


Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate						Licence Number		TSU 002-15			
						Issued		2015-10-30			
Company holding the		T.W.I. spol. s r.o.				Country		Czech republic			
Brand (optional)						Website		www.twi.cz			
Street, street number		Mnichov 146				E-mail		z.pravda@twi.cz			
Postal Code / City, province		793 26		Vrbno pod Pradědem		Tel/Fax		420 737258600			
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)	Gross length	Gross width	Gross height	Gross area (AG)	Power output per collector module					
						G = 1000 W/m ²					
						Tm-Ta					
	m ²	mm	mm	mm	m ²	0 K	10 K	30 K	50 K	70 K	
						W	W	W	W	W	
SUN WING T4 Alu 1,9	1,81	1 774	1 092	82	1,90	1 491	1 424	1 274	1 101	907	
SUN WING T4 Alu 2,2	2,10	2 015	1 092	82	2,20	1 730	1 652	1 478	1 278	1 053	
SUN WING T4 Alu 2,5	2,35	2 294	1 092	82	2,50	1 936	1 849	1 654	1 430	1 178	
SUN WING T4 Alu 2,66	2,50	2 433	1 092	82	2,66	2 060	1 967	1 759	1 521	1 253	
Performance test method						Glazed liquid heating collector - steady state - outdoor					
Performance parameters related to aperture area						η ₀	a ₁	a ₂			
Units						-	W/(m ² K)	W/(m ² K ²)			
Test results - Flow rate and fluid see note 1						0,824	3,560	0,015			
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)					0,95				0,00
Stagnation temperature - Weather conditions see note 2						T _{stg}		201		°C	
Effective thermal capacity						c _{eff} = C/Ag		4,6		kJ/(m ² K)	
Max. intended operation temperature - see note 3						T _{max,op}		110		°C	
Max. operation pressure - see note 3						p _{max,op}		600		kPa	
Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m ² aperture area											
Flow rate	kg/(s m ²)										
Pressure drop, ΔP	Pa										
Optional weather data	Location					Link					
Testing Laboratory		Technický skúšobný ústav Piešťany, š.p.									
Website		www.tsu.eu									
Test report id. number		150700004/1/PQ, 150700004/2/P				Date of test report		2015.10.28			
During the test GDIF/GTOT was always between		0,09	and	0,12							
Comments of testing laboratory:											
Tested according to EN ISO 9806											
Note 1	Flow rate	0,018	kg/(s m ²)	Fluid	Water						
Note 2	Irradiance, G = 1000 W/m ² ; Ambient temperature, Ta=30 °C										
Note 3	Given by manufacturer										
 Datasheet version: 4.06, 2014-01-15											
Technický skúšobný ústav Piešťany, š.p. Address: Krajinská cesta 2929/9, 92101 Piešťany, Slovak Republic Phone: +421 33 79 57 111, Fax: +421 33 77 23 716, E-mail: sv@tsu.sk, web: www.tsu.eu											

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	TSU 002-15
	Issued	30.10.2015

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	
SUN WING T4 Alu 1,9	2 410	1 762	1 181	1 854	1 308	840	1 364	913	564	1 481	989	600	
SUN WING T4 Alu 2,2	2 796	2 044	1 370	2 151	1 518	974	1 583	1 059	655	1 718	1 147	697	
SUN WING T4 Alu 2,5	3 129	2 287	1 533	2 407	1 699	1 090	1 772	1 185	732	1 923	1 284	780	
SUN WING T4 Alu 2,66	3 329	2 433	1 631	2 561	1 807	1 160	1 885	1 261	779	2 046	1 366	829	

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

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>.

Technický skúšobný ústav Piešťany, š.p. Address: Krajinská cesta 2929/9, 92101 Piešťany, Slovak Republic Phone: +421 33 79 57 111, Fax: +421 33 77 23 716, E-mail: sv@tsu.sk, web: www.tsu.eu	Datasheet version: 4.06, 2014-01-15
	ScenoCalc version: Ver. 4.06 (Jan, 2014)