TÜVRheinland®
DIN CERTCO
Precisely Right.

Annex to Solar Keymark Certificate

Licence Number	**011-7S3268 F**
Date issued	**2024-10-25**
Issued by	**DINCERTCO**

Licence holder	**Viessmann Sp. Z.o.o.**	**Country**	Poland
Brand (optional)		**Web**	www.viessmann.pl
Street, Number	Aleja Karkonoska 65	**E-mail**	szak@viessmann.com
Postcode, City	53-015 Wroclaw	**Tel**	+48 782 756 729

Collector Type	Flat plate collector

Collector name	**Gross area (A_G)**	**Gross length**	**Gross width**	**Gross height**	**Power output per collector** Gb = 850 W/m2, Gd = 150 W/m2 & u = 1.3 m/s $\vartheta_m - \vartheta_a$					
					0 K	10 K	30 K	50 K	70 K	90 K
	m²	mm	mm	mm	W	W	W	W	W	W
ViSOL 1.5	15.50	2 350	6 606	173	11 697	11 339	10 549	9 659	8 670	7 582
Power output per m² gross area					755	732	681	623	559	489

Performance parameters test method	Quasi dynamic									
Performance parameters (related to A_G)	η0, b	a1	a2	a3	a4	a5	a6	a7	a8	Kd
Units	-	W/(m²K)	W/(m²K²)	J/(m³K)	-	J/(m²K)	s/m	W/(m²K⁴)	W/(m²K⁴)	-
Test results	0.765	2.23	0.008	0.000	0.00	6 483	0.000	0.00	0.0E+00	0.91

Incidence angle modifier test method		Quasi dynamic - outdoor								
Incidence angle modifier	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal	$K_{\theta T,coll}$	1.00	0.99	0.98	0.95	0.91	0.84	0.70	0.35	0.00
Longitudinal	$K_{\theta L,coll}$	1.00	0.99	0.98	0.95	0.91	0.84	0.70	0.35	0.00

Heat transfer medium for testing	Water		
Flow rate for testing (per gross area, A_G)	dm/dt	0.021	kg/(sm²)
Maximum temperature difference during thermal performance test	$(\vartheta_m-\vartheta_a)_{max}$	60	K
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)	ϑ_{stg}	250	°C
Maximum operating temperature	$\vartheta_{max\ op}$	n.n.	°C
Maximum operating pressure	$p_{max,op}$	1000	kPa

Testing laboratory	TÜV Rheinland (Energy) Solar GmbH	www.tuv.com/solar	
Test report(s)	21249150.001 (TÜV Rheinland Energy GmbH DE24BC4Y 001 (Doc-Check; TÜV Rheinland Solar	**Dated**	20.07.2020 25.10.2024

Comments of testing laboratory Ver. 6.2 (13.01.2022)

TÜVRheinland® Gen. Richtig. TÜV Rheinland Solar GmbH Am Grauen Stein 51105 Köln

TÜVRheinland®
DIN CERTCO
Precisely Right.

Annex to Solar Keymark Certificate	Licence Number	011-7S3268 F
Supplementary Information	Issued	2024-10-25

Gross Thermal Yield in kWh/collector at mean fluid temperature ϑ_m

Standard Locations	Athens			Davos			Stockholm			Würzburg		
Collector name / ϑ_m	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
ViSOL 1.5	18 749	15 137	11 710	15 272	12 057	9 144	11 044	8 373	6 131	11 947	9 063	6 556
Gross Thermal Yield per m² gross area	1 210	977	755	985	778	590	712	540	396	771	585	423
Annual efficiency, η_a	69%	55%	43%	60%	48%	36%	61%	46%	34%	62%	47%	34%
Fixed or tracking collector	Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane	1765 kWh/m²			1630 kWh/m²			1166 kWh/m²			1244 kWh/m²		
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 ϑm (mean of in- and outlet temperatures). The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool Scenocalc Ver. 6.2 (13.01.2022). A detailed description of the calculations is available at http://www.estif.org/solarkeymarknew/

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)					A	--
G (W/m²) >	1000	ϑ_a (°C) >	20	H_X (MJ/m²) >		600
Maximum tested positive load					5400	Pa
Maximum tested negative load					3500	Pa
Hail resistance using ice balls (diameter)					45	mm

Additional collector attribute(s)

Using external power source(s) for normal operation	No	Active or passive measure(s) for self-protection	No
Co-generating thermal and electrical power	No	Façade collector(s)	No

Energy Labelling Information

	Reference Area, A_{sol} (m²)
ViSOL 1.5	15.50

Additional Informative Technical Data

Hydraulic Designation Code	Aperture Area, A_a (m²)
6-V-1234R-A:9,21100-C:26,1050	14.18

Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}

Collector efficiency (η_{col})	65%

Remark: Collector efficiency (ηcol) 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 ηcol is based on reference area (Asol) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2017.

Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}

Zero-loss efficiency (η_0)	0.75	--
First-order coefficient (a_1)	2.23	W/(m²K)
Second-order coefficient (a_2)	0.008	W/(m²K²)
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.