

SQUERO COMBINATION

WALL

STATIC WHITE, BIOS



Project: _____

Type: _____

LUMENWERX

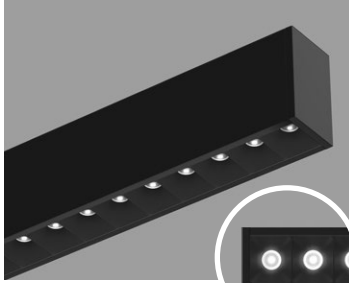
DESCRIPTION

Squero Combination brings style and flexibility to linear lighting systems. Less than 2" wide, Squero offers a variety of optics, each providing a different visual texture, as well as photometric performance. Squero Combination allows various optics to be combined in a single luminaire. It can be installed as individual luminaires or in continuous runs. See separate spec sheet for Squero.

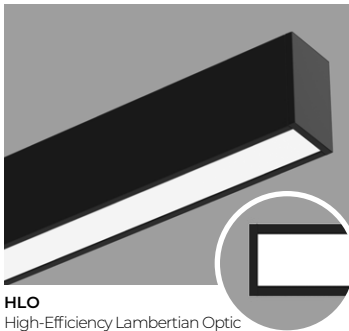
SENSORS
For latest
information
on sensors,
click [here](#).



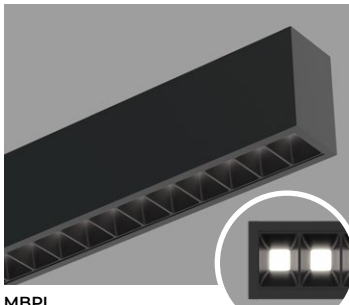
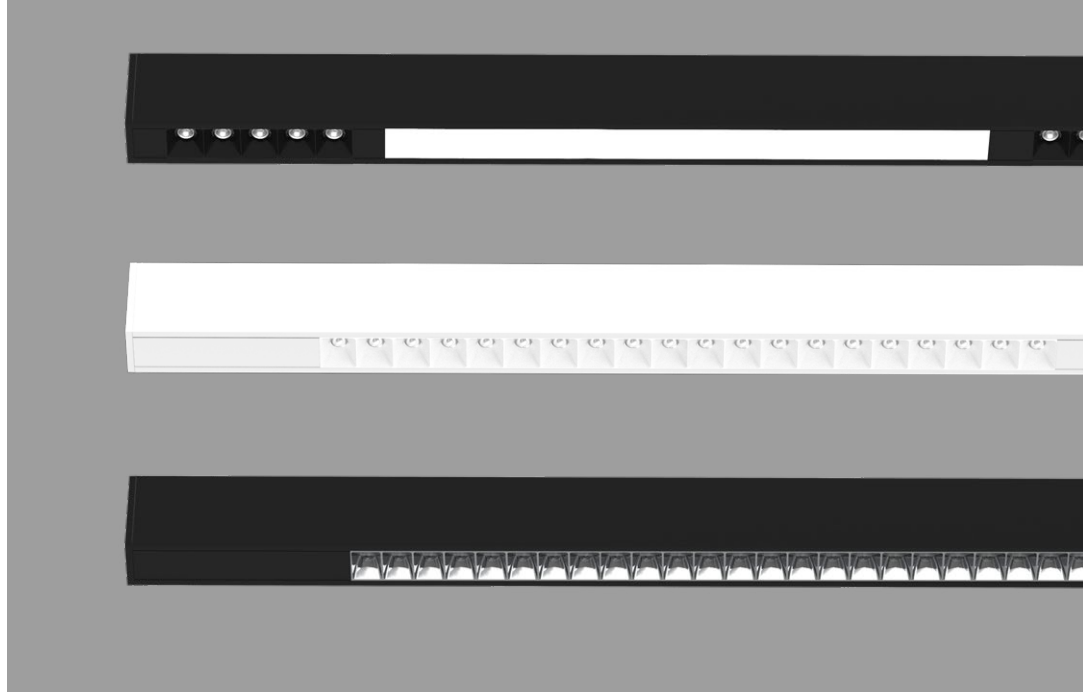
Up to 139 lm/W performance



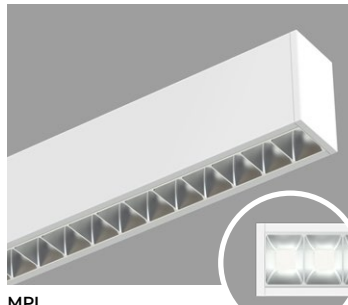
MRO
Miniature Reflector Optics



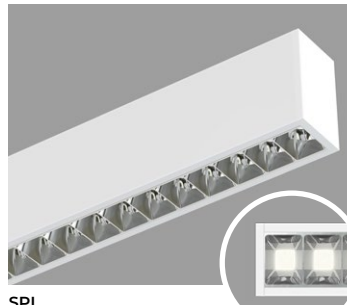
HLO
High-Efficiency Lambertian Optic



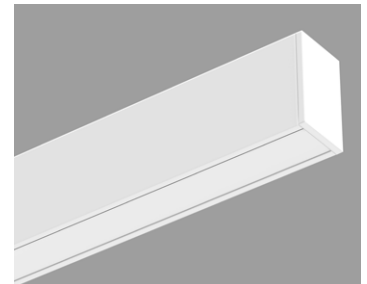
MBPL
Matte Black Parabolic Louver



MPL
Matte Parabolic Louver



SPL
Specular Parabolic Louver



BLA
Blank

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Project: _____

Type: _____

Order Guide

Example: SQUCOMW-D-MRO18-2FT-HLO-2FT6IN-WH-NA-SW-80CRI-350LMF-NA-27K-4FT6IN-120V-D1-1C-NA-DMB-W-NA-NA

A drawing of your combination pattern is required - anything from a line drawing to an architectural drawing. You can also use the grid on page 4 to sketch your layout.

LUMINAIRE ID	DISTRIBUTION	DIRECT OPTICS ^{1, 2, 3} Specify the total length for each required optic.	MRO COLOR			INDIRECT OPTIC Specify NA for Direct fixture	LIGHT SOURCE
SQUCOMW							
SQUCOMW - Squero Combination Wall	DI - Direct/Indirect D - Direct	MRO18 - 18 degree Miniature Reflector Optic	FT	IN	WH ⁵ - White BK ⁵ - Black NA - Not applicable	TIO ⁶ - Translucent Indirect Optic WAI2 ⁶ - Widespread Asymmetric Indirect Optic NA - Not applicable	SW - Static white
		MRO35 - 35 degree Miniature Reflector Optic	FT	IN			BIOSST ⁷ - BIOS Biological Static
		MRO55 - 55 degree Miniature Reflector Optic	FT	IN			BIOSDY ⁷ - BIOS Biological Dynamic
		MBPL ⁴ - Matte Black Parabolic Louver	FT				BIOSTU ⁷ - BIOS Biological Tunable
		MPL ⁴ - Matte Parabolic Louver	FT		⁵ Only available with MRO optics.	⁶ Not available with BIOS.	
		SPL ⁴ - Specular Parabolic Louver	FT				
		HLO - High-Efficiency Lambertian Optic	FT	IN			
		BLA - Blank	FT	IN			
		¹ Specify MROs in 6" increments, Parabolic Louvers in 1' increments, HLO and Blank in 1" increments.					⁷ See page 7 for details.
		² The minimum total length per louver/optic must be 2' in each section of the fixture.					
		³ Minimum fixture length is 4'.					
		⁴ Not available with BIOSTU.					

CRI	DIRECT LUMEN PACKAGE	INDIRECT LUMEN PACKAGE Specify NA for Direct fixture	COLOR TEMP.	TOTAL LUMINAIRE LENGTH	VOLTAGE
80CRI - 80 CRI 90CRI ⁸ - 90 CRI	350LMF - Eco low output 350 lm/ft 500LMF - Low output 500 lm/ft 750LMF - Medium output 750 lm/ft 1000LMF ^{9,10} - High output 1000 lm/ft	350LMF - Eco low output 350 lm/ft 500LMF - Low output 500 lm/ft 750LMF - Medium output 750 lm/ft 1000LMF ^{11,12,13} - High output 1000 lm/ft NA - Not applicable	27K ¹⁴ - 2700K 30K - 3000K 35K - 3500K 40K - 4000K 50K ¹⁴ - 5000K	#FT#IN ¹⁵ - Specify the total nominal length (#) in 1' and/or 1" increments Standard nominal lengths: Single units - 4' to 12' Continuous runs: lengths over 12'	120V - 120V 277V - 277V UNV - 120V-277V 347V ¹⁶ - 347V
⁸ Not available with BIOS.		⁹ Not available with MBPL optic. ¹⁰ Not available with BIOS.		¹¹ Not available with WAI2. ¹² For Direct/Indirect, Direct must not exceed 750 lm/ft. ¹³ Not available with BIOS.	
		¹⁴ Not available with BIOS.		¹⁵ Total luminaire length should equal the sum of all the direct optic lengths.	
				¹⁶ Available with D1 driver only.	

DRIVER ¹⁷	ELECTRICAL	ELECTRICAL SECTIONS (optional) ^{23,24}	MOUNTING
D1 - 1% 0-10V DA ¹⁸ - DALI LDE1 ¹⁸ - Lutron Hi-lume 1% Eco ELD1 - eldoLED 1% ECOdrive 0-10V ELDO - eldoLED 0.1% SOLOdrive 0-10V ¹⁷ PoE (Power-over-Ethernet) compatible. Consult factory for details. ¹⁸ On-site commissioning is required.	1C - 1 circuit 2C ¹⁹ - 2 circuits #MC ²⁰ - Multi circuit EC - Emergency-powered fixture NL - Night light fixture DL - Daylight fixture GTD ^{21,22} - Generator transfer device fixture ¹⁹ Available for Direct/Indirect only. Separate direct and indirect circuits. ²⁰ Specify total number of circuits (#), including any required for electrical section options. Provide drawing or layout specifications. Minimum 4' section per circuit. ²¹ Minimum 4' fixture. ²² Not available with 347V.	#EC## ²⁵ - Emergency-powered section #NL## ²⁵ - Night light section #DL## ²⁵ - Daylight section #GTD## ^{25,26,27} - Generator transfer device section #EMB ^{27,28} - Emergency battery NA - None ²³ Specify with multi circuit (#MC) electrical option only. ²⁴ Provide drawing or layout specifications. Consult factory for other configurations. Default section length is 4'. ²⁵ Specify quantity (#), and section length in inches (##). ²⁶ Minimum 4' section. ²⁷ Not available with 347V. ²⁸ Specify quantity (#). All batteries will be on the same circuit. Each battery powers a 4' section. For Direct/Indirect, minimum 8' fixture.	DMB DMB - Drywall mounting bracket

FINISH ²⁹	CONTROL ³⁰	OPTIONS
W - Matte white AL - Aluminum B - Matte black CF# - Custom finish, specify RAL# ²⁹ Blank finish will match fixture finish.	STANDALONE CONTROLS ^{31,32} Specify the quantity (#) of sensors per fixture. #ODS - Onboard Daylight CONNECTED CONTROLS ³³ LU - Lutron AWN - Lutron Athena Wireless Node RF Only AWNS - Lutron Athena Wireless Node Sensor EN - Enlighted ENC - Encelium NA - None ³⁰ Standalone and connected control options cannot be combined. ³¹ Available with D1 driver and 1 circuit options only. ³² Minimum 4' per zone. Provide control zone length. ³³ Consult factory for connected controls.	WL - Cooper Wavelinx AN - Acuity nLight CA - Casambi LG - Legrand FU120 - Fuse 120V FU277 - Fuse 277V NA - None

SQUERO COMBINATION

WALL

STATIC WHITE, BIOS

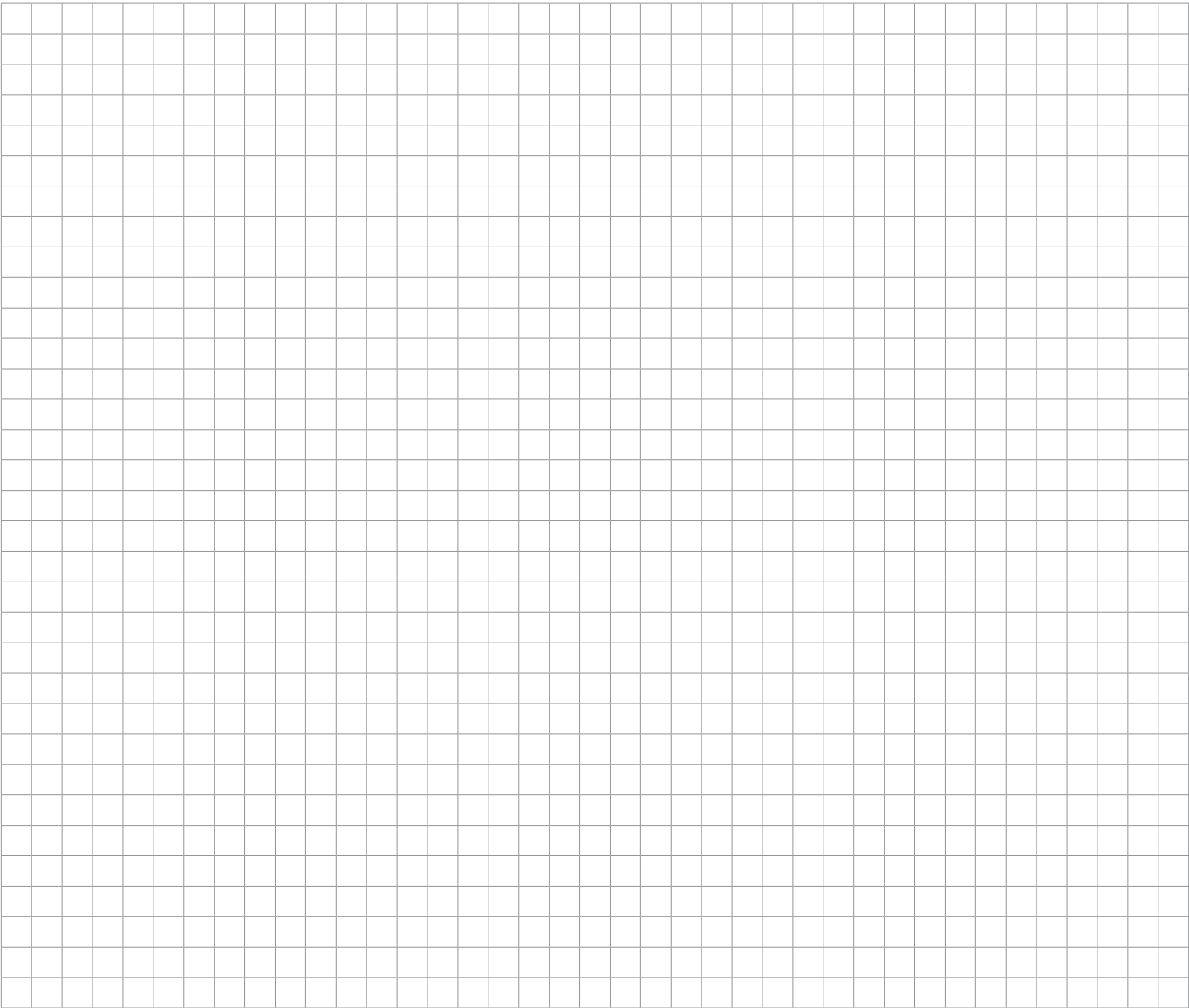
LUMENWERX

Squero Combination Layout

Use the grid below to sketch and label the layout of your combination.

Make sure to follow the guidelines specified in the order code:

- MROs in 6 inch increments;
Parabolic Louvers in 1 foot increments;
HLO/Blank in 1 inch increments.
- The minimum total length per louver/optic must be 2' in each section of the fixture.
- Minimum fixture length is 4'.
- Maximum length for a section is 12'.



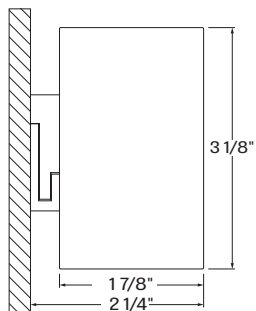
SQUERO COMBINATION

LUMENWERX

WALL

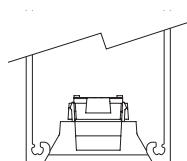
STATIC WHITE, BIOS

Dimensions



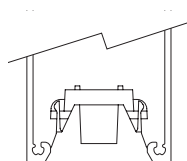
Section Views

DIRECT OPTICS



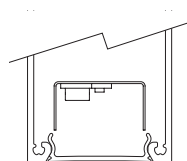
MRO

Miniature Reflector Optic



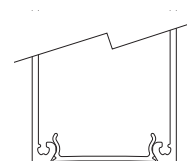
MBPL, MPL & SPL

Matte Black, Matte & Specular
Parabolic Louver



HLO

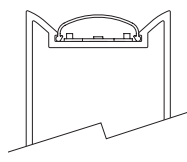
High-Efficiency Lambertian
Optic



BLA

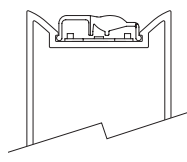
Blank

INDIRECT OPTICS



TIO

Translucent Indirect Optic



WAI2

Widespread Asymmetric
Indirect Optic

SQUERO COMBINATION

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STATIC WHITE, BIOS

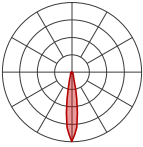
LUMENWERX

Photometrics

Values calculated based on a 4ft fixture at 35K and 80 CRI for all optics.

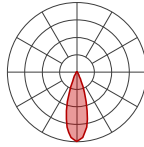
DIRECT OPTICS

MRO18



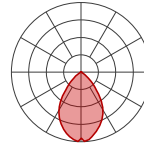
LM/FT	W/FT	LPW
350	2.7	130
500	4.0	125
750	6.4	118
1000	9.1	110

MRO35



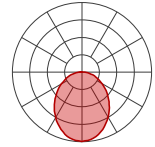
LM/FT	W/FT	LPW
350	2.9	121
500	4.3	116
750	6.9	108
1000	9.9	101

MRO55



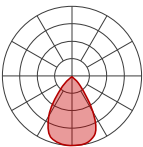
LM/FT	W/FT	LPW
350	3.2	109
500	4.8	104
750	7.7	97
1000	11.0	91

HLO



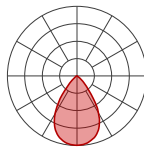
LM/FT	W/FT	LPW
350	3.1	112
500	4.6	108
750	7.3	103
1000	10.2	98

MBPL



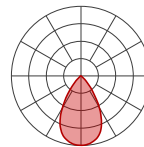
LM/FT	W/FT	LPW
350	5.2	67
500	7.5	66
750	11.7	64

MPL



LM/FT	W/FT	LPW
350	3.5	99
500	5.1	98
750	7.7	98
1000	10.6	95

SPL



LM/FT	W/FT	LPW
350	3.1	113
500	4.4	113
750	6.7	112
1000	9.1	109

MULTIPLIER TABLES - CCT/CRI

Use these tables to get results for different color temperatures and CRI for all Direct and Indirect photometric tables.

MRO18 / MRO35 / MRO55

CCT (K)	WATTS		LPW	
	CRI 80	CRI 90	CRI 80	CRI 90
2700	1.04	1.19	0.96	0.84
3000	1.00	1.15	1.00	0.87
3500	1.00	1.12	1.00	0.89
4000	0.99	1.10	1.01	0.91
5000	0.94	1.06	1.06	0.94

MBPL / MPL / SPL

CCT (K)	WATTS		LPW	
	CRI 80	CRI 90	CRI 80	CRI 90
2700	1.04	1.19	0.96	0.84
3000	1.00	1.15	1.00	0.87
3500	1.00	1.12	1.00	0.89
4000	0.99	1.10	1.01	0.91
5000	0.94	1.06	1.06	0.94

HLO

CCT (K)	WATTS		LPW	
	CRI 80	CRI 90	CRI 80	CRI 90
2700	1.05	1.27	0.95	0.79
3000	1.02	1.23	0.98	0.81
3500	1.00	1.19	1.00	0.84
4000	1.00	1.19	1.00	0.84
5000	0.96	1.12	1.04	0.89

SQUERO COMBINATION

WALL

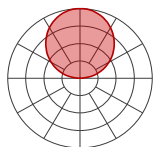
STATIC WHITE, BIOS

LUMENWERX

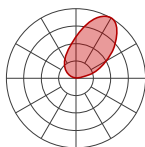
Values calculated based on a 4ft fixture at 35K and 80 CRI for all optics.

INDIRECT OPTICS

TIO



WAI2



LM/FT	W/FT	LPW
350	2.8	127
500	4.0	124
750	6.3	119
1000	8.8	114

LM/FT	W/FT	LPW
350	2.5	139
500	3.7	135
750	5.8	130

MULTIPLIER TABLES - CCT/CRI

Use these tables to get results for different color temperatures and CRI for all Direct and Indirect photometric tables.

TIO / WAI2

CCT (K)	WATTS		LPW	
	CRI 80	CRI 90	CRI 80	CRI 90
2700	1.05	1.27	0.95	0.79
3000	1.02	1.23	0.98	0.81
3500	1.00	1.19	1.00	0.84
4000	1.00	1.19	1.00	0.84
5000	0.96	1.12	1.04	0.89

DIRECT/INDIRECT - LPW CALCULATION

For Direct/Indirect performance values, follow the formula.

$$\frac{\left(\begin{array}{c} \text{DIRECT} \\ \text{LM/FT} \end{array} + \begin{array}{c} \text{INDIRECT} \\ \text{LM/FT} \end{array} \right)}{\left(\begin{array}{c} \text{DIRECT} \\ \text{W/FT} \end{array} + \begin{array}{c} \text{INDIRECT} \\ \text{W/FT} \end{array} \right)} = \text{LPW}$$

SQUERO COMBINATION

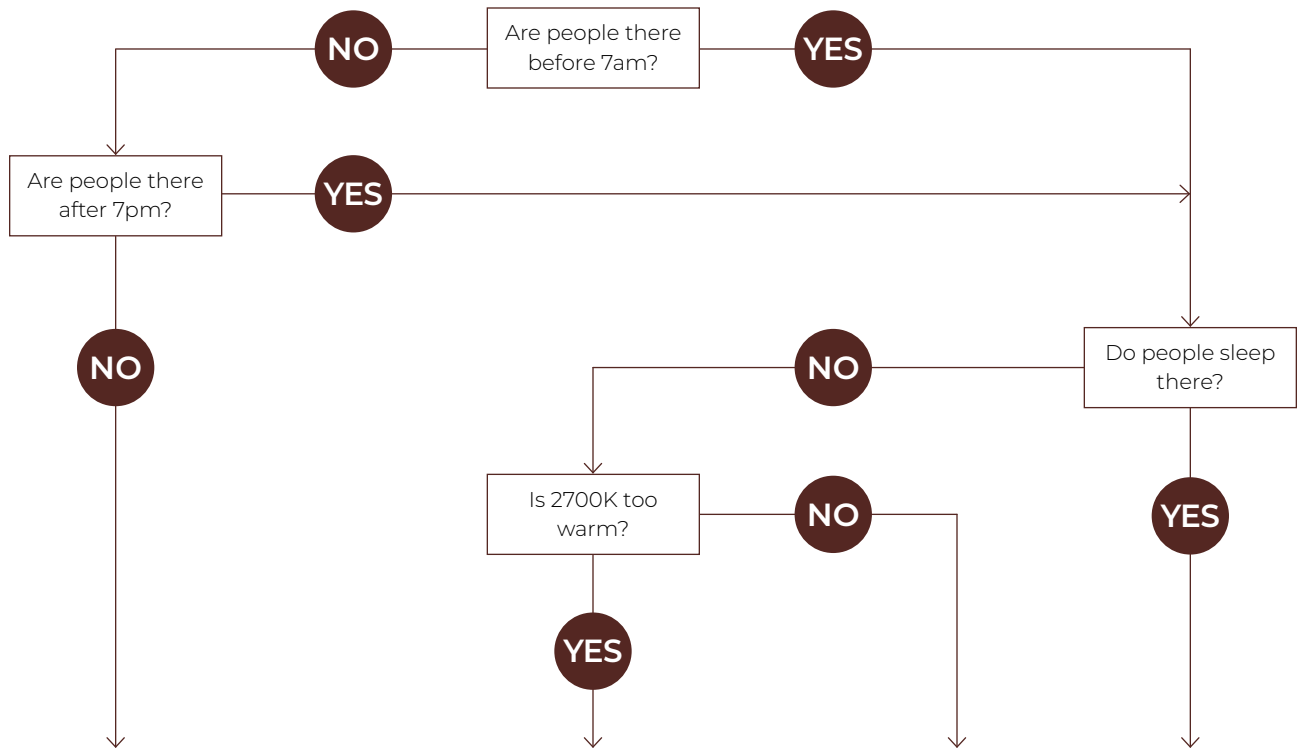
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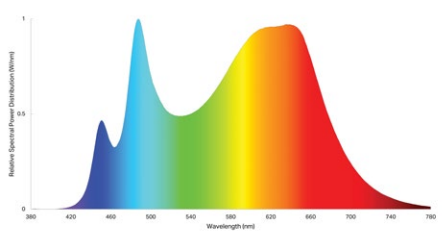
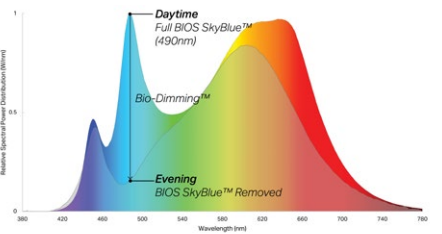
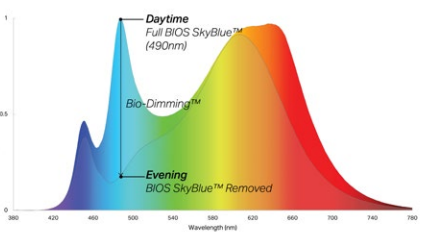
STATIC WHITE, BIOS

LUMENWERX

BIOS

Three BIOS Circadian LED solutions are offered – Biological Static, Biological Dynamic, and Biological Tunable. Use the decision tree below to identify when and where to use BIOS Wellness LED Lighting Solutions.



Biological Static BIOSST	Biological Dynamic BIOSDY	Biological Tunable BIOS TU
No CCT change when dimmed	500K shift when dimmed	Dims to 2700K
Daytime solution	Daytime + evening solution	Daytime + evening solution
Spaces in operation during daytime hours, between 7am and 7pm	Spaces in operation overnight, after 7pm and before 7am, and when CCT color shift in the evening is not preferred	Suitable for spaces in operation overnight, after 7pm and before 7am, and where people do not sleep (CCT color shift in the evening is preferred)
E.g. offices, medical/dental offices	E.g. hospitals	E.g. offices, shiftwork
		

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LUMENWERX

Technical Specifications

DIRECT OPTICS

Miniature Reflector Optic (MRO)

Locates individual, precisely molded TIR elements over each LED emitter, and further shield the source with precise parabolic reflectors. The controlled beam is remarkably comfortable – especially in a small LED luminaire.

MRO is available in a specular black or gloss white finish and creates a distinctive visual texture.

Different TIR elements offer a choice of beam spreads: narrow (18° with SC of 0.3), medium (35° with SC of 0.6), and wide (55° with SC of 0.9). These concentrated distributions can provide effective task illumination in a variety of applications.

Each MRO module is 6" long with five optical chambers.



Parabolic Louvers (MBPL, MPL & SPL)

Parabolic Louver Optics provide excellent shielding and a pleasing crisp visual texture. The precisely molded louvers consist of 1" deep blades and side reflectors with shielding of 50° lengthwise and 45° crosswise.

The parabolic contour of the blades and side reflectors direct light into a comfortable downlight distribution with a spacing criterion of 1.1, while minimizing shadows from the LED array above each cell.

Three finishes are available: matte black, matte, and specular. Specular (SPL) provides higher efficacy, sharper cut-off, and an ultra quiet appearance at shallow viewing angles. Matte (MPL) offers a softer appearance, a wider beam spread, and gentle brightness transition at cut-off. Matte black (MBPL) offers the highest UGR in Squero as the black parabolic louver is very quiet and glare free. The UGR is the best in class rating of under 10.



High-Efficiency Lambertian Optic (HLO)

The High-Efficiency Lambertian Optic (HLO) shielding of diffusing 0.075" thick acrylic with up to 88% transmission and good source obscuration is combined with matte white side reflectors to create an efficient optical chamber with uniform luminosity.

Luminaire brightness is controlled by the flux-to-shielding area ratio. For visual comfort, avoid high lumen output unless Squero is installed in a high ceiling application. Spacing criteria: 1.2 (longitudinal) x 1.1 (lateral).



Blank (BLA)

Aluminum Blank covers provide spacing – functional or rhythmic – in the direct component of a Squero Combination luminaire.

Covers are sized according to the Combination design, finished to match the luminaire housing, and snap into the aperture.



INDIRECT OPTICS

Translucent Indirect Optic (TIO)

The Translucent Indirect Optic (TIO) is composed of a horizontal LED array that has a translucent lens to mask pixilation from the diodes. TIO has a 100° spread in the indirect that is ideal when the fixture is mounted farther away from the ceiling.

Widespread Asymmetric Indirect Optic (WAI2)

The Widespread Asymmetric Indirect Optic (WAI2) offers an upward grazing effect with a 45° forward throw. It softly highlights the ceiling in the up-light while distributing the required illumination of the rest of an interior space. For avoiding glare and enjoying visual comfort, WAI2 is an ideal solution.

LIGHT SOURCE

Custom linear array of high-flux LEDs mounted onto aluminum-backed circuitry with quick-connect wiring to facilitate service and optimize thermal management. Available in 2700K, 3000K, 3500K, 4000K, and 5000K with a minimum 80 CRI and an option for 90 CRI with elevated R9 value. Color consistency maintained to within 3 SDCM. All LEDs have been tested in accordance with IESNA LM-80-08 and the results have shown L80 lumen maintenance greater than 60,000 hours. Absolute product photometry is measured and presented in accordance with IESNA LM-79, unless otherwise indicated.

LUMINAIRE LENGTH - STATIC WHITE

Squero is made up of standard 4 to 12 foot sections that may be joined together to create longer continuous run lengths. Exact run lengths must be noted in the product code. The minimum individual section available is 4 feet.

All individual sections are joined together onsite using the joiner kits provided. Lumenwerx offers joiner kits that are extremely simple to work with in the field and result in a fixture that appears virtually seamless with no light leak at any connection.

SQUERO COMBINATION

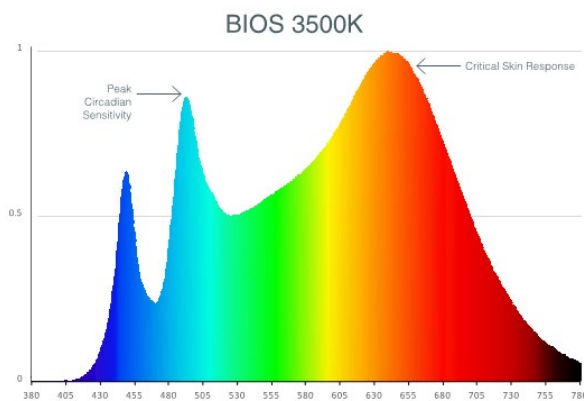
WALL

STATIC WHITE, BIOS

LUMENWERX

LIGHT SOURCE - BIOS

BIOS SkyBlue™ Technology is designed to provide the specific circadian stimulus to improve overall sleep quality, recovery during the night, and overall feelings of well-being. The non-visual light signals that stimulate our circadian system have peak intensity in the "sky blue" region. As the diagram below illustrates, BIOS SkyBlue technology shifts the peak LED spectral intensity (490 nm) to align better with the peak response of circadian stimulus. Also note the enhanced deep-red (near 660 nm) spectrum.



Three BIOS solutions are offered: BIOS Biological Static (BIOSST), BIOS Biological Dynamic (BIOSDY), and BIOS Biological Tunable (BIOSTU). See page 7 for details.

ELECTRICAL

Factory-set, adjustable output current LED driver with universal (120-277VAC) input. Dimmable from 100% to 1% with 0-10V dimming control. Rated life (90% survivorship) of 50,000 hours at 50°C max. ambient (and 70°C max. case) temperature. At maximum driver load: Efficiency > 84%, PF > 0.9, THD < 20%. Other specifiable options include Lutron Hi-Lume 1% Eco, eidoLED 1% ECOdrive 0-10V, eidoLED 0.1% SOLOdrive 0-10V, and DALI protocol drivers. All of our standard 0-10V drivers are NEMA 410 compliant.

PoE

Depending on the PoE manufacturer selected, Lumenwerx will install the node in factory as either integral to the luminaire or as a remote module. Factory programming of the PoE node may or may not enable the following functionalities: lumen package, Duo (tunable white), emergency battery backup, and sensor integration. These must be addressed and evaluated on a case-by-case basis.

ELECTRICAL SECTION OPTIONS

Electrical section options are available for fixtures specified as multi circuit (#MC). With MC, specify the total number of circuits (#), including any circuits required for optional electrical sections. A drawing is required to specify the layout. Please consult factory for custom configurations.

Electrical sections

Options include emergency-powered (#EC##), night light (#NL##), daylight (#DL##), and generator transfer device (#GTD##) sections. Specify the quantity (#), as well as the section length in inches (##).

Example 1: A 32' Direct fixture with two 8' emergency-powered sections on a second circuit.

Code: 2MC-2EC96

Example 2: A 16' Direct/Indirect fixture with separate circuits for direct and indirect, and with one 4' night light section on the direct side on a third circuit.

Code: 3MC-1NL48

Example 3: A 24' Direct fixture with one 4' generator transfer device section.

Code: 1MC-1GTD48

Battery

Each emergency battery (#EMB) powers a 4' section. All batteries will be on the same circuit. Specify the number of batteries (#) required.

Factory installed long life, high temperature, maintenance-free Lithium-Ion battery pack with self-test functionality, test switch and charge indicator. Minimum of 90 minutes operation, up to 1000 lumens per 4' (25°C) emergency lighting output and recharge time of 24 hours.

MOUNTING OPTIONS

Fixtures may be horizontally mounted to the wall using a bracket. For long runs, a minimum of 6" from adjacent walls is required.

FINISH

Interior - 95%, reflective matte powder coated white paint

Exterior - Matte white, matte black, or aluminum powder coating. Custom finishes are also available.

CONTROLS

Lumenwerx offers several options for integrating occupancy and daylight harvesting controls in our luminaires.

For latest information on sensors, click [here](#).



SQUERO COMBINATION

WALL

STATIC WHITE, BIOS

LUMENWERX

STANDALONE CONTROLS

An integrated standalone sensor controls the luminaire in which it is installed. Depending on the length, more than one sensor may be necessary and may control the entire luminaire, or just a section of it. These controls operate independently. Unless otherwise agreed, sensor location, blank size, and functionality of the sensor within the luminaire are selected by Lumenwerx. See client drawings for details.

One type is available:

ODS: An integral, daylight harvesting sensor with closed-loop operation dims the luminaire in which it is installed in order to compensate for available daylight. The sensor measures the combination of daylight and luminaire light reflected from horizontal surfaces below the luminaire. Initial onsite calibration is required via the use of provided remote control.

CONNECTED CONTROLS

With connected controls, sensors or nodes installed in the luminaire form part of a larger control system infrastructure from manufacturers such as: Lutron, Enlighted, Encelium, Cooper Wavelinx, Acuity nLight, Casambi, Legrand, and others. These connected controls allow for a scalable system providing features like occupancy and daylight control, manual control, scheduling and configuration of various zones and scenes. Energy reporting and system monitoring are also possible. Specific capabilities depend on the control system being used.

Lumenwerx installs the components (sensors, nodes, power packs, etc) which may be supplied to us by a third party, or procured directly by Lumenwerx, depending on the control system manufacturer.

Lumenwerx is solely responsible for the installation of specified components; the controls manufacturer is responsible for performance of the control system.

To indicate a Lumenwerx luminaire with connected controls, identify the specific onsite control system to be integrated into the luminaires using the ordering code. Due to the diversity of components, you must contact factory to assure complete compatibility with intended control system and to fully specify the luminaire.

Complete control specifications, sensor/node/power pack layout, and narrative for the control system are required for Lumenwerx to create shop drawings and submittals.

CONSTRUCTION

Housing - Extruded aluminum (0.100" nominal) up to 90% recycled content

Interior brackets - Die formed cold rolled sheet steel 10 gauge thick

Joining system - Die cast aluminum

Louvers - Injection molded optical grade polycarbonate (0.100" nominal) up to 95% reflective

Light guide - Clear PMMA laminated with microstructure film formed into optical TIR/extraction form

End caps - Die cast aluminum (0.125" nominal)

WEIGHT

4ft - 10.02 lbs - 4.54 kg

6ft - 15.18 lbs - 6.89 kg

8ft - 19.78 lbs - 8.97 kg

CERTIFICATION

ETL - Rated for Indoor Dry/Damp locations. Conforms to UL Standard 1598 and certified to CAN/CSA Standard C22.2 No. 250.0.

WARRANTY

Lumenwerx provides a five-year limited warranty on electrical and mechanical performance of the luminaires, including the LED boards, drivers, and auxiliary electronics. Lumenwerx will repair or replace defective luminaires or components at our discretion, provided they have been installed and operated in accordance with our specifications. Other limitations apply, please refer to the full warranty on our website.