TÜVRheinland® DIN CERTCO

Fraunhofer ISE

Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate

Licence number	011-7S199 F
Date of issue	25.06.2012

Company holding the licence	Sunex S,A,	**Country**	Poland
Brand (optional)		**Website**	www.sunex.pl
Street, number	Piskowa 7	**E-mail**	info@sunex.pl
Postal Code	47-400	**Tel.** +48	324149212
City	Raciborz	**Fax**	

Collector Type (flat plate / evacuate tubular / un-glazed)	Flat plate collector
Integration in the roof possible ?	No

Collector name	Aperture area (Aa) [m²]	Gross length [mm]	Gross width [mm]	Gross height [mm]	Gross area (A_G) [m²]	Power output per collector unit G = 1000 W/m² Tm-Ta : 0 K [W]	10 K [W]	30 K [W]	50 K [W]	70 K [W]
PIX 2.0	1,83	1787	1139	97	2,04	1396	1333	1195	1043	877
PIX 2.5	2,29	2242	1122	97	2,44	1.752	1672	1499	1309	1.100
PIX 2.85	2,53	2243	1273	97	2,86	1.935	1847	1657	1446	1.215

Collector efficiency parameters related to aperture area (Aa) Type of fluid and flow rate see note 1	η_{0a}	0.778	-
	a_{1a}	3.369	W/(m²K)
	a_{2a}	0.0141	W/(m²K²)
Stagnation temperature - Weather conditions see note 2	t_{stg}	169.3	°C
Effective thermal capacity	$c_{eff} = C/A_a$	4,20	kJ/(m²K)
Max. operation pressure - see note 3	p_{max}	1000	kPa

Incidence angle modifiers $K_\theta(\theta)$	G_{DIF}/G_{TOT} min	max	θ_T / θ_L	50°	*10°*	*20°*	*30°*	*40°*	*60°*	*70°*
	0,082	0,12	$K_\theta(\theta_T)$	0.91	*1.00*	*1.00*	*1.00*	*0.96*	*0.82*	*0.67*
			$K_\theta(\theta_L)$	0.91	*1.00*	*1.00*	*1.00*	*0.96*	*0.82*	*0.67*
G_{DIF}/G_{TOT}: min&max - while measuring					***Optional values***					

Testing Laboratory	Fraunhofer ISE, TestLab Solar Thermal Systems
Website	www.kollektortest.de
Test report id. number	ktb-2007-21
Date of test report	29.06.2007
Perf. test method	EN 12975-2 6.1.4 (outdoor)

Comments of testing laboratory :

Note 1	**Fluid**	Water	**Flow rate**	0,020	kg/s per m²
Note 2	**Irradiance, Gs=1000 W/m²; Ambient temperature , Ta=30 °C**				
Note 3	**Given by manufacturer**				

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VERSION 3.7, 2012.03.22

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence number	RRRRRRRRR
	Issued	25.06.2012

Annual collector output kWh

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			
PIX 2.0	2.243	1.631	1.088	1.846	1.294	825	1.246	845	524	1.371	911	556			
PIX 2.5	2.807	2.041	1.361	2.310	1.619	1.032	1.559	1.057	656	1.716	1.140	696			
PIX 2.85	3.512	2.554	1.704	2.891	2.026	1.292	1.951	1.323	821	2.147	1.427	871			

Collector mounting: Fixed or tracking	No tracking; 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

Calculation of the annual collector performance is done by the official Solar Keymark spreadsheet tool. Hour by hour the collector output is calculated according to the efficiency parameters from the Keymark test using constant collector operating temperature (Tm). Detailed description with all equations used is available from the Solar Keymark web site (direct link: http://www.estif.org/solarkeymark/annexb1.php)

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Datasheet version:
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Calculation program version:
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