

AENOR

Keymark Certificate Solar thermal energy



078/000288

AENOR certifies that the organization

SYSTOVI

registered office	14 AVENUE SYRMA 44470 CARQUEFOU (Francia)
supplies	Air heating solar collectors
in compliance with	Specific CEN KEYMARK Scheme Rules for Solar Thermal Products Version 28.00 – December 2015
Trade Mark	R-VOLT ON TOP
Technical characteristics	Specified in Annexes to the Certificate
Production site	14 AVENUE SYRMA 44470 CARQUEFOU (Francia)
Certification scheme	In order to grant this Certificate, AENOR has tested the product and has verified the quality system implemented for its manufacture. AENOR performs these tasks periodically while the Certificate has not been cancelled, in accordance with Specific Rules RP 078.01. The tests have been performed according to the EN ISO 9806:2013 standard. The specific requirements for certifying solar air collectors are established in annex L of these Specific Rules. This certificate supersedes 078/000288, dated 2017-03-16
First issued on	2017-03-16
Modified on	2019-07-19
Validity date	2022-03-16

Rafael GARCÍA MEIRO
Chief Executive Officer

Original Electronic Certificate



Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results						Licence Number		078/000288			
						Date issued		2019-07-19			
						Issued by					
Licence holder		SYSTOVI				Country		FRANCE			
Brand (optional)		--				Web		www.systovi.com			
Street, Number		14 AVENUE SYRMA				E-mail		M.BENABDELKARIM@systovi.com			
Postcode, City		44470 CARQUEFOU				Tel		+33 02 40 92 44 20			
Collector Type						Flat plate collector (air heating)- un-glazed					
Collector name	Gross area (A _G) m ²	Gross length mm	Gross width mm	Gross height mm	Power output per collector module G = 1000 W/m ² ; u < 1m/s						
					T _m - T _a [K] =	4,1	5,9	8,2	ṁ [kg/h] =	239,4	135
R-VOLT ON TOP	1,56	1.524	1.023	70	Power output [W] =	596	523	458			
Performance parameters test method		Steady state - outdoor (air heating)									
Performance parameters (related to AG)		η _{0,hem}	b ₁	b ₂	b _u	ε/α					
Units		-	W/(m ² K)	Ws/(m ³ K)	s/m	-					
Test results	90,6 (kg/h)	0,291	--	--	0,043	0,85					
	135 kg/h	0,333	--	--	0,042	0,85					
	239,4 kg/h	0,380	--	--	0,032	0,85					
Incidence angle modifier test method		Steady state - outdoor (air heating)									
Bi-directional incidence angle modifiers		No									
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal		K _{θT, coll}					0,86				0,00
Longitudinal		K _{θL, coll}					0,86				0,00
Heat transfer medium for testing		Air									
Flow rate for testing (per gross area, A _G)		dm/dt	0,016	kg/(sm ²)	dm/dt	0,024	kg/(sm ²)	dm/dt	0,043	kg/(sm ²)	
Maximum temperature difference for thermal performance calculations		(θ _m -θ _a) _{max}	8,2	K							
Standard stagnation temperature (G = 1000 W/m ² ; θ _a = 30 °C)		θ _{stg}	90,9	°C							
Effective thermal capacity, incl. fluid (per gross area, A _G)		C/m ²	4,97	kJ/(Km ²)							
Maximum operating temperature		θ _{max, op}	85	°C							
Maximum operating pressure		p _{max, op}	0,03	kPa							
Testing laboratory		Fundación CENER-CIEMAT, LEST				www.cener.com					
Test report(s)		30.2926.0-3-1 30.2926.0-4-1				Dated		29/09/2016			
Comments of testing laboratory		Datashet version: 5.01, 2016-03-01									
1 For open to ambient solar air heaters, sucking in ambient air, it is just possible to determine the instantaneous efficiency at certain mass flow rates and ambient temperature.											
2 Thermal performance parameters are given for the PV-module working with max. electrical power output ('MPP mode')											
Comments regarding compliance with IEC standards: Certificate by AENOR (FCS) A98/000018 in compliance with standards EN 61215 and EN 61730-1 and-2.. Test reports by CENER: 30.2782.0-01, 30.2782.0-02 and 30.2782.0-03. PV module manufacturer is Systovi.											
AENOR INTERNACIONAL, S.A.U. - Génova, 6. - 28004 - Madrid, España - Tel. 91 432 60 00- www.aenor.com Product certification body accredited by ENAC, number 01/C-PR002.078											



Annex to Solar Keymark Certificate Supplementary Information	Licence Number	078/000288
	Issued	2019-07-19

Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on ISO 9806:2013 test results													
Standard Locations		Athens			Davos			Stockholm			Würzburg		
Collector name	ϑ_m	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
R-VOLT ON TOP		1.268	955	662	1.002	736	497	730	511	332	792	557	357
Annual output per m ² gross area		813	612	424	642	472	318	468	328	213	508	357	229
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m ²			1714 kWh/m ²			1166 kWh/m ²			#iREF!		
Mean annual ambient air temperature		18,5°C			3,2°C			7,5°C			9,0°C		
Collector orientation or tracking mode		South, 25°			South, 30°			South, 45°			South, 35°		
#iNOMBRE?													

Additional Information		
Collector heat transfer medium		Air
Hybrid Thermal and Photo Voltaic collector		Yes
The collector is deemed to be suitable for roof integration		No
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:		
Climate class (A, B or C)		A --
Maximum tested positive load		2400 Pa
Maximum tested negative load		2400 Pa
Hail resistance using ice balls (diameter)		25 mm

Energy Labelling Information				
	Reference Area, A _{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A _{sol}		
R-VOLT ON TOP	1,56	Collector efficiency (η_{col})	#iVALOR!	%
		Remark: Collector efficiency (η_{col}) is defined in CDR (EU) No 811/2013 as collector efficiency of the solar collector at a temperature difference between the solar collector and the surrounding air of 40 K and a global solar irradiance of 1000 W/m ² , expressed in % and rounded to the nearest integer. Deviating from the regulation η_{col} is based on reference area (A _{sol}) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2013.		
		Data required for CDR (EU) No 812/2013 - Reference Area A _{sol}		
		Zero-loss efficiency (η_0)	0,368	--
		First-order coefficient (a ₁)	#iVALOR!	W/(m ² K)
		Second-order coefficient (a ₂)	0,000	W/(m ² K ²)
#iREF!		Incidence angle modifier IAM (50°)	0,86	--
#iREF!		Remark: The data given in this section are related to collector reference area (A _{sol}) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806. Consistent data sets for either aperture or gross area can be used in calculations like in the regulation 811 and 812 and simulation programs.		