TEST REPORT OF ANSI/IES LM-79-19

APPROVED METHOD FOR OPTICAL AND ELECTRICAL MEASUREMENTS OF SOLID-STATE LIGHTING PRODUCTS

Client.....	:	HK Lighting Group
Address.....	:	3529 Old Conejo, Suite 118, Newbury Park, CA. USA
Test Model.....	:	ZXL-08-M
Product Description	:	LED Luminaire
Brand Name.....	:	HK Lighting Group
Testing Laboratory.....	:	Guangdong Meide Testing Technology Co., Ltd.
Address.....	:	1st floor, B Area, Jinbaisheng Industrial Park, Headquarters 2 Road, Songshan Lake Hi-tech Industrial Development Zone,Dongguan City, Guangdong Pr., China.
Testing location.....	:	As above
Report No.....	:	C02A20100034L 01003
Test Date.....	:	Oct.12,2020 - Oct.13,2020
Report Date.....	:	Oct.15,2020

Tested by:	**Checked by:**	**Approved by:**
Tim Qian/ Test Engineer	Luke Lei/ Project Engineer	Jessie Li/ Technical Manager

Note 1: The test data was only valid for the test sample(s).This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or use in part without prior written consent from Guangdong Meide Testing Technology Co., Ltd. This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP,NIST, or any agency of the Federal Government.
Note 2: This report does not imply product certification, approval, or endorsement by NVLAP, NIST,or any agency of the Federal Government.

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1.Product Description for Equipment under Test(EUT)

The client submitted 1 sample of model ZXL-08-M. The sample was received on 2020-10-12,is undamaged condition.

Model Tested:	ZXL-08-M
Manufacturer:	HK Lighting Group
Address:	3529 Old Conejo, Suite 118, Newbury Park, CA. USA
Product Type:	LED Luminaire
Rated Voltage/Frequency:	AC 12V 60Hz
Rated Power:	3W
Nominal CCT:	3000K
LED Manufacturer:	N/A
LED Model No:	N/A

2.Standards Used

- ANSI/IES LM-79-19:APPROVED METHOD:OPTICAL AND ELECTRICAL MEASUREMENTS OF SOLID-STATE LIGHTING PRODUCTS

3.Test equipment list

Test Equipment	Serial No	Model No	Calibration due date
Full-field Speed Goniophotometer	MD-E028	GO-R5000	2021/09/29
Digital Power Meter	MD-E001	PF2010	2021/09/29
AC Testing Power Source	MD-E002	DPS1060	2021/09/29
Total Spectral Radiant Flux Standard Lamp	MD-E007	D908S	2021/09/29

Statement of Traceability: Guangdong Meide Testing Technology Co., Ltd.attested that all calibration has been performed using suitable standards traceable to national primary standards and International System of Unit(SI).

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4.Test Method

Requirements of Ambient Condition

Product was tested with no seasoning. All stabilization and measurements were made in compliance with ANSI/IES LM-79-19. The product was operated at rated voltage or at voltage required by manufacturer. The ambient temperature of the sample was maintained at 25°C±1.2°C during measurement. And relative humidity between 10% and 65%.

Goniophotometer System

The sample was tested according to the ANSI/IES LM-79-19.

Photometric paramters were measured using a type C goniophotometer and software. The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, Luminous efficacy, zonal flux were calculated from the software taken at 1° vertical intervals and 22.5°horizontal intervals.Photometric distance was more than five times of the Largest dimension of the test SSL product.

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5. Goniophotometer Test results

5.1 Test Data

Test Ambient Temperature	25.1℃	Test orientation	Downward
Operate time(Min.)	90	stabilization time(Min.)	60

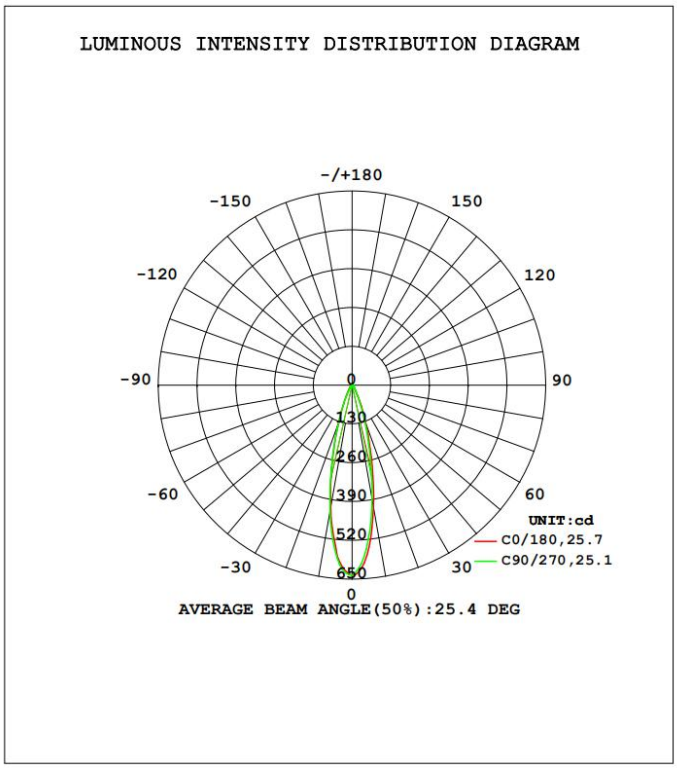
Electrical Measurement

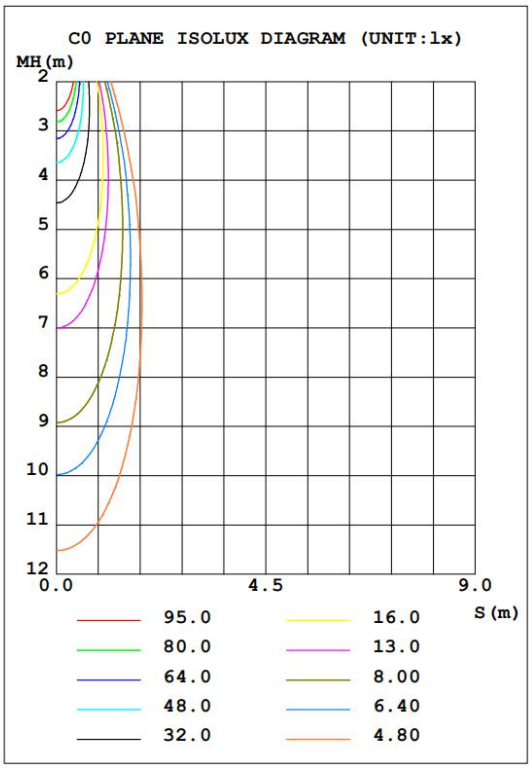
Input Voltage (V)	Frequency (Hz)	Input Current(A)	Power Factor	Power(W)
12.0	60.00	0.3783	0.6564	2.980

Photometric Measurement

Luminous Flux (lm)	Efficacy(lm/W)	Imax(cd)	Spacing Criteria (C0/180°)	Spacing Criteria (C90/270°)
168.892	56.68	636.6	0.44	0.44

5.2 LUMINOUS INTENSITY DISTRIBUTION DIAGRAM AND C0 PLANE ISOLUX DIAGRAM (UNIT:lx)





AVERAGE BEAM ANGLE(50%):25.4 DEG

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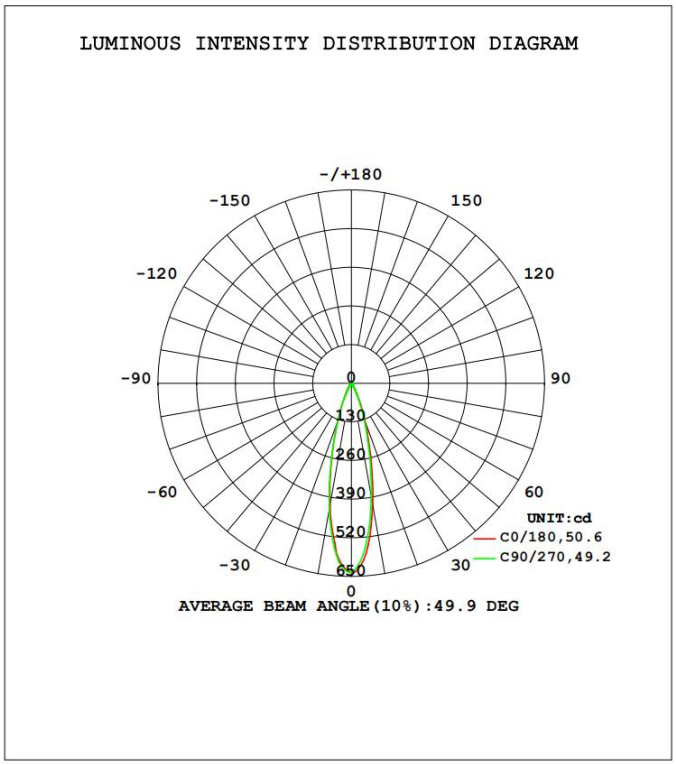

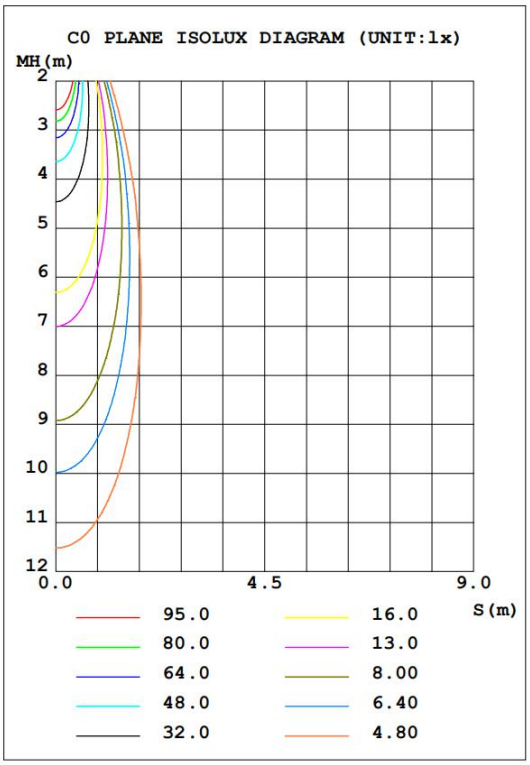

AVERAGE BEAM ANGLE(10%):49.9 DEG

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5.3 ZONAL FLUX DIAGRAM

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp
10	413.9	400.3	388.2	404.7	416.2	427.0	429.0	424.2	0- 10	49.20	49.20	29.1,29.1
20	134.1	125.8	119.2	123.5	133.5	135.5	133.5	137.6	10- 20	68.38	117.6	69.6,69.6
30	31.14	29.83	28.87	31.02	34.39	33.08	29.96	32.75	20- 30	30.74	148.3	87.8,87.8
40	9.811	9.347	9.484	10.33	11.43	10.90	9.643	9.966	30- 40	11.13	159.4	94.4,94.4
50	4.257	4.051	3.999	4.337	5.063	4.867	4.167	4.245	40- 50	5.199	164.6	97.5,97.5
60	1.565	1.492	1.551	1.737	2.189	2.128	1.681	1.583	50- 60	2.569	167.2	99,99
70	0.4737	0.4719	0.5397	0.6479	0.8529	0.9487	0.5986	0.4965	60- 70	1.102	168.3	99.7,99.7
80	0.0781	0.0800	0.0934	0.1094	0.1342	0.1526	0.0960	0.0794	70- 80	0.3403	168.7	99.9,99.9
90	0.0000	0.0000	0.0000	0.0010	0.0001	0.0023	0.0000	0.0001	80- 90	0.0443	168.7	99.9,99.9
100	0	0	0	0	0	0	0	0	90-100	0.0000	168.7	99.9,99.9
110	0	0	0	0	0	0	0	0	100-110	0	168.7	99.9,99.9
120	0	0	0	0	0	0	0	0	110-120	0.0000	168.7	99.9,99.9
130	0.0031	0.0026	0.0080	0.0053	0.0050	0.0054	0.0028	0.0022	120-130	0.0006	168.7	99.9,99.9
140	0.0298	0.0351	0.0664	0.0558	0.0498	0.0574	0.0396	0.0352	130-140	0.0159	168.7	99.9,99.9
150	0.0537	0.0636	0.1747	0.1610	0.1285	0.1525	0.0911	0.0794	140-150	0.0493	168.8	99.9,99.9
160	0.0675	0.0851	0.2393	0.2319	0.1944	0.1972	0.1240	0.1004	150-160	0.0654	168.8	100,100
170	0.0721	0.1159	0.2029	0.1947	0.1635	0.1466	0.1215	0.0941	160-170	0.0439	168.9	100,100
180	0.3129	0.3129	0.0980	0.0980	0.0980	0.0980	0.3129	0.3129	170-180	0.0138	168.9	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

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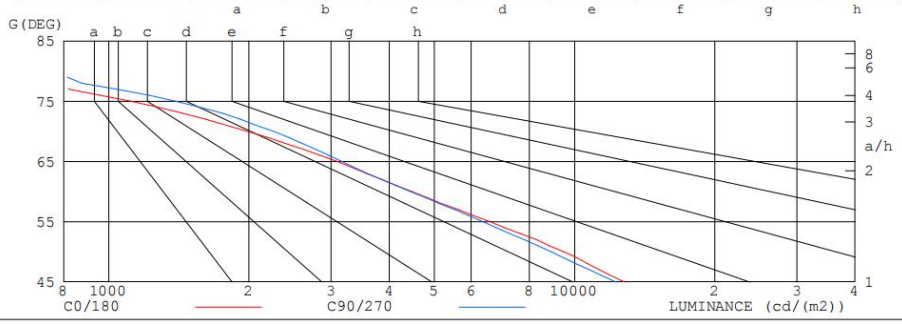
5.4 LUMINANCE LIMITATION CURVES

LUMINANCE LIMITATION CURVES

GLARE	CLASS	ILLUMINANCE (lx)							
1.15	A	2000	1000	500	<=300				
1.50	B		2000	1000	500	<=300			
1.85	C			2000	1000	500	<=300		
2.20	D				2000	1000	500	<=300	
2.55	E					2000	1000	500	<=300
		a	b	c	d	e	f	g	h



LUMINANCE cd/(m2)		
G(DEG)	C0/180	C90/270
85	469	531
80	642	768
75	1110	1385
70	1979	2254
65	3088	3157
60	4471	4431
55	6570	6342
50	9461	8888
45	12797	12258

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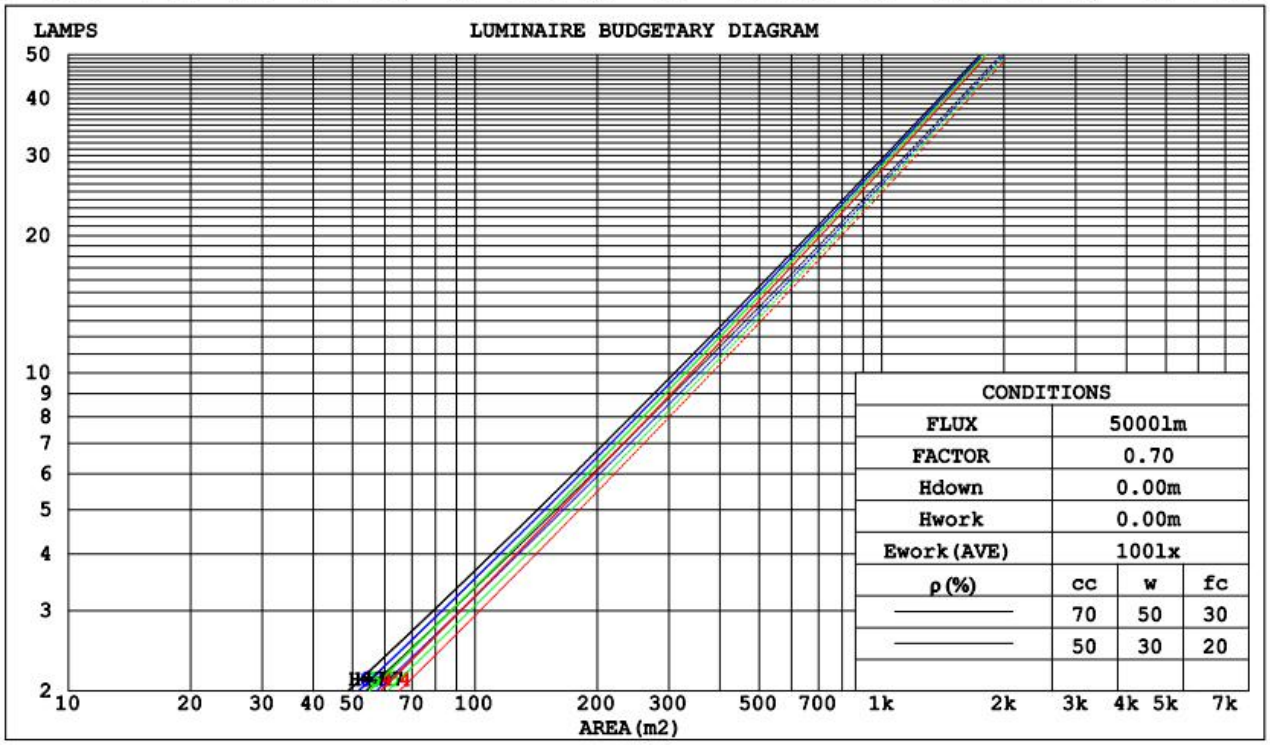
5.5 CU AND LUMINAIRE BUDGETARY ESTIMATE DIAGRAM

ρcc	80%			70%			50%			30%			10%			0
ρw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
ρfc	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio			Coefficients of Utilization(CU)												
0.0	1.19	1.19	1.19	1.16	1.16	1.16	1.11	1.11	1.11	1.06	1.06	1.06	1.02	1.02	1.02	.00
1.0	1.12	1.10	1.08	1.10	1.08	1.06	1.06	1.04	1.03	1.02	1.01	1.00	.99	.98	.97	.95
2.0	1.06	1.03	.00	1.04	1.01	.99	1.01	.99	.97	.98	.96	.95	.96	.94	.93	.91
3.0	1.01	.97	.93	.99	.96	.93	.97	.94	.91	.95	.92	.90	.92	.90	.88	.87
4.0	.96	.92	.88	.95	.91	.88	.93	.89	.87	.91	.88	.86	.89	.87	.85	.83
5.0	.92	.87	.84	.91	.87	.83	.89	.86	.83	.88	.85	.82	.86	.84	.81	.80
6.0	.88	.83	.80	.87	.83	.80	.86	.82	.79	.85	.81	.79	.83	.81	.78	.77
7.0	.85	.80	.77	.84	.80	.76	.83	.79	.76	.82	.78	.76	.81	.78	.75	.74
8.0	.82	.77	.74	.81	.77	.74	.80	.76	.73	.79	.76	.73	.78	.75	.73	.72
9.0	.79	.74	.71	.78	.74	.71	.77	.74	.71	.77	.73	.71	.76	.73	.70	.69
10.0	.76	.72	.69	.76	.71	.69	.75	.71	.68	.74	.71	.68	.74	.70	.68	.67



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5.6 WEC AND CCEC

ρcc	80%			70%			50%			30%			10%			0
ρw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
ρfc	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio						Wall Exitance Coeffcients(WEC)									
0.0																
1.0	.151	.086	.027	.144	.082	.026	.132	.076	.024	.120	.069	.022	.110	.063	.020	
2.0	.142	.078	.024	.136	.075	.023	.126	.070	.022	.116	.065	.020	.107	.061	.019	
3.0	.133	.071	.021	.128	.069	.021	.119	.065	.020	.111	.061	.019	.104	.057	.018	
4.0	.125	.065	.019	.121	.063	.019	.114	.060	.018	.107	.057	.017	.100	.054	.017	
5.0	.118	.060	.017	.115	.059	.017	.108	.056	.017	.102	.054	.016	.097	.052	.016	
6.0	.112	.056	.016	.109	.055	.016	.103	.053	.015	.098	.051	.015	.093	.049	.015	
7.0	.106	.052	.015	.104	.052	.015	.099	.050	.014	.094	.048	.014	.090	.047	.014	
8.0	.101	.049	.014	.099	.049	.014	.095	.047	.013	.091	.046	.013	.087	.045	.013	
9.0	.097	.047	.013	.095	.046	.013	.091	.045	.013	.087	.044	.013	.084	.043	.012	
10.0	.092	.044	.012	.091	.044	.012	.087	.043	.012	.084	.042	.012	.081	.041	.012	

ρcc	80%			70%			50%			30%			10%			0
ρw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
ρfc	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio						Ceiling Cavity Exitance Coefficients(CCEC)									
0.0	.191	.191	.191	.164	.164	.164	.112	.112	.112	.064	.064	.064	.020	.020	.020	
1.0	.170	.158	.148	.146	.136	.127	.100	.094	.088	.057	.054	.051	.018	.017	.017	
2.0	.153	.134	.117	.131	.115	.101	.090	.080	.071	.052	.046	.041	.017	.015	.013	
3.0	.139	.114	.095	.119	.099	.082	.082	.068	.058	.047	.040	.034	.015	.013	.011	
4.0	.127	.099	.078	.109	.086	.067	.075	.060	.048	.043	.035	.028	.014	.011	.009	
5.0	.117	.087	.065	.101	.075	.056	.069	.053	.040	.040	.031	.024	.013	.010	.008	
6.0	.109	.077	.055	.093	.067	.048	.064	.047	.034	.037	.028	.020	.012	.009	.007	
7.0	.101	.069	.047	.087	.060	.041	.060	.042	.029	.035	.025	.017	.011	.008	.006	
8.0	.095	.063	.040	.082	.054	.035	.057	.038	.025	.033	.022	.015	.011	.007	.005	
9.0	.089	.057	.035	.077	.050	.031	.053	.035	.022	.031	.021	.013	.010	.007	.004	
10.0	.085	.052	.031	.073	.046	.027	.051	.032	.019	.029	.019	.011	.010	.006	.004	

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5.7 UGR(Unified Glare Rating) Table

ceiling/cavity		0.7	0.7	0.5	0.5	0.3	0.7	0.7	0.5	0.5	0.3
walls		0.5	0.3	0.5	0.3	0.3	0.5	0.3	0.5	0.3	0.3
working plane		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Room dimensions		Viewed crosswise					Viewed endwise				
x = 2H	y = 2H	13.3	14.1	13.5	14.2	14.4	13.2	14.0	13.5	14.1	14.3
	3H	13.4	14.0	13.6	14.2	14.4	13.3	14.0	13.5	14.2	14.4
	4H	13.3	14.0	13.6	14.2	14.4	13.3	13.9	13.5	14.1	14.3
	6H	13.2	13.8	13.5	14.1	14.3	13.2	13.8	13.5	14.0	14.3
	8H	13.2	13.8	13.5	14.0	14.3	13.1	13.7	13.4	14.0	14.2
	12H	13.1	13.7	13.5	14.0	14.3	13.1	13.7	13.4	13.9	14.2
4H	2H	13.3	13.9	13.5	14.1	14.4	13.2	13.9	13.5	14.1	14.3
	3H	13.3	13.9	13.6	14.2	14.4	13.3	13.8	13.6	14.1	14.4
	4H	13.3	13.8	13.6	14.1	14.4	13.2	13.8	13.6	14.1	14.4
	6H	13.2	13.7	13.6	14.0	14.3	13.2	13.6	13.5	14.0	14.3
	8H	13.2	13.6	13.5	13.9	14.3	13.1	13.6	13.5	13.9	14.3
	12H	13.1	13.5	13.5	13.9	14.3	13.1	13.5	13.5	13.8	14.2
8H	4H	13.2	13.6	13.5	13.9	14.3	13.1	13.6	13.5	13.9	14.3
	6H	13.1	13.4	13.5	13.8	14.2	13.0	13.4	13.5	13.8	14.2
	8H	13.0	13.3	13.5	13.8	14.2	13.0	13.3	13.4	13.7	14.2
	12H	13.0	13.2	13.4	13.7	14.2	12.9	13.2	13.4	13.7	14.1
12H	4H	13.1	13.5	13.5	13.9	14.3	13.1	13.5	13.5	13.8	14.2
	6H	13.0	13.3	13.5	13.7	14.2	13.0	13.3	13.4	13.7	14.2
	8H	13.0	13.2	13.4	13.7	14.1	12.9	13.2	13.4	13.7	14.1
Variations with the observer position at spacings:											
S = 1.0H		+ 2.0 / - 3.0					+ 1.8 / - 3.0				
1.5H		+ 2.8 / - 2.2					+ 2.6 / - 2.0				
2.0H		+ 3.2 / - 3.4					+ 3.0 / - 3.3				

CIE Pub.117, 168.9 lm Total Lamp Luminous Flux Corrected (8log(F/F0) = -6.2)

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5.8 UTILIZATION FACTORS TABLE

REFLECTANCE										
Ceiling	0.8	0.8	0.8	0.7	0.7	0.7	0.5	0.5	0.5	0
Walls	0.7	0.5	0.3	0.7	0.5	0.3	0.7	0.5	0.3	0
Working plane	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0
ROOM INDEX	UTILIZATION FACTORS(PERCENT) k(RI) x RCR = 5									
k = 0.60	88	82	78	88	82	78	87	81	78	74
0.80	95	90	86	95	89	86	94	89	85	82
1.00	100	94	91	99	94	90	97	94	90	86
1.25	104	98	95	103	98	95	101	97	94	90
1.50	106	102	98	105	101	98	103	99	97	92
2.00	109	105	102	107	104	101	105	102	99	94
2.50	110	107	104	109	105	103	106	103	101	95
3.00	112	109	106	110	107	105	107	104	103	96
4.00	114	111	109	112	110	108	108	106	105	98
5.00	115	113	111	113	111	110	109	108	106	99
ROOM INDEX	UF(total)									Direct
According to DIN EN 13032-2 2004				Suspended					SHRNOM = 1.25	

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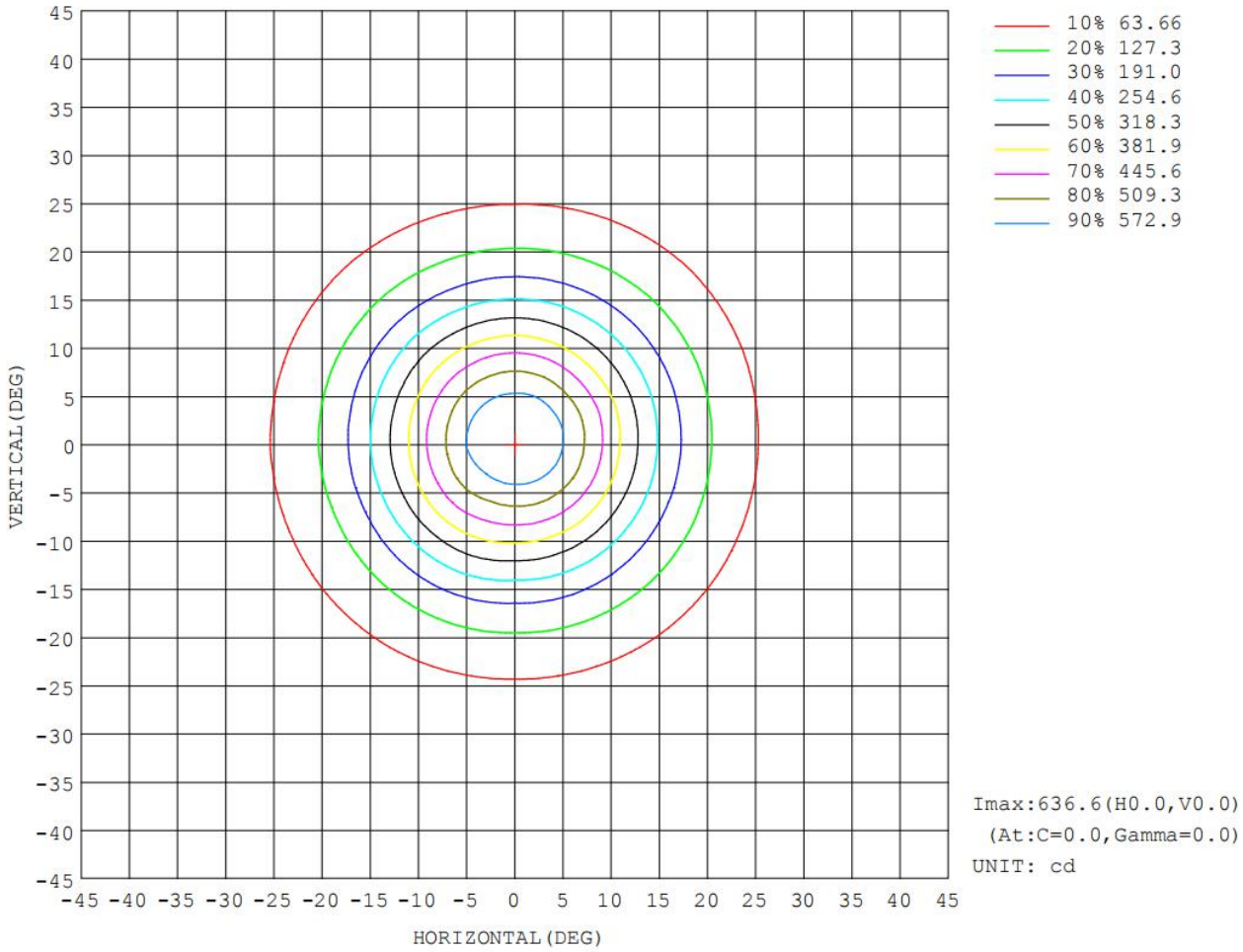
5.9 ISOCANDELA DIAGRAM



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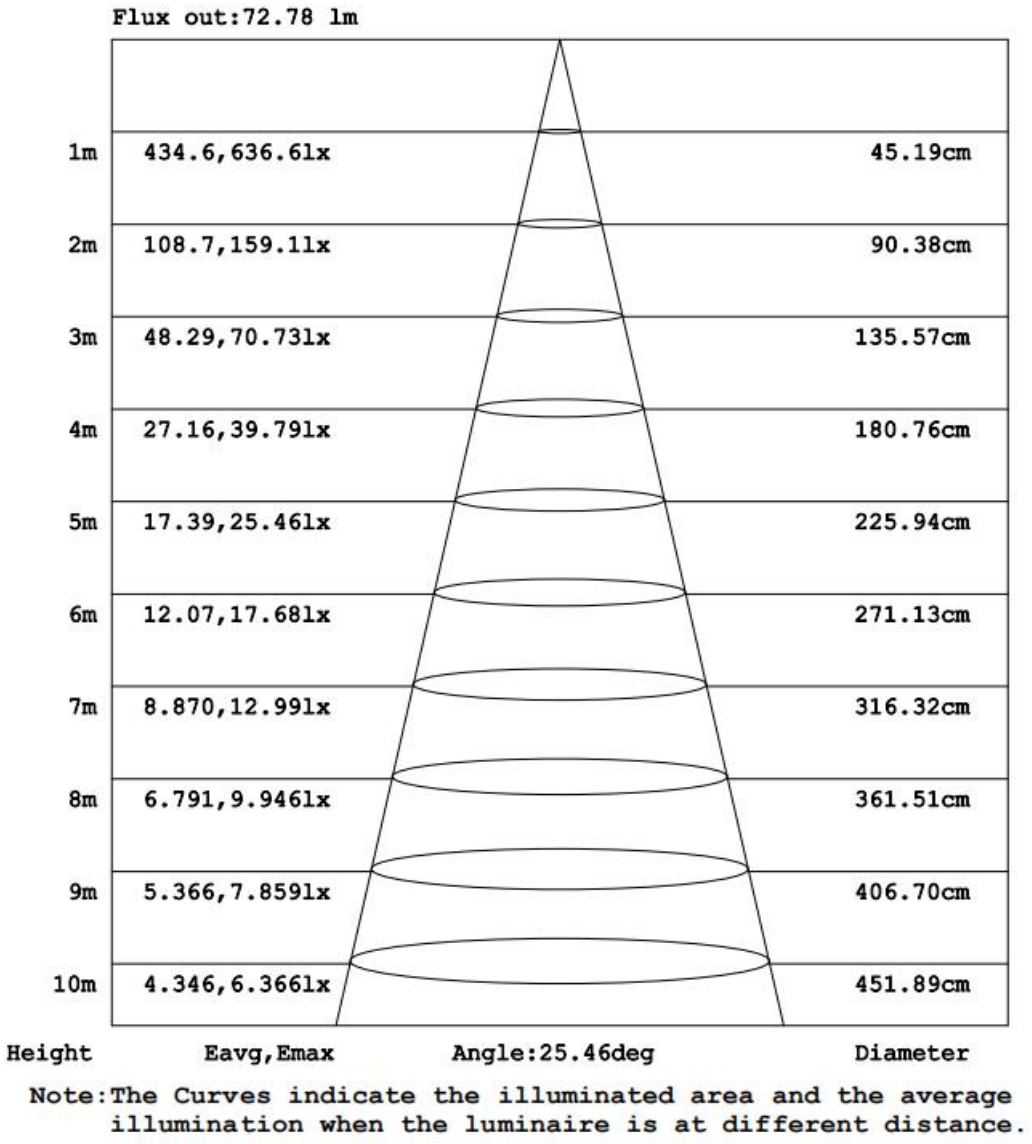
5.10 AAI Figure



Note:The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

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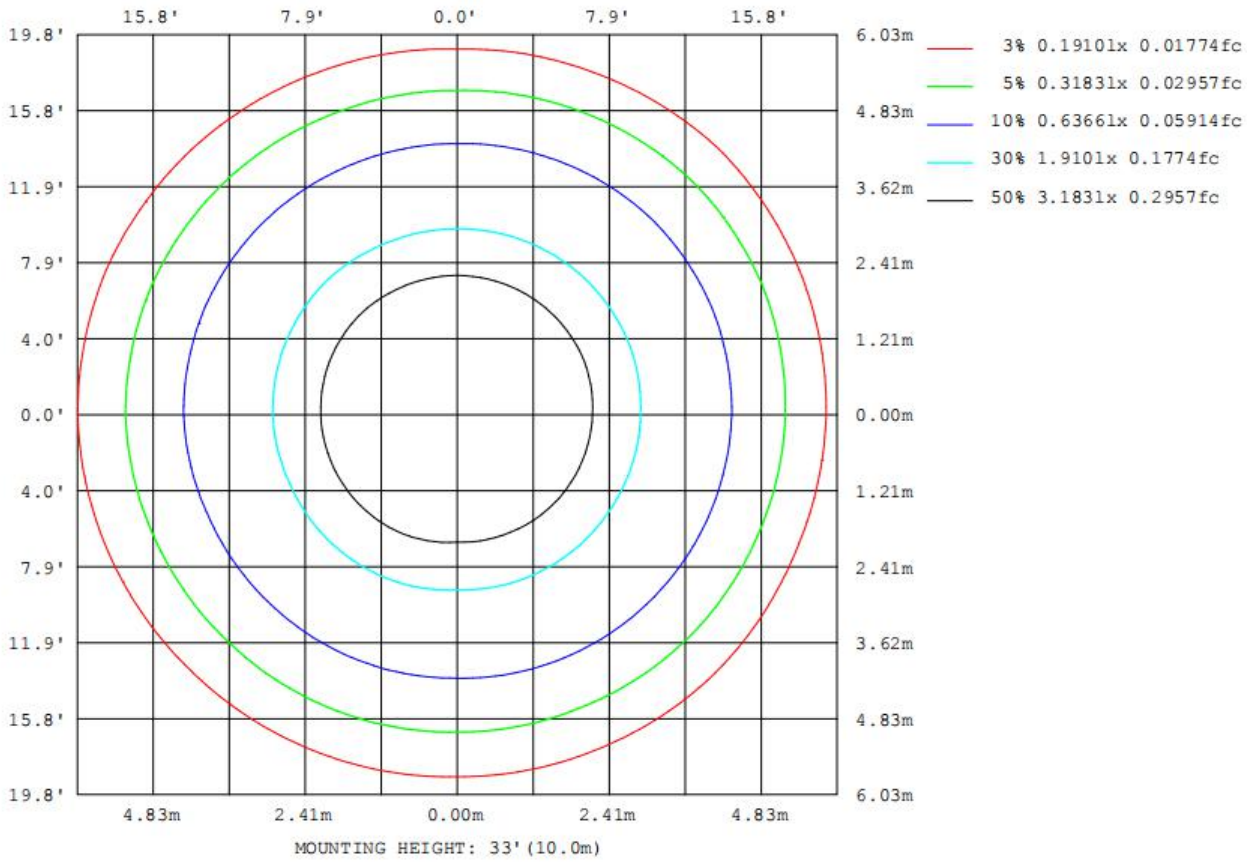
5.11 ISOLUX DIAGRAM



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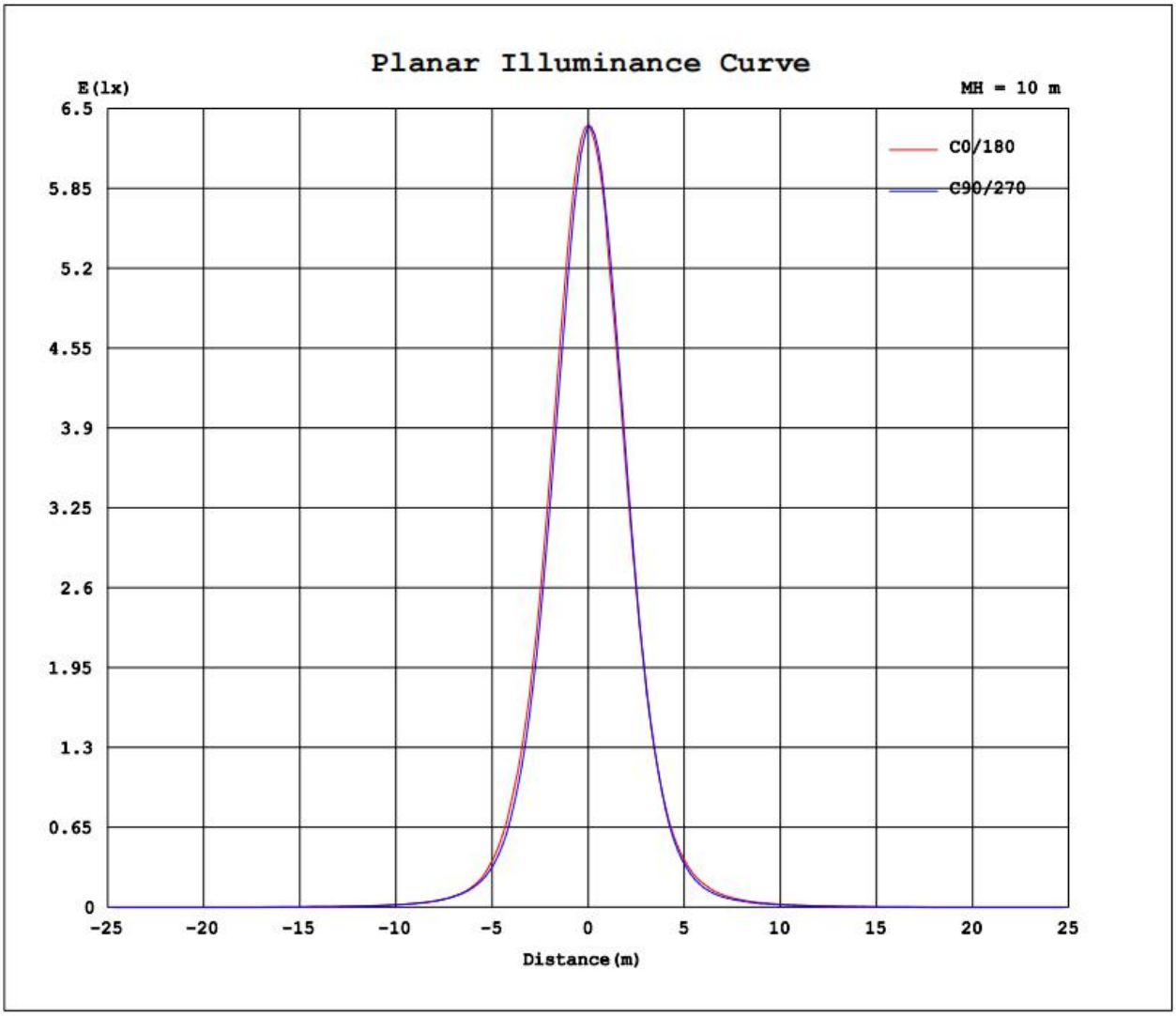
5.12 Planar Illuminance Curve



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5.13 Luminous Distribution Intensity Data

Table--1 UNIT: cd

γ (DEG) \ C (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5
0	637	637	637	637	637	637	637	637	637	637	637	637	637	637	637	637
5	573	568	561	555	551	550	553	564	575	577	578	580	581	583	580	579
10	414	407	400	392	388	396	405	410	416	422	427	427	429	427	424	423
15	249	243	238	233	228	236	241	245	254	258	262	258	257	259	258	256
20	134	130	126	122	119	121	124	127	134	135	135	133	133	136	138	138
25	66.3	63.1	60.3	58.4	57.5	58.8	60.4	62.8	66.9	66.8	65.5	63.3	62.7	65.2	67.8	68.1
30	31.1	29.8	29.8	29.1	28.9	29.9	31.0	32.7	34.4	34.5	33.1	31.3	30.0	31.0	32.8	32.3
35	16.6	15.7	15.6	15.9	16.0	16.2	17.1	17.9	18.8	19.0	18.0	16.6	15.8	16.2	16.9	16.5
40	9.81	9.45	9.35	9.44	9.48	9.82	10.3	10.9	11.4	11.6	10.9	10.2	9.64	9.79	9.97	9.86
45	6.33	6.13	6.08	6.09	6.07	6.32	6.62	7.00	7.47	7.60	7.19	6.72	6.29	6.37	6.40	6.34
50	4.26	4.11	4.05	4.04	4.00	4.15	4.34	4.67	5.06	5.14	4.87	4.50	4.17	4.22	4.25	4.24
55	2.64	2.55	2.52	2.55	2.55	2.64	2.77	3.03	3.35	3.42	3.21	2.95	2.67	2.67	2.64	2.66
60	1.56	1.52	1.49	1.51	1.55	1.64	1.74	1.93	2.19	2.29	2.13	1.90	1.68	1.63	1.58	1.56
65	0.91	0.89	0.88	0.90	0.93	1.00	1.07	1.20	1.40	1.60	1.50	1.22	1.04	0.97	0.93	0.91
70	0.47	0.46	0.47	0.49	0.54	0.59	0.65	0.75	0.85	1.00	0.95	0.74	0.60	0.53	0.50	0.48
75	0.20	0.20	0.21	0.22	0.25	0.29	0.34	0.41	0.47	0.53	0.49	0.37	0.28	0.23	0.22	0.20
80	0.08	0.08	0.08	0.09	0.09	0.10	0.11	0.12	0.13	0.16	0.15	0.12	0.10	0.09	0.08	0.08
85	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03	0.03
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
125	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
130	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
135	0.01	0.02	0.01	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.01	0.02	0.02	0.01
140	0.03	0.03	0.04	0.05	0.07	0.06	0.06	0.05	0.05	0.05	0.06	0.06	0.04	0.04	0.04	0.03
145	0.04	0.04	0.05	0.08	0.12	0.12	0.11	0.09	0.09	0.09	0.11	0.12	0.07	0.06	0.05	0.04
150	0.05	0.06	0.06	0.11	0.17	0.17	0.16	0.14	0.13	0.14	0.15	0.16	0.09	0.09	0.08	0.06
155	0.07	0.07	0.08	0.16	0.22	0.21	0.20	0.19	0.16	0.17	0.19	0.20	0.12	0.11	0.10	0.08
160	0.07	0.08	0.09	0.18	0.24	0.24	0.23	0.22	0.19	0.19	0.20	0.21	0.12	0.11	0.10	0.08
165	0.07	0.08	0.08	0.20	0.23	0.23	0.23	0.21	0.19	0.18	0.18	0.18	0.13	0.11	0.10	0.08
170	0.07	0.07	0.12	0.22	0.20	0.20	0.19	0.18	0.16	0.16	0.15	0.15	0.12	0.11	0.09	0.08
175	0.11	0.14	0.19	0.25	0.16	0.16	0.15	0.15	0.13	0.13	0.12	0.12	0.14	0.13	0.13	0.12
180	0.31	0.31	0.31	0.31	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.31	0.31	0.31	0.31

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6.Photo of sample

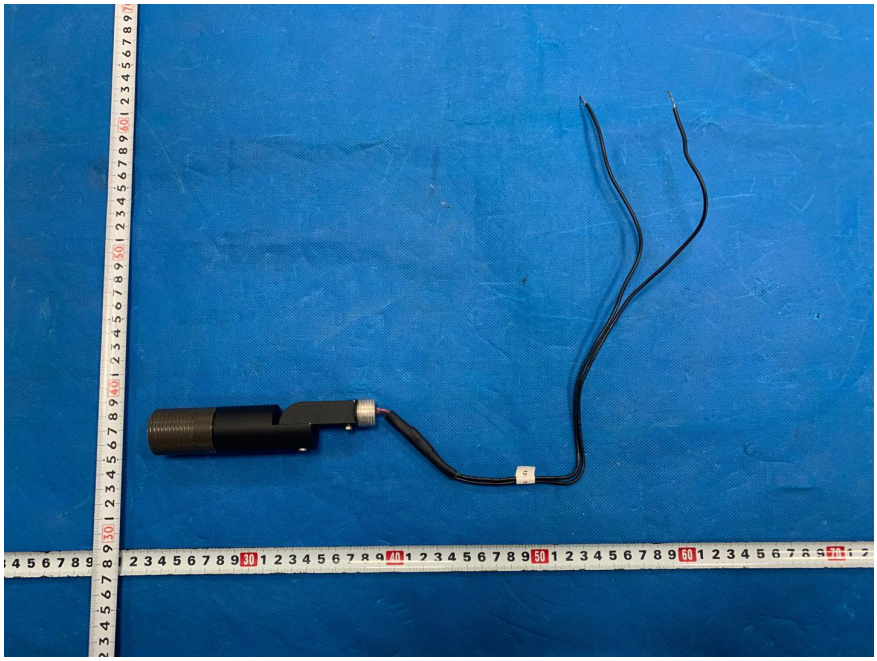

Figure 1

Figure 2

****** END OF THE TEST REPORT******

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