

Holder/Issued to/Manufacturer

Playsystem S.R.L

Via G. Puccini, 8, 80040 POGGIOMARINO, Italy

Product name and description

Vacuum tube solar thermal collectors for water heating.
For technical information see Appendix (2 pages).

Models:	PSS/P6-58/1800-8HP	PSS/P6-58/1800-9HP	PSS/P6-58/1800-10HP
	PSS/P6-58/1800-12HP	PSS/P6-58/1800-14HP	PSS/P6-58/1800-15HP
	PSS/P6-58/1800-16HP	PSS/P6-58/1800-18HP	PSS/P6-58/1800-20HP
	PSS/P6-58/1800-21HP	PSS/P6-58/1800-22HP	PSS/P6-58/1800-24HP

Performance specification

The product is found to comply with the requirements in EN 12975-1:2006+A1:2010 Solar collectors, Part 1: General requirements and the Specific CEN Keymark Scheme Rules for Solar Thermal Products and are based on test results according to EN 12975-2:2006 Solar collectors Part 2: Test methods.

Marking

Products conforming to this certificate shall be marked in accordance with the requirements in the Specific CEN Keymark Scheme Rules for Solar Thermal Products. The marking shall, together with the Keymark logo, show the identification code of the empowered certification body (RISE Research Institutes of Sweden AB, No. 012), also see CEN-CENELEC Internal Regulations Part 4 Certification, Annex A.

Validity

This certificate is valid until 2024-01-20 provided that the conditions in the Solar Keymark Rules are fulfilled and the standard or rules are not modified significantly. The validity of the certificate can be checked in the database, see Solar Keymark website <http://www.solarkeymark.org>.

Miscellaneous

The manufacturer's factory production control procedures are under surveillance by the responsibility of RISE. This certificate was first issued 2018-03-22. RISE certification rules SPCR 402 for Keymark – Solar Thermal Products applies.

Johan Åkesson

Magnus Stuesson

Certificate No. SC0217-18 | issue 2 | 2019-04-04


RISE Research Institutes of Sweden AB | Certification
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2017-08-08



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Annex to Solar Keymark Certificate						Licence Number		SC0217-18				
						Date issued		2019-04-04				
						Issued by		RISE				
Licence holder		PLAYSYSTEM srl				Country		Italy				
Brand (optional)		PSS				Web		www.pss-italy.com				
Street, Number		Via G. Puccini 8 -80040				E-mail		info@pss-italy.com				
Postcode, City		Poggiomarino				Tel		+39 3332443207				
Collector Type						Evacuated tubular collector						
Collector name						Power output per collector						
						G _b = 850 W/m ² , G _d = 150 W/m ² & u = 1.3 m/s θ _m - θ _a						
		Gross height	Gross area (A_G)	Gross length	Gross width	Aperture area (A_a)	0 K	10 K	30 K	50 K	70 K	93 K
		mm	m ²	mm	mm	m ²	W	W	W	W	W	W
PSS/P6-58/1800-8HP		133	1,74	1 917	910	1,41	938	917	869	816	757	682
PSS/P6-58/1800-9HP		133	1,96	1 917	1 020	1,59	1 052	1 027	974	914	848	764
PSS/P6-58/1800-10HP		133	2,17	1 917	1 130	1,78	1 165	1 138	1 079	1 013	940	846
PSS/P6-58/1800-12HP		133	2,59	1 917	1 350	2,16	1 392	1 360	1 289	1 210	1 123	1 011
PSS/P6-58/1800-14HP		133	3,01	1 917	1 570	2,53	1 619	1 582	1 500	1 408	1 306	1 176
PSS/P6-58/1800-15HP		133	3,22	1 917	1 680	2,72	1 733	1 693	1 605	1 506	1 398	1 259
PSS/P6-58/1800-16HP		133	3,43	1 917	1 790	2,91	1 846	1 803	1 709	1 605	1 489	1 341
PSS/P6-58/1800-18HP		133	3,85	1 917	2 010	3,28	2 073	2 025	1 920	1 802	1 672	1 506
PSS/P6-58/1800-20HP		133	4,28	1 917	2 230	3,66	2 300	2 247	2 130	1 999	1 855	1 671
PSS/P6-58/1800-21HP		133	4,49	1 917	2 340	3,84	2 413	2 358	2 235	2 098	1 947	1 753
PSS/P6-58/1800-22HP		133	4,70	1 917	2 450	4,03	2 527	2 468	2 340	2 197	2 038	1 835
PSS/P6-58/1800-24HP		133	5,12	1 917	2 670	4,41	2 753	2 690	2 550	2 394	2 221	2 000
						538	526	498	468	434	391	
Power output per m² gross area						538	526	498	468	434	391	
Performance parameters test method		Steady state - outdoor										
Performance parameters (related to A_G)		η 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		0,540	1,206	0,004	0,000	0,000	0,000	0,000	0,000	0,000	0,98	
Incidence angle modifier test method		Steady state - outdoor										
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°	
Transversal		K _{θT, coll}	1,02	1,03	1,04	1,05	1,12	1,18	0,79	0,39	0,00	
Longitudinal		K _{θL, coll}	1,00	0,99	0,99	0,97	0,95	0,91	0,83	0,57	0,00	
Heat transfer medium for testing						Water						
Flow rate for testing (per gross area, A_G)						dm/dt		0,016	kg/(sm ²)			
Maximum temperature difference during thermal performance test						(θ _m -θ _a) _{max}		63,24	K			
Standard stagnation temperature (G = 1000 W/m²; θ_a = 30 °C)						θ _{stg}		280	°C			
Maximum operating temperature						θ _{max op}		120	°C			
Maximum operating pressure						p _{max, op}		1000	kPa			
Testing laboratory		Intertek Testing Services Shenzhen Ltd. Guangzhou				http://www.intertek.com						
Test report(s)		171114109GZU-001				Dated		2018-03-09				
Comments of testing laboratory						Datasheet version: 6.0, 2018-10-30						
<p>The "negative pressure test of the collector" according to EN12975-2:2006, 5.9.2 was not performed.</p> <p>Tests were performed based on EN 12975-2:2006.</p>												
						<p><i>William zheng</i></p>						
<p>RISE Research Institutes of Sweden AB Certification</p> <p>Box 857, SE-501 15 Borås, Sweden, Phone: +46 10-516 50 00, certifiering@ri.se www.ri.se</p>												

Annex to Solar Keymark Certificate	Licence Number	SC0217-18
Supplementary Information	Issued	2019-04-04

Annual collector output in kWh/collector at mean fluid temperature ϑ_m													
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
PSS/P6-58/1800-8HP		1 633	1 406	1 180	1 374	1 161	961	991	813	654	1 069	878	704
PSS/P6-58/1800-9HP		1 830	1 576	1 322	1 541	1 302	1 077	1 111	912	733	1 198	984	789
PSS/P6-58/1800-10HP		2 028	1 746	1 465	1 707	1 442	1 194	1 230	1 010	812	1 327	1 091	874
PSS/P6-58/1800-12HP		2 423	2 086	1 750	2 039	1 723	1 426	1 470	1 207	970	1 586	1 303	1 044
PSS/P6-58/1800-14HP		2 818	2 426	2 036	2 372	2 004	1 659	1 710	1 404	1 129	1 844	1 516	1 215
PSS/P6-58/1800-15HP		3 015	2 596	2 179	2 538	2 145	1 775	1 830	1 502	1 208	1 974	1 622	1 300
PSS/P6-58/1800-16HP		3 212	2 766	2 321	2 704	2 285	1 891	1 949	1 600	1 286	2 102	1 728	1 384
PSS/P6-58/1800-18HP		3 607	3 106	2 606	3 036	2 566	2 123	2 189	1 797	1 445	2 361	1 940	1 555
PSS/P6-58/1800-20HP		4 002	3 446	2 891	3 369	2 847	2 356	2 428	1 994	1 603	2 619	2 153	1 725
PSS/P6-58/1800-21HP		4 200	3 616	3 034	3 535	2 987	2 472	2 548	2 092	1 682	2 749	2 259	1 810
PSS/P6-58/1800-22HP		4 397	3 786	3 177	3 701	3 127	2 589	2 668	2 191	1 761	2 878	2 365	1 895
PSS/P6-58/1800-24HP		4 791	4 125	3 462	4 033	3 408	2 821	2 907	2 387	1 919	3 136	2 577	2 065
Annual output per m ² gross area		936	806	676	788	666	551	568	466	375	613	504	404
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. 6.0 (October 2018). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc

Additional Information			
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)			C
G (W/m ²) >	800	ϑ_a (°C) >	10
		H_x (MJ/m ²) >	420
Maximum tested positive load			2860 Pa
Maximum tested negative load			-- Pa
Hail resistance using steel ball (maximum drop height)			0,8 m
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"/> Wind and/or infrared sensitive collector(s) (WISC)		
<input type="checkbox"/> Façade collector(s)			

Energy Labelling Information		
	Reference Area, A_{sol} (m ²)	Hydraulic Designation Code
PSS/P6-58/1800-8HP	1,74	1-H-12S-C:19.3,985-D
PSS/P6-58/1800-9HP	1,96	1-H-12S-C:19.3,1095-D
PSS/P6-58/1800-10HP	2,17	1-H-12S-C:19.3,1205-D
PSS/P6-58/1800-12HP	2,59	1-H-12S-C:19.3,1425-D
PSS/P6-58/1800-14HP	3,01	1-H-12S-C:19.3,1645-D
PSS/P6-58/1800-15HP	3,22	1-H-12S-C:19.3,1755-D
PSS/P6-58/1800-16HP	3,43	1-H-12S-C:19.3,1865-D
PSS/P6-58/1800-18HP	3,85	1-H-12S-C:19.3,2085-D
PSS/P6-58/1800-20HP	4,28	1-H-12S-C:19.3,2305-D
PSS/P6-58/1800-21HP	4,49	1-H-12S-C:19.3,2415-D
PSS/P6-58/1800-22HP	4,70	1-H-12S-C:19.3,2525-D
PSS/P6-58/1800-24HP	5,12	1-H-12S-C:19.3,2745-D

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)	0,54
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)	1,21 W/(m ² K)
		Second-order coefficient (a_2)	0,004 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	1,01
		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.	