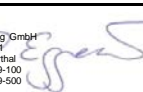




Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate						Licence Number <b>011-7S2314 F</b>						
						Issued		2014-02-07				
Company holding the			Oventrop GmbH & Co. KG			Country		Germany				
Brand (optional)			-			Website		www.owntrop.de				
Street, street number			Paul Oventrop Str. 1			E-mail		info@owntrop.de				
Postal Code / City, province			D-59939 Olsberg		Tel/Fax		49 2962 820					
Collector Type (flat plate glazed/un-glazed; evacuate tubular)						Flat plate collector - glazed						
Thermal / photo voltaic hybrid collector? (PVT collector)						No						
Integration in the roof possible? (manufacturers declaration)						No						
Collector name	Aperture area (Aa) m <sup>2</sup>	Gross length mm	Gross width mm	Gross height mm	Gross area (AG) m <sup>2</sup>	Power output per collector module						
						G = 1000 W/m <sup>2</sup>						
						Tm-Ta						
						0 K	10 K	30 K	50 K	70 K		
						W	W	W	W	W		
OKF-MQ 25	2.37	2 151	1 215	80	2.61	1 887	1 809	1 625	1 401	1 137		
Performance test method			Glazed liquid heating collector - steady state - indoor									
Performance parameters related to aperture area			η <sub>0</sub>	a <sub>1</sub>	a <sub>2</sub>							
Units			-	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K <sup>2</sup> )							
Test results - Flow rate and fluid see note 1			0.796	3.050	0.021							
Bi-directional incidence angle modifiers?			No <i>Kθ values are obligatory for 50°.</i>									
Incidence angle modifiers Kθ(θ)			Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
			Kθ(θ)	1.00	0.99	0.98	0.96	0.93	0.88			0.00
Incidence angle modifier not bi-directional - leave fields blank												
Stagnation temperature - Weather conditions see note 2						T <sub>stg</sub>	184	°C				
Effective thermal capacity						ceff = C/Ag	6.6	kJ/(m <sup>2</sup> K)				
Max. intended operation temperature - see note 3						T <sub>max,op</sub>	-	°C				
Max. operation pressure - see note 3						p <sub>max,op</sub>	1000	kPa				
Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m <sup>2</sup> aperture area												
Flow rate	kg/(s m <sup>2</sup> )	0.007										
Pressure drop, ΔP-see note 3	Pa	150										
Optional weather data			Location			Link						
Testing Laboratory			Institut für Solarenergieforschung Hameln									
Website			www.isfh.de									
Test report id. number			11-14/KD; 12-14/KQ			Date of test report			2014.02.07			
During the test GDIF/GTOT was always between			-	and	-							
Comments of testing laboratory:												
The collector efficiency parameter and incidence angle modifiers are related to G(DIF)/G(TOT)=0.15. The incidence angle modifier was determined outdoor according to a quasi-dynamic test procedure.												
Note 1	Flow rate	0.020	kg/(s m <sup>2</sup> )	Fluid	Water							
Note 2	Irradiance, G = 1000 W/m <sup>2</sup> ; Ambient temperature , Ta=30 °C											
Note 3	Given by manufacturer											
						Institut für Solarenergieforschung GmbH Am Ohrberg 1 D-31860 Emmertal Tel.: 051 51 / 999-100 Fax: 051 51 / 999-500 						
						Datasheet version: 4.06, 2014-01-15						
<b>DIN CERTCO • Alboinstraße 56 • 12103 Berlin</b> <b>Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de.</b>												



Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	<b>Licence Number</b>	<b>011-7S2314 F</b>
	Issued	07.02.2014

Annual collector output kWh/module														
Collector name	Location and collector temperature (Tm)													
	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-MQ 25	2 955	2 178	1 434	2 303	1 622	1 014	1 682	1 133	686	1 823	1 221	729		

Collector mounting: Fixed or tracking Fixed; slope = latitude - 15° (rounded to nearest 5°)

Overview of locations				
Location	Latitude °	Gtot kWh/m <sup>2</sup>	Ta °C	Collector orientation or tracking mode
Athens	38	1 765	18.5	South, 25°
Davos	47	1 714	3.2	South, 30°
Stockholm	59	1 166	7.5	South, 45°
Würzburg	50	1 244	9.0	South, 35°

Gtot	Annual total irradiation on collector plane	kWh/m <sup>2</sup>
Ta	Mean annual ambient air temperature	°C
Tm	Constant collector operating temperature (mean of in- and outlet temperatures)	°C

The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool ScenoCalc. The collector output is calculated hour by hour according to the efficiency parameters from the Keymark test using constant collector operating temperature (Tm). A detailed description of the calculations is available at <http://www.sp.se/en/index/services/solar/ScenoCalc/Sidor/default.aspx>.