Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2158 F
	Issued	2013-10-10

Company holding the	HEWALEX SP. Z.o.o Sp.k.		Country	POLAND
Brand (optional)	--		Website	www.hewalex.eu
Street, street number	ul. Sowacklego 33		E-mail	hewalex@hewalex.pl
Postal Code / City, province	43-502	Czechowice-Dziedzice	Tel/Fax	48 32 214 17 10 / 32 214 50 04

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)	Yes

	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
Collector name	m²	mm	mm	mm	m²	W	W	W	W	W
KS 2100 TP AC	1,82	2.018	1.037	89	**2,09**	1.471	1.406	1.256	1.076	867
KS 2100 TLP AC	1,82	2.018	1.037	89	**2,09**	1.471	1.406	1.256	1.076	867
KS 2200 TP AC	2,01	2.018	1.129	89	**2,28**	1.624	1.553	1.387	1.189	958
KS 2200 TLP AC	2,01	2.018	1.129	89	**2,28**	1.624	1.553	1.387	1.189	958
KS 2400 TP AC	2,19	2.018	1.221	89	**2,46**	1.770	1.692	1.511	1.295	1.044
KS 2400 TLP AC	2,19	2.018	1.221	89	**2,46**	1.770	1.692	1.511	1.295	1.044
KS 2600 TP AC	2,36	2.018	1.314	89	**2,65**	1.907	1.823	1.628	1.395	1.125
KS 2600 TLP AC	2,36	2.018	1.314	89	**2,65**	1.907	1.823	1.628	1.395	1.125

Performance test method	Glazed liquid heating collector - steady state - indoor									
Performance parameters related to aperture	η0	a1	a2							
Units	-	W/(m²K)	W/(m²K²)							
Test results - Flow rate and fluid see note 1	0,808	3,334	0,020							

Bi-directional incidence angle	No	*Kϑ values are obligatory for 50°.*								
Incidence angle modifiers Kθ(θ)	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
	Kθ(θ)					0,95				0,00
Incidence angle modifier not bi-directional - leave fields blank										

Stagnation temperature - Weather conditions see note 2	Tstg	204,9 °C
Effective thermal capacity	ceff = C/Ag	4,93 kJ/(m²K)
Max. intende operation temperature - see note 3	Tmax,op	250 °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)	0,000	0,010	0,023	0,037	0,050	0,063			
Pressure drop, ΔP	Pa	0	120	310	530	770	1040			

Optional weather data	Location		Link

Testing Laboratory	Fundación CENER-CIEMAT
Website	www.cener.com
Test report id. number	30.2047.0-1-1 R / 30.2047.0-2-1 R 30.2047.0-3-1 R / 30.2047.0
Date of test report	2013/09/18

During the test GDIF/GTOT was always between	0,13	and	0,15

Comments of testing laboratory:

The collectors models KS 2100 TLP AC and KS 2600 TLP AC were tested according to EN 12975-2. According to SKM rules the results of the collector model KS 2100 TLP AC are representative for the whole KS-AC family.

Note 1	Flow rate	0,030	kg/(s m²)	Fluid	Water
Note 2	Irradiance, G = 1000 W/m²; Ambient temperature , Ta=30 °C				
Note 3	Given by manufacturer				

CENER

Datasheet version: 4.06, 2014-01-15

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2158 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
KS 2100 TP AC	2.378	1.737	1.138	1.833	1.278	788	1.350	895	534	1.465	970	569
KS 2100 TLP AC	2.378	1.737	1.138	1.833	1.278	788	1.350	895	534	1.465	970	569
KS 2200 TP AC	2.626	1.918	1.256	2.024	1.411	871	1.491	989	590	1.618	1.072	629
KS 2200 TLP AC	2.626	1.918	1.256	2.024	1.411	871	1.491	989	590	1.618	1.072	629
KS 2400 TP AC	2.861	2.090	1.369	2.206	1.537	949	1.624	1.077	643	1.762	1.168	685
KS 2400 TLP AC	2.861	2.090	1.369	2.206	1.537	949	1.624	1.077	643	1.762	1.168	685
KS 2600 TP AC	3.083	2.252	1.475	2.377	1.657	1.022	1.750	1.161	693	1.899	1.258	738
KS 2600 TLP AC	3.083	2.252	1.475	2.377	1.657	1.022	1.750	1.161	693	1.899	1.258	738

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.