



NVLAP LAB CODE:201045-0



Shenzhen Anbotek Compliance Laboratory Limited

IES LM-79-08 TEST REPORT

For
Beyond LED Technology

Report Number: R011412501L
Product Type: LED Tube Light
Test Date: 2014-12-15-2014-12-18
Report Date: 2014-12-25
Product Model: 101790-1
Product Description: 120-277VAC 50/60Hz 28W 6500K
Product Criteria: IES LM-79-08: Electrical and Photometric Measurements of Solid-State Lighting Products

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1 – GENERAL

1.1 Product description

General Information

Applicant	Beyond LED Technology
Applicant Address	1939 Parker Ct Stone Mountain, GA 30087
Manufacturer	Beyond LED Technology
Manufacturer Address	1939 Parker Ct Stone Mountain, GA 30087
Brand name	Beyond LED
Test Model Number	101790-1
Burning time before test	0 Hours (For new products)

Rated Values

Rated Inputs	100-277VAC 50/60Hz
Rated Power	28W
Nominal CCT	6500K

1.2 Standard of method

- ANSI C78.377-2011: Specifications for the Chromaticity of Solid State Lighting Products
- ANSI C82.77-2002: Harmonic Emission Limits-Related Power Quality Requirements for Lighting Equipment
- CIE Publication No.13.3-1995: Method of Measuring and Specifying Color Rendering of Light Sources
- IESNA LM-79-08 Approved Method: Electric & Photometric Measurement of Solid-state Lighting Products

1.3 Test Facility

The test facility used by Shenzhen Anbotek Compliance Laboratory Limited is located at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China.

1.4 Report Revision

Report Number	Model	Report Date	Contents
R011411382L	102178	2014-12-19	Original report
R011412501L	101790-1	2014-12-25	Update the model number and report number

2 – Test Equipment List and Details

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
Goniophotometric System	SENSING	GMS-3000	-	-	2014-3-20	2015-3-19
AC Power Source	Ainuo	AN97001W	-	0-300V, 1000VA	2014-3-12	2015-3-11
Digital Power Meter	YOKOGAWA	WT310		0-600V/0-10A/0-100Hz	2014-3-12	2015-3-11
Temperature & Humidity meter	XINIXI	CTH-608	-	0°C~50°C, 10% to 90%RH	2014-4-16	2015-4-15
Total Luminous Flux Standard Lamp	SENSING	220V/500W	S135009	220V/500W	2014-4-10	2015-4-09
Total Luminous Flux Standard Lamp	SENSING	220V/500W	S1350014	220V/500W	2014-4-10	2015-4-09
1.5m Integral Sphere	SENSING	SPR-600M	-	380nm-780nm,0.011m~6.00×10 ⁵ lm	2014-4-10	2015-4-09
Spectrum analyzer	SENSING	SPR-3000	-	380nm-780nm,0.011m~6.00×10 ⁵ lm	2014-4-10	2015-4-09
AC Power Source	ALL POWER	APW-110N	997079	0-300V, 0-1000VA	2014-7-14	2015-7-13
Digital Power Meter	YOKOGAWA	WT210	-	0-600V/0-10A/0-100Hz	2014-3-12	2015-3-11
DC Power Supply	Linkcolor	Linkcolor	-	DC 30V, 5A	2014-3-12	2015-3-11
Total Luminous Flux Standard Lamp	SENSING	110 V / 100 W	S13100190	Refer specification	2014-4-10	2015-4-09
Total Luminous Flux Standard Lamp	SENSING	110 V / 100 W	S1310034	Refer specification	2014-4-10	2015-4-09
Temperature & Humidity meter	XINIXI	CTH-608	-	0°C~50°C, 10% to 90%RH	2014-4-16	2015-4-15

Statement of Traceability: Shenzhen Anbotek Compliance Laboratory Limited attests that all calibration has been performed using suitable standards traceable to national primary standards and International System of Unit (SI).

3 - Test Method

3.1 Ambient Condition

The ambient temperature in which measurements are being taken was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, the air flow around the sample(s) being tested did not affect the performance.

3.2 Power Supply Characteristics

The AC 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.

3.3 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).

3.4 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.

3.5 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. The method according to IESNA LM-79-08 following chapter.

4-TEST RESULT

[Integrating Sphere System]

4.1 Electrical data

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.00	60	0.224	26.668	0.985

4.2 Photometric data

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
3076.0	9.498	115.344	6642	0.00728

4.3 Chromaticity Coordinate

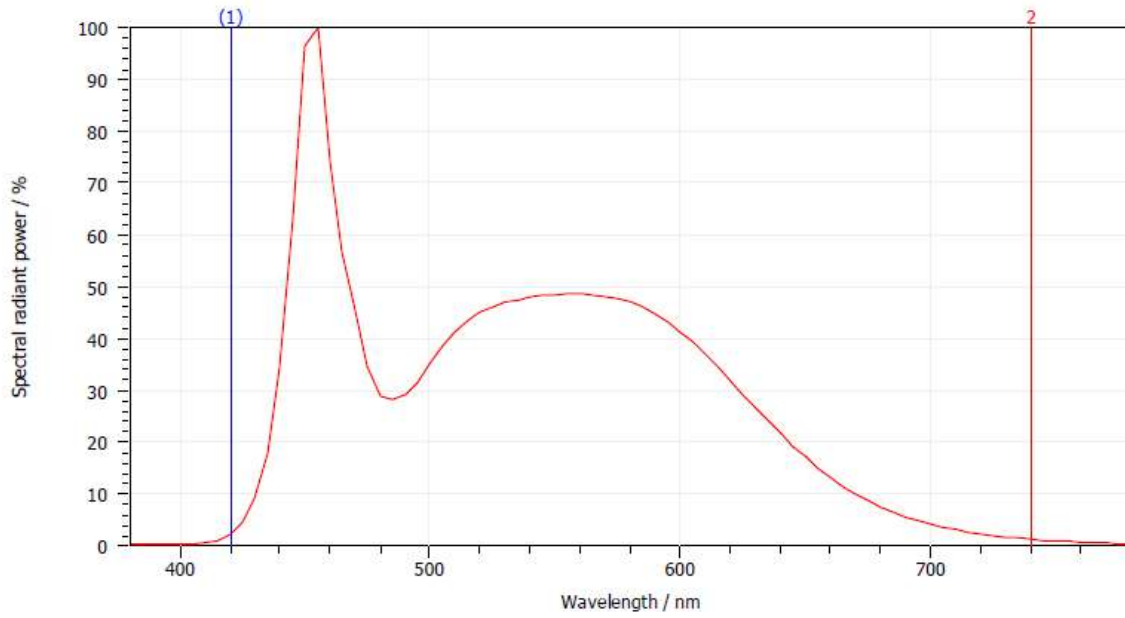
x	y	u	v	u'	v'
0.3093	0.3352	0.1932	0.3141	0.1932	0.4711

4.4 Color Rendering Details

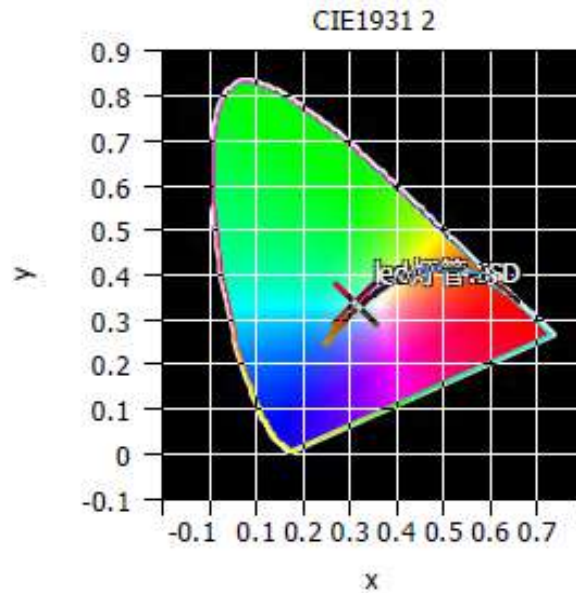
Ra
82.0

R1	R2	R3	R4	R5
79.0	88.1	93.1	79.1	79.3
R6	R7	R8	R9	R10
82.4	87.9	66.8	-2.7	71.0
R11	R12	R13	R14	R15
78.0	53.7	81.8	96.6	72.6

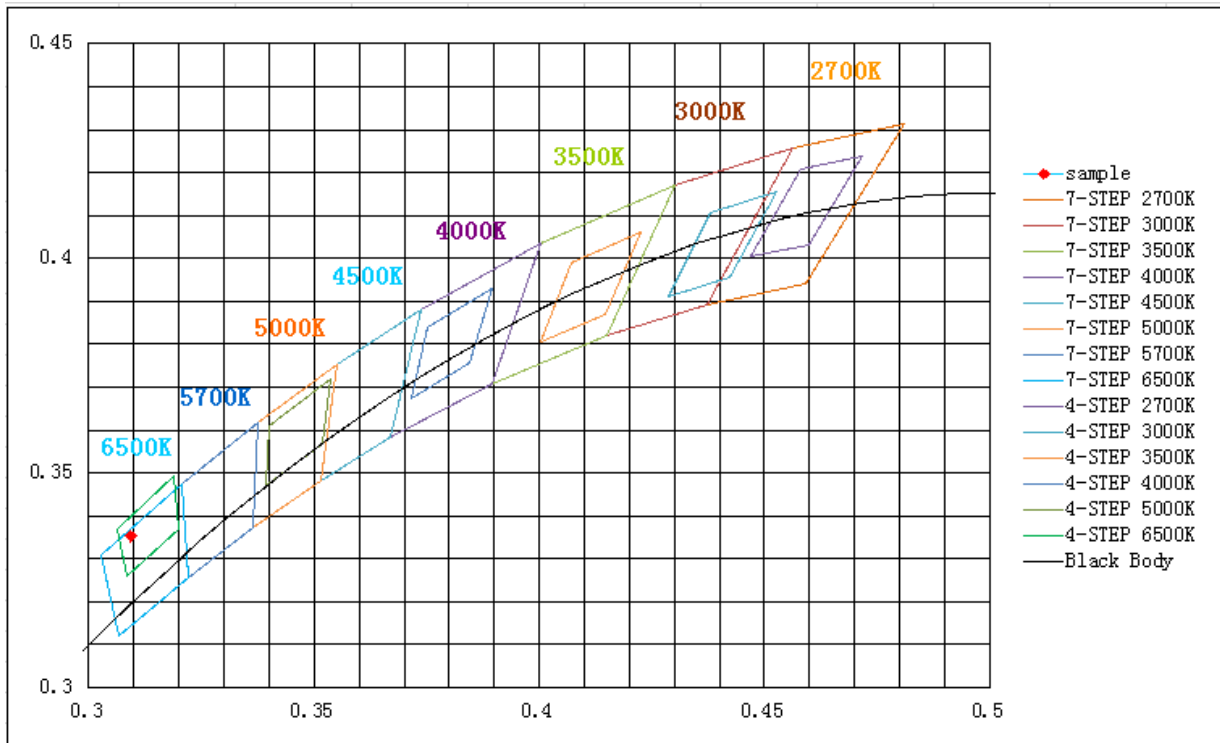
4.5 Spectral Distribution



4.6 Chromaticity Diagram (CIE 1931)



4.7 ANSI Chromaticity Quadrangles Diagram



[Goniophotometer System]

4.8 Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.02	60	0.225	26.73	0.991

4.9 Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	CBCP (cd)	S/MH (C0/180)	S/MH (C90/270)
3085.42	115.42	577.531	1.54	1.26

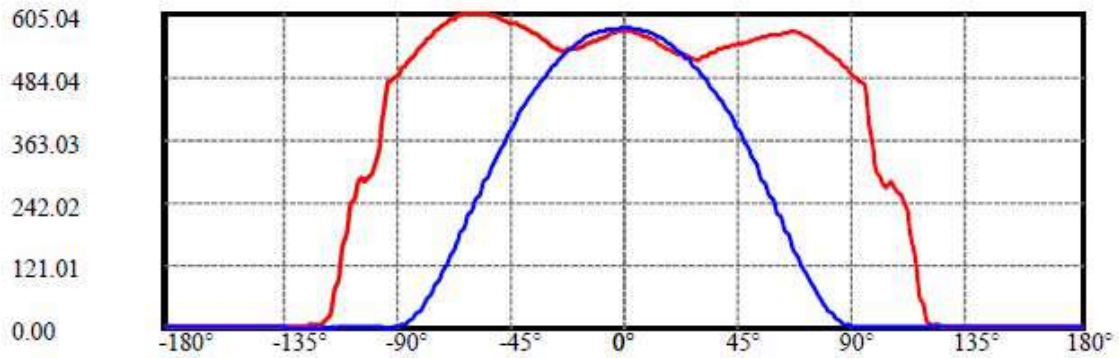
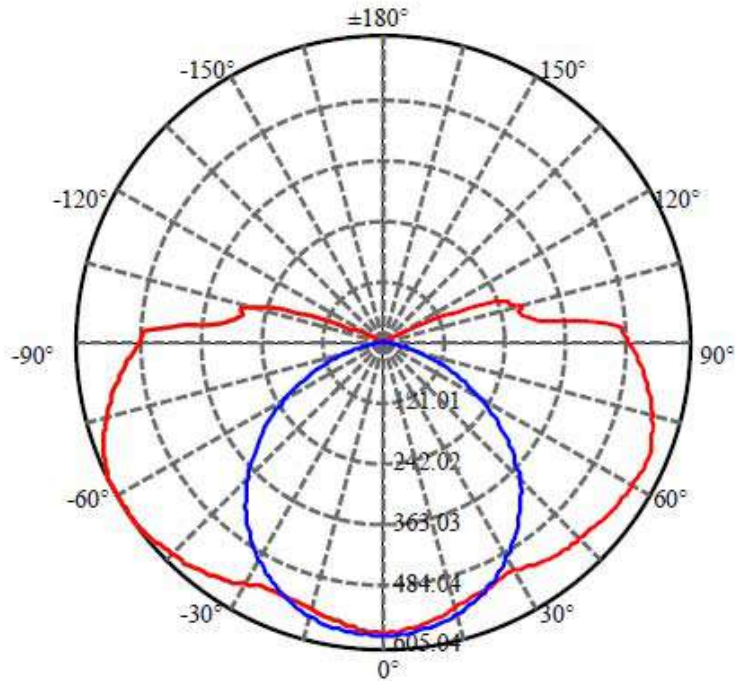
4.10 Zonal Lumen Summary

ZONAL LUMEN SUMMARY			
Zone	Lumens	%Lamp	%Fixt
0-30	448.71	14.54%	14.54%
0-40	759.89	24.63%	24.63%
0-60	1531.33	49.64%	49.63%
0-90	2687.78	87.12%	87.11%
0-120	3075.52	99.69%	99.68%
0-180	3085.42	100.01%	100.00%
60-90	1197.78	38.83%	38.82%
90-120	419.56	13.60%	13.60%
90-130	423.27	13.72%	13.72%
90-150	427.25	13.85%	13.85%
90-180	429.46	13.92%	13.92%
0-83.44	2468.34	80.01%	80.00%

ZONAL LUMEN SUMMARY

0-10	54.18
10-20	155.08
20-30	239.44
30-40	311.18
40-50	367.72
50-60	403.73
60-70	415.92
70-80	395.92
80-90	344.60
90-100	242.13
100-110	121.65
110-120	23.96
120-130	3.71
130-140	2.36
140-150	1.62
150-160	1.18
160-170	0.76
170-180	0.27

4.11 Light Distribution Curve [Unit: cd]



C180(Max): ———
 C0/C180: ———
 C90/C270: ———

Field angle(10%Imax):C0/180Left:113.8 Right:116.2
 :C90/270Left:76.9 Right:76.6

Beam Angle(50%Imax):C0/180Left:100.0 Right:99.9
 :C90/270Left:54.0 Right:53.9

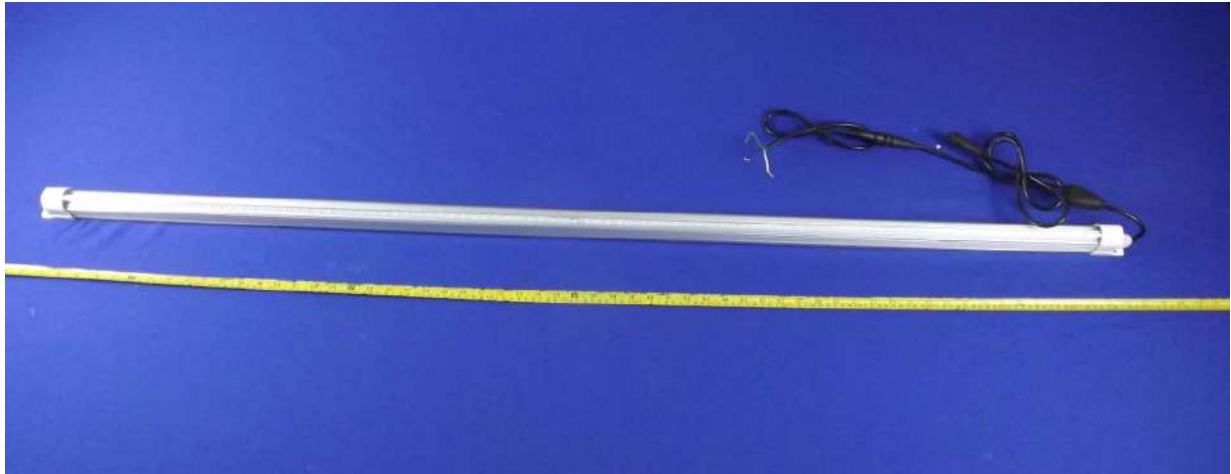
4.12 Luminous Intensity (cd) Distribution Data

C/γ(°)	0.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0
0.0	577.53	566.63	557.03	541.71	530.55	520.95	517.57	531.07	541.19
15.0	575.45	571.30	562.48	548.46	538.08	530.81	531.07	549.76	563.00
30.0	583.76	577.79	568.19	553.65	534.44	521.72	512.64	517.05	530.81
45.0	575.19	569.74	559.88	546.90	529.51	510.04	494.21	476.56	473.19
60.0	584.02	576.49	566.63	554.69	534.70	509.01	480.71	454.50	431.66
75.0	573.90	569.74	558.32	543.01	524.84	499.40	472.93	439.44	398.69
90.0	576.75	574.94	567.67	555.99	538.34	517.05	487.20	456.05	421.79
105.0	577.79	575.19	567.93	551.06	531.85	507.19	478.64	443.34	409.33
120.0	560.92	553.65	540.41	527.95	517.57	497.58	474.74	450.08	429.06
135.0	561.18	557.54	548.72	543.27	529.77	512.12	499.40	490.84	491.10
150.0	571.82	574.68	561.44	549.50	536.00	527.69	524.06	534.18	538.60
165.0	581.16	576.23	561.96	552.61	543.53	538.34	548.46	562.48	571.04
180.0	572.60	567.15	554.69	544.31	535.74	534.70	549.50	565.59	578.83
195.0	575.45	570.26	555.99	545.60	535.74	531.33	541.19	554.95	561.70
210.0	583.76	578.05	564.29	551.83	535.74	526.14	520.95	532.63	539.12
225.0	575.19	571.82	558.84	545.60	531.07	511.86	498.62	490.06	489.02
240.0	584.02	582.98	574.94	558.58	539.89	521.46	494.99	473.19	448.79
255.0	573.90	574.16	568.71	559.88	544.31	520.43	494.99	468.25	431.92
270.0	576.75	574.68	569.48	559.88	540.15	518.87	492.91	457.09	423.35
285.0	577.79	576.49	569.48	557.54	537.82	513.94	484.35	452.94	417.64
300.0	560.92	568.19	561.70	549.24	532.89	509.52	479.16	470.85	447.23
315.0	561.18	558.58	555.73	551.83	535.74	518.09	503.55	487.46	480.97
330.0	571.82	564.29	555.73	540.93	526.66	517.57	510.82	514.98	526.14
345.0	581.16	574.16	565.85	543.79	526.92	514.20	512.90	531.07	547.16
360.0	577.53	566.63	557.03	541.71	530.55	520.95	517.57	531.07	541.19

C/γ(°)	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	547.68	553.39	561.70	565.07	569.74	563.77	548.98	529.25	509.01
15.0	570.78	572.34	574.16	573.12	567.67	558.84	541.19	517.05	495.77
30.0	532.37	533.66	537.82	535.48	532.37	527.18	507.45	481.49	453.98
45.0	480.45	484.61	479.42	471.63	461.51	446.19	425.95	398.43	364.69
60.0	406.22	392.72	384.67	362.87	346.00	328.09	304.73	271.24	235.94
75.0	357.16	321.34	283.44	245.81	209.99	176.50	143.28	128.22	95.52
90.0	381.04	329.65	279.03	221.41	168.98	114.73	69.82	34.26	12.72
105.0	368.32	333.54	296.42	259.82	224.78	191.30	157.04	126.67	96.04
120.0	410.89	396.87	381.82	365.21	345.22	327.31	303.17	267.61	226.34
135.0	486.68	478.64	468.51	455.80	448.01	439.18	418.94	386.23	353.79
150.0	543.79	545.34	548.72	545.86	535.22	519.65	498.10	464.62	433.21
165.0	577.53	580.65	589.73	589.73	584.02	569.48	546.90	518.87	486.42
180.0	586.87	597.52	604.53	604.01	601.15	586.10	563.00	539.63	509.27
195.0	561.96	562.74	567.67	570.00	575.71	566.11	545.09	517.05	489.28
210.0	543.01	540.15	546.38	540.41	535.48	519.13	494.99	464.62	431.40
225.0	487.20	478.38	474.48	466.18	457.61	450.60	429.32	389.09	352.23
240.0	421.27	405.70	391.68	376.11	360.28	338.21	313.81	286.04	248.40
255.0	396.87	351.19	311.74	273.58	237.50	204.02	164.04	133.94	101.23
270.0	374.81	329.13	280.33	225.30	170.27	120.70	71.38	35.56	12.46
285.0	374.81	332.24	291.23	252.04	219.07	192.34	160.93	131.34	97.86
300.0	423.09	402.32	395.32	383.64	365.99	343.40	319.52	292.79	258.53
315.0	483.57	479.93	472.93	464.88	456.83	443.86	426.98	399.47	365.99
330.0	532.89	532.11	535.74	534.96	528.99	518.35	496.81	473.45	445.93
345.0	557.03	564.81	572.86	574.16	572.86	562.48	546.64	522.24	497.58
360.0	547.68	553.39	561.70	565.07	569.74	563.77	548.98	529.25	509.01

$C/\gamma(^{\circ})$	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	481.75	437.89	288.12	276.96	232.05	89.55	9.34	4.93	3.89
15.0	471.63	422.31	284.74	276.44	211.54	66.97	9.60	6.23	4.93
30.0	424.65	365.47	258.01	242.17	139.39	13.76	7.53	5.45	4.67
45.0	331.72	244.51	207.39	148.73	16.87	7.53	5.71	4.67	4.15
60.0	202.72	138.87	64.11	8.31	6.49	5.45	4.41	3.89	3.11
75.0	66.19	8.83	7.27	5.71	4.93	3.89	2.86	2.34	2.08
90.0	2.86	2.86	3.11	3.11	2.86	2.86	2.34	2.34	2.34
105.0	70.08	8.31	5.71	5.19	4.41	3.37	2.86	2.60	2.60
120.0	202.72	111.87	22.06	7.79	6.49	5.19	4.15	3.89	3.37
135.0	323.68	204.54	157.30	64.89	10.12	7.53	5.97	4.93	4.15
150.0	404.66	289.93	225.56	182.99	52.43	10.12	7.01	5.45	4.67
165.0	462.80	354.31	271.24	241.91	135.49	22.84	7.53	5.19	4.41
180.0	479.42	394.02	288.38	263.20	157.56	31.93	8.05	5.19	4.41
195.0	462.28	361.05	286.04	243.47	124.59	17.39	6.23	4.67	3.89
210.0	405.96	295.12	265.27	193.64	49.06	8.31	5.19	4.15	3.63
225.0	321.08	218.29	195.97	73.72	9.08	5.71	4.67	3.89	3.11
240.0	209.21	148.21	47.24	7.53	5.19	3.89	3.11	2.60	2.34
255.0	65.15	15.31	5.45	4.41	3.37	2.34	1.82	1.82	1.82
270.0	2.08	2.08	2.08	2.34	2.08	1.82	1.82	1.82	1.82
285.0	69.04	14.54	4.93	4.67	4.15	3.37	2.86	2.34	2.34
300.0	224.78	191.82	100.45	15.31	6.49	5.45	4.67	3.63	3.37
315.0	334.06	233.35	163.01	123.81	17.91	6.49	4.93	4.41	3.63
330.0	418.16	350.67	219.33	213.10	130.82	13.24	6.23	4.67	4.15
345.0	469.29	404.66	266.31	261.38	213.62	64.89	7.79	4.93	3.89
360.0	481.75	437.89	288.12	276.96	232.05	89.55	9.34	4.93	3.89
$C/\gamma(^{\circ})$	135.0	140.0	145.0	150.0	155.0	160.0	170.0	175.0	180.0
0.0	3.37	3.11	2.86	2.86	2.60	2.60	2.60	2.86	2.86
15.0	3.89	3.37	2.86	2.86	2.86	2.60	2.60	2.60	2.86
30.0	3.89	3.11	3.11	2.60	2.60	2.60	2.60	2.86	2.86
45.0	3.37	2.86	2.60	2.34	2.60	2.60	2.86	2.86	2.86
60.0	2.86	2.60	2.08	2.34	2.34	2.34	2.86	3.11	2.86
75.0	2.08	2.08	2.08	2.34	2.34	2.60	2.86	2.86	3.11
90.0	2.34	2.08	2.34	2.34	2.60	2.60	2.86	3.11	3.11
105.0	2.60	2.60	2.60	2.86	2.60	2.86	2.86	3.11	3.11
120.0	2.86	2.60	2.34	2.60	2.60	2.86	2.86	2.86	3.11
135.0	3.37	3.11	2.60	2.34	2.60	2.86	2.86	2.86	2.86
150.0	3.63	3.11	2.86	2.86	2.60	2.60	2.86	2.86	2.86
165.0	3.63	3.11	2.86	2.86	2.60	2.60	2.86	2.86	2.86
180.0	3.37	2.86	2.86	2.60	2.60	2.60	2.60	2.86	2.86
195.0	3.11	2.86	2.86	2.60	2.60	2.60	2.60	2.86	2.86
210.0	3.11	2.60	2.60	2.60	2.34	2.60	2.60	2.86	2.86
225.0	2.86	2.60	2.34	2.34	2.34	2.34	2.60	2.86	2.86
240.0	2.08	2.08	2.08	2.08	2.34	2.60	2.86	2.86	2.86
255.0	1.82	1.82	1.82	2.34	2.34	2.60	2.86	2.86	3.11
270.0	2.08	2.08	2.34	2.34	2.60	2.60	2.86	3.11	3.11
285.0	2.08	2.08	2.34	2.34	2.60	2.60	2.86	3.11	3.11
300.0	2.86	2.60	2.34	2.34	2.34	2.60	2.60	2.86	3.11
315.0	3.37	2.86	2.60	2.60	2.60	2.34	2.86	2.86	2.86
330.0	3.63	3.37	2.60	2.86	2.60	2.60	2.86	2.86	2.86
345.0	3.63	3.11	2.86	2.60	2.60	2.34	2.60	2.86	2.86
360.0	3.37	3.11	2.86	2.86	2.60	2.60	2.60	2.86	2.86

Attachment A – Product PHOTO



101790-1

-----End of Report-----