



CERTIFICATE

Solar Keymark Certificate

No. SP SC0841-14

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:	HTHEATboost 35/10
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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 SC0841-14				
					Date issued		2016-07-14				
					Issued by		SP				
Licence holder	Arcon-Sunmark A/S				Country	Denmark					
Brand (optional)	HTHEATboost 35/10				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	Gross area (A_G)	Gross length	Gross width	Gross height	Power output per collector Gb = 850 W/m ² ; Gd = 150 W/m ² ; u = 3 m/s $\vartheta_m - \vartheta_a$						
	m ²	mm	mm	mm	0 K W	10 K W	30 K W	50 K W	70 K W	80 K W	
HTHEATboost 35/10	13.57	5 973	2 272	145	10 539	10 192	9 375	8 395	7 253	6 620	
Power output per m² gross area					777	751	691	619	534	488	
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		0.779	2.410	0.015	0.000	0.000	0.000	0.980			
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		$K_{\theta T, coll}$	1.00	0.99	0.98	0.96	0.92	0.86	0.73	0.32	0.00
Longitudinal		$K_{\theta L, coll}$	1.00	0.99	0.98	0.96	0.92	0.86	0.73	0.32	0.00
Heat transfer medium for testing					Water						
Flow rate for testing (per gross area, A_G)					dm/dt	0.061	kg/(sm²)				
Maximum temperature difference for thermal performance calculations					$(\vartheta_m - \vartheta_a)_{max}$	80	K				
Standard stagnation temperature ($G = 1000 \text{ W/m}^2$; $\vartheta_a = 30 \text{ }^\circ\text{C}$)					ϑ_{stg}	210	°C				
Effective thermal capacity, incl. fluid (per gross area, A_G)					C/m^2	6.798	kJ/(Km²)				
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-A-Rev 1 4P04266-A-Rev 2				Dated		2016-07-06 2015-11-10			
Comments of testing laboratory					Datasheet version: 5.01, 2016-03-01						
<p align="center">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</p>											



Annex to Solar Keymark Certificate

Annex to Solar Keymark Certificate Supplementary Information	Licence Number	SP SC0841-14
	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
HTHEATboost 35/10		17 278	13 636	9 973	13 891	10 539	7 396	10 099	7 365	4 999	10 982	8 025	5 378
Annual output per m ² gross area		1 273	1 005	735	1 024	777	545	744	543	368	809	591	396
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}	
HTHEATboost 35/10	13.57	Collector efficiency (η_{col})	66 %
		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)	0.777 --
		First-order coefficient (a_1)	2.410 W/(m ² K)
		Second-order coefficient (a_2)	0.015 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.92 --
		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.	