CERTIFIKAT

Solar Keymark Certificate
No. SP SC1396-13

Product name and description

Flat plate thermal solar collector for water heating. For technical information see Appendix.

Model:	**FPC1200D**

Certificate

The product mentioned above is found to comply with requirements in EN 12975-1:2006+A1:2010 and EN 12975-2: 2006 and the Specific CEN Keymark Scheme Rules for Solar Thermal Products.

Marking

Products conforming to this certificate shall be marked in accordance with the requirements in the Specific CEN Keymark Scheme Rules for Solar Thermal Products. The marking shall, together with the Keymark logo, show the identification code of the empowered certification body (SP Technical Research Institute of Sweden, No. 012), also see CEN-CENELEC Internal Regulations Part 4 Certification, Annex A.

Validity

This certificate is valid until 2018-12-11 provided that the conditions in the Solar Keymark Rules are fulfilled and the standard or rules are not modified significantly. The validity of the certificate can be checked in the database, see Solar Keymark website http://www.solarkeymark.org

Miscellaneous

The manufacturer's factory production control procedures are under surveillance by the responsibility of SP. This is the first version of this certificate.

Borås, Sweden 11th December 2013

SP Technical Research Institute of Sweden
Certification

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Product / Certification Manager

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EN 45 011

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Appendix to Solar Keymark Certificate

Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	Certificate number	SP SC1396-13
	Date of issue	11-12-2013

Company holding the licence		**Country**	
Brand (optional)		**Website**	
Street, number		**E-mail**	
Postal Code		**Tel.**	
City		**Fax**	

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

Collector name	Aperture area (Aa)	Gross length	Gross width	Gross height	Gross area (AG)	Power output per collector unit G = 1000 W/m² Tm-Ta : 0 K	10 K	30 K	50 K	70 K
	[m²]	[mm]	[mm]	[mm]	[m²]	[W]	[W]	[W]	[W]	[W]
FPC1200D	1.85	2000	1000	80	2.00	1412	1319	1103	850	559

Collector efficiency parameters related to aperture area (Aa) Type of fluid and flow rate see note 1	η_{0a}	0.76	-
	a_{1a}	4.81	W/(m²K)
	a_{2a}	0.0253	W/(m²K²)
Stagnation temperature - Weather conditions see note 2	t_{stg}	160.5	°C
Effective thermal capacity	$c_{eff} = C/A_a$	2.57	kJ/(m²K)
Max. operation pressure - see note 3	p_{max}	1200	kPa

Incidence angle modifiers $K_\theta(\theta)$	G_{DIF}/G_{TOT} min	G_{DIF}/G_{TOT} max	θ_T / θ_L	50°	10°	20°	30°	40°	60°	70°
			$K_\theta(\theta_T)$	0.88	--	--	--	--	--	--
	0.13	0.2	$K_\theta(\theta_L)$	--	--	--	--	--	--	--
G_{DIF}/G_{TOT}: min&max - while measuring					*Optional values*					

Testing Laboratory	Intertek Testing Services Shenzhen Ltd. Guangzhou Branch
Website	www.intertek.com
Test report id. number	130617017GZU-002
Date of test report	25-11-2013
Perf. test method	EN 12975-2 6.1.4 (outdoor)

Comments of testing laboratory :

No comment

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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Appendix to Solar Keymark Certificate

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Certificate number	SP SC1396-13
	Date of issue	11-12-2013

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			
FPC1200D	2101	1280	639	1486	853	375	1109	606	267	1211	647	284			

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

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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Calculation program version:
4.05,Nov 2013 (SP)