


Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate							Licence Number		011-7S2594 F			
							Issued		2015-10-09			
Company holding the			Riello S.p.A.				Country		Italy			
Brand (optional)			-				Website		www.riello.it			
Street, street number			Via Ing. Pilade Riello 7				E-mail		info@riello.it			
Postal Code / City, province			IT-37045		Legnago (VR)		Tel/Fax		+39 (0)44-263 01 11 /-260 06 65			
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						
						T _m -T _a						
						0 K	10 K	30 K	50 K	70 K		
						W	W	W	W	W		
CSAL 25 R	2.202	2'046	1'187	90	2.429	1'685	1'599	1'413	1'209	987		
Performance test method							Glazed liquid heating collector - steady state - outdoor					
Performance parameters related to aperture							η ₀	a ₁	a ₂			
Units							-	W/(m ² K)	W/(m ² K ²)			
Test results - Flow rate and fluid see note 1							0.765	3.79	0.0105			
Bi-directional incidence angle			Yes		K _θ values are obligatory for 50°.							
Incidence angle modifiers K _θ (θT) transversal direction			Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
K _θ (θT)				1.00	1.00	0.99	0.96	0.92	0.84	0.69	0.39	0.00
Incidence angle modifiers K _θ (θL) longitudinal direction			Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
K _θ (θL)				1.00	1.00	0.99	0.96	0.92	0.84	0.69	0.39	0.00
Stagnation temperature - Weather conditions see note 2							T _{stg}		201 °C			
Effective thermal capacity							C _{eff} = C/A _g		4.9 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	0.013	0.020	0.027	0.033	0.040	0.047	0.053	0.060	0.067
Pressure drop, ΔP		Pa	294	626	996	1404	1850	2334	2856	3415	4013	4648
Optional weather data			Location			Link						
Testing Laboratory			SPF, CH-8640 Rapperswil									
Website			www.spf.ch									
Test report id. number			C1682LPEN, C1682QPEN				Date of test reports		07.10.2015			
During the test G _{DIF} /G _{TOT} was always between			0.10		and		0.15					
Comments of testing laboratory:												
-												
Note 1		Flow rate	0.021 kg/(s m ²)	Fluid		Water-Glycole						
Note 2		Irradiance, G = 1000 W/m ² ; Ambient temperature, T _a =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	011-7S2594 F
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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	
CSAL 25 R	2'641	1'858	1'207	1'995	1'370	865	1'466	950	576	1'593	1'023	610	

Collector mounting: Fixed or tracking	Fixed; slope = latitude - 15° (rounded to nearest 5°)
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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)