



Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate		Certificate No.	011-7S1870 F
		Date of issue	01.03.2012
Company	SOLTOP Schuppisser AG	Country	Switzerland
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Collector Type (flat plate / evacuate tubular / un-glazed)	Flat plate collector
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Integration <u>in</u> the roof possible ?	Yes
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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 unit G = 1000 W/m ² Tm-Ta :				
						0 K	10 K	30 K	50 K	70 K
						[W]	[W]	[W]	[W]	[W]
COBRA Evo X 2.8V	2.493	2'367	1'167	101	2.762	2'166	2'062	1'839	1'597	1'337
COBRA Evo X 2.8H	2.463	1'189	2'347	101	2.791	2'140	2'037	1'817	1'578	1'321

Collector efficiency parameters related to <u>aperture area (Aa)</u> Type of fluid and flow rate see note 1	η_{0a}	0.869	-
	a_{1a}	4.09	W/(m ² K)
	a_{2a}	0.0095	W/(m ² K ²)

Stagnation temperature - Weather conditions see note 2	t _{stg}	187	°C
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Effective thermal capacity	C _{eff} = C/Aa	8.8	kJ/(m ² K)
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Max. operation pressure - see note 3	p _{max}	6	kPa
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Incidence angle modifiers K _θ (θ)	G _{DIF} /G _{TOT}		θ _r / θ _l	50°	10°	20°	30°	40°	60°	70°
	min	max	K _θ (θ _r)	0.94	1.00	1.00	0.99	0.97	0.89	0.72
	0.1	0.25	K _θ (θ _l)	0.94	1.00	1.00	0.99	0.97	0.89	0.72
G _{DIF} /G _{TOT} : min&max - while measuring					<i>Optional values</i>					

Testing Laboratory	SPF, CH-8640 Rapperswil
Website	www.solarenergy.ch
Test report id. number	C1373QPEN, C1374LPEN, C1374QPEN
Date of test report	17.02.2012 / 17.02.2012 / 17.02.2012
Perf. test method	EN 12975-2 6.1.4 (outdoor)

Comments of testing laboratory :
COBRA Evo X 2.8V and COBRA Evo X 2.8H are constructed in the same way. COBRA Evo X 2.8V is the vertical version of COBRA Evo X 2.8H.

Note 1	Fluid	Water-Glycole	Flow rate	0.024 kg/s per m ²	Dr. Andreas Bohren
Note 2	Irradiance, G_s=1000 W/m²				
Note 3	Ambient temperature , Ta=30 °C				
	Given by manufacturer				



Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Certificate No.	011-7S1870 F
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Annual collector output kWh													
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	
COBRA Evo X 2.8V	3'444	2'484	1'679	2'818	1'981	1'298	1'929	1'289	816	2'096	1'390	866	
COBRA Evo X 2.8H	3'403	2'454	1'659	2'784	1'957	1'282	1'906	1'273	806	2'071	1'373	856	

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

Calculation of the annual collector performance is done by the official Solar Keymark spreadsheet tool. Hour by hour the collector output is calculated according to the efficiency parameters from the Keymark test using constant collector operating temperature (Tm). Detailed description with all equations used is available from the Solar Keymark web site (direct link: <http://www.estif.org/solarkeymark/annexb1.php>)

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	VERSION 3.5, 2012.01.13
	Calculation program version: 3.07, October 2011 (SP)