



Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	Certificate No.	011-7S1935 R
	Date of issue	4. October 2013

Company	Kingspan Environmental Ltd.	Country	Northern Ireland; Unite
Brand (optional)	0	Website	www.kingspansolar.com
Street, number	180 Gilford Road	E-mail	info@kingspansolar.com
Postal Code	BT 63 5LF	Tel.	+44 (0)28 3836 4500
City	Portadown, Co. Armagh	Fax	+44 (0)28 3836 4501

Collector Type (flat plate / evacuate tubular / un-glazed)	Evacuated tubular collector
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Integration in the roof possible ?	No
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Collector name	Aperture area (Aa) [m ²]	Gross length [mm]	Gross width [mm]	Gross height [mm]	Gross area (AG) [m ²]	Power output per collector unit				
						G = 1000 W/m ² Tm-Ta :				
						0 K	10 K	30 K	50 K	70 K
varisol HP135	0.11	1 965	71	80	0.14	83	81	76	70	64
varisol HP135 (for 10 tubes)	1.06	1 965	710	80	1.40	830	807	757	702	641
varisol HP135 (for 20 tubes)	2.13	1 965	1 420	80	2.80	1 660	1 614	1 514	1 403	1 283
varisol HP135 (for 30 tubes)	3.19	1 965	2 130	80	4.20	2 490	2 420	2 270	2 105	1 924
varisol HP135 (for 40 tubes)	4.26	1 965	2 840	80	5.60	3 320	3 227	3 027	2 806	2 565
varisol HP135 (for 50 tubes)	5.32	1 965	3 550	80	7.00	4 150	4 034	3 784	3 508	3 207

Collector efficiency parameters related to aperture area (Aa) Type of fluid and flow rate see note 1	η_{0a}	0.780	-
	a_{1a}	2.112	W/(m ² K)
	a_{2a}	0.006	W/(m ² K ²)

Stagnation temperature - Weather conditions see note 2	t _{stg}	192	°C
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Effective thermal capacity	C _{eff} = C/Aa	4.74	kJ/(m ² K)
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Max. operation pressure - see note 3	p _{max}	600	kPa
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Incidence angle modifiers K _θ (θ)	G _{DIF} /G _{TOT}		θ _T / θ _L K _θ (θ _T)	50°	10°	20°	30°	40°	60°	70°
	min	max								
	G _{DIF} /G _{TOT} : min&max - while measuring			K _θ (θ _L)	0.96	1.00	1.02	1.06	1.05	0.88
				0.97	1.00	1.00	0.99	0.98	0.94	0.89

Optional values

Testing Laboratory	TÜV Energie und Umwelt GmbH
Website	www.eco-tuv.de
Test report id. number	21218850_P1_HP135; 21218850a_R
Date of test report	25 June 2012 (both)
Perf. test method	EN 12975-2 6.1.5 (indoor)

Comments of testing laboratory :
This collector is using a temperature limiter for stagnation protection.
The special construction allows to put a various number of tubes together. The tube itself could be seen as collector.

Note 1	Fluid	Water	Flow rate	0.026 kg/s per m ²	 TÜV Rheinland Energie und Umwelt GmbH Am Grünen Stein D - 51105 Köln
Note 2	Irradiance, G _s =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	Certificate No.	011-7S1935 R
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Annual collector output kWh													
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	
varisol HP135	139	115	93	122	100	80	83	65	50	89	70	54	
varisol HP135 (for 10 tubes)	1 386	1 153	931	1 220	1 003	796	826	650	501	892	704	538	
varisol HP135 (for 20 tubes)	2 772	2 306	1 862	2 441	2 006	1 592	1 651	1 301	1 002	1 785	1 407	1 075	
varisol HP135 (for 30 tubes)	4 159	3 458	2 793	3 661	3 009	2 387	2 477	1 951	1 503	2 677	2 111	1 613	
varisol HP135 (for 40 tubes)	5 545	4 611	3 725	4 882	4 013	3 183	3 302	2 601	2 004	3 570	2 815	2 151	
varisol HP135 (for 50 tubes)	6 931	5 764	4 656	6 102	5 016	3 979	4 128	3 252	2 505	4 462	3 518	2 689	

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

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 (T_m). Detailed description with all equations used is available from the Solar Keymark web site (direct link:<http://www.estif.org/solarkeymark/annexb1.php>)

DIN CERTCO • Alboinstraße 56 • 12103 Berlin Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de	Datasheet version:
	VERSION 3.5, 2012.01.13
	Calculation program version: 3.07, October 2011 (SP)