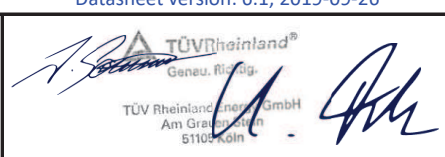


Annex to Solar Keymark Certificate					Licence Number		011-7S2264 R							
					Date issued		2020-02-03							
					Issued by		TÜV Rheinland Energy GmbH							
Licence holder		HAINING JU YANG NEW ENERGY			Country		P.R. China							
Brand (optional)		ONOSI			Web		www.onosisolar.com							
Street, Number		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									
					Gb = 850 W/m ² , Gd = 150 W/m ² & u = 1.3 m/s $\vartheta_m - \vartheta_a$									
					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-HPC-10					1.62	2 010	805	158	679	668	634	585	523	402
ONS-HPC-12					1.92	2 010	955	158	805	791	751	694	620	477
ONS-HPC-15					2.37	2 010	1 180	158	994	977	927	856	765	589
ONS-HPC-16					2.52	2 010	1 255	158	1 057	1 039	986	911	813	626
ONS-HPC-18					2.82	2 010	1 405	158	1 183	1 162	1 103	1 019	910	700
ONS-HPC-20					3.13	2 010	1 555	158	1 313	1 290	1 224	1 131	1 010	777
ONS-HPC-22					3.43	2 010	1 705	158	1 438	1 414	1 342	1 239	1 107	852
ONS-HPC-24					3.73	2 010	1 855	158	1 564	1 537	1 459	1 348	1 204	926
ONS-HPC-25					3.88	2 010	1 930	158	1 627	1 599	1 518	1 402	1 252	964
ONS-HPC-30					4.63	2 010	2 305	158	1 942	1 908	1 811	1 673	1 494	1 150
Power output per m ² gross area					419	412	391	361	323	248				
Performance parameters test method		Quasi dynamic												
Performance parameters (related to A _G)		$\eta_{0, b}$	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		0.406	0.61	0.011	0.000	0.00	60 093	0.000	0.00	0.0E+00	1.22			
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}	1.03	1.07	1.20	1.34	1.50	1.53	1.51	-	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	0.013	kg/(sm ²)										
Maximum temperature difference during thermal performance test		($\vartheta_m - \vartheta_a$) _{max}	70	K										
Standard stagnation temperature (G = 1000 W/m ² ; $\vartheta_a = 30$ °C)		ϑ_{stg}	210	°C										
Maximum operating temperature		$\vartheta_{max, op}$	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)		154026306_EN_P_10_Report_Gao 154026306a_EN_30_Report_Gao					Dated		28.10.2013 05.12.2013					
Comments of testing laboratory		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.												
		 Datasheet version: 6.1, 2019-09-26 TÜV Rheinland Energy GmbH Am Graubühl 51109 Köln												
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Annex to Solar Keymark Certificate							Licence Number		011-7S2264 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-HPC-10		1 383	1 227	1 012	1 177	994	781	861	717	552	930	778	600	
ONS-HPC-12		1 639	1 454	1 199	1 396	1 178	926	1 021	850	654	1 102	922	712	
ONS-HPC-15		2 023	1 795	1 480	1 723	1 454	1 143	1 260	1 049	807	1 361	1 138	878	
ONS-HPC-16		2 151	1 908	1 573	1 832	1 546	1 215	1 340	1 115	859	1 447	1 210	934	
ONS-HPC-18		2 407	2 135	1 761	2 050	1 730	1 360	1 499	1 248	961	1 619	1 354	1 045	
ONS-HPC-20		2 672	2 370	1 954	2 275	1 920	1 509	1 664	1 385	1 066	1 797	1 503	1 160	
ONS-HPC-22		2 928	2 597	2 142	2 493	2 104	1 654	1 823	1 518	1 169	1 969	1 647	1 271	
ONS-HPC-24		3 184	2 825	2 329	2 711	2 288	1 799	1 983	1 651	1 271	2 141	1 791	1 382	
ONS-HPC-25		3 312	2 938	2 423	2 820	2 380	1 871	2 063	1 717	1 322	2 227	1 863	1 438	
ONS-HPC-30		3 952	3 506	2 891	3 365	2 840	2 233	2 461	2 049	1 577	2 658	2 223	1 716	
Annual output per m ² gross area		854	757	624	727	613	482	532	443	341	574	480	371	
Annual efficiency, η_a		48%	43%	35%	45%	38%	30%	46%	38%	29%	46%	39%	30%	
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										2000		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-HPC-10							1.62		1-H-12S-C38,895			0.95		
ONS-HPC-12							1.92		1-H-12S-C38,1045			1.14		
ONS-HPC-15							2.37		1-H-12S-C38,1270			1.42		
ONS-HPC-16							2.52		1-H-12S-C38,1345			1.51		
ONS-HPC-18							2.82		1-H-12S-C38,1495			1.70		
ONS-HPC-20							3.13		1-H-12S-C38,1645			1.89		
ONS-HPC-22							3.43		1-H-12S-C38,1795			2.08		
ONS-HPC-24							3.73		1-H-12S-C38,1945			2.27		
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})							38%		Zero-loss efficiency (η_0)		0.42		--	
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)		0.61		W/(m ² K)			
							Second-order coefficient (a_2)		0.011		W/(m ² K ²)			
							Incidence angle modifier IAM (50°)		1.30					
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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