



Guangdong Meide Testing Technology Co., Ltd.



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..... : ZXL11-HP

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..... : CA2006443L 01003

Test Date..... : June.22,2020 - June.24,2020

Report Date..... : June.28,2020

Tested by:

Tim Qian/ Test Engineer

Checked by:

Luke Lei/ Project Engineer

Approved by:

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.

Report No.: CA2006443L 01003

Page 1 of 17

Laboratory: Guangdong Meide Testing Technology Co., Ltd.

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1. Product Description for Equipment under Test(EUT)

The client submitted 1 sample of model ZXL11-HP. The sample was received on 2020-06-22, is in undamaged condition.

Model Tested:	ZXL11-HP
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:	7W
Nominal CCT:	3000K
LED Manufacturer:	Nichia
LED Model No:	NFCWL036B-V3

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	2020/10/06
Digital Power Meter	MD-E001	PF2010	2020/10/06
AC Testing Power Source	MD-E002	DPS1060	2020/10/06
Total Spectral Radiant Flux Standard Lamp	MD-E007	D908S	2020/10/06

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 $25^{\circ}\text{C} \pm 1.2^{\circ}\text{C}$ during measurement. And relative humidity between 10% and 65%.

Goniophotometer System

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

Photometric parameters 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

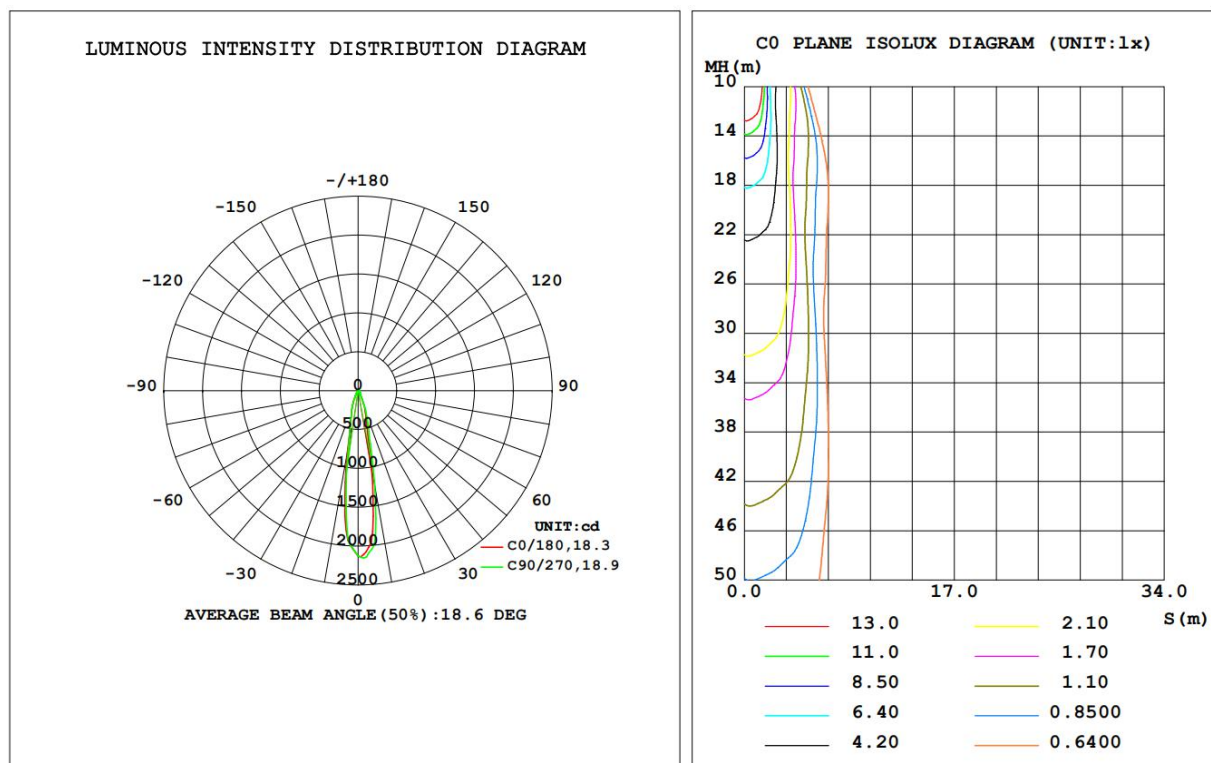
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current(A)	Power Factor	Power(W)
12.00	60.00	0.5993	0.9303	6.690

Photometric Measurement

Luminous Flux (lm)	Efficacy(lm/W)	I _{max} (cd)	Spacing Criteria (C0/180°)	Spacing Criteria (C90/270°)
383.668	57.35	2168	0.29	0.28

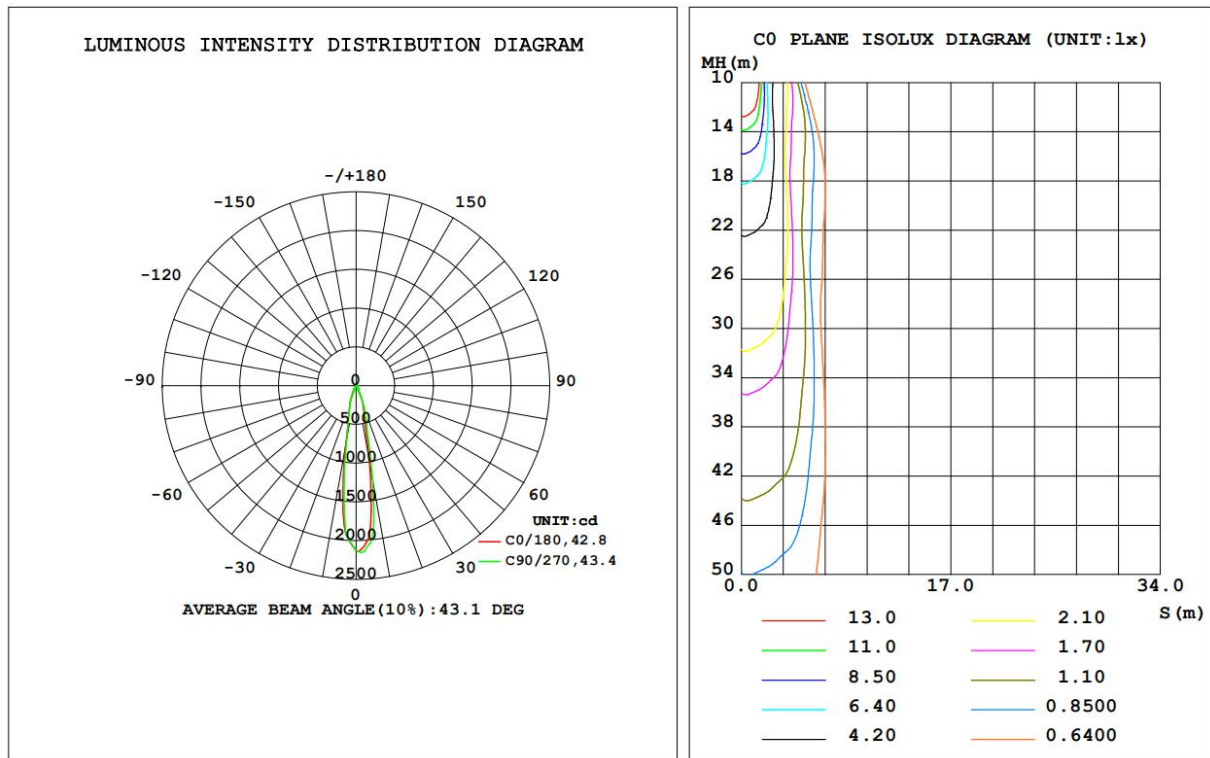
5.2 LUMINOUS INTENSITY DISTRIBUTION DIAGRAM AND C0 PLANE ISOLUX DIAGRAM (UNIT:lx)



AVERAGE BEAM ANGLE(50%):18.6 DEG



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AVERAGE BEAM ANGLE(10%):43.1 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	1006	1219	1243	994.6	789.2	674.4	702.1	838.5	0- 10	146.7	146.7	38.2, 38.2
20	272.1	296.5	311.3	264.3	225.2	213.7	230.0	249.3	10- 20	124.8	271.5	70.8, 70.8
30	66.13	68.61	67.44	62.07	57.28	55.19	57.30	63.86	20- 30	61.05	332.6	86.7, 86.7
40	27.65	29.04	29.66	26.21	22.81	22.16	23.12	26.22	30- 40	25.89	358.5	93.4, 93.4
50	11.20	12.03	12.12	11.46	9.932	9.503	9.633	10.18	40- 50	12.93	371.4	96.8, 96.8
60	5.159	5.401	5.229	5.548	4.353	3.866	3.970	4.111	50- 60	6.496	377.9	98.5, 98.5
70	2.581	2.915	2.656	2.866	1.508	1.412	1.415	1.341	60- 70	3.085	381.0	99.3, 99.3
80	1.244	1.413	1.242	1.341	0.3539	0.1754	0.0885	0.2608	70- 80	1.401	382.4	99.7, 99.7
90	0.4447	0.5311	0.4425	0.4470	0	0.0883	0	0	80- 90	0.4945	382.9	99.8, 99.8
100	0.0913	0	0	0.0015	0	0	0.0885	0	90-100	0.1626	383.0	99.8, 99.8
110	0	0	0	0	0.3525	0.1766	0	0	100-110	0.0391	383.1	99.8, 99.8
120	0.0880	0.1765	0.0911	0.0894	0.3553	0	0	0	110-120	0.0510	383.1	99.9, 99.9
130	0.0888	0.0027	0	0	0.3553	0	0	0	120-130	0.0489	383.2	99.9, 99.9
140	0.0888	0	0	0	0.3636	0	0	0	130-140	0.0257	383.2	99.9, 99.9
150	0.0888	0	0	0	0.7995	0.0003	0.1769	0	140-150	0.0454	383.2	99.9, 99.9
160	0.1753	0	0	0	0.9772	0.8842	0.7961	0.7165	150-160	0.1038	383.3	99.9, 99.9
170	1.332	0.4378	0.2642	0.5347	1.688	1.413	1.504	1.431	160-170	0.1999	383.5	100, 100
180	1.421	1.325	1.768	1.520	1.599	1.413	1.415	1.074	170-180	0.1203	383.7	100, 100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

Conical surface Flux(90deg) : 365.97 lm

%lum = 95.4%

%lamp = 95.4%

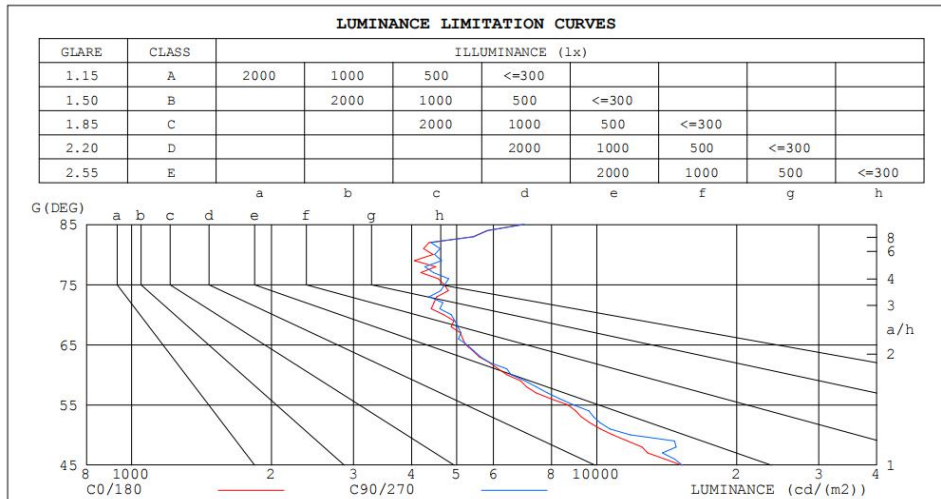
Conical surface Flux(120deg) : 377.89 lm

%lum = 98.5%

%lamp = 98.5%



5.4 LUMINANCE LIMITATION CURVES



LUMINANCE cd/(m2)		
G (DEG)	C0/180	C90/270
85	6961	6991
80	4446	4480
75	4700	4712
70	4685	4863
65	5227	5253
60	6406	6549
55	8664	8899
50	10821	11811
45	15218	15280

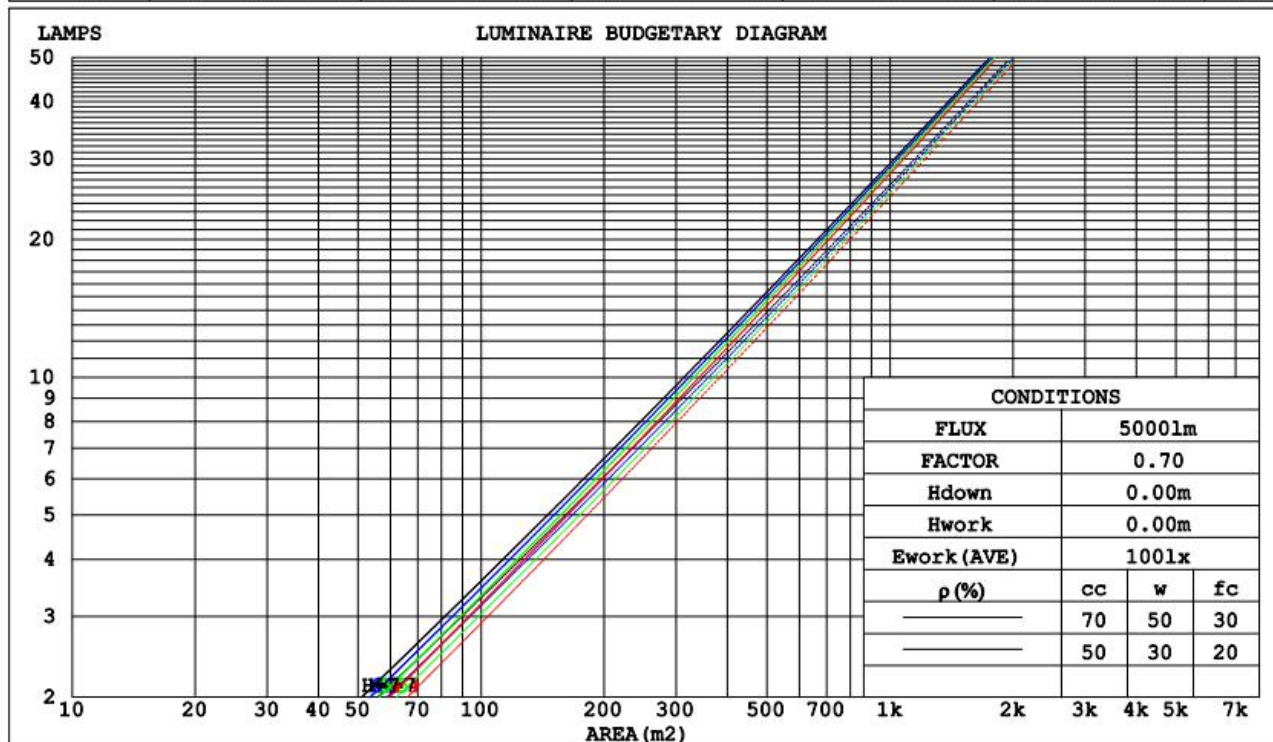


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5.5 CU AND LUMINAIRE BUDGETARY ESTIMATE DIAGRAM

pcc	80%			70%			50%			30%			10%			0
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
pfc	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	1.07	1.06	1.05	1.03	1.02	1.01	1.00	.99	.98	.97	.96
2.0	1.06	1.03	1.00	1.05	1.02	.99	1.01	.99	.97	.99	.97	.95	.96	.94	.93	.91
3.0	1.01	.97	.94	.90	.96	.93	.97	.94	.92	.95	.93	.91	.93	.91	.89	.88
4.0	.97	.92	.89	.96	.92	.89	.94	.90	.88	.92	.89	.87	.90	.88	.86	.84
5.0	.93	.88	.85	.92	.88	.85	.90	.87	.84	.89	.86	.83	.87	.85	.83	.81
6.0	.89	.85	.82	.89	.84	.81	.87	.84	.81	.86	.83	.80	.85	.82	.80	.79
7.0	.86	.82	.79	.86	.81	.78	.84	.81	.78	.83	.80	.78	.82	.79	.77	.76
8.0	.83	.79	.76	.83	.79	.76	.82	.78	.75	.81	.78	.75	.80	.77	.75	.74
9.0	.81	.76	.74	.80	.76	.73	.80	.76	.73	.79	.75	.73	.78	.75	.73	.72
10.0	.79	.74	.71	.78	.74	.71	.77	.74	.71	.77	.73	.71	.76	.73	.71	.70





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5.6 WEC AND CCEC

pcc	80%			70%			50%			30%			10%			0	
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0	
pfc	20%			20%			20%			20%			20%			0	
RCR	RCR:Room Cavity Ratio						Wall Exitance Coefficients(WEC)										
0.0																	
1.0	.149	.084	.027	.142	.081	.026	.129	.074	.024	.118	.068	.022	.107	.062	.020		
2.0	.139	.076	.023	.133	.073	.023	.123	.068	.021	.113	.063	.020	.104	.059	.019		
3.0	.129	.069	.021	.125	.067	.020	.116	.063	.019	.108	.059	.018	.100	.056	.017		
4.0	.121	.063	.019	.117	.061	.018	.110	.058	.017	.103	.055	.017	.097	.052	.016		
5.0	.114	.058	.017	.111	.057	.017	.104	.054	.016	.098	.052	.015	.093	.050	.015		
6.0	.107	.054	.015	.105	.053	.015	.099	.051	.015	.094	.049	.014	.089	.047	.014		
7.0	.102	.050	.014	.099	.049	.014	.094	.048	.014	.090	.046	.013	.086	.045	.013		
8.0	.097	.047	.013	.094	.046	.013	.090	.045	.013	.086	.044	.013	.082	.042	.012		
9.0	.092	.044	.012	.090	.044	.012	.086	.043	.012	.083	.041	.012	.079	.040	.012		
10.0	.088	.042	.012	.086	.042	.012	.083	.041	.011	.080	.040	.011	.077	.039	.011		

pcc	80%			70%			50%			30%			10%			0
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
pfc	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio						Ceiling Cavity Exitance Coefficients(CCEC)									
0.0	.192	.192	.192	.164	.164	.164	.112	.112	.112	.064	.064	.064	.021	.021	.021	
1.0	.171	.159	.149	.146	.137	.128	.100	.094	.089	.058	.054	.051	.018	.018	.017	
2.0	.153	.134	.118	.131	.116	.102	.090	.080	.071	.052	.047	.042	.017	.015	.014	
3.0	.139	.115	.096	.119	.099	.083	.082	.069	.058	.047	.040	.034	.015	.013	.011	
4.0	.127	.100	.079	.109	.086	.069	.075	.060	.048	.043	.035	.029	.014	.011	.009	
5.0	.117	.088	.066	.100	.076	.058	.069	.053	.041	.040	.031	.024	.013	.010	.008	
6.0	.108	.078	.056	.093	.067	.049	.064	.047	.035	.037	.028	.021	.012	.009	.007	
7.0	.100	.070	.048	.086	.060	.042	.060	.042	.030	.035	.025	.018	.011	.008	.006	
8.0	.094	.063	.042	.081	.055	.036	.056	.038	.026	.033	.023	.015	.011	.007	.005	
9.0	.088	.057	.037	.076	.050	.032	.053	.035	.023	.031	.021	.013	.010	.007	.004	
10.0	.083	.053	.032	.072	.046	.028	.050	.032	.020	.029	.019	.012	.009	.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	14.9	15.6	15.1	15.8	15.9	15.1	15.8	15.3	16.0	16.2
3H	15.2	15.9	15.4	16.0	16.2	15.4	16.1	15.7	16.3	16.5
4H	15.4	16.0	15.6	16.2	16.4	15.6	16.2	15.9	16.4	16.6
6H	15.5	16.1	15.8	16.3	16.6	15.7	16.3	16.0	16.6	16.8
8H	15.6	16.2	15.9	16.4	16.7	15.8	16.4	16.1	16.6	16.9
12H	15.7	16.3	16.0	16.5	16.8	15.9	16.5	16.2	16.7	17.0
4H 2H	15.0	15.6	15.3	15.8	16.1	15.2	15.8	15.5	16.1	16.3
3H	15.4	16.0	15.7	16.3	16.5	15.6	16.2	16.0	16.5	16.7
4H	15.7	16.2	16.0	16.5	16.8	15.9	16.4	16.2	16.7	17.0
6H	15.9	16.4	16.3	16.7	17.1	16.1	16.6	16.5	16.9	17.2
8H	16.1	16.5	16.4	16.8	17.2	16.2	16.7	16.6	17.0	17.4
12H	16.2	16.6	16.6	17.0	17.4	16.4	16.8	16.8	17.2	17.5
8H 4H	15.8	16.2	16.2	16.5	16.9	15.9	16.4	16.3	16.7	17.1
6H	16.1	16.5	16.5	16.8	17.3	16.3	16.6	16.7	17.0	17.4
8H	16.3	16.6	16.8	17.0	17.5	16.5	16.8	16.9	17.2	17.6
12H	16.6	16.8	17.1	17.3	17.8	16.7	17.0	17.2	17.4	17.9
12H 4H	15.7	16.1	16.1	16.5	16.9	15.9	16.3	16.3	16.7	17.1
6H	16.1	16.4	16.6	16.9	17.3	16.3	16.6	16.8	17.0	17.5
8H	16.4	16.6	16.8	17.1	17.6	16.5	16.8	17.0	17.2	17.7
Variations with the observer position at spacings:										
S = 1.0H	+ 1.0 / - 1.3					+ 1.3 / - 1.5				
1.5H	+ 1.7 / - 1.1					+ 2.2 / - 1.0				
2.0H	+ 1.6 / - 1.2					+ 1.6 / - 1.1				

CIE Pub.117, 383.7 lm Total Lamp Luminous Flux Corrected ($8\log(F/F_0) = -3.3$)



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5.8 UTILIZATION FACTORS TABLE

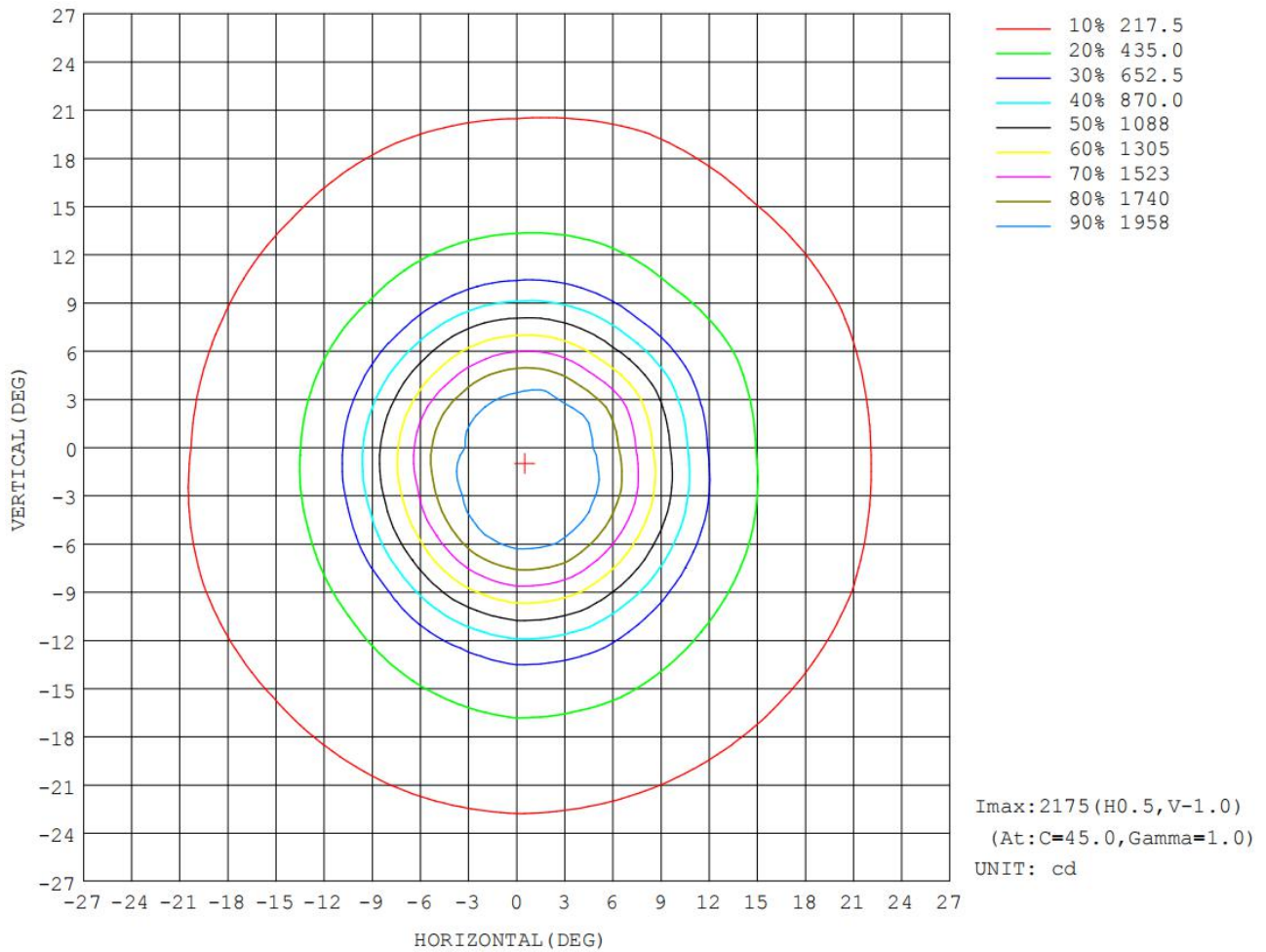
REFLECTANCE										
Ceiling	0.8	0.8	0.8	0.7	0.7	0.7	0.5	0.5	0.5	0
Walls	0.7	0.5	0.3	0.7	0.5	0.3	0.7	0.5	0.3	0
Working plane	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0
ROOM INDEX	UTILIZATION FACTORS (PERCENT) $k(RI) \times RCR = 5$									
$k = 0.60$	87	81	77	87	81	77	86	81	77	74
0.80	95	89	85	94	89	85	93	88	85	81
1.00	99	94	90	98	93	90	97	93	89	85
1.25	103	98	94	102	97	94	100	96	93	89
1.50	106	101	98	105	100	97	102	99	96	92
2.00	108	104	101	107	103	100	104	101	99	94
2.50	110	106	103	109	105	102	105	103	101	95
3.00	112	108	106	110	107	104	106	104	102	96
4.00	114	111	109	112	109	107	108	106	105	97
5.00	115	113	111	113	111	109	109	107	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

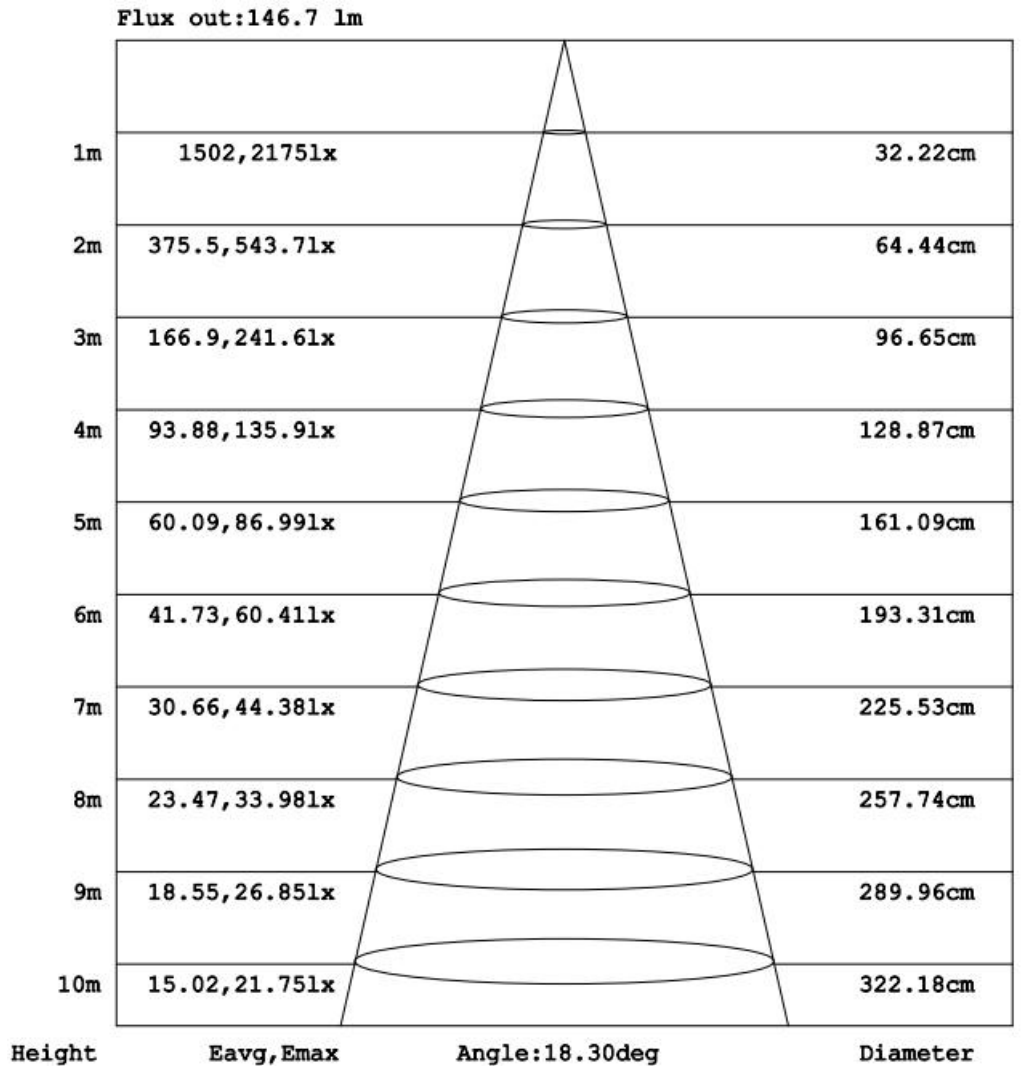




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5.10 AAI Figure



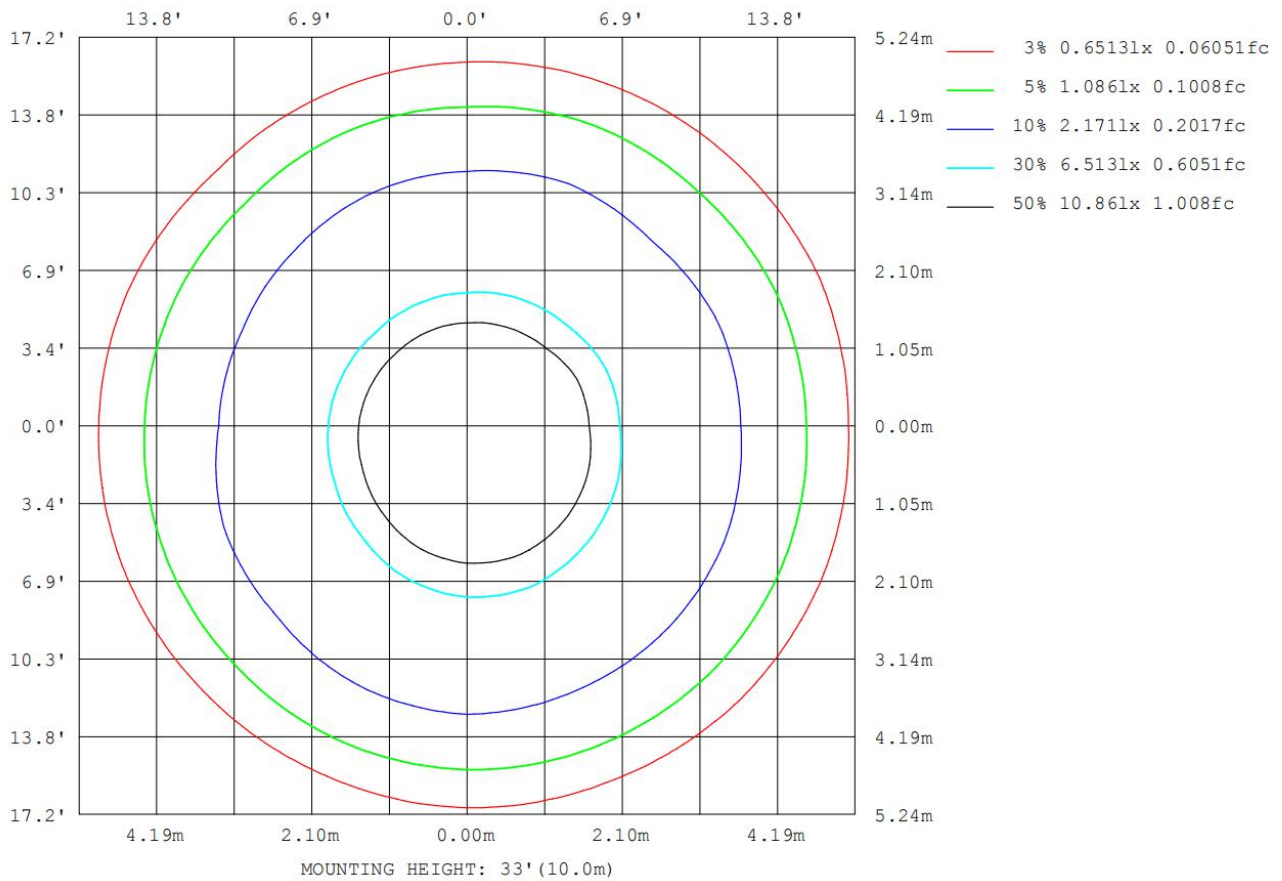
Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.



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5.11 ISOLUX DIAGRAM

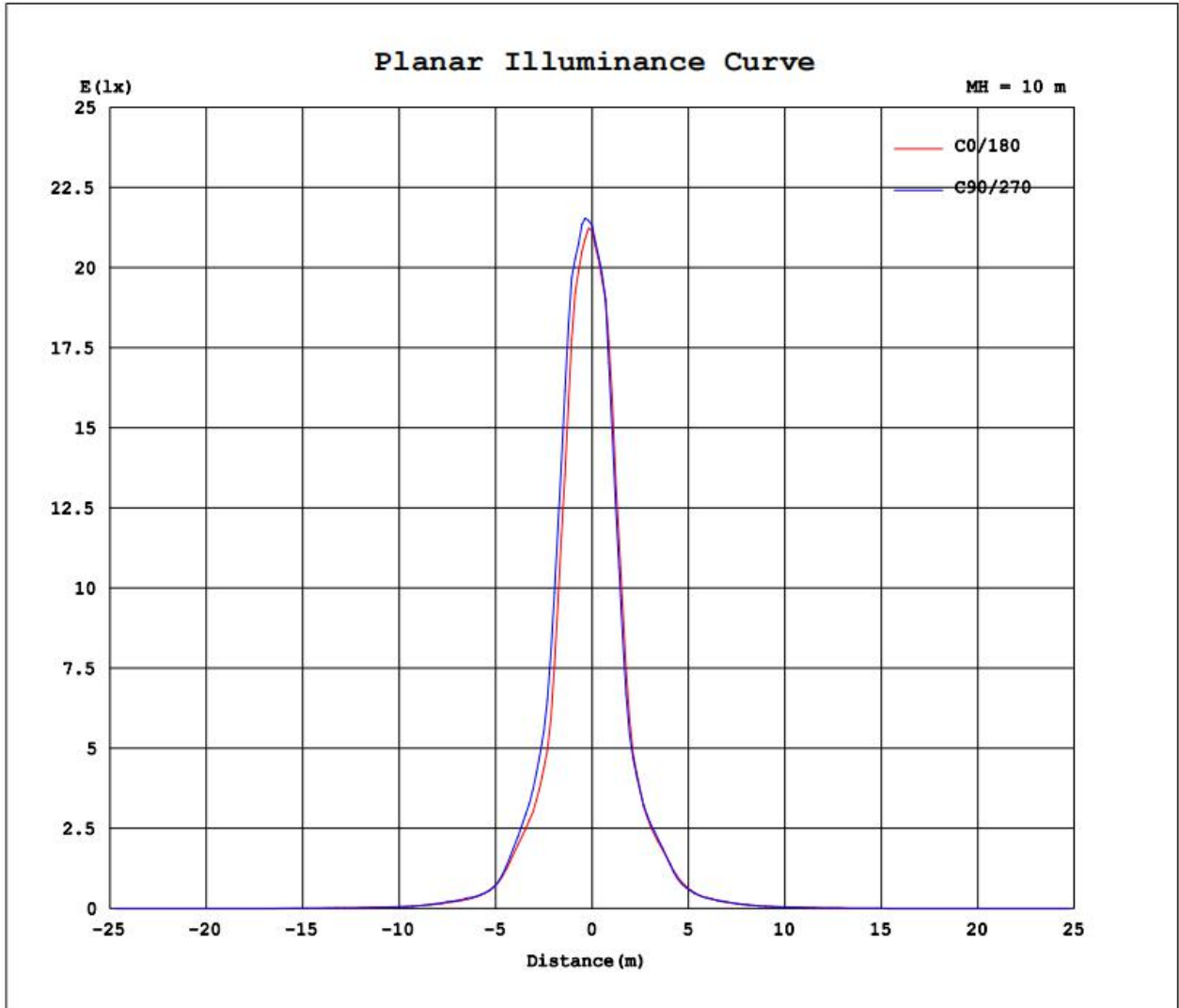




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5.12 Planar Illuminance Curve





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5.13 Luminous Distribution Intensity Data

Table--1

UNIT: cd

C (DEG) γ (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	2128	2128	2128	2128	2128	2128	2128	2128	2128	2128	2128	2128	2128	2128	2128	2128			
5	1956	2008	2016	2033	2047	2013	1968	1854	1803	1755	1700	1692	1718	1763	1864	1930			
10	1006	1134	1219	1263	1243	1134	995	851	789	722	674	676	702	755	839	954			
15	433	470	499	537	542	481	431	379	357	341	336	348	358	374	392	422			
20	272	285	296	304	311	286	264	249	225	217	214	224	230	246	249	264			
25	135	143	148	143	141	132	125	119	112	105	97.7	102	103	111	122	130			
30	66.1	67.5	68.6	66.1	67.4	63.8	62.1	57.2	57.3	56.7	55.2	55.0	57.3	61.5	63.9	67.9			
35	42.7	44.8	44.7	44.8	47.3	43.1	40.8	37.6	36.4	37.1	36.1	36.5	38.6	40.8	42.6	45.9			
40	27.6	28.5	29.0	28.6	29.7	27.5	26.2	24.2	22.8	22.5	22.2	22.5	23.1	24.9	26.2	28.1			
45	17.3	17.3	17.6	17.1	17.3	16.7	16.8	15.8	14.8	14.3	14.6	13.8	15.6	14.7	15.9	16.8			
50	11.2	11.4	12.0	11.4	12.1	11.5	11.5	10.9	9.93	9.87	9.50	9.39	9.63	10.1	10.2	10.5			
55	8.00	7.86	8.22	7.92	8.15	7.80	7.97	7.50	6.83	6.23	5.99	5.88	6.10	6.29	7.05	6.84			
60	5.16	5.27	5.40	5.28	5.23	5.23	5.55	5.00	4.35	4.10	3.87	3.60	3.97	3.99	4.11	4.09			
65	3.56	3.49	3.98	3.52	3.54	3.37	4.03	3.48	2.84	2.57	2.29	2.11	2.48	2.39	2.67	2.84			
70	2.58	2.50	2.91	2.55	2.66	2.48	2.87	2.49	1.51	1.51	1.41	1.49	1.42	1.77	1.34	1.34			
75	1.96	1.87	2.12	1.76	1.95	1.69	2.06	1.69	1.15	0.62	0.61	0.35	0.53	0.70	0.80	0.62			
80	1.24	1.25	1.41	1.23	1.24	0.89	1.34	1.25	0.35	0.18	0.18	0.09	0.09	0.09	0.26	0.18			
85	0.98	0.80	0.97	0.71	0.97	0.62	0.90	0.80	0.00	0.18	0.09	0.09	0.09	0.09	0.00	0.00			
90	0.44	0.45	0.53	0.53	0.44	0.27	0.45	0.53	0.00	0.09	0.09	0.00	0.00	0.09	0.00	0.00			
95	0.27	0.36	0.44	0.18	0.09	0.18	0.45	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
100	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.26	0.09	0.09	0.00	0.00			
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.18	0.09	0.00	0.09	0.00	0.00			
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.18	0.09	0.00	0.09	0.00	0.00			
115	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.36	0.00	0.18	0.09	0.00	0.09	0.00	0.00			
120	0.09	0.00	0.18	0.00	0.09	0.09	0.09	0.00	0.36	0.00	0.00	0.09	0.00	0.09	0.00	0.00			
125	0.09	0.00	0.09	0.00	0.09	0.09	0.09	0.00	0.36	0.00	0.00	0.09	0.00	0.00	0.00	0.00			
130	0.09	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
135	0.09	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
140	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.09	0.00	0.00	0.00	0.00	0.00	0.00			
145	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.44	0.00	0.00	0.00	0.09	0.00	0.00			
150	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.36	0.00	0.09	0.18	0.18	0.00	0.18			
155	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.80	0.35	0.26	0.26	0.27	0.18	0.36			
160	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.98	1.07	0.88	0.88	0.80	0.80	0.72	0.71			
165	0.18	0.00	0.00	0.00	0.00	0.00	0.09	0.27	1.78	1.60	1.41	1.41	1.33	1.51	1.43	1.25			
170	1.33	0.62	0.44	0.35	0.26	0.27	0.53	1.07	1.69	1.51	1.41	1.41	1.50	1.68	1.43	1.51			
175	1.42	1.42	1.32	0.88	1.42	0.71	1.43	1.51	1.69	1.51	1.41	1.41	1.42	1.68	1.25	1.51			
180	1.42	1.43	1.32	1.32	1.77	1.06	1.52	1.60	1.60	1.43	1.41	1.50	1.42	1.59	1.07	1.51			



Guangdong Meide Testing Technology Co., Ltd.



6.Photo of sample

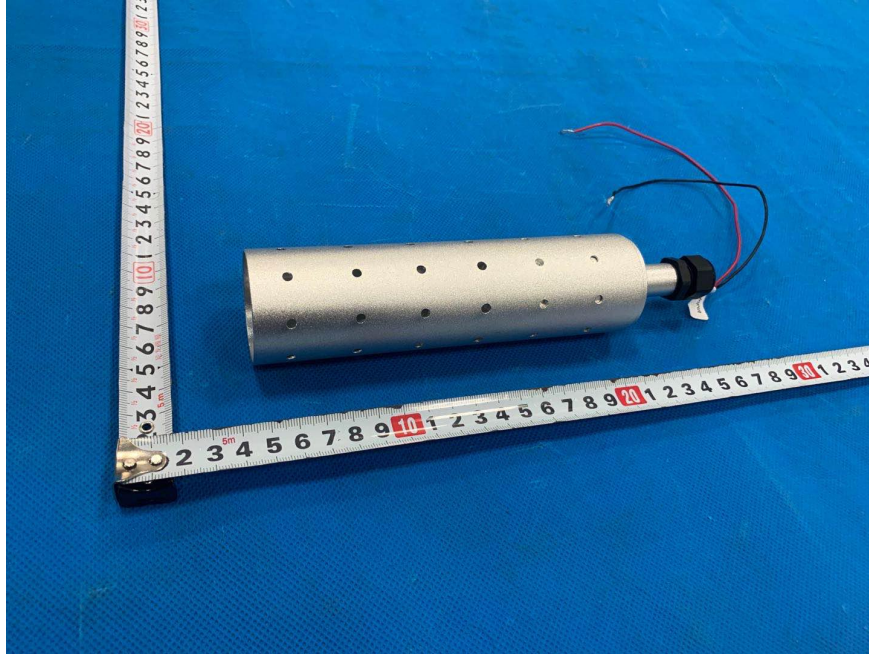


Figure 1

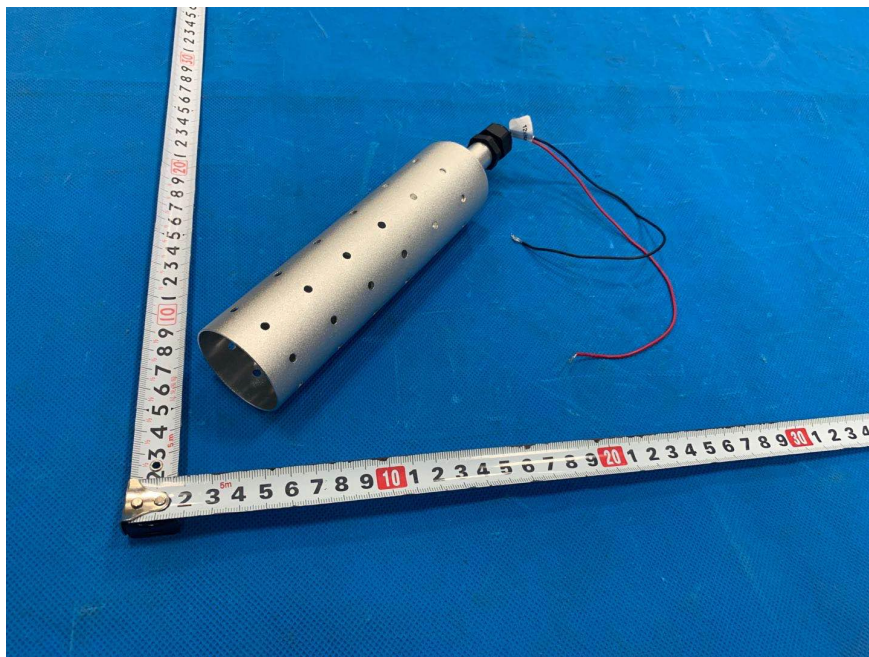


Figure 2

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