

Holder/Issued to/Manufacturer

TWL – Technologie GmbH

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

Performance specification

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 (RISE Research Institutes of Sweden AB, No. 012), also see CEN-CENELEC Internal Regulations Part 4 Certification, Annex A.

Validity

This certificate is valid until 2024-03-19 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 RISE. This certificate was first issued 2017-02-28. RISE certification rules SPCR 402 for Keymark – Solar Thermal Products applies.

Johan Åkesson

Magnus Sturesson

Certificate No. SC0414-17 | issue 2 | 2019-03-28


RISE Research Institutes of Sweden AB | Certification
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2017-08-08



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Annex to Solar Keymark Certificate						Licence Number		SC0414-17								
						Date issued		2019-03-28								
						Issued by		RISE								
Licence holder			TWL Technologie GmbH			Country		Germany								
Brand (optional)			EtaSun Pro®			Web		http://www.twl-technologie.de/								
Street, Number			Im Gewerbegebiet 2-12			E-mail		vertrieb@twl-technologie.de								
Postcode, City			D-92271, Freihung			Tel		+49 9646-80918-10								
Collector Type						Evacuated tubular collector										
Collector name						Power output per collector										
						$G_b = 850 \text{ W/m}^2$, $G_d = 150 \text{ W/m}^2$ & $u = 1.3 \text{ m/s}$ $\vartheta_m - \vartheta_a$										
						0 K	10 K	30 K	50 K	70 K	94 K					
						mm	m ²	mm	mm	mm	mm	mm				
EtaSun Pro® VRK20						162	3,10	1 983	1 565	1,87	1 431	1 390	1 297	1 190	1 067	902
EtaSun Pro® VRK30						162	4,57	1 983	2 303	2,81	2 109	2 048	1 911	1 753	1 572	1 330
Power output per m ² gross area						462	449	419	384	344	291					
Performance parameters test method						Steady state - outdoor										
Performance parameters (related to A _G)						η _{0, b}	a ₁	a ₂	a ₃	a ₄	a ₅	a ₆	a ₇	a ₈	K _d	
Units						-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	J/(m ² K)	s/m	W/(m ² K ⁴)	W/(m ² K ⁴)	-	
Test results						0,461	1,259	0,006	0,000	0,000	0,000	0,000	0,000	0,000	1,01	
Incidence angle modifier test method						Steady state - outdoor										
Incidence angle modifier						Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°	
Transversal						K _{θT, coll}	1,04	1,08	1,15	1,22	1,31	1,39	0,93	0,46	0,00	
Longitudinal						K _{θL, coll}	1,00	0,99	0,97	0,93	0,88	0,78	0,58	0,29	0,00	
Heat transfer medium for testing						Water										
Flow rate for testing (per gross area, A _G)						dm/dt	0,013	kg/(sm ²)								
Maximum temperature difference during thermal performance test						($\vartheta_m - \vartheta_a$) _{max}	63,67	K								
Standard stagnation temperature (G = 1000 W/m ² ; $\vartheta_a = 30 \text{ °C}$)						ϑ_{stg}	230	°C								
Maximum operating temperature						$\vartheta_{max, op}$	95	°C								
Maximum operating pressure						p _{max, op}	600	kPa								
Testing laboratory			Intertek Testing Services Shenzhen Ltd. Guangzhou Branch			http://www.intertek.com										
Test report(s)			131101048GZU-001			Dated		2014-01-15								
Comments of testing laboratory						Datasheet version: 6.0, 2018-10-30										
<p>The "negative pressure test of the collector" according to EN 12975-2:2006, 5.9.2 was not performed.</p> <p>Tests were performed based on EN 12975-2:2006.</p>						 <i>William zheng</i>										
<p align="center">RISE Research Institutes of Sweden AB Certification</p> <p align="center">Box 857, SE-501 15 Borås, Sweden, Phone: +46 10-516 50 00, certifying@ri.se www.ri.se</p>																

Annex to Solar Keymark Certificate	Licence Number	SC0414-17
Supplementary Information	Issued	2019-03-28

Annual collector output in kWh/collector at mean fluid temperature ϑ_m													
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		2 629	2 199	1 762	2 167	1 765	1 383	1 582	1 251	954	1 703	1 348	1 018
EtaSun Pro® VRK30		3 873	3 239	2 596	3 193	2 601	2 038	2 330	1 843	1 405	2 509	1 986	1 500
Annual output per m ² gross area		848	709	568	699	570	446	510	404	308	549	435	328
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. 6.0 (October 2018). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc

Additional Information					
Collector heat transfer medium	Water-Glycole				
The collector is deemed to be suitable for roof integration	No				
The collector was tested successfully under the following conditions:					
Climate class (A+, A, B or C)			C	--	
G (W/m ²) >	800	ϑ_a (°C) >	10	H_x (MJ/m ²) >	420
Maximum tested positive load			3400	Pa	
Maximum tested negative load			--	Pa	
Hail resistance using steel ball (maximum drop height)			1,0	m	

Additional collector attribute(s)				
<input type="checkbox"/> Using external power source(s) for normal operation			<input type="checkbox"/> Active or passive measure(s) for self-protection	
<input type="checkbox"/> Co-generating thermal and electrical power			<input type="checkbox"/> Wind and/or infrared sensitive collector(s) (WISC)	
<input type="checkbox"/> Façade collector(s)				

Energy Labelling Information		
	Reference Area, A _{sol} (m ²)	Hydraulic Designation Code
EtaSun Pro® VRK20	3,10	1-H-12S-C:24,1615-D
EtaSun Pro® VRK30	4,57	1-H-12S-C:24,2365-D

Data required for CDR (EU) No 811/2013 - Reference Area A _{sol}		Data required for CDR (EU) No 812/2013 - Reference Area A _{sol}	
Collector efficiency (η_{col})	40%	Zero-loss efficiency (η_0)	0,46
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 9806:2017.		First-order coefficient (a_1)	1,26
		Second-order coefficient (a_2)	0,006
		Incidence angle modifier IAM (50°)	1,12
		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.	