From: Michael Chan [mailto:chan_michael@comcast.net]
Sent: Friday, February 27, 2009 6:00 PM
To: SSL
Cc: 'Michael Chan'
Subject: Comment on SSL Replacement lamp

Energy Star SSL replacement draft has proposed a factor of 10 for any SSL replacement lamp. This means, if we are replacing a 20W halogen lamp, DOE is expecting 200 (20 x 10) lumens. This factor may be conservative. I feel that a factor of 7 or 8 may be more reasonable. Here I have enclosed:

a) Excel worksheet on lux measurement – lamp (a) is with "Vendor A" lamp at 2.58 W and 109 lumen per LM79 testing. The viewing angle is 36. Lamp (b) is "Vendor A" as well at 2.58W and 19 degree viewing angle. Lamp (g) is "Vendor B" at 3.2W and estimated 150 lumen and 19 degree. Then, these lamps are compared with 20 W halogen with different viewing angles. It is obvious that lamp (g) is dimmer than 20W halogen narrow flood lamp.
b) LM79 testing of "Vendor A" MR 16.
c) Accent lighting application – I have installed 3 MR 16 based fixture at my yard and about 8 feet from the objects. LEDs are on the left and on the right. The center is halogen 20W 12 degree spot. Halogen lamp is a fresh lamp. It is obviously that LED is brighter or better performance than halogen lamp.

If 150 lumens 19 degree 3100 Kelvin SSL MR 16 lamp seems to be brighter than 20W Halogen lamp with 12 degree, we feel that a factor of 7 or 8 may be more appropriate. At the end, DLI is supporting Light Fact labeling and all guidance from DOE. We are also an Energy Star Partner. Please consider.

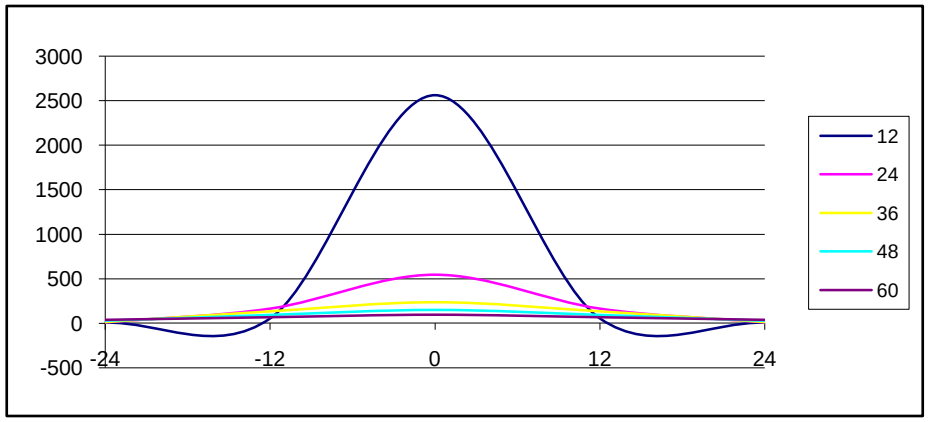
Regards,

Michael Chan
Digital Lighting Inc.
408 624-6168

Lux Data of various
MR16

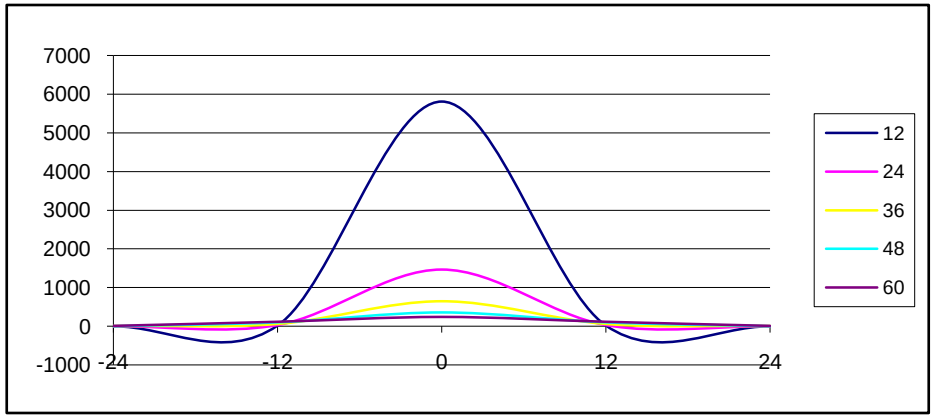
a) 3W LED MR16 (Frosted at side Optics)

Distance y(inch)	x(inch)				
	-24	-12	0	12	24
12	4	52	2560	52	4
24	9	164	546	164	9
36	12	132	234	132	12
48	26	93	150	93	26
60	39	68	96	68	39



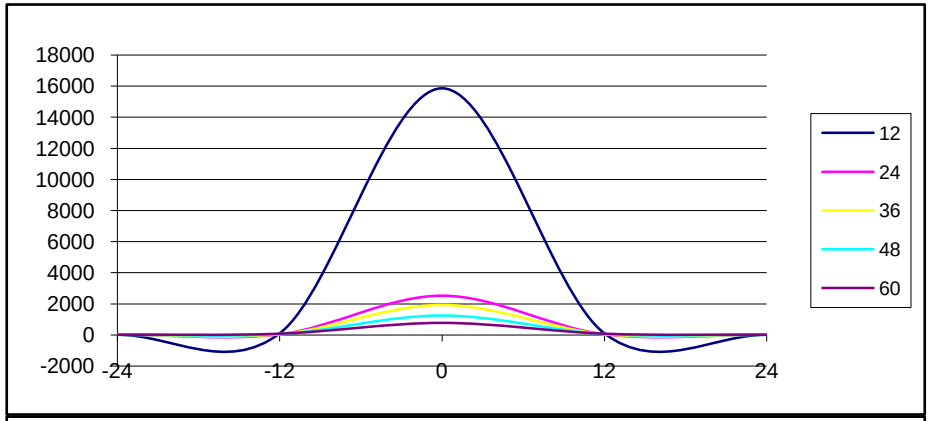
b) 3W LED MR16 (Fully Frosted Optics)

Distance y(inch)	x(inch)				
	-24	-12	0	12	24
12	4	23	5810	23	4
24	4	34	1467	34	4
36	6	59	650	59	6
48	6	105	361	105	6
60	12	116	239	116	12



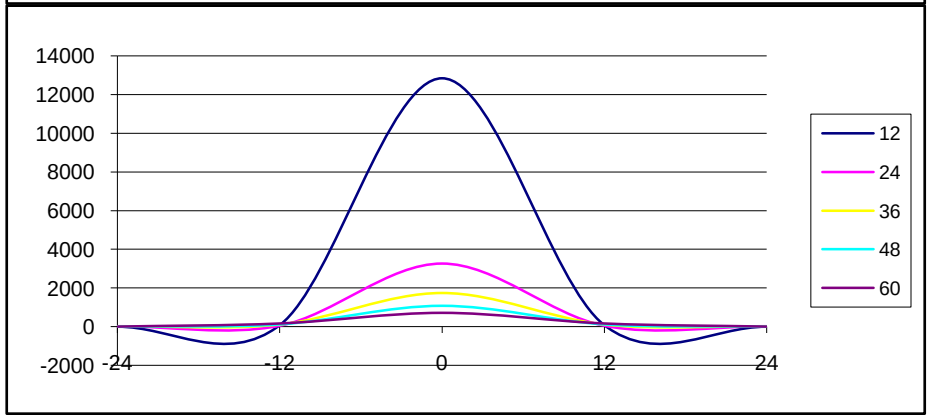
c) 20W Halogen MR16 (Narrow Spot)

Distance y(inch)	x(inch)				
	-24	-12	0	12	24
12	6	101	15850	101	6
24	27	46	2520	46	27
36	17	48	1929	48	17
48	8	58	1251	58	8
60	12	77	775	77	12



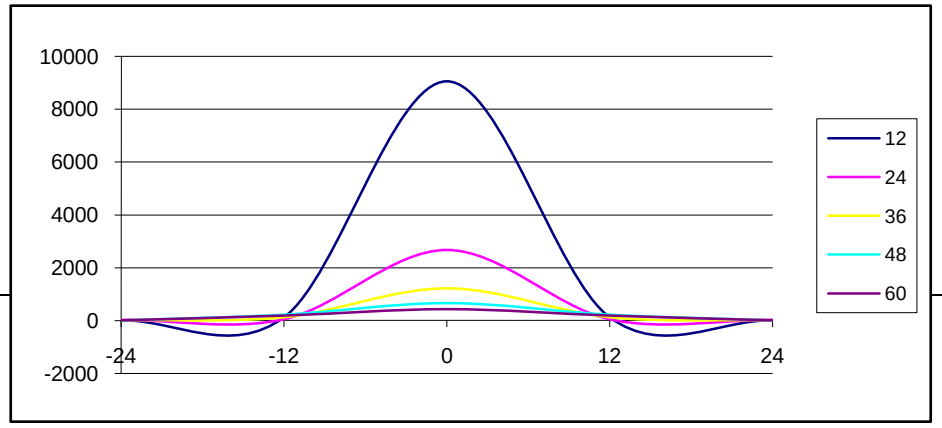
d) 20W Halogen MR16 (Spot)

Distance y(inch)	x(inch)				
	-24	-12	0	12	24
12	6	86	12850	86	6
24	28	53	3260	53	28
36	15	110	1750	110	15
48	11	126	1086	126	11
60	12	171	712	171	12



e) 20W Halogen MR16 (Narrow Flood)

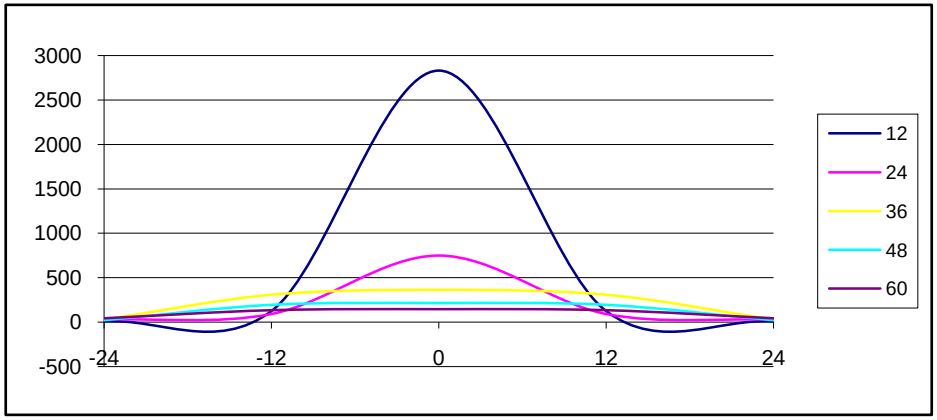
Distance y(inch)	x(inch)				
	-24	-12	0	12	24
12	7	121	9050	121	7
24	27	47	2670	47	27
36	12	126	1220	126	12
48	9	220	654	220	9



60	7	186	426	186	7

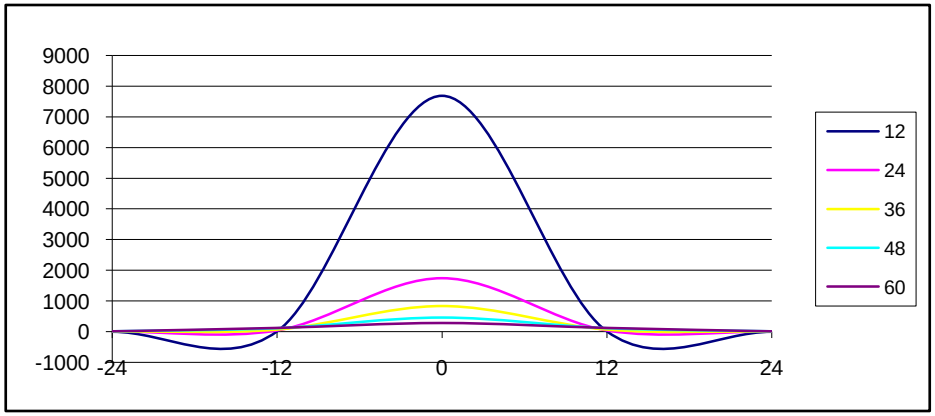
f) 20W Halogen MR16 (Flood)

Distance y(inch)	x(inch)				
	-24	-12	0	12	24
12	8	124	2830	124	8
24	25	90	748	90	25
36	27	308	363	308	27
48	20	195	215	195	20
60	42	134	146	134	42



g) 3W "Vendor B" LED MR16

Distance y(inch)	x(inch)				
	-24	-12	0	12	24
12	1	15	7680	15	1
24	4	39	1740	39	4
36	5	71	832	71	5
48	9	112	462	112	9
60	15	125	286	125	15



Lighting Sciences
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CERTIFIED TEST REPORT # 24706

TEST OF LED MR16 LAMP CAT# Q RAY
3 LEDS WITH INDIVIDUAL LENSES

TEST CONDITIONS:

POSITION: BASE UP

AMBIENT TEMPERATURE: 25° C (77.0° F)

ELECTRICAL MEASUREMENTS OF THE LAMP:

INPUT VOLTAGE: 11.3 VAC

INPUT POWER: 2.58 W

SPECTRAL MEASUREMENTS OF THE LAMP:

x - 0.4379 CRI - 84.2

y - 0.4059 CCT - 2997 K

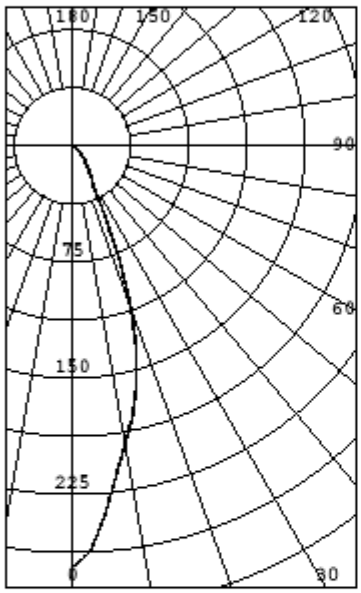
JANUARY 9, 2009

REPORT PREPARED FOR: REPORT CERTIFIED BY:

ITRAMAS CORP.
PERAI, PENANG
MALAYSIA

CERTIFIED TEST REPORT No. 24697

ITRAMAS CORPORATION - LED MR16 LAMP,CAT# Q RAY
THREE INDIVIDUAL PLASTIC LENSES
THREE LEDS. LAMP LUMEN OUTPUT = 109 LMS.
LAMP OPERATING AT 11.3 VAC AND 2.58 WATTS



INTENSITY(CANDLEPOWER) SUMMARY

ANGLE	MEAN CP	LUMENS
0	271	
5	239	22
10	195	
15	159	43
20	108	
25	46	24
30	24	
35	17	11
40	12	
45	8	6
50	5	
55	2	3
60	2	
65	1	1
70	1	
75	0	0
80	0	
85	0	0
90	0	

ZONAL LUMENS AND PERCENTAGES

ZONE	LUMENS	% LAMP	%LUMINAIRE
0-30	88	80.71	80.71
0-40	98	90.42	90.42
0-60	107	98.52	98.52
0-90	109	100.00	100.00
40-90	10	9.58	9.58
60-90	1	1.48	1.48
90-180	0	0.00	0.00
0-180	109	100.00	100.00

** EFFICACY: 42.2 LUMENS/WATT **

CERTIFIED BY:

DATE:
JAN 13, 2009

PREPARED FOR:
ITRAMAS CORPORATION
PRAI, PULAU PINANG, MALAYSIA.

TESTED IN ACCORDANCE WITH IES PROCEDURES.

LIGHTING SCIENCES, INC.
7826 E. EVANS RD.
SCOTTSDALE, AZ, USA 85260
CERTIFIED TEST REPORT No. 24697
ITRAMAS CORPORATION - LED MR16 LAMP,CAT# Q RAY
THREE INDIVIDUAL PLASTIC LENSES
THREE LEDS. LAMP LUMEN OUTPUT = 109 LMS.
LAMP OPERATING AT 11.3 VAC AND 2.58 WATTS
INTENSITY(CANDLEPOWER) DATA
IN 2.5 DEGREE STEPS

ANGLE	INTENSITY(CANDLEPOWER)	LUMENS
0.0	271	
2.5	262	
5.0	239	22
7.5	215	
10.0	195	
12.5	179	
15.0	159	43
17.5	137	
20.0	108	
22.5	77	
25.0	46	24
27.5	29	
30.0	24	
32.5	20	
35.0	17	11
37.5	14	
40.0	12	
42.5	10	
45.0	8	6
47.5	6	
50.0	5	
52.5	4	
55.0	2	3
57.5	2	
60.0	2	
62.5	1	
65.0	1	1
67.5	1	
70.0	1	
72.5	1	
75.0	0	0
77.5	0	
80.0	0	
82.5	0	
85.0	0	0
87.5	0	
90.0	0