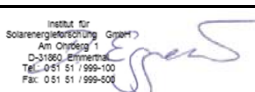


Precisely Right.

Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate						Licence Number		011-7S567 F													
						Issued		2016-01-14													
Company holding the			Solvis GmbH			Country		Germany													
Brand (optional)			-			Website		www.solvis.de													
Street, street number			Grotrian-Steinweg-Str. 12			E-mail		info@solvis-solar.de													
Postal Code / City, province			D-38112 Braunschweig		Tel/Fax		49 531 28904-0 / -100														
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											
SolvisCala C-254-AR	2.39	2 176	1 176	98	2.56	1 991	1 902	1 703	1 475	1 218											
Performance test method						Glazed liquid heating collector - steady state - indoor															
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		0.833		3.57		0.015															
Bi-directional incidence angle		No		<i>K_θ 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)		1.00		0.99		0.98		0.96		0.93		0.87						0.00	
Incidence angle modifier not bi-directional - leave fields blank																					
Stagnation temperature - Weather conditions see note 2						T _{stg}		205		°C											
Effective thermal capacity						c _{eff} = C/Ag		6.7		kJ/(m ² K)											
Max. intende operation temperature - see note 3						T _{max,op}		-		°C											
Max. operation pressure - see note 3						p _{max,op}		400		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 m ²)		-																	
Pressure drop, ΔP		Pa		-																	
Optional weather data		Location			Link																
Testing Laboratory		Institut für Solarenergieforschung Hameln																			
Website		www.isfh.de																			
Test report id. number		14-15/KT; 146-08/KQ				Date of test report		12.06.2015; 30.04.2009													
During the test GDIF/GTOT was always between		0.1		and		0.3															
Comments of testing laboratory:																					
The collector efficiency parameters are related to G(DIF)/G(TOT)=0.15.																					
The incidence angle modifier was determined outdoor according to a quasi-dynamic test procedure.																					
Note 1		Flow rate		0.021 kg/(s m ²)		Fluid		Water													
Note 2		Irradiance, G = 1000 W/m ² ; Ambient temperature, T _a =30 °C																			
Note 3		Given by manufacturer																			
						 Institut für Solarenergieforschung Hameln Am Ohrberg 1 D-31060, Emmenroth Tel.: 051 51 / 999-100 Fax: 051 51 / 999-500															
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	011-7S567 F
	Issued	2016-01-14

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		
SolvisCala C-254-AR	3 106	2 259	1 507	2 397	1 691	1 091	1 751	1 175	730	1 900	1 264	775		

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>.