



CERTIFICATE

Solar Keymark Certificate No. SP SC0414-17

Holder/Issued to

Company: TWL Technologie GmbH
Address: Im Gewerbegebiet 2-12, D-92271, Freihung, Germany

Product name and description

Vacuum tube solar thermal collectors for water heating

For technical information see Appendix (2 pages).

Models:	EtaSun Pro VRK20	EtaSun Pro VRK30
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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 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 2019-01-27 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 2017-02-28

SP Technical Research Institute of Sweden Certification

Lennart Aronsson
Certification Manager

Magnus Sturesson
Certification Officer



Annex to Solar Keymark Certificate	Licence Number	SP SC0414-17
Supplementary Information	Issued	2017-02-28

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
EtaSun Pro VRK20		2 565	2 140	1 714	2 113	1 720	1 349	1 543	1 218	930	1 660	1 312	991
EtaSun Pro VRK30		3 775	3 149	2 523	3 110	2 531	1 985	2 270	1 793	1 369	2 443	1 930	1 459
Annual output per m ² gross area		827	690	552	681	554	435	497	393	300	535	423	319
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	3400	Pa
Maximum tested negative load	-	Pa
Hail resistance using steel ball (maximum drop height)	1	m

Energy Labelling Information				
	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}		
EtaSun Pro VRK20	3,10	Collector efficiency (η_{col})	40	%
EtaSun Pro VRK30	4,57	<i>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/m², 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.</i>		
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}		
		Zero-loss efficiency (η_0)	0,462	--
		First-order coefficient (a_1)	1,26	W/(m ² K)
		Second-order coefficient (a_2)	0,006	W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0,00	--
		<i>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.</i>		