



CERTIFICATE

Solar Keymark Certificate No. SP SC0251-13

Holder/Issued to/Manufacturer

Company: Sonnenwärme Direkt GmbH
Address: Dammholmer Str. 3, 24873 Haventoft, Germany

Product name and description

Vacuum tube solar thermal collectors for water heating.
For technical information see Appendix (2 pages).

Models:	SWD HP-12	SWD HP-15	SWD HP-18
	SWD HP-20	SWD HP-22	SWD HP-24
	SWD HP-30		

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 12975-2:2006 Solar collectors Part 2: 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 2022-05-10 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 2013-05-04. This is issue number 2.

Borås, Sweden 2017-08-01

SP Technical Research Institute of Sweden Certification

Johan Åkesson
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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 Supplementary Information	Licence Number	SP SC0251-13
	Issued	2017-08-01

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
SWD HP-12		1490	1220	865	1227	928	604	900	669	431	970	724	459
SWD HP-15		1829	1497	1061	1506	1139	741	1105	821	529	1190	889	563
SWD HP-18		2168	1774	1258	1785	1349	879	1310	973	627	1411	1053	667
SWD HP-20		2393	1959	1389	1970	1490	970	1446	1075	692	1558	1163	737
SWD HP-22		2619	2144	1520	2156	1631	1062	1582	1176	757	1705	1273	806
SWD HP-24		2845	2328	1651	2342	1771	1153	1719	1277	822	1852	1383	876
SWD HP-30		3522	2883	2044	2900	2193	1428	2128	1581	1018	2293	1712	1084
Annual output per m ² gross area		712	582	413	586	443	288	430	320	206	463	346	219
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)	C	--
Maximum tested positive load	2500	Pa
Maximum tested negative load	--	Pa
Hail resistance using steel ball (maximum drop height)	--	m

Energy Labelling Information

	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
SPA-58/1800-12	2,09	Collector efficiency (η_{col})	33 %
SPA-58/1800-15	2,57	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.	
SPA-58/1800-18	3,05		
SPA-58/1800-20	3,36		
SPA-58/1800-22	3,68		
SPA-58/1800-24	4,00		
SPA-58/1800-30	4,95		
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0,389 --
		First-order coefficient (a_1)	0,80 W/(m ² K)
		Second-order coefficient (a_2)	0,018 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	1,15 --
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.			