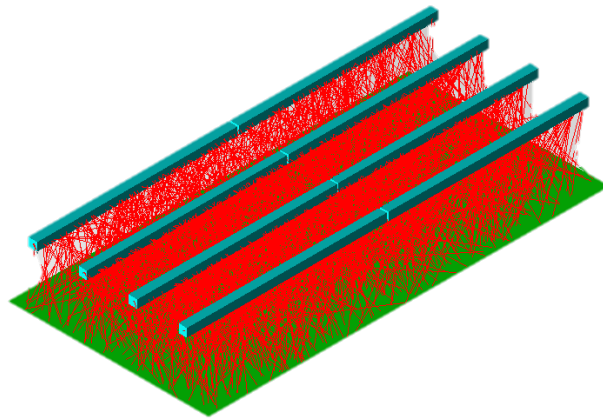


# Lighting Design Guide: Infinity LED Light

## Indoor Farming



## Background

### **Overview**

This application note describes optimized lighting layouts using Thrive Agritech's Infinity LED Light Bar. The lighting layouts address many of the common lighting requirements for indoor agriculture, and cover a range of illumination areas and intensities. The lighting layouts specify:

- Number of Infinity Lights over the plant area
- Mounting height of the lights
- Position and center-to-center spacing of the lights

### **Illumination Area**

Typical illumination areas (tables, shelves, etc.) for indoor agriculture include footprints of 2'x4', 4'x4', and 4'x8'. Often these illumination areas are building blocks that are combined to create larger growing areas within a commercial grow facility. The objective of this application note is to specify the lighting designs for the building blocks, the 2'x4', 4'x4' and 4'x8' areas, which can then be extended to larger areas.

### **Light Intensity**

The primary application for the Infinity Linear LED Light is to provide energy efficient illumination for leafy greens and other vegetative growth, with light intensities at the plant surface ranging from 100-400 umols/m<sup>2</sup>/sec. The Infinity LED Light has been designed to replace older, less efficient, lighting technologies including fluorescent and metal halide.

### **Light Uniformity**

The lighting layouts created within this design guide have been optimized to produce uniform illumination over the extent of the plant surface area.

### **Non-Standard Lighting Designs**

This application note addresses the most common design configurations and intensity requirements. Please contact Thrive Agritech's applications engineering team with lighting design requirements not covered within this guide.

## Summary of Lighting Designs

*(Detailed lighting layouts are on the following pages)*

### 2'x4' Illumination Area

Light Intensity (umols/m2/sec)	# of Infinity Lights	Mounting Height (inches)	Center-to-Center Spacing (inches)	Page Number
100	1	15"	n/a	3
200	2	10"	12"	4
300	3	9"	8"	5
400	3	6"	8"	6

### 4'x4' Illumination Area

Light Intensity (umols/m2/sec)	# of Infinity Lights	Mounting Height (inches)	Center-to-Center Spacing (inches)	Page Number
100	2	15"	24"	7
200	4	12"	12"	8
300	5	8"	9.6"	9
400	6	6"	8"	10

### 4'x8' Illumination Area

Light Intensity (umols/m2/sec)	# of Infinity Lights	Mounting Height (inches)	Center-to-Center Spacing (inches)	Page Number
100	4	15"	24"	11
200	8	12"	12"	12
300	10	9"	9.6"	13
400	12	6"	8"	14

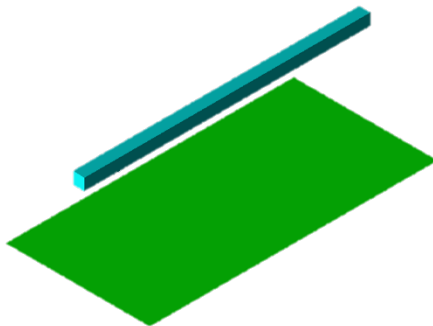
## 2'x4' Illumination Area

*100  $\mu\text{mol}/\text{m}^2/\text{sec}$*

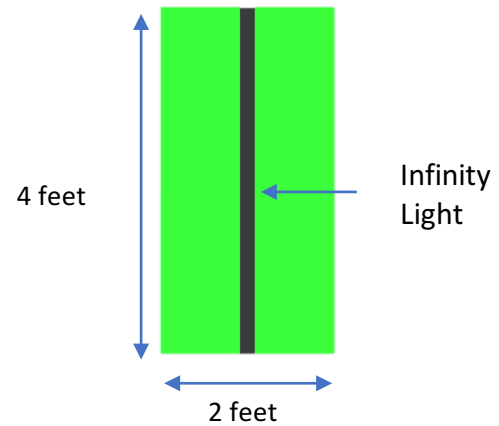
### Lighting Design

- # of Infinities: 1
- Mounting Height: 15"

Isometric View

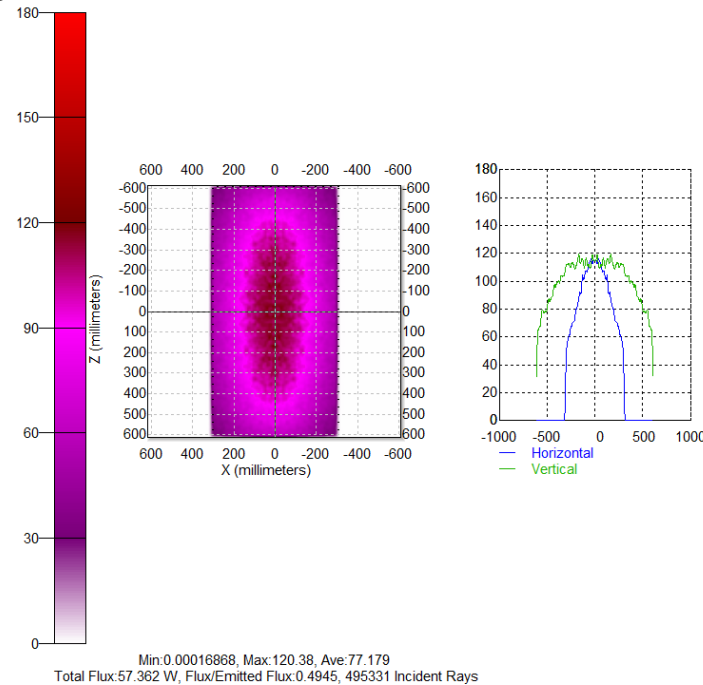


Top Down View



Intensity Map

Avg PPFD = 77  $\mu\text{mol}/\text{m}^2/\text{sec}$ , Max PPFD = 120  $\mu\text{mol}/\text{m}^2/\text{sec}$



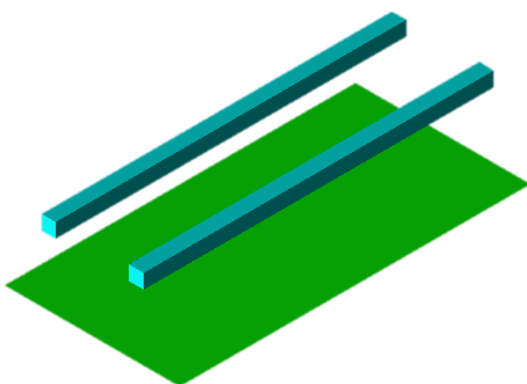
## 2'x4' Illumination Area

*200  $\mu\text{mol}/\text{m}^2/\text{sec}$*

### Lighting Design

- # of Infinities: 2
- Mounting Height: 10"
- Center-to-center spacing: 12"

Isometric View

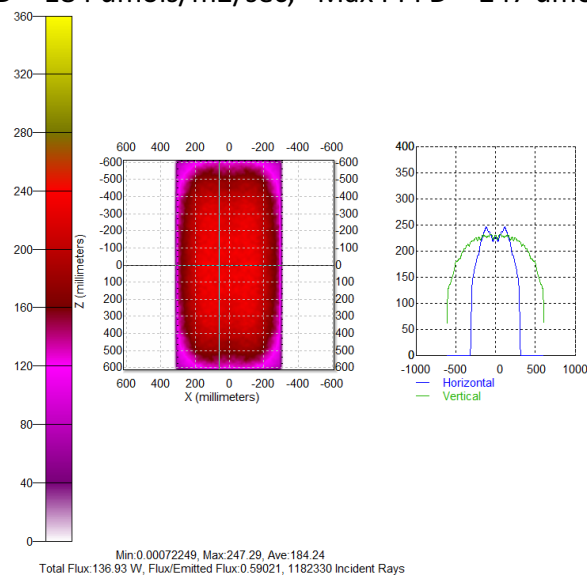


Top Down View



### Intensity Map

Avg PPFD = 184  $\mu\text{mol}/\text{m}^2/\text{sec}$ , Max PPFD = 247  $\mu\text{mol}/\text{m}^2/\text{sec}$



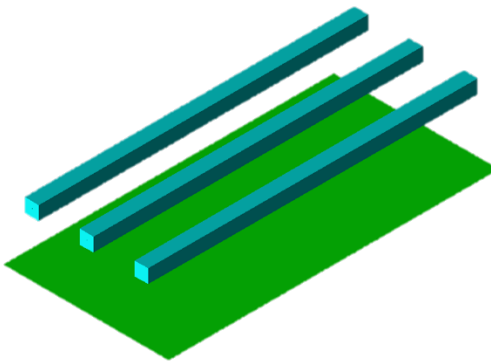
## 2'x4' Illumination Area

*300  $\mu\text{mol}/\text{m}^2/\text{sec}$*

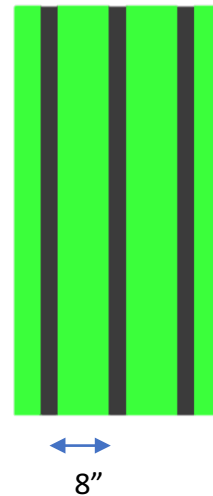
### Lighting Design

- # of Infinities: 3
- Mounting Height: 9"
- Center-to-center spacing: 8"

Isometric View

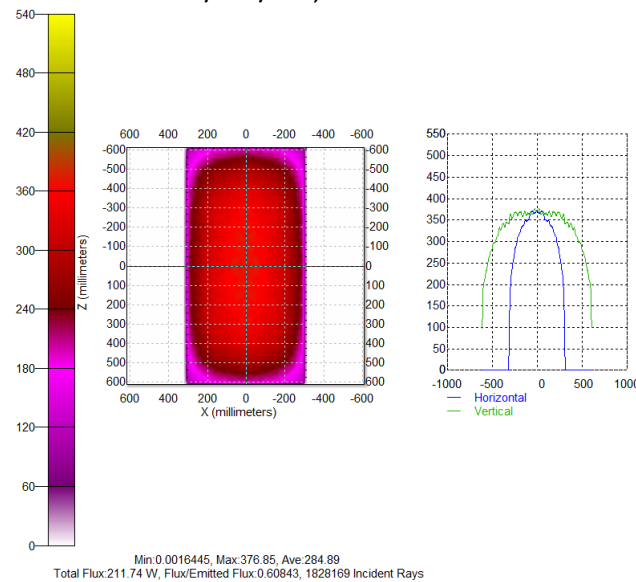


Top Down View



Intensity Map

Avg PPFD = 284  $\mu\text{mol}/\text{m}^2/\text{sec}$ , Max PPFD = 376  $\mu\text{mol}/\text{m}^2/\text{sec}$



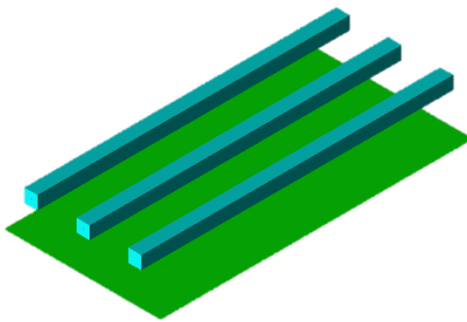
## 2'x4' Illumination Area

*400  $\mu\text{mol}/\text{m}^2/\text{sec}$*

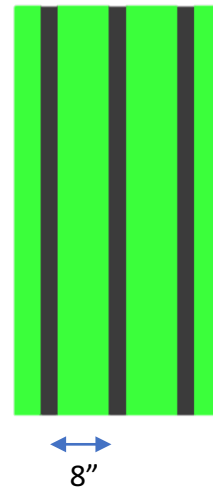
### Lighting Design

- # of Infinities: 3
- Mounting Height: 6"
- Center-to-center spacing: 8"

Isometric View

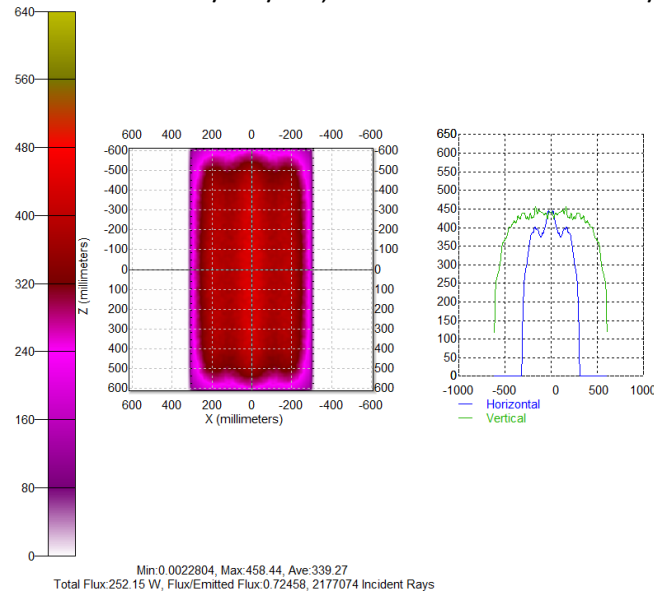


Top Down View



### Intensity Map

Avg PPFD = 339  $\mu\text{mol}/\text{m}^2/\text{sec}$ , Max PPFD = 458  $\mu\text{mol}/\text{m}^2/\text{sec}$



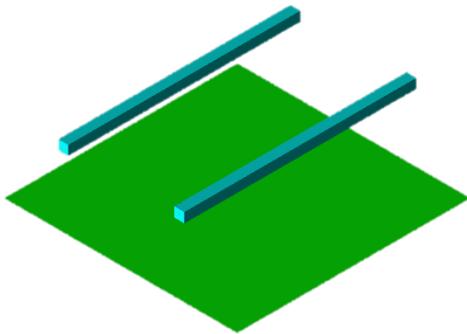
## 4'x4' Illumination Area

### *100 $\mu\text{mol}/\text{m}^2/\text{sec}$*

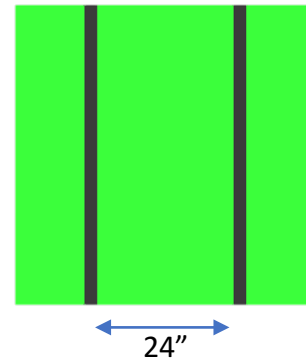
#### Lighting Design

- # of Infinities: 2
- Mounting Height: 15"
- Center-to-center spacing: 24"

Isometric View

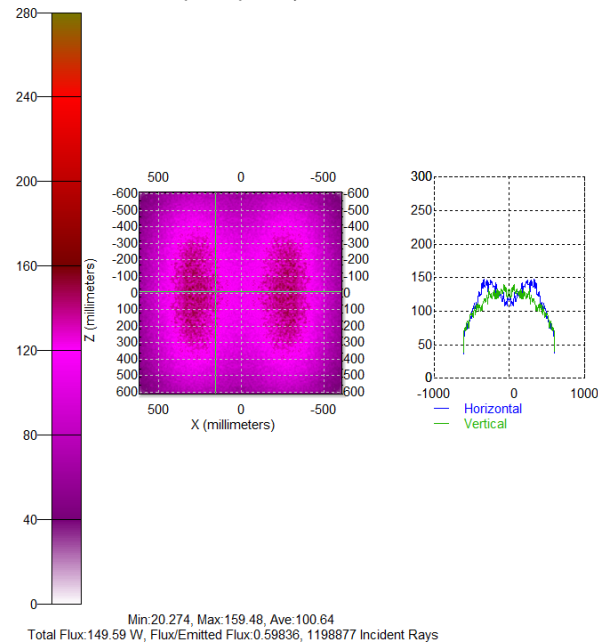


Top Down View



Intensity Map

Avg PPFD = 100  $\mu\text{mol}/\text{m}^2/\text{sec}$ , Max PPFD = 159  $\mu\text{mol}/\text{m}^2/\text{sec}$





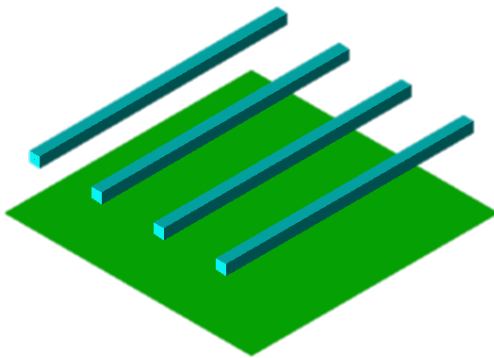
## 4'x4' Illumination Area

*200  $\mu\text{mol}/\text{m}^2/\text{sec}$*

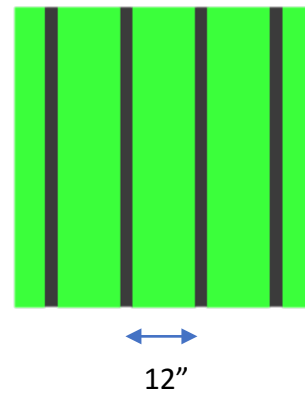
### Lighting Design

- # of Infinities: 4
- Mounting Height: 12"
- Center-to-center spacing: 12"

Isometric View

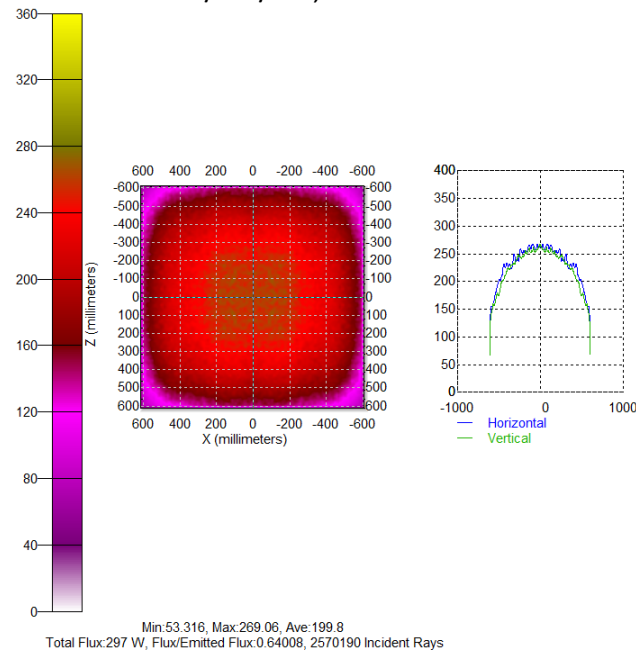


Top Down View



### Intensity Map

Avg PPFD = 200  $\mu\text{mol}/\text{m}^2/\text{sec}$ , Max PPFD = 269  $\mu\text{mol}/\text{m}^2/\text{sec}$



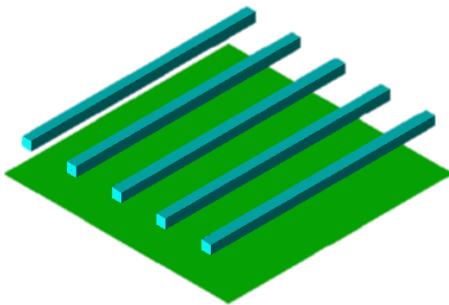
## 4'x4' Illumination Area

### *300 $\mu\text{mol}/\text{m}^2/\text{sec}$*

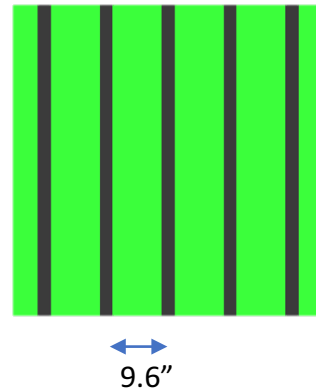
#### Lighting Design

- # of Infinities: 5
- Mounting Height: 8"
- Center-to-center spacing: 9.6"

Isometric View

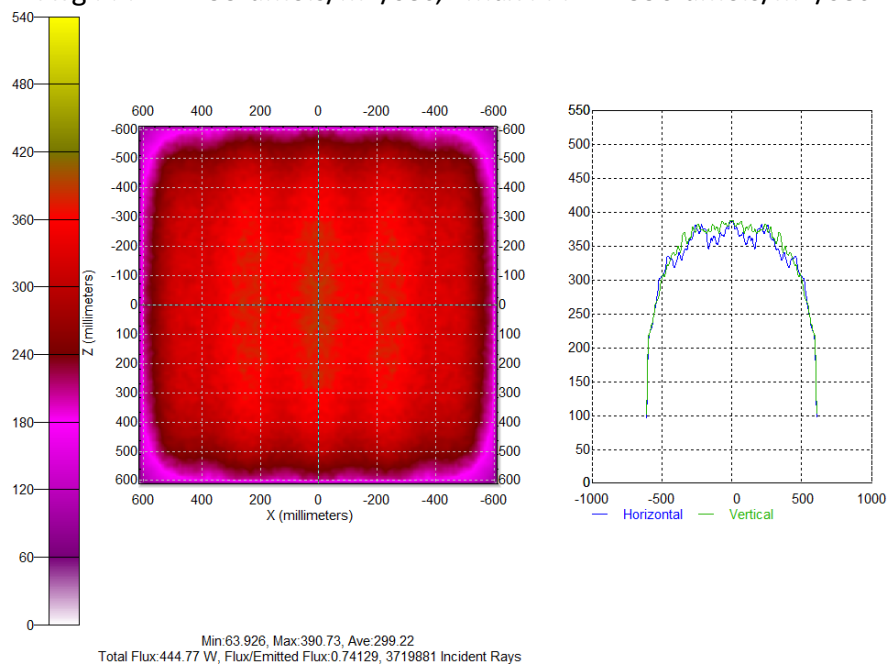


Top Down View



#### Intensity Map

Avg PPFD = 299  $\mu\text{mol}/\text{m}^2/\text{sec}$ , Max PPFD = 390  $\mu\text{mol}/\text{m}^2/\text{sec}$



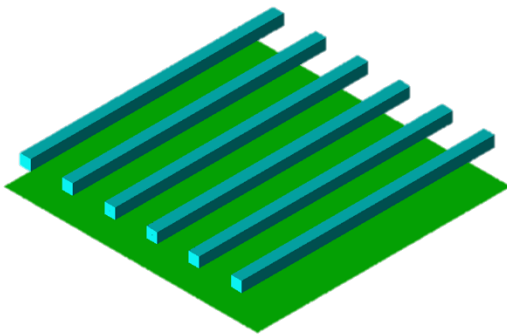
## 4'x4' Illumination Area

### *400 $\mu\text{mol}/\text{m}^2/\text{sec}$*

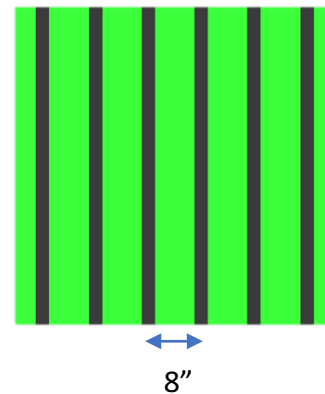
#### Lighting Design

- # of Infinities: 6
- Mounting Height: 6"
- Center-to-center spacing: 8"

Isometric View

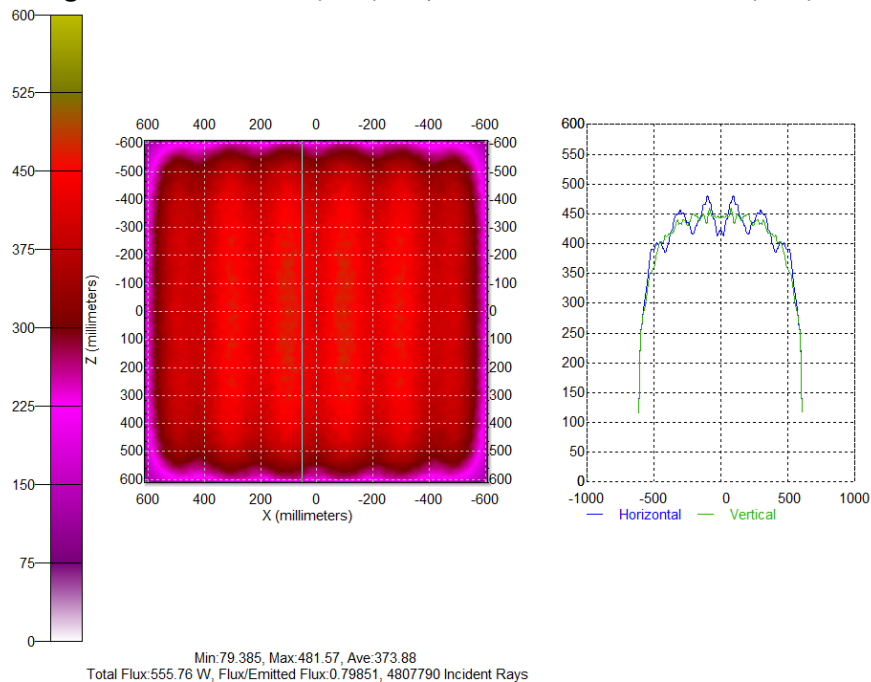


Top Down View



#### Intensity Map

Avg PPFD = 373  $\mu\text{mol}/\text{m}^2/\text{sec}$ , Max PPFD = 481  $\mu\text{mol}/\text{m}^2/\text{sec}$



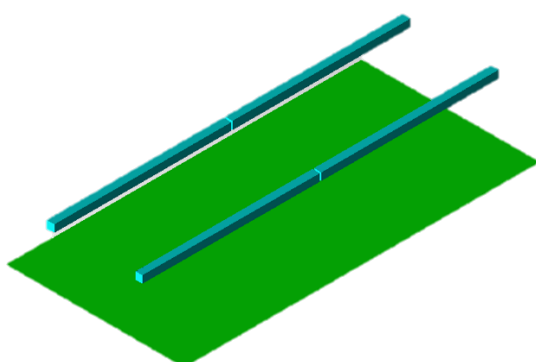
## 4'x8' Illumination Area

*100  $\mu\text{mol}/\text{m}^2/\text{sec}$*

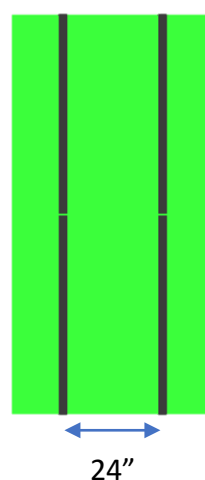
### Lighting Design

- # of Infinities: 4
- Mounting Height: 15"
- Center-to-center spacing: 24"

Isometric View

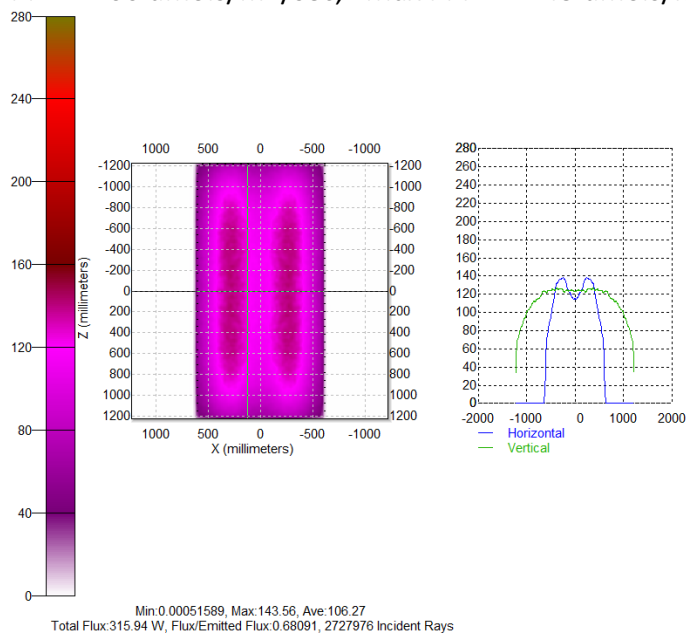


Top Down View



### Intensity Map

Avg PPFD = 106  $\mu\text{mol}/\text{m}^2/\text{sec}$ , Max PPFD = 143  $\mu\text{mol}/\text{m}^2/\text{sec}$



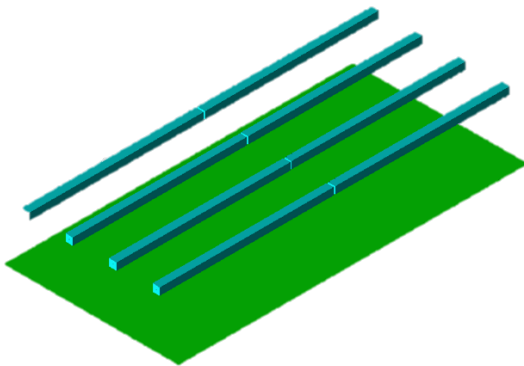
## 4'x8' Illumination Area

### *200 $\mu\text{mol}/\text{m}^2/\text{sec}$*

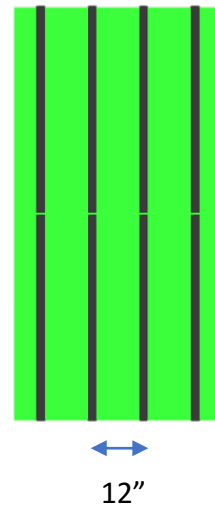
#### Lighting Design

- # of Infinities: 8
- Mounting Height: 12"
- Center-to-center spacing: 12"

Isometric View

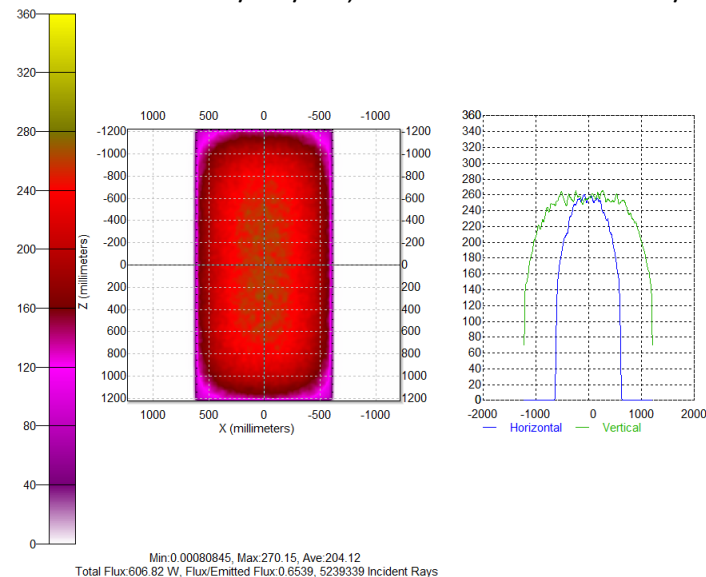


Top Down View



Intensity Map

Avg PPFD = 204  $\mu\text{mol}/\text{m}^2/\text{sec}$ , Max PPFD = 270  $\mu\text{mol}/\text{m}^2/\text{sec}$



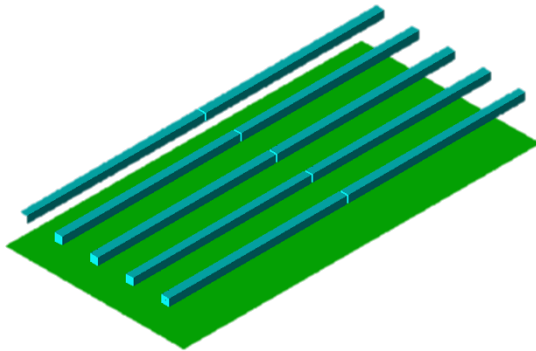
## 4'x8' Illumination Area

*300  $\mu\text{mol}/\text{m}^2/\text{sec}$*

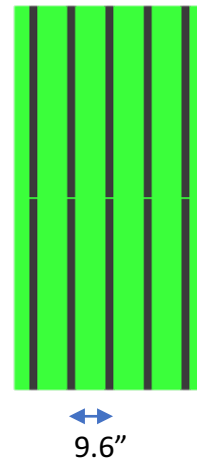
### Lighting Design

- # of Infinities: 10
- Mounting Height: 9"
- Center-to-center spacing: 9.6"

Isometric View

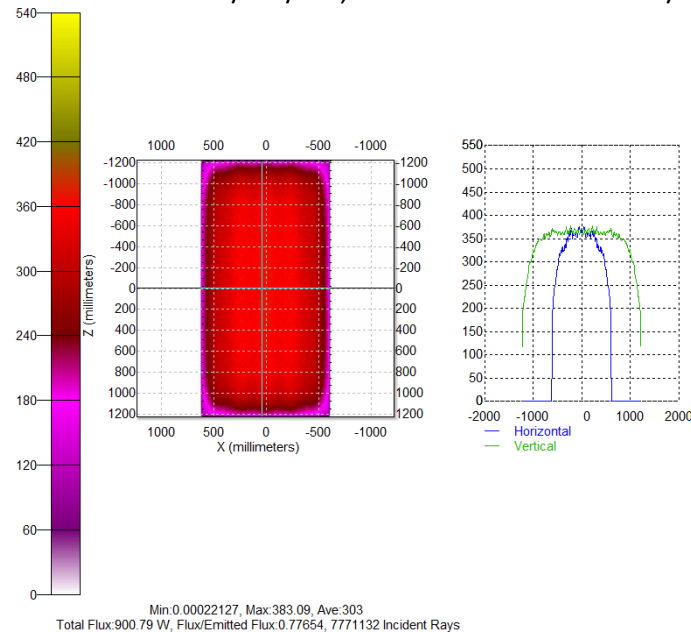


Top Down View



Intensity Map

Avg PPFD = 303  $\mu\text{mol}/\text{m}^2/\text{sec}$ , Max PPFD = 383  $\mu\text{mol}/\text{m}^2/\text{sec}$



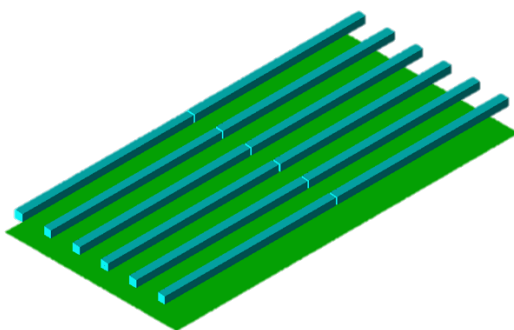
## 4'x8' Illumination Area

### *400 $\mu\text{mol}/\text{m}^2/\text{sec}$*

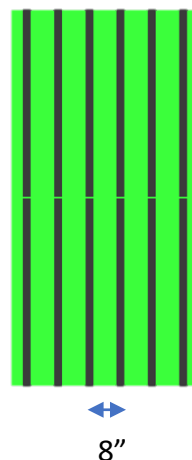
#### Lighting Design

- # of Infinities: 12
- Mounting Height: 6"
- Center-to-center spacing: 8"

Isometric View



Top Down View



Intensity Map

Avg PPFD = 400  $\mu\text{mol}/\text{m}^2/\text{sec}$ , Max PPFD = 497  $\mu\text{mol}/\text{m}^2/\text{sec}$

