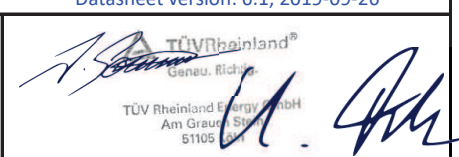


Annex to Solar Keymark Certificate					Licence Number		011-7S2283 R							
					Date issued		2020-02-03							
					Issued by		TÜV Rheinland Energy GmbH							
Licence holder		HAINING JU YANG NEW ENERGY			Country		P.R. China							
Brand (optional)		ONOSI			Web		www.onosisolar.com							
Street, Number		No.58 Beitang road, Puqiao Village			E-mail		onosi@onosisolar.com							
Postcode, City		314416 / Yuanhua, Haining, Zhejiang			Tel		+86 0573 - 87718300							
Collector Type					Evacuated tubular collector									
Collector name					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				
					m ²	mm	mm	mm	mm	mm	mm			
					W	W	W	W	W	W				
ONS-HPC01/14-10					1.85	2 010	920	159	590	560	498	435	372	275
ONS-HPC01/14-12					2.15	2 010	1 070	159	687	651	579	506	432	320
ONS-HPC01/14-15					2.63	2 010	1 310	159	841	797	709	619	529	391
ONS-HPC01/14-16					2.79	2 010	1 390	159	892	846	752	657	561	415
ONS-HPC01/14-18					3.12	2 010	1 550	159	995	943	839	733	626	463
ONS-HPC01/14-20					3.44	2 010	1 710	159	1 097	1 040	925	809	691	511
ONS-HPC01/14-22					3.76	2 010	1 870	159	1 200	1 138	1 012	884	755	559
ONS-HPC01/14-24					4.08	2 010	2 030	159	1 303	1 235	1 098	960	820	607
ONS-HPC01/14-25					4.24	2 010	2 110	159	1 354	1 284	1 141	998	852	630
ONS-HPC01/14-30					5.05	2 010	2 510	159	1 611	1 527	1 358	1 187	1 014	750
Power output per m ² gross area					319	303	269	235	201	149				
Performance parameters test method		Steady state - outdoor												
Performance parameters (related to A _G)		η _{0, b}	a1	a2	a3	a4	a5	a6	a7	a8	Kd			
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		0.312	1.66	0.001	0.000	0.00	31 800	0.000	0.00	0.0E+00	1.16			
Incidence angle modifier test method		Quasi dynamic - outdoor												
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°			
Transversal		K _{GT, coll}	1.02	1.08	1.18	1.33	1.52	1.48	1.43	-	0.00			
Longitudinal		K _{GL, coll}	1.00	1.00	0.99	0.98	0.97	0.94	0.88	-	0.00			
Heat transfer medium for testing					Water									
Flow rate for testing (per gross area, A _G)					dm/dt	0.027	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}	250	°C							
Maximum operating temperature					θ _{max, op}	99	°C							
Maximum operating pressure					p _{max, op}	600	kPa							
Testing laboratory		TÜV Rheinland (Shanghai) Co., Ltd.					http://www.tuv.com/solarenergy							
Test report(s)		154031403_EN_30_Report_Gao 154031403_EN_P_10_Report_Gao					Dated		28.11.2013 18.12.2013					
Comments of testing laboratory					Datasheet version: 6.1, 2019-09-26									
All input figures are taken out of the original test reports issued by TÜV Rheinland Shanghai. If necessary, the reference area and the corresponding figures are changed to gross area.														
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Annex to Solar Keymark Certificate							Licence Number		011-7S2283 R							
Supplementary Information							Issued		2020-02-03							
Annual collector output in kWh/collector at mean fluid temperature ϑ_m																
Collector name	Standard Locations	Athens			Davos			Stockholm			Würzburg					
	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			
ONS-HPC01/14-10		1 152	869	639	884	659	477	659	467	326	716	507	348			
ONS-HPC01/14-12		1 339	1 011	743	1 028	766	555	766	543	379	833	590	405			
ONS-HPC01/14-15		1 640	1 237	910	1 258	938	679	938	665	465	1 020	722	496			
ONS-HPC01/14-16		1 740	1 313	965	1 335	996	721	995	706	493	1 082	766	526			
ONS-HPC01/14-18		1 940	1 464	1 076	1 489	1 110	804	1 110	787	550	1 207	855	587			
ONS-HPC01/14-20		2 141	1 615	1 187	1 643	1 225	887	1 224	869	606	1 331	943	647			
ONS-HPC01/14-22		2 341	1 766	1 299	1 796	1 339	970	1 339	950	663	1 456	1 031	708			
ONS-HPC01/14-24		2 541	1 917	1 410	1 950	1 454	1 053	1 453	1 031	720	1 581	1 119	769			
ONS-HPC01/14-25		2 641	1 993	1 465	2 027	1 511	1 094	1 511	1 072	748	1 643	1 164	799			
ONS-HPC01/14-30		3 142	2 371	1 743	2 411	1 798	1 302	1 797	1 275	890	1 954	1 384	950			
Annual output per m ² gross area		623	470	345	478	356	258	356	253	176	387	274	188			
Annual efficiency, η_a		35%	27%	20%	29%	22%	16%	31%	22%	15%	31%	22%	15%			
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. 6.1 (September 2019). 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							No									
The collector was tested successfully under the following conditions:																
Climate class (A+, A, B or C)							B			--						
G (W/m ²) >		900		ϑ_a (°C) >		15		H _x (MJ/m ²) >			540					
Maximum tested positive load							2400			Pa						
Maximum tested negative load							-			Pa						
Hail resistance using ice balls (diameter)							-			mm						
Additional collector attribute(s)																
<input type="checkbox"/> Using external power source(s) for normal operation							<input type="checkbox"/> Active or passive measure(s) for self-protection									
<input type="checkbox"/> Co-generating thermal and electrical power							<input type="checkbox"/> Façade collector(s)									
Energy Labelling Information							Additional Informative Technical Data									
Reference Area, A _{sol} (m ²)							Hydraulic Designation Code			Aperture Area, A _a (m ²)						
ONS-HPC01/14-10							1.85			1-H-12S-C35,959			0.94			
ONS-HPC01/14-12							2.15			1-H-12S-C35,1119			1.13			
ONS-HPC01/14-15							2.63			1-H-12S-C35,1359			1.41			
ONS-HPC01/14-16							2.79			1-H-12S-C35,1439			1.50			
ONS-HPC01/14-18							3.12			1-H-12S-C35,1599			1.69			
ONS-HPC01/14-20							3.44			1-H-12S-C35,1759			1.88			
ONS-HPC01/14-22							3.76			1-H-12S-C35,1919			2.07			
ONS-HPC01/14-24							4.08			1-H-12S-C35,2079			2.26			
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})							25%			Zero-loss efficiency (η_0)			0.32			
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)			1.66			W/(m ² K)			
							Second-order coefficient (a ₂)			0.001			W/(m ² K ²)			
							Incidence angle modifier IAM (50°)			1.28			--			
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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