



Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	Certificate No.	011-7S1936 R
	Date of issue	04. October 2013

Company	Kingspan Environmental Ltd.	Country	Northern Ireland; Unite
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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 (A _a) [m ²]	Gross length [mm]	Gross width [mm]	Gross height [mm]	Gross area (A _G) [m ²]	Power output per collector unit G = 1000 W/m ² T _m -T _a :				
						0 K	10 K	30 K	50 K	70 K
						[W]	[W]	[W]	[W]	[W]
varisol HP90	0.11	1 965	71	80	0.14	81	79	75	70	65
varisol HP90 (for 10 tubes)	1.06	1 965	710	80	1.40	809	791	749	701	646
varisol HP90 (for 20 tubes)	2.13	1 965	1 420	80	2.80	1 617	1 581	1 498	1 402	1 292
varisol HP90 (for 30 tubes)	3.19	1 965	2 130	80	4.20	2 426	2 372	2 248	2 103	1 939
varisol HP90 (for 40 tubes)	4.26	1 965	2 840	80	5.60	3 235	3 162	2 997	2 804	2 585
varisol HP90 (for 50 tubes)	5.32	1 965	3 550	80	7.00	4 043	3 953	3 746	3 506	3 231

Collector efficiency parameters related to aperture area (A_a) Type of fluid and flow rate see note 1	η _{0a}	0.760	-
	a _{1a}	1.621	W/(m ² K)
	a _{2a}	0.008	W/(m ² K ²)

Stagnation temperature - Weather conditions see note 2	t _{stg}	100	°C
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Effective thermal capacity	C _{eff} = C/A _a	4.74	kJ/(m ² K)
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Max. operation pressure - see note 3	p _{max}	600	kPa
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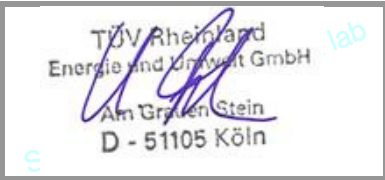
Incidence angle modifiers K _θ (θ)	G _{DIF} /G _{TOT}		θ _T / θ _L	50°	10°	20°	30°	40°	60°	70°
	min	max								
	G _{DIF} /G _{TOT} : min&max - while measuring			K _θ (θ _T)	0.96	1.00	1.02	1.06	1.05	0.88
			K _θ (θ _L)	0.97	1.00	1.00	0.99	0.98	0.94	0.89

Optional values

Testing Laboratory	TÜV Energie und Umwelt GmbH
Website	www.eco-tuv.de
Test report id. number	21218850_P_HP90; 21218850a_R
Date of test report	25 May 2012; 25 June 2012
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 starting point of this limiter is at about 70°C, so the results for Output Power at 50K and 70 K as well as the annual collector output at 75°C collector mean temperature could be lower. With the existing efficiency curves, it is not possible to describe the special characteristic of this collector for the full temperature range.
 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	0.024 kg/s per m ²
Note 2	Irradiance, G_s=1000 W/m² Ambient temperature, T_a=30 °C			
Note 3	Given by manufacturer			





**Annual collector output based on EN 12975 Test Results,
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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 HP90	136	116	96	121	102	83	82	67	52	89	72	56
varisol HP90 (for 10 tubes)	1 356	1 162	960	1 214	1 024	829	820	667	524	885	721	565
varisol HP90 (for 20 tubes)	2 711	2 323	1 921	2 428	2 048	1 657	1 641	1 333	1 049	1 771	1 441	1 129
varisol HP90 (for 30 tubes)	4 067	3 485	2 881	3 642	3 072	2 486	2 461	2 000	1 573	2 656	2 162	1 694
varisol HP90 (for 40 tubes)	5 422	4 646	3 841	4 857	4 096	3 315	3 281	2 666	2 097	3 541	2 882	2 258
varisol HP90 (for 50 tubes)	6 778	5 808	4 802	6 071	5 120	4 143	4 102	3 333	2 622	4 427	3 603	2 823

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

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>)

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Datasheet version:

VERSION 3.5, 2012.01.13

Calculation program version:

3.07, October 2011 (SP)