PacifiCorp Energy

Hunter Power Plant

Utah

Lighting Upgrade Audit/Study

November 2013

Executive Summary

PacifiCorp Energy hired Evergreen Consulting Group to conduct site audit of lighting at the Hunter plant located in Castle Dale, Utah. Site visits were conducted on July 11-12, 2013 and the following 4 phase recommendations for lighting upgrades (for UNIT #3 ONLY) are contained in this report.

- T12 Lighting throughout plant: Typical 1.5" diameter fluorescent tubes (4' or 8' lengths, sometime U-tubes) should be replaced with longer life, high performance T8 linear fluorescent. Scope includes delamping most 4 and 3 lamp fixture due to the improved light output of the retrofit kits. T-12 lamps are phasing out and will be more expensive to maintain both on energy consumption and maintenance. Project will improve "quality of light" <how it appears>, reduce maintenance by 75-85% over current levels, and allow for some controls in areas that fixtures don't need 24 hour operation (or occupancy). LED fixtures are an option (or retrofit kits), but costs are more than the T8 technology with similar life of lamps. There are a total of 690 - T12 fixtures recommended for upgrade.
- Turbine Area: Existing fixtures include dual-head (i.e. 2 lamps) 400 watt (W) Mercury Vapor and Metal Halide Fixtures. The recommended upgrade for this measure is to install a 515W LED high bay fixtures to match the number of fixtures existing (28) as an one-for-one unit replacement without installing new electrical for a change in layout. *Alternative designs are possible to install two fixtures (heads) for everyone existing, if requested.* Scope also include simple LED Exit Signs upgrades also.
- 175W and 400W HID fixtures: The primary fixtures are 175 and 400 W Metal Halide (MH) or High Pressure Sodium (HPS) industrial fixtures hanging throughout the entire facility. Known as High Intensity Discharge (HID) fixtures, the recommended upgrade is an LED retrofit kit (industrial) where the housing is changed out on existing fixture. The new LED fixture recommended is 78 watts and lasts approximately 60,000 hours compared to the existing fixtures typical 15,000-25,000 hour lamp life.
- Exterior fixtures are similar to the interiors, but are broken out as their own phase. This High Intensity Discharge (HID) type fixtures can be upgraded with a LED pole mounted L type fixture. Many of the existing fixtures don't have photocell controls, so these should be re-incorporated to prevent wasted usage.

Table 1: Breakout of Lighting Upgrades for phasing purposes

Recommended Breakout	Number of light fixtures	Rough Budget $	kWh Savings
T-12 Lighting Upgrade	690	$58,260	182,309
Turbine Area	38	$37,193	141,023
Industrial Fixtures	1311	$1,154,701	1,463,965
Exterior Lighting	644	$570,122	520,362
Totals	**2683**	**$1,820,276**	**2,307,659**

In addition to this specific location (Hunter), these fixture types are identical at other PacifiCorp Energy power plants and for cost savings to PacifiCorp, it is recommended that a main industrial LED (Crouse Hinds) fixtures use bulk ordering agreements be set-up to share material orders in for all locations. Costs in this report are based on individual sites and fixture costs from distributors, larger orders could reduce these estimates.

Benefits of Recommendations:

Why invest in lighting: The economics of the internal savings is not included in this report. PacifiCorp can't use Rocky Mountain Power's incentive unless they are physically paying a utility bill with an eligible industrial rate. Also, the actual cost of energy is not the sell rate to commercial/industrial customers, so once internal rates of power generation is applied, we don't expect projects to net on energy alone with under 2 years or less paybacks to make this an automatic capital investment. But looking at the long term benefits, there are significant value for investing in lighting upgrades and to move forward with these recommended projects:

1) The kWh (energy units) and kW (demand) are real and can be re-sold to PacifiCorp end-users
2) Maintenance savings for both hard and soft costs are significant. Recommendations above should reduce 75 – 85 percent of the current lighting maintenance expenses each year for the next 10 years (and nominal increases thereafter).
3) Reduced safety risk to maintenance staff (minimizes access to restricted access areas/heights/lifts and lighting over process equipment).
4) Quality of light: New technology improves the color, enhances visibility and human comfort. Existing lighting has a color accuracy of 50 – 65 percent; recommended lighting has a color accuracy of 80 – 90 percent. Term in lighting is called CRI (color rendering index).
5) Increases productivity and safety by providing clearer distinction in colors (e.g., instrumentation wiring) and small details of equipment, etc., in working areas.
6) Computer glare is reduced especially in the office areas. Additionally, current IES (Illuminating Engineering Society) light level recommendations can be met in those offices with these recommendations.
7) Make power available for other equipment: These projects are base load reductions, meaning power for panels and transformers are reduced and allow mores options to be used for new connections/loads or equipment, besides reducing stress on existing panels or overload situations.
8) In some cases, insurance premiums could qualify for reductions with some project improvements.
9) Net payback, once included cost benefits factors above (especially adding the human factors), and should meet all PacifiCorp's internal rates-of-returns to invest in all power plants. This report cannot identify the physical dollars associated to all these internal pieces to form a final financial calculation. But based in the nature that these power plants are long-term facilities and even if basic energy savings only net paybacks look longer to invest with more expensive LED technology, the secondary benefits on maintenance and improve working environment should make these projects a high priority on capital investments. The recommended technologies also provide 15 - 20 years equipment life for new fixtures and 12 - 15 years of equipment life on retrofits (for existing fixtures) before replacements or next capital investments should need to be reconsidered.

Lighting Audit Report

Richard Wood of Evergreen Consulting Group performed a lighting audit for Hunter Power Plant in July 2013. The entire facility consists of mechanical, service walkways, offices, labs and some maintenance shops. The lighting audit scope only encompasses all areas of Unit #3 per the request of PacifiCorp. The entire facility is operated all day 365 days a year.

The building lighting is mostly lower wattage 175W mercury vapor and metal halide fixtures, typical for industrial facilities. They come in a variety ranging from dusk-to-dawn (pole mounted), low bays, to emergency lighting. The recommendations for Hunter Power Plant include installing lower wattage LED industrial and hazardous designed fixtures from Crouse Hinds to replace the existing fixtures. Environmental heat concerns may be a concern for some areas near the boiler where temperatures reach 131 degrees Fahrenheit, special care in specifications will be needed. If areas meet this threshold, the installer should use a metal halide technology instead of the LED, alternative fixture is a Pulse Start Metal Halide technology that provide some savings and yet is equal to the exiting probe start metal halide technology. This report shows the LED option. The facility has a natural tendency to collect dirt, so dirt depreciation is a major threat to lighting performance. Semi-regular cleaning is recommended to preserve proper light levels. There is no change in this cleaning need for baseline or proposed fixtures.

Recommendations

Detail Lighting Survey:

Appendix B contains a large spreadsheet on each area showing baseline and proposed fixtures for the total project, then repeating phases (subsets) breakouts for groups are then included:

1. One - master spreadsheet with all baseline opportunities (all fixtures surveyed).
    a. Each energy efficient measure has corresponding wattages, counts and descriptions. Space wattages are also calculated on a per-line basis.
2. Four – breakout spreadsheets (sub-sets or phases) that group the T12 fixtures, low bay high intensity discharge (plant standard), turbine area, and exterior lighting.

Recommended Fixtures:

Appendix C contains specification sheets of the typical fixture type being recommended. No specific manufacturer is required and an “or-equal” alternative can be used for bid purposes.

- **De-lamping 4’ T12 to T8 retrofit kits**: The typical 4’ T12 fluorescent fixtures should be replaced with 2-lamp T8 CEE high performance ballast/lamp de-lamping kits. These kits fit inside the existing fixture housing and re-position the lamp holders for the new lamps and optimizing how much light projected out of the fixture. They increase the efficiency of the fixture using reflectors and lenses to give recommended light levels as needed for each area of the offices. Plant area T12’s are typical 8’ slim-line or high output fluorescent fixture that will be either de-lamped or retrofitted with 4’ T8 lamps using a “kit” which allows for easy installation without removing the “body” of the fixture. The 8’ lamps will be eliminated also, which is a significant maintenance expense and storage concern. Please pay particular attention to the ballast factor and lamp types being recommended as higher savings can be achieved by installing CEE T8 lamps and ballasts. The attached spreadsheets show the individual room-by-room recommendations with the associated fixture or retrofit components.

- **Crouse Hinds** – Currently, the plant has over 1,900 low-bay industrial fixtures using either 175W metal halide or 150W high-pressure sodium. It is recommended to replace these with a retrofit kit that uses the existing back box when retrofitting the fixture, thereby reducing the labor time to replace. These retrofit kits are available from Dialight or Crouse-Hinds (at the time of this report). Other manufactures may have an equal product. Alternatives could be looked at as a cost saving measure only, which would be a LED screw-in retrofit hybrid kit. This would save money but not provide the "engineered" lighting pattern as described for the recommended retrofit option. Plant would need to do their due-diligence before approving the LED screw-in option (test for example).
- **LED High Bay fixtures**: We strongly recommend the plant select a high quality LED high bay fixture to replace the turbine area's existing high bay high intensity discharge (HID) lamps. Maintenance reduction, long life, safety, and lighting quality are all drivers here. Recently new fixtures designed specifically for high ceiling applications have been introduced to the market and would meet the space requirements for light levels, uniformity, and quality of light that the turbine area requires. In the turbine area, the existing average FC is 55-60, which is higher than IES recommends (@30FC). Caution should be taken when recommending a new fixture and light level. Uniformity and higher quality light (CRI) is highly recommended if reducing FC's. It is recommended that the plant review multiple products before choosing a fixture for this area.

Existing and Projected Lighting Performance in Turbine Area

Existing Foot-candle readings:

Area	MIN	MAX	AVG
Turbine Area with daylight	25	75	40

Proposed Foot-candle Estimates:

Area	MIN	MAX	AVG
Turbine Area without daylight	28.1	53	45.5

- **Exterior fixtures:** This area would receive a standard replacement with most recommended products changing to a new LED fixture. Time will need to be spent determining the proper fixtures that use the correct optics, wattage, and fixture design. Since the market has been using LED fixtures of this type for a few years now, it has matured faster than other LED sectors, driving the price down where the incremental cost difference between existing technologies and LED are minimal.
- **Why CEE/DLC:** The fixtures recommended above can be found on the Consortium for Energy Efficiency (CEE) and Designlights Consortium (DLC) listed fixtures. The utility programs require these listed products for lamps/ballast and LED related products. These not only protect the owner from lower performance products being installed but also insure that they get the best available technology in the market for their buildings.

  CEE uses NEMA (National Electrical Manufacturers Association) premium ballast specification and minimum lamp efficiency standards to identify the longest lasting and higher quality linear fluorescent lamps (U-tube and 4' lamps only are listed). By ordering CEE listed products (there are over 1,000+), your lamp life and quality will be maximized while saving energy and reducing maintenance costs. Estimated costs shown do include these products. Note: For all interior T8 lamps, it is recommended to use longer life 28W lamps (84,000 estimated hours). For all T8 ballasts, it is recommended to use "program start" ballasts in conjunction with these same lamps. Program start ballasts, besides

being recommended where occupancy sensors are used, provide exact voltage and pre-heat the fluorescent lamp cathode, which extends the life of the lamps.

DLC is a national list for LED fixtures and retrofit kits that provides minimum performance standards to help identify less desirable products in the market. Because LED is an emerging technology and has experienced early products failures, a national standard was developed.

Recommended Maintenance and Life of Lighting: The primary fixtures are shown for comparison on life of lamps compared to existing.

- Existing T12 lighting at this location have an average lamp life of **12,000 - 20,000 hours** (based on size or brand of lamps). This is typically **1.5 to 2.5 years** before replacement.
- Recommended T8 lighting: Recommended new lamps replacing the T12 lamps have **84,000 hours or 9 years** life span between burnouts**.** Adding controls will extend these fixtures longer than 9 years if currently operating 24-hours a day. Office fixtures operating only M-F, could have 15-20 year life before burn-outs. Paying 1 - 2 dollars more for these lamps are well worth the investment up-front over the standard T8 lamps.
- Existing 175W metal halide fixtures have a lamp life of **12,000 hours or 1.5 years** before they burn out.
- Existing 150W high-pressure sodium fixtures have a lamp life of **24,000 hours or 2.8 years** before they burn out.
- Recommended LED fixtures have a useful (L70) life of **60,000+ hours or 7+ years**. Definition of “useful” is when the lumen output is at 70 percent of initial light output. LED lamps will keep burning, provide light past this useful life, and therefore offer some additional benefit over lamps that burn out; however, replacement/updates should be considered at the 70 percent light output mark.
- Existing 400W metal halide (high bay) fixtures have a lamp life of **20,000 hours or 2.8 years**. Metal halide lamps have multiple drawbacks: poor color rendering (CRI), short lamp life and steep lamp lumen depreciation (40% loss in light levels). Because of this, this plant is experiencing excessive maintenance (cost/time) and low light levels from existing light fixtures compared to today’s technology options.
- Recommended LED high bay fixtures have **60,000 hours** typical useful life (L70). You also get a product that uses less energy to deliver useful lumens (light) on your task with better uniformity than existing high intensity discharge as well as more light with this direct source of lighting. A side benefit is that these turn on “instantly” rather than having a 5 to 10 minute wait for a fixture to come up to full brightness allowing for controls to be added in storage areas that will extend the longevity of the fixture (years) and energy savings for not being used 24-hours/day.

Costs/Budgets

Appendix D contains the detail cost breakout and shows all assumptions or logic for material and labor by fixture type.

Costs are an estimate only (budgeting) and disregard any notations to any utility incentive or dollar savings per year values in attached lighting tools. These values are only applicable if the power plant was able to participate in the Rocky Mountain Power Fin*Answer* Express/***watt***smart

Business incentive program. Any $ values (savings or incentive) shown in attachments should be ignored; lighting tools are only used for calculating kW and kWh savings and identifying the fixture types by space.

***Logic for cost estimates*:**
Most fixtures were budgeted at one hour per installation averages. Some will take longer but some will take less time. Labor cost was based at $80 an hour, which is a typical hourly wage for electricians. Cost could be adjusted up or down depending on your evaluation of local labor rates and the difficulty of each installation; spreadsheets are provided to make those adjustments internally. Individual costs do not include such things as disposal, scaffolding, permitting, safety requirements, or cost of shut down if needed; but other contingency amounts were provided on a total that may be leveraged to cover some of these expenses. PacifiCorp Energy may have other contingency factors not provided for in this report that should be added as necessary based on location of site, security restriction time for contractors, and regional bidding environment of local/remote resources availability.

Cost reduction options:
For the purposes of this lighting survey/audit and ease of installation, the Crouse Hinds retrofit fixture was used for cost estimating. Other manufacturers (Dialight) have or may have a cost effective alternative that may meet the owner's needs with a lower installed cost than the Crouse Hinds fixture. It is recommended that these options be researched or Evergreen Consulting could assist in doing the research.

Upon request, we have changed the recommended the lighting fixture type from a fluorescent to a LED for the main open turbine area (when compared to the original preliminary report copies). A 511W (watt) LED high bay fixture is recommended as it offers the best maintenance option and longer life desired by facility owners and maintenance personal.

The costs can range dramatically on a project of this size and complexity. LEDs were considered for the plant standard 175W metal halide general low bays and for most of the 1,000W metal halide high bays fixtures, as this would be the simplest and easiest to replace. Pricing is higher for this product technology (LED) but should be considered for its ease of change out and probability of substantial price reduction if pre-negotiated with the manufacturer prior to purchase for multiple plants (locations). We recommend arranging a national purchase agreement to consolidate same fixture purchases for all power plants over a 1 - 2 year time period purchasing window.

Appendix A

Fixture Summary Page

Hunter Unit 3 - Entire Scope

Fixture Summary & Count

Fluorescent	
FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	319
FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE H	95
FLT8CEE-32W x 4'-CEE RS/PRS CEE L	255
FLT8-32W x 4L x 4'-2 IS N	2
FLT8CEE-32W x 2L x 4'-CEE IS CEE L	15
HID	
Induction	
LED	
LEDWP-45W	6
LEDE-2W	14
Other	
CUST: PVM7LDM2/UNV1	1948
CUST: LEDHB-515W-DIM	28
CUST: PVM9LDM2/UNV1	1
Controls	
Occupancy	21
Ad. Daylighting	1

Hunter Unit 3 - T12 Phase

Fixture Summary & Count

Fluorescent	
FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	319
FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE H	95
FLT8CEE-32W x 4'-CEE RS/PRS CEE L	255
FLT8-32W x 4L x 4'-2 IS N	2
FLT8CEE-32W x 2L x 4'-CEE IS CEE L	15
HID	
Induction	
LED	
LEDE-2W	4
Other	
Controls	
Occupancy	20

Hunter Unit 3 - Turbine Phase

Fixture Summary & Count

Fluorescent

HID

Induction

LED

LEDE-2W	10

Other

CUST: LEDHB-515W-DIM	28

Controls

Ad. Daylighting	1

Hunter Unit 3 - Industrial Phase

Fixture Summary & Count

Fluorescent

HID

Induction

LED

Other

CUST: PVM7LDM2/UNV1	1311

Controls

Occupancy	1

Hunter Unit 3 - Exterior Phase

Fixture Summary & Count

Fluorescent

HID

Induction

LED

LEDWP-45W	6

Other

CUST: PVM7LDM2/UNV1	637
CUST: PVM9LDM2/UNV1	1

Controls

Appendix B

Lighting Tools

ROCKY MOUNTAIN POWER

Let's turn the answers on.

V 070113.5.3

wattsmart® Business - Utah

07/01/13 Effective Date

You Can Now Use The Project Information Tab

Project ID	
Lighting Coordinator	Richard Wood
Tool Prepared by	RW
Project Manager	
Account Manager	

Customer Information

Project Name	Hunter Power Plant - Entire Scope		
Business Name	PacifiCorp Energy		
Installation Address	Utah 10		
City, State, Zip	Castle Dale	UT	
Contact, Title	Don Arnold		
Phone, Email	801-220-4757	Don.Arnold@PacifiCorp.com	
Account, Meter, Rate			9
Participant is:	Acct Holder	Elect. User	Building Owner
Business Type	Manufacturing Facility		

Contractor Information

Contact		wattsmart Business vendor
Business Name		
Address		
City, State, Zip		
Phone, Email		

Payee Information

Incentive Should Be Addressed To:	
Business Name	
Attention	
Check Reference	
Address	
City, State, Zip	

Eligibility Information

Business Name		
Address		
City, State, Zip		
Account #		
Meter Base #, Rate		

Processing Information

Construction Type	Retrofit	Stage	Preliminary

Project Cost

Material	Labor	Other	Total Project Cost
$1,581,836.00	$188,440.00	$50,000.00	**$1,820,276.00**

Space Type & Size

	Calculation Method	Whole Building	Allowed Wattage		650,000	
1	Manufacturing Facility		FT^2	500,000	1.30	W/FT^2
			FT^2			W/FT^2
			FT^2			W/FT^2
			FT^2			W/FT^2
			FT^2			W/FT^2
	Manufacturing Facility		FT^2	500,000	1.30	W/FT^2

Lighting Operation Schedule

# of Holidays Closed?	Day	A	B	C	D	E
0	Mon	9.0				
Op Weeks Per Year	Tue	9.0				
52	Wed	9.0				
"S" is for a seasonal operational schedule	Thu	9.0				
S is for 0 hrs/year	Fri	9.0				
X is for 8760 hrs/year	Sat	9.0				
Y is for 4380 hrs/year	Sun	9.0				
	Total	3,285				

Additional Information

Category	
Fixture	
Lamp	
Lamp (W)	
Lamp Qty	
Ballast	
Factor	

26W - CMH-20W-ELEC
125W - CMH-100W-SCWA
26W - MHPS-20W-ELEC
189W - CMH-150W-SCWA
45W - CMH-39W-ELEC
277W - CMH-250W-LR
288W - CMH-250W-SCWA
324W - CMH-300W-LR
342W - CMH-300W-SCWA
55W - MH-50W-ELEC
342W - CMH-320W-LR

Add Fixture | Remove Fixture | Clear Filter | Build Fixture | Reset

98 W - CUST: LED Ind and Haz Ap
98 W - CUST: Crouse Hinds LED ind
48W - FLT8CEE-32W x 2L x 4'-CEE T
48W - FLT8CEE-32W x 2L x 4'-CEE R
98 W - CUST: VMV9L LED
98 W - CUST: VMV7L
78 W - CUST: PVM7LDM2/UNV1
94 W - CUST: PVM9LDM2/UNV1
351W - FLT5HO-54W x 6L x 4'-3 RS/
515 W - CUST: LEDHB-515W-DIM

45W - LEDWP-45W

LED Wall Pack (45W x 1L)

Standard Incentive (12.4% of Cost Paid By Incentive)

Incentive

Savings Information

2,307,659 kWh Saved Per Year

Lighting Power Density

1.30	Code	76.1%
0.73	Existing	Better Than Code
0.31	Proposed	LPD

ROCKY MOUNTAIN POWER
Let's turn the answers on.

↓↓Project Tracking↓↓
Preliminary
Pre-Inspection
Agreement Needed
Contracted
Post-Inspection
Final Review Needed

↓↓Project Notes↓↓

Preliminary

Hunter Power Plant - Entire Scope

190 Out Of 201 Lines Used

Line Number	Exterior	Schedule	Space Description	Existing Fixture	Existing Qty (2683)	Existing Controls (0)	Existing Interior Fixture Wattage	Existing Interior Space Wattage (365,261)	Existing Exterior Space Wattage (99,520)	Proposed Fixture	Proposed Qty (2683)	Proposed Controls (22)	Proposed Interior Fixture Wattage	Proposed Interior Space Wattage (155,616)	Proposed Exterior Space Wattage (40,690)	Project Notes
1	+	X	Elevator Machine RM Fl	MV-175W-CWA	7		205	1,435		CUST: PVM7LDM2/UNV1	7		78	546		Type RLB1
2		X	Elevator Machine RM	FLT12-34W x 2L x 4'-MG(E)	2		72	144		FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	2		48	96		L&B TYPE BRLO1, TYPE L1
3		X	17th Floor	MV-175W-CWA	28		205	5,740		CUST: PVM7LDM2/UNV1	28		78	2,184		Type RLB1
4		X	16th Floor	MV-175W-CWA	13		205	2,665		CUST: PVM7LDM2/UNV1	13		78	1,014		Type RLB1
5		X	Steam Drum (West)	MV-175W-CWA	2		205	410		CUST: PVM7LDM2/UNV1	2		78	156		Type RLB1
6		X	16th Floor	MH-175W-CWA	1		215	215		CUST: PVM7LDM2/UNV1	1		78	78		Type RLB1
7		X	151/2 Floor	MV-175W-CWA	22		205	4,510		CUST: PVM7LDM2/UNV1	22		78	1,716		Type RLB1
8		X	Steam Drum (East) 16th	MV-175W-CWA	2		205	410		CUST: PVM7LDM2/UNV1	2		78	156		Type RLB1
9		X	15th Drum Level Transmitter	MV-175W-CWA	2		205	410		CUST: PVM7LDM2/UNV1	2		78	156		Type RLB1
10		X	15th Floor	MV-175W-CWA	36		205	7,380		CUST: PVM7LDM2/UNV1	36		78	2,808		Type RLB1
11		X	14th Floor	MV-175W-CWA	24		205	4,920		CUST: PVM7LDM2/UNV1	24		78	1,872		Type RLB1
12		X	13th Floor	MV-175W-CWA	3		205	615		CUST: PVM7LDM2/UNV1	3		78	234		Type RLB1
13		X	13th Floor	MV-175W-CWA	17		205	3,485		CUST: PVM7LDM2/UNV1	17		78	1,326		Type RLB1
14		X	13th Floor	MV-175W-CWA	1		205	205		CUST: PVM7LDM2/UNV1	1		78	78		Type RLB1
15		X	Coal Receiving Surge Hop Level 13	MV-175W-CWA	12		205	2,460		CUST: PVM7LDM2/UNV1	12		78	936		Type RLB1
16		X	Coal Receiving Surge Hop Level 13	MV-175W-CWA	6		205	1,230		CUST: PVM7LDM2/UNV1	6		78	468		Type RLB1
17		X	12th Floor	MV-175W-CWA	29		205	5,945		CUST: PVM7LDM2/UNV1	29		78	2,262		Type RLB1
18		X	12th Floor	MH-175W-CWA	11		215	2,365		CUST: PVM7LDM2/UNV1	11		78	858		Type RLB1
19		X	12th Floor	MH-175W-CWA	1		215	215		CUST: PVM7LDM2/UNV1	1		78	78		Type RLB1
20		X	12th Floor	MV-100W-CWA	1		125	125		CUST: PVM7LDM2/UNV1	1		78	78		Type RLB1
21		X	Coal Receiving Surge Hop Level 11-12	MV-175W-CWA	2		205	410		CUST: PVM7LDM2/UNV1	2		78	156		Type RLB1
22		X	Deaerator Deck	MV-175W-CWA	8		205	1,640		CUST: PVM7LDM2/UNV1	8		78	624		Type RLB1
23		X	11th Floor	FLT12-34W x 2L x 4'-MG(E)	2		72	144		FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	2		48	96		L&B TYPE BRLO1, TYPE L1
24		X	11th Floor	MV-175W-CWA	39		205	7,995		CUST: PVM7LDM2/UNV1	39		78	3,042		Type RLB1
25		X	11th Floor	MH-175W-CWA	1		215	215		CUST: PVM7LDM2/UNV1	1		78	78		Type RLB1
26		X	10th Floor	MV-175W-CWA	38		205	7,790		CUST: PVM7LDM2/UNV1	38		78	2,964		Type RLB1
27		X	9th Floor	MV-175W-CWA	34		205	6,970		CUST: PVM7LDM2/UNV1	34		78	2,652		Type RLB1
28		X	9th Floor	MV-175W-CWA	36		205	7,380		CUST: PVM7LDM2/UNV1	36		78	2,808		Type RLB1
29		X	8th Floor	MH-175W-CWA	4		215	860		CUST: PVM7LDM2/UNV1	4		78	312		Type RLB1

30		X	8th Floor	MV-175W-CWA	2		205	410	CUST: PVM7LDM2/UNV1	2		78	156	Type RLB1
31		X	7th Floor	MV-175W-CWA	9		205	1,845	CUST: PVM7LDM2/UNV1	9		78	702	Type RLB1
32		X	7th Floor	MV-175W-CWA	4		205	820	CUST: PVM7LDM2/UNV1	4		78	312	Type RLB1
33		X	6th Floor	MH-175W-CWA	6		215	1,290	CUST: PVM7LDM2/UNV1	6		78	468	Type RLB1
34		X	6th Floor	MV-175W-CWA	1		205	205	CUST: PVM7LDM2/UNV1	1		78	78	Type RLB1
35		X	5th Floor	MV-175W-CWA	7		205	1,435	CUST: PVM7LDM2/UNV1	7		78	546	Type RLB1
36		X	5th Floor	MH-175W-CWA	7		215	1,505	CUST: PVM7LDM2/UNV1	7		78	546	Type RLB1
37		X	4th Floor	MV-175W-CWA	4		205	820	CUST: PVM7LDM2/UNV1	4		78	312	Type RLB1
38	+	X	4th Floor	MH-175W-CWA	1		215	215	CUST: PVM7LDM2/UNV1	1		78	78	Type RLB1
39		X	4th Floor	MV-175W-CWA	6		205	1,230	CUST: PVM7LDM2/UNV1	6		78	468	Type RLB1
40		X	4th Floor	MV-175W-CWA	15		205	3,075	CUST: PVM7LDM2/UNV1	15		78	1,170	Type RLB1
41		X	4th Floor	MH-175W-CWA	5		215	1,075	CUST: PVM7LDM2/UNV1	5		78	390	Type RLB1
42		X	4th Floor	MV-175W-CWA	1		205	205	CUST: PVM7LDM2/UNV1	1		78	78	Type RLB1
43		X	4th Floor	MV-175W-CWA	11		205	2,255	CUST: PVM7LDM2/UNV1	11		78	858	Type RLB1
44		X	5th Floor	MV-175W-CWA	6		205	1,230	CUST: PVM7LDM2/UNV1	6		78	468	Type RLB1
45		X	5th Floor	MV-175W-CWA	23		205	4,715	CUST: PVM7LDM2/UNV1	23		78	1,794	Type RLB1
46		X	6th Floor	MV-175W-CWA	9		205	1,845	CUST: PVM7LDM2/UNV1	9		78	702	Type RLB1
47		X	7th Floor	MV-175W-CWA	7		205	1,435	CUST: PVM7LDM2/UNV1	7		78	546	Type RLB1
48		X	8th Floor	MV-175W-CWA	5		205	1,025	CUST: PVM7LDM2/UNV1	5		78	390	Type RLB1
49		X	5th Floor	MV-100W-CWA	3		125	375	CUST: PVM7LDM2/UNV1	3		78	234	Type RLB1
50		X	6th Floor South Side	MV-175W-CWA	7		205	1,435	CUST: PVM7LDM2/UNV1	7		78	546	Type RLB1
51		X	6th Floor South Side	MV-175W-CWA	3		205	615	CUST: PVM7LDM2/UNV1	3		78	234	Type RLB1
52		X	7th Floor South Side	MV-175W-CWA	10		205	2,050	CUST: PVM7LDM2/UNV1	10		78	780	Type RLB1
53		X	7th Floor South Side	MV-175W-CWA	7		205	1,435	CUST: PVM7LDM2/UNV1	7		78	546	Type RLB1
54		X	8th Floor	MV-175W-CWA	6		205	1,230	CUST: PVM7LDM2/UNV1	6		78	468	Type RLB1
55		X	Feeder Deck	MV-175W-CWA	8		205	1,640	CUST: PVM7LDM2/UNV1	8		78	624	Type RLB1
56		X	Feeder Deck	MV-175W-CWA	8		205	1,640	CUST: PVM7LDM2/UNV1	8		78	624	Type RLB1
57		X	3rd Floor	MV-175W-CWA	4		205	820	CUST: PVM7LDM2/UNV1	4		78	312	Type RLB1
58		X	3rd Floor	MV-175W-CWA	4		205	820	CUST: PVM7LDM2/UNV1	4		78	312	Type RLB1
59		X	2nd Floor	MV-175W-CWA	26		205	5,330	CUST: PVM7LDM2/UNV1	26		78	2,028	Type RLB1
60		X	2nd Floor	MV-175W-CWA	7		205	1,435	CUST: PVM7LDM2/UNV1	7		78	546	Type RLB1
61		X	Pulverizer Level	MV-175W-CWA	9		205	1,845	CUST: PVM7LDM2/UNV1	9		78	702	Type RLB1
62		X	Pulverizer Level	MV-175W-CWA	4		205	820	CUST: PVM7LDM2/UNV1	4		78	312	Type RLB1
63		X	Pulverizer Level	MV-175W-CWA	1		205	205	CUST: PVM7LDM2/UNV1	1		78	78	Type RLB1
64		X	Under Pulverizer Level	MV-175W-CWA	2		205	410	CUST: PVM7LDM2/UNV1	2		78	156	Type RLB1
65		X	Floor 1 Boiler	MV-175W-CWA	4		205	820	CUST: PVM7LDM2/UNV1	4		78	312	Type RLB1
66		X	Floor 1 Boiler	MH-175W-CWA	2		215	430	CUST: PVM7LDM2/UNV1	2		78	156	Type RLB1
67		X	Pulverizer Basement	MV-175W-CWA	19		205	3,895	CUST: PVM7LDM2/UNV1	19		78	1,482	Type RLB1
68		X	Pulverizer Basement	MV-175W-CWA	9		205	1,845	CUST: PVM7LDM2/UNV1	9		78	702	Type RLB1
69		X	10th Floor Reddler Deck	MV-175W-CWA	37		205	7,585	CUST: PVM7LDM2/UNV1	37		78	2,886	Type RLB1
70		X	6th Floor	MV-175W-CWA	36		205	7,380	CUST: PVM7LDM2/UNV1	36		78	2,808	Type RLB1
71		X	6th Floor	MV-175W-CWA	1		205	205	CUST: PVM7LDM2/UNV1	1		78	78	Type RLB1
72		X	Coal Silo 7th Floor	MV-175W-CWA	5		205	1,025	CUST: PVM7LDM2/UNV1	5		78	390	Type RLB1
73		X	Coal Silo 7th Floor	MV-175W-CWA	5		205	1,025	CUST: PVM7LDM2/UNV1	5		78	390	Type RLB1
74		X	Control RM Mezzanine	FLT12-60W x 2L x 8'-MG(E)	15		123	1,845	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE H	15	Occupancy	73	1,095	Delamp TYPE SK2, BHLO1 & L1
75		X	Unit 3 Control RM	FLT12-40W x 4'-MG(E)	255		43	10,965	FLT8CEE-32W x 4'-CEE RS/PRS CEE L	255		25	6,375	L&B TYPE BRLO1, TYPE L1
76		X	Hallway to INC	FLT12-40W x 2L x 4'-MG(E)	10		72	720	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	10		48	480	L&B TYPE BRLO1, TYPE L1
77		X	Logic RM	FLT12-60W x 2L x 8'-MG(E)	4		123	492	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE H	4		73	292	Delamp TYPE SK2, BHLO1 & L1
78		X	RM 317	FLT12-40W x 4L x 4'-2 MG(E)	4		144	576	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE H	4	Occupancy	73	292	Delamp TYPE SK2, BHLO1 & L1

79		X	BCS	FLT12-40W x 2L x 4'-MG(E)	53		72	3,816	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	53		48	2,544	L&B TYPE BRLO1, TYPE L1
80			INC Workshop											T8's Already
81		X	Large Logic RM	FLT12-40W x 2L x 4'-MG(E)	72		72	5,184	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	72		48	3,456	L&B TYPE BRLO1, TYPE L1
82		X	Men's RR	FLT8-32W x 4L x 4'-2 IS N	1		118	118	FLT8-32W x 4L x 4'-2 IS N	1	Occupancy	118	118	T8's Already
83		X	Women's RR	FLT8-32W x 4L x 4'-2 IS N	1		118	118	FLT8-32W x 4L x 4'-2 IS N	1	Occupancy	118	118	T8's Already
84		X	Unit 3 Turbine	MV-400W x 2L-CWA	28		910	25,480	CUST: LEDHB-515W-DIM	28	Ad. Daylighting	515	14,420	Type HB1
85		X	Turbine Deck Level 3	MV-175W-CWA	42		205	8,610	CUST: PVM7LDM2/UNV1	42		78	3,276	Type RLB1
86		X	Deck 2	MH-175W-CWA	41		215	8,815	CUST: PVM7LDM2/UNV1	41		78	3,198	Type RLB1
87		X	Deck 2	MV-175W-CWA	8		205	1,640	CUST: PVM7LDM2/UNV1	8		78	624	Type RLB1
88		X	Deck 2	MV-175W-CWA	10		205	2,050	CUST: PVM7LDM2/UNV1	10		78	780	Type RLB1
89		X	6900 RM	FLT12-34W x 2L x 4'-MG(E)	28		72	2,016	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	28		48	1,344	L&B TYPE BRLO1, TYPE L1
90		X	MCC RM	FLT12-34W x 2L x 4'-MG(E)	13		72	936	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	13		48	624	L&B TYPE BRLO1, TYPE L1
91		X	DC Hall	MH-175W-CWA	3		215	645	CUST: PVM7LDM2/UNV1	3		78	234	Type RLB1
92		X	DC RM	FLT12-34W x 2L x 4'-MG(E)	6		72	432	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	6	Occupancy	48	288	L&B TYPE BRLO1, TYPE L1
93		X	Battery RM	MV-175W-CWA	6		205	1,230	CUST: PVM7LDM2/UNV1	6	Occupancy	78	468	Type RLB1
94		X	Floor 1 Turbine	MV-175W-CWA	38		205	7,790	CUST: PVM7LDM2/UNV1	38		78	2,964	Type RLB1
95		X	Floor 1 Turbine	MV-175W-CWA	63		205	12,915	CUST: PVM7LDM2/UNV1	63		78	4,914	Type RLB1
96		X	Floor 1 Turbine	MV-175W-CWA	8		205	1,640	CUST: PVM7LDM2/UNV1	8		78	624	Type RLB1
97		X	Chemical Dock	MV-175W-CWA	13		205	2,665	CUST: PVM7LDM2/UNV1	13		78	1,014	Type RLB1
98		X	Floor 1 Turbine	MV-175W-CWA	3		205	615	CUST: PVM7LDM2/UNV1	3		78	234	Type RLB1
99		X	Diesel Generator	MV-175W-CWA	3		205	615	CUST: PVM7LDM2/UNV1	3		78	234	Type RLB1
100		X	Laboratory	FLT12-40W x 2L x 4'-MG(E)	15		72	1,080	FLT8CEE-32W x 2L x 4'-CEE IS CEE L	15	Occupancy	48	720	L&B TYPE BRLO1, TYPE L1
101		X	Real Lab	FLT12-40W x 2L x 4'-MG(E)	18		72	1,296	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	18	Occupancy	48	864	L&B TYPE BRLO1, TYPE L1
102		X	… Storage	FLT12-40W x 4L x 4'-2 MG(E)	4		144	576	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE H	4	Occupancy	73	292	L&B TYPE BHLO1, TYPE L1
103		X	Hydrogen Trailer /Co2	MV-175W-CWA	9		205	1,845	CUST: PVM7LDM2/UNV1	9		78	702	Type RLB1
104	+	Y	Exterior Turbine	MV-175W-CWA	1		205	205	CUST: PVM7LDM2/UNV1	1		78	78	Type RLB1
105	+	Y	Exterior Turbine	MV-175W-CWA	7		205	1,435	CUST: PVM7LDM2/UNV1	7		78	546	Type RLB1
106	+	Y	Back Exterior Boiler	MV-175W-CWA	7		205	1,435	CUST: PVM7LDM2/UNV1	7		78	546	Type RLB1
107	+	Y	Back Exterior Boiler	MV-175W-CWA	15		205	3,075	CUST: PVM7LDM2/UNV1	15		78	1,170	Type RLB1
108		X	Bag House	MV-175W-CWA	54		205	11,070	CUST: PVM7LDM2/UNV1	54		78	4,212	Type RLB1
109		X	2nd Floor	MV-175W-CWA	24		205	4,920	CUST: PVM7LDM2/UNV1	24		78	1,872	Type RLB1
110		X	3rd Floor	MV-175W-CWA	10		205	2,050	CUST: PVM7LDM2/UNV1	10		78	780	Type RLB1
111		X	Top Floor of Bag House	FLT12-40W x 2L x 4'-MG(E)	18		72	1,296	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	18		48	864	L&B TYPE BRLO1, TYPE L1
112	+	Y	Top level Back Side	MV-175W-CWA	6		205	1,230	CUST: PVM7LDM2/UNV1	6		78	468	Type RLB1
113	+	Y	Top level Center Walkway	MV-175W-CWA	6		205	1,230	CUST: PVM7LDM2/UNV1	6		78	468	Type RLB1
114	+	Y	Top level Center Walkway	MV-175W-CWA	1		205	205	CUST: PVM7LDM2/UNV1	1		78	78	Type RLB1
115	+	Y	Top Floor /Front of Bag House	MV-175W-CWA	8		205	1,640	CUST: PVM7LDM2/UNV1	8		78	624	Type RLB1
116	+	Y	Top Floor Outside East/West	MV-175W-CWA	4		205	820	CUST: PVM7LDM2/UNV1	4		78	312	Type RLB1
117	+	Y	3rd Floor Outside Walkway.	MV-175W-CWA	40		205	8,200	CUST: PVM7LDM2/UNV1	40		78	3,120	Type RLB1
118	+	Y	3rd Floor Center outside.	MV-175W-CWA	7		205	1,435	CUST: PVM7LDM2/UNV1	7		78	546	Type RLB1

119		X	Air Heater Floor	MV-175W-CWA	10		205	2,050	CUST: PVM7LDM2/UNV1	10		78	780	Type RLB1
120		X	Air Heater Floor	MV-175W-CWA	13		205	2,665	CUST: PVM7LDM2/UNV1	13		78	1,014	Type RLB1
121		X	Upper Air Handler	MV-175W-CWA	6		205	1,230	CUST: PVM7LDM2/UNV1	6		78	468	Type RLB1
122		X	Upper Air Handler	MV-175W-CWA	4		205	820	CUST: PVM7LDM2/UNV1	4		78	312	Type RLB1
123		Y	Outside Back of Bag House downstairs	HPS-100W	28		130	3,640	CUST: PVM7LDM2/UNV1	28		78	2,184	Type RLB1
124		X	Air Purity Testing Station	FLT12-34W x 2L x 4'-MG(E)	2		72	144	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	2		48	96	L&B TYPE BRLO1, TYPE L1
125		X	Air Purity Testing Station	FLT12-34W x 2L x 4'-MG(E)	2		72	144	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	2		48	96	L&B TYPE BRLO1, TYPE L1
126	+	X	Induced Draft Fans (West)	MV-175W-CWA	13		205	2,665	CUST: PVM7LDM2/UNV1	13		78	1,014	Type RLB1
127	+	X	Induced Draft Fans (East)	MV-175W-CWA	13		205	2,665	CUST: PVM7LDM2/UNV1	13		78	1,014	Type RLB1
128	+	X	West Induced Draft	MV-175W-CWA	19		205	3,895	CUST: PVM7LDM2/UNV1	19		78	1,482	Type RLB1
129	+	X	East Induced Draft	MV-175W-CWA	19		205	3,895	CUST: PVM7LDM2/UNV1	19		78	1,482	Type RLB1
130	+	Y	Bottom Ash Transport Lines	HPS-100W	5		130	650	CUST: PVM7LDM2/UNV1	5		78	390	Type RLB1
131	+	X	Bottom Level of Fans	MV-175W-CWA	24		205	4,920	CUST: PVM7LDM2/UNV1	24		78	1,872	Type RLB1
132	+	X	Top of Tanks	MV-175W-CWA	2		205	410	CUST: PVM7LDM2/UNV1	2		78	156	Type RLB1
133	+	Y	Bottom Ash Transport upper lines	HPS-100W	45		130	5,850	CUST: PVM7LDM2/UNV1	45		78	3,510	Type RLB1
134	+	Y	Bottom Ash Lower Transport lines	HPS-100W	11		130	1,430	CUST: PVM7LDM2/UNV1	11		78	858	Type RLB1
135	+	Y	Conveyor Support Tower	HPS-100W	7		130	910	CUST: PVM7LDM2/UNV1	7		78	546	Type RLB1
136	+	X	Lime Silo Stairs	MV-175W-CWA	40		205	8,200	CUST: PVM7LDM2/UNV1	40		78	3,120	Type RLB1
137	+	X	Lime Silo Middle/lower	MV-175W-CWA	10		205	2,050	CUST: PVM7LDM2/UNV1	10		78	780	Type RLB1
138	+	X	Scrubber top level	MV-175W-CWA	20		205	4,100	CUST: PVM7LDM2/UNV1	20		78	1,560	Type RLB1
139		X	Stairs Down	MV-175W-CWA	80		205	16,400	CUST: PVM7LDM2/UNV1	80		78	6,240	Type RLB1
140		X	Stairs Down	MV-175W-CWA	20		205	4,100	CUST: PVM7LDM2/UNV1	20		78	1,560	Type RLB1
141		X	Scrubber Recycle Pump Bay	MV-175W-CWA	32		205	6,560	CUST: PVM7LDM2/UNV1	32		78	2,496	Type RLB1
142		X	Pump RM	MV-175W-CWA	3		205	615	CUST: PVM7LDM2/UNV1	3		78	234	Type RLB1
143		X	Panel RM	FLT12-34W x 2L x 4'-MG(E)	4		72	288	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	4	Occupancy	48	192	L&B TYPE BRLO1, TYPE L1
144	+	X	Ash Water Pump House Exterior	MV-175W-CWA	2		205	410	LEDWP-45W	2		45	90	WP1
145		X	Ash Water Pump House	MV-175W-CWA	36		205	7,380	CUST: PVM7LDM2/UNV1	36		78	2,808	Type RLB1
146		X	MCC RM	FLT12-34W x 2L x 4'-MG(E)	10		72	720	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	10		48	480	L&B TYPE BRLO1, TYPE L1
147	+	Y	Ash De-watering System Stairs	MV-175W-CWA	11		205	2,255	CUST: PVM7LDM2/UNV1	11		78	858	Type RLB1
148	+	Y	Ash De-watering System Stairs	HPS-100W	13		130	1,690	CUST: PVM7LDM2/UNV1	13		78	1,014	Type RLB1
149	+	Y	Ash Water Surge Tank + Settling tank	HPS-100W	6		130	780	CUST: PVM7LDM2/UNV1	6		78	468	Type RLB1
150	+	Y	Bottom Ash Unloading	HPS-100W	6		130	780	CUST: PVM7LDM2/UNV1	6		78	468	Type RLB1
151		X	Ash Unloading Base Room	MV-175W-CWA	10		205	2,050	CUST: PVM7LDM2/UNV1	10		78	780	Type RLB1
152	+	Y	Thickener Bldg. Exterior	MV-175W-CWA	9		205	1,845	CUST: PVM7LDM2/UNV1	9		78	702	Type RLB1
153		X	Thickener for Scrubber	FLT12-34W x 2L x 4'-MG(E)	12		72	864	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	12	Occupancy	48	576	L&B TYPE BRLO1, TYPE L1

154		X	Alcoline Transfer Pump Bldg.	FLT12-34W x 2L x 4'-MG(E)	3		72	216	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	3		48	144	L&B TYPE BRLO1, TYPE L1
155		X	Thickener Transfer Pump Bldg	FLT12-34W x 2L x 4'-MG(E)	3		72	216	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	3		48	144	L&B TYPE BRLO1, TYPE L1
156	+	Y	Fly Ash Unloading outside tower	HPS-100W	12		130	1,560	CUST: PVM7LDM2/UNV1	12		78	936	Type RLB1
157	+	X	Ground Level Outside (tanks) fly ash unloading	MV-175W-CWA	18		205	3,690	CUST: PVM7LDM2/UNV1	18		78	1,404	Type RLB1
158		X	Fly ash unloader RM	MV-175W-CWA	17		205	3,485	CUST: PVM7LDM2/UNV1	17		78	1,326	Type RLB1
159	+	Y	Fly Ash Unloader Suspended Balcony	HPS-250W	1		295	295	CUST: PVM9LDM2/UNV1	1		94	94	Type RLB2
160		X	Fly Ash Unloader Office	FLT12-34W x 2L x 4'-MG(E)	2		72	144	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	2	Occupancy	48	96	L&B TYPE BRLO1, TYPE L1
161		X	Fly Ash Slurry Pump RM	MV-175W-CWA	8		205	1,640	CUST: PVM7LDM2/UNV1	8		78	624	Type RLB1
162		X	Unit 3 Cooling Tower Chemical Bldg.	MV-175W-CWA	7		205	1,435	CUST: PVM7LDM2/UNV1	7		78	546	Type RLB1
163		X	Side RM's	MV-175W-CWA	2		205	410	CUST: PVM7LDM2/UNV1	2		78	156	Type RLB1
164		X	Side RM's	MV-175W-CWA	2		205	410	CUST: PVM7LDM2/UNV1	2		78	156	Type RLB1
165	+	Y	Unit 3 Cooling Tower Tank Outside	MV-175W-CWA	5		205	1,025	CUST: PVM7LDM2/UNV1	5		78	390	Type RLB1
166	+	Y	Unit 3 Cooling Tower Tank Outside Covered Deck	MV-175W-CWA	6		205	1,230	CUST: PVM7LDM2/UNV1	6		78	468	Type RLB1
167	+	Y	Exterior	MV-175W-CWA	2		205	410	LEDWP-45W	2		45	90	Type RLB1
168		X	Cooling Tower Switch RM	FLT12-34W x 2L x 4'-MG(E)	11		72	792	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	11	Occupancy	48	528	L&B TYPE BRLO1, TYPE L1
169	+	Y	Exterior	MV-175W-CWA	2		205	410	LEDWP-45W	2		45	90	Type RLB1
170		X	Cooling Tower (two sides)	MV-175W-CWA	18		205	3,690	CUST: PVM7LDM2/UNV1	18		78	1,404	Type RLB1
171		X	Cooling Tower Traveling Screen Bldg.	MV-175W-CWA	4		205	820	CUST: PVM7LDM2/UNV1	4		78	312	Type RLB1
172		X	Remote Switch Gear Battery RM	FLT12-34W x 2L x 4'-MG(E)	2		72	144	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	2	Occupancy	48	96	L&B TYPE BRLO1, TYPE L1
173		X	Mechanics Shop	FLT12-34W x 2L x 4'-MG(E)	3		72	216	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	3	Occupancy	48	144	L&B TYPE BRLO1, TYPE L1
174		X	Remote Maintenance	FLT12-60W x 2L x 8'-MG(E)	24		123	2,952	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE H	24	Occupancy	73	1,752	Delamp TYPE SK2, BHLO1 & L1
175		X	Remote Switch Gear RM	FLT12-34W x 2L x 4'-MG(E)	34		72	2,448	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	34	Occupancy	48	1,632	L&B TYPE BRLO1, TYPE L1
176	+	X	General Fan/ Switch Gear Area Ext.	MV-175W-CWA	21		205	4,305	CUST: PVM7LDM2/UNV1	21		78	1,638	Type RLB1
177		X	Scrubber Control RM	FLT12-40W x 4L x 4'-2 MG(E)	2		144	288	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE H	2		73	146	Delamp TYPE SK2, BHLO1 & L1
178		X	Scrubber Control RM	FLT12-40W x 4L x 4'-2 MG(E)	40		144	5,760	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE H	40		73	2,920	Delamp TYPE SK2, BHLO1 & L1
179		X	Office	FLT12-40W x 4L x 4'-2 MG(E)	2		144	288	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE H	2	Occupancy	73	146	Delamp TYPE SK2, BHLO1 & L1
180		X	Restroom and Hall	FLT12-34W x 2L x 4'-MG(E)	4		72	288	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	4	Occupancy	48	192	L&B TYPE BRLO1, TYPE L1
181		X	Restroom	FLT12-34W x 2L x 4'-MG(E)	2		72	144	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	2	Occupancy	48	96	L&B TYPE BRLO1, TYPE L1
182		X	Fly Ash Blower RM	MV-175W-CWA	17		205	3,485	CUST: PVM7LDM2/UNV1	17		78	1,326	Type RLB1

183		X	Fly Ash Blower RM	ICE-15W x 2L	4		30	120	LEDE-2W	4		2	8	
184	+	X	Conveyor Bridge	MH-175W-CWA	55		215	11,825	CUST: PVM7LDM2/UNV1	55		78	4,290	Type RLB1
185		X	Conveyor #3 base Transfer Hut	MV-175W-CWA	17		205	3,485	CUST: PVM7LDM2/UNV1	17		78	1,326	Type RLB1
186		X	SWOL 472 Small Upper RM	FLT12-34W x 2L x 4'-MG(E)	3		72	216	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	3	Occupancy	48	144	L&B TYPE BRLO1, TYPE L1
187		X	3242 Conveyor Tunnel	MV-175W-CWA	34		205	6,970	CUST: PVM7LDM2/UNV1	34		78	2,652	Type RLB1
188	+	X	Conveyor Support Towers	MV-175W-CWA	4		205	820	CUST: PVM7LDM2/UNV1	4		78	312	Type RLB1
189	+	Y	Longer Conveyor under support	HPS-100W	9		130	1,170	CUST: PVM7LDM2/UNV1	9		78	702	Type RLB1
190	+	X	Conveyor Tower Support	MV-175W-CWA	4		205	820	CUST: PVM7LDM2/UNV1	4		78	312	Type RLB1
191		X	Turbine Deck Exits	ICE-15W x 2L	10		30	300	LEDE-2W	10		2	20	
192														
193														
194														
195														
196														
197														
198														
199														
200														
201														

ROCKY MOUNTAIN POWER

Let's turn the answers on.

V 070113.5.3

wattsmart® Business - Utah

07/01/13 Effective Date

You Can Now Use The Project Information Tab

Project ID	
Lighting Coordinator	Richard Wood
Tool Prepared by	RW
Project Manager	
Account Manager	

Customer Information

Project Name	Hunter Power Plant - T12 Phase		
Business Name	PacifiCorp Energy		
Installation Address	Utah 10		
City, State, Zip	Castle Dale	UT	
Contact, Title	Don Arnold		
Phone, Email	801-220-4757	Don.Arnold@PacifiCorp.com	
Account, Meter, Rate			9
Participant is:	Acct Holder	Elect. User	Building Owner
Business Type	Manufacturing Facility		

Contractor Information

Contact		wattsmart Business vendor
Business Name		
Address		
City, State, Zip		
Phone, Email		

Payee Information

Incentive Should Be Addressed To:	
Business Name	
Attention	
Check Reference	
Address	
City, State, Zip	

Eligibility Information

Business Name	
Address	
City, State, Zip	
Account #	
Meter Base #, Rate	

Processing Information

Construction Type	Retrofit	Stage	Preliminary

Project Cost

Material	Labor	Other	Total Project Cost
$24,700.00	$28,560.00	$5,000.00	**$58,260.00**

Space Type & Size

Calculation Method	Whole Building			Allowed Wattage	65,000	
1	Manufacturing Facility	FT^2	50,000	1.30	W/FT^2	
		FT^2			W/FT^2	
		FT^2			W/FT^2	
		FT^2			W/FT^2	
		FT^2			W/FT^2	
	Manufacturing Facility	FT^2	50,000	1.30	W/FT^2	

Lighting Operation Schedule

# of Holidays Closed?	Day	A	B	C	D	E
0	Mon	9.0				
Op Weeks Per Year	Tue	9.0				
52	Wed	9.0				
"S" is for a seasonal operational schedule	Thu	9.0				
S is for 0 hrs/year	Fri	9.0				
X is for 8760 hrs/year	Sat	9.0				
Y is for 4380 hrs/year	Sun	9.0				
	Total	3,285				

Additional Information

Category	
Fixture	
Lamp	
Lamp (W)	
Lamp Qty	
Ballast	
Factor	

26W - CMH-20W-ELEC
125W - CMH-100W-SCWA
26W - MHPS-20W-ELEC
189W - CMH-150W-SCWA
45W - CMH-39W-ELEC
277W - CMH-250W-LR
288W - CMH-250W-SCWA
324W - CMH-300W-LR
342W - CMH-300W-SCWA
55W - MH-50W-ELEC
342W - CMH-320W-LR

Add Fixture | Remove Fixture | Clear Filter | Build Fixture | Reset

98 W - CUST: LED Ind. and Haz. Ap
98 W - CUST: Crouse Hinds LED ind
48W - FLT8CEE-32W x 2L x 4'-CEE T
48W - FLT8CEE-32W x 2L x 4'-CEE R
98 W - CUST: VMV9L LED
98 W - CUST: VMV7L
78 W - CUST: PVM7LDM2/LINV1
94 W - CUST: PVM9LDM2/LINV1
351W - FLT5HO-54W x 6L x 4'-3 RS/
515 W - CUST: LEDHB-515W-DIM

48W - FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L

Fluorescent Linear T8 CEE (32W x 2L x 4') 1 CEE Rapid/Program Start Ballast (BF < 0.85)

Standard Incentive (46.3% of Cost Paid By Incentive)

T12 Phase

Savings Information

182,309 kWh Saved Per Year

Lighting Power Density

1.30	Code	54.5%
0.96	Existing	Better Than Code
0.59	Proposed	LPD

ROCKY MOUNTAIN POWER
Let's turn the answers on.

↓↓Project Tracking↓↓

Preliminary
Pre-Inspection
Agreement Needed
Contracted
Post-Inspection
Final Review Needed

↓↓Project Notes↓↓

Preliminary

Hunter Power Plant - T12 Phase

38 Out Of 49 Lines Used

Line Number	Exterior	Schedule	Space Description	Existing Fixture	Existing Qty (690)	Existing Controls (0)	Existing Fixture Wattage (Interior 48,026)	Existing Space Wattage (Exterior 0)	Proposed Fixture	Proposed Qty (690)	Proposed Controls (20)	Proposed Fixture Wattage (Interior 29,578)	Proposed Space Wattage (Exterior 0)	Notes
1		X	Elevator Machine RM	FLT12-34W x 2L x 4'-MG(E)	2		72	144	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	2		48	96	Lamp and Ballast
2		X	11th Floor	FLT12-34W x 2L x 4'-MG(E)	2		72	144	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	2		48	96	Lamp and Ballast
3		X	Control RM Mezzanine	FLT12-60W x 2L x 8'-MG(E)	15		123	1,845	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE H	15	Occupancy	73	1,095	Delamp
4		X	Unit 3 Control RM	FLT12-40W x 4'-MG(E)	255		43	10,965	FLT8CEE-32W x 4'-CEE RS/PRS CEE L	255		25	6,375	Lamp and Ballast
5		X	Hallway to INC	FLT12-40W x 2L x 4'-MG(E)	10		72	720	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	10		48	480	Lamp and Ballast
6		X	Logic RM	FLT12-60W x 2L x 8'-MG(E)	4		123	492	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE H	4		73	292	Delamp
7		X	RM 317	FLT12-40W x 4L x 4'-2 MG(E)	4		144	576	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE H	4	Occupancy	73	292	Delamp
8		X	BCS	FLT12-40W x 2L x 4'-MG(E)	53		72	3,816	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	53		48	2,544	Lamp and Ballast
9			INC Workshop											T8's Already
10		X	Large Logic RM	FLT12-40W x 2L x 4'-MG(E)	72		72	5,184	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	72		48	3,456	Lamp and Ballast
11		X	Men's RR	FLT8-32W x 4L x 4'-2 IS N	1		118	118	FLT8-32W x 4L x 4'-2 IS N	1	Occupancy	118	118	T8's Already
12		X	Women's RR	FLT8-32W x 4L x 4'-2 IS N	1		118	118	FLT8-32W x 4L x 4'-2 IS N	1	Occupancy	118	118	T8's Already
13		X	6900 RM	FLT12-34W x 2L x 4'-MG(E)	28		72	2,016	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	28		48	1,344	Lamp and Ballast
14		X	MCC RM	FLT12-34W x 2L x 4'-MG(E)	13		72	936	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	13		48	624	Lamp and Ballast
15		X	DC RM	FLT12-34W x 2L x 4'-MG(E)	6		72	432	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	6	Occupancy	48	288	Lamp and Ballast
16		X	Laboratory	FLT12-40W x 2L x 4'-MG(E)	15		72	1,080	FLT8CEE-32W x 2L x 4'-CEE IS CEE L	15	Occupancy	48	720	Lamp and Ballast
17		X	Real Lab	FLT12-40W x 2L x 4'-MG(E)	18		72	1,296	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	18	Occupancy	48	864	Lamp and Ballast
18		X	… Storage	FLT12-40W x 4L x 4'-2 MG(E)	4		144	576	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE H	4	Occupancy	73	292	Lamp and Ballast
19		X	Top Floor of Bag House	FLT12-40W x 2L x 4'-MG(E)	18		72	1,296	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	18		48	864	Lamp and Ballast
20		X	Air Purity Testing Station	FLT12-34W x 2L x 4'-MG(E)	2		72	144	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	2		48	96	Lamp and Ballast

21		X	Air Purity Testing Station	FLT12-34W x 2L x 4'-MG(E)	2		72	144	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	2		48	96	Lamp and Ballast
22		X	Panel RM	FLT12-34W x 2L x 4'-MG(E)	4		72	288	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	4	Occupancy	48	192	Lamp and Ballast
23		X	MCC RM	FLT12-34W x 2L x 4'-MG(E)	10		72	720	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	10		48	480	Lamp and Ballast
24		X	Thickener for Scrubber	FLT12-34W x 2L x 4'-MG(E)	12		72	864	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	12	Occupancy	48	576	Lamp and Ballast
25		X	Alcoline Transfer Pump Bldg.	FLT12-34W x 2L x 4'-MG(E)	3		72	216	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	3		48	144	Lamp and Ballast
26		X	Thickener Transfer Pump Bldg	FLT12-34W x 2L x 4'-MG(E)	3		72	216	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	3		48	144	Lamp and Ballast
27		X	Fly Ash Unloader Office	FLT12-34W x 2L x 4'-MG(E)	2		72	144	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	2	Occupancy	48	96	
28		X	Cooling Tower Switch RM	FLT12-34W x 2L x 4'-MG(E)	11		72	792	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	11	Occupancy	48	528	Lamp and Ballast
29		X	Remote Switch Gear Battery RM	FLT12-34W x 2L x 4'-MG(E)	2		72	144	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	2	Occupancy	48	96	Lamp and Ballast
30		X	Mechanics Shop	FLT12-34W x 2L x 4'-MG(E)	3		72	216	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	3	Occupancy	48	144	Lamp and Ballast
31		X	Remote Maintenance	FLT12-60W x 2L x 8'-MG(E)	24		123	2,952	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE H	24	Occupancy	73	1,752	Delamp
32		X	Remote Switch Gear RM	FLT12-34W x 2L x 4'-MG(E)	34		72	2,448	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	34	Occupancy	48	1,632	Lamp and Ballast
33		X	Scrubber Control RM	FLT12-40W x 4L x 4'-2 MG(E)	2		144	288	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE H	2		73	146	Delamp
34		X	Scrubber Control RM	FLT12-40W x 4L x 4'-2 MG(E)	40		144	5,760	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE H	40		73	2,920	Delamp
35		X	Office	FLT12-40W x 4L x 4'-2 MG(E)	2		144	288	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE H	2	Occupancy	73	146	Delamp
36		X	Restroom and Hall	FLT12-34W x 2L x 4'-MG(E)	4		72	288	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	4	Occupancy	48	192	Lamp and Ballast
37		X	Restroom	FLT12-34W x 2L x 4'-MG(E)	2		72	144	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	2	Occupancy	48	96	Lamp and Ballast
38		X	SWOL 472 Small Upper RM	FLT12-34W x 2L x 4'-MG(E)	3		72	216	FLT8CEE-32W x 2L x 4'-CEE RS/PRS CEE L	3	Occupancy	48	144	Lamp and Ballast
39		X	Fly Ash Blower RM	ICE-15W x 2L	4		30	120	LEDE-2W	4		2	8	
40														
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48														
49														

ROCKY MOUNTAIN POWER

Let's turn the answers on.

V 070113.5.3

wattsmart® Business - Utah

07/01/13 Effective Date

You Can Now Use The Project Information Tab

Project ID	
Lighting Coordinator	Richard Wood
Tool Prepared by	RW
Project Manager	
Account Manager	

Customer Information

Project Name	Hunter Power Plant (Turbine Phase)		
Business Name	PacifiCorp Energy		
Installation Address	Utah 10		
City, State, Zip	Castle Dale	UT	
Contact, Title	Don Arnold		
Phone, Email	801-220-4757	Don.Arnold@PacifiCorp.com	
Account, Meter, Rate			9
Participant is:	Acct Holder	Elect. User	Building Owner
Business Type	Manufacturing Facility		

Contractor Information

Contact		wattsmart Business vendor
Business Name		
Address		
City, State, Zip		
Phone, Email		

Payee Information

Incentive Should Be Addressed To:	
Business Name	
Attention	
Check Reference	
Address	
City, State, Zip	

Eligibility Information

Business Name		
Address		
City, State, Zip		
Account #		
Meter Base #, Rate		

Processing Information

Construction Type	Retrofit	Stage	Preliminary

Project Cost

Material	Labor	Other	Total Project Cost
$28,773.00	$3,420.00	$5,000.00	$37,193.00

Space Type & Size

	Calculation Method	Whole Building	Allowed Wattage		650,000	
1	Manufacturing Facility		FT^2	500,000	1.30	W/FT^2
			FT^2			W/FT^2
			FT^2			W/FT^2
			FT^2			W/FT^2
			FT^2			W/FT^2
	Manufacturing Facility		FT^2	500,000	1.30	W/FT^2

Lighting Operation Schedule

# of Holidays Closed?	Day	A	B	C	D	E
0	Mon	9.0				
Op Weeks Per Year	Tue	9.0				
52	Wed	9.0				
"S" is for a seasonal operational schedule	Thu	9.0				
S is for 0 hrs/year	Fri	9.0				
X is for 8760 hrs/year	Sat	9.0				
Y is for 4380 hrs/year	Sun	9.0				
	Total	3,285				

Additional Information

Category	
Fixture	
Lamp	
Lamp (W)	
Lamp Qty	
Ballast	
Factor	

26W - CMH-20W-ELEC
125W - CMH-100W-SCWA
26W - MHPS-20W-ELEC
189W - CMH-150W-SCWA
45W - CMH-39W-ELEC
277W - CMH-250W-LR
288W - CMH-250W-SCWA
324W - CMH-300W-LR
342W - CMH-300W-SCWA
55W - MH-50W-ELEC
342W - CMH-320W-LR

Add Fixture | Remove Fixture | Clear Filter | Build Fixture | Reset

98 W - CUST: LED Ind. and Haz. Ap
98 W - CUST: Crouse Hinds LED ind
48W - FLT8CFE-32W x 2L x 4'-CFE T
48W - FLT8CFE-32W x 2L x 4'-CFE R
98 W - CUST: VMV9L LED
98 W - CUST: VMV7L
78 W - CUST: PVM7LDM2/LINV1
94 W - CUST: PVM9LDM2/LINV1
351W - FLT5HO-54W x 6L x 4'-3 RS/
515 W - CUST: LEDHB-515W-DIM

515W - CUST: LEDHB-515W-DIM

Custom Fixture

Standard Incentive (0.4% of Cost Paid By Incentive)

Turbine Phase

Savings Information

141,023 kWh Saved Per Year

Lighting Power Density

1.30	Code	97.8%
0.05	Existing	Better Than Code
0.03	Proposed	LPD

ROCKY MOUNTAIN POWER
Let's turn the answers on.

↓↓Project Tracking↓↓

Preliminary

Pre-Inspection

Agreement Needed

Contracted

Post-Inspection

Final Review Needed

↓↓Project Notes↓↓

Preliminary

Hunter Power Plant (Turbine Phase)

2 Out Of 28 Lines Used

Line Number	Exterior	Schedule	Space Description	Existing Fixture	Existing Qty	Existing Controls	Existing Interior Fixture Wattage (38)	Existing Interior Space Wattage (25,480)	Existing Exterior Fixture Wattage (0)	Existing Exterior Space Wattage (0)	Proposed Fixture	Proposed Qty	Proposed Controls	Proposed Interior Fixture Wattage (38)	Proposed Interior Space Wattage (14,420)	Proposed Exterior Fixture Wattage (1)	Proposed Exterior Space Wattage (0)
1		X	Unit 3 Turbine	MV-400W x 2L-CWA	28		910	25,480			CUST: LEDHB-515W-DIM	28	Ad. Daylighting	515	14,420		
2		X	Turbine Deck Exits	ICE-15W x 2L	10		30	300			LEDE-2W	10		2	20		
3																	
4																	
5																	
6																	
7																	
8																	
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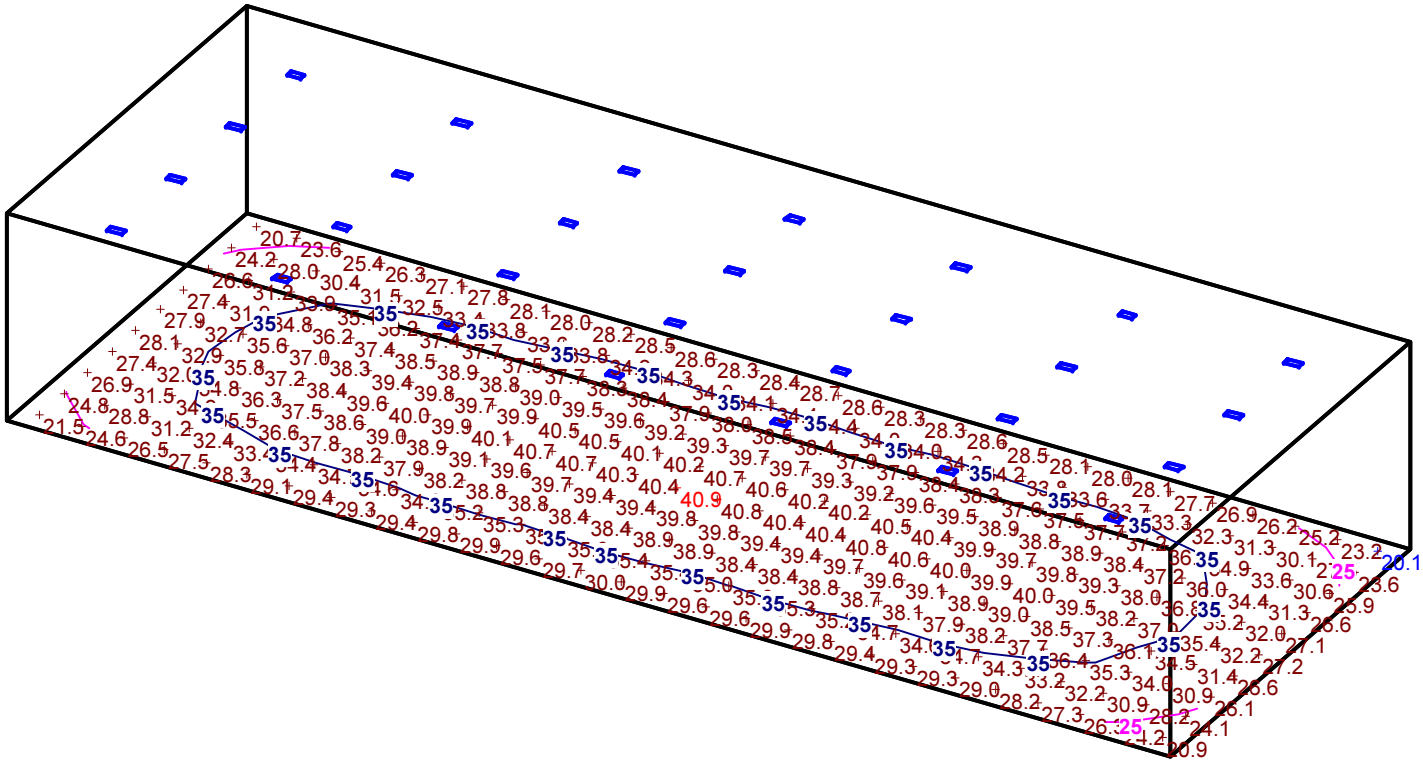
LED Lighting Layout



Northeast View

Not to Scale

STATISTICS

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
Calc Zone #1	+	34.3 fc	40.9 fc	20.1 fc	2.0:1	1.7:1

Calculated values include direct and interreflected components.

Evergreen Consulting Group

Lighting Layout Estimator

Designer
Richard Wood

Date
Sep 16 2013

Scale

Drawing No.
Hunter Turbine 3

1 of 1

ROCKY MOUNTAIN POWER

Let's turn the answers on.

V 070113.5.3

wattsmart® Business - Utah

07/01/13 Effective Date

You Can Now Use The Project Information Tab

Project ID	
Lighting Coordinator	Richard Wood
Tool Prepared by	RW
Project Manager	
Account Manager	

Customer Information

Project Name	Hunter Power Plant (Industrial Phase)		
Business Name	PacifiCorp Energy		
Installation Address	Utah 10		
City, State, Zip	Castle Dale	UT	
Contact, Title	Don Arnold		
Phone, Email	801-220-4757	Don.Arnold@PacifiCorp.com	
Account, Meter, Rate			9
Participant is:	Acct Holder	Elect. User	Building Owner
Business Type	Manufacturing Facility		

Contractor Information

Contact		wattsmart Business vendor
Business Name		
Address		
City, State, Zip		
Phone, Email		

Payee Information

Incentive Should Be Addressed To:	
Business Name	
Attention	
Check Reference	
Address	
City, State, Zip	

Eligibility Information

Business Name		
Address		
City, State, Zip		
Account #		
Meter Base #, Rate		

Processing Information

Construction Type	Retrofit	Stage	Preliminary

Project Cost

Material	Labor	Other	Total Project Cost
$1,024,761.00	$104,940.00	$25,000.00	**$1,154,701.00**

Space Type & Size

	Calculation Method	Whole Building	Allowed Wattage		650,000	
1	Manufacturing Facility		FT^2	500,000	1.30	W/FT^2
			FT^2			W/FT^2
			FT^2			W/FT^2
			FT^2			W/FT^2
			FT^2			W/FT^2
	Manufacturing Facility		FT^2	500,000	1.30	W/FT^2

Lighting Operation Schedule

# of Holidays Closed?	Day	A	B	C	D	E
0	Mon	9.0				
Op Weeks Per Year	Tue	9.0				
52	Wed	9.0				
"S" is for a seasonal operational schedule	Thu	9.0				
S is for 0 hrs/year	Fri	9.0				
X is for 8760 hrs/year	Sat	9.0				
Y is for 4380 hrs/year	Sun	9.0				
	Total	3,285				

Additional Information

Category	
Fixture	
Lamp	
Lamp (W)	
Lamp Qty	
Ballast	
Factor	

26W - CMH-20W-ELEC
125W - CMH-100W-SCWA
26W - MHPS-20W-ELEC
189W - CMH-150W-SCWA
45W - CMH-39W-ELEC
277W - CMH-250W-LR
288W - CMH-250W-SCWA
324W - CMH-300W-LR
342W - CMH-300W-SCWA
55W - MH-50W-ELEC
342W - CMH-320W-LR

Add Fixture | Remove Fixture | Clear Filter | Build Fixture | Reset

295W - MH-250W-CWA
144W - FLT12-40W x 4I x 4'-2 MG(F
130W - HPS-100W
98 W - CUST: LED Ind and Haz An
98 W - CUST: Crouse Hinds LED ind
48W - FLT8CFF-32W x 2I x 4'-CFF I
48W - FLT8CFF-32W x 2I x 4'-CFF R
98 W - CUST: VMV9L LED
98 W - CUST: VMV7I
78 W - CUST: PVM7LDM2/UNV1

Industrial Phase

Savings Information

1,463,965 kWh Saved Per Year

ROCKY MOUNTAIN POWER
Let's turn the answers on.

↓↓Project Tracking↓↓

Preliminary
Pre-Inspection
Agreement Needed
Contracted
Post-Inspection
Final Review Needed

205W - MV-175W-CWA

HID Mercury Vapor Standard (175W x 1L) 1 CWA Ballast

Standard Incentive (0.0% of Cost Paid By Incentive)

Lighting Power Density

1.30	Code	84.2%
0.54	Existing	Better Than Code
0.21	Proposed	LPD

Preliminary

Hunter Power Plant (Industrial Phase)

105 Out Of 122 Lines Used

Line Number	Exterior	Schedule	Space Description	Existing Fixture	Qty	Controls	Interior 269,265 / Exterior 0 Fixture Wattage	Space Wattage	Proposed Fixture	Qty	Controls	Interior 102,258 / Exterior 0 Fixture Wattage	Space Wattage	↓↓Project Notes↓↓
					1311	0				1311	1			
1		X	Elevator Machine RM Fl	MV-175W-CWA	7		205	1,435	CUST: PVM7LDM2/UNV1	7		78	546	Type RLB1
2		X	17th Floor	MV-175W-CWA	28		205	5,740	CUST: PVM7LDM2/UNV1	28		78	2,184	Type RLB1
3		X	16th Floor	MV-175W-CWA	13		205	2,665	CUST: PVM7LDM2/UNV1	13		78	1,014	Type RLB1
4		X	Steam Drum (West)	MV-175W-CWA	2		205	410	CUST: PVM7LDM2/UNV1	2		78	156	Type RLB1
5		X	16th Floor	MH-175W-CWA	1		215	215	CUST: PVM7LDM2/UNV1	1		78	78	Type RLB1
6		X	151/2 Floor	MV-175W-CWA	22		205	4,510	CUST: PVM7LDM2/UNV1	22		78	1,716	Type RLB1
7		X	Steam Drum (East) 16th	MV-175W-CWA	2		205	410	CUST: PVM7LDM2/UNV1	2		78	156	Type RLB1
8		X	15th Drum Level Transmitter	MV-175W-CWA	2		205	410	CUST: PVM7LDM2/UNV1	2		78	156	Type RLB1
9		X	15th Floor	MV-175W-CWA	36		205	7,380	CUST: PVM7LDM2/UNV1	36		78	2,808	Type RLB1
10		X	14th Floor	MV-175W-CWA	24		205	4,920	CUST: PVM7LDM2/UNV1	24		78	1,872	Type RLB1
11		X	13th Floor	MV-175W-CWA	3		205	615	CUST: PVM7LDM2/UNV1	3		78	234	Type RLB1
12		X	13th Floor	MV-175W-CWA	17		205	3,485	CUST: PVM7LDM2/UNV1	17		78	1,326	Type RLB1
13		X	13th Floor	MV-175W-CWA	1		205	205	CUST: PVM7LDM2/UNV1	1		78	78	Type RLB1
14		X	Coal Receiving Surge Hop Level 13	MV-175W-CWA	12		205	2,460	CUST: PVM7LDM2/UNV1	12		78	936	Type RLB1
15		X	Coal Receiving Surge Hop Level 13	MV-175W-CWA	6		205	1,230	CUST: PVM7LDM2/UNV1	6		78	468	Type RLB1
16		X	12th Floor	MV-175W-CWA	29		205	5,945	CUST: PVM7LDM2/UNV1	29		78	2,262	Type RLB1
17		X	12th Floor	MH-175W-CWA	11		215	2,365	CUST: PVM7LDM2/UNV1	11		78	858	Type RLB1
18		X	12th Floor	MH-175W-CWA	1		215	215	CUST: PVM7LDM2/UNV1	1		78	78	Type RLB1
19		X	12th Floor	MV-100W-CWA	1		125	125	CUST: PVM7LDM2/UNV1	1		78	78	Type RLB1
20		X	Coal Receiving Surge Hop Level 11-12	MV-175W-CWA	2		205	410	CUST: PVM7LDM2/UNV1	2		78	156	Type RLB1
21		X	Deaerator Deck	MV-175W-CWA	8		205	1,640	CUST: PVM7LDM2/UNV1	8		78	624	Type RLB1
22		X	11th Floor	MV-175W-CWA	39		205	7,995	CUST: PVM7LDM2/UNV1	39		78	3,042	Type RLB1
23		X	11th Floor	MH-175W-CWA	1		215	215	CUST: PVM7LDM2/UNV1	1		78	78	Type RLB1
24		X	10th Floor	MV-175W-CWA	38		205	7,790	CUST: PVM7LDM2/UNV1	38		78	2,964	Type RLB1
25		X	9th Floor	MV-175W-CWA	34		205	6,970	CUST: PVM7LDM2/UNV1	34		78	2,652	Type RLB1
26		X	9th Floor	MV-175W-CWA	36		205	7,380	CUST: PVM7LDM2/UNV1	36		78	2,808	Type RLB1
27		X	8th Floor	MH-175W-CWA	4		215	860	CUST: PVM7LDM2/UNV1	4		78	312	Type RLB1
28		X	8th Floor	MV-175W-CWA	2		205	410	CUST: PVM7LDM2/UNV1	2		78	156	Type RLB1
29		X	7th Floor	MV-175W-CWA	9		205	1,845	CUST: PVM7LDM2/UNV1	9		78	702	Type RLB1
30		X	7th Floor	MV-175W-CWA	4		205	820	CUST: PVM7LDM2/UNV1	4		78	312	Type RLB1
31		X	6th Floor	MH-175W-CWA	6		215	1,290	CUST: PVM7LDM2/UNV1	6		78	468	Type RLB1

32		X	6th Floor	MV-175W-CWA	1		205	205	CUST: PVM7LDM2/UNV1	1		78	78	Type RLB1
33		X	5th Floor	MV-175W-CWA	7		205	1,435	CUST: PVM7LDM2/UNV1	7		78	546	Type RLB1
34		X	5th Floor	MH-175W-CWA	7		215	1,505	CUST: PVM7LDM2/UNV1	7		78	546	Type RLB1
35		X	4th Floor	MV-175W-CWA	4		205	820	CUST: PVM7LDM2/UNV1	4		78	312	Type RLB1
36		X	4th Floor	MH-175W-CWA	1		215	215	CUST: PVM7LDM2/UNV1	1		78	78	Type RLB1
37		X	4th Floor	MV-175W-CWA	6		205	1,230	CUST: PVM7LDM2/UNV1	6		78	468	Type RLB1
38		X	4th Floor	MV-175W-CWA	15		205	3,075	CUST: PVM7LDM2/UNV1	15		78	1,170	Type RLB1
39		X	4th Floor	MH-175W-CWA	5		215	1,075	CUST: PVM7LDM2/UNV1	5		78	390	Type RLB1
40		X	4th Floor	MV-175W-CWA	1		205	205	CUST: PVM7LDM2/UNV1	1		78	78	Type RLB1
41		X	4th Floor	MV-175W-CWA	11		205	2,255	CUST: PVM7LDM2/UNV1	11		78	858	Type RLB1
42		X	5th Floor	MV-175W-CWA	6		205	1,230	CUST: PVM7LDM2/UNV1	6		78	468	Type RLB1
43		X	5th Floor	MV-175W-CWA	23		205	4,715	CUST: PVM7LDM2/UNV1	23		78	1,794	Type RLB1
44		X	6th Floor	MV-175W-CWA	9		205	1,845	CUST: PVM7LDM2/UNV1	9		78	702	Type RLB1
45		X	7th Floor	MV-175W-CWA	7		205	1,435	CUST: PVM7LDM2/UNV1	7		78	546	Type RLB1
46		X	8th Floor	MV-175W-CWA	5		205	1,025	CUST: PVM7LDM2/UNV1	5		78	390	Type RLB1
47		X	5th Floor	MV-100W-CWA	3		125	375	CUST: PVM7LDM2/UNV1	3		78	234	Type RLB1
48		X	6th Floor South Side	MV-175W-CWA	7		205	1,435	CUST: PVM7LDM2/UNV1	7		78	546	Type RLB1
49		X	6th Floor South Side	MV-175W-CWA	3		205	615	CUST: PVM7LDM2/UNV1	3		78	234	Type RLB1
50		X	7th Floor South Side	MV-175W-CWA	10		205	2,050	CUST: PVM7LDM2/UNV1	10		78	780	Type RLB1
51		X	7th Floor South Side	MV-175W-CWA	7		205	1,435	CUST: PVM7LDM2/UNV1	7		78	546	Type RLB1
52		X	8th Floor	MV-175W-CWA	6		205	1,230	CUST: PVM7LDM2/UNV1	6		78	468	Type RLB1
53		X	Feeder Deck	MV-175W-CWA	8		205	1,640	CUST: PVM7LDM2/UNV1	8		78	624	Type RLB1
54		X	Feeder Deck	MV-175W-CWA	8		205	1,640	CUST: PVM7LDM2/UNV1	8		78	624	Type RLB1
55		X	3rd Floor	MV-175W-CWA	4		205	820	CUST: PVM7LDM2/UNV1	4		78	312	Type RLB1
56		X	3rd Floor	MV-175W-CWA	4		205	820	CUST: PVM7LDM2/UNV1	4		78	312	Type RLB1
57		X	2nd Floor	MV-175W-CWA	26		205	5,330	CUST: PVM7LDM2/UNV1	26		78	2,028	Type RLB1
58		X	2nd Floor	MV-175W-CWA	7		205	1,435	CUST: PVM7LDM2/UNV1	7		78	546	Type RLB1
59		X	Pulverizer Level	MV-175W-CWA	9		205	1,845	CUST: PVM7LDM2/UNV1	9		78	702	Type RLB1
60		X	Pulverizer Level	MV-175W-CWA	4		205	820	CUST: PVM7LDM2/UNV1	4		78	312	Type RLB1
61		X	Pulverizer Level	MV-175W-CWA	1		205	205	CUST: PVM7LDM2/UNV1	1		78	78	Type RLB1
62		X	Under Pulverizer Level	MV-175W-CWA	2		205	410	CUST: PVM7LDM2/UNV1	2		78	156	Type RLB1
63		X	Floor 1 Boiler	MV-175W-CWA	4		205	820	CUST: PVM7LDM2/UNV1	4		78	312	Type RLB1
64		X	Floor 1 Boiler	MH-175W-CWA	2		215	430	CUST: PVM7LDM2/UNV1	2		78	156	Type RLB1
65		X	Pulverizer Basement	MV-175W-CWA	19		205	3,895	CUST: PVM7LDM2/UNV1	19		78	1,482	Type RLB1
66		X	Pulverizer Basement	MV-175W-CWA	9		205	1,845	CUST: PVM7LDM2/UNV1	9		78	702	Type RLB1
67		X	10th Floor Reddler Deck	MV-175W-CWA	37		205	7,585	CUST: PVM7LDM2/UNV1	37		78	2,886	Type RLB1
68		X	6th Floor	MV-175W-CWA	36		205	7,380	CUST: PVM7LDM2/UNV1	36		78	2,808	Type RLB1
69		X	6th Floor	MV-175W-CWA	1		205	205	CUST: PVM7LDM2/UNV1	1		78	78	Type RLB1
70		X	Coal Silo 7th Floor	MV-175W-CWA	5		205	1,025	CUST: PVM7LDM2/UNV1	5		78	390	Type RLB1
71		X	Coal Silo 7th Floor	MV-175W-CWA	5		205	1,025	CUST: PVM7LDM2/UNV1	5		78	390	Type RLB1
72		X	Turbine Deck Level 3	MV-175W-CWA	42		205	8,610	CUST: PVM7LDM2/UNV1	42		78	3,276	Type CR7L
73		X	Deck 2	MH-175W-CWA	41		215	8,815	CUST: PVM7LDM2/UNV1	41		78	3,198	Type CR7L
74		X	Deck 2	MV-175W-CWA	8		205	1,640	CUST: PVM7LDM2/UNV1	8		78	624	Type CR7L
75		X	Deck 2	MV-175W-CWA	10		205	2,050	CUST: PVM7LDM2/UNV1	10		78	780	Type CR7L
76		X	DC Hall	MH-175W-CWA	3		215	645	CUST: PVM7LDM2/UNV1	3		78	234	Type RLB1
77		X	Battery RM	MV-175W-CWA	6		205	1,230	CUST: PVM7LDM2/UNV1	6	Occupancy	78	468	Type RLB1
78		X	Floor 1 Turbine	MV-175W-CWA	38		205	7,790	CUST: PVM7LDM2/UNV1	38		78	2,964	Type RLB1
79		X	Floor 1 Turbine	MV-175W-CWA	63		205	12,915	CUST: PVM7LDM2/UNV1	63		78	4,914	Type RLB1
80		X	Floor 1 Turbine	MV-175W-CWA	8		205	1,640	CUST: PVM7LDM2/UNV1	8		78	624	Type RLB1
81		X	Chemical Dock	MV-175W-CWA	13		205	2,665	CUST: PVM7LDM2/UNV1	13		78	1,014	Type RLB1
82		X	Floor 1 Turbine	MV-175W-CWA	3		205	615	CUST: PVM7LDM2/UNV1	3		78	234	Type RLB1
83		X	Diesel Generator	MV-175W-CWA	3		205	615	CUST: PVM7LDM2/UNV1	3		78	234	Type RLB1
84		X	Hydrogen Trailer /Co2	MV-175W-CWA	9		205	1,845	CUST: PVM7LDM2/UNV1	9		78	702	Type RLB1

85		X	Bag House	MV-175W-CWA	54		205	11,070	CUST: PVM7LDM2/UNV1	54		78	4,212	Type RLB1
86		X	2nd Floor	MV-175W-CWA	24		205	4,920	CUST: PVM7LDM2/UNV1	24		78	1,872	Type RLB1
87		X	3rd Floor	MV-175W-CWA	10		205	2,050	CUST: PVM7LDM2/UNV1	10		78	780	Type RLB1
88		X	Air Heater Floor	MV-175W-CWA	10		205	2,050	CUST: PVM7LDM2/UNV1	10		78	780	Type RLB1
89		X	Air Heater Floor	MV-175W-CWA	13		205	2,665	CUST: PVM7LDM2/UNV1	13		78	1,014	Type RLB1
90		X	Upper Air Handler	MV-175W-CWA	6		205	1,230	CUST: PVM7LDM2/UNV1	6		78	468	Type RLB1
91		X	Upper Air Handler	MV-175W-CWA	4		205	820	CUST: PVM7LDM2/UNV1	4		78	312	Type RLB1
92		X	Scrubber Recycle Pump Bay	MV-175W-CWA	32		205	6,560	CUST: PVM7LDM2/UNV1	32		78	2,496	Type RLB1
93		X	Pump RM	MV-175W-CWA	3		205	615	CUST: PVM7LDM2/UNV1	3		78	234	Type RLB1
94		X	Ash Water Pump House	MV-175W-CWA	36		205	7,380	CUST: PVM7LDM2/UNV1	36		78	2,808	Type RLB1
95		X	Ash Unloading Base Room	MV-175W-CWA	10		205	2,050	CUST: PVM7LDM2/UNV1	10		78	780	Type RLB1
96		X	Fly ash unloader RM	MV-175W-CWA	17		205	3,485	CUST: PVM7LDM2/UNV1	17		78	1,326	Type RLB1
97		X	Fly Ash Slurry Pump RM	MV-175W-CWA	8		205	1,640	CUST: PVM7LDM2/UNV1	8		78	624	Type RLB1
98		X	Unit 3 Cooling Tower Chemical Bldg.	MV-175W-CWA	7		205	1,435	CUST: PVM7LDM2/UNV1	7		78	546	Type RLB1
99		X	Side RM's	MV-175W-CWA	2		205	410	CUST: PVM7LDM2/UNV1	2		78	156	Type RLB1
100		X	Side RM's	MV-175W-CWA	2		205	410	CUST: PVM7LDM2/UNV1	2		78	156	Type RLB1
101		X	Cooling Tower (two sides)	MV-175W-CWA	18		205	3,690	CUST: PVM7LDM2/UNV1	18		78	1,404	Type RLB1
102		X	Cooling Tower Traveling Screen Bldg.	MV-175W-CWA	4		205	820	CUST: PVM7LDM2/UNV1	4		78	312	Type RLB1
103		X	Fly Ash Blower RM	MV-175W-CWA	17		205	3,485	CUST: PVM7LDM2/UNV1	17		78	1,326	Type RLB1
104		X	Conveyor #3 base Transfer Hut	MV-175W-CWA	17		205	3,485	CUST: PVM7LDM2/UNV1	17		78	1,326	Type RLB1
105		X	3242 Conveyor Tunnel	MV-175W-CWA	34		205	6,970	CUST: PVM7LDM2/UNV1	34		78	2,652	Type RLB1
106														
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ROCKY MOUNTAIN POWER

Let's turn the answers on.

V 070113.5.3

wattsmart® Business - Utah

07/01/13 Effective Date

You Can Now Use The Project Information Tab

Project ID	
Lighting Coordinator	Richard Wood
Tool Prepared by	RW
Project Manager	
Account Manager	

Customer Information

Project Name	Hunter Power Plant (Exterior Phase)		
Business Name	PacifiCorp Energy		
Installation Address	Utah 10		
City, State, Zip	Castle Dale	UT	
Contact, Title	Don Arnold		
Phone, Email	801-220-4757	Don.Arnold@PacifiCorp.com	
Account, Meter, Rate			9
Participant is:	Acct Holder	Elect. User	Building Owner
Business Type	Manufacturing Facility		

Contractor Information

Contact		wattsmart Business vendor
Business Name		
Address		
City, State, Zip		
Phone, Email		

Payee Information

Incentive Should Be Addressed To:	
Business Name	
Attention	
Check Reference	
Address	
City, State, Zip	

Eligibility Information

Business Name		
Address		
City, State, Zip		
Account #		
Meter Base #, Rate		

Processing Information

Construction Type	Retrofit	Stage	Preliminary

Project Cost

Material	Labor	Other	Total Project Cost
$503,602.00	$51,520.00	$15,000.00	$570,122.00

Space Type & Size

	Calculation Method	Whole Building	Allowed Wattage		650,000	
1	Manufacturing Facility		FT^2	500,000	1.30	W/FT^2
			FT^2			W/FT^2
			FT^2			W/FT^2
			FT^2			W/FT^2
			FT^2			W/FT^2
	Manufacturing Facility		FT^2	500,000	1.30	W/FT^2

Lighting Operation Schedule

# of Holidays Closed?	Day	A	B	C	D	E
0	Mon	9.0				
Op Weeks Per Year	Tue	9.0				
52	Wed	9.0				
"S" is for a seasonal operational schedule	Thu	9.0				
S is for 0 hrs/year	Fri	9.0				
X is for 8760 hrs/year	Sat	9.0				
Y is for 4380 hrs/year	Sun	9.0				
	Total	3,285				

Additional Information

Category	LED
Fixture	
Lamp	Wall Pack
Lamp (W)	45
Lamp Qty	
Ballast	
Factor	

45W - LEDWP-45W

Add Fixture | Remove Fixture | Clear Filter | Build Fixture | Reset

130W - HPS-100W
98 W - CUST: LED Ind and Haz An
98 W - CUST: Crouse Hinds LED ind
48W - FLT8CFF-32W x 2L x 4'-CFF T
48W - FLT8CFF-32W x 2L x 4'-CFF R
98 W - CUST: VMV9L LED
98 W - CUST: VMV7L
78 W - CUST: PVM7LDM2/UNV1
94 W - CUST: PVM9LDM2/UNV1
351W - FLT5HO-54W x 6L x 4'-3 RS/

205W - MV-175W-CWA

HID Mercury Vapor Standard (175W x 1L) 1 CWA Ballast

Standard Incentive (0.0% of Cost Paid By Incentive)

Exterior Phase

Savings Information

520,362 kWh Saved Per Year

Lighting Power Density

1.30	Code	100.0%
0.00	Existing	Better Than Code
0.00	Proposed	LPD

ROCKY MOUNTAIN POWER
Let's turn the answers on.

↓↓Project Tracking↓↓

Preliminary
Pre-Inspection
Agreement Needed
Contracted
Post-Inspection
Final Review Needed

Preliminary

Hunter Power Plant (Exterior Phase)

45 Out Of 56 Lines Used

Line Number	Exterior	Schedule	Space Description	Existing Fixture	Qty	Controls	Interior	0	Exterior	122,010	Proposed Fixture	Qty	Controls	Interior	0	Exterior	50,050	↓↓Project Notes↓↓
					644	0		Fixture Wattage		Space Wattage		644	0		Fixture Wattage		Space Wattage	
1	+	Y	Exterior Turbine	MV-175W-CWA	1			205		205	CUST: PVM7LDM2/UNV1	1			78		78	Type RLB1
2	+	Y	Exterior Turbine	MV-175W-CWA	7			205		1,435	CUST: PVM7LDM2/UNV1	7			78		546	Type RLB1
3	+	Y	Back Exterior Boiler	MV-175W-CWA	7			205		1,435	CUST: PVM7LDM2/UNV1	7			78		546	Type RLB1
4	+	Y	Back Exterior Boiler	MV-175W-CWA	15			205		3,075	CUST: PVM7LDM2/UNV1	15			78		1,170	Type RLB1
5	+	Y	Top level Back Side	MV-175W-CWA	6			205		1,230	CUST: PVM7LDM2/UNV1	6			78		468	Type RLB1
6	+	Y	Top level Center Walkway	MV-175W-CWA	6			205		1,230	CUST: PVM7LDM2/UNV1	6			78		468	Type RLB1
7	+	Y	Top level Center Walkway	MV-175W-CWA	1			205		205	CUST: PVM7LDM2/UNV1	1			78		78	Type RLB1
8	+	Y	Top Floor /Front of Bag House	MV-175W-CWA	8			205		1,640	CUST: PVM7LDM2/UNV1	8			78		624	Type RLB1
9	+	Y	Top Floor Outside East/West	MV-175W-CWA	4			205		820	CUST: PVM7LDM2/UNV1	4			78		312	Type RLB1
10	+	Y	3rd Floor Outside Walkway.	MV-175W-CWA	40			205		8,200	CUST: PVM7LDM2/UNV1	40			78		3,120	Type RLB1
11	+	Y	3rd Floor Center outside.	MV-175W-CWA	7			205		1,435	CUST: PVM7LDM2/UNV1	7			78		546	Type RLB1
12	+	Y	Outside Back of Bag House downstairs	HPS-100W	28			130		3,640	CUST: PVM7LDM2/UNV1	28			78		2,184	Type RLB1
13	+	X	Induced Draft Fans (West)	MV-175W-CWA	13			205		2,665	CUST: PVM7LDM2/UNV1	13			78		1,014	Type RLB1
14	+	X	Induced Draft Fans (East)	MV-175W-CWA	13			205		2,665	CUST: PVM7LDM2/UNV1	13			78		1,014	Type RLB1
15	+	X	West Induced Draft	MV-175W-CWA	19			205		3,895	CUST: PVM7LDM2/UNV1	19			78		1,482	Type RLB1
16	+	X	East Induced Draft	MV-175W-CWA	19			205		3,895	CUST: PVM7LDM2/UNV1	19			78		1,482	Type RLB1
17	+	Y	Bottom Ash Transport Lines	HPS-100W	5			130		650	CUST: PVM7LDM2/UNV1	5			78		390	Type RLB1
18	+	X	Bottom Level of Fans	MV-175W-CWA	24			205		4,920	CUST: PVM7LDM2/UNV1	24			78		1,872	Type RLB1
19	+	X	Top of Tanks	MV-175W-CWA	2			205		410	CUST: PVM7LDM2/UNV1	2			78		156	Type RLB1
20	+	Y	Bottom Ash Transport upper lines	HPS-100W	45			130		5,850	CUST: PVM7LDM2/UNV1	45			78		3,510	Type RLB1
21	+	Y	Bottom Ash Lower Transport lines	HPS-100W	11			130		1,430	CUST: PVM7LDM2/UNV1	11			78		858	Type RLB1
22	+	Y	Conveyor Support Tower	HPS-100W	7			130		910	CUST: PVM7LDM2/UNV1	7			78		546	Type RLB1
23	+	X	Lime Silo Stairs	MV-175W-CWA	40			205		8,200	CUST: PVM7LDM2/UNV1	40			78		3,120	Type RLB1
24	+	X	Lime Silo Middle/lower	MV-175W-CWA	10			205		2,050	CUST: PVM7LDM2/UNV1	10			78		780	Type RLB1

25	+	X	Scrubber top level	MV-175W-CWA	20		205	4,100	CUST: PVM7LDM2/UNV1	20		78	1,560	Type RLB1
26	+	X	Stairs Down	MV-175W-CWA	80		205	16,400	CUST: PVM7LDM2/UNV1	80		78	6,240	Type RLB1
27	+	X	Stairs Down	MV-175W-CWA	20		205	4,100	CUST: PVM7LDM2/UNV1	20		78	1,560	Type RLB1
28	+	X	Ash Water Pump House Exterior	MV-175W-CWA	2		205	410	LEDWP-45W	2		45	90	WP1
29	+	Y	Ash De-watering System Stairs	MV-175W-CWA	11		205	2,255	CUST: PVM7LDM2/UNV1	11		78	858	Type RLB1
30	+	Y	Ash De-watering System Stairs	HPS-100W	13		130	1,690	CUST: PVM7LDM2/UNV1	13		78	1,014	Type RLB1
31	+	Y	Ash Water Surge Tank + Settling tank	HPS-100W	6		130	780	CUST: PVM7LDM2/UNV1	6		78	468	Type RLB1
32	+	Y	Bottom Ash Unloading	HPS-100W	6		130	780	CUST: PVM7LDM2/UNV1	6		78	468	Type RLB1
33	+	Y	Thickener Bldg. Exterior	MV-175W-CWA	9		205	1,845	CUST: PVM7LDM2/UNV1	9		78	702	Type RLB1
34	+	Y	Fly Ash Unloading outside tower	HPS-100W	12		130	1,560	CUST: PVM7LDM2/UNV1	12		78	936	Type RLB1
35	+	X	Ground Level Outside (tanks) fly ash unloading	MV-175W-CWA	18		205	3,690	CUST: PVM7LDM2/UNV1	18		78	1,404	Type RLB1
36	+	Y	Fly Ash Unloader Suspended Balcony	HPS-250W	1		295	295	CUST: PVM9LDM2/UNV1	1		94	94	Type RLB2
37	+	Y	Unit 3 Cooling Tower Tank Outside	MV-175W-CWA	5		205	1,025	CUST: PVM7LDM2/UNV1	5		78	390	Type RLB1
38	+	Y	Unit 3 Cooling Tower Tank Outside Covered Deck	MV-175W-CWA	6		205	1,230	CUST: PVM7LDM2/UNV1	6		78	468	Type RLB1
39	+	Y	Exterior	MV-175W-CWA	2		205	410	LEDWP-45W	2		45	90	Type RLB1
40	+	Y	Exterior	MV-175W-CWA	2		205	410	LEDWP-45W	2		45	90	Type RLB1
41	+	X	General Fan/ Switch Gear Area Ext.	MV-175W-CWA	21		205	4,305	CUST: PVM7LDM2/UNV1	21		78	1,638	Type RLB1
42	+	X	Conveyor Bridge	MH-175W-CWA	55		215	11,825	CUST: PVM7LDM2/UNV1	55		78	4,290	Type RLB1
43	+	X	Conveyor Support Towers	MV-175W-CWA	4		205	820	CUST: PVM7LDM2/UNV1	4		78	312	Type RLB1
44	+	Y	Longer Conveyor under support	HPS-100W	9		130	1,170	CUST: PVM7LDM2/UNV1	9		78	702	Type RLB1
45	+	X	Conveyor Tower Support	MV-175W-CWA	4		205	820	CUST: PVM7LDM2/UNV1	4		78	312	Type RLB1
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Appendix C

Fixture Specification Sheets

PacifiCorp Power Plant Projects Fixture Schedule

Fixture Type	Manufacturer	Catalog Number	Description	Lighting Tool fixture code
BHLO1	Osram Sylvania	QHE 2x32T8/UNV PSH-HT # 49450	2L program start HLO Ballast	FLT8CEE-32W x 2L X 4'-CEE RS/PRS CEE H
BRLO1	Osram Sylvania	QHE2x32T8/UNV PSX-MC # 51428	2L program start RLO Ballast 1L program start RLO Ballast option	FLT8CEE-32W x 2L X 4'-CEE RS/PRS CEE L FLT8CEE-32W x 4'-CEE RS/PRS CEE L FLT8CEE-32W x 2L X 4'-CEE IS CEE L
HB6	Lithonia	IBL 48L WD LP740 DLC	515w LED high bay	CUST: LEDHB-515W-DIM
L1	Osram Sylvania	FO32/841/XPS/ECO3 # 21681	21681 HPT8 lamp 32w	FLT8CEE-32W x 4'-…
RLB1	Crouse Hinds	PVM7LDM2/UNV1	78W Retrofit low bay-Indust	CUST: PVM7LDM2/UNV1
RLB2	Crouse Hinds	PVM9LDM2/UNV1	98W Retrofit low bay-Indust	CUST: PVM9LDM2/UNV1
SK2	Lithonia	AVRK8 2 32 CW42 1/4 BINP WHR	HPT8 strip kit with reflector	8' conversion - FLT8CEE-32W x 2L X 4'-CEE RS/PRS CEE H
WP1	Lithonia	DSXW1 LED 20C 700 40K T3M MVOLT DDBXD	45w LED wall pack	LEDWP-45w
IC			integral occupancy sensor	
W-OCC			Wireless occupancy sensor	
Exit			2W LED exit sign	LEDE-2W

D-Series Size 1
LED Wall Luminaire

Catalog Number	DSXW1 LED 20C 700 40K T3M MVOLT DDBXD
Notes	
Type	WP1

Hit the Tab key or mouse over the page to see all interactive elements.

d-series

Introduction

The D-Series Wall luminaire is a stylish, fully integrated LED solution for building-mount applications. It features a sleek, modern design and is carefully engineered to provide long-lasting, energy-efficient lighting with a variety of optical and control options for customized performance.

With an expected service life of over 20 years of nighttime use and up to 74% in energy savings over comparable 250W metal halide luminaires, the D-Series Wall is a reliable, low-maintenance lighting solution that produces sites that are exceptionally illuminated.

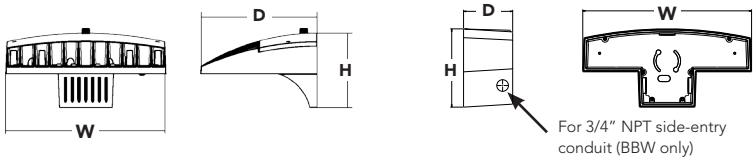
Specifications

Luminaire

Width:	13-3/4" (34.9 cm)	**Weight:**	12 lbs (5.4 kg)
Depth:	10" (25.4 cm)		
Height:	6-3/8" (16.2 cm)		

Back Box (BBW, ELCW)

Width:	13-3/4" (34.9 cm)	**BBW Weight:**	5 lbs (2.3 kg)
Depth:	4" (10.2 cm)	**ELCW Weight:**	10 lbs (4.5 kg)
Height:	6-3/8" (16.2 cm)		



Ordering Information

EXAMPLE: DSXW1 LED 20C 1000 40K T3M MVOLT DDBTXD

DSXW1 LED							
Series	**Performance Package**	**Distribution**	**Voltage**	**Mounting**	**Control Options**	**Other Options**	**Finish** *(required)*
DSXW1 LED	**LEDs** 10C 10 LEDs (one engine) 20C 20 LEDs (two engines) **Drive current** 350 350 mA 530 530 mA 700 700 mA 1000 1000 mA (1 A) **Color temperature** 30K 3000K 40K 4000K 50K 5000K	T2S Type II Short T2M Type II Medium T3S Type III Short T3M Type III Medium T4M Type IV Medium TFTM Forward Throw Medium	MVOLT [1] 120 [1] 208 [1] 240 [1] 277 [1]	**Shipped included** (blank) Surface mounting bracket BBW Surface-mounted back box (for conduit entry) [2]	**Shipped installed** PE Photoelectric cell, button type [3] DMG 0-10V dimming driver (no controls) PIR 180° motion/ambient light sensor, <15' mtg ht [4,6] PIRH 180° motion/ambient light sensor, 15-30' mtg ht [5,6] ELCW Emergency battery backup (includes external component enclosure) [7]	**Shipped installed** SF Single fuse (120, 277V) [8] DF Double fuse (208, 240V) [8] HS House-side shield [9] **Shipped separately** BSW Bird-deterrent spikes [9] WG Wire guard [9] VG Vandal guard [9]	DDBXD Dark bronze DBLXD Black DNAXD Natural aluminum DWHXD White DSSXD Sandstone DDBTXD Textured dark bronze DBLBXD Textured black DNATXD Textured natural aluminum DWHGXD Textured white DSSTXD Textured sandstone

NOTES

1 MVOLT driver operates on any line voltage from 120-277V (50/60 Hz). Specify 120, 208, 240 or 277 options only when ordering with fusing (SF, DF options), or photocontrol (PE option).
2 Back box ships installed on fixture. Cannot be field installed. Cannot be ordered as an accessory.
3 Photocontrol (PE) requires 120, 208, 240 or 277 voltage option. Not available with motion/ambient light sensors (PIR or PIRH).
4 Specifies the Sensor Switch SBR-10-ODP control; see Motion Sensor Guide for details. Includes ambient light sensor. Not available with "PE" option (button type photocell). Dimming driver standard.
5 Specifies the Sensor Switch SBR-6-ODP control; see Motion Sensor Guide for details. Includes ambient light sensor. Not available with "PE" option (button type photocell). Dimming driver standard.
6 Not available with 20 LED/1000 mA configuration (DSXW1 LED 20C 1000).
7 Not compatible with conduit entry applications. Not available with BBW mounting option.
8 Single fuse (SF) requires 120 or 277 voltage option. Double fuse (DF) requires 208 or 240 voltage option.
9 Also available as a separate accessory; see Accessories information.

Accessories

Ordered and shipped separately.

DSXWHS U	House-side shield (one per light engine)
DSXWBSW U	Bird-deterrent spikes
DSXW1WG U	Wire guard accessory
DSXW1VG U	Vandal guard accessory

Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Actual wattage may differ by +/- 8% when operating between 120-480V +/- 10%. Contact factory for performance data on any configurations not shown here.

LEDs	Drive Current (mA)	Performance Package	System Watts	Dist. Type	40K (4000K, 70 CRI)					50K (5000K, 65 CRI)				
					Lumens	B	U	G	LPW	Lumens	B	U	G	LPW
10C (10 LEDs)	530	10C 530 --K	20 W	T2S	1724	1	0	1	86	1807	1	0	1	90
				T2M	1729	1	0	1	86	1812	1	0	1	91
				T3S	1709	1	0	1	85	1792	1	0	1	90
				T3M	1753	1	0	1	88	1838	1	0	1	92
				T4M	1753	1	0	1	88	1837	1	0	1	92
				TFTM	1766	1	0	1	88	1851	1	0	1	93
	700	10C 700 --K	27 W	T2S	2234	1	0	1	83	2341	1	0	1	87
				T2M	2241	1	0	1	83	2349	1	0	1	87
				T3S	2216	1	0	1	82	2322	1	0	1	86
				T3M	2272	1	0	1	84	2381	1	0	1	88
				T4M	2272	1	0	1	84	2381	1	0	1	88
				TFTM	2289	1	0	1	85	2399	1	0	1	89
	1000	10C 1000 --K	40 W	T2S	2992	1	0	1	75	3136	1	0	1	78
				T2M	3001	1	0	1	75	3146	1	0	1	79
				T3S	2967	1	0	1	74	3110	1	0	1	78
				T3M	3043	1	0	1	76	3189	1	0	1	80
				T4M	3043	1	0	1	76	3189	1	0	1	80
				TFTM	3066	1	0	1	77	3213	1	0	1	80
20C (20 LEDs)	530	20C 530 --K	36 W	T2S	3545	1	0	1	98	3715	1	0	1	103
				T2M	3556	1	0	1	99	3727	1	0	1	104
				T3S	3515	1	0	1	98	3685	1	0	1	102
				T3M	3606	1	0	2	100	3779	1	0	2	105
				T4M	3605	1	0	1	100	3779	1	0	1	105
				TFTM	3632	1	0	1	101	3807	1	0	1	106
	700	20C 700 --K	47 W	T2S	4357	1	0	1	93	4566	1	0	1	97
				T2M	4370	1	0	1	93	4580	1	0	1	97
				T3S	4320	1	0	1	92	4528	1	0	1	96
				T3M	4431	1	0	2	94	4644	1	0	2	99
				T4M	4430	1	0	1	94	4644	1	0	2	99
				TFTM	4464	1	0	1	95	4678	1	0	1	100
	1000	20C 1000 --K	75 W	T2S	5745	2	0	2	77	6020	2	0	2	80
				T2M	5763	1	0	2	77	6039	2	0	2	81
				T3S	5697	1	0	1	76	5970	1	0	2	80
				T3M	5843	1	0	2	78	6123	2	0	2	82
				T4M	5843	1	0	2	78	6123	1	0	2	82
				TFTM	5887	1	0	2	78	6169	1	0	2	82

Lumen Ambient Temperature (LAT) Multipliers

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

Ambient		Lumen Multiplier
0°C	32°F	1.02
10°C	50°F	1.01
20°C	68°F	1.00
25°C	**77°F**	**1.00**
30°C	86°F	1.00
40°C	104°F	0.98

Projected LED Lumen Maintenance

Data references the extrapolated performance projections for the **DSXW1 LED 20C 1000** platform in a **25°C ambient**, based on 10,000 hours of LED testing (tested per IESNA LM-80-08 and projected per IESNA TM-21-11).

To calculate LLF, use the lumen maintenance factor that corresponds to the desired number of operating hours below. For other lumen maintenance values, contact factory.

Operating Hours	0	25,000	50,000	100,000
Lumen Maintenance Factor	1.0	0.95	0.93	0.88

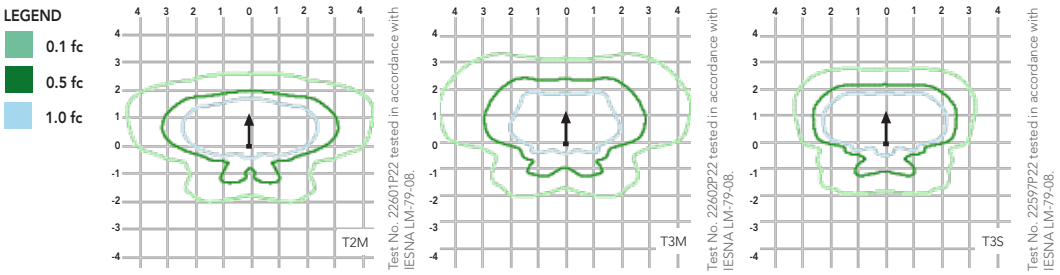
Electrical Load

LEDs	Drive Current (mA)	System Watts	Current (A)					
			120	208	240	277	347	480
10C	350	14 W	0.13	0.07	0.06	0.06	-	-
	530	20 W	0.19	0.11	0.09	0.08	-	-
	700	27 W	0.25	0.14	0.13	0.11	-	-
	1000	40 W	0.37	0.21	0.19	0.16	-	-
20C	350	25 W	0.23	0.13	0.12	0.10	-	-
	530	36 W	0.33	0.19	0.17	0.14	-	-
	700	47 W	0.44	0.25	0.22	0.19	-	-
	1000	75 W	0.69	0.40	0.35	0.30	-	-

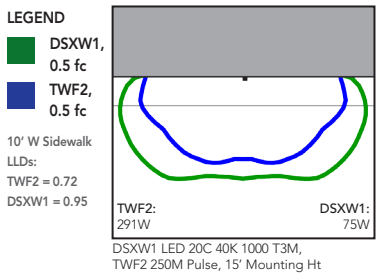
Photometric Diagrams

To see complete photometric reports or download .ies files for this product, visit Lithonia Lighting's D-Series Wall Size 1 homepage.

Isofootcandle plots for the DSXW1 LED 20C 1000 40K. Distances are in units of mounting height (15').



Distribution overlay comparison to 250W metal halide.



DSXW1 LED 20C 40K 1000 T3M, TWF2 250M Pulse, 15' Mounting Ht

FEATURES & SPECIFICATIONS

INTENDED USE
The energy savings, long life and easy-to-install design of the D-Series Wall Size 1 make it the smart choice for building-mounted doorway and pathway illumination for nearly any facility.

CONSTRUCTION
Two-piece die-cast aluminum housing has integral heat sink fins to optimize thermal management through conductive and convective cooling. Modular design allows for ease of maintenance. The LED driver is mounted to the door to thermally isolate it from the light engines for low operating temperature and long life. Housing is completely sealed against moisture and environmental contaminants.

FINISH
Exterior parts are protected by a zinc-infused Super Durable TGIC thermoset powder coat finish that provides superior resistance to corrosion and weathering. A tightly controlled multi-stage process ensures a minimum 3 mils thickness for a finish that can withstand extreme climate changes without cracking or peeling. Available in textured and non-textured finishes.

OPTICS
Precision-molded proprietary acrylic lenses provide multiple photometric distributions tailored specifi cally to building mounted applications. Light engines are available in 3000K (80 min. CRI), 4000K (70 min. CRI) or 5000K (65 min. CRI) configurations.

ELECTRICAL
Light engine(s) consist of 10 high-efficacy LEDs mounted to a metal-core circuit board to maximize heat dissipation and promote long life (L88/100,000 hrs at 25°C). Class 1 electronic drivers have a power factor >90%, THD <20%, and an expected life of 100,000 hours. Surge protection device meets a minimum Category C Low (per ANSI/IEEE C62.41.2).

INSTALLATION
Included universal mounting bracket attaches securely to any 4" round or square outlet box for quick and easy installation. Luminaire has a slotted gasket wireway and attaches to the mounting bracket via corrosion-resistant screws.

LISTINGS
CSA certified to U.S. and Canadian standards. Rated for -40°C minimum ambient.

WARRANTY
Five year limited warranty. Full warranty terms located at www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx.

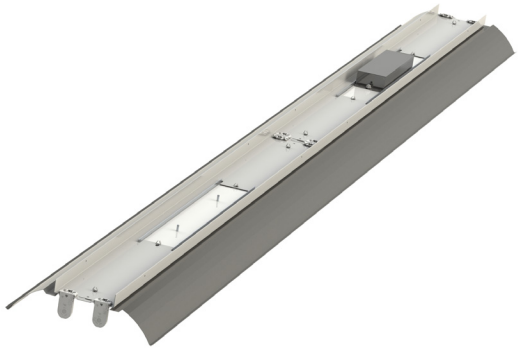
Note: Specifications subject to change without notice.

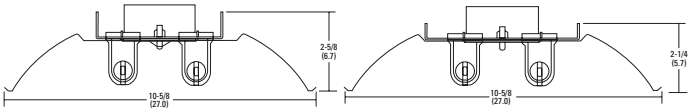
LITHONIA LIGHTING®

Catalog Number	AVRK8 2 32 CW42 1/4 BINP WHR
Notes	
Type	

AVRK

Assembled Strip retrofit kit
1 or 2 Lamp
4' or 8'
Energy saving T8





FEATURES & SPECIFICATIONS

INTENDED USE - The AVRK series retrofit kits are designed to convert existing 4' and 8' fluorescent strip fixtures to state of the art energy-efficient fluorescent lamp and ballast technology along with high performance reflectors for enhanced light output. Retrofitting older fixtures can greatly reduce energy consumption and lamp replacement costs while improving light. The channels are shipped fully assembled and pre-wired to allow fast, easy installation with minimal labor. Choice of channel widths ensures compatibility with the broadest range of existing fixtures. The AVRK strip reflector conversion kit maximizes fixture efficiency and provides enhanced uniform light distribution.

CONSTRUCTION - One-piece 4' or 8' nominal channels are formed from rugged corrosion resistant aluminum for durability and light weight. All channel aluminum is painted with high-reflectance white paint. Reflectors are precision formed aluminum with highly reflective white paint or 95% reflective specular aluminum. The AVRK is available in two channel widths designed to fit most commercial fluorescent strip fixtures, and the kit installs with simple hand tools. The conversion kit includes a "quick access" aluminum ballast cover secured to the channel with captive quarter-turn fasteners. The snap-in rotary lampholders, ballasts, and ballast quick-disconnect plug are shipped prewired for quick installation. Reflector panels (4' sections) attach to channel with captive quarter-turn fasteners.

ELECTRICAL - Standard ballast is high-efficiency, CEE (Consortium for Energy Efficiency) qualified NEMA premium, instant start, <10% THD, universal voltage and sound rated A. Suggested lamps are high-lumen, long-life super T8 lamps which contribute to optimizing system performance. Optional program start and step-dim bi-level ballasts are available as well as several ballast factor options to maximize energy savings and to allow the amount of light to be balanced to the application. Rotary lampholders and ballast disconnect plug are prewired to ballast assembly.

INSTALLATION - Two channel widths are available for optimum fit to the broadest range of commercial strip fixtures. One-piece aluminum covers with snap-in rotary lampholders attach to the existing channel using provided Tek screws. Ballast is factory mounted to the "quick access" plate and pre-wired to the lampholders. After wiring connection is made to included ballast disconnect plug, ballast access plate secures to channel cover with captive quarter-turn fasteners. Reflector panels (4' sections) attach to channel with captive quarter-turn fasteners.

Installation is designed for maximum speed and simplicity.

LISTING - UL classified for luminaire conversion, retrofit.

WARRANTY — 1-year limited warranty. Complete warranty terms located at:
www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx.

Note: Specifications subject to change without notice.

ORDERING INFORMATION

For shortest lead times, configure products using **bold options**.

Example: AVRK8 2 32 CW42 1/4 BINP WHR

Series	Number of lamps	Wattage	Width	Ballast configuration	Ballast type	Reflector type
AVRK4 4' long, no uplight	1	**32**	**CW42**	AVRK4 / AVRKA4	**BINP**	**WHR**
AVRK8 8' long, no uplight	**2**		CW50	**(blank)** 1 or 2-lamp ballast	BIHP	**SSR**
AVRKA4 4' long, 10% uplight				AVRK8 / AVRKA8	BILP	
AVRKA8 8' long, 10% uplight				**(blank)** Two 2-lamp ballast	BPNP	
				1/4 One 4-lamp ballast	BPHP	
					BPLP	
					BSNP[1]	

Notes
1 Not available as 1/4.
2 AVRK channels and reflectors will ship separately for field installation. Example:
(qty 1) AVRK8 2 32 CW42 BINP SSR *ships as*
(qty 1) AVRK8 2 32 CW42 1/4 BINP L/REFL
(qty 2) AVRK 4FT SSR REFL

Champ® Pro PVM Series Luminaires

UL/cUL Listed
NEMA 4X
IP66

Ideal for general high bay/low bay illumination

The Champ® Pro PVM Family

Champ® Pro PVM Series Luminaires are designed to provide full-spectrum, crisp, white light with a true IES type V distribution. Five versions of the PVM Series are available, providing ideal solutions for a wide range of applications.

Champ® Pro PVM Model	Equivalent HID Luminaire	Typical Energy Savings / Lifetime
PVM3L	70W-100W	Up to 70%
PVM5L	100W-150W	reduction in energy
PVM7L	150W-175W	costs and 60,000
PVM9L	175W-200W	hours of continuous
PVM11L	200W-400W	operation!

Standard Materials:

- Lamp housing and adapter – die cast aluminum with Corro-free™ epoxy powder coat
- Lens – heat- and impact-resistant glass
- Gaskets – silicone
- External hardware – stainless steel
- Factory-sealed, no external seals required

Certifications and Compliances:

- UL1598
- UL1598A
- cUL
- NEMA 4X; IP66
- DesignLights Consortium® approved for select models (refer to Ordering Information for details)

LED System:

- High brightness light emitting diode (LED) arrays
- Color temperature: 3000K (CRI 82) where a warmer color is preferred and 5600K (CRI 65) where a cooler color is required
- Advanced heat sink design ensures LED does not exceed manufacturer's temperature ratings across all specified ambient conditions

Drivers:

Model	3L - 9L	11L
Standard	90-305 VAC, 50 / 60 Hz; 108-250 VDC	100-240, 277 VAC
Option 1	347 VAC Model	347 VAC Kit Available
Option 2	480 VAC Model	480 VAC Kit Available

Electrical Ratings:

	PVM3L	PVM5L	PVM7L	PVM9L	PVM11L
Voltage Range, VAC	100-277V	100-277V	100-277V	100-277V	100-240, 277V
Frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Input Power	46 Watts	60 Watts	78 Watts	94 Watts	134 Watts
Input Amps (Max.)	0.5	0.7	0.8	0.98	1.7
Voltage Range, VDC	108-250	108-250	108-250	108-250	Not Available
Power Factor	>0.90	>0.90	>0.90	>0.90	>0.90

Ordering Information:

Mounting Style	3L Series†	5L Series†	7L Series†	9L Series†	11L Series†
Luminaire Less Mounting Module	**PVM3LDM2/UNV1**	**PVM5LDM2/UNV1**	**PVM7LDM2/UNV1**	**PVM9LDM2/UNV1**	**PVM11LDM1/UNV**
¾" Pendant	**PVM3L2ADM2/UNV1**	**PVM5L2ADM2/UNV1**	**PVM7L2ADM2/UNV1**	**PVM9L2ADM2/UNV1**	**PVM11L2ADM1/UNV**
1" Pendant	**PVM3L3ADM2/UNV1**	**PVM5L3ADM2/UNV1**	**PVM7L3ADM2/UNV1**	**PVM9L3ADM2/UNV1**	**PVM11L3ADM1/UNV**
¾" Cone Pendant	**PVM3L2BDM2/UNV1**	**PVM5L2BDM2/UNV1**	**PVM7L2BDM2/UNV1**	**PVM9L2BDM2/UNV1**	**PVM11L2BDM1/UNV**
1" Cone Pendant	**PVM3L3BDM2/UNV1**	**PVM5L3BDM2/UNV1**	**PVM7L3BDM2/UNV1**	**PVM9L3BDM2/UNV1**	**PVM11L3BDM1/UNV**
¾" Flexible Pendant	**PVM3L2HADM2/UNV1**	**PVM5L2HADM2/UNV1**	**PVM7L2HADM2/UNV1**	**PVM9L2HADM2/UNV1**	**PVM11L2HADM1/UNV**
¾" Ceiling Mount Thru Feed	**PVM3L2CDM2/UNV1**	**PVM5L2CDM2/UNV1**	**PVM7L2CDM2/UNV1**	**PVM9L2CDM2/UNV1**	**PVM11L2CDM1/UNV**
1" Ceiling Mount Thru Feed	**PVM3L3CDM2/UNV1**	**PVM5L3CDM2/UNV1**	**PVM7L3CDM2/UNV1**	**PVM9L3CDM2/UNV1**	**PVM11L3CDM1/UNV**
¾" Wall Mount Thru Feed	**PVM3L2TWDM2/UNV1**	**PVM5L2TWDM2/UNV1**	**PVM7L2TWDM2/UNV1**	**PVM9L2TWDM2/UNV1**	**PVM11L2TWDM1/UNV**
1" Wall Mount Thru Feed	**PVM3L3TWDM2/UNV1**	**PVM5L3TWDM2/UNV1**	**PVM7L3TWDM2/UNV1**	**PVM9L3TWDM2/UNV1**	**PVM11L3TWDM1/UNV**
1½" Stanchion 25°	**PVM3LJDM2/UNV1**	**PVM5LJDM2/UNV1**	**PVM7LJDM2/UNV1**	**PVM9LJDM2/UNV1**	**PVM11LJDM1/UNV**
1½" Stanchion	**PVM3LPDM2/UNV1**	**PVM5LPDM2/UNV1**	**PVM7LPDM2/UNV1**	**PVM9LPDM2/UNV1**	**PVM11LPDM1/UNV**

†DesignLights Consortium approved models. Cool white only. 3L through 9L models approved at 120V only. For 120 VAC option, replace DM2/UNV1 with DM2/120*. 11L model approved at 120-277V.
For 347 VAC option, replace DM2/UNV1 with DM3/347. For 480 VAC option, replace DM2/UNV1 with DM4/480. **NOTE: Requires additional enclosure for use with 11L series.**
For warm white color temperature, use W designation after luminaire style (Example: PVM3LWDM2/UNV1). **NOTE: Not available for 9L series.**
*5 year limited warranty. Refer to page 2 of the D-0413 authorized distributor price book for Cooper Crouse-Hinds standard Terms and Conditions.

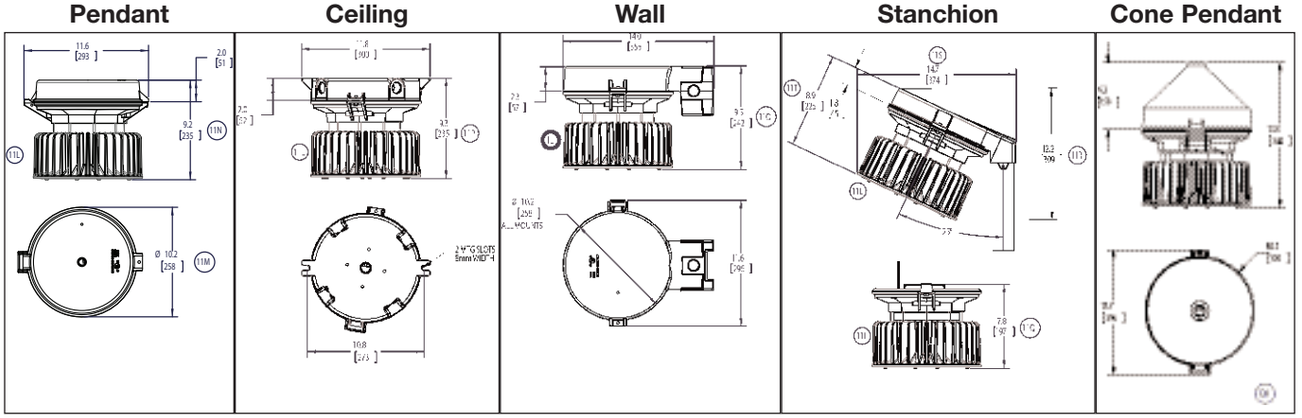
Ideal for general high bay/low bay illumination

Options:

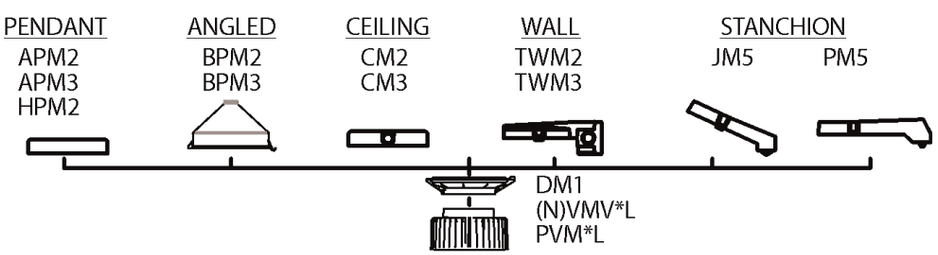
Description	Suffix
Wire guard with captive mounting hardware	P3001
Trunnion mount with redundant pin locking mechanism	S812 K1
Quick Clip for quick installation	S890
Diffused lens reduces glare in applications where the user may have direct visual contact with the light source	S891
Teflon coating on lens for additional shatter protection	S896
Polycarbonate lens available in applications where glass is prohibited	S903

Dimensions:

Pendant | Ceiling | Wall | Stanchion | Cone Pendant



Family Tree:



Weights:

Net Luminaire Weight:	17.8 lb.	8.07 kg.
Mounting Module add (lb.)		
Pendant	1.25	0.57
Cone Pendant	4.00	1.81
Flexible Pendant	1.50	0.68
Ceiling	2.75	1.25
Wall	4.50	2.04
Angle Stanchion	3.50	1.59
Straight Stanchion	4.50	2.04

Ambient Temperature:

Champ® Pro PVM Model	Max. Temp. °C
PVM3L	55
PVM5L	55
PVM7L	55
PVM9L	55
PVM11L	40

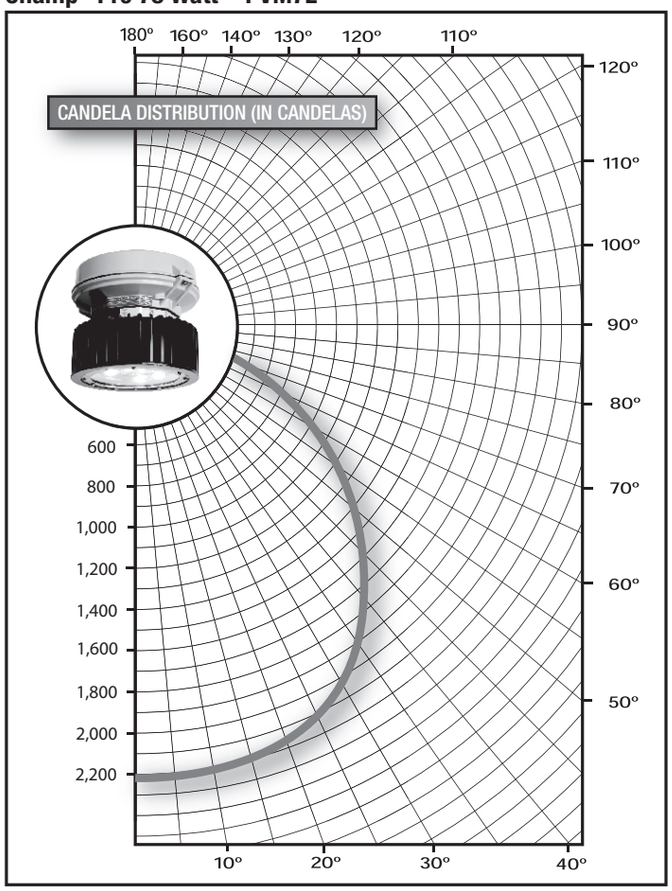
Champ® Pro PVM Series Luminaires

UL/cUL Listed
NEMA 4X
IP66

Ideal for general high bay/low bay illumination

Photometric Data:

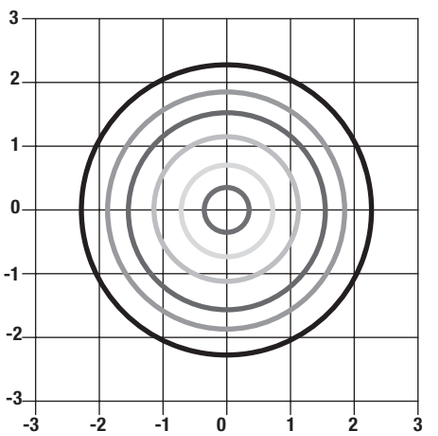
Champ® Pro 78 Watt* - PVM7L



CANDELAS ZONAL LUMENS

VERTICAL ANGLE	FRONT SIDE	ZONE	WITH LUMENS	% LUMEN
0	2245	0-10	212	4%
5	2234	10-20	612	10%
15	2167	20-30	941	15%
25	2041	30-40	1155	18%
35	1846	40-50	1207	19%
45	1566	50-60	1077	17%
55	1207	60-70	764	12%
65	775	70-80	286	5%
75	251	80-90	13	0%
85	0	90-100	0	0%
90	0	100-120	0	0%
		Total	6267	100%

DISTANCE TO MOUNTING HEIGHT
Isofootcandle chart shows illuminance in footcandles at ground level



ISOFOOTCANDLE CHART
Footcandle Values for Isofootcandle Lines

Mtg. Hgt.	A	B	C	D	E	F
8'	31.25	15.63	7.81	3.13	1.56	0.78
10'	20.00	10.00	5.00	2.00	1.00	0.50
12'	13.89	6.94	3.47	1.39	0.69	0.35
16'	7.81	3.91	1.95	0.78	0.39	0.20
20'	5.00	2.50	1.25	0.50	0.25	0.13

LUMEN OUTPUT FOR CHAMP® LED LUMINAIRES

Luminaire Series	System Watts	Lumens
PVM3L	46	3748
PVM5L	60	4654
PVM7L	78	6267
PVM9L	94	7085
PVM11L	134	8880

*Testing performed in accordance with IES LM-79-08.

Champ® Pro PVM Series Luminaires

UL/cUL Listed
NEMA 4X
IP66

Ideal for general high bay/low bay illumination

The Champ® Pro PVM Family

Champ® Pro PVM Series Luminaires are designed to provide full-spectrum, crisp, white light with a true IES type V distribution. Five versions of the PVM Series are available, providing ideal solutions for a wide range of applications.

Champ® Pro PVM Model	Equivalent HID Luminaire	Typical Energy Savings / Lifetime
PVM3L	70W-100W	Up to 70%
PVM5L	100W-150W	reduction in energy
PVM7L	150W-175W	costs and 60,000
PVM9L	175W-200W	hours of continuous
PVM11L	200W-400W	operation!

Standard Materials:

- Lamp housing and adapter – die cast aluminum with Corro-free™ epoxy powder coat
- Lens – heat- and impact-resistant glass
- Gaskets – silicone
- External hardware – stainless steel
- Factory-sealed, no external seals required

Certifications and Compliances:

- UL1598
- UL1598A
- cUL
- NEMA 4X; IP66
- DesignLights Consortium® approved for select models (refer to Ordering Information for details)

LED System:

- High brightness light emitting diode (LED) arrays
- Color temperature: 3000K (CRI 82) where a warmer color is preferred and 5600K (CRI 65) where a cooler color is required
- Advanced heat sink design ensures LED does not exceed manufacturer's temperature ratings across all specified ambient conditions

Drivers:

Model	3L - 9L	11L
Standard	90-305 VAC, 50 / 60 Hz; 108-250 VDC	100-240, 277 VAC
Option 1	347 VAC Model	347 VAC Kit Available
Option 2	480 VAC Model	480 VAC Kit Available

Electrical Ratings:

	PVM3L	PVM5L	PVM7L	PVM9L	PVM11L
Voltage Range, VAC	100-277V	100-277V	100-277V	100-277V	100-240, 277V
Frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Input Power	46 Watts	60 Watts	78 Watts	94 Watts	134 Watts
Input Amps (Max.)	0.5	0.7	0.8	0.98	1.7
Voltage Range, VDC	108-250	108-250	108-250	108-250	Not Available
Power Factor	>0.90	>0.90	>0.90	>0.90	>0.90

Ordering Information:

Mounting Style	3L Series†	5L Series†	7L Series†	9L Series†	11L Series†
Luminaire Less Mounting Module	**PVM3LDM2/UNV1**	**PVM5LDM2/UNV1**	**PVM7LDM2/UNV1**	**PVM9LDM2/UNV1**	**PVM11LDM1/UNV**
¾" Pendant	**PVM3L2ADM2/UNV1**	**PVM5L2ADM2/UNV1**	**PVM7L2ADM2/UNV1**	**PVM9L2ADM2/UNV1**	**PVM11L2ADM1/UNV**
1" Pendant	**PVM3L3ADM2/UNV1**	**PVM5L3ADM2/UNV1**	**PVM7L3ADM2/UNV1**	**PVM9L3ADM2/UNV1**	**PVM11L3ADM1/UNV**
¾" Cone Pendant	**PVM3L2BDM2/UNV1**	**PVM5L2BDM2/UNV1**	**PVM7L2BDM2/UNV1**	**PVM9L2BDM2/UNV1**	**PVM11L2BDM1/UNV**
1" Cone Pendant	**PVM3L3BDM2/UNV1**	**PVM5L3BDM2/UNV1**	**PVM7L3BDM2/UNV1**	**PVM9L3BDM2/UNV1**	**PVM11L3BDM1/UNV**
¾" Flexible Pendant	**PVM3L2HADM2/UNV1**	**PVM5L2HADM2/UNV1**	**PVM7L2HADM2/UNV1**	**PVM9L2HADM2/UNV1**	**PVM11L2HADM1/UNV**
¾" Ceiling Mount Thru Feed	**PVM3L2CDM2/UNV1**	**PVM5L2CDM2/UNV1**	**PVM7L2CDM2/UNV1**	**PVM9L2CDM2/UNV1**	**PVM11L2CDM1/UNV**
1" Ceiling Mount Thru Feed	**PVM3L3CDM2/UNV1**	**PVM5L3CDM2/UNV1**	**PVM7L3CDM2/UNV1**	**PVM9L3CDM2/UNV1**	**PVM11L3CDM1/UNV**
¾" Wall Mount Thru Feed	**PVM3L2TWDM2/UNV1**	**PVM5L2TWDM2/UNV1**	**PVM7L2TWDM2/UNV1**	**PVM9L2TWDM2/UNV1**	**PVM11L2TWDM1/UNV**
1" Wall Mount Thru Feed	**PVM3L3TWDM2/UNV1**	**PVM5L3TWDM2/UNV1**	**PVM7L3TWDM2/UNV1**	**PVM9L3TWDM2/UNV1**	**PVM11L3TWDM1/UNV**
1½" Stanchion 25°	**PVM3LJDM2/UNV1**	**PVM5LJDM2/UNV1**	**PVM7LJDM2/UNV1**	**PVM9LJDM2/UNV1**	**PVM11LJDM1/UNV**
1½" Stanchion	**PVM3LPDM2/UNV1**	**PVM5LPDM2/UNV1**	**PVM7LPDM2/UNV1**	**PVM9LPDM2/UNV1**	**PVM11LPDM1/UNV**

†DesignLights Consortium approved models. Cool white only. 3L through 9L models approved at 120V only. For 120 VAC option, replace DM2/UNV1 with DM2/120*. 11L model approved at 120-277V.
For 347 VAC option, replace DM2/UNV1 with DM3/347. For 480 VAC option, replace DM2/UNV1 with DM4/480. **NOTE: Requires additional enclosure for use with 11L series.**
For warm white color temperature, use W designation after luminaire style (Example: PVM3LWDM2/UNV1). **NOTE: Not available for 9L series.**
*5 year limited warranty. Refer to page 2 of the D-0413 authorized distributor price book for Cooper Crouse-Hinds standard Terms and Conditions.

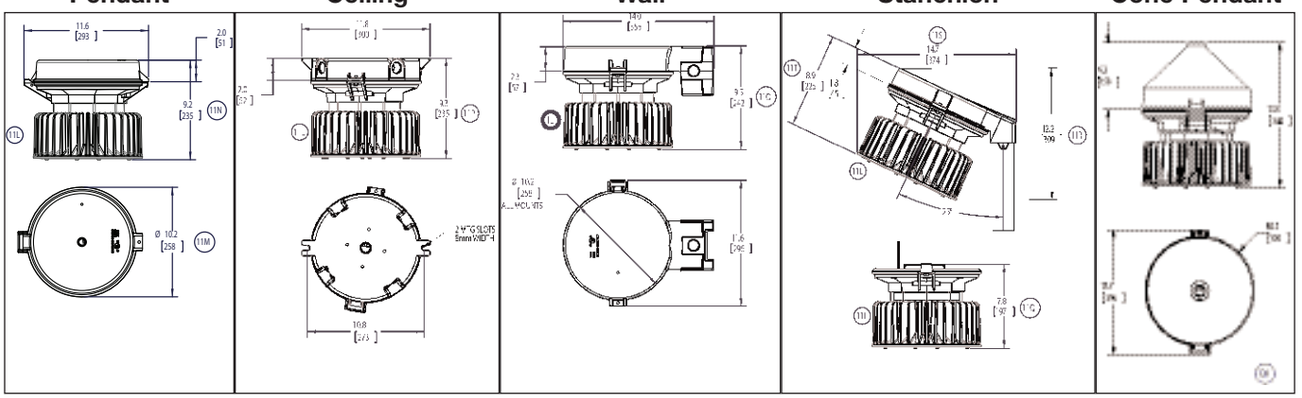
Ideal for general high bay/low bay illumination

Options:

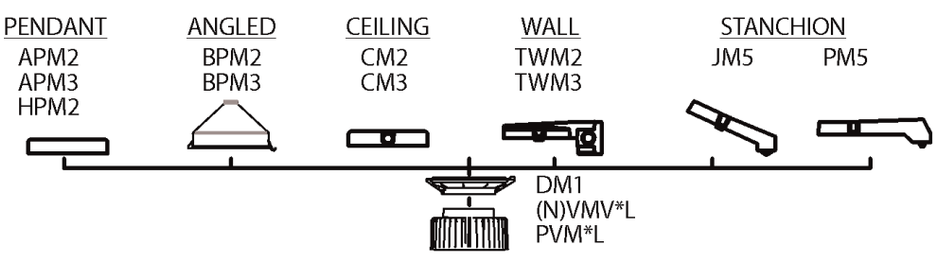
Description	Suffix
Wire guard with captive mounting hardware	P3001
Trunnion mount with redundant pin locking mechanism	S812 K1
Quick Clip for quick installation	S890
Diffused lens reduces glare in applications where the user may have direct visual contact with the light source	S891
Teflon coating on lens for additional shatter protection	S896
Polycarbonate lens available in applications where glass is prohibited	S903

Dimensions:

Pendant | Ceiling | Wall | Stanchion | Cone Pendant



Family Tree:



Weights:

Net Luminaire Weight:	17.8 lb.	8.07 kg.
Mounting Module add (lb.)		
Pendant	1.25	0.57
Cone Pendant	4.00	1.81
Flexible Pendant	1.50	0.68
Ceiling	2.75	1.25
Wall	4.50	2.04
Angle Stanchion	3.50	1.59
Straight Stanchion	4.50	2.04

Ambient Temperature:

Champ® Pro PVM Model	Max. Temp. °C
PVM3L	55
PVM5L	55
PVM7L	55
PVM9L	55
PVM11L	40

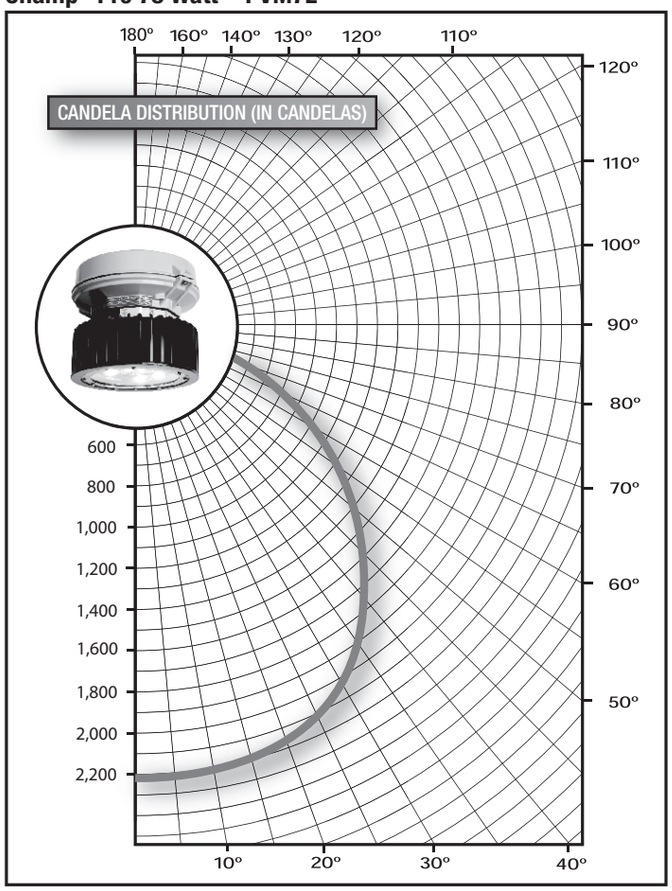
Champ® Pro PVM Series Luminaires

UL/cUL Listed
NEMA 4X
IP66

Ideal for general high bay/low bay illumination

Photometric Data:

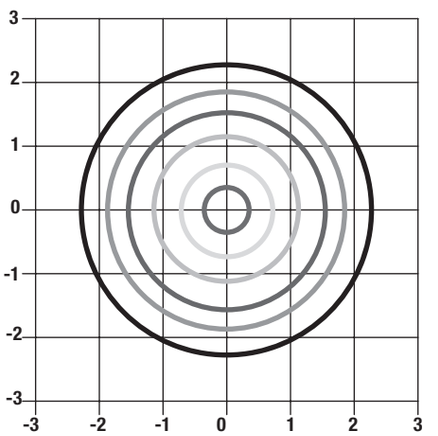
Champ® Pro 78 Watt* - PVM7L



CANDELAS ZONAL LUMENS

VERTICAL ANGLE	FRONT SIDE	ZONE	WITH LUMENS	% LUMEN
0	2245	0-10	212	4%
5	2234	10-20	612	10%
15	2167	20-30	941	15%
25	2041	30-40	1155	18%
35	1846	40-50	1207	19%
45	1566	50-60	1077	17%
55	1207	60-70	764	12%
65	775	70-80	286	5%
75	251	80-90	13	0%
85	0	90-100	0	0%
90	0	100-120	0	0%
		Total	6267	100%

DISTANCE TO MOUNTING HEIGHT
Isofootcandle chart shows illuminance in footcandles at ground level



ISOFOOTCANDLE CHART
Footcandle Values for Isofootcandle Lines

Mtg. Hgt.	A	B	C	D	E	F
8'	31.25	15.63	7.81	3.13	1.56	0.78
10'	20.00	10.00	5.00	2.00	1.00	0.50
12'	13.89	6.94	3.47	1.39	0.69	0.35
16'	7.81	3.91	1.95	0.78	0.39	0.20
20'	5.00	2.50	1.25	0.50	0.25	0.13

LUMEN OUTPUT FOR CHAMP® LED LUMINAIRES

Luminaire Series	System Watts	Lumens
PVM3L	46	3748
PVM5L	60	4654
PVM7L	78	6267
PVM9L	94	7085
PVM11L	134	8880

*Testing performed in accordance with IES LM-79-08.

OCTRON® XPS® ECOLOGIC®3

EXtended Performance Super Fluorescent Lamps

SYLVANIA OCTRON Extended Performance Super ECOLOGIC3 (XPS) lamps deliver the highest performance of all OCTRON lamps with initial and mean lumens that are up to 11% higher and substantially longer lamp life than standard T8 fluorescent lamps. These lamps are available in 2, 3, and 4-foot lengths, in a choice of correlated color temperatures with high lumen maintenance of 94%.

When OCTRON XPS ECOLOGIC lamps are operated on existing instant start ballasts as a retrofit lamp, they deliver higher lumen output than the installed system. In new installations paired with QUICKTRONIC PSX ballasts, 2-lamp systems deliver light levels comparable to 3-lamp 700 series T8 lamps, while maximizing energy savings and lamp life.

Key Features & Benefits

- Highest lumen 4-foot OCTRON T8 lamps
- Also available in 2-foot (FO17) and 3-foot (FO25) sizes
- Longer lamp life than standard T8 lamps
  - 40,000 hours rated life @ 12 hrs/start on instant start ballast
  - 42,000 hours rated life @ 12 hrs/start on programmed rapid start ballasts
- 94% Lumen maintenance
- TCLP compliant
- Lead free glass
- Made in USA
- QUICK 60+® system warranty when paired with QUICKTRONIC® electronic ballasts
- Meets CEE Standards

SYLVANIA OCTRON 800 XPS ECOLOGIC3 fluorescent lamps are designed to satisfy the Federal Toxicity Characteristic Leaching Procedure (TCLP[1]) criteria for classification as non-hazardous waste in most states.[2]

ECOLOGIC3 represents a more comprehensive approach to sustainability encompassing high efficiency, long life and RoHS/TCLP compliance.

[1] TCLP test results are based on NEMA LL Series standards and are available on request.
[2] Regulations may vary. Check your local and state regulations.

This light source meets restrictions on hazardous substances.

Product Offering

Ordering Abbreviation	Watts	Nominal Length (in)	CCT
FO17/800/XPS/ECO3	17	24	3000K, 3500K, 4100k
FO25/800/XPS/ECO3	25	36	3000K, 3500K, 4100k
FO32/800/XPS/ECO3	32	48	3000K, 3500K, 4100K, 5000K, 6500K

Application Information

Applications

- Hospitals
- Industrial
- Office
- Retail
- Schools

Application Notes

1. Minimum lamp starting temperature determined by ballast.
2. Operation below 50°F may affect lumen output or lamp operation.
3. For cold temperature applications, use in enclosed fixtures or use tube guards to maximize lamp performance.
4. Good ballast to socket to lamp contact essential for correct operation of system.
5. Actual lamp life dependent on ballast type, switching cycle and hours of operation per start.
6. These lamps may help facilitate compliance with national energy codes such as ASHRAE/IES 90.1 or IECC and state energy codes such as California Title 24. For more information contact your local building inspection office.

Ordering Information

Item Number	Ordering Abbreviation	Watts	Nominal Length (in)	Initial Lumens	Mean Lumens[1]	Lumens per Watt	Average Rated Life Instant Start 3 hrs/ start	Instant Start 12 hrs/ start	Programmed Rapid Start 3 hrs/ start	Programmed Rapid Start 12 hrs/ start	CCT	CRI
22150	F017/830/XPS/ECO3	17	24	1400	1316	82	24,000	40,000	40,000	42,000	3000K	85
22151	F017/835/XPS/ECO3	17	24	1400	1316	82	24,000	40,000	40,000	42,000	3500K	85
22152	F017/841/XPS/ECO3	17	24	1400	1316	82	24,000	40,000	40,000	42,000	4100K	85
22153	F025/830/XPS/ECO3	25	36	2200	2068	88	24,000	40,000	40,000	42,000	3000K	85
22154	F025/835/XPS/ECO3	25	36	2200	2068	88	24,000	40,000	40,000	42,000	3500K	85
22155	F025/841/XPS/ECO3	25	36	2200	2068	88	24,000	40,000	40,000	42,000	4100K	85
21680	F032/830/XPS/ECO3	32	48	3100	2914	97	24,000	40,000	40,000	42,000	3000K	85
21697	F032/835/XPS/ECO3	32	48	3100	2914	97	24,000	40,000	40,000	42,000	3500K	85
21681	F032/841/XPS/ECO3	32	48	3100	2914	97	24,000	40,000	40,000	42,000	4100K	85
21660	F032/850/XPS/ECO3	32	48	3100	2914	97	24,000	40,000	40,000	42,000	5000K	81
21659	F032/865/XPS/ECO3	32	48	3000	2820	94	24,000	40,000	40,000	42,000	6500K	81

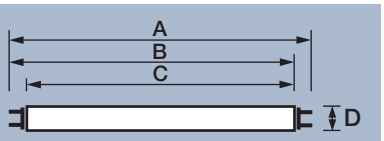
1. Measured at 40% of rated life.

Ordering Guide

FO	32	/	8	35	XPS	/	ECO3
Fluorescent OCTRON®	Wattage: 17, 25, or 32 watts		8 = 81-85 CRI	30 = 3000K 35 = 3500K 41 = 4100K 50 = 5000K 65 = 6500K	EXtended Performance Super		ECOLOGIC3

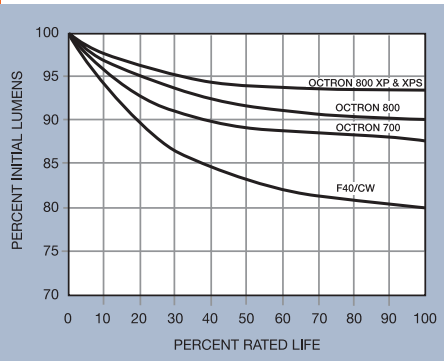
Lamp Dimensions

Item Number	(A) Max. Overall Length (in.)	(B) Base Face to Opposite Pin (in.) Min.	(B) Base Face to Opposite Pin (in.) Max.	(C) Max. Base Face to Base Face (in.)	(D) Max. Outside Diameter (in.)
F017	23.78	23.41	23.50	23.22	1.1
F025	35.78	35.40	35.50	35.22	1.1
F032	47.78	47.41	47.50	47.22	1.1



Technical Information

Lumen Maintenance
OCTRON XP, OCTRON XPS, OCTRON & F40/CW



Related Literature

For optimum system performance and warranty pair with these QUICKTRONIC® Systems:

High Efficiency NEMA Premium QUICKTRONIC® T8 Brochure (Literature Code: ECS112)
Ballast Technology Applications & Specification Guide (Literature Code: ECS-ELECTRONIC2009)
QUICK 60+® System Warranty (Literature Code: ECS140)

Specification Data

Fixture Description

Type

Project/Job

SYLVANIA lamp

SYLVANIA ballast

Notes

Sample Specification

Lamp(s) shall be (a) OCTRON® EXtended Performance Super XPS®/ECO3 2-foot, 3-foot, or 4-foot lamp(s) having medium bi-pin bases. Lamps shall pass the existing Federal TCLP limits. Lamp(s) shall have initial lumens of (1400, 2200, 3100, 3000), an average rated life of (24,000, 40,000) hours on (instant start, programmed rapid start) ballasts, a CRI of (85, 81), 94% lumen maintenance and a correlated color temperature of (3000K, 3500K, 4100K, 5000K or 6500K). Lamps shall be operated on QUICKTRONIC ballasts with complete system warranty from the manufacturer covering lamps and ballasts.

United States
OSRAM SYLVANIA
100 Endicott Street
Danvers, MA 01923

Trade
Phone: 1-800-255-5042
Fax: 1-800-255-5043

National Accounts
Phone: 1-800-562-4671
Fax: 1-800-562-4674

OEM/Special Markets
Phone: 1-800-762-7191
Fax: 1-800-762-7192

Display/Optic
Phone: 1-888-677-2627
Fax: 1-800-762-7192

Canada
OSRAM SYLVANIA LTD.
2001 Drew Road
Mississauga, ON L5S 1S4

Trade
Phone: 1-800-263-2852
Fax: 1-800-667-6772

OEM/Special Markets/Display/Optic
Phone: 1-800-265-2852
Fax: 1-800-667-6772

www.sylvania.com

LITHONIA LIGHTING®

Catalog Number	
Notes	
Type	

T-BEAM® LED

LED High Bay

IBL

Unlensed (standard) 9-24L pictured

Patent Pending

Lensed (optional) 36-48L pictured

LED DESIGNLIGHTS CONSORTIUM®

FEATURES & SPECIFICATIONS

INTENDED USE — Ideal one-for-one replacement of conventional high bay systems such as HID and fluorescent. Applications include warehousing, manufacturing and other large indoor spaces with mounting heights up to 60'. **Certain airborne contaminants can diminish integrity of acrylic.** Click here for Acrylic Environmental Compatibility table for suitable uses.

CONSTRUCTION — Die-formed aluminum alloy chassis with integrated fins for superior cooling through natural convection. The channel is made of heavy-duty code gauge (20-gauge) steel which is powder coated after fabrication. The assembly is rigidly designed to resist twisting and bowing. Access plate on the back of the channel housing allows quick and easy wiring.

OPTICS — Narrow and wide distributions available to meet both horizontal and vertical light level requirements. Reflectors feature precision-formed optics utilizing reflective Alanod® MIRO-5® aluminum. Semi-diffuse lens optional to provide glare control and LED protection.

ELECTRICAL — 89% lumen maintenance at 60,000 hours; predicted life of more than 100,000 hours. Thermally protected driver standard with 0-10V dimming.

LISTINGS — CSA Certified to U.S. and Canadian safety standards. Damp location listed. Suitable for ambient temperatures from -40°F (-40°C) to 131°F (55°C). Patent pending.

WARRANTY — 5-year limited warranty. Complete warranty terms located at www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx

Actual performance may differ as a result of end-user environment and application.

Actual wattage may differ by +/-1% when operating between 120-277V +/-10%.

Note: Specifications subject to change without notice.

ORDERING INFORMATION

Lead times will vary depending on options selected. Consult with your sales representative.

Example: IBL 18L WD LP740 DLC

IBL													
Series	**Lumens**				**Distribution**		**Lens**		**Voltage**		**Color temperature**[2]	
IBL	9L	9,000 lumens	24L	24,000 lumens	WD	Wide	(blank)	No shielding	(blank)	MVOLT; 120-277V	LP740 DLC	70 CRI, 4000K CCT
	12L	12,000 lumens	36L	36,000 lumens[1]	ND	Narrow	SD125	Semi-diffuse acrylic	HVOLT	347V-480V	LP750 DLC	70 CRI, 5000K CCT
	18L	18,000 lumens	48L	48,000 lumens[1]					120	120V	LP740	70 CRI, 4000K CCT
									277	277V	LP750	70 CRI, 5000K CCT

Options

GLR	Internal fast-blow fuse[3,4]
OUTCTR	Wiring leads pulled through back center of fixture
OCS	RELOC® OnePass® 5' installed[3]
IMP	Integrated modular plug[5,6]
I2412	IOTA emergency LED battery pack for 32°F to104°F (0°C to 40°C) ambient[7,8]
SPD	Surge protector[3]
WGX	Standard wire guard, installed

Cord sets:[9]

CS1W	Straight plug, 120V[10]
CS3W	Twist-lock, 120V[10]
CS7W	Straight plug, 277V[10]
CS11W	Twist-lock, 277V[10]
CS25W	Twist-lock, 347V[10]
CS97W	Twist-lock, 480V[10]
CS93W	600 SO white cord, no plug (no voltage required)

Motion sensors :

MSE360	360° motion sensor embedded, high bay[11,12]
MSE360LB	360° motion sensor embedded, low bay[11,12]
MSIPED	Aisle motion sensor, photo sensor, pre-wired[3]
MSI360PED	360° motion sensor, photo sensor, pre-wired[3]
MSI	Aisle motion sensor, pre-wired[3]
MSI360	360° motion sensor, pre-wired[3]
MSID	Aisle motion sensor, pre-wired, HI/LO dimming control[3]
MSI360D	360° motion sensor, pre-wired, HI/LO dimming control[3]
NMSI	nLight, aisle motion sensor, pre-wired[3]
NMSI360	nLight enabled, 360° motion sensor, pre-wired[3]
nEPP5D	nLight dimming module[3,13]

Finish

(blank)	Gloss white with textured dark gray accents
DWH	Gloss white

Accessories: *Order as separate catalog number.*

Mounting:

IBAC120 M20	Aircraft cable 10' with hook (one pair)
IBAC240 M20	Aircraft cable 20' with hook (one pair)
IBHMP	Hook monopoint
ZACVH	Aircraft 10' V hanger (one pair)[8]
IBLPMP	Pendant monopoint splice box, includes side covers for use with 9L-24L
IBLPMPHB	Pendant monopoint splice box, includes side covers (3/4" hub)for use with 9L-24L.
IBLPMP48	Pendant monopoint splice box, includes side covers for use with 36L and 48L
IBLPMPHB48	Pendant monopoint splice box, includes side covers (3/4" hub) for use with 36L and 48L
HC36	Hanger chain, 36"[8]
THUN	Tong hanger bracket (one pair)[8,14]

Cord sets and sensors for IMP option:

CS1WIMP	Straight plug, 120V[9,10,15]
CS3WIMP	Twist-lock, 120V[9,10,15]
CS7WIMP	Straight plug, 277V[9,10,15]
CS11WIMP	Twist-lock, 277V[9,10,15]
CS25WIMP	Twist-lock 347V[9,10,15]
CS93WIMP	600V SO white cord, no plug (no voltage required)[9, 15]
CS97WIMP	Twist-lock 480V[9,10,15]
MSIIMP	Aisle sensor[6,15]
MSI360IMP	360° sensor[6,15]

Field-installable door and lens assemblies:

DLIBL SD125	Semi-diffuse acrylic lens for use 9L - 24L
DLIBL48 SD125	Semi-diffuse acrylic lens for use with 36L and 48L

Wire guards:

WGIBL	Wire guard for use with 9L - 24L
WGIBL48	Wire guard for use with 36L and 48L

See footnotes on page 2.

Notes

1 Fixtures more than 24" wide can interfere with the operation of some fire sprinkler systems. Verify specific installation requirements with local fire official and insurance carrier. Emergency battery packs are not available with 36L or 48L.
2 Select product configurations are Design Lights Consortium (DLC) qualified; does not apply to 9L packages or 12 ND SD125 LP740 configuration.
3 Specify voltage.
4 Not available with 347 voltage.
5 Must be factory-installed.
6 Must have "IMP" power cord to power fixture.
7 Must specify voltage. 120V or 277V only. Not available with cordset w/plug or OUTCTR option.
8 Not available with 36L or 48L lumen package. When using THUN option maximum ambient temperature is 35°C.
9 All cord sets are 18/3, 6', white.
10 Cord sets are voltage specific. Specify voltage. Other configurations available. Consult factory.
11 Specify voltage;120, 277 or 347 only.
12 Not available with battery pack.
13 Consult factory for dimming of 208, 347 or 480V fixtures.
14 95°F (35°C) maximum ambient temperature when using the THUN.
15 Must have IMP option on fixture.

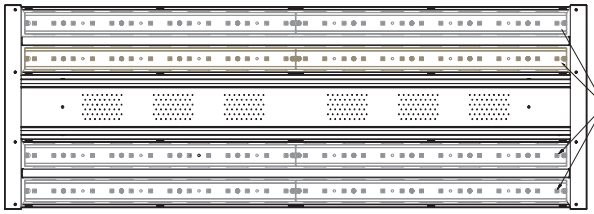
9L, 18L, and 36L lumen packages

12L, 24L, and 48L lumen packages

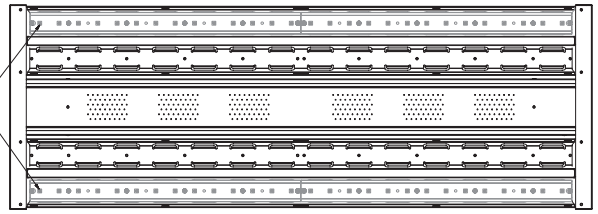
To create the 9L, 18L, and 36L lumen packages, the PCBA (LED board) is depopulated from the endcaps inward. The first LED is 5-1/2" from the end cap on those units, compared to 1-1/8" on the 12L, 24L, and 48L product.

DIMENSIONS

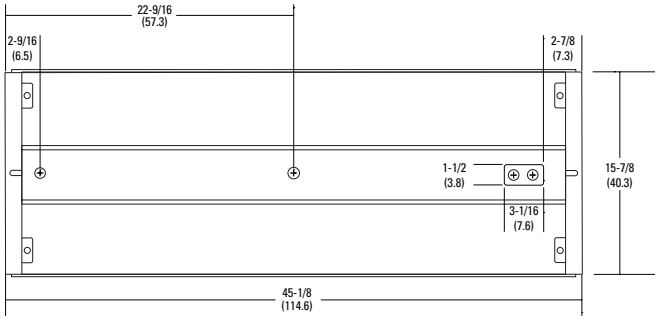
Dimensions may vary with options or accessories.



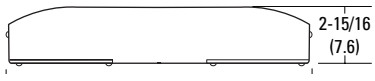
18L, and 24L utilize two drivers wired inboard/outboard
36L and 48L ***(not shown)*** utilize four drivers wired inboard/outboard



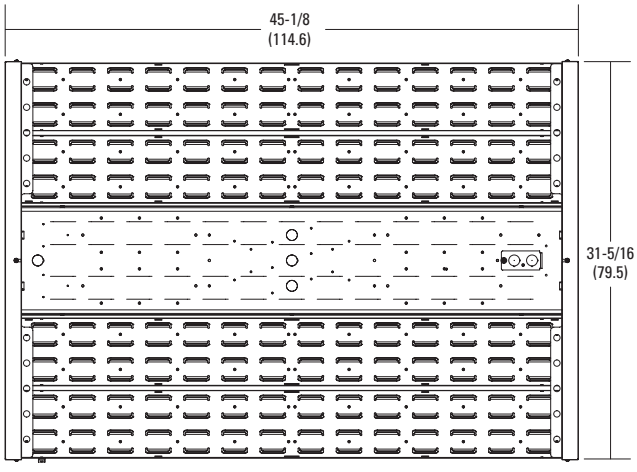
9L and 12L utilize one driver



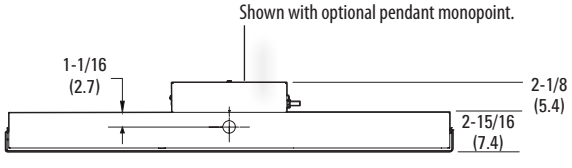
9L-24L



9L-24L



36L-48L



36L-48L

OPERATIONAL DATA

Lumen Package	Ambient Rating (120V - 277V)	Ambient Rating (347V / 480V)	Distribution	Delivered Lumens 5000K CCT @ 77°F (25°C) Ambient Temperature	Delivered Lumens 4000K CCT @ 77°F (25°C) Ambient Temperature	Lumen Multiplier @ 104°F (40°C) Ambient Temperature	Lumen Multiplier @ 104°F (40°C) Ambient w/SD125 Lens Kit
9L	-40°F to 131°F (-40°C to 55°C)	-40°F to 104°F (-40°C to 40°C)	WD	10,039	9,794	0.98	0.901
			ND	8,888	8,671	0.98	0.950
12L	-40°F to 131°F (-40°C to 55°C)	-40°F to 104°F (-40°C to 40°C)	WD	13,055	11,702	0.98	0.901
			ND	11,558	10,360	0.98	0.950
18L	-40°F to 131°F (-40°C to 55°C)	-40°F to 104°F (-40°C to 40°C)	WD	19,893	19,406	0.98	0.901
			ND	17,612	17,181	0.98	0.950
24L	-40°F to 131°F (-40°C to 55°C)	-40°F to 104°F (-40°C to 40°C)	WD	24,052	23,463	0.98	0.901
			ND	21,294	20,772	0.98	0.950
36L	-40°F to 131°F (-40°C to 55°C)	-40°F to 104°F (-40°C to 40°C)	WD	36,805	36,480	0.98	0.901
			ND	35,599	35,284	0.98	0.950
48L	-40°F to 131°F (-40°C to 55°C)	-40°F to 104°F (-40°C to 40°C)	WD	46,856	46,443	0.98	0.901
			ND	45,320	44,920	0.98	0.950

CHARACTERISTICS

Lumen Package	Wattage				Length	Width	Depth	Weight without Lens *(Lens kit adds approx. 7 lbs.)*	Comparable Light Source
	120V	277V	347V	480V	Dimensions are shown in inches (centimeters) unless otherwise noted.				
9L	103	98	107	106	45 (114.3)	15-3/4 (40.0)	3-1/4 (8.3)	12.5 lbs. (5.7 kg)	2-lamp T5HO
12L	134	131	142	141	45 (114.3)	15-3/4 (40.0)	3-1/4 (8.3)	12.5 lbs. (5.7 kg)	4-lamp T8, 250W HID
18L	213	199	213	211	45 (114.3)	15-3/4 (40.0)	3-1/4 (8.3)	17.5 lbs. (7.9 kg)	4-lamp T5HO, 6-lamp T8, 400W HID
24L	262	258	284	281	45 (114.3)	15-3/4 (40.0)	3-1/4 (8.3)	17.5 lbs. (7.9 kg)	6-lamp T5HO, 8-lamp T8
36L	423	417	459	454	45 (114.3)	31-1/3 (79.5)	3-1/4 (8.3)	35 lbs. (15.9 kg)	8-lamp T5HO, 750 HID
48L	531	511	562	557	45 (114.3)	31-1/3 (79.5)	3-1/4 (8.3)	35 lbs. (15.9 kg)	10-lamp T5HO,1000W HID

PROJECTED LUMEN MAINTENANCE

Operating Hours	0	10,000	20,000	25,000	35,000	50,000	60,000	75,000	100,000
Lumen Maintenance Factor	1	0.96	0.95	0.94	0.93	0.91	0.89	0.87	0.84

LUMENS VS. AMBIENT TEMPERATURE

Ambient °C	Ambient °F	Lumen Multiplier
0	32	1.02
5	41	1.015
10	50	1.01
15	59	1.008
20	68	1.005
25	77	1
30	86	0.995
35	95	0.985
40	104	0.98
45	113	0.97
50	122	0.965
55	131	0.96

PHOTOMETRICS

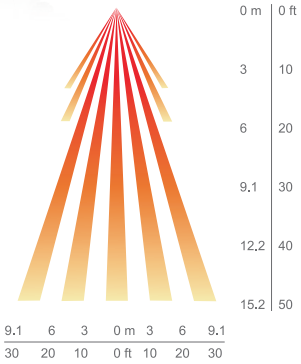
See www.lithonia.com.

SENSORS AND CONTROLS

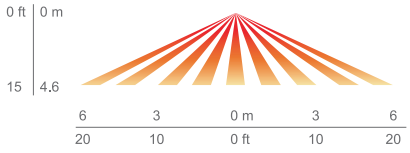
Sensors are an excellent way to maximize the return on your high bay lighting investment. I-BEAM LED fixtures can be equipped with an occupancy sensor, photocell, nLight® or nWiFi™. These devices are factory-installed and require minimal labor to set up during fixture installation.

MSI360
360° Lens

HIGH VIEW



LOW VIEW



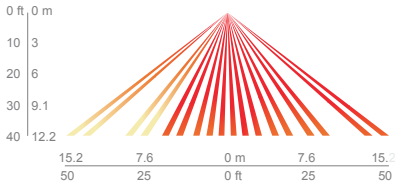
MSI: The Sensor Switch CMRB 50 aisleway sensor offers a dedicated sensor and extended range, compared to competitive products.

Mounting Location: End Plate

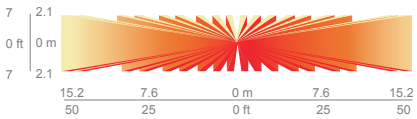
- Provides 50° bi-directional and 10° wide coverage pattern
- 1.2x mounting height equals approximate detection range in either direction
- Sensor lens turret rotates 90° in order to easily adjust the direction of the view pattern

MSI
Aisleway Lens

SIDE VIEW



TOP VIEW



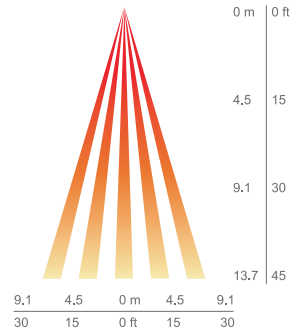
MSI360: The Sensor Switch CMRB 6 open-area sensor has 360° coverage and can be integrated with a photocell (PE) for further energy savings.

Mounting Location: End Plate

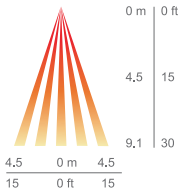
- Best choice for 15 to 45 ft (4.57 to 13.72 m) mounting heights
- 15 to 20 ft (4.57 to 6.10 m) radial coverage overlaps area lit by a typical high bay fixture

MSE360
Embedded 360° Lens

HIGH VIEW



LOW VIEW



MSE360: The Sensor Switch SFR 5 open-area sensor is embedded in the fixture, making it less intrusive than traditional sensors.

Mounting Location: Center Channel

- Recommended for fixtures that have a 1.0 spacing-to-mounting height ratio or less
- Use provided masking kit to mask off a portion of the view pattern for end-of-aisle applications or, to trim sensor's side viewing to create a rectangular pattern for center-of-aisle viewing only.

nLIGHT

nWiFi

All I-BEAM LED fixtures can be equipped with nLight. nLight is an exclusive and revolutionary system that cost-effectively combines time-based and sensor-based lighting controls. The digital interface allows for quick, easy modifications to time delays, photocell sensitivity and light levels at the individual fixture level.

nWiFi for nLight adds conventional WiFi technology to nLight devices, such as occupancy sensors and relays, enabling them to seamlessly communicate with both wired and wireless nLight lighting control zones. This powerful new nLight technology further simplifies installation and reduces hardware costs.

OPTIONS AND ACCESSORIES

The I-BEAM LED fixture offers numerous options for almost every electrical and optical component, including a long list of field-installable accessories.

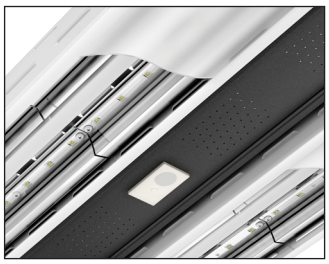
REFLECTORS
Wide distribution is formed with 93% reflective white paint. Narrow distribution is formed with Alanod® MIRO®.

INTEGRATED ELECTRICAL OPTIONS
Channel sized to accept emergency components, surge protector, fusing and embedded sensors.

WIRE GUARD (external)
Field- or factory-installed. Protects light engine from impact. Mounting hardware included.

Factory-installed option:
WGX

Field-installed options:
WGIBL
WGIBL48



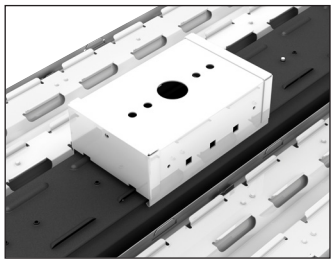
DIFFUSER
Field- or factory-installed. Available in semi-diffuse acrylic. Mounting hardware included.

Factory-installed option:
SD125

Field-installed option:
DLIBL SD125
DLIBL48 SD125

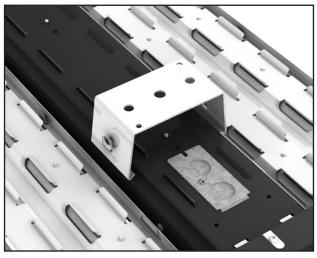
EMBEDDED OCCUPANCY SENSOR
Can be placed in the channel cover which reduces the risk of sensor damage compared to non-embedded sensors.

Factory-installed option:
MSE360



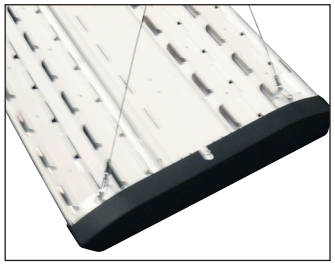
PENDANT MONOPOINT BRACKET
Accepts ¾" rigid conduit for single-point mounting. The bracket can be adjusted to help counterbalance fixture to offset weight variance from end to end.

Order as:
IBLPMP
IBLPMPHB
IBLPMP48
IBLPMPHB48



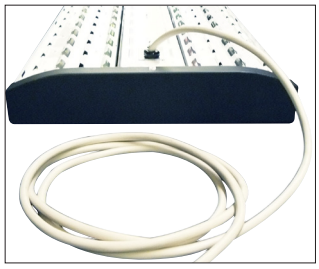
SURFACE MOUNT BRACKET
Rigidly attach I-BEAM LED to a hard ceiling. Can be placed anywhere along fixture.

Order as:
THUN (not for use in ambient temperatures exceeding 95°F (35°C), or on the 36L or 48L)



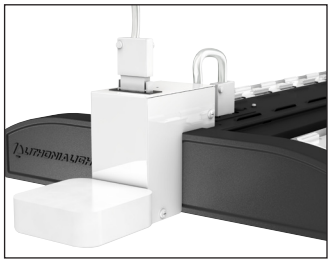
HANGERS
Several lengths of aircraft cables and chains available; with or without V-hooks.

Order as:
IBAC120 M20
IBHMP
For others, see accessories on page 1.



CORD SETS
Available in several lengths with or without molded plug. White is standard.

For available options, see ordering information on page 1.



INTEGRATED MODULAR PLUG (IMP)
Must be factory-installed and allows for field installation of various modular accessories including cordsets, motion sensors, photocells and LC&D X-point™ relays.

www.sylvania.com

QUICKTRONIC® PROStart® T8 Parallel Operation Systems

Type CC, Lamp Striation Control
Parallel Operation
Xtreme Low Ballast Factor

High Efficiency Series

QHE T8 PSX

Lamp / Ballast Guide

Primary Systems
32W T8 - OCTRON®
1-lamp QHE 1x32T8/UNV PSX-MC
2-lamp QHE 2x32T8/UNV PSX-MC
3-lamp QHE 3x32T8/UNV PSX-SC
4-lamp QHE 4x32T8/UNV PSX-SC

Also operates:
FO30/SS, FO28/SS, FO25/SS, FBO32, FBO31, FBO30/SS, FBO29/SS, FO25, FO17, FBO24 & FBO16

F40T8 operation:
1 lamp on 2L ballast; 2 lamps on 3L ballast; 3 lamps on 4L ballast

Key System Features

- High Efficiency Systems
- NEMA Premium Electronic Ballast Program compliant
- PROStart programmed rapid start
- Parallel operation (one lamp out, remaining lamps stay lit)
- Xtreme Low Ballast Factor: 0.71- 0.72
- UL Type CC
- LSC (Lamp Striation Control)
- Universal input voltage (120-277V)
- Minimum starting temperature:
  - -20°F (-29°C) for T8 lamps
  - 60°F (16°C) for energy saving T8 lamps
- RoHS compliant
- Lead-free solder and manufacturing process

Application Information

SYLVANIA QUICKTRONIC PROStart Ballast is ideally suited for:

- Any applications where the lowest power systems are needed for maximum energy savings
- Energy retrofits
- Occupancy sensors
- Building control systems

SYLVANIA QUICKTRONIC High Efficiency PROStart PSX programmed rapid start electronic T8 ballast family offers several advantages:

- **Lowest Power** T8 OCTRON system available when combined with OCTRON SUPERSAVER® high performance T8 lamps.
- **Parallel Circuitry:** keeps remaining lamps lit if one or more go out.
- **Lamp Striation Control (LSC):** T8 energy saving lamps should be operated above 60°F, but under certain conditions, the lamps may striate. LSC circuitry will minimize or eliminate this condition in most applications. (Please consult lamp manufacturers for additional details.)
- **Micro-Can Enclosure:** the 1 & 2-lamp models are in the micro-can enclosure. This allows the ballast to fit in very small profile fixtures where standard can T8 ballasts are too large.

- **NEMA Premium Electronic Ballast Program and RoHS compliant:** These ballasts feature lead-free solder and manufacturing. The NEMA Premium program promotes the use of high efficiency T8 electronic ballasts by meeting or exceeding the Ballast Efficiency Factors, (BEF) established by the CEE, (Consortium for Energy Efficiency). For additional details on this program go to: ***www.cee1.org or www.nema.org***

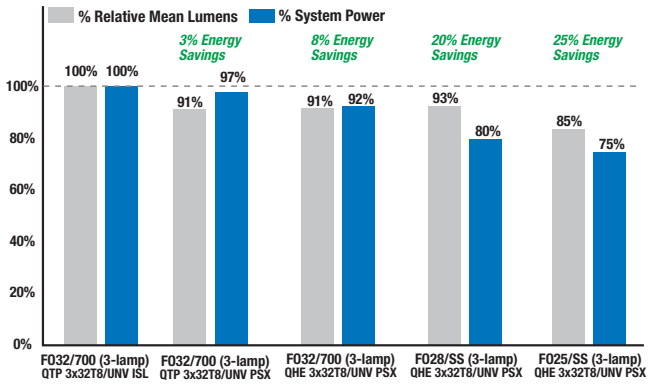
System Information

SYLVANIA QUICKTRONIC High Efficiency (QHE) PROStart System advantages:

- Operate from 120V through 277V
  - Eliminates "wrong voltage" errors
  - Reduces inventory by 50%
- Utilizes Programmed Rapid Start operation for:
  - High System Efficacy
  - Longer Life
  - Over 100,000 switching cycles for occupancy sensor and building control systems applications with OCTRON SUPERSAVER lamps.
- Operate at >42 kHz to reduce potential interference with infrared control systems
- UL Type CC compliant: ballasts utilize a micro-controller based circuit to reduce arcing caused by loose connections or improper lamp pin-to-socket connections
- These ballasts are also RoHS compliant and feature lead-free solder, printed circuit boards and manufacturing process

System Type	Input System Power (W)	Initial System Lumens	Mean System Lumens	Initial System Efficacy (lm/W)	Mean Relative Lumens (%)	Energy Savings (%)
FO32/700 (3-lamps) - QTP3x32T8/UNV ISL	75	6085	5595	81	Baseline	Baseline
FO32/700 (3-lamps) - QTP3x32T8/UNV PSX	73	5540	5090	76	91%	3%
FO32/700 (3-lamps) - QHE3x32T8/UNV PSX	69	5540	5090	80	91%	8%
FO28/SS (3-lamps) - QHE3x32T8/UNV PSX	60	5805	5455	97	97%	20%
FO25/SS (3-lamps) - QHE3x32T8/UNV PSX	56	5345	5025	95	90%	25%

**Fixture efficiency not considered.* **120V input voltage.*



SPECIFICATION DATA

Catalog #	Date	Type
Project	Prepared by	
Comments		

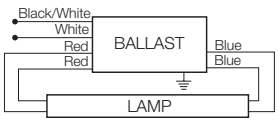
SUPERSAVER Xtreme Systems Universal Voltage (120-277V)

RoHS compliant · NEMA Premium

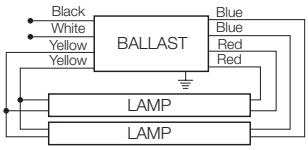
Item Number	OSRAM SYLVANIA Description	Input Current (AMPS)	Lamp[1] Type	Rated[1] Lumens (lm)	No. of Lamps	Ballast[1] Factor (BF)	System[1] Lumens	Mean[1] Lumens	Input[1] Power (W) 120	277	System[3] Efficacy (lm/W)	BEF[2]
51423 ✪	QHE1x32T8/UNV PSX-MC	0.21/0.09	F032/700	2600	1	0.72	1870	1720	25	24	78	2.94
	Banded 10-Pack	0.21/0.09	F032XPS®	3100	1	0.72	2230	2100	25	24	93	3.00
		0.21/0.09	F032XP®/XL	2950	1	0.72	2110	1985	25	24	88	2.97
		0.20/0.09	F030/SS	2850	1	0.72	2050	1930	23	23	88	3.10
		0.18/0.08	**F028/SS**	**2725**	**1**	**0.72**	**1960**	**1845**	**21**	**21**	**93**	**3.41**
		0.16/0.07	F025/SS	2475	1	0.72	1780	1675	20	19	92	3.71
51428 ✪	QHE2x32T8/UNV PSX-MC	0.40/0.17	F032/700	2600	2	0.72	3745	3440	48	47	80	1.53
	Banded 10-Pack	0.40/0.17	F032XPS	3100	2	0.72	4465	4195	48	47	94	1.53
		0.40/0.17	F032XP/XL	2950	2	0.72	4250	3995	48	47	90	1.53
		0.37/0.16	F030/SS	2850	2	0.72	4105	3860	45	43	95	1.66
		0.34/0.15	**F028/SS**	**2725**	**2**	**0.72**	**3925**	**3690**	**41**	**40**	**98**	**1.80**
		0.31/0.14	F025/SS	2475	2	0.72	3565	3350	38	37	96	1.94
51433 ✪	QHE3x32T8/UNV PSX-SC	0.58/0.25	F032/700	2600	3	0.71	5540	5090	69	67	83	1.06
	Banded 10-Pack	0.58/0.25	F032XPS	3100	3	0.71	6605	6205	69	67	99	1.06
		0.58/0.25	F032XP/XL	2950	3	0.71	6285	5905	69	67	94	1.06
		0.54/0.23	F030/SS	2850	3	0.71	6070	5705	65	63	97	1.13
		0.50/0.22	**F028/SS**	**2725**	**3**	**0.71**	**5805**	**5455**	**60**	**59**	**98**	**1.20**
		0.47/0.20	F025/SS	2475	3	0.71	5345	5025	56	55	96	1.28
51438 ✪	QHE4x32T8/UNV PSX-SC	0.76/0.32	F032/700	2600	4	0.71	7385	6790	90	89	83	0.79
	Banded 10-Pack	0.76/0.32	F032XPS	3100	4	0.71	8770	8240	90	89	99	0.79
		0.76/0.32	F032XP/XL	2950	4	0.71	8345	7845	90	89	94	0.79
		0.72/0.31	F030/SS	2850	4	0.71	8065	7580	86	84	96	0.84
		0.66/0.28	**F028/SS**	**2725**	**4**	**0.71**	**7745**	**7280**	**79**	**77**	**100**	**0.92**
		0.61/0.26	F025/SS	2475	4	0.71	7060	6640	73	71	99	1.00

1 See QUICKSYSTEMS for delamped data. 2 Ballast Efficiency Factor (BEF) shown = (Ballast Factor x 100) divided by Input Power (Note: calculation based on lowest wattage value).
3 System Efficacy calculation based on lowest input power value. ✪ Preliminary specifications. Please contact OSRAM SYLVANIA for additional information.

1 lamp



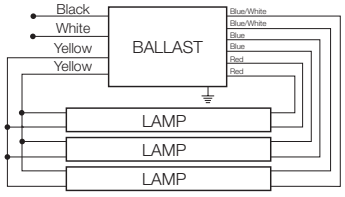
2 lamp



Note: For 1L application, individually cap both RED leads.
Insulate to 600 volts.

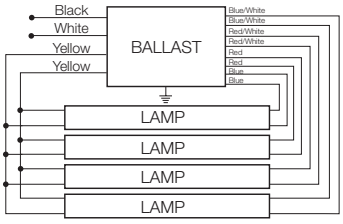
Installation Notes Lamp wiring for 3 & 4 lamp QHE PSX "parallel" models vary from QTP series models. Be sure to wire ballasts per label/ schematics shown on this bulletin.

3 lamp



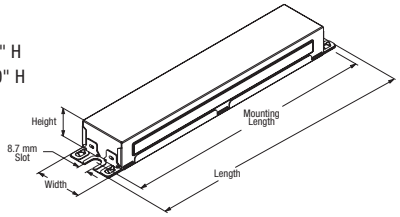
Note: For 2L application, individually cap both RED leads.
For 1L operation, individually cap both RED and BLUE leads.
Insulate to 600 volts.

4 lamp



Note: For 3L application, individually cap both RED leads.
For 2L application, individually cap both RED and BLUE leads.
For 1L application, individually cap both RED, BLUE and Red/White leads.
For lamps approved for 1L operation, see QUICKSYSTEMS.
Insulate to 600 volts.

"SC" Overall: 9.5" L x 1.68" W x 1.18" H
"MC" Overall: 9.5" L x 1.30" W x 1.00" H
Mounting: 8.90"



Product Weight:
QHE1xPSN & QHE2xPSN: 0.66 lbs. each
QHE3xPSN & QHE4xPSN: 1.27 lbs. each

Wiring:
Leads only (no connectors provided)

Item Number — **51428 QHE 2 x 32T8 / UNV PSX - MC** — Enclosure Type (MC or SC)
QUICKTRONIC High Efficiency — Starting Type/Ballast Factor - PROStart/Xtreme Low BF
Number of Lamps — Line Voltage (120-277V)
Primary Lamp Wattage

Xtreme Low Ballast Factor

T8 PROStart®

High Efficiency

Performance Guide

Data based upon SYLVANIA OCTRON® lamps shown. QUICKTRONIC® QHE PROStart ballasts are also compatible with other lamp manufacturers equivalent lamp types that meet ANSI specifications.

QHE PROStart ballasts will also operate F017 & F025, SUPERSAVER & U-Bend equivalent T8 lamps. Complete performance data is available in the QUICKSYSTEMS section of the SYLVANIA Ballast Technology & Specification Guide.

Specifications

Data based on F32T8

Starting Method: Programmed Rapid Start
Ballast Factor: 0.71 - 0.72
Circuit Type: Parallel
Lamp Frequency: >42 kHz
Lamp CCF: Less than 1.7
Starting Temp:[4]
-20°F (-29°C) for OCTRON T8 lamps;
60°F (16°C) for SUPERSAVER® T8 lamps
Input Frequency: 50/60 Hz
Low THD: <10%
Power Factor: >98%
Voltage Range: ±10% of 120-277V rated line (108-305V)

UL Listed Class P, Type 1 Outdoor
UL Type CC Rated
Lamp Striation Control (LSC)
CSA Certified (where applicable)
70°C Max. Case Temperature
FCC 47 CFR Part 18 Non-Consumer
Class A Sound Rating
NEMA Premium Electronic Ballast
Program compliant
RoHS compliant[5]
ANSI C62.41 Cat. A Transient Protection
GFCI & emergency ballast compatible
Remote Mounting (Max wire length from ballast case to lampholder):
- 20 ft: full wattage T8s
- 10 ft: energy saving T8s
- 4 ft: 25W energy saving T8s

4 Operation below 50°F (10°C) may affect light output or lamp operation – see "Low Temp. Starting" definition.

5 Complies with European Union Restriction of Hazardous Substances Directive

System Life / Warranty

QUICKTRONIC products are covered by the QUICK 60+® warranty, a comprehensive lamp and ballast system warranty. For additional details, refer to the QUICK 60+ warranty bulletin.

OSRAM SYLVANIA
National Customer
Service and Sales Center
1-800-LIGHTBULB
(1-800-544-4828)
www.sylvania.com

Specifications subject to change without notice.

QHE T8 PSX

QUICKTRONIC® PROStart® T8
High Ambient Temperature

NEMA Premium

Type CC, Lamp Striation Control & Parallel Operation
High Ballast Factor

High Efficiency Series

QHE T8 PSH

Lamp / Ballast Guide

Primary Systems
32W T8 - OCTRON®
2-lamp QHE2x32T8/UNV PSH-HT
3-lamp QHE3x32T8/UNV PSH-HT
4-lamp QHE4x32T8/UNV PSH-HT

Also operates:
FBO32, FBO31, FO30/SS (30W), FO28/SS (28W), FO25/SS (25W), FBO30/SS (30W), FBO29/SS (29W), FO25, FBO24, FO17 & FBO16

Key System Features

- High Efficiency Systems over 90% efficient
- NEMA Premium Ballast compliant
- PROStart Programmed Rapid Start
  - Extends lamp life
- High ballast factor: 1.15
- Parallel operation, (one lamp out, remaining lamps stay lit)
- 90°C maximum case temp.
- UL Type CC
- LSC (Lamp Striation Control)
- Universal input voltage (120-277V)
- Min. Starting Temp:
  - 0°F/-18°C for T8 lamps
  - 60°F/16°C for Energy Saving T8 lamps

Application Information

SYLVANIA QUICKTRONIC PROStart T8 is ideally suited for:

- High bay
- Warehouses
- Applications where extended lamp life is required to reduce maintenance costs
- Areas where frequent switching is desired
- Occupancy sensor usage
- Building control systems
- Areas that are underlit

SYLVANIA QUICKTRONIC PROStart programmed rapid start electronic T8 ballasts offer eight major advantages:

1. **Operate** 32W linear and U-bend equivalent T8 lamps at High Efficiency and high ballast factor which increases light levels while optimizing system performance.
2. **Longer Lamp Life:** System PSH, (Programmed Start High Ballast Factor) is the first SYLVANIA high ballast factor model to extend lamp life which is ideal for applications where long lamp life is desired to reduce maintenance costs.
3. **High Ambient Temperature:** specifically designed for those applications where the ballast is subjected to higher ambient temperatures, such as high bays in industrial installations.
4. **Parallel Circuitry:** keeps remaining lamps lit if one or more go out. First SYLVANIA PROStart ballast to offer parallel lamp operation.
5. **Available in 2, 3 & 4-lamp models** which allows great flexibility for various light levels in high bay applications to replace HID or T12HO lighting systems.
6. **NEMA Premium Ballast (NPB) program compliant.** The NPB program promotes the use of high efficiency T8 electronic ballasts by meeting or exceeding the Ballast Efficiency Factors, (BEF) established by the CEE, (Consortium for Energy Efficiency). For additional information on this program go to: ***www.cee1.org or www.nema.org***
7. **UL Type CC compliant:** ballasts utilize a micro-controller based circuit to reduce arcing caused by loose connections or improper lamp pin to socket connections.
8. **Lamp Striation Control (LSC):** T8 energy saving lamps should be operated above 60°F, but under certain conditions the lamps may striate. LSC circuitry may minimize or eliminate this condition; however there are limited applications where LSC circuitry may not entirely mitigate lamp striations. (Please consult lamp manufacturers for additional details.)

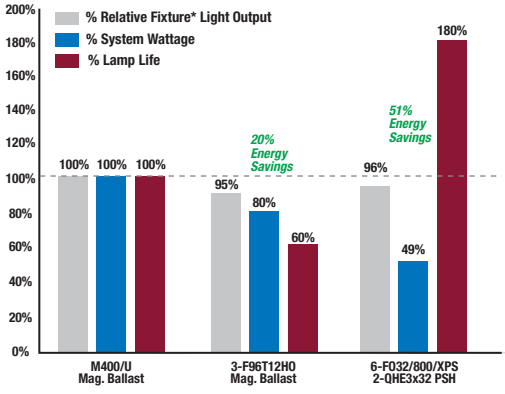
System Information

SYLVANIA QUICKTRONIC High Efficiency (QHE) System advantages:

- Operate from 120V through 277V
  - Eliminates "wrong voltage" errors
  - Reduces inventory by 50%
- Utilizes Programmed Rapid Start operation for:
  - Highest System Efficacy
  - Longer Life
  - Over 100,000 switching cycles for occupancy sensor and building control systems applications.
- Operate at >42Hz to reduce potential interference with infrared control systems

Lamp & Ballast Type	Input Power (W)	Initial LPW	Mean Fixture* Lumens	Relative Fixture* Output	% Energy Savings	% Lamp Life @3hrs/ start
M400/U Magnetic Ballast	452	61	17,784	Baseline	Baseline	Baseline
3-F96T12HO Magnetic Ballast	360	58	16,875	95%	20%	60%
6-FO32/800/XPS 2-QHE3x32 PSH	220	83	17,090	96%	51%	180%

*Based on Fixture Efficiency: 76% for M400/U and 85% for T12HO and FO32T8 lamps.



SEE THE WORLD IN A NEW LIGHT SYLVANIA

SPECIFICATION DATA

Catalog #	Date	Type
Project	Prepared by	
Comments		

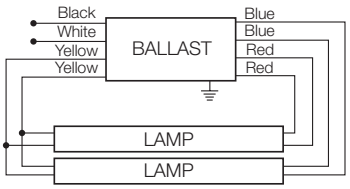
High Efficiency Type CC, Lamp Striation Control & High Ambient (120-277V)

NEMA Premium

Item Number	OSRAM SYLVANIA Description	Input Current (AMPS)	Lamp Type	Rated Lumens (lm)	No. of Lamps	Ballast Factor (BF)	System Lumens	Mean Lumens	Input Power (W)	System Efficacy (lm/W)	BEF[1]
	QHE2x32T8/UNV-PSH-HT	0.60/0.27	F032/700	2800	2	1.15	6440	5795	72/70	89/92	1.64
49450	*Banded Pack*	0.60/0.27	F032/XP	3000	2	1.15	6900	6485	72/70	96/99	1.64
49459	*Pallet Pack*	0.57/0.25	F030/SS	2850	2	1.15	6555	6160	69/67	95/98	1.72
		0.53/0.23	**F028/SS**	**2725**	**2**	**1.15**	**6270**	**5890**	**63/62**	**100/101**	**1.85**
		0.47/0.20	F025/SS	2475	2	1.15	5695	5350	56/55	102/104	2.09
		0.46/0.20	F025/XP	2175	2	1.16	5045	4740	55	92	2.11
		0.32/0.14	F017/XP	1375	2	1.17	3220	3025	38	85	3.08
	QHE3x32T8/UNV-PSH-HT	0.94/0.40	F032/700	2800	3	1.15	9660	8695	110/108	88/89	1.06
49453	*Banded Pack*	0.94/0.40	F032/XP	3000	3	1.15	10,350	9730	110/108	94/96	1.06
49460	*Pallet Pack*	0.88/0.37	F030/SS	2850	3	1.15	9835	9245	104/101	95/97	1.14
		0.81/0.34	**F028/SS**	**2725**	**3**	**1.15**	**9400**	**8835**	**95/93**	**99/101**	**1.24**
		0.72/0.31	F025/SS	2475	3	1.15	8540	8025	85/84	100/102	1.37
		0.70/0.30	F025/XP	2175	3	1.17	7635	7175	83/82	92/93	1.43
		0.48/0.21	F017/XP	1375	3	1.18	4870	4575	56	87	2.11
	QHE4x32T8/UNV-PSH-HT	1.22/0.53	F032/700	2800	4	1.15	12,880	11,590	143/141	90/91	0.82
49455	*Banded Pack*	1.22/0.53	F032/XP	3000	4	1.15	13,800	12,970	143/141	97/98	0.82
49470	*Pallet Pack*	1.13/0.49	F030/SS	2850	4	1.15	13,110	12,325	132/130	99/101	0.88
		1.06/0.46	**F028/SS**	**2725**	**4**	**1.15**	**12,535**	**11,785**	**124/123**	**101/102**	**0.93**
		0.95/0.41	F025/SS	2475	4	1.15	11,385	10,700	112/110	102/104	1.05
		0.91/0.40	F025/XP	2175	4	1.17	10,180	9570	107/106	95/96	1.10
		0.63/0.28	F017/XP	1375	4	1.18	6490	6100	73	89	1.62

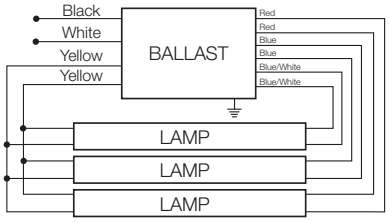
Banded pack contains 10 pieces, (add "-B" to Description). Pallet Pack contains 500 pieces, (add "-PAL" to Description).
1: Ballast Efficiency Factor (BEF) shown = (Ballast Factor x 100) divided by Input Power (Note: calculation based on lowest wattage value).

2 lamp



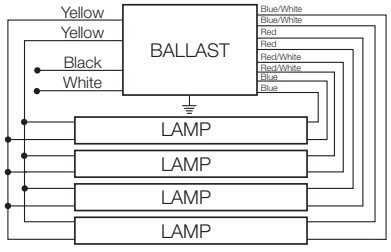
QUICKTRONIC 2x32

3 lamp



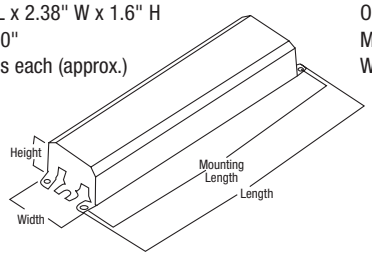
QUICKTRONIC 3x32

4 lamp

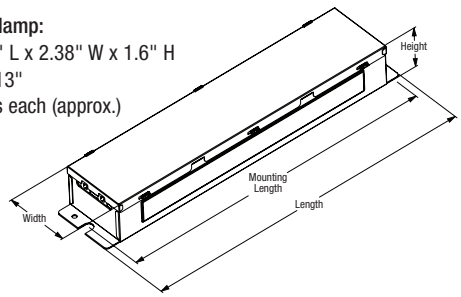


QUICKTRONIC 4x32

Dimensions 2 & 3-lamp:
Overall: 9.5" L x 2.38" W x 1.6" H
Mounting: 8.90"
Weight: 1.6 lbs each (approx.)



Dimensions 4-lamp:
Overall: 11.75" L x 2.38" W x 1.6" H
Mounting: 11.13"
Weight: 2.9 lbs each (approx.)



Item Number — **49450 QHE 2 x 32T8 / UNV PSH HT** — High Case Temp. Rating
QUICKTRONIC High Efficiency — Starting Type/Ballast Factor
Number of Lamps (2, 3, 4) — Line Voltage (120-277V)
Primary Lamp Wattage

Performance Guide

Data based upon SYLVANIA OCTRON® lamps shown. QUICKTRONIC® QHE PROStart ballasts are also compatible with other lamp manufacturers equivalent lamp types that meet ANSI specifications.

QHE PROStart ballasts will also operate F17 & F25, SUPERSAVER & U-Bend equivalent T8 lamps.

NEW!

QHE T8 PSH

Specifications

Data based on F32T8

Starting Method: Programmed Rapid-Start
Ballast Factor: 1.15
Circuit Type: Parallel
Lamp Frequency: >40 kHz
Lamp CCF: Less than 1.7
Starting Temp:[2]
0°F (-18°C) for OCTRON T8 lamps;
60°F (16°C) for SUPERSAVER® T8 lamps
Input Frequency: 50/60 Hz
THD: <10%
Power Factor: >98%
Voltage Range: ±10% of 120-277V rated line (108-305V)

UL Listed Class P, Type 1 Outdoor
UL Type CC Rated
Lamp Striation Control (LSC)
CSA Certified
High Ambient Applications:
90°C Max. Case Temp. **(3 yr. warranty)**
Standard Ambient Applications:
70°C Max. Case Temp. **(5 yr. warranty)**
FCC 47CFR Part 18 Non-Consumer Class A Sound Rating
ANSI C62.41 Cat A. Transient Protection
GFCI compatible
Emergency ballast compatible
Remote Mounting (Max. wire length from ballast case to lampholder):

- 20 ft: full wattage T8s
- 10 ft: energy saving T8s
- 4 ft: 25W energy saving T8s

2 Operation below 50ºF (10°C) may affect light output or lamp operation – see "Low Temp. Starting" definition.

System Life / Warranty

QUICKTRONIC products are covered by our QUICK 60+® warranty, a comprehensive lamp and ballast system warranty. For additional details, refer to our QUICK 60+ warranty bulletin.

OSRAM SYLVANIA
National Customer Service and Sales Center
1-800-LIGHTBULB
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Specifications subject to change without notice.

Appendix D

Budget Breakout

Hunter Plant
Lighting Budget Estimate

Lighting Calculator Code	Fixture Type	Description	Qty	lamp/ fix. qty	lamp/ fix cost	total lamp/ fix cost	ballast/ fix cost	measure cost (no mark-up)	Distributor Net Cost (no mark-up)	Mark up (%)	Marked Up Total (per unit)	Measure total (materials)	Unit Labor rate ($)	Total Labor ($)
FLT8CEE-32W x 2L X 4'-CEE RS/PRS CEE L	BRLO1 & L1	2L PRS RLO	319	2	$5	$9	$19	$29	$9,092	126%	$36	$11,498	$ 40	$ 12,760
FLT8CEE-32W x 2L X 4'-CEE RS/PRS CEE H	BHLO1 & L1	2L PRS HLO	95	2	$5	$9	$22	$31	$2,949	126%	$39	$3,729	$ 40	$ 3,800
FLT8CEE-32W x 4'-CEE RS/PRS CEE L	BRL01 & L1	1L PRS RLO	255	1	$5	$5	$19	$24	$6,079	126%	$30	$7,689	$ 40	$ 10,200
FLT8-32W x 4L x 4'-2 IS N	N/A	"as is"	2	4	$0	$0	$0	$0	$0	126%	$0	$0	$ -	$ -
FLT8CEE-32W x 2L X 4'-CEE IS CEE L	BRL01 & L1	2L IS RLO	15	2	$5	$9	$10	$19	$290	126%	$24	$367	$ 40	$ 600
LEDE-2W	Exit	exit sign	14	1	$30	$30		$30	$420	126%	$38	$531	$ -	$ -
CUST: PVM7LDM2/UNV1	RLB1	78w LED high bay	1948	1	$618	$618		$618	$1,203,864	126%	$782	$1,522,587	$ 80	$ 155,840
CUST: LEDHB-515W-DIM	HB6	515w LED high bay DIM	28	1	$800	$800		$800	$22,400	126%	$1,012	$28,330	$ 120	$ 3,360
CUST: PVM9LDM2/UNV1	RLB2	98w LED high bay	1	1	$809	$809		$809	$809	126%	$1,023	$1,023	$ 80	$ 80
Occupancy controls	OCC		22	1	$50	$50		$50	$1,100	126%	$63	$1,391	$ 60	$ 1,320
LEDWP-45w	WP1	wall pack 45W	6	1	$618	$618		$618	$3,708	126%	$782	$4,690	$ 80	$ 480

total fixtures: *2705*

$1,250,710
DNC

$1,581,836
with sell markup

$188,440

* Contingency and other costs include lifts, scaffolding, or other misc. materials/spares.

Other Costs **$ 50,000**

Grand Total all phases all budgeted costs = $ 1,820,276