Certificate

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Partner for progress

Number	KIP-083546/01	Replaces	64479/02
Issued	25-06-2014	Scope	EN 12975-1:2006 + A1:2010, EN 12975-2:2006, Solar Keymark Specific Scheme Rules V21.00
Expiry date	31-08-2017	Contract number	KIP TH 750
Report number	100179791	Page	1 of 1

Kiwa hereby declares that the **thermal solar collector**, type

HPC2,5

supplied by **HRsolar**
De Lier, The Netherlands

Is entitled to use the Solar Keymark label.

The compliance is based on examination to:
EN 12975-1:2006 + A1:2010, EN 12975-2:2006 and the
Specific Keymark Scheme Rules for Solar Thermal Products V21.00

A description of the test results is given in the appendix to this certificate.

B. Meekma

Bouke Meekma
Kiwa

034

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Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate		Licence Number	KIP-083546/01
		Issued	2014-06-25

Company holding the	Hrsolar		Country	The Netherlands	
Brand (optional)			Website	www.hrsolar.nl	
Street, street number	Leehove 4		E-mail	info@hrsolar.nl	
Postal Code / City, province	2678 MC	De Lier	Tel/Fax	31	0174 52 33 03

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
HPC2,5	2,28	2.118	1.181	94	2,50	1.952	1.863	1.656	1.412	1.128

Performance test method	Glazed liquid heating collector - steady state - indoor										
Performance parameters related to aperture area		η0	a1	a2							
Units		-	W/(m²K)	W/(m²K²)							
Test results - Flow rate and fluid see note 1		0,856	3,688	0,021							

Bi-directional incidence angle modifiers?	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	0,98	0,96	0,93	0,87		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	0,98	0,96	0,93	0,87		0,00	

Stagnation temperature - Weather conditions see note 2	Tstg	210	°C
Effective thermal capacity	ceff = C/Ag	5,84	kJ/(m²K)
Max. intende operation temperature - see note 3	Tmax,op	120	°C
Max. operation pressure - see note 3	pmax,op	600	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)	0,003	0,007	0,010	0,013	0,017	0,020	0,023	0,027	0,030	0,033
Pressure drop, ΔP	Pa	11	44	100	178	278	400	544	711	900	1111

Optional weather data	Location		Link	
Testing Laboratory	CENER; Kiwa Nederland B.V.			
Website	www.cener.com; www.1kiwa.com			
Test report id. number	30.1586 / 120300931	Date of test report	19/05/2011; 28/08/2012	
During the test GDIF/GTOT was always between	0,1	and	0,2	

Comments of testing laboratory:

Performance test performed by Kiwa

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

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Datasheet version: 4.06, 2014-01-15

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	KIP-083546/01
	Issued	25/06/2014

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
HPC2,5	3.167	2.291	1.483	2.429	1.678	1.022	1.788	1.176	693	1.944	1.274	739

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.

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ScenoCalc version: Ver. 4.06 (Jan, 2014)