



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..... : ZXL16-CAT-BM

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 01005

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

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

Tested by:

Tim

Tim Qian/ Test Engineer

Checked by:

Luke lei

Luke Lei/ Project Engineer

Approved by:

Jessie

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 ZXL16-CAT-BM. The sample was received on 2020-06-22, is in undamaged condition.

Model Tested:	ZXL16-CAT-BM
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:	10W
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

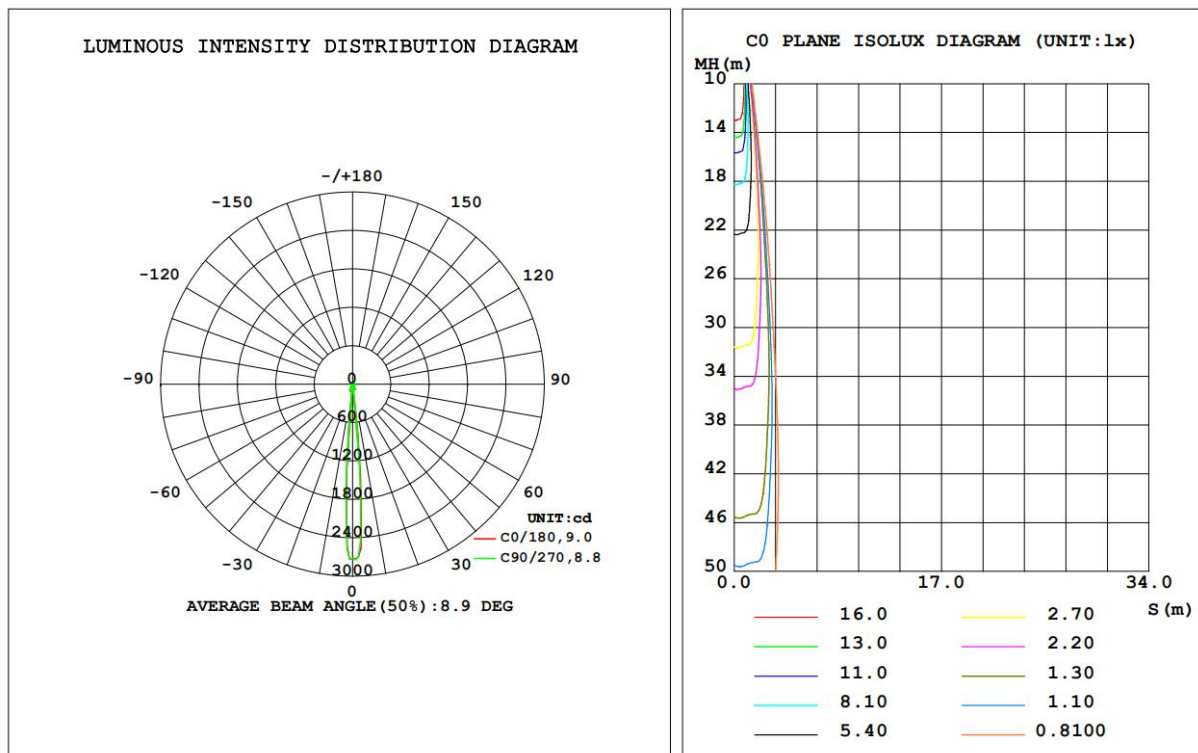
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current(A)	Power Factor	Power(W)
12.00	60.00	0.7770	0.9416	8.780

Photometric Measurement

Luminous Flux (lm)	Efficacy(lm/W)	I _{max} (cd)	Spacing Criteria (C0/180°)	Spacing Criteria (C90/270°)
295.12	33.61	2745	0.13	0.13

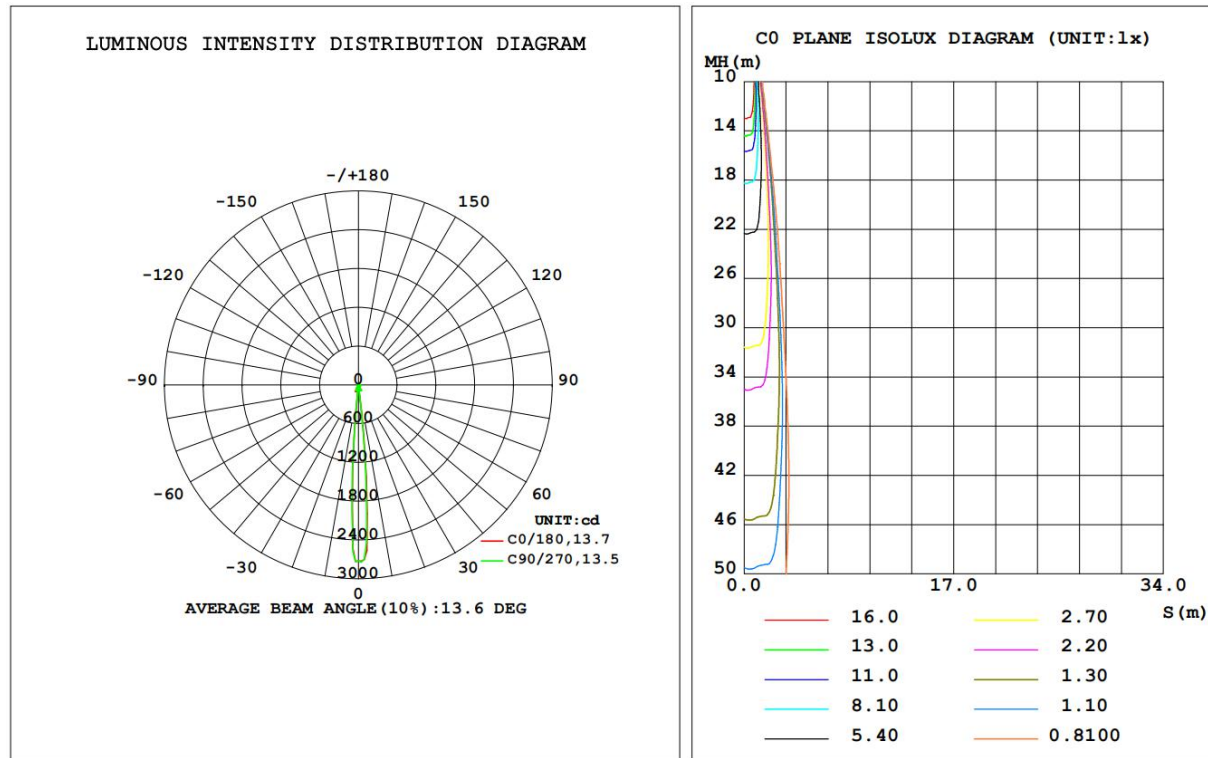
5.2 LUMINOUS INTENSITY DISTRIBUTION DIAGRAM AND C0 PLANE ISOLUX DIAGRAM (UNIT:lx)



AVERAGE BEAM ANGLE(50%):8.9 DEG



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AVERAGE BEAM ANGLE(10%):13.6 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	38.37	39.21	36.55	31.06	38.52	35.48	31.37	35.59	0- 10	63.20	63.20	21.4, 21.4
20	73.70	84.82	86.29	95.56	111.3	112.6	95.67	91.41	10- 20	14.70	77.90	26.4, 26.4
30	47.96	52.25	47.17	43.35	43.24	44.99	45.50	49.21	20- 30	39.39	117.3	39.7, 39.7
40	21.15	24.28	23.22	22.16	25.52	23.87	22.73	23.67	30- 40	16.18	133.5	45.2, 45.2
50	22.48	23.94	25.47	23.05	26.60	24.74	25.29	24.55	40- 50	18.04	151.5	51.3, 51.3
60	19.89	23.02	25.16	23.10	23.29	24.03	23.63	23.25	50- 60	20.36	171.9	58.2, 58.2
70	18.54	18.32	20.46	19.64	21.90	19.13	20.44	22.60	60- 70	19.50	191.4	64.8, 64.8
80	15.53	20.72	20.77	19.99	20.15	21.37	18.93	18.58	70- 80	19.12	210.5	71.3, 71.3
90	15.86	18.15	16.46	15.57	18.01	20.90	21.33	21.34	80- 90	18.88	229.4	77.7, 77.7
100	14.39	14.18	7.100	13.26	17.62	15.53	8.791	17.07	90-100	16.92	246.3	83.5, 83.5
110	5.759	10.19	13.12	9.479	6.810	11.00	13.09	9.764	100-110	11.78	258.1	87.4, 87.4
120	7.076	11.26	12.22	11.35	9.585	14.37	13.90	13.03	110-120	11.17	269.2	91.2, 91.2
130	8.151	12.41	4.315	12.76	9.681	14.38	6.094	15.78	120-130	10.27	279.5	94.7, 94.7
140	8.688	11.53	1.971	14.36	11.38	14.19	1.166	11.00	130-140	7.143	286.7	97.1, 97.1
150	9.045	6.533	2.504	11.18	13.08	6.305	12.38	9.211	140-150	4.187	290.8	98.6, 98.6
160	11.37	0.9103	3.139	0.1781	11.73	0	8.592	6.999	150-160	3.293	294.1	99.7, 99.7
170	9.871	0.1787	0.2691	0.7157	7.384	1.328	0.1750	0.0876	160-170	0.9122	295.1	100, 100
180	0	0.0901	0	0	0	0	0	0	170-180	0.0688	295.1	100, 100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

Conical surface Flux(90deg): 142 lm

%lum = 48.1%

%lamp = 48.1%

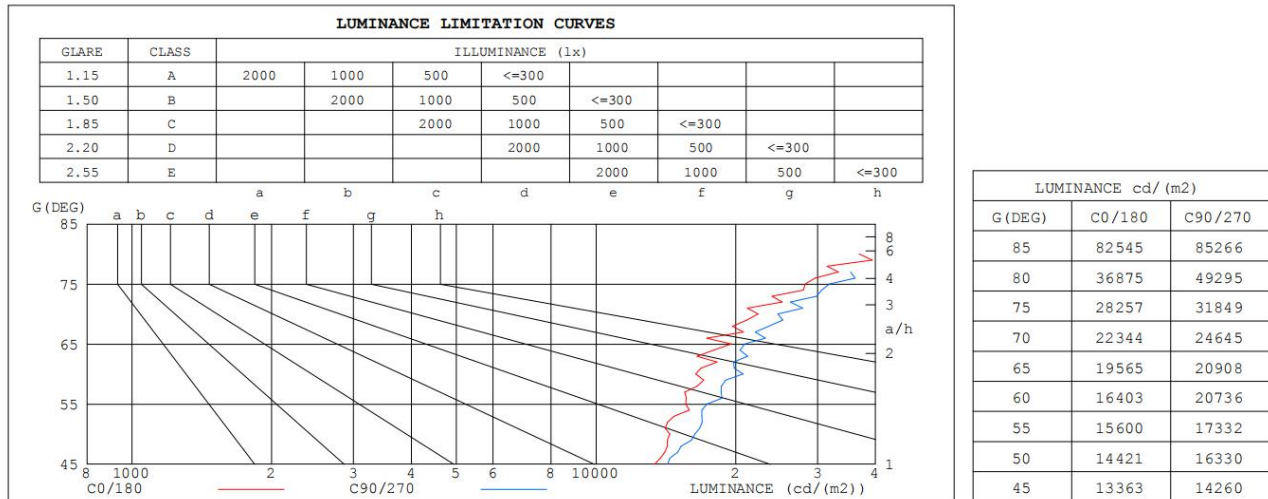
Conical surface Flux(120deg): 171.87 lm

%lum = 58.2%

%lamp = 58.2%



5.4 LUMINANCE LIMITATION CURVES



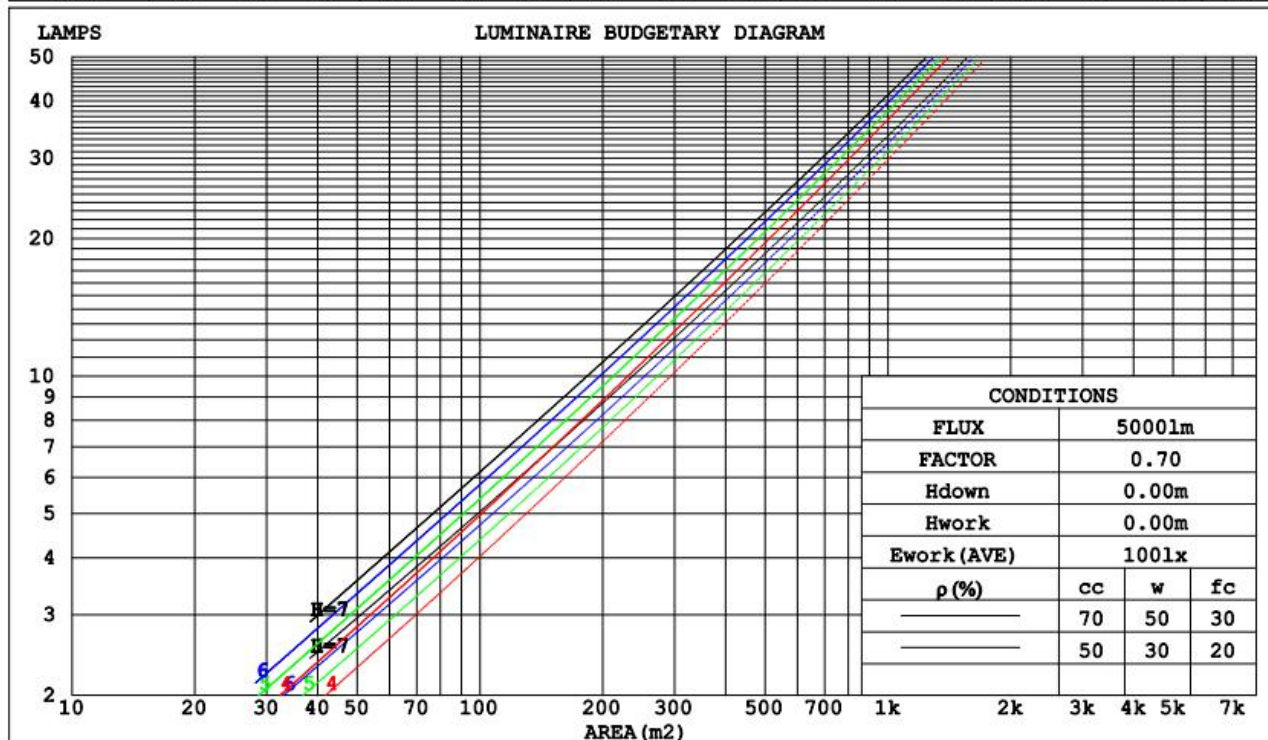


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5.5 CU AND LUMINAIRE BUDGETARY ESTIMATE DIAGRAM

pcc	80%			70%			50%			30%			10%			0
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
pf _c	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio			Coefficients of Utilization(CU)												
0.0	1.14	1.14	1.14	1.09	1.09	1.09	.99	.99	.99	.90	.90	.90	.82	.82	.82	.78
1.0	.98	.94	.90	.94	.90	.86	.85	.82	.80	.78	.75	.73	.71	.69	.67	.64
2.0	.87	.81	.76	.84	.78	.73	.77	.72	.68	.70	.67	.63	.64	.61	.59	.56
3.0	.79	.72	.66	.76	.69	.64	.70	.65	.60	.64	.60	.56	.59	.56	.53	.50
4.0	.72	.65	.59	.70	.63	.57	.64	.59	.54	.60	.55	.51	.55	.51	.48	.46
5.0	.67	.59	.54	.64	.58	.52	.60	.54	.50	.56	.51	.47	.52	.48	.45	.43
6.0	.62	.55	.49	.60	.53	.48	.56	.51	.46	.53	.48	.44	.49	.45	.42	.40
7.0	.58	.51	.46	.57	.50	.45	.53	.47	.43	.50	.45	.42	.47	.43	.40	.38
8.0	.55	.48	.43	.53	.47	.42	.50	.45	.41	.48	.43	.39	.45	.41	.38	.36
9.0	.52	.45	.41	.51	.45	.40	.48	.43	.39	.46	.41	.38	.43	.39	.36	.35
10.0	.50	.43	.39	.48	.42	.38	.46	.41	.37	.44	.39	.36	.42	.38	.35	.33





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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	.316	.179	.057	.302	.172	.055	.276	.158	.051	.252	.145	.047	.230	.133	.043		
2.0	.269	.147	.045	.256	.141	.044	.233	.130	.040	.212	.119	.037	.192	.109	.034		
3.0	.237	.126	.038	.226	.121	.036	.205	.111	.034	.186	.102	.031	.168	.093	.029		
4.0	.213	.111	.033	.203	.106	.031	.184	.098	.029	.167	.090	.027	.150	.082	.025		
5.0	.194	.099	.029	.185	.095	.028	.167	.087	.026	.152	.080	.024	.137	.073	.022		
6.0	.177	.089	.025	.169	.085	.025	.154	.079	.023	.139	.072	.021	.125	.066	.020		
7.0	.164	.081	.023	.156	.078	.022	.142	.072	.021	.129	.066	.019	.116	.060	.018		
8.0	.152	.074	.021	.145	.072	.020	.132	.066	.019	.120	.061	.018	.108	.056	.016		
9.0	.142	.069	.019	.136	.066	.019	.124	.061	.017	.112	.056	.016	.101	.052	.015		
10.0	.133	.064	.018	.127	.061	.017	.116	.057	.016	.106	.052	.015	.096	.048	.014		

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	.360	.360	.360	.308	.308	.308	.210	.210	.210	.121	.121	.121	.039	.039	.039		
1.0	.352	.327	.305	.301	.281	.263	.206	.193	.182	.119	.112	.106	.038	.036	.034		
2.0	.341	.304	.273	.292	.262	.236	.200	.181	.165	.116	.105	.097	.037	.034	.031		
3.0	.331	.287	.252	.284	.248	.219	.195	.172	.153	.113	.101	.090	.036	.033	.030		
4.0	.322	.274	.238	.276	.237	.206	.190	.165	.145	.110	.097	.086	.035	.031	.028		
5.0	.313	.264	.227	.269	.228	.198	.185	.159	.140	.107	.094	.083	.035	.031	.027		
6.0	.305	.255	.219	.262	.221	.191	.181	.155	.135	.105	.091	.080	.034	.030	.027		
7.0	.298	.248	.214	.256	.215	.186	.177	.151	.132	.103	.089	.078	.033	.029	.026		
8.0	.291	.242	.209	.251	.210	.182	.173	.148	.129	.101	.087	.077	.033	.029	.025		
9.0	.285	.237	.205	.245	.206	.179	.170	.145	.127	.099	.085	.076	.032	.028	.025		
10.0	.279	.233	.202	.241	.202	.176	.167	.142	.125	.097	.084	.075	.032	.028	.025		



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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	18.5	19.6	19.1	20.1	20.7	19.5	20.5	20.0	21.0	21.6
3H	21.2	22.2	21.8	22.7	23.4	22.3	23.2	22.9	23.8	24.4
4H	22.8	23.7	23.4	24.3	25.0	24.1	25.0	24.7	25.6	26.2
6H	24.7	25.6	25.3	26.2	26.8	25.9	26.8	26.5	27.4	28.1
8H	25.8	26.6	26.4	27.2	28.0	26.9	27.7	27.5	28.4	29.1
12H	27.1	27.9	27.7	28.5	29.2	28.1	28.9	28.8	29.6	30.3
4H 2H	19.9	20.8	20.5	21.4	22.0	20.5	21.4	21.1	22.0	22.7
3H	22.5	23.3	23.2	24.0	24.7	23.4	24.2	24.1	24.9	25.6
4H	24.1	24.8	24.8	25.5	26.2	25.3	26.0	25.9	26.7	27.4
6H	26.0	26.7	26.7	27.4	28.2	27.2	27.9	27.9	28.6	29.4
8H	27.2	27.8	27.9	28.5	29.3	28.3	29.0	29.0	29.7	30.5
12H	28.6	29.1	29.3	29.8	30.7	29.7	30.3	30.4	31.0	31.8
8H 4H	25.0	25.6	25.7	26.3	27.2	25.9	26.5	26.6	27.2	28.1
6H	27.1	27.6	27.9	28.4	29.2	28.2	28.7	28.9	29.5	30.3
8H	28.4	28.9	29.1	29.6	30.5	29.5	29.9	30.2	30.7	31.6
12H	29.9	30.3	30.6	31.1	32.0	31.0	31.5	31.8	32.2	33.1
12H 4H	25.3	25.9	26.0	26.6	27.4	26.0	26.6	26.8	27.3	28.2
6H	27.5	28.0	28.3	28.8	29.7	28.5	28.9	29.2	29.7	30.6
8H	28.9	29.4	29.7	30.1	31.0	29.9	30.3	30.7	31.1	32.0
Variations with the observer position at spacings:										
S = 1.0H	+ 0.2 / - 0.2					+ 0.1 / - 0.2				
1.5H	+ 0.4 / - 0.7					+ 0.5 / - 0.7				
2.0H	+ 0.4 / - 0.6					+ 0.6 / - 0.4				

CIE Pub.117, 295.1 lm Total Lamp Luminous Flux Corrected ($8\log(F/F_0) = -4.2$)



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5.8 UTILIZATION FACTORS TABLE

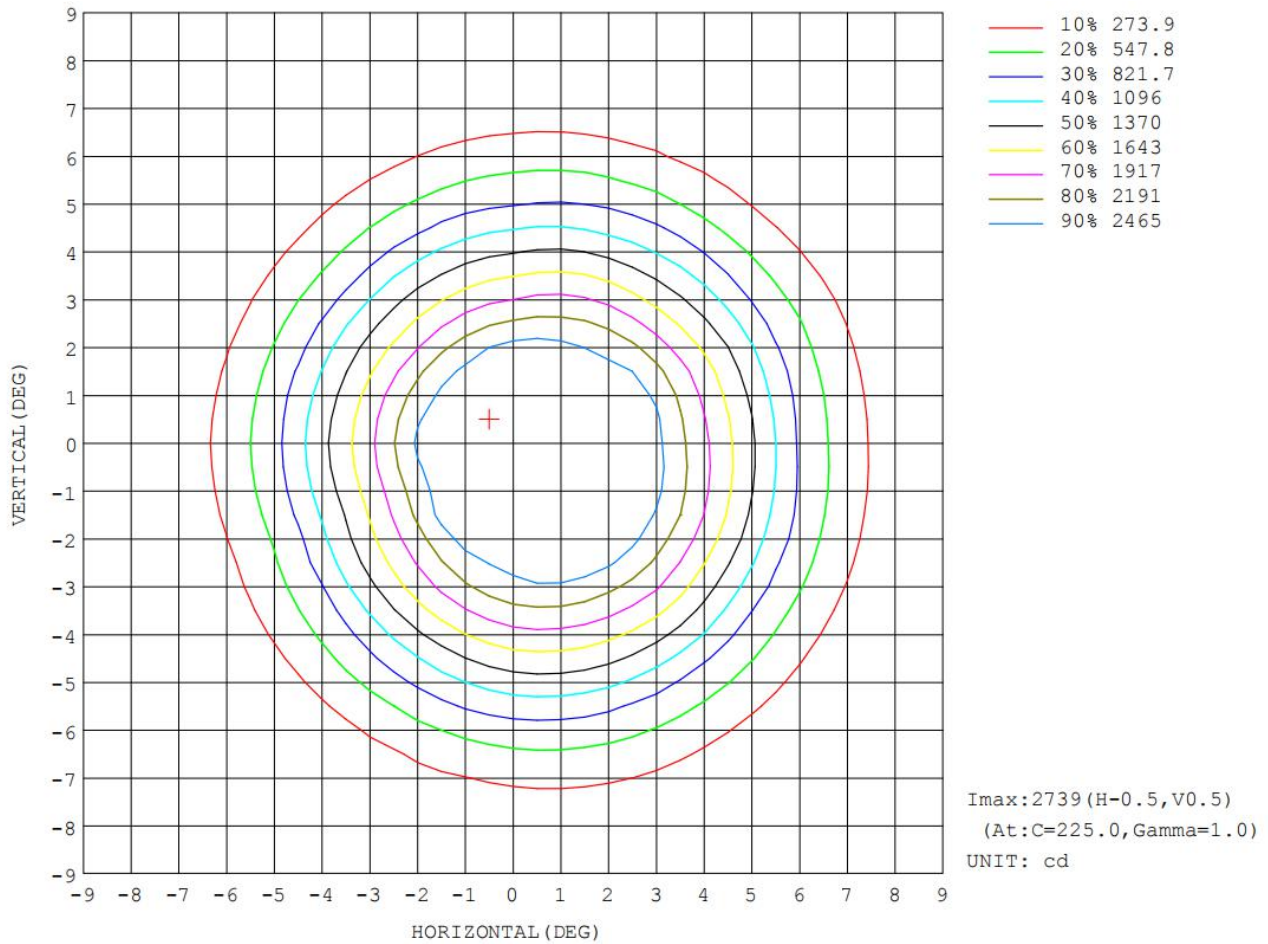
REFLECTANCE										
Ceiling	0.8	0.8	0.8	0.7	0.7	0.7	0.5	0.5	0.5	0
Walls	0.7	0.5	0.3	0.7	0.5	0.3	0.7	0.5	0.3	0
Working plane	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0
ROOM INDEX	UTILIZATION FACTORS (PERCENT) $k(RI) \times RCR = 5$									
$k = 0.60$	58	48	42	57	47	41	55	46	41	35
0.80	66	55	49	64	54	48	61	53	47	40
1.00	72	61	54	70	60	54	66	60	52	44
1.25	78	67	60	76	66	59	71	63	57	48
1.50	82	72	65	79	70	64	74	67	61	51
2.00	88	79	72	85	76	70	79	72	66	55
2.50	92	83	76	88	80	74	81	75	70	57
3.00	95	87	80	91	84	78	84	78	73	60
4.00	99	92	86	95	89	83	87	82	78	63
5.00	101	95	90	97	92	87	89	85	81	65
ROOM INDEX	UF (total)									Direct
According to DIN EN 13032-2 2004				Suspended				SHRNOM = 1.25		



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5.9 ISOCANDELA DIAGRAM

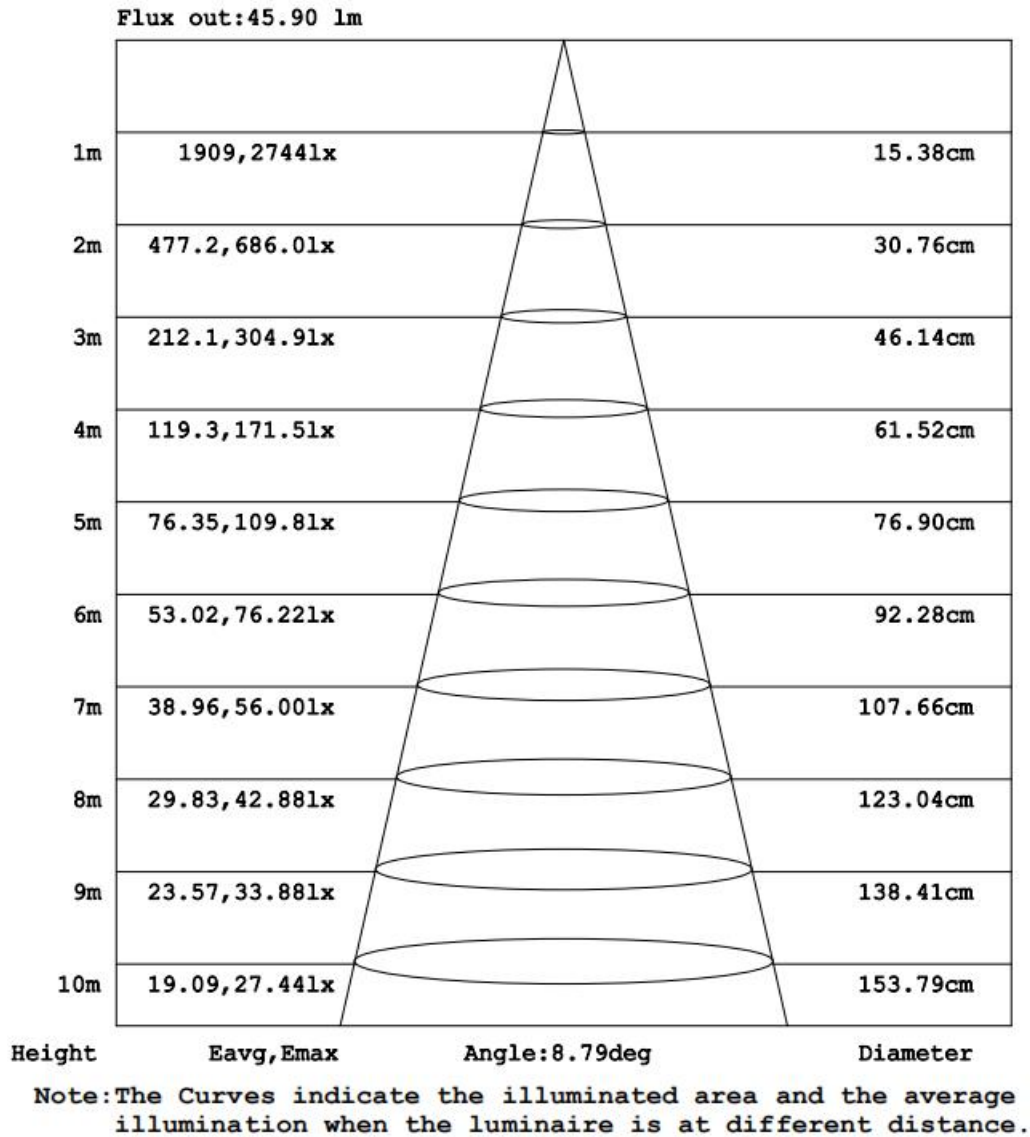




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5.10 AAI Figure

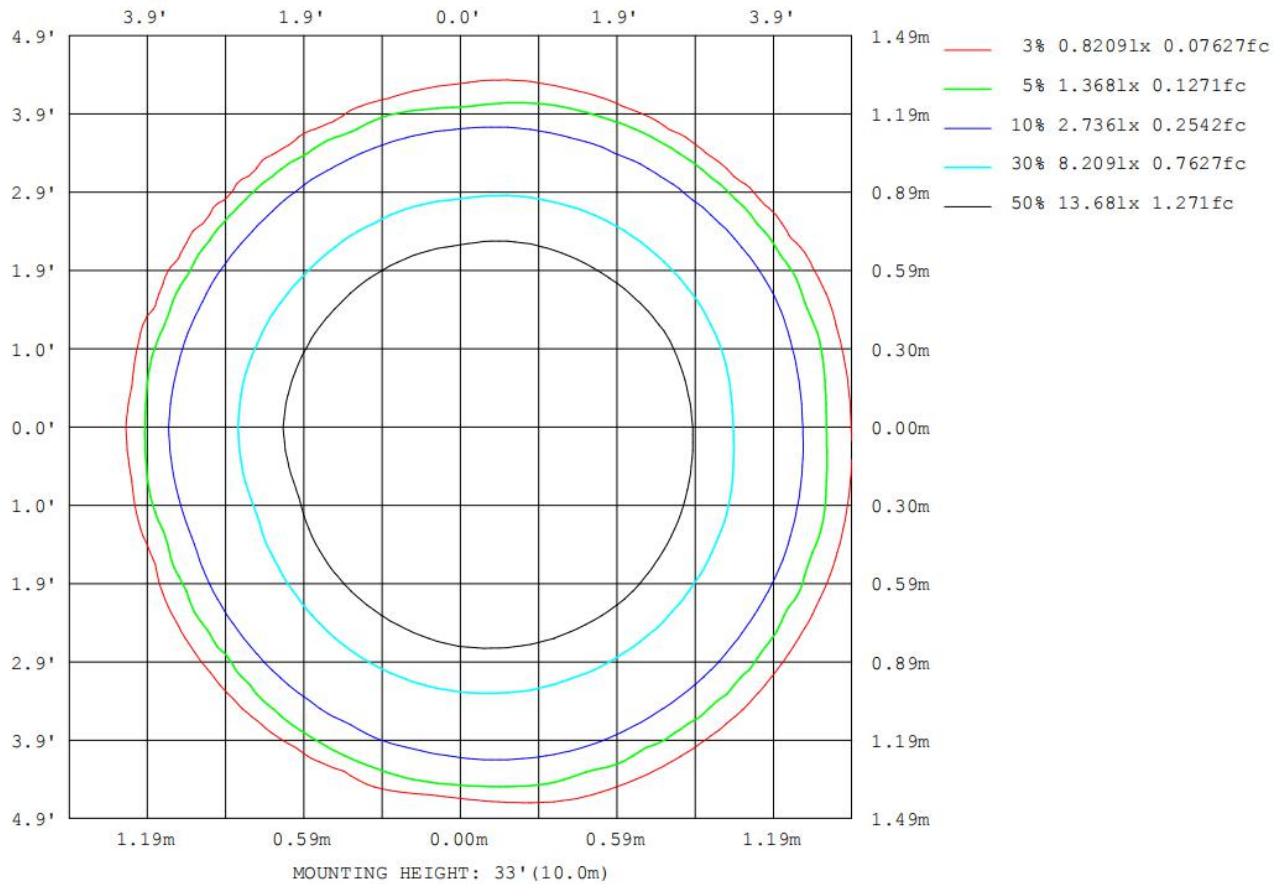




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5.11 ISOLUX DIAGRAM

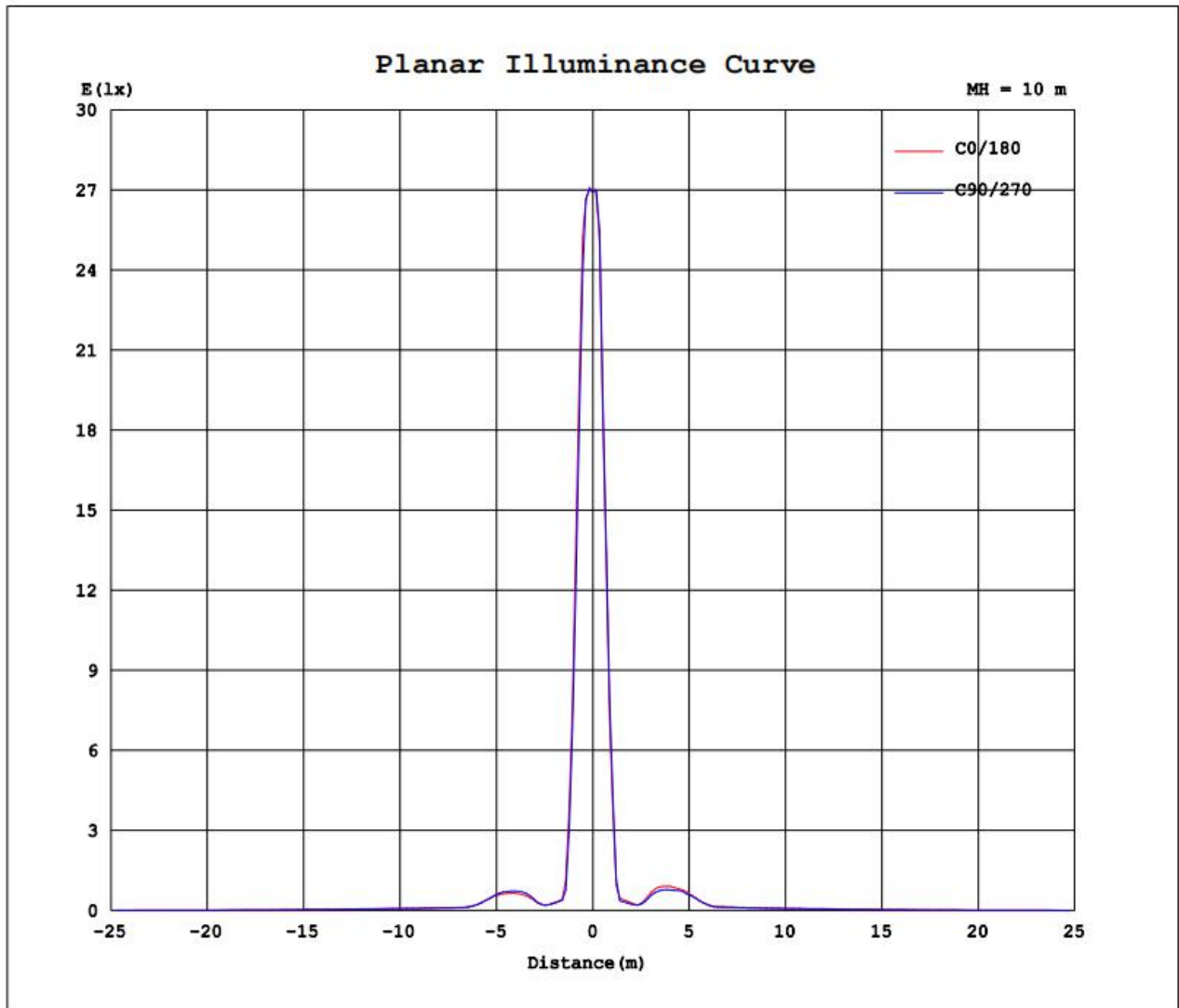




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5.12 Planar Illuminance Curve





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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	2723	2723	2723	2723	2723	2723	2723	2723	2723	2723	2723	2723	2723	2723	2723	2723			
5	1427	1471	1493	1377	1260	1045	859	712	740	701	677	713	811	947	1145	1340			
10	38.4	38.8	39.2	37.6	36.5	33.4	31.1	32.6	38.5	40.1	35.5	30.4	31.4	32.9	35.6	37.9			
15	26.8	27.2	25.8	25.2	27.4	30.2	34.8	39.2	43.2	46.3	44.6	40.4	36.8	34.5	34.4	29.9			
20	73.7	71.5	84.8	84.5	86.3	89.2	95.6	104	111	112	113	101	95.7	91.6	91.4	87.8			
25	86.9	75.2	95.5	95.0	95.3	93.6	93.8	105	107	107	110	102	98.3	95.9	97.8	97.5			
30	48.0	39.0	52.2	50.3	47.2	45.3	43.4	44.5	43.2	45.7	45.0	41.9	45.5	46.9	49.2	49.7			
35	21.4	19.6	23.8	22.2	23.1	22.6	22.7	24.4	25.6	25.4	24.7	22.6	23.1	24.9	22.6	22.9			
40	21.2	19.1	24.3	21.2	23.2	22.5	22.2	23.0	25.5	25.1	23.9	23.0	22.7	23.7	23.7	22.7			
45	22.9	20.0	23.0	21.5	24.5	22.1	21.9	25.0	25.1	25.1	25.0	21.8	24.6	24.3	24.2	22.1			
50	22.5	19.4	23.9	23.1	25.5	21.8	23.0	22.3	26.6	26.3	24.7	21.4	25.3	23.9	24.6	21.9			
55	21.7	18.9	22.9	20.7	24.1	20.4	22.4	21.6	26.7	25.9	23.9	20.6	24.8	23.4	25.0	19.4			
60	19.9	16.4	23.0	22.3	25.2	20.3	23.1	18.4	23.3	22.5	24.0	22.2	23.6	18.8	23.2	19.2			
65	20.1	15.6	18.9	17.6	21.4	16.4	20.2	17.0	22.6	20.3	20.0	18.3	22.0	18.9	22.7	16.2			
70	18.5	14.9	18.3	15.8	20.5	14.5	19.6	15.8	21.9	18.7	19.1	17.7	20.4	18.5	22.6	17.5			
75	17.7	12.8	18.5	18.5	20.0	15.7	19.0	12.5	19.8	18.9	20.5	17.4	20.4	16.8	21.2	14.3			
80	15.5	14.6	20.7	20.0	20.8	17.1	20.0	16.4	20.1	20.3	21.4	16.9	18.9	12.1	18.6	13.4			
85	17.5	13.7	19.1	15.7	18.0	15.3	19.9	18.0	18.5	15.9	16.8	14.5	18.4	15.8	19.9	18.6			
90	15.9	13.2	18.2	18.8	16.5	15.1	15.6	10.7	18.0	18.7	20.9	17.5	21.3	17.2	21.3	14.3			
95	15.1	13.5	18.2	19.6	17.9	17.7	18.8	18.3	17.8	14.9	14.8	11.3	14.8	10.7	15.2	16.8			
100	14.4	12.6	14.2	7.84	7.10	7.40	13.3	17.0	17.6	16.5	15.5	9.55	8.79	8.70	17.1	18.0			
105	9.83	8.92	8.83	15.9	11.9	11.8	6.92	9.71	12.4	10.3	9.43	14.1	12.8	13.0	8.92	10.5			
110	5.76	5.27	10.2	16.7	13.1	15.0	9.48	8.11	6.81	7.77	11.0	14.6	13.1	13.8	9.76	6.64			
115	5.91	6.78	10.7	17.6	13.9	14.5	10.6	10.3	8.60	10.2	12.1	15.8	13.8	14.7	11.9	8.38			
120	7.08	6.43	11.3	17.1	12.2	13.1	11.3	12.9	9.58	9.90	14.4	15.9	13.9	14.3	13.0	9.94			
125	8.07	4.64	11.8	15.9	14.4	14.1	12.4	9.98	10.05	8.55	14.1	16.6	14.1	14.1	13.8	7.12			
130	8.15	3.39	12.4	16.3	4.32	13.2	12.8	8.80	9.68	5.79	14.4	16.8	6.09	14.5	15.8	5.33			
135	8.51	2.50	12.4	15.3	2.06	12.2	14.1	6.94	10.2	4.08	14.7	15.1	2.59	15.4	14.1	3.64			
140	8.69	1.70	11.5	8.18	1.97	2.62	14.4	4.63	11.4	2.58	14.2	3.26	1.17	6.56	11.0	2.49			
145	8.87	0.89	8.96	3.44	0.99	9.13	13.3	3.03	12.3	0.80	10.8	4.55	1.80	11.0	9.75	1.51			
150	9.05	0.71	6.53	13.7	2.50	15.1	11.2	1.78	13.1	1.26	6.30	9.64	12.4	19.0	9.21	0.98			
155	10.03	0.54	4.02	12.9	3.14	14.6	4.93	0.98	12.5	4.93	2.47	8.31	13.9	17.1	1.51	0.27			
160	11.4	1.42	0.91	8.87	3.14	10.8	0.18	0.80	11.7	9.72	0.00	4.68	8.59	12.5	7.00	0.09			
165	2.54	0.18	0.18	0.54	0.82	1.07	1.41	0.09	1.77	1.58	2.33	1.33	4.09	5.60	4.06	0.00			
170	9.87	4.19	0.18	0.98	0.27	1.08	0.72	1.33	7.38	7.79	1.33	0.09	0.17	0.00	0.09	0.09			
175	0.45	0.45	0.35	0.44	0.18	0.45	0.44	0.36	0.18	0.00	0.09	0.00	0.00	0.00	0.00	0.00			
180	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.00			



Guangdong Meide Testing Technology Co., Ltd.



6.Photo of sample



Figure 1



Figure 2

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