


Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results						Licence Number		011-7S2719 F			
						Date issued		2016-11-23			
						Issued by		DIN CERTCO			
Licence holder	Şimşek Güneş Kolektörleri San.Tic.Ltd.Şti.					Country	Turkey				
Brand (optional)	-					Web	www.simseksolar.com				
Street, Number	2. OSB Rasim Dokur Bulvarı No: 32					E-mail	can@simseksolar.com				
Postcode, City	Akdeniz / Mersin					Tel	+90 05062324432				
Collector Type						Flat plate collector, glazed					
Collector name	Gross area (A _G) m ²	Gross length mm	Gross width mm	Gross height mm	Power output per collector G _b = 850 W/m ² ; G _d = 150 W/m ² ; u = 3 m/s θ _m - θ _a						
					0 K W	10 K W	30 K W	50 K W	70 K W	110 K W	
Orion 612 Series	1.81	1 935	935	81	1 178	1 108	959	796	620	230	
Orion 613 Series	1.83	1 960	935	81	1 191	1 121	969	805	627	233	
Orion 622 Series	1.89	1 770	1 065	81	1 230	1 157	1 001	831	648	240	
Orion 623 Series	2.09	1 960	1 065	81	1 361	1 280	1 107	919	716	266	
Orion 624 Series	2.22	2 080	1 065	81	1 445	1 359	1 176	976	761	282	
Orion 625 Series	2.31	2 170	1 065	81	1 504	1 415	1 224	1 016	792	294	
Orion 632 Series	2.08	1 770	1 175	81	1 354	1 274	1 102	915	713	264	
Orion 633 Series	2.30	1 960	1 175	81	1 497	1 408	1 218	1 012	788	292	
Orion 634 Series	2.44	2 080	1 175	81	1 588	1 494	1 292	1 073	836	310	
Orion 635 Series	2.55	2 170	1 175	81	1 660	1 562	1 351	1 122	874	324	
Orion 636s Series	2.68	2 280	1 175	81	1 745	1 641	1 420	1 179	919	341	
Orion 636 Series	2.69	2 290	1 175	81	1 751	1 647	1 425	1 183	922	342	
Orion 637 Series	2.73	2 320	1 175	81	1 777	1 672	1 446	1 201	936	347	
Orion 638 Series	2.81	2 390	1 175	81	1 829	1 721	1 488	1 236	963	357	
Power output per m ² gross area					651	612	530	440	343	127	
Performance parameters test method		Quasi dynamic									
Performance parameters (related to A _G)		η _{0,b}	c1	c2	c3	c4	c6	Kd			
Units		-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	s/m	-			
Test results		0.660	3.773	0.009	0.000	0.000	0.000	0.909			
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 _{θT, coll}	1.00	0.98	0.96	0.92	0.86	0.74	0.51	0.00	0.00
Longitudinal		K _{θL, coll}	1.00	0.98	0.96	0.92	0.86	0.74	0.51	0.00	0.00
Heat transfer medium for testing		Water									
Flow rate for testing (per gross area, A _G)		dm/dt	0.020		kg/(sm ²)						
Maximum temperature difference for thermal performance calculations		(θ _m -θ _a) _{max}	110		K						
Standard stagnation temperature (G = 1000 W/m ² ; θ _a = 30 °C)		θ _{stg}	185		°C						
Effective thermal capacity, incl. fluid (per gross area, A _G)		C/m ²	8.63		kJ/(Km ²)						
Maximum operating temperature		θ _{max, op}	120		°C						
Maximum operating pressure		p _{max, op}	900		kPa						
Testing laboratory		TZS, ITW University Stuttgart				www.itw.uni-stuttgart.de					
Test report(s)		16COL1321 16COL1322 16COL1322Q				Dated		18.11.2016 18.11.2016 18.11.2016			
Comments of testing laboratory		documented performance parameters are taken from 16COL1322 (Orion 638 Series)				Datasheet version: 5.01, 2016-03-01					
						 Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 6, 70560 Stuttgart (Vaihingen)					
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2719 F
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Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on ISO 9806:2013 test results

Standard Locations Collector name	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
Orion 612 Series		1 795	1 182	706	1 307	839	477	968	586	326	1 060	632	342
Orion 613 Series		1 815	1 195	713	1 322	848	483	978	592	329	1 072	639	346
Orion 622 Series		1 874	1 234	737	1 365	876	499	1 011	611	340	1 107	660	358
Orion 623 Series		2 072	1 365	815	1 510	968	551	1 117	676	376	1 224	730	395
Orion 624 Series		2 201	1 450	865	1 604	1 029	586	1 187	718	400	1 300	775	420
Orion 625 Series		2 291	1 508	901	1 669	1 070	609	1 235	747	416	1 353	806	437
Orion 632 Series		2 063	1 358	811	1 502	964	549	1 112	673	374	1 218	726	394
Orion 633 Series		2 281	1 502	897	1 661	1 066	607	1 230	744	414	1 347	803	435
Orion 634 Series		2 420	1 593	951	1 762	1 131	644	1 305	789	439	1 429	852	462
Orion 635 Series		2 529	1 665	994	1 842	1 182	673	1 363	825	459	1 493	890	482
Orion 636s Series		2 658	1 750	1 045	1 936	1 242	707	1 433	867	482	1 570	935	507
Orion 636 Series		2 667	1 756	1 049	1 943	1 246	710	1 438	870	484	1 575	939	509
Orion 637 Series		2 707	1 783	1 064	1 972	1 265	720	1 460	883	491	1 599	953	516
Orion 638 Series		2 786	1 835	1 095	2 030	1 302	741	1 502	909	506	1 646	981	532
Annual output per m ² gross area		992	653	390	722	463	264	535	323	180	586	349	189
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	Yes	
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:		
Climate class (A, B or C)	A	--
Maximum tested positive load	2800	Pa
Maximum tested negative load	2400	Pa
Hail resistance using steel ball (maximum drop height)	2	m

Energy Labelling Information

	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}		
Orion 612 Series	1.81	Collector efficiency (η_{col})	49	%
Orion 613 Series	1.83	<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>		
Orion 622 Series	1.89			
Orion 623 Series	2.09			
Orion 624 Series	2.22			
Orion 625 Series	2.31			
Orion 632 Series	2.08			
Orion 633 Series	2.30	Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}		
Orion 634 Series	2.44			
Orion 635 Series	2.55	Zero-loss efficiency (η_0)	0.651	--
Orion 636s Series	2.68	First-order coefficient (a_1)	3.77	W/(m ² K)
Orion 636 Series	2.69	Second-order coefficient (a_2)	0.009	W/(m ² K ²)
Orion 637 Series	2.73	Incidence angle modifier IAM (50°)	0.86	--
Orion 638 Series	2.81	<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>		