



Precisely Right.

Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate						Licence Number		011-7S822 F				
						Issued		2015-03-13				
Company holding the		Chromagen (ACS) Ltd.				Country		Israel				
Brand (optional)		Kibbutz Sha'ar Haa'makim				Website		www.chromagen.com				
Street, street number		--				E-mail		yair@chromagen.com				
Postal Code / City, province		3658800 --				Tel/Fax		972 4-9538839				
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		
PR-K	1,51	1.816	917	90	1,67	1.090	1.037	918	781	628		
PR-D	1,77	1.909	1.082	95	2,03	1.278	1.215	1.076	916	736		
PR-E	2,17	2.199	1.082	95	2,37	1.567	1.490	1.319	1.123	903		
PR-F	2,57	2.184	1.271	90	2,78	1.856	1.765	1.562	1.330	1.069		
Performance test method						Glazed liquid heating collector - steady state - indoor						
Performance parameters related to aperture		η_0	a1	a2								
Units		-	W/(m ² K)	W/(m ² K ²)								
Test results - Flow rate and fluid see note 1		0,722	3,390	0,014								
Bi-directional incidence angle		No <i>Kθ values are obligatory for 50°.</i>										
Incidence angle modifiers K θ (θ)		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°	
		K θ (θ)					0,86				0,00	
Incidence angle modifier not bi-directional - leave fields blank												
Stagnation temperature - Weather conditions see note 2						Tstg		222,8 °C				
Effective thermal capacity						ceff = C/Ag		4,59 kJ/(m ² K)				
Max. intended operation temperature - see note 3						Tmax,op		160 °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 m ² aperture area												
Flow rate	kg/(s m ²)	0,000	0,013	0,030	0,048	0,067	0,083					
Pressure drop, ΔP	Pa	0	62	164	297	455	619					
Optional weather data		Location				Link						
Testing Laboratory		Fundación CENER-CIEMAT										
Website		www.cener.com										
Test report id. number		30.1126.0-3-2; 30.1126.0-4-2; 30.1126.0-2-2; 30.1226.1				Date of test report		30/04/2009 - 06/05/2009 20/05/2009				
During the test GDIF/GTOT was always between		0,18	and	0,2								
Comments of testing laboratory: PA-F is representative collector of the collectors PR-K, PR-D, PR-E and PR-F.												
Note 1	Flow rate	0,020 kg/(s m ²)	Fluid	Water								
Note 2	Irradiance, G = 1000 W/m ² ; Ambient temperature, Ta=30 °C											
Note 3	Given by manufacturer											
						 CENER  Ditech Datasheet version: 4.06, 2014-01-15						
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												

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S822 F
	Issued	13/03/2015

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	
PR-K	1.619	1.128	713	1.226	831	505	897	578	341	973	617	358	
PR-D	1.897	1.322	836	1.437	974	592	1.052	678	400	1.140	723	419	
PR-E	2.326	1.621	1.025	1.762	1.194	726	1.290	831	490	1.398	887	514	
PR-F	2.755	1.919	1.214	2.087	1.414	860	1.527	984	581	1.655	1.050	608	

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>.