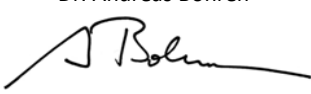




Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate						Certificate No.		011-7S2186 R				
						Date of issue		27.06.2013				
Company			Thermics Energie S.r.l.			Country			Italy			
Brand (optional)			-			Website			www.thermics-energie.it			
Street, number			Via dell'Olmo 37/2			E-mail			info@thermics-energie.it			
Postal Code			33030			Tel.		+39 (0)432 823600				
City			Varmo			Fax		+39 (0)432 825847				
Collector Type (flat plate / evacuate tubular / un-glazed)						Evacuated tubular collector						
Integration in the roof possible ?						No						
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 [W]	10 K [W]	30 K [W]	50 K [W]	70 K [W]		
10 DTH-CPC	1.962	1'965	1'132	140	2.224	1'281	1'253	1'192	1'127	1'056		
Collector efficiency parameters related to aperture area (Aa)						η _{0a}		0.653		-		
Type of fluid and flow rate see note 1						a _{1a}		1.41		W/(m ² K)		
						a _{2a}		0.0033		W/(m ² K ²)		
Stagnation temperature - Weather conditions see note 2						t _{stg}		182		°C		
Effective thermal capacity						C _{eff} = C/Aa		12.4		kJ/(m ² K)		
Max. operation pressure - see note 3						p _{max}		1000		kPa		
Incidence angle modifiers K_θ(θ)	G _{DIF} /G _{TOT}		θ _r / θ _L	50°	10°	20°	30°	40°	60°	70°		
	min	max	K _θ (θ _r)	1.11	0.99	0.98	0.98	1.02	1.15	1.07		
			K _θ (θ _L)	0.94	1.00	1.00	0.99	0.98	0.87	0.73		
G _{DIF} /G _{TOT} : min&max - while measuring						<i>Optional values</i>						
Testing Laboratory						SPF, CH-8640 Rapperswil						
Website						www.solarenergy.ch						
Test report id. Number						C1319LPEN, C1319QPEN						
Date of test report						08.08.2011 / 08.08.2011						
Perf. test method						EN 12975-2 6.1.4 (outdoor)						
Comments of testing laboratory :												
Note 1	Fluid	Water-Glycole	Flow rate	0.021 kg/s per m ²		<div style="text-align: right;"> Dr. Andreas Bohren  </div>						
Note 2	Irradiance, G_s=1000 W/m²											
Note 3	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.

011-7S2186 R

Issued

27.06.2013

Annual collector output kWh

Collector name	Location and collector temperature (Tm)											
	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
10 DTH-CPC	2'203	1'911	1'626	1'988	1'713	1'443	1'343	1'116	913	1'447	1'202	982

Collector mounting: Fixed or tracking

Fixed; slope = latitude - 15° (rounded to nearest 5°)

Overview of locations

Location	Latitude °	Gtot kWh/m²	Ta °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°

Gtot	Annual total irradiation on collector plane	kWh/m²
Ta	Mean annual ambient air temperature	°C
Tm	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 (Tm). Detailed description with all equations used is available from the Solar Keymark web site (direct link: <http://www.estif.org/solarkeymark/annexb1.php>)

<p>DIN CERTCO • Alboinstraße 56 • 12103 Berlin Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de</p>	Datasheet version:
	VERSION 3.5, 2012.01.13
	Calculation program version: 3.07, October 2011 (SP)