

**LIGHTING SOLUTION
FOR
INDUSTRIAL
APPLICATION**



CONTENTS

01

Introduction

03

02

Products

05

- 2.1 Full Spectrum Sunlight Simulation System 07
- 2.2 High Speed Imaging Lighting System 15
- 2.3 LED Panoramic Light Source System 21



03

Reference

31

- 3.1 Standard Environmental Test Chamber — Sunlight Simulation System
- 3.2 CRRC Qingdao — Sunlight Simulation System
- 3.3 CRRC Changchun — High Speed Imaging Lighting System
- 3.4 Automobile Company — LED Panoramic Light Source System

32

33

35

37

04

Partners

39

01

INTRODUCTION



Shenzhen Sunny Xiao Technology Co., Ltd. (hereinafter refer to as “Sunnyxiao”), is an innovative company with scientific research spirit, focusing on lighting systems and professional lighting equipment in rail transit, film and multimedia industries. Products include solar simulation radiation lamps (metal halide lamps), infrared and ultraviolet radiation equipment, LED and related lighting accessories. Patented in China, Europe and America, Sunnyxiao’s core technology in solar simulation radiation system and LED lighting system enables us to provide whole process solutions with competitive advantage for special lighting system.

The R & D engineers, technicians, designers, and project managers were graduated from well-known universities at home and abroad with more than 15 years working experience in the industry. Over more than half of employees are R&D engineers, majoring in optics, lighting engineering, machinery, electronics, industrial automation, electrical engineering, computer science, thermal energy engineering, fluid mechanics and other fields.

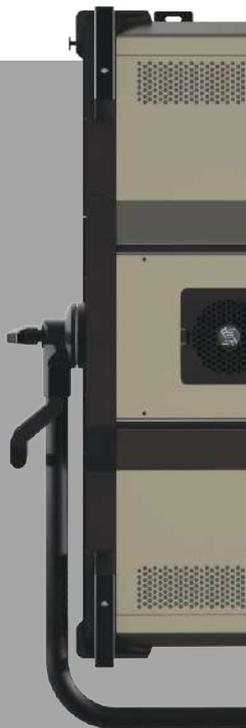
The R&D center is located in the CBD of Bao'an district, Shenzhen city. It is an independent professional testing center about 1,500m², capable of conducting tests of light intensity, color temperature and 40 lamps’ lighting system.

Sunnyxiao has a comprehensive sales and after-sales service system and has established several sales and after-sales service centers in Germany and China.

Adhering to the development concept of "independent innovation, employee stock ownership and sustainability", Sunnyxiao aims to provide high-quality products and perfect technical services.

02

PRODUCTS



2.1 Full Spectrum Sunlight Simulation System

2.2 High Speed Imaging Lighting System

2.3 LED Panoramic Light Source System



2.1

FULL SPECTRUM SUNLIGHT SIMULATION SYSTEM

- Complying CIE 85 standard for solar spectral irradiance, SUNLITE full spectrum sunlight simulation system can perfectly mimic natural sunlight, providing uniform and reliable sunlight radiation simulation, and is widely used in environmental simulation tests of aerospace equipment, automobiles and rail transit vehicles.



SUNLITE 2000

Features

- With polyhedral reflection technology, the reflector maximize the uniformity of light distribution and is of high reflectivity;
- Light distribution angle, adjusted between 60°~ 80°, can be easily achieved through focal knob, which can adapt to the needs of different irradiation distances and irradiation angles;
- Aluminum alloy housing and opening of the honeycomb array improve air convection and heat dissipation performance, which greatly prolongs the lifespan of lamp;
- With easily unbuckling the movable clip, the high-transmittance anti-UV glass is designed to be flipped forward and opened, lowering the maintenance cost;
- Excellent protection treatment prepares the lighting for simulation in extremely complex environments, such as in high temperature and high humidity scenarios;
- Timing circuit patented technology. The igniter provides a service life of over 3000 hours.



SUNLITE Q2000 Ballast

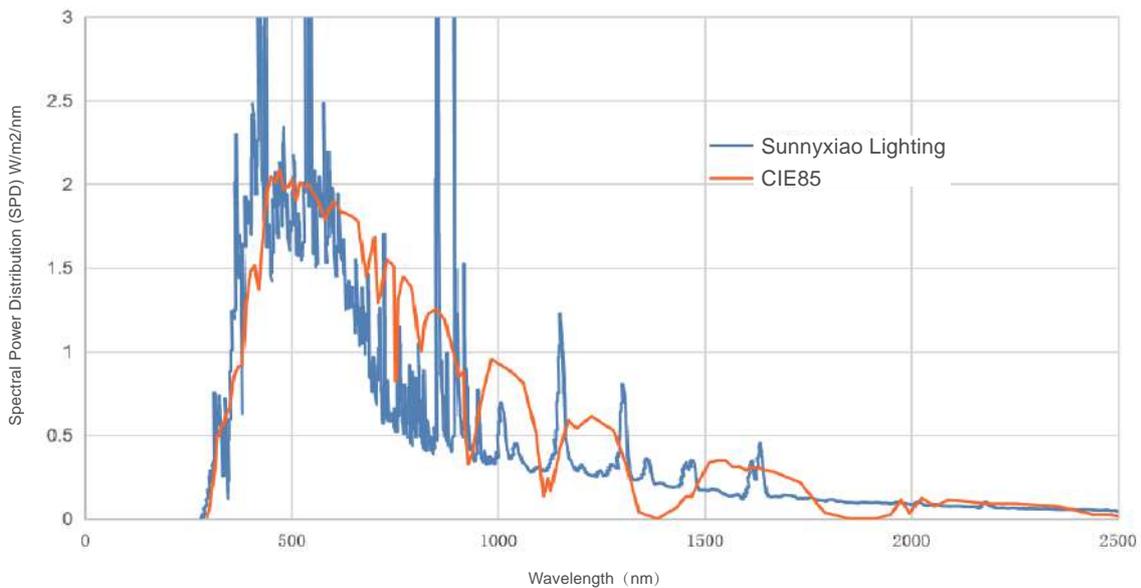
Features

- Four power modules are integrated into one ballast. Power modules are subject to individual control and centralized control;
- High-efficiency pulse width modulation circuit enables continuous brightness adjustment for each lamp;
- Auto protection for power over- and under-voltage supply;
- Real-time monitoring and display of information such as temperature and faults for each channel;
- Continuous 50%~100% brightness adjustment;
- Flexible remote control functions achieved by DMX and LAN dual interfaces;
- Automatic accumulation of working hours for each light.



- Full spectrum is composed of ultraviolet, visible, and infrared light, in which the ratio of red, green and blue in the visible part is similar to that of sunlight, and the color rendering index is close to 100.

Spectrum	Wavelength (nm)	Percentage in Total Radiation Output
Ultraviolet A	280—320	0.9%
Ultraviolet B	320—360	2.3%
	360—400	5.7%
Visible Light	400—520	21.2%
	520—640	21.0%
	640—800	12.7%
Infrared Light	800—2500	36.2%



Spectral Distribution Chart

(provided by an authorized third-party testing agency)

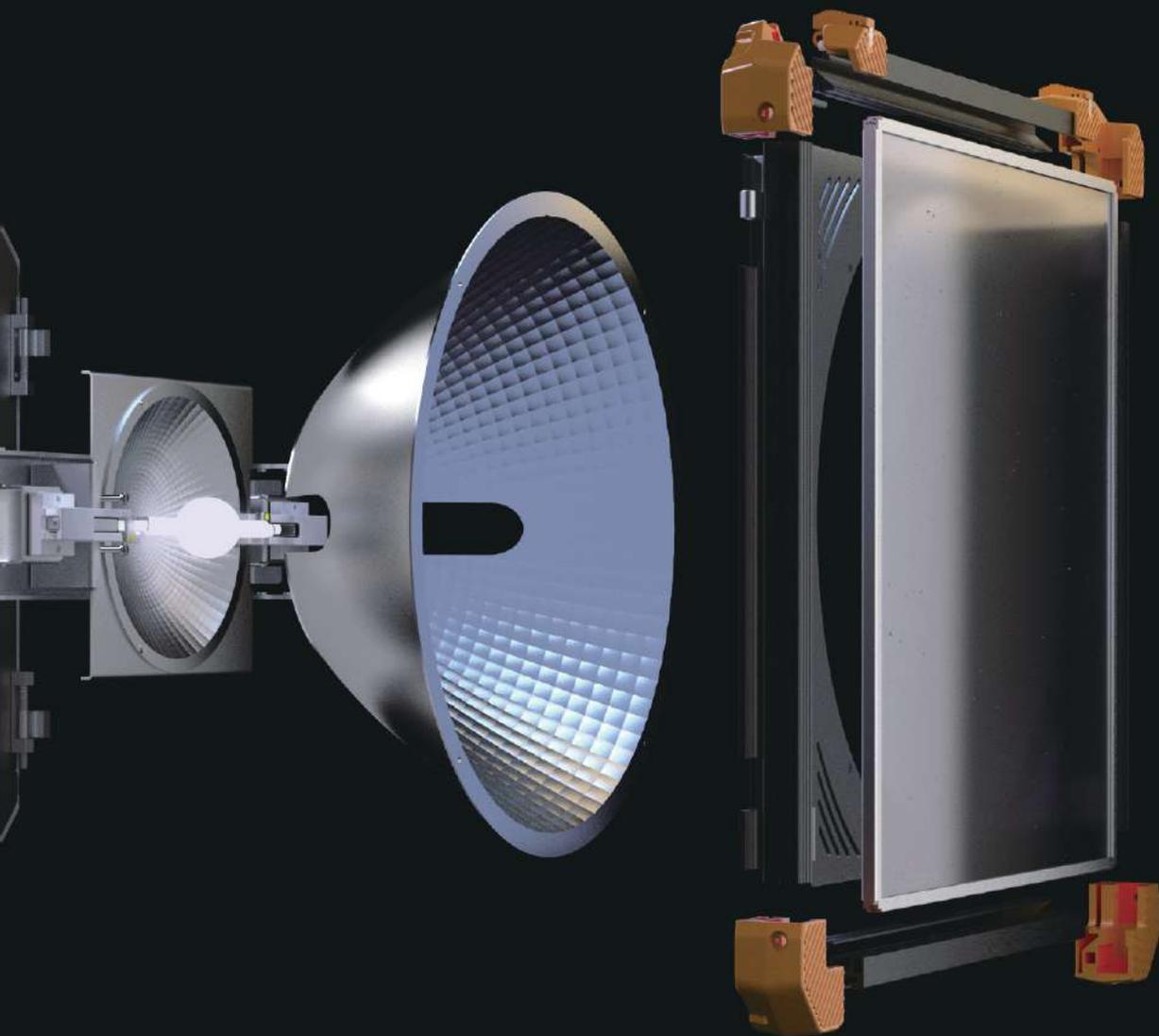


PARAMETER



Technical Specification

Lamp Type	HQI2000W/D/S
Luminous Flux	210000 lm
Nominal Color Temperature	6100K
Ambient Temperature Range	-55°C— 55°C
Average Lifetime	3000h
Color Rendering Index (Ra)	>90
Half Peak Angle	60°— 80°
IP Rating	IP54
Input Power for Lamp	200V
Net Weight	18kg
Certification	CE,RoHS,REACH

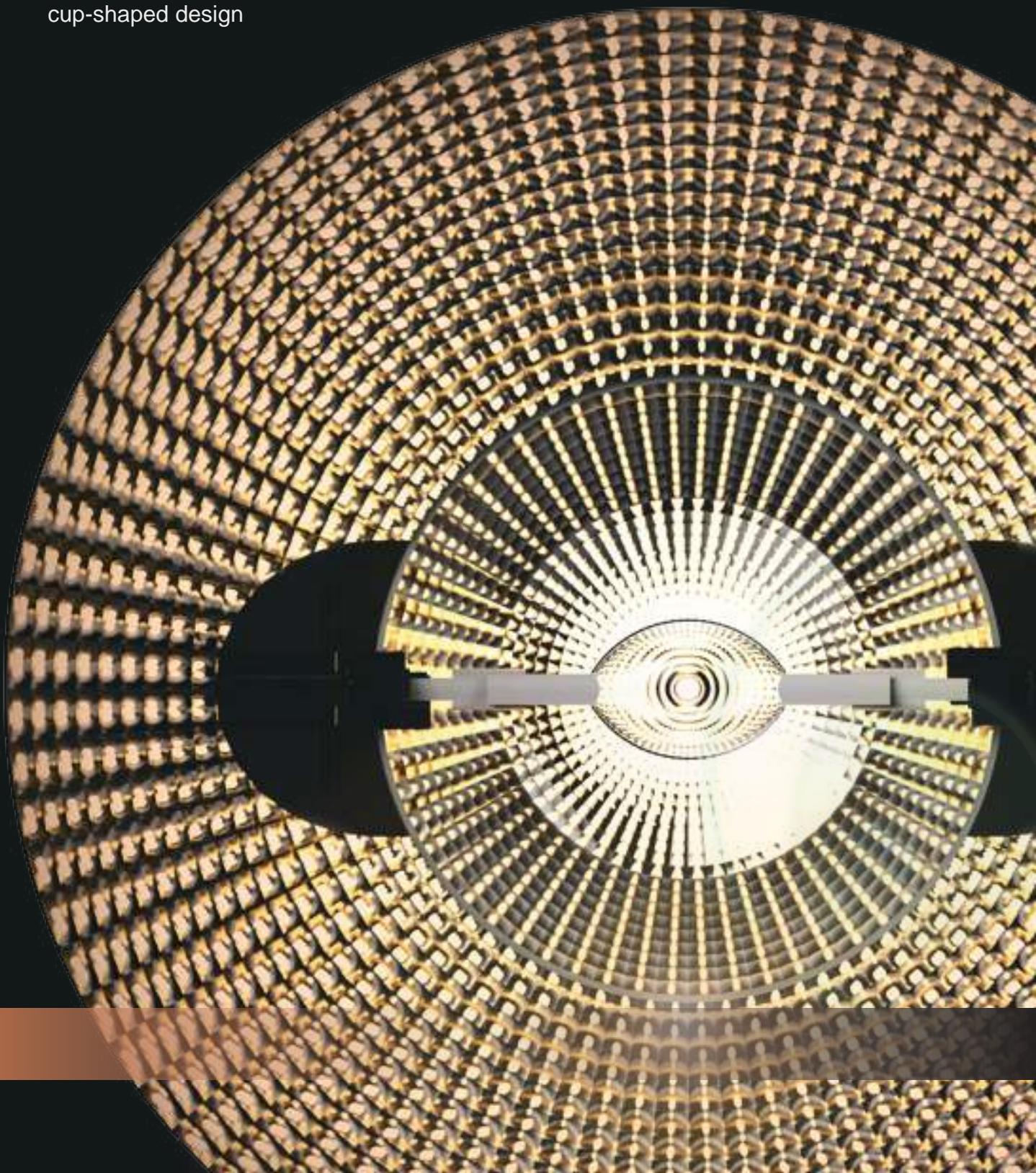


Photometric Data

	5m	7m	10m
Distance	5m	7m	10m
Beam Angle: 16°			
Output	29605lux	15105lux	7401lux
Diameter	1.4m	2.0m	2.8m
Beam Angle: 18°			
Output	24815lux	12661lux	6204lux
Diameter	1.6m	2.2m	3.2m
Beam Angle: 30°			
Output	13382lux	6828lux	3345lux
Diameter	2.7m	3.8m	5.4m

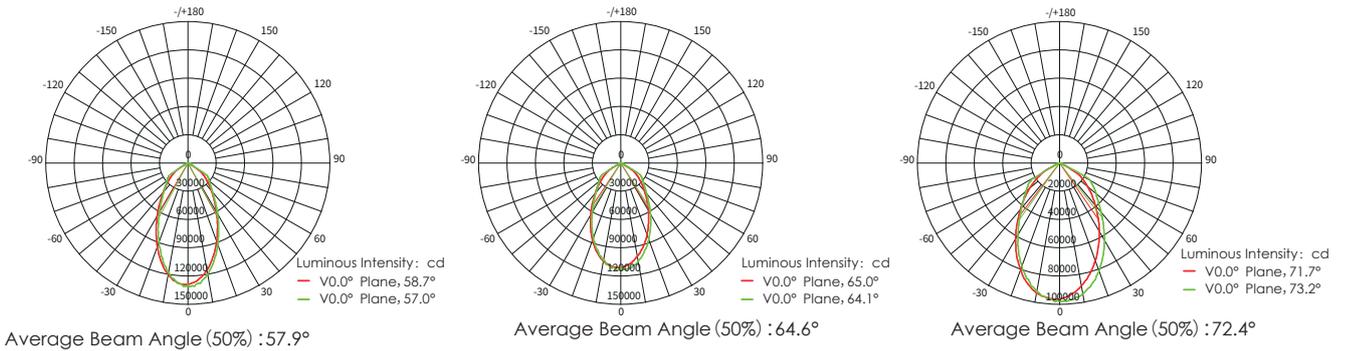
PATENTED LIGHT REFLECTION SYSTEM

- Illumination uniformity effectively improved by polyhedral reflection technology
- Luminous efficacy significantly enhanced by patented specular reflection and cup-shaped design

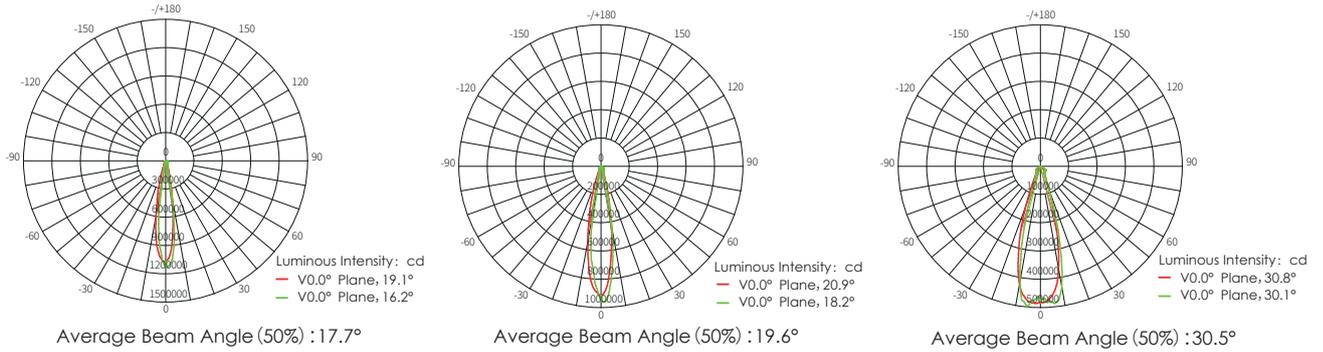


LIGHT DISTRIBUTION CURVE

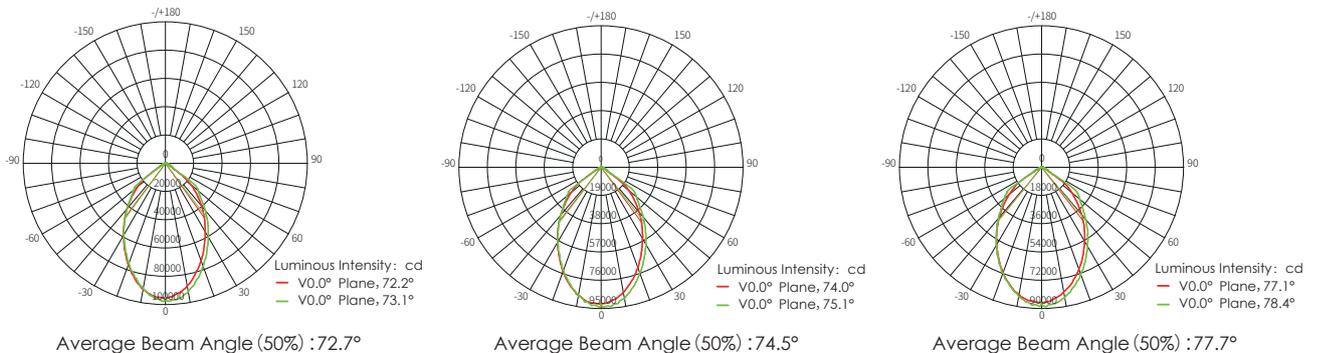
With variable focal length and reflector manufactured from different materials and of sophisticated surface treatment, multiple types of light distribution curves are generated, suitable for various testing scenarios.



Light Distribution Curves for Satin Reflector



Light Distribution Curves for Polished Reflector

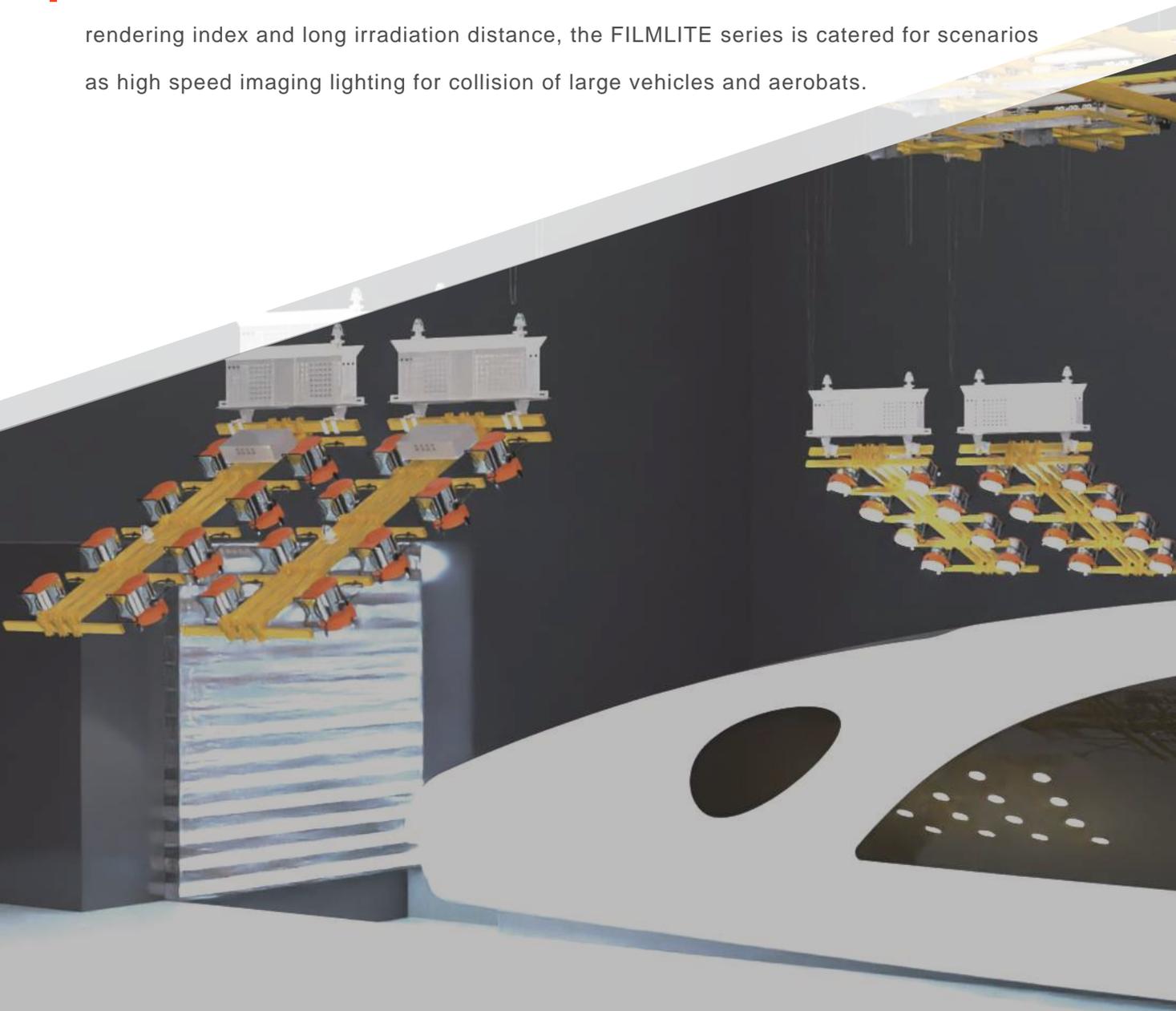


Light Distribution Curves for Matted Reflector

2.2

HIGH SPEED IMAGING LIGHTING SYSTEM

Leading by metal halide lamps, which are of high power, high brightness, high color rendering index and long irradiation distance, the FILMLITE series is catered for scenarios as high speed imaging lighting for collision of large vehicles and aerobats.



FILMLITE 4000 HMI Metal Halide Lamp

Features

- Polygonal parabolic reflector;
- Integral magnesium- aluminum alloy structure, 30% lighter (in weight) than existing ones;
- Cross- cooling technology ensures safe operation at any angle;
- Compensation of cable loss (CCL);
- Ingress protection rating of IP23.



FILMLITE S4000 Ballast

Features

- Three output modes: Silence, Flicker Free, High Speed;
- High efficiency pulse width modulation circuit enables continuous brightness adjustment for Filmlite;
- Power protection system, providing protection in over and under voltage, leakage, and short circuit conditions;
- Real time monitoring and display of information such as temperature and faults;
- Self-adapting for 4,000W and 2,500W HMI lamps;
- Stable power output. Boost for power upgrade is available.

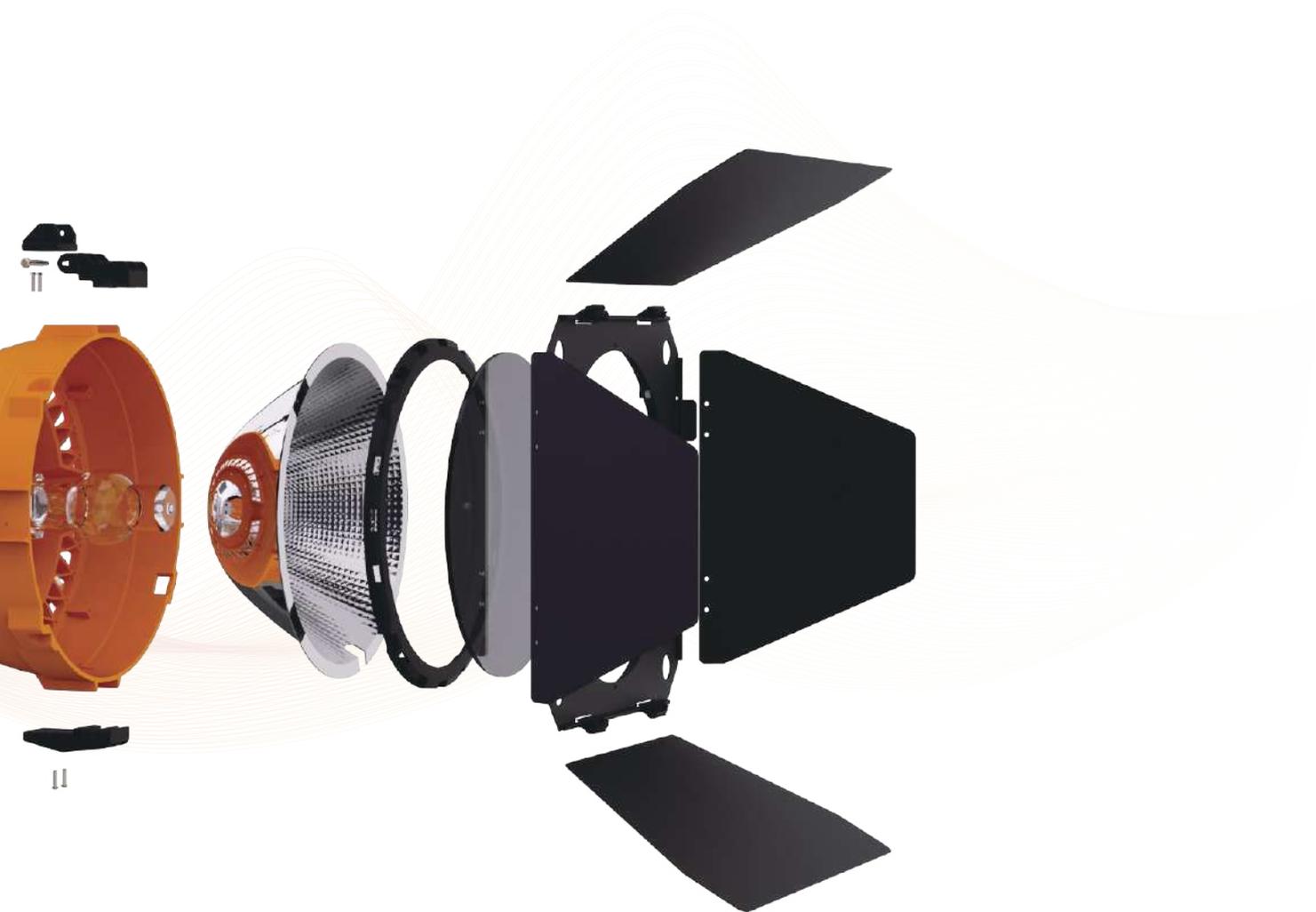


PARAMETER



Technical Specification

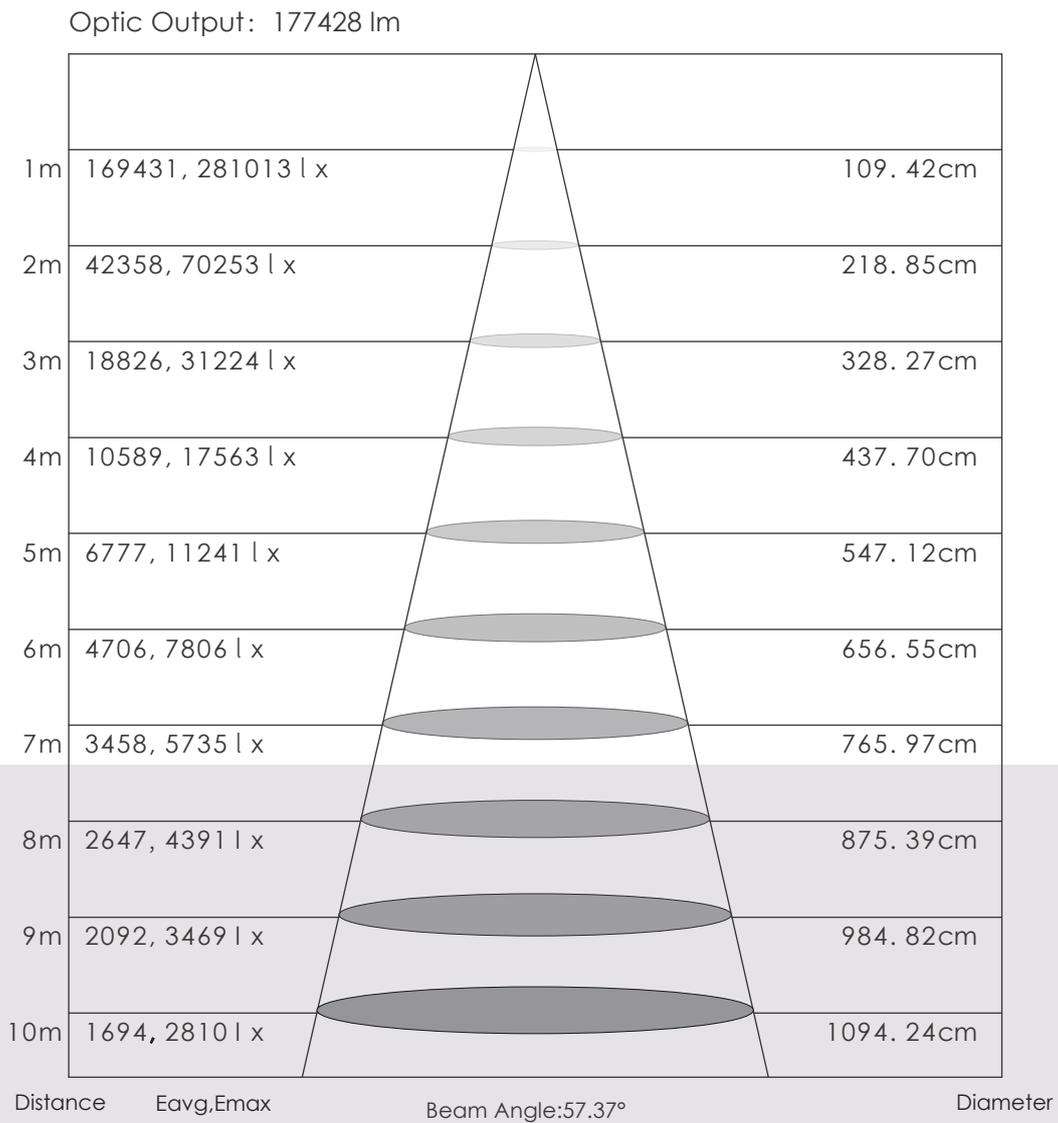
Lamp Type	HMI2500W,HMI4000W
Luminous Flux	380000 lm,HMI4000W
Nominal Color Temperature	6300K
Ambient Temperature Range	-55℃—55℃
Average Lifetime	3000h
Color Rendering Index (Ra)	>95
Half Peak Angle	16°—60°
IP Rating	IP23
Input Power for Lamp	115V / 200V
Net Weight	16kg
Certificate	CE,RoHS,REACH



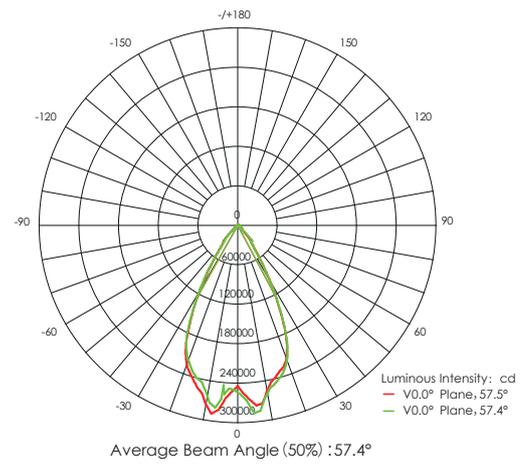
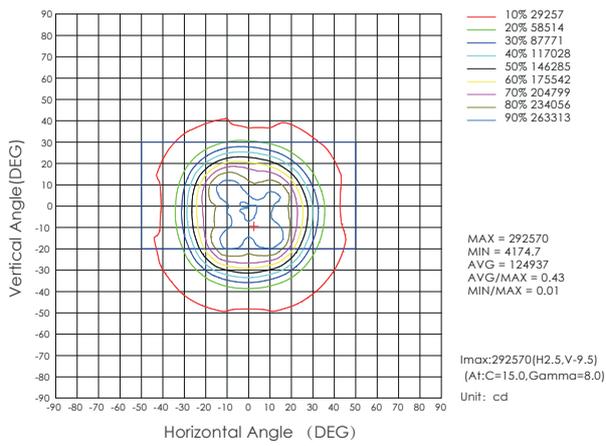
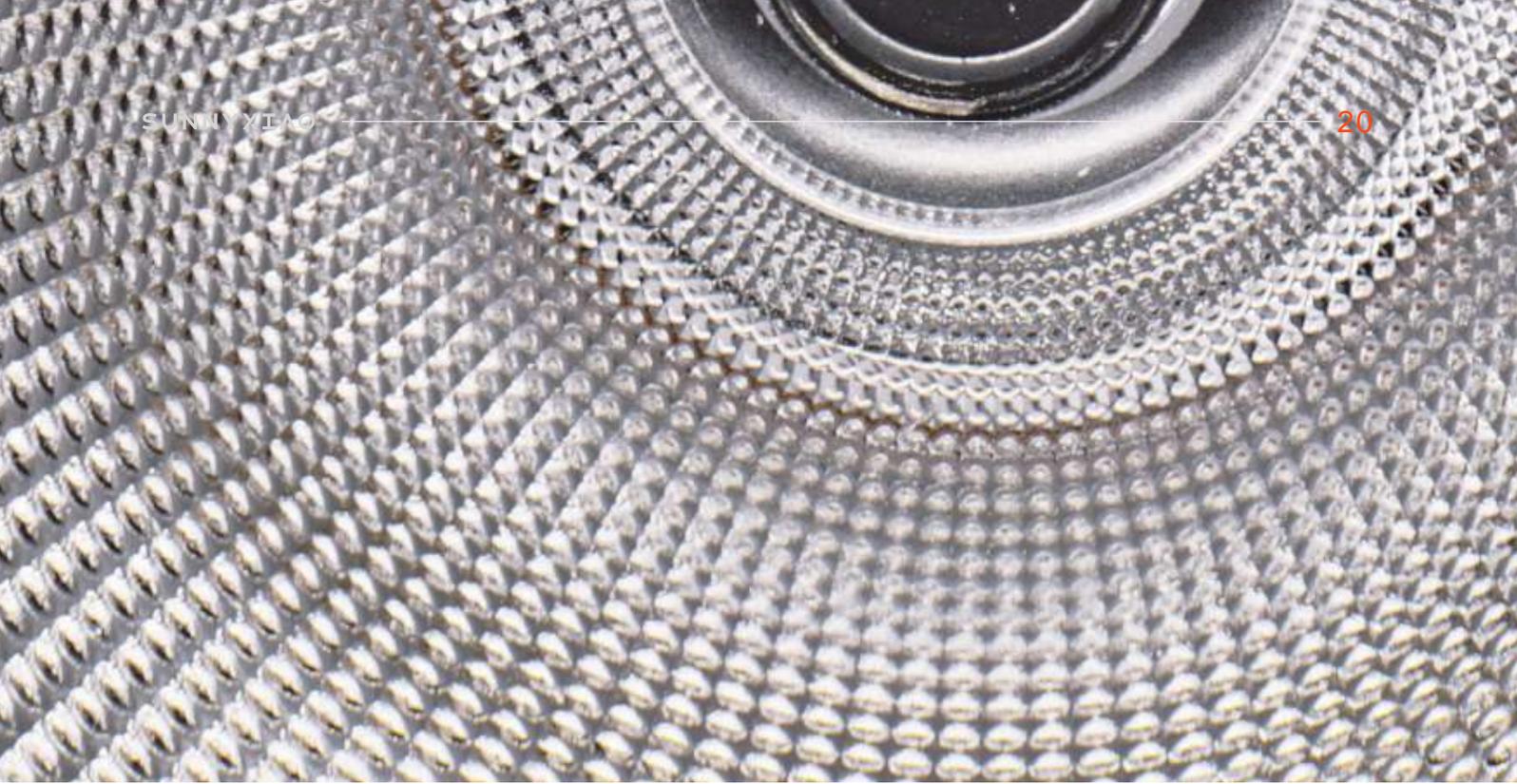
Photometric Data with 4,000W Lamp

	7m	10m	15m
Distance	7m	10m	15m
Spotlight: 18°			
Output	41020lux	20107lux	8937lux
Diameter	2.2m	3.1m	6.1m
Middle: 30°			
Output	13765lux	6635lux	2962lux
Diameter	3.5m	5.2m	7.8m
Floodlight: 52°			
Output	5098lux	2505lux	1105lux
Diameter	6.0m	8.8m	13.2m

OPTICAL PERFORMANCE



Remarks: The curve shows the irradiation area and average illumination per various irradiation distance for the lamp



Patents and Certificates



Certified with



2.3

LED PANORAMIC LIGHT SOURCE SYSTEM

LED panoramic light source system is mainly used in automotive interior and exterior decoration design review, vehicle backup camera image and other image optical testing scenes;

It has the advantages of high brightness, uniform and soft light, continuous dimming and color, good heat dissipation and long life;

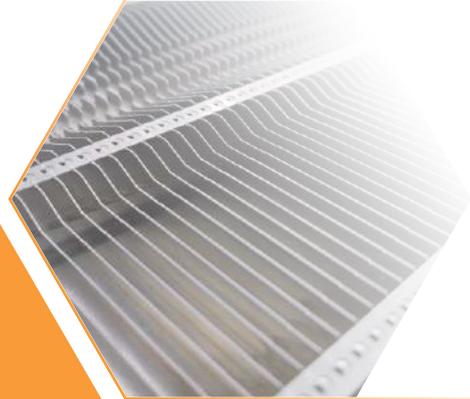
RGBW color mix can provide accurate and high quality light source, matching a variety of scene lighting needs.



Customized high power packaging LED chip



Enhanced eagle wing cooling system



SOLUTION

Each lamp is equipped with an independent constant current high frequency PWM driver



High efficiency and high gain (LLC) power module



LED lamps emit relatively little heat during operation and can still keep the temperature in a satisfactory range even under continuous operation for long periods.

- Separate structure of control unit and lamp board to avoid heat superposition;
- The grid structure on the back of the lamp body makes the airflow circulation smooth;
- Built-in high-power silent fan, efficient heat dissipation under 25 dB.

According to the technical characteristics and practical application experience of LED lamps, LED panoramic light source system can be subdivided into 5 levels of difficulties, and the difficulties are increasing from Level 1 to Level 5.

Lighting effects and scene simulation

On the basis of satisfying the basic functions, it also has various lighting effects and scene simulation, such as weather simulation function.

LEVEL 5

The ultimate color rendering index, highly restore original color

The experiment process and data are recorded by means of photography and video recording, only high color rendering index can restore true and clear images.

LEVEL 4

Irradiation plane uniformity

The uniformity of the irradiation plane is determined by the luminescence characteristics of the light source, the distance between the light source and the control precision of the system.

LEVEL 3

Realize high illumination in tall space

For the tall space with special test requirements, it needs to meet the high illumination ($\geq 10000\text{Lux}$), which cannot be met by ordinary LED light source, high-power lamp chip is a better choice.

LEVEL 2

Poor heat dissipation effect and high failure rate

Common household or commercial LED lighting fixtures are not equipped with an efficient cooling system, which leads to frequent failures in high-density and pure light space, causing the driver to fail to work properly.

LEVEL 1

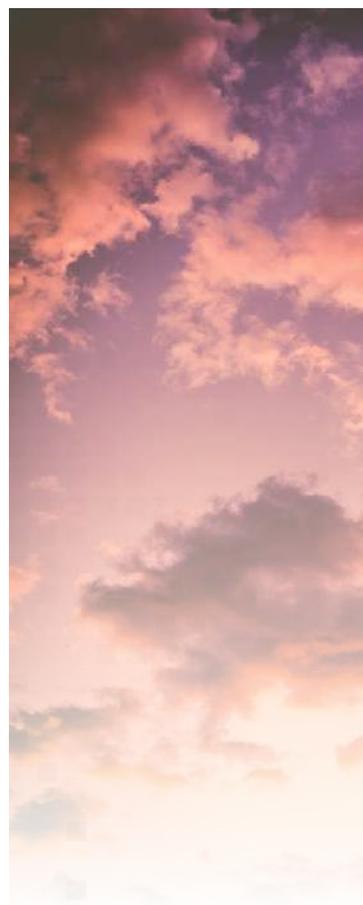
Realization of a variety of scene simulation, various modes for free choice



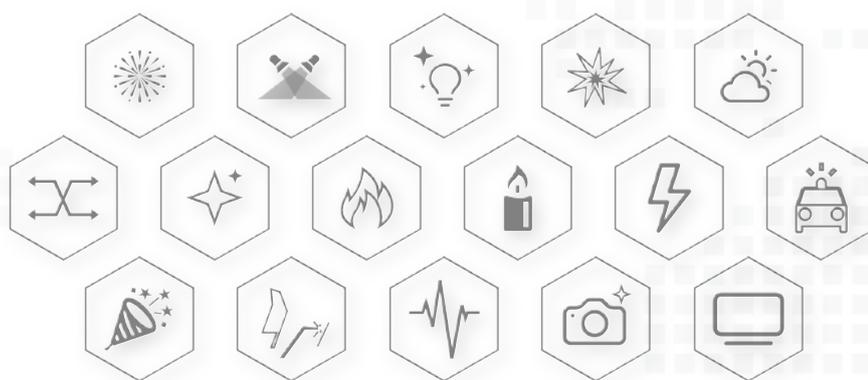
Cloudy day



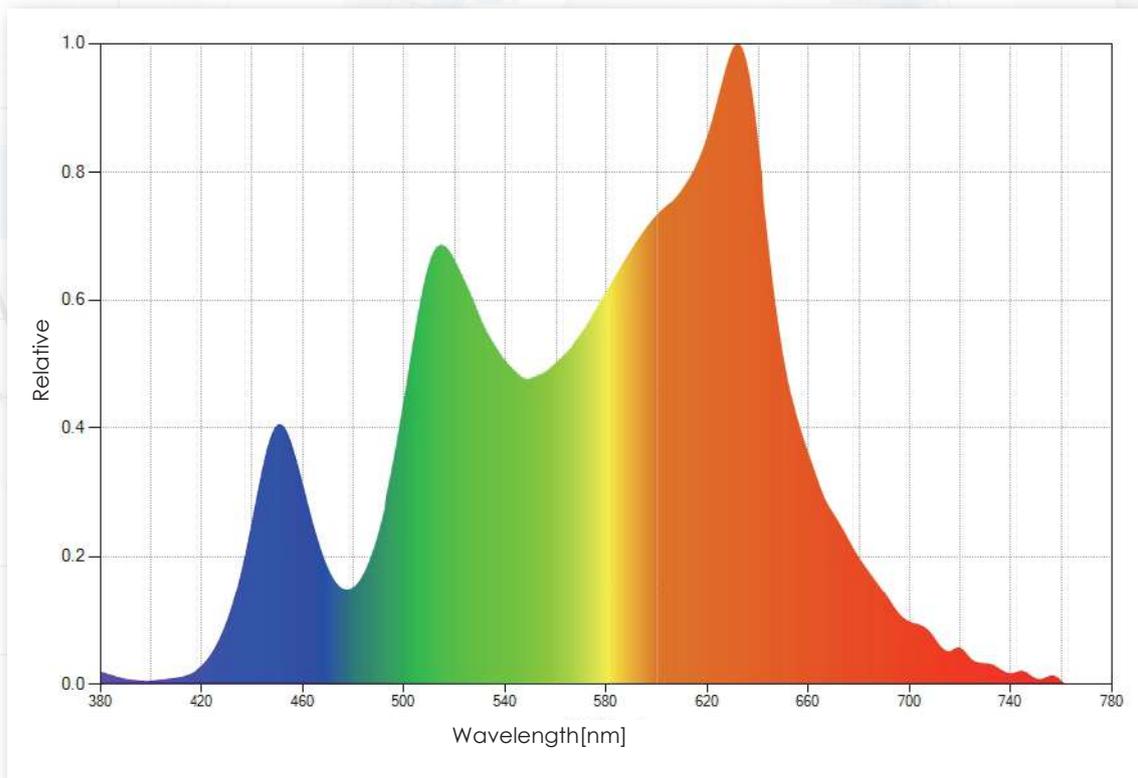
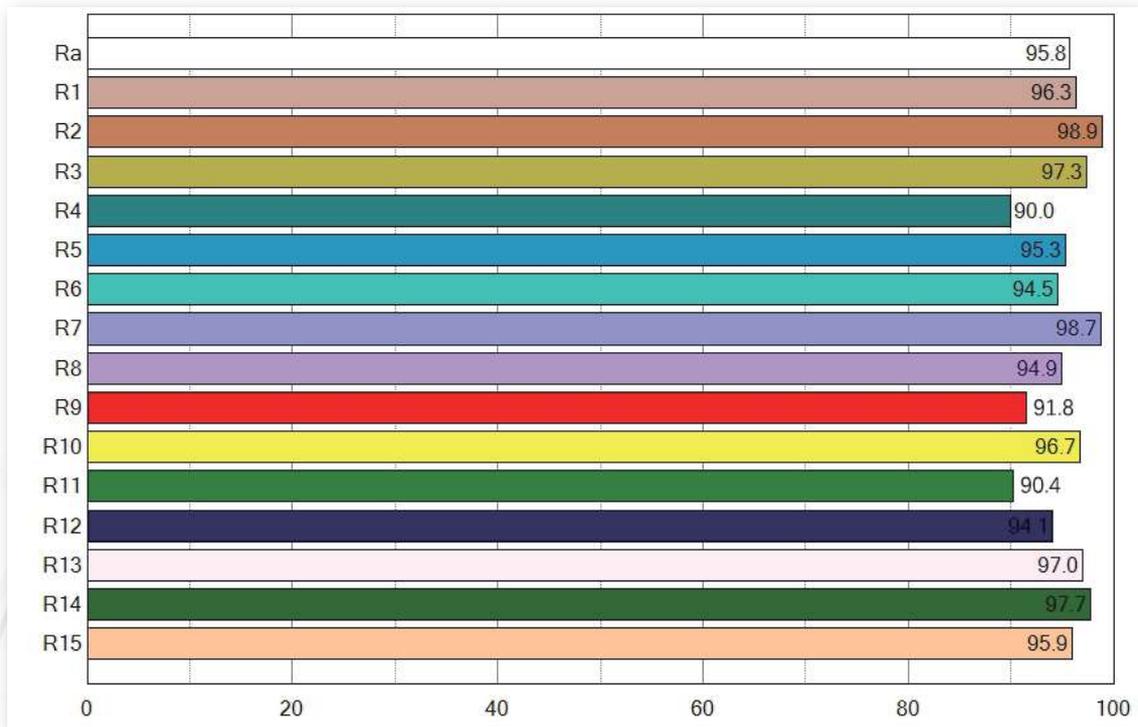
Lightning



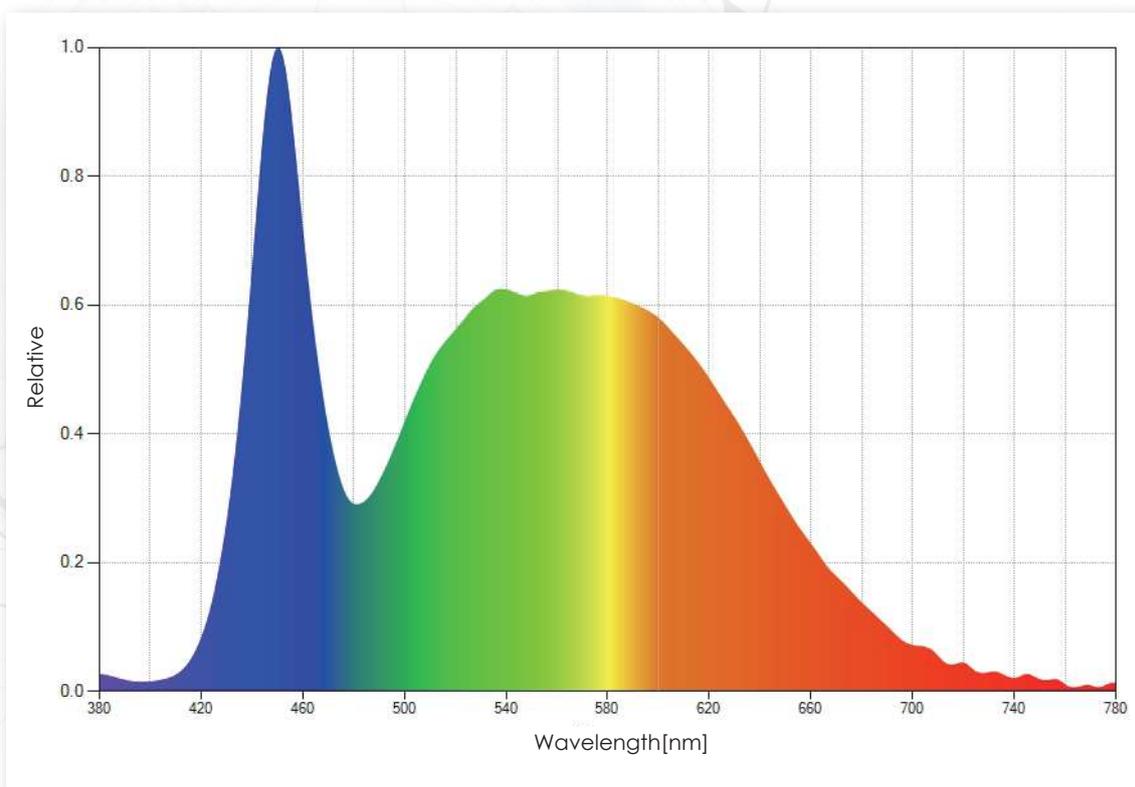
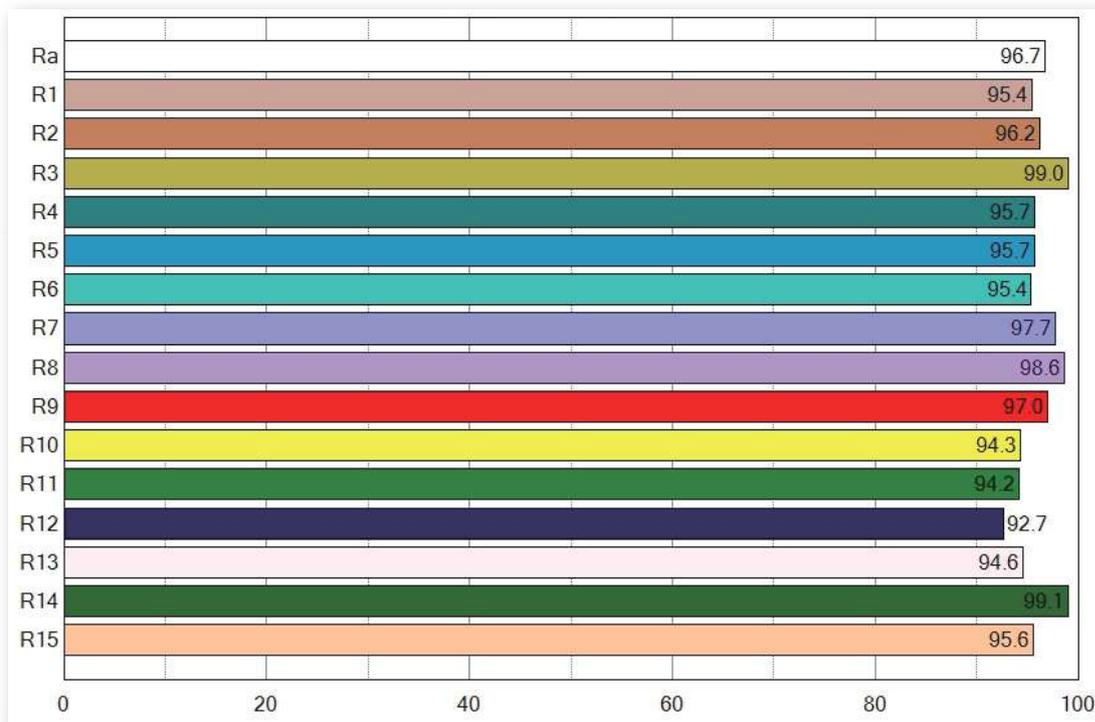
Nightfall



Color Rendering Index

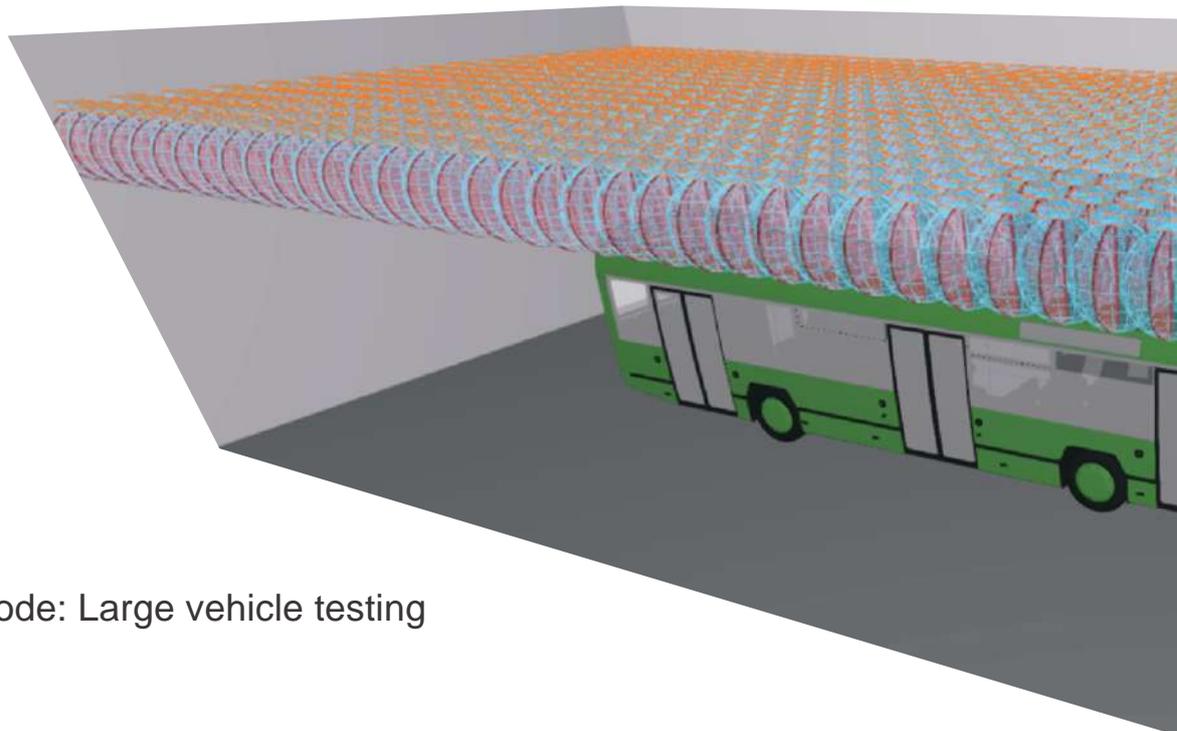


3200K CRI>95 TLCI>95

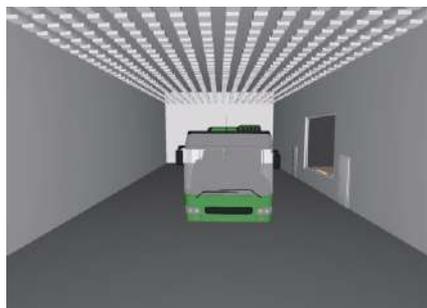


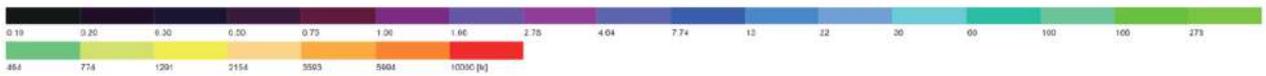
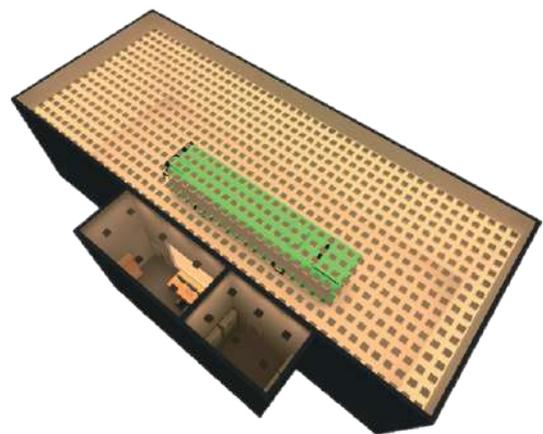
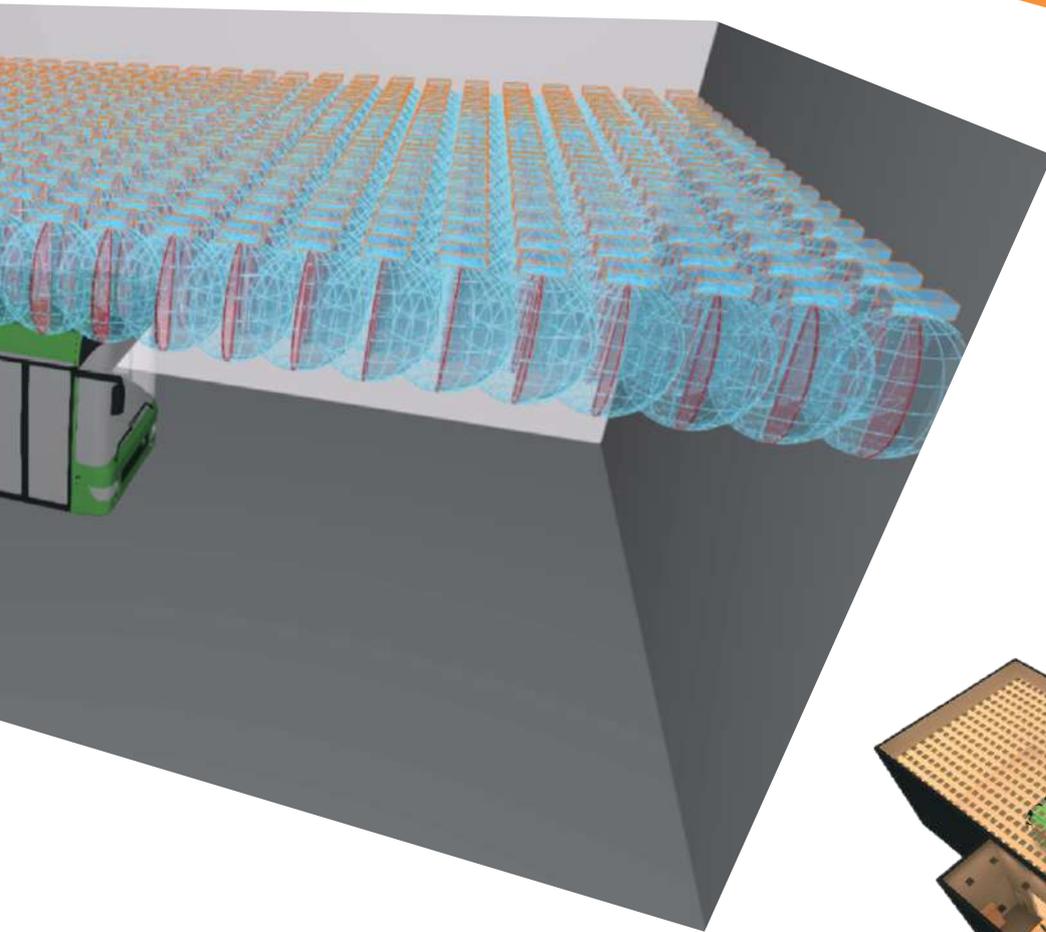
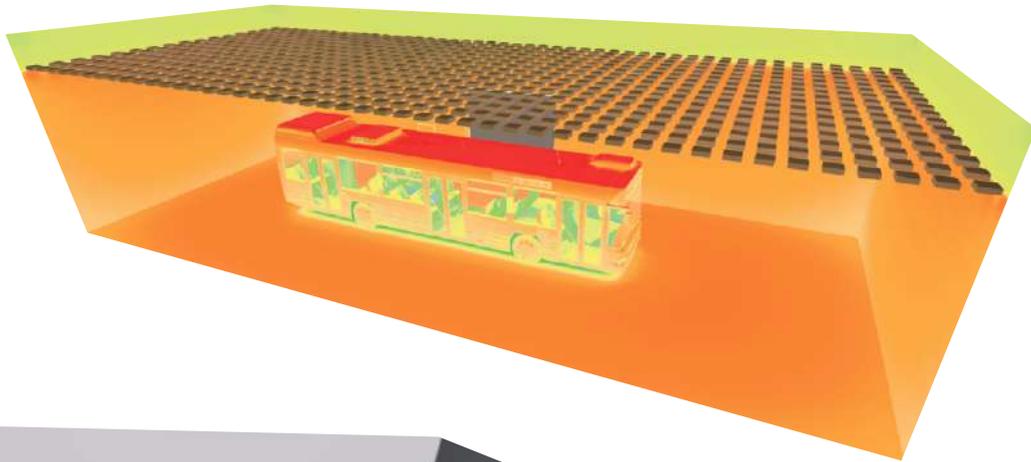
5600K CRI>95 TLCI>95

COMPREHENSIVE LIGHTING SCHEME DESIGN

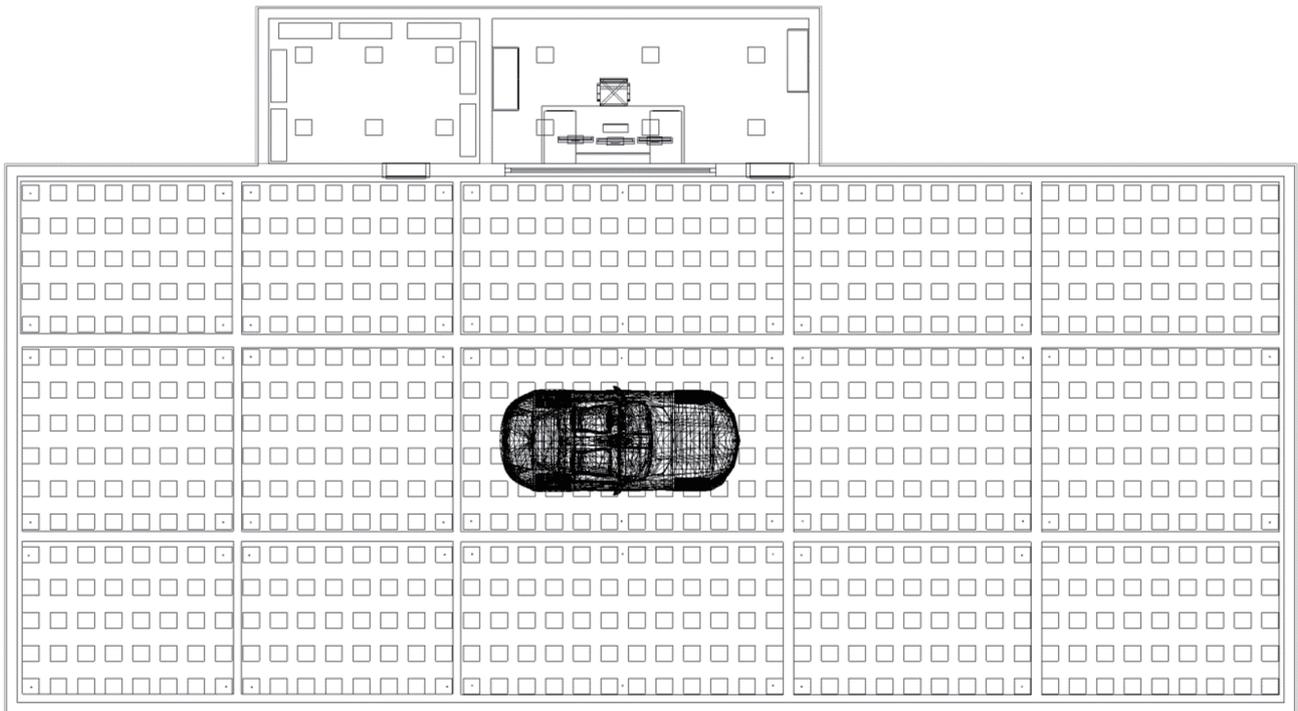


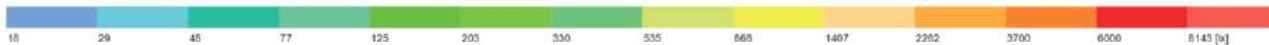
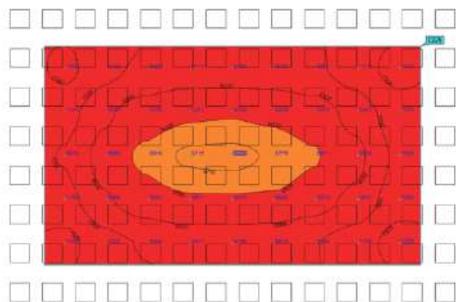
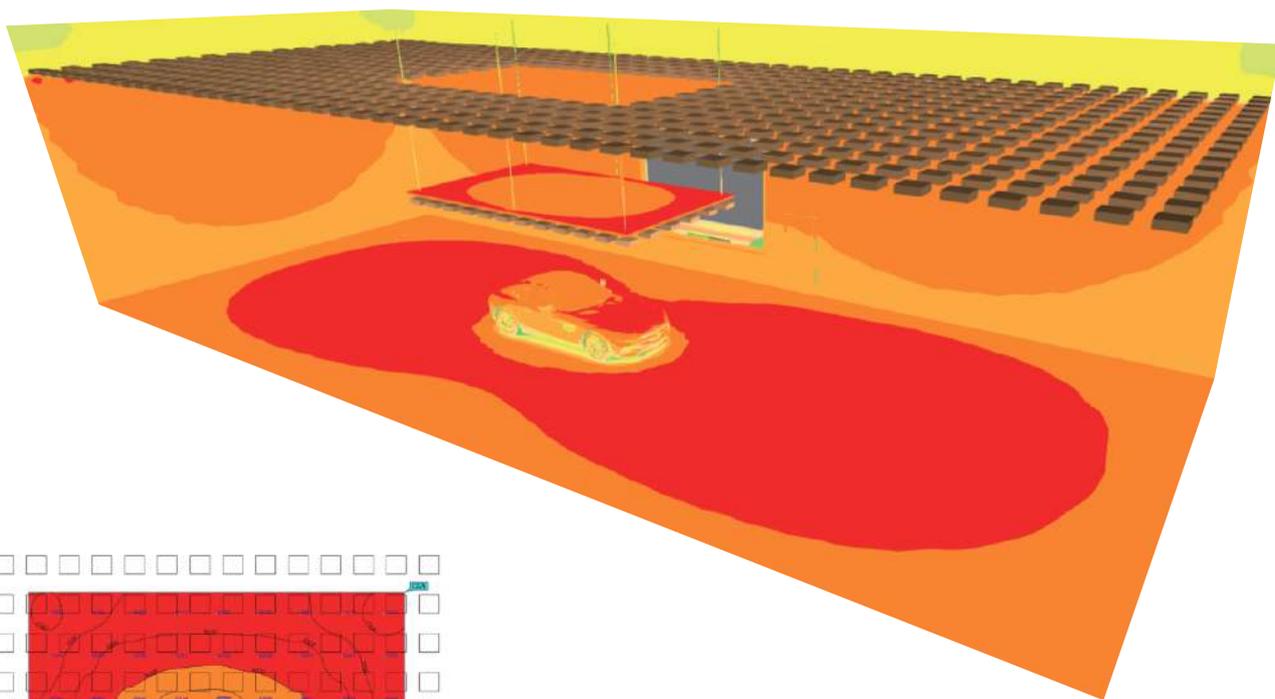
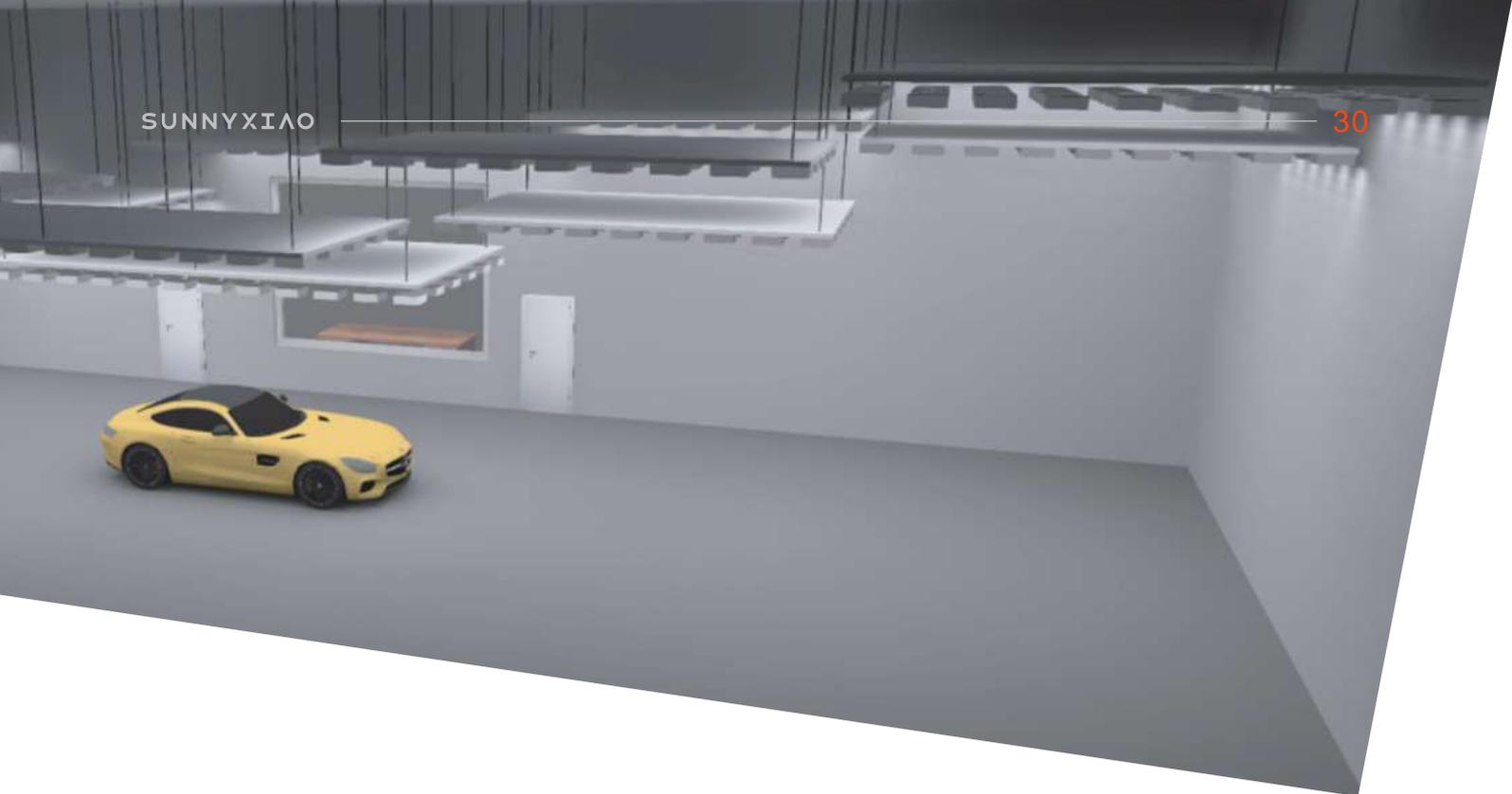
| Global mode: Large vehicle testing





| Lifting mode: Small vehicle testing







REFERENCE

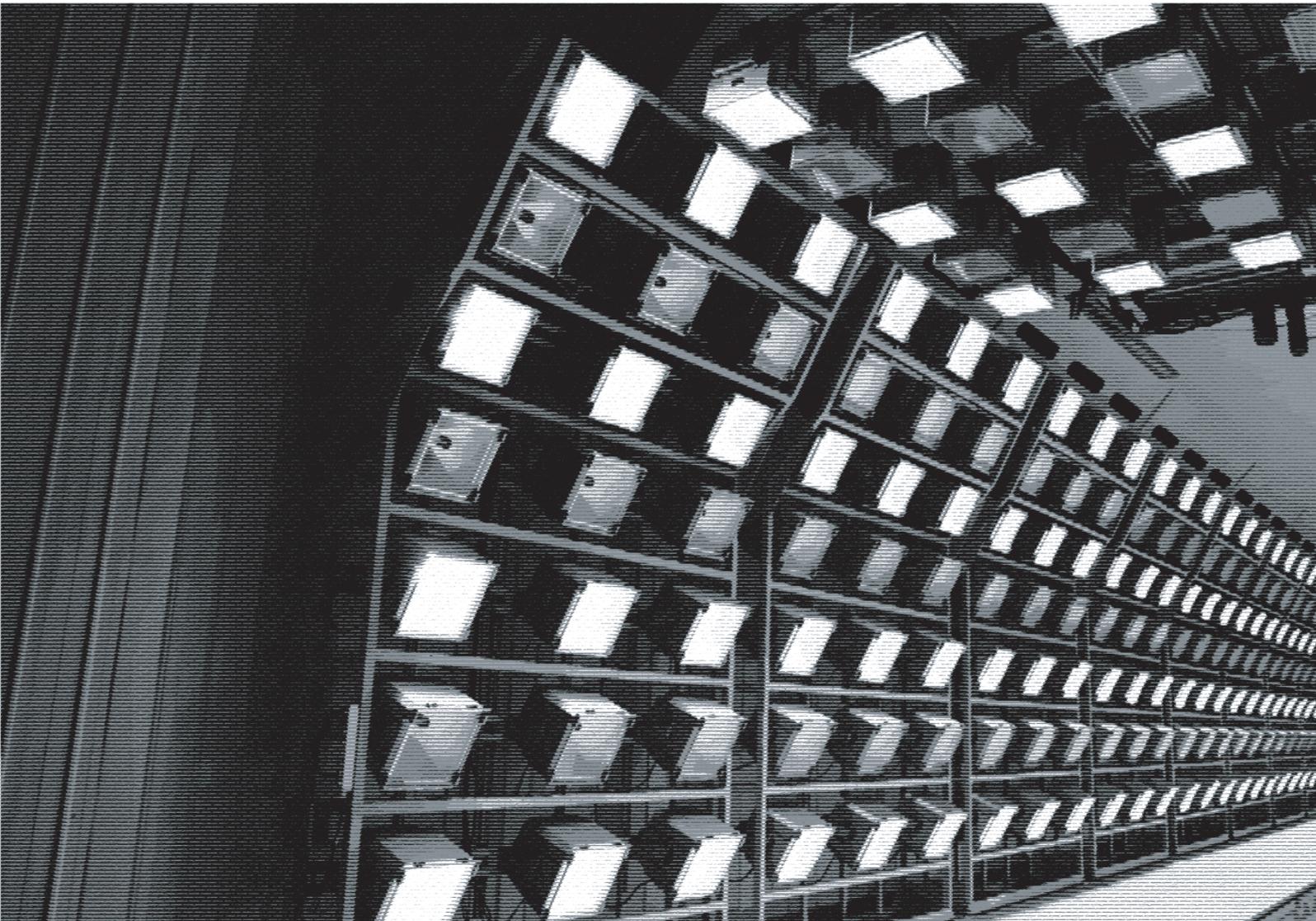


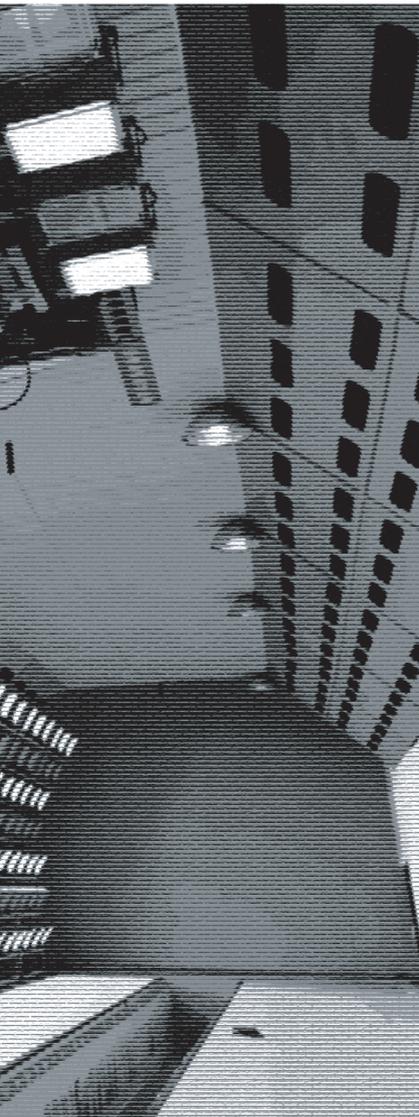
3.1 Standard Environment Test Chamber — Sunlight Simulation System

The sunlight simulation system will be installed on the top of the test chamber. The full-spectrum light is irradiated vertically into the chamber. By controlling and monitoring the temperature, humidity and irradiance within a certain period, components' accelerated aging test under natural conditions of dry heat and damp heat is stimulated. Specimen's aging status to evaluate the thermal effect and photochemical effect after the test is checked.



3.2 CRRC Qingdao — Sunlight Simulation System





- This is the largest full-spectrum sunlight simulation laboratory for rail vehicles in Asia. With metal halide lamps radiating the stationary rail vehicle and air-conditioning providing refrigeration, sunlight simulation type test to stimulate solar radiation load on car body is performed.

- HQI lamp quantity: 209 pieces

3.3 CRRC Changchun — High Speed Imaging Lighting System

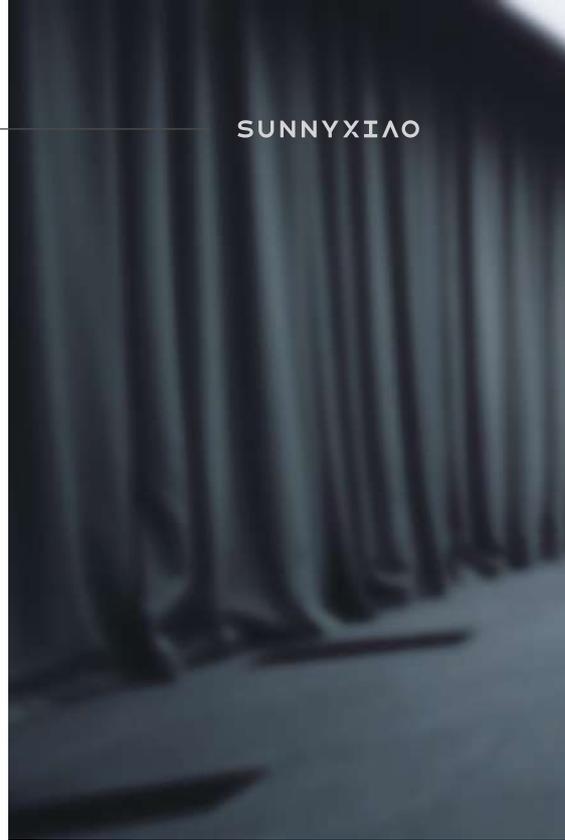




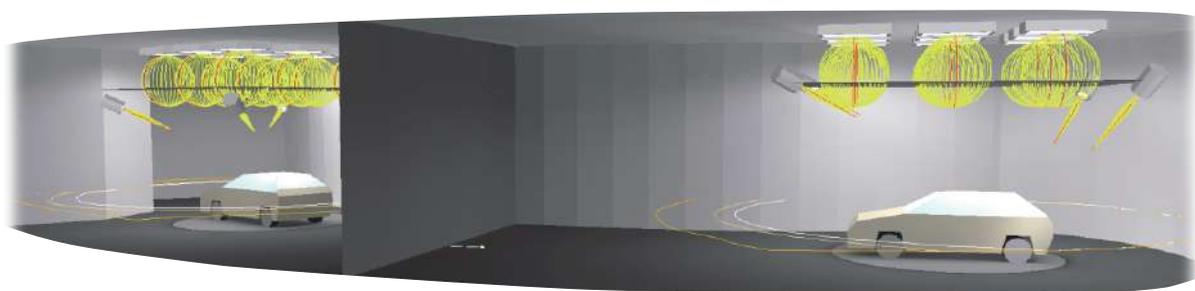
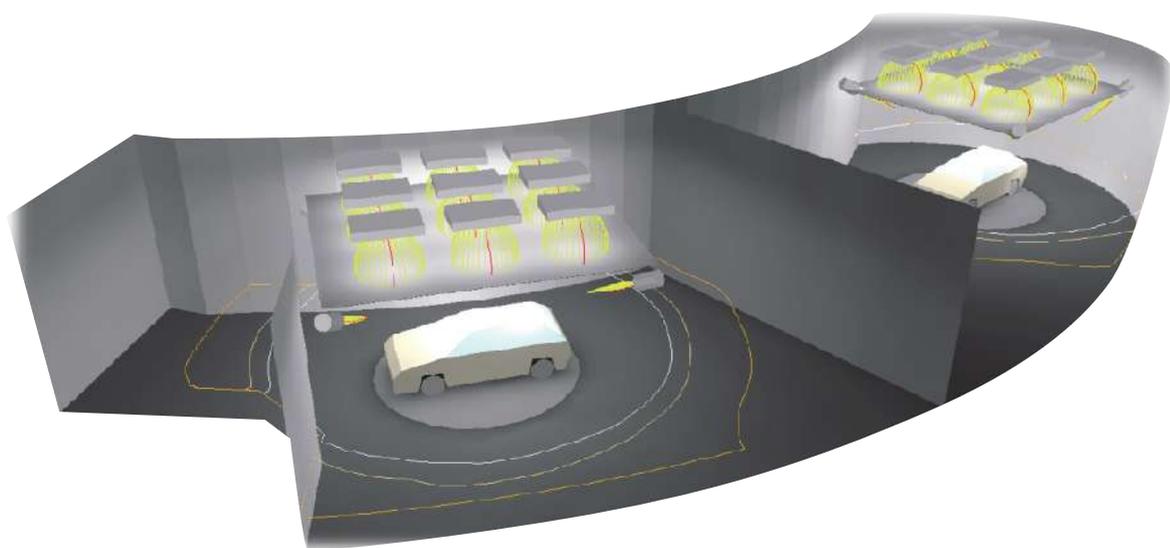
- This is the first set of lighting system in Asia for high-speed train collision test, supplementing light during shooting the collision of rail vehicles. Satisfying the requirement of area, brightness, color temperature and safety, this lighting system improves the quality of shooting for collision analysis.

- HMI lamp quantity: 38 pieces

3.4 Automobile Company — LED Panoramic Light Source System



-
- The overall lighting uniformity provides optimal visual comfort and satisfies color temperature and light distribution curve, meeting the observing and evaluating requirements for the paint surface and lines of the car body;
 - The overall brightness reaches 6000lx (the lamp is 2.3 meters away from the working surface); The color temperature adjustment range is from 2800K to 10000K; The color rendering index is greater than 94, and the color temperature deviation is less than 200K;
 - Realizing continuously adjustment of illuminance and color temperature, displaying RGB 16 million colors, and the lighting matrix can realize customized multi-scene combination dynamic display.



04

PARTNERS





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