Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	**Licence Number**	**011-7S567 F**
	Issued	2015-06-12

Company holding the	Solvis GmbH & Co. KG		**Country**	Germany
Brand (optional)	-		**Website**	www.solvis.de
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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 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
SolvisCala C-253-I	2.39	2 170	1 168	93	**2.54**	1 907	1 822	1 628	1 403	1 148
SolvisCala C-253-S	2.39	2 170	1 168	93	**2.54**	1 907	1 822	1 628	1 403	1 148
SolvisCala C-254-AR	2.39	2 176	1 176	98	**2.56**	1 907	1 822	1 628	1 403	1 148

Performance test method	Glazed liquid heating collector - steady state - indoor								
Performance parameters related to aperture	η0	a1	a2						
Units	-	W/(m²K)	W/(m²K²)						
Test results - *Flow rate and fluid see note 1*	0.798	3.42	0.016						

Bi-directional incidence angle	No	Kθ *values are obligatory for 50°.*								
Incidence angle modifiers Kθ(θ)	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
	Kθ(θ)	1.00	0.99	0.98	0.96	0.93	0.88	0.77	0.43	0.00
Incidence angle modifier not bi-directional - leave fields blank										

Stagnation temperature - *Weather conditions see note 2*	T_{stg}	208	°C
Effective thermal capacity	$c_{eff} = C/A_g$	4.4	kJ/(m²K)
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 m²)	-									
Pressure drop, ΔP	Pa	-									

Optional weather data	Location	-	Link	
Testing Laboratory	Institut für Solarenergieforschung Hameln			
Website	www.isfh.de			
Test report id. number	145-08/KD2; 146-08/KQ; 14-15/KT	**Date of test report**	02.06.2009; 30.04.2009; 12.06.2015	

During the test G_{DIF}/G_{TOT} 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**	0.017	kg/(s m²)	**Fluid**	Water
Note 2	**Irradiance, G = 1000 W/m²; Ambient temperature , T_a=30 °C**				
Note 3	**Given by manufacturer**				

Datasheet version: 4.06, 2014-01-15

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S567 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	25°C	50°C	75°C
SolvisCala C-253-I	3 020	2 193	1 448	2 321	1 624	1 026	1 705	1 134	691	1 851	1 225	734			
SolvisCala C-253-S	3 020	2 193	1 448	2 321	1 624	1 026	1 705	1 134	691	1 851	1 225	734			
SolvisCala C-254-AR	3 020	2 193	1 448	2 321	1 624	1 026	1 705	1 134	691	1 851	1 225	734			

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°
-				South, -15°

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