



Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	Certificate No.	011-7S1892 F
	Date of issue	14-08-2013

Company	T.M.L. S.r.l.	Country	Italy
Brand (optional)	TML	Website	www.tmlgroup.net
Street, number	Frazione Favale	E-mail	info@tmlgroup.net
Postal Code	64010	Tel.	+39 086 1927003
City	Civitella del Tronto (TE)	Fax	+39 086 1927024

Collector Type (flat plate / evacuate tubular / un-glazed)	Flat plate collector
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Integration in the roof possible ?	No
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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 unit G = 1000 W/m ² Tm-Ta :				
						0 K	10 K	30 K	50 K	70 K
						[W]	[W]	[W]	[W]	[W]
TML2.1AV	1.86	2 120	1 025	90	2.17	1 427	1 347	1 173	981	772
TML2.6AV	2.38	2 125	1 275	95	2.71	1 825	1 723	1 501	1 256	988

Collector efficiency parameters related to aperture area (Aa) Type of fluid and flow rate see note 1	η _{0a}	0.767	-
	a _{1a}	4.187	W/(m ² K)
	a _{2a}	0.012	W/(m ² K ²)

Stagnation temperature - Weather conditions see note 2	t _{stg}	185	°C
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Effective thermal capacity	c _{eff} = C/Aa	5.48	kJ/(m ² K)
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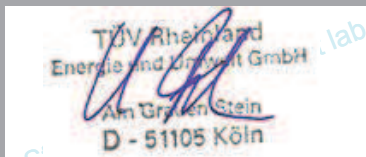
Max. operation pressure - see note 3	p _{max}	900	kPa
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Incidence angle modifiers K _θ (θ)	G _{DIF} /G _{TOT}		θ _T / θ _L	50°	10°	20°	30°	40°	60°	70°
	min	max								
	G _{DIF} /G _{TOT} : min&max - while measuring	0.1	0.75	K _θ (θ _L)	0.92	1.00	0.99	0.98	0.95	0.85

Optional values

Testing Laboratory	TÜV Energie und Umwelt GmbH
Website	www.eco-tuv.de
Test report id. number	21222683_EN_AV; 21222683_P_AV
Date of test report	all: 13 August 2013
Perf. test method	EN 12975-2 6.3 (outdoor)

Comments of testing laboratory :

Note 1	Fluid	Water	Flow rate	0.022 kg/s per m ²	
Note 2	Irradiance, G _s =1000 W/m ² Ambient temperature, T _a =30 °C				
Note 3	Given by manufacturer				



Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Certificate No.	011-7S1892 F
	Issued	14-08-2013

Annual collector output kWh													
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	
TML2.1AV	2 216	1 498	917	1 757	1 142	662	1 211	750	425	1 318	806	449	
TML2.6AV	2 835	1 917	1 173	2 248	1 461	847	1 550	960	544	1 687	1 031	575	

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

Calculation of the annual collector performance is done by the official Solar Keymark spreadsheet tool. Hour by hour the collector output is calculated according to the efficiency parameters from the Keymark test using constant collector operating temperature (T_m). Detailed description with all equations used is available from the Solar Keymark web site (direct link: <http://www.estif.org/solarkeymark/annexb1.php>)

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