

Annex to Solar Keymark Certificate - Summary of EN 12975-2:2006 Test Results					Licence Number		011-7S 853 F					
					Date issued		2017-01-19					
					Issued by		ISFH CalTeC					
Licence holder	Oventrop GmbH & Co. KG				Country	Germany						
Brand (optional)					Web	www.ventrop.de						
Street, Number	Paul-Oventrop-Str. 1				E-mail	mail@ventrop.de						
Postcode, City	D-59939 Olsberg				Tel	+49 (0)2962 82 0						
Collector Type	Flat plate collector, glazed											
Collector name	Gross area (A_G) m ²	Gross length mm	Gross width mm	Gross height mm	Power output per collector G _b = 850 W/m ² ; G _d = 150 W/m ² $\vartheta_m - \vartheta_a$							
					0 K W	10 K W	30 K W	50 K W	70 K W	85 K W		
OKF-CK 22 Flachkollektor	2.25	1 933	1 163	110	1 679	1 604	1 438	1 248	1 034	859		
Power output per m ² gross area					746	713	639	555	460	382		
Performance parameters test method	Steady state - indoor											
Performance parameters (related to A _G)	$\eta_{0,hem}$	a1	a2									
Units	-	W/(m ² K)	W/(m ² K ²)									
Test results	0.746	3.180	0.013									
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	0.93	0.87	0.75	0.38	0.00		
Longitudinal	$K_{\theta L, coll}$	1.00	0.99	0.98	0.96	0.93	0.87	0.75	0.38	0.00		
Heat transfer medium for testing	Water											
Flow rate for testing (per gross area, A _G)	dm/dt	0.037	kg/(sm ²)									
Maximum temperature difference for thermal performance calculations	$(\vartheta_m - \vartheta_a)_{max}$	85	K									
Standard stagnation temperature (G = 1000 W/m ² ; $\vartheta_a = 30$ °C)	ϑ_{stg}	208	°C									
Effective thermal capacity, incl. fluid (per gross area, A _G)	C/m ²	4.9	kJ/(Km ²)									
Maximum operating temperature	$\vartheta_{max, op}$	-	°C									
Maximum operating pressure	$p_{max, op}$	1000	kPa									
Testing laboratory	ISFH CalTeC				www.isfh.de							
Test report(s)	140-11/KD 142-11/KQ				Dated	13.12.2011 16.12.2011						
Comments of testing laboratory	The performance parameter are related to gross area A _G and based on EN 12975-2:2006 test results. <div style="float: right; text-align: right;"> Datasheet version: 5.01, 2016-03-01 Institut für Solarenergieforschung GmbH Am Ohrberg 1 D-31860 Emmerthal Tel.: 05151/999-100 Fax: 05151/999-500 </div>											
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S 853 F
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Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on EN 12975-2:2006 test results

Standard Locations Collector name	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
OKF-CK 22 Flachkollektor		2 653	1 939	1 303	2 046	1 449	939	1 500	1 009	630	1 627	1 089	668
Annual output per m ² gross area		1 179	862	579	909	644	417	667	449	280	723	484	297
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	Yes	
The collector was tested successfully according to EN 12975-2:2006 under the following conditions:		
Climate class (A, B or C)	--	--
Maximum tested positive load	5000	Pa
Maximum tested negative load	3000	Pa
Hail resistance using steel ball (maximum drop height)	2	m

Energy Labelling Information

	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
OKF-CK 22 Flachkollektor	2.25	Collector efficiency (η_{col})	60 %
		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)	0.746 --
		First-order coefficient (a_1)	3.18 W/(m ² K)
		Second-order coefficient (a_2)	0.013 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.93 --
		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.	