AENOR

Keymark Certificate
Solar thermal energy

078/000227

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 54
Technical characteristics	Specified in Annex 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.
First issued on	2014-12-26
Last issued on	2019-12-26
Validity date	2024-12-26

Rafael GARCÍA MEIRO
Chief Executive Officer

Original Electronic Certificate

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Product certification body accredited by ENAC, number 1/C-PR271

Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	**Licence Number**	**078/000227**
	Issued	2019-12-26

Company holding the	SYSTOVI	**Country**	FRANCE
Brand (optional)	--	**Website**	www.systovi.com
Street, street number	14 AVENUE SYRMA	**E-mail**	M.BENABDELKARIM@systovi.com
Postal Code / City, province	44470 CARQUEFOU	**Tel/Fax**	+33 02 40 92 44 20

Collector Type (flat plate glazed/un-glazed; evacuate tubular)	Flat plate collector (air heating)- unglazed
Thermal / photo voltaic hybid collector? (PVT collector)	Yes
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 ; u < 1m/s			
						Tm - Ta [K] =	6,3	7,8	8,5
Collector name	m²	mm	mm	mm	**m²**	ṁ [kg/h] =	345,6	237,6	180
R-VOLT 54	1,40	1.500	987	41	**1,48**	Power output [W] =	611	539	474

Performance test method		Glazed air heating collector - steady state - outdoor								
Performance parameters (gross area)		η0,hem	b1	b2	bu					
Units		-	W/(m²K)	Ws/(m³K)	s/m					
Test results	180(kg/h)	0,316	--	--	0,0379					
	237,6 kg/h	0,363	--	--	0,0470					
	345,6 kg/h	0,408	--	--	0,0450					

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)					0,87				0,00
Incidence angle modifier not bi-directional - leave fields blank										

Stagnation temperature - *Weather conditions see note 2*	T_{stg}	91,2 °C
Effective thermal capacity	$c_{eff} = C/A_g$	5,54 kJ/(m²K)
Max. intende operation temperature - *see note 3*	$T_{max,op}$	75 °C
Max. operation pressure - *see note 3*	$p_{max,op}$	0,03 kPa

Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m² gross area

Flow rate	kg/(s m²)	0,000	0,047	0,053	0,060	0,067	0,075				
Pressure drop, ΔP	Pa	0	19	28	39	50	67				

Optional weather data	Location		Link	

Testing Laboratory	Fundación CENER-CIEMAT, LEST
Website	www.cener.com
Test report id. number	30,2779,0-1-1 30.2779.0-2-1
Date of test report	2015/12/16

During the test G_{DIF}/G_{TOT} was always between	0,13	and	0,15

Comments of testing laboratory:

1 For open to ambient solar air heaters, sucking in ambient air, it is just possible to determine the instantaneous efficiency at certainmass flow rates and ambient temperature.
2 Efficiency test has been performed in two collectors connected in parallel in an open loop, except for pressure drop test
3 Thermal performance parameters are given for the PV-module working with max. electrical power output ('MPP mode')

Commets regarding compliance with IEC standards: Certificate by AENOR (FCS) A98/000017 in compliance with standards IEC 61215, IEC 61730-1 and IEC 61730-2. Test reports by CENER: 30.2732.0-01, 30.2732.0-02 and 30.2732.0-03. PV module manufacturer is Systovi.

Note 1	**Flow rate**	--	**Fluid**	Air
Note 2	**Irradiance, G = 1000 W/m²; Ambient temperature , T_a=30 °C**			
Note 3	**Given by manufacturer**			

CENER

Datasheet version: 4.06, 2014-01-15