


<b>Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results</b>					<b>Licence Number</b>		<b>011-7S600 F</b>								
					<b>Date issued</b>		<b>2017-03-01</b>								
					<b>Issued by</b>		<b>DIN CERTCO</b>								
<b>Licence holder</b>		Ernst Schweizer AG			<b>Country</b>		Schweiz								
<b>Brand (optional)</b>					<b>Web</b>		www.schweizer-metallbau.ch								
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<b>Postcode, City</b>		8909	Hedingen		<b>Tel</b>		+41 (0) 44 763 61 11								
<b>Collector Type</b>					Flat plate collector, glazed										
<b>Collector name</b>					<b>Power output per collector</b>										
					Gb = 850 W/m <sup>2</sup> ; Gd = 150 W/m <sup>2</sup> ; u = 3 m/s ̑m - ̑a										
					Gross area (A <sub>G</sub> )	Gross length	Gross width	Gross height	0 K	10 K	30 K	50 K	70 K	109 K	
					m <sup>2</sup>	mm	mm	mm	W	W	W	W	W	W	
FK1 H2H					2.58	2 092	1 234	108	1 847	1 756	1 563	1 355	1 134	659	
FK1 H2H-18					2.58	2 092	1 234	108	1 847	1 756	1 563	1 355	1 134	659	
<b>Power output per m<sup>2</sup> gross area</b>					716	681	606	525	439	256					
<b>Performance parameters test method</b>					Quasi dynamic										
<b>Performance parameters (related to AG)</b>					̑ <sub>0,b</sub>	c1	c2	c3	c4	c6	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)	-	s/m	-				
<b>Test results</b>					0.722	3.461	0.007	0.000	0.000	0.000	0.944				
<b>Incidence angle modifier test method</b>					Quasi dynamic - outdoor										
<b>Bi-directional incidence angle modifiers</b>					No										
<b>Incidence angle modifier</b>					Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°	
<b>Transversal</b>					K <sub>̑T, coll</sub>	1.00	0.99	0.98	0.96	0.93	0.87	0.75	0.38	0.00	
<b>Longitudinal</b>					K <sub>̑L, coll</sub>	1.00	0.99	0.98	0.96	0.93	0.87	0.75	0.38	0.00	
<b>Heat transfer medium for testing</b>					Water										
<b>Flow rate for testing (per gross area, A<sub>G</sub>)</b>					dm/dt		0.030		kg/(sm <sup>2</sup> )						
<b>Maximum temperature difference for thermal performance calculations</b>					(̑ <sub>m</sub> -̑ <sub>a</sub> ) <sub>max</sub>		109		K						
<b>Standard stagnation temperature (G = 1000 W/m<sup>2</sup>; ̑<sub>a</sub> = 30 °C)</b>					̑ <sub>stg</sub>		201		°C						
<b>Effective thermal capacity, incl. fluid (per gross area, A<sub>G</sub>)</b>					C/m <sup>2</sup>		14.603		kJ/(Km <sup>2</sup> )						
<b>Maximum operating temperature</b>					̑ <sub>max, op</sub>		n.a.		°C						
<b>Maximum operating pressure</b>					p <sub>max, op</sub>		600		kPa						
<b>Testing laboratory</b>					TZS, ITW University Stuttgart					www.itw.uni-stuttgart.de					
<b>Test report(s)</b>					08COL743/1					<b>Dated</b>		17.02.2010			
<b>Comments of testing laboratory</b>					Datasheet version: 5.01, 2016-03-01										
This data sheet replaces the data sheet issued on 17.02.2010 Documented performance parameters are taken from FK1 H2H.					 <b>Forschungs- und Testzentrum für Solaranlagen</b> Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 6, 70550 Stuttgart (Vaihingen)										
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<b>Annex to Solar Keymark Certificate</b> <b>Supplementary Information</b>	<b>Licence Number</b>	<b>011-7S600 F</b>
	<b>Issued</b>	<b>2017-03-01</b>

Annual collector output in kWh/collector at mean fluid temperature $\vartheta_m$ , based on ISO 9806:2013 test results													
Collector name	Standard Locations $\vartheta_m$	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
FK1 H2H		2 965	2 128	1 435	2 251	1 581	1 040	1 656	1 099	692	1 805	1 190	738
FK1 H2H-18		2 965	2 128	1 435	2 251	1 581	1 040	1 656	1 099	692	1 805	1 190	738
Annual output per m <sup>2</sup> gross area		1 149	825	556	872	613	403	642	426	268	700	461	286
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m <sup>2</sup>			1714 kWh/m <sup>2</sup>			1166 kWh/m <sup>2</sup>			1244 kWh/m <sup>2</sup>		
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 $\vartheta_m$ (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 <a href="http://www.solarkeymark.org/scenocalc">www.solarkeymark.org/scenocalc</a>													

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)	C	--
Maximum tested positive load	3000	Pa
Maximum tested negative load	3000	Pa
Hail resistance using steel ball (maximum drop height)	n.a.	m

Energy Labelling Information			
	Reference Area, $A_{sol}$ (m <sup>2</sup> )	Data required for CDR (EU) No 811/2013 - Reference Area $A_{sol}$	
FK1 H2H	2.58	Collector efficiency ( $\eta_{col}$ )	57 %
FK1 H2H-18	2.58	Remark: Collector efficiency ( $\eta_{col}$ ) 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 <sup>2</sup> , expressed in % and rounded to the nearest integer. Deviating from the regulation $\eta_{col}$ 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 ( $\eta_0$ )	0.716 --
		First-order coefficient ( $a_1$ )	3.46 W/(m <sup>2</sup> K)
		Second-order coefficient ( $a_2$ )	0.007 W/(m <sup>2</sup> K <sup>2</sup> )
		Incidence angle modifier IAM (50°)	0.93 --
		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.	