Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	**Licence Number**	**011-7S2478 F**
	Issued	2015-02-05

Company holding the	Agena Energies SA	**Country**	Switzerland
Brand (optional)	–	**Website**	www.agena-energies.ch
Street, street number	Chemin du Grand Pré 1C	**E-mail**	agena@agena-energies.ch
Postal Code / City, province	CH-1510 Moudon	**Tel/Fax**	+41 21 905 -26 56/-43 88

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

	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
AZUR 8+ AC 2.2V	1.957	1'897	1'166	100	**2.212**	1'656	1'572	1'396	1'206	1'001
AZUR 8+ AC 2.3H	1.952	970	2'347	100	**2.277**	1'651	1'568	1'392	1'202	999
AZUR 8+ AC 2.8V	2.468	2'368	1'169	100	**2.768**	2'088	1'983	1'760	1'520	1'263
AZUR 8+ AC 2.8H	2.463	1'189	2'347	100	**2.791**	2'084	1'979	1'757	1'517	1'260

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*	0.846	4.11	0.0088						

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	0.94	0.86	0.70	0.40	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	0.94	0.86	0.70	0.40	0.00

Stagnation temperature - *Weather conditions see note 2*	T_{stg}	195	°C
Effective thermal capacity	$c_{eff} = C/A_g$	6.54	kJ/(m²K)
Max. intende operation temperature - *see note 3*	$T_{max,op}$	130	°C
Max. operation pressure - *see note 3*	$p_{max,op}$	600	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)	0.006	0.012	0.018	0.024	0.030	0.036	0.042	0.047	0.053	0.059
Pressure drop, ΔP	Pa	6587	18966	37137	61100	90855	126401	167740	214871	267793	326508

Optional weather data	Location		Link	
Testing Laboratory	SPF, CH-8640 Rapperswil			
Website	www.solarenergy.ch			
Test report id. number	C1663LPEN, C1664LPEN, C1664QPEN,C1665QPEN	**Date of test reports**	05.02.2015	

During the test G_{DIF}/G_{TOT} was always between 0.11 and 0.19

Comments of testing laboratory:

–

Note 1	**Flow rate**	0.024	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	011-7S2478 F
	Issued	05.02.2015

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
AZUR 8+ AC 2.2V	2'616	1'860	1'239	1'984	1'385	903	1'456	959	598	1'583	1'033	635
AZUR 8+ AC 2.3H	2'609	1'856	1'236	1'979	1'382	901	1'453	956	597	1'579	1'030	633
AZUR 8+ AC 2.8V	3'299	2'346	1'563	2'502	1'747	1'139	1'836	1'209	755	1'996	1'302	801
AZUR 8+ AC 2.8H	3'292	2'341	1'559	2'497	1'744	1'137	1'833	1'206	753	1'992	1'300	799

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.

DIN CERTCO ● Alboinstraße 56 ● 12103 Berlin, Germany
Tel: +49 30 7562-1131 ● Fax: +49 30 7562-1141 ● E-Mail: info@dincertco.de ● www.dincertco.de

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