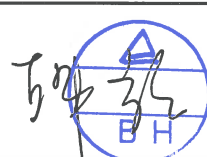




Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results						Licence Number		011-7S2199 R				
						Date issued		2017-07-17				
						Issued by		DIN CERTCO				
Licence holder		Zhejiang Shende New Energy Co., Ltd.				Country		CHINA				
Brand (optional)		DLL				Web		www.zjshende.com				
Street, Number		No.12 Guangdian Road				E-mail		josen@zjshende.com				
Postcode, City		314415, Huangwan Town, Haining				Tel		+86 (0)573 87958888				
Collector Type						Evacuated tubular collector						
					Power output per collector							
					Gb = 850 W/m ² ; Gd = 150 W/m ² ; u = 3 m/s ϑ _m - ϑ _a							
Collector name		Gross area (A _G) m ²	Gross length mm	Gross width mm	Gross height mm	0 K W	10 K W	30 K W	50 K W	70 K W	134 K W	
DLL-C-P01-12		1.94	1986	975	160	738	734	701	638	543	32	
DLL-C-P01-15		2.31	1980	1168	160	879	874	835	760	647	38	
DLL-C-P01-20		3.08	1980	1557	160	1172	1165	1114	1013	863	51	
DLL-C-P01-30		4.62	1986	2325	160	1759	1748	1670	1519	1294	77	
Power output per m ² gross area						381	378	362	329	280	17	
Performance parameters test method			Quasi dynamic									
Performance parameters (related to A _G)			η _{0,b}	c ₁	c ₂	c ₃	c ₄	c ₆	K _d			
Units			-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	s/m	-			
Test results			0.404	0.037	0.020	0.000	0.000	0.000	0.615			
Incidence angle modifier test method			Quasi dynamic - outdoor									
Bi-directional incidence angle modifiers			Yes									
Incidence angle modifier			Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal			K _{θT, coll}	1.00	1.09	1.04	1.27	1.64	1.67	1.58	0.00	0.00
Longitudinal			K _{θL, coll}	1.00	1.00	0.99	0.98	0.97	0.94	0.88	0.00	0.00
Heat transfer medium for testing						Water-Glycole						
Flow rate for testing (per gross area, A _G)						dm/dt	0.020	kg/(sm ²)				
Maximum temperature difference for thermal performance calculations						(ϑ _m - ϑ _a) _{max}	134	K				
Standard stagnation temperature (G = 1000 W/m ² ; ϑ _a = 30 °C)						ϑ _{stg}	164	°C				
Effective thermal capacity, incl. fluid (per gross area, A _G)						C/m ²	91.6	kJ/(Km ²)				
Maximum operating temperature						ϑ _{max, op}	100	°C				
Maximum operating pressure						p _{max, op}	900	kPa				
Testing laboratory						TÜV Rheinland (Shanghai) Co., Ltd.						
Test report(s)						www.tuv.com						
154229326_Shende_DLL-C-P01-12_ISO_Report_zhao 154229326_Shende_DLL-C-P01-30_ISO_Report_zhao						Dated		2017-07-10				
								2017-07-10				
Comments of testing laboratory						Datasheet version: 5.01, 2016-03-01						
												
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2199 R
	Issued	2017-07-17

Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on ISO 9806:2013 test results													
Collector name	Standard Locations 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
DLL-C-P01-12		1 293	1 164	904	1 141	943	681	828	686	492	866	720	511
DLL-C-P01-15		1 540	1 387	1 076	1 359	1 123	811	985	816	585	1 031	857	608
DLL-C-P01-20		2 053	1 849	1 435	1 812	1 497	1 082	1 314	1 089	781	1 374	1 143	811
DLL-C-P01-30		3 079	2 773	2 153	2 718	2 245	1 623	1 971	1 633	1 171	2 062	1 714	1 216
Annual output per m ² gross area		667	600	466	588	486	351	427	353	253	446	371	263
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. 5.01 (March 2016). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc

Additional Information

Collector heat transfer medium	Water-Glycole
Hybrid Thermal and Photo Voltaic collector	No
The collector is deemed to be suitable for roof integration	Yes
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:	
Climate class (A, B or C)	C --
Maximum tested positive load	2400 Pa
Maximum tested negative load	1200 Pa
Hail resistance using steel ball (maximum drop height)	0.6 m

Energy Labelling Information

	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
DLL-C-P01-12	1.94	Collector efficiency (η_{col})	35 %
DLL-C-P01-15	2.31	<i>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/m², 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 9806:2013.</i>	
DLL-C-P01-20	3.08		
DLL-C-P01-30	4.62		
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.381 --
		First-order coefficient (a_1)	0.04 W/(m ² K)
		Second-order coefficient (a_2)	0.020 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	1.24 --
		<i>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.</i>	