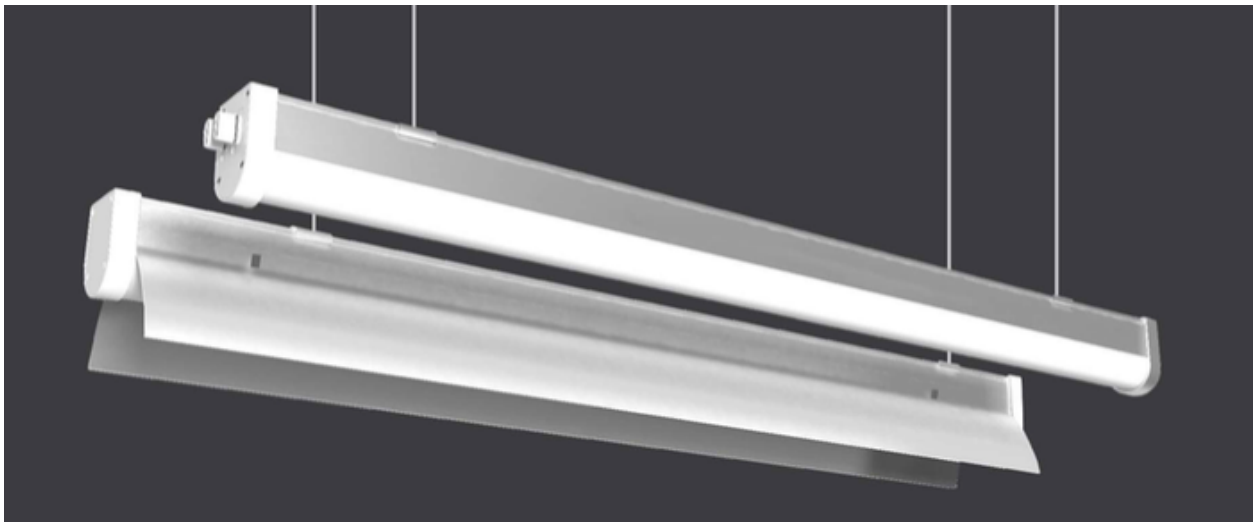
Lighting Design Guide: Boost LED Light Bar

Greenhouse Supplemental Lighting
&
Indoor Farming



A Lighting Design Guide for Controlled Environment Agriculture

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Background: Greenhouse Supplemental Lighting

Overview

This lighting design guide describes optimized lighting layouts using Thrive Agritech's Boost LED Light Bar for Greenhouse supplemental. The designs specify:

- Number of Boost Lights over the canopy
- Mounting height of the lights
- Position and center-to-center spacing of the lights

Mounting

Most Greenhouses have support structures (trusses) to provide mechanical rigidity and stability (see figure below). To minimize blockage of natural sunlight by the Boost LED lights, it is recommended that the lights are mounted to the support trusses. For the lighting layouts, a continuous line of light under each support truss was created by daisy-chaining the Boost lights in an end-to-end configuration as described in the installation manual.

Light Intensity

The primary application for the Boost LED Light is to provide energy efficient illumination for plant growth. This LED fixture 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 canopy.

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.

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Summary of Lighting Designs

(Detailed lighting layouts are on the following pages)

60’ x 60’ Illumination Area: Single line of Boost Lights for each Support Truss

DLI (mols/m2/day)	Light Intensity (umols/m2/sec)	Mounting Height (Feet)	Spacing (Feet)	Page Number
5	60	10’	12’	4

60’ x 60’ Illumination Area: Double line of Boost Lights for each Support Truss

DLI (mols/m2/day)	Light Intensity (umols/m2/sec)	Mounting Height (Feet)	Spacing (Feet)	Page Number
10	120	10’	12’	5

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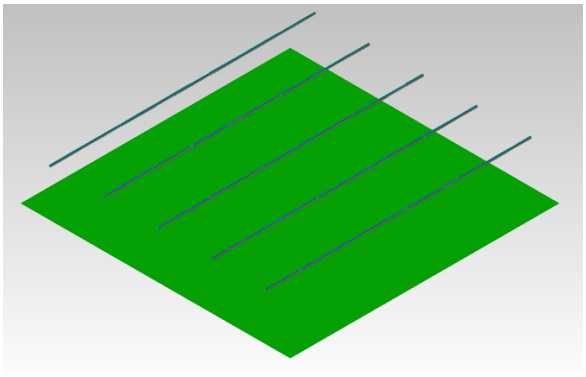
Greenhouse Supplemental Lighting

Single Line of Boost LED Lights for each support truss over a 60’ x 60’ Canopy

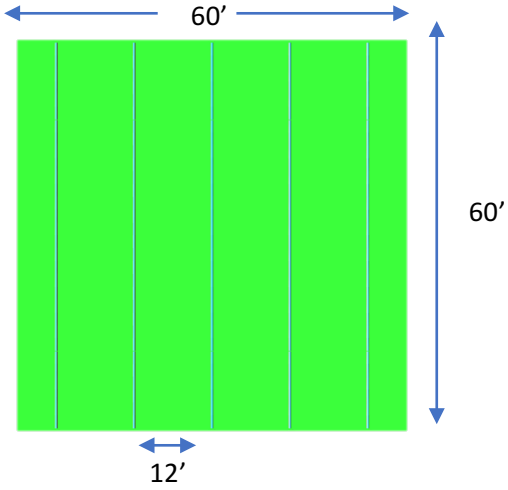
Lighting Design

- Single line of Boost lights along each support truss
- Mounting Height: 10’
- Spacing: 12’

Isometric View

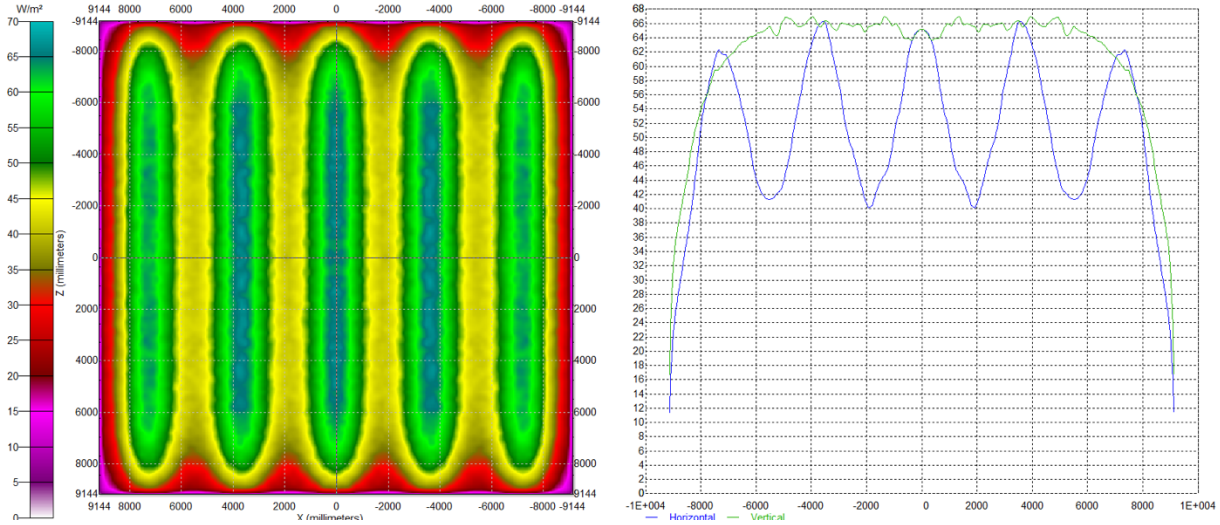


Top Down View



Intensity Map on 60’x60’ Canopy

DLI = 5 mols/m2/day, PPFD = 60 umols/m2/sec



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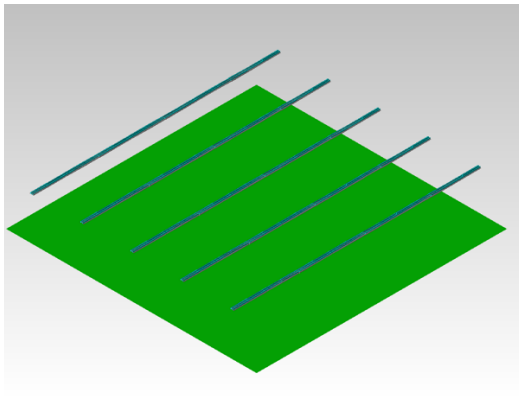
Greenhouse Supplemental Lighting

Double Line of Boost LED Lights for each support truss over a 60’ x 60’ Canopy

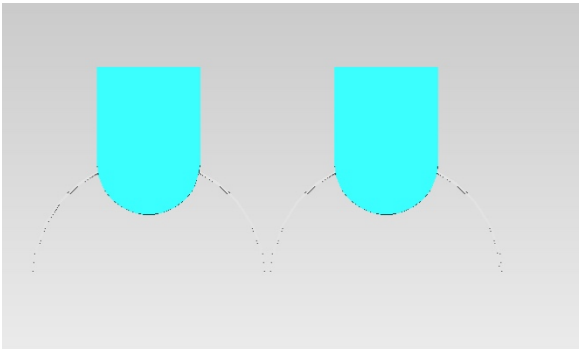
Lighting Design

- Two lines of Boost lights along each support truss
- Mounting Height: 10’
- Spacing: 12’

Isometric View

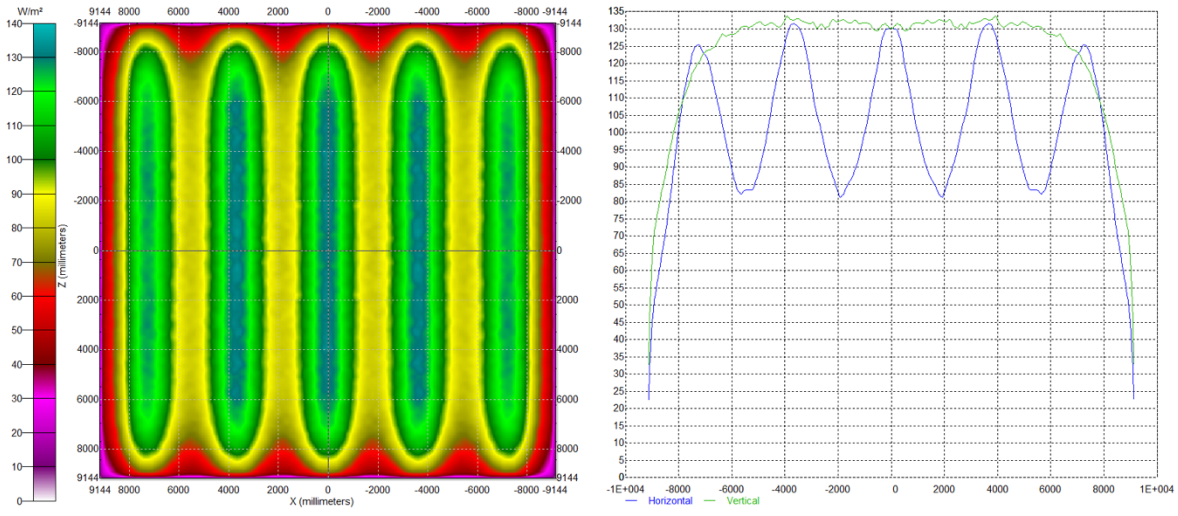


Boost Lights Side-by-Side, End View



Intensity Map on 60’x60’ Canopy

DLI = 10 mols/m2/day, PPFD = 120 umols/m2/sec



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Background: Indoor Farming

Overview

This lighting design guide describes optimized lighting layouts using Thrive Agritech's Boost LED Light Bar for single-tier and multi-tier indoor grow facilities. The designs specify:

- Number of Boost Lights over the canopy
- Mounting height of the lights
- Position and center-to-center spacing of the lights

Illumination Area / Canopy

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

Light Intensity

The primary application for the Boost LED Light is to provide energy efficient illumination for plant growth. This LED fixture 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.

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Summary of Lighting Designs

(Detailed lighting layouts are on the following pages)

4'x4' Illumination Area

Light Intensity (umols/m2/sec)	# of Boost Lights	Mounting Height (inches)	Center-to-Center Spacing (inches)	Page Number
900-1,000	6	12"	8"	8

4'x8' Illumination Area

Light Intensity (umols/m2/sec)	# of Boost Lights	Mounting Height (inches)	Center-to-Center Spacing (inches)	Page Number
900-1,000	12	12"	8"	9

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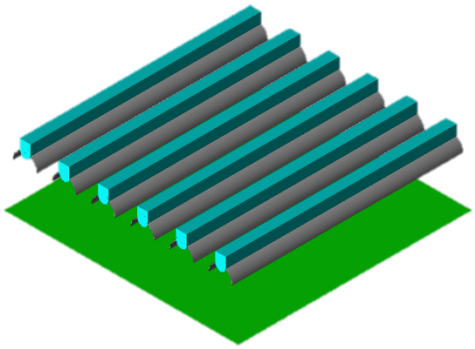
4’ x 4’ Illumination Area

900-1,000 umols/m2/sec

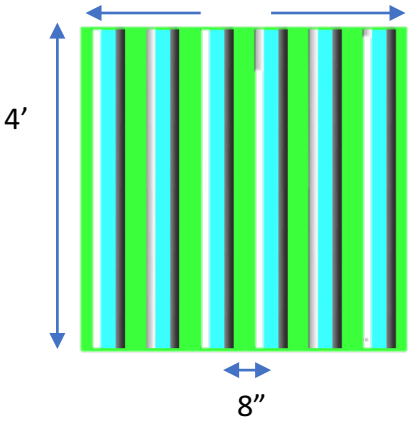
Lighting Design

- # of Boost LED Lights: 6
- Mounting Height: 12”
- Center-to-center spacing: 8”

Isometric View

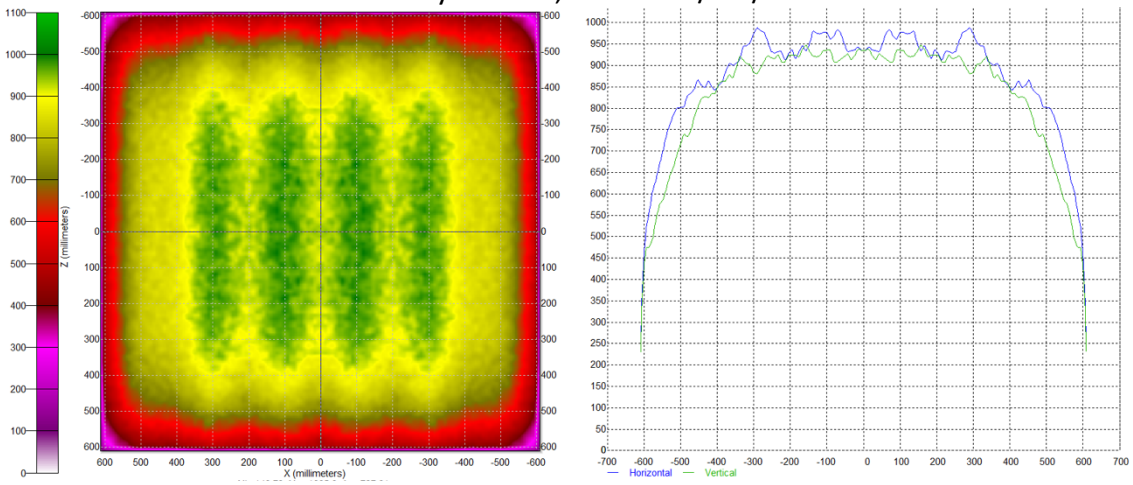


Top Down View



Intensity Map

Intensity = 900-1,000 umols/m2/sec



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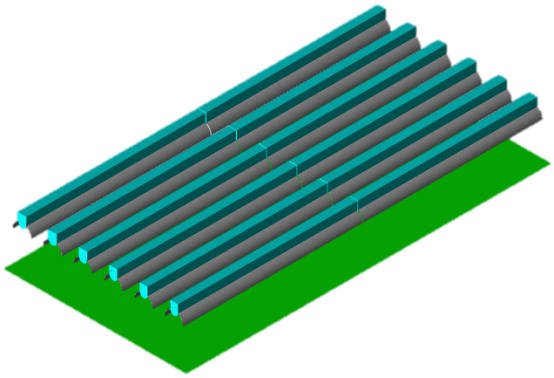
4’x8’ Illumination Area

900-1,000 umols/m2/sec

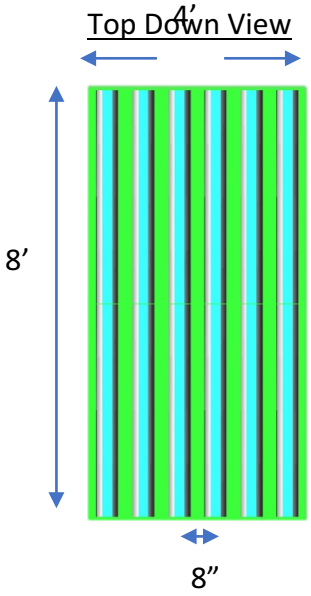
Lighting Design

- # of Boost LED Lights: 12
- Mounting Height: 12”
- Center-to-center spacing: 8”

Isometric View

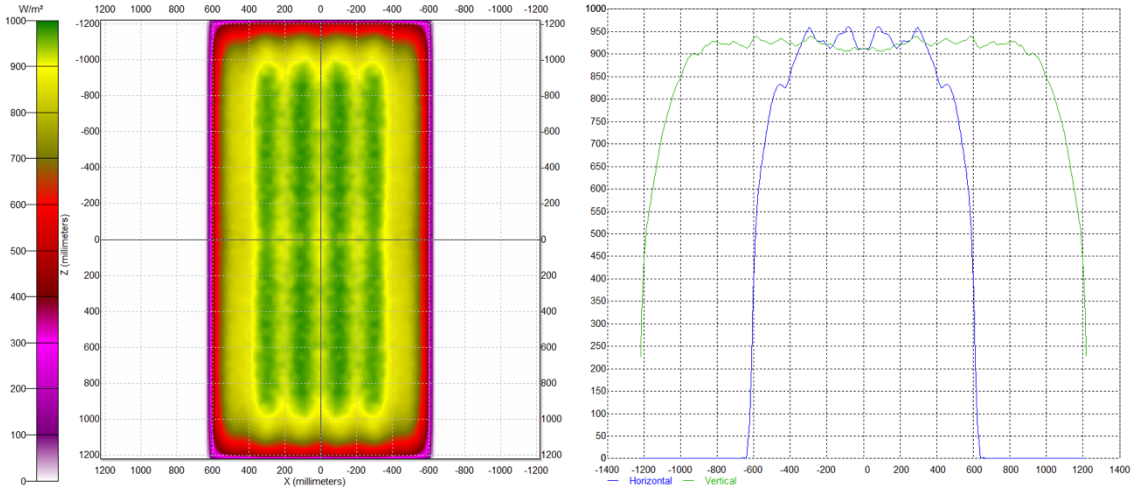


Top Down View



Intensity Map

Intensity = 900-1,000 umols/m2/sec



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