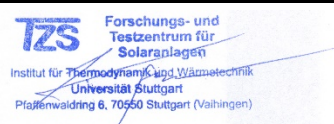


<b>Annex to Solar Keymark Certificate</b>					<b>Licence Number</b>		<b>011-7S406 F</b>							
					<b>Date issued</b>		<b>2020-11-10</b>							
					<b>Issued by</b>		<b>DIN CERTCO</b>							
<b>Licence holder</b>		<b>Vaillant GmbH</b>			<b>Country</b>		<b>Germany</b>							
<b>Brand (optional)</b>					<b>Web</b>		<b>www.vaillant.de</b>							
<b>Street, Number</b>		<b>Berghauser Straße 40</b>			<b>E-mail</b>		<b>info@vaillant.com</b>							
<b>Postcode, City</b>		<b>42859 Remscheid</b>			<b>Tel</b>		<b>+49 (0) 2191 18-0</b>							
<b>Collector Type</b>					<b>Flat plate collector</b>									
<b>Collector name</b>					<b>Power output per collector</b>									
					$G_b = 850 \text{ W/m}^2, G_d = 150 \text{ W/m}^2 \text{ \& } u = 1.3 \text{ m/s}$ $\vartheta_m - \vartheta_a$									
					0 K	10 K	30 K	50 K	70 K	102 K				
					m <sup>2</sup>	mm	mm	mm	mm	mm				
<b>VFK 145/3 V</b>					2.51	2 033	1 233	80	1 844	1 751	1 543	1 305	1 037	546
<b>VFK 145/3 H</b>					2.51	1 233	2 033	80	1 844	1 751	1 543	1 305	1 037	546
<b>Power output per m<sup>2</sup> gross area</b>					<b>735</b>	<b>698</b>	<b>615</b>	<b>520</b>	<b>413</b>	<b>217</b>				
<b>Performance parameters test method</b>		<b>Quasi dynamic</b>												
<b>Performance parameters (related to A<sub>G</sub>)</b>		$\eta_0, b$	a1	a2	a3	a4	a5	a6	a7	a8	Kd			
<b>Units</b>		-	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K <sup>2</sup> )	J/(m <sup>3</sup> K)	-	J/(m <sup>2</sup> K)	s/m	W/(m <sup>2</sup> K <sup>4</sup> )	W/(m <sup>2</sup> K <sup>4</sup> )	-			
<b>Test results</b>		<b>0.737</b>	<b>3.542</b>	<b>0.015</b>	<b>0.000</b>	<b>0.00</b>	<b>10 580</b>	<b>0.000</b>	<b>0.00</b>	<b>0.0</b>	<b>0.98</b>			
<b>Incidence angle modifier test method</b>		<b>Quasi dynamic - outdoor</b>												
<b>Incidence angle modifier</b>		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°			
<b>Transversal</b>		$K_{\vartheta T, coll}$	1.00	1.00	1.00	0.99	0.95	0.79	0.59	0.30	0.00			
<b>Longitudinal</b>		$K_{\vartheta L, coll}$	1.00	1.00	1.00	0.99	0.95	0.79	0.59	0.30	0.00			
<b>Heat transfer medium for testing</b>					<b>Water</b>									
<b>Flow rate for testing (per gross area, A<sub>G</sub>)</b>					$dm/dt$		0.020		kg/(sm <sup>2</sup> )					
<b>Maximum temperature difference during thermal performance test</b>					$(\vartheta_m - \vartheta_a)_{max}$		72		K					
<b>Standard stagnation temperature (G = 1000 W/m<sup>2</sup>; <math>\vartheta_a = 30 \text{ }^\circ\text{C}</math>)</b>					$\vartheta_{stg}$		200		°C					
<b>Maximum operating temperature</b>					$\vartheta_{max, op}$		200		°C					
<b>Maximum operating pressure</b>					$p_{max, op}$		1000		kPa					
<b>Testing laboratory</b>		<b>Institut für Gebäudeenergetik, Thermotechnik und Energiespeicherung (IGTE)</b>					<b><a href="http://www.igte.uni-stuttgart.de">http://www.igte.uni-stuttgart.de</a></b>							
<b>Test report(s)</b>		20COL1579 20COL1579Q 20COL1580 20COL1580Q					<b>Dated</b>		10.11.2020 10.11.2020 10.11.2020 10.11.2020					
<b>Comments of testing laboratory</b>					<b>Datasheet version: 6.1, 2019-09-26</b>									
Thermal performance parameters are given from 20COL1579 (VFK 145/3 V)					 <p> <b>TZS</b> Forschungs- und Testzentrum für Solaranlagen        Institut für Thermodynamik und Wärmetechnik        Universität Stuttgart        Pfaffenwaldring 6, 70569 Stuttgart (Vaihingen)     </p>									
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