


Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		011-7S2668 F							
					Date issued		2016-06-21							
					Issued by		TÜV Rheinland Energy GmbH							
Licence holder	Viessmann Werke GmbH & Co. KG				Country	Germany								
Brand (optional)	Viessmann				Web	http://www.viessmann.com								
Street, Number	Viessmannstrasse 1				E-mail	---								
Postcode, City	35107 Allendorf (Eder)				Tel	+49 (0)6452-70-0								
Collector Type					Flat plate collector, glazed									
Collector name	Gross area (A _G) m ²	Gross length mm	Gross width mm	Gross height mm	Power output per collector G _b = 850 W/m ² ; G _d = 150 W/m ² ϑ _m - ϑ _a									
					0 K W	10 K W	30 K W	50 K W	70 K W	70 K W				
Vitosol 200-FM SV2F	2.51	2 380	1 056	90	1 910	1 794	1 526	1 212	852	852				
Power output per m ² gross area					761	715	608	483	340	340				
Performance parameters test method					Steady state - indoor									
Performance parameters (related to A _G)					η _{0,hem}	a1	a2							
Units					-	W/(m ² K)	W/(m ² K ²)							
Test results					0.761	4.410	0.023							
Incidence angle modifier test method					Quasi dynamic - outdoor									
Bi-directional incidence angle modifiers					No									
Incidence angle modifier					Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal					K _{θT, coll}	1.00	0.99	0.97	0.94	0.89	0.81	0.63	0.33	0.00
Longitudinal					K _{θL, coll}	1.00	0.99	0.97	0.94	0.89	0.81	0.63	0.33	0.00
Heat transfer medium for testing					Water									
Flow rate for testing (per gross area, A _G)					dm/dt	0.019	kg/(sm ²)							
Maximum temperature difference for thermal performance calculations					(ϑ _m -ϑ _a) _{max}	70	K							
Standard stagnation temperature (G = 1000 W/m ² ; ϑ _a = 30 °C)					ϑ _{stg}	145	°C							
Effective thermal capacity, incl. fluid (per gross area, A _G)					C/m ²	4.9	kJ/(Km ²)							
Maximum operating temperature					ϑ _{max, op}	---	°C							
Maximum operating pressure					p _{max, op}	600	kPa							
Testing laboratory					TÜV Rheinland Energy GmbH		http://www.tuv.com/solarthermie							
Test report(s)					21232810.001		Dated		21.06.2016					
Comments of testing laboratory					Datasheet version: 5.01, 2016-03-01									
Because of special modulating coating: Performance parameters (related to A Gross) for absolute average fluid temperature T _m < 50°C: 0.757 /// 4.069 /// 0.020 Additional information : Performance parameters (related to A Aperture): 0.820 /// 4.750 /// 0.025					 TÜVRheinland® Genau. Richtig. TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln									
DIN CERTCO • Alboinstraße 56 • 12103 Berlin, Germany Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de														

Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2668 F
	Issued	2016-06-21

Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on EN 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
Vitosol 200-FM SV2F		2 896	1 847	990	2 089	1 261	613	1 557	893	431	1 696	955	455
Annual output per m ² gross area		1 154	736	395	832	503	244	620	356	172	676	381	181
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			1244 kWh/m ²		
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 ϑ_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

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	3500	Pa
Maximum tested negative load	3000	Pa
Hail resistance using ice balls (diameter)	35	mm

Energy Labelling Information				
	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}		
Vitosol 200-FM SV2F	2.51	Collector efficiency (η_{col})	55	%
		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)	0.761	--
		First-order coefficient (a_1)	4.41	W/(m ² K)
		Second-order coefficient (a_2)	0.023	W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.89	--
		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.		