


Annex to Solar Keymark Certificate

Annex to Solar Keymark Certificate					Licence Number		011-7S477 F				
					Date issued		2025-06-30				
					Issued by		DINCERTCO				
Licence holder		Vaillant GmbH			Country		Germany				
Brand (optional)		Vaillant			Web		www.vaillant.com				
Street, Number		Berghauser Str. 40			E-mail		info@vaillant.com				
Postcode, City		42859 Remscheid			Tel		+49 2191180-0				
Collector Type					Flat plate 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 = 1.3 m/s θ _m - θ _a					
						0 K	10 K	30 K	50 K	70 K	100 K
						W	W	W	W	W	W
VFK 135/3 VD		2.51	2,033	1,233	80	1,831	1,744	1,548	1,325	1,073	644
VFK 135/3 D		2.15	1,233	2,033	80	1,568	1,494	1,326	1,135	920	551
Power output per m ² gross area						729	695	617	528	428	256
Performance parameters test method		Quasi dynamic									
Performance parameters (related to A _G)		η ₀ , b	a ₁	a ₂	a ₃	a ₄	a ₅	a ₆	a ₇	a ₈	K _d
Units		-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	J/(m ² K)	s/m	W/(m ² K ⁴)	W/(m ² K ⁴)	-
Test results		0.736	3.33	0.014	0.000	0.00	5,222	0.000	0.00	0.0E+00	0.94
Incidence angle modifier test method			Quasi dynamic - outdoor								
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal		K _{θT, coll}	1.00	1.00	0.99	0.93	0.88	0.78	0.58	0.29	0.00
Longitudinal		K _{θL, coll}	1.00	1.00	0.99	0.93	0.88	0.78	0.58	0.29	0.00
Heat transfer medium for testing							Water				
Flow rate for testing (per gross area, A _G)							dm/dt	0.021	kg/(sm ²)		
Maximum temperature difference during thermal performance test							(θ _m -θ _a) _{max}	70	K		
Standard stagnation temperature (G = 1000 W/m ² ; θ _a = 30 °C)							θ _{stg}	220	°C		
Maximum operating temperature							θ _{max op}	n.n.	°C		
Maximum operating pressure							p _{max, op}	1000	kPa		
Testing laboratory		TÜV Rheinland Energy GmbH				www.tuv.com/solar					
Test report(s)		21250538.001rev02 21250538.002				Dated		29.01.2021 29.01.2021			
Comments of testing laboratory							Ver. 6.2 (13.01.2022)				
							 TÜVRheinland® Genau. Richtig. TÜV Rheinland Solar GmbH Am Grauen Stein 51105 Köln				
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Supplementary Information								Issued		2025-06-30					
Gross Thermal Yield in kWh/collector at mean fluid temperature ϑ_m															
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		
VFK 135/3 VD		2,897	2,071	1,344	2,204	1,517	942	1,619	1,059	635	1,766	1,146	677		
VFK 135/3 D		2,482	1,774	1,151	1,888	1,299	807	1,387	907	544	1,513	982	580		
Gross Thermal Yield per m ² gross area		1,154	825	535	878	604	375	645	422	253	704	457	270		
Annual efficiency, η_a		65%	47%	30%	54%	37%	23%	55%	36%	22%	57%	37%	22%		
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)													
Annual irradiation on collector plane		1765 kWh/m ²			1630 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. 6.2 (13.01.2022). A detailed description of the calculations is available at http://www.estif.org/solarkeymarknew/															
Additional Information															
Collector heat transfer medium										Water-Glycole					
The collector is deemed to be suitable for roof integration										Yes					
The collector was tested successfully under the following conditions:															
Climate class (A+, A, B or C)										A+		--			
G (W/m ²) >		1100		ϑ_a (°C) >		40		H_x (MJ/m ²) >		700					
Maximum tested positive load										5400		Pa			
Maximum tested negative load										3000		Pa			
Hail resistance using ice balls (diameter)										45		mm			
Additional collector attribute(s)															
Using external power source(s) for normal operation						No		Active or passive measure(s) for self-protection				No			
Co-generating thermal and electrical power						No		Façade collector(s)				No			
Energy Labelling Information						Additional Informative Technical Data									
Reference Area, A_{sol} (m ²)						Hydraulic Designation Code				Aperture Area, A_a (m ²)					
VFK 135/3 VD						2.51				1-H-12345-A:9.2,20630-C:10.5,1180				2.35	
VFK 135/3 D						2.15				1-H-145-A:9.2,20142-C:0,0-D				2.35	
Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}						Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}									
Collector efficiency (η_{col})						57%		Zero-loss efficiency (η_0)				0.73		--	
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 9806:2017.						First-order coefficient (a_1)				3.33		W/(m ² K)			
						Second-order coefficient (a_2)				0.014		W/(m ² K ²)			
						Incidence angle modifier IAM (50°)				0.88		--			
						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.									
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