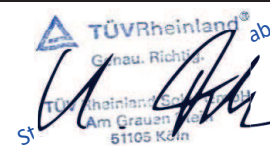


<b>Annex to Solar Keymark Certificate</b>					<b>Licence Number</b>		<b>011-7S2214 F</b>							
					<b>Date issued</b>		<b>2025-01-29</b>							
					<b>Issued by</b>		<b>DINCERTCO</b>							
<b>Licence holder</b>		<b>GASOKOL GmbH</b>			<b>Country</b>		Austria							
<b>Brand (optional)</b>		-			<b>Web</b>		http://www.gasokol.at							
<b>Street, Number</b>		Solarpark 1			<b>E-mail</b>		office@gasokol.at							
<b>Postcode, City</b>		4351 Saxen			<b>Tel</b>		+43 7269 76600-0							
<b>Collector Type</b>					Flat plate collector									
<b>Collector name</b>					<b>Power output per collector</b>									
					G <sub>b</sub> = 850 W/m <sup>2</sup> , G <sub>d</sub> = 150 W/m <sup>2</sup> & u = 1.3 m/s θ <sub>m</sub> - θ <sub>a</sub>									
					0 K	10 K	30 K	50 K	70 K	100 K				
					m <sup>2</sup>	mm	mm	mm	mm	mm	mm			
					W	W	W	W	W	W				
gigaSol P49					4.83	2 080	2 320	105	3 469	3 290	2 900	2 467	1 992	1 199
gigaSol P52M					5.21	1 500	3 470	105	3 742	3 549	3 128	2 661	2 148	1 294
gigaSol P60H					6.06	1 050	5 770	105	4 353	4 128	3 638	3 095	2 499	1 505
gigaSol P69M					6.93	1 500	4 620	105	4 978	4 721	4 161	3 540	2 858	1 721
gigaSol P72					7.22	2 080	3 470	105	5 186	4 918	4 335	3 688	2 977	1 793
gigaSol P86M					8.66	1 500	5 770	105	6 220	5 899	5 199	4 423	3 571	2 150
gigaSol P96					9.61	2 080	4 620	105	6 903	6 546	5 770	4 909	3 963	2 386
gigaSol P120					12.00	2 080	5 770	105	8 619	8 174	7 205	6 129	4 949	2 979
<b>Power output per m<sup>2</sup> gross area</b>					<b>718</b>	<b>681</b>	<b>600</b>	<b>511</b>	<b>412</b>	<b>248</b>				
<b>Performance parameters test method</b>		Quasi dynamic												
<b>Performance parameters (related to A<sub>G</sub>)</b>		η <sub>0</sub> , b	a1	a2	a3	a4	a5	a6	a7	a8	Kd			
<b>Units</b>		-	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K <sup>2</sup> )	J/(m <sup>3</sup> K)	-	J/(m <sup>2</sup> K)	s/m	W/(m <sup>2</sup> K <sup>4</sup> )	W/(m <sup>2</sup> K <sup>4</sup> )	-			
<b>Test results</b>		0.727	3.60	0.011	0.000	0.00	5 133	0.000	0.00	0.0E+00	0.92			
<b>Incidence angle modifier test method</b>		Quasi dynamic - outdoor												
<b>Incidence angle modifier</b>		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°			
<b>Transversal</b>		K <sub>θT, coll</sub>	1.00	0.99	0.97	0.95	0.91	0.83	0.68	0.34	0.00			
<b>Longitudinal</b>		K <sub>θL, coll</sub>	1.00	0.99	0.97	0.95	0.91	0.83	0.68	0.34	0.00			
<b>Heat transfer medium for testing</b>					Water									
<b>Flow rate for testing (per gross area, A<sub>G</sub>)</b>					dm/dt		0.028		kg/(sm <sup>2</sup> )					
<b>Maximum temperature difference during thermal performance test</b>					(θ <sub>m</sub> -θ <sub>a</sub> ) <sub>max</sub>		70		K					
<b>Standard stagnation temperature (G = 1000 W/m<sup>2</sup>; θ<sub>a</sub> = 30 °C)</b>					θ <sub>stg</sub>		210		°C					
<b>Maximum operating temperature</b>					θ <sub>max op</sub>		200		°C					
<b>Maximum operating pressure</b>					p <sub>max, op</sub>		1000		kPa					
<b>Testing laboratory</b>		TÜV Rheinland Solar GmbH			http://www.tuv.com/solar									
<b>Test report(s)</b>		300100701.001			<b>Dated</b>		01.12.2022							
<b>Comments of testing laboratory</b>					Ver. 6.2 (13.01.2022)									
Die kundenspezifisch gefertigte Kollektorserie gigaSol beinhaltet die Standardmodule mit einer Bruttofläche von 4.8 bis 12 m <sup>2</sup> auch Sonderbauformen, sämtliche Zwischengrößen und Sonderabmessungen. The customer specific collector series gigaSol comprises the standard modules with a gross area between 4.8 and 12 m <sup>2</sup> as well as special construction forms and all intermediate sizes.														
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<b>Annex to Solar Keymark Certificate</b>										<b>Licence Number</b>			<b>011-7S2214 F</b>			
<b>Supplementary Information</b>										<b>Issued</b>			<b>2025-01-29</b>			
<b>Gross Thermal Yield in kWh/collector at mean fluid temperature <math>\vartheta_m</math></b>																
<b>Standard Locations</b>		<b>Athens</b>			<b>Davos</b>			<b>Stockholm</b>			<b>Würzburg</b>					
<b>Collector name</b>	<b><math>\vartheta_m</math></b>	<b>25°C</b>	<b>50°C</b>	<b>75°C</b>	<b>25°C</b>	<b>50°C</b>	<b>75°C</b>	<b>25°C</b>	<b>50°C</b>	<b>75°C</b>	<b>25°C</b>	<b>50°C</b>	<b>75°C</b>			
gigaSol P49		5 464	3 817	2 438	4 101	2 777	1 705	3 026	1 938	1 149	3 299	2 094	1 219			
gigaSol P52M		5 894	4 117	2 630	4 423	2 996	1 839	3 264	2 091	1 239	3 558	2 258	1 315			
gigaSol P60H		6 856	4 789	3 059	5 145	3 484	2 140	3 796	2 432	1 441	4 139	2 627	1 530			
gigaSol P69M		7 840	5 477	3 498	5 884	3 985	2 447	4 341	2 781	1 648	4 733	3 004	1 749			
gigaSol P72		8 168	5 706	3 644	6 130	4 151	2 549	4 523	2 898	1 717	4 931	3 130	1 823			
gigaSol P86M		9 797	6 844	4 371	7 352	4 979	3 057	5 425	3 476	2 060	5 915	3 754	2 186			
gigaSol P96		10 872	7 595	4 851	8 159	5 526	3 393	6 020	3 857	2 286	6 564	4 166	2 426			
gigaSol P120		13 576	9 483	6 057	10 188	6 900	4 237	7 518	4 816	2 854	8 196	5 201	3 029			
Gross Thermal Yield per m <sup>2</sup> gross area		1 131	790	505	849	575	353	626	401	238	683	433	252			
Annual efficiency, $\eta_a$		64%	45%	29%	52%	35%	22%	54%	34%	20%	55%	35%	20%			
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)														
Annual irradiation on collector plane		1765 kWh/m <sup>2</sup>			1630 kWh/m <sup>2</sup>			1166 kWh/m <sup>2</sup>			1244 kWh/m <sup>2</sup>					
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 $\vartheta_m$ (mean of in- and outlet temperatures). The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool Scenocalc Ver. 6.2 (13.01.2022). A detailed description of the calculations is available at <a href="http://www.estif.org/solarkeymarknew/">http://www.estif.org/solarkeymarknew/</a>																
<b>Additional Information</b>																
Collector heat transfer medium										Water-Glycole						
The collector is deemed to be suitable for roof integration										Yes						
The collector was tested successfully under the following conditions:																
Climate class (A+, A, B or C)										A		--				
G (W/m <sup>2</sup> ) >		1000		$\vartheta_a$ (°C) >		20		$H_x$ (MJ/m <sup>2</sup> ) >		600						
Maximum tested positive load										5400		Pa				
Maximum tested negative load										2400		Pa				
Hail resistance using ice balls (diameter)										35		mm				
<b>Additional collector attribute(s)</b>																
Using external power source(s) for normal operation					No		Active or passive measure(s) for self-protection					No				
Co-generating thermal and electrical power					No		Façade collector(s)					Yes				
<b>Energy Labelling Information</b>							<b>Additional Informative Technical Data</b>									
Reference Area, $A_{sol}$ (m <sup>2</sup> )							Hydraulic Designation Code				Aperture Area, $A_a$ (m <sup>2</sup> )					
gigaSol P49							4.83				6,6,6-H-13S-A:9.2,2191-C:20.0,3878			4.40		
gigaSol P52M							5.21				12-H-24S-A:9.2,3341-C:20.0,2718			4.69		
gigaSol P60H							6.06				8-H-24S-A:9.2,5641-C:20.0,1816			5.35		
gigaSol P69M							6.93				12-H-24S-A:9.2,34491-C:20.0,2718			6.27		
gigaSol P72							7.22				18-H-13S-A:9.2,3341-C:20.0,3878			6.61		
gigaSol P86M							8.66				12-H-24S-A:9.2,5641-C:20.0,2718			7.84		
gigaSol P96							9.61				18-H-13S-A:9.2,4491-C:20.0,3878			8.83		
gigaSol P120							12.00				18-H-13S-A:9.2,5641-C:20.0,3878			11.05		
<b>Data required for CDR (EU) No 811/2013 - Reference Area</b>							<b>Data required for CDR (EU) No 812/2013 - Reference Area <math>A_{sol}</math></b>									
Collector efficiency ( $\eta_{col}$ )							56%				Zero-loss efficiency ( $\eta_0$ )		0.72		--	
Remark: Collector efficiency ( $\eta_{col}$ ) 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 <sup>2</sup> , expressed in % and rounded to the nearest integer. Deviating from the regulation $\eta_{col}$ 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 ( $a_1$ )		3.60		W/(m <sup>2</sup> K)					
							Second-order coefficient ( $a_2$ )		0.011		W/(m <sup>2</sup> K <sup>2</sup> )					
							Incidence angle modifier IAM (50°)		0.91		--					
							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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