Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2646 F
	Issued	2016-04-19

Company holding the	Riello NV/SA	Country	Belgium	
Brand (optional)	–	Website	www.riello.be	
Street, street number	Waverstraat 15	E-mail	info@riello.be	
Postal Code / City, province	BE-9310 Moorsel (Aalst)	Tel/Fax	+32	53 769 030/789 440

Collector Type (flat plate glazed/un-glazed; evacuate tubular)	Flat plate collector - glazed
Thermal / photo voltaic hybid collector? (PVT collector)	No
Integration in the roof possible ? (manufacturers declaration)	Yes

Collector name	Aperture area (Aa)	Gross length	Gross width	Gross height	Gross area (AG)	Power output per collector module G = 1000 W/m², Tm-Ta 0 K	10 K	30 K	50 K	70 K
	m²	mm	mm	mm	m²	W	W	W	W	W
CSALO 25 RS	2.147	2'004	1'148	85	2.301	1'674	1'575	1'375	1'171	964

Performance test method	Glazed liquid heating collector - steady state - outdoor									
Performance parameters related to aperture	η0	a1	a2							
Units	-	W/(m²K)	W/(m²K²)							
Test results - Flow rate and fluid see note 1	0.778	4.57	0.0021							

Bi-directional incidence angle	Yes	Kϑ values are obligatory for 50°.								
Incidence angle modifiers Kθ(θT)	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
transversal direction	Kθ(θT)	1.00	1.00	0.99	0.97	0.93	0.86	0.72	0.47	0.00
Incidence angle modifiers Kθ(θL)	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
longitudinal direction	Kθ(θL)	1.00	1.00	0.99	0.97	0.93	0.86	0.72	0.47	0.00

Stagnation temperature - Weather conditions see note 2	Tstg	199	°C
Effective thermal capacity	ceff = C/Ag	5.3	kJ/(m²K)
Max. intende operation temperature - see note 3	Tmax,op	--	°C
Max. operation pressure - see note 3	pmax,op	1000	kPa

Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m² aperture area											
Flow rate	kg/(s m²)	0.004	0.008	0.012	0.016	0.020	0.025	0.029	0.033	0.037	0.041
Pressure drop, ΔP	Pa	47	100	159	224	295	372	455	544	640	741

Optional weather data	Location		Link	
Testing Laboratory	SPF, CH-8640 Rapperswil			
Website	www.spf.ch			
Test report id. number	C1698LPEN, C1698QPEN	Date of test reports	31.03.2016	
During the test GDIF/GTOT was always between	0.08	and	0.15	

Comments of testing laboratory:

The outside surface of the collector frame within the collector height is available in two different wave pattern.

Note 1	Flow rate	0.022 kg/(s m²)	Fluid	Water-Glycole	
Note 2	Irradiance, G = 1000 W/m²; Ambient temperature , Ta=30 °C				
Note 3	Given by manufacturer				

Dr. Andreas Bohren

Datasheet version: 4.06, 2014-01-15

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2646 F
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Annual collector output kWh/module

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
CSALO 25 RS	2'641	1'793	1'156	1'946	1'313	840	1'437	906	552	1'566	974	584

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

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 (Tm). 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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ScenoCalc version: Ver. 4.06 (Jan, 2014)