SUN2	3.127	2.273	1.493	2.411	1.684	1.055	1.767	1.173	709	1.918	1.267	754	
SUN2Q	3.127	2.273	1.493	2.411	1.684	1.055	1.767	1.173	709	1.918	1.267	754	

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

Overview of locations				
Location	Latitude °	G _{tot} kWh/m ²	T _a °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°

G _{tot}	Annual total irradiation on collector plane	kWh/m ²
T _a	Mean annual ambient air temperature	°C
T _m	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 (T_m). A detailed description of the calculations is available at <http://www.sp.se/en/index/services/solar/ScenoCalc/Sidor/default.aspx>.

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	ScenoCalc version: Ver. 4.05 (Nov, 2013)