


<b>Annex to Solar Keymark Certificate</b>					<b>Licence Number</b>		<b>011-7S3273 R</b>							
					<b>Date issued</b>		<b>2024-11-28</b>							
					<b>Issued by</b>		<b>DIN CERTCO</b>							
<b>Licence holder</b>		<b>PLAYSYSTEM SRL</b>			<b>Country</b>		<b>ITALY</b>							
<b>Brand (optional)</b>		<b>PSS-SOLAR</b>			<b>Web</b>		<b>PSS-ITALY.COM</b>							
<b>Street, Number</b>		<b>VIAG.POCCINI N.8</b>			<b>E-mail</b>		<b>info@PSS-ITALY.COM</b>							
<b>Postcode, City</b>		<b>80040,SOGGIOMARINO</b>			<b>Tel</b>		<b>+39 3332443202</b>							
<b>Collector Type</b>					<b>Evacuated tubular collector</b>									
<b>Collector name</b>					<b>Power output per collector</b>									
					$G_b = 850 \text{ W/m}^2, G_d = 150 \text{ W/m}^2 \text{ \& } u = 1.3 \text{ m/s}$ $\dot{\theta}_m - \dot{\theta}_a$									
					0 K	10 K	30 K	50 K	70 K	84 K				
					W	W	W	W	W	W				
<b>PSS/P6-58/1800-10HP</b>					2.24	1980	1130	133	1,298	1,262	1,152	994	788	619
<b>PSS/P6-58/1800-12HP</b>					2.67	1980	1350	133	1,551	1,507	1,377	1,188	942	740
<b>PSS/P6-58/1800-15HP</b>					3.33	1980	1680	133	1,930	1,876	1,713	1,479	1,172	920
<b>PSS/P6-58/1800-18HP</b>					3.98	1980	2010	133	2,309	2,244	2,050	1,769	1,402	1,101
<b>PSS/P6-58/1800-20HP</b>					4.42	1980	2230	133	2,562	2,490	2,274	1,963	1,556	1,222
<b>PSS/P6-58/1800-22HP</b>					4.85	1980	2450	133	2,815	2,736	2,498	2,156	1,709	1,342
<b>PSS/P6-58/1800-24HP</b>					5.29	1980	2670	133	3,068	2,981	2,723	2,350	1,863	1,463
<b>PSS/P6-58/1800-25HP</b>					5.50	1,980	2,780	133	3,194	3,104	2,835	2,447	1,940	1,523
<b>PSS/P6-58/1800-28HP</b>					6.04	1,980	3,050	133	3,504	3,406	3,110	2,684	2,128	1,671
<b>Power output per m<sup>2</sup> gross area</b>					580	564	515	444	352	277				
<b>Performance parameters test method</b>		<b>Steady state - outdoor</b>												
<b>Performance parameters (related to A<sub>G</sub>)</b>		$\eta_{0, b}$	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>		0.583	1.37	0.027	0.000	0.00	12220	0.000	0.00	0	0.97			
<b>Incidence angle modifier test method</b>		<b>Steady state - outdoor</b>												
<b>Incidence angle modifier</b>		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°			
<b>Transversal</b>		$K_{\theta T, coll}$	1.02	1.03	1.04	1.05	1.12	1.18	0.79	0.39	0.00			
<b>Longitudinal</b>		$K_{\theta L, coll}$	1.00	1.00	0.99	0.98	0.95	0.88	0.75	0.50	0.00			
<b>Heat transfer medium for testing</b>					<b>Water</b>									
<b>Flow rate for testing (per gross area, A<sub>G</sub>)</b>					dm/dt		0.020		kg/(sm <sup>2</sup> )					
<b>Maximum temperature difference during thermal performance test</b>					$(\dot{\theta}_m - \dot{\theta}_a)_{max}$		53.72		K					
<b>Standard stagnation temperature (G = 1000 W/m<sup>2</sup>; <math>\dot{\theta}_a = 30 \text{ }^\circ\text{C}</math>)</b>					$\dot{\theta}_{stg}$		280		°C					
<b>Maximum operating temperature</b>					$\dot{\theta}_{max, op}$		230		°C					
<b>Maximum operating pressure</b>					$p_{max, op}$		1000		kPa					
<b>Testing laboratory</b>		<b>Intertek Testing Services Shenzhen Ltd. Guangzhou Branch</b>					<a href="http://www.intertek.com">http://www.intertek.com</a>							
<b>Test report(s)</b>		231031204GZU-001 241031023GZU-001					<b>Dated</b>		2024/7/10 2024/11/28					
<b>Comments of testing laboratory</b>					Draft Ver. 6.2 (22.09.2021)									
<i>All datas in this datasheet are come from Intertek Test Report 231031204GZU-001.</i>					 Stamp & signature...									
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Supplementary Information		011-7S3273 R												
		Issued												
		2024-11-28												
<b>Gross Thermal Yield in kWh/collector at mean fluid temperature <math>\vartheta_m</math></b>														
Standard Locations		Athens		Davos		Stockholm		Würzburg						
Collector name	$\vartheta_m$	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	
PSS/P6-58/1800-10HP		2,242	1,779	1,206	1,823	1,333	823	1,331	950	577	1,440	1,032	618	
PSS/P6-58/1800-12HP		2,678	2,126	1,441	2,177	1,593	983	1,590	1,135	689	1,720	1,233	738	
PSS/P6-58/1800-15HP		3,333	2,645	1,793	2,710	1,982	1,223	1,978	1,412	858	2,141	1,535	919	
PSS/P6-58/1800-18HP		3,987	3,165	2,146	3,242	2,371	1,463	2,367	1,689	1,026	2,561	1,837	1,100	
PSS/P6-58/1800-20HP		4,424	3,511	2,380	3,597	2,631	1,623	2,626	1,874	1,139	2,842	2,038	1,220	
PSS/P6-58/1800-22HP		4,860	3,858	2,615	3,952	2,890	1,784	2,885	2,059	1,251	3,122	2,239	1,340	
PSS/P6-58/1800-24HP		5,296	4,204	2,850	4,307	3,150	1,944	3,144	2,244	1,363	3,402	2,440	1,461	
PSS/P6-58/1800-25HP		5,515	4,378	2,968	4,484	3,280	2,024	3,273	2,336	1,419	3,542	2,540	1,521	
PSS/P6-58/1800-28HP		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 <sup>2</sup> gross area		1,002	795	539	815	596	368	595	424	258	644	461	276	
Annual efficiency, $\eta_a$		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 <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 Draft Ver. 6.2 (22.09.2021). 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	No													
The collector was tested successfully under the following conditions:														
Climate class (A+, A, B or C)											B	--		
G (W/m <sup>2</sup> ) >	900		$\vartheta_a$ (°C) >		15		$H_x$ (MJ/m <sup>2</sup> ) >		540					
Maximum tested positive load											2800	Pa		
Maximum tested negative load											1000	Pa		
Hail resistance using steel ball (maximum drop height)											0.6	m		
<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)						No				
<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> )						
PSS/P6-58/1800-10HP	2.24			1-H-12S-C:19,1205-D				1.82						
PSS/P6-58/1800-12HP	2.67			1-H-12S-C:19,1425-D				2.16						
PSS/P6-58/1800-15HP	3.33			1-H-12S-C:19,1755-D				2.70						
PSS/P6-58/1800-18HP	3.98			1-H-12S-C:19,2085-D				3.23						
PSS/P6-58/1800-20HP	4.42			1-H-12S-C:19,2305-D				3.59						
PSS/P6-58/1800-22HP	4.85			1-H-12S-C:19,2525-D				3.95						
PSS/P6-58/1800-24HP	5.29			1-H-12S-C:19,2745-D				4.41						
PSS/P6-58/1800-25HP	5.50			1-H-12S-C:19,2855-D				4.59						
PSS/P6-58/1800-28HP	6.04			1-H-12S-C:19,3185-D				5.24						
<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 ( $\eta_{col}$ )	48%						Zero-loss efficiency ( $\eta_0$ )	0.58		--				
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 ( $a_1$ )	1.37		W/(m <sup>2</sup> K)				
							Second-order coefficient ( $a_2$ )	0.027		W/(m <sup>2</sup> K <sup>2</sup> )				
							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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