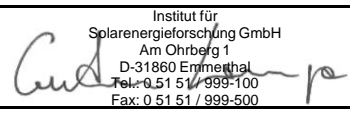


Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate							Licence Number		011-7S2122 R		
							Issued		2013-12-17		
Company holding the		Viessmann Werke GmbH & Co. KG					Country		Germany		
Brand (optional)							Website		www.viessmann.com		
Street, street number		Viessmannstraße 1					E-mail				
Postal Code / City, province		D-35107	Allendorf (Eder)			Tel/Fax		49 6452 70 0			
Collector Type (flat plate glazed/un-glazed; evacuate tubular)							Evacuated tubular collector				
Thermal / photo voltaic hybrid collector? (PVT collector)							No				
Integration in the roof possible? (manufacturers declaration)							No				
		Aperture area (Aa) m ²	Gross length mm	Gross width mm	Gross height mm	Gross area (AG) m ²	Power output per collector module				
							G = 1000 W/m ²				
Collector name		Tm-Ta					0 K	10 K	30 K	50 K	70 K
							W	W	W	W	W
Vitosol 200-T SPE 1.63 m²		1.73	2 257	1 220	174	2.75	1 142	1 118	1 061	995	919
Vitosol 200-T SPE 3.26 m²		3.46	2 257	2 390	174	5.39	2 284	2 235	2 123	1 990	1 838
Performance test method							Glazed liquid heating collector - steady state - indoor				
Performance parameters related to aperture area		η ₀	a ₁	a ₂							
Units		-	W/(m ² K)	W/(m ² K ²)							
Test results - Flow rate and fluid see note 1		0.660	1.330	0.007							
Bi-directional incidence angle modifiers?		Yes	K _θ values are obligatory for 50°.								
Incidence angle modifiers K_θ(θT) transversal direction		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
		K _θ (θT)	1.01	1.02	1.03	1.05	1.06	0.88	0.81	0.56	0.00
Incidence angle modifiers K_θ(θL) longitudinal direction		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
		K _θ (θL)	1.00	0.99	0.97	0.95	0.90	0.82	0.65	0.24	0.00
Stagnation temperature - Weather conditions see note 2							T _{stg}	269	°C		
Effective thermal capacity							ceff = C/Ag	5.2	kJ/(m ² K)		
Max. intende operation temperature - see note 3							T _{max,op}		°C		
Max. operation pressure - see note 3							p _{max,op}	600	kPa		
Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m ² aperture area											
Flow rate	kg/(s m ²)	0.003	0.017	0.026	0.038	0.048					
Pressure drop, ΔP	Pa	0	119	283	586	885					
Optional weather data		Location			Link						
Testing Laboratory		Institut für Solarenergieforschung Hameln									
Website		www.isfh.de									
Test report id. number		115-12/KD; 116-12/KD, 117-12/KO					Date of test report		16.06., 19.07., 16.12.2012		
During the test GDIF/GTOT was always between		0.1	and		0.2						
Comments of testing laboratory:											
Note 1	Flow rate	0.032 kg/(s m ²)	Fluid	Water							
Note 2	Irradiance, G = 1000 W/m ² ; Ambient temperature, Ta=30 °C										
Note 3	Given by manufacturer										
											
							D-31860 Emmethal Tel.: 0 51 51 / 999-100 Fax: 0 51 51 / 999-500				
							Datasheet version: 4.05, 2013-11-07				
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											



Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2122 R
	Issued	17.12.2013

Annual collector output kWh/module														
Collector name	Location and collector temperature (T _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		
Vitosol 200-T SPE 1.63 m ²	1 906	1 642	1 363	1 613	1 356	1 105	1 163	952	752	1 249	1 023	805		
Vitosol 200-T SPE 3.26 m ²	3 812	3 285	2 727	3 227	2 713	2 209	2 326	1 904	1 504	2 497	2 045	1 610		

Collector mounting: Fixed or tracking Fixed; slope = latitude - 15° (rounded to nearest 5°)

Overview of locations				
Location	Latitude °	G _{tot} kWh/m ²	T _a °C	Collector orientation or tracking mode
Athens	38	1 765	18.5	South, 25°
Davos	47	1 714	3.2	South, 30°
Stockholm	59	1 166	7.5	South, 45°
Würzburg	50	1 244	9.0	South, 35°

G _{tot}	Annual total irradiation on collector plane	kWh/m ²
T _a	Mean annual ambient air temperature	°C
T _m	Constant collector operating temperature (mean of in- and outlet temperatures)	°C

The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool ScenoCalc. The collector output is calculated hour by hour according to the efficiency parameters from the Keymark test using constant collector operating temperature (T_m). A detailed description of the calculations is available at <http://www.sp.se/en/index/services/solar/ScenoCalc/Sidor/default.aspx>.

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	Datasheet version: 4.05, 2013-11-07
	ScenoCalc version: Ver. 4.05 (Nov, 2013)