



lighting  
design  
lab

A Northwest utility funded lighting education facility promoting commercial and industrial energy conservation.

# WHAT'S NEW IN LIGHTING FOR 2012

PRESENTED BY

ANDREW PULTORAK, LC, MIES





# LFI 2012 INNOVATION AWARDS



Yearly awards announced at LightFair Conference. They honor industry innovations and designs that have been introduced in the past 12 months in numerous categories.



# IES PROGRESS REPORT



## 2011 Progress Report

REPORT PUBLISHED JANUARY 2012  
261 SUBMITTALS - 156 ACCEPTED



[www.ies.org](http://www.ies.org)



# NEXT GENERATION LUMINAIRES

The goal of the NGL SSL Design Competition is to identify winning products that are *worthy of* specification. The 2012 Winners were announced Feb 2012 (187 submissions, 53 awards).



Luminaires were chosen on the basis of color appearance, color rendering, appropriate illuminance, appropriate luminance, application effectiveness, aesthetic appearance and style, serviceability and replacement. Bonus points were awarded for entries exhibiting the following attributes: no off-state power use, dark-sky friendly, and adjustability/flexibility.





# NEW IN 2012



PUBLICATIONS / SOFTWARE / REGULATIONS / LABELING

CONTROLS and DAYLIGHT INTEGRATION

SPECIALTY LUMINAIRES/HARDWARE/COMPONENTS

INTERIOR LUMINAIRES

EXTERIOR LUMINAIRES

UNIQUE APPLICATIONS

SOURCES AND SUPPLY





PUBLICATIONS

SOFTWARE

REGULATIONS

LABELING



# ENERGY STANDARDS

**PHILIPS**

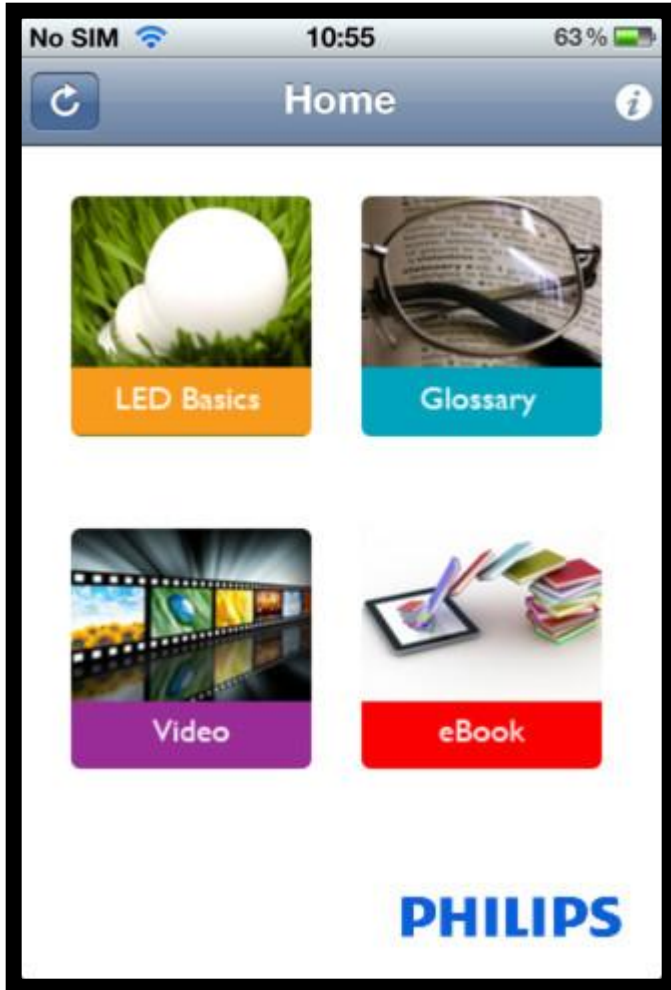


DOE Approves Two-Year Extension for  
Energy Standards for 700 Series T8 Lamps  
NEW DATE: JULY 14, 2014

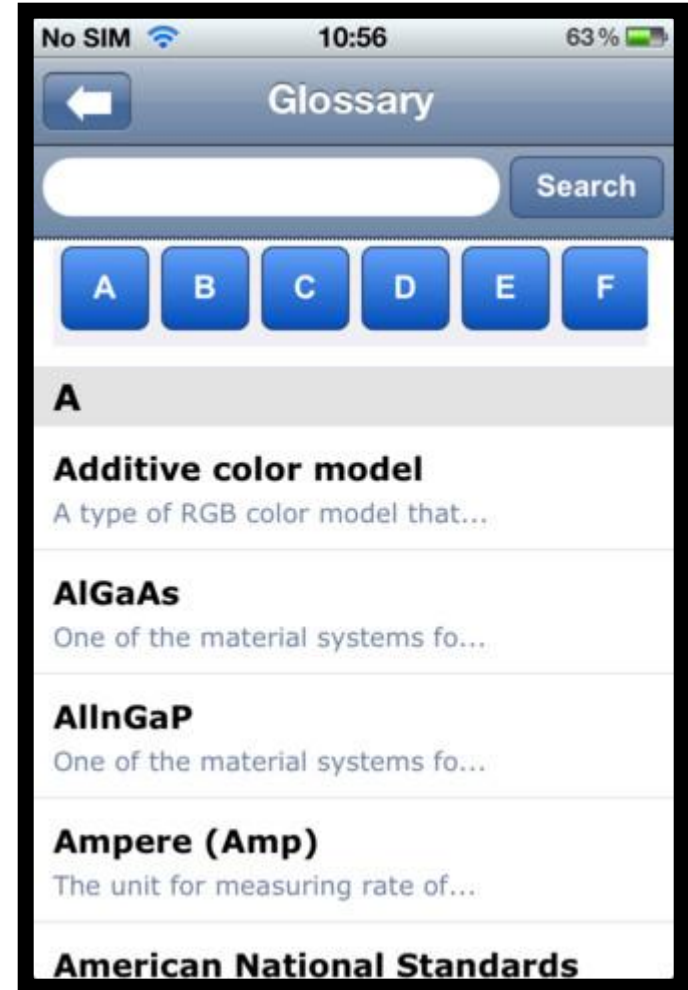




# SOFTWARE



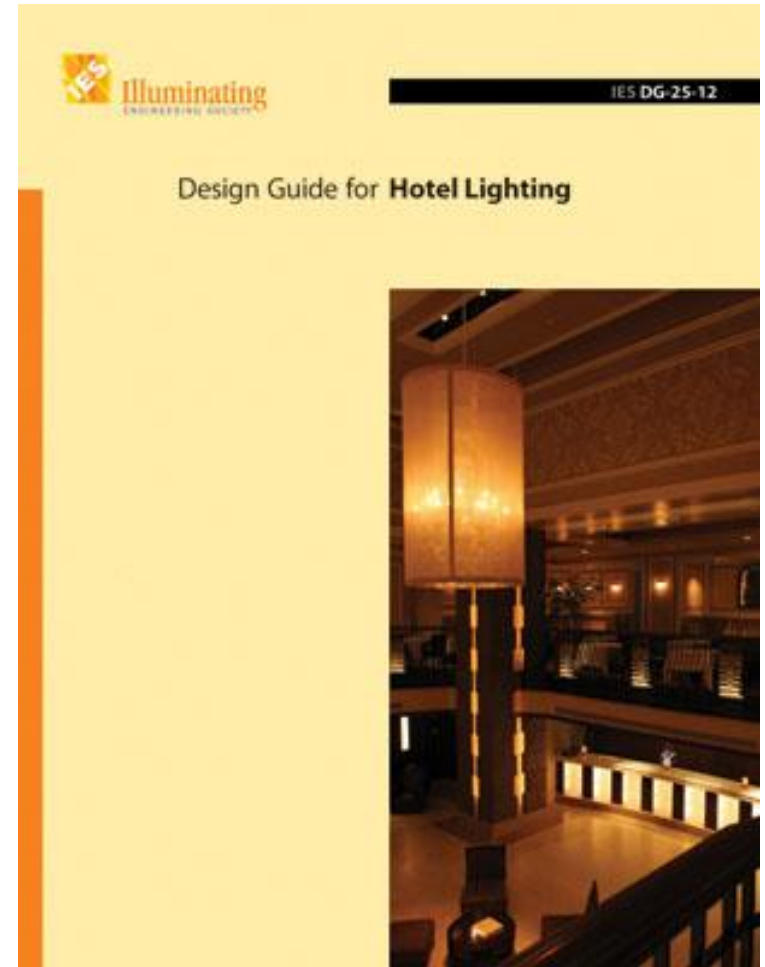
- learn LEDs
- iPhone
- iPad
- soon  
Android





# DG25-12

- Economy/Mid-Market / Upscale / Luxury / All-Suite / Extended Stay
- Covers Lighting Design Considerations / Uses of Space / Design Criteria and Lighting Solutions
- \$60.00 non member / \$42.00 member





# LDL LIGHTING GUIDES

## LIGHTING LAYOUT GUIDE SERIES

CLASSROOM GUIDE 1

### ROOM CHARACTERISTICS

Length: 30'  
Width: 30'  
Height: 9'  
Reflectivity:  
Ceiling - 80%  
Walls - 50%  
Floor - 20%

### PRODUCT SPECIFICATIONS



Dimensions: 9" x 48"  
Louvers: Parabolic  
Lamps: (2) F32T8  
Lumens per Lamp: 3100  
Ballast Factor: 0.88\*  
Lamp Lumen Depreciation: 0.95  
Watts: 59

\* If the light levels are higher than required, consider a lower ballast factor (BF) for greater savings (see options on back).

## CLASSROOM

2-LAMP DIRECT/INDIRECT



### THE OPPORTUNITY

In this typical 9' classroom space, it is possible to provide high quality even lighting that both illuminates the vertical surfaces and desk tops to recognized standards, and meets or beats the local energy codes. This solution is the current best practice recommended for classrooms.

### THE SOLUTION

Install (2) rows of pendant mounted, direct/indirect luminaires, equipped with electronic ballasts and T8 32w lamps. This combination meets the target of 35-40 average maintained footcandles. This solution also substantially reduces glare on traditional computer screens, and works well with LCD monitors.

### DESIGN CONSIDERATIONS

As is the case with many interior applications such as office spaces, this layout emphasizes not only appropriate horizontal and vertical illumination, but uniformity as well. This layout also achieves a highly desirable contrast ratio of less than 5.0 to 1.0 at desk level.



The Lighting Design Lab is a Northwest utility funded lighting education facility promoting commercial and industrial energy conservation. Additional guides are available at the Lighting Design Lab website.

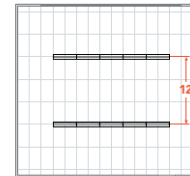
[WWW.LIGHTINGDESIGNLAB.COM](http://WWW.LIGHTINGDESIGNLAB.COM)  
(206) 325-9711 or Toll Free: (800) 354-3864  
2915 4th Avenue South, Seattle, WA 98134

With support from 

- 9 Scenarios
- 19 Total Guides
- All downloadable

### LAYOUT OPTIONS

2-Lamp Direct/Indirect | 12' Spacing



### INSTALLATION SPECS

Number of Luminaires: 10  
Luminaire Spacing: (2) Rows 12' on center  
Mounting Condition: Pendant  
Mounting Height: 7'6"  
Average Illumination: ~45 footcandles  
Watts/sq. ft.: ~0.65

### CONTROLS

Most energy codes now require controlled luminaires within the Daylight Zones separately from those outside the zones. In addition, those luminaires within the zones must be controlled by automatic daylight sensing devices capable of either continuous dimming to at least 20% of light output, step switching of each lamp in individual luminaires, or step dimming of all lamps to 50% of light output, and must include an automatic OFF control.

### ADDITIONAL ENERGY SAVING STRATEGIES

STRATEGY	WATTS/LUMINAIRE	SAVINGS	LIGHT LEVELS
Daylight dimming ballasts (first row near windows)	-30w (@ 50% dimming)	50%	Maintained from daylight
Lower wattage lamps (28w T8)	-166w (average)	21%	20% lower
Lower ballast factor	48w (BF of 0.78)	12%	10% lower

### ENERGY CODE INFORMATION

JURISDICTION	CODE	LIGHTING POWER ALLOWANCE (CLASSROOMS)
Seattle	2009 Seattle Energy Code	0.99 w/sq. ft.
Washington	2009 WSEC	1.00 w/sq. ft.
Oregon	2010 OEESC	1.01 w/sq. ft.
Idaho	2009 IECC	1.20 w/sq. ft.
Montana	2009 IECC	1.20 w/sq. ft.

LIGHTING LAYOUT GUIDE SERIES:

CLASSROOM | 2-LAMP DIRECT/INDIRECT





# FTC LABEL

Brightness

**820**  
lumens

Estimated  
Energy Cost

**\$7.49**  
per year

Front

## Lighting Facts

Per Bulb

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<b>Brightness</b>	<b>820 lumens</b>
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<b>Estimated Yearly Energy Cost</b>	<b>\$7.49</b>
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Based on 3 hrs/day and 11.4 ¢/kWh.  
Your cost will depend on your rates and use.

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<b>Life in Years</b>	<b>1.4 yrs</b>
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Based on 3 hrs/day.

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<b>Color Appearance</b>	
Warm	Cool
	
2700 K	

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<b>Energy Used</b>	<b>60 watts</b>
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Back

- Required label deadline changed from July 2011 to January 2012
- directed to consumers
- Applies to all medium screw base lamps
- No test procedures are required





# FTC LABEL (Hg)

<b>Lighting Facts</b> Per Bulb	
Brightness	870 lumens
Estimated Yearly Energy Cost	\$1.57
Based on 3 hrs/day, 11¢/kWh Cost depends on rates and use	
Life	5.5 years
Based on 3 hrs/day	
Light Appearance	
Warm <span style="float: right;">Cool</span>	
	
Energy Used	13 watts
<b>Contains Mercury</b>	
For more on clean up and safe disposal, visit <a href="http://epa.gov/cfl">epa.gov/cfl</a> .	

Back





# DOE SSL LABEL



### Light Output/Lumens

Measures light output. The higher the number, the more light is emitted.  
Reported as "Total Integrated Flux (Lumens)" on LM-79 test report.

### Watts

Measures energy required to light the product. The lower the wattage, the less energy used.  
Reported as "Input Power (Watts)" on LM-79 report.

### Lumens per Watt/Efficacy

Measures efficiency. The higher the number, the more efficient the product.  
Reported as "Efficacy" on LM-79 test report.

### IESNA LM-79-2008

Industry standardized test procedure that measures performance qualities of LED luminaires and integral lamps. It allows for a true comparison of luminaires regardless of the light source.

### Registration Number Model Number Type

### Brand

### Color Rendering Index (CRI)

Measures color accuracy.  
Color rendition is the effect of the lamp's light spectrum on the color appearance of objects.

### Correlated Color Temperature (CCT)

Measures light color.  
"Cool" colors have higher Kelvin temperatures (3600–5500 K); "warm" colors have lower color temperatures (2700–3500 K). Color temperatures higher than 6500 are outside of the defined region for white light, but may be appropriate for outdoor applications.

- Voluntary: Original label in effect as of July 2011
- Test procedures required

[www.lightingfacts.com](http://www.lightingfacts.com)





# DOE SSL LABEL: 4 OPTIONS

- Updated label available March 2012
- Total of 4 options: use current required metrics, one or both of new metrics

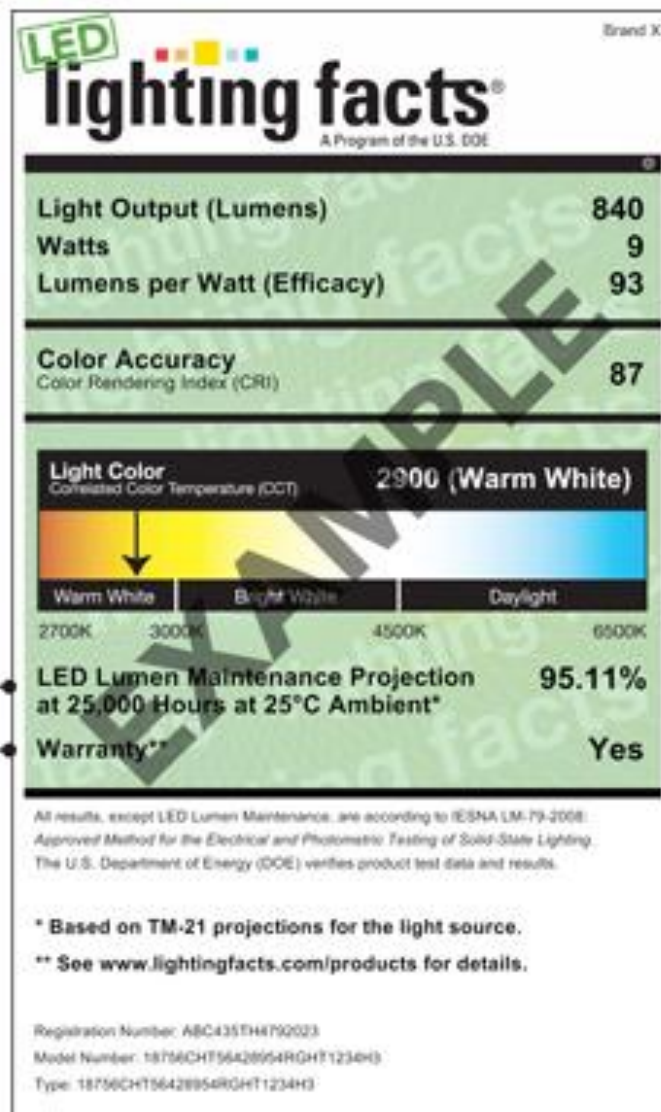
## LED Lumen Maintenance

The amount of light remaining at a given time.

A projection of light output over time compared to initial light output. Based on a combination of TM-21 projections for the LED light source and temperature measurements of the light source while operating inside the luminaire or lamp product.

## Warranty

Partners provide a link to detailed warranty information, which can be found by searching for this product at [www.lightingfacts.com/products](http://www.lightingfacts.com/products).





# TM1-12

- shows the reader how to perform the basic calculations of luminous flux, luminous intensity, illuminance, luminance, and luminous exitance
- \$20.00 non member / \$14.00 member





# NEW BALLAST STANDARDS

(Since the "2011 What's New" class)

## New Ballast Energy Standards to Take Effect November 2014

*Ballasts that do not comply with the new standards will be prohibited from manufacture and import, but existing inventories can be sold until they are exhausted.*

The new standards go beyond T12 to include T8 and T5 electronic ballast efficiency including:

- instant- and rapid-start nonresidential ballasts designed to operate 4-ft. medium bi-pin, 2-ft. U-shaped and 8-ft. single-pin (“Slimline”) lamps;
- programmed-start nonresidential ballasts designed to operate 4-ft. medium bi-pin, miniature bi-pin (standard and high output), and 2-ft. U-shaped lamps;
- instant- and rapid-start non-sign ballasts designed to operate 8-ft. high-output lamps; and
- programmed-start non-sign ballasts designed to operate 8-ft. high-output lamps.





# NEW BALLAST STANDARDS

## The Requirements

- establish energy efficiency standards for each ballast type;
- require the ballast have a power factor of  $>0.90$  if designed for nonresidential use or  $>0.50$  if designed for residential use;
- require outdoor sign ballasts acquire UL Type 2 rating and be designed, labeled and marketed for use in this application; and
- require residential-only ballasts satisfy FCC 47 CFR part 18 and be designed, labeled and marketed only for use in this application.

## New Efficiency Metric Ballast Luminous Efficiency (BLE)

Previous rulemaking: Ballast Efficacy Factor (BEF)

BLE removes the lamp as a variable, eliminating variation in results caused by the lamp load, which represents the large majority of the total load. Light output is measured independently of the new metric.





# NEW BALLAST STANDARDS

## The Exceptions

- dimming ballasts that dim to 50% or less of full light output (except for T12 dimming ballasts);
- programmed-start ballasts operating 4-ft. medium bi-pin lamps that deliver a current of less than 140 mA to each lamp (0.71 ballast factor); and
- T8 magnetic ballasts labeled and marketed for use in electromagnetic interference-sensitive applications and sold in packages of 10 or fewer units.

## Most Likely to Vanish

- majority of T12 electronic ballasts;
- majority of outdoor-sign and residential-only ballasts; and
- T8 and T5 programmed-start ballasts lacking a cathode cutout design.





CONTROLS  
AND  
DAYLIGHT  
INTEGRATION



# MAESTRO OCCUPANCY SENSOR



- Occupancy and vacancy sensor
- single pole or 3-way
- NO NEUTRAL
- 250W or 600W incandescent or halogen loads/ ELV
- 200W or 450W MLV / 360W CFL or LED
- 3amp / 5 amp fans



# MODLET SMART OUTLET



Courtesy: ThinkEco

- plug load scheduling
- power draw and energy consumption reports
- monitor from pc



# SERENA

## Light-filtering options



### **Sheer – Single-cell**

- Softens intense rays
- Preserves some exterior view



### **Light-filtering – Single-cell**

- Transforms harsh daylight into a soft, filtered glow
- Provides varying levels of privacy from the outside
- Saves energy with insulating fabric and design



### **Light-filtering – Double-cell**

- Allows some light to filter into the space
- Saves even more energy with double-cell insulating design



### **Room-darkening – Single-cell**

- Blocks light from entering into a space
- Creates complete privacy from the outside
- Saves the most energy due to aluminum lining



- shades and shade control
- 3 year battery life
- wall mount or remote
- pricing starting at....



# LUMENTRAC LT1



- continuously monitors the output of a light source at the fixture level
- notifies the user when the source has reached 70% of its initial output.
- settings for frequently-switched and always-on luminaires



INDUSTRIAL  
AND  
SPECIALTY  
LUMINAIRES



# H-SERIES

BEST  
IN  
CLASS



HIGH  
BAY  
INDUSTRIAL



LED - 94.19 I/w - 4852K - 74CRI - AISLE, NARROW, WIDE DISTRIBUTION



[www.albeotech.com](http://www.albeotech.com)



# I-BEAM LED (UPDATED)



- High bay LED
- mounting heights 15' – 40'
- 4000K / 5000K with 70 CRI
- narrow or wide beam distributions
- dimmable
- occ sensor / photocell avail



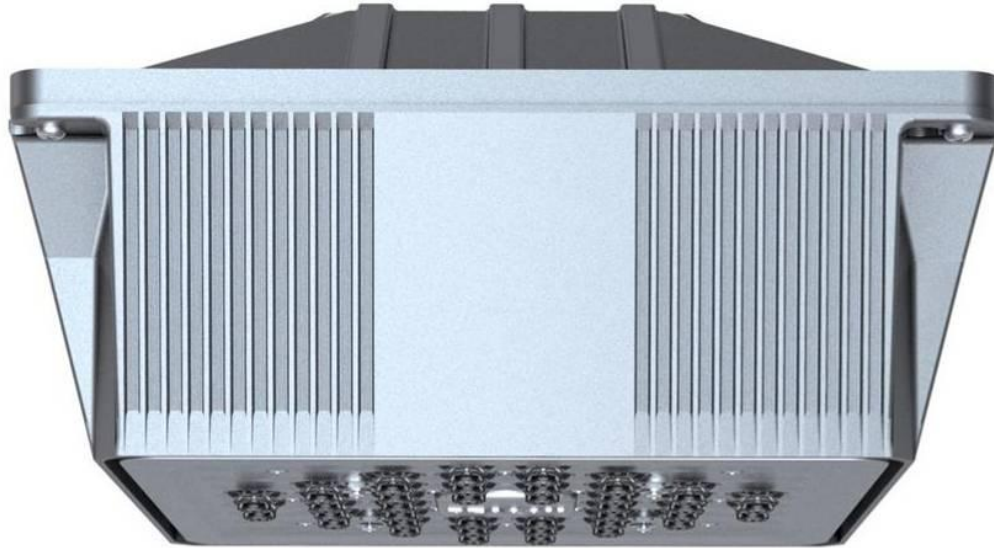
# ESSENTIALS BAY SERIES

- High bay LED
- 5,600 – 36,000 lumens
- 90-103 l/w
- 4000K / 5000K with 70 CRI
- mounting heights 10' – 60'
- dimmable / occupancy sensors
- 70,000 hours at L70





# ENDURA LED



- garage and canopy
- 28.64W / 3197 lumens
- 111 l/w
- 68 CRI
- 4500K
- 6 distributions
- dimmable / occupancy sensors
- low glare



INTERIOR  
LUMINAIRES

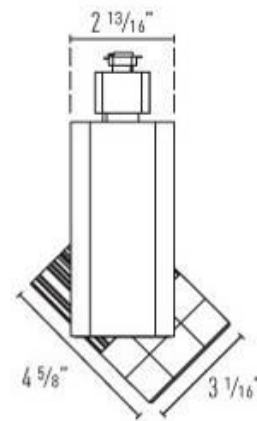
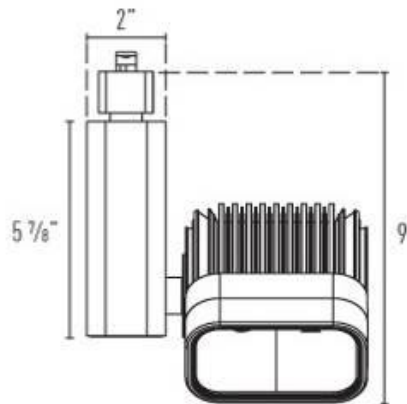


# MBW2 LED

BEST  
IN  
CLASS



ACCENT  
TRACK  
LIGHTING



- LED
- 54.5 watts (2500 lumens)
- 27K / 30K / 35K / 41K
- 82 CRI
- Best for wall washing



# TANGENT



- Cold cathode
- customizable radius
- 75,000 hr life
- independent uplight and downlight
- 1900K – 8300K
- average 77 lumens/watt



# GENERATION 3 LED



4" WarmDim Downlights



5" WarmDim Downlights



6" WarmDim Downlights



- 10.5W (600 lumens)
- 14.6W (900 lumens)
- 10 SP/ 37 NFL / 50 MFL / 76 WFL
- 2700K / 3000K / 3500K / 4200K
- 83 CRI



# BARE

- 10.4 W
- 3881K
- 84.2 CRI
- 5% uplight
- 11.5" W x 10.5" H





# AERIAL CEILING



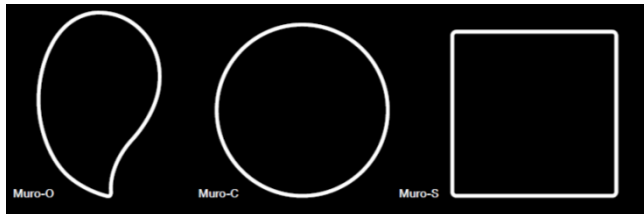
- 16W LED each
- mountable vertical or horizontal
- positions at 0, 45 or 90 degrees
- 3000K / 3500K / 4200K
- dimmable to 1%





# MURO-OVAL

- replaceable LED T8 light engine
- pendant / wall
- 2' / 4' / 8'
- 4100K
- 97% recyclable at end of life





# AERIAL SCONCE



- 16W LED
- mountable vertical or horizontal
- swivel 0-180 degrees
- 3000K / 3500K / 4200K
- dimmable to 1%
- 19.5" overall height / 5.5" depth / 1.25" wide



# VOICE



- T8 / T5 / T5HO
- Response Daylight sensors factory pre-calibrated
- dimmable



- Meso Optics – 95% transmission, reduces hot spots, reduces color shifts, more uniform light
- wireless controls



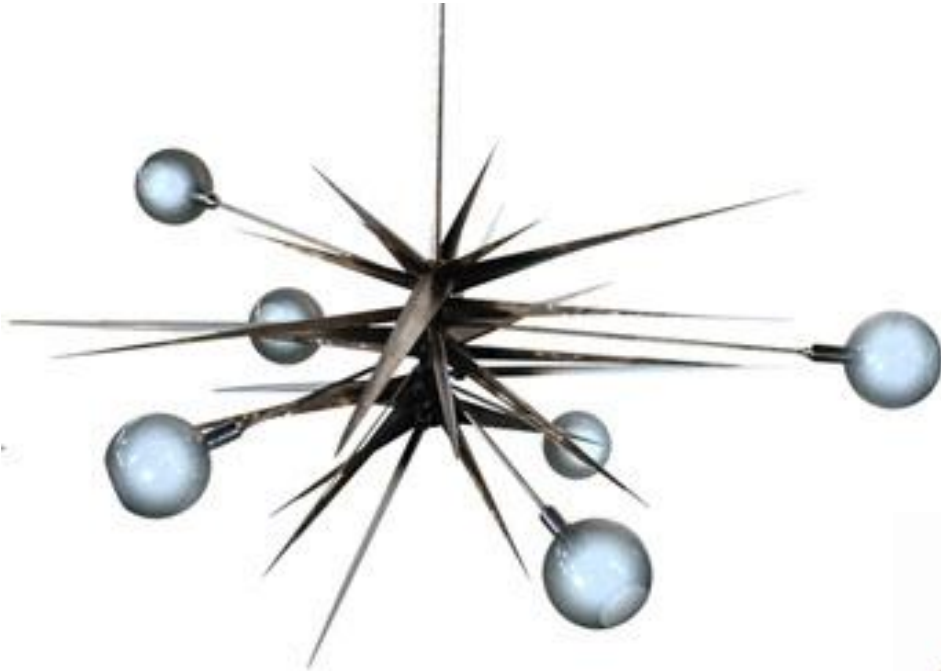
# P3LED

- 20W (900 lumens)
- 3000K
- 85 CRI
- dimmable
- 45 degree tilt / 365 degree rotation
- interchangeable optics (10/15/25/40)
- downlight / wallwash / slot / cut / shower
- first Zhaga standard fixture



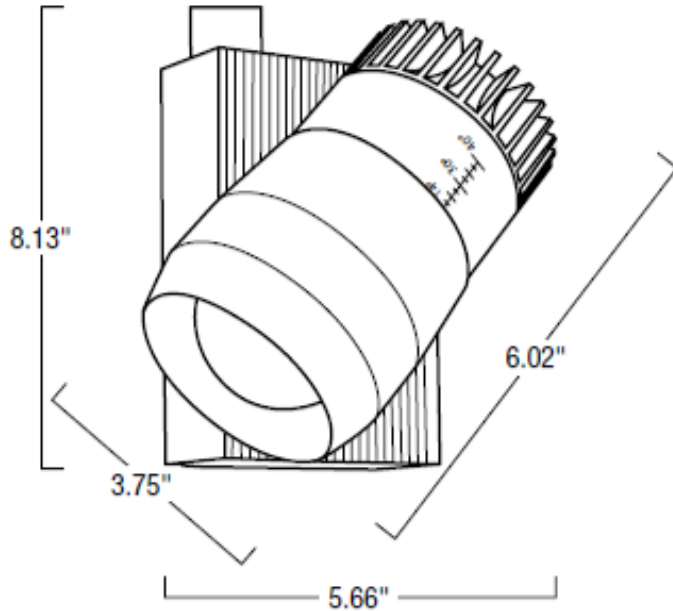


# NEW DECORATIVES





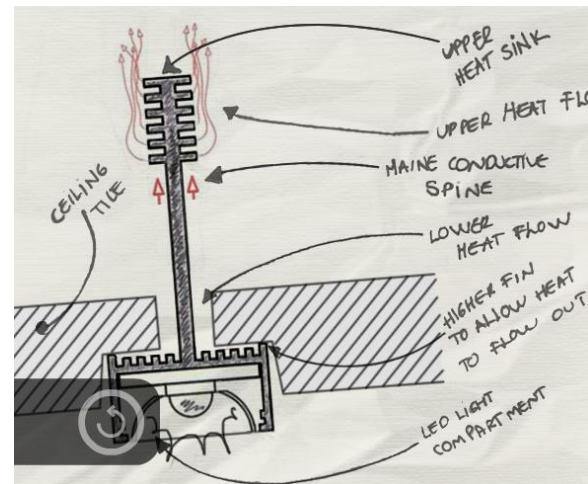
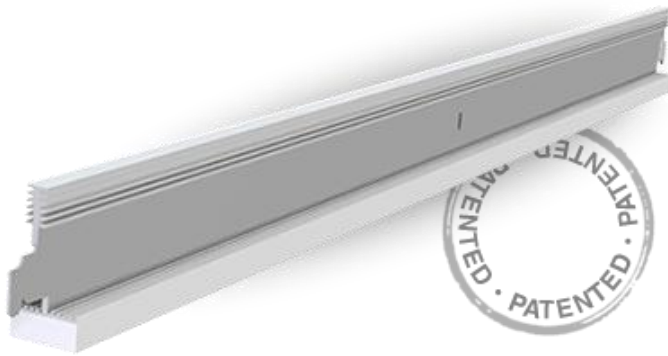
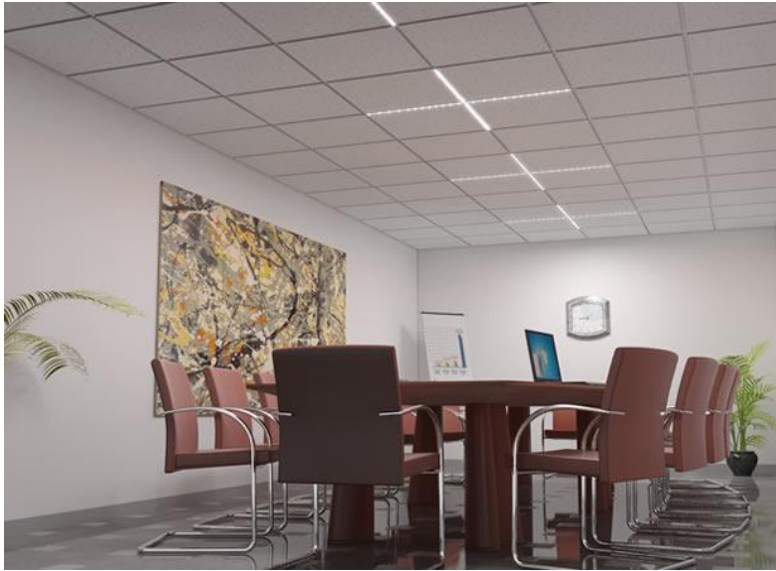
# LED FLEX BEAM



- 25W Bridgelux LED
- adjustable beam from 14 – 40 degrees
- 2700K (1650 lumens) / 3000K (1800 lumens) / 4000K (2000 lumens)
- 80 CRI

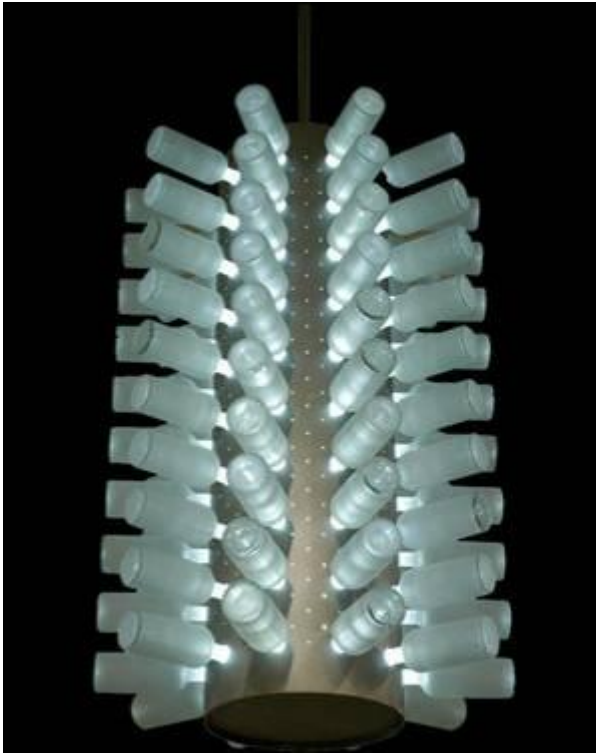


# TBAR SMART LIGHT





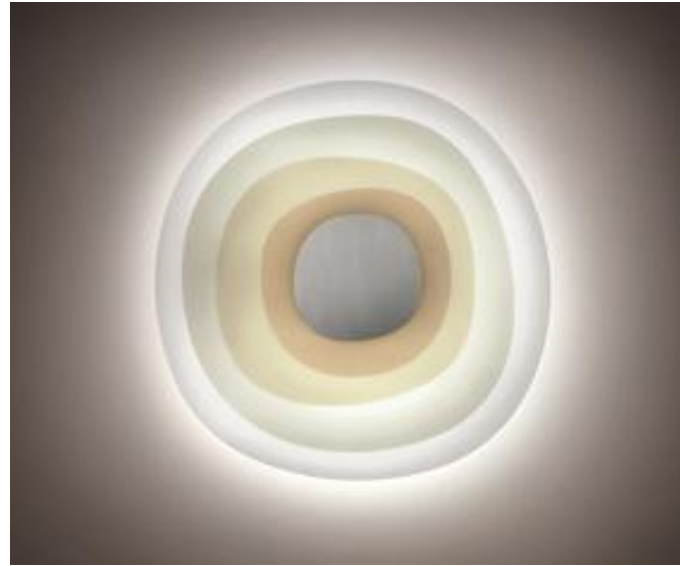
# SEMI-CUSTOM





# BETA WALL/CEILING

- ADA compliant
- 20.5" square or 13.75" square
- 2.75" deep
- appears white when turned off, center is finished in steel





# MOSSO LED

- 10.5W / 588 lumens
- 3500K / 4500K
- 85 CRI
- dimmable
- built in occupancy sensor
- multiple mounting options

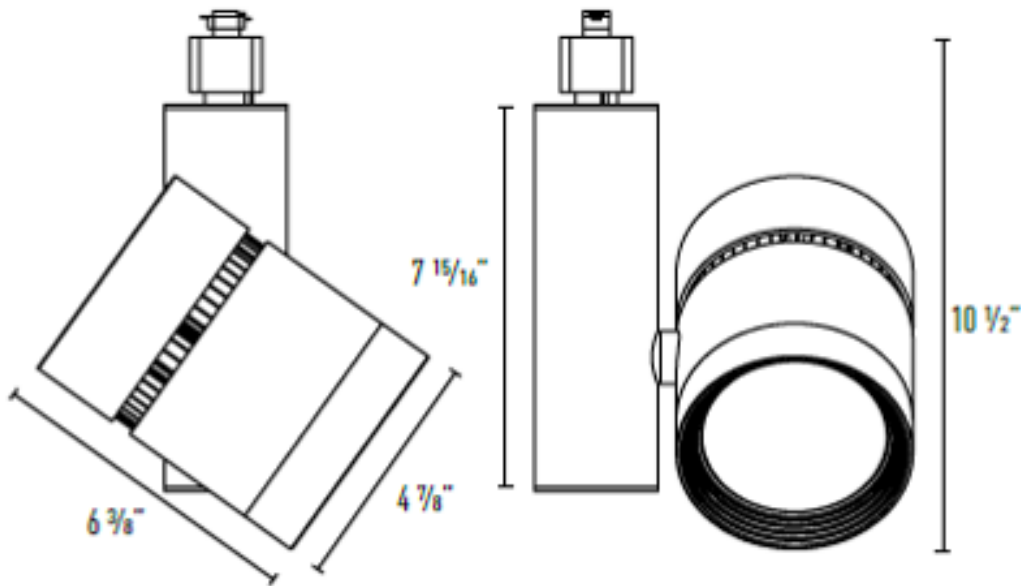


KONCEPT

[www.koncept.com](http://www.koncept.com)



# MB3 LED



Horizontal Adjustability: 358° / Vertical Adjustability: 258° Total



- LED 52 watts (3000 lumens)
- 27K / 30K / 35K / 41K at 82 CRI
- 27K / 30K at 92 CRI available
- 59 R9 value available
- 19 SP / 28 NFL / 51 WFL



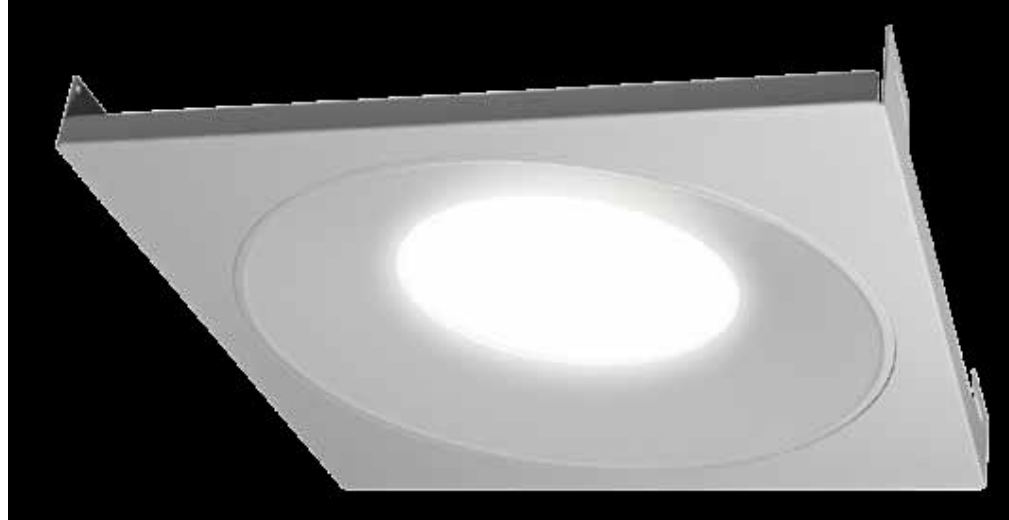
# SPIN AND FOLD



available in black with bronze interior or silver with white interior



# RLC22



- LED 38.8W (3110 lumens)
- 3250K / 3500K / 4000K
- 82.5 CRI
- Aperature 10.9"
- 0-10V dimming standard
- 50,000 hours at L85



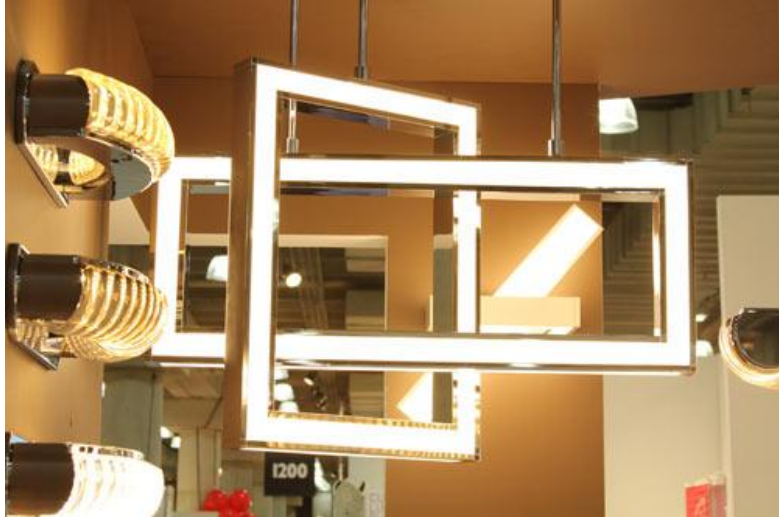
# ARCFORM



- LED 50W (4400 lumens) / 40W (3600 lumens)
- 3000K / 3500K / 4000K
- Response Daylight sensors factory pre-calibrated
- Meso Optics – 95% transmission, reduces hot spots, reduces color shifts, more uniform light
- dimmable
- wireless controls



# SATCO!

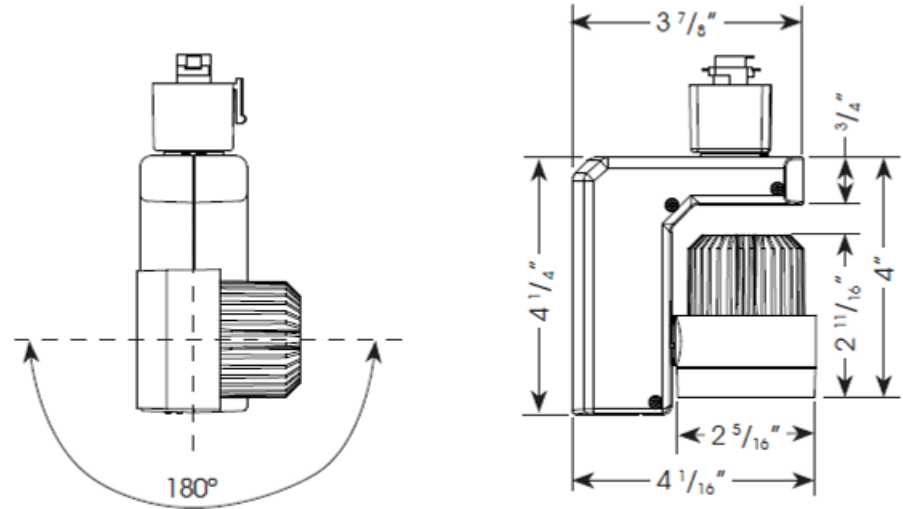


- 2800K LED
- available square, rectangle or circle





# HORNET LED



- LED 15W (830 lumens spot)
- 27K / 30K / 35K / 40K at 85 CRI
- 30K at 90 CRI available
- 15 SP / 28 NFL / 45 WFL
- 10 year warranty
- accessories available



# PELLA - LEATHER





# BeveLED

- 16W (1100 lumens) / 24W (1525 lumens) / 33W (2100 lumens) DOWNLIGHT
- 2700K / 3000K / 3500K / 4000K (2 step Macadam ellipse)
- 80+ CRI or 90+ CRI
- 90+ R9 values
- trimless options
- dimmable
- 3.5" aperture (square)
- 40 degree tilt / 362 degree rotation
- 10/30/50/80 degree options
- downlight / wallwash / adjustable
- "Warm Glo" available Q1 2013?





# ROLO



- 4W LED / 50W MR16 / 20W CMH
- rotatable with rare earth magnet
- 4" – 6" depending on source
- black / chrome / white



# MINO LED



- recessed / surface / pendant
- 2x2 / 93 lumens per watt
- 3500K / 4000K
- 80+ CRI
- optics reduce high angle glare
- dimmable





# CRYSTAL FAME



available 12" / 18" / 24"

**SWAROVSKI**

[www.architecture.swarovski.com](http://www.architecture.swarovski.com)



# STL LED SERIES

BEST  
IN  
CLASS



GENERAL  
PURPOSE  
LIGHTING



50 watts - 98.68 l/w - 3567K - 81CRI - dimmable



# BINGO WALL/CEILING



- fluorescent circline lamp
- available brushed nickel or venetian bronze
- semi-customizable with your own fabric





# SR6 LED



- 6" downlight 17W / 18W
- 1200 lumens / 1800 lumens
- up to 75 l/w
- 90+ CRI
- 30K / 35K / 40K
- 0-10V dimming to 5%
- wallwash available
- 75,000 hours



# SMART LED



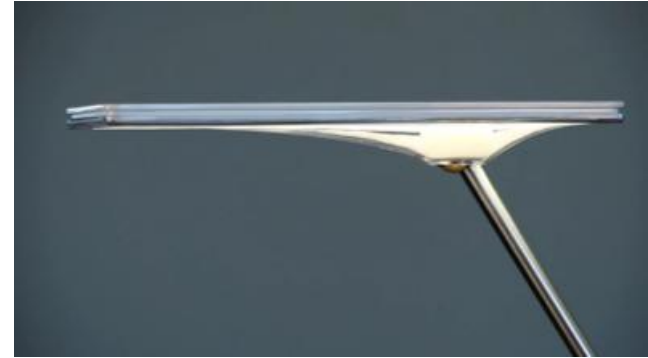
- LED 43W (3926 lumens)
- CCT changes from 3000K – 6500K as dimmed
- 88.7 CRI at 4344K



# HORIZON



- LED, thin film, glare reduction
- 3000K / 81 CRI
- 9 level dimming (1W to 9W)
- white, black or silver finish





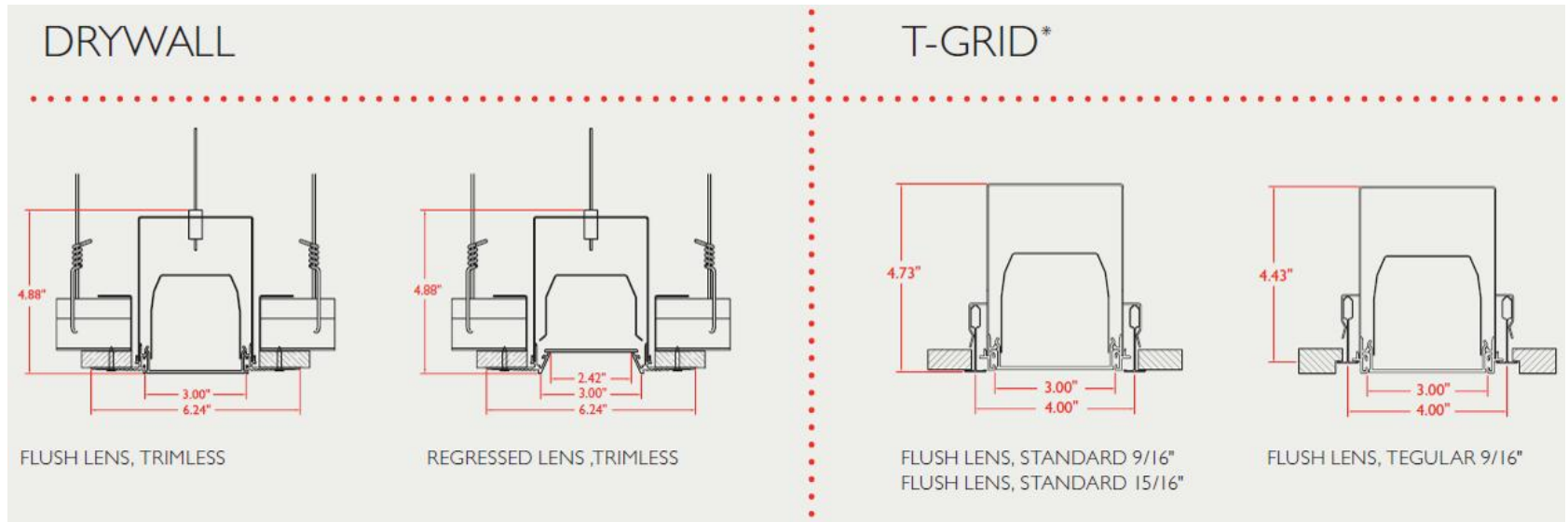
# INDY PERFORMANCE SERIES



- 4" / 6" / 8"
- 19W – 46W (800 – 2800 lumens)
- Hyperbolic "silent ceiling" or parabolic trims
- 2700K / 3000K / 3500K / 4100K
- 80+ CRI



# TRUGROOVE



- LED (3500K / 4000K) or T5 / T5HO
- Symmetric or Asymmetric
- 83% efficient
- Meso Optics – 95% transmission, reduces hot spots, reduces color shifts, more uniform light
- Response Daylight sensors factory pre-calibrated





# HYPHAE



- 3W LED (200 lumens)
- one-of-a-kind design 3D-printed in nylon plastic





# NanoLED NXT

- 20W (979 lumens)
- 27K / 30K / 35K / 40K (2 step Macadam ellipse)
- 80+ CRI or 90+ CRI
- 90+ R9 values
- trimless options
- dimmable
- 2.5" aperture (square or round)
- 40 degree tilt / 362 degree rotation
- 10/25/50 degree options
- downlight / wallwash / adjustable
- "Warm Glo" available Q1 2013





# LC SHUTTERS



- 17.3" W x 8.11" H
- 42W CFL
- white or multi-colored design



# EXTERIOR LUMINAIRES

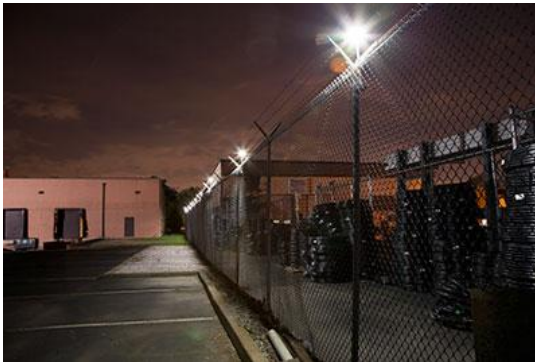
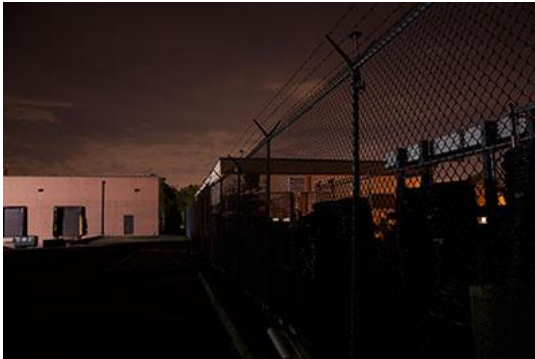


# CPL1

2012  
LIGHTFAIR  
LAS VEGAS

MOST  
INNOVATIVE  
PRODUCT  
OF THE YEAR

BEST OF  
CATEGORY  
INDUSTRIAL, VANDAL,  
EMERGENCY, EXIT



- 6.2W LED
- 265 delivered lumens
- pipe or stake mount
- 60,000 hours L70
- 4500K
- 73 CRI
- 22.5" tall / 4.5" wide
- estimated 36,000 hours life





# AEROBLADES



- 2 / 4 / 6 blade options
- pole or wall mounted
- refractor control
- thermal management allows LEDs to increase life to 100,000 hours



# LFLED5



- 5W LED (208 – 299 lumens)
- 3000K (86 CRI) / 4000K (90 CRI) / 5000K (68 CRI)
- optional spot reflector and accessories available



# ALTITUDE SERIES



- PicoPrism™ Optical System
- ALT - Small 17" (60, 96, 120 diodes)
- ALT - Large 25" (180, 240, 300 diodes)





# FOREFRONT SERIES



AREA



FLOOD

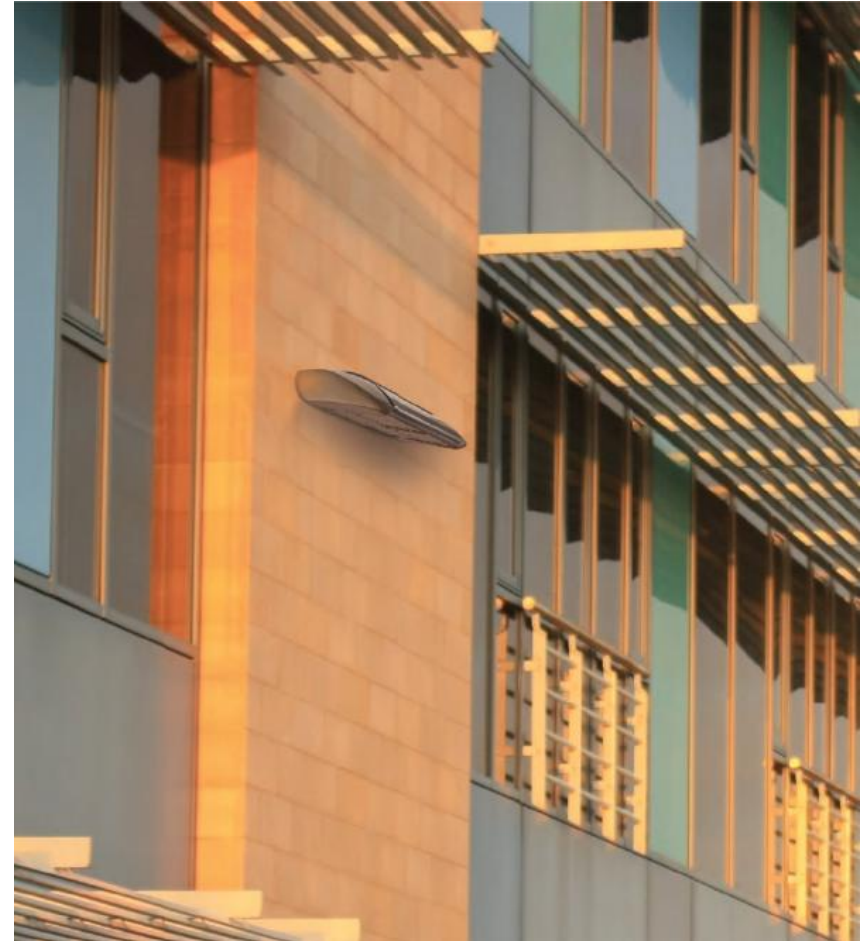


HIGHBAY



PEDESTRIAN

- Variety of distributions
- PIR sensors for dimming – 100% to 50% in 10% increments





# XSP SERIES

- Uses BetaLED Nano Optic Precision Delivery Grid – creates a 15% improvement in optical performance
- 70 CRI minimum
- 4000K / 5700K





# HMAO-LED HIGH MAST



- Asymmetric and symmetric distribution
- 4000K / 5000K
- 20,000 / 30,000 / 40,000 lumen packages
- L70 100,000 hours
- 65 CRI minimum
- User-friendly mechanics & tool-less access



# LUMENFACADE



- LED cove / wall wash
- 1' / 2' / 3' / 4' versions
- meets ASHRAE 5w/ft for lighting facades
- IP66 rated
- dimmable
- 120,000 hrs (L70)
- 1 fc at 129'



# UNIQUE APPLICATIONS



# SOFT LINE INDIRECT LED



- 1.25" channel
- 214 lumens/ft (single) / 428 lumens/ft (double)
- 80+ CRI
- 88 R9 value available
- white or RGB





# LIVING SHAPES INTERACTIVE MIRROR

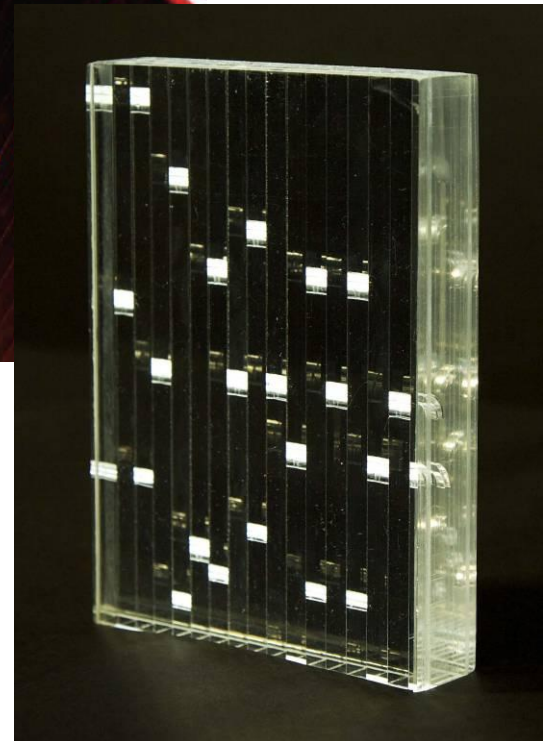
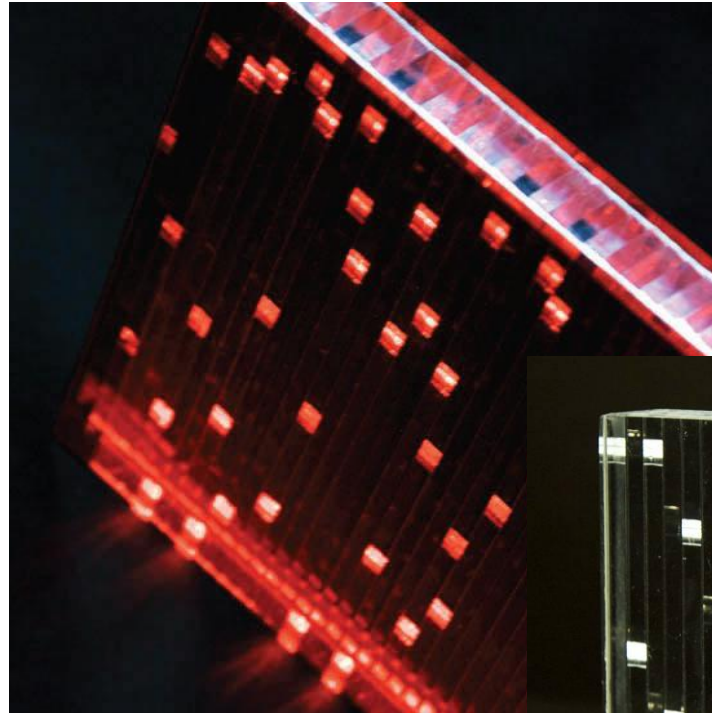
- 64 OLEDs
- 120 lumens per OLED
- 300K
- total 29.53" square
- as you approach, infrared switches turn middle OLEDs to off state





# LUMINA

- LED edge lit
- Acrylic resin
- clear or colored mirror backing
- 4' x 8' panels
- curved available
- etching of logos





SOURCES

AND

SUPPLY



# STANDARDIZING LED FORMAT



Zhaga creates specifications that enable interchangeability of LED light sources made by different manufacturers...  
simplifying LED applications for general lighting



# ENERGY SMART LED A19



- 27W LED
- 100W A19/IF replacement (1600+ Lumens)
- 25,000 hrs
- 3000K
- 80+ CRI
- Available 2013





# LM-L04



- line voltage linear module
- Self contained plug and play for manufacturers or retrofit
- IP65 rated
- Uses for sconces, step lights, wall packs
- 50 l/w
- 60,000 hours at L70





# SODINETTE



- HPS lamps
- 50W / 70W / 100W / 150W / 250W / 400W / 600W / 1000W
- Twin arc tubes
- 70,000 hours
- Immediate restrike



# ULTRA LED with CCT DIMMING

- replacement for 75PAR38
- 16W / 900 lumens / 2100 CBCP
- 25,000 hours
- 3000K
- dims to 10% (2000K)
- 30 degrees
- 85CRI





# ANTIQUE SERIES



- carbon filament
- variety of shapes/wattages
- simulated oil rubbed glass
- up to 3,000 hours life



# LMH2 MODULE

- 2" package
- 850 / 1250 / 2000 / 3000 lumens
- Over 95 lumens per watt
- 27K / 30K / 35K / 40K
- Dimming to 5%
- Directional / Non Directional





# R30 ESL

- Electron Stimulated Luminescence
- intent to replace 65R30
- 19.5W (500 lumens)
- 11,000 hrs
- 3200K
- CRI?
- Available 2013?
- No stores carry within 1,000 miles of LDL





# HALOGEN CLASSIC SHAPES

- Traditional shape lamps
- up to 3,000 hours
- all EISA compliant
- 99+ CRI
- variety of wattages
- dimmable down to 0%





# DEFINITY MR16HO



- 8W LED
- 50W MR16 replacement
- 2350 CBCP at 25 degrees
- 2700K / 3000K / 4000K
- 83 CRI
- True ANSI form



# DEFINITY MR16HO

## MR16 High Output Competitor Overview



		LightingScience <sup>®</sup>	LEDnovation <sup>®</sup>	PHILIPS	TOSHIBA Leading Innovation >>>	Soraa
Lamp Type	MR16					
Optical Distribution	Light Output CCT CBCP Beam Spread CRI Equivalent	525 3000K 2350 25° 83 50W Halogen	525 3000K 2,300 23° 82 49W Halogen	415 3000K 1990 25° 80 35W Halogen	440 3000K 1900 25° 84 35W Halogen	500 3000K 2,375 25° 80 50W Halogen
Wattage	Watts Efficacy	8W 66	7.9W 66	10W 41	9w 49	12w 42
Lamp Specifications	Life (Hours) Dimmability Warranty	25,000 ✓ 3 Year	35,000 ✓ 3 Year	25,000 ✓ 3 Year	25,000 ✓ 5 Year	25,000 ✓ 3 Year

Wattage equivalency calculated from E\* CBCP calculator for CBCP values

- 5.3 base outside of ANSI Spec (23mm vs 19mm)

- Internal Cooling fan
- Larger M.O.L

- Non Standard Form Factor

- Shuts off at high temp
- Highest Wattage



# CRYSTAL

- Long life CMH lamps
- 43,000 hours
- 35W / 50W / 70W / 100W / 150W
- Twin arc tubes
- 3000K / 80+ CRI
- Direct retrofit to HPS in existing luminaires for upgrade from yellow to white light possible





# XT-E LEDS



- 148 lumens / 162 lumens
- 2600K / 3700K
- 85 CRI minimum



# DIMTONE

- 13W BR30
- 730 lumens
- starts at 2700K down to 2200K
- dimmable down to 10%
- 83 CRI
- 25,000 hours



**PHILIPS**

sense **and** simplicity

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# RESOURCES

- Lighting Design Lab: [www.lightingdesignlab.com](http://www.lightingdesignlab.com)
- LightFair International: [www.lightfair.com](http://www.lightfair.com)
- Illuminating Engineering Society: [www.ies.org](http://www.ies.org)
- Lightsearch: [www.lightsearch.com](http://www.lightsearch.com)
- Elumit: [www.elumit.com](http://www.elumit.com)
- Next Generation Luminaires: [www.ngldc.org](http://www.ngldc.org)



# COMMON TERMINOLOGY

- CRI (Color rendering Index): Expressed as a rating from 0 to 100. Describes how a light source makes the color of an object appear to human eyes and how well subtle variations in color shades are revealed. The higher the CRI rating is, the better its color rendering ability.
- CCT (Correlated Color Temperature): Expressed on the Kelvin scale (K), is the color appearance of the lamp and the light it produces. Lamps with a lower color temperature (3500K or less) have a warm appearance. Lamps with a mid-range color temperature (3500K to 4100K) have a neutral or white appearance. Lamps with a higher color temperature (4100K or higher) have a cooler appearance.
- CMH (Ceramic Metal Halide): A discharge lamp in which metal halide salts are added to the contents of a discharge tube in which there is a high-pressure arc and produces high efficacy white light.
- LED (Light Emitting Diode): An electronic solid state semiconductor device. Illumination is achieved when the semiconductor crystal is excited so that it directly produces visible light.
- OLED (Organic Light Emitting Diode): Are made by placing a series of organic thin films between two conductors. When electrical current is applied, a bright light is emitted.
- Footcandle: a measurement of the quantity of light striking a surface.
- Lumen: a measurement of the quantity of light emitted from a light source.



**CALL, VISIT OR CLICK!**

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