

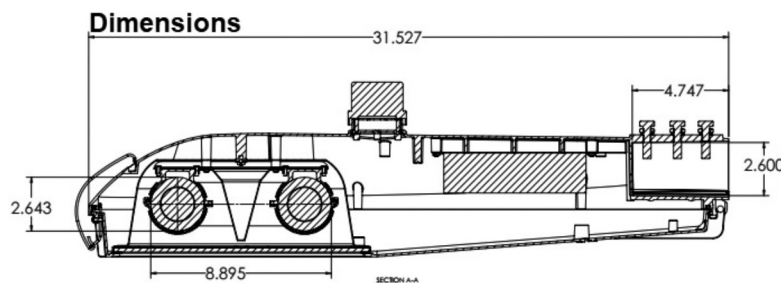
AN EVOLUTIONARY LEAP FORWARD IN COBRA HEAD LIGHTING



STBT-CH-(40W, 60W, 80W,100W)



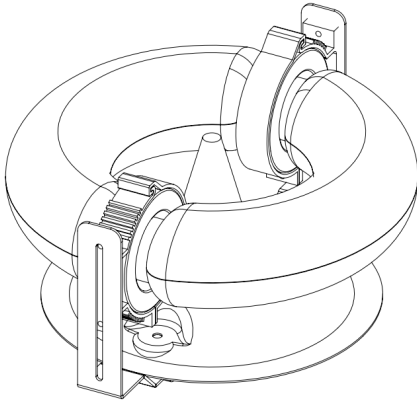
- **STREET-BRIGHT™ LUMENTEC®** tuned spectrum
- **BRIGHT-TECH®** System integrated technology
- Color Rendition Index (CRI) > .90
- 100,000 hour life cycle
- 110V ~ 277V auto-sensing ballast
- Instant strike/re-strike
- Large format full-dispersion light source
- Patented full-diffusion nano particle reflector
- Powder-coated all-weather aluminum
- IP66 rated WF2 anti-corrosion grade
- 7-pin Smart-City ready
- 150mph wind resistance



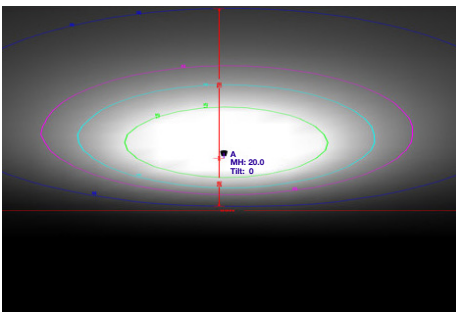
Evolutionary patented compact Street-Bright™ wide area diffusion “cobra head” is designed for roadways, highways, streets, and parking lots where lateral parameters may be constrained. Its unique full-spectrum/full-diffusion design can replace sodium and metal halide fixtures for up to 90% energy savings including ballast overhead. Full cut-off and dispersion *curvilinear* geometry minimizes light pollution while adhering to existing pole separations. No other fixture achieves the same pattern flexibility by simply changing the interior and exterior angle of the bulb mount.



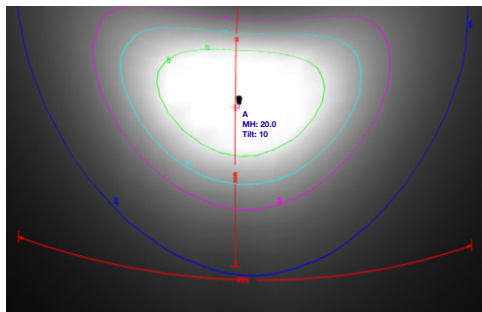
Multiple light distribution patterns from the same fixture.



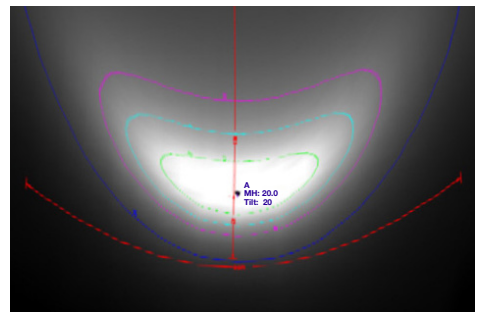
Patented interior reflector takes advantage of 360° x 360° bulb geometry. As the illustration shows, light is reflected from the circular bulb interior to the outer reflector. This projects more light from the fixture in a uniform *circular field*. As the field angle is changed, the lighting distribution pattern follows the intersection of the linear and spherical projection. At the same time, rapid dispersion prevents excessive illumination beyond the intended focal range, making fixtures *Dark Sky compliant* for most applications. *In effect, one skew fits all lighting dynamics.*



Type V

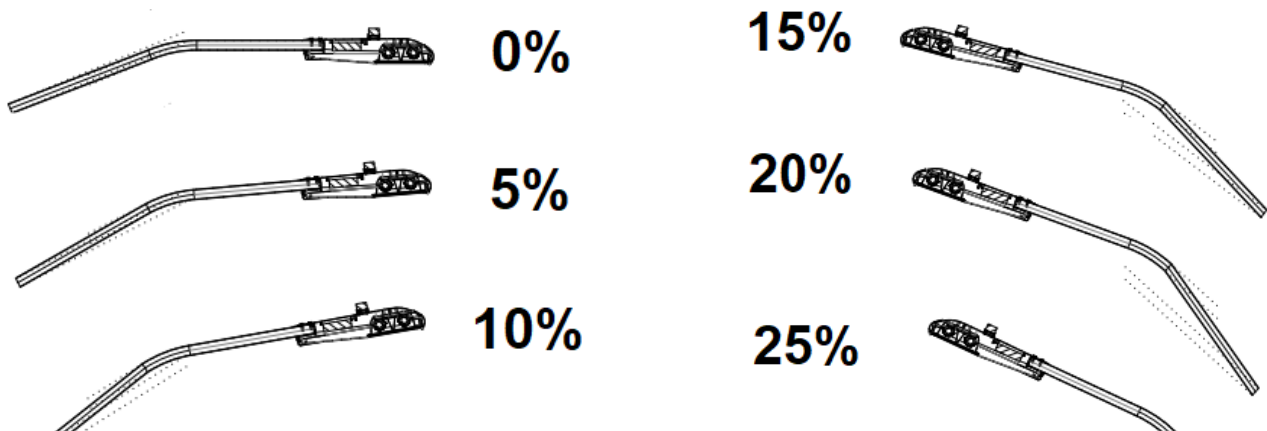


Type IV



Type III

How it Works



Unlike point-source luminaires like high intensity discharge (HID) which include metal halide, high and low pressure sodium, and halogen, the unique Street-Bright reflector uses spherical geometry to align the lighting pattern with the angle of the fixture or fixture interior with the target surface.

When the mounting armature angle is changed, the pattern adapts to the circular intersection of the bulb and outer reflector. To achieve the same result using LEDs, the entire angular diode pattern must be altered, meaning unique fixtures are required to accomplish the same task.

Evolutionary Leap Forward

Facility and inventory managers spend considerable time, effort, and resources tracking and maintaining hundreds or even thousands of lighting skews. Some municipalities can have dozens of different luminaire wattages and lighting patterns that require parts inventories, replacement lamp contingencies, storage space, and more. It is a substantial and costly burden. The evolutionary Street-Bright™ flexibility condenses luminaires to a single form factor from 40-watts

to 100-watts... providing the visual equivalent of 400-watts down to 80-watts HID with energy reductions up to 90%.

The 100,000 hour lifecycle is *proven* in actual installations dating back to the 1980s. Original inventor Nikola Tesla called magnetic induction lighting the “Forever Bulb.” No filament to burn out, no vacuum or pressure vessel to maintain. It represents 11 years burning 365 days by 24 hours.

FEATURES	HID	HPS	LED	Street-Bright™	Other MIL
100,000 hour lifecycle	No	No	No	YES	Some
60% - 80% energy savings	No	No	No	YES	No
Wide Dispersion Bulb	No	No	No	YES	Yes
Negligible in-rush current	No	No	No	YES	Some
Nano-Reflector with 98% efficiency	No	No	No	YES	No
Proprietary Geometry	No	No	No	YES	No
Instant strike - no warm up or cool down	No	No	No	YES	Yes
Full Spectrum with CRI > .90	No	No	No	YES	Some
Exceptionally high power factor > .98	No	No	No	YES	Some
Unparalleled Warranty 5 years 50K hrs	No	No	Some	YES	Some
Fully recyclable, no special disposal	No	No	No	YES	Yes
Lease Financing Available	No	No	No	YES	No



Unparalleled Energy Savings

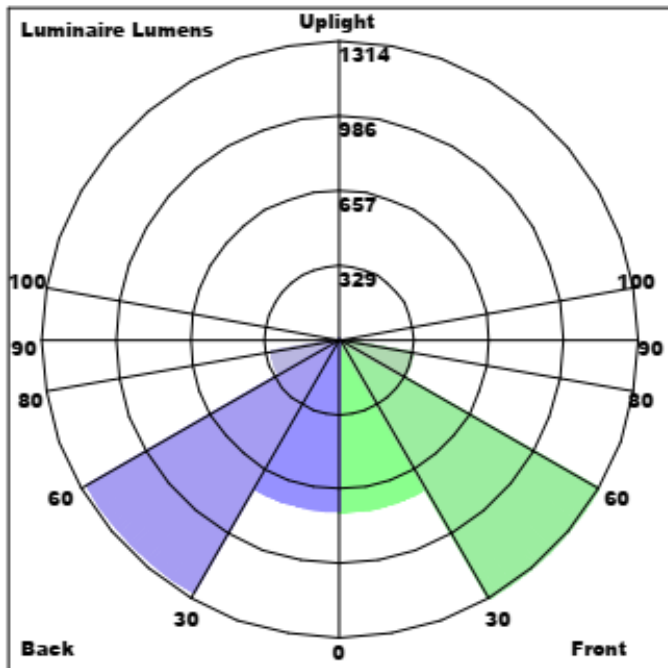
With an S/P ratio of 2.77, Street-Bright™ provides the most energy savings of any cobra head technology... including high-intensity LEDs. That’s because Street-Bright™ can provide greater visual acuity with less *gross lumens*. More than 85% of Street-Bright™ lumens are in the most receptive range of the human eye. None of the light emission is wasted. Further, magnetic induction technology has minimal in-rush

current, representing as much as 95% savings in associated electrical demand charges.

As the efficiency comparison demonstrates, Street-Bright™ technology can even save over LED upgrades that were implemented over the past decade. Instant strike means never having to wait for a warm-up or cool-down like conventional HIDs. Lower in-rush current is superior to high-power LEDs.

HID FIXTURE TYPE	HID SYSTEM WATTAGE	LED REPLACEMENT	LED S/P RATIO	LED LUMENS	LED WATTAGE
Cobrahead - 70W HPS	108	25W - 3000K	1	3200	25
Cobrahead - 100W HPS	142	35W - 3000K	1	4600	35
Cobrahead - 150W HPS	199	51W - 3000K	1	6390	51
Cobrahead - 250W HPS	311	68W - 3000K	1	9350	68
Cobrahead - 400W HPS	488	135W - 3000K	1	17350	135
Cobrahead - 100W MV	127	35W - 3000K	1	4600	35
Cobrahead - 175W MV	211	60W - 3000K	1	7700	60
Cobrahead - 400W MV	459	135W - 3000K	1	17350	165
Cobrahead - 23W LED	23	18W - 3000K	1	2650	18
Cobrahead - 35W LED	35	25W - 3000K	1	3250	25
Cobrahead - 50W LED	50	25W - 3000K	1	3250	25
Cobrahead - 68W LED	68	35W - 3000K	1	4600	35
Cobrahead - 74W LED	74	35W - 3000K	1	4600	35
Cobrahead - 103W LED	103	51W - 3000K	1	6390	51

Unparalleled Safety and Risk Mitigation



Street-Bright™ lights use proprietary **LUMENTEC®** spectral tuning for stunning resolution and contrast on blacktop and white-top roadway surfaces. The STBT-CH-XXxW series comes in 40W, 60W, 80W and 100W configurations from Type II to VS. Lights are flicker-free, meaning no dangerous strobe effect. Increased use of LED street lighting has been associated with higher accident rates that could be caused by high-speed flickering that impinges upon depth and spatial perception. French researchers reported that a third of people who were exposed to high-intensity LED road lights found “disturbing” glare, with some going so far as to call it “unbearable.” Safety engineers claim that even a partial or momentary lapse in sight could increase risk for accidents. Migraine with aura (also called classic migraine) is a recurring headache that

strikes after or at the same time as sensory disturbances called aura. These disturbances can include flickering light, excessive glare, blind spots, and other vision changes.

There are also legal considerations as more and more municipalities face litigation over newly installed LED street and roadway lighting. Claims include excessive glare, harsh and excessively blue spectrum, sleep disruption, ballast humming, flickering, failure and even cancer. Street-Bright™ is a neighbor-friendly fixture that can be focused away from surrounding buildings and homes.

LED SAVINGS	STREET-BRIGHT™ MIL	STREET-BRIGHT™ LUMENS	STREET-BRIGHT™ S/P RATIO	MIL VISUAL LUMENS	MIL SAVINGS
77%	20-40W - 6500K DIM	1200 - 1700	2.77	3324 - 4709	81%
75%	20-40W - 6500K DIM	1200 - 1700	2.77	3324 - 4709	86%
74%	20-40W - 6500K DIM	1200 - 1700	2.77	3324 - 4709	90%
78%	30-60W - 6500K DIM	3550 - 5100	2.77	9834 - 14127	90%
72%	100W - 6500K	8500	2.77	23545	80%
72%	20-40W - 6500K DIM	1200 - 1700	2.77	3324 - 4709	68%
72%	30-60W - 6500K DIM	3550 - 5100	2.77	9834 - 14127	72%
71%	100W - 6500K	8500	2.77	23545	78%
22%	20-40W - 6500K DIM	1200 - 1700	2.77	3324 - 4709	13%
29%	20-40W - 6500K DIM	1200 - 1700	2.77	3324 - 4709	43%
50%	20-40W - 6500K DIM	1200 - 1700	2.77	3324 - 4709	60%
49%	20-40W - 6500K DIM	1200 - 1700	2.77	3324 - 4709	71%
53%	30-60W - 6500K DIM	3550 - 5100	2.77	9834 - 14127	59%
50%	30-60W - 6500K DIM	3550 - 5100	2.77	9834 - 14127	71%

Unparalleled Sustainability

Sustainability is the operative objective. It's not just about energy savings and reducing the carbon footprint. Sustainability touches upon lifecycle, landfills, soil/water/air pollutants, and light pollution (Dark Sky compliance). Consider the following **toxic materials** that go into high-intensity LEDs:

- Aluminium Gallium Nitride (AlGaN)
- Aluminium gallium indium phosphide (AlInGaP)
- Aluminium phosphide (Al₃P)
- Indium Gallium Nitride (InGaN)
- Aluminium Indium Gallium Phosphide (AlInGaP)
- Gallium Arsenide (GaAs)
- Aluminium Gallium Arsenide (AlGaAs)

How are components of modern LEDs produced? These elements are often mined in countries that use slave and child labor under inhuman conditions. Such chemicals cannot be easily disposed of. Some are similar to “forever chemicals” that have serious adverse health implications and can last in the environment for many decades or hundreds of years. Street-Bright™ technology consists of completely

recyclable glass and metal. Phosphor in bulb coatings is *not toxic*. Electronic components are RoHS certified. Mercury is encapsulated as a solid amalgam similar to the silver-mercury used as dental fillings. It is isolated and easily recycled. No special handling or disposal is necessary. The Street-Bright™ spectrum and intensity is less impactful on wildlife.

TECHNICAL SPECIFICATIONS

MODEL	STBT-CH-100W (40, 60, 80)
RATED WATTAGE	40W – 100W
VOLTAGE RANGE	120V~277V 315%
CURRENT @ 100W	0.14735A~0.2947A @ 277V
FREQUENCY	50/60Hz
POWER FACTOR	0.98
IN-RUSH CURRENT	NEGLIGIBLE
RFI PART 15/18	SHIELDED
NOISE	<20dB
TYPE	MAGNETIC INDUCTION
COLOR RENDITION INDEX	> .90
COLOR TEMPERATURE	~6,500K to 10,000K UV TRUNCATED
CERTIFICATIONS	CCC/CE/FC/RoHS/CB
B.U.G. RATING	B2-U0-G1
DARK SKY	COMPLIANT G(0)
UL-C	WET LOCATION
TEMPERATURE RANGE	-30°F ~ +140°F
RATING	IP65 WF2 ANTI-CORROSION
FINISH	WF2 ANTI-CORROSION
REFLECTOR	FULL-DIFFUSION NANO-PARTICLE
WIND RATING SLIP-FITTER	110mph~150mph gust, pole dependent
LUMENS PER WATT	85LPW~105LPW
VISUALLY EFFECTIVE LUMENS	277/W



LCS SUMMARY

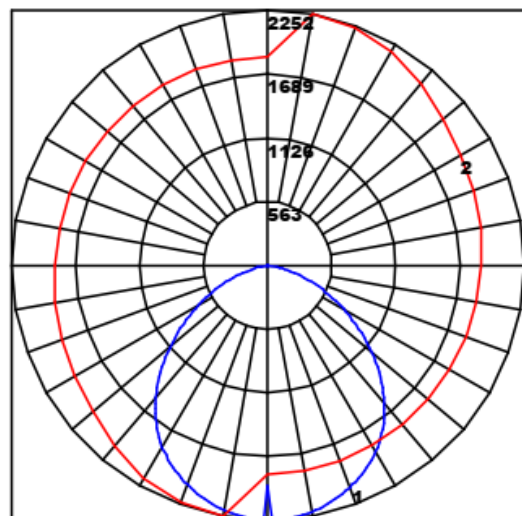
For Type II, very short, full cut-off:

Upward waste light ratio: 0.00

BUG rating: B2-U0-G1

LCS Zone	Lumens	%Lamp	%Lum

Polar Candela Curves

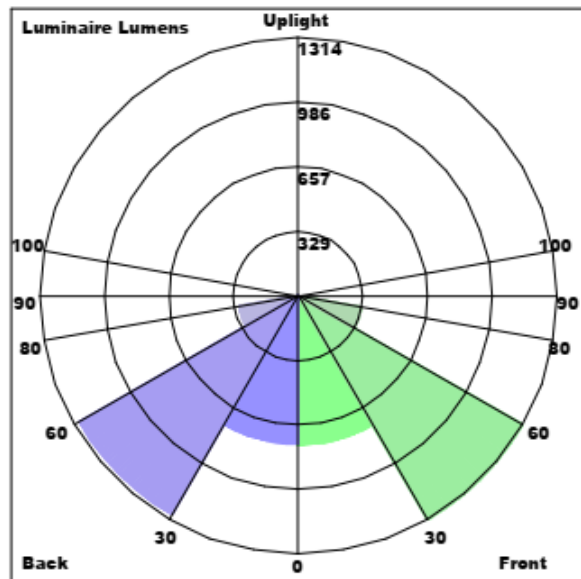
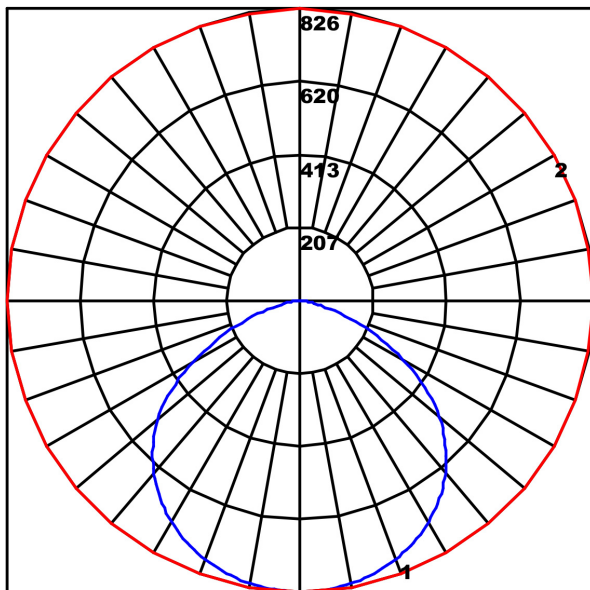


FL (0-30)	756.2	16.0	16.0
FM (30-60)	1314.0	27.7	27.7
FH (60-80)	325.6	6.9	6.9
FVH (80-90)	1.6	0.0	0.0
BL (0-30)	752.6	15.9	15.9
BM (30-60)	1283.7	27.1	27.1
BH (60-80)	303.9	6.4	6.4
BVH (80-90)	1.4	0.0	0.0
UL (90-100)	0.0	0.0	0.0
UH (100-180)	0.0	0.0	0.0

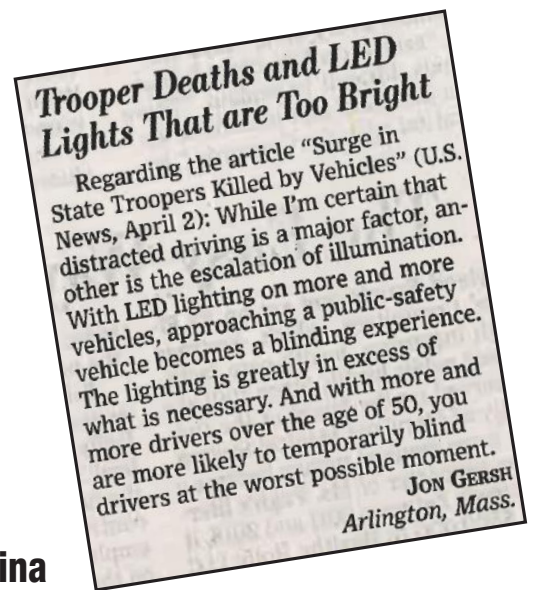
For Type VS, very short, full cut-off:

Upward waste light ratio: 0.00

BUG rating: B0 -U0- G0



After two decades, LEDs have become the major replacement for high-pressure sodium and metal halide lighting. Now, there are significant safety issues after alarming increases in accidents.



Warning – Unshielded LED Lighting Can Damage the Retina

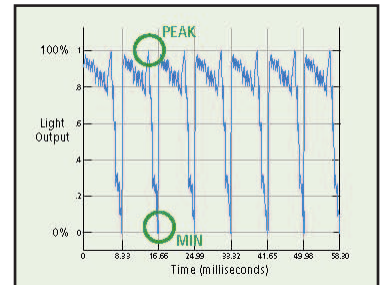


In the May 13, 2013 edition of Live Science, Assistant Editor Marc Lallanilla reported on the research of Dr. Celia Sánchez-Ramos of Complutense

University (Madrid, Spain) regarding potential dangers of directly viewing unshielded LED lighting. Simply put, the intense concentrated light of LEDs can permanently damage the retina, causing blind spots and color de-sensitivity. As the LED installed base rapidly expands, more and more emphasis is being placed upon health risks associated with directly viewing LEDs. While still under peer review, this revelation has raised concerns of possible liabilities associated with newly deployed or anticipated LED roadway lighting. Now, lighting designers and consultants are increasingly faced with the tradeoff between installing energy efficient LED fixtures and potential liability associated with eye-damage claims.

For most high intensity LED street lighting, flicker presents several advanced challenges. “Strobe Effect” is the motion distortion that occurs when moving objects are viewed under the offending

light. This disrupts visual perception and the ability to judge time and distance. Since many LED arrays are subject to flicker rates of 60 and 120 cycles per second, the strobe effect will be proportional to the speed at which a vehicle or other objects are traveling. Perception distortion is compounded by the motion of the reference vehicle (one being driven) relative to the moving vehicle (one being viewed) combined with the duration of the flicker (cycle time).



Since LED streetlight deployment is new, the consequence of strobe effect has not been fully evaluated. However, there is strong anecdotal evidence that strobe effect disrupts visual perception and acuity. For highway driving above 65mph, the amount of missing interpolative perception may significantly contribute to night time accidents. It should also be noted that some LED street lighting systems offer dimming capabilities for enhanced energy savings. Dimming LEDs increases strobe effect and may not be advisable based upon current knowledge and evidence.



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