

Commercial Building Electrical Systems - Lighting



Commercial Building Electrical Systems - Lighting

Lumens

Lumens are a measure of the brightness of a bulb. One lumen is equal to the light of one candle from one foot away.

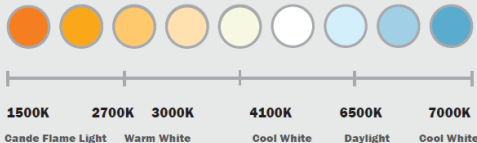


Watt

Watts measure the amount of energy a bulb uses to produce light. Wattage is the amount of power required to operate an electrical appliance or device.

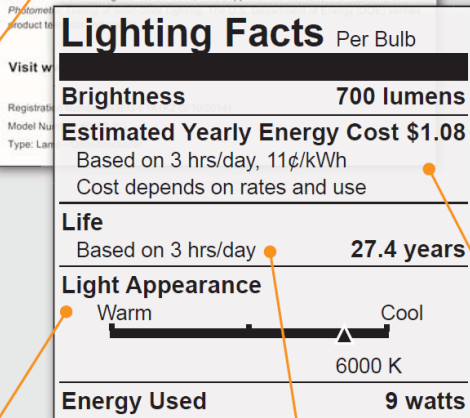
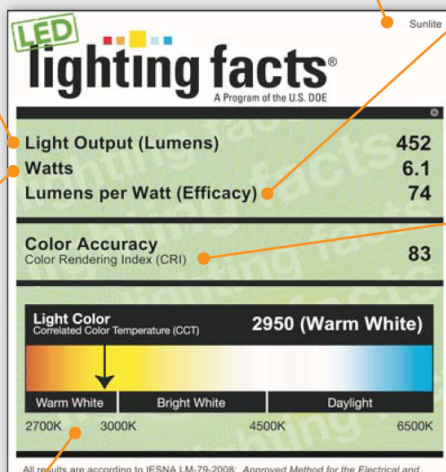
Kelvins

The color temperature, measured in Kelvins, refers to a lamp's emitted color.



Brand

The manufacturer.



Life

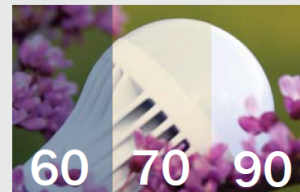
Life of the bulb, based on 3 hours a day work.

Efficacy

Lumens per Watt measures efficiency. The higher the number, the more efficient the product.

CRI

The Color Rendering Index (CRI) is a rating scale up to a 100 that rates how accurately a light source can express true color in comparison with an ideal or natural light source.



Reasonable CRI Good CRI Excellent CRI

Yearly Cost

Estimated Yearly Energy Cost based on 3 hrs/day 11¢/kWh (cost depends on rates and use)

Commercial Building Electrical Systems - Lighting

Lamp Types

Light Emitting Diode - LED

Fluorescent - FL

Compact Fluorescent (CFL)

Incandescent (INC)

Halogens

High Intensity Discharge (HID)

High Pressure Sodium (HPS)

Metal Halide (MH)

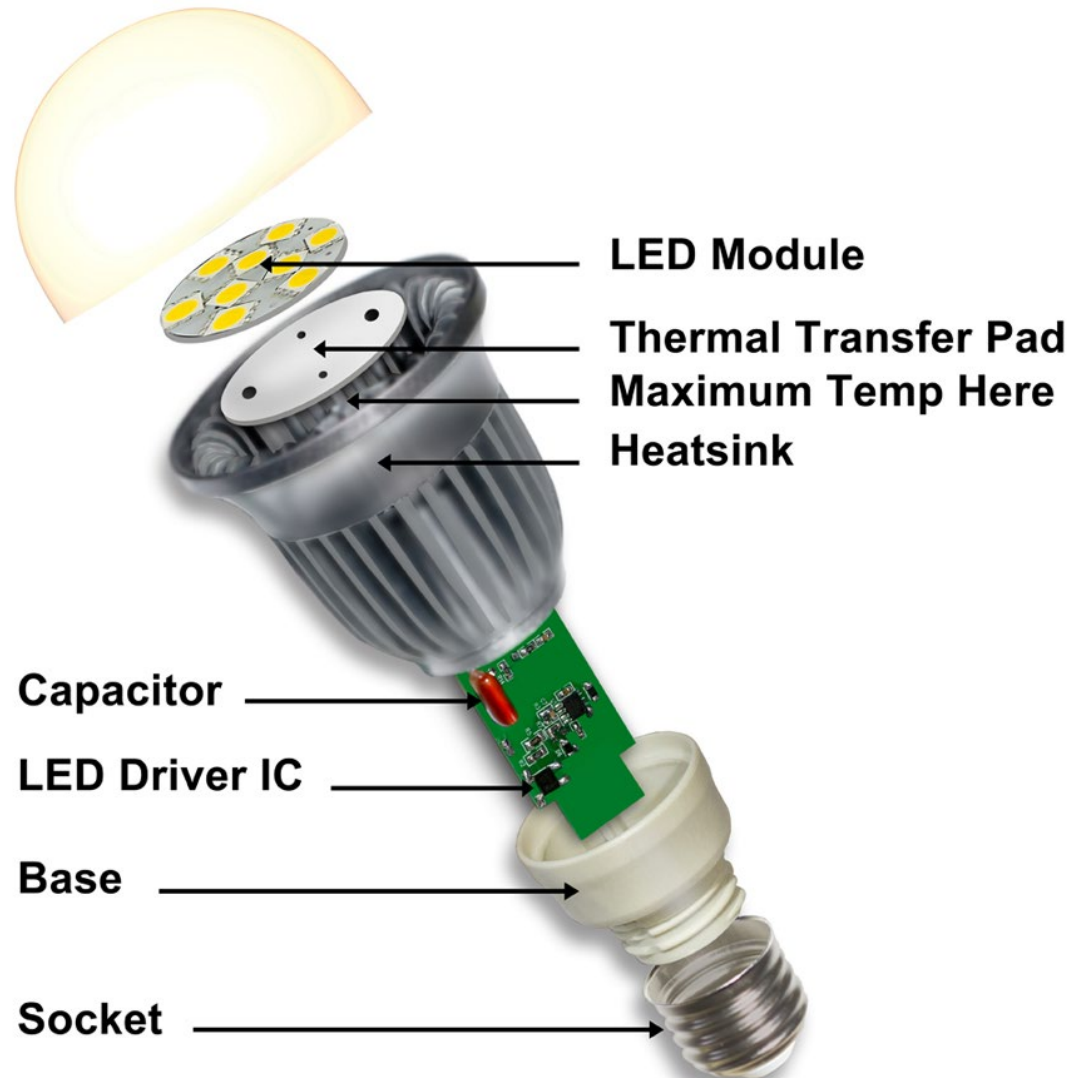
Mercury Vapor (MV)

Low Pressure Sodium (LPS)



Commercial Building Electrical Systems - **Lighting**

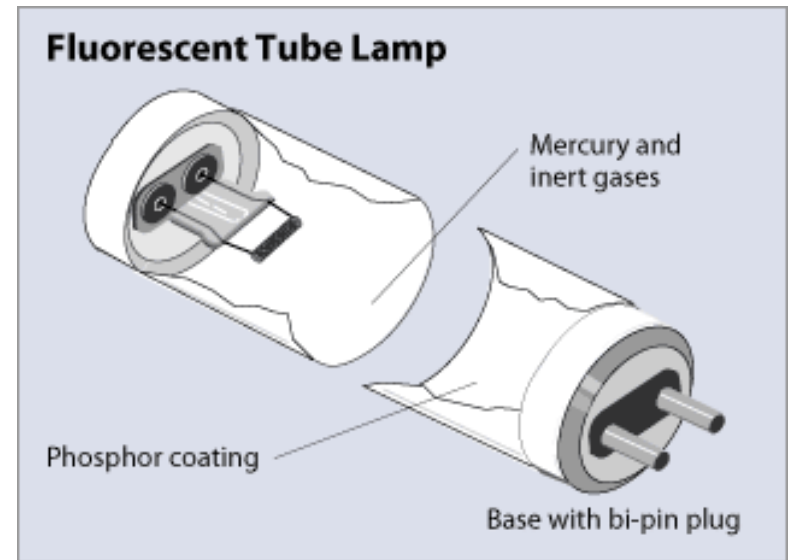
Light Emitting Diode



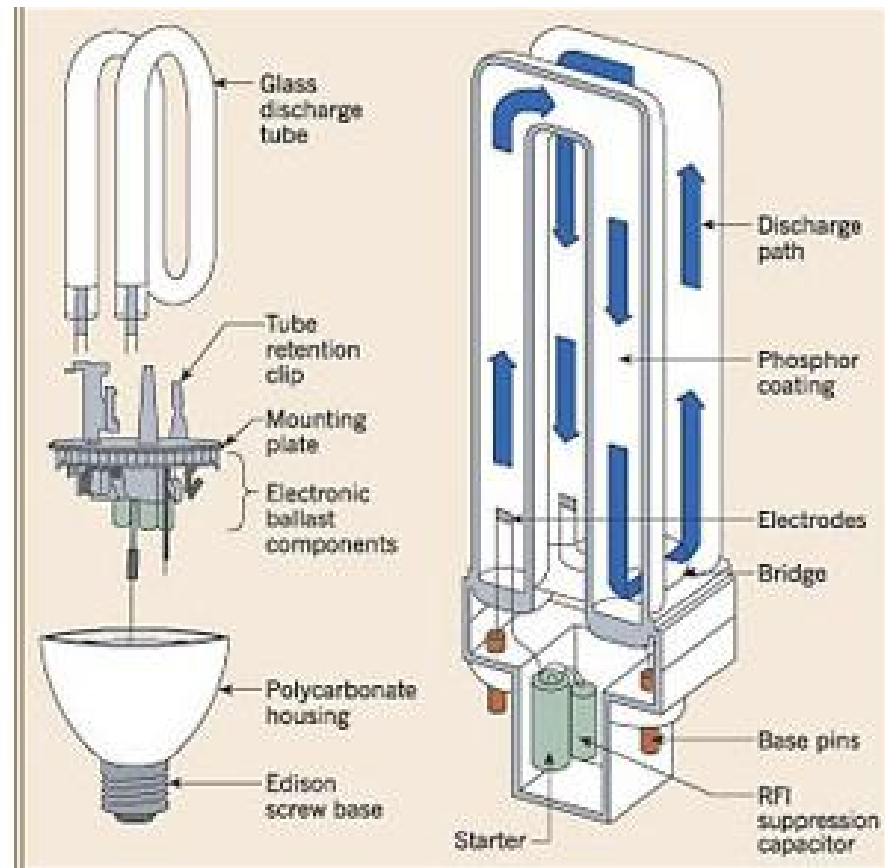
Commercial Building Electrical Systems - Lighting

T5 $5 \times 1/8'' = 5/8''$

T8 $8 \times 1/8'' = 1''$



Commercial Building Electrical Systems - Lighting



Commercial Building Electrical Systems - Lighting

Shape

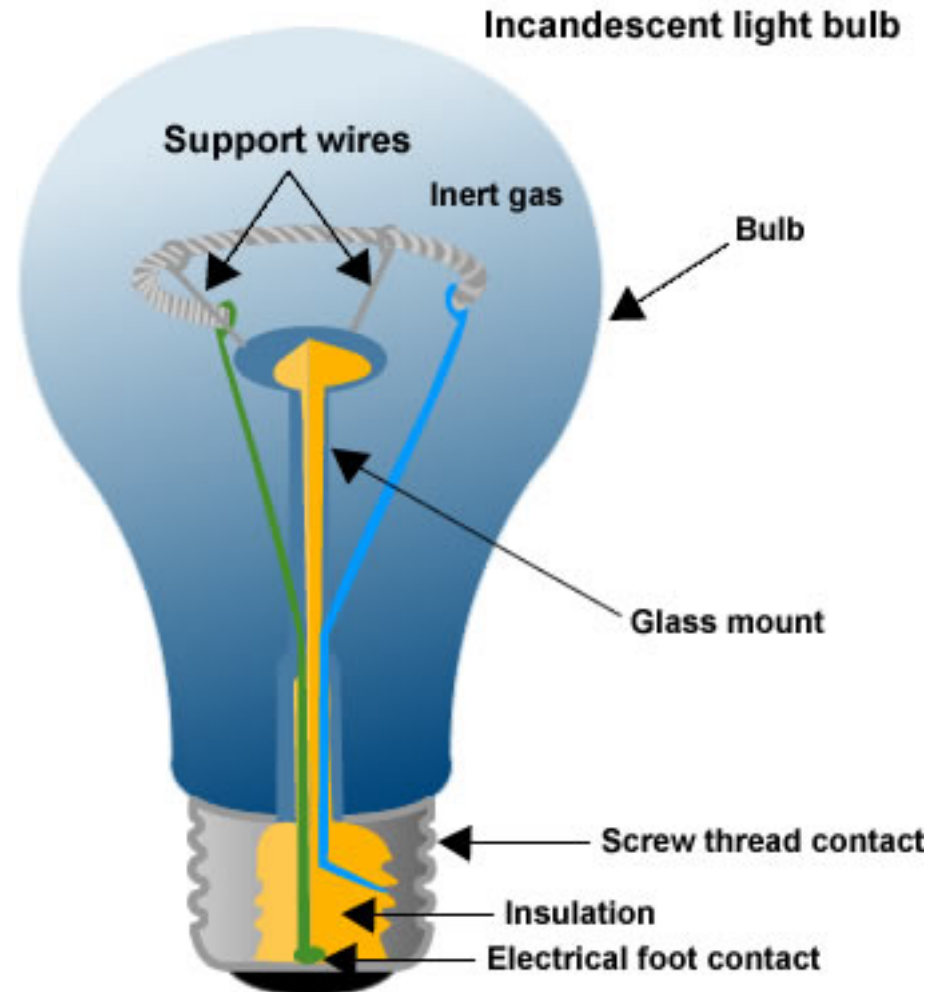
General (A)

Globe (G)

Decorative

Typical

40 W to 100 W



Commercial Building Electrical Systems - Lighting

Low Pressure Discharge

Compact Fluorescent
Fluorescent

Low Pressure Sodium

High Pressure Discharge

Metal Halide

High Pressure Sodium

High Pressure Mercury-Vapor

High-Intensity Discharge (HID)

Mercury-vapor lamps

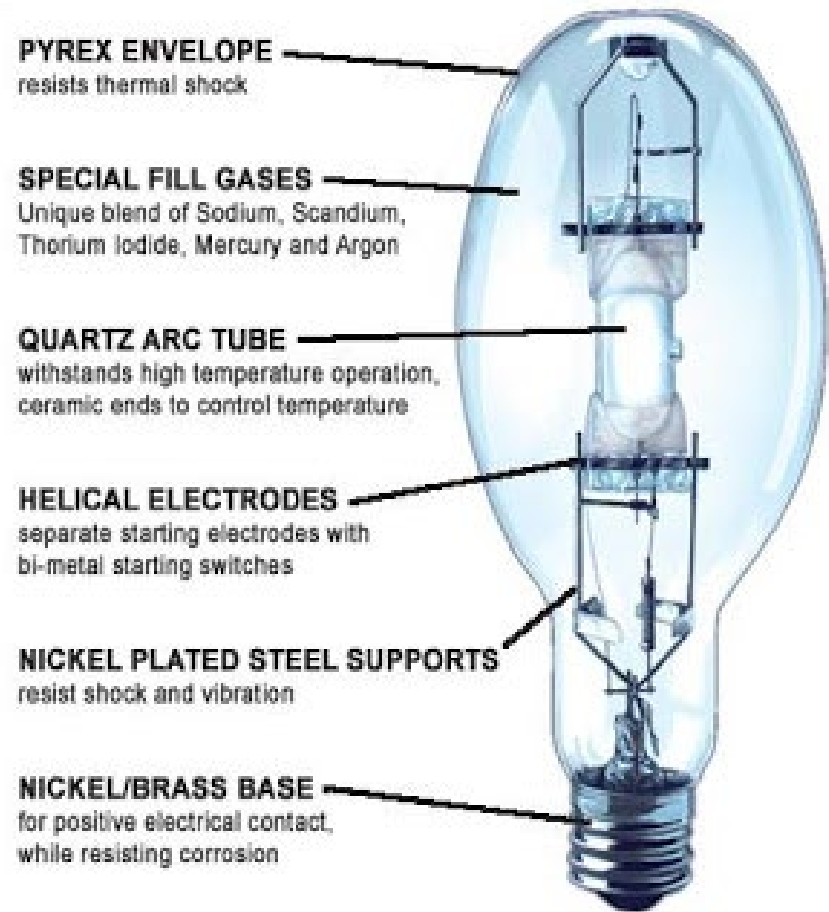
Metal halide lamps

Ceramic discharge metal halide lamps

Sodium vapor lamps

Xenon arc lamps

Ultra-High Performance (UHP)



Commercial Building Electrical Systems - Lighting



**Common 60W
Incandescent Bulb**

uses 60W per bulb
for 800 lumens

1 bulb lasts 1,200 hrs

20 years = 21 bulbs



**Common 14W
CFL Bulb**

uses 14W per bulb
for 800 lumens

1 bulb lasts 10,000 hrs

20 years = 3 CFL bulbs



**Philips 12.5W
AmbientLED Bulb**

uses 12.5W per bulb
for 800 lumens

1 bulb lasts 25,000 hrs

20 years = 1 LED bulb

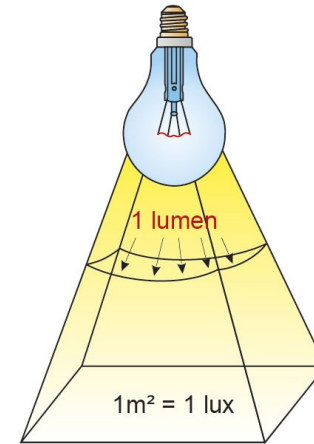
Commercial Building Electrical Systems - **Lighting**

	Incandescent incl. Tungsten Halogen	Fluorescent	Compact Fluorescent Lamp	Metal Halide	High Pressure Sodium
Wattages (Lamp only)	15-15,000	15-219	4-40	175-1000	70-1000
Life (hr)	750-12,000	7,500-24,000	10,000- 20,000	1,500- 15,000	24,000
Efficacy (lm/W) lamp only	15-25	55-100	50-80	80-100	75-140
Lumen maintenance	Fair to excellent	Fair to excellent	Fair	Good	Excellent
Color renditions	Excellent	Good to excellent	Good to excellent	Very good	Fair
Light direction control	Very good to excellent	Fair	Fair	Very good	Very good

Commercial Building Electrical Systems - Lighting

Watts vs. Lumens

- 40W bulb: at least 450 lumens
- 60W bulb: at least 800 lumens
- 75W bulb: at least 1,100 lumens
- 100W bulb: at least 1,500 lumens



Fact: The more lumens of light you get per watt of electricity, the more efficient the bulb is.

A 10W LED can easily outshine a 12W competitor if it converts watts to lumens more efficiently.

Efficiency = lumens / watts

Commercial Building Electrical Systems - Lighting

A Group

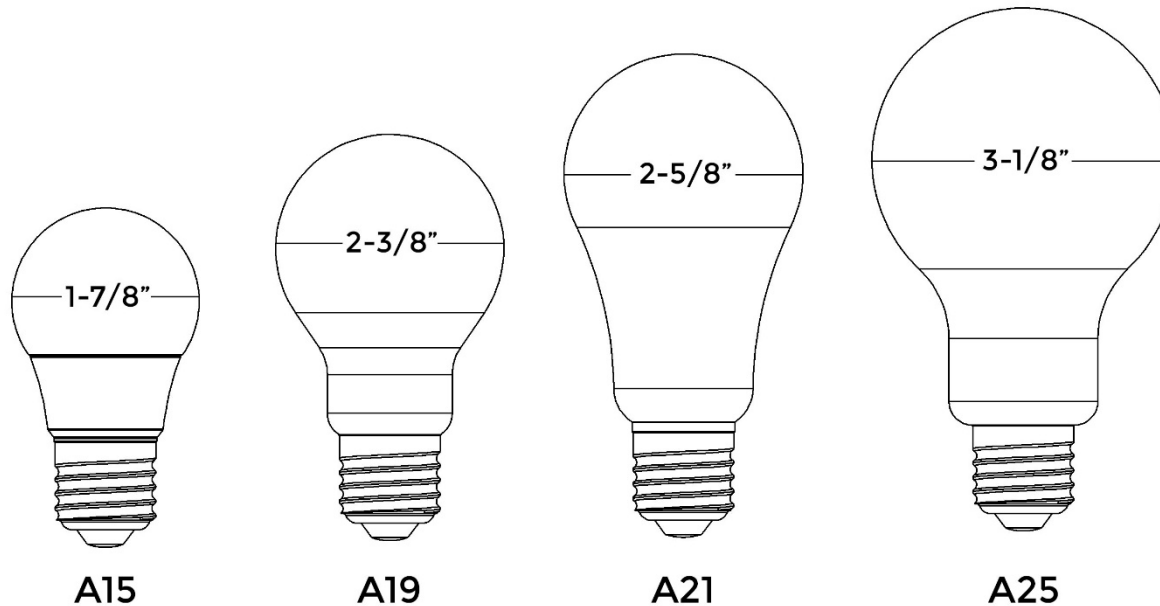


Commercial Building Electrical Systems - Lighting

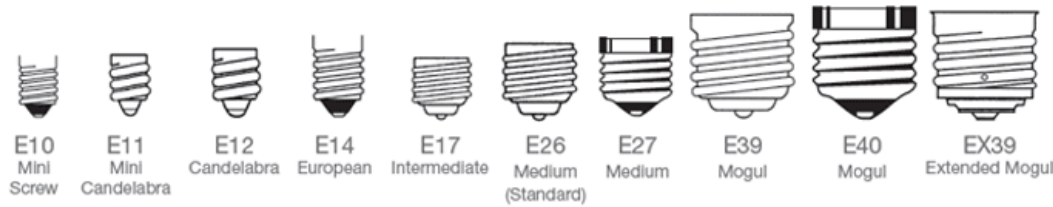
Standard/Arbitrary (A) Bulb

- Most widely used and thought of when it comes to household lighting.
- These bulbs work well for a variety of applications

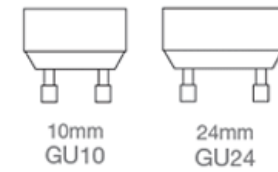
Numbers in each code refer to the bulb's diameter in one-eighths of an inch.



SCREW BASES



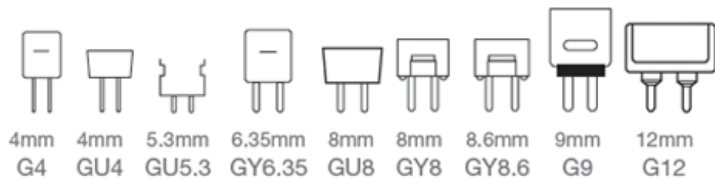
TWIST & LOCK BASES



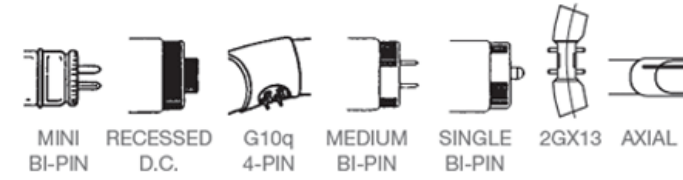
SPECIALTY BASES



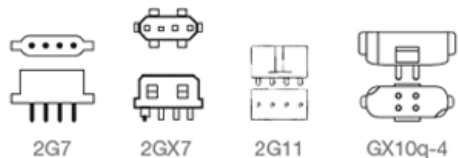
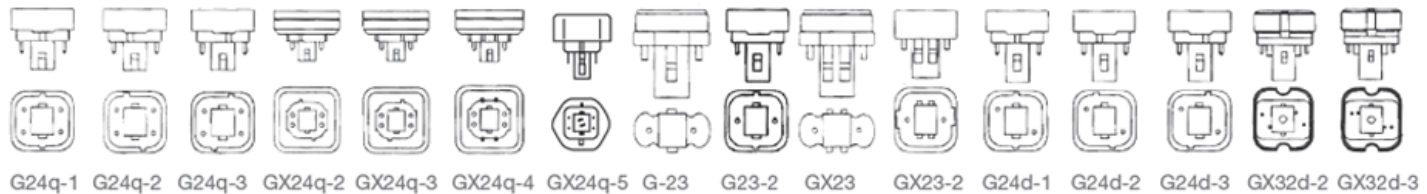
BI PIN BASES



FLUORESCENT PIN BASES

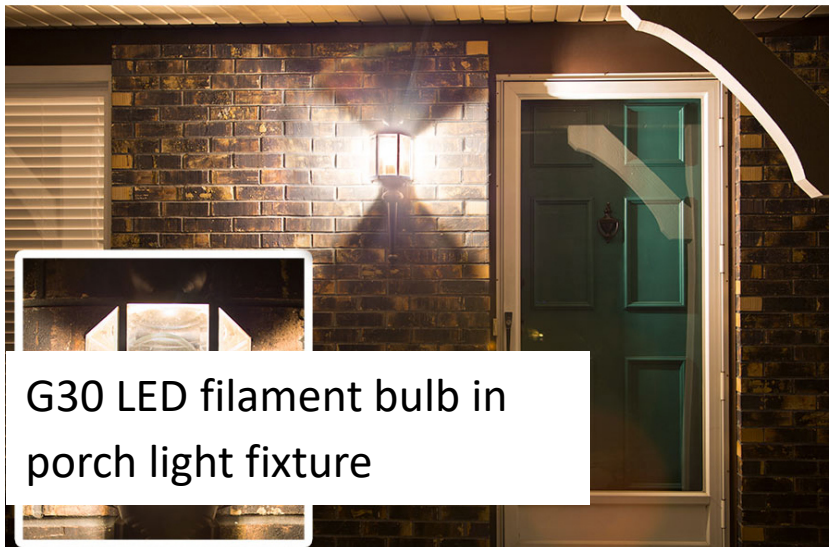


COMPACT FLUORESCENT PLUG IN LAMP BASES



Commercial Building Electrical Systems - Lighting

G Group

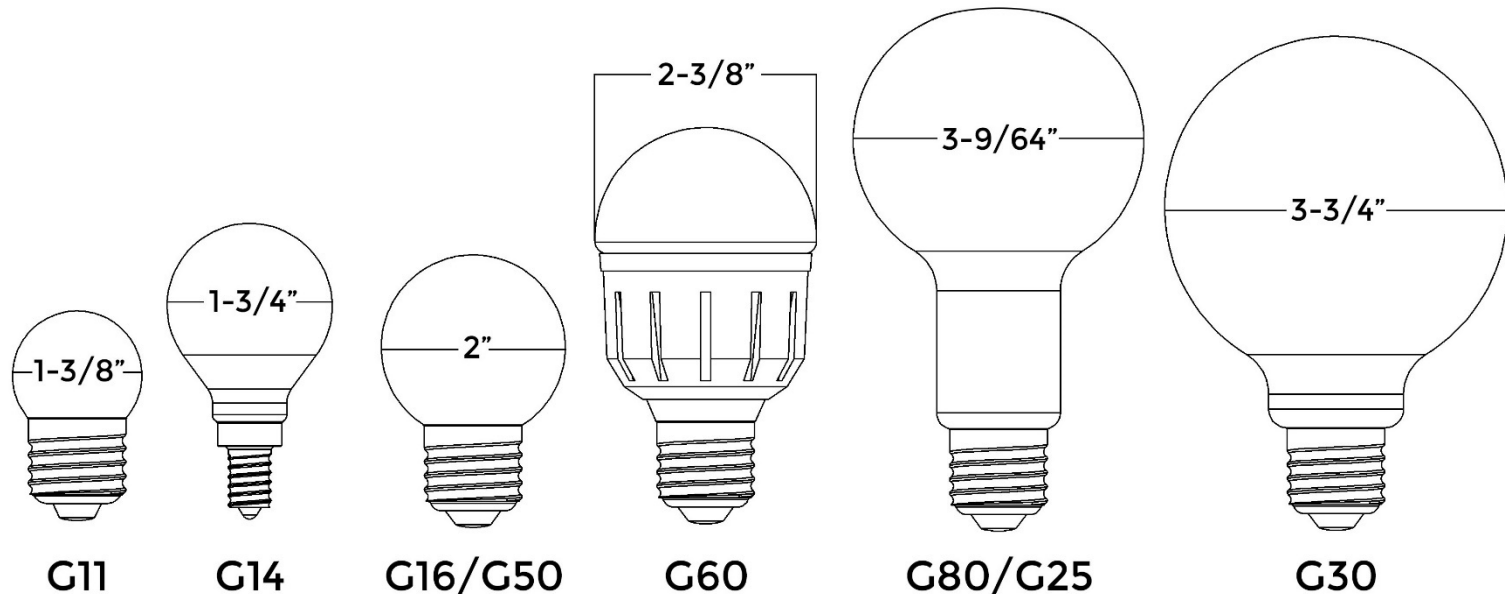


Commercial Building Electrical Systems - Lighting

Globe (G) Bulb

- Full, round shape and are available in various sizes.
- The most common type is the large G30 bulb, which is used in bathroom and makeup vanities.

Depending on the bulb, numbers in each code can refer to the bulb's diameter in one-eighths of an inch or in millimeters.



Commercial Building Electrical Systems - Lighting

B and C Group

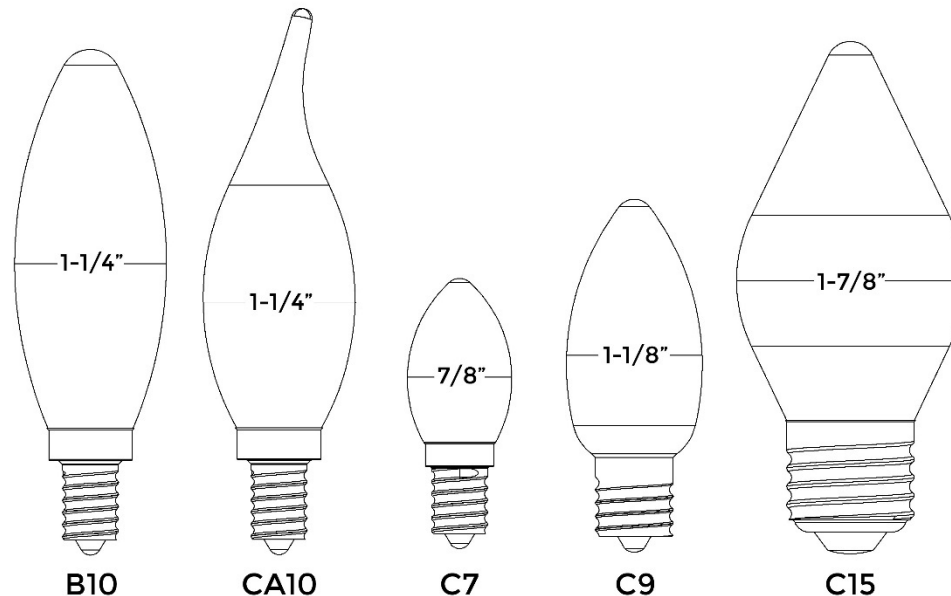


Commercial Building Electrical Systems - Lighting

Conical (C) – Conical Angular (CA) – Blunt-Tip (B) Bulbs

- All of the bulbs in these groups resemble the shape of a candle flame and are often referred to as candle bulbs.
- Chandeliers, night lights, decorative home lighting applications

Numbers in each code refer to the bulb's diameter in one-eighths of an inch.



Commercial Building Electrical Systems - Lighting

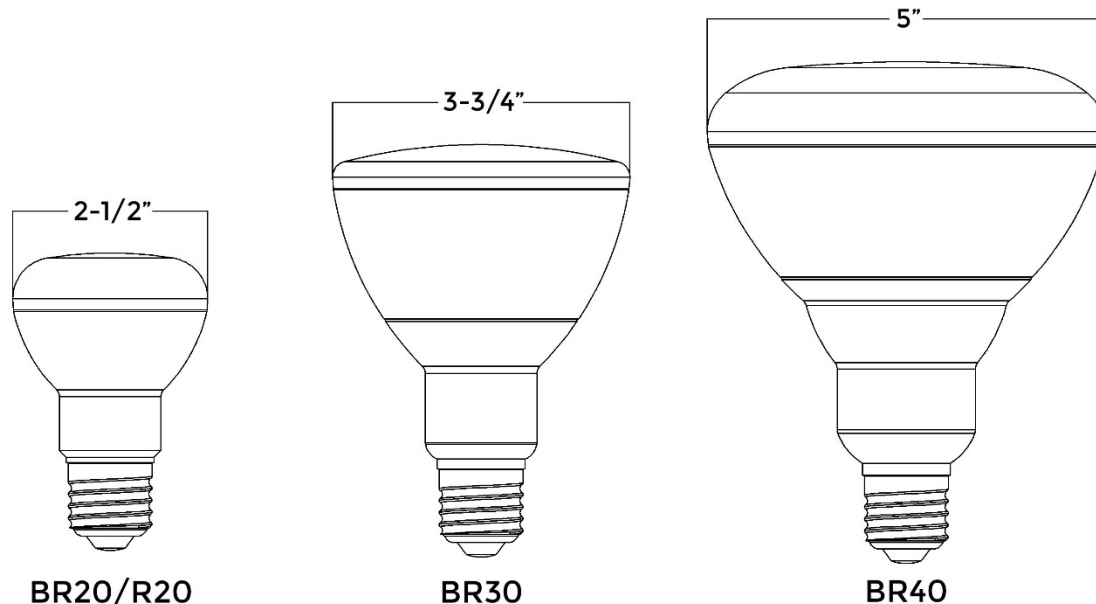
BR Group



Bulged Reflector (BR) Bulb

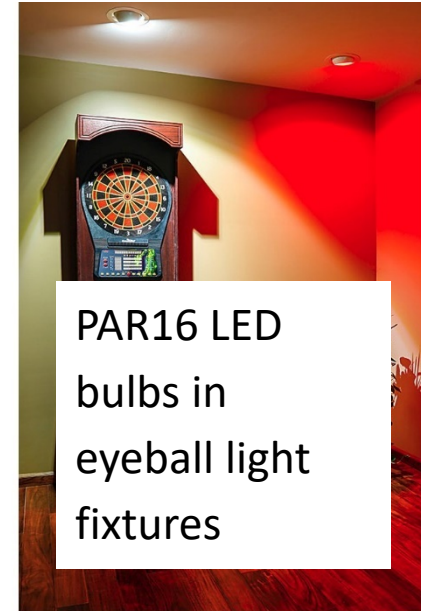
- These bulbs can have a frosted, clear, or patterned dome-shaped lens that diffuses light and provides a gradual fade into nonilluminated areas.

Numbers in each code refer to the bulb's diameter in one-eighths of an inch.



Commercial Building Electrical Systems - Lighting

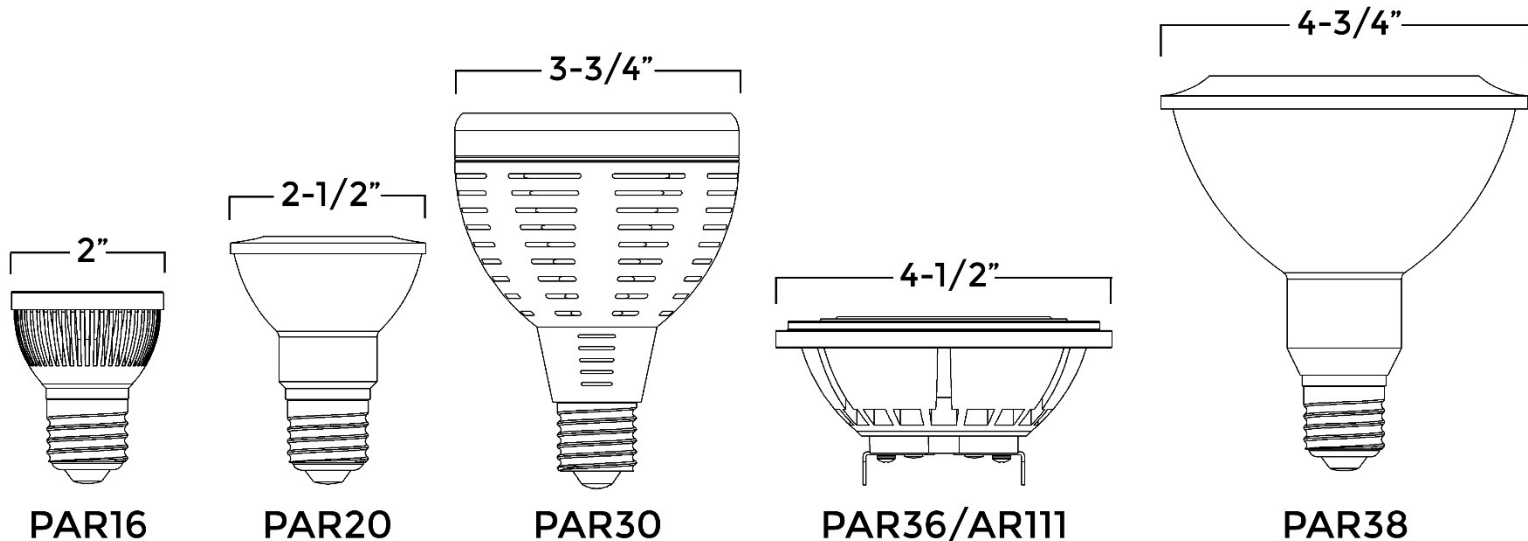
PAR Group



Parabolic Aluminized Reflector (PAR) Bulb

- Traditional incandescent PAR bulbs, a U-shaped reflector is used to maximize brightness and direct light through the front of the bulb in a narrow spot beam or wide flood beam pattern.

Numbers in each code refer to the bulb's diameter in one-eighths of an inch. The numbers after "AR" refer to the bulb's diameter in millimeters.



Commercial Building Electrical Systems - Lighting

MR Group



MR11 LED bulbs in bollard lights



MR16 LED bulbs in ceiling fan fixture



MR11 LED bulbs in path lights



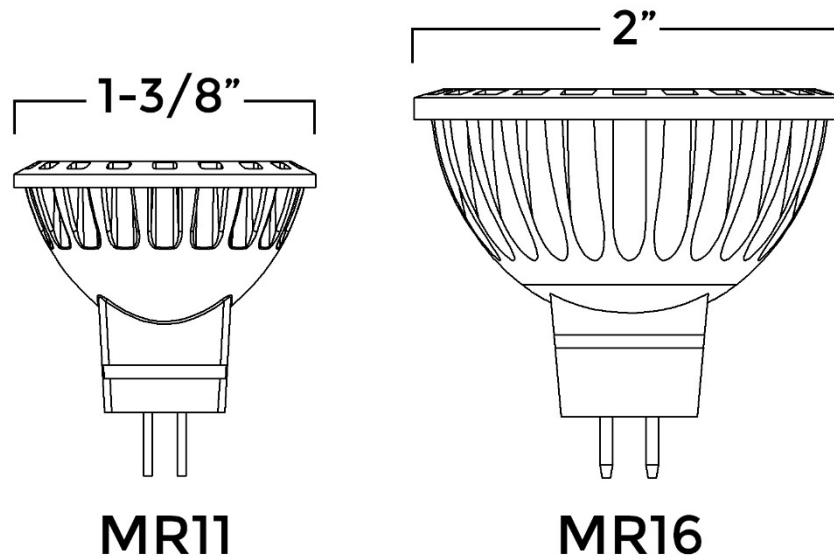
MR16 LED bulbs in kitchen track light fixture



Multifaceted Reflector (MR) Bulb

- The facets create a concentrated beam of light that can be displayed in a narrow spot or wide flood beam pattern.

Numbers in each code refer to the bulb's diameter in one-eighths of an inch.



Commercial Building Electrical Systems - Lighting

T Group

T7 LED bulb in wall sconce



T14 LED bulbs in bathroom vanity light fixture

T8 LED bulbs in garage tube light fixture



T10 LED bulb in freezer

T8 LED bulb in basement tube light fixture

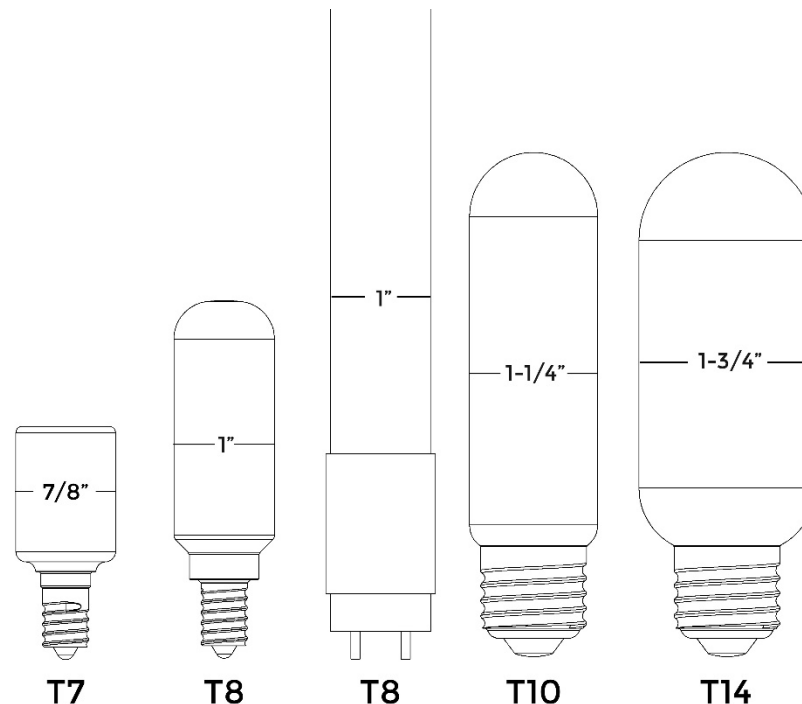


Commercial Building Electrical Systems - Lighting

Tubular (T) Bulb

- Depending on their size, these bulbs can be used in applications ranging from chandeliers, wall sconces, and pendant lights to basement and garage light fixtures.

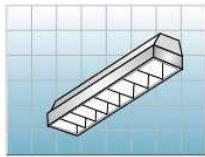
Numbers in each code refer to the bulb's diameter in one-eighths of an inch.



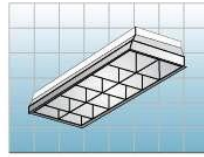
Commercial Building Electrical Systems - Lighting



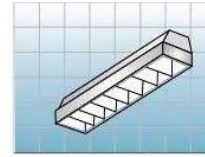
Lensed Fluorescent Troffer



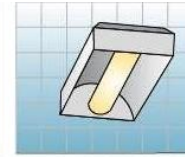
Parabolic Louver Fluorescent Troffer, 1x4 Baffle



Parabolic Louver Fluorescent Troffer, 2x4 Louver



Parabolic Louver Fluorescent Troffer for Critical VDT Applications



Recessed "Indirect" Luminaire



Open HID High-bay (Metal Reflector) Luminaire



Recessed Round Downlight



Recessed Square Downlight



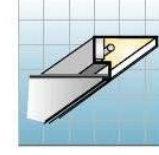
Recessed Linear Wall-washer



Chalkboard or Whiteboard Luminaire



Recessed Round Wall-washers



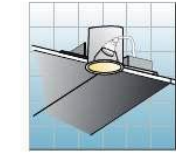
Recessed Wall Slots



Decorative Wall Sconce



Recessed Accent Light (MR-16)



Recessed Accent Light (MH PAR)



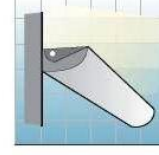
Track Lighting (Incandescent)



Track Lighting (Fluorescent)



Track Lighting (Metal Halide)



Wall-mounted Uplighting



Decorative Direct-Indirect Pendant



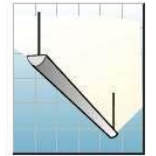
Task Lighting, Fixed and Furniture Integrated



Portable Task Lighting



Decorative Pendant Downward Light



Suspended Linear Fluorescent Luminaire



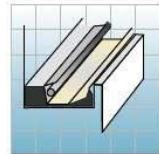
Decorative Indirect Pendants



Decorative Luminaire, Pendant



Decorative Luminaire, Sconce



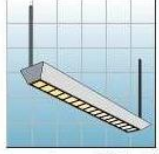
Cove-mounted Uplighting



Portable Torchiere Uplight



Open HID High-bay Luminaire Glass or Plastic Reflector



Suspended Direct-Indirect Fluorescent Luminaire (mostly up)



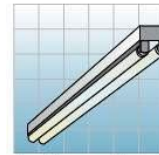
Suspended Direct-Indirect Fluorescent Luminaire (mostly down)



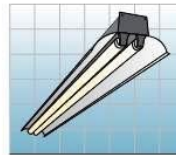
Lensed CF "Low-bay" Luminaire



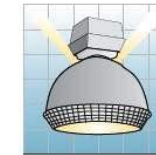
Functional Wall Sconce



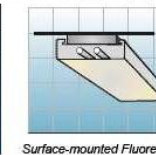
Open Fluorescent Luminaire, Striplight



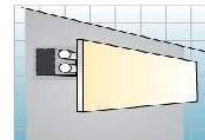
Open Fluorescent Luminaire, Refl. Industrial



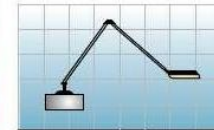
Lensed HID "Low-bay" Luminaire



Surface-mounted Fluorescent "Wraparound"



Wall-mounted Valance



Typical Compact Fluorescent Task Light

Commercial Building Electrical Systems - Lighting

Surface

Wall

Ceiling

Recessed

Suspended

Lay-In

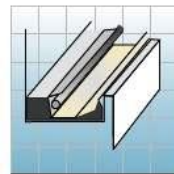
Under-Cabinet

Cove

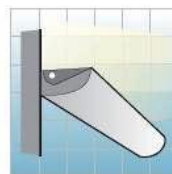
Track



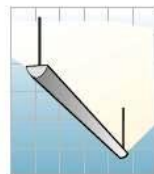
Commercial Building Electrical Systems - Lighting



Cove-mounted Uplighting



Wall-mounted Uplighting



Suspended Linear Fluorescent Luminaire



Recessed Round Downlight



Open HID High-bay (Metal Reflector) Luminaire



Recessed Round Wall-washers



Decorative Pendant Downward Light



Portable Task Lighting



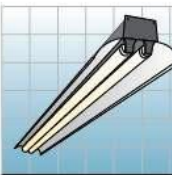
Track Lighting (Metal Halide)



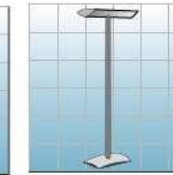
Track Lighting (Incandescent)



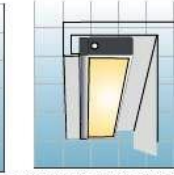
Functional Wall Sconce



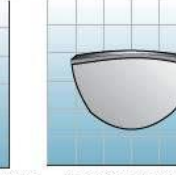
Open Fluorescent Luminaire, Ref. Industrial



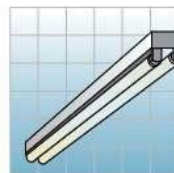
Portable Torchiere Uplight



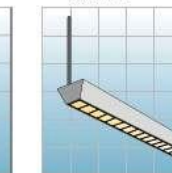
Task Lighting, Fixed and Furniture Integrated



Decorative Wall Sconce



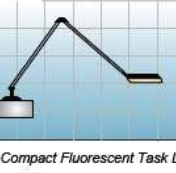
Open Fluorescent Luminaire, Striplight



Suspended Direct-Indirect Fluorescent Luminaire (mostly up)



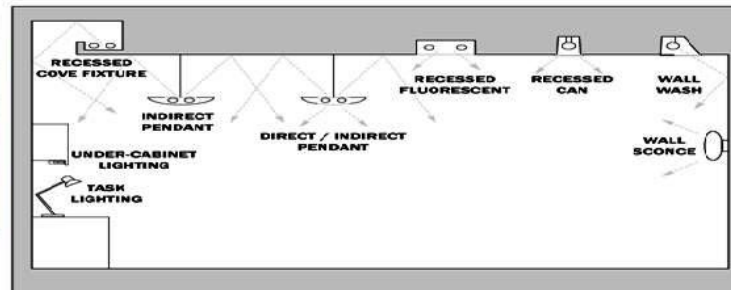
Open HID High-bay Luminaire, Glass or Plastic Reflector



Typical Compact Fluorescent Task Light















LED Exit Sign



Commercial Building Electrical Systems - Lighting

LIGHTING SYMBOLS:

ALL SYMBOLS MAY NOT APPLY TO THIS PROJECT.

	• 1x4 LED LIGHT.	\$	• SINGLE POLE TOGGLE SWITCH MOUNTED AT 48" A.F.F. TO CENTER, UNO. HUBBELL #1221W, 20A, 120/277V.
	• 1X4 NIGHT LED LIGHT.		
	• 2x4 LED LIGHT.	\$D	• SINGLE POLE DIMMER SWITCH MOUNTED AT 48" A.F.F. TO CENTER, UNO. LEVITON #81000-W, 20A, 120V, 1000W, UNO.
	• 2X4 NIGHT LED LIGHT.		
	• 8ft" LINEAR LED NIGHT LIGHT.	\$3	• THREE WAY TOGGLE SWITCH MOUNTED AT 48" A.F.F. TO CENTER, UNO. HUBBELL #1223W, 20A, 120/277V
	• 4ft" LINEAR NIGHT LED LIGHT.		
	• 8ft" LINEAR LED LIGHT.	△	• HORN AND SPEAKER - REFER TO E2 & ETD SYMBOLS LISTS FOR FURTHER INFORMATION.
	• 4ft" LINEAR LED LIGHT.	NL	• NIGHT LIGHT WIRED TO BE UNSWITCHED FIXTURE.
	• WALL MOUNTED LIGHTING.	EM	• EMERGENCY WIRED TO BE UNSWITCHED FIXTURE, UNO.
	• RECESSED LED DOWN LIGHT.	\$M	• MOTION SENSOR WALL SWITCH-MAESTRO MODEL #MS-VPS6M2-DV-WH MOUNTED AT 48" A.F.F. TO CENTER OR AS NOTED.
	• EXTERIOR WALL MOUNTED FIXTURE.	Ⓜ	• CEILING MOTION SENSOR - SENSOR SWITCH MODEL #CMR-PDT9-W, LINE VOLTAGE
	• EXIT SIGNS (PENDANT MOUNTED)	□	• 2x2 LED LIGHT
	• EXIT SIGNS (WALL / BULKHEAD MOUNTED)	◼	• 2x2 NIGHT LED LIGHT
	• CEILING OR WALL 2-HEAD EMERGENCY FIXTURE		

Commercial Building Electrical Systems - Lighting

ELECTRICAL GENERAL NOTES:











1. ALL LED AND/OR FLUORESCENT LAMPS NOT INCLUDED WITH FIXTURES ARE FURNISHED BY THE GENERAL CONTRACTOR THROUGH GRAYBAR.
2. PROVIDE FIXTURE SAFETY CHAINS WHERE REQUIRED.
3. ALL LAY-IN FIXTURES SHALL BE FURNISHED WITH "FIXTURE SUPPORT CLIPS" PER NEC SECTION 410.
4. OFFSET LIGHT FIXTURES AS NEEDED TO CLEAR STRUCTURAL BRIDGING ACROSS STORE.
5. ALL LIGHT SWITCHES SHALL BE LOCATED AS CLOSE AS POSSIBLE TO ADJACENT DOOR FRAMES AT A.D.A. HEIGHTS. COORDINATE LOCATIONS WITH ALL FIXTURES/EQUIPMENT.
6. ALL LIGHTING SHALL BE CIRCUITED AS SHOWN TO ALLOW MULTI-LEVEL SWITCHING FOR ENERGY MANAGEMENT CONTROL, SEE SHEET EM2.
7. CONDUIT AND PIPING SHALL BE ROUTED PARALLEL WITH WALLS IN MAIN SALES AND RECEIVING. RUNS SHALL BE GROUPED TOGETHER WHERE PRACTICAL & HOLD AS HIGH AS POSSIBLE AND SUSPEND TIGHT TO THE TOP CORD OF JOIST.
8. PROVIDE ZERO DEGREE BALLASTS FOR FIXTURES LOCATED OUTSIDE.
9. ALL ELECTRICAL CONDUITS/WIRING MUST RUN OVERHEAD (UNO) UNLESS REQUIRED TO RUN UNDERGROUND. ANY EXCEPTIONS MUST BE APPROVED BY PETSMAST CONSTRUCTION MANAGER.
10. SNAP SWITCHES THAT ARE GROUPED OR GANGED IN AN ENCLOSURE WITH OTHER SNAP SWITCHES OR SIMILAR DEVICES THAT THE VOLTAGE BETWEEN THE ADJACENT DEVICES EXCEEDS 300 VOLTS, MUST HAVE A PERMANENT BARRIER INSTALLED BETWEEN THE ADJACENT DEVICES PER THE N.E.C.
11. GENERAL CONTRACTORS SHALL CONTACT F.E. MORAN INC. ALARM FOR NATIONAL ACCOUNT BID PRICING ON FIRE AND BURGLAR ALARM SYSTEMS - SEE SPECIFICATIONS.
12. PROVIDE (2) PULL STRINGS IN EACH EMPTY CONDUIT FOR DATA & PHONE BOXES.
13. REFER TO "EM" SHEETS FOR SENSOR MOUNTING.
14. SEE ARCHITECTURAL ELEVATION DRAWINGS FOR EXACT PLACEMENT OF OUTLETS.
15. E.C. TO VERIFY EXACT CONDUIT SIZE PRIOR TO ROUGH-IN OF BOXES FOR PHONE AND DATA.
16. WHERE CONDUITS, DEVICE BOXES, ETC... ARE SURFACE MOUNTED, SEAL ALL PENETRATIONS WITH SIKA, SIKAFLEX 1A POLYURETHANE SEALANT.
17. NOT USED.
18. SEE SHEET #E0.1 FOR ONE LINE DIAGRAM KEYED NOTES.
19. PROVIDE CONDUIT FOR LOW VOLTAGE WIRING WHEN REQUIRED BY CODE. TERMINATE PHONE & DATA WIRING AT PETSMAST SERVER LOCATION.
20. ALARM PACKAGE: THE ALARM PACKAGE WILL REQUIRE AN AVERAGE OF 15 CONDUIT DROPS WITH BOXES, AND 35 BACK BOXES (ONLY) FOR CEILING MOUNTED DEVICES - THIS IS SUBJECT TO CHANGE BASED ON LOCAL REQUIREMENTS AND FINAL STORE DESIGN. ALL CEILING MOUNTED ALARM & INTRUSION DEVICES WILL REQUIRE A BACK BOX PROVIDED BY THE EC. ANY QUESTIONS, CONTACT NATIONAL ACCOUNT VENDOR - F.E. MORAN, INC. ALARM. (866) 472-6450 - SEE ARCHITECTURAL DRAWING F2.0 PRODUCT SCHEDULE.

Commercial Building Electrical Systems - Lighting

LIGHT FIXTURE SCHEDULE

TYPE	MANUFAC.	CATALOG #	VOLT.	LAMP TYPE	WATTS	REMARKS
A08	COOPER	CORELITE RCL-WL-2L35-1D-UNV-SU-JB-8STD-W	MVOLT	LED	84	6.4" WD X 81" LONG LED LINEAR LIGHT FIXTURE, THREE-SIDED FROSTED PRISMATIC LENS. SEE NOTE 2,4.
A32	COOPER	CORELITE RCL-WL-2L35-1D-UNV-SU-JB-32STD-W	MVOLT	LED	336	6.4" WD X 321" LONG LED LINEAR LIGHT FIXTURE, THREE-SIDED FROSTED PRISMATIC LENS. SEE NOTE 2,4.
A52	COOPER	CORELITE RCL-WL-2L35-1D-UNV-SU-JB-52STD-W	MVOLT	LED	546	6.4" WD X 521" LONG LED LINEAR LIGHT FIXTURE, THREE-SIDED FROSTED PRISMATIC LENS. SEE NOTE 2,4.
A84	COOPER	CORELITE RCL-WL-2L35-1D-UNV-SU-JB-84STD-W	MVOLT	LED	882	6.4" WD X 841" LONG LED LINEAR LIGHT FIXTURE, THREE-SIDED FROSTED PRISMATIC LENS. SEE NOTE 2,4.

LIGHT FIXTURE LEGEND & SCHEDULE

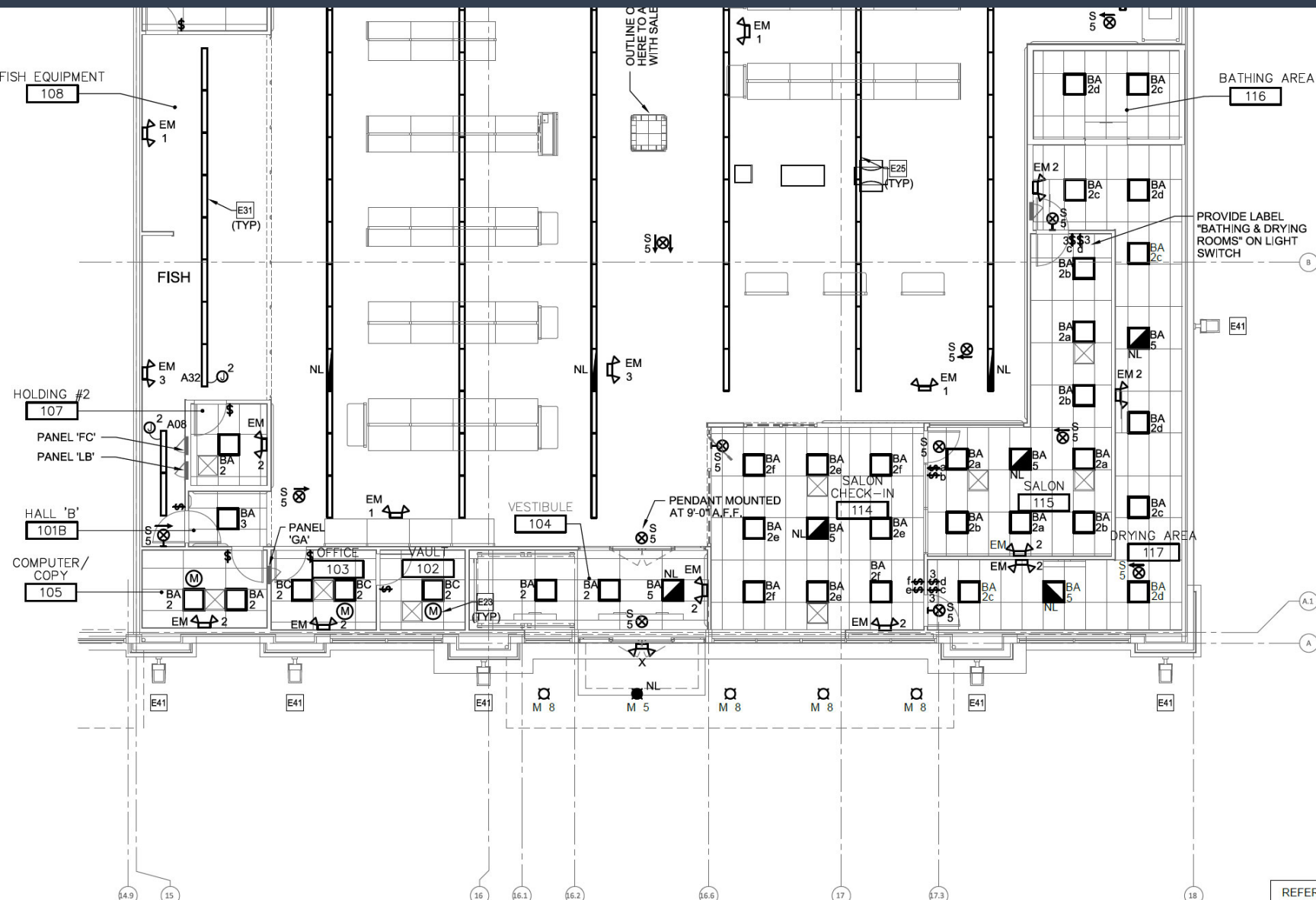
				
2x4 FLUORESCENT - LAY IN MFR: HE, WILLIAMS, INC. MODEL#: LPT-24-428-SAIO-EB4-05-UNV LAMP: (4) F028/B41/ECO LAMPS: (28 W) NOTES: FINISH: WHITE -LENS-SMOOTH SIDE DOWN -GHEL LOW POWER FACTOR BALLAST	2x2 FLUORESCENT - LAY IN MFR: HE, WILLIAMS, INC. MODEL#: LPT-22-232U-SAIO-EB2-UNV LAMP: (2) F032/B41 U6 ECO LAMPS: (32 W) NOTES: FINISH: WHT (BLK IN DINING) -LENS-SMOOTH SIDE DOWN -GHEL LOW POWER FACTOR BALLAST	RED PENDANT MFR: NUVO LIGHTING MODEL#: 60-1296 STD RED FINISH GU24 LAMP: (1) 13 W GU24 BASE CFL LAMPS: (13 W) FINISH: RED (INSIDE & OUT) NOTE: DO NOT PAINT WIRING	WHITE PENDANT MFR: NUVO LIGHTING MODEL#: 60-1297 STD WHITE FINISH GU24 LAMP: (1) 13 W GU24 BASE CFL LAMPS: (13 W) FINISH: WHITE (INSIDE & OUT) NOTE: DO NOT PAINT WIRING	MENU BOARD TRACK LIGHTING MFR: JUNO TRAC-MASTER MODEL#: T6 WH (6'-0", TRACK), T38 WH (END FEED), TCLF11 WH CURRENT LIMITER, T253LED-3K-NFL-WH(HEAD), TCL11WH CURRENT LIMITER BREAKER (1A, 120V) LAMP: 22 WATT LED HEAD 4K(QTY.5, HEADS)
				
EXIT SIGN MFR: TBD MODEL#: MATCH EXISTING NOTES: MATCH EXISTING AIRPORT EXIT SIGN	4x4 FLUORESCENT - COOLER MFR: PER COOLER MANUFACTURE MODEL#: PER COOLER MANUFACTURE LAMP: PER COOLER MANUFACTURE LAMPS: PER COOLER MANUFACTURE FINISH: PER COOLER MANUFACTURE NOTE:	RED PENDANT W/ SHATTER RESISTANT BULB MFR: NUVO LIGHTING MODEL#: 60-1296 STD RED FINISH GU24 LAMP: (1) 13W GU24 BASE CFL W/SHT.RESIST LAMPS: (13 W) SATCO 58203/TF FINISH: RED (INSIDE & OUT) NOTE: DO NOT PAINT WIRING	WHITE PENDANT W/ SHATTER RESISTANT BULB MFR: NUVO LIGHTING MODEL#: 60-1297 STD WHITE FINISH GU24 LAMP: (1) 13W GU24 BASE CFL W/SHT.RESIST. LAMPS: (13 W) SATCO 58203/TF FINISH: WHITE (INSIDE & OUT) NOTE: DO NOT PAINT WIRING	EMERGENCY LIGHTS MFR: TBD MFS: MODEL#: MATCH EXISTING MFT: TWIN HEAD EM BATTERY UNIT WHT / BLK POLYCARBONATE HOUSING INTEGRAL BATTERY BACKUP 120 VOLT

NOTE:

- NATIONAL ACCOUNT FOR LIGHTING: LIGHTING BY DESIGN, ATTN: BYRON GORDON, PH: (800-426-3398), FX: (800-376-0816), EMAIL: BGORDON@INDUSTRIALLIGHTING.COM
- RESTROOMS TO HAVE OCCUPANCY OR VAGANCY SENSOR.
- ALL FIXTURES IN KITCHEN, DISH WASH AREA & FOOD SERVICE AREA TO BE LENSED OR HAVE SHATTER PROOF LAMPS. LAMPS TO BE SHATTER PROOFED WITH THE FOLLOWING: NORMAN LAMPS, INC., (800) 942-8020, TUFF-COAT
- ORDER AN EXTRA CASE OF BULBS PER FIXTURE, BUYER TO ADD TO ORDER SHEET
- GC SHALL PROVIDE LIGHT FIXTURES & MUST ORDER THROUGH FG VENDOR

W	LITHONIA	ELM1272-R0-TD	277	LED	-	EMERGENCY BATTERY UNIT W/O LAMP HEADS TO PROVIDE BATTERY POWER FOR EXTERIOR REMOTE HEADS.
X	LITHONIA	ELA-T-6CS-WP-M12	277	(2) 5.4W LAMPS, FURNISHED W/FIXTURE	8	REMOTE LAMP HEADS FOR EXTERIOR EMERGENCY LIGHTING. CONTRACTOR SHALL PROVIDE MANUFACTURER RECOMMENDED WIRE SIZE BETWEEN BATTERY POWER PACK AND REMOTE HEADS FOR VOLTAGE DROP.

- CONTRACTOR SHALL CONTACT LIGHTING DISTRIBUTOR, GRAYBAR ELECTRIC FOR ORDERING INFORMATION. THIS IS A REQUIRED VENDOR, SEE REQUIRED VENDOR LIST ON SHEET F2.0 FOR CONTACT INFORMATION.
- SEE PLAN FOR LENGTH AND QUANTITY OF LINEAR FIXTURES PER ROW. (42-WATTS PER 4-FT LENGTH).
- ELECTRICAL CONTRACTOR TO VERIFY ALL QUANTITIES OF LIGHT FIXTURES PRIOR TO ORDERING FIXTURES.
- FURNISH FIXTURE WITH ALL NECESSARY JOINERS, CONNECTORS, ENDCAPS, ETC FOR A COMPLETE AND CONTINUOUS FIXTURE LENGTH RUN.



FISH EQUIPMENT
108

HOLDING #2
107

PANEL 'FC'
PANEL 'LB'

HALL 'B'
101B

COMPUTER/
COPY
105

OUTLINE C
HERE TO A
WITH SALE

BATHING AREA
116

PROVIDE LABEL
"BATHING & DRYING
ROOMS" ON LIGHT
SWITCH

VESTIBULE
104

PENDANT MOUNTED
AT 9'-0" A.F.F.

SALON
CHECK-IN
114

SALON
115

DRYING AREA
117

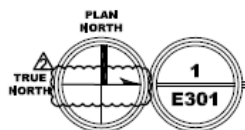
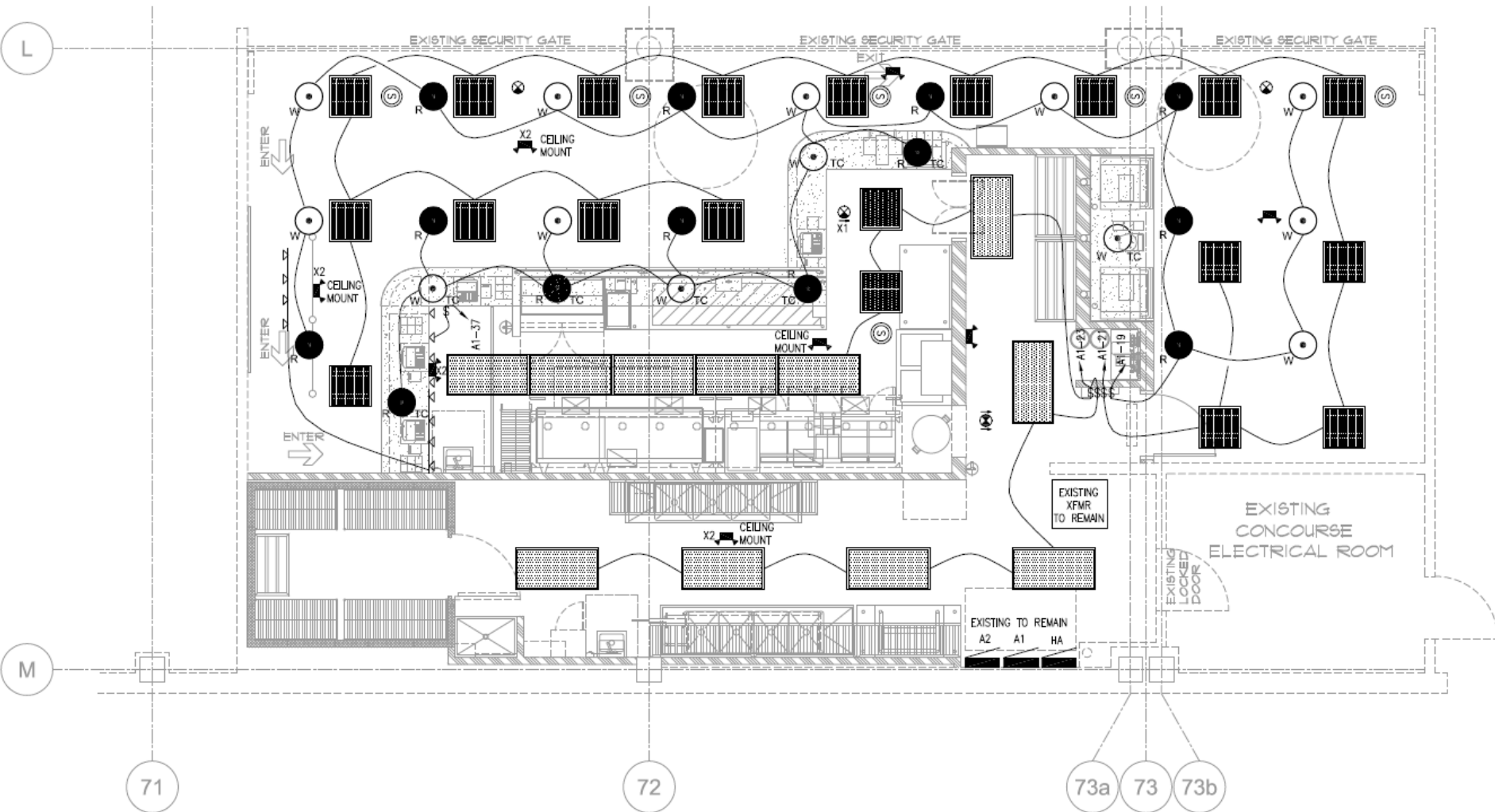
1 LIGHTING FLOOR PLAN
E1.0 SCALE 1/8" = 1'-0"



REFER TO SHEET E0.1 FOR
GENERAL AND KEYED NOTES.

NOTE:
ALL LIGHTING ON THIS DRAWING
IS CIRCUITED TO PANEL HA,
UNLESS OTHERWISE NOTED.

Five Guys Burgers and Fries













ELECTRICAL REFLECTED CEILING PLAN

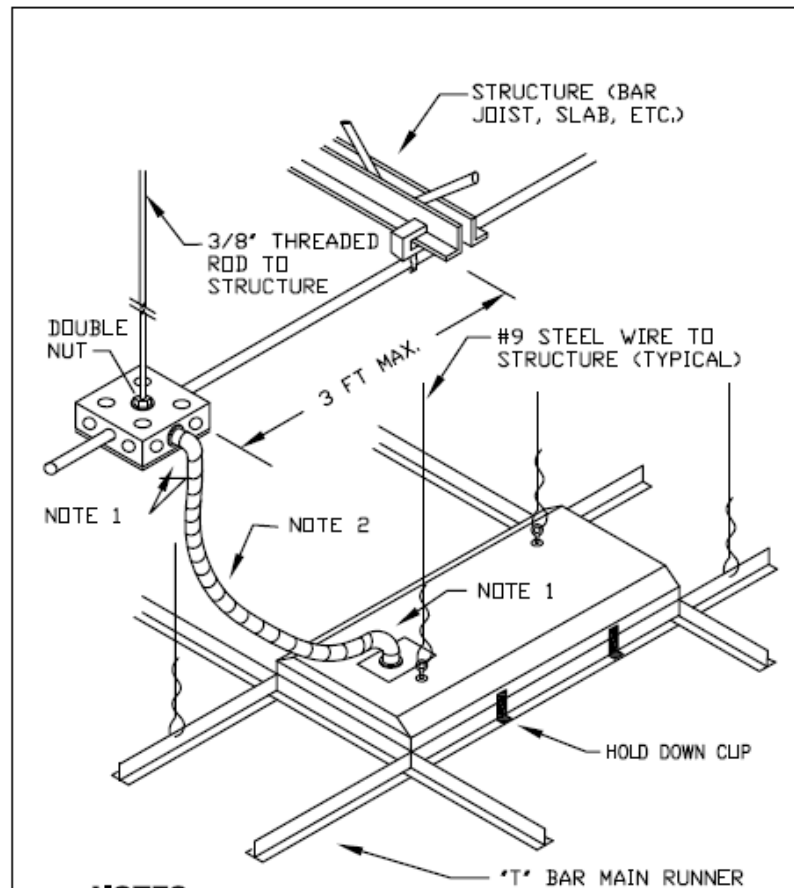
SCALE: 1/4" = 1'-0"

Five Guys Burgers and Fries

LIGHT FIXTURE LEGEND & SCHEDULE

				
<p>2x4 FLUORESCENT - LAYIN MFR: HE, WILLIAMS, INC. MODEL#: LPT-24-428-SAIO-EB4-05-UNV LAMP: (4)F02B/B4/ECO LAMPS: (28 W) FINISH: WHITE NOTES: -LENS-SMOOTH SIDE DOWN -QHEL LOW POWER FACTOR BALLAST</p>	<p>2x2 FLUORESCENT - LAYIN MFR: HE, WILLIAMS INC. MODEL#: LPT-22-232U-SAIO-EB2-UNV LAMP: (2) F032/B4/U6 ECO LAMPS: (32 W), FINISH:WHT (BLK IN DINING) NOTE: -LENS-SMOOTH SIDE DOWN -QHEL LOW POWER FACTOR BALLAST</p>	<p>RED PENDANT MFR: NUVO LIGHTING MODEL#: 60-1296 STD RED FINISH GU24 LAMP: (1)13 W GU24 BASE CFL LAMPS: (13 W) FINISH: RED (INSIDE & OUT) NOTE: DO NOT PAINT WIRING</p>	<p>WHITE PENDANT MANUF: NUVO LIGHTING MODEL#: 60-1297 STD WHITE FINISH GU24 LAMP: (1)13 W GU24 BASE CFL LAMPS: (13 W) FINISH: WHITE (INSIDE & OUT) NOTE: DO NOT PAINT WIRING</p>	<p>MENU BOARD TRACK LIGHTING MFR: JUNO TRAC-MASTER MODEL#: T6 WH (6'-0", TRACK), T38 WH (END FEED), TCLFII WH CURRENT LIMITER, T253LED-3K-NFL-WH(HEAD), TCLIWH CURRENT LIMITER BREAKER (1A, 120W) LAMP: 22 WATT LED HEAD 4K(QTY.5, HEADS)</p>
				
<p>EXIT SIGN MFR: TBD MODEL#: MATCH EXISTING NOTES: MATCH EXISTING AIRPORT EXIT SIGN</p>	<p>1x4 FLUORESCENT - COOLER MFR: PER COOLER MANUFACTURE MODEL#: PER COOLER MANUFACTURE LAMP: PER COOLER MANUFACTURE LAMPS: PER COOLER MANUFACTURE FINISH: PER COOLER MANUFACTURE NOTE:</p>	<p>RED PENDANT W/ SHATTER RESISTANT BULB MANUF: NUVO LIGHTING MODEL#: 60-1296 STD RED FINISH GU24 LAMP: (1)13W GU24 BASE CFL W/SHT.RESIST LAMPS: (13 W) SATCO 58203/TF FINISH: RED (INSIDE & OUT) NOTE: DO NOT PAINT WIRING</p>	<p>WHITE PENDANT W/ SHATTER RESISTANT BULB MANUF: NUVO LIGHTING MODEL#: 60-1297 STD WHITE FINISH GU24 LAMP: (1)13W GU24 BASE CFL W/SHT.RESIST. LAMPS: (13 W) SATCO 58203/TF FINISH: WHITE (INSIDE & OUT) NOTE: DO NOT PAINT WIRING</p>	<p>EMERGENCY LIGHTS MFR: TBD MFS: MODEL#: MATCH EXISTING MFT: TWIN HEAD EM BATTERY UNIT WHT / BLK POLYCARBONATE HOUSING INTEGRAL BATTERY BACKUP 120 VOLT</p>
<p>NOTE:</p> <ul style="list-style-type: none"> NATIONAL ACCOUNT FOR LIGHTING: LIGHTING BY DESIGN, ATTN: BYRON GORDON, PH: (800-426-3398), FX: (800-376-0816), EMAIL: BGORDON@INDUSTRIALLIGHTING.COM RESTROOMS TO HAVE OCCUPANCY OR VAGANCY SENSOR. ALL FIXTURES IN KITCHEN, DISH WASH AREA & FOOD SERVICE AREA TO BE LENSED OR HAVE SHATTER PROOF LAMPS. LAMPS TO BE SHATTER PROOFED WITH THE FOLLOWING: NORMAN LAMPS, INC., (800) 942-8020, TUFF-COAT ORDER AN EXTRA CASE OF BULBS PER FIXTURE, BUYER TO ADD TO ORDER SHEET GC SHALL PROVIDE LIGHT FIXTURES & MUST ORDER THROUGH FG VENDOR 				

Five Guys Burgers and Fries



NOTES:

1. USE 90 DEGREE CONNECTORS.
2. INSTALL FLEXIBLE CONDUIT WITH GROUND WIRE AND NOT TO EXCEED 6 FEET IN LENGTH.
3. SUPPORT FIXTURE INDEPENDANT OF CEILING GRID.



TYPICAL LAY-IN FLUORESCENT FIXTURE

SCALE: N.T.S.

Electrical Energy Costs

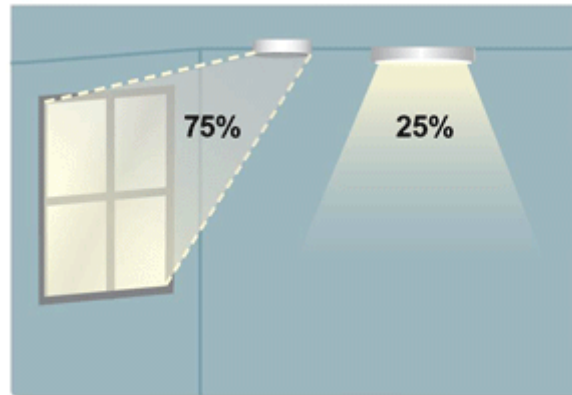
Commercial Building

1. Lighting
2. Cooling and Heating

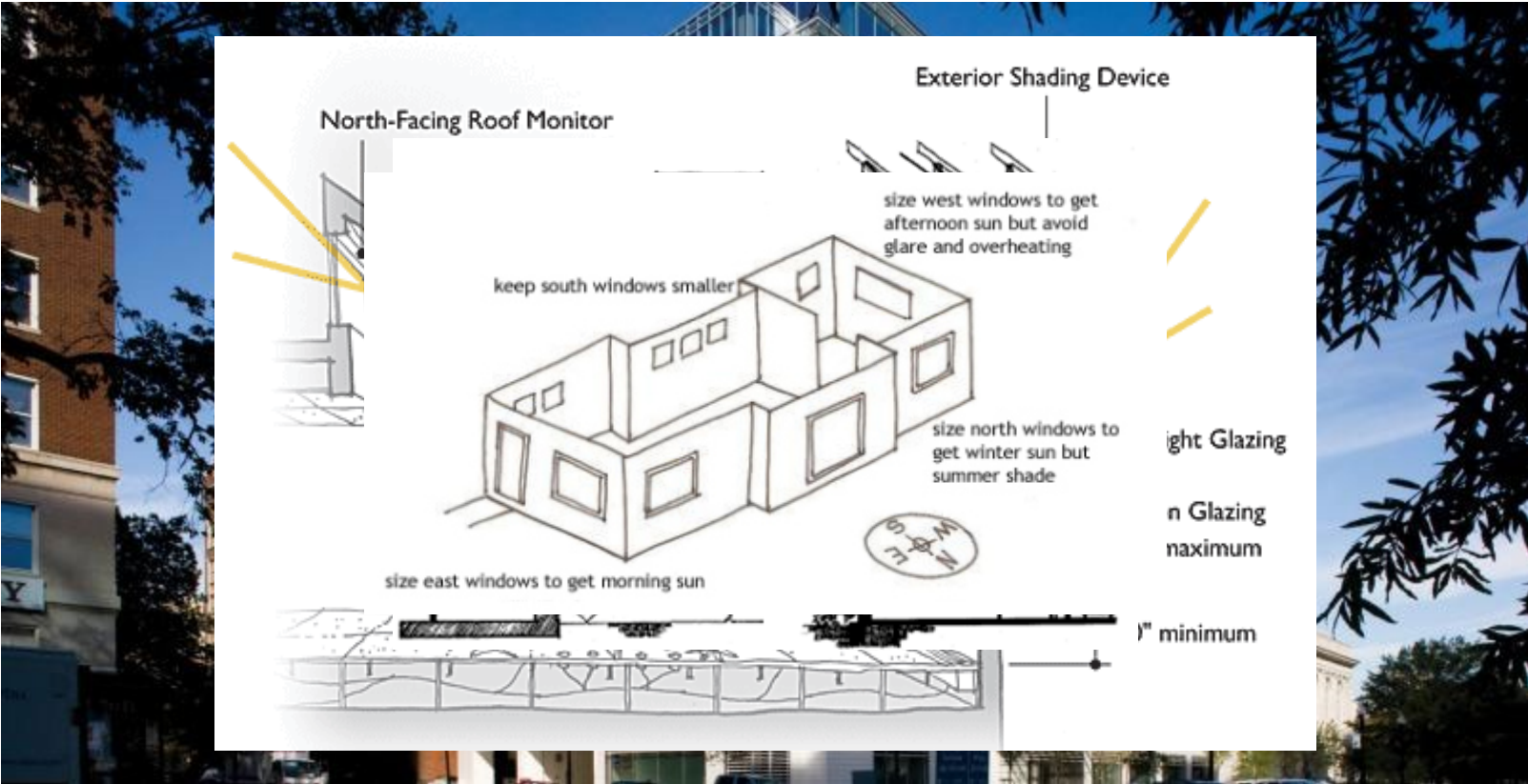


Daylighting

Introducing natural light into a space with the intention of reducing or eliminating the electric light.



Daylighting



High-Performance Building

Engineering design integrates the electric lighting system design with the architectural design to:

- ▶ Supplement the changing daylighting levels
- ▶ Maintain constant prescribed lighting levels in the space
- ▶ Use efficient lighting technologies and control strategies

Lighting Standards

STANDARD




ANSI/ASHRAE/IES Standard 90.1-2013
(Supersedes ANSI/ASHRAE/IES Standard 90.1-2010)
Includes ANSI/ASHRAE/IES Addenda listed in Appendix F

**Energy Standard
for Buildings
Except Low-Rise
Residential Buildings
(1-P Edition)**

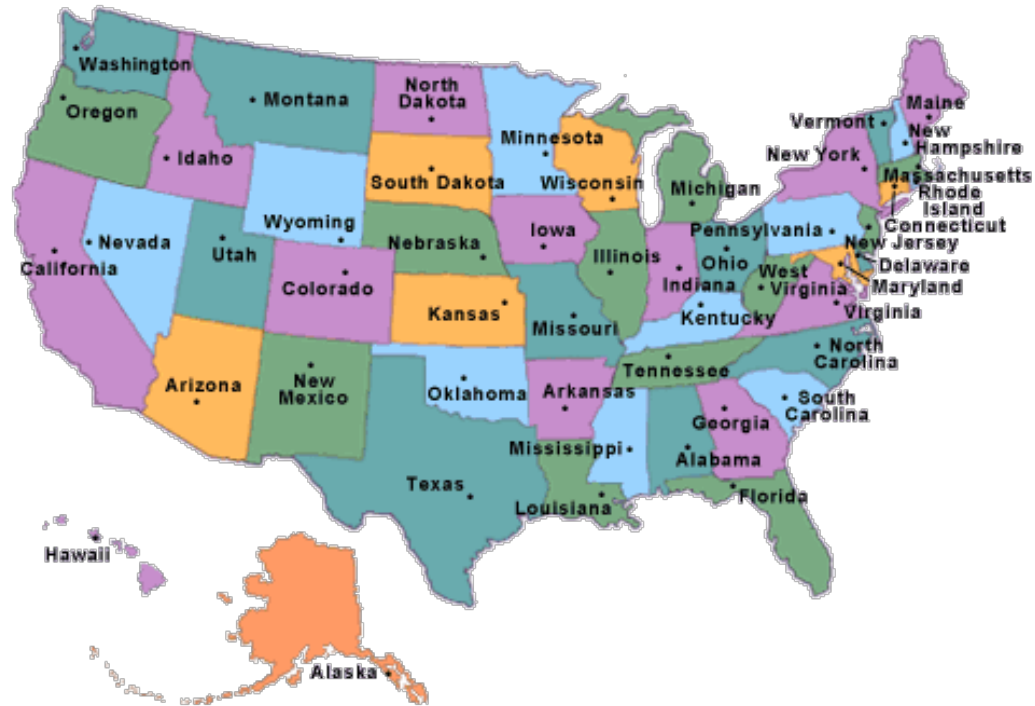
See Appendix F for approval rules by the ASHRAE Standards Committee, the ASHRAE Board of Directors, the IES Board of Directors, and the American National Standards Institute.

This standard is under continuous maintenance by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for change documentation, consensus action on requests for change to any part of the standard. The change editorial form, instructions, and directions may be obtained online from the ASHRAE web site (www.ashrae.org) or in paper form from the Manager of Standards. The most edition of an ASHRAE Standard may be purchased from the ASHRAE web site (www.ashrae.org), or from ASHRAE Customer Service, 1791 Tull Creek, NE, Atlanta, GA 30329-2305. Email: orders@ashrae.org, Fax: 404-521-1478. Telephone: 404-521-8800. Copyright © or all text © 2013 ASHRAE. For more information, go to www.ashrae.org/permissions.

© 2013 ASHRAE ISBN 1041-2336



Lighting Codes



ICC
**INTERNATIONAL
CODE
COUNCIL**

2013 TITLE 24, PART 6
BUILDING ENERGY EFFICIENCY STANDARDS



Lighting Measurements

Wattage	The amount of electricity consumed by a light source
Lumens	The amount of light that a light source produces
Footcandles	The amount of light reaching a subject
Lux	Lumens per meter squared



Lamp Operating Characteristics

Efficacy	Lumens per watt
Life	Lamp life rated in hours
Color	Color temperature is used to describe the color of light. i.e. INC 2,600 to 3,000 K
CRI	Color Rendering Index

Types of Fixtures



Lighting Control



Lighting Control



Lighting Control



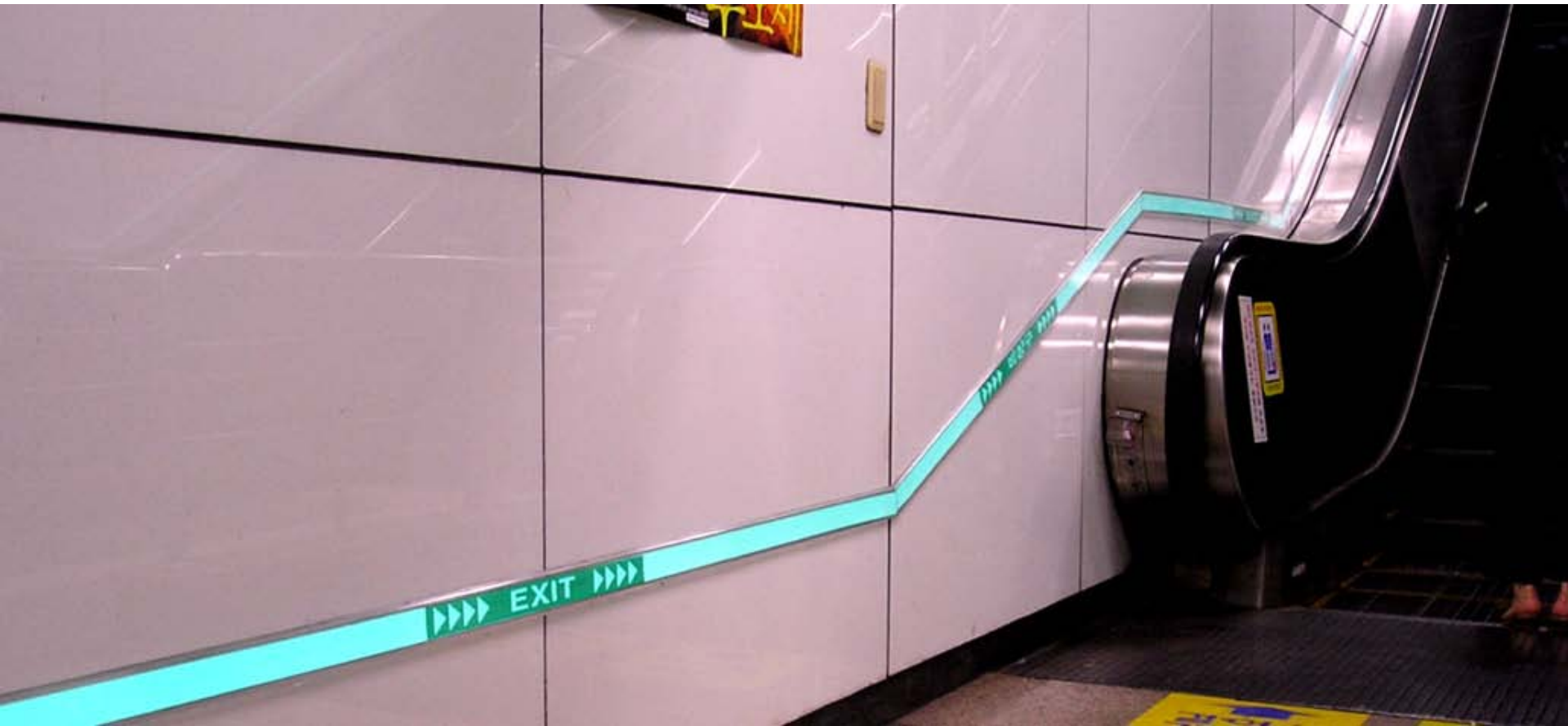
Lighting Control



Lighting Control



Lighting Control



Occupancy Sensor

