Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	**Licence Number**	**011-7S2415 F**
	Issued	2014-08-22

Company holding the	H. Lenz AG	**Country**	Switzerland	
Brand (optional)	–	**Website**	www.lenz.ch	
Street, street number	Hirzenstrasse 2	**E-mail**	info@lenz.ch	
Postal Code / City, province	CH-9244 Niederuzwil	**Tel/Fax**	+41 (0)71 955 70 20/-25	

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
Multisol M240	1.998	959	2'349	85	**2.253**	1'642	1'562	1'392	1'208	1'010

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*	0.822	3.91	0.0087							

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	1.00	0.98	0.96	0.89	0.77	0.51	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	1.00	0.98	0.96	0.89	0.77	0.51	0.00

Stagnation temperature - *Weather conditions see note 2*	T_{stg}	186	°C
Effective thermal capacity	$c_{eff} = C/A_g$	7.0	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)	0.004	0.009	0.013	0.018	0.022	0.026	0.031	0.035	0.040	0.044
Pressure drop, ΔP	Pa	2264	6200	11807	19086	28037	38659	50953	64919	80556	97865

Optional weather data	Location		Link	
Testing Laboratory	SPF, CH-8640 Rapperswil			
Website	www.solarenergy.ch			
Test report id. number	C1396LPEN, C1396QPEN	**Date of test reports**	22.08.2014	
During the test G_{DIF}/G_{TOT} was always between	0.07	and	0.19	

Comments of testing laboratory:

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Note 1	**Flow rate**	0.021	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	011-7S2415 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
Multisol M240	2'648	1'911	1'296	2'021	1'430	947	1'484	990	627	1'613	1'070	668

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)