

Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate						Licence Number		011-7S2439 F			
						Issued		2014-11-03			
Company holding the				Wolf GmbH		Country		Deutschland			
Brand (optional)						Website		www.wolf-heiztechnik.de			
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Postal Code / City, province				84048 Mainburg		Tel/Fax		08751/74-1797 / 08751/741736			
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					
						Power output per collector module					
						G _b = 850 W/m ² ; G _d = 150 W/m ²					
						T _m -T _a					
						0 K	10 K	30 K	50 K	70 K	
Collector name						m ²	mm	mm	mm	m ²	W
TopSon F3-1Q						2,11	1.100	2.100	110	2,30	1.628
Performance test method						Liquid heating collector - quasi-dynamic - outdoor					
Performance parameters related to aperture area						η _{0b}	c ₁	c ₂	c ₃	c ₄	
Units						-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	
Test results - Flow rate and fluid see note 1						0,783	3,430	0,011		0,910	
Bi-directional incidence angle modifiers?						No <i>K_θ values are obligatory for 50°.</i>					
Incidence angle modifiers K_θ(θ)						Angle	10°	20°	30°	40°	
						K _θ (θ)	1,00	1,00	0,99	0,97	
Incidence angle modifier not bi-directional - leave fields blank											
Stagnation temperature - Weather conditions see note 2						T _{stg}		189		°C	
Effective thermal capacity						c _{eff} = C/Ag		5,88		kJ/(m ² K)	
Max. intended operation temperature - see note 3						T _{max,op}		200		°C	
Max. operation pressure - see note 3						p _{max,op}		1000		kPa	
Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m² aperture area											
Flow rate		kg/(s m ²)									
Pressure drop, ΔP		Pa									
Testing Laboratory						Fraunhofer TestLab Solar Thermal Systems					
Website						www.collectortest.com					
Test report id. number						ktb-2014-18-k			Date of test report		2014.11.03
During the test GDIF/GTOT was always between						0,1	and	0,2			
Comments of testing laboratory:											
						TestLab					
Note 1						Flow rate	0,020	kg/(s m ²)	Fluid	Water	
Note 2						Irradiance, G = 1000 W/m ² ; Ambient temperature, T _a =30 °C					
Note 3						Given by manufacturer					
						Solar Thermal Systems Heidenhofstraße 2 D-79110 Freiburg Tel: +49 (0)761 4588 5354					
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Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2439 F
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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		
TopSon F3-1Q	2.614	1.906	1.290	2.011	1.427	936	1.474	990	624	1.601	1.070	664		

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

Overview of locations				
Location	Latitude °	Gtot kWh/m²	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/m²
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>.

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	ScenoCalc version: Ver. 4.06 (Jan, 2014)