



Indigo-Clean® Technology **Dual-Mode**

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Introduction

Indigo-Clean Technology

Indigo-Clean Technology is a Continuous Environmental Disinfection System that emits a narrow spectrum light that kills bacteria, Influenza-A1, and SARS-CoV-2 – the virus that causes COVID-19 ¹ – and is proven effective by recently conducted independent lab testing. Unlike UV disinfection, Indigo-Clean Technology is designed to safely and continuously disinfect a space while it is fully occupied.

Single-Mode Indigo-Clean Technology utilizes a combination of blended white LEDs and 405nm LEDs on a single circuit board design. When the luminaires are on, the disinfection is active.

Dual-Mode Indigo-Clean Technology utilizes a mid-power of blended white LEDs and 405nm LEDs on a two circuit board design and full 405nm indigo light using automated controls to disinfect the space. When the space is unoccupied, it utilizes just the 405nm LEDs with increased output to increase disinfection efficacy.

Technology	White + Indigo 405nm Blended Only	White + Indigo 405nm Blended or Indigo 405nm Only	Automated Controls	SARS-CoV-2 & Influenza-A Claim	Recommended Hours of Operation	Optimum Performance
Dual-Mode Indigo-Clean		Yes	Yes	94% Kill Rate	24/7 Operation (12 hrs blended/12 hrs indigo only)	Average 50-60 footcandles
Single-Mode Indigo-Clean	Yes		No	Effectively Kills	24/7 Operation	Average 50-60 footcandles

¹[Indigo-Clean Research Reports](#)

Application

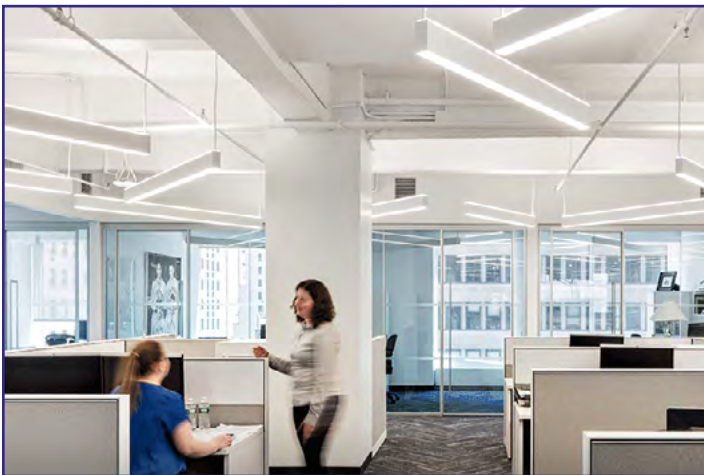
Designing with Indigo-Clean disinfection by Finelite is as simple and easy as designing with traditional light

Select Your Luminaires:

Explore our comprehensive portfolio of safe and effective disinfection lighting solutions using Indigo-Clean Technology. Our product portfolio features various styles, sizes, and distributions allowing you to easily achieve your design goals. Dual-Mode is ideal for environments where people congregate including Office, Education, Healthcare, Transportation, and Retail applications.

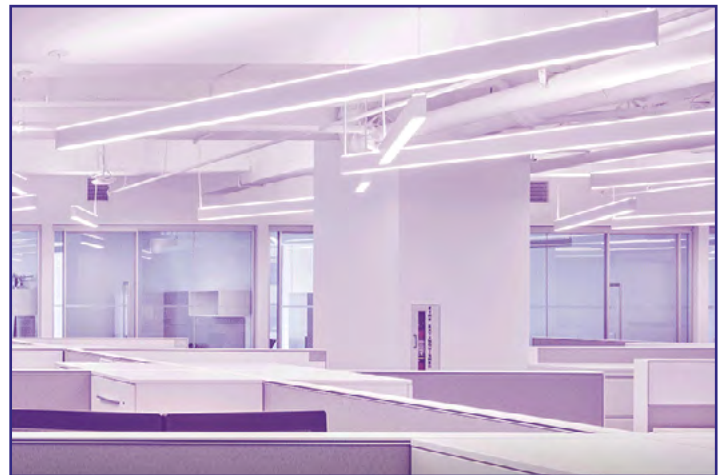
Design Recommendation:

For optimal disinfection performance simply create a luminaire layout that meets the needs of the space from an aesthetic perspective with distributions and outputs that provide an average of 50-60 footcandles on the work plane and high touch surfaces (24/7).



Occupied - White + Blue

- White + Indigo 405nm Blended
- Average 50-60 footcandles



Unoccupied - Blue Only

- Indigo 405nm Only
- Increased Output
- Improved disinfection efficacy

System Controls:

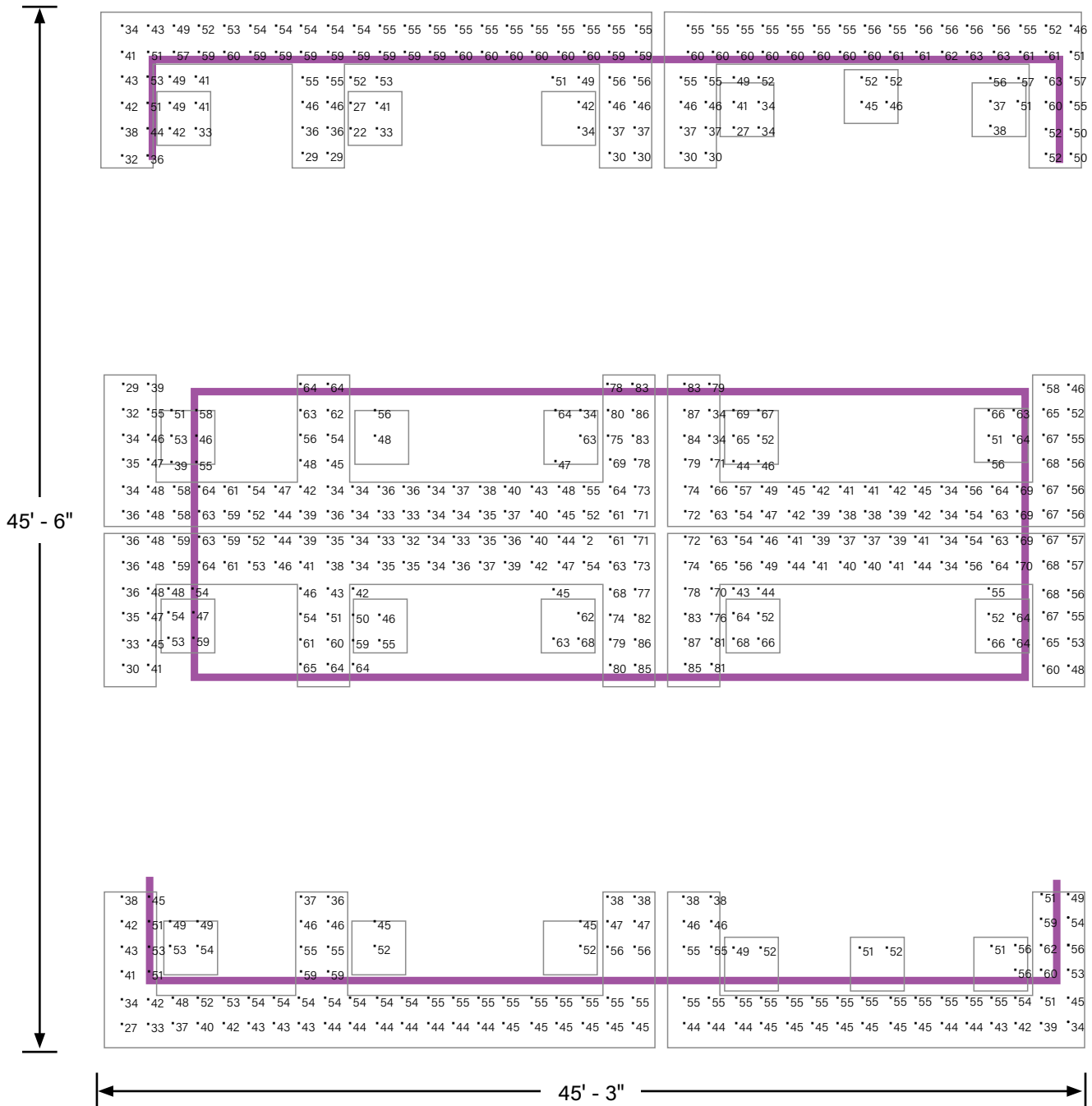
Indigo-Clean Dual-Mode utilizes a two circuit board design. These two circuits are used to create an occupied and unoccupied state. Switching between occupied and unoccupied can be accomplished via occupancy sensors or an automated timeclock. Recommendations are to have at least 12 hours of the Unoccupied state per space. Operating in less than 12 hours in unoccupied operation results in lower levels of disinfection, while operating longer than 12 hours will result in higher levels of disinfection.

Power Consumption:

- Use Occupied Power for total electrical load calculations. Use this value to estimate branch circuit lighting loads.
- Use LPD Power of lighting power density calculations. Only the power attributed to white light is required per NEMA LSD EB 840202X. Power used toward germicidal disinfection has been removed for this calculation.
- Use Unoccupied and Occupied Power for energy calculations to determine the power consumed over time based on the use of the space.

Application Data

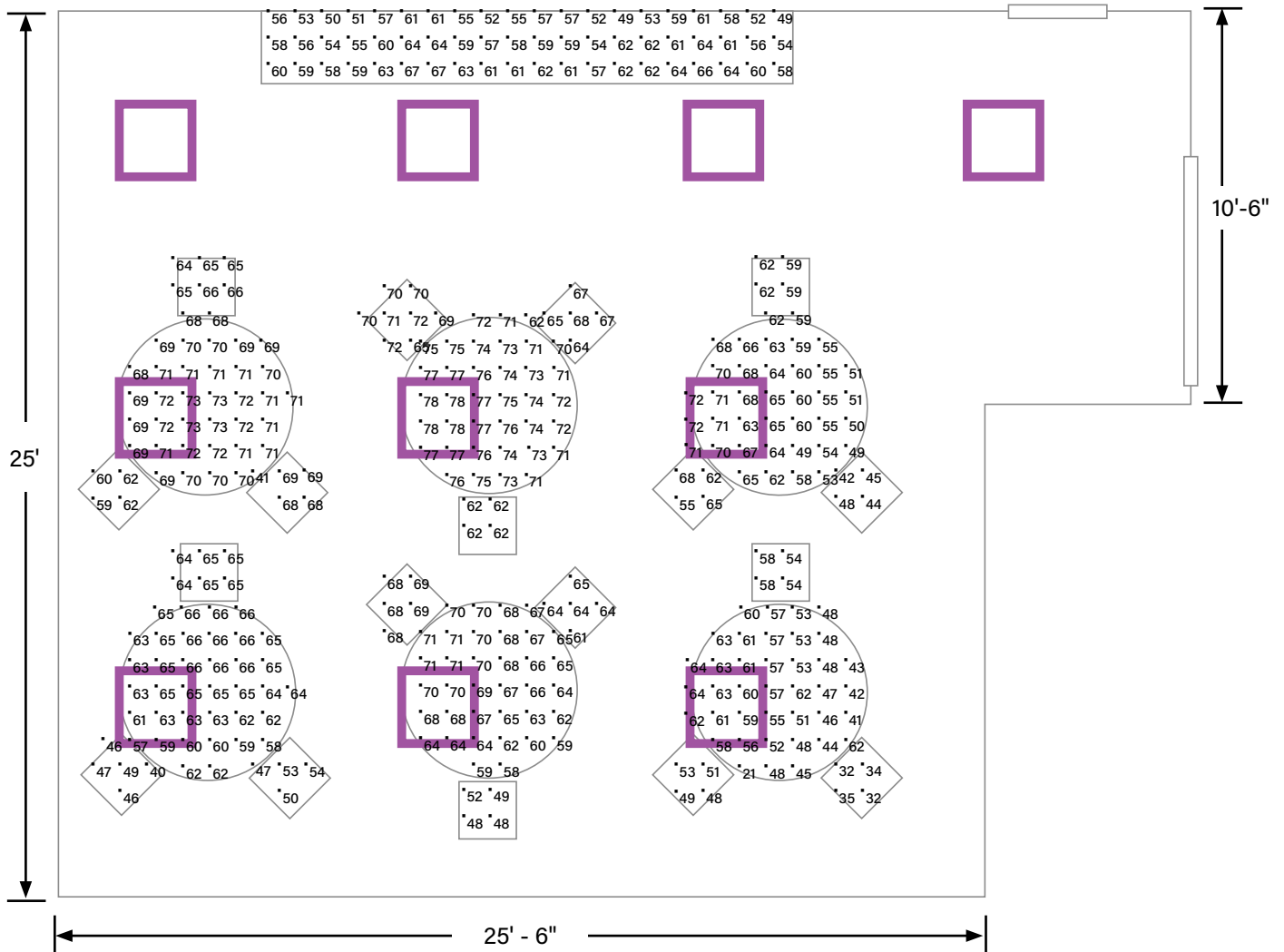
Open Office with HP-2



	HP-2-D-4ft-B-835	
	Chairs	Tabletops
Average Light Level at Workplane (Footcandles)	51.2	52.0
Energy Consumption (Lighting Power Density)	0.384 W/ft ²	
Room Size	45' - 6"x45' - 3"	

- Ceiling Height: 10'
- Luminaire Mounting Height: 7'6" AFF to bottom of the luminaire
- Room reflectance: 80/50/20
- Light levels are initial (No LLF's included)

Break Room with HPR 2X2

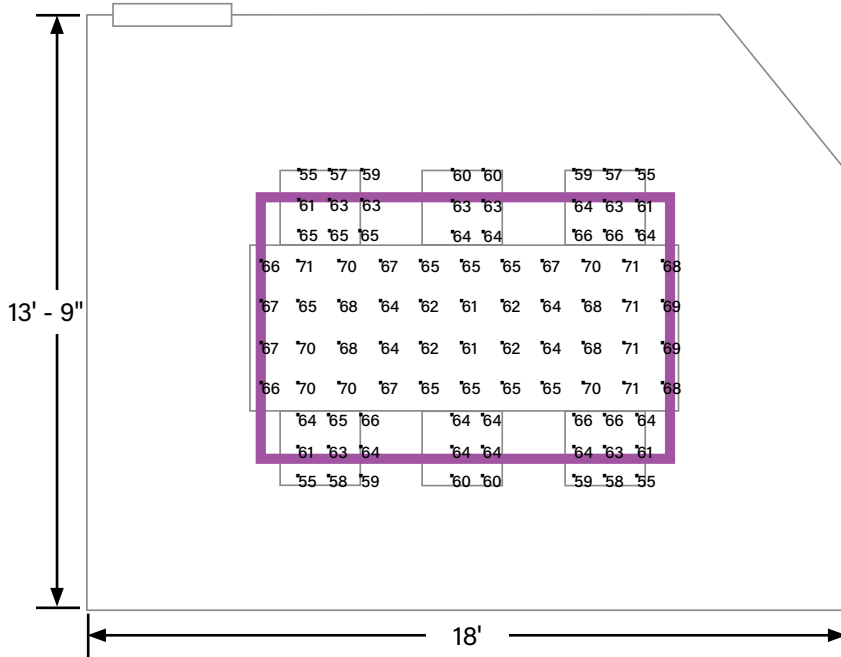


HPR-LED-A-2X2-DCO-B-835			
	Countertop	Chairs	Tabletops
Average Light Level at Workplane (Footcandles)	58.1	58.1	64.9
Energy Consumption (Lighting Power Density)	0.527 W/ft ²		
Room Size	25'x25'-6"		

- Ceiling Height: 10'
- Luminaire Mounting Height: 7'6" AFF to bottom of the luminaire
- Room reflectance: 80/50/20
- Light levels are initial (No LLF's included)

Application Data

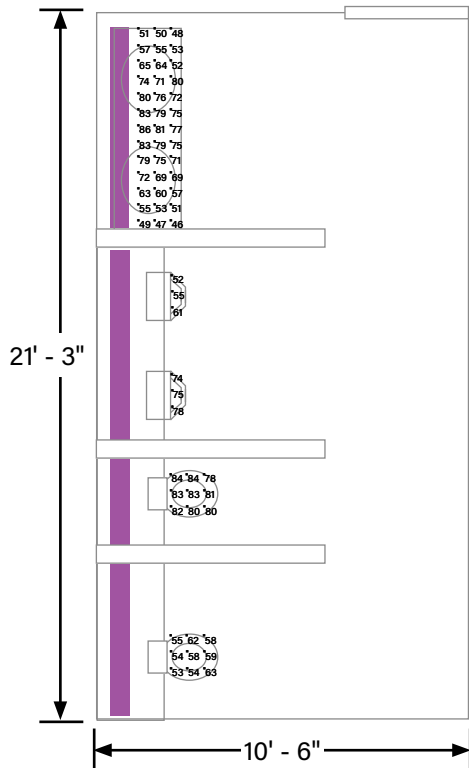
Conference Room with HP-2



	HP-2-D-4ft-B-835	
	Chairs	Tabletops
Average Light Level at Workplane (Footcandles)	61.8	66.8
Energy Consumption (Lighting Power Density)	0.609 W/ft ²	
Room Size	13'-9" x 18'	

- Ceiling Height: 9'
- Luminaire Mounting Height: 7'6" AFF to bottom of the luminaire
- Room reflectance: 80/50/20
- Light levels are initial (No LLF's included)

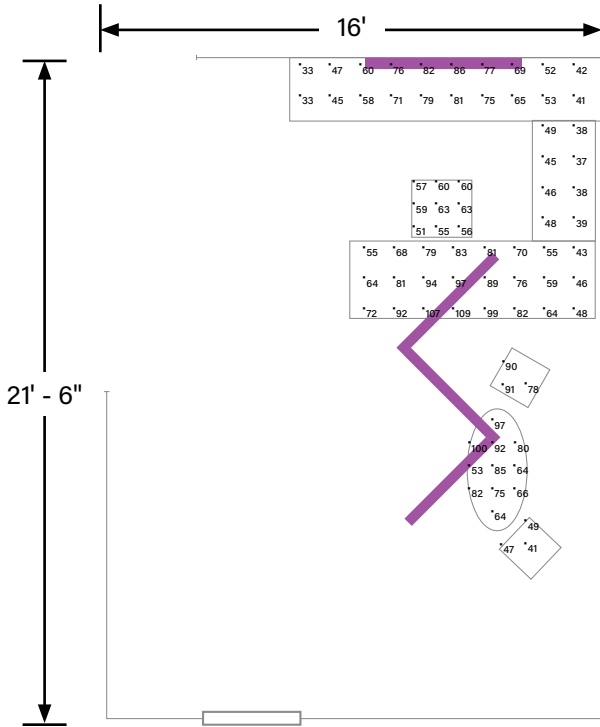
Bathroom with HP-2



	HP-2-D-4ft-B-835				
	Counter	Toilet 1	Toilet 2	Urinal 1	Urinal 2
Average Light Level at Workplane (Footcandles)	58.1	56.8	81.5	56.3	76.0
Energy Consumption (Lighting Power Density)	0.72 W/ft ²				
Room Size	21'-3"x10'-6"				

- Ceiling Height: 9'
- Luminaire Mounting Height: 7'6" AFF to bottom of the luminaire
- Room reflectance: 80/50/20
- Light levels are initial (No LLF's included)

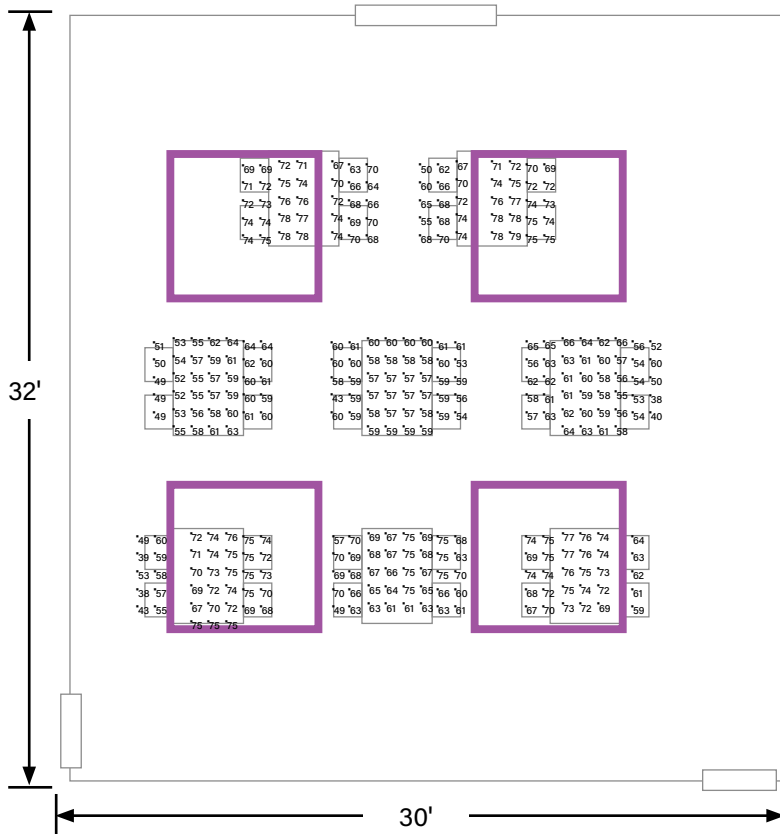
Reception with HP-4



	HP-2-D-4ft-B-835		
	Countertop	Chairs	Tabletops
Average Light Level at Workplane (Footcandles)	58.1	58.1	64.9
Energy Consumption (Lighting Power Density)	0.527 W/ft ²		
Room Size	21'-6" x 16'		

- Ceiling Height: 10'
- Luminaire Mounting Height: 7'6" AFF to bottom of the luminaire
- Room reflectance: 80/50/20
- Light levels are initial (No LLF's included)

Classroom with HP-2



	HP-2-ID-6ft-Custom Output-835-277V	
	Chairs	Desks
Average Light Level at Workplane (Footcandles)	58.8	66.1
Energy Consumption (Lighting Power Density)	0.918 W/ft ²	
Room Size	32' x 30'	

- Ceiling Height: 9'
- Luminaire Mounting Height: 7'6" AFF to bottom of the luminaire
- Room reflectance: 80/50/20
- Light levels are initial (No LLF's included)
- Output: 610 lumens/foot; 7.2 watts/foot

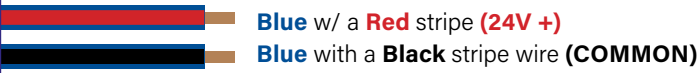
Technical Information

1. Dual-Mode luminaires must be connected to constant hot power.
2. A 24V pair of wires controlled via occupancy sensor or timeclock will change to either an Occupied or Unoccupied state.

Occupied = Blended white LEDs and 405nm LEDs will be on in each luminaire
Unoccupied = 405nm LEDs at an increased output will be on in each luminaire

3. There are several lighting control options for Dual-Mode lighting luminaires, but *each option will require a 24V pair of Low Voltage wires* to connect each luminaire to **Blue/Red** and **Blue/Black** wire.

24V Dual-Mode Control Pair
Each Indigo-Clean Dual-Mode luminaire will have a pair of #18awg low voltage wires



Blue w/ a Red stripe (24V +)
Blue with a Black stripe wire (COMMON)

When connecting the Low Voltage pair, be sure to connect the **24V +** to the **Blue/Red** stripe wire and the **24V COMMON** to the **Blue/Black** stripe wire.

Recommendation: Use a separate shielded pair of **Red** and **Black** wires to connect and daisy chain to each luminaire.

4. When the use of an **Emergency Generator** is required, the Dual-Mode luminaire will fail to the **Occupied state**. See EM diagram for more details (pg 14).

General Operation

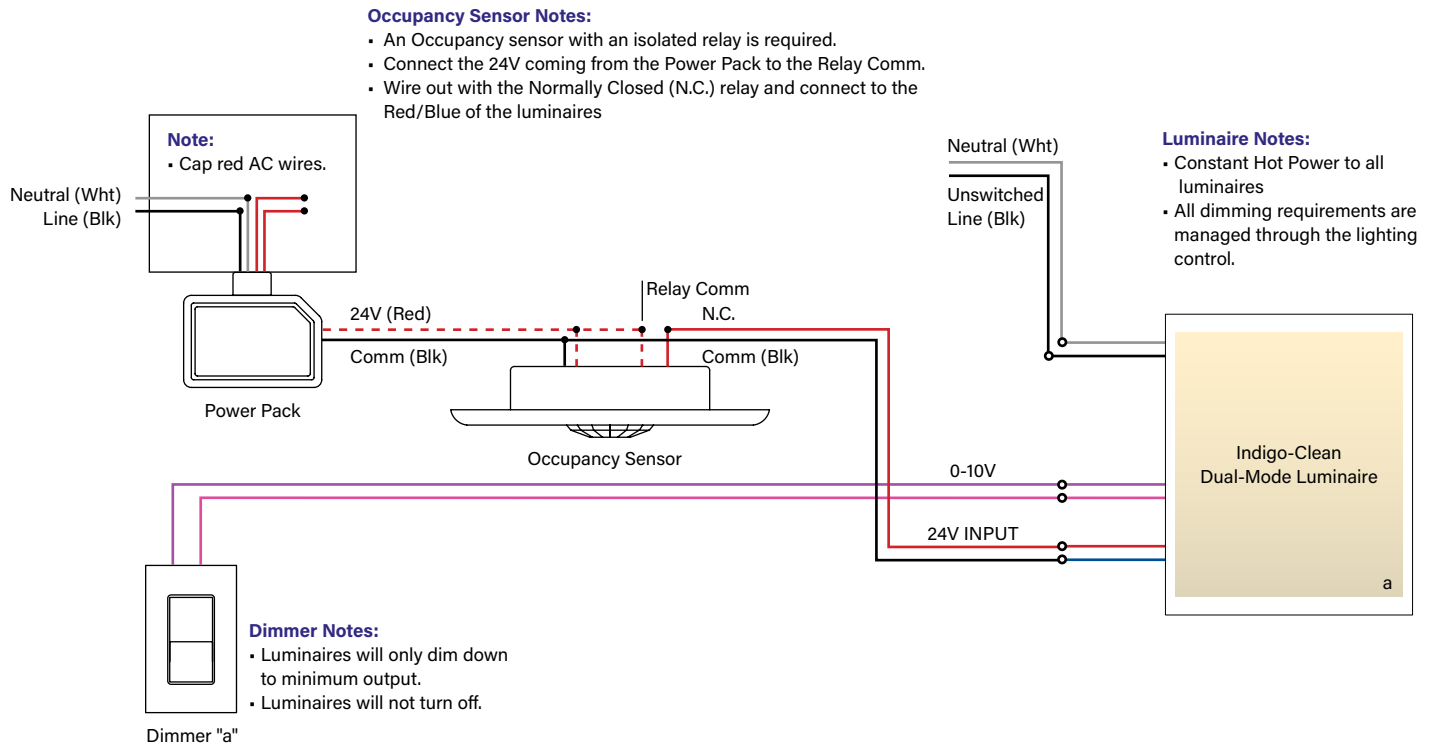
- The space becomes Unoccupied.
- After a set occupancy timeout period, the Indigo-Clean Dual-Mode switch from the Occupied state (blended white LED and 405nm LEDs) to the Unoccupied state (405nm LEDs only).
- The space becomes Occupied.
- The system detects occupancy.
- Immediately, the Indigo-Clean Dual-Mode luminaires switch from the Unoccupied state (405nm LEDs only) to the Occupied state (blended white LED and 405nm LEDs).

Note: In the event of damage to sensor, wiring, or loss of power to the control device the luminaire will fail to the Occupied state (blended white LED and 405nm LEDs) at full output.

A control scheme that incorporates a timeclock system, either as a standalone control method or in conjunction with occupancy sensors, is another acceptable strategy. In this scenario, it is recommended that the Operational Hours of the space do NOT exceed 12 hours, this will ensure the highest level of germicidal effectiveness. 12 hours occupied and 12 hours unoccupied (per day) should be the design target for a timeclock-based system.

Wiring Diagrams

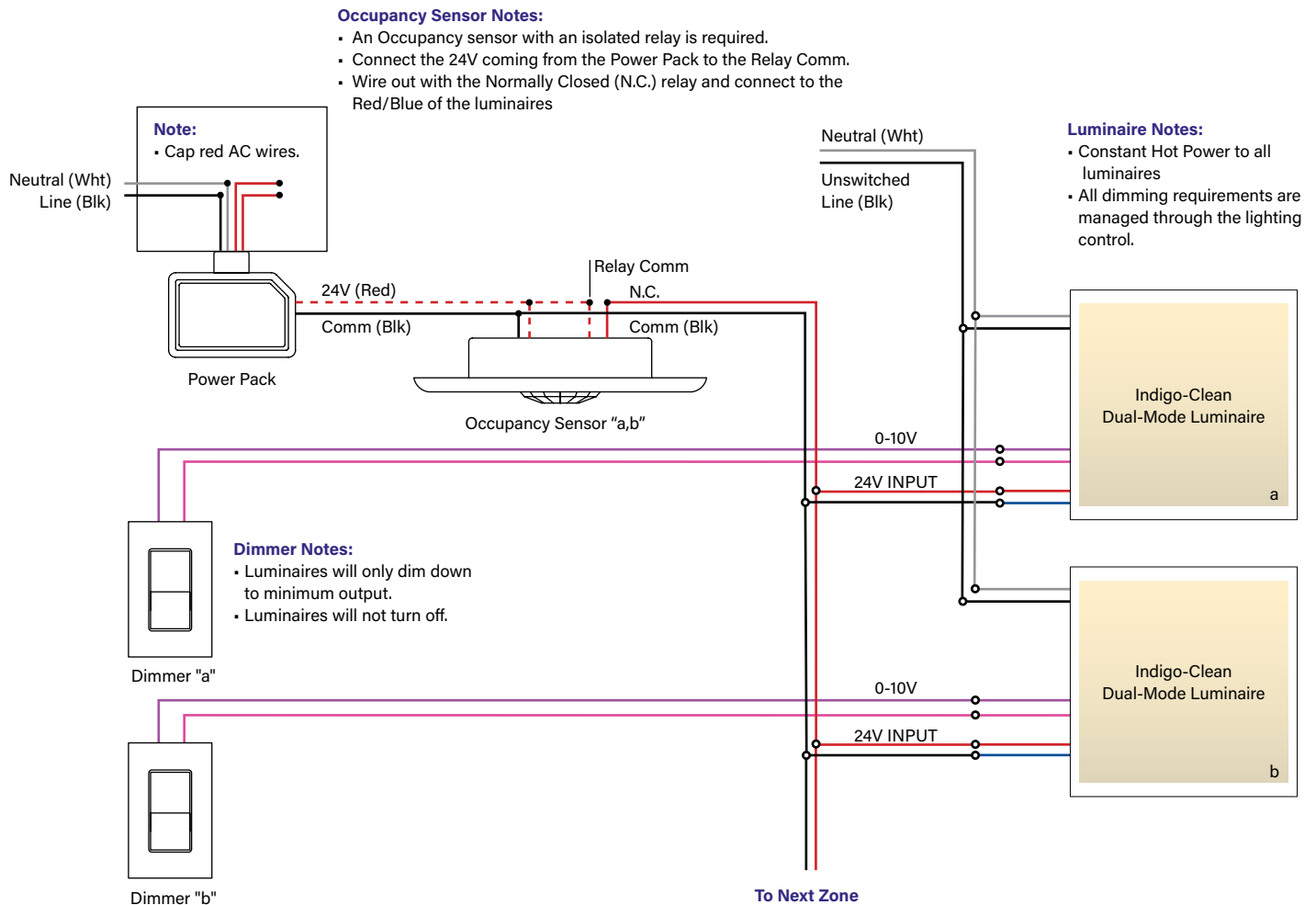
Isolated Relay Occupancy Sensor - Single Zone



1. **Power Pack:** Install a low voltage power pack with flying leads to constant hot power.
2. **Isolated Relay Occupancy Sensor:** Make sure to use an OCC. Sensor that has an **isolated relay**. Connect to the **Normally Closed (N.C.)** output of the OCC. Sensor.
3. **Connect to Luminaires:** Connect the **24V +** (coming from the N.C. terminal of the sensor) to the **Blue w/ Red** stripe wire and the **24V COMMON** (coming from the power pack) to the **Blue w/ Black** stripe.
4. **Dimming:** This strategy of Dual-Mode control wiring only allows for dimming of the luminaire. It is recommended to use a switch that only has dimming capabilities and no On/Off. **0-10V dimming switches must be used.**

Note: All control components supplied by others

Isolated Relay Occupancy Sensor - Multi Zones

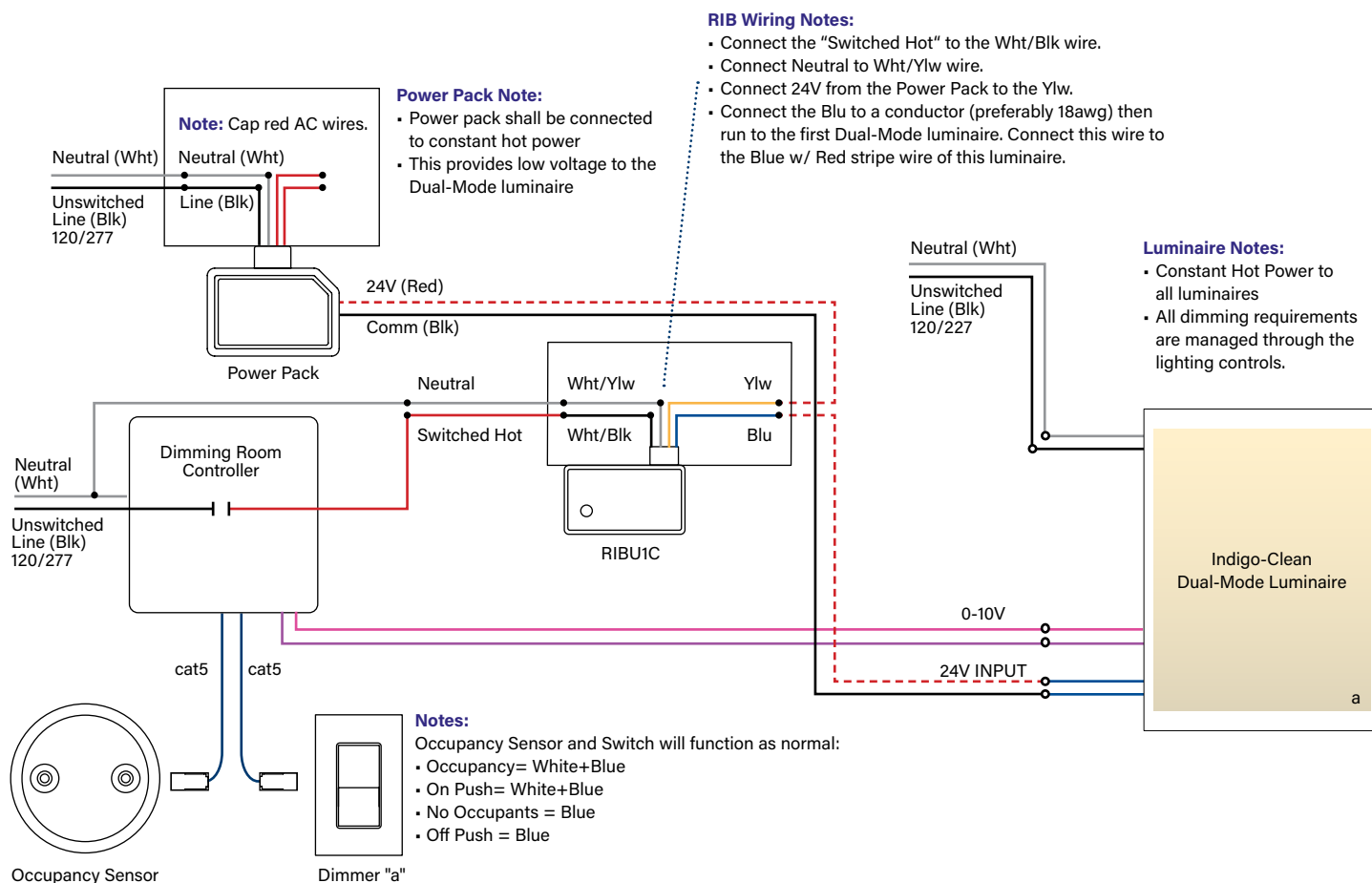


1. **Power Pack:** Install a low voltage power pack with flying leads to constant hot power.
2. **Isolated Relay Occupancy Sensor:** Make sure to use an OCC. Sensor that has an **isolated relay**. Connect to the **Normally Closed (N.C.)** output of the OCC. Sensor.
3. **Connect to Luminaires:** Connect the **24V +** (coming from the N.C. terminal of the sensor) to the **Blue w/ Red** stripe wire and the **24V COMMON** (coming from the power pack) to the **Blue w/ Black** stripe.
4. **Dimming:** This strategy of Dual-Mode control wiring only allows for dimming of the luminaire. It is recommended to use a switch that only has dimming capabilities and no On/Off. **0-10V dimming switches must be used.**
5. **Multi Zones:** If additional dimming zones are required, add an additional 0-10V dimmer and daisy chain to the additional zones.

Note: All control components supplied by others

Digital Controls

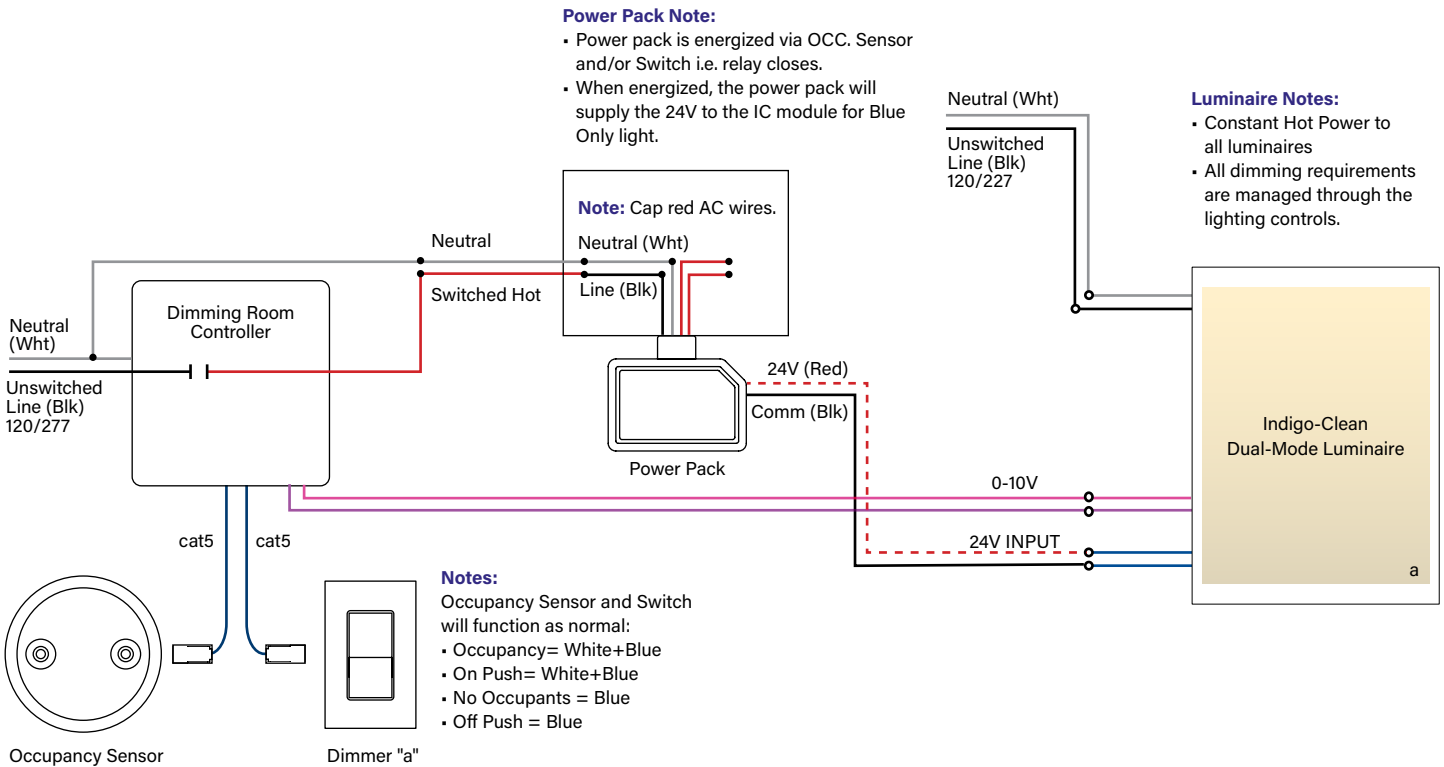
Normal Controls Programming - Single Zone



1. **Power Pack:** Install a low voltage power pack with flying leads to constant hot power.
2. **RIB:** Connect a RIBU1C to the "Switched Hot" of the Digital Control lighting system installed. Wire per diagram notes.
3. **Connect to Luminaires:** Connect the **24V +** (coming from the Blue of the RIB) to the **Blue w/ Red** stripe wire and the **24V COMMON** to the **Blue w/ Black** stripe.
4. **Dimming - On/Off:** All digitally programmed dimming from the system will work as normal. Manual dimming will function normally. An Off manual push will not turn the lights off, but rather turn the lights to Blue Mode.

Note: All control components supplied by others

Reverse Relay Logic Programming - Single Zone

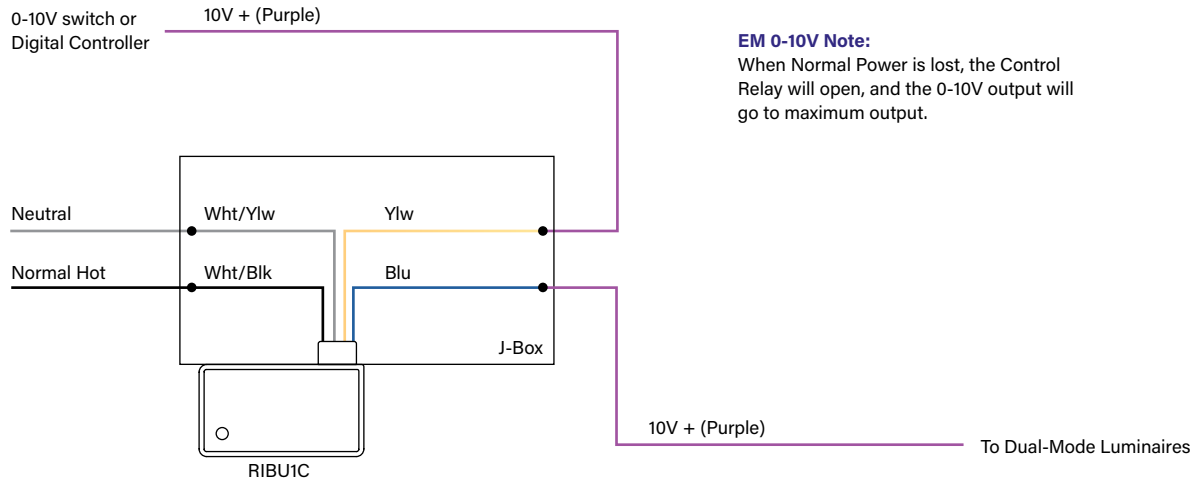


1. **Programming:** Any Digital Control system used with this wiring method MUST be able to program the relay logic to be reversed **i.e. On/Occupied = relay opens. Off/Unoccupied = relay closes.**
2. **Power Pack:** Install a low voltage power pack with flying leads to constant hot power.
3. **Connect to Luminaires:** Connect the **24V +** to the **Blue w/ Red** stripe wire and the **24V COMMON** to the **Blue w/ Black** stripe.
4. **Dimming - On/Off:** All digitally programmed dimming from the system will work as normal. Manual dimming will function normally. An Off manual push will not turn the lights off, but rather turn the lights to Blue Mode.

Note: All control components supplied by others

Emergency Wiring

EM Wiring Diagram - SPDT Control Relay



- Loss of Normal Power the Dual-Mode EM luminaires will need to go to full output while in the Occupied state.
- To achieve this a Control Relay can be used in between the 0-10V Switch OR Digital Controller and the Dual-Mode luminaires.
- This device would be used on the 0-10V + (Purple wire), the Control Relay opens when Normal Power is lost and causes the Dual-Mode EM luminaires to go to maximum output.

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