Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	**Licence Number**	**011-7S2400 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 hybid collector? (PVT collector)	No
Integration in the roof possible ? (manufacturers declaration)	No

	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
Collector name	m²	mm	mm	mm	**m²**	W	W	W	W	W
CP20TSS	1.772	1'813	1'044	70	**1.893**	1'379	1'291	1'114	937	759

Performance test method	Glazed liquid heating collector - steady state - outdoor			
Performance parameters related to aperture area	η0	a1	a2	
Units	-	W/(m²K)	W/(m²K²)	
Test results - *Flow rate and fluid see note 1*	0.778	4.96	0.0005	

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	0.99	0.96	0.87	0.76	0.66	0.39	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	0.99	0.96	0.87	0.76	0.66	0.39	0.00

Stagnation temperature - *Weather conditions see note 2*	T_{stg}	192	°C
Effective thermal capacity	$c_{eff} = C/A_g$	4.81	kJ/(m²K)
Max. intende 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 m² aperture area											
Flow rate	kg/(s m²)	0.008	0.017	0.025	0.033	0.041	0.050	0.058	0.066	0.074	0.083
Pressure drop, ΔP	Pa	103	222	357	508	675	859	1058	1273	1505	1752

Optional weather data	Location		Link	
Testing Laboratory	SPF, CH-8640 Rapperswil			
Website	www.solarenergy.ch			
Test report id. number	C1361LPEN, C1361QPEN	**Date of test reports**	07.07.2014	
During the test G_{DIF}/G_{TOT} was always between	0.08	and	0.26	

Comments of testing laboratory:

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Note 1	**Flow rate**	0.023	kg/(s m²)	**Fluid**	Water-Glycole
Note 2	**Irradiance, G = 1000 W/m²; Ambient temperature , Ta=30 °C**				
Note 3	**Given by manufacturer**				

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Datasheet version: 4.06, 2014-01-15

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2400 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
CP20TSS	2'102	1'372	851	1'521	994	615	1'125	683	404	1'226	731	423

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.