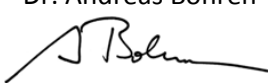


Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate							Licence Number		011-752399 F				
							Issued		2014-07-22				
Company holding the				Riello S.p.A.			Country		Italy				
Brand (optional)				-			Website		www.riellogroup.com				
Street, street number				Via Mussa 20			E-mail		info@riello.it				
Postal Code / City, province				IT-35017		Piombino Dese		Tel/Fax		+39 049 932 39 11 /-46			
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)							Yes						
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 module							
						G = 1000 W/m ²							
						Tm-Ta							
						0 K	10 K	30 K	50 K	70 K			
						W	W	W	W	W			
CP25TVS	2.152	2'000	1'145	85	2.290	1'694	1'604	1'413	1'207	987			
Performance test method				Glazed liquid heating collector - steady state - outdoor									
Performance parameters related to aperture area				η0	a1	a2							
Units				-	W/(m ² K)	W/(m ² K ²)							
Test results - Flow rate and fluid see note 1				0.784	4.08	0.0084							
Bi-directional incidence angle modifiers?				Yes Kθ values are obligatory for 50°.									
Incidence angle modifiers Kθ(θT) transversal direction				Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
				Kθ(θT)	1.00	1.00	1.00	0.98	0.96	0.87	0.68	0.38	0.00
Incidence angle modifiers Kθ(θL) longitudinal direction				Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
				Kθ(θL)	1.00	1.00	1.00	0.98	0.96	0.87	0.68	0.38	0.00
Stagnation temperature - Weather conditions see note 2							T _{stg}		197 °C				
Effective thermal capacity							C _{eff} = C/A _g		5.11 kJ/(m ² K)				
Max. intended operation temperature - see note 3							T _{max,op}		-- °C				
Max. operation pressure - see note 3							P _{max,op}		1000 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)	0.007	0.014	0.020	0.027	0.034	0.041	0.048	0.054	0.061	0.068		
Pressure drop, ΔP	Pa	329	690	1084	1509	1968	2458	2981	3537	4124	4744		
Optional weather data		Location				Link							
Testing Laboratory				SPF, CH-8640 Rapperswil									
Website				www.solarenergy.ch									
Test report id. number				C1630LPEN, C1630QPEN				Date of test reports				07.07.2014	
During the test G _{DIF} /G _{TOT} was always between				0.09		and		0.26					
Comments of testing laboratory:													
-													
Note 1	Flow rate	0.022 kg/(s m ²)	Fluid	Water-Glycole									
Note 2	Irradiance, G = 1000 W/m ² ; Ambient temperature, Ta=30 °C												
Note 3	Given by manufacturer												
Dr. Andreas Bohren 													
Datasheet version: 4.06, 2014-01-15													
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Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2399 F
	Issued	22.07.2014

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		
CP25TVS	2'681	1'875	1'221	2'016	1'384	881	1'481	957	583	1'612	1'031	619		

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>.

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	4.06, 2014-01-15
	ScenoCalc version:
	Ver. 4.06 (Jan, 2014)