BBE

Operating the City Green Lighting ▪ Building the Harmonious Society

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HIGH POWER LED STREETLIGHT MANUAL

—— Road Lighting Complete Solution

Under the same brightness, can save power more than 80%

SHENZHEN BANG-BELL ELECTRONICS CO., LTD.

The member of the China Semiconductor Lighting Technology Standard Workgroup

Shenzhen Bang-Bell Electronics Co., Ltd., we are one of the Shenzhen Hi-Tech enterprises, engaged in developing and manufacturing LED products since 1992. Now our products have sold to more than 80 countries or areas of five continents all over the world. Most of products have passed the UL and CE approvals. There are some optical, electrical, thermal and structural experts compose a powerful LED application products research & development team. We have invested tens of millions of dollars to build the fully automated LED packaging assembly lines. Through the exact Optical and Thermal design, our product and technology are in the leading level of the international LED industry.

Under the ISO9001:2000 quality management system, we are now at a stage of rapid development. We will take developing green urban lighting, building a harmonious society as our responsibility, work together with the people from the same industry, to create the Green Lighting storm.

In today's world, the gradual depletion of energy and the gradually deteriorated of environment is become a great challenge of us. LED is the most Green Lighting Source in 21 century, which is the criterion of the Energy saving and environment protection. Most of country in the world has use policy and rules to map out the spread plan. A revolutionary war in the lighting field is coming.

In the past three years, we have invested a tremendous amount of manpower and resources. Committed to developing a new generation of semiconductor LED lighting products, these products have been published right now. They need only 20% of the power consumption of traditional bulbs, which can generate 80lm/w and has super long life up to 50, 000 hours, also 10 times brightness than the traditional light bulb. Now, all this is no longer inconceivable, in our efforts, it has become a reality.

Let's Light The World And Light Your Future With Green LED Light, Bring You Fresh Illumination Experience!

Bang-Bell takes “Save Energy, Reduce Consumption” as our responsibity to answer the government's call of “Save Energy, Reduce Release”; engage in high tech green light, work for the well-being of the people. The new generation LED green light has been in the leading position to this industry!

Our target: Make the serious pollution caused by the conventional light and the power plant disappeared, to repay our green and clear world”!
Our Slogan: “Build green city; create an abstemious and harmonious society”!
Our Service: Wherever our products were sold, where you will have our service
Our Tenet: “Technology works for the people”

Our Pride

BBE LED is a global originated product with patents, it characterizes universal advanced photometric technology and other excellent features; Achieving distinction, saving energy and reducing power consumption, in the meantime, we pay great attention to the spirit of “Technology works for the people”; promoting the successful wave of energy and illumination revolution in 21 century by the new concept of “technological and green illumination”. And it will be the global lighting mainstream. BBE LED will sail to every corner of the world with great passion rapidly like a giant warship!

BBE-LED streetlight BBE-LED Tunnel lamp BBE-LED illumination light source .....

CE ISO 9001 UL RoHS

contents

Catalogue

Patent Number
ZL 200510037514.5
ZL 200710073278.1

Product Brief Introduction

2004-2007, The Sword Was Sharpened for Three Years, BBE LED - Be Braving to Be the First!

After tireless efforts and struggles, we have finally developed a world leaded High Power LED Streetlights, this indicates that the prevalence of LED lighting Times has arrived!
BBE LED Streetlight, shocked appeared in front of us, 3 major revolutionary and innovative technologies have created a new Times of LED lighting!

- Super-rate high-power LED to replace the traditional light source, green, energy efficient, it is green, environmental protection and energy efficiency;
- Rectangular beam pattern design, realized high intensity, high uniformity and eliminate glare;
- Module integrated design, long life, easy to maintain;

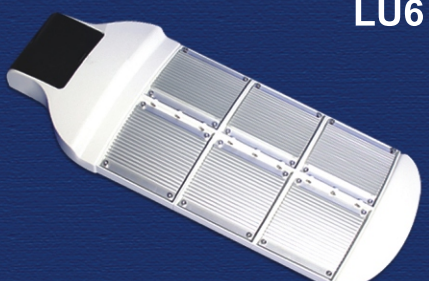
BBE LED Streetlight, with rich revolutionary and creative idea, is the perfect combination of technology, creative and light, let the LED release the maximum brightness; Design for the road lighting, it is the total subversion of the traditional concept of road lighting, create a new concept of road lighting, guide the new road lighting trends, it is an epoch-making milestone in the road lighting field, it must rise a rapturous revolution in the lighting industry.

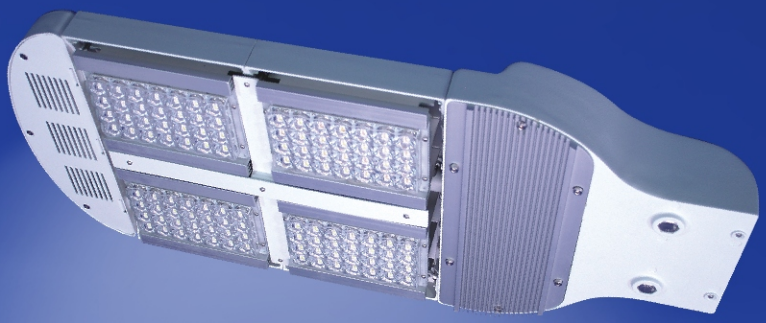
We always insist on hard exploration, with persistent pursuit and innovative spirit, extraordinary refined design concepts, constantly surpassing ourselves; we developed the prominent quality and excellence extraordinary performance, bringing you a new lighting experience.

LU2

LU4

LU6





- **LED streetlight, Save energy and expense**
- **Save more than 80% power consumption than traditional streetlights**
- **Each LED Streetlight saves RMB 37,100 per ten years**
- **100,000 streetlight will save RMB 3,710,000,000 in ten years.**

With generous appearance, novel and unique, BBE Integrated LED Streetlight LU2/LU4/LU6 was designed for the road lighting demand, fully meet the special requirements of road lighting. This product adopt the High Power LED as the light source, using dozens of BBE Emitter high power 1W LED. With the world's leading optical allocation, advanced thermal, structural and circuit design, it is a highly cost-effective product.

Application concourse

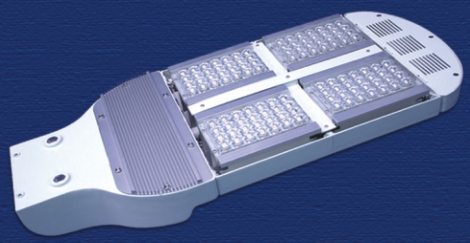
Apply to install: expressway, highway, roads, sub-roads, ramps roads, residential areas, sidewalks lighting, square sports

BBE LED adopt the high reliability eutectic welding LED packaging process, the thermal conductivity, electrical conductivity, thermal expansion and mechanical soundness standard is higher than the ordinary silver epoxy packaging. Excellent heat dissipation design, LED junction temperature can be controlled in an ideal temperature (TJ<60 ° C). Fully guarantee the long life of the LED. High power factor and low harmonic distortion reduce the power loss on transmission lines, avoid the high frequency interference contamination for the power network. Lampshade (lens) using engineering plastics PC, with resisting acid corrosion, smoke corrosion, ultraviolet aging characteristics.

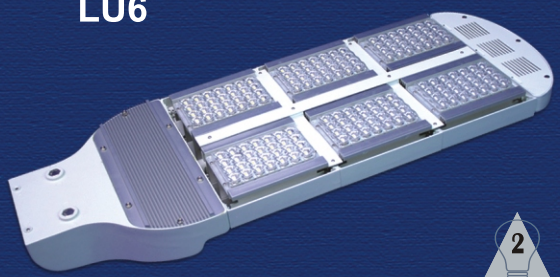
BBE High Power LED Streetlight-LU2/LU4/LU6

LU2

LU4



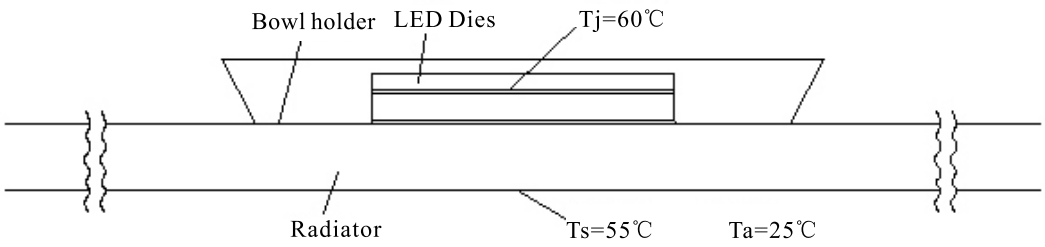
LU6



Function and Features

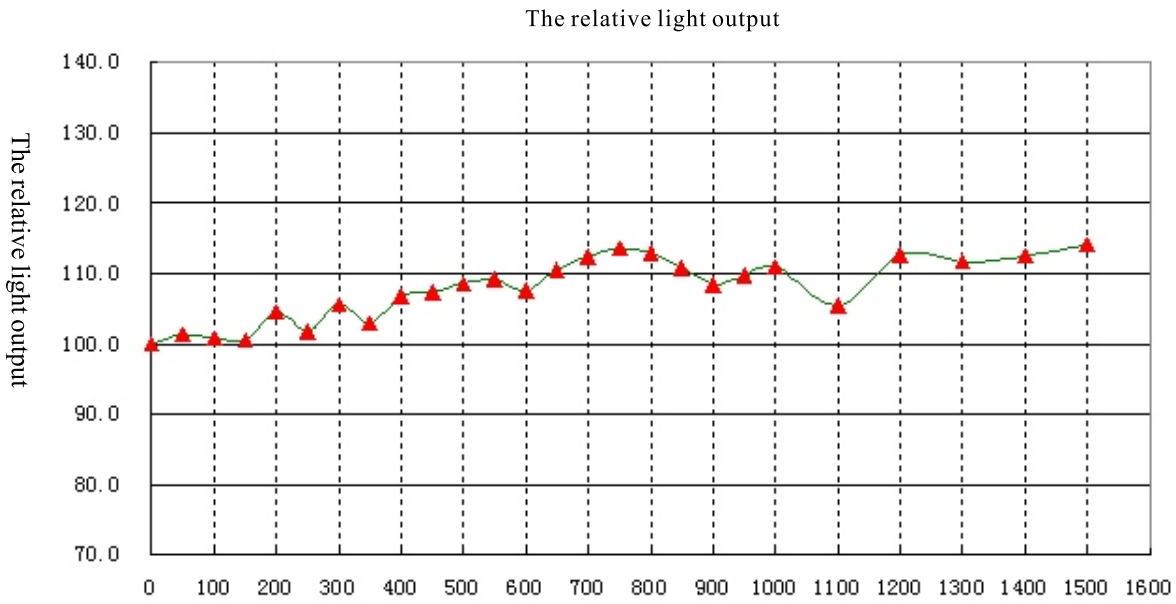
1. **Revolutionary Photometric Design—The world's first dedicated optical system(rectangular beam focusing lens):** Reasonable control of the light distribution, spot rectangular bean pattern ,and ensure an ideal uniformity of brightness on the road surface, eliminate the glare and keep the LED lighting efficiency on a high level, no light pollution.
2. **Unique Integrated Lens and Lampshade Design:** Array Lens play a protective and spot light role, avoid wasteful duplication of light and reduce the loss of light, also reduce the weight of the product and enable simplified structure, to keep the product ethereal.
3. **Creative Design of the Radiator and Lamp holder Integration:** Fully protect LED life and heat dissipation requirements, satisfied with the structure and design of LED Lights fundamentally, which the most distinctive features of LED Lights(see page 4 attached picture);
4. **Unique Thermal slide-shell design, disassembled with simple and convenient combination:** Slide lights with composite shells, the installation forms dynamic, simple and convenient combination lamps. Easy for dismantle and maintenance, save cost and the job has become very easy;
5. **Ethereal apperance** Reduce wind-resistance and weight efficiently, lighten the pressure of the lamp pole to ensure the safety.
6. **Intelligent current control, achieve the precision constant current:** Each LED module can implement intelligent current control, whatever power network how to wave, it is able to achieve the precision constant current, ensure the LED can work under the secure current.
7. **No Adverse Glare:** Eliminate the glare caused by the adverse ordinary lights glare and visual fatigue sight interference, improve driving safety, reduce the incidence of traffic accidents, fully embodies the spirit of "People-oriented Technology" in this product;
8. **No light Pollution:** Light distribution controlled strictly and will not bring any light out of the request area.
9. **No High-voltage, No Dust Adsorption:** Eliminate the chance of adsorbs the dust by high-voltage which will cause the lampshade become dark, reduce the brightness;
10. **No High-temperature, No Aging Yellow Lampshade:** Eliminate the baking which cause traditional lampshade turn yellow, shortened life expectancy and decrease the brightness;
11. **Widest Working Voltage**The traditional sodium light's working voltage wave is over ± 7%, which will decline the life and brightness, while BBE LED streetlight working voltage even at ± 20% wave, the life and brightness keep still.
12. **Start Without Delay:** Reach the normal brightness directly and do not have any delay, eliminate the long process starting of the traditional tunnel lights;
13. **No Strobe Flashing:** Eliminate the visual fatigue which caused by the strobe lights of the traditional tunnel lamps;
14. **Impact Resistance, Shock-proof, Without Ultraviolet (UV) and Infrared (IR) Radiation:** No filament and glass frames, avoid break of the traditional lamp, without harm to the human body;
15. **High Color Index, Nice Coloration:** To show the true colors and brighter, good identifiably;
16. **Multiple Color Temperature Options:** Color temperature to meet the needs of different occasions, eliminated the low color temperature of the sodium lamp which cause the depressed mood, observers will feel more comfortable;
17. **Tremendous Energy Saving:** Used the ultra high power, high brightness LED light source ,together with the high power efficiency power supply, which can save energy 50%-80% than the conventional sodium and mercury lamps;
18. **Long Life, Up to 50,000 Hours:** (Working for 10 hours a day, can be used for more than 13 years), is 5-10 times working life than a traditional sodium or mercury lamp;
19. **Green and Environmental Protection:** no lead, no mercury, no environmental pollution;
20. **Universal Input Voltage-** 85-264vAC full voltage range constant, constant-current PWM technology, high efficiency, low-heat, high-precision constant current;
21. **No Pollution to Power Network:** Power factor ≥0.9, THD≤20%, EMI apply with the global universal index, reduce the power loss and transmission lines to avoid contamination of the network of high frequency interference;
22. **Work under Low-voltage and Low-Heat, Safe and Reliable:** LED junction temperature can be controlled under an ideal temperature (Tj<60℃, Ta=25℃ ambient temperature);
23. **Perfect Combination With solar Energy:** Fully exert the advantage of the LED work under low voltage and environment work, according to the local solar energy resources, electricity and solar power can also be combined .To achieve the best cost performance and high reliability customers.
24. **High Luminous Efficiency:** LED luminous efficiency of the existing condition is ≥801m/w, with the rapid increase LED brightness, lighting power will be further reducing, and saving energy efficiency will show obviously.
25. **Have a number of patents for inventions and utility model patents.**

◆ Chip PN junction temperature and radiator temperature distribution



Above test data was measured by no wind conditions

◆ 1,500 hours degradation test figure



Luminance degradation Figure

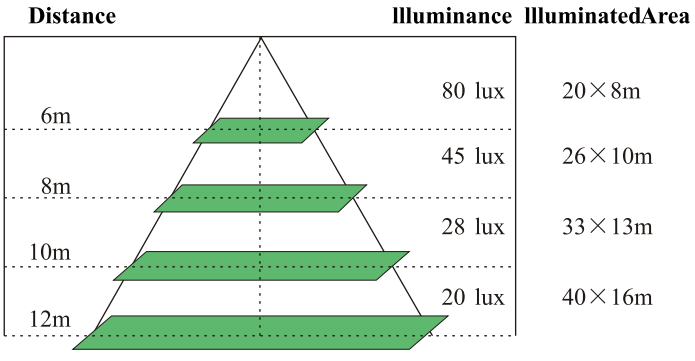
Technical Parameters

Item	LU2	LU4	LU6
Input Voltage	85 ~ 264 VAC		
Frequency Range	47 ~ 63 Hz		
Power Factor	＞0.9		
Total Harmonic Distortion(THD)	＜20%		
Power Efficiency	85%		
LED Working Voltage	24 VDC		
LED Consumption	56W	112W	168W
Power Supply Consumption	10W	20W	30W
LED Luminous Efficiency	⩾80 lm/w		
LED Initial Flux	5,000 lm（Tj=25℃）	10,000 lm（Tj=25℃）	15,000 lm（Tj=25℃）
LED Maintain Flux	4,600 lm（Tj=60℃,Ta=25℃）	9,300 lm（Tj=60℃,Ta=25℃）	14,000 lm（Tj=60℃,Ta=25℃）
Lamp's Flux	4,200 lm（Tj=60℃,Ta=25℃）	8,400 lm（Tj=60℃,Ta=25℃）	12,600 lm（Tj=60℃,Ta=25℃）
Lamp's Efficiency(%)	>90 %		
IIIumination(E)	(height=6m)：⩾26LUX (replaced sodium light of 65LUX)	(height=6m)：⩾53LUX (replaced sodium light of 132LUX)	(height=6m)：⩾80LUX (replaced sodium light of 200LUX)
	(height=8m)：⩾15LUX (replaced sodium light of 38LUX)	(height=8m)：⩾30LUX (replaced sodium light of 75LUX)	(height=8m)：⩾45LUX (replaced sodium light of 113LUX)
	(height=10m)：⩾9LUX (replaced sodium light of 20LUX)	(height=10m)：⩾18LUX (replaced sodium light of 45LUX)	(height=10m)：⩾28LUX (replaced sodium light of 70LUX)
	(height=12m)⩾6LUX (replaced sodium light of 15LUX)	(height=12m)⩾13LUX (replaced sodium light of 33LUX)	(height=12m)⩾20LUX (replaced sodium light of 50LUX)
Effective llluminated Area	(height＝6 m)： 2 0 × 8 m (height=10m)： 33×13 m (height＝8 m)： 26×10 m (height=12m)： 40×16 m		
Color Temperature(CCT)	PureWhite: 5,000 ~ 7,000 K, WarmWhite:3,000 ~ 4,000K		
Color Index(CRI)	Ra＞75		
Light Source	BBE Emitter (1 Watt)		
Light Distribution Curve/Beam Pattern	Asymmetric (Bat Wing)/ Rectangular Beam		
The Maximum Light Intensity Angle	120°:The Horizontal Axis:110°, The Vertical Axis:45°; 140°:The Horizontal Axis:130, The Vertical Axis:45°		
Light Beam Angle	120°:The Horizontal Axis:120°, The Vertical Axis:60°; 140°:The Horizontal Axis:140, °The Vertical Axis:60°		
Junction Temperature(Tj)	60 ℃ ± 1 0% (Ta= 25℃)		
System Resistance(Rja)	0.56°C/W	0.28°C/W	0.19°C/W
Working Temperature	- 30 ℃~ 50℃		
Working Humidity	10 % ~ 90 % RH		
Storage Temperature	10 ℃~ 85 ℃		
Working Life	>50,000 Hrs		
Light Body & Lampshade Material	Aluminum Alloy and PC		
Dimensions(mm)	540(L)X315(W)X90(H)	715(L)X315(W)X90(H)	890(L)X315(W)X90(H)
Net Weight	7 kg	10 kg	13 kg
IP Rating	IP 65		

Photometric Performance

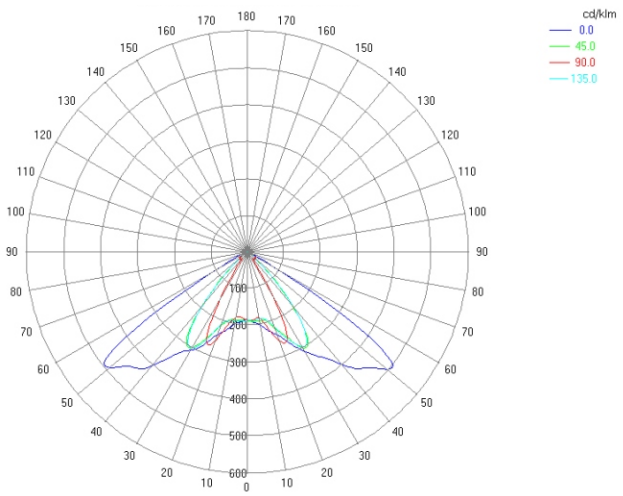
Bat-wing beam pattern of the distribution curve, also can be changed by different section's demand. Rationally control the distribution to be a rectangular beam pattern. When the installation height=12m, the beam pattern is 40x16m rectangular , and the radiation-efficiency is more than 70% in the effective region, the total transparence is more than 90%, the greatest extent possible to reduce the loss of light, the LED light has been fully utilized. The illumination uniformity is very good in the effective radiation region, even better than 0.5, higher than the highest grades of 0.4 of the state road's standards. The edge of the beam pattern is very clear and slide, no adverse glare out of the effective radiation region, will not cause any light pollution, it is an idea cut-lighting lamp. Satisfy the requirements of the road lighting or other special lighting, which can be widely used in the special requirements such as street lighting, advertising lighting, etc.; it is a green, energy-saving, environmentally friendly lighting product.

◆ Illuminance Distribution at different heights

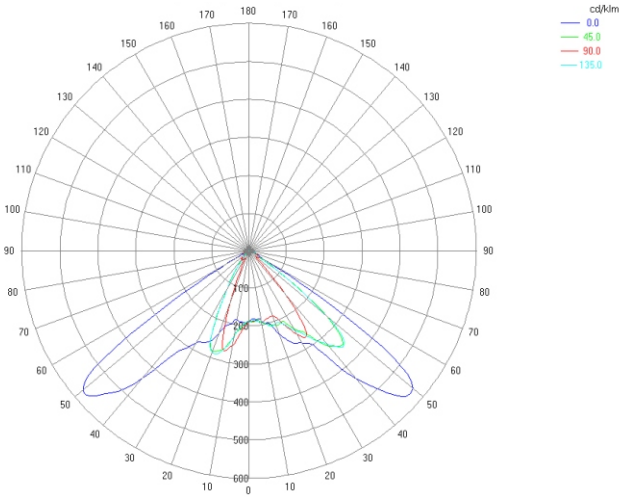


◆ Light Distribution Curve

1 Lamp's Plane Installation

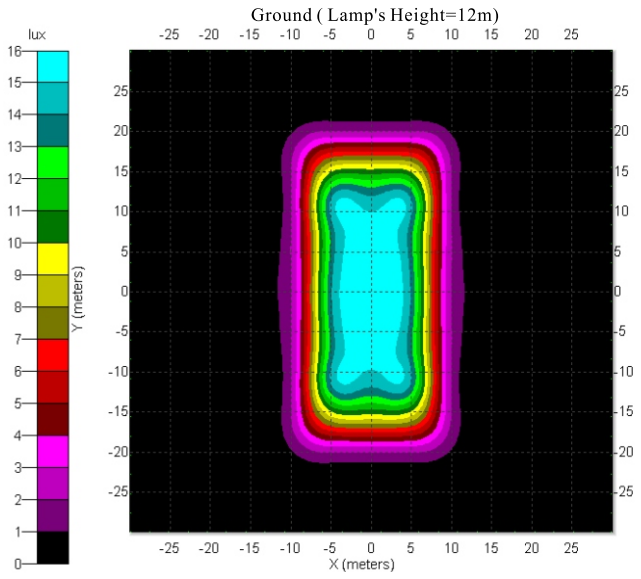


2 Lamp's Inclined Installation

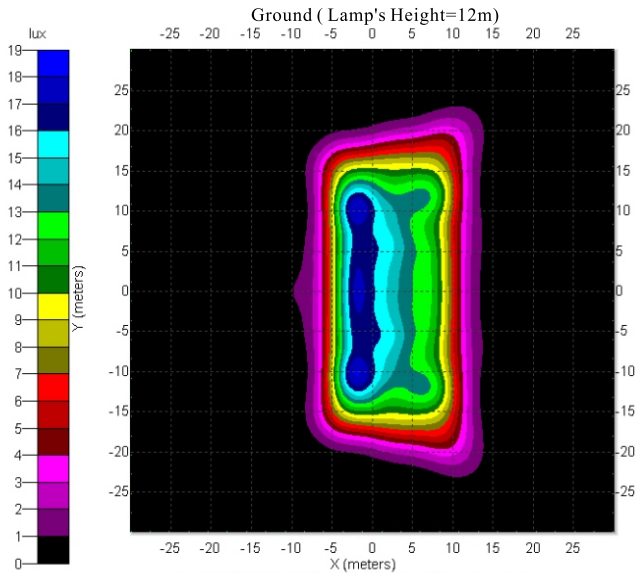


◆ Plane Equal lluminance Distribution Map

1 Lamp's Plane Installation



2 Lamp's Inclined Installation



◆ Actual Lighting Effects (Beam Pattern)

1 Lamp's Plane Installation

2 Lamp's Inclined Installation

The Beam Pattern is rectangular (rectangle), good illumination uniformity, brightness difference is very little between the spot of center and periphery. Almost no difference in the direction of extending the road completely with the continuous extension of the road, it is the ideal lighting lamps for road lighting.

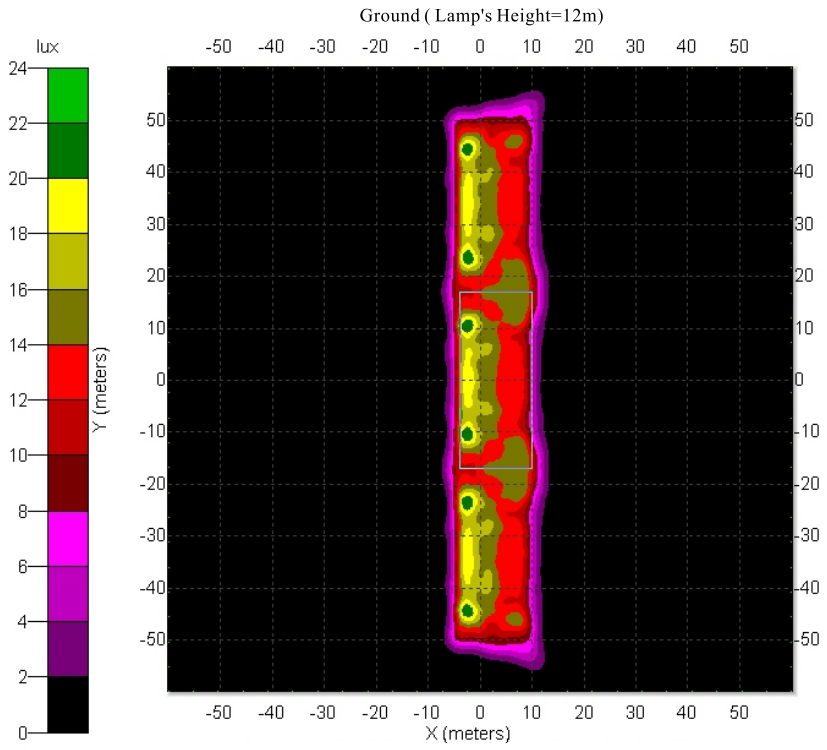
Application Projects Display

◆ The Actual Effects On the Road

1 Unilateral Road Layout

1. Lamp Model: Lu6
2. Lamp Power Consumption:168W
3. Lamp Height:12M
4. Lamp Pole Space:32M
5.Lamp Elevation:10° ~ 15°
6.Lamp Pole Arm Length:3~4M
7 Road Width:14m (two-way 4 lanes)

Equal Illuminance Distribution



Actual Lighting Effects (Beam Pattern)

Above picture is we install the lamps on each side of the road, each 3 lamp's illumination map and beam pattern, in a single lamp's effective covered regional (pane area) is very uniform illumination,10m(3 lanes) width intensity values: 19lux maximum,14lux minimum , 14m(4lanes) 19maximum,10lux minimum, uniformity value> 0.5. The brightness difference is very little between the center of the beam pattern and edge, almost no difference in the direction of the road extension, fully consistent with the road for the extended, reached the ideal road lighting effects.

2 Symmetrically On Both Sides of the Road:

1: Lamp Model: LU6

2: Lamp Power Consumtion: 168W

3: Lamp Height: 12m

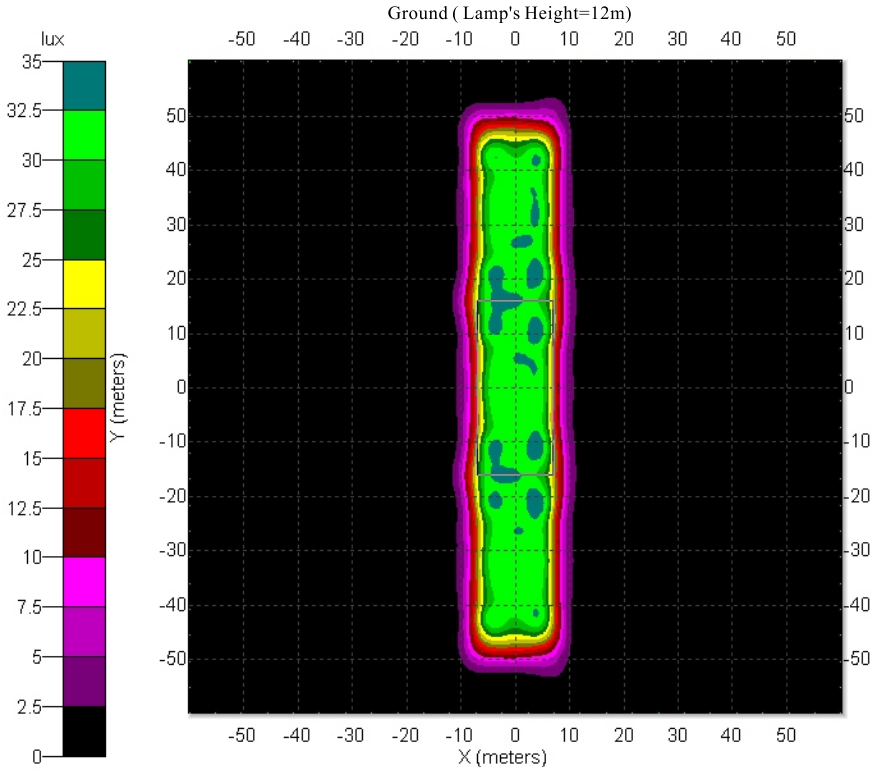
4: Lamp Pole Space: 32m

5: Lamp Elevation: 10° ~ 15°

6 : Road Width: 14m (two-way 4 lanes)

7 : Lamp Pole Arm Length: 3-4m

Equal Illuminance Distribution



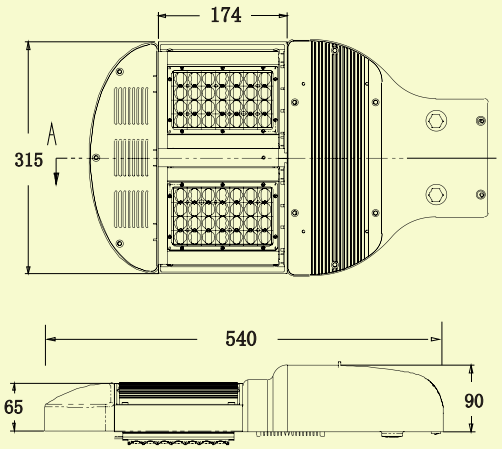
Actual Lighting Effects (Beam Pattern)

Above picture is we install the lamps on each side of the road, each 3 lamp's illumination map and beam pattern, in a single lamp's effective covered regional (pane area)is very uniform illumination,14m(4 lanes) width intensity values: 35lux maximum,25lux minimum , uniformity value> 0.7. The brightness difference is very little between the center of the beam pattern and edge, almost no difference in the direction of the road extension, fully consistent with the road for the extended, reached the ideal road lighting effects.

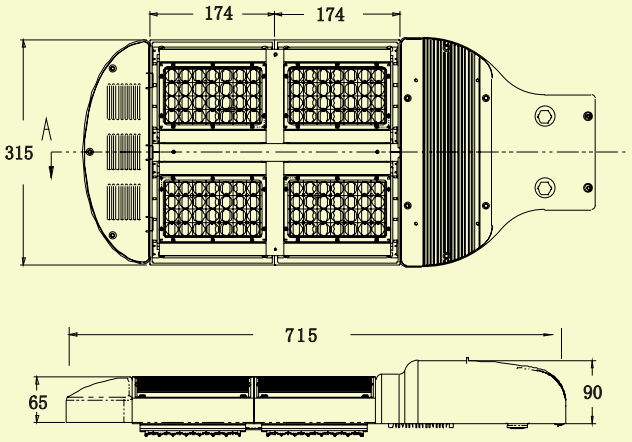
Integrated High Power LED Streetlight Installation Method

◆ Figure

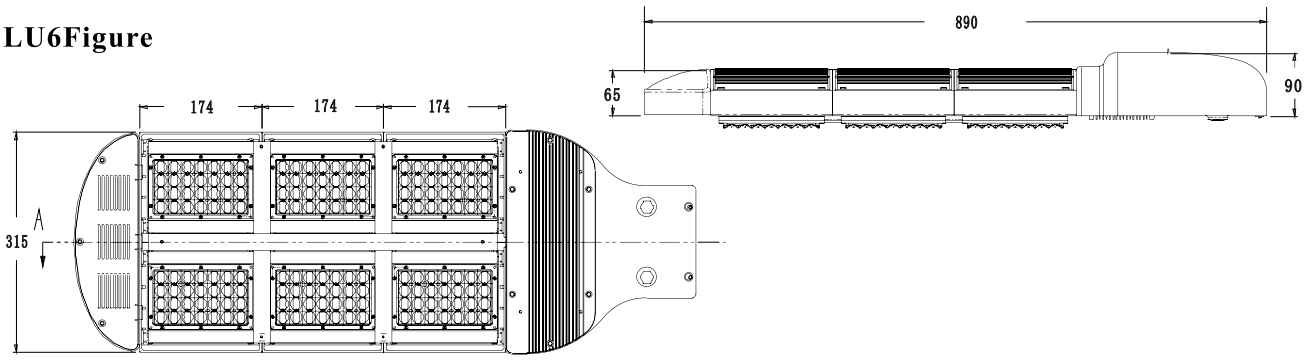
LU2Figure



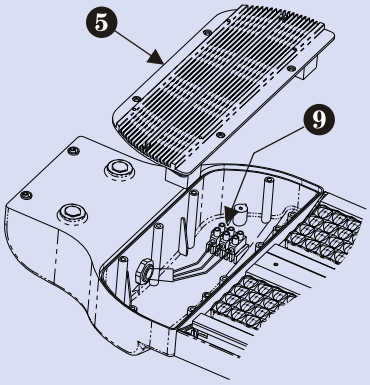
LU4Figure

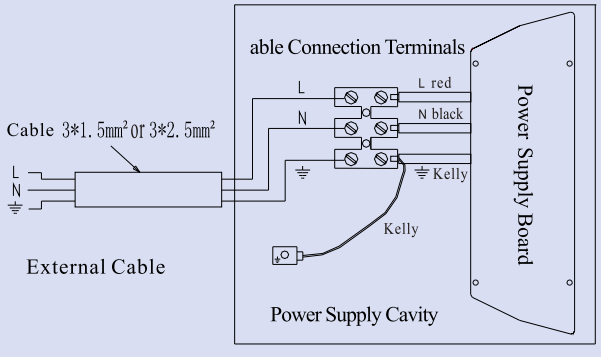


LU6Figure



◆ Integrated High Power LED Streetlight Power Supply Cavity Structure and Connection Diagrams





Connection Sketch Map

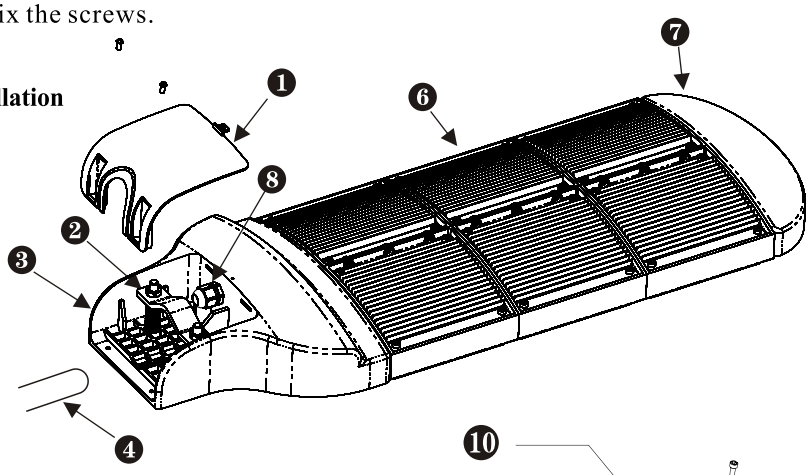
◆Integrated High Power LED Streetlight and Lamp Pole Installation Method

Installation of Streetlight and Lamp Pole (take LU6 for example)

1. Demount the black rubber cover①
2. Adjust the hoop②to the suitable place according to the lamp pole's diameter, and then put the streetlight on the lamp pole ④
3. Locking the two M 10 nut on the hoop ②, fastening the lamp on the lamp pole④ pay attention to adjust the angle of the lamp when locking);
4. Demount the six screws on the board, ⑤ M5 inside six angles), and take out the board of power supply ⑤
5. Put the cable into the power supply cavity through the cable fixture⑧
6. Locking the cable fixture head ⑧(The cable should have sufficient length to prevent break off);
7. Shell the cable head about 6mm, connect the juncture ⑨, with live wire and cathode wire, mount screws;
8. Mount the board on the power supply⑤in order to reach the target of waterproof (note: make sure the sealed loop unrugated and steady)
9. Mount the black rubber cover ①at last, fix the screws.

Sketch Map for Streetlight and Lamp Pole Installation

❶ Rubber Cover
❷ Hoop
❸ Tailstock
❹ Lamp Pole
❺ Board of Power Supply
❻ Module& Framework
❼ Frame
❽ Cable fixing head
❾ Juncture



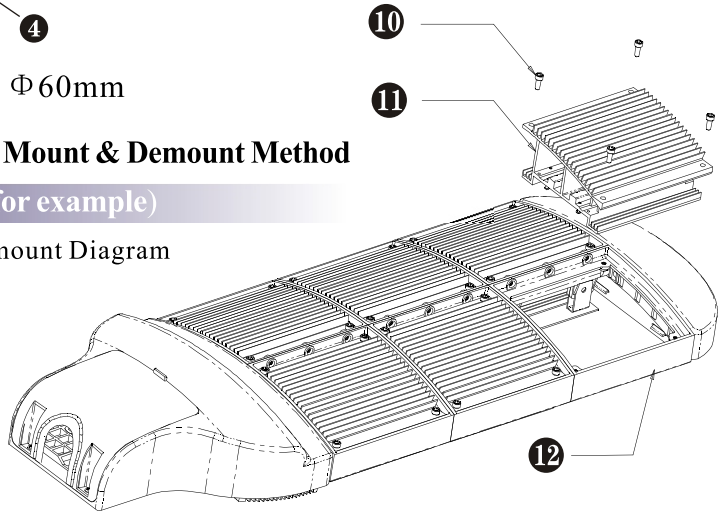
The diameter area for lamp pole : Φ40mm- Φ60mm

◆ Integrated High Power LED Streetlight Module Mount & Demount Method

Installation and Demount Method(take LU6 for example)

Integrated High Power LED Streetlight Module Demount Diagram

❿ Fixed screws(5 angles)
⓫ LED Module
⓬ Frame



Modules Demounting

1.Demount the 4 screws ⑩ fisation from the radiator
2.Pick up the LED module ②slightly, and then slide it to the outside;
3.Overturn the LED module②, take the LED module② out to a certain position;
4.Unplug the power supply cable, remove the entire LED module②.

Modules Mounting

1.Put the LED module ②on a suitable position on the framework③, connect the power supply plug;
2.Put the outside of the module② to the available place first, then put in the whole module②;
3.Note there should no cable drop or block on the bottom of the framework ③which cause the decorative plate deformation;
4.Put the screws on the right place of the module, then tight the 4 fixed screw⑩.

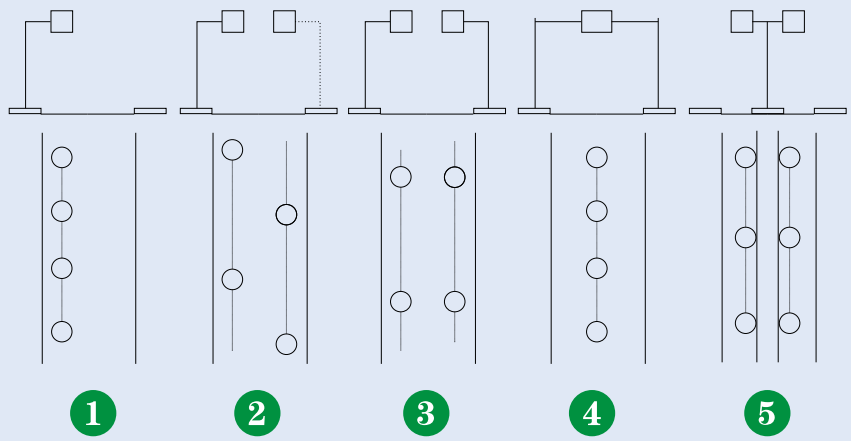
Common Installation and Illumination

◆ Recommended Installation and Illumination Comparison List

Installation Style	Installation Angle	Road Width	Lamp Height	Lamp Distance	Ground Illumination						Luminance Uniformity	Vertical Uniformity	Remark
					LU2 (56W)		LU4 (112W)		LU6 (168W)				
					Max.	Average	Max.	Average	Max.	Average			
Unilateral Installation (No central buffer zone)	10°~15°	Two-way 2 Lanes(7m)	6m	15~18m	26	17	53	35	80	53	0.66	0.75	The Uniformity is good, the illumination on the lane of lamp pole side is better than other lanes (Please see page 8,)
		Two-way 4 Lanes(14m)	12m	32~36m	6	4	13	9	20	13			
Center Symmetrical Installation / Bilateral Installation	10°~15°	Two-way 4 Lanes(14m)	6m	15~18m	26	17	53	35	80	53			
			8m	20~24m	15	10	30	20	45	30			
		Two-way 6 Lanes(21m)	10m	25~30m	9	6	18	12	28	18			
		Two-way 8 Lanes(28m)	12m	32~36m	6	4	13	9	20	13			
Horizontal Suspension Installation (Height Uniformity)	0°	Two-way 2 Lanes(7m)	8m	20~24m	15	11	30	23	45	34	0.75	0.75	The Uniformity is very good, the illumination on each lane is same (Please see page 9,)
		Two-way 4 Lanes(14m)	14m	36~42m	5	4	10	8	15	11			
Bilateral Installation(Height Uniformity)	10°~15°	Two-way 4 Lanes(14m) (No central buffer zone)	12m	32~36m	12	10	26	21	40	30	0.75	0.85	

Remark:① If it is necessary to increase the brightness, we can do the following measures:
A. Install 2 lamps on the same lamp pole; B.Narrowing the gap between the lamp poles.
② If compare sodium light with LED, LED illumination multiply by 2.5 for the sodium light illumination.
For example: 20 lux LED streetlight wins 50lux sodium light

◆ Five common formats to install streetlight



1 Unilateral Installation
2 Bilateral Staggered Installation
3 Bilateral Symmetry Installation
4 Horizontal Suspension Installation
5 Center Symmetry Installation

Troubleshooting Methods and Maintenance

◆ Troubleshooting Methods

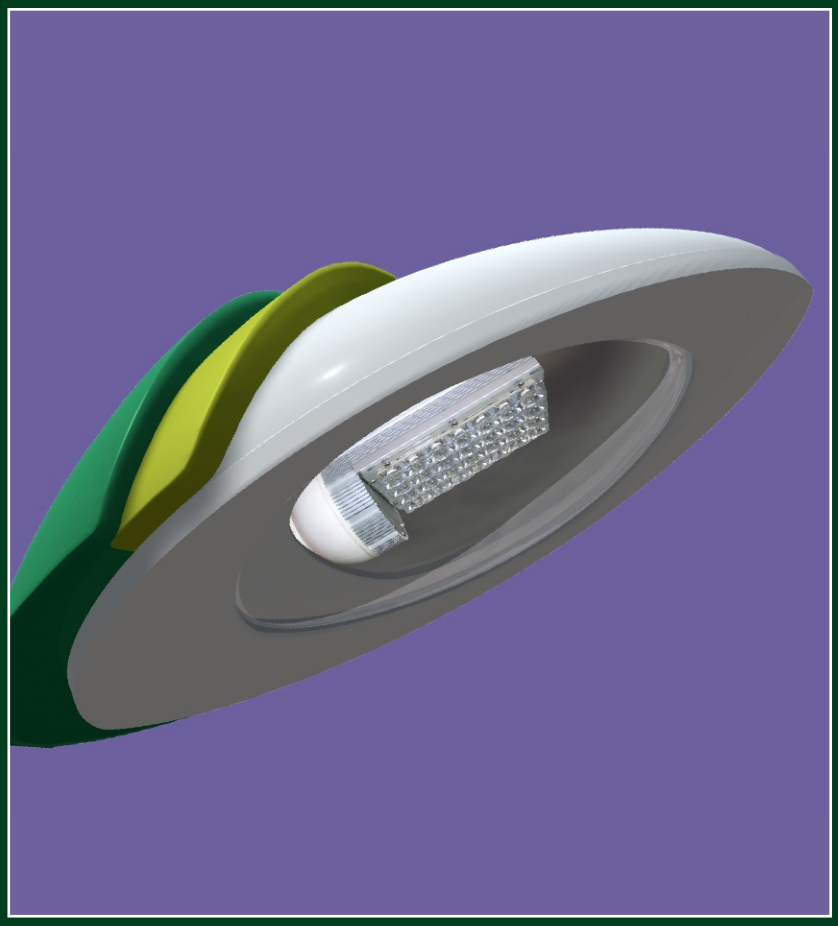
Fault	Possible Reasons	Troubleshooting Methods
All the LED can not Light on	The Power input connecter is no connect well	Please use the "-"shape screwdriver connects the cable on the input connectors.
	The fuse of power supply was damaged	Please change the 5A/250V glass tube fuse, if it still can not light up, please change the power supply.
	The power supply output plug was not connected well.	Please connect the 12P connector on the power supply output well, and then tighten the screws.
LED Flashing	Malfunction of the powerSupply.	Please change the power supply.
One of the LED Modules is darker or not light on	One of Power supply broken	Please change the power supply.
Few individual LED not Light on or dark	LED was broken	Please replace the same type of LED

◆ Maintenance and Repairing

In order to ensure the normal use of lights, enhance light flux rate, you should map out the maintain plans, clean the lamp regularly, cleaning period should be determined according to the local environment and climate.

Product packaging

Model	Q'ty(pcs)	N.W.(kg)	G.W.(kg)	Dimension(mm)	Volume (m^3)
LU2	1	7	7.5	610×390 ×180	0. 043
LU4	1	10	10.5	780 ×390×180	0. 055
LU6	1	13	13.5	960×390×180	0. 067



SP90 LED Streetlight

BBE LED Streetlight, shocked appeared in front of us, 3 major revolutionary and innovative technologies have created a new Times of LED lighting!

I、Super-rate high-power LED to replace the traditional light source, green, energy efficient, it is green, environmental protection and energy efficiency;

II、Rectangular beam pattern design, realized high intensity, high uniformity And eliminate glare;

III、360-degree Rotation Lamp Holder Design, replace the conventional lamp directly, save cost, maintains easily.

S P 9 0

With generous appearance, novel and unique, SP90 was designed for the road lighting demand, fully meet the special requirements of road lighting. This product adopt the High Power LED as the light source, using dozens of BBE Emitter high power 1W LED. With the world's leading optical allocation, advanced thermal, structural and circuit design, it is a highly cost-effective product.

BBE LED adopt the high reliability eutectic welding LED packaging process, the thermal conductivity, electrical conductivity, thermal expansion and mechanical soundness standard is higher than the ordinary silver epoxy packaging. Excellent heat dissipation design, LED junction temperature can be controlled in an ideal temperature (Tj<70 °C). Fully guarantee the long life of the LED. High power factor and low harmonic distortion reduce the power loss on transmission lines, avoid the high frequency interference contamination for the power network. Adopting surface anodization Lampshade (lens) using engineering plastics PC, with resisting acid corrosion, smoke corrosion, ultraviolet aging characteristics.

Apply to Replace: High-pressure mercury lamp, high pressure sodium lamp, metal halide lamps, energy-saving lamps

Apply to Install: Expressway, highway, roads,sub-roads, sidewalks, square sports ground, industrial plants and other advertises lighting

SP90 Technical Parameters

1. **Revolutionary Photometric Design** —— The world's first dedicated optical system (rectangular beam focusing lens). Reasonable control of the light distribution, spot rectangular bean pattern, and ensure an ideal uniformity of brightness on the road surface;
2. **Unique Integrated Lens and Lampshade Design** - Array Lens play a protective and spot light role, avoid wasteful duplication of light and reduce the loss of light, also reduce the weight of the product and enable simplified structure;
3. **Creative Design of the Radiator and Lampholder Integration** - Fully protect LED life and heat dissipation requirements, satisfied with the structure and design of LED Lights fundamentally, with the most distinctive features of LED Lights(see attached picture);
4. **Standard E40, 360-degree Rotation Lamp Holder** - It can still rotate after full tightening the lamp holder arbitrarily, adjust to ensure the best direction face to the ground.
5. **Direct Replacement Light Source Design** - Direct replace the existing high-pressure mercury lamp, high pressure sodium lamp, metal halide lamps, no need to change the original lamp shell.
6. **Intelligent Current Control** - Intelligent current control, whatever any deviant situation, it is able to achieve the precision constant current, ensure the LED can work under the secure current.
7. **No Adverse Glare** - Eliminate the glare caused by the adverse ordinary lights glare and visual fatigue sight interference, improve driving safety, reduce the incidence of traffic accidents, fully embodies the spirit of "People-oriented Technology" in this product;
8. **No Light Pollution** - Light Distribution designed for road lighting, in addition to illuminate the path and will not illuminate the road outside the region. Eliminate the interference signal by the residents of the light into the rest room;
9. **No High-voltage, No Dust Adsorption** - Eliminate the high-voltage adsorb the dust cause the lampshade become dark, reduce the brightness;
10. **No High-temperature, No Aging Yellow Lampshade** - Eliminate baking the traditional lampshade which cause aging yellow, shortened life expectancy and decrease the brightness;Wide Working Voltage The brightness and working life will be reduced if the working voltage change more than 7% for the traditional streetlight, but it will not influence our LED Streetlight at all;
11. **Widest Working Voltage**The traditional sodium light's working voltage wave is over ± 7%, which will decline the life and brightness, while BBE LED streetlight working voltage even at ± 20% wave, the life and brightness keep still.
12. **Start Without Delay** - Reach the normal brightness and do not have to wait when switch on, eliminate a long process of starting of the traditional street lights;
13. **No Strobe Flashing** - Eliminate the visual fatigue which caused by the strobe lights of the traditional street lamps;
14. **Impact Resistance, Shock-proof, Without Ultraviolet (UV) and Infrared (IR) Radiation** - No filament and glass frames, avoid break of the traditional lamp, without harm to the human body;
15. **High Color Index, Nice Coloration** - To show the true colors and more brighter;
16. **Multiple Color Temperature Options** - Color temperature to meet the needs of different occasions, eliminated the low color temperature of the sodium lamp which cause the hypnotic mood and high color temperature of the mercury lamp which cause the depressed mood, observers will feel more comfortable;
17. **Tremendous Energy Saving** - Used the ultra high power, high brightness LED light source, together with the high power efficiency power supply, which can save energy 50%-80% than the conventional sodium and mercury lamps;
18. **Long Life, Up To 50,000 Hours** - (Working for 10 hours a day, can be used for more than 13 years), is 5-10 times working life than a traditional sodium or mercury lamp;
19. **Green and Environmental Protection** - no lead, no mercury, no environmental pollution;
20. **Universal Input Voltage** - 85-264VAC full voltage range constant, constant-current PWM technology, high efficiency, low-heat, high-precision constant current;
21. **No Pollution to Power Network** - Power factor≥0.9 , THD≤20%, EMI apply with the global universal index, reduce the power loss and transmission lines to avoid contamination of the network of high frequency interference;
22. **Work Under Low-voltage and Low-Heat, Safe and Reliable** - LED junction temperature can be controlled under an ideal temperature (Tj<60 ℃, Ta=25 ° C ambient temperature);
23. **Perfect Combination With Solar Energy** - Fully exert the advantage of the LED work under low voltage and environmental work, according to the local solar energy resources, electricity and solar power can also be combined. To achieve the best cost performance and high reliability customers
24. **High Luminous Efficiency** - LED luminous efficiency of the existing conditions is ≥ 65lm/w, with the rapid increase LED brightness, when the luminous efficiency reach 150lm/w, the 400W sodium lamp will be replace by the 100W LED lamp, the luminous efficiency will reach 300lm/w eventually;
25. **Have a number of patents for inventions and utility model patents**;

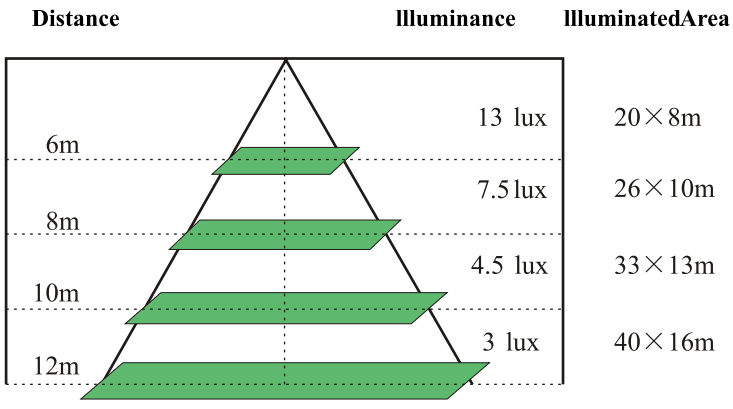
SP90 Technical Parameters

Item / Mode	SP90
Input Voltage	85 ~ 264 VAC
Power Factor	47 ~ 63 Hz
Frequency Range	＞0.9
Total Harmonic Distortion(THD)	＜20%
Power Efficiency	83%
LED Working Voltage	24 VDC
LED Consumption	28 W
Power Supply Consumption	7W
LED Luminous Efficiency	⩾80 lm/w
LED Initial Flux	2,500 lm (Tj=25℃)
LED Maintain Flux	2 , 300 lm (Tj=70℃ , Ta=25℃)
Lamp's Flux	2 , 100 lm (Tj=70℃ , Ta=25℃)
Lamp's Efficiency(%)	>90 %
IIIumination(E)	(height=6 m): ⩾13 LUX (The equivalent of high pressure sodium lamp 33 LUX) (height=8 m): ⩾7.5 LUX (The equivalent of high pressure sodium lamp 19 LUX) (height=10 m): ⩾4.5 LUX (The equivalent of high pressure sodium lamp 11 LUX) (height=12 m): ⩾3 LUX (The equivalent of high pressure sodium lamp 7.5 LUX)
Effective lIluminated Area	(height= 6 m): 20× 8 m (height= 8 m): 26×10m (height=10 m): 33×13m (height=12 m): 40×16m
Color Temperature(CCT)	PureWhite: 5 , 000 ~ 7 , 000 K, WarmWhite:3 , 000 ~ 4 , 000K
Color Index(CRI)	Ra＞75
Light Source	BBE Emitter (1 Watt)
Light Distribution Curve/Beam Pattern	Asymmetric(Bat Wing)/Rectangular Beam
The Maximum Light Intensity Angle	120°:The Horizontal Axis:110°, The Vertical Axis:45°; 140°:The Horizontal Axis:130, The Vertical Axis:45°
Light Beam Angle	120°:The Horizontal Axis:120°, The Vertical Axis:60°; 140°:The Horizontal Axis:140, °The Vertical Axis:60°
Junction Temperature(Tj)	70 ℃ ± 1 0% (Ta= 25℃)
System Resistance(Rja)	1 . 4℃/ W
Working Temperature	- 30 ℃~ 40℃
Working Humidity	10 % ~ 90 % RH
Storage Temperature	10 ℃~ 85 ℃
Working Life	>50,000 Hrs
Light Body & Lampshade Material	Aluminum Alloy and PC
Lamp Base	E40
Dimensions(mm)	90 (Φ) X275 (L)
Net Weight	1 kg
IP Rating	IP 60

SP 90 Photometric Performance

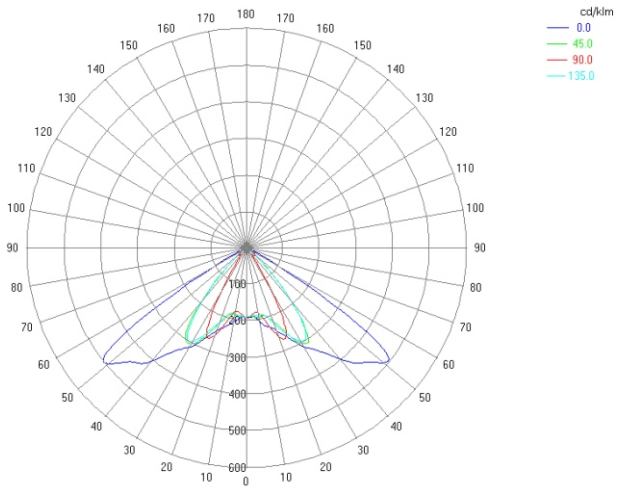
Bat-Wing beam pattern of the distribution curve also can be changed by different section's demand. Rationally control the distribution to be a rectangular beam pattern. When the installation height=6m, the beam pattern is 20x8m rectangular, and the radiation-efficiency is more than 70% in the effective region, the total transparence is more than 90%, the greatest extent possible to reduce the loss of light, the LED light has been fully utilized. The illumination uniformity is very good in the effective irradiation region, even better than 0.5, higher than the highest grades of 0.4 of the state road's standards. The edge of the beam pattern is very clear and slide, no adverse glare out of the effective radiation region, will not cause any light pollution, it is an idea cut-lighting lamp. Satisfy the requirements of the road lighting or other special lighting, which can be widely used in the special requirements such as street lighting, advertising lighting, etc. It is a green, energy-saving, environmentally friendly lighting product.

◆ Illuminance Distribution at different heights

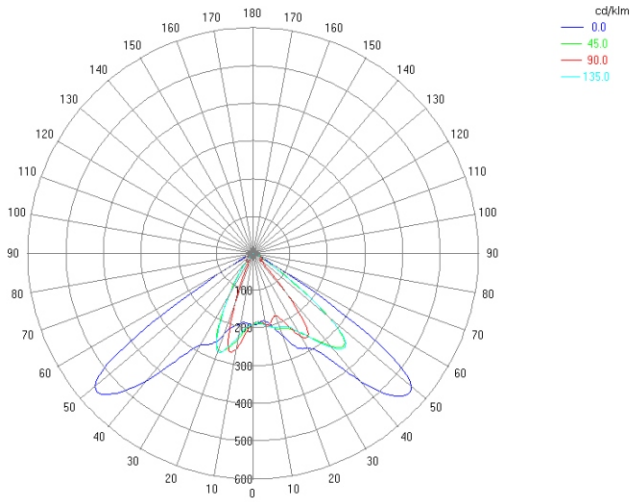


◆ Light Distribution Curve

1 Lamp's Plane Installation

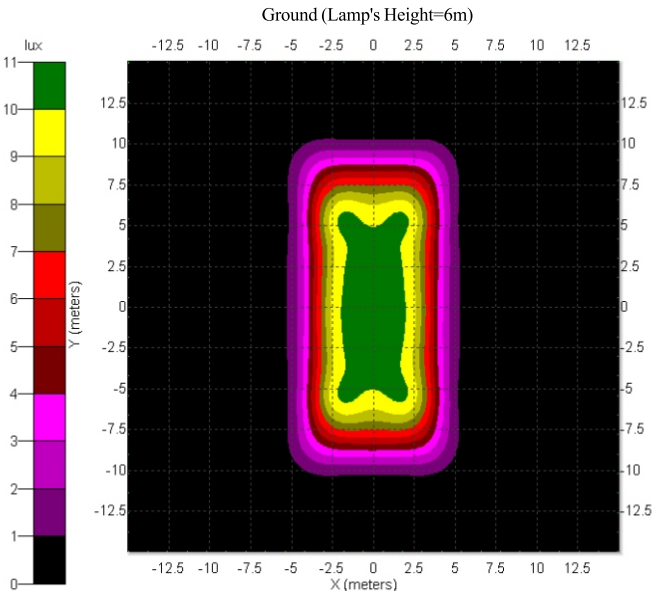


2 Lamp's Inclined Installation

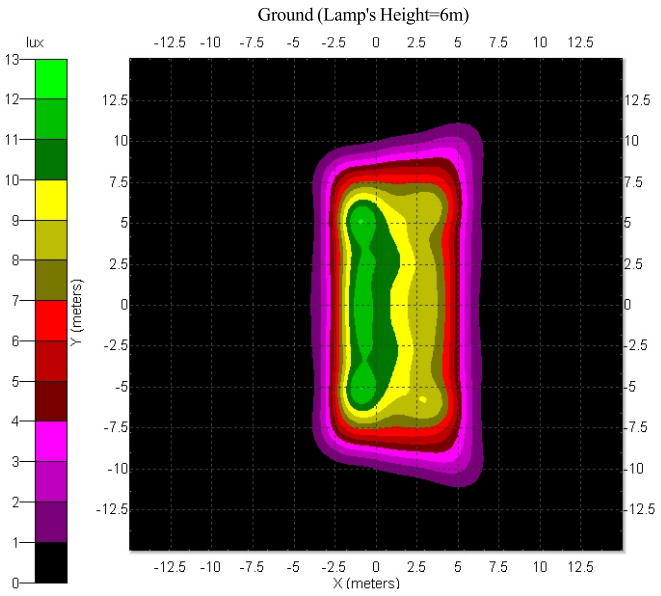


◆ Plane Equal Illuminance Distribution

1 Lamp's Plane Installation



2 Lamp's Inclined Installation



◆ Actual Lighting Effects (Beam Pattern)

1 Lamp's Plane Installation

2 Lamp's Inclined Installation

The Beam Pattern is rectangular (rectangle), good illumination uniformity, the brightness difference is very little between the spot of center and periphery. Almost no difference in the direction of extending the road completely with the continuous extension of the road, it is the ideal lighting lamps for road lighting.

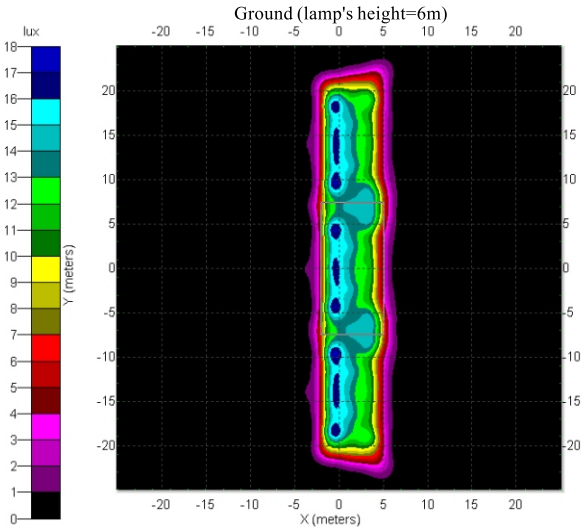
SP90 Application Project Display

◆ Actual Effects on the Road

1 Unilateral Road Layout

Below picture is we install the lamps on one side of the road, 3 lamps' illumination may and beam pattern, in a single lamp's effective covered regional (pane area) is very uniform illumination ,7 M(2 lanes) width intensity values:18 lux maximum, 7 lux minimum, uniformity value ＞ 0.5 . The brightness difference is very little between the center of the beam pattern and edge, almost no difference in the direction of the road extension, fully consistent with the road for the extended, reached the ideal road lighting effects.

Plane Equal Illuminance Distribution



Actual Lighting Effects (Beam Pattern)

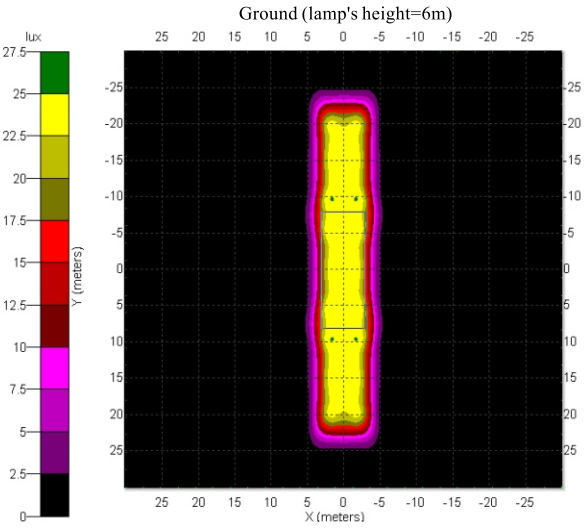
Unilateral Road Layout Related Parameters

1: lamp model : SP90
2: 1.lamp power consumption:28 W
3: lamp height :6M
4: Lamp Pole space :15M
5: lamp elevation:10°～15°
6: 1.road width: 7M(two-way 2 lanes)
7: 1.lamp pole arm length :1.5~2m

2 Symmetrically on both sides of the road:

Below picture is we install the lamps on each sides of the road symmetrically, each 3 lamps' illumination map and beam pattern, in a single lamp's effective covered regional (pane area) is very uniform illumination,7M(2 lanes) width intensity values: 25lux maximum,15lux minimum, uniformity value ＞0.7. The brightness difference is very little between the center of the beam pattern and edge, almost on difference in the direction of the road extension, fully consistent with the road for the extended, reached the ideal road lighting effects.

Plane Equal Illuminance Distribution



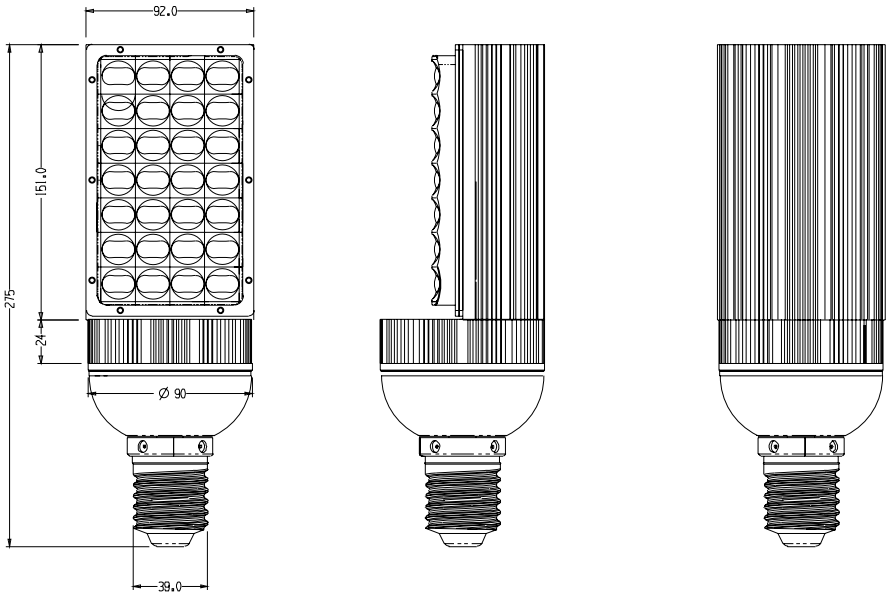
Actual Lighting Effects (Beam Pattern)

Symmetrical Road Layout Related

1: lamp model : SP90
2: 1.lamp power consumption:28 W
3: lamp height :6M
4: Lamp Pole space :15M
5: lamp elevation:10°～15°
6: 1.road width: 7M(two-way 2 lanes)
7: 1.lamp pole arm length :1.5~2m

SP90 Installation Method

◆ Figure



◆ Lamp Installation

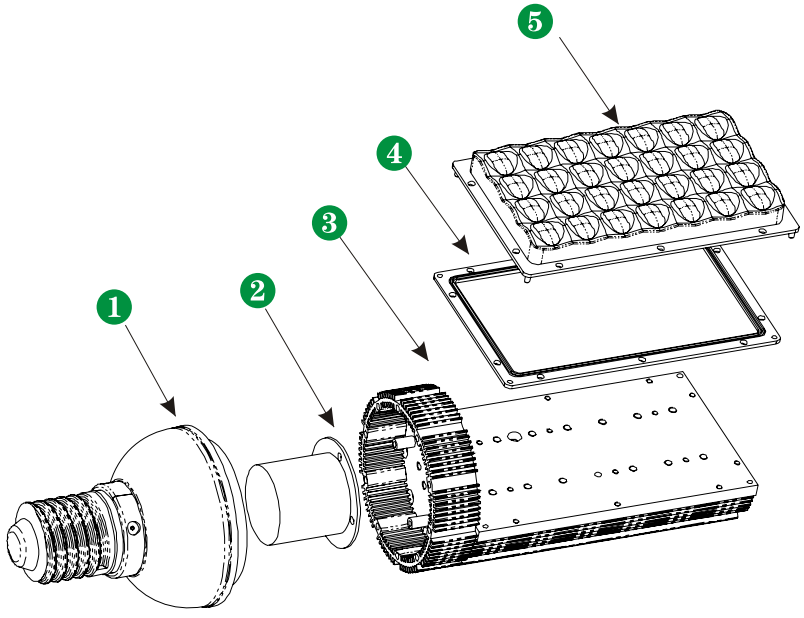
The left picture is the effect which we use the high power led streetlight to replace the conventional high pressure sodium lamp in the existing lamp shade.

Remove the existing light source, connect the 220VAC or 110VAC input terminal direct with the lampholders. **Do not use the original rectifier, otherwise, the high voltage will burn the LED.**

◆ Anatomical Drawings

Part Names

1. Lamp Holder Parts
2. Power Supply
3. Radiator
4. Sealing Gasket
5. LED Modules & Lens



SP90 Troubleshooting & Maintenance

◆ Troubleshooting Methods

Fault	Possible Reasons	Troubleshooting Methods
All the LED can not light up	The lamp holder is not be tightened enough.	Put the lamp into the socket, then turn and tighten it.
	Malfunction of the power supply.	Please change the power supply.
LED Flashing Or Darker	Malfunction of the power supply.	Please change the power supply.
Few individual LED is not light up or dark	LED was damaged	Please replace the same type of LED

◆ Maintenance and Repairing

In order to ensure the normal use of lights， enhance light flux rate, you should develop the maintain plans, clean the lamp regularly, cleaning cycle should be determined according to the local environment and climate.

Product packaging

Model	Q'ty(pcs)	G.W.(kg)	N.W.(kg)	Dimension(mm)	Volume (m^3)
SP90	10	13.5	10	678×330×300	0. 067

Comparison analysis between LED streetlight and conventional streetlight

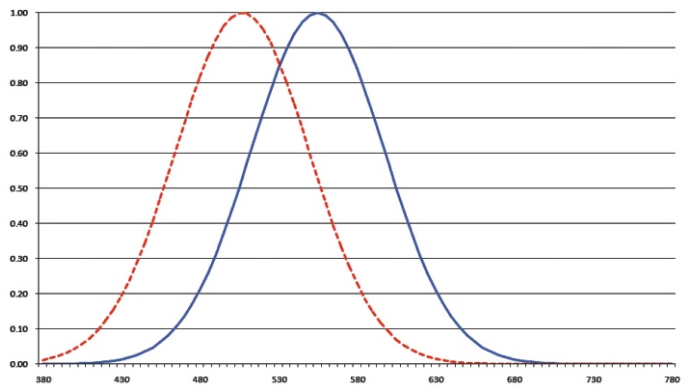
◆ Integrated Performance Comparison

Item	High Pressure Sodium Lamp	BBE LED Streetlight
Photometric Performance	Bad	Excellent
Radiator Performance	Bad	Excellent
Electrical Performance	Electric Shock Easy(High Voltage)	Safe (Low Voltage)
Working life	Short(5,000h)	Very long(>50,000h)
Working voltage Range	Narrow (±7%)	Wide (±20%)
Power Consumption	Quite High	Quite Low
Startup Speed	Quite Slow(Over 10minutes)	Rapid (2s)
Strobe	Yes(Alternating Current Drive)	No(Direct Current Drive)
Optical Efficiency	Low (< 60%)	High (>90%)
Color Index/ Distinguish Feature	Bad, Ra< 50 (The Color Of Object Is Faith, Boring, Hypnosis)	Good, Ra>75 (The Color Of Object Is Fresh, Veritable And Comfortable)
Color Temperature	Quite Low (Yellow Or Amber , Uncomfortable)	Ideal Color Temperature (Comfortable)
Bad Glare	Strong Glare	No Glare
Light Pollution	Serious	No
Heat Generation	Serious(>300℃)	Cold light source(<60℃)
Lampshade Turn Dark	Easy (Dust Absorption)	No (Static Proof)
Lampshade Aging Turn Yellow	Very fast	Not
Shockproof Performance	Bad (frangibility)	Good (No Filament Nor Glass)
Environment Pollution	Lead pollution, etc.	None
Maintenance Costs	High	Quite Low
Product Cubage	Very large	Small (Slim Appearance)
Product Weight	Heavy	Light
Cost-effective	Bad	High
Integrated Performance	**Bad**	**Excellent**

◆ Photometric Comparison

As far as eyes: LED streetlight is 2.5 times brighter than sodium light, in the same altitude

Picture (one)

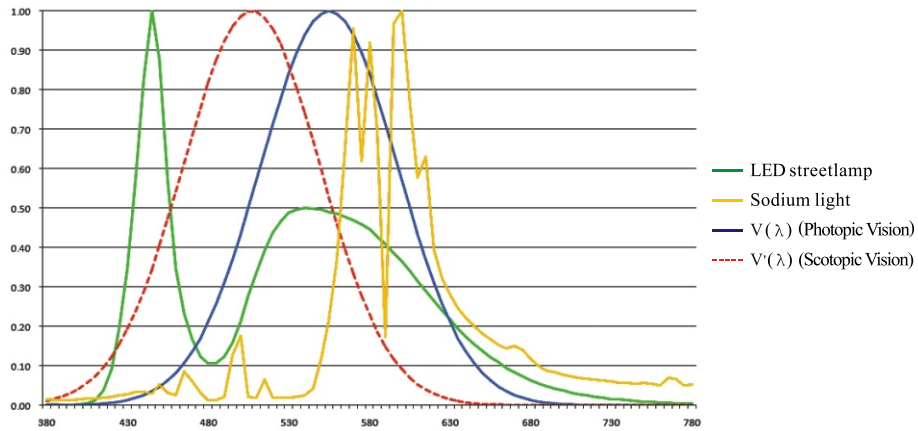


Spectra-effect Function

Man's retina is a radiate receiver which is made up of subulate and bacilliform cells. Each cell has different character and function completely. The sensitization ability of bacilliform cells is much worse than the subulate cells, but they have different sensitivity to the light. When illuminate (daytime), subulate cells operate on the vision, when illuminate at dark, bacilliform cells operate on the vision. To different wavelength spectrum, the sensitivity for man depends on the function of the wavelength called spectrum effect function

Experiment shows, depend on the observation field is different; spectrum efficiency function is different. The international lighting commission determined the spectrum efficiency function as picture (one), From picture (one) we can see the corresponding peak value wavelength of Photopic Vision V(λ) and Scotopic Vision V'(λ)\ is different, the peak value of V(λ) is 555nm, while V'(λ) is 507nm.

Picture (two)

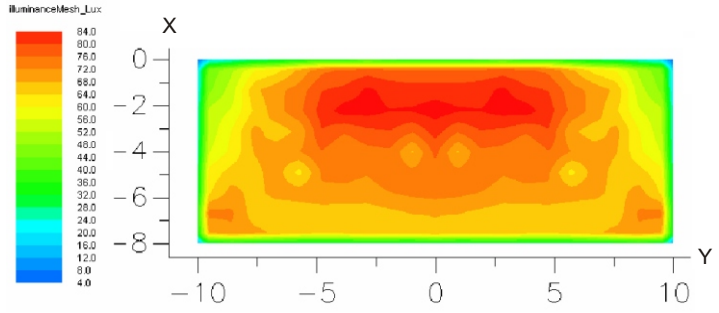


With the same distributing to the spectrum, the brightness is quite different between bright vision and dark vision. See picture (two), LED light dark vision is 2.35 times than the bright vision, while the dark vision is 0.94 times brighter than. Usually, photics meterage equipment sense light in bright vision condition, while streetlight is effective at night (dark vision), so the common illuminate date get to be revised. The revised coefficient of LED is 2.35, and the revised coefficient of sodium light is 0.94; **So in the same condition, (the same meterage instrument), LED streetlight is 2.5 times brighter than sodium light. Accordingly, to reach the same brightness, for LED streetlight, 40% illumination is needed of sodium light.**

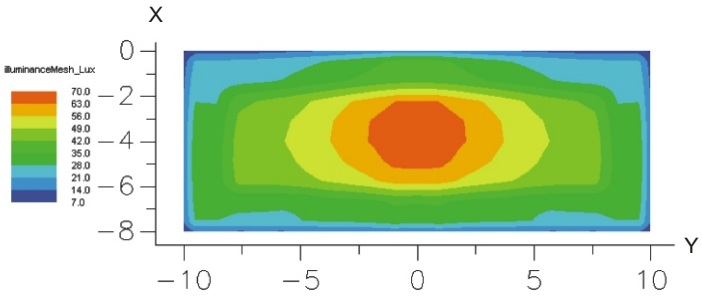
◆ Comparison Illumination Effect For Single Light(Practical Data)

Lamp \ Item		Lamp Height (m)	Lamp Pole Space (m)	Illumination				Electric Parameter						Measure Instrument
				Maximum	Minimum	Average	Uniformity	Working current(A)	Working Voltage (V)	Power consumption	System consumption	Power factor	Tunel Wave distortion	
112W LED Street Lamp	Measurement	7.5	20	40	22.6	33.2	0.7	0.66	AC85-264	143	145	0.99	15%	Illumination calculation parameter list
	Revised	\	\	94	53.1	78	\	\	\	\	\	\	\	
250W Sodium Lamp	Measurement	7.5	20	68.3	21.6	40.4	0.45	3.05	AC210-230	302	670	0.45	\	
	Revised	\	\	64.2	20.3	37.9	\	\	\	\	\	\	\	
250W Metal Halide Lamp	Measurement	7.5	20	34.6	2	12.6	0.15	2.8	AC210-230	308	616	0.5	\	
	Revised	\	\	73	4.2	26	\	\	\	\	\	\	\	

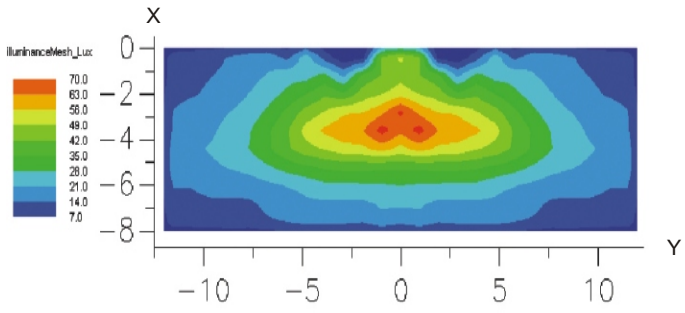
A. Lamp represents the road illumination effect for 112W BBE-LED Streetlight (lamp height=7.5)



B. Lamp represents the road illumination effect for 250W sodium light (lamp height=7.5)



C. Lamp represents the road illumination effect for 250W halogen light (lamp height=7.5)



Note: As there is another light 4 meters rearward, so it will be lighter, the actual illumination is lower.

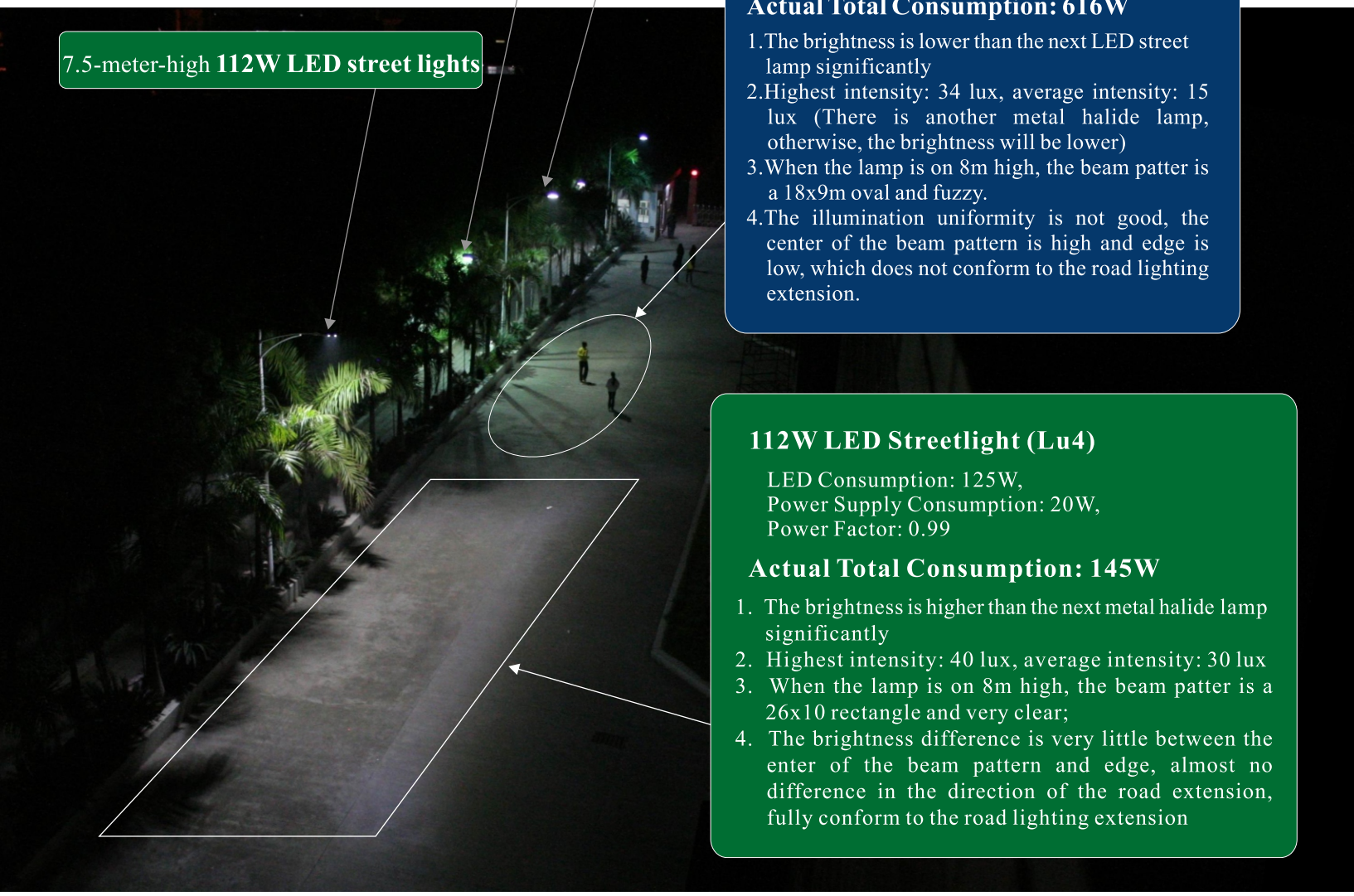
Conclusion:

1. 112W BBE-LED streetlight save 79% and 77% energy, compared with 250W sodium and halogen light, and the equal illumination distribution is 2times or even 3times than the sodium and halogen lamp. In the same condition, **BBE-LED streetlight saves 90% energy above.**
2. **The illumination uniformity of BBE-LED streetlight much excess sodium light;**
3. **The humorous distortion is far lower than sodium lightand halogen light;**
4. The working voltage wave of sodium light and halogen light is over ± 7%, which descend the life and brightness rapidly; while the working voltage wave for **BBE-LED streetlight is ±20%, keep long life and brightness not change.**

7.5-meter-high **250W** Metal Halide Lamp

Rear 4-meter-high 250W Metal Halide Lamp
(increased ground illumination)

7.5-meter-high **112W LED street lights**



250W Metal Halide Lamp

Lamp Power: 285W, Rectifier Power: 23W,
Power Factor: 0.5

Actual Total Consumption: 616W

1. The brightness is lower than the next LED street lamp significantly
2. Highest intensity: 34 lux, average intensity: 15 lux (There is another metal halide lamp, otherwise, the brightness will be lower)
3. When the lamp is on 8m high, the beam patter is a 18x9m oval and fuzzy.
4. The illumination uniformity is not good, the center of the beam pattern is high and edge is low, which does not conform to the road lighting extension.

112W LED Streetlight (Lu4)

LED Consumption: 125W,
Power Supply Consumption: 20W,
Power Factor: 0.99

Actual Total Consumption: 145W

1. The brightness is higher than the next metal halide lamp significantly
2. Highest intensity: 40 lux, average intensity: 30 lux
3. When the lamp is on 8m high, the beam patter is a 26x10 rectangle and very clear;
4. The brightness difference is very little between the enter of the beam pattern and edge, almost no difference in the direction of the road extension, fully conform to the road lighting extension

Conclusion:

Our 150W LU4 High Power LED Street Lamp can save energy 60% than the 250W Metal Halide Lamp, the average brightness is more than double, then under the same brightness, it can save 80% energy than the metal halide lamp.

◆ Glare, Color Temperature and Color Index for BBE LED Street Lamp and the conventional street lamps

A BBE LED Street Lamp

No glare, the color temperature is comfortable, the objects were irradiated is colorful and true, people feels more comfortable;

B Metal Halide Lamp

Strong glare, the color temperature is too high (close to cyan), the objects were irradiated is untrue, people feels irritable, depressed.

C Sodium Lamp

Strong glare, the color temperature is too low (very yellow or orange), the objects were irradiated is untrue, people feels boring, hypnosis.

LED Streetlight Use Benefit Analysis

◆ LED Streetlight & HPS Streetlight Use Benefit Analysis (1 light, working life is 10 years)

Item \ Lamp Source			HPS Streetlight	BBE LED Streetlight	Remark
Light Source			400W	168W	
Cable Expense	Cross-Sectional Area		4 × 25+1 × 16mm²	4 × 6+1 × 4mm²	Calculated By 30m Lamp Distance, 50 Streetlight, That Is 1.5km Cable
	Unit Price		￥92.00/m	￥16.00/M	
	Quantity(Length)		30m	30M	
	Amount (Subtotal)		￥2,760.00	￥480.00	
	Save Expense (Subtotal)		\	￥2,280.00	
	Cable Expense (Total)		￥2,760.00	￥480.00	
	Save Cable Expense (Total)		\	￥2,280.00	
Power Consumption	Lamp Power Consumption		400W	168W	
	Electrical Distribution		Rectifier	Switching Powe	
			120W	30W	
	Comprehensive Cable Loss(6%)		24W	10W	International Standard: 5%
	Transformer loss (3%)		12W	5W	The Lowest Level For 100kva Transformer Is 3%
	Reactive Power Compensation		Power Factor: 0.45	Power Factor: 0.99	
	Subtotal Lamp's Power Consumption		1302W	215W	
	Daily Consumption		16Kwh	3 Kwh	Calculated By 12 Hours Per Day
	10 Year's Consumption (Subtotal)		57,037Kwh	9,429Kwh	
Electric Fee	Monthly Electric Fee		￥328.16	￥54.25	RMB0.70/Kwh
	Annual Electric Fee		￥3,992.61	￥660.03	
	10 Year's Electric Fee		￥39,926.13	￥6,600.26	
	10 Year's Electric Fee Saving		\	￥33,325.87	
Maintenance Expense	Light Source	Working Life	< 1 Year	10 Year	
		Replacement Times	10 Times	0 Time	
		Unit Price	￥80.00	\	
		Subtotal	￥800.00	￥0.00	
	Electrical Distribution	Working Life	Rectifier: 5 Years	\	
		Replacement Times	1 Time	\	
		Unit Price	￥200.00	\	
		Subtotal	￥200.00	￥0.00	
	Manpower	Manpower Price	￥500/Lamp/Time	\	
		Replacement Times	10 Times	\	
		Subtotal	￥500.00	￥0.00	
	10 Year's Maintenance Expense (Total)		￥1,500.00	￥0.00	
	10 Year's Expense Saving (Total)		\	￥1,500.00	

10 Year's Expense (Total)		￥44,186.13	￥7,080.26	
10 Year's Expense Saving (Total)		\	￥37,105.87	
Investment Return	Annual Electric Fee Saving	\	￥3,332.59	
	Annual Maintenance Expense Saving	\	￥150.00	
	10 Year's Net Profit	\	￥35,605.87	Not Included The Maintenance Expense
		\	￥37,105.87	Included The Maintenance Expense

We get a conclusion from above list:

A BBE LED Streetlight saves 83.5% energy, compared with the conventional light;

B At initial stages, we have economy benefit, saving RMB 2280 in the cable expense for every single light.

C Every year, one single light saves RMB3, 332 compared with the conventional light. In ten years, we have economy effect on the expense for RMB 33,325 (not included the maintenance expense)

D We will save RMB 150 on the expense for labor cost, material and the maintenance cost; supposing the maintenance expense of sodium light in 10 years is appended, then we will have RMB 37,105 as economy benefit.

E In addition, the power consumption BBE LED streetlight is only 20% of high pressure sodium light, the capacity of transformer could be reduced, whose cost will be reduced too.

F BBE LED working life will last for 10 years. In these 10 years, the expense of traditional high pressure sodium light is 6 times than the cost of BBE LED streetlight;

Supposing 100,000 pcs street lights are installed in a capital city, we will save RMB 3.7 billion in ten years, and save 0.37 billion in one year.

- **LED Streetlight not only saves energy but also save expense.**
- **Save 80% energy than the conventional streetlight**
- **One LED streetlight can save RMB3, 710 annually, can save RMB37, 100 in 10 years**
- **100,000 LED streetlight can save RMB3.71 billion in 10 years**

LED Streetlight Project Display

◆ SP90, High Power LED Streetlight Installation View —— The State Streetlight replacement project in Mexico

Lamp Installation Method	Model No	Lamp Consumption	Lamp Height	Lamp Pole Space	Lamp Elevation
Unilateral Installation	SP90	28W	7W	14W	10°
Road Width	Lamp Pole Arm Length	Max. Illumination	Minimum Illumination	Average Illumination	Uniformity
7M(Two-Lanes)	1.5m	12lux(Equal to 30lux Sodium Light)	6lux (Equal to 15lux Sodium Light	9lux (Equal to 23lux Sodium Light	0. 7

◆ Integrated LED Streetlight Installation View —— The Streetlight Replacement Project From Nanshan District, Shenzhen City (Photo Taken In Shenzhen, China)

◆ **Integrated LED Streetlight Installation Scene-Lights —— The Streetlight Replacement Project From Nanshan District, Shenzhen City (Photo Taken In Shenzhen, China)**

Lamp Installation Method	Model No	Lamp Consumption	Lamp Height	Lamp Pole Space	Lamp Elevation
Unilateral Installation	LU4	112W	9W	25W	10°
Road Width	Lamp Pole Arm Length	Max. Illumination	Minimum Illumination	Average Illumination	Uniformity
16M(Two-Lanes)	2m	26lux(Equal to 65lux Sodium Light)	16lux (Equal to 40lux Sodium Light	23lux (Equal to 58lux Sodium Light	0. 7





The LED contribution on energy saving and environment protection streetlight's

1、 **Economy Benefit**

Compared with the conventional light

Each BBE-LED saves RMB3,332 in expense annually, and we'll save RMB33，300 in 10 years.

2、 **Energy Saving Benefit**

BBE-LED saves above 80% power, plays an important role in the trend of "reduce 4% power " which is advocated currently, that is power to which we take advantage to establish an abstemious society and to create circular economy.

Each BBE-LED saves 47.608 KWH power in ten years.

3、 **Consumption Saving Benefit**

Based on the coal consumption in Electrical Factory in China are 396g/KWH as a standard,

BBE-LED streetlight:

Each light will save 396g*4,760.80KWH/1000=1,885.29kg

Each BBE-LED street light will save 18.85 ton

4、 **Environmental Protection Benefits**

Based on the coal discharge 175.4 CO_2/KWh and 8g SO_2/KWh /1000=1,885.29kg in Electrical Factory in China

Co_2 and SO_2 discharged by BBE LED list as below:

	Reducing Release Co_2	Reducing Release So_2
Annual	835.05 Kg	38.09 Kg
10 year	8.35 Tons	0.38 Tons

While our homeland pay extremely for the expense caused by the environment pollution each year, according to < China Green Civil Economic calculation (Green GDP calculation) research report of 2004>, it shows that we paid RMB511.8 billion on the expense for the environmental pollution in 2004, which is 3.05% of GDP.

So that replacing conventional streetlight by advanced energy saving LED streetlight is an exigent demand for human survival, environmental protection, civil economical prorogation and profitable to our next generation!

Each streetlight can save RMB**33,300** in ten years;

Each streetlight can save power of **47,608** kwh in 10 years;

Each streetlight can save **18** tons of coal;

Each streetlight reduce release **8.35** tons of CO_2 and **0.38**tons of SO_2 in ten years;

……

100,000 streetlights can save RMB **3.33** billion in ten years;

100,000 streetlights can save power of **4.76** billion kwh in 10 years;

100,000 streetlights can save **1,880,000** tons of coal;

100,000 streetlights reduce release **835,000** tons of CO_2 and 38,000 tons of SO_2 in 10 years;

We have one earth only !