EVERLAST®
INDUCTION LIGHTING

Manufactured in Jackson, Michigan U.S.A.

Eco-$mart, Inc.
www.eco-smart.com
(888) 329-2705

Full Spectrum Solutions, Inc. Company Background

- Founded in 1995
- Leading manufacturer of full spectrum task lamp and light therapy fixtures
- Lighting solutions for all applications
- Manufacturer of EverLast® Induction Fixtures

- New 70,000 sq. ft. facility, expected completion Summer 2009
- Exhibitors at National trade shows
- Affiliated with CLTC and UofM for Research and Development

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Full Spectrum Solutions, Inc. Company Background - Product Lines

Full Spectrum Solutions, Inc. Commercial Products

- UltraLux® T5 High Bay and Office Fixtures

- EverLast® Induction

Full Spectrum Solutions, Inc. Residential Products

- BlueMax™ Light Therapy

- BlueMax™ Task Lighting

- BlueMax™ Linear Tubes

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UltraLux® T5 High Bay Fixtures

- Available in a 4 Lamp and 6 Lamp Model
- Miro-4 Parabolic Aluminum Reflector
- Programmed Rapid Start Electronic Ballasts
- Universal Voltage Ballasts 120v – 277v Single Phase
- High quality light output with 5900 Kelvin and 92+ CRI
- Replace 400w Metal Halide one for one
- Instant Restrike
- 25 Year Fixture Warranty
- 5 Year Ballast Warranty
- 2 Year Lamp Warranty

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EverLast® Induction Fixtures

Electrodeless Technology

- Up to 60% Energy Savings Over HID
- 100,000 Hour Life, 70% Lumen Maintenance
- Dimming and Sensor Options
- Reduced Maintenance Costs
- Familiar Designs and Easy Installation
- Wide Range of Wattages and Styles
- Low EMC Interference

Wide Range Fixture Application

- Indoor Fixtures
- Outdoor Fixtures
- Security Lighting
- Flood Lighting
- Parking Lots
- Garages
- Industrial
- Roadway

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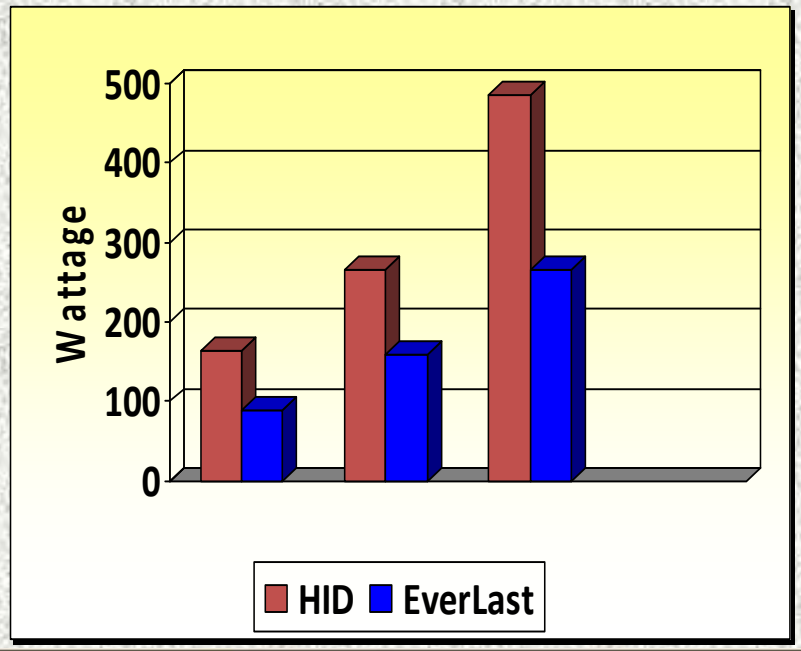
EverLast® Induction Fixtures

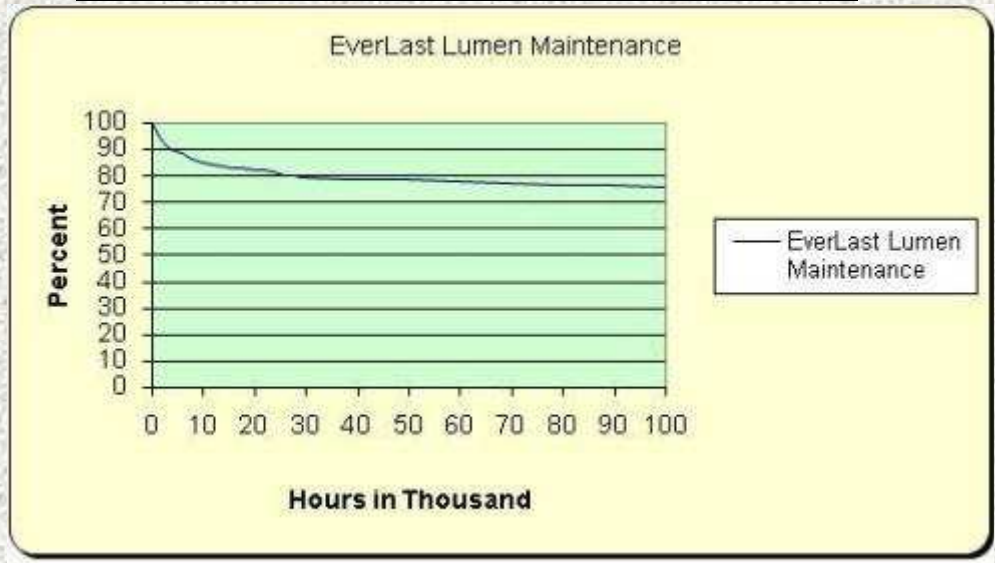
Energy Savings

Up to 60% Energy Savings
Over HID Sources



Lumen Maintenance

70% Lumen Maintenance
Over 100,000 Hours



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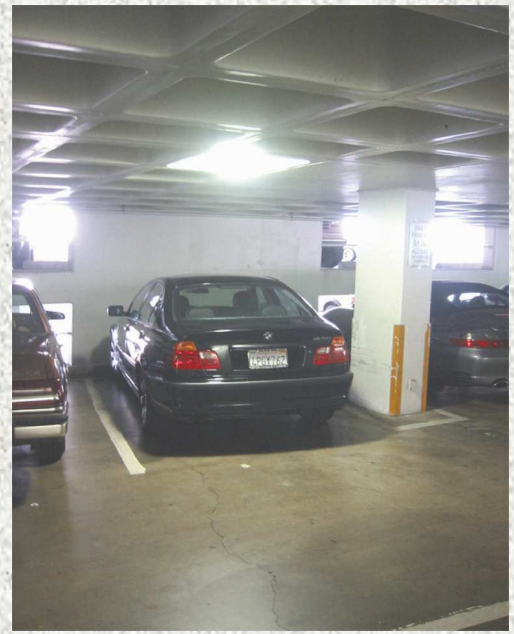
EverLast® Induction Fixtures

Bi-Level Step Dimming

- Customized Pre-Programmed Settings
- Always Some Light for Safety
- Additional Energy Savings When Empty

Occupied



Unoccupied

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EverLast® Induction Fixtures

UC Davis Parking Garage

- Mid-way through project completion

- Retrofit High Pressure Sodium fixtures with EverLast® Induction Garage Fixtures

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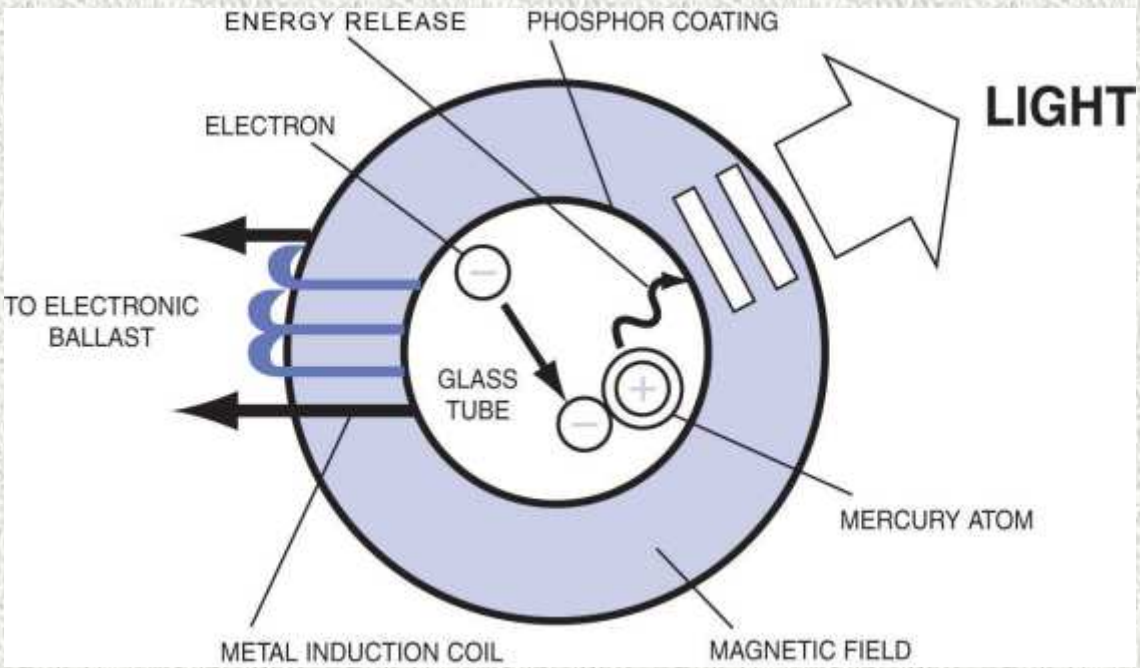
What is Induction?

•Induction lighting is a:

- Fluorescent lamp without electrodes
- Lamp that relies on gas discharge and electromagnetic induction to produce light
- Lighting source with an unmatched life span
- Lamp hour rating of 100,000 hours



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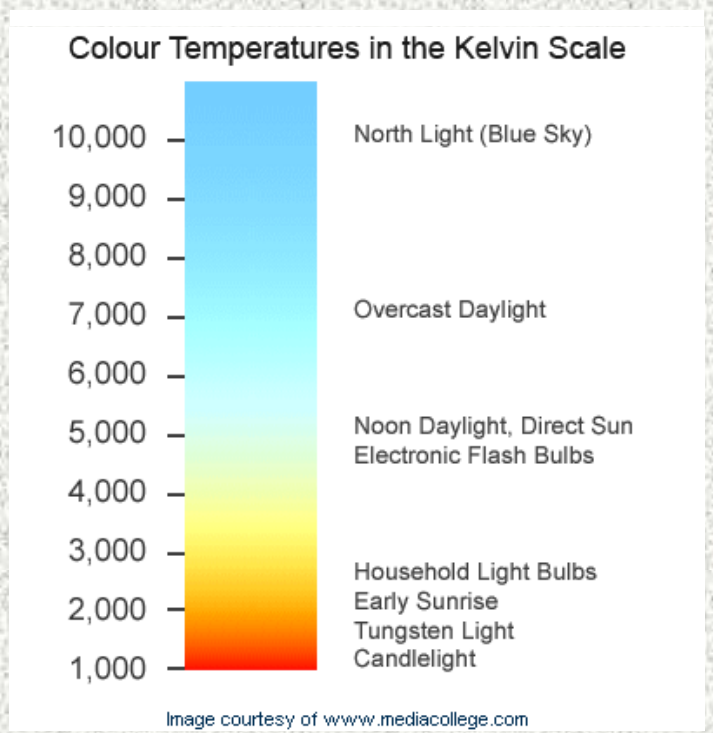
CRI and Kelvin

- **Color Rendering Index (CRI)**

  - Measure of the quality of light
  - Similar to the contrast knob on a television
  - Range 0 (worst) – 100 (best)
  - High CRI = Sharper, crisper, more natural colored image

- **Kelvin (Color Temperature)**

  - Measure of the color of a light source relative to a black body at a particular temperature expressed in degrees Kelvin (K)
  - Incandescent = 2800 K
  - Cool White = 4100 K
  - Noon Daylight = 5000 K – 5900 K
  - EverLast® Induction = 5000 K
  - BlueMax™ Lamps = 5900 K



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Energy Efficiency and Fixture Input Demand Comparisons

EverLast® vs. LED

Specifications	***EverLast® Induction Lighting***	***LED Street Lighting***
Watts - Electrical Usage	100w	135w
Lumens - Light Output	9,625 Lumens	5000 Lumens
Efficiency	96 lm / watt	37-50 lm / watt
Rated Lamp Life	100,000 Hours	50,000 Hours
Applications	Unlimited	Limited
Light Distribution	IES Class I-V	Spot
Heat Issues	Maintains output from -40° F to 122° F	Drastically reduced output above 77° F
Upfront Cost	$410.00	$800.00 +

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Energy Efficiency and Fixture Input Demand Comparisons

EverLast® vs. HID

Specifications	*EverLast® Induction Lighting*	*Metal Halide High Bay*
Watts - Electrical Usage	200w	400w
Kelvin Temp	5000K	3700K
CRI	90+	65
Rated Lamp Life	100,000 Hours	20,000 Hours
Fixture S/P Factor	2.0	1.26
Fixture Lumens - Photopic	20,500	28,800
Visual Acuity Lumens	41,000	36,288
Visual Acuity Lumens per Watt	191	79
Operating Temperature	200° F	900° F
Annual Operating Cost	$183.96	$478.21

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Energy Efficiency and Fixture Input Demand Comparisons

EverLast® vs. HPS

Specifications	*EverLast® Induction Lighting*	*High Pressure Sodium*
Watts - Electrical Usage	200w	400w
Kelvin Temp	5000K	2100K
CRI	90+	22
Rated Lamp Life	100,000 Hours	21,000 Hours
Fixture S/P Factor	2.0	0.76
Fixture Lumens - Photopic	20,500	40,800
Visual Acuity Lumens	41,000	31,008
Visual Acuity Lumens per Watt	191	67
Operating Temperature	200° F	900° F
Annual Operating Cost	$183.96	$477.46

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Energy Efficiency and Fixture Input Demand Comparisons

EverLast® vs. Fluorescent High Bay

Specifications	*EverLast® Induction Lighting*	*Fluorescent High Bay*
Watts - Electrical Usage	200w	254w
Kelvin Temp	5000K	4100K
CRI	90+	85
Rated Lamp Life	100,000 Hours	20,000 Hours
Fixture S/P Factor	2.0	1.58
Lamps to Maintain	1	6
10-Year Maintenance Cost per Fixture	$0.00	$690.00
Annual Operating Cost	$183.96	$242.45

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Energy Efficiency and Fixture Input Demand Comparisons

EverLast® vs. UltraLux® T5 4 Lamp High Bay

Linear Fluorescent fixtures vs. Induction fixtures is a comparison of two different technologies. The biggest difference between the two technologies is that Induction fixtures do not have the maintenance, replacement or labor costs associated with linear tubes as they operate by cathodes.

When comparing the EverLast® Induction fixtures against the UltraLux® T5 High Bay Fixtures, quality of light output, energy savings and lumen output are similar.

Specifications	***EverLast® Induction Lighting***	***T5 Fluorescent (UltraLux® 4 Lamp)***
Watts - Electrical Usage	200w	190w
Kelvin Temp	5000K	5900K
CRI	90+	93+
Rated Lamp Life	100,000 Hours	35,000 Hours
Fixture S/P Factor	2.0	2.0
Lamps to Maintain	1	4

T8 fixtures produce less light compared to T5 fixtures as each T8 bulb produces about half the lumens of a T5 HO (High Output) bulb.

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Lumen and Color Maintenance

• Lumen output from a fixture is a significant factor to the overall fixture quality

• Intensity of light is not the only feature in reviewing quality lumen output

• A fixture can produce a great amount of light, but if the light output is not of high scotopic lumen value, the usable light is low

• Lumen and color maintenance over the life of a fixture is significant to evaluate.

• High depreciation / low maintenance of lumens and color quality significantly reduce a fixture's illumination and distribution

EverLast® Induction fixtures produce a high quality, scotopic light output with a very low depreciation / high maintenance of lumens and color quality.

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Light Meter Readings / Eye Readings

- Usable light is a critical component to review when comparing different lighting fixtures

- What does the eye see? What is the light output at the desired workplane?

- Accurate measurement of light output will take into consideration the entire light spectrum and measure scotopic lumens, along with photopic lumens

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Scotopic / Photopic Lumens

•**Scotopic**

- Light lumens that are within the scotopic response curve of the retina
- Scotopic response peaks more toward the blue end of the visible spectrum at 480nm
- Scotopic lumens: Represent the sensitivity of the eye under typical interior lighting conditions and cannot be measured directly with a standard light meter. Scotopic lumen output is the amount of light registered by the rods of the human eye and also controls pupil size directly effecting visual acuity for tasks.

•**Photopic**

- Light output response of a person during high light levels
- Does not take into account the role that the rods and pupil size have on visual acuity.
- Photopic or design lumens: Represent the relative sensitivity of the eye under intense lighting such as full outdoor sun. Photopic lumen output is the amount of light registered by the cones in the human eye and is measured by standard lumen and footcandle meters.

A light source that is rich in both photopic and scotopic illuminance is considered an ideal light source.

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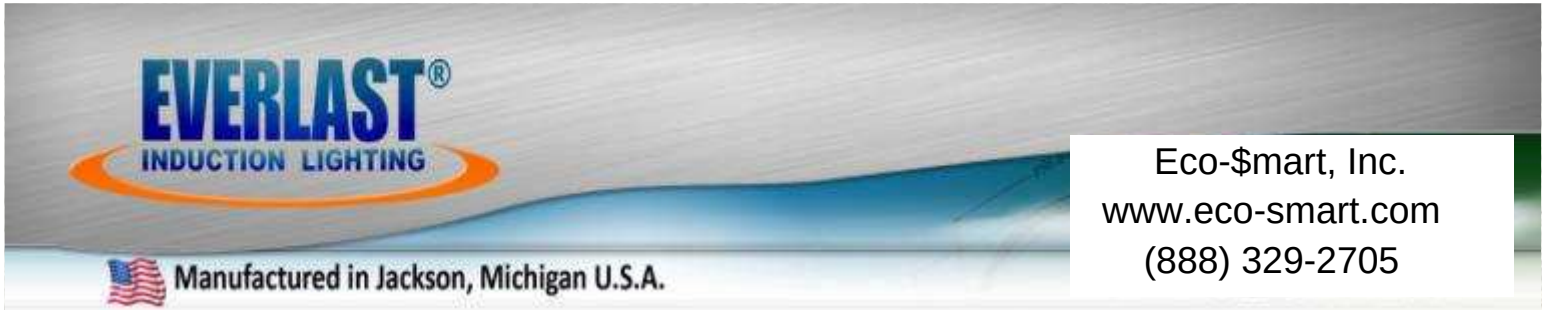
Scotopic / Photopic Lumens

Pupil Lumens

For lighting interior spaces a correction factor may be applied to photopic lumen readings to find the usable light produced by a given light source, also called **pupil lumens**.

As shown below, two different light sources having similar design lumen readings taken by a standard light meter can have drastically different usable light outputs and apparent brightness.



R&D / Projects

- CLTC and associated projects
- Continuation of USA Fixture Development
- Further development of optional accessories for PVW system

2009 Trade Show Schedule

Start Dates	Event Name	City	State	Location	Booth #
June 9th-11th	San Diego Gas & Electric	San Diego	CA	San Diego Convention Center	TBA
June 10th-11th	WestCoast Energy Management Congress	Long beach	CA	Long Beach Convention Center	351
June 16th-17th	Green Buildings NY	New York	NY	Javits Convention Center	556
June 21st-24th	UC, CSU, CC Sustainability Conference	Santa Barbara	CA	University of California, Santa Barbara	556
July 1st	CLTC 2009 Campus Lighting Retrofit Forum	Berkeley	CA	University of California, Davis	11
July 13th	CLTC 2009 Campus Lighting Retrofit Forum	Berkeley	CA	University of California, Irvine	11
Sep. 13th-16th	IES Street & Area Lighting	Philadelphia	PA	Loews Philadelphia Hotel	TBA
Oct. 27th-29th	Solar Power International	Anaheim	CA	Anaheim Convention Center	2721
Nov. 4th-6th	World Energy Engineering Congress (WEEC)	Washington DC	Dist. of Columbia	Washington DC Convention Center	646
Nov. 11th-13th	GreenBuild	Phoenix	AZ	Phoenix Convention Center	5307
Nov. 18th-20th	Alternative Energy & Building Efficiency	Santa Clara	CA	Santa Clara Convention Center	316
Dec. 10th-11th	EcoBuild	Washington DC	Dist. of Columbia	Washington DC	427

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Affiliations and Current Sale Projects

A few of our notable clients…

- United States Air Force
- Harley-Davidson®
- John Deere
- Crystal Springs®
- Yellowstone National Park
- UC Davis – University of California
- Maryland National Park
- Sacramento Housing & Redevelopment Agency
- Yuengling Brewery
- Argonne National Laboratory
- Consumers Energy

Affiliations

- University of California, California Lighting Technology Center
- University of Michigan, Enhanced Spectrum Lab
- IESNA, The Illuminating Engineering Society of North America
- Berkeley License, Berkeley National Laboratory
- SBIC, Sustainable Buildings Industry Council

CLTC
CALIFORNIA LIGHTING TECHNOLOGY CENTER

IES
The LIGHTING AUTHORITY®

SUSTAINABLE BUILDINGS INDUSTRY COUNCIL

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EverLast® Induction Fixture Line

Indoor Lighting

- Aluminum High Bay
- Acrylic High Bay
- Low Bay
- Open Rectangular High Bay
- Freezer
- Recessed Office

Outdoor Lighting

- Garage
- Wall Pack
- Flood
- Canopy
- Tunnel

Street and Parking Fixtures

- Cobra
- Shoe Box
- Walkway

- Wattage range 40w – 400w
- Various IP Ratings IP20 – IP65
- Minimum Warranty 5 years ballast / 5 years lamp

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USA Smart Technology Fixtures

- Research and Development of USA Smart Technology Fixtures
- Type III Light Distribution
- Material
- Future Fixture Plans
- Current Fixture Demonstration

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New Cobra Fixture Review

- *Lamp Rating*: 100,000 Hours
- *Lumen Maintenance*: 70% over 100,000 Hours
- *Step-dimming* ballast option dims to 50% power for increased energy savings
- *Automatic* on/off control with twist lock photocell
- *Energy Savings*: 50% - 70% over HPS and HID
- *IP Rating*: IP65
- *Light Output*: 5000K, 82-85 CRI
- *Voltage*: 120-277 Standard, 347 and 480 volt available
- *Applications*: Freeway, roadway, secondary roads, off street areas and parking lots

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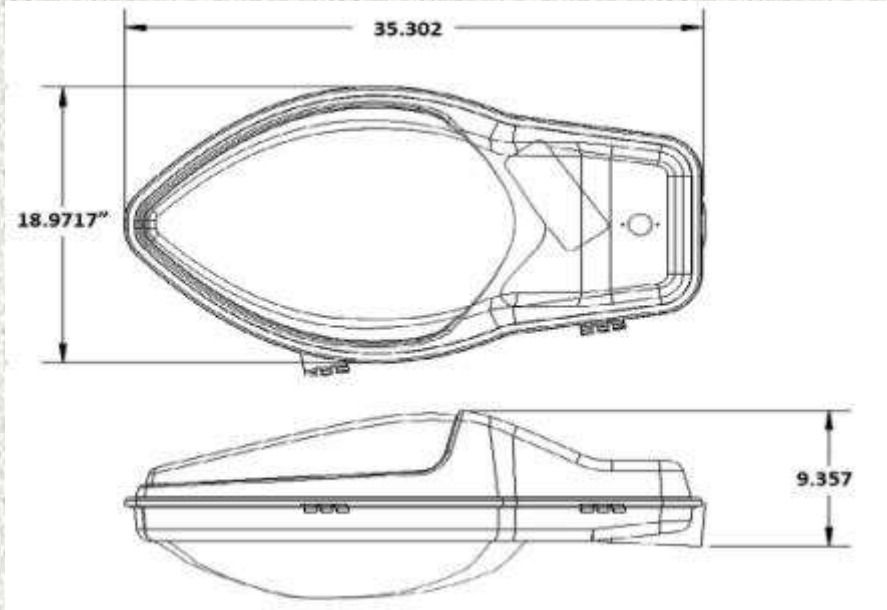
New Cobra Fixture Review

- Specular reflector optimized for induction lamp geometry
- Integrated heat sink system for extended life
- Acrylic lens with Type III, Medium throw prescription
- Lightweight polycarbonate design with increased durability for harsh environments



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New Cobra Fixture Review

EverLast® Smart Light Series 70w Cobra Induction Fixture

- *Light Distribution*
  - Type III “Medium Throw” Distribution
- *Illumination Pattern*
  - EverLast® Smart Light Series 70w Cobra Induction Fixture is more efficient at spreading light along the roadway instead of across the roadway.
- *Vertical Spread Angle*
  - 102°spread
- *Horizontal Spread Angle*
  - 154.1°spread
- *Pole Spacing*
  - 186’
- *Reference*
  - Isofootcandle Plot
  - Vertical and Horizontal Spread Angles

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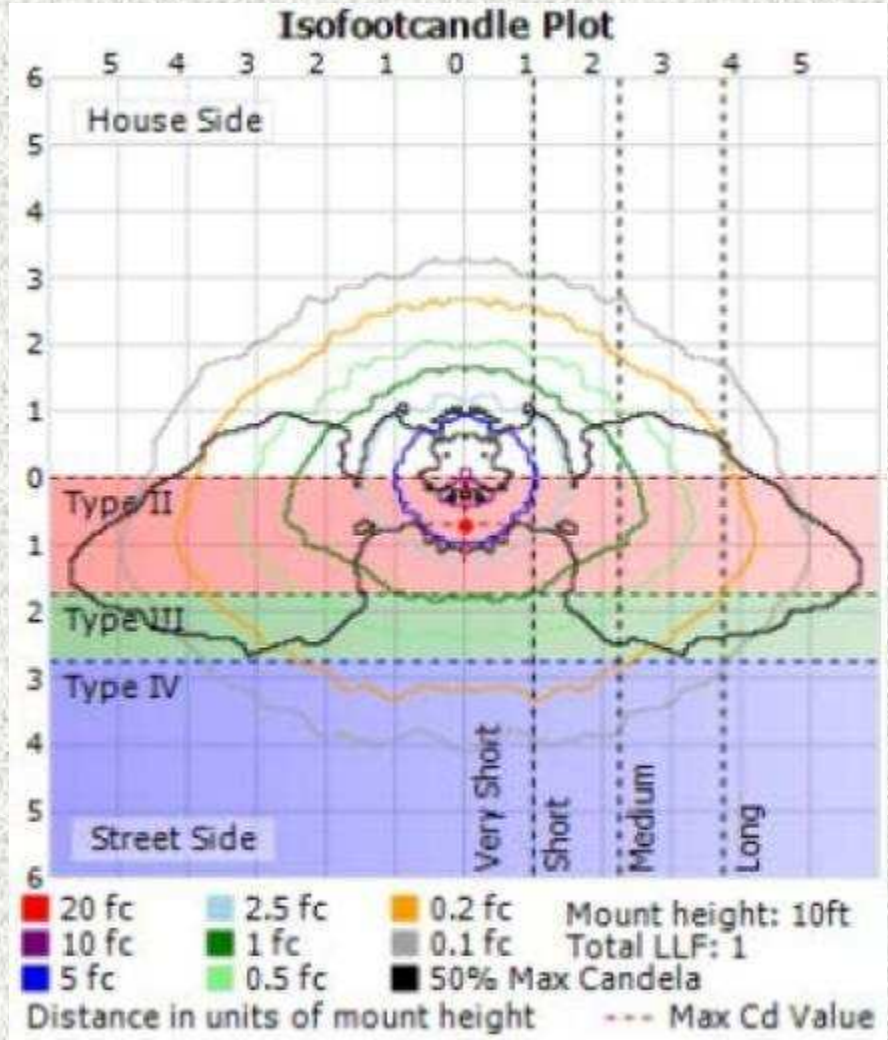
EverLast® 70w / 120w Cobra Isofootcandle Plot

EverLast® Smart Light Series 70w / 120w Cobra Induction Fixture



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Manufacturer Comparisons
EverLast® vs. Kim

	EverLast®	KIM
Specifications		
Technology	Induction	LED
Fixture Style	Cobra Head	Cobra Head
Fixture	Smart Light Series	WARP 9: WP9LE
Fixture Wattage	120 W	175 W
Rated Lamp Life	100,000	50,000
Distribution Type	Type III	Type III
Longitudinal Class	Medium	n/a
Lumens-Light Output	10,200	5942
Efficiency (Lumens/Watt)	85	34
CRI	82-85	75
Kelvin	5000	3500, 5100
Power Factor	0.99	n/a
Ambient Temp (F)	Temp: -40 to 130	Temp: -76 to 140
IP Rating/UL Listing	IP65 / UL	IP66 : UL
Weight (lbs)	17	35

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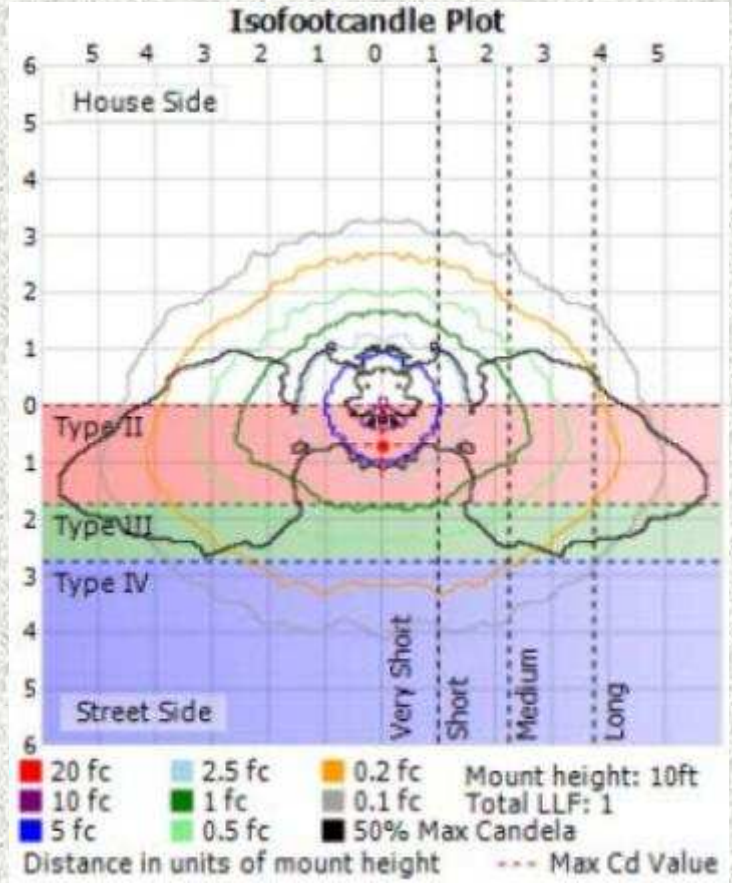
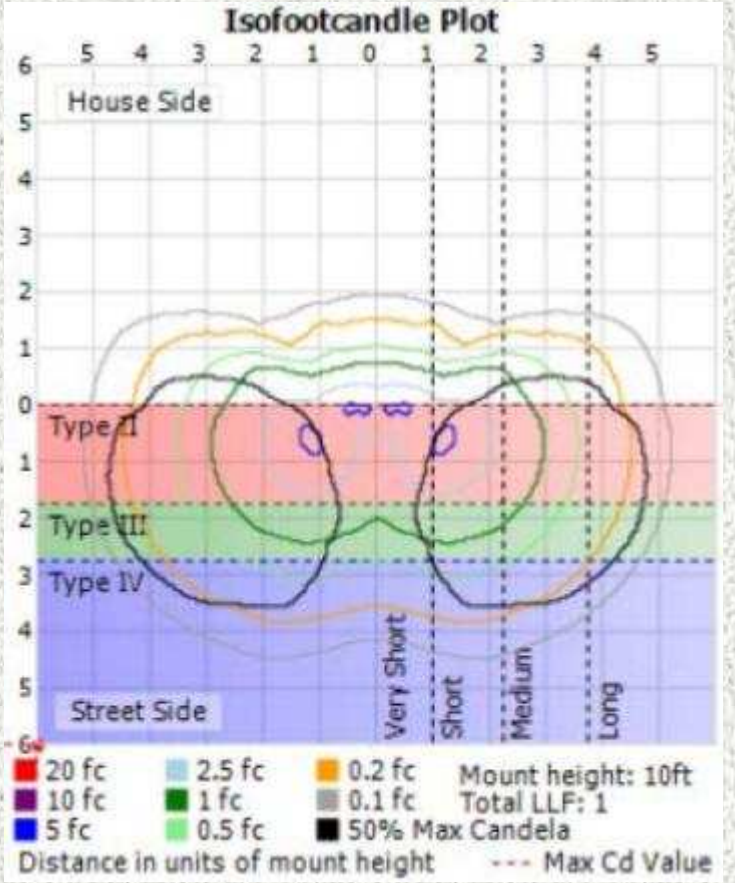
Manufacturer Comparisons
EverLast® vs. Kim

Isofootcandle Plot

EverLast® Smart Light Series
120w Cobra Induction Fixture



Kim WARP9 175w LED Cobra



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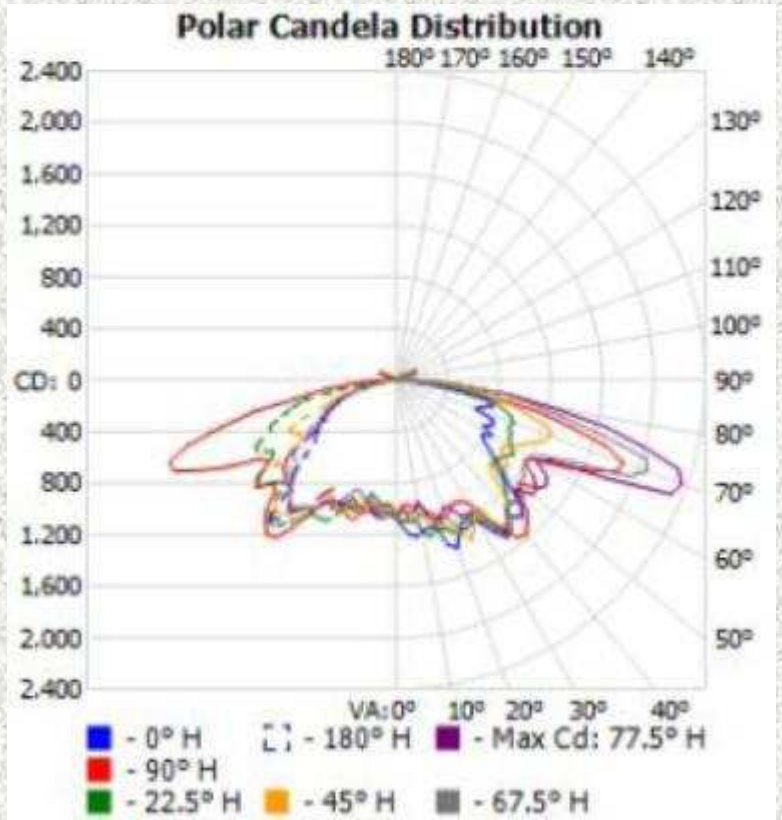
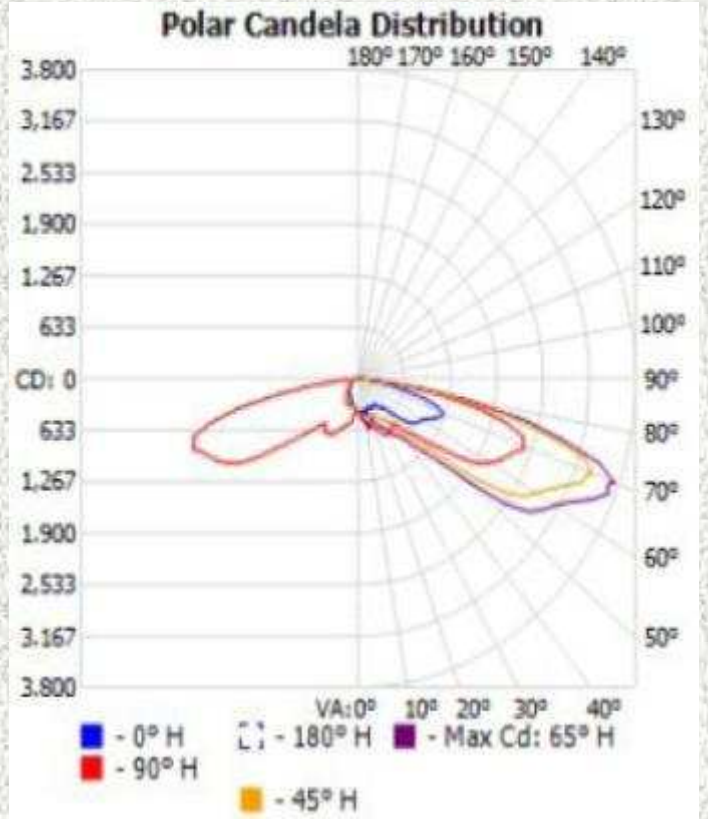
Manufacturer Comparisons
EverLast® vs. Kim

Light Summary – Polar Candela Distribution

EverLast® Smart Light Series
120w Cobra Induction Fixture



Kim WARP9 175w LED Cobra



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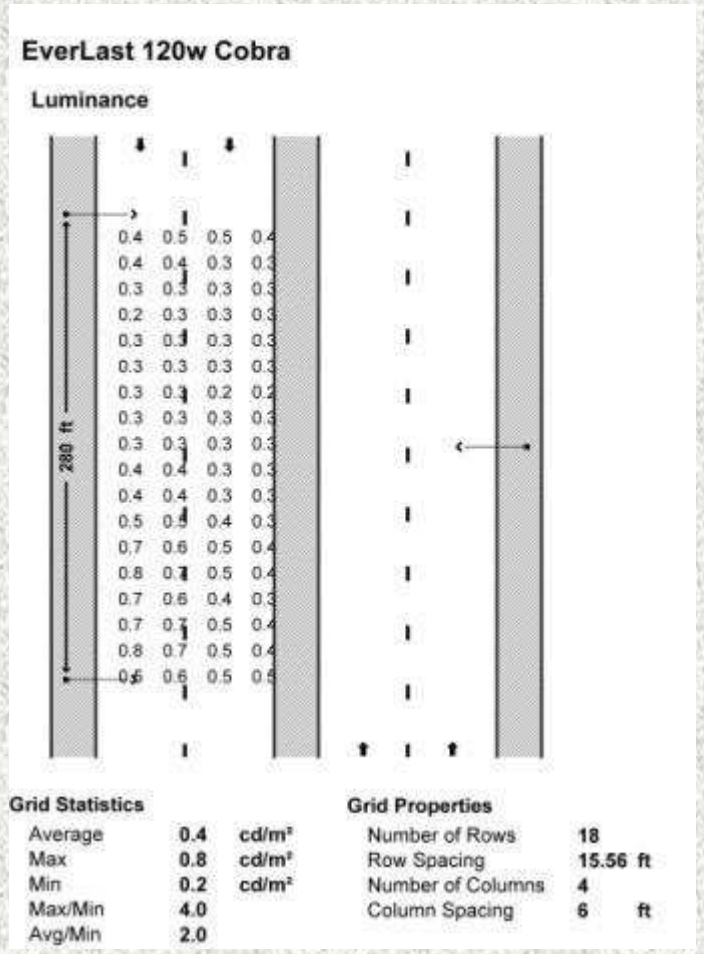
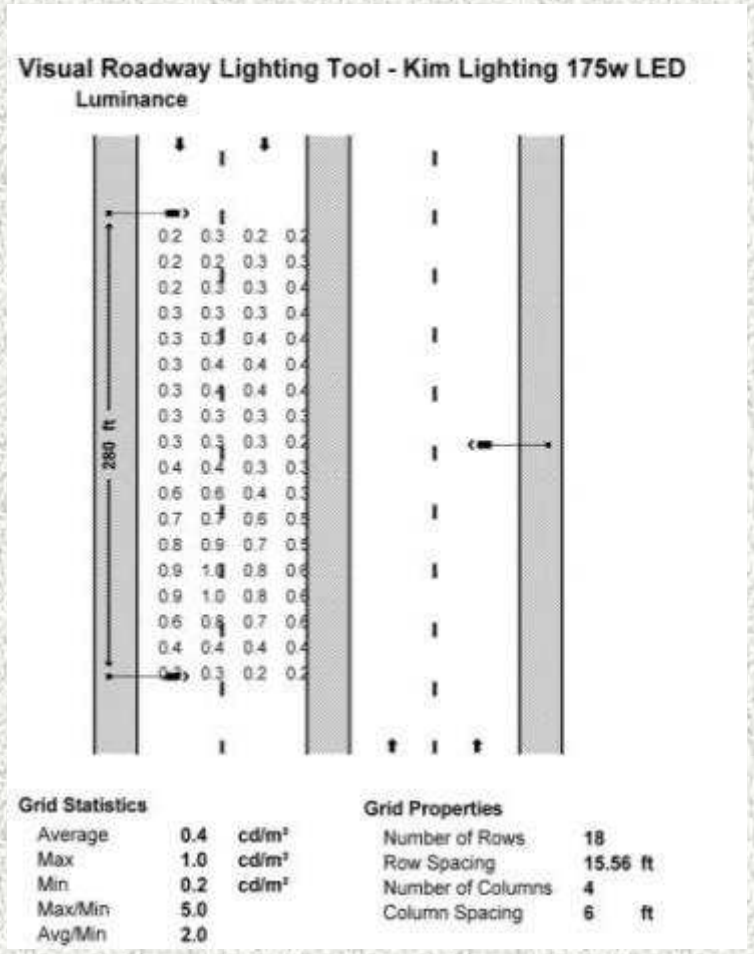
Manufacturer Comparisons
EverLast® vs. Kim
Luminance Roadway Image

EverLast® Smart Light Series
120w Cobra Induction Fixture



Kim WARP9 175w LED Cobra



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Manufacturer Comparisons
EverLast® vs. Phillips

	EverLast®	Phillips
Specifications		
Technology	Induction	Induction
Fixture Style	Cobra Head	QL 165 Lamp
Fixture	Smart Light Series	QL 165 Lamp
Fixture Wattage	120 W	165 W
Rated Lamp Life	100,000	100,00
Distribution Type	Type III	n/a
Longitudinal Class	Medium	n/a
Lumens-Light Output	10,200	12,000
Efficiency (Lumens/Watt)	85	65-70
CRI	82-85	80
Kelvin	5000	4000
Power Factor	0.99	0.85
Ambient Temp (F)	Temp: -40 to 130	Reference B
IP Rating/UL Listing	IP65 / UL	Reference C
Weight (lbs)	17	n/a

*Note: Sylvania and Phillips are not fixture Manufacturers; Sylvania and Phillips offer induction lamp/ballast combinations
REFERENCES:
B → Ambient Temperature is rated for bulb, but contingent upon fixture casing material.
C → The QL Lamp system is designed for built in purposes in appropriate luminaires. QL Luminaires in outdoor applications should be at least classified as IP54.