



Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate					Licence Number		011-7S2278 R					
					Issued		2017-08-29					
Company holding the			Jiangsu Sunrain Solar Energy Co., Ltd.			Country		China				
Brand (optional)			Sunrain			Website		en.sunrain.com				
Street, street number			Ninghai Industrial Zone			E-mail		certification@sunrain.com				
Postal Code / City, province			222000 Lianyungang, Jiangsu Province			Tel/Fax		86(0)518 85959253/(0)518 85959808				
Collector Type (flat plate glazed/un-glazed; evacuate tubular)						Evacuated tubular collector						
Thermal / photo voltaic hybrid collector? (PVT collector)						No						
Integration in the roof possible? (manufacturers declaration)						No						
	Aperture area (Aa)	Gross length	Gross width	Gross height	Gross area (AG)	Power output per collector module						
						G = 1000 W/m ²						
						Tm-Ta						
						0 K	10 K	30 K	50 K	70 K		
Collector name	m ²	mm	mm	mm	m ²	W	W	W	W	W		
TZ58/1800-10RA	0.92	2 000	870	150	1.74	676	651	603	554	505		
TZ58/1800-15RA	1.38	2 000	1 260	150	2.52	1 014	977	904	831	758		
TZ58/1800-20RA	1.84	2 000	1 650	150	3.30	1 352	1 303	1 205	1 108	1 010		
TZ58/1800-25RA	2.31	2 000	2 040	150	4.08	1 690	1 629	1 507	1 385	1 263		
TZ58/1800-30RA	2.77	2 000	2 430	150	4.86	2 027	1 954	1 808	1 662	1 516		
Performance test method			Glazed liquid heating collector - steady state - outdoor									
Performance parameters related to aperture area			n ₀	a1	a2							
Units			-	W/(m ² K)	W/(m ² K ²)							
Test results - Flow rate and fluid see note 1			0.733	2.643	0.000							
Bi-directional incidence angle modifiers?			Yes <i>Kθ values are obligatory for 50°.</i>									
Incidence angle modifiers Kθ(θT) transversal direction			Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
			Kθ(θT)	1.02	1.08	1.19	1.37	1.52	1.58	1.50	1.20	0.00
Incidence angle modifiers Kθ(θL) longitudinal direction			Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
			Kθ(θL)	1.00	1.00	0.99	0.98	0.96	0.94	0.88	0.00	0.00
Stagnation temperature - Weather conditions see note 2						T _{stg}	227	°C				
Effective thermal capacity						ceff = C/Ag	63.57	kJ/(m ² K)				
Max. intended operation temperature - see note 3						T _{max,op}	120	°C				
Max. operation pressure - see note 3						p _{max,op}	600	kPa				
Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m ² aperture area												
Flow rate	kg/(s m ²)	0.003	0.007	0.010	0.013	0.017	0.020	0.023	0.027	0.030	0.033	
Pressure drop, ΔP	Pa	39	109	176	254	376	482	599	774	918	1075	
Optional weather data		Location					Link					
Testing Laboratory			TUV Rheinland (Shanghai) Co., Ltd.									
Website			www.tuv.com									
Test report id. number			154019941_EN_P_Sunrain_10_Report_Gao;				Date of test report		2013/12/04			
			154019941_EN_Sunrain_30_Report									
During the test GDIF/GTOT was always between			0.065	and	0.892							
Comments of testing laboratory:												
Note 1	Flow rate	0.028	kg/(s m ²)	Fluid	Water							
Note 2	Irradiance, G = 1000 W/m ² ; Ambient temperature, Ta=30 °C											
Note 3	Given by manufacturer											





Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2278 R
	Issued	8/29/2017

Annual collector output kWh/module														
Collector name	Location and collector temperature (Tm)													
	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		
TZ58/1800-10RA	1 352	1 118	917	1 092	895	730	807	638	503	872	689	542		
TZ58/1800-15RA	2 028	1 677	1 376	1 638	1 342	1 095	1 211	958	754	1 308	1 034	813		
TZ58/1800-20RA	2 704	2 236	1 835	2 185	1 789	1 460	1 614	1 277	1 006	1 744	1 379	1 084		
TZ58/1800-25RA	3 379	2 796	2 293	2 731	2 237	1 825	2 018	1 596	1 257	2 180	1 723	1 355		
TZ58/1800-30RA	4 055	3 355	2 752	3 277	2 684	2 190	2 421	1 915	1 509	2 616	2 068	1 626		

Collector mounting: Fixed or tracking Fixed; slope = latitude - 15° (rounded to nearest 5°)

Overview of locations				
Location	Latitude °	Gtot kWh/m²	Ta °C	Collector orientation or tracking mode
Athens	38	1 765	18.5	South, 25°
Davos	47	1 714	3.2	South, 30°
Stockholm	59	1 166	7.5	South, 45°
Würzburg	50	1 244	9.0	South, 35°

Gtot	Annual total irradiation on collector plane	kWh/m²
Ta	Mean annual ambient air temperature	°C
Tm	Constant collector operating temperature (mean of in- and outlet temperatures)	°C

The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool ScenoCalc. The collector output is calculated hour by hour according to the efficiency parameters from the Keymark test using constant collector operating temperature (Tm). A detailed description of the calculations is available at <http://www.sp.se/en/index/services/solar/ScenoCalc/Sidor/default.aspx>.

<p align="center">DIN CERTCO • Alboinstraße 56 • 12103 Berlin Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de</p>	Datasheet version:
	4.06, 2014-01-15
	ScenoCalc version:
	Ver. 4.06 (Jan, 2014)