

## Lighting Mitigation Plan

For



### TRIPPETT PAD

**Project Number: 21017**

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**1.0 EXECUTIVE SUMMARY**

PDC Energy commissioned Samuel Engineering to develop a lighting mitigation plan for the Trippett 3N66W3 1-48 pad site. The purpose of this report is to demonstrate compliance with the various State and Local lighting regulations, predict the lighting impacts of the different development phases, and to detail the various lighting mitigation techniques that were implemented.

The key points of the study are:

- Demonstrate compliance with Colorado Oil and Gas Conservation Commission (COGCC) Rule 424 and Weld County Regulations.
- Identify the light level impacts associated with each phase of the facility operations on surrounding buildings.
- Demonstrate compliance with the total lighting used based on site working surfaces.
- Demonstrate the various lighting mitigation techniques that were implemented to reduce lighting pollution.

Site specific three-dimensional lighting models were developed for each of the phases to determine their associated lighting impacts. The lighting fixtures used in the models were selected based on currently operated representative sites and research conducted into available vendor lighting systems.

The following Table 1.0 summarizes the calculated findings of this report compared to the regulatory limits:

<b>Calculated Lighting Values vs. Regulatory Limits Summary</b>			
	<b>Calculated Value</b>	<b>Regulatory Limit</b>	<b>Code Reference</b>
Max. Light Impact on Surrounding Building	0.9 lux	=< 4.0 lux	<i>COGCC 424.f</i>
Pre-Production – Drilling Phase (Lumens / Hardscape)	3.05 lm/ft <sup>2</sup>	=< 12 lm/ft <sup>2</sup>	<i>Weld County Ordinance ORD2021-17 Table 405 B.1</i>
Pre-Production – Completions Phase (Lumens / Hardscape)	5.43 lm/ft <sup>2</sup>	=< 12 lm/ft <sup>2</sup>	<i>Weld County Ordinance ORD2021-17 Table 405 B.1</i>
Production (Lumens / Hardscape)	0.10 lm/ft <sup>2</sup>	=< 1.25 lm/ ft <sup>2</sup>	<i>Weld County Sec 21-5-405 Table 405.C.1 for land use LZ-1 and COGCC Rule 424.d.(2) for Agricultural/Commercial</i>

*Table 1.0 - Calculated Lighting Values vs. Regulatory Limits*

As shown, all calculated values fall within their prescribed regulatory limits.

## 2.0 INTRODUCTION AND DEFINITION OF TECHNICAL TERMS

### 2.1 INTRODUCTION

Light mitigation plans seek to quantify and prescribe methods to address the negative effects of multiple forms of light pollution. Effective mitigation plans address light pollution by limiting the impacts on the surrounding communities, preserving the overall night-sky aesthetics, and maintaining existing ecosystems, all while maintaining a safe work environment.

There are a number of standards, best practices, and regulations which are used as guidelines when developing lighting plans for reducing the negative effects of artificial lighting. The applicable regulations used for this report are COGCC Rule 424 and Weld County Ordinance ORD2021-17.

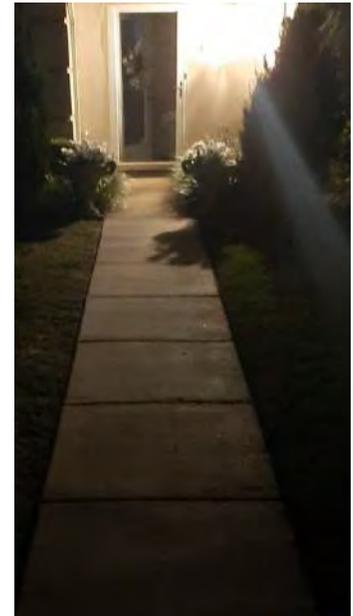
### 2.2 DEFINITION OF TECHNICAL TERMS

A number of technical terms are used throughout this report and, as an aid to the reader, are defined below.

#### Illuminance (lx)

Illuminance is defined as the amount of light falling on a surface area. It is measured in Lux (lx). One lux is equal to one lumen per square meter. As an example, the photo in Figure 2.2 shows the lux levels decreasing on the sidewalk, as the distance from the light source increases.

Illuminance is often associated with values for lighting levels for safe operation in various standard codes. In addition, photometric plans are used to predict the illuminance on surfaces of an area to provide minimum lighting levels and for mitigation of light trespass into adjoining properties or areas. Most lighting meter units used today are in lux and used to measure these values at a given distance. It should be noted that the measured value is dependent on angle, sensitivity, and optics.



*Figure 2.2 – Illuminance (lx) level decreasing with distance from light source.*

Table 2.2 below provides examples of typical Lux values.

Example Lux Values	
Clear night, no moon:	0.002 lx
Clear night, full Moon:	0.27-1 lx
Family Living Room	50 lx
Sunrise/sunset	300-500 lx
Overcast day:	1000 lx
Daylight:	10000-25000 lx
Direct sunlight:	32000-130000 lx

Table 2.2 – Example Lux Values

### Luminous Flux (lm)

Luminous Flux is defined as the amount of light energy produced per unit time and is measured in Lumens (lm). It is a physical property of light and, in general terms, is a measurement of the total amount of light emanating from a source. It is important to note that the luminous flux value of a given source is independent of where a measurement is taken.

For example, a 60-watt light bulb produces approximately 800 lumens, regardless of if the measurement is taken at 1 foot, 10 miles, or 10,000 miles away from the source.

### 3.0 MODEL AND ANALYSIS DEVELOPMENT

Site-specific three-dimensional models were developed for each of the major project development phases. These phases being Pre-Production Drilling, Pre-Production Completions, and final Production. Elements incorporated into the models, among others, were the local site topographical information, major lighting obstructions (sound wall, large equipment, etc), individual luminaire lighting qualities, lighting mounting characteristics and surrounding building units.

The site geographical information was obtained using USGS topographical information to model the surrounding 1-mile landscape.

To determine the lighting impacts on local building units, 25-foot vertical walls were modeled at the unit’s locations, at the USGS identified elevations.

Modeling of site-specific information (including large equipment, type of luminaire, and sound wall locations)

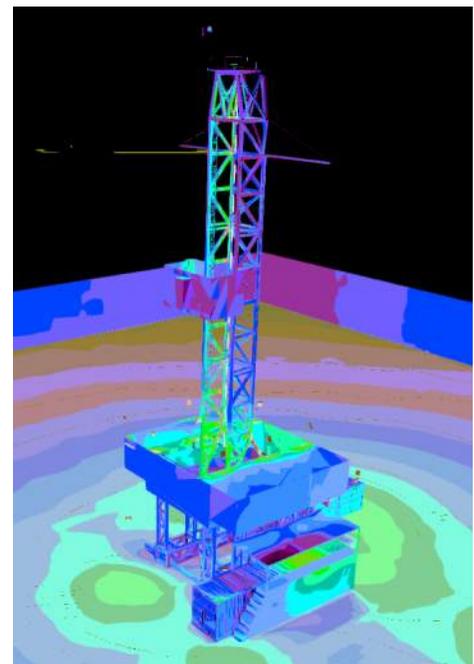


Figure 3.0 – Screenshot from an example 3-D model showing a false color rendering

were based on inspections of operational representative sites, provided vendor information, and research into various available lighting systems. The major pieces of equipment modeled included:

- Drilling: Drill rig floor, derrick, substructure, temporary lighting, sound barriers, backyard, and trailers.
- Completions: Temporary lighting, sound barriers, completions fleet equipment, and trailers.
- Production: LACT skids, separators, large tanks, and associated equipment.

Once site-specific topographical information and equipment were modeled, lighting characteristics were placed within the model. These characteristics were obtained from the various manufacturers and were specific to the make/model of the light to be used. The luminaire information included in the model were the type, quantity, mounting height, orientation, and tilt angle.

Models for each of the various project phases were developed in a similar manner and the resulting calculated lighting impacts were tabulated. An Excel spreadsheet was used to total the site lumens for each fixture and compare it to the site working pad surface (hardscape).

In the Pre-Production phases, temporary lighting fixtures were based on currently available rental units and on observations from representative sites. The temporary lighting system that will be used might vary based on rental availability at the time of procurement but is expected to be representative of the lumen values used in this analysis.

## **4.0 LIGHTING ANALYSIS RESULTS**

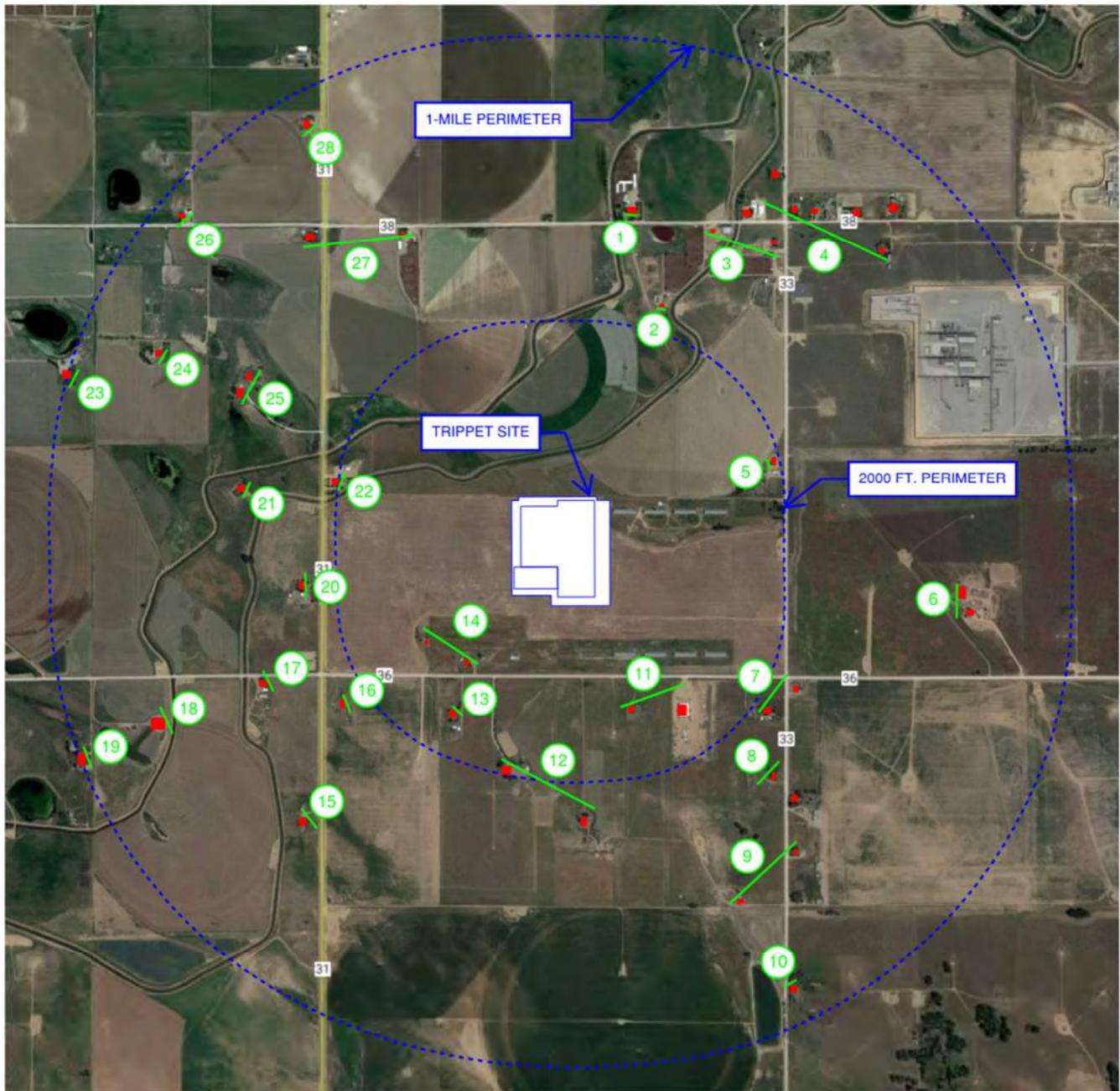
### **4.1 CUMULATIVE LIGHTING IMPACTS**

Applicable Code Reference: COGCC Rule 424.f:

*“Operators will develop site lighting to reduce cumulative nighttime light intensity from all Oil and Gas Facilities to 4 lux at any Residential Building Unit or High Occupancy Building Unit within 1 mile of any Oil and Gas Facility, measured at 5.5 feet above grade in a direct line of sight to the brightest light fixture onsite.”*

Due to the large number of buildings units located within the 1-mile radius of the site, buildings were grouped into clusters and a representative "wall" location was selected for analysis. These analyzed "wall" locations were selected to determine an upper cumulative light impact limit for that clustered group, taking into account the local topography, orientation, and distance to the site.

Figure 4.1 shows the residential building units that are located within a 1-mile radius of the Trippett Pad site.



LEGEND

- - BUILDING UNIT
- - ANALYZED CUMULATIVE LIGHT IMPACT LOCATION AS MEASURE 5.5FT ABOVE GRADE

Figure 4.1 – Building Units Within a 1-Mile Radius of PDC Trippett Site

Calculated Lighting Impact Results				
Building Unit No.	Pre-Production Drilling	Pre-Production Completions	Production	Regulatory Limit
1	< 0.1 Lux	< 0.1 Lux	< 0.1 Lux	4 lux
2	< 0.1 Lux	< 0.1 Lux	< 0.1 Lux	4 lux
3	< 0.1 Lux	< 0.1 Lux	< 0.1 Lux	4 lux
4	< 0.1 Lux	< 0.1 Lux	< 0.1 Lux	4 lux
5	< 0.1 Lux	< 0.1 Lux	< 0.1 Lux	4 lux
6	< 0.1 Lux	< 0.1 Lux	< 0.1 Lux	4 lux
7	< 0.1 Lux	0.27 Lux	< 0.1 Lux	4 lux
8	< 0.1 Lux	0.21 Lux	< 0.1 Lux	4 lux
9	< 0.1 Lux	0.29 Lux	< 0.1 Lux	4 lux
10	< 0.1 Lux	< 0.1 Lux	< 0.1 Lux	4 lux
11	< 0.1 Lux	0.9 Lux	< 0.1 Lux	4 lux
12	< 0.1 Lux	0.19 Lux	< 0.1 Lux	4 lux
13	< 0.1 Lux	0.27 Lux	< 0.1 Lux	4 lux
14	0.22 Lux	0.58 Lux	< 0.1 Lux	4 lux
15	< 0.1 Lux	< 0.1 Lux	< 0.1 Lux	4 lux
16	< 0.1 Lux	< 0.1 Lux	< 0.1 Lux	4 lux
17	< 0.1 Lux	< 0.1 Lux	< 0.1 Lux	4 lux
18	< 0.1 Lux	< 0.1 Lux	< 0.1 Lux	4 lux
19	< 0.1 Lux	< 0.1 Lux	< 0.1 Lux	4 lux
20	< 0.1 Lux	< 0.1 Lux	< 0.1 Lux	4 lux
21	< 0.1 Lux	< 0.1 Lux	< 0.1 Lux	4 lux
22	< 0.1 Lux	0.14 Lux	< 0.1 Lux	4 lux
23	< 0.1 Lux	< 0.1 Lux	< 0.1 Lux	4 lux
24	< 0.1 Lux	< 0.1 Lux	< 0.1 Lux	4 lux
25	< 0.1 Lux	< 0.1 Lux	< 0.1 Lux	4 lux
26	< 0.1 Lux	< 0.1 Lux	< 0.1 Lux	4 lux
27	< 0.1 Lux	< 0.1 Lux	< 0.1 Lux	4 lux
28	< 0.1 Lux	< 0.1 Lux	< 0.1 Lux	4 lux

Table 4.1 – Building Units Within a 1-Mile Radius of PDC Trippett Site

Table 4.1 demonstrates compliance with COGCC Rule 424.f.

#### 4.2 HARDSCAPE VS LUMEN LEVEL RESULTS

Applicable Code Reference: Weld County Ordinance ORD2021-17 TABLE 405 B.1 (B)  
 Construction base allowance for lighting is stated as 12.0 lumens per SF of hardscape.

Lumens per hardscape calculations were performed based on the number of exterior fixtures light output (lumens) and the working pad surface (hardscape). The area of the working pad surface is the same for both construction phases and exceeds the maximum of 12 acres. Therefore, the maximum of 12 acres was used. The calculated lumen values were then compared to the regulatory allowed site lumens per square foot to demonstrate compliance.

4.2.1 Pre-Production Drilling Hardscape per Lumens Compliance

<b>Pre-Production Drilling Lighting Compliance</b>		
	Calculated Value	Notes
Site Hardscape Area:	522,720 ft <sup>2</sup>	
Site Hardscape Acres:	12 Acres	Not to Exceed 12 Acres (ORD2021-17)
Site Total Lumens:	1,596,171 lm	See Section 5.2
Site Allowance Initial Lumens Total:	6,272,640 lm	
Calculated Site (Lumens / ft <sup>2</sup> ):	3.05 lm/(ft <sup>2</sup> )	Construction Site is Verified
Regulatory Allowed Limit:	12 lm/(ft <sup>2</sup> )	Per Weld County Ordinance ORD2021-17 Table 405 B.1

*Table 4.2.1 – Pre-Production Drilling Operation Compliance Calculation*

Based on the calculation shown in Table 4.2.1, the estimated site lighting during the Pre-Production Drilling operation phase is less than the regulatory maximum value and in compliance with Weld County Ordinance ORD2021-17.

4.2.2 Pre-Production Completions Hardscape per Lumens Compliance

<b>Pre-Production Completions Lighting Compliance</b>		
	Calculated Value	Notes
Site Hardscape Area:	522,720 ft <sup>2</sup>	
Site Hardscape Acres:	12 Acres	Not to Exceed 12 Acres (ORD2021-17)
Site Total Lumens:	2,840,964 lm	See Section 5.5
Site Allowance Initial Lumens Total:	6,272,640 lm	
Calculated Site (Lumens / ft <sup>2</sup> ):	5.43 lm/(ft <sup>2</sup> )	Construction Site is Verified
Regulatory Allowed Limit:	12 lm/(ft <sup>2</sup> )	Per Weld County Ordinance ORD2021-17 Table 405 B.1

*Table 4.2.2 – Pre-Production Completions Operation Compliance Calculation*

Based on the calculation shown in Table 4.2.2, the estimated site lighting during the Pre-Production Completions operation phase is less than the regulatory maximum value and in compliance with Weld County Ordinance ORD2021-17.

4.2.3 Production Hardscape per Lumens Compliance

Production Lighting Compliance		
	Calculated Value	Notes
Site Hardscape Area:	696,960 ft <sup>2</sup>	
Site Hardscape Acres:	16 Acres	
Site Total Lumens:	71,094 lm	See Section 5.6
Planning Zone for Weld County:	LZ-1	“Near Urban Planning Zone” based on Weld County Appendix 21-B
Calculated Site Value:	0.10 lm/(ft <sup>2</sup> )	Production Site is Verified
Regulatory Allowed Limit:	1.25 lm/(ft <sup>2</sup> )	Weld County Sec. 21-5-405 Table 405. C.1 & COGCC Rule 424.d.(2)

*Table 4.2.3 – Production Operation Compliance Calculation*

Based on the calculation shown in Table 4.2.3, the estimated site lighting during the Production operation phase is less than the regulatory maximum value and in compliance with Weld County Ordinance ORD2021-17 and COGCC Rule 424.d.(2) for Commercial/Agricultural.

## 5.0 SITE LIGHTING POSITIONS AND ORIENTATION

### 5.1 SITE LIGHTING NOTES

Applicable Code Reference: COGCC Rule 424(a)(2)(A)(ii)

Pertaining to Pre-Production activities: *“The proposed anticipated location, mounting, height, and orientation of all outdoor lighting fixtures on the site during pre-production activities”*

The following figures and tables in this section show the lighting location, mounting, height, and orientations for the Pre-Production Drilling, Completions, and Production Operations, in accordance with COGCC Rule 424(a)(2)(A)(ii). The following notes apply:

- 1) Stated tilt at zero (0) degrees represents a luminaire facing directly downward.

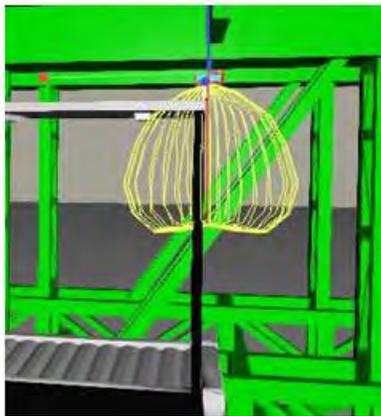


Figure 5.0 Example 0 degrees

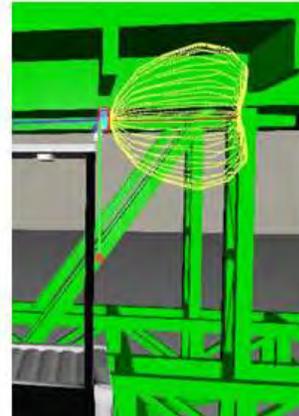
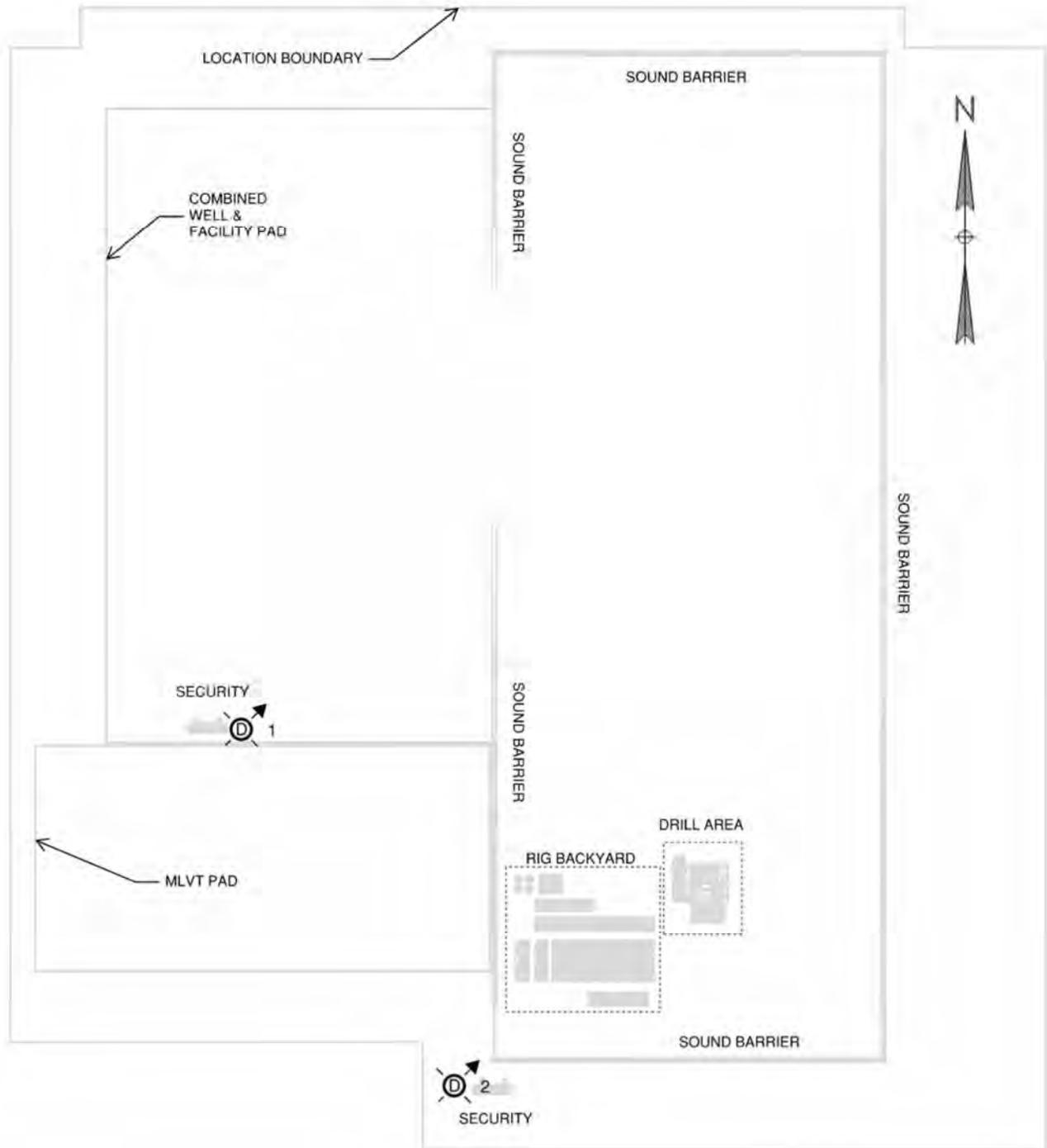


Figure 5.1 Example 90 degrees

- 2) Intermittent Sources of Lights such as glow from on-site combustor and alarm lights are not included in this analysis.
- 3) Temporary lighting where necessary for safety reasons per COGCC 424.a.2.A.iii have not been modeled or accounted for in this analysis.
- 4) The quantity of lights and calculated values shown represents an estimated upper limit to the actual values that will be present on-site.
- 5) Refer to Attachment A for further lighting fixture information.

5.2 PRE-PRODUCTION - DRILLING SITE LAYOUT AND LUMINAIRE SCHEDULE

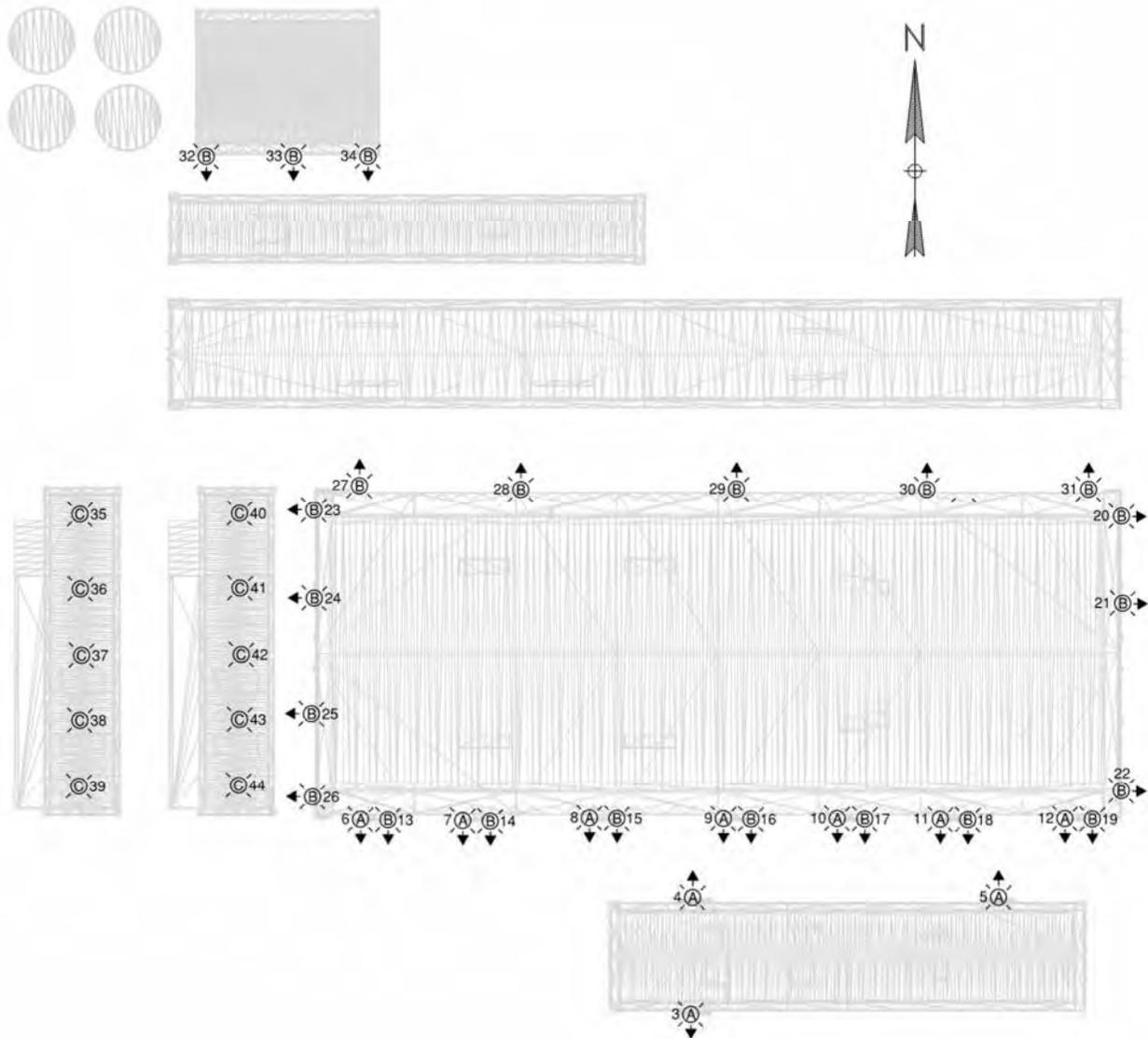


LUMINAIRE LAYOUT  
PDC TRIPPETT – OVERALL SITE LAYOUT  
PRE-PRODUCTION – CONSTRUCTION  
DRILLING OPERATIONS

Luminaire Schedule					
Luminaire Type	Manufacturer	Model Number	Description	Power (Watts)	Luminous Flux (Φ)
D	HPWINNER	M8B-VCA-63	LED - TEMP. LIGHTING SYSTEM POLE-MOUNTED, EACH FIXTURE CONSISTS OF 16 MODULES, VALUES GIVEN ARE TOTAL PER FIXTURE	960 W	121920 lm

Luminaire Position and Tilt				
Luminaire No.	Mounting Height (ft)	Tilt (Degrees)	Luminaire Type	Luminous Flux (Φ)
1	30'	75°	D	121920 lm
2	30'	75°	D	121920 lm
Total Lumens Calculation				
Subtotal Area Calculation:				243,840 lm
Total Rig Backyard Area Lumens:				725,002 lm
Total Rig Area Lumens:				627,329 lm
Total Area Lumens:				<b>1,596,171 lm</b>

5.3 PRE-PRODUCTION – DRILLING – RIG BACKYARD - SITE LAYOUT AND LUMINAIRE SCHEDULE



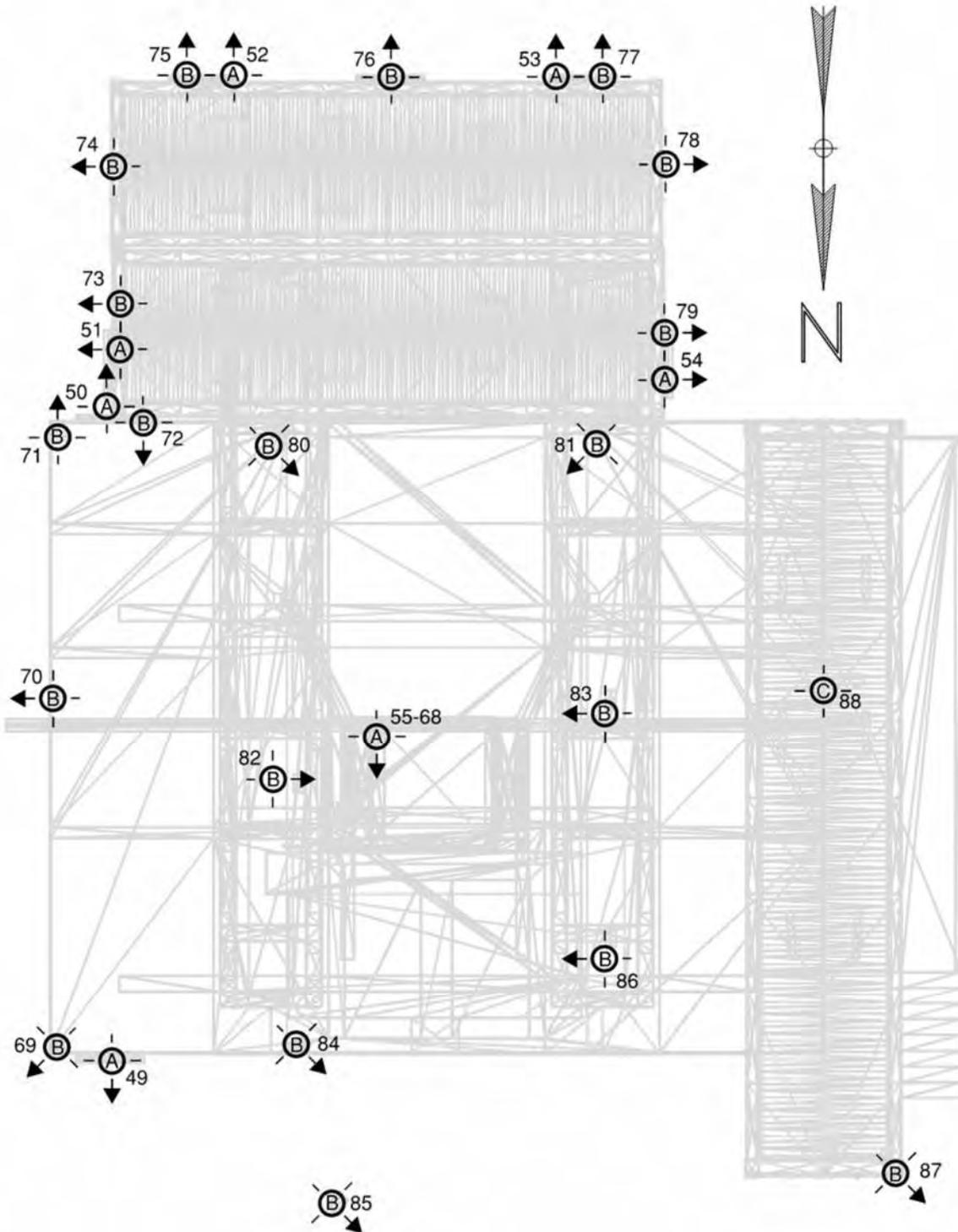
LUMINAIRE LAYOUT  
PDC TRIPPETT – RIG BACKYARD  
PRE-PRODUCTION – CONSTRUCTION  
DRILLING OPERATIONS

Luminaire Schedule					
Luminaire Type	Manufacturer	Model Number	Description	Power (Watts)	Luminous Flux (Φ)
A	EATON – COOPER CROUSE HINDS	DLL4/UNV1 S903D	LED – 4FT LINEAR W/ DIFF. POLYCARBONATE LENS	63 W	7900 lm
B	EATON – COOPER CROUSE HINDS	DFLMYM400/TT 76	HID – HAZ. AREA CLEAR CLASS FLOODLIGHT	400 W	24091 lm
C	DIALIGHT	HEULMC2ANNWNGN	LED – HIGH BAY W/ DIFF. POLYCARBONATE DOME	80 W	11600 lm

Luminaire Position and Tilt				
Luminaire No.	Mounting Height (ft)	Tilt (Degrees)	Luminaire Type	Luminous Flux (Φ)
3	9'	75°	A	7900 lm
4	9'	75°	A	7900 lm
5	9'	75°	A	7900 lm
6	9'	75°	A	7900 lm
7	9'	75°	A	7900 lm
8	9'	75°	A	7900 lm
9	9'	75°	A	7900 lm
10	9'	75°	A	7900 lm
11	9'	75°	A	7900 lm
12	9'	75°	A	7900 lm
13	15'	75°	B	24091 lm
14	15'	75°	B	24091 lm
15	15'	75°	B	24091 lm
16	15'	75°	B	24091 lm
17	15'	75°	B	24091 lm
18	15'	75°	B	24091 lm
19	15'	75°	B	24091 lm
20	15'	75°	B	24091 lm
21	15'	75°	B	24091 lm
22	15'	75°	B	24091 lm
23	15'	75°	B	24091 lm
24	15'	75°	B	24091 lm
25	15'	75°	B	24091 lm
26	15'	75°	B	24091 lm
27	15'	75°	B	24091 lm
28	15'	75°	B	24091 lm
29	15'	75°	B	24091 lm
30	15'	75°	B	24091 lm
31	15'	75°	B	24091 lm

Luminaire Position and Tilt				
Luminaire No.	Mounting Height (ft)	Tilt (Degrees)	Luminaire Type	Luminous Flux (Φ)
32	15'	75°	B	24091 lm
33	15'	75°	B	24091 lm
34	15'	75°	B	24091 lm
35	16'	0°	C	11600 lm
36	16'	0°	C	11600 lm
37	16'	0°	C	11600 lm
38	16'	0°	C	11600 lm
39	16'	0°	C	11600 lm
40	16'	0°	C	11600 lm
41	16'	0°	C	11600 lm
42	16'	0°	C	11600 lm
43	16'	0°	C	11600 lm
44	16'	0°	C	11600 lm
<b>Total Lumens Calculation</b>				
Total Area Lumens:				<b>725,002 lm</b>

5.4 PRE-PRODUCTION - DRILL AREA - SITE LAYOUT AND LUMINAIRE SCHEDULE



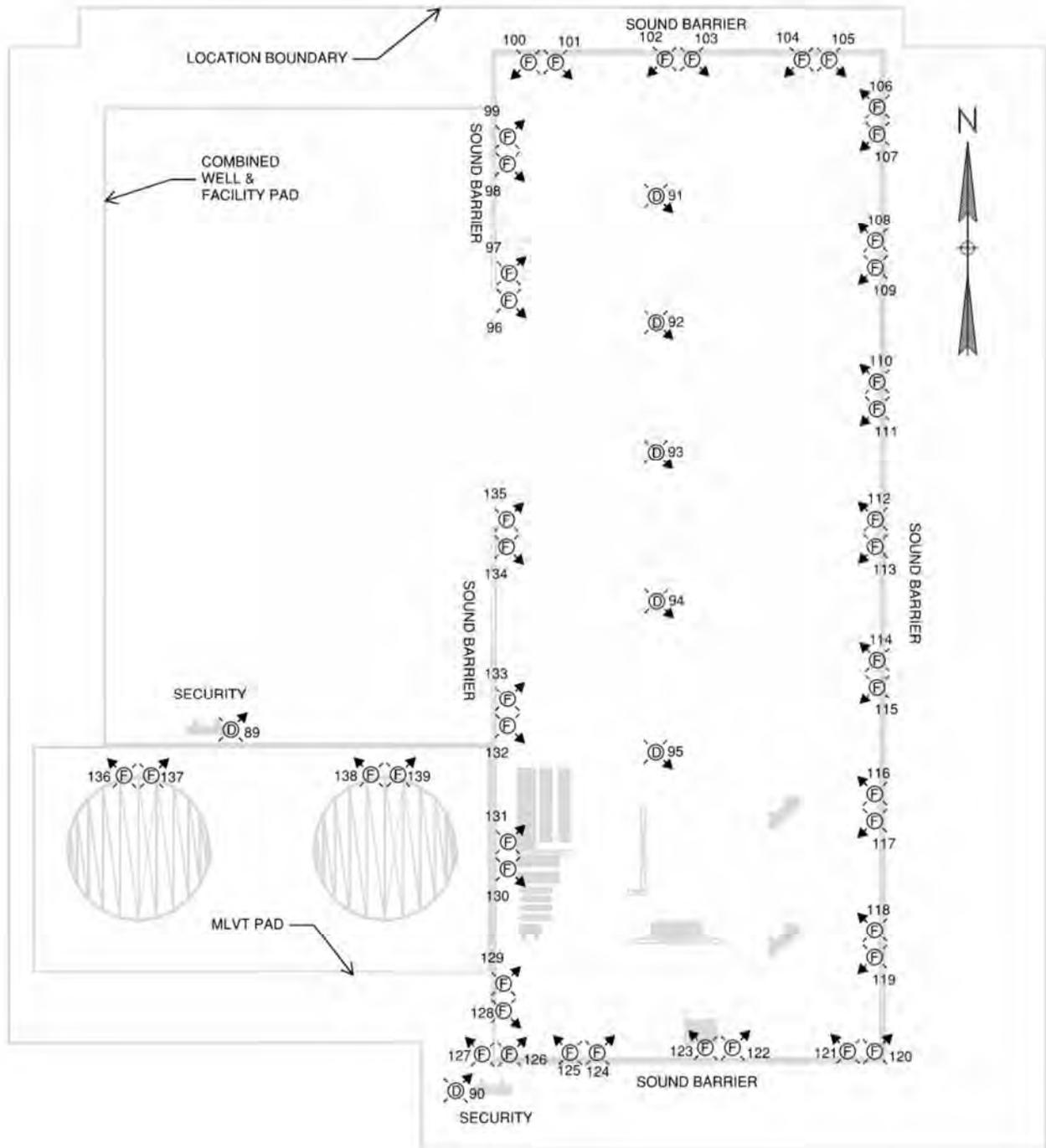
LUMINAIRE LAYOUT  
PDC TRIPPETT – DRILL AREA – DETAIL B  
PRE-PRODUCTION – CONSTRUCTION  
DRILLING OPERATIONS

Luminaire Schedule					
Luminaire Type	Manufacturer	Model Number	Description	Power (Watts)	Luminous Flux (Φ)
A	EATON – COOPER CROUSE HINDS	DLL4/UNV1 S903D	LED – 4FT LINEAR W/ DIFF. POLYCARBONATE LEN	63 W	7900 lm
B	EATON – COOPER CROUSE HINDS	DFLMYM400/TT 76	HID – HAZ. AREA CLEAR CLASS FLOODLIGHT	400 W	24091 lm
C	DIALIGHT	HEULMC2ANNWNGN	LED – HIGH BAY W/ DIFF. POLYCARBONATE DOME	80 W	11600 lm

Luminaire Position and Tilt				
Luminaire No.	Mounting Height (ft)	Tilt (Degrees)	Luminaire Type	Luminous Flux (Φ)
49	37'	75°	A	7900 lm
50	37'	75°	A	7900 lm
51	20'	75°	A	7900 lm
52	20'	75°	A	7900 lm
53	20'	75°	A	7900 lm
54	20'	75°	A	7900 lm
55	39'	90°	A	7900 lm
56	47'	90°	A	7900 lm
57	55'	90°	A	7900 lm
58	62'	90°	A	7900 lm
59	69'	90°	A	7900 lm
60	77'	90°	A	7900 lm
61	85'	90°	A	7900 lm
62	93'	90°	A	7900 lm
63	100'	90°	A	7900 lm
64	108'	90°	A	7900 lm
65	115'	90°	A	7900 lm
66	123'	90°	A	7900 lm
67	130'	90°	A	7900 lm
68	138'	90°	A	7900 lm
69	44'	75°	B	24091 lm
70	44'	75°	B	24091 lm
71	44'	75°	B	24091 lm
72	23'	75°	B	24091 lm
73	23'	75°	B	24091 lm
74	23'	75°	B	24091 lm
75	23'	75°	B	24091 lm

Luminaire Position and Tilt				
Luminaire No.	Mounting Height (ft)	Tilt (Degrees)	Luminaire Type	Luminous Flux (Φ)
76	23'	75°	B	24091 lm
77	23'	75°	B	24091 lm
78	23'	75°	B	24091 lm
79	23'	75°	B	24091 lm
80	44'	75°	B	24091 lm
81	44'	75°	B	24091 lm
82	44'	75°	B	24091 lm
83	44'	75°	B	24091 lm
84	44'	75°	B	24091 lm
85	20'	75°	B	24091 lm
86	14'	75°	B	24091 lm
87	23'	75°	B	24091 lm
88	20'	0°	C	11600 lm
<b>Total Lumens Calculation</b>				
Total Area Lumens:				<b>627,329 lm</b>

5.5 PRE-PRODUCTION - COMPLETIONS - SITE LAYOUT AND LUMINAIRE SCHEDULE



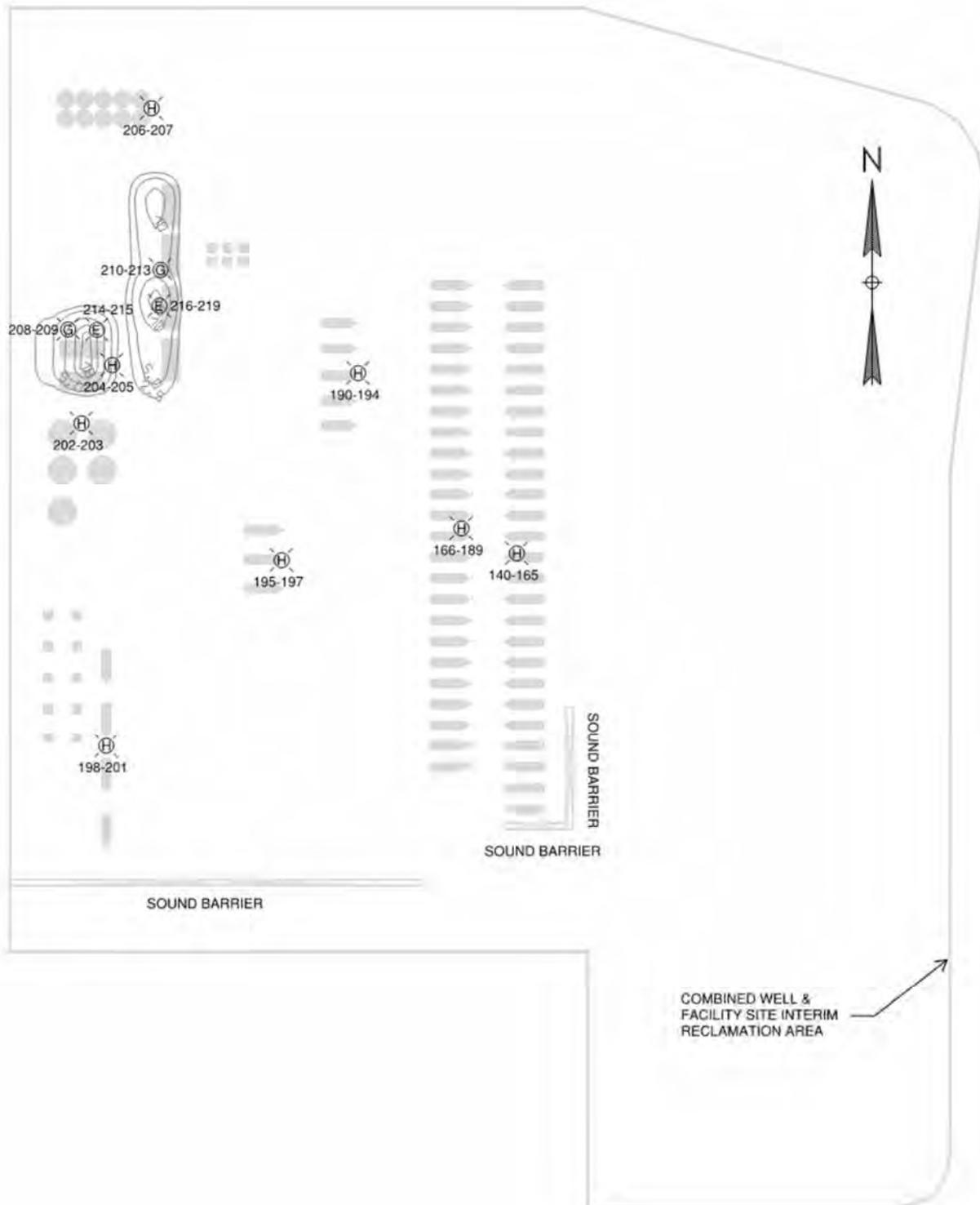
LUMINAIRE LAYOUT  
PDC TRIPPETT – COMPLETIONS  
PRE-PRODUCTION – CONSTRUCTION

Luminaire Schedule					
Luminaire Type	Manufacturer	Model Number	Description	Power (Watts)	Luminous Flux (Φ)
D	HPWINNER	M8B-VCA-63	LED - TEMP. LIGHTING SYSTEM POLE-MOUNTED, EACH FIXTURE CONSISTS OF 16 MODULES, VALUES GIVEN ARE TOTAL PER FIXTURE	960 W	121920 lm
F	RAB	FXLED300SF	LED – HIGH OUTPUT FLOODLIGHT	300 W	45171 lm

Luminaire Position and Tilt				
Luminaire No.	Mounting Height (ft)	Tilt (Degrees)	Luminaire Type	Luminous Flux (Φ)
89	31'	75°	D	121920 lm
90	31'	75°	D	121920 lm
91	31'	75°	D	121920 lm
92	31'	75°	D	121920 lm
93	31'	75°	D	121920 lm
94	31'	75°	D	121920 lm
95	31'	75°	D	121920 lm
96	31'	75°	F	45171 lm
97	31'	75°	F	45171 lm
98	31'	75°	F	45171 lm
99	31'	75°	F	45171 lm
100	31'	75°	F	45171 lm
101	31'	75°	F	45171 lm
102	31'	75°	F	45171 lm
103	31'	75°	F	45171 lm
104	31'	75°	F	45171 lm
105	31'	75°	F	45171 lm
106	31'	75°	F	45171 lm
107	31'	75°	F	45171 lm
108	31'	75°	F	45171 lm
109	31'	75°	F	45171 lm
110	31'	75°	F	45171 lm
111	31'	75°	F	45171 lm
112	31'	75°	F	45171 lm
113	31'	75°	F	45171 lm
114	31'	75°	F	45171 lm
115	31'	75°	F	45171 lm
116	31'	75°	F	45171 lm
117	31'	75°	F	45171 lm
118	31'	75°	F	45171 lm

Luminaire Position and Tilt				
Luminaire No.	Mounting Height (ft)	Tilt (Degrees)	Luminaire Type	Luminous Flux (Φ)
119	31'	75°	F	45171 lm
120	31'	75°	F	45171 lm
121	31'	75°	F	45171 lm
122	31'	75°	F	45171 lm
123	31'	75°	F	45171 lm
124	31'	75°	F	45171 lm
125	31'	75°	F	45171 lm
126	31'	75°	F	45171 lm
127	31'	75°	F	45171 lm
128	31'	75°	F	45171 lm
129	31'	75°	F	45171 lm
130	31'	75°	F	45171 lm
131	31'	75°	F	45171 lm
132	31'	75°	F	45171 lm
133	31'	75°	F	45171 lm
134	31'	75°	F	45171 lm
135	31'	75°	F	45171 lm
136	31'	75°	F	45171 lm
137	31'	75°	F	45171 lm
138	31'	75°	F	45171 lm
139	31'	75°	F	45171 lm
<b>Total Lumens Calculation</b>				
Total Area Lumens:				<b>2,840,964 lm</b>

5.6 PRODUCTION - SITE LAYOUT, LUMINAIRE SCHEDULE, AND PHOTOMETRIC ISO



LUMINAIRE LAYOUT  
PDC TRIPPETT – OVERALL SITE  
LAYOUT PRODUCTION AREA

Luminaire Schedule					
Luminaire Type	Manufacturer	Model Number	Description	Power (Watts)	Luminous Flux (Φ)
E	EATON – COOPER CROUSE HINDS	CPMV5L- UNV1-S903D	LED – WALL PACK LIGHTING FIXTURE LED W/ DIFF. POLYCARBONATE LENS	45 W	5200 lm
G	ORBIT	LWP2-50W-CW	LED – WALL PACK FIXTURE	50 W	5969 lm
H	RAYCHEM	E-100	LED – HEAT TRACE END SEAL KIT	2 W	60 lm

Luminaire Position and Tilt				
Luminaire No.	Mounting Height (ft)	Tilt (Degrees)	Luminaire Type	Luminous Flux (Φ)
140	5'	180°	H	60 lm
141	5'	180°	H	60 lm
142	5'	180°	H	60 lm
143	5'	180°	H	60 lm
144	5'	180°	H	60 lm
145	5'	180°	H	60 lm
146	5'	180°	H	60 lm
147	5'	180°	H	60 lm
148	5'	180°	H	60 lm
149	5'	180°	H	60 lm
150	5'	180°	H	60 lm
151	5'	180°	H	60 lm
152	5'	180°	H	60 lm
153	5'	180°	H	60 lm
154	5'	180°	H	60 lm
155	5'	180°	H	60 lm
156	5'	180°	H	60 lm
157	5'	180°	H	60 lm
158	5'	180°	H	60 lm
159	5'	180°	H	60 lm
160	5'	180°	H	60 lm
161	5'	180°	H	60 lm
162	5'	180°	H	60 lm
163	5'	180°	H	60 lm
164	5'	180°	H	60 lm
165	5'	180°	H	60 lm
166	5'	180°	H	60 lm
167	5'	180°	H	60 lm

Luminaire Position and Tilt				
Luminaire No.	Mounting Height (ft)	Tilt (Degrees)	Luminaire Type	Luminous Flux (Φ)
168	5'	180°	H	60 lm
169	5'	180°	H	60 lm
170	5'	180°	H	60 lm
171	5'	180°	H	60 lm
172	5'	180°	H	60 lm
173	5'	180°	H	60 lm
174	5'	180°	H	60 lm
175	5'	180°	H	60 lm
176	5'	180°	H	60 lm
177	5'	180°	H	60 lm
178	5'	180°	H	60 lm
179	5'	180°	H	60 lm
180	5'	180°	H	60 lm
181	5'	180°	H	60 lm
182	5'	180°	H	60 lm
183	5'	180°	H	60 lm
184	5'	180°	H	60 lm
185	5'	180°	H	60 lm
186	5'	180°	H	60 lm
187	5'	180°	H	60 lm
188	5'	180°	H	60 lm
189	5'	180°	H	60 lm
190	5'	180°	H	60 lm
191	5'	180°	H	60 lm
192	5'	180°	H	60 lm
193	5'	180°	H	60 lm
194	5'	180°	H	60 lm
195	5'	180°	H	60 lm
196	5'	180°	H	60 lm
197	5'	180°	H	60 lm
198	5'	180°	H	60 lm
199	5'	180°	H	60 lm
200	5'	180°	H	60 lm
201	5'	180°	H	60 lm
202	5'	180°	H	60 lm
203	5'	180°	H	60 lm
204	5'	180°	H	60 lm

Luminaire Position and Tilt				
Luminaire No.	Mounting Height (ft)	Tilt (Degrees)	Luminaire Type	Luminous Flux (Φ)
205	5'	180°	H	60 lm
206	5'	180°	H	60 lm
207	5'	180°	H	60 lm
208	9'	0°	G	5969 lm
209	9'	0°	G	5969 lm
210	9'	0°	G	5969 lm
211	9'	0°	G	5969 lm
212	9'	0°	G	5969 lm
213	9'	0°	G	5969 lm
214	9'	0°	E	5200 lm
215	9'	0°	E	5200 lm
216	9'	0°	E	5200 lm
217	9'	0°	E	5200 lm
218	9'	0°	E	5200 lm
219	9'	0°	E	5200 lm
<b>Total Lumens Calculation</b>				
Total Area Lumens:				<b>71,094 lm</b>

## **6.0 SITE MITIGATION NOTES AND TECHNIQUES**

The following mitigation notes and techniques apply:

- 1) To the extent possible, LED fixtures are used to reduce skyglow. This is based on the calculated results of the relative impact versus traditional lighting methods using DOE Skyglow comparison tool PNNL-SA-138348. (Pre-Production and Production Phase)
- 2) All lights have been positioned to point in a downward direction where vertical lighting is not required. Where it is required, lights are angled in a vertical direction to provide task lighting for safety and operations involving personnel. (Pre-Production and Production Phase)
- 3) Luminaire Type “A” used on the Derrick mast are facing horizontally to provide adequate lighting for safe operations. (Pre-Production Phase)
- 4) Luminaire Lights Type “G” and “E” are used exclusively for task lighting when required for maintenance operations at night for safety reasons. Otherwise, these lights are to remain off. The values for these lights are included in the analysis as an upper limit to the actual values that will be present on site. (Production Phase)
- 5) To the extent possible, design considerations have been made regarding the type of light fixtures used, quantity, and positioning to reduce various forms of lighting pollution. Examples include:
  - Lighting is angled away from surrounding off site buildings.
  - Lighting within the Production area has been reduced to provide a minimum acceptable value for safe operations.
  - Light masts are automatically switched off/on based on lighting sensors.
  - Lights are switched off when not required.
  - Lights are directed to task areas only.
  - Low power (63W) LED lights are used for the drill rig.
  - Sound barriers are positioned to reduce lighting trespass to surrounding off-site buildings.
  - The calculated cumulative light impacts, as indicated in Section 4.1, on surrounding buildings within a one-mile radius area are below 4 lux when measured 5.5 feet above grade.
- 6) Lighting Cut Sheet Notes for Attachment A
  1. Type A Fixtures (Pre-Production Phase) are representative of current fixtures used during drilling operations.
  2. Type B fixtures (Pre-Production Phase) are representative of current fixtures used during drilling operations.
  3. Type C Fixtures (Pre-Production Phase) are representative of current fixtures used during drilling operations.
  4. Type D Fixtures (Pre-Production Phase) are portable construction light towers. See the fixture cut sheet cover for further notes.

5. Type E Fixtures (Production Phase) are representative of current fixtures used for LACT skids and mounted near the doors to the skids.
6. Type F Fixtures (Pre-Production Phase) are floodlights placed on the sound wall and are representative of current fixtures used during drilling operations.
7. Type G Fixtures (Production Phase) are representative of current fixtures used for trailers and LACT skids.
8. Type H Fixtures (Production Phase)
  - o Type H Fixtures are an estimation of heat trace end kits. Photometric data from the manufacturer is not available. These lights are low power LED's mounted on the pipe where heat trace is installed. Mounting height and location vary based on final design and installation.

## **7.0 ATTACHMENTS**

Attachment A – Lighting Cutsheets

END OF REPORT

ATTACHMENT A  
FIXTURE CUT SHEETS TYPES A,B,C,D,E,F,G,H  
LIGHTING MITIGATION PLAN  
FOR  
**PDC ENERGY**  
**TRIPPETT PAD**  
**Project Number: 21017**

FIXTURE CUT  
SHEET  
TYPE A

# Pauluhn DLL LED Luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D  
Cl. I, Zone 2  
Cl. II, Div. 2, Groups F, G  
Cl. III

UL Listed  
CSA Certified  
Marine & Wet Locations  
NEMA 4X; IP66

2L

2L

The Pauluhn™ DLL linear LED is specifically designed to replace fluorescent T12, T8 and T5HO lighting on land-based and offshore drilling platforms. The rugged and durable design features the industry's most versatile and flexible mounting options. The Pauluhn DLL is the ideal solution for high vibration, impact and hose down in drilling applications.

Model	Typical lumens	Watts	Lumens per watt	Equivalent HID luminaire	Typical energy savings / lifetime
DLL2	3,958	32	124	T12HO	Up to 63%
				T8HO	Up to 59%
				T5HO	Up to 47%
				T12	Up to 36%
				T8	Up to 25%
DLL4	7,900	63	130	T5	Up to 9%
				T12HO	Up to 58%
				T8HO	Up to 54%
				T5HO	Up to 43%
				T12	Up to 37%
DLL4	7,900	63	130	T8	Up to 22%
				T5	Up to 10%

## Applications:

- Land-based and offshore rigs; areas include: derrick, mast, SCR house, top drive, operator's house, power and pump stations

## Features:

- High efficacy: up to 120 LPW
- 40°C to +65°C ambient operating temperature (standard model)
- Low profile (<3" height)
- Versatile ceiling/swivel, wall, flush, pole and pendant mounting options
- Wide and narrow optics for uniform illumination in control room and drill mast
- Four points of secondary retention
- 2,000 PSI high pressure hose rated
- High vibration resistance
- Emergency battery back-up (90 minutes) and surge protection options (up to 10 kV) <sup>Ⓐ</sup>
- DesignLights Consortium® Qualified (some models are not DLC qualified) <sup>Ⓑ</sup>
- 5 year fixture warranty

## Standard materials:

- Housing – copper-free aluminum; Corro-free epoxy powder coat (optional)
- Lens – clear polycarbonate; diffused polycarbonate

## Photometrics:

- Complete photometrics can be found at [www.crouse-hinds.com/photometrics](http://www.crouse-hinds.com/photometrics)

## Temperature performance data:

Ambient temp. °C	Min. temp. supply wire °C	Simultaneous rating		
		Class I, Div. 2	Class II, Div. 2	Class I, Div. 2; Class II, Div. 2
40	60	T6	T6	T6
55	75	T5	T5	T5
65	90	T5	T5	T5



## Mounting (ordered separately):

Versatile mounting options:

- Flush back mount
- Swivel/ceiling back mount
- Offset ceiling mount
- Offset wall mount
- Pole mount
- Pendant mount

Easily retrofit to:

- Existing Pauluhn DuraPro and MagnaPro fluorescent light fixtures
- Rig-A-Lite and Snelson C1D2 fluorescent lighting fixtures

## Certifications and compliances:

### NEC:

- Class I, Division 2, Groups A, B, C, D
- Class I, Zone 2
- Class II, Division 2, Groups F, G
- Class III
- NEMA 4X, IP66
- Marine and wet locations

### UL standards:

- UL844 – Electrical Fixture Hangers for Hazardous Locations
- UL1598 – Luminaire
- UL1598A – Luminaire for Installation on Marine Vessels
- UL924 – Emergency Lighting

### CSA standard:

- C22.2 No. 137

### Additional certifications:

- ABS design assessed

## Electrical ratings:

	DLL2	DLL4
Lumen output	3,958	7,900
Frequency	50/60 Hz	50/60 Hz
Voltage	100-277 VAC, 108-250 VDC; 347-480 VAC	

Model	Voltage	Current (A)	Watts	Power factor	THD
DLL2/UNV1	100	0.33	32.5	0.92	<20%
DLL2/UNV1	277	0.13	34.3	0.92	<20%
DLL2/UNV34	347	0.10	32.2	0.92	<20%
DLL2/UNV34	480	0.07	34.5	0.92	<20%
DLL4/UNV1	100	0.63	63.4	0.92	<20%
DLL4/UNV1	277	0.23	62.5	0.92	<20%
DLL4/UNV34	347	0.18	61.4	0.92	<20%
DLL4/UNV34	480	0.13	63.9	0.92	<20%

## Weights:

Model	Lbs.	Kg.
DLL2	12.50	5.70
DLL4	22.50	10.20

<sup>Ⓐ</sup> One year warranty.

<sup>Ⓑ</sup> Refer to [www.designlights.org](http://www.designlights.org) Qualified Products List under Family Models for full listing details. Not all models are approved for all application categories.

# Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D  
Cl. I, Zone 2  
Cl. II, Div. 2, Groups F, G  
Cl. III

UL Listed  
CSA Certified  
Marine & Wet Locations  
NEMA 4X; IP66

2L

2L

**Designed for drilling.** Pauluhn DLL linear LED luminaires are engineered to handle demanding conditions faced on land-based drilling rigs. The DLL stands up to high vibration, hose down, shock and impact, while delivering long life and high lumen performance for up to 20 years.

#### Custom optics:

- Standard wide (120°) beam spread for control room and indoor application maximizes illumination on wall panels
- Narrow (80°) beam spread option for high mast/derrick application avoids spillage and light loss

#### Comprehensive certification:

- Single model certified for use in Class I, Division 2 and Class II, Division 2 harsh and hazardous applications

#### Quick & easy installation:

- Easy access to drivers and wiring
- No custom brackets or hardware needed
- Seven mounting options available
- Easily retrofit to Pauluhn DuraPro and MagnaPro, Rig-A-Lite and Snelson



#### Slim profile:

- 2.7" fixture height (excluding mounting brackets)
- Perfect for mounting in confined or low height areas

#### Built to last:

- Ingress protection from hose down water or diesel fuel in harsh operational conditions – passed 2,000 PSI high pressure test
- Vibration-, impact- and shock-resistant – passed 5G, 3-axis vibration test
- 60,000 hour lifetime at 55°C ambient



# Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D  
Cl. I, Zone 2  
Cl. II, Div. 2, Groups F, G  
Cl. III

UL Listed  
CSA Certified  
Marine & Wet Locations  
NEMA 4X; IP66

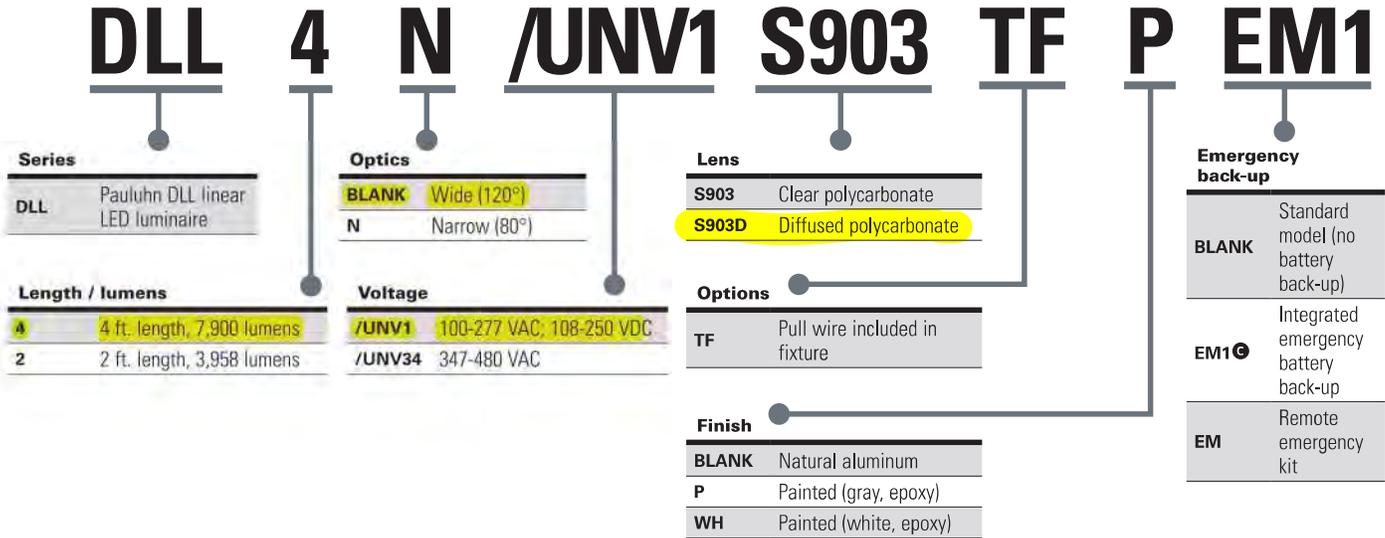
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## Ordering information:

Part number example

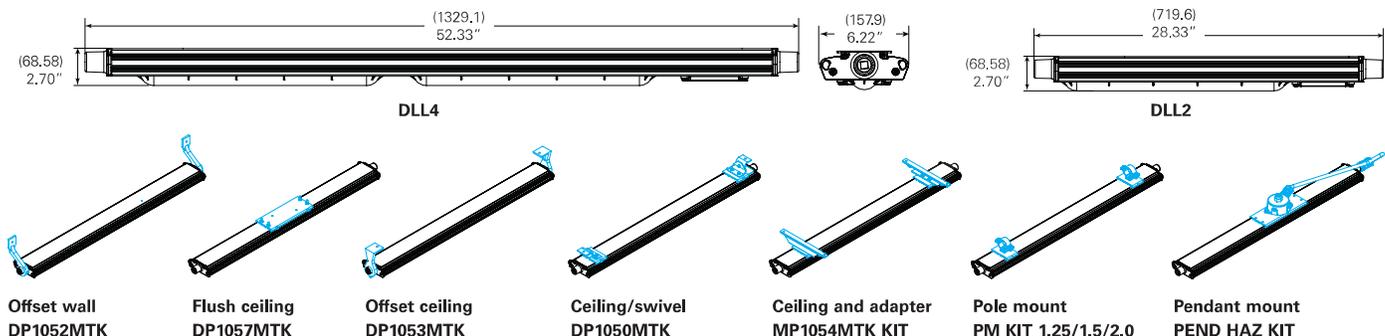
**DLL4N/UNV1 S903 TF P EM1**



## Accessories (ordered separately):

Description	Cat. #	Description	Cat. #
• Flush/back mount back plate.....	<b>DP1057MTK</b> <i>Compatible with DuraPro</i>	• Pendant mount kit.....	<b>PEND HAZ KIT</b>
• Ceiling/swivel mount.....	<b>DP1050MTK</b> <i>Compatible with DuraPro</i>	• Safety chain kit.....	<b>SS KIT</b>
• Ceiling/wall mount offset.....	<b>DP1053MTK</b> <i>Compatible with DuraPro</i>	• 1 amp driver replacement kit, 100-277 VAC for 4 ft. linear.....	<b>VMVL/UNV1 80W 1A KIT</b>
• Ceiling mount bracket and adapter kit.....	<b>MP1054MTK KIT</b> <i>Compatible with MagnaPro</i>	• 1 amp driver replacement kit, 347-480 VAC for 4 ft. linear.....	<b>VMVL/UNV34 80W 1A KIT</b>
• Offset wall mount.....	<b>DP1052MTK</b> <i>Compatible with DuraPro</i>	• 0.5 amp driver replacement kit, 100-277 VAC for 2 ft. linear.....	<b>VMVL/UNV1 80W 0.5A KIT</b>
• Pole mount kit, 1.25" conduit.....	<b>PM KIT 1.25</b>	• 0.5 amp driver replacement kit, 347-480 VAC for 2 ft. linear.....	<b>VMVL/UNV34 80W 0.5A KIT</b>
• Pole mount kit, 1.50" conduit.....	<b>PM KIT 1.5</b>		
• Pole mount kit, 2.00" conduit.....	<b>PM KIT 2.0</b>		

## Dimensions and mounting options:



Ⓢ One year warranty. Remote EM kit also available, 120-277 VAC only. Available with 4 ft. model only.

# Pauluhn DLL LED Luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D  
Cl. I, Zone 2  
Cl. II, Div. 2, Groups F, G  
Cl. III

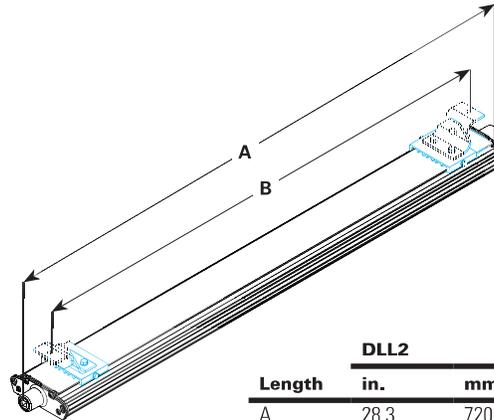
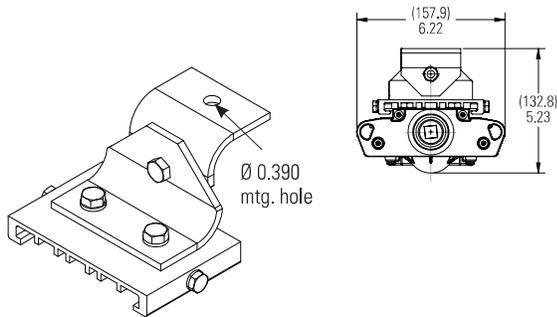
UL Listed  
CSA Certified  
Marine & Wet Locations  
NEMA 4X; IP66

2L

2L

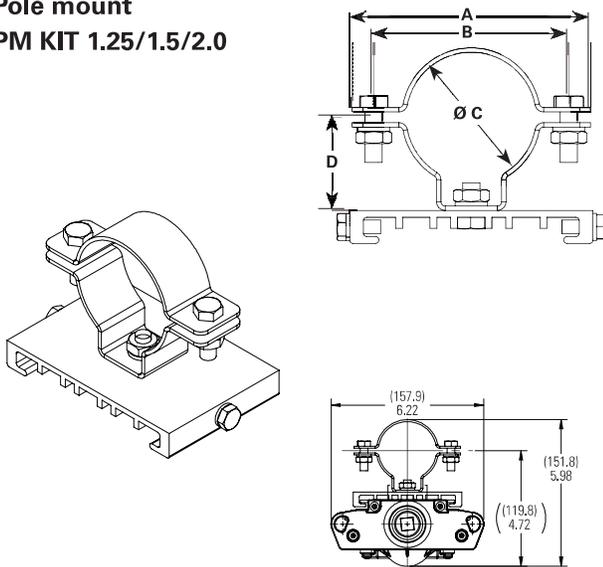
## Mounting options:

### Ceiling/swivel mount DP1050MTK

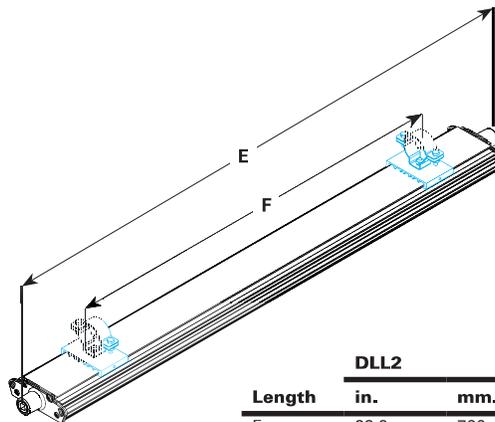


Length	DLL2		DLL4	
	in.	mm.	in.	mm.
A	28.3	720	52.3	1329
B	9-27	222-681	9-51	222-1289

### Pole mount PM KIT 1.25/1.5/2.0

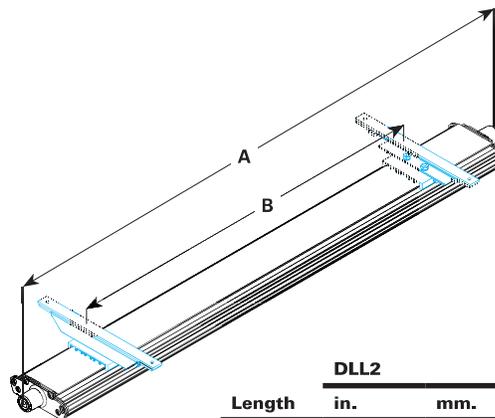
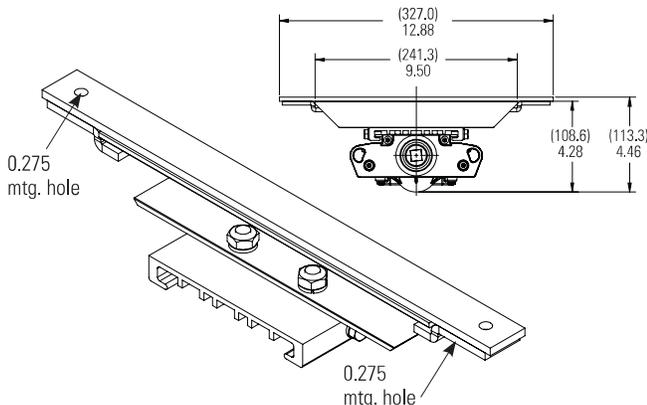


Configuration	ALL MEASUREMENTS IN INCHES			
	A	B	C	D
PM KIT 1.25	4.331	3.543	1.680	1.693
PM KIT 1.5	3.740	2.953	2.000	1.535
PM KIT 2.0	3.386	2.598	2.360	1.378



Length	DLL2		DLL4	
	in.	mm.	in.	mm.
E	28.3	720	52.3	1329
F	12-21	305-533	24-45	610-1143

### MagnaPro mount MP1054MTK KIT



Length	DLL2		DLL4	
	in.	mm.	in.	mm.
A	28.3	720	52.3	1329
B	12-22	305-559	24-46	610-1168

# Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D  
Cl. I, Zone 2  
Cl. II, Div. 2, Groups F, G  
Cl. III

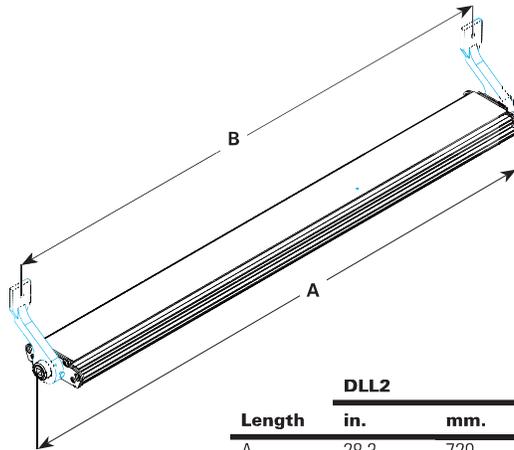
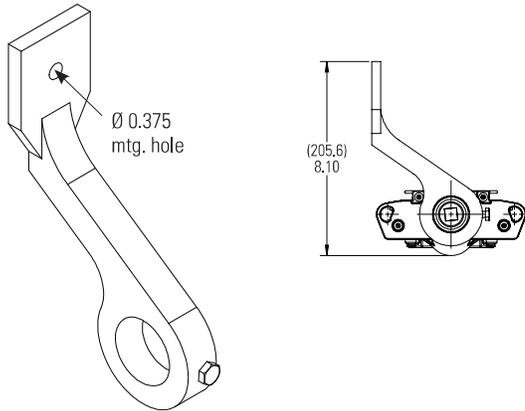
UL Listed  
CSA Certified  
Marine & Wet Locations  
NEMA 4X; IP66

2L

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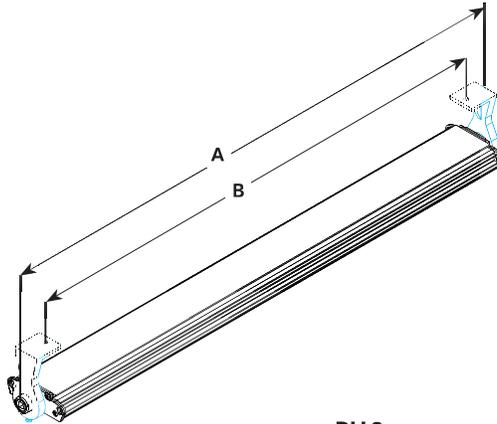
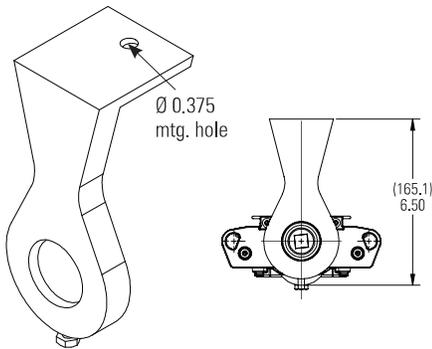
## Mounting options (continued):

### Offset wall DP1052MTK



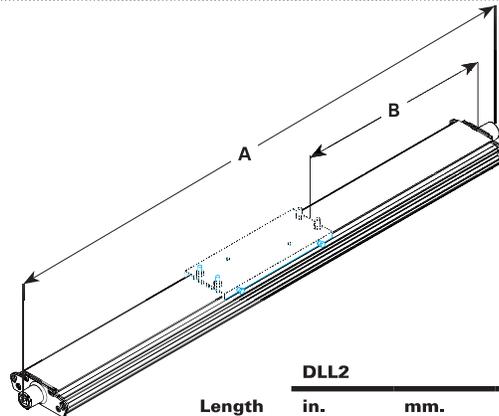
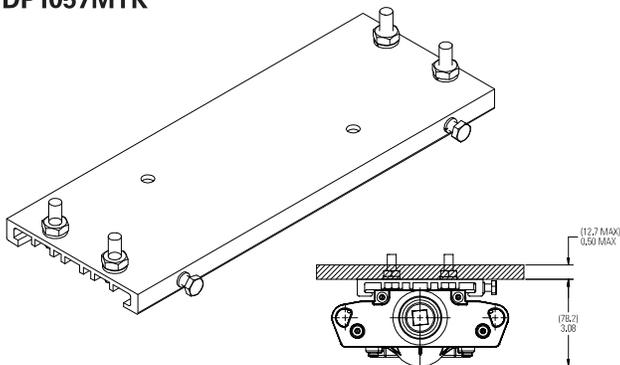
Length	DLL2		DLL4	
	in.	mm.	in.	mm.
A	28.3	720	52.3	1329
B	26.3	669	50.3	1278

### Offset ceiling/wall mount DP1053MTK



Length	DLL2		DLL4	
	in.	mm.	in.	mm.
A	28.3	720	52.3	1329
B	26.3	584	47.0	1194

### Flush ceiling DP1057MTK



Length	DLL2		DLL4	
	in.	mm.	in.	mm.
A	28.3	720.0	52.3	1329.0
B	6.2	157.5	18.2	462.0

# Pauluhn DLL LED luminaires

For land-based drilling

Cl. I, Div. 2, Groups A, B, C, D  
Cl. I, Zone 2  
Cl. II, Div. 2, Groups F, G  
Cl. III

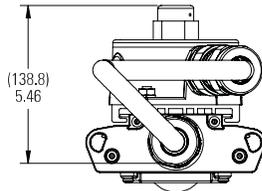
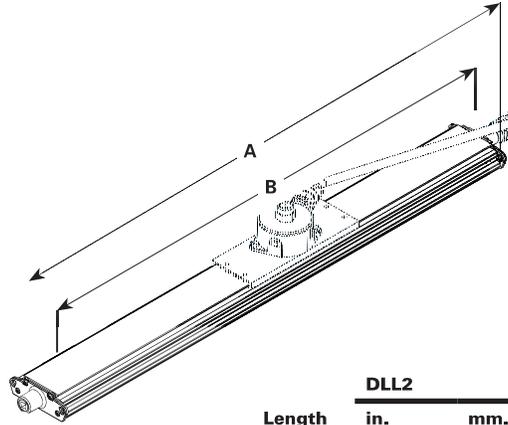
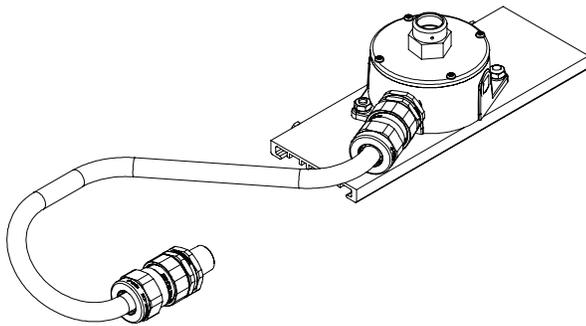
UL Listed  
CSA Certified  
Marine & Wet Locations  
NEMA 4X; IP66

2L

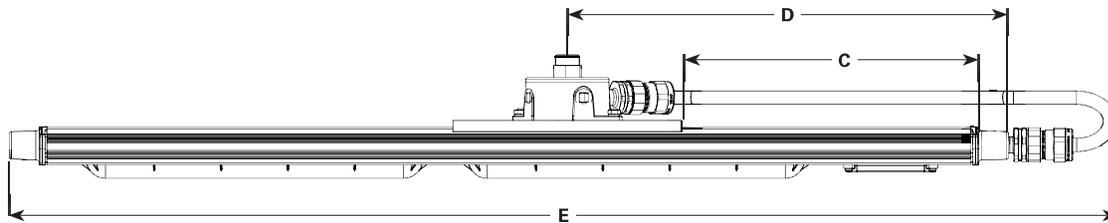
2L

## Mounting options (continued):

Pendant mount – Class I, Division 2 only  
PEND HAZ KIT



Length	DLL2		DLL4	
	in.	mm.	in.	mm.
A	31.7	805	55.8	1418
B	28.3	720	52.3	1329
C	4.2	108	16.0	406
D	12.2	310	24.0	610
E	34.9	886	58.9	1495



# Pauluhn DLL LED luminaires

Integral battery back-up

Cl. I, Div. 2, Groups A, B, C, D  
Cl. II, Div. 2, Groups F, G

UL Listed  
CSA Certified  
Wet Locations  
Type 4X; IP66

2L

2L

Pauluhn DLL linear LED luminaires are available with an integral battery back-up module. Virtually the same size as the standard 4 foot model and 90 minutes of emergency lighting to keep your facility and personnel safe.



Model	EM output	Normal output
DLL4/UNV1 S903 EM1	1,400 lumens (100-277V)	6,720 lumens (100-277V)

## Applications:

- Egress and emergency lighting for areas requiring uninterrupted lighting during power failure
- Hazardous rated indoor and outdoor emergency lighting in manufacturing plants, heavy industrial, chemical and petrochemical facilities, platforms, loading docks and parking areas

## Features:

- Operating ambient: 0°C to +40°C
- 90-minute run time in emergency mode
- 6,720 lumen output for normal operation; 1,400 lumen output in emergency mode
- 50,000 hours rated life at 40°C
- IP66 rated enclosure
- LED indicator to check battery operation
- Nickel cadmium battery
- 1 year warranty

## Certifications and compliances:

### NEC/CEC:

- Class I, Division 2, Groups A, B, C, D
- Class II, Division 2, Groups F, G
- Wet locations, Type 4X, IP66

### UL standards:

- UL844 – Hazardous (Classified)
- UL1598 – Luminaires
- UL1598A – Marine
- UL924 – Emergency Lighting

### CSA standard:

- CSA C22.2 Nos. 137, 141

## Electrical ratings:

	EM output	Normal output
Voltage	120	277
Amperage at 120 VAC	0.480	0.212
Wattage at 120 VAC	57.8	57.7
Lumen output	1,400	6,720
Frequency	50/60 Hz	50/60 Hz
Power factor at 100 VAC	>0.90	>0.90
THD	6.58	11.70

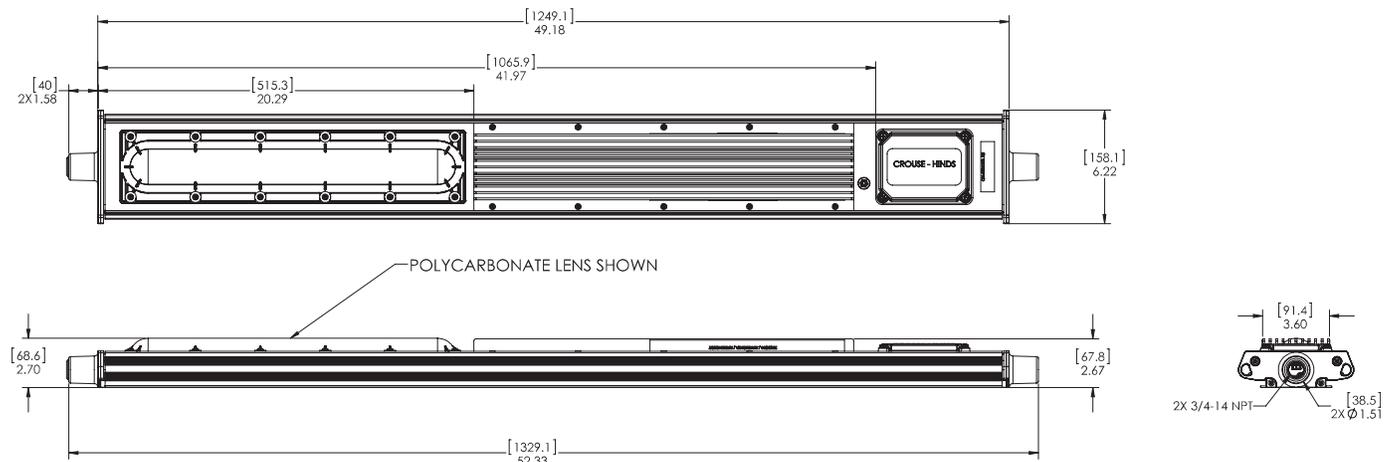
## Temperature performance data:

Ambient temp. °C	Min. temp. supply wire °C	Simultaneous rating		
		Class I, Div. 2	Class II, Div. 2	Class I, Div. 2; Class II, Div. 2
40	60	T5	T6	T5

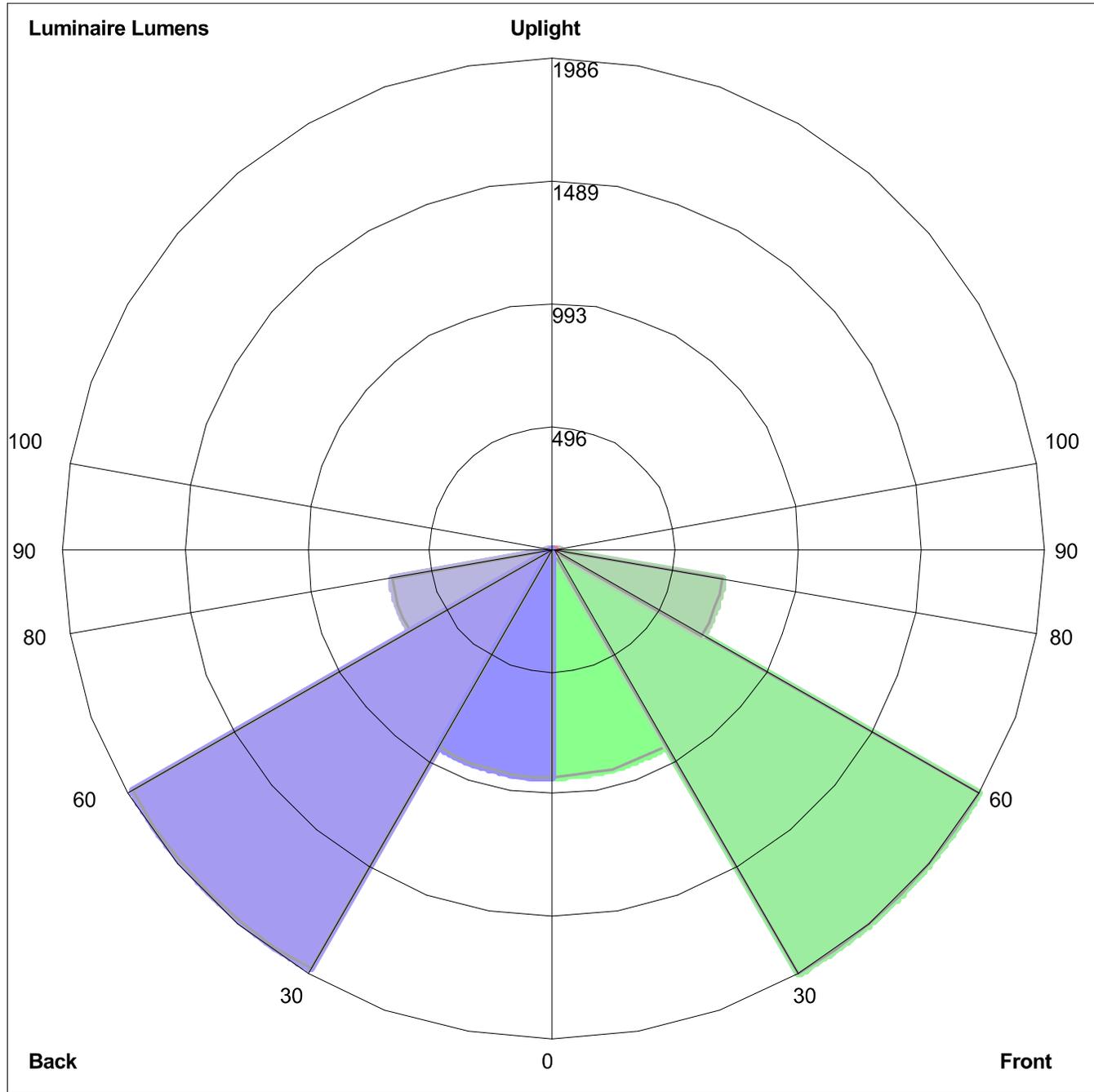
## Photometrics:

- Complete photometrics can be found at [www.crouse-hinds.com/photometrics](http://www.crouse-hinds.com/photometrics)

## Dimensions:



LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:  
Front: Low=921.0, Medium=1985.6, High=698.7, Very High=29.2  
Back: Low=925.1, Medium=1963.4, High=664.7, Very High=26.5  
Uplight: Low=4.7, High=1.2

BUG Rating : B2-U1-G1

FIXTURE CUT  
SHEET  
TYPE B

# Pauluhn DFL HID hazardous area floodlights

Cl. I, Div. 2, Groups A, B, C, D  
Cl. I, Zone 2, AEx nR II  
Cl. II, Div. 1, Groups F, G (250W  
max.)  
Ex nR II

Marine & Wet Locations  
NEMA 4X  
IP66

6L

## Applications:

- Onshore drilling and exploration
- Pipeline compressor and storage
- Corrosive environments
- Façade security lighting

## Features:

- 150-400W high pressure sodium or 175-400W metal halide
- AEx nR, Ex nR restricted breathing rating is standard – restricted breathing offers cooler T-numbers for increased hazardous locations suitability
- NEMA 7x6 butterfly beam floodlight pattern – wide, uniform and far reaching to provide excellent efficiency and more light where you need it
- NEMA Type 4X and IP66 heavy duty, die cast copper-free aluminum construction is designed for use indoors and outdoors in marine and wet locations with stainless steel external hardware suitable for saltwater and corrosive applications
- 40°C, 55°C and 65°C ambient suitability – addresses high ambient common at industrial facilities
- Low ambient capability to -40°C – perfect for colder climates
- Hinged door frame assembly – has captive cover screws for ease of relamping
- Yoke mount design – standard construction provides the greatest mounting flexibility; can be mounted vertically (wall), horizontally (rooftop or floor) or any angle in between
- 3-axis resonance withstand and UL844 vibration compliant – can stand up to the tough jobs
- Precision formed aluminum reflector – superior beam control, distribution and efficiency
- High light output with a low cost of operation – cost-effectiveness in a high wattage floodlight
- Slipfitter adapter for pole mounting and wall mounting bracket available

## Certifications and compliances:

- Class I, Division 2, Groups A, B, C, D
- Class I, Zone 2, AEx nR II
- Class II, Division 1, Groups F, G (250W maximum)
- Ex nR II
- UL/cUL844 – Hazardous Locations
- UL/cUL1598 – Luminaires
- UL/cUL1598A – Supplemental Requirements for Luminaires for Installation on Marine Vessels
- 60079-15
- NEMA Type 4X
- IP66
- Marine and wet locations
- ABS



## Standard materials and finishes:

- Housing and lens frame – heavy duty die cast copper-free aluminum with Corro-free epoxy powder coat finish
- Lens – heat- and impact-resistant tempered glass
- Gasket – one-piece silicone
- Mounting brackets – aluminum with Corro-free epoxy powder coat finish
- Reflector – precision formed aluminum
- Lamp holder – porcelain
- Hardware – stainless steel

## Technical specifications:

- Entries – one 3/4" AEx/Ex gland
- Wind rating – EPA: 2.90 at vertical
- Lamp type – high pressure sodium; probe start metal halide<sup>A</sup>; pulse start metal halide (lamps not provided)
- Lamp holder – mogul base
- Ballast – multi-tap 120/208/240/277V, 60 Hz (standard); 220-240V, 50 Hz (optional); tri-tap 120/277/347V (optional); 480V (optional)

## Mounting option:

- Yoke mount

## Photometrics:

- Complete photometrics can be found at [www.crouse-hinds.com/photometrics](http://www.crouse-hinds.com/photometrics)

<sup>A</sup> Not available in the U.S.

# Pauluhn DFL HID hazardous area floodlights

Cl. I, Div. 2, Groups A, B, C, D  
Cl. I, Zone 2, AEx nR II  
Cl. II, Div. 1, Groups F, G (250W max.)  
Ex nR II

Marine & Wet Locations  
NEMA 4X  
IP66

6L

## Options:

Description	Suffix
• Lamps included .....	<b>L</b> ⓐ
• 480V.....	<b>480</b>
<i>Replace /MT in catalog number with /480</i>	
• 230V.....	<b>230</b>
<i>Replace /220 ONLY in catalog number with /230</i>	

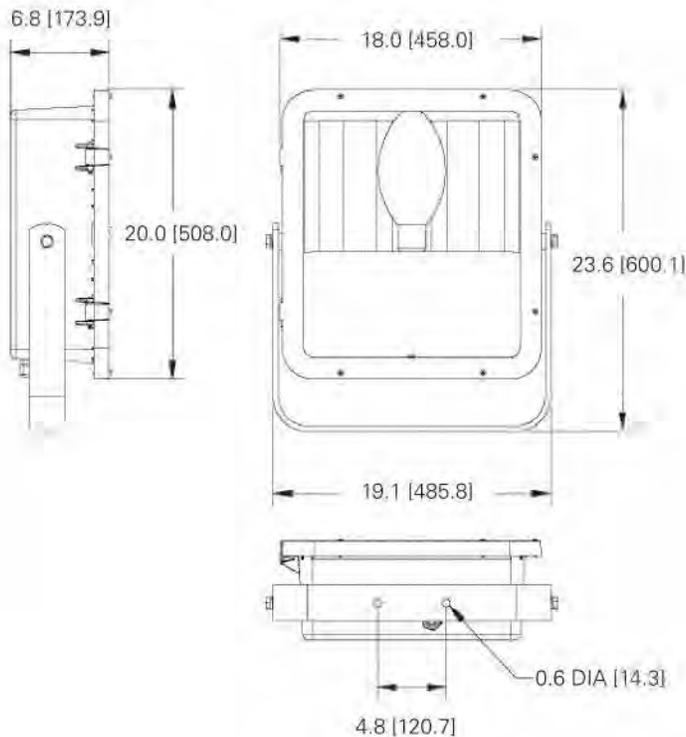
## Accessories (ordered separately):

Description	Cat. #
• Pole mount slipfitter adapter.....	<b>SFA6</b>
• Wall mount bracket adapter.....	<b>SWB6</b>
• Bull horn, 2 tenon, gray.....	<b>BLHN2</b>
• Bull horn, 3 tenon, gray.....	<b>BLHN3</b>

## Ordering information:

Cat. #	Lamp type	Watts	Weight (lbs.)	ANSI lamp type	Zone T-code	Division T-code	Ambient temperature °C	Supply wire °C
DFLMY250/MT 76 S828	Pulse start metal halide	250	42.0	M153	T3	T1	40/55/65	90/90/105
DFLMY400/MT 76 S828	Pulse start metal halide	400	44.0	M155	T3	T1	40/55	105/105
DFLMY320/MT 76 S828	Pulse start metal halide	320	44.0	M154	T3	T1	40/55	105/105
DFLMY250/TT 76 ⓐ	Probe start metal halide	250	42.0	M58 ⓐ	T3	T1	40/55/65	90/90/105
DFLMY400/TT 76 ⓐ	Probe start metal halide	400	44.0	M59 ⓐ	T3	T1	40/55	90/105
DFLMY250/220 50 76 ⓐ	Probe start metal halide	250	42.0	M58 ⓐ	T3	T1	40/55/65	90/90/105
DFLMY400/220 50 76 ⓐ	Probe start metal halide	400	44.0	M59 ⓐ	T3	T1	40/55	90/105
DFLSY250/MT 76	High pressure sodium	250	40.0	S50	T3	T1	40/55/65	90/90/105
DFLSY400/MT 76	High pressure sodium	400	44.0	S51	T3	T1	40/55	90/105
DFLSY250/TT 76	High pressure sodium	250	40.0	S50	T3	T1	40/55/65	90/90/105
DFLSY400/TT 76	High pressure sodium	400	44.0	S51	T3	T1	40/55	90/105
DFLSY250/220 50 76	High pressure sodium	250	40.0	S50	T3	T1	40/55/65	90/90/105
DFLSY400/220 50 76	High pressure sodium	400	44.0	S51	T3	T1	40/55	90/105

## Dimensions (in inches):



Bull horns – provided with 2 3/8" pole tenon

ⓐ Lamp is not included unless option 'L' is selected.  
ⓐ Not available in the U.S.

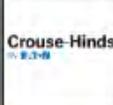
6L

# Pauluhn DFL HID hazardous area floodlight

The image below was obtained from the manufacturer's IES file of the fixture. It is included to show the lumen value of the fixture, which is not included in the manufacturer catalog cutsheet.

Active luminaire

CAST ALUMINUM HOUSING, FORMED SPECULAR HAMMERTONE REFLECTOR, CLEAR GLASS ENCSLOURE.  
DFLMYM400



0.813 x 1.240 x 0.328ft

Luminaire type index

Designation in DWG plan

Select

---

Properties

Name

Positioning

Position    ft

Rotation    °

Mounting type

Mounting type

Light centre height  ft

Mounting height  ft

Photometric data

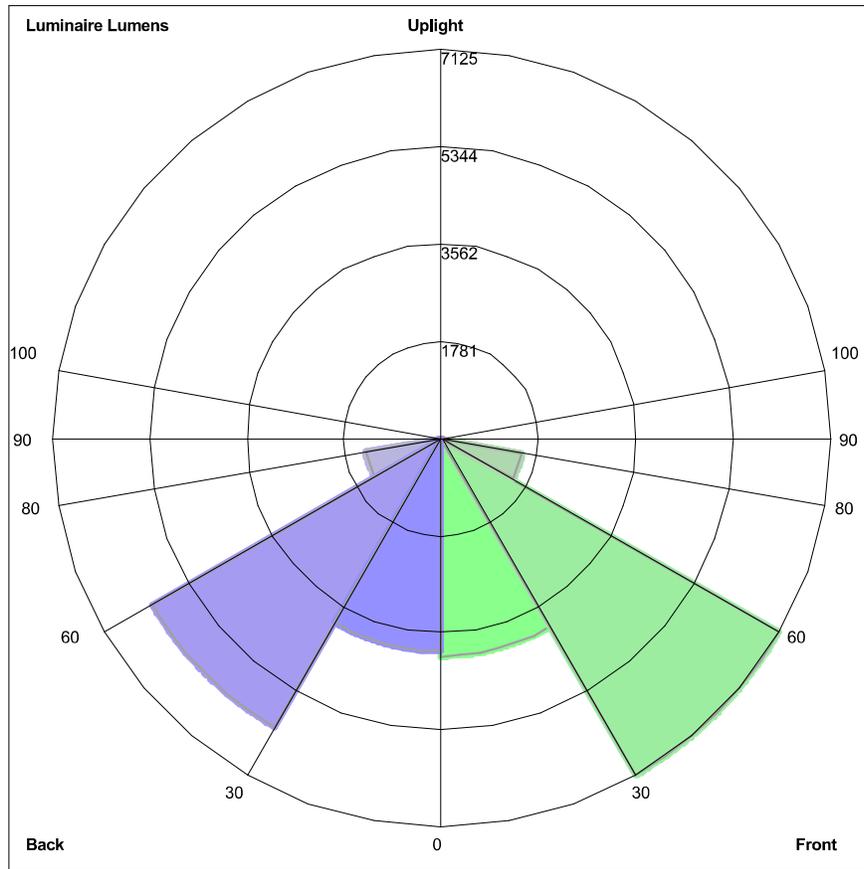
Luminaire luminous flux  lm

Light output ratio  %

Connected load  W

Luminous efficacy  lm / W

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:  
Front: Low=3985.6, Medium= 7125.0, High=1500.3, Very High=28.6  
Back: Low=3894.8, Medium=6102.1, High=1404.5, Very High=40.2  
Uplight: Low=0.0, High=0.0

BUG Rating : B4-U0-G3

FIXTURE CUT  
SHEET  
TYPE C

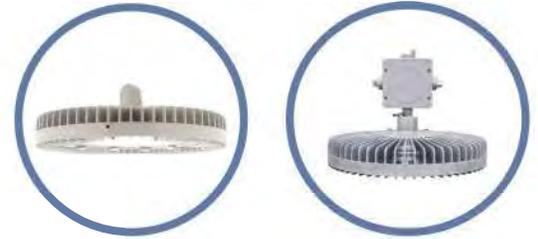


# Dialight® LED High Bay & Low Bay

## Technical Specification Sheet - Americas



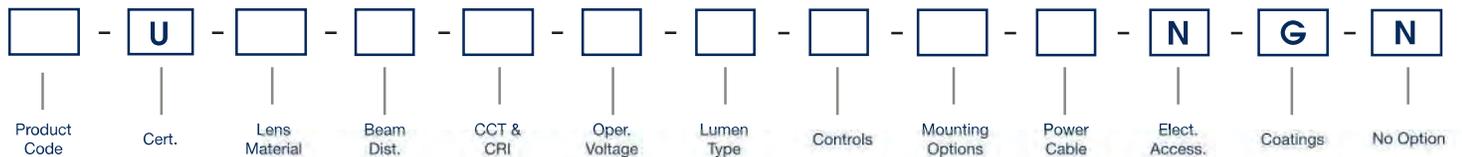
### Vigilant® LED High Bay - UL / CSA Corded & Integrated Wiring Box



Project Information	
Part Number:	
Project:	
Fixture Type:	Date:

Specifications

### Ordering Information



Product Code
HC High Bay Integrated Pendant Wiring Box
<b>HE High Bay 3/4" NPT</b>

Certification
<b>U UL 1598/A, CSA</b>

Lens Material
2 Acrylic - Clear (dry location only)
4 Polycarbonate - Clear
7 Glass - Clear
<b>L Polycarbonate Dome - Diffused</b>
R Power Wash Glass, Clear

Beam Distribution
E Oval
<b>M Medium</b>
N Narrow
W Wide

CCT & CRI
<b>C Cool White 5000K - 80 CRI</b>
N Neutral White 4000K - 80 CRI

Operating Voltage
<b>2 100-277 VAC / 120-250 VDC</b>
5 347-480 VAC

Lumen Type
<b>A 11,600 Lumens</b>
B 14,900 Lumens
C 19,800 Lumens
E 27,500 Lumens

Controls
D Dimming (0-10V)
<b>N No Dimming (HE only)</b>
M Occupancy Sensor (HC only)

Mounting Options
H Hook
<b>N Pendant 3/4" NPT</b>
P Pendant 3/4" NPT with Safety Retention Tabs
R Safety Retention Tabs with Hook

Power Cable
N No Cord (HC only)
<b>W 10' [3 meter] Power Cable (HE only)</b>

Electrical Accessories
<b>N No Plug</b>

Coatings
<b>G Gray (RAL 7040)</b>

Option
<b>N No Option</b>

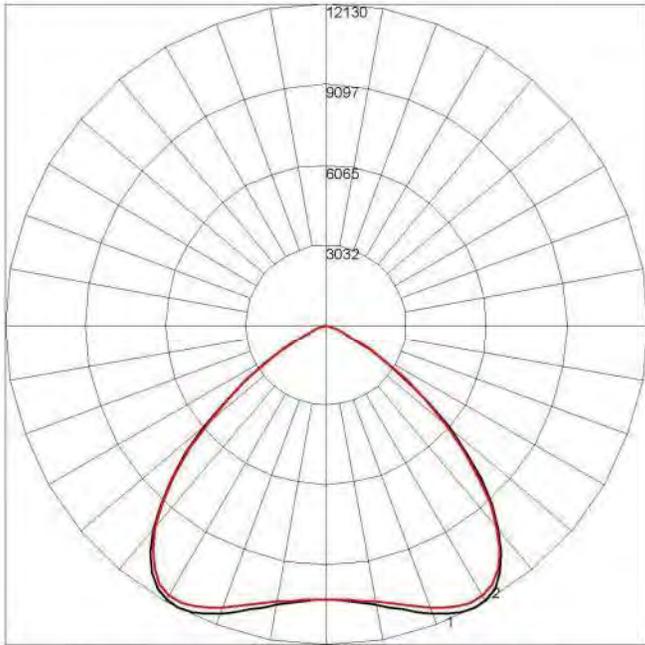
Notes
1) Lumen type based on using a glass lens. See tables for lumens when changing lenses.
2) When ordering occupancy sensor, use prefix HC.
3) When ordering option HC, Controls = (D) Dimming or (M) Occupancy Sensor.

**DISCLAIMER.** All product information provided is, to the best of Dialight's knowledge, accurate as of the date of publication. When ordering, refer to [www.dialight.com](http://www.dialight.com) for current versions of: (a) relevant product documentation (including the relevant product data sheets); (b) Dialight terms and conditions of sale; and, (c) the relevant product warranty. To the extent that any contract is deemed formed between Dialight and the purchaser of Dialight products and/or an end-user, versions of documents available at [www.dialight.com](http://www.dialight.com) as at the date of sale shall be the versions incorporated therein. In the event of any discrepancy between this document or information provided at [www.dialight.com](http://www.dialight.com), the latter shall prevail.

# Beam Distribution

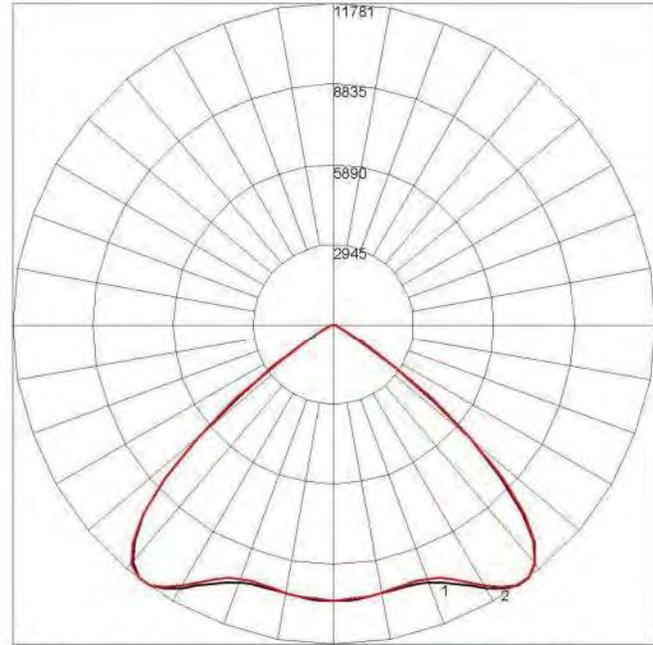


## High Bay Medium



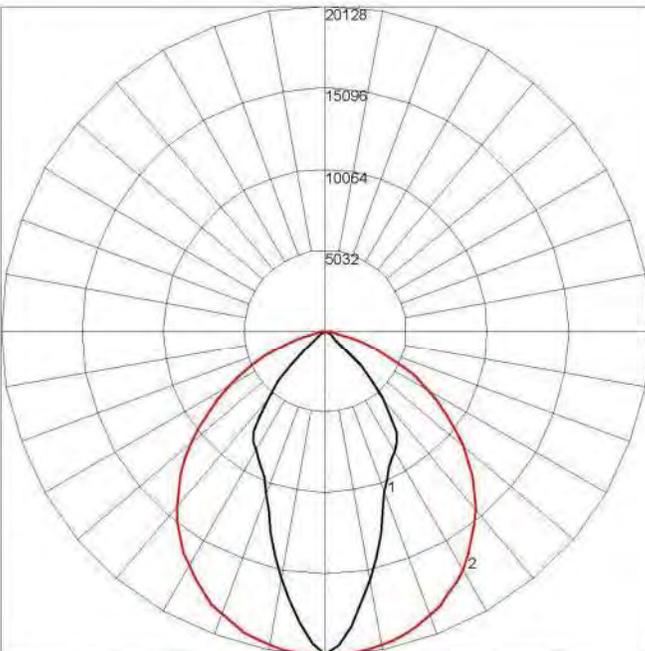
Maximum Candela = 12129.5 Located At Horizontal Angle = 0, Vertical Angle = 27.5  
 # 1 - Vertical Plane Through Horizontal Angles (0 - 180)  
 # 2 - Vertical Plane Through Horizontal Angles (90 - 270)

## High Bay Wide



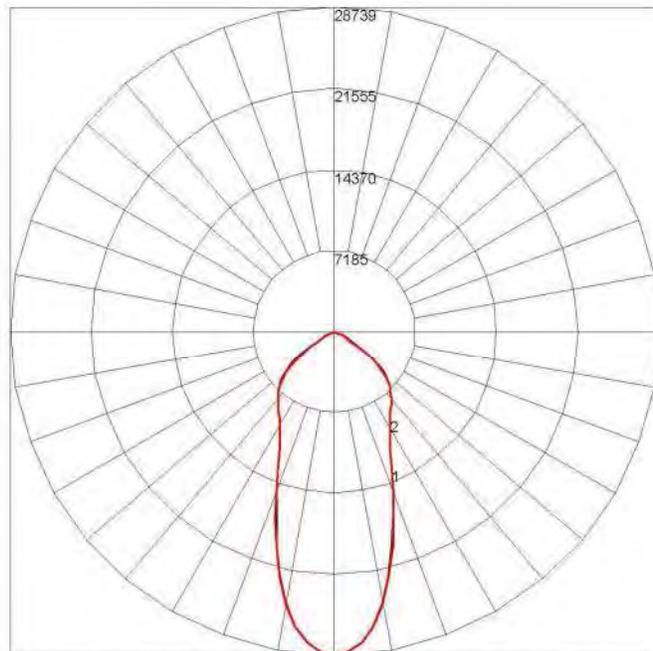
Maximum Candela = 11780.5 Located At Horizontal Angle = 90, Vertical Angle = 37.5  
 # 1 - Vertical Plane Through Horizontal Angles (0 - 180)  
 # 2 - Vertical Plane Through Horizontal Angles (90 - 270)

## High Bay Oval



Maximum Candela = 20128.4 Located At Horizontal Angle = 85, Vertical Angle = 2.5  
 # 1 - Vertical Plane Through Horizontal Angles (0 - 180)  
 # 2 - Vertical Plane Through Horizontal Angles (90 - 270)

## High Bay Narrow



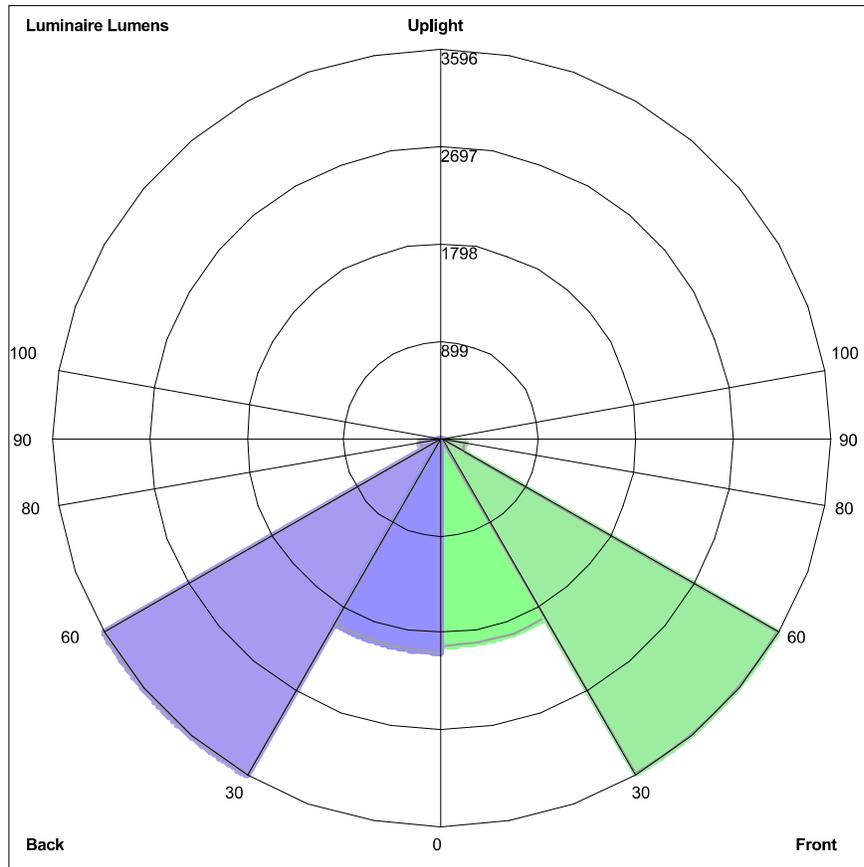
Maximum Candela = 28739.4 Located At Horizontal Angle = 0, Vertical Angle = 0  
 # 1 - Vertical Plane Through Horizontal Angles (0 - 180)  
 # 2 - Vertical Plane Through Horizontal Angles (90 - 270)

**DISCLAIMER.** All product information provided is, to the best of Dialight's knowledge, accurate as of the date of publication. When ordering, refer to [www.dialight.com](http://www.dialight.com) for current versions of: (a) relevant product documentation (including the relevant product data sheets); (b) Dialight terms and conditions of sale; and, (c) the relevant product warranty. To the extent that any contract is deemed formed between Dialight and the purchaser of Dialight products and/or an end-user, versions of documents available at [www.dialight.com](http://www.dialight.com) as at the date of sale shall be the versions incorporated therein. In the event of any discrepancy between this document or information provided at [www.dialight.com](http://www.dialight.com), the latter shall prevail.

IES ROAD REPORT

PHOTOMETRIC FILENAME : DIALIGHT - HXU4MC2AXXXXXX\_VIGILANT LED HIGH BAY\_UL\_POLYCARB LENS\_MEDIUM\_CW\_11500 LUMENS\_2.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:  
Front: Low=1920.3, Medium=3580.5, High=221.0, Very High=4.4  
Back: Low=1974.5, Medium=3596.1, High=199.5, Very High=3.8  
Uplight: Low=0.0, High=0.0

BUG Rating : B3-U0-G0

# FIXTURE CUT SHEET TYPE D

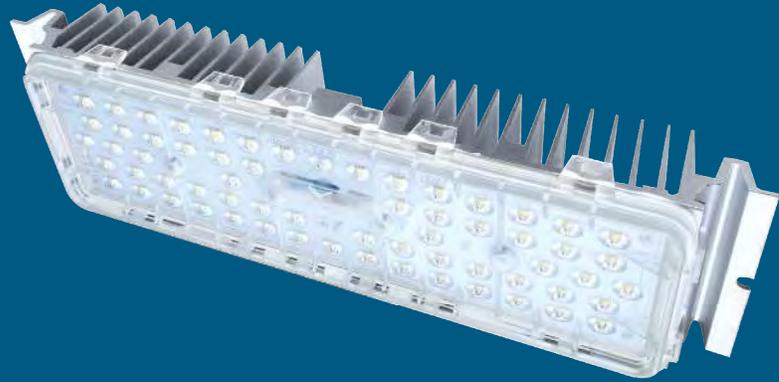
## Notes for Type D.

1. Type D fixtures are portable construction light towers with vertical masts. These units vary significantly depending on supplier, rental agency, inventory, and current market available fixtures. HP Winner M4 Model was selected for this analysis based on site inspections and current available units, however specific site units may vary based on time of construction. The model for these portable light towers consisted of a LED light source with 4 fixtures. Each of these fixtures were comprised of 4 LED modules mounted in a rectangular arrangement. The attached cut sheet for HP Winner represents 1 LED module. 16 total modules were modeled for each light mast (Type D) indicated.
2. The typical light pole center of fixtures is raised approximately 30 feet from grade and pointed downward toward work area.
3. The fixture mounting for portable light towers are articulated mountings which allows for both vertical and horizontal plane adjustments. For this analysis the light mast fixtures were modeled at 15 degrees from horizontal (with 0 degrees indicates a fixture facing directly downward).

# TYPE D Model Example Used



## LED Module M8B Series



### Specification

**Working Environment:** -40°C~+50°C

**Storage Temperature:** -40°C~+50°C

**Relative humidity:** 10%~90%RH

**Typical value of pad temperature<sup>[1]</sup>:** 70°C

**IP Rating of LED Light Engine:** IP68

**Impact Protection Level:** IK09

**Color Temperature (CCT)<sup>[2]</sup>:** 3000K, 4000K, 5000K, 5700K

**Main Material:** Aluminum 6063

**Module N.W.:** 0.67±0.04 kg

**Note :**

[1] Typical values of pad temperature is obtained based on 60W with a ambient temperature of 25°C.

[2] Efficacy of 3000K is 5% lower than other CCTs.

### Features

- Lumileds Luxeon 3030;
- Super long lifetime(Lumen maintenance);
- Multiple lighting distributions available;
- Wide applicability for complex situations;
- High versatility apply for all sorts of lamps retrofit.

### Application

- Street lighting retrofit and application;
- Factory lighting retrofit and application;
- Tunnel lighting retrofit and application;
- Sports lighting retrofit and application.

## Ordering Information

For example: M8B-VCA-63 -1321-7040-LU

Module Model	Interface	Dimension of LEDS	Wire Material	LED Qty	Lens Model	Ra & CCT	LED Brand	
<b>M8B</b>	V: V-shape Groove	C: 3030	A: CCC+VDE C: PSE H: UL X: Others	49 49PCS	1324 Type II Short	1325 25 DEG	7030: Ra≥70, 3000K	LU: Lumileds
				63 63PCS	2322 Type II Short (V)	2360 60 DEG	8040: Ra≥80, 4000K	SN: Sanan
					5321 Type II Short	5340 40 DEG	...	XX: Others
					2321 Type II Short	5390 90 DEG		
					1321 Type III Medium	1310 Lambert Type		
					1390 Tunnel Lighting			

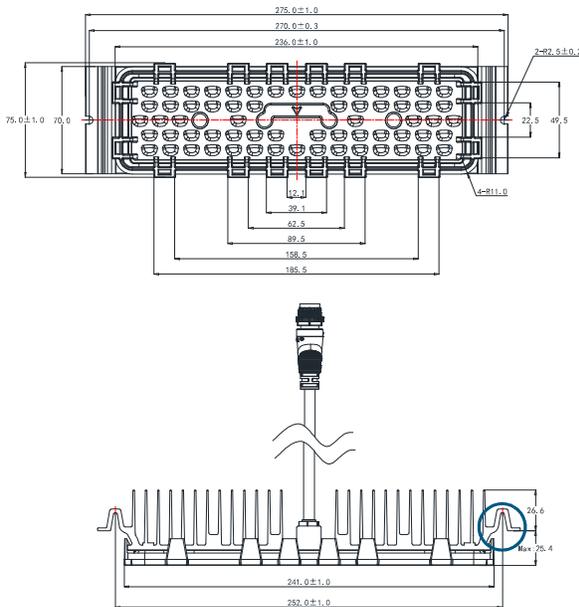
## Performance

Model	Power (W)	Driving current (mA)	Input voltage (Vdc)	Efficacy (lm/W)	Lumens (lm)
M8B-VCA-63	40	700	48~61	140	5600
M8B-VCA-49	50	1050	38~48	127	6350
M8B-VCA-63	50	860	48~61	135	6750
<b>M8B-VCA-63</b>	<b>60</b>	<b>1050</b>	<b>48~61</b>	<b>127</b>	<b>7620</b>

Note : Values shown are subject to ±5%~±8% tolerance; Cable default A type;

Efficacy above is based on calculated @92% power efficiency ; Light efficacy of 3000K is 5% lower than other CCTs.

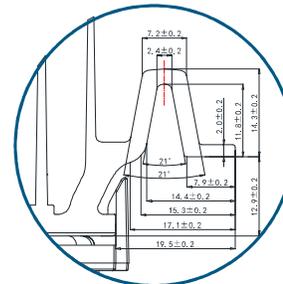
## Dimensions



L (mm)	W (mm)	H (mm)
275	75	Max52

The height of the module is the maximum value.

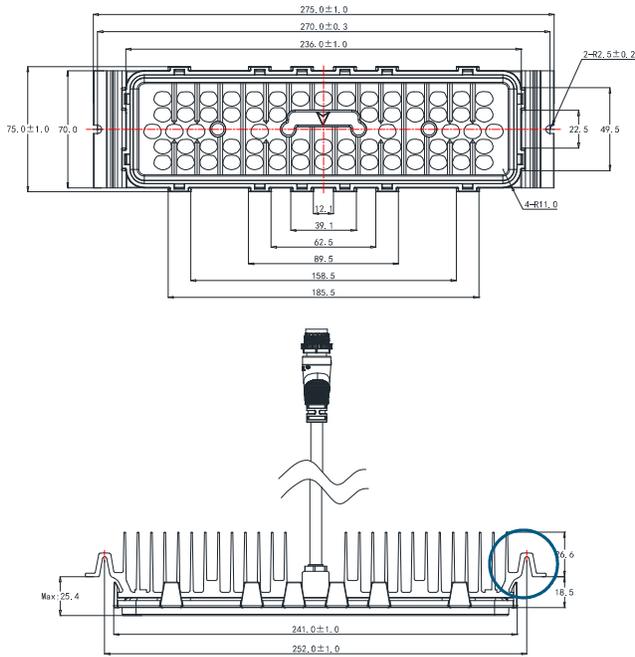
Tolerance: ±0.5mm



### Available Lens Model

1321	1324	1390
1232	2322	5321

## Dimensions

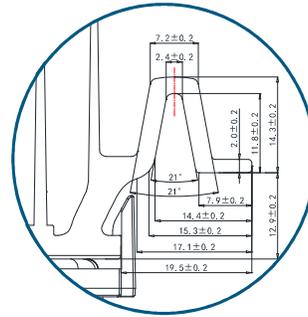


L (mm)	W (mm)	H (mm)
--------	--------	--------

275                      75                      Max52

The height of the module is the maximum value.

Tolerance: ±0.5mm



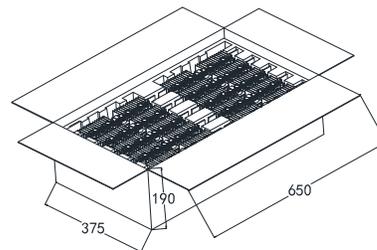
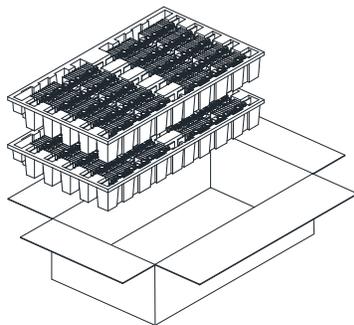
### Available Lens Model

1310	1325	5340	2360
5390			

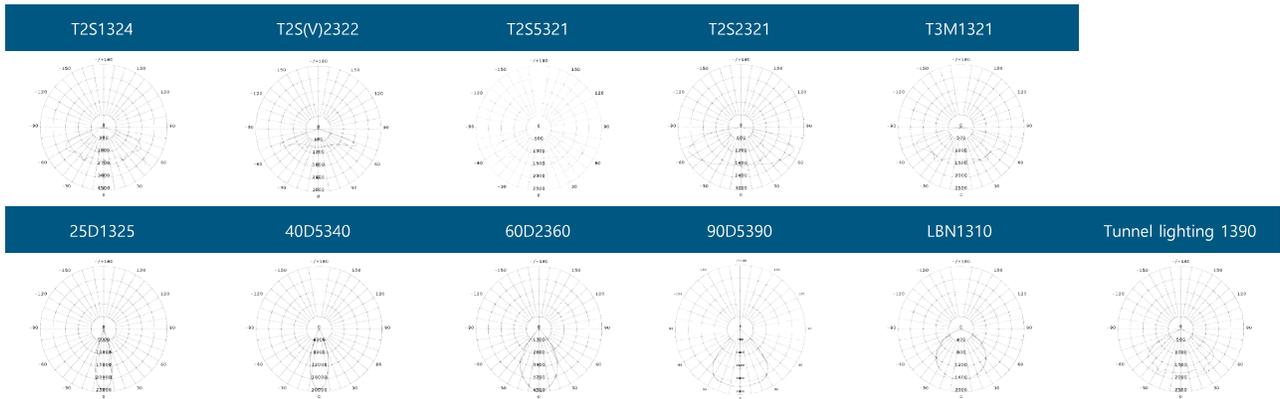
## Package Information

L (mm)	W (mm)	H (mm)	Module pcs/carton (PCS)	Package weight (kg)
650	375	190	20	14.9

Values shown are subject to ±5% tolerance.



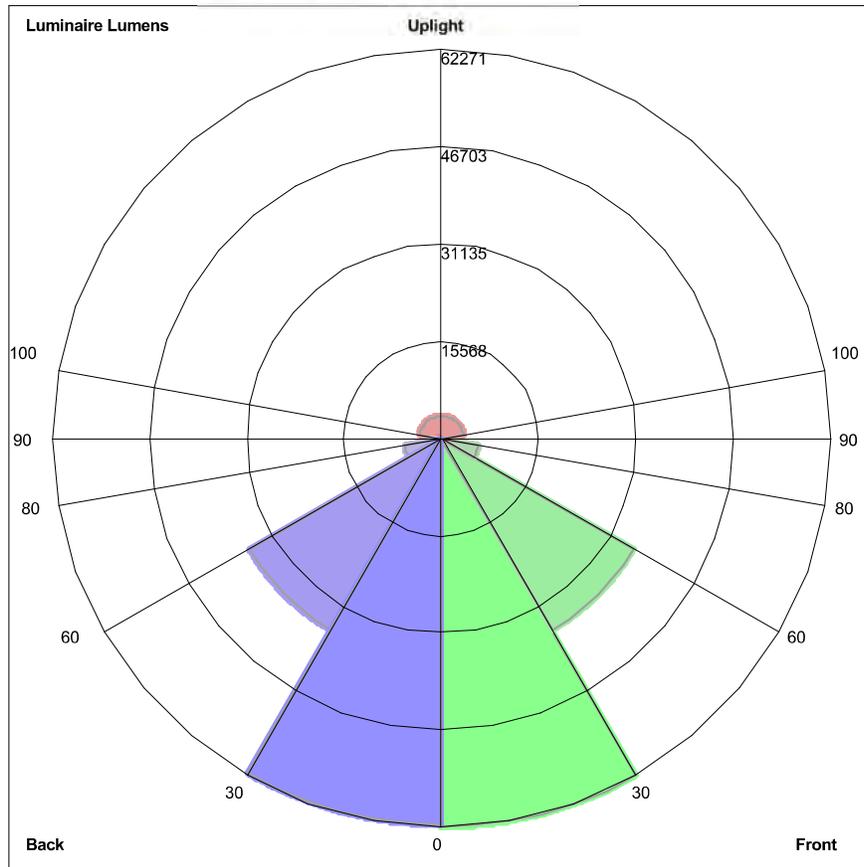
## Lighting distributions



## Version History

Change Date	Version	Description of Change		
		Item	From	To
20190905	Ver2.0	Data sheets release (new version) Update of luminous efficacy Optimized G.W of Module package	16.2kgs	14.9kgs

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:  
Front: Low=62270.6, Medium=35421.7, High=5946.3, Very High= 1328.0  
Back: Low= 61920.0, Medium=35466.8, High=5958.8, Very High=1320.7  
Uplight: Low=493.0, High=3564.5

BUG Rating : B5-U5-G5

FIXTURE CUT  
SHEET  
TYPE E

# Champ CPMV LED wall pack light fixtures

Cl. I, Div. 2, Groups A, B, C, D  
Cl. II, Div. 1, Groups E, F, G  
Cl. III & Simultaneous Presence

Marine & Wet Locations  
NEMA 4X; IP66

6L

**NOTE: LIGHT FIXTURE IS USED EXCLUSIVELY FOR TASK LIGHTING WHEN REQUIRED FOR MAINTENANCE OPERATIONS AT NIGHT FOR SAFETY REASONS. OTHERWISE THESE LIGHTS ARE TO REMAIN OFF.**

## Rugged wall pack solutions.

Champ-Pak CPMV LED wall packs are engineered to provide maintenance-free illumination, long life and high performance in Class I, Division 2 areas.

The Champ CPMV LED is available from 3,000 to 7,000 lumens and is designed for extreme conditions and hazardous applications.

Model	Nominal lumens <sup>A</sup>	Watts	Lumens per watt	Equivalent MH luminaire
CPMV3L	3,400	30.6	111 Lm/W	70W
CPMV5L	5,200	44.8	116 Lm/W	100W
CPMV7L	6,800	58.9	115 Lm/W	150W-175W

## Applications:

- Oil and gas refineries, drilling rigs, petrochemical facilities, food and beverage facilities, platforms, loading docks, tunnels, outdoor wall mounted general area lighting, and where flammable vapors, gases, ignitable dusts, fibers or flyings are present
- Locations requiring continuous and consistent light levels in extreme ambient temperatures
- Extremely corrosive, wet, dusty, hot and/or cold conditions
- NEMA 4X, marine, wet locations and hose down environments
- Classified and hazardous locations

## Features:

- Engineered to perform in ambient temperatures from -40°C to +55°C
- Die cast aluminum LED housing provides efficient thermal path to heat sink assembly
- Vertical fin design facilitates air flow and dust shedding
- High efficiency provides up to 116 lumens per watt
- Type 4X rated
- Impact-resistant lens sealed to provide ingress protection against water and dust
- 60,000+ hours of operation at 55°C
- Contractor-friendly design is ideal for both retrofit and new construction
- Available with lever lock connectors
- Clear glass lens standard
- Optional lenses include diffused glass, clear polycarbonate or diffused polycarbonate

## Certifications and compliances:

- DesignLights Consortium® Qualified (pending)

### NEC/CEC:

- Class I, Division 2, Groups A, B, C, D
- Class II, Division 1, Groups E, F, G
- Class III & Simultaneous Presence
- Marine and wet locations, NEMA 4X, IP66

### UL standards:

- UL844
- UL1598
- UL1598A
- UL8750

### CSA standard:

- C22.2 No. 137



## Standard materials:

- Fixture housing and door frame assembly – die cast aluminum
- External hardware – stainless steel
- Lens – clear glass (standard); diffused glass, clear polycarbonate, diffused polycarbonate (optional)
- Gasket – silicone

## Standard finish:

- Aluminum – Corro-free epoxy powder coat

## Photometrics:

- Complete photometrics can be found at [www.crouse-hinds.com/photometrics](http://www.crouse-hinds.com/photometrics)

## Electrical ratings:

Model	120V		277V		347V		480V	
	Input power	Input amps						
CPMV3L	30.6	0.26	30.6	0.11	29.9	0.09	30.3	0.07
CPMV5L	44.8	0.37	43.9	0.16	43.3	0.13	43.7	0.09
CPMV7L	58.9	0.50	57.8	0.23	56.0	0.16	56.2	0.12

### All models

Voltage range, VAC	120-277V at 50/60 Hz, 347-480V at 60 Hz
Voltage range, VDC	125/250 VDC
Power factor	≥0.90
Surge	6kV standard
THD	≤ 20%
Dimming	0-10V

<sup>A</sup> Nominal lumens based on 5000K CCT with clear glass lens. Wattage measured at 120 VAC.

# Champ CPMV LED wall pack light fixtures

Cl. I, Div. 2, Groups A, B, C, D  
Cl. II, Div. 1, Groups E, F, G  
Cl. III & Simultaneous Presence

Marine & Wet Locations  
NEMA 4X; IP66

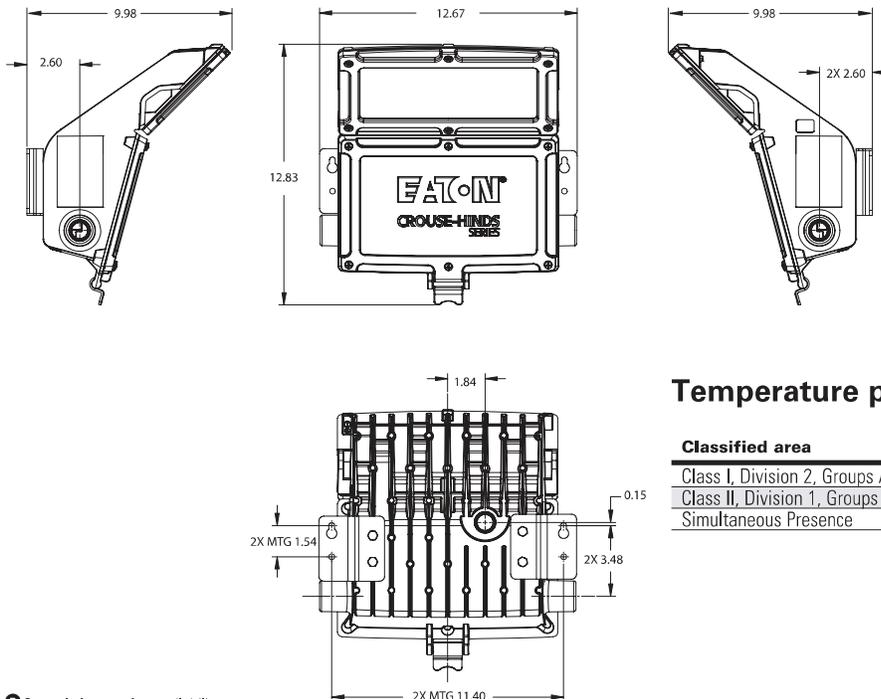
6L

## Ordering information:

Part number example  
CPMV3LWY-UNV1-S891 PC1

<b>CPMV</b>	<b>3L</b>	<b>W</b>	<b>Y</b>	<b>-UNV1</b>	<b>-S891</b>	<b>PC1</b>
<b>Light source / intensity</b>		<b>Mounting</b>		<b>Lens material</b>		
3L	3,400 nominal lumens	BLANK	Wall	BLANK	Clear glass lens	
5L	5,200 nominal lumens	H	Hub	S891	Diffused glass lens	
7L	6,800 nominal lumens	Y	Yoke	S903	Clear polycarbonate	
<b>Color temperature</b>		<b>Voltage</b>		<b>Photocell<sup>Ⓞ</sup></b>		
C	5000K (cool white)	-UNV1	120-277 VAC, 50/60 Hz; 125/250 VDC	PC1	120V	
N <sup>Ⓢ</sup>	4000K (neutral white)	-UNV34	347-480 VAC, 60 Hz	PC2	208-277V	
W	3000K (warm white)					
<b>Optics</b>						
BLANK	White					
R5	Narrow					

## Dimensions – standard wall mount:



## Temperature performance data:

Classified area	40°C	55°C
Class I, Division 2, Groups A, B, C, D	T5	T4A
Class II, Division 1, Groups E, F, G	T4A	T4A
Simultaneous Presence	T3	T3

<sup>Ⓢ</sup> Consult factory for availability.

<sup>Ⓞ</sup> Class I, Division 2 only.

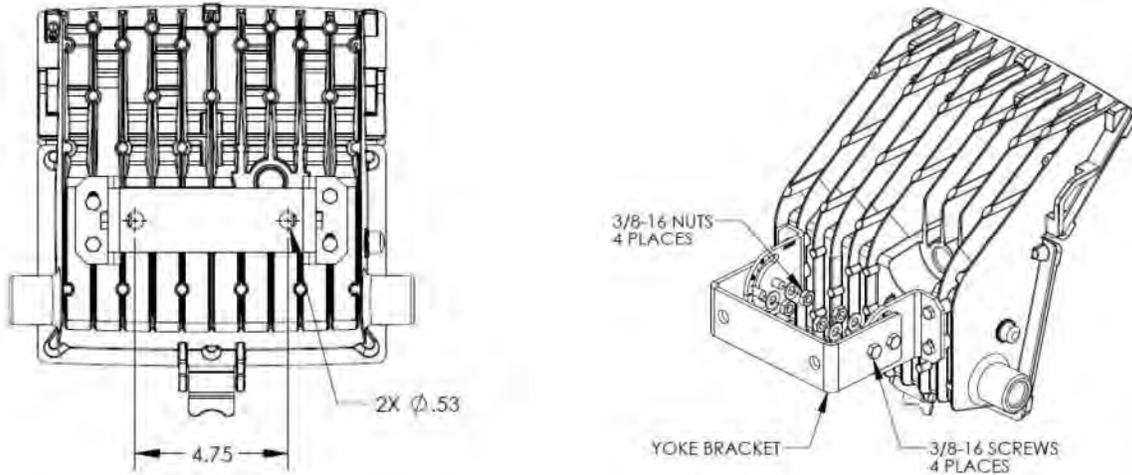
# Champ CPMV LED wall pack light fixtures

Cl. I, Div. 2, Groups A, B, C, D  
Cl. II, Div. 1, Groups E, F, G  
Cl. III & Simultaneous Presence

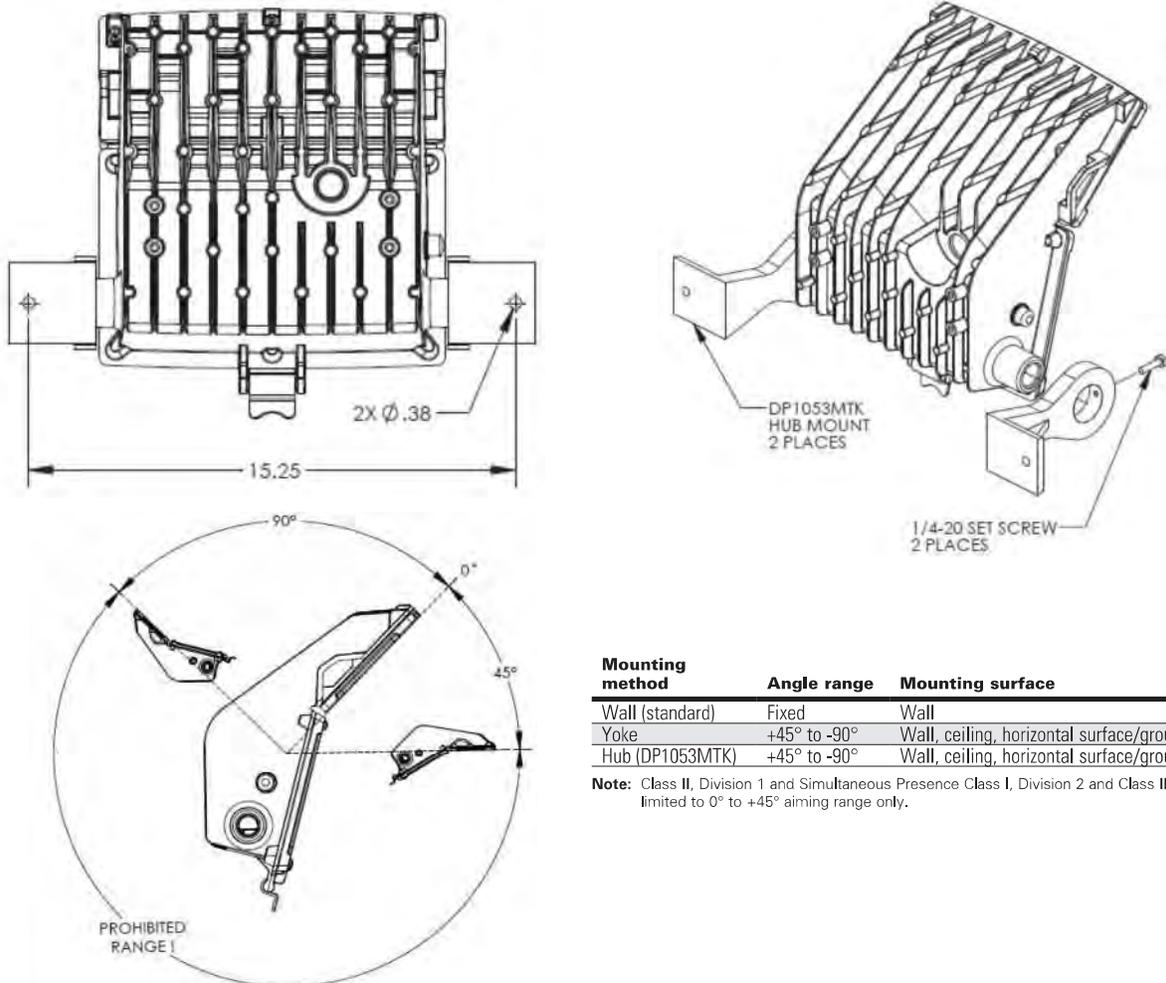
Marine & Wet Locations  
NEMA 4X; IP66

6L

## Dimensions – yoke mount:



## Dimensions – hub mount:



Mounting method	Angle range	Mounting surface
Wall (standard)	Fixed	Wall
Yoke	+45° to -90°	Wall, ceiling, horizontal surface/ground
Hub (DP1053MTK)	+45° to -90°	Wall, ceiling, horizontal surface/ground

**Note:** Class II, Division 1 and Simultaneous Presence Class I, Division 2 and Class II will be limited to 0° to +45° aiming range only.

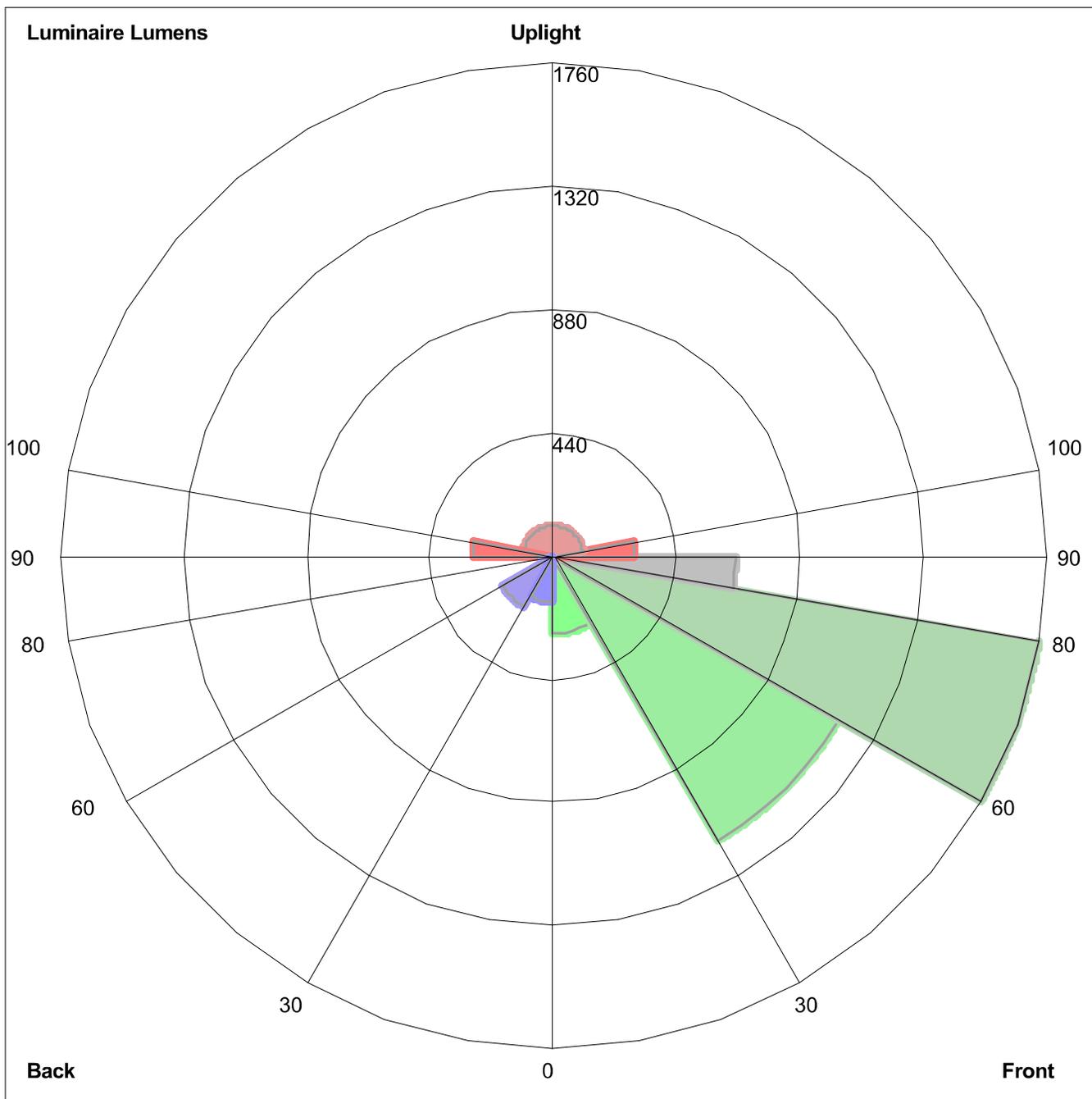
6L

NOTE: LIGHT FIXTURE IS USED EXCLUSIVELY FOR TASK LIGHTING WHEN REQUIRED FOR MAINTENANCE OPERATIONS AT NIGHT FOR SAFETY REASONS. OTHERWISE THESE LIGHTS ARE TO REMAIN OFF.

## IES ROAD REPORT

PHOTOMETRIC FILENAME : CPMV5L-UNV1.IES

### LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:

Front: Low=276.3, Medium=1174.3, High=1760.1, Very High=651.1

Back: Low=163.6, Medium=209.0, High=46.0, Very High=0.9

Uplight: Low=288.6, High=107.5

BUG Rating : B1-U3-G4

FIXTURE CUT  
SHEET  
TYPE F



Ultra high output, high efficiency LED floodlight with NEMA Types: 7H x 6V, 6H x 4V, 4H x 6V, 5H x 5V and 3H x 3V. patent-pending "Air-Flow" technology ensures long LED and driver lifespan. Use for general and security lighting for large areas, building façades, signs and landscapes.

Color: Bronze

Weight: 66.1 lbs

**Project:**

**Type:**

**Prepared By:**

**Date:**

#### Driver Info

Type	Constant Current
120V	2.65A
208V	1.59A
240V	1.38A
277V	1.17A
Input Watts	325.9W

#### LED Info

Watts	300W
Color Temp	5000K (Cool)
Color Accuracy	72 CRI
L70 Lifespan	100,000 Hours
Lumens	45,171
Efficacy	138.6 lm/W

## Technical Specifications

### Compliance

#### UL Listed:

Suitable for wet locations. Suitable for ground mounting.

#### IESNA LM-79 & LM-80 Testing:

RAB LED luminaires and LED components have been tested by an independent laboratory in accordance with IESNA LM-79 and LM-80.

#### DLC Listed:

This product is listed by Design Lights Consortium (DLC) as an ultra-efficient premium product that qualifies for the highest tier of rebates from DLC Member Utilities. DLC Product Code: PF5PMFXJ

### Optical

#### NEMA Type:

NEMA Beam Spread of 7H x 6V

### Performance

#### Lifespan:

100,000-Hour LED lifespan based on IES LM-80 results and TM-21 calculations

### Construction

#### IP Rating:

Ingress Protection rating of IP66 for dust and water

#### Maximum Ambient Temperature:

Suitable for use in up to 40°C (104°F)

#### Effective Projected Area:

EPA = 4

#### Cold Weather Starting:

Minimum starting temperature is -40°C (-40°F)

#### Thermal Management:

Superior thermal management with external "Air-Flow" fins

### Lens:

Tempered glass lens

### Housing:

Die-cast aluminum housing and door frame

### Mounting:

Heavy-duty slipfitter for 2 3/8"OD pipe

### Reflector:

Specular and semi-specular vacuum-metalized polycarbonate

## Technical Specifications (continued)

### Construction

#### Gaskets:

High-temperature silicone gaskets

#### Finish:

Formulated for high durability and long-lasting color

#### Green Technology:

Mercury and UV free. RoHS-compliant components.

#### Tilt Increment:

Rotates in 6 degree increments

### LED Characteristics

#### LEDs:

Multip-chip, high-output, long-life LEDs

#### Color Consistency:

7-step MacAdam Ellipse binning to achieve consistent fixture-to-fixture color

#### Color Stability:

LED color temperature is warranted to shift no more than 200K in color temperature over a 5-year period

#### Color Uniformity:

RAB's range of Correlated Color Temperature follows the guidelines of the American National Standard for Specifications for the Chromaticity of Solid State Lighting (SSL) Products, ANSI C78.377-2017.

### Electrical

#### Drivers:

Constant Current, 1050mA, 50/60 Hz, 120-277V, 4 kV surge protection, 120V: 2.65A, 208V: 1.59A, 240V: 1.38A, 277V: 1.17A, THD <20%, Power Factor: 99%

#### THD:

9.26% at 120V, 12.56% at 277V

#### Power Factor:

99.3% at 120V, 96.6% at 277V

#### Note:

All values are typical (tolerance +/- 10%)

### Other

#### Equivalency:

Equivalent to 1000W Metal Halide

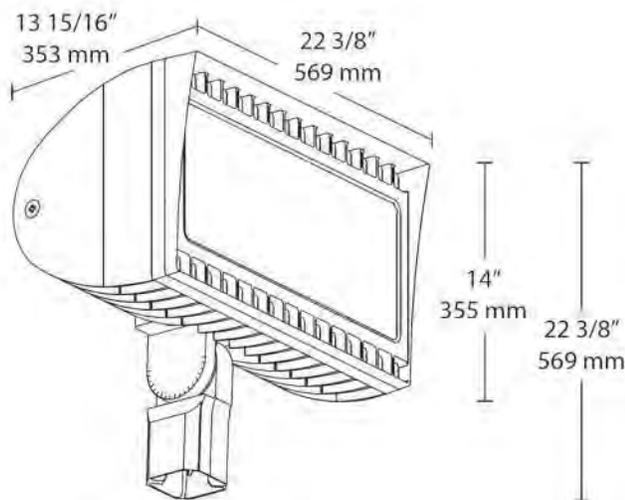
#### Warranty:

RAB warrants that our LED products will be free from defects in materials and workmanship for a period of five (5) years from the date of delivery to the end user, including coverage of light output, color stability, driver performance and fixture finish. RAB's warranty is subject to all terms and conditions found at [rablighting.com/warranty](http://rablighting.com/warranty).

#### Buy American Act Compliance:

RAB values USA manufacturing! Upon request, RAB may be able to manufacture this product to be compliant with the Buy American Act (BAA). Please contact customer service to request a quote for the product to be made BAA compliant.

### Dimensions



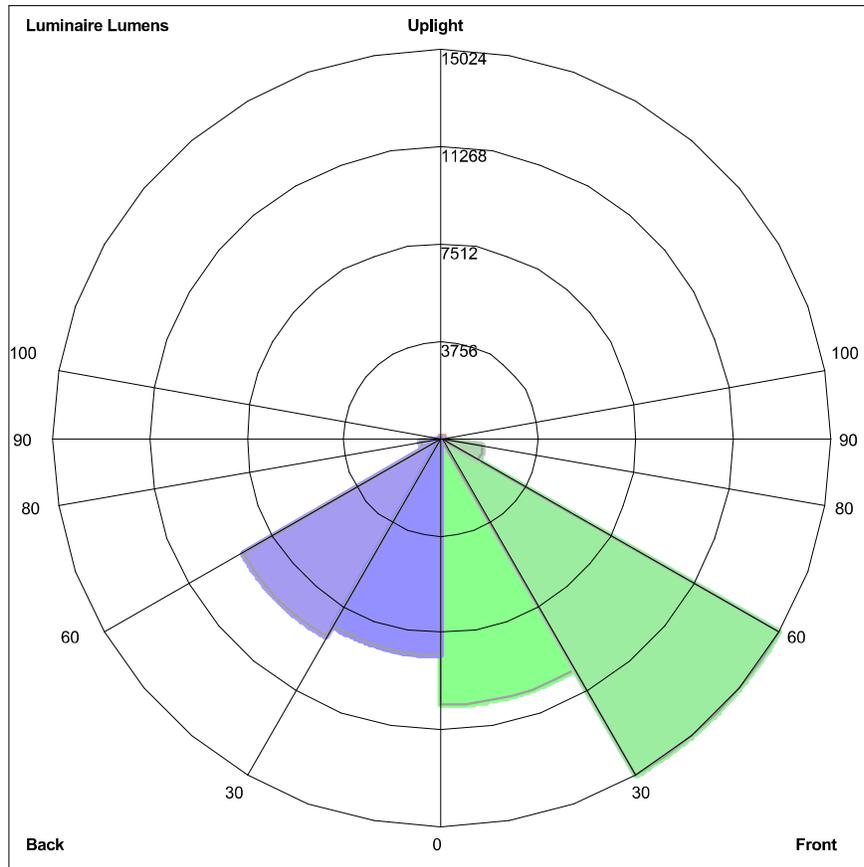
### Features

- 300W replaces 1000 MH floodlights
- 100,000-hour LED lifespan
- 5-Year, No-Compromise Warranty

## Ordering Matrix

Family	Wattage	Mounting	Color Temp	NEMA Type	Finish	Driver Options	Options	Other Options
FXLED	300	SF						
	<b>200 = 200W</b> <b>300 = 300W</b>	<b>SF = Slipfitter</b> <b>T = Trunnion</b>	<b>Blank = 5000K</b> (Cool) <b>N = 4000K</b> (Neutral) <b>Y = 3000K</b> (Warm)	<b>Blank = 7H</b> x 6V <b>B64 = 6H x</b> 4V <b>B55 = 5H x</b> 5V <b>B33 = 3H x</b> 3V <b>B46 = 4H x</b> 6V	<b>Blank =</b> Bronze <b>W = White</b>	<b>Blank = 120-277V</b> <b>/480 = 480V</b> <b>/BL = Bi-Level</b> (Slipfitters only) <sup>1</sup> <b>/D10 = 0-10V</b> Dimming	<b>Blank = No option</b> <b>/PCS = 120V Swivel</b> <b>/PCS2 = 277V</b> Swivel <b>/PCT = 120-277V</b> Twistlock <b>/PCT4 = 480V</b> Twistlock <b>/PCS4 = 480V</b> Swivel <b>/LC = Lightcloud®</b> Controller	<b>USA = BAA</b> Compliant <b>Blank = Standard</b>

<sup>1</sup> Slipfitter models only



Luminaire Lumens:  
 Front: Low=10319.6, Medium=15024.4, High=1636.8, Very High=9.1  
 Back: Low= 8373.0, Medium=8865.3, High=802.5, Very High=9.9  
 Uplight: Low=0.9, High=61.0

BUG Rating : B5-U3-G2

FIXTURE CUT  
SHEET  
TYPE G

NOTE: LIGHT FIXTURE IS USED EXCLUSIVELY FOR TASK LIGHTING WHEN REQUIRED FOR MAINTENANCE OPERATIONS AT NIGHT FOR SAFETY REASONS. OTHERWISE THESE LIGHTS ARE TO REMAIN OFF.



Type: \_\_\_\_\_ Date: \_\_\_\_\_  
 Job Name: \_\_\_\_\_  
 Contractor: \_\_\_\_\_  
 Catalog No.: \_\_\_\_\_  
 Notes: \_\_\_\_\_

LED WALLPACKS

## LWP2-50W

### Descriptions

The LWP2 is a traditionally designed LED Wall Pack ideal for commercial areas such as retail centers, loading docks, or warehouses. Its low power consumption makes it a perfect choice for customers looking to upgrade technology while keeping the same classic motif. UL listed for Wet Locations. Photocell Optional.

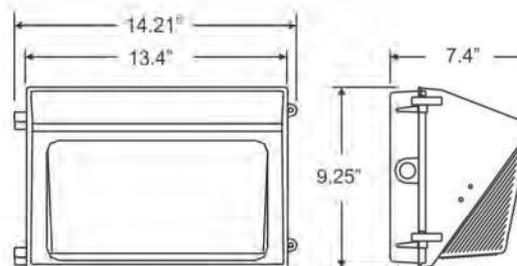


LWP2-50W-CW

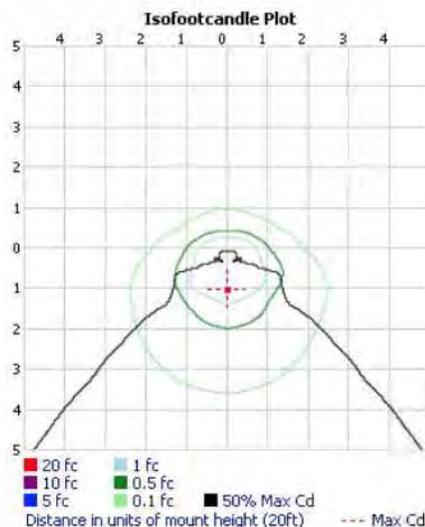
### General Specifications

	Spec	LWP2-50W-CW
Electrical	Input Voltage	120~277V
	Input Power	50W
	Power Factor	> 0.9
Light Output	Total Lumens	5969 lm
	Efficacy	124 lm/W
	CRI	70+
	Color Temp.	5000K
	BUG	B1-U4-G4
	Distribution Type	TYPE IV Distribution
Physical	Equivalent	175W
	Housing	ADC12 Die Cast Aluminum
	Finish	UV Resistant Bronze Powder Coat Finish
	Lens Material	Prismatic borosilicate molded lens with weatherproof gasket
	Ambient Operating Temp	-20°C / -4°F to 40°C / 104°F
	Mount	Wall Mount
Other	Net Weight	3.65 KG
	Certification	cULus E335594; DLC 4.2

### Dimensions



### Photometrics



- ▶ LED Brand: **Philips Lumileds**
- ▶ Lifespan: **50,000 hrs**
- ▶ Warranty: **5 Year Limited Warranty**
- ▶ **UL listed for Wet Location**
- ▶ Beam Angle: **120°**
- ▶ Photocell Optional



Item No.	Description	Std. Pkg.
LWP2-50W-CW	LED WALL PACK 50W 120~277V 5000K CW - BRONZE	1



1-800-90-ORBIT

www.orbitelectric.com

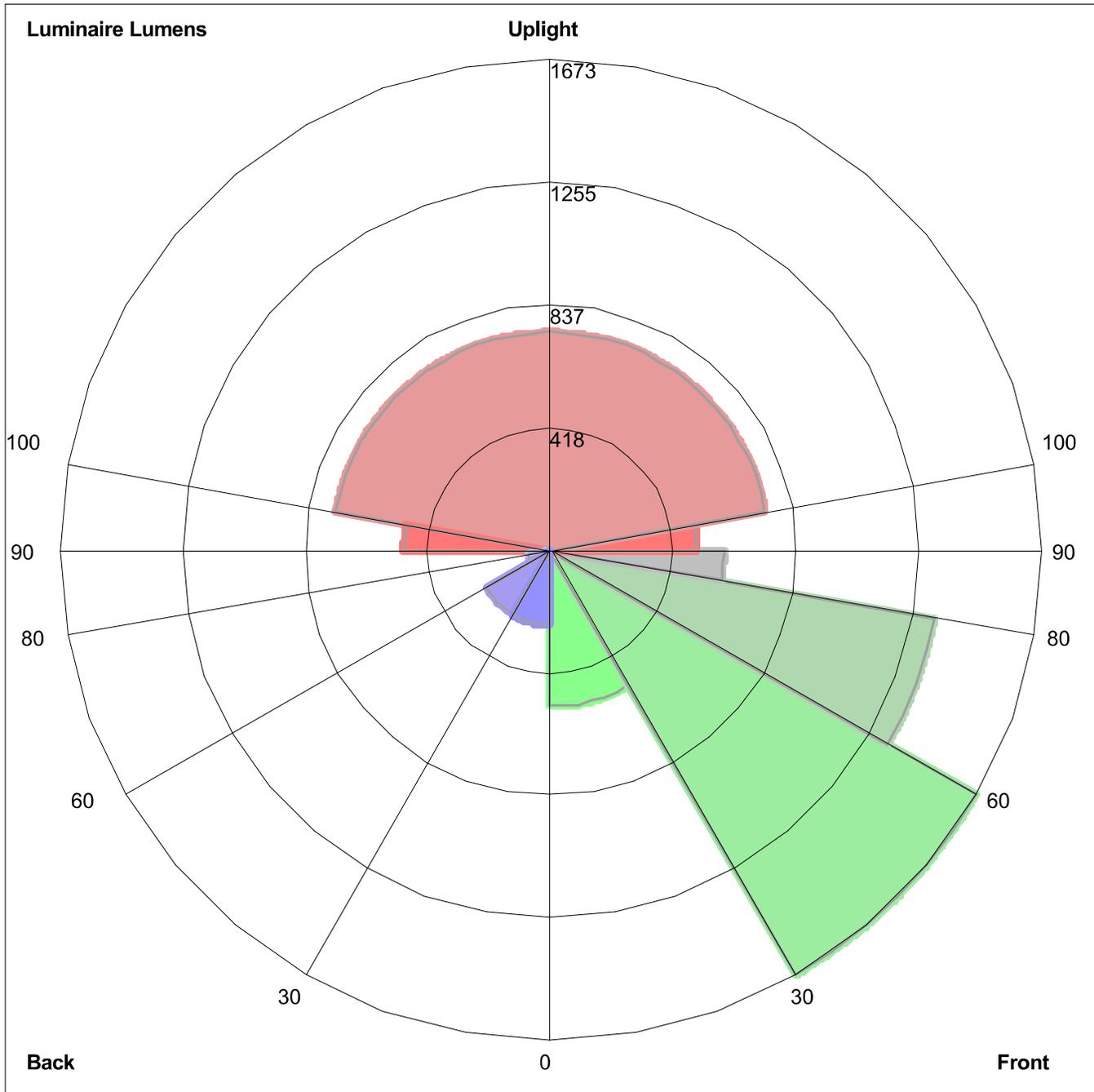


NOTE: LIGHT FIXTURE IS USED EXCLUSIVELY FOR TASK LIGHTING WHEN REQUIRED FOR MAINTENANCE OPERATIONS AT NIGHT FOR SAFETY REASONS. OTHERWISE THESE LIGHTS ARE TO REMAIN OFF.

## IES ROAD REPORT

PHOTOMETRIC FILENAME : LWP2-50W.IES

### LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:

Front: Low=533.6, Medium=1673.2, High= 1328.0, Very High=591.8

Back: Low=255.4, Medium=250.5, High=76.3, Very High=18.0

Uplight: Low=499.2, High=742.7

BUG Rating : B1-U4-G4

FIXTURE CUT  
SHEET  
TYPE H

## Type H



Mounting: Vertical Green LED Heat Trace End Seal Kit

Mounting Height: Piping Height Varies.

Part Number: E-100-L-A

Manufacturer: Raychem

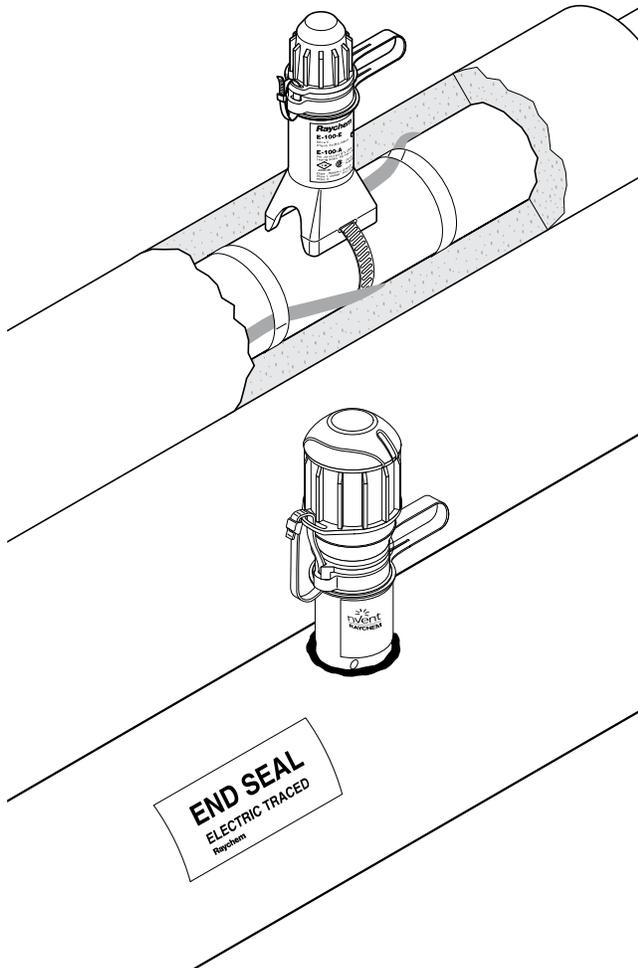
Wattage: 2 watts at 60 Lumens/watt LED. 120 Lumens per end seal

# E-100-E AND E-100-L-E



**RAYCHEM**

## END SEAL AND LIGHTED END SEAL



Both the nVent RAYCHEM E-100-E and E-100-L-E are accessible, re-entrable end seals, the E-100-E without a light, the E-100-L-E with a signal light. Both end seals can be used with all nVent RAYCHEM BTV, QTVR, XTV, KTV or VPL industrial parallel heating cables. They are approved for use in hazardous areas. They are extremely rugged - made of a strong, moulded part with 4 mm wall thickness.

The heating cable is firmly kept in place by the integral strain relief.

Sealing is done twice. First a dry compartment for the heating cable is created, then a boot filled with a non-curing sealant (silicone free) is placed over the end of the heating cable inside the compartment.

The end seals are mounted on the pipe and project through the cladding.

The light module of the E-100-L-E uses an array of super-bright green LEDs for long life and excellent visibility from almost any angle. The robust industrial-grade electronics are encapsulated to reliably seal out moisture.

Extra sealant filled boots for the E-100-E end seal can be ordered separately.

### KIT CONTENTS

	E-100-E	E-100-L-E
	1 end seal	1 end seal with indicator light
	1 cable tie	1 cable tie
	1 polywater sachet	1 polywater sachet
	1 installation instruction	2 insulated parallel crimps
		1 core sealer
		1 installation instruction

### APPROVAL DATA

Area of use

Hazardous or ordinary (indoors and outdoors)

## APPROVALS

E-100-E	E-100-L-E
PTB 09 ATEX 1060 U Ⓜ II 2G Ex e II II 2D Ex tD A21 IP66 IECEx PTB 09.0038U Ex e II Ex tD A21 IP66 Ⓜ Ex e II T*	Sira 14ATEX3015X Ⓜ II 2GD Ex e mb IIC T* Gb Ex tb IIIC T***°C Db Ta = -40°C to +40°C IECEx SIR 14.0007X Ex e mb IIC T* Gb Ex tb IIIC T***°C Db Ta = -40°C to +40°C FM CLI, ZN1, AEx e mb IIC T* Gb (1) ZN21 AEx tb IIIC T* Ⓜ Ex e mb IIC T* Gb Ⓜ Ex tb IIIC T***°C Db
DNV Certificate No. E-11564 and E-11565 *For T-rating, see heating cable or design documentation (1) Except VPL	
EAC Ex TC RU C-BE.MI062.B.00054/18 Ex e IIC Gb U Ex tb IIIC Db U Ex e mb IIC Gb U Ex tb mb IIIC Db U Ta -55°C...+56°C IP66 000 "ТехИмпорт"	EAC Ex TC RU C-BE.MI062.B.00054/18 Ex e IIC Gb U Ex tb IIIC Db U Ex e mb IIC Gb U Ex tb mb IIIC Db U Ta -55°C...+56°C IP66 000 "ТехИмпорт"

## PRODUCT SPECIFICATIONS

	E-100-E	E-100-L-E
Max. pipe temperature	Refer to heating cable specification (absolute maximum is 260°C)	
Max. operating voltage	480 V*	277 V
	*Extra conditions for safe use apply for voltages above 277 V. Please refer to the certificate or installation instructions for full details.	
Ambient temperature range	-50°C to +56°C*	-40°C to +40°C
	*Extra conditions for safe use apply for ambient temperatures above +40°C. Please refer to the summary the certificate or installation instructions for full details.	
Min. installation temperature	-50°C	-40°C
Overall height	171 mm	197 mm
Outer diameter	46 mm Usable with up to 100 mm thermal insulation	66 mm
Ingress protection	IP66, Type 4X	IP66, Type 4X
Impact resistance	EN 60079-30-1, ≥ 7 joules	EN 60079-30-1, ≥ 7 joules
UV stability	No degradation after > 1000 h	No degradation after > 1000 h
Solvent resistance	Excellent	Excellent
Strain relief	> 250 N	> 250 N

## LIGHT SOURCE

Type	Green LEDs
Voltage rating range	110-277 Vac, 50/60 Hz
Power consumption	< 2 W
Electromagnetic immunity/emissions	Complies with IEC61000-6 and IEC61000-4

## INSTALLATION DATA

Tools required	Cable knife, wire cutters, screwdriver	Cable knife, wire cutters, screwdriver, crimp tool (Panduit-CT-100), long nose pliers
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## ORDERING DETAILS

### End seal

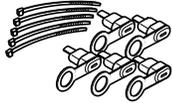
Part description	E-100-E	E-100-L-E
PN (Weight)	101255-000 (0.22 kg) Requires one pipe strap (not supplied)	P000001583 (0.63 kg) Requires one pipe strap (not supplied) PTB, DNV and EAC approved product

## ACCESSORIES

Small pipe adaptor JBS- SPA, required for pipes  $\leq 1"$  (DN 25), E 90515-000 (bag of 5 adaptors)

## SPARE PART

Boot pack for E-100-E



Part description	E-100-BOOT-5-PACK
PN (Weight)	281053-000 (140 g)
Pack size	5 sealant filled boots and 5 cable ties

Replacement indicator light for E-100-L

Part description:	E-100-LR-E
PN	P000001586

### North America

Tel +1.800.545.6258  
Fax +1.800.527.5703  
thermal.info@nVent.com

### Europe, Middle East, Africa

Tel +32.16.213.502  
Fax +32.16.213.604  
thermal.info@nVent.com

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Fax +86.21.5426.3167  
cn.thermal.info@nVent.com

### Latin America

Tel +1.713.868.4800  
Fax +1.713.868.2333  
thermal.info@nVent.com



Our powerful portfolio of brands:

nVent.com

CADDY

ERICO

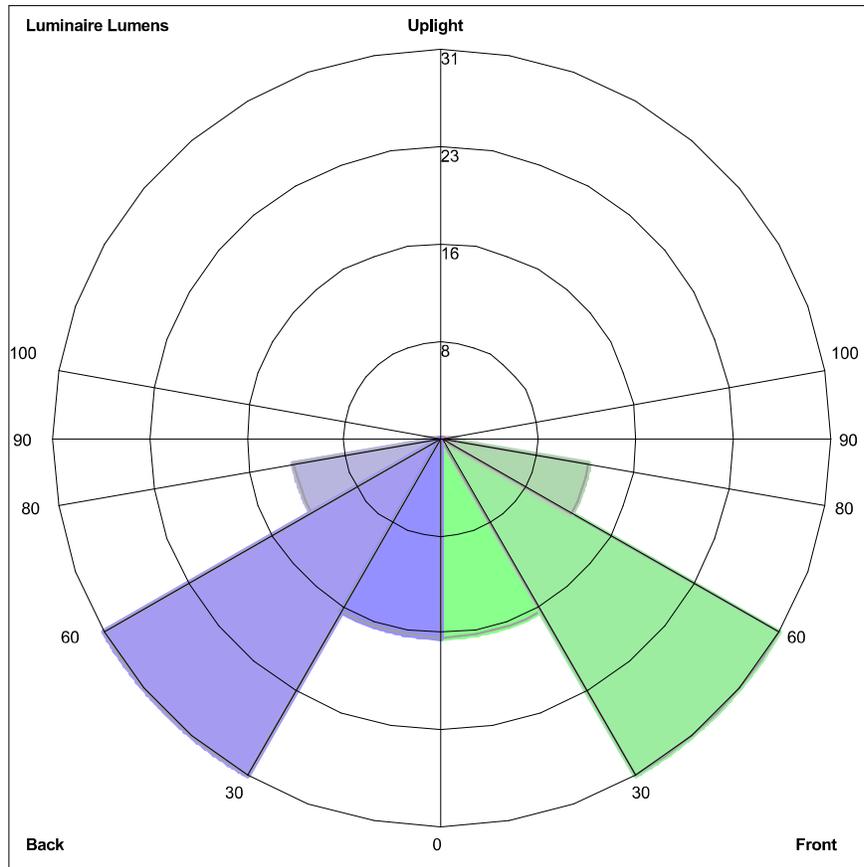
HOFFMAN

RAYCHEM

SCHROFF

TRACER

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:  
Front: Low=16.0, Medium=31.2, High=12.0, Very High=1.2  
Back: Low=16.0, Medium=31.2, High=12.0, Very High=1.2  
Uplight: Low=0.0, High=0.0

BUG Rating : B0-U0-G0