

# Sunlight Indoors!



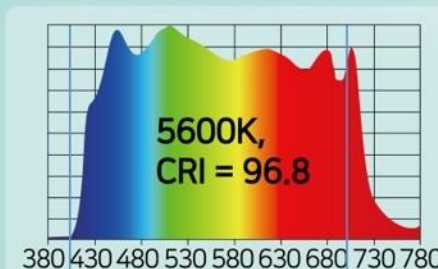
380 430 480 530 580 630 680 730 780



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SolarMission Co., Ltd.  
The profit of sunlight to the world



UV

Visible light

IR



## For healthy eyes and body

### Hatssalnuri<sup>®</sup> Bio lighting

Full spectrum with IR

For healthy people and plant all together

Masterpiece healthy lighting

The world's first lighting containing health

Artificial sunlight without UV

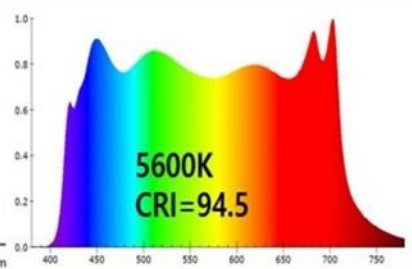
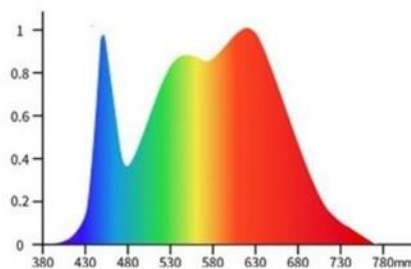
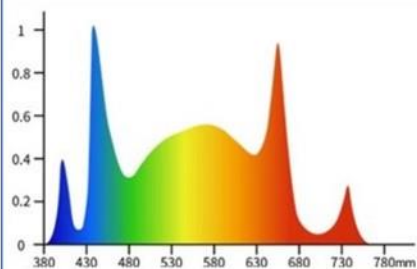
Eco-friendly healthy LED lighting

Chanel of lighting

Social venture company

# For healthy people and healthy plants

## Artificial Sunlight Bar(40W) The first development in the world



Full spectrum with IR  
Masterpiece healthy lighting  
Artificial sunlight without UV  
Chanel of lighting

LED received  
a presidential award



+ 680  
+ IR



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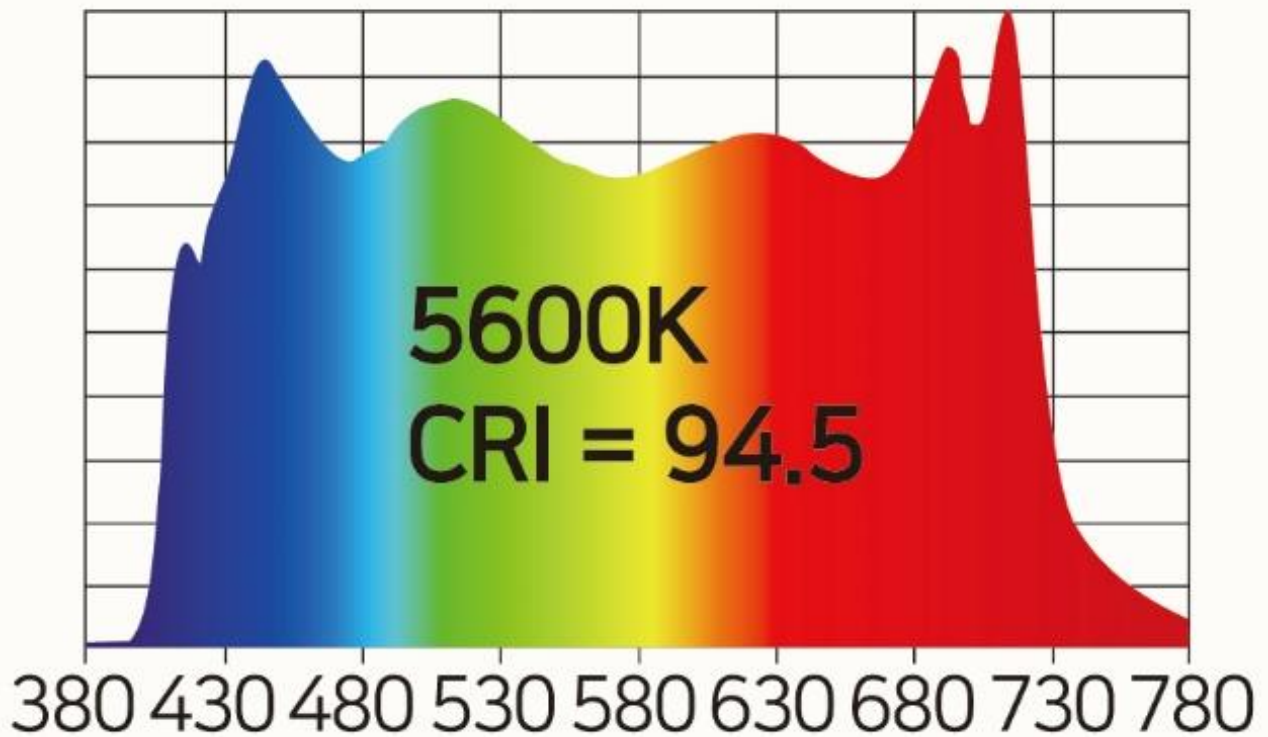
[www.solarmission.co.kr](http://www.solarmission.co.kr)  
[solarmission@naver.com](mailto:solarmission@naver.com)  
Youtube: solarmission



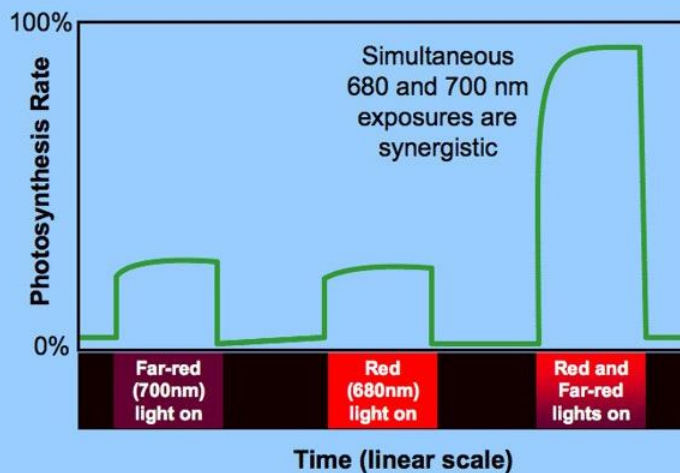
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# Artificial Sunlight Bar 40W

## The first development in the world



### The Emerson Enhancement Effect



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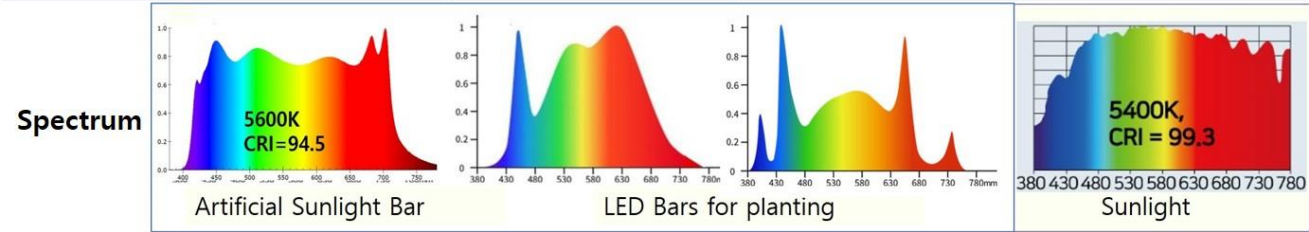
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〈4-leaf clover smart farm〉

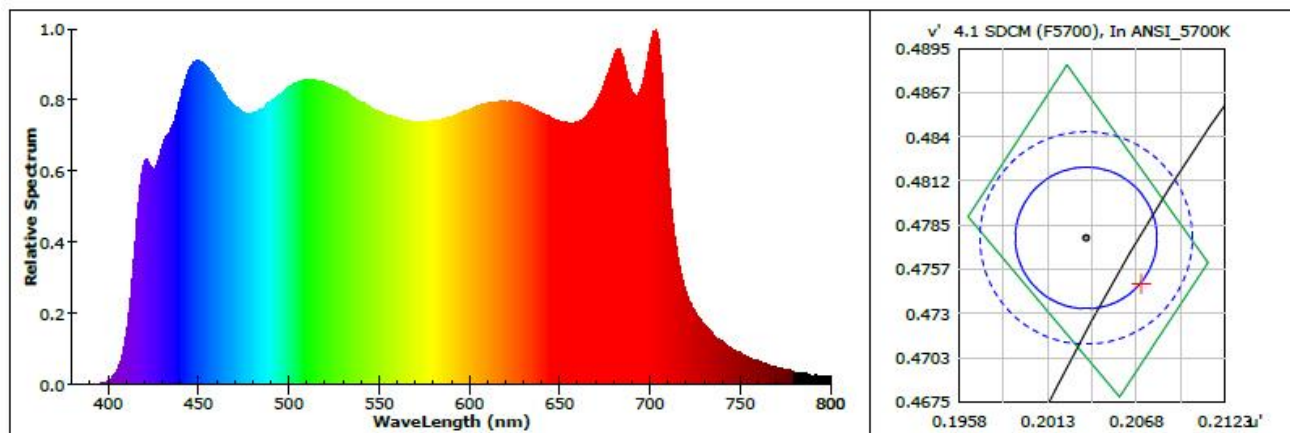


〈European vegetable mini farm〉

| Classification | Cube Farm                                                                                                       |                      | Indoor Farm                               | Traditional Farm                          |
|----------------|-----------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------------------|-------------------------------------------|
| Lighting       | Artificial Sunlight Bar                                                                                         | LED Bar for planting | Sunlight + LED Bar                        | Sunlight                                  |
| Brix           | 15 ~ 17                                                                                                         | 8 ~ 9                | 11 ~ 13                                   | 11 ~ 13                                   |
| Data source    | <br>Hubmeme Co., Ltd. in Korea | Company U* in Korea  | Rural Development Administration of Korea | Rural Development Administration of Korea |



## 〈Spec. of Artificial Sunlight Bar〉



### CIE Colorimetric Parameters

CIE(x,y): 0.3302,0.3364

CIE(u,v): 0.2072,0.3166

CIE(u',v'): 0.2072,0.4748

CCT: 5600 K (Duv=-0.001401)

Dominant Wavelength: 505.7 nm

Color Purity: 0.009

Peak Wavelength: 702.9 nm

Half Width: 295.5 nm

Color Ratio: R:0.177, G:0.755, B:0.068

Color Render Index: Ra:94.5, avgR(1~14):92.7, avgR(1~15):92.6

R1: 92

R2: 96

R3: 99

R4: 92

R5: 93

R6: 95

R7: 97

R8: 92

R9: 77

R10: 91

R11: 89

R12: 93

R13: 93

R14: 99

R15: 91

Color Quality Scale: Qa:97.7, Qf:95.6, Qp:101.2, Qg:104.3,

Q1: 98

Q2: 98

Q3: 100

Q4: 97

Q5: 96

Q6: 98

Q7: 98

Q8: 97

Q9: 98

Q10: 99

Q11: 97

Q12: 98

Q13: 99

Q14: 98

Q15: 98

TM-30-18: Rf:96, Rg:103

Gamut Area Index (GAI): GAI\_EES:99.5, GAI\_BB\_8:107.3, GAI\_BB\_15:106.0

### Photometric Parameters

Luminous Flux: 3559.20 lm

Radiant Power: 15.336 W

Efficiency: 88.54 lm/W

Energy Efficiency Class:F (EU 2019/2015  $\eta_{TM}$ :88.54lm/W)

S/P: 2.328

M/P Ratio (WELL): 1.029

Kmel,v: 1.236 mW/lm

Kmel,v(D65): 0.932

Pupil Flux: 6879.33 Plm (Kp=1.933)

Pupil Lumens per Watt: 171.14 Plm/W

Cirtopic Flux: 17071.29 lm

Mesopic Flux (CIE R.): 4981.96 lm (Lp=0.100)

Mesopic Flux (USP): 5961.82 lm (Lp=0.100)

Mesopic Flux (MOVE): 5220.95 lm (Lp=0.100)

### Electric Parameters

Voltage: 219.263 V

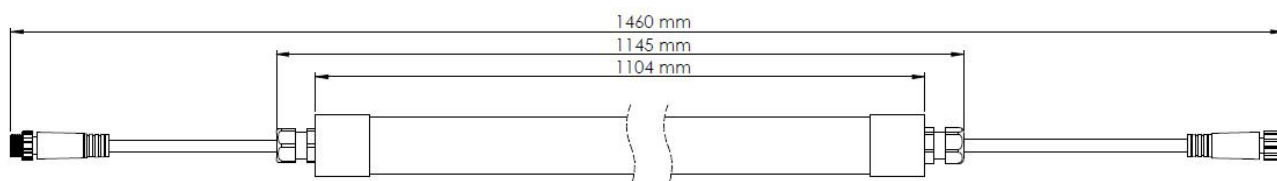
Current: 0.1887 A

Power: 40.198 W

Power Factor: 0.9714

Frequency: 60.00 Hz

Displacement Factor: 0.9834



# For healthy people and healthy plants

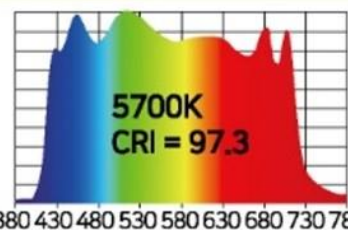
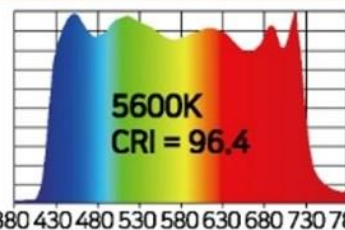
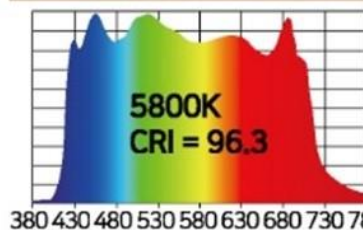
The lamp good to the plants  
is good to people



Artificial Sunlight Bars have  
produced **strawberry** with  
Brix **17.8** in a **cube farm**!



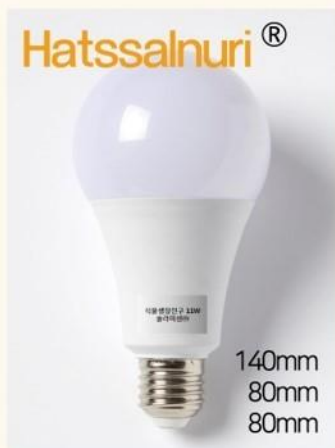
Artificial Flood Light: 50W/200W/350W for vertical farm



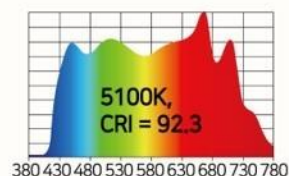
380 430 480 530 580 630 680 730 780 380 430 480 530 580 630 680 730 780 380 430 480 530 580 630 680 730 780

# For healthy people and healthy plants

## Bio Planting Bulb(11W) The first development in the world



Full spectrum with IR  
Masterpiece healthy lighting  
Artificial sunlight without UV  
Chanel of lighting



### > Feature

- No UV for plants.
- Containing IR for Emerson effect.
- Adding 660nm for photosynthesis.

### Comparison of spectrum

| Classification | Sunlight      | Bio light     | White LED  |
|----------------|---------------|---------------|------------|
| UV             | Yes           | No            | No         |
| IR             | Yes           | Yes           | No         |
| Visible light  | Full spectrum | Full spectrum | Blue light |
| Spectrum       |               |               |            |

LED received  
a presidential award



+ 660  
+ IR



Green Energy Grand Prize  
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[www.solarmission.co.kr](http://www.solarmission.co.kr)  
[solarmission@naver.com](mailto:solarmission@naver.com)

Youtube ch: solarmission



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The profit of sunlight to the world

# 〈Bio Flat Lamp for smart office〉



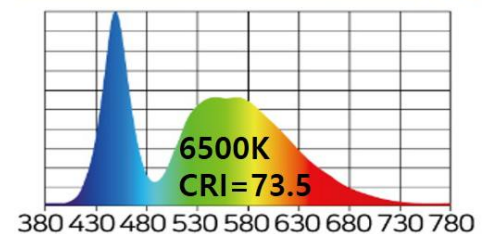
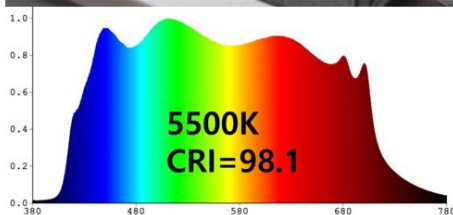
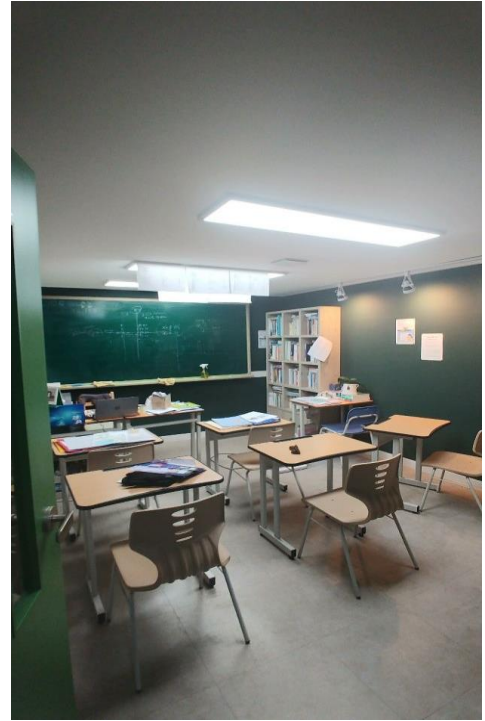
BETTER EYE



BETTER STUDY

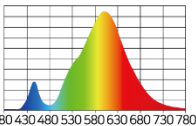
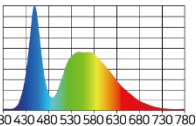
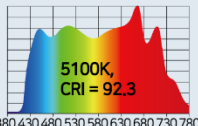
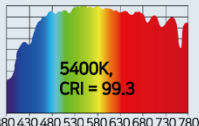


BETTER SLEEP



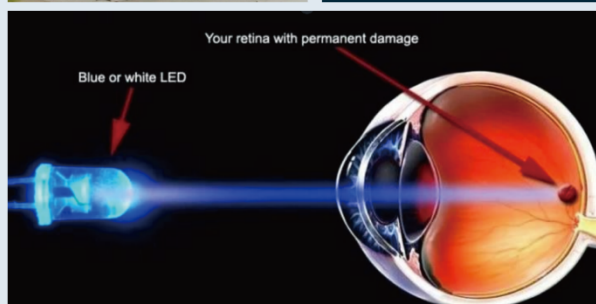
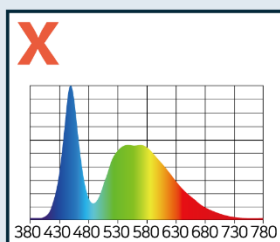
# Monochromatic light can reduce our lifespan!

## The effect of lighting on lifespan(Experiment)

|                                  |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
|----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Fluorescent lamp                 | Pink                                                                              | White                                                                             | Full spectrum                                                                      | Sunlight                                                                            |
| Average lifespan of mice(Months) | 7.5                                                                               | 8.2                                                                               | 15.6                                                                               | 16.1                                                                                |
| Spectrum of LED lamp             |  |  |  |  |

(by John Ott, 1977)

**Light pollution! Blue light!**  
**White LED can deteriorate even our eyesight!**  
<Blue light of white LED destroying retina>



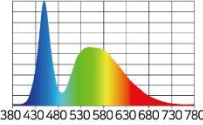
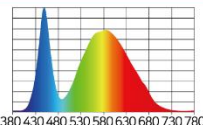
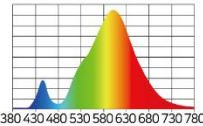
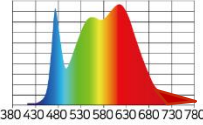
Korean government regulates  
blue light of LED lamp.

정부가 LED 조명기기의 안전기준을 개정해 제품의 안전관리를 강화한다.

산업통상자원부 국가기술표준원은 천장조명, 전 기스탠드 등의 LED 조명기기를 정시간 사용할 경우 열적광 노출로 인해 사용자의 눈 건강에 영향을 줄 수 있다는 우려가 제기됨에 따라 제품별로 열적광 위험등급을 관리하고 주의사항을 표시하도록 관련 안전기준을 개정한다고 지난 12월 21일 밝혔다. <라이트뉴스, 2022.01.26>

(White LED brings out decreased vision, sleep disorder and lifespan shortening)

# Types of monochromatic LED lamp

| Type         | Spectrum                                                                           | Influence on human being                | Remark                         |
|--------------|------------------------------------------------------------------------------------|-----------------------------------------|--------------------------------|
| Cool white   |   | Decreased vision<br>Lifespan shortening | Blue light,<br>High efficiency |
| Hybrid white |   | Lifespan shortening                     | For eye protection             |
| Warm white   |   | Lifespan shortening                     | For emotional lighting         |
| Gardening    |  | Lifespan shortening                     | For plant growth               |

## Sunlight through window loses red and IR light!

