LCTECH

NVLAP TESTING
NVLAP LAB CODE 500080-0

Ref. No.: LCZP24040433
Version: 1.0
Date of Issue: May. 16, 2024
Total pages: 12

Test report of

IES LM-79-08

Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Rendered to:

Beyond LED Technology
1939 Parker Court, Stone Mountain, GA 30087

For products:

Direct Linear Ambient Luminaires

Models No.:

DYU-ITATWC-4S

(Where "ZZ" denotes commercial code, it can be number or A, B, C, D.)

Test Date:	May. 7, 2024 to May. 15, 2024
Test Lab.:	**LCTECH Guangdong Testing Services Co., Ltd.** 1/F., Building I, & 2, 3, 4/F., Building II, Technology and Enterprise Development Center, Guangyuan Road, Xiaolan, Zhongshan, Guangdong, China Tel:+86-760-22833366 E-mail:Service@lccert.com http://www.lccert.com
Test Sites:	2/F., Building II & 1/F., Building I, Technology and Enterprise Development Center, Guangyuan Road, Xiaolan, Zhongshan, Guangdong, China
Template No.:	LC-RT-PL-049 Rev.1.4
Test Note:	*N/A*

Compiled by:		**Reviewed by:**	
Kargel Yuan	Kargel Yuan	**Lin Qiu**	Lin Qiu
May. 16, 2024		**May. 16, 2024**	

Table of Contents

1. General

1.1 Product Information

Brand Name	Beyond LED
Category	Indoor
General Application	Linear Ambient
Primary Use	Direct Linear Ambient Luminaires
Model Number	DYU-ITATWC-4S
Rated Inputs	120VAC, 50/60Hz
Rated Power	60W
Rated Light output	9000lm
Declared CCT	3500K
Power Supply	Integrated in lamps
LED Package, Array or Module	Model: 2835 3V 0.5W WhiteSMD LED, manufactured by ShenZhen JuFei Optoelectronics Co., Ltd.
Dimming	Continuous Dimming
Integral Controls	No
Controls Controllability	No
Receipt Samples	2 units
Sample Code of lab.	The half of model DYU-ITATWC-ZZ(3500K): 240430102001 DYU-ITATWC-ZZ(3500K): 240430102003
Date of Receipt Samples	Apr. 30, 2024
Note	-

1.2 Standards or methods

The following standards are partly or totally used or referenced for test:

No.	Name
ANSI/NEMA/ ANSLG C78.377- 2017	Specifications for the Chromaticity of Solid State Lighting Products
ANSI/IES TM-30-18[1]	IES Method for Evaluating Light Source Color Rendition
ANSI C82.77-2002	Harmonic Emission Limits—Related Power Quality Requirements for Lighting Equipment
CIE Pub. No. 13.3-1995	Method of Measuring and Specifying Color Rendering of Light Sources
CIE Pub. No. 15:2004	Colorimetry
IES LM-79-08	Electrical and Photometric Measurements of Solid-State Lighting Products

Note:

1, For reference only and not in the scope of NVLAP.

1.3 Equipment list

Instrument	ID	Model name	Cal. date	Next cal. Date
AC Power supply	LC-I-987	APW-120N	2023-12-12	2024-12-11
AC Power supply	LC-I-989	APW-120N	2023-12-12	2024-12-11
Power analyzer	LC-I-PL-024	WT310E	2023-12-15	2024-12-14
Power analyzer	LC-I-954	WT210	2023-12-12	2024-12-11
Multimeter	LC-I-972	Fluke 17B	2023-06-28	2024-06-27
Photometric colorimetric electric system[2]	LC-I-956	HAAS-2000	Before use	Before use
Standard lamp[3]	LC-I-963	24V50W	2023-06-29	2024-06-28
Luminous Flux Lamp[4]	LC-I-PL-031	AC220V/200W	2023-06-29	2024-06-28
Goniophotometer(with mirror)	LC-I-902	GMS2000	2024-03-25	2025-03-24
Wireless temperature transmitter	LC-I-PL-009	DWLR-DLR	2023-12-14	2024-12-13
Wireless temperature transmitter	LC-I-PL-008	DWLR-DLR	2023-12-14	2024-12-13

Note:

2, Bandwidth of spectroradiometer is 1 nm.

3, Halogen lamp, 50W, omni-directional type, and its traceability to NIM.

4, Incandescent lamp, 200W, omni-directional type, and its traceability to NIM.

2. Test conducted and method

One lamp should be measured for lumen, while the system as intended should be measured for electrical input. The lamps were operated at least 2 hours to reach stabilization and temperature equilibrium before test.

2.1 Ambient Condition

The ambient temperature in which measurements are being taken was maintained at 25°C ± 1°C; the air flow around the sample(s) being tested did not affect the performance.

2.2 Power Supply Characteristics

The AC/DC power supply had a sinusoidal voltage wave shape at the prescribed frequency (60 Hz) such that the RMS summation of the harmonic components does not exceed 3 percent of the fundamental during operation of the test item.

The voltage of AC power supply (RMS voltage) applied to the device under test was regulated to within±0.2 percent under load.

2.3 Seasoning and Stabilization

No seasoning was performed in accordance with IESNA LM-79-08. And before the measurement, the sample was stabilized until the light output and power variations were less than 0.5% in 30 minutes intervals (3 readings, 15 minutes apart).

2.4 Electrical Instrumentation

The calibration uncertainties of the instruments for AC/DC voltage and current were less than 0.2 percent, and the calibration uncertainty of the AC/DC power meter was less than 0.5 percent(95 % confidence interval, k=2).

2.5 Color Measurement Method

Spectral radiant flux was measured by a sphere -spectroradiometer system, and the color characteristics (Color rendering index, correlated color temperature, chromaticity coordinate) were calculated from these by software automatically.

2.6 Total Luminous Flux Measurement Method

Total luminous flux was measured by both sphere-spectroradiometer system.

Spectral radiant flux was measured by a sphere-spectroradiometer system, and the total luminous flux was calculated from these by software automatically.

2.7 Luminous Intensity Distribution Measurement Method

Luminous intensity distribution was measured by a mirror-type goniophotometer (Type C) which can keep the sample in burn position when the tests conduct, and the kinds of graph were generated by software automatically.

2.8 Spatial Non-uniformity of Chromaticity

The customer did not require this measurement.

3. Test Result Summary

3.1 Electrical data of half of model DYU-ITATWC-ZZ(3500K)

Criteria Item	Result
Input Voltage & Frequency	120.03 V~60Hz
Input Current(A)	0.249
Total Power(W)	29.63
Power Factor	0.992
I-THD	11.13 %
Off-state Power(W)	-

3.2 Photometric data of model DYU-ITATWC-ZZ(3500K)

Criteria Item	Result
Input Voltage & Frequency	120.00 V~60Hz
Input Current(A)	0.498
Total Power(W)	59.32
Power Factor	0.992
I-THD	6.73 %
Off-state Power(W)	-

3.3 Photometric data of half of model DYU-ITATWC-ZZ(3500K)

Criteria Item	Result
Total Lumens(lm)	4684.74
Luminaire Length(ft)	4
Lumens per Foot(lm/ft)	1171.19
Luminaire Efficacy(lm/W)	158.11
Zone Lumens between 0-60°[2]	76.00%

3.4 Lumen and Color Characteristic data of model DYU-ITATWC-ZZ(3500K)

Criteria Item	Result
Total Lumens(lm)[1]	9369.48
Luminaire Length(ft)	8
Lumens per Foot(lm/ft)	1171.19
Luminaire Efficacy(lm/W)[1]	157.95
Correlated Color Temperature (CCT)(K)	3449
Color Rendering Index (CRI)	82.0
R9	5
R_f	84
R_g	95
$R_{cs,h1}$	-12%
Chromaticity Coordinate (x,y)	x = 0.4112 y = 0.3999

Chromaticity Coordinate (u',v')	u' = 0.2358 v' = 0.5159
Duv	0.0027
Zone Lumens between 0-60°[2]	76.00%

Note:

1, The Total Lumens is based on the test data of half of model DYU-ITATWC-ZZ(3500K)multiplied by 2, the luminaire efficacy is equal to total lumens divided by total power.

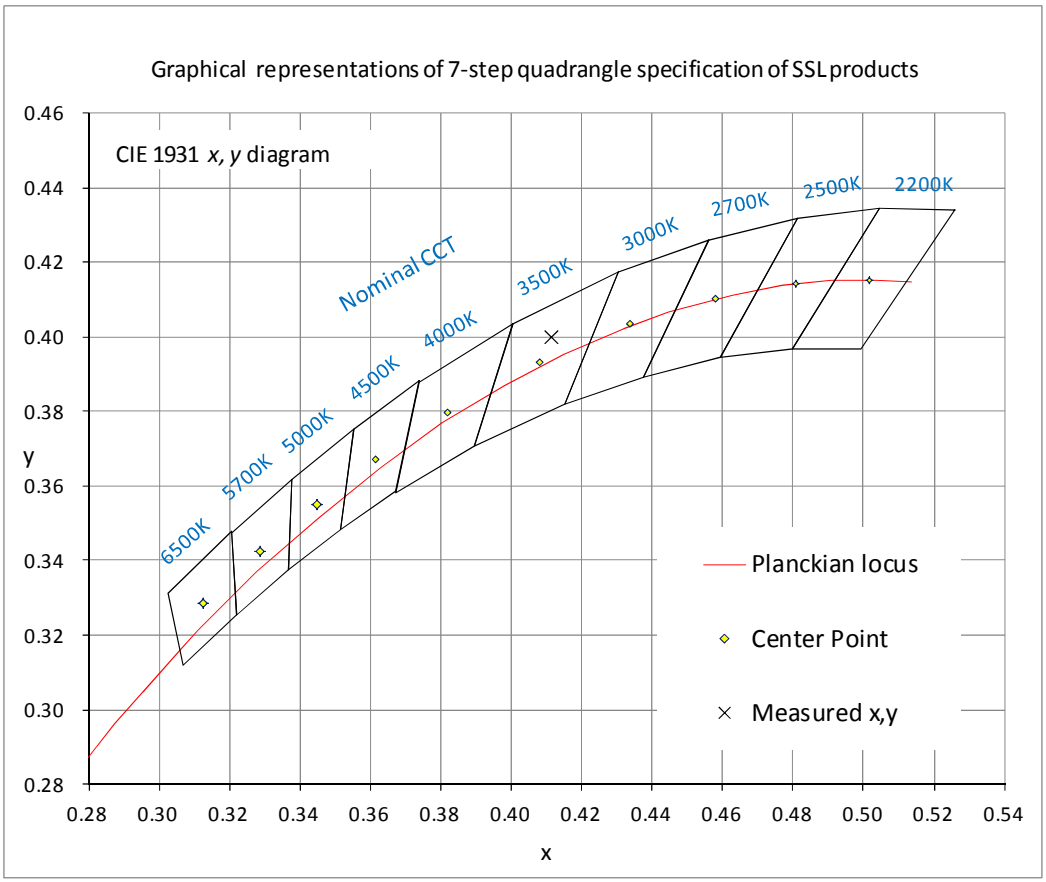
2, Zone lumens Distribution is shared from a shorter version of the product, because the optic is the same.

3.5 Color Rendering Details of model DYU-ITATWC-ZZ(3500K)

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
80	88	96	81	80	84	86	62	5	72	80	62	82	97	73

4. Test Data

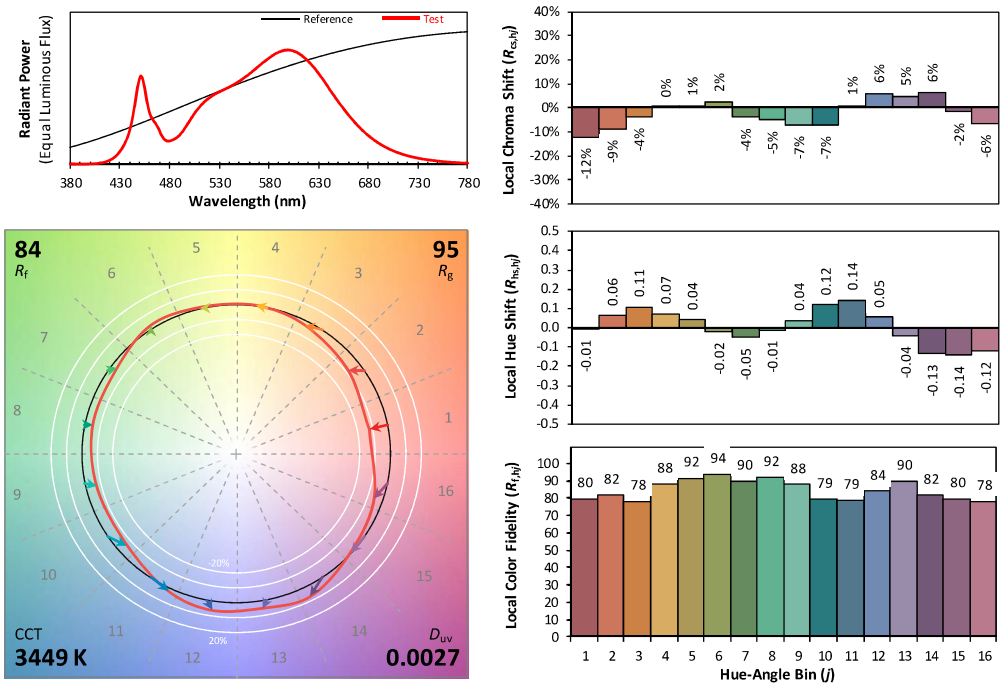
4.1 ANSI Chromaticity Quadrangles Diagram

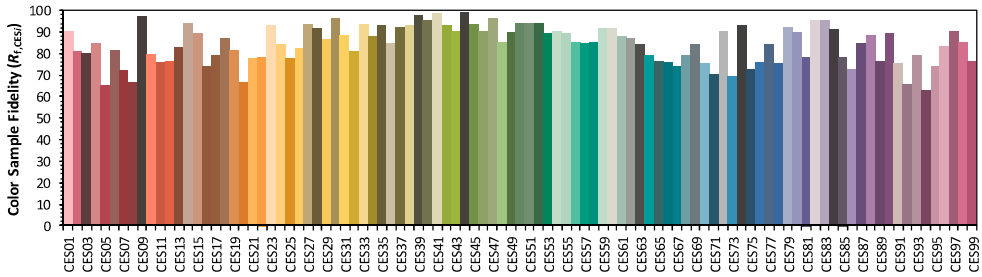


4.2 ANSI/IES TM-30-18 Color Rendition

ANSI/IES TM-30-18 Color Rendition Report

Source: SPD
Manufacturer: Huizhou Virtutech Co., Ltd
Date: 2024/5/16
Model: DYU-ITATWC-ZZ(3500K)





Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.4112
y	0.3999
u'	0.2358
v'	0.5159

CIE 13.3-1995 (CRI)

R_a	82
R_9	5

Note:

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

4.3 Goniometry Test Data of half of model DYU-ITATWC-ZZ(3500K)

CIE Type	Semi-Direct	Basic Luminous Shape	Rectangular w/Sides
Spacing Criteria (0-180)	1.26	Luminous Length	1.16 m
Spacing Criteria (90-270)	1.28	Luminous Width	0.03 m
Spacing Criteria (Diagonal)	1.40	Luminous Height	0.02 m
Test Distance	29.97 m	-	-

4.4 Zonal Lumen Summary of half of model DYU-ITATWC-ZZ(3500K)

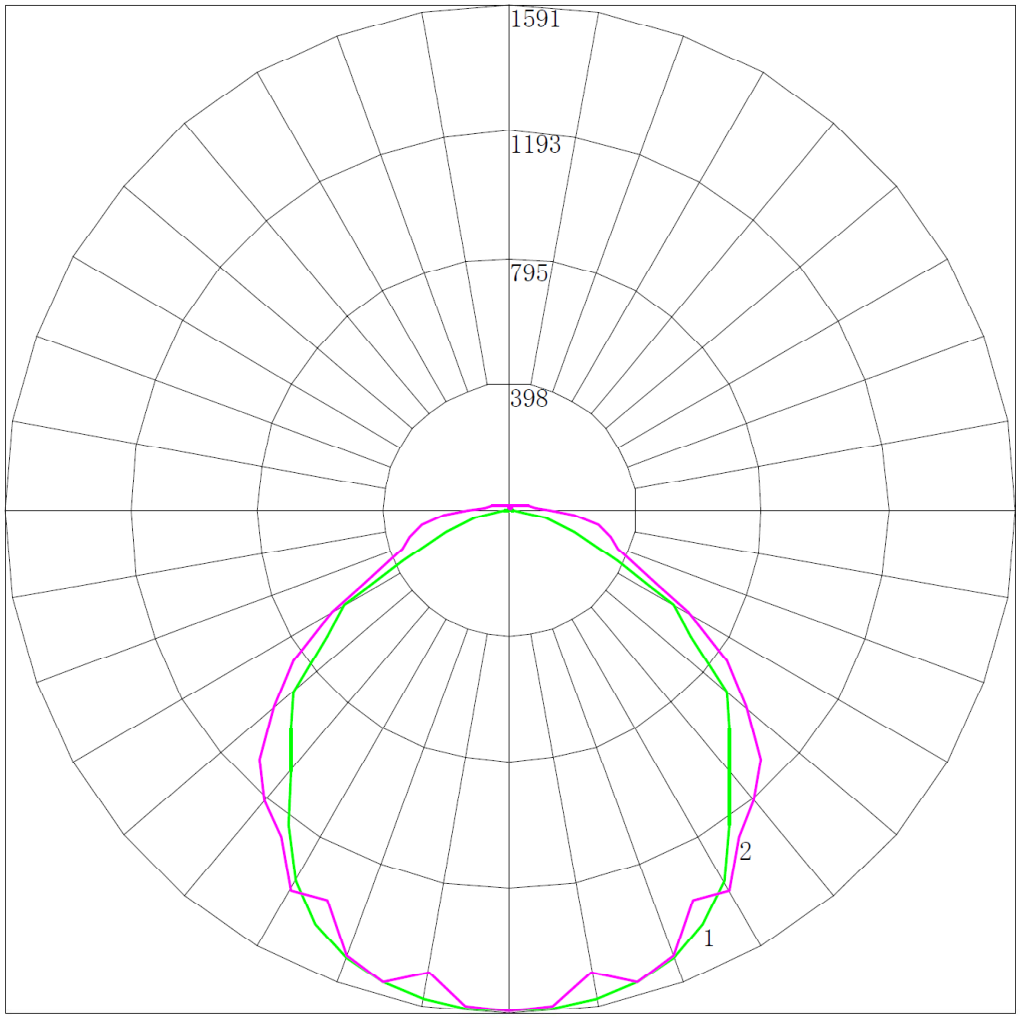
Zone	Lumens	%Lamp	%Fixt
0-20	576.58	12.30	12.30
0-30	1229.94	26.30	26.30
0-40	2024.5	43.20	43.20
0-60	3559.01	76.00	76.00
0-80	4320.21	92.20	92.20
0-90	4501.44	96.10	96.10
10-90	4352.02	92.90	92.90
20-40	1447.92	30.90	30.90
20-50	2270.24	48.50	48.50
40-70	2006.21	42.80	42.80
60-80	761.20	16.20	16.20
70-80	289.49	6.20	6.20
80-90	181.23	3.90	3.90
90-110	129.24	2.80	2.80
90-120	150.14	3.20	3.20
90-130	163.25	3.50	3.50
90-150	176.95	3.80	3.80
90-180	183.29	3.90	3.90
110-180	54.05	1.20	1.20
0-180	4684.74	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	149.42
10-20	427.16
20-30	653.36
30-40	794.56
40-50	822.32
50-60	712.19
60-70	471.71
70-80	289.49
80-90	181.23
90-100	89.48
100-110	39.76
110-120	20.89
120-130	13.11
130-140	8.30
140-150	5.40
150-160	3.58
160-170	2.10
170-180	0.67

4.5 Polar Curves of half of model DYU-ITATWC-ZZ(3500K)

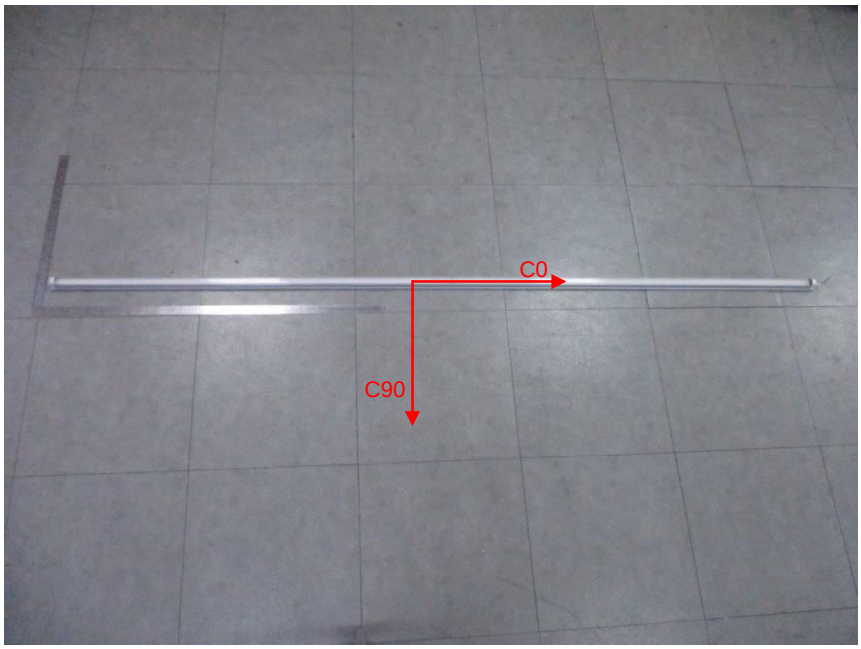


Maximum Candela = 1590.685 Located At Horizontal Angle = 60, Vertical Angle = 5
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

4.6 Candela Tabulation of half of model DYU-ITATWC-ZZ(3500K)

	0	15	30	45	60	75	90
0	1584.015	1584.015	1584.015	1584.015	1584.015	1584.015	1584.015
5	1582.108	1582.970	1590.293	1566.692	1590.685	1588.143	1573.066
10	1566.813	1572.116	1566.967	1515.002	1519.991	1514.515	1486.934
15	1542.213	1537.366	1494.122	1439.502	1482.266	1527.080	1543.443
20	1507.764	1474.059	1421.641	1465.545	1531.120	1550.860	1501.326
25	1446.628	1382.219	1409.297	1486.034	1411.329	1380.004	1362.791
30	1348.137	1294.429	1402.044	1318.719	1304.693	1377.783	1386.852
35	1212.838	1256.579	1285.020	1225.010	1330.220	1315.027	1261.031
40	1076.767	1195.910	1170.359	1193.259	1183.487	1175.274	1198.474
45	974.373	1026.567	1094.716	1069.619	1064.608	1132.994	1116.536
50	889.590	885.766	924.291	927.787	978.696	975.947	970.099
55	699.327	751.643	806.179	790.375	846.457	854.370	833.947
60	600.746	566.567	637.559	657.275	708.143	658.675	647.203
65	376.714	398.037	484.114	494.484	490.091	477.247	458.605
70	214.500	264.974	353.659	419.550	381.642	357.277	363.599
75	112.106	171.870	287.874	296.170	286.726	338.238	326.074
80	47.566	119.053	221.256	242.272	272.263	289.681	283.825
85	14.206	65.183	173.510	190.208	231.487	215.553	207.891
90	2.224	40.390	125.391	173.748	159.364	139.396	130.633
95	1.997	25.951	98.392	123.245	91.738	86.259	80.922
100	1.906	18.140	82.123	72.580	64.018	61.199	58.186
105	1.906	15.007	44.816	42.990	42.788	41.979	39.865
110	1.770	11.193	26.250	30.546	33.078	35.426	35.186
115	1.861	7.969	16.799	22.460	28.536	31.214	30.815
120	2.133	5.880	13.088	19.872	23.769	25.986	25.738
125	2.315	5.154	10.839	16.125	20.103	22.290	21.985
130	2.406	4.586	9.152	13.623	17.001	18.909	18.851
135	2.632	4.291	7.804	11.385	14.347	16.025	16.070
140	3.086	4.314	7.084	9.901	12.723	13.726	13.774
145	3.722	4.586	6.589	8.860	10.883	12.058	12.185
150	4.357	4.859	6.431	8.240	9.827	10.750	10.860
155	5.356	5.313	6.589	7.687	9.107	9.804	9.845
160	6.127	6.107	6.859	7.443	8.297	8.991	8.962
165	6.672	6.675	6.745	7.376	7.825	8.227	8.256
170	7.171	7.152	7.106	7.000	7.509	7.731	7.682
175	7.670	7.674	7.556	7.421	7.533	7.550	7.461
180	3.877	3.877	3.877	3.877	3.877	3.877	3.877

Appendix A Product Photo



Picture 1

Picture 2

****End of test report****