



Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		011-7S2095 F																	
					Date issued		2017-12-11																	
					Issued by		DINCERTCO																	
Licence holder		Viessmann Werke GmbH & Co. KG			Country		GERMANY																	
Brand (optional)		--			Web		www.viessmann.com																	
Street, Number		Viessmannstrasse 1			E-mail		info@viessmann.com																	
Postcode, City		35108 - Allendorf			Tel		+49 (0) 6452 70-0																	
Collector Type					Flat plate collector, glazed																			
Collector name					Power output per collector																			
					Gb = 850 W/m <sup>2</sup> ; Gd = 150 W/m <sup>2</sup> θ <sub>m</sub> - θ <sub>a</sub>																			
					0 K		10 K		30 K		50 K		70 K		51 K									
					W		W		W		W		W		W									
Vitosol 200-F SVE					2,50		2.379		1.049		72		1.923		1.832		1.623		1.378		1.097		1.364	
EV2 Typ SVE					2,50		2.379		1.049		72		1.923		1.832		1.623		1.378		1.097		1.364	
Power output per m <sup>2</sup> gross area					769		733		649		551		439		546									
Performance parameters test method					Steady state - indoor																			
Performance parameters (related to AG)					η <sub>0,hem</sub>		a <sub>1</sub>		a <sub>2</sub>															
Units					-		W/(m <sup>2</sup> K)		W/(m <sup>2</sup> K <sup>2</sup> )															
Test results					0,769		3,459		0,018															
Incidence angle modifier test method					Steady state - outdoor																			
Bi-directional incidence angle modifiers					No																			
Incidence angle modifier					Angle		10°		20°		30°		40°		50°		60°		70°		80°		90°	
Transversal					K <sub>θT, coll</sub>										0,94								0,00	
Longitudinal					K <sub>θL, coll</sub>										0,94								0,00	
Heat transfer medium for testing					Water																			
Flow rate for testing (per gross area, A <sub>G</sub> )					dm/dt		0,019		kg/(sm <sup>2</sup> )															
Maximum temperature difference for thermal performance calculations					(θ <sub>m</sub> -θ <sub>a</sub> ) <sub>max</sub>		51		K															
Standard stagnation temperature (G = 1000 W/m <sup>2</sup> ; θ <sub>a</sub> = 30 °C)					θ <sub>stg</sub>		209		°C															
Effective thermal capacity, incl. fluid (per gross area, A <sub>G</sub> )					C/m <sup>2</sup>		5,553		kJ/(Km <sup>2</sup> )															
Maximum operating temperature					θ <sub>max, op</sub>		220		°C															
Maximum operating pressure					P <sub>max, op</sub>		900		kPa															
Testing laboratory					Fundación CENER-CIEMAT, LEST							www.cener.com												
Test report(s)					30.3261.0-1-1 30.3261.0-2-1 30.3261.0 Technical annex							Dated		17/11/2017										
Comments of testing laboratory					The collector VITOSOL 200-F SVE tested in CENER is also comercialized with the name EV2 Typ SVE.							Datasheet version: 5.01, 2016-03-01												
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<b>Supplementary Information</b>	<b>Issued</b>	<b>2017-12-11</b>

Annual collector output in kWh/collector at mean fluid temperature $\vartheta_m$ , based on ISO 9806:2013 test results													
Standard Locations	$\vartheta_m$	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
Collector name													
Vitosol 200-F SVE		3.071	2.191	1.398	2.338	1.596	961	1.724	1.117	651	1.872	1.208	693
EV2 Typ SVE		3.071	2.191	1.398	2.338	1.596	961	1.724	1.117	651	1.872	1.208	693
Annual output per m <sup>2</sup> gross area		1.228	876	559	935	638	384	690	447	260	749	483	277
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m <sup>2</sup>			1714 kWh/m <sup>2</sup>			1166 kWh/m <sup>2</sup>			1244 kWh/m <sup>2</sup>		
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°		

The collector is operated at constant temperature  $\vartheta_m$  (mean of in- and outlet temperatures). The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool Scenocalc Ver. 5.01 (March 2016). A detailed description of the calculations is available at [www.solarkeymark.org/scenocalc](http://www.solarkeymark.org/scenocalc)

Additional Information		
Collector heat transfer medium	Water-Glycole	
Hybrid Thermal and Photo Voltaic collector	No	
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 <sup>2</sup> )	Data required for CDR (EU) No 811/2013 - Reference Area $A_{sol}$	
Vitosol 200-F SVE	2,50	Collector efficiency ( $\eta_{col}$ )	60 %
		<i>Remark: Collector efficiency (<math>\eta_{col}</math>) 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<sup>2</sup>, expressed in % and rounded to the nearest integer. Deviating from the regulation <math>\eta_{col}</math> is based on reference area (<math>A_{sol}</math>) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2013.</i>	
		Data required for CDR (EU) No 812/2013 - Reference Area $A_{sol}$	
		Zero-loss efficiency ( $\eta_0$ )	0,769 --
		First-order coefficient ( $a_1$ )	3,46 W/(m <sup>2</sup> K)
		Second-order coefficient ( $a_2$ )	0,018 W/(m <sup>2</sup> K <sup>2</sup> )
		Incidence angle modifier IAM (50°)	0,94 --
		<i>Remark: The data given in this section are related to collector reference area (<math>A_{sol}</math>) 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.</i>	