


Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		011-7S 2780 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 ϑ _m - ϑ _a						
					0 K	10 K	30 K	50 K	70 K	90 K	
					W	W	W	W	W	W	
Vitosol 300-TM SP3C 1.25 m ² HW	1.98	2 244	885	150	988	965	900	809	690	544	
Vitosol 300-TM SP3C 1.51 m ² HW	2.36	2 244	1 052	150	1 177	1 151	1 073	964	822	648	
Vitosol 300-TM SP3C 3.03 m ² HW	4.61	2 244	2 060	150	2 300	2 248	2 097	1 882	1 606	1 266	
Power output per m ² gross area					499	488	455	408	348	275	
Performance parameters test method		Quasi dynamic									
Performance parameters (related to AG)		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		0.504	0.962	0.017	0.000	0.000	0.000	0.933			
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	0.017	kg/(sm ²)							
Maximum temperature difference for thermal performance calculations		(ϑ _m -ϑ _a) _{max}	90	K							
Standard stagnation temperature (G = 1000 W/m ² ; ϑ _a = 30 °C)		ϑ _{stg}	155	°C							
Effective thermal capacity, incl. fluid (per gross area, A _G)		C/m ²	10.662	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)		21240359.001; 21240359.002			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									
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	011-7S 2780 R
	Issued	2017-07-11

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 1.25 m ² HW		1 671	1 387	1 026	1 392	1 082	749	1 010	766	512	1 088	829	552
Vitosol 300-TM SP3C 1.51 m ² HW		1 992	1 653	1 223	1 659	1 289	893	1 204	913	610	1 297	989	658
Vitosol 300-TM SP3C 3.03 m ² HW		3 892	3 229	2 388	3 241	2 519	1 745	2 351	1 784	1 192	2 533	1 931	1 286
Annual output per m ² gross area		844	700	518	703	546	378	510	387	259	550	419	279
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	1375	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 1.25 m ² HW	1.98	Collector efficiency (η_{col})	43	%
Vitosol 300-TM SP3C 1.51 m ² HW	2.36	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.		
Vitosol 300-TM SP3C 3.03 m ² HW	4.61			
		Data required for CDR (EU) No 812/2013 - Reference Area A _{sol}		
		Zero-loss efficiency (η_0)	0.499	--
		First-order coefficient (a ₁)	0.96	W/(m ² K)
		Second-order coefficient (a ₂)	0.017	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.		