

Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results						Licence Number		011-7S2856 R																	
						Date issued		2018-06-01																	
						Issued by		ISFH CalTeC																	
Licence holder			Meska-Europa			Country		Germany																	
Brand (optional)			-			Web		www.meskaeuropa.com																	
Street, Number			Finkensteg 5			E-mail		info@meskaeuropa.com																	
Postcode, City			59229 Ahlen			Tel		+49 (0) 2382 64319																	
Collector Type																									
Collector name						Gross area (A_G)		Gross length		Gross width		Gross height		Power output per collector $G_b = 850 \text{ W/m}^2$; $G_d = 150 \text{ W/m}^2$ $\vartheta_m - \vartheta_a$											
						m ²		mm		mm		mm								0 K		10 K		30 K	
						W		W		W		W		W		W		W		W					
Wärmatech 5818-20						3.33		2 020		1 650		185		1 309		1 265		1 172		1 071		963		846	
Wärmatech 5818-22						3.66		2 020		1 810		185		1 438		1 391		1 289		1 178		1 058		929	
Wärmatech 5818-24						3.97		2 020		1 970		185		1 560		1 508		1 398		1 277		1 148		1 008	
Wärmatech 5818-30						4.95		2 020		2 450		185		1 945		1 881		1 743		1 593		1 431		1 257	
Power output per m² gross area						393		380		352		322		289		254									
Performance parameters test method						Steady state - outdoor																			
Performance parameters (related to A_G)						$\eta_{0,hem}$		a1		a2															
Units						-		W/(m ² K)		W/(m ² K ²)															
Test results						0.393		1.275		0.003															
Incidence angle modifier test method						Quasi dynamic - outdoor																			
Bi-directional incidence angle modifiers						No																			
Incidence angle modifier						Angle		10°		20°		30°		40°		50°		60°		70°		80°		90°	
Transversal						$K_{\theta T, coll}$		1.00		1.00		0.99		0.97		0.94		0.90		0.88				0.00	
Longitudinal						$K_{\theta L, coll}$		1.00		1.00		0.99		0.97		0.94		0.90		0.88				0.00	
Heat transfer medium for testing						Water																			
Flow rate for testing (per gross area, A_G)						dm/dt		0.028		kg/(sm ²)															
Maximum temperature difference for thermal performance calculations						$(\vartheta_m - \vartheta_a)_{max}$		90		K															
Standard stagnation temperature ($G = 1000 \text{ W/m}^2$; $\vartheta_a = 30 \text{ °C}$)						ϑ_{stg}		210		°C															
Effective thermal capacity, incl. fluid (per gross area, A_G)						C/m ²		13.5		kJ/(Km ²)															
Maximum operating temperature						$\vartheta_{max, op}$		-		°C															
Maximum operating pressure						$p_{max, op}$		600		kPa															
Testing laboratory						ISFH CalTeC						www.isfh.de													
Test report(s)						23-18/B						Dated		01.06.2016											
Comments of testing laboratory												Datasheet version: 5.01, 2016-03-01													
												Institut für Solarenergieforschung GmbH Am Ohrberg 1 D-31860 Emmerthal Tel.: 05151/999-100 Fax: 05151/999-500													
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	011-7S2856 R
	Issued	2018-06-01

Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on ISO 9806:2013 test results													
Collector name	Standard Locations ϑ_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
Wärmatech 5818-20		2 134	1 708	1 321	1 725	1 358	1 034	1 251	943	692	1 353	1 020	739
Wärmatech 5818-22		2 346	1 877	1 452	1 896	1 492	1 137	1 375	1 036	760	1 487	1 121	812
Wärmatech 5818-24		2 545	2 036	1 575	2 057	1 618	1 233	1 492	1 124	825	1 613	1 215	881
Wärmatech 5818-30		3 173	2 539	1 964	2 564	2 018	1 537	1 860	1 402	1 029	2 012	1 515	1 099
Annual output per m ² gross area		641	513	397	518	408	311	376	283	208	406	306	222
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)	C	--
Maximum tested positive load	2400	Pa
Maximum tested negative load	2400	Pa
Hail resistance using steel ball (maximum drop height)	1.4	m

Energy Labelling Information

	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
Wärmatech 5818-20	3.33	Collector efficiency (η_{col})	34 %
Wärmatech 5818-22	3.66	<i>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/m², 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.</i>	
Wärmatech 5818-24	3.97		
Wärmatech 5818-30	4.95		
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.393 --
		First-order coefficient (a_1)	1.28 W/(m ² K)
		Second-order coefficient (a_2)	0.003 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.94 --
<i>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.</i>			

DIN CERTCO • Alboinstraße 56 • 12103 Berlin, Germany

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