



Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2443 R
	Issued	2016-01-12

Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on ISO 9806 Test Results													
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
Germanstar HP 70/8		1'437	1'256	1'074	1'224	1'053	889	879	736	604	945	792	649
Germanstar HP 70/16		2'833	2'477	2'117	2'414	2'076	1'753	1'733	1'450	1'191	1'864	1'561	1'280
Germanstar HP 70/18		3'179	2'780	2'376	2'709	2'330	1'967	1'945	1'628	1'336	2'092	1'752	1'436
Germanstar HP 70/24		4'229	3'698	3'160	3'604	3'099	2'617	2'587	2'165	1'777	2'783	2'331	1'911
Annual output per m ² gross area		1'019	891	762	868	747	631	623	522	428	671	562	460
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 (July 2015). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc													

Additional Information		
Collector heat transfer medium	Liquid	
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 under the following conditions:		
Climate class (A, B or C)	A	--
Positive Mechanical Load	1000	Pa
Negative Mechanical Load	1000	Pa
Hail resistance using ice balls (diameter)	25	mm

Energy Labelling Information			
	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
Germanstar HP 70/8	1.41	Collector efficiency (η_{col})	55 %
Germanstar HP 70/16	2.78	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.	
Germanstar HP 70/18	3.12		
Germanstar HP 70/24	4.15		
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.600 --
		First-order coefficient (a_1)	1.17 W/(m ² K)
		Second-order coefficient (a_2)	0.040 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	1.01 --
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.			