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		e Numb	er	SKM 9965/4									
Annex to Solar Keymark Cer	Date issued			2022-08-29									
						Issued	by		DQS Hellas				
Licence holder	NOBE	L INTER	NATION	VAL EAD)	Country	BULGAR	A					
Brand (optional)	-	ON AL S.I.				Web	http://no						
Street, Number		OSHA BL				E-mail	info@nobel.bg						
Postcode, City		IN PELIN				Tel	+359 2 4210232						
						1.6.							
Collector Type						Flat plat	e collecto	r					
						Power output per collector							
		- -			Gross height	Fower output per collector $Gb = 850 W/m2, Gd = 150 W/m2 & u = 1.3$							
Collector name		A SS	Gross length	Gross width		0.0	$\vartheta_{\rm m} - \vartheta_{\rm a}$						
conector name		Gross area (A _G)				οк	10 K	30 K	50 K	70 K	89 K		
		m ²	mm	mm	mm	W	W	W	W	W	W		
APOLLON AL S.I. HOR 2000		2.03	1010	2010	110	1406	1329	1151	941	698	438		
APOLLON AL S.I. HOR 2600		2.53	1260	2010	110	1752	1657	1435	1173	870	545		
AFOLLON AL S.I. HOR 2000		2.55	1200	2010	110	1752	1057	1455	11/5	870	545		
Power output per m ² gross area						602	CEE	5.67	101	244	210		
· · · ·						693	655	567	464	344	216		
Performance parameters test met		· · ·	tate - out			1			1				
Performance parameters (related	to A _G)	η0, b	a1	a2	a3	a4	a5	a6	a7	a8	Kd		
Units		-		W/(m²K²)	J/(m³K)	-	J/(m²K)	s/m	W/(m²K⁴)	W/(m²K⁴)	-		
Test results		0.703	3.58	0.020	0.000	0.00	9750	0.000	0.00	0.0E+00	0.90		
Incidence angle modifier test meth	nod		Steady s	tate - out	door								
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°		
Transversal		K _{θT,coll}	1.00	1.00	0.99	0.98	0.94	0.87	0.73	0.48	0.00		
Longitudinal		K _{θL,coll}	1.00	1.00	0.99	0.98	0.94	0.87	0.73	0.48	0.00		
Heat transfer medium for testing							Water		•				
Flow rate for testing (per gross are	a. A.)						dm/dt		0.020	kg/(sm²))		
Maximum temperature difference		$(\vartheta_m - \vartheta_a)_n$		59 K									
Standard stagnation temperature					°C								
Maximum operating temperature		ປ _{max_op}		159 C									
Maximum operating pressure										kPa			
Testing laboratory	NCSR Demokritos						www.solar.dem						
Test report(s) 4065DE5, 4066DQ2 4068DE4, 4071DE2							Dated	05/09/13					
4103DE2, 4104DE2													
Comments of testing laboratory		-	Ver.	6.2 (13.01.	2022)								
					,								
		N.C.S.R. "DEMOKRITOS"											
							SOLAF	ENERGY	LABORATO	EL III	AT		
							Tel: +21 P.O. BOX	0 6503815 - F	ax: +210 6544 g. Paraskevi, Gra	592 VAN	Ausi		
			and a start of the										
Central Offices: Kalavriton 4, 14	5 64 kifi	sia, Ather	ns, Tel: +3	30 210 62 3	33493-4,	Fax: +30	210 6233	495, htti	o://www	.dqs.gr, e-	mail:		
				lexiou@d									

Annex to Solar Keymark Certific	ate					Licen	ce Nur	nber		SKM S		ige 2/: I
Supplementary Information		Issued						2022-08-29				
Gross Thermal Yield in kWh/collect	or at m	oon flu	id tom	noratu	r.a. 9		-					
Standard Locations		Athens	iu ten	lperatu	Davos			Stockholm		v	Vürzbur	a
Collector name	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	۵ 75°C
APOLLON AL S.I. HOR 2000		1,508	877	1,655		569	1,226	745	391	1,336	803	416
APOLLON AL S.I. HOR 2600	2,781	1,880	1,093	2,062	1,320	709	1,528	928	487	1,665	1,001	518
Gross Thermal Yield per m ² gross area	1,099	743	432	815	522	280	604	367	193	658	396	205
Annual efficiency, η _a	62%	42%	24%	50%	32%	17%	52%	31%	17%	53%	32%	16%
ixed or tracking collector								nded to n				
Annual irradiation on collector plane	1765 kWh/m ²			1630 kWh/m ²			1166 kWh/m²			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 ter collector performance is performed with												ad
description of the calculations is availab				•				iic ver. 0.2	2 (15.01		A detail	eu
	ne at fit						/					
		Ad	dition	al Info	rmati	on			1			
Collector heat transfer medium										Water-		
he collector is deemed to be suitable for	orroor	ntegrat	ion							N	0	
The collector was tested successfully un	der the	followi	ng cond	litions								
Climate class (A+, A, B or C)		10110101	ig cond							4	-	-
G (W/m ²) > 1000	θ	(°C) >		20 H _x (MJ/					m ²) > 600			00
Maximum tested positive load										000	P	а
Maximum tested negative load									10	000	Р	а
Hail resistance using steel ball (maximur											r	n
	A	\dditio	nal co	ollecto								
Using external power source(s) for normal operation No				Active or passive measure(s) for self-prot						۱		No
Co-generating thermal and electrical po			No	Façade	collect	. /						No
Energy Labelling Infor								rmative				
	Referen	ce Area,	A _{sol} (m ²)			Ť	nation C		Аре	Aperture Area, A		
APOLLON AL S.I. HOR 2000		2.03		20-V-1	L234S-A	:7.2,84	2-C:20.6	5,2050-D	1.81			
APOLLON AL S.I. HOR 2600		2.53		20-V-1234S-A:7.2,1102-C:20.6,2050-D					2.32			
	13 - Refe		Area					o 812/20			Area A _s	ol
	L3 - Refe	erence A	Area	Zero-lo	ss effici	ency (η	₀)	o 812/20	0.	69	-	-
ollector efficiency (η _{col})		52%	Area	Zero-lo First-or	ss effici der coe	ency (η fficient	₀) (a ₁)	o 812/20	0. 3.	69 58	- W/(I	- n²K)
ollector efficiency (η _{col}) emark: Collector efficiency (ηcol) is defined	in CDR (52% EU) No		Zero-lo First-or Second	ss effici der coe l-order	ency (ŋ fficient coefficie	₀) (a ₁) ent (a ₂)		0. 3. 0.0	69 58)20	-	- n²K)
ollector efficiency (η _{col}) emark: Collector efficiency (ηcol) is defined 11/2013 as collector efficiency of the solar c	in CDR (l ollector a	52% EU) No at a temp	erature	Zero-lo First-or Second Inciden	ss effici der coe l-order ice angl	ency (ŋ fficient coeffici e modif	$_0$) (a ₁) ent (a ₂) ier IAM	(50°)	0. 3. 0.0 0.	69 58 020 94	W/(i W/(r	- n²K) n²K²) -
ollector efficiency (n _{col}) emark: Collector efficiency (ncol) is defined 11/2013 as collector efficiency of the solar c ifference between the solar collector and th	in CDR (l ollector a e surrou	52% EU) No at a temp nding air	erature of 40 K	Zero-lo First-or Second Inciden Remark:	ss effici der coe l-order ce angl The dat	ency (ŋ fficient coeffici e modif a given i	$\binom{0}{0}$ (a ₁) ent (a ₂) ier IAM	(50°) tion are rel	0. 3. 0.0 0. ated to a	69 58 020 94 collector r	- W/(I W/(r -	- m²K) n²K²) - - - area
Collector efficiency (η _{col}) temark: Collector efficiency (ηcol) is defined 11/2013 as collector efficiency of the solar c lifference between the solar collector and th nd a global solar irradiance of 1000 W/m ² , e	in CDR (I ollector a e surrou xpressed	52% EU) No at a temp nding air I in % and	erature of 40 K	Zero-lo First-or Second Inciden Remark: (A sol) w	ss effici der coe l-order ce angl The dat hich is ap	ency (η fficient coefficio e modif a given i perture a	₀) (a ₁) ent (a ₂) fier IAM in this sec prea for ve	(50°) tion are rel alues accore	0. 3. 0.0 ated to a ding to E	69 58 020 94 collector r	- W/(I W/(r - reference -2 <u>or</u> gro	- m²K) n²K²) - e area oss area
Collector efficiency (η_{col}) Remark: Collector efficiency (ncol) is defined (11/2013 as collector efficiency of the solar c lifference between the solar collector and th and a global solar irradiance of 1000 W/m ² , e ounded to the nearest integer. Deviating fro pased on reference area (Asol) which is apert	in CDR (I ollector a e surrou xpressed m the re sure area	52% EU) No at a temp nding air in % and gulation for value	erature of 40 K Ι ηcol is	Zero-lo First-or Second Inciden Remark: (A sol) wi for ISO S	ss effici der coe -order ce angl The dat hich is ap 0806. Cor	ency (ŋ fficient coeffici e modif a given i perture a psistent o	₀) (a ₁) ent (a ₂) fier IAM in this sec rea for ve data sets	(50°) tion are rel	0. 3. 0. 0. ated to a ding to E perture	69 58 020 94 collector r 7N 12975- or gross c	- W/(r W/(r - reference -2 <u>or</u> gro area can	- m²K) n²K²) - e area oss area
Collector efficiency (η_{col}) Remark: Collector efficiency (ncol) is defined (11/2013 as collector efficiency of the solar c lifference between the solar collector and th and a global solar irradiance of 1000 W/m ² , e ounded to the nearest integer. Deviating fro pased on reference area (Asol) which is apert	in CDR (I ollector a e surrou xpressed m the re sure area	52% EU) No at a temp nding air in % and gulation for value	erature of 40 K Ι ηcol is	Zero-lo First-or Second Inciden Remark: (A sol) wi for ISO S	ss effici der coe l-order o ce angl The dat hich is ap 0806. Cor calculatio	ency (ŋ fficient coeffici e modif a given i perture a psistent o	₀) (a ₁) ent (a ₂) fier IAM in this sec rea for ve data sets	(50°) tion are rel alues accorr for either a	0. 3. 0. 0. ated to a ding to E perture	69 58 020 94 collector r 7N 12975- or gross c	- W/(r W/(r - reference -2 <u>or</u> gro area can	- m²K) n²K²) - e area oss area
Data required for CDR (EU) No 811/201 Collector efficiency (η_{col}) Remark: Collector efficiency (ncol) is defined 811/2013 as collector efficiency of the solar collector and th ind a global solar irradiance of 1000 W/m ² , e ounded to the nearest integer. Deviating fro pased on reference area (Asol) which is apert according to EN 12975-2 or gross area for ISO Central Offices: Kalavriton 4, 145 64 ki	in CDR (ollector a e surrou xpressed m the re sure area 9 9806:20	52% EU) No at a temp nding air i in % and gulation for value 17.	erature of 40 K I ncol is	Zero-lo First-or Second Inciden Remark: (A sol) wi for ISO S used in a program	ss effici der coe -order of ce angl The dat hich is ap 2806. Cor calculations.	ency (ŋ fficient coeffici e modif a given i perture a pisistent o possistent o	o) (a ₁) ent (a ₂) fier IAM in this sec rea for ve data sets in the reg	(50°) tion are rel alues accord for either a ulation 811	0. 3. 0. ated to a ding to E perture and 812	69 58 020 94 collector r 7N 12975- or gross c 2 and sim	- W/(I W/(r - reference -2 <u>or</u> gro area can ulation	n ² K) n ² K ²) - area oss area be