


Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate						Licence Number		011-7S2397 F							
						Issued		2014-10-09							
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									
Collector name	Aperture area (Aa) m ²	Gross length mm	Gross width mm	Gross height mm	Gross area (AG) m ²	Power output per collector module									
						Gb = 850 W/m ² ; Gd = 150 W/m ²									
						Tm-Ta									
						0 K	10 K	30 K	50 K	70 K					
						W	W	W	W	W					
PFM-S 3.30 m ²	3.15	2 803	1 183	62	3.32	2 538	2 408	2 120	1 794	1 430					
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	c ₆	Kθd			
Units						-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	s/m	-			
Test results - Flow rate and fluid see note 1						0.81	3.976	0.015	0.000	0.000	0.000	0.965			
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	0.98	0.96	0.92	0.85	0.74	0.49	0.00	0.00
Incidence angle modifier not bi-directional - leave fields blank															
Stagnation temperature - Weather conditions see note 2						T _{stg}		185		°C					
Effective thermal capacity						c _{eff} = C/Ag		6.461		kJ/(m ² K)					
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 m ²)	-	-	-	-	-	-	-	-	-	-				
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						14COL1216, 14COL1216Q			Date of test report		2014.09.25				
During the test GDIF/GTOT was always between						0	and	1							
Comments of testing laboratory:															
Note 1	Flow rate	0.020	kg/(s m ²)	Fluid	Water										
Note 2	Irradiance, G = 1000 W/m ² ; Ambient temperature, Ta=30 °C														
Note 3	Given by manufacturer														
															
						Datashet version: 4.06, 2014-01-15									

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2397 F
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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 3.30 m ²	3 954	2 746	1 722	2 960	1 978	1 177	2 181	1 385	803	2 391	1 504	853		

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)