

IES LM-79-08

MEASUREMENT AND TEST REPORT For

Overdrive Electronics Pvt. Ltd

SDF No. E24A &B, NSEZ, Phase 2, Noida 201305 UP India

Test Model: 4000K/6W A Shape LED bulb

Report Type:	Electrical and Photometric tests including: Luminous Flux, Color, Luminous Intensity Distribution
Test Engineer:	Daniel Duan <i>Daniel Duan</i>
Report Number:	RSZ130604501-10A2
Test Date:	2013-06-06
Report Date:	2013-06-06
Reviewed By:	Jeanne Han/Safety Manager <i>Jeanne Han</i>
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008
Test Facility	Test facility was located at Pu Long Cun 69, Puxinghu Industrial Area, Tangxia Town, Dongguan, Guangdong, P.R.China.
Accreditation:	The NVLAP Lab Code is 200707-0.

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1. Product Description

General Information:

One sample was received on 2013-06-04 and used for testing.

Model Tested: 4000K/6W A Shape LED bulb

Manufacturer: Overdrive Electronics Pvt. Ltd

Brand Name: Overdrive

Product Designation: LED bulb

Burning Time Before Test: 0 hour(For New Products)

Rated Values:

Rated Voltage/Frequency: 120VAC 60Hz

Rated Power: 6W

Nominal CCT: 4000K

2. Standards Used

- IESNA LM-79-08: Approved Method: Electrical & Photometric Measurement of Solid-state Lighting Products
- ANSI C82.77-2002: Harmonic Emission Limits – Related Power Quality Requirements for Lighting

3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Test Range	Calibration date
1.5m temperature integrating sphere	SENSING	SPR-600	S09008	25~50℃	2013-03-08
Spectral radiation analyzer	SENSING	SPR3000	90902027	350nm~800nm	2013-03-08
Digital power meter	YOKOGAWA	WT-210	91j926132	15/30/60/150/300/600 V	2013-03-25
Precision frequency power supply	ALL Power	APW-105N	970613	110V-240V 50-400Hz	2013-03-25
Standard Light Source	EVERFINE	D062	1011064	3000K	2013-03-08
Temperature/humidity/clock	Victor	VC230	EE209	0~40℃0~90%	2013-04-01
Programmable Precision DC Power Supply	ITECH	IT6154	0061 0417 6471 0010 19	0~32V	2013-03-25
AC POWER SUPPLY	EVERFINE	VPS1060 PWM	1101006	0-150V, 0-300V	2013-03-25
Digital CC&CV DC Power Supply	EVERFINE	WY12010	1009009	30V/5A	2013-03-25
Electrical parameter tester	YOKOGAWA	WT-210	91KB35700	15/30/60/150/300/600 V	2013-03-25
full-field speed goniophotometer	EVERFINE	GO-R5000	YG108492N1 0120001	1600mm,3000W/10A	2013-03-08
Temperature/humidity/clock	Victor	VC230	EE091	0~40℃0~90%	2013-04-01
Standard Light Source	SENSING	D908	1012004	N/A	2013-03-20

4. Test Method

Product was tested with no seasoning. All stabilization and measurements were made in compliance with IES LM-79-08. The product was operated at rated voltage or at voltage required by manufacturer. The ambient temperature of the sample was maintained at $25^{\circ}\text{C}\pm 1^{\circ}\text{C}$ during measurement. And relative humidity is less than 65%.

Integrating Sphere System

The system includes AC power source, digital power meter, DC power supply, spectrophotometer, and integrating sphere. The integrating sphere system is calibrated by standard light source before measurement. The system and standard light source has been calibrated regularly and traceable to the National Primary Standards.

4π geometry was used during measurement. The product was operated in its intended orientation in application and was recorded in this report.

Goniophotometer System

The goniophotometer system is calibrated by standard light source before measurement. The standard light source has been calibrated regularly and traceable to the National Primary Standards.

Type C goniophotometer was used for measuring total luminous flux, luminous intensity distribution, and color spatial uniformity. The product was operated in its intended orientation in application and was recorded in this report.

5. Test Result

[Integrating Sphere System]

Total operating time for integrating sphere test: **1.5 hours**

Test orientation: **Base up**

Electrical Measurement

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60.0	0.069	5.8	0.706

Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
499.409	1.585	86.105	4146	-3.10E-03

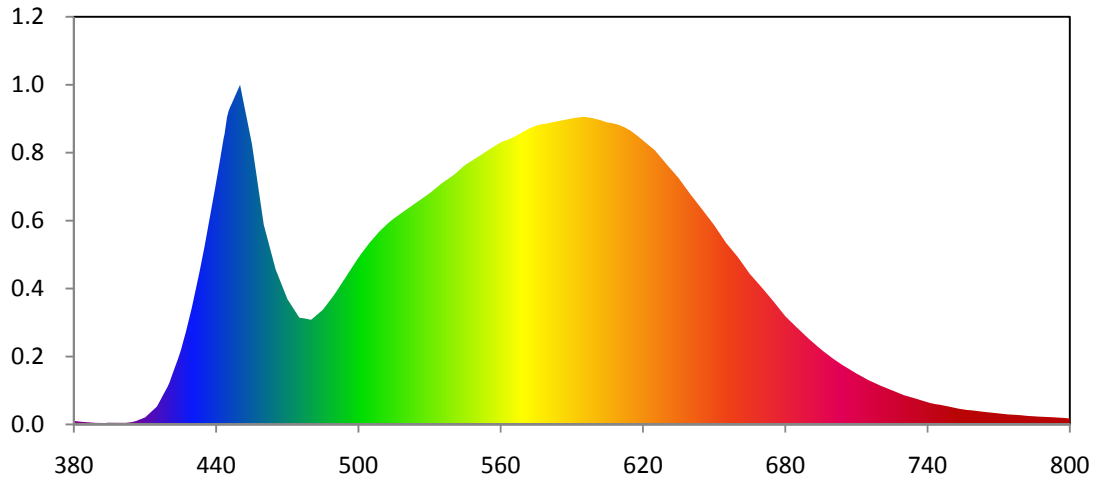
Chromaticity Coordinate

x	y	u	v	u'	v'
0.3724	0.3651	0.2245	0.3301	0.2245	0.4951

Color Rendering Index

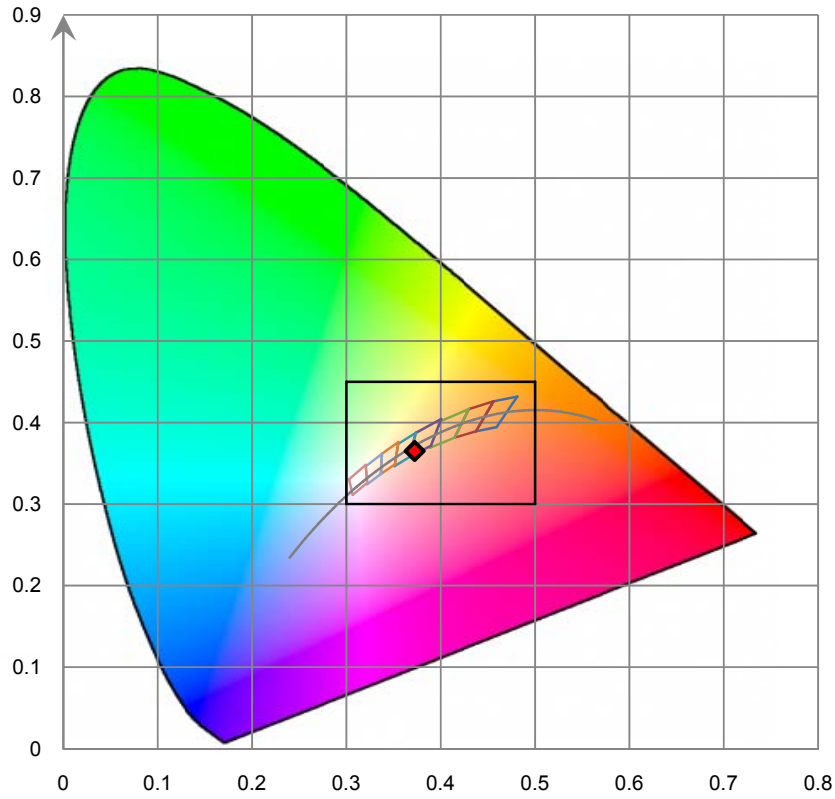
Ra 86.5			
R1 86	R2 90	R3 93	R4 87
R5 86	R6 86	R7 89	R8 75
R9 36	R10 77	R11 86	R12 71
R13 87	R14 96	R15 83	

Relative Spectral Power Distribution

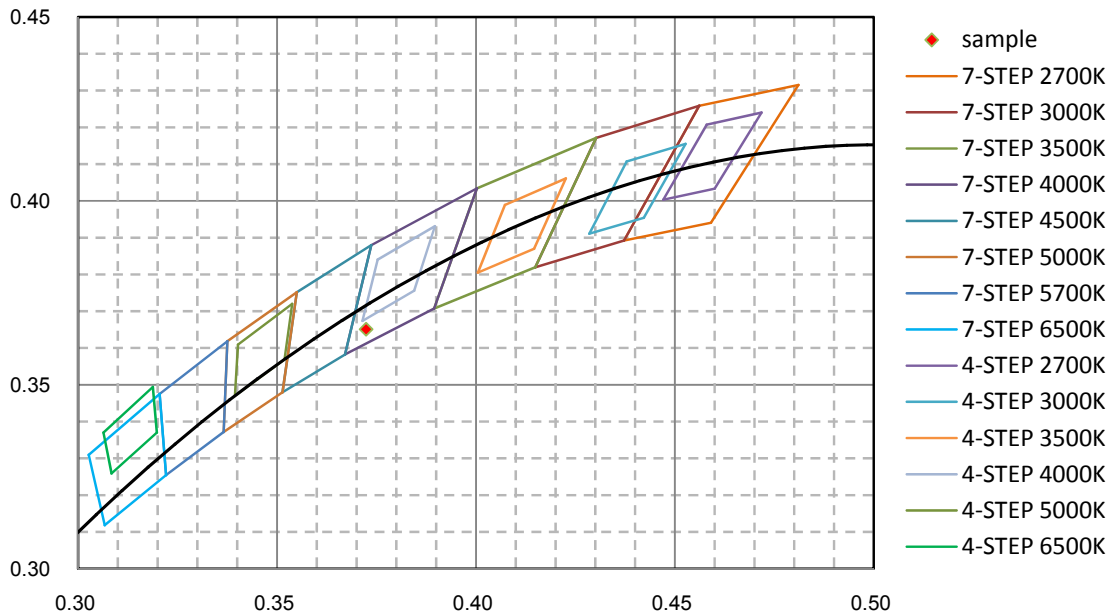


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	4.794E-04	465	1.991E-02	550	3.422E-02	635	3.158E-02	720	5.001E-03
385	2.771E-04	470	1.608E-02	555	3.524E-02	640	2.949E-02	725	4.386E-03
390	2.176E-04	475	1.371E-02	560	3.617E-02	645	2.754E-02	730	3.759E-03
395	1.773E-04	480	1.343E-02	565	3.676E-02	650	2.554E-02	735	3.322E-03
400	1.971E-04	485	1.472E-02	570	3.763E-02	655	2.330E-02	740	2.850E-03
405	3.216E-04	490	1.674E-02	575	3.835E-02	660	2.143E-02	745	2.546E-03
410	9.231E-04	495	1.906E-02	580	3.861E-02	665	1.930E-02	750	2.228E-03
415	2.314E-03	500	2.140E-02	585	3.896E-02	670	1.756E-02	755	1.930E-03
420	5.143E-03	505	2.344E-02	590	3.923E-02	675	1.577E-02	760	1.786E-03
425	9.374E-03	510	2.516E-02	595	3.946E-02	680	1.385E-02	765	1.579E-03
430	1.518E-02	515	2.644E-02	600	3.920E-02	685	1.239E-02	770	1.418E-03
435	2.277E-02	520	2.753E-02	605	3.870E-02	690	1.094E-02	775	1.280E-03
440	3.114E-02	525	2.858E-02	610	3.838E-02	695	9.641E-03	780	1.180E-03
445	4.010E-02	530	2.965E-02	615	3.762E-02	700	8.468E-03	785	1.040E-03
450	4.354E-02	535	3.091E-02	620	3.639E-02	705	7.439E-03	790	9.608E-04
455	3.599E-02	540	3.195E-02	625	3.514E-02	710	6.530E-03	795	9.249E-04
460	2.564E-02	545	3.329E-02	630	3.333E-02	715	5.704E-03	800	7.670E-04

CIE 1931 x y Chromaticity Diagram



7-Step & 4-Step Chromaticity Quadrangles



[Goniophotometer System]

Total operating time for luminous intensity distribution: **1.5 hours**

Test orientation: **Base up**

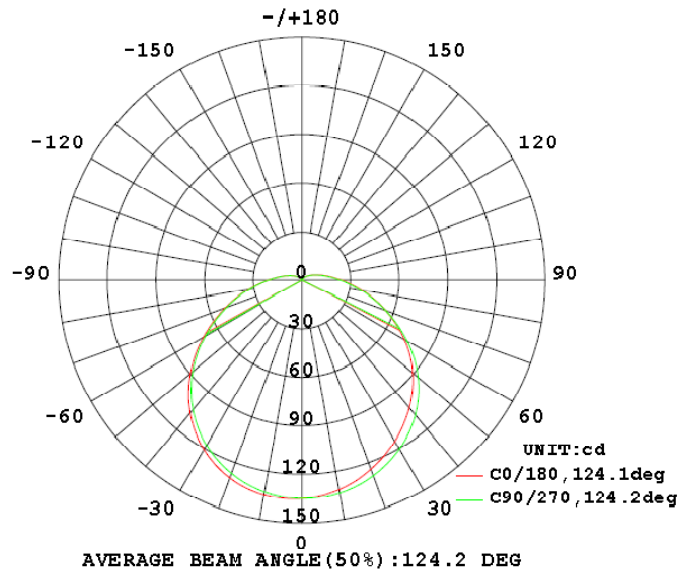
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.1	60.0	0.0694	5.87	0.7043

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	CBCP (cd)	S/MH (C0/180)	S/MH (C90/270)
509.689	86.83	135	1.33	1.30

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% Imax):	124.1	124.5	124.2	124.8	124.4
Field Angle (10% Imax):	201.3	201.2	200.4	201.3	201.1

Luminous Intensity (cd) Distribution Data

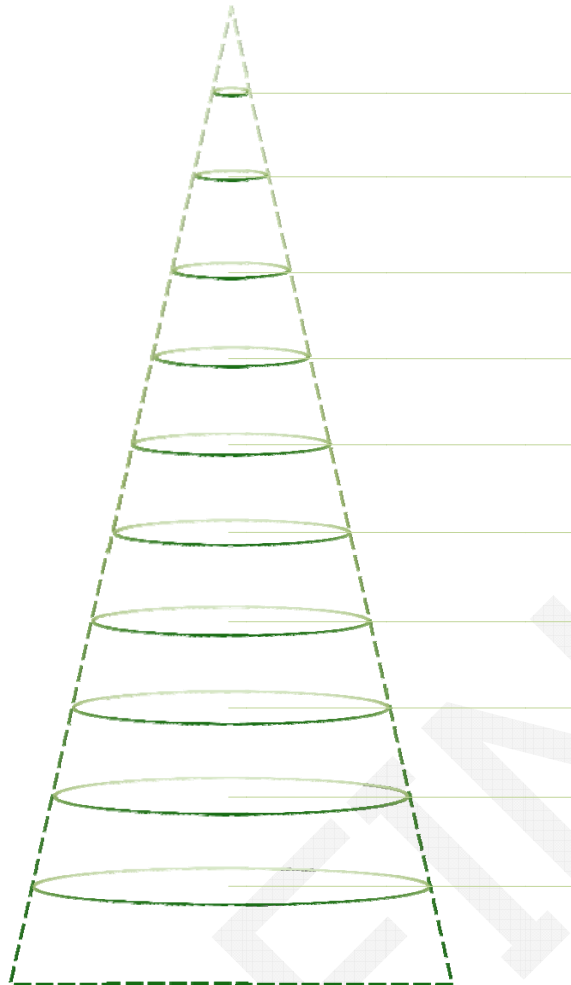
C \ Y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	135	135	135	135	135	135	135	135
5.0°	136	135	135	135	134	134	134	134
10.0°	135	135	134	134	133	132	132	132
15.0°	133	133	132	131	130	130	129	129
20.0°	130	130	129	128	127	126	125	125
25.0°	126	125	125	124	123	122	121	120
30.0°	121	120	119	119	118	117	116	115
35.0°	115	114	113	112	112	111	110	110
40.0°	107	106	105	105	105	104	104	104
45.0°	99	98	97	97	97	97	97	97
50.0°	90	89	88	88	88	88	89	90
55.0°	80	79	78	78	79	79	80	81
60.0°	70	69	68	68	69	70	71	73
65.0°	60	59	58	58	59	60	62	63
70.0°	50	49	48	49	49	51	52	54
75.0°	41	40	40	40	41	42	43	45
80.0°	33	32	32	32	33	34	35	37
85.0°	26	26	25	25	26	27	28	29
90.0°	21	20	20	20	21	21	22	23
95.0°	16	16	15	16	16	17	18	18
100.0°	13	13	12	12	13	13	14	15
105.0°	10	10	10	10	10	10	11	11
110.0°	8	8	8	8	8	8	9	9
115.0°	6	6	6	6	6	6	7	7
120.0°	5	5	5	5	5	5	5	6
125.0°	4	4	4	4	4	4	4	4
130.0°	3	3	3	3	3	3	3	3
135.0°	2	2	2	2	2	2	2	3
140.0°	2	1	1	1	2	2	2	2
145.0°	1	1	1	1	1	1	1	1
150.0°	1	1	1	1	1	1	1	1
155.0°	0	0	0	0	0	0	0	1
160.0°	0	0	0	0	0	0	0	0
165.0°	0	0	0	0	0	0	0	0
170.0°	0	0	0	0	0	0	0	0
175.0°	0	0	0	0	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

C \ Y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	135	135	135	135	135	135	135	135
5.0°	134	134	134	135	135	135	135	135
10.0°	131	132	132	133	134	134	135	135
15.0°	128	129	130	130	132	132	133	133
20.0°	124	125	126	127	129	130	130	130
25.0°	120	121	122	123	125	126	127	126
30.0°	115	116	117	119	120	121	122	121
35.0°	109	110	112	113	115	116	116	115
40.0°	103	104	106	107	109	109	110	108
45.0°	96	98	99	100	102	102	102	100
50.0°	89	90	92	93	93	93	93	92
55.0°	81	83	84	85	85	84	84	82
60.0°	73	74	76	75	75	74	74	72
65.0°	64	65	66	66	65	64	64	62
70.0°	55	56	57	56	55	54	54	52
75.0°	46	47	48	47	45	44	44	43
80.0°	38	39	39	38	37	36	36	35
85.0°	31	31	32	31	30	29	28	28
90.0°	24	25	25	25	23	23	22	22
95.0°	19	20	20	19	18	18	18	17
100.0°	15	16	16	15	15	14	14	14
105.0°	12	12	13	12	12	11	11	11
110.0°	9	10	10	10	9	9	9	8
115.0°	7	8	8	8	7	7	7	7
120.0°	6	6	6	6	6	5	5	5
125.0°	5	5	5	5	4	4	4	4
130.0°	4	4	4	4	3	3	3	3
135.0°	3	3	3	3	3	3	2	2
140.0°	2	2	2	2	2	2	2	2
145.0°	1	1	1	1	1	1	1	1
150.0°	1	1	1	1	1	1	1	1
155.0°	1	1	1	1	1	1	0	0
160.0°	0	0	0	0	0	0	0	0
165.0°	0	0	0	0	0	0	0	0
170.0°	0	0	0	0	0	0	0	0
175.0°	0	0	0	0	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

Average Area Illumination Figure

Angle: 124.4°. Flux out: 346.0 lm.



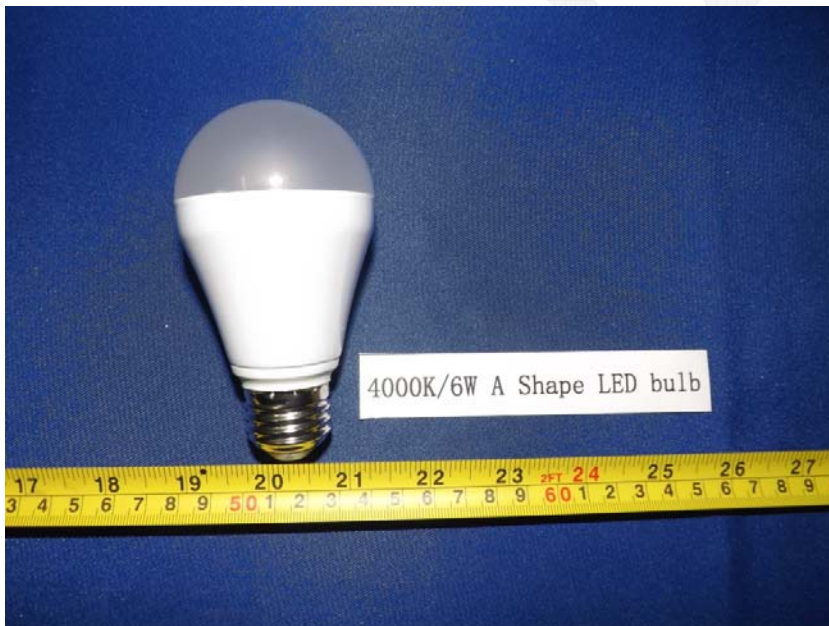
Height (m)	Diameter (cm)	E _{avg} (lx)	E _{max} (lx)
0.5	189.7	114.4	542.8
1.0	379.3	28.6	135.7
1.5	569.0	12.7	60.3
2.0	758.7	7.1	33.9
2.5	948.3	4.6	21.7
3.0	1138.0	3.2	15.1
3.5	1327.7	2.3	11.1
4.0	1517.3	1.8	8.5
4.5	1707.0	1.4	6.7
5.0	1896.7	1.1	5.4

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	3.2	0.63
5-10	9.6	1.88
10-15	15.7	3.08
15-20	21.3	4.17
20-25	26.3	5.17
25-30	30.6	6.00
30-35	34.0	6.68
35-40	36.5	7.16
40-45	37.9	7.43
45-50	38.2	7.49
50-55	37.3	7.32
55-60	35.4	6.95
60-65	32.6	6.40
65-70	29.1	5.70
70-75	25.1	4.93
75-80	21.1	4.13
80-85	17.2	3.38
85-90	13.8	2.71
90-95	10.9	2.14
95-100	8.5	1.68
100-105	6.6	1.30
105-110	5.1	1.00
110-115	3.9	0.77
115-120	2.9	0.58
120-125	2.2	0.43
125-130	1.6	0.31
130-135	1.1	0.22
135-140	0.8	0.15
140-145	0.5	0.10
145-150	0.3	0.06
150-155	0.2	0.03
155-160	0.1	0.01
160-165	0.0	0.01
165-170	0.0	0.00
170-175	0.0	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	3.2	0.63
0-10	12.8	2.51
0-15	28.5	5.59
0-20	49.8	9.76
0-25	76.1	14.93
0-30	106.7	20.93
0-35	140.7	27.61
0-40	177.2	34.77
0-45	215.1	42.20
0-50	253.3	49.69
0-55	290.6	57.01
0-60	326.0	63.96
0-65	358.6	70.36
0-70	387.7	76.06
0-75	412.8	80.99
0-80	433.9	85.12
0-85	451.1	88.50
0-90	464.9	91.21
0-95	475.8	93.35
0-100	484.4	95.03
0-105	491.0	96.33
0-110	496.1	97.33
0-115	500.0	98.10
0-120	502.9	98.68
0-125	505.1	99.11
0-130	506.7	99.42
0-135	507.8	99.64
0-140	508.6	99.79
0-145	509.1	99.89
0-150	509.4	99.95
0-155	509.6	99.98
0-160	509.7	99.99
0-165	509.7	100.00
0-170	509.7	100.00
0-170	509.7	100.00
0-180	509.7	100.00

6. Product Photo



*****END OF REPORT*****