Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate		Licence Number	011-7S1490 F
		Issued	2016-06-09

Company holding the	DIMAS SA	Country	Greece
Brand (optional)		Website	www.dimas-solar.gr
Street, street number	2nd km Argos – Nafplion road	E-mail	info@dimas-solar.gr
Postal Code / City, province	21200 Argos	Tel/Fax	+30 27510 -20920 / -62671

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
ENERGY+ARGO 25	2.32	2 008	1 258	87	**2.53**	1 793	1 698	1 495	1 275	1 038
ENERGY+ARGO 23*	2.03	1 893	1 183	87	**2.24**	1 569	1 486	1 308	1 115	908
ENERGY+ARGO 20*	1.83	2 006	1 007	87	**2.02**	1 415	1 339	1 179	1 005	819
ENERGY+ARGO 19*	1.79	1 503	1 305	87	**1.96**	1 384	1 310	1 153	984	801
ENERGY+ARGO 17*	1.51	1 420	1 183	87	**1.68**	1 167	1 105	973	830	676
ENERGY+ARGO 15	1.36	1 500	1 007	87	**1.51**	1 051	995	876	747	609

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	0.773	4.021	0.009							

Bi-directional incidence angle modifiers?	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	0.94	0.88	0.78	0.45	0.00
Incidence angle modifier not bi-directional - leave fields blank										

Stagnation temperature - Weather conditions see note 2	Tstg	200	°C
Effective thermal capacity	ceff = C/Ag	19.92	kJ/(m²K)
Max. intende operation temperature - see note 3	Tmax,op		°C
Max. operation pressure - see note 3	pmax,op	1600	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	TZS, ITW University Stuttgart			
Website	http://www.itw.uni-stuttgart.de			
Test report id. number	10COL910/1; 10COL911/1; 10COL911Q/1	Date of test report	2013.08.01	
During the test GDIF/GTOT was always between	0	and	1	

Comments of testing laboratory:

*dimensions accoding to manufacturer

This data sheet replaces the data sheet issuded on 21.01.2011
The data sheet is issued on the newest version 4.06.

Note 1	Flow rate	0.020 kg/(s m²)	Fluid	Water	
Note 2	Irradiance, G = 1000 W/m²; Ambient temperature , Ta=30 °C				
Note 3	Given by manufacturer				

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	011-7S1490 F
	Issued	09.06.2016

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
ENERGY+ARGO 25	2 829	1 968	1 268	2 116	1 439	899	1 563	1 001	600	1 701	1 079	637
ENERGY+ARGO 23	2 476	1 722	1 109	1 852	1 259	787	1 368	876	525	1 488	944	557
ENERGY+ARGO 20	2 232	1 553	1 000	1 669	1 135	709	1 233	789	474	1 342	851	502
ENERGY+ARGO 19	2 183	1 519	978	1 633	1 110	694	1 206	772	463	1 312	832	491
ENERGY+ARGO 17	1 842	1 281	825	1 377	936	585	1 017	651	391	1 107	702	414
ENERGY+ARGO 15	1 659	1 154	743	1 241	843	527	916	587	352	997	632	373

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.

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ScenoCalc version: Ver. 4.06 (Jan, 2014)