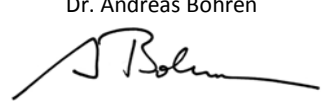


Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate						Certificate No.		011-7S1984 F																	
						Date of issue		09.01.2013																	
Company			Riello S.p.A.			Country			Italy																
Brand (optional)			-			Website			www.riello.com																
Street, number			Via Mussa 20			E-mail			info@riello.it																
Postal Code			35017			Tel.		+39		049 932 39 11															
City			Piombino Dese			Fax		+39		049 932 39 46															
Collector Type (flat plate / evacuate tubular / un-glazed)						Flat plate collector																			
Integration in the roof possible ?						Yes																			
						Power output per collector unit G = 1000 W/m ² Tm-Ta :																			
						Aperture area (Aa)		Gross length		Gross width		Gross height		Gross area (Ag)											
Collector name						[m ²]	[mm]	[mm]	[mm]	[m ²]	0 K	10 K	30 K	50 K	70 K										
CP25VVM						2.290	2'077	1'239	99	2.573	1'811	1'725	1'546	1'359	1'165										
Collector efficiency parameters related to aperture area (Aa)						η_{0a}		0.791		-															
Type of fluid and flow rate see note 1						a_{1a}		3.74		W/(m ² K)															
						a_{2a}		0.0042		W/(m ² K ²)															
Stagnation temperature - Weather conditions see note 2						tstg		198		°C															
Effective thermal capacity						Ceff = C/Aa		5.0		kJ/(m ² K)															
Max. operation pressure - see note 3						pmax		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)		0.87		1.00		0.99		0.97		0.93		0.77		0.62	
G _{DIF} /G _{TOT} : min&max - while measuring						0.20		0.27		K _θ (θ _l)		0.87		1.00		0.99		0.97		0.93		0.77		0.62	
						<i>Optional values</i>																			
Testing Laboratory						SPF, CH-8640 Rapperswil																			
Website						www.solarenergy.ch																			
Test report id. number						C1465LPEN-A1, C1465QPEN																			
Date of test report						09.01.2013 /30.07.2012																			
Perf. test method						EN 12975-2 6.1.4 (outdoor)																			
Comments of testing laboratory :																									
Note 1	Fluid	Water-Glycole		Flow rate	0.018 kg/s per m ²		Dr. Andreas Bohren 																		
Note 2	Irradiance, G_s=1000 W/m²																								
Note 3	Ambient temperature , Ta=30 °C																								
Note 3	Given by manufacturer																								

VERSION 3.5, 2012.01.13

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Annual collector output based on EN 12975 Test Results,
annex to Solar KEYMARK Certificate

Certificate No.

011-7S1984 F

Issued

09.01.2013

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
CP25VVM	2'758	1'986	1'371	2'244	1'593	1'086	1'543	1'040	683	1'670	1'113	720

Collector mounting: Fixed or tracking

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

Overview of locations

Location	Latitude °	Gtot kWh/m ²	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/m ²
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>)

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Datasheet version:

VERSION 3.5, 2012.01.13

Calculation program version:

3.07, October 2011 (SP)