

Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	Certificate No.	011-7S2242 F
	Date of issue	14-08-2013

Company	T.M.L. S.r.l.	Country	Italy
Brand (optional)	TML	Website	www.tmlgroup.net
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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]
TML2.1MV	1.87	2 125	1 025	95	2.18	1 416	1 336	1 163	973	764
TML2.6MV	2.38	2 125	1 275	95	2.71	1 802	1 700	1 481	1 238	973

Collector efficiency parameters related to aperture area (Aa) Type of fluid and flow rate see note 1	η_{0a}	0.757	-
	a_{1a}	4.134	W/(m ² K)
	a_{2a}	0.012	W/(m ² K ²)

Stagnation temperature - Weather conditions see note 2	t _{stg}	217	°C
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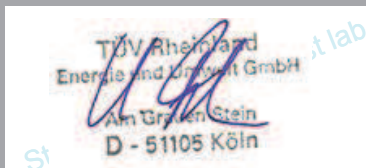
Effective thermal capacity	c _{eff} = C/Aa	5.19	kJ/(m ² K)
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Max. operation pressure - see note 3	p _{max}	900	kPa
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Incidence angle modifiers K _θ (θ)	G _{DIF} /G _{TOT}		θ _T / θ _L	50°	10°	20°	30°	40°	60°	70°
	min	max								
	G _{DIF} /G _{TOT} : min&max - while measuring	0.12	0.75	K _θ (θ _L)	0.90	1.00	0.99	0.97	0.94	0.82
					<i>Optional values</i>					

Testing Laboratory	TÜV Energie und Umwelt GmbH
Website	www.eco-tuv.de
Test report id. number	21222683_EN_MV; 21222683_P_MV
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.

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Issued

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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
TML2.1MV	2 160	1 452	883	1 708	1 106	639	1 178	728	412	1 281	779	433
TML2.6MV	2 749	1 848	1 124	2 174	1 408	814	1 499	926	524	1 631	992	551

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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Datasheet version:

VERSION 3.5, 2012.01.13

Calculation program version:

3.07, October 2011 (SP)