


Annex to Solar Keymark Certificate					Licence Number		011-7S3259 R							
					Date issued		2024-07-26							
					Issued by		DIN CERTCO							
Licence holder		2-Improve Energy			Country		The Netherlands							
Brand (optional)		Prisma pro			Web		www.prisma-pro.nl [prisma-pro.nl]							
Street, Number		Symon spiersweg 7D10			E-mail		info@prisma-pro.nl							
Postcode, City		1506 RZ Zaandam			Tel		+31 756703958							
Collector Type					Evacuated tubular collector									
Collector name					Power output per collector									
					$G_b = 850 \text{ W/m}^2$, $G_d = 150 \text{ W/m}^2$ & $u = 1.3 \text{ m/s}$ $\vartheta_m - \vartheta_a$									
					0 K	10 K	30 K	50 K	70 K	84 K				
					W	W	W	W	W	W				
Prisma Pro 10					2.24	1980	1130	133	1,298	1,262	1,152	994	788	619
Prisma Pro 12					2.67	1980	1350	133	1,551	1,507	1,377	1,188	942	740
Prisma Pro 14					3.11	1980	1570	133	1,804	1,753	1,601	1,382	1,095	860
Prisma Pro 15					3.33	1980	1680	133	1,930	1,876	1,713	1,479	1,172	920
Prisma Pro 16					3.54	1980	1790	133	2,057	1,999	1,825	1,575	1,249	981
Prisma Pro 18					3.98	1980	2010	133	2,309	2,244	2,050	1,769	1,402	1,101
Prisma Pro 20					4.42	1980	2230	133	2,562	2,490	2,274	1,963	1,556	1,222
Prisma Pro 21					4.63	1980	2340	133	2,689	2,613	2,386	2,059	1,633	1,282
Prisma Pro 22					4.85	1980	2450	133	2,815	2,722	2,498	2,156	1,709	1,342
Prisma Pro 24					5.29	1980	2670	133	3,068	2,981	2,723	2,350	1,863	1,463
Prisma Pro 25					5.50	1,980	2,780	133	3,194	3,104	2,835	2,447	1,940	1,523
Prisma Pro 28					6.04	1,980	3,050	133	3,504	3,406	3,110	2,684	2,128	1,671
Power output per m ² gross area					580	564	515	444	352	277				
Performance parameters test method		Steady state - outdoor												
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		0.583	1.37	0.027	0.000	0.00	12220	0.000	0.00	0	0.97			
Incidence angle modifier test method		Steady state - outdoor												
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°			
Transversal		$K_{\theta T, coll}$	1.02	1.03	1.04	1.05	1.12	1.18	0.79	0.39	0.00			
Longitudinal		$K_{\theta L, coll}$	1.00	1.00	0.99	0.98	0.95	0.88	0.75	0.50	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 during thermal performance test					$(\vartheta_m - \vartheta_a)_{max}$	53.72	K							
Standard stagnation temperature (G = 1000 W/m ² ; $\vartheta_a = 30 \text{ }^\circ\text{C}$)					ϑ_{stg}	280	°C							
Maximum operating temperature					$\vartheta_{max, op}$	230	°C							
Maximum operating pressure					$p_{max, op}$	1000	kPa							
Testing laboratory		Intertek Testing Services Shenzhen Ltd. Guangzhou Branch					http://www.intertek.com							
Test report(s)		231031204GZU-004 231031204GZU-001					Dated		2024/7/26 2024/7/10					
Comments of testing laboratory					Draft Ver. 6.2 (22.09.2021)									
Above efficiency parameters come from OEM test type SHC10;					 Stamp & signature									
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Supplementary Information		Issued		2024-07-26													
Gross Thermal Yield in kWh/collector at mean fluid temperature ϑ_m																	
	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				
Prisma Pro 10		2,242	1,779	1,206	1,823	1,333	823	1,331	950	577	1,440	1,032	618				
Prisma Pro 12		2,678	2,126	1,441	2,177	1,593	983	1,590	1,135	689	1,720	1,233	738				
Prisma Pro 14		3,114	2,472	1,676	2,532	1,852	1,143	1,849	1,319	802	2,001	1,434	859				
Prisma Pro 15		3,333	2,645	1,793	2,710	1,982	1,223	1,978	1,412	858	2,141	1,535	919				
Prisma Pro 16		3,551	2,819	1,911	2,887	2,112	1,303	2,108	1,504	914	2,281	1,636	979				
Prisma Pro 18		3,987	3,165	2,146	3,242	2,371	1,463	2,367	1,689	1,026	2,561	1,837	1,100				
Prisma Pro 20		4,424	3,511	2,380	3,597	2,631	1,623	2,626	1,874	1,139	2,842	2,038	1,220				
Prisma Pro 21		4,642	3,685	2,498	3,774	2,760	1,704	2,755	1,966	1,195	2,982	2,138	1,280				
Prisma Pro 22		4,860	3,858	2,615	3,952	2,890	1,784	2,885	2,059	1,251	3,122	2,239	1,340				
Prisma Pro 24		5,296	4,204	2,850	4,307	3,150	1,944	3,144	2,244	1,363	3,402	2,440	1,461				
Prisma Pro 25		5,515	4,378	2,968	4,484	3,280	2,024	3,273	2,336	1,419	3,542	2,540	1,521				
Prisma Pro 28		6,050	4,803	3,256	4,920	3,598	2,220	3,591	2,563	1,557	3,886	2,787	1,668				
Gross Thermal Yield per m ² gross area		1,002	795	539	815	596	368	595	424	258	644	461	276				
Annual efficiency, η_a		57%	45%	31%	50%	37%	23%	51%	36%	22%	52%	37%	22%				
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 Draft Ver. 6.2 (22.09.2021). 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											2800		Pa				
Maximum tested negative load											1000		Pa				
Hail resistance using steel ball (maximum drop height)											0.6		m				
Additional collector attribute(s)																	
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)				No							
Energy Labelling Information						Additional Informative Technical Data											
	Reference Area, A _{sol} (m ²)					Hydraulic Designation Code				Aperture Area, A _a (m ²)							
Prisma Pro 10	2.24					1-H-12S-C:19,1205-D				1.82							
Prisma Pro 12	2.67					1-H-12S-C:19,1425-D				2.16							
Prisma Pro 14	3.11					1-H-12S-C:19,1645-D				2.52							
Prisma Pro 15	3.33					1-H-12S-C:19,1755-D				2.70							
Prisma Pro 16	3.54					1-H-12S-C:19,1865-D				2.87							
Prisma Pro 18	3.98					1-H-12S-C:19,2085-D				3.23							
Prisma Pro 20	4.42					1-H-12S-C:19,2305-D				3.59							
Prisma Pro 21	4.63					1-H-12S-C:19,2415-D				3.77							
Prisma Pro 22	4.85					1-H-12S-C:19,2525-D				3.95							
Prisma Pro 24	5.29					1-H-12S-C:19,2745-D				4.41							
Prisma Pro 25	5.50					1-H-12S-C:19,2855-D				4.59							
Prisma Pro 28	6.04					1-H-12S-C:19,3185-D				5.24							
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})						48%		Zero-loss efficiency (η_0)				0.58		--			
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)				1.37		W/(m ² K)					
						Second-order coefficient (a ₂)				0.027		W/(m ² K ²)					
						Incidence angle modifier IAM (50°)				1.02							
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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