

Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate				Licence Number	011-7S2396 F						
				Issued	2014-10-06						
Company holding the		TISUN GmbH			Country	Österreich					
Brand (optional)					Website	www.tisun.at					
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Postal Code / City, province		A-6306 Söll			Tel/Fax	+43 5333 201 -0 /-100					
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 (A _a) m ²	Gross length mm	Gross width mm	Gross height mm	Gross area (A _g) m ²	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	
PFM-W 2,55	2.41	1 182	2 162	62	2.55	1917	1807	1577	1334	1 077	
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/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	s/m	-			
Test results - Flow rate and fluid see note 1		0.80	4.491	0.007	0.000	0.000	0.000	0.962			
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°
Incidence angle modifier not bi-directional - leave fields blank		K_θ(θ)	1.00	0.99	0.97	0.95	0.91	0.84	0.68	0.22	0.00
Stagnation temperature - Weather conditions see note 2		T_{stg}							185	°C	
Effective thermal capacity		c_{eff} = C/A_g							8.703	kJ/(m²K)	
Max. intended 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 Universität Stuttgart									
Website		http://www.itw.uni-stuttgart.de									
Test report id. number				14COL1217, 14COL1216Q			Date of test report		2014-10-06, 2014-09-25		
During the test G_{DIF}/G_{TOT} was always between		0	and	1							
Comments of testing laboratory:											
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									
Datashheet 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	011-7S2396 F
	Issued	06.10.2014

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-W 2,55	3 044	2 071	1 308	2 243	1 492	913	1 660	1 040	612	1 819	1 126	651	

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)