


Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate						Licence Number		011-7S2395 F				
						Issued		2015-07-13				
Company holding the		TISUN GMBH				Country		Österreich				
Brand (optional)						Website		www.tisun.com				
Street, street number		Stockach 100				E-mail		Christian.Gschwentner@tisun.com				
Postal Code / City, province		6306		Söll		Tel/Fax		43 5333201208 / 533201499				
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)						Yes						
						Power output per collector module						
						G_b = 850 W/m²; G_d = 150 W/m²						
						T_m-T_a						
						0 K	10 K	30 K	50 K	70 K		
Collector name		Aperture area (A_a)	Gross length	Gross width	Gross height	Gross area (A_G)	W	W	W	W	W	
PFM-S 2.55 m²		2.41	2 161	1 182	62	2.55	1 933	1 836	1 619	1 371	1 092	
Performance test method						Liquid heating collector - quasi-dynamic - outdoor						
Performance parameters related to aperture area		η_{0b}	c₁	c₂	c₃	c₄	c₆	K_{θd}				
Units		-	W/(m²K)	W/(m²K)	J/(m³K)	-	s/m	-				
Test results - Flow rate and fluid see note 1		0.81	3.869	0.016	0.000	0.000	0.000	0.936				
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°	50°	60°	70°	80°	90°	
		K_θ(θ)	1.00	0.98	0.96	0.93	0.87	0.76	0.54	0.00	0.00	
Incidence angle modifier not bi-directional - leave fields blank												
Stagnation temperature - Weather conditions see note 2						T_{stg}		184 °C				
Effective thermal capacity						ceff = C/Ag		7.879 kJ/(m²K)				
Max. intende operation temperature - see note 3						T_{max,op}		- °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 m²)	-	-	-	-	-	-	-	-	-	-	
Pressure drop, ΔP	Pa	-	-	-	-	-	-	-	-	-	-	
Optional weather data		Location				Link						
Testing Laboratory		TZS, ITW University Stuttgart										
Website		http://www.itw.uni-stuttgart.de										
Test report id. number		14COL1215, 14COL1216Q/2				Date of test report		2014-09-25, 2015-07-07				
During the test GDIF/GTOT was always between		0	and	1								
Comments of testing laboratory:												
This document replaces the document dated 2014-10-09												
Note 1	Flow rate	0.020	kg/(s m²)	Fluid	Water							
Note 2	Irradiance, G = 1000 W/m²; Ambient temperature, T_a = 30 °C											
Note 3	Given by manufacturer											
						 <small> Forschung- und Testzentrum für Solaranlagen Institut für Photovoltaik und Wasserwerkstoffe Universität Stuttgart Pfaffenwaldring 8, 70569 Stuttgart (Nobelpark) </small>						
Datasheet version: 4.06, 2014-01-15												
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Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2395 F
	Issued	09.10.2014

Annual collector output kWh/module														
Collector name	Location and collector temperature (T _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		
PFM-S 2.55 m ²	3 002	2 094	1 315	2 258	1 514	902	1 661	1 060	615	1 817	1 148	652		

Collector mounting: Fixed or tracking	Fixed; slope = latitude - 15° (rounded to nearest 5°)
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Overview of locations				
Location	Latitude °	G _{tot} kWh/m ²	T _a °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°

G _{tot}	Annual total irradiation on collector plane	kWh/m ²
T _a	Mean annual ambient air temperature	°C
T _m	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 (T_m). 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)