


Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		011-7S 2747 R				
					Date issued		2017-07-11				
					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					Evacuated tubular collector						
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 ; u = 3 m/s ∅ _m - ∅ _a						
					0 K W	10 K W	30 K W	50 K W	70 K W	90 K W	
Vitosol 300-TM SP3C 1.51 m ²	2.36	2 244	1 052	150	1 189	1 157	1 089	1 013	929	838	
Power output per m ² gross area					504	490	461	429	394	355	
Performance parameters test method		Quasi dynamic									
Performance parameters (related to A _G)		η _{0,b}	c ₁	c ₂	c ₃	c ₄	c ₆	K _d			
Units		-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	s/m	-			
Test results		0.510	1.292	0.004	0.000	0.000	0.000	0.917			
Incidence angle modifier test method		Quasi dynamic - outdoor									
Bi-directional incidence angle modifiers		Yes									
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal		K _{GT, coll}	1.00	1.00	1.00	0.99	0.99	0.98	0.96	0.90	0.00
Longitudinal		K _{GL, coll}	1.00	1.02	1.01	1.03	1.03	1.06	0.98	0.78	0.00
Heat transfer medium for testing		Water-Glycole									
Flow rate for testing (per gross area, A _G)		dm/dt	0.020	kg/(sm ²)							
Maximum temperature difference for thermal performance calculations		(∅ _m -∅ _a) _{max}	90	K							
Standard stagnation temperature (G = 1000 W/m ² ; ∅ _a = 30 °C)		∅ _{stg}	155	°C							
Effective thermal capacity, incl. fluid (per gross area, A _G)		C/m ²	10.777	kJ/(Km ²)							
Maximum operating temperature		∅ _{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)		21239899.001; 21239899.002				Dated 11.07.2017 (all)					
Comments of testing laboratory		Datashet version: 5.01, 2016-03-01									
The given values are valid between 3° and 90°inclination angle of tube		 TÜVRheinland® Genau. Richtig. TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln									
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S 2747 R
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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 300-TM SP3C 1.51 m ²		1 292	1 028	792	1 292	1 028	792	1 292	1 028	792	1 292	1 028	792
Annual output per m ² gross area		847	711	578	704	579	465	508	404	312	547	435	335
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	5600	Pa
Maximum tested negative load	1400	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 300-TM SP3C 1.51 m ²	2.36	Collector efficiency (η_{col})	45 %
		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)	0.504 --
		First-order coefficient (a ₁)	1.29 W/(m ² K)
		Second-order coefficient (a ₂)	0.004 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	1.02 --
		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.	