



CERTIFICATE

Solar Keymark Certificate

No. SP SC0842-14

Holder/Issued to/Manufacturer

Company: Arcon-Sunmark A/S

Address: Skørping Nord 3, DK-9520 Skørping, Denmark

Product name and description

Flat plate solar thermal collector for water heating. For technical information see Appendix (2 pages).

Models:	HTHEATstore 35/08
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Certificate

The product is found to comply with the requirements in EN 12975-1:2006+A1:2010 Solar collectors Part 1: General requirements and the Specific CEN Keymark Scheme Rules for Solar Thermal Products, and are based on test results according to EN ISO 9806:2013 Solar thermal collectors – Test methods.

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 2019-10-31 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 certificate was first issued 2014-10-31. This is issue 3.

Borås, Sweden 2016-07-14

SP Technical Research Institute of Sweden Certification

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Empowered Certification Body No. 012: SP Certification, Sweden

For more information of Solar Keymark visit: www.solarkeymar.org

This certificate may not be reproduced other than in full, except with the prior written approval by SP. SP Certification rules SPCR402 applies.



Annex to Solar Keymark Certificate

Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results						Licence Number		SP SC0842-14							
						Date issued		2016-07-14							
						Issued by		SP							
Licence holder		Arcon-Sunmark A/S				Country		Denmark							
Brand (optional)		HTHEATstore 35/08				Web		http://arcon-sunmark.com/							
Street, Number		Skørping Nord 3				E-mail		info@arcon-sunmark.com							
Postcode, City		DK-9520 Skørping				Tel		+45 9839 1477							
Collector Type						Flat plate collector, glazed									
Collector name						Power output per collector G _b = 850 W/m ² ; G _d = 150 W/m ² ; u = 3 m/s $\vartheta_m - \vartheta_a$									
						Gross area (A _G)		Gross length	Gross width	Gross height	0 K	10 K	30 K	50 K	70 K
		m ²	mm	mm	mm	W	W	W	W	W	W				
HTHEATstore 35/08		13.57	5 973	2 272	145	10 180	9 872	9 199	8 451	7 626	7 185				
Power output per m² gross area						750	727	678	623	562	529				
Performance parameters test method						Quasi dynamic									
Performance parameters (related to AG)						$\eta_{0,b}$	c1	c2	c3	c4	c6	Kd			
Units						-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	s/m	-			
Test results						0.757	2.199	0.007	0.000	0.000	0.000	0.940			
Incidence angle modifier test method						Quasi dynamic - outdoor									
Bi-directional incidence angle modifiers						No									
Incidence angle modifier						Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal						K _{θT, coll}	1.00	0.99	0.97	0.95	0.90	0.83	0.67	0.33	0.00
Longitudinal						K _{θL, coll}	1.00	0.99	0.97	0.95	0.90	0.83	0.67	0.33	0.00
Heat transfer medium for testing						Water									
Flow rate for testing (per gross area, A_G)						dm/dt	0.041	kg/(sm ²)							
Maximum temperature difference for thermal performance calculations						($\vartheta_m - \vartheta_a$) _{max}	80	K							
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)						ϑ_{stg}	260	°C							
Effective thermal capacity, incl. fluid (per gross area, A_G)						C/m ²	6.201	kJ/(Km ²)							
Maximum operating temperature						$\vartheta_{max, op}$	110	°C							
Maximum operating pressure						p _{max, op}	1000	kPa							
Testing laboratory						SP Technical Research Institute of Sweden				http://www.sp.se/en					
Test report(s)						6P02267-D-Rev 1 4P04266-D-Rev 2				Dated 2016-07-06 2015-11-10					
Comments of testing laboratory						Datasheet version: 5.01, 2016-03-01									
Certification Body: SP Technical Research Institute of Sweden Box 857, 501 15 Borås, Sweden www.sp.se info@sp.se phone: +46(0) - 10 516 50 00															



Annex to Solar Keymark Certificate

Annex to Solar Keymark Certificate Supplementary Information	Licence Number	SP SC0842-14
	Issued	2016-07-14

Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on ISO 9806:2013 test results													
Collector name	Standard Locations ϑ_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
HTHEATstore 35/08		16 412	13 316	10 397	13 388	10 633	8 151	9 682	7 389	5 471	10 491	8 013	5 866
Annual output per m ² gross area		1 209	981	766	987	784	601	713	544	403	773	591	432
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m ²			1714 kWh/m ²			1166 kWh/m ²			1244 kWh/m ²		
Mean annual ambient air temperature		18.5°C			3.2°C			7.5°C			9.0°C		
Collector orientation or tracking mode		South, 25°			South, 30°			South, 45°			South, 35°		

The collector is operated at constant temperature ϑ_m (mean of in- and outlet temperatures). The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool Scenocalc Ver. 5.01 (March 2016). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc

Additional Information		
Collector heat transfer medium	Water-Glycole	
Hybrid Thermal and Photo Voltaic collector	No	
The collector is deemed to be suitable for roof integration	No	
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:		
Climate class (A, B or C)	A	--
Maximum tested positive load	1000	Pa
Maximum tested negative load	1000	Pa
Hail resistance using steel ball (maximum drop height)	2.2	m

Energy Labelling Information			
	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
HTHEATstore 35/08	13.57	Collector efficiency (η_{col})	65 %
		Remark: Collector efficiency (η_{col}) is defined in CDR (EU) No 811/2013 as collector efficiency of the solar collector at a temperature difference between the solar collector and the surrounding air of 40 K and a global solar irradiance of 1000 W/m ² , expressed in % and rounded to the nearest integer. Deviating from the regulation η_{col} is based on reference area (A_{sol}) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2013.	
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.750 --
		First-order coefficient (a_1)	2.199 W/(m ² K)
		Second-order coefficient (a_2)	0.007 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.90 --
		Remark: The data given in this section are related to collector reference area (A_{sol}) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806. Consistent data sets for either aperture or gross area can be used in calculations like in the regulation 811 and 812 and simulation programs.	