



SHELDUCK SOUTH PAD LIGHTING PLAN

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Article I. Introduction

Location Information

This document provides site-specific information for the Shelduck South Pad within the Shelduck South OGD. The information in this document relates specifically to the time during the construction, drilling, completion, and production of the eight (8) proposed horizontal wells on this location. This project is a refile of the approved Location ID 455769.

The proposed location is rangeland approximately 4,000 feet south of Weld County Road 97, south of Highway 14. The Pad will be in Lot 6, Section 6, Township 7 North, Range 60 West, zoned Agricultural within the Ag-Rural Planning Area of Weld County. A WOGLA application for the Shelduck South Pad was approved as WOGLA20-0059 on August 27, 2020.

The proposed Pad will be 11.0 acres, reduced to 5.6 after interim reclamation. The Pad is on Parcel 071906000001 owned by Edith L West, Donald James West, Neil Stewart West, Terrance O Bolton, and Alice M Jones. The location is currently used for farming.

The proposed production facility equipment for the Shelduck South Pad will be located within the Working Pad Surface adjacent to the wells and will consist of oil tanks, water tanks, separators, vapor recovery towers (VRT), vapor recovery units (VRU), VOC Combustors, gas compressors, combustors, meter skid(s), Instrument Air skid(s), gas lift(s), sump(s), LACT Unit(s), Pigging Stations, a temporary MLVT, and proposed electrical and/or solar equipment.

Phase	Duration (days)	Estimated Start Date
Pad Construction	20	2 nd Quarter (April) 2022
Facility Construction	60	2 nd Quarter (April) 2022
Drilling	52	3 rd Quarter (July) 2022
Completion	56	4 th Quarter (October) 2022
Flowback	10	4 th Quarter (December) 2022
Production	9125 (25 years)	1 st Quarter (January) 2023
Interim Reclamation	20	2 nd Quarter (April) 2023*

**or the first favorable growing season.*

Article II. Plan Narrative

Jurisdictional Agency

The Relevant Local Government has lighting plan requirements under applicable Weld County code.

The Land Use designation of the proposed Location is Agricultural within the Ag-Rural Planning Area. At the time of this WOGLA approval a photometric plan was not required. The standards within COGCC Rule 424 are less protective; Mallard will follow the more restrictive standard.

COGCC Maximum Permissible Light Levels:

LAND USE	Lumens per square foot of Working Pad Surface
Residential /Rural/State Parks/State Wildlife Areas/High Priority Habitat/Wilderness Areas/National Park/National Monument	1.25
Commercial/Agricultural	2.5
Light Industrial	5.0
Industrial	7.5

Article III. Mitigation Measures and Best Management Practices

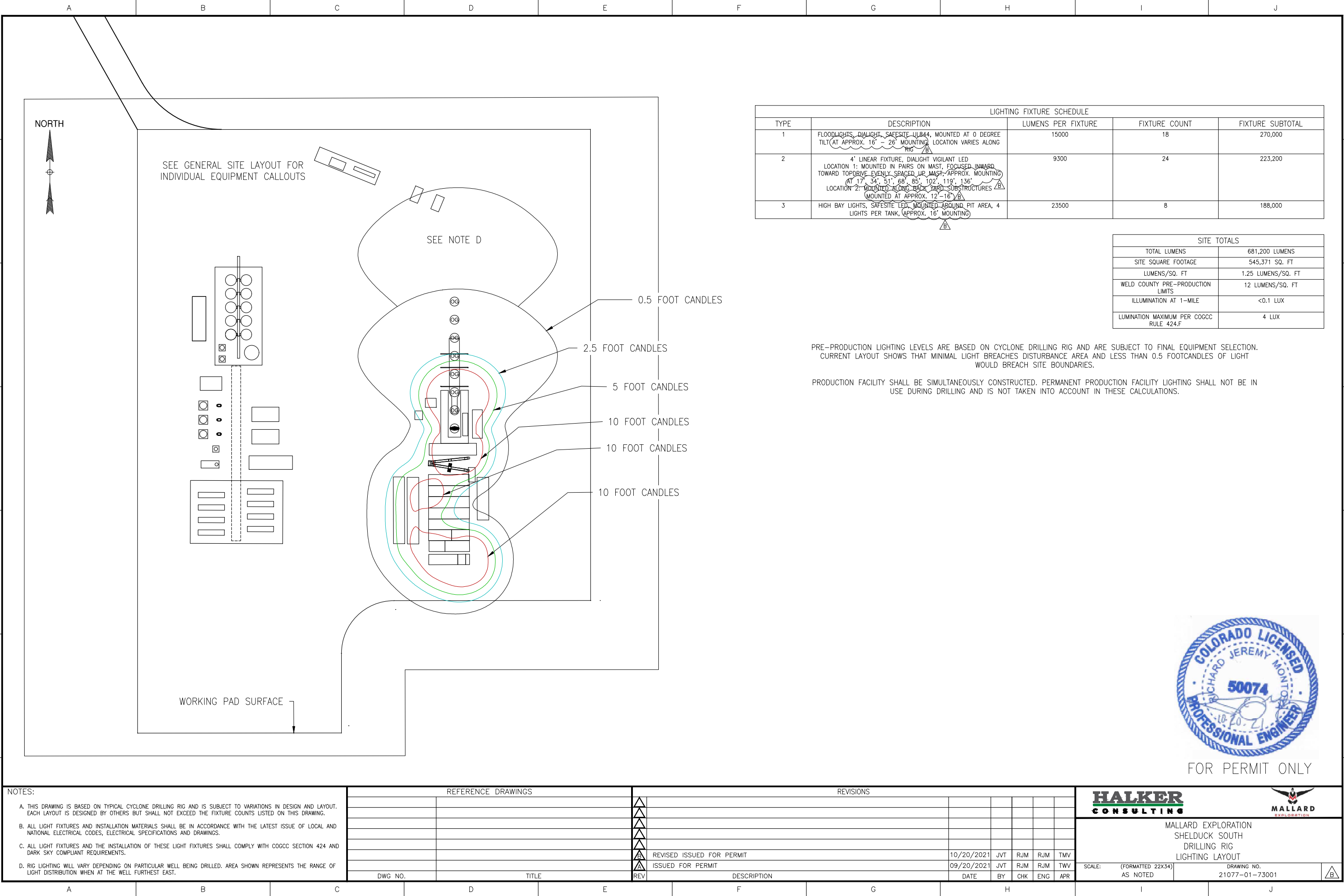
- Operator will direct site lighting downward and inward, such that no light shines above a horizontal plane passing through the center point light source.
- Operator will use appropriate technology within fixtures that obscures, blocks, or diffuses the light to reduce light intensity outside the boundaries of the Oil and Gas Facility.
- Operator will minimize lighting when not needed using timers or motion sensors; to minimize light pollution and obtrusive lighting.
- Operator will use full cut-off lighting; to minimize light pollution and obtrusive lighting.
- Operator will use lighting colors that reduce light intensity to minimize light pollution and obtrusive lighting.
- Operator will use low-glare or no-glare lighting to minimize light pollution and obtrusive lighting.
- When operator has active operations involving personnel ongoing at an oil and gas location, Operator will provide sufficient on-site pre-production lighting to ensure the safety of all persons on or near the site.
- No Sound Walls on this location. Prior to the Commencement of Production Operations, Operator will take all necessary and reasonable precautions to ensure that lighting from Oil and Gas Facilities does not unnecessarily impact the health, safety, and welfare of persons occupying the 0 Building Units (0 HOBUs within 5,280 feet) within 2,000 feet of the Oil and Gas Facility.
- Prior to the Commencement of Production Operations, Operators will take all necessary and reasonable precautions to ensure that lighting from Oil and Gas Facilities does not unnecessarily impact the health, safety, and welfare of Motorists on nearby roads. There are no public roads within 2,000 feet of the Oil and Gas Facility.
- Prior to the Commencement of Production Operations, Operators will take all necessary and reasonable precautions to ensure that lighting from Oil and Gas Facilities does not unnecessarily impact the health, safety, and welfare of Wildlife occupying any High Priority Habitat within 2,000 feet of the Oil and Gas Facility. There are approximately 290 acres of Pronghorn Winter Concentration Area habitat within 2,000 of the Working Pad Surface. Per the lighting plan calculations, the production lighting will be less than 0.1-foot candles within the limits of the reclaimed pad. CPW was consulted and had no concerns or requests for mitigation.

Article IV. Exhibits/References/Appendices

Please see attached signed Lighting Layout sheets.

Note: The BUG rating for the Eaton-Crouse-Hinds Explosion proof LED fixture is B1-U4-G4.

FILE PATH: P:\MALLARD EXPLORATION\21077-01_SHELDUCK_SOUTH_PERMITTING_SUPPORT\3-0_DESIGN\3-6_EI&C\21077-01-73001.DWG BY:JEREMYMONTDOYA DATE:Oct 20, 2021 4:46pm



LIGHTING FIXTURE SCHEDULE				
TYPE	DESCRIPTION	LUMENS PER FIXTURE	FIXTURE COUNT	FIXTURE SUBTOTAL
1	FLOODLIGHTS, DIALIGHT, SAFESITE UL844, MOUNTED AT 0 DEGREE TILT (AT APPROX. 16' - 26' MOUNTING, LOCATION VARIES ALONG RIG) ^{△B}	15000	18	270,000
2	4' LINEAR FIXTURE, DIALIGHT VIGILANT LED LOCATION 1: MOUNTED IN PAIRS ON MAST, FOCUSED INWARD TOWARD TOPDRIVE EVENLY SPACED UP MAST, APPROX. MOUNTING AT 17', 34', 51', 68', 85', 102', 119', 136' LOCATION 2: MOUNTED ALONG BACK YARD SUBSTRUCTURES (MOUNTED AT APPROX. 12'-18') ^{△B}	9300	24	223,200
3	HIGH BAY LIGHTS, SAFESITE LED, MOUNTED AROUND PIT AREA, 4 LIGHTS PER TANK, (APPROX. 16' MOUNTING) ^{△B}	23500	8	188,000

SITE TOTALS	
TOTAL LUMENS	681,200 LUMENS
SITE SQUARE FOOTAGE	545,371 SQ. FT
LUMENS/SQ. FT	1.25 LUMENS/SQ. FT
WELD COUNTY PRE-PRODUCTION LIMITS	12 LUMENS/SQ. FT
ILLUMINATION AT 1-MILE	<0.1 LUX
LUMINATION MAXIMUM PER COGCC RULE 424.F	4 LUX

PRE-PRODUCTION LIGHTING LEVELS ARE BASED ON CYCLONE DRILLING RIG AND ARE SUBJECT TO FINAL EQUIPMENT SELECTION. CURRENT LAYOUT SHOWS THAT MINIMAL LIGHT BREACHES DISTURBANCE AREA AND LESS THAN 0.5 FOOTCANDLES OF LIGHT WOULD BREACH SITE BOUNDARIES.

PRODUCTION FACILITY SHALL BE SIMULTANEOUSLY CONSTRUCTED. PERMANENT PRODUCTION FACILITY LIGHTING SHALL NOT BE IN USE DURING DRILLING AND IS NOT TAKEN INTO ACCOUNT IN THESE CALCULATIONS.



FOR PERMIT ONLY

- NOTES:
- A. THIS DRAWING IS BASED ON TYPICAL CYCLONE DRILLING RIG AND IS SUBJECT TO VARIATIONS IN DESIGN AND LAYOUT. EACH LAYOUT IS DESIGNED BY OTHERS BUT SHALL NOT EXCEED THE FIXTURE COUNTS LISTED ON THIS DRAWING.
 - B. ALL LIGHT FIXTURES AND INSTALLATION MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST ISSUE OF LOCAL AND NATIONAL ELECTRICAL CODES, ELECTRICAL SPECIFICATIONS AND DRAWINGS.
 - C. ALL LIGHT FIXTURES AND THE INSTALLATION OF THESE LIGHT FIXTURES SHALL COMPLY WITH COGCC SECTION 424 AND DARK SKY COMPLIANT REQUIREMENTS.
 - D. RIG LIGHTING WILL VARY DEPENDING ON PARTICULAR WELL BEING DRILLED. AREA SHOWN REPRESENTS THE RANGE OF LIGHT DISTRIBUTION WHEN AT THE WELL FURTHEST EAST.

REFERENCE DRAWINGS		REVISIONS						
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		△						
		△						
		△						
		△	REVISED ISSUED FOR PERMIT	10/20/2021	JVT	RJM	RJM	TMV
		△	ISSUED FOR PERMIT	09/20/2021	JVT	RJM	RJM	TWV
DWG. NO.	TITLE	REV	DESCRIPTION	DATE	BY	CHK	ENG	APR

HALKER
CONSULTING

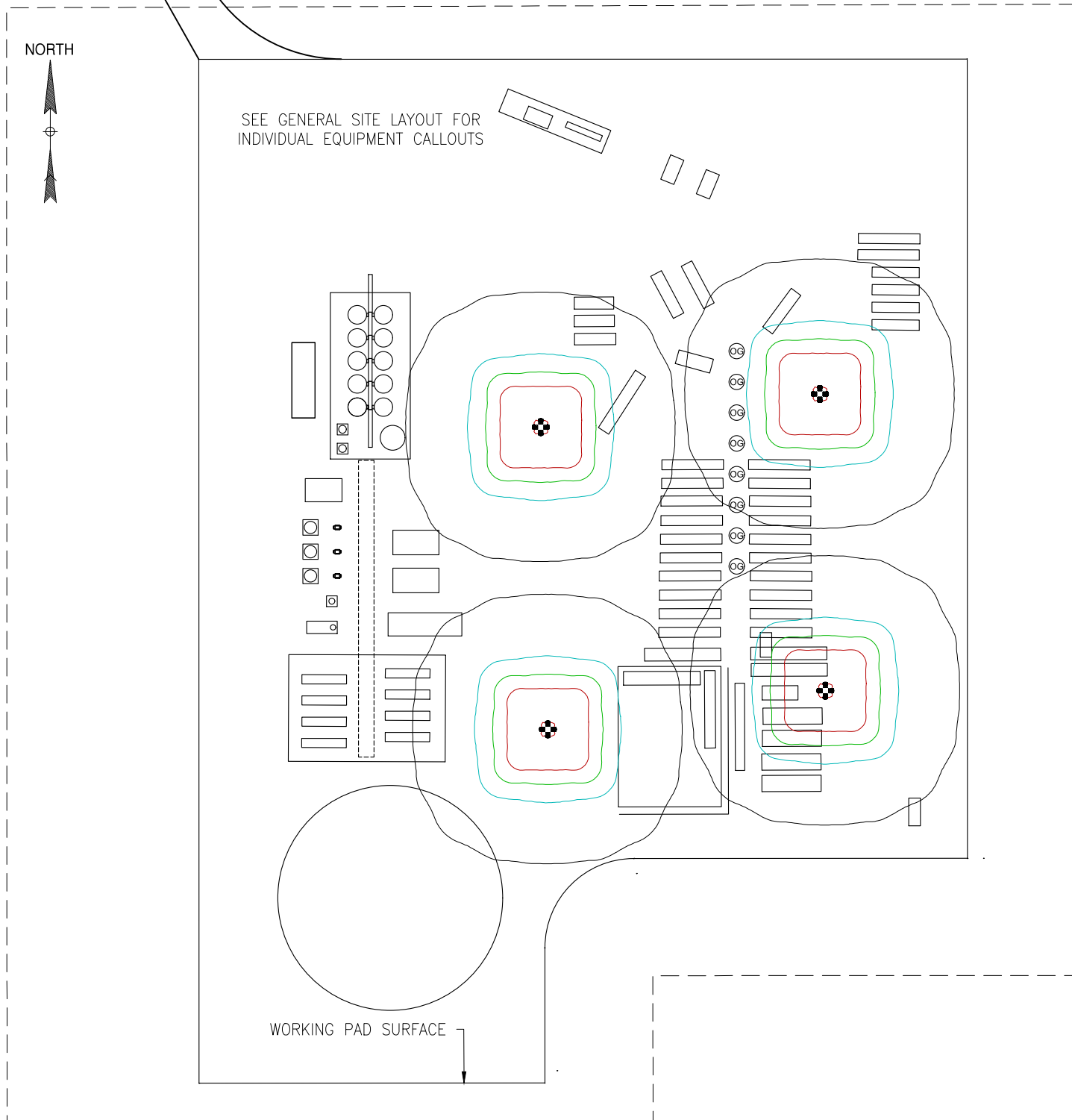
MALLARD
EXPLORATION

MALLARD EXPLORATION
SHELDUCK SOUTH
DRILLING RIG
LIGHTING LAYOUT

SCALE: (FORMATTED 22X34)
AS NOTED

DRAWING NO.
21077-01-73001

△B



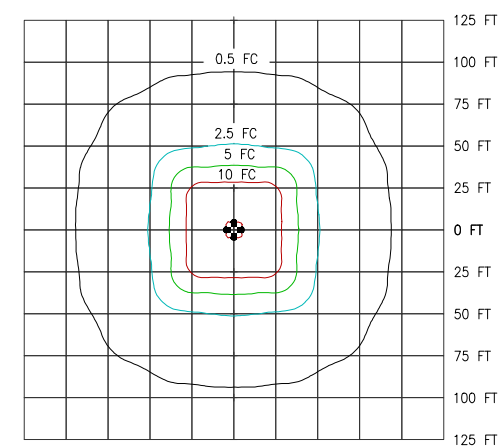
LIGHTING FIXTURE SCHEDULE				
TYPE	DESCRIPTION	LUMENS PER FIXTURE	FIXTURE COUNT PER TRAILER	TRAILER SUBTOTAL
1	GENERAC ML76SMD5 320W LED FIXTURES (4 LIGHTS MOUNTED PER TRAILER AT MAX HEIGHT OF 23')	47,000	4	188,000

SITE TOTALS	
PROPOSED NUMBER OF TRAILERS	4
TOTAL LUMENS	752,000 LUMENS
SITE SQUARE FOOTAGE	545,371 SQ. FT
LUMENS/SQ. FT	1.38 LUMENS/SQ. FT
WELD COUNTY PRE-PRODUCTION LIMITS	12 LUMENS/SQ. FT
MAXIMUM NUMBER OF TRAILERS TO MAINTAIN WELD COUNTY LIMITS	34
ILLUMINATION AT 1-MILE	<0.1 LUX
LUMINATION MAXIMUM PER COGCC RULE 424.F	4 LUX

FRAC LIGHTING UTILIZES TRAILER MOUNTED LIGHTS. FINAL LIGHT TRAILER SUBJECT TO CHANGE. THIS LAYOUT BASED ON GENERAC MLT6SMDS TRAILER WITH LIGHTS MOUNTED AT 60 DEGREES. FINAL PLACEMENT DETERMINED BY CONTRACTOR.

CONTRACTOR SHALL NOT PLACE ANY TRAILER WITHIN 100' OF SITE BOUNDARY TO AVOID ANY LIGHT TRANSMISSION OUTSIDE OF SITE BOUNDARY. IF LIGHTS ARE NEEDED IN THESE AREAS, THE TRAILER LIGHTS SHALL BE ADJUST TO POINT INWARD TOWARDS SITE WITH NO ANGLES EXCEEDING 60 DEGREES FROM GROUND TO AVOID ANY UPWARD LIGHT POLLUTION.

PRODUCTION FACILITY SHALL BE SIMULTANEOUSLY CONSTRUCTED. PERMANENT PRODUCTION FACILITY LIGHTING SHALL NOT BE IN USE DURING DRILLING AND IS NOT TAKEN INTO ACCOUNT IN THESE CALCULATIONS.



TEMPORARY LIGHT TRAILER FOOT CANDLE TEMPLATE
 MODELED AFTER GENERAC MLT6SMD5
 WITH LIGHTS ADJUSTED AT 60 DEGREE TILT
 (E) AND MAX MOUNTING HEIGHT OF 23'
 ACTUAL TRAILER SELECTION SHALL VARY







FOR PERMIT ONLY

NOTES:




- A. THIS DRAWING IS BASED ON TEMPLATE LIGHTING TRAILER THAT SHALL BE PLACED BY FRAC CONTRACTOR DURING PRE-PRODUCTION FRACING PERIOD. FINAL PLACEMENT SHALL BE BY CONTRACTOR AND SHALL AVOID PLACING TRAILERS WITHIN 100' OF SITE BOUNDARY.
- B. ALL LIGHT FIXTURES AND INSTALLATION MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST ISSUE OF LOCAL AND NATIONAL ELECTRICAL CODES, ELECTRICAL SPECIFICATIONS AND DRAWINGS.
- C. ALL LIGHT FIXTURES AND THE INSTALLATION OF THESE LIGHT FIXTURES SHALL COMPLY WITH COGCC SECTION 424 AND DARK SKY COMPLIANT REQUIREMENTS.

REFERENCE DRAWINGS		REVISIONS						
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		△	REVISED ISSUED FOR PERMIT	10/20/2021	JVT	RJM	RJM	TW
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<p style="text-align: center;">MALLARD EXPLORATION SHELDUCK SOUTH FRAC PRE-PRODUCTION LIGHTING LAYOUT</p>		
SCALE:	(FORMATTED 22X34) AS NOTED	DRAWING NO. 21077-01-73002
		



FOR PERMIT ONLY

			
MALLARD EXPLORATION SHELDUCK SOUTH PRODUCTION LIGHTING LAYOUT			
SCALE:	(FORMATTED 22X34) AS NOTED	DRAWING NO. 21077-01-73003	

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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

ILLUMINATION AT 1-MILE	<0.1 LUX
LUMINATION MAXIMUM PER COGCC RULE 424.F	4 LUX



FOR PERMIT ONLY

NOTES:

- A. THIS DRAWING IS BASED ON PRELIMINARY LIGHTING LAYOUTS FOR PRODUCTION AND PRE-PRODUCTION SCENARIOS AS DETAILED ON DRAWINGS -73001 THROUGH 73003. THIS DRAWING MEANT TO SHOW POTENTIAL INTERACTIONS WITH ADJACENT STRUCTURES, WHICH ARE MINIMIZED THROUGH USE OF ENGINEERED LIGHTING DESIGN.
- B. ALL LIGHT FIXTURES AND INSTALLATION MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST ISSUE OF LOCAL AND NATIONAL ELECTRICAL CODES, ELECTRICAL SPECIFICATIONS AND DRAWINGS.
- C. ALL LIGHT FIXTURES AND THE INSTALLATION OF THESE LIGHT FIXTURES SHALL COMPLY WITH COGCC SECTION 424 AND DARK SKY COMPLIANT REQUIREMENTS.

REFERENCE DRAWINGS

DWG NO.	TITLE

REVISIONS

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△	ISSUED FOR PERMIT	09/20/2021	KMR	JVT	RJM	TWV			
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MALLARD EXPLORATION
SHELDUCK SOUTH
COGCC LIGHTING PERMIT
LIGHTING LAYOUT

SCALE: (FORMATTED 22X34)
NONE

DRAWING NO.
21077-01-73004



Project		Catalog #		Type	
Prepared by		Notes		Date	



Lumark

LAS

Area / Site Luminaire

Typical Applications

Outdoor • Parking Lots • Walkways • Building Areas

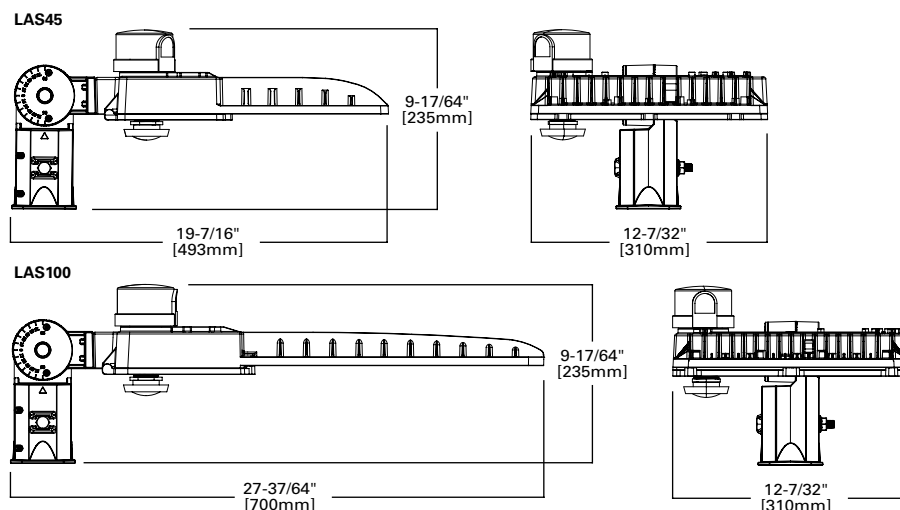
Interactive Menu

- Stock Ordering Information [page 2](#)
- Ordering Information [page 2](#)
- Product Specifications [page 2](#)
- Mounting Details [page 2](#)
- Energy and Performance Data [page 2](#)
- Controls Options [page 3](#)

Quick Facts

- 10-position lumen selectable across 2 housing sizes
- Lumen packages range from 4,900 - 34,000 lumens (30W - 250W)
- Replaces up to 450W and 1,000W HID equivalent
- Efficacies up to 135 lumens per watt at maximum output
- Energy and maintenance savings up to 79% versus HID solutions

Dimensional Details



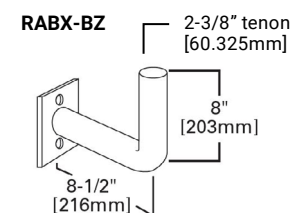
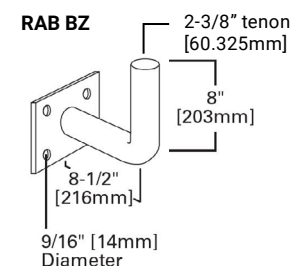
Product Certifications



Product Features



Mounting Accessories



Stock Ordering Information

SAMPLE NUMBER: **LAS45S-T4**

Model Number ¹	Distribution	Voltage
LAS45S =450W HID Equivalent, 10-Position Lumen Selectable LAS100S =1,000W HID Equivalent, 10-Position Lumen Selectable	T3 =Type III T4 =Type IV T5 =Type V	[Blank] =Universal, 120-277V HV =High Voltage, 347-480V ²
NOTES: 1. DesignLights Consortium® Qualified. Refer to www.designlights.org Qualified Products List under Family Models for details. 2. Supplied with shorting cap. Use NEMA 3-PIN twistlock photocontrol that matches the input voltage used (either 347V or 480V) as desired.		

Ordering Information

SAMPLE NUMBER: **LAS45-T4-MS/DIM-L40W**

Model Number ^{1,2}	Distribution	Voltage	Options	Accessories (Order Separately)
LAS45 =450W HID Equivalent LAS100 =1,000W HID Equivalent	T3 =Type III T4 =Type IV T5 =Type V	[Blank] =Universal, 120-277V HV =High Voltage, 347-480V	MS/DIM-L40W =Motion Sensor for Dimming Operation, 21' - 40' Mounting Height	FSIR-100 =Wireless Configuration Tool for Motion Sensor ³ RABBZ =Wall Mount Tenon Adapter RABX-BZ =Pole Mount Tenon Adapter
NOTES: 1. DesignLights Consortium® Qualified. Refer to www.designlights.org Qualified Products List under Family Models for details. 2. Standard lead times apply. Sensor versions do not include lumen select switch. Max light output can be field-programmed via the motion sensor with the accessory configuration tool. 3. This tool enables adjustment to Motion Sensor (MS) parameters including high and low modes, sensitivity, time delay, cutoff and more. Consult your lighting representative for more information.				

Product Specifications

Construction

- Die-cast aluminum housing with hinged, die-cast aluminum door
- Slipfitter mounts 2-3/8" vertical or horizontal tenons. Downward facing only.
- IP65 rated housing enclosure
- 10-position lumen select switch accessible via hinged housing door

Optics

- UV-resistant polycarbonate optics
- Full cutoff when mounted at 0 degrees tilt
- 4000K CCT, 70CRI minimum standard
- IP66 optical enclosures

Electrical

- 40°C minimum operating temperature
- 40°C maximum operating temperature
- >0.9 power factor
- <20% total harmonic distortion
- Class P drivers incorporate internal MOVs designed to withstand 6kV of surge
- 0-10V dimming driver is standard
- 3-PIN NEMA twistlock photocontrol receptacle and photocontrol included (UNV configurations)

Finish





- Standard color is bronze
- Finish only warrantied for a period of 1 year

Shipping Data

- LAS45: 14.0 lbs. (6.4 kgs.)
- LAS100: 18.0 lbs. (8.2 kgs.)

Mounting Details

Mounting Configurations and EPAs

POWER	Mounting	Tilt							
			1	2 @ 90°	2 @ 120°	2 @ 180°	3 @ 90°	3 @ 120°	4 @ 90°
LAS45	Slipfitter	0°	0.48776	0.77155	1.10981	0.9737	1.25749	1.32041	1.26178
LAS45	Slipfitter	10°	0.48815	0.85358	1.21680	0.97500	1.30520	1.53192	1.30650
LAS45	Slipfitter	20°	0.48802	1.15778	1.44040	0.97656	1.64372	2.10210	1.64619
LAS45	Slipfitter	30°	0.48776	1.41297	1.66088	0.97188	1.89241	2.58219	1.89605
LAS45	Slipfitter	45°	0.48672	1.73303	1.97171	0.97448	2.21949	3.20801	2.22430
LAS100	Slipfitter	0°	0.60398	0.88777	1.23721	1.20770	1.48902	1.52074	1.49162
LAS100	Slipfitter	10°	0.60385	1.17130	1.54141	1.20380	1.76462	2.10002	1.76514
LAS100	Slipfitter	20°	0.60359	1.59679	1.91997	1.20224	2.19141	2.90810	2.19466
LAS100	Slipfitter	30°	0.60320	1.99550	2.28956	1.20354	2.59064	3.67016	2.59545
LAS100	Slipfitter	45°	0.60346	2.47832	2.77628	1.20094	3.06969	4.65127	4.37489

Energy and Performance Data

Lumen Maintenance

Ambient Temperature	TM-21 Lumen Maintenance (54,000 Hours)	Theoretical L70 (Hours)
Up to 40°C	85.80%	126,000

Energy and Performance Data (cont.)

[View LAS IES files](#)

Power and Lumens (LAS45)

Lumen Select Switch	Position 0 (Factory Preset)	1	2	3	4	5	6	7	8	9	
Power (Watts)	152.7	135.4	119.7	99.2	89.5	79.2	75.2	68.8	29.3	29.3	
Input Current @ 120V (A)	1.27	1.13	1.00	0.83	0.75	0.66	0.63	0.57	0.27	0.27	
Input Current @ 277V (A)	0.58	0.53	0.48	0.42	0.39	0.36	0.34	0.32	0.19	0.19	
Input Current @ 347V (A)	0.45	0.40	0.36	0.30	0.27	0.24	0.23	0.21	0.10	0.10	
Input Current @ 480V (A)	0.33	0.30	0.27	0.23	0.21	0.19	0.19	0.17	0.09	0.09	
Distribution											
T3 (Type III)	Lumens	20,089	18,434	16,810	14,515	13,360	12,083	11,550	10,705	4,901	4,901
	BUG Rating ¹	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G3	B2-U0-G2	B1-U0-G1	B1-U0-G1
	Lumens per Watt	132	136	140	146	149	153	154	156	167	167
T4 (Type IV)	Lumens	19,720	18,095	16,502	14,249	13,115	11,862	11,338	10,509	4,811	4,811
	BUG Rating ¹	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G3	B2-U0-G3	B2-U0-G3	B2-U0-G3	B1-U0-G2	B1-U0-G2
	Lumens per Watt	129	134	138	144	147	150	151	153	164	164
T5 (Type V)	Lumens	19,956	18,311	16,698	14,418	13,271	12,003	11,473	10,634	4,868	4,868
	BUG Rating ¹	B3-U0-G3	B4-U0-G2	B4-U0-G2	B3-U0-G2	B3-U0-G2	B3-U0-G2	B3-U0-G1	B3-U0-G1	B2-U0-G1	B2-U0-G1
	Lumens per Watt	131	135	139	145	148	152	153	155	166	166
NOTES: 1. All BUG Ratings reported with fixture oriented at 0 degrees.											

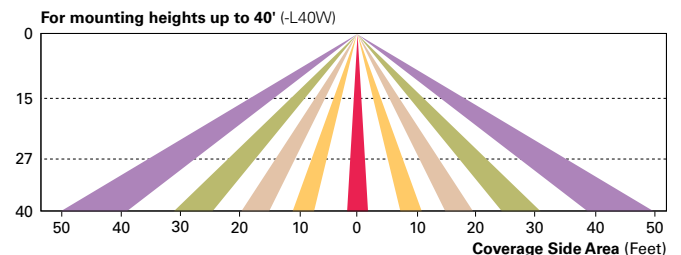
Power and Lumens (LAS100)

Lumen Select Switch	Position 0 (Factory Preset)	1	2	3	4	5	6	7	8	9	
Power (Watts)	251.0	222.2	196.4	162.8	146.8	129.9	123.4	112.9	48.0	48.0	
Input Current @ 120V (A)	2.09	1.86	1.64	1.36	1.23	1.09	1.03	0.95	0.41	0.41	
Input Current @ 277V (A)	0.90	0.82	0.73	0.62	0.57	0.52	0.50	0.46	0.28	0.28	
Input Current @ 347V (A)	0.74	0.66	0.59	0.49	0.44	0.40	0.38	0.34	0.15	0.15	
Input Current @ 480V (A)	0.55	0.49	0.44	0.37	0.34	0.30	0.29	0.27	0.13	0.13	
Distribution											
T3 (Type III)	Lumens	33,965	31,166	28,421	24,541	22,588	20,429	19,527	18,100	8,286	8,286
	BUG Rating ¹	B4-U0-G4	B4-U0-G4	B4-U0-G4	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G3	B2-U0-G2	B2-U0-G2
	Lumens per Watt	135	140	145	151	154	157	158	160	173	173
T4 (Type IV)	Lumens	33,342	30,594	27,900	24,090	22,174	20,055	19,169	17,768	8,134	8,134
	BUG Rating ¹	B4-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G3	B2-U0-G2	B2-U0-G2
	Lumens per Watt	133	138	142	148	151	154	155	157	169	169
T5 (Type V)	Lumens	33,740	30,959	28,232	24,378	22,438	20,294	19,398	17,980	8,231	8,231
	BUG Rating ¹	B5-U0-G3	B5-U0-G3	B4-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B3-U0-G1	B3-U0-G1
	Lumens per Watt	134	139	144	150	153	156	157	159	171	171
NOTES: 1. All BUG Ratings reported with fixture oriented at 0 degrees.											

Control Options

Dimming Occupancy Sensor (MS)

These sensors are factory installed in the luminaire housing. When a sensor for dimming operation (/DIM) option is selected, the luminaire will dim down to approximately 50 percent power after five minutes of no activity detected. When activity is detected, the luminaire returns to full light output. These occupancy sensors include an integral photocell that can be activated or inactivated with the programming remote / configuration tool for "dusk-to-dawn" control or "daylight harvesting". Note: For MS sensors, the factory preset is OFF (Disabled). The programming remote / tool is a wireless tool that can be utilized to change the dimming level, time delay, sensitivity and other parameters. The sensor lens optimizes the coverage pattern for mounting heights from 20'-40'.



Champ VMVL LED luminaires

3,000 to 13,000 lumens

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2, AEx ec mb IICT^AGC
Cl. II, Groups E, F, G
Cl. III & Simultaneous Presence
Zone 21 tb IIIC

UL/CSA Listed
IEC/ATEX
Wet Locations
Type 4X

2L

2L

The Champ VMVL LED family

Champ® VMVL LED luminaires are engineered to provide maintenance-free illumination in the most demanding hazardous rated environments.

The Champ VMVL features a compact, high efficacy design with custom optics to ensure maximum efficiency and mounting flexibility, including the ability to retrofit the Crouse-Hinds installed base to service both LED upgrades and new projects.

Model	Nominal lumens ^B	Watts	Efficacy	Equivalent HID luminaire
VMVL-3	3,250	26	123 lm/W	70W
VMVL-5	5,537	43	127 lm/W	100W
VMVL-7	7,442	59	127 lm/W	175W
VMVL-9	9,234	73	126 lm/W	250W
VMVL-11	11,114	91	122 lm/W	320W
VMVL-13	13,100	95	125 lm/W	400W

Applications:

- For areas with mounting heights of up to 30 feet
- Oil and gas refineries, drilling rigs, petrochemical facilities, food and beverage facilities, platforms, loading docks, tunnels, indoor/outdoor spotlighting, outdoor wall and stanchion 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
- Classified and hazardous locations

Features:

- Instant illumination and restrike
- Cold temperature operation/no warm-up required
- Option for redundancy in drivers with multiple series circuits connected to each driver to avoid complete loss of illumination
- Easy installation – compact modular fixture attaches onto existing Champ mounting module
- Energy-efficient technology – up to 77% energy savings over HID fixtures
- Contains no mercury or other hazardous substances
- Shock- and vibration-resistant solid state luminaires have no filaments or glass components that could break – greatly reduces the risk of premature failure
- Operating ambient: -40°C to 65°C
- Up to 60,000 hours lifetime at 55°C
- 5 year fixture warranty

^A IEC/ATEX certifications applicable for voltage ranges: 100-277 VAC, 127-250 VDC.

^B Nominal lumens based on Type V optics, 5000K CCT with clear glass lens. Wattage measured at 120 VAC.

^C Refer to www.designlights.org Qualified Products List under family models for full listing details. Not all models are approved for all application categories.

^D Custom optics not available with colored LEDs.

Certifications and compliances:

NEC/CEC/IEC:

- Class I, Division 2, Groups A, B, C, D
- Class I, Zone 2, AEx ec mb IICT^AGC
- Class II, Groups E, F, G
- Class III
- Zone 21 tb IIIC
- Simultaneous Presence
- Wet locations, Type 4X

UL standards:

- UL844 – Hazardous (Classified)
- UL1598 – Luminaires
- UL1598A – Marine

CSA standard:

- CSA C22.2 No. 137

IEC/ATEX standards^A:

- IEC 60079-0:2011, 6th Edition / EN 60079-0:2012
- IEC 60079-7:2010, 5.1 Edition / EN 60079-7:2015
- IEC 60079-31:2008, 2nd Edition / EN 60079-31:2014
- IEC 60529:2001 / EN 60529:2001
- IEC 60598-1:2008 / EN 60598-1:2008
- IEC 60598-2:2008 / EN 60598-2:2008
- IEC 60079-18:2017, 4.1 Edition / EN 60079-18:2015 + A1:2017

Luminaire markings:

- IECEx UL 13.0052X
- DEMKO 13 ATEX 1305741X
- DEMKO 13 ATEX 1475031X

100-277 VAC/127-250 VDC (UNV1 luminaire only)

- II 3 G EX ec mb IIC T5 Gc -40°C to +40°C
- II 3 G EX ec mb IIC T5 Gc -40°C to +55°C
- II 3 G EX ec mb IIC T4 Gc -40°C to +65°C
- II 2 D EX tb IIIC T72°C Db -40°C to +40°C
- II 2 D EX tb IIIC T87°C Db -40°C to +55°C
- II 2 D EX tb IIIC T92°C Db -40°C to +65°C

Qualifications and compliances:

- DesignLights Consortium® Qualified (pending) ^C



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

LED system:

- High intensity discrete power emitters
- Cool white (5000K, 70 CRI) (standard); warm white (3000K, 80 CRI) or neutral white (4000K, 70 CRI) (optional)
- Custom Type I, III and V optics available

Colored LED options:

- Available in green and amber ^D
- Reduction in light pollution for night space observation and sky glow due to isolating blue wavelength in red and amber colors
- Wildlife-friendly
- Improves visibility for telescopes in observatories during night sky space exploration

Net luminaire weights:

Model	Lbs.	Kg.
VMVL-3 to VMVL-7	19.00	8.62
VMVL-9 to VMVL-13	19.20	8.70
Add mounting modules:		
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
Angled stanchion	3.50	1.59
Straight stanchion	4.50	2.04

Champ VMVL LED luminaires

3,000 to 13,000 lumens

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2, AEx ec mb IICT●GC
Cl. II, Groups E, F, G
Cl. III & Simultaneous Presence
Zone 21 tb IIIC

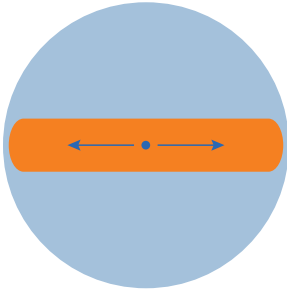
UL/cUL Listed
IEC/ATEX
Wet Locations
Type 4X

2L

2L

Custom optics:

Three optical options to maximize light distribution and intensity:

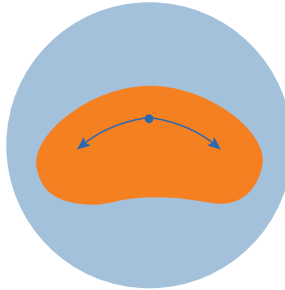


TYPE I

Long and rectangular for hallways, walkways, loading docks, catwalks.

Ideal for:

- Mining conveyor belts
- Aisleways and hallways
- Catwalks and walkways
- Ramps and loading docks
- Tunnels with overhead mounts

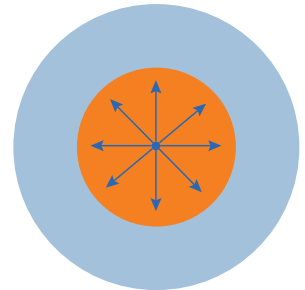


TYPE III

Stanchion and wall mount light distribution, minimizing spillover on the wall.

Ideal for:

- Narrow crosswalks or passages with wall mounted fixtures
- Tunnels with wall mount
- Wall or stanchion mount requiring 180° forward throw beam patterns



TYPE V

Regular circular distribution pattern for high/low bay indoor and outdoor ceiling or pendant mount lighting.

Ideal for:

- Pendant, ceiling or stanchion mount overhead building mounts
- Processing mills, industrial plants, large buildings, warehouses, etc.

● IEC/ATEX certifications applicable for voltage ranges: 100-277 VAC, 127-250 VDC.

Champ VMVL LED luminaires

3,000 to 13,000 lumens

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2, AEx ec mb IICT[Ⓔ]GC
Cl. II, Groups E, F, G
Cl. III & Simultaneous Presence
Zone 21 tb IIIC

UL/cUL Listed
IEC/ATEX
Wet Locations
Type 4X

2L

2L

Electrical ratings:

UNV1 driver	Input power (watts)	Input amps at 100-277 VAC	UNV34 driver	Input power (watts)	Input amps at 347-480 VAC
VMVL-3	26	0.27 - 0.10	VMVL-3	27	0.08 - 0.06
VMVL-5	43	0.45 - 0.16	VMVL-5	44	0.13 - 0.09
VMVL-7	59	0.61 - 0.21	VMVL-7	57	0.16 - 0.12
VMVL-7-S892	60	0.60 - 0.23	VMVL-7-S892	61	0.18 - 0.13
VMVL-9	73	0.76 - 0.26	VMVL-9	75	0.20 - 0.14
VMVL-9-S892	80	0.80 - 0.29	VMVL-9-S892	73	0.22 - 0.15
VMVL-11	91	0.92 - 0.32	VMVL-11	91	0.24 - 0.17
VMVL-11-S892	97	0.97 - 0.35	VMVL-11-S892	86	0.25 - 0.18
VMVL-13	95	1.10 - 0.42	VMVL-13	91	0.29 - 0.17
VMVL-13-S892	99	1.10 - 0.36	VMVL-13-S892	96	0.31 - 0.19

All models

Power factor	≥0.90	THD	≤15%
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UNV1

Voltage range, VAC [Ⓔ]	100-277V at 50/60 Hz
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Voltage range, VDC	127-250V
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UNV34

Voltage range, VAC [Ⓔ]	347-480V at 50/60 Hz
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EMC / CE compliance:

If the dimming interface of the LED driver is connected to an external dimmer which is not provided with the luminaire, a ferrite core must be used on the input and dimming lines.

Approved ferrite cores are: Fair-Rite P/N 0431167281.

Temperature performance data – UNV1 driver:

UNV1: VMVL-3 to VMVL-11	40°C	55°C	65°C
Class I, Division 2	T5	T5	T4A
Class II, Division 1	T5	T4A	T4A
Simultaneous rating Class I, Divisions 1 & 2	T3C	T3A	T3A
Class I, Zone 2 AEx ec mb; Ex ec mb	T5	T5 [Ⓔ]	T4
Class III, Division 1 Class II, Division 1, Groups E, F, G Zone 21, AEx tb IIIC	T72	T72	T92

UNV1: VMVL-7, -9 & -11-S892	40°C	55°C	65°C
Class I, Division 2	T5	T4A	T4A
Class II, Division 1	T6	T6	T5
Simultaneous rating Class I, Divisions 1 & 2	T4A	T4	T3C
Class I, Zone 2 AEx ec mb; Ex ec mb	T5A	T4	T3C
Class III, Division 1 Class II, Division 1, Groups E, F, G Zone 21, AEx tb IIIC	T72	T87	T92

UNV1: VMVL-13	40°C	55°C
Class I, Division 2	T4A	T4A
Class II, Division 1	T6	T6
Simultaneous rating Class I, Divisions 1 & 2	T4A	T4A
Class I, Zone 2 AEx ec mb; Ex ec mb	T5	T4
Class III, Division 1 Class II, Division 1, Groups E, F, G Zone 21, AEx tb IIIC	T64	T77

UNV1: VMVL-13-S892	40°C	55°C
Class I, Division 2	T5	T4A
Class II, Division 1	T6	T6
Simultaneous rating Class I, Divisions 1 & 2	T5	T4A
Class I, Zone 2 AEx ec mb; Ex ec mb	T4	T4
Class III, Division 1 Class II, Division 1, Groups E, F, G Zone 21, AEx tb IIIC	T64	T77

Temperature performance data – UNV34 driver:

UNV34: VMVL-3 to VMVL-11	40°C	55°C	65°C
Class I, Division 2	T5	T5 [Ⓔ]	T4A
Class II, Division 1	T6	T6	T5
Simultaneous rating Class I, Divisions 1 & 2	T4A	T4	T3C

UNV34: VMVL-7, -9, & -11-S892	40°C	55°C	65°C
Class I, Division 2	T5	T5 [Ⓔ]	T4A
Class II, Division 1	T6	T6	T5
Simultaneous rating Class I, Divisions 1 & 2	T4A	T4	T3C

UNV34: VMVL-13	40°C	55°C
Class I, Division 2	T4A	T4A
Class II, Division 1	T6	T6
Simultaneous rating Class I, Divisions 1 & 2	T4A	T4A

UNV34: VMVL-13-S892	40°C	55°C
Class I, Division 2	T4A	T4A
Class II, Division 1	T6	T6
Simultaneous rating Class I, Divisions 1 & 2	T4A	T4A

[Ⓔ] IEC/ATEX certifications applicable for voltage ranges: 100-277 VAC, 127-250 VDC.

[Ⓔ] IEC voltage: 100-240 VAC at 50/60 Hz. For VMVL-3: PF>0.9 from 100-255 VAC.

[Ⓔ] T-code is T4A for VMVL-11 with R1, R3 optics.

[Ⓔ] T-code is T4A for VMVL-11-S892 with R1, R3 optics.

Champ VMVL LED luminaires

3,000 to 13,000 lumens

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2, AEx ec mb IICT●GC
Cl. II, Groups E, F, G
Cl. III & Simultaneous Presence
Zone 21 tb IIIC

UL/cUL Listed
IEC/ATEX
Wet Locations
Type 4X

2L

Ordering information:

Part number example

VMVL-3-N-2A-R1-G-UNV1-S831-S891-UPLT

VMVL -3 -N -2A -R1 -G -UNV1 -S831 -S891 -UPLT

Light source / intensity

3	3,250 nominal lumens
5	5,537 nominal lumens
7	7,442 nominal lumens
9	9,234 nominal lumens
11	11,114 nominal lumens
13^K	13,100 nominal lumens
A	Amber – 5,200 lumens
G	Green – 4,300 lumens

Color temperature

BLANK	Cool white (5000K), 70 CRI
N^L	Neutral white (4000K), 70 CRI
W	Warm white (3000K), 80 CRI

Mounting style

BLANK	No mounting module	2C	¾" ceiling
J	1½" stanchion, 25° angled	3C	1" ceiling
P	1½" stanchion, straight	20C	20mm ceiling
2A	¾" pendant	25C	25mm ceiling
3A	1" pendant	2HA	¾" flexible pendant
20A	20mm pendant	2TW	¾" wall
25A	25mm pendant	3TW	1" wall
2B	¾" cone pendant	20TW	20mm wall
3B	1" cone pendant	25TW	25mm wall

Guard

BLANK	No guard
G	Wire guard

Voltage^N

UNV1	100-277 VAC, 50/60 Hz; 127-250 VDC
UNV34	347-480 VAC, 50/60 Hz

Optics

BLANK	Type V optic standard
R1	Type I optic (<i>all mounts minus ceiling</i>)
R1A^M	Type I optic (<i>ceiling with conduit 45° counterclockwise from top hat hinge</i>)
R1B^M	Type I optic (<i>ceiling with conduit 135° clockwise from top hat hinge</i>)
R3	Type III optic (<i>all mounts minus ceiling</i>)
R3AP^M	Type III optic (<i>select when using Appleton® top hat adapter with Champ fixture</i>)
R3A1^M	Type III optic (<i>ceiling with conduit 45° counterclockwise from top hat hinge</i>)
R3A2^M	Type III optic (<i>ceiling with conduit 135° clockwise from top hat hinge</i>)
R3B1^M	Type III optic (<i>ceiling with conduit 45° clockwise from top hat hinge</i>)
R3B2^M	Type III optic (<i>ceiling with conduit 135° counterclockwise from top hat hinge</i>)

Lens material

BLANK	Clear glass
S891	Diffused glass
S896^Q	Teflon coated lens
S903	Polycarbonate
UPLT^R	Uplight refractor lens

Accessories and options^Q

S812^M	Trunnion mount kit with pin
S831	Safety cable
S890	Quick Clip
S891	Diffused lens
S892^P	Redundant driver
TB6^Q	Six-pole terminal block

¹ IEC/ATEX certifications applicable for voltage ranges: 100-277 VAC, 127-250 VDC.

^K For 13L models, add suffix -M2 at the end of the part number. Example: VMVL-13-2A-R1-UNV1-S831-M2.

^L Consult factory for lead time. 5700K and 6500K are available upon request; consult factory. Not available for amber or green LED.

^M Available with ceiling mount modules only.

^N IEC voltage: 100-240 VAC at 50/60 Hz.

^Q Ordered with fixture or available separately.

^P Available for VMVL-7, -9, -11 and -13 only.

^Q For NEC/CEC only.

^R Recommended for use with Type V optic.

Champ VMVL LED luminaires

3,000 to 13,000 lumens

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2, AEx ec mb IIC⁵GC
Cl. II, Groups E, F, G
Cl. III & Simultaneous Presence
Zone 21 tb IIIC

UL/cUL Listed
IEC/ATEX
Wet Locations
Type 4X

2L

2L

Accessories (ordered separately):

Replacement driver kits

VMVL-3-5-7L-UNV1-DRIVER-KIT	UNV1 replacement driver kit for VMVL-3, -5 and -7
VMVL-9-11L-UNV1-DRIVER-KIT	UNV1 replacement driver kit for VMVL-9 and -11
VMVL-96W-13L-UNV1-M2-DRIVER-REPL-KIT	UNV1 replacement driver kit for VMVL-13
VMVL-3L-5L-UNV34-DRIVER-KIT	UNV34 replacement driver kit for VMVL-3 and -5
VMVL-7L-UNV34-DRIVER-KIT	UNV34 replacement driver kit for VMVL-7
VMVL-9L-UNV34-DRIVER-KIT	UNV34 replacement driver kit for VMVL-9
VMVL-11L-UNV34-DRIVER-KIT	UNV34 replacement driver kit for VMVL-11
VMVL-13-M2-DRIVER-KIT	UNV34 replacement driver kit for VMVL-13
VMVL-7L-S892-UNV1-DRIVER-KIT	UNV1 replacement redundant driver kit for VMVL-7
VMVL-9L-11L-S892-UNV1-DRIVER-KIT	UNV1 replacement redundant driver kit for VMVL-9 and -11
VMVL-13-UNV1-S892-M2-DRIVER-KIT	UNV1 replacement redundant driver kit for VMVL-13
VMVL-7L-S892-UNV34-DRIVER-KIT	UNV34 replacement redundant driver kit for VMVL-7
VMVL-9L-S892-UNV34-DRIVER-KIT	UNV34 replacement redundant driver kit for VMVL-9
VMVL-11L-S892-UNV34-DRIVER-KIT	UNV34 replacement redundant driver kit for VMVL-11
VMVL-13-UNV34-S892-M2-DRIVER-KIT	UNV34 replacement redundant driver kit for VMVL-13
VMVL-AL-GL-UNV1-DRIVER-KIT	UNV1 replacement driver kit for amber or green models

Mounting and hardware

VMVL S812 K1	Trunnion mount kit with pin ¹
VMVL S812 K1 DBR	PVC coated trunnion mount kit with pin ¹
VMVL S831 K1	Safety cable
VMVL S890 K1	Quick Clip

Mounting adapters

CHMM1	For Appleton MercMaster III mounts
CHMM2	For MercMaster II mounts
CHMM3	For Thomas & Betts HazLux mounts
CHMM4	For GE H2 Filtr-Gard mounts

Refractor kit

PVML-UPLT-KIT	Uplight refractor lens
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Photocells

D2S20	Photocell, 120V
D2S208 277	Photocell, 208-277V

Lens guard

P3001	Wire guard
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⁵ IEC/ATEX certifications applicable for voltage ranges: 100-277 VAC, 127-250 VDC.

¹ Available with ceiling mounted modules only.

Champ VMVL LED luminaires

3,000 to 13,000 lumens

Cl. I, Div. 2, Groups A, B, C, D
Cl. I, Zone 2, AEx ec mb IICT GC
Cl. II, Groups E, F, G
Cl. III & Simultaneous Presence
Zone 21 tb IIIC

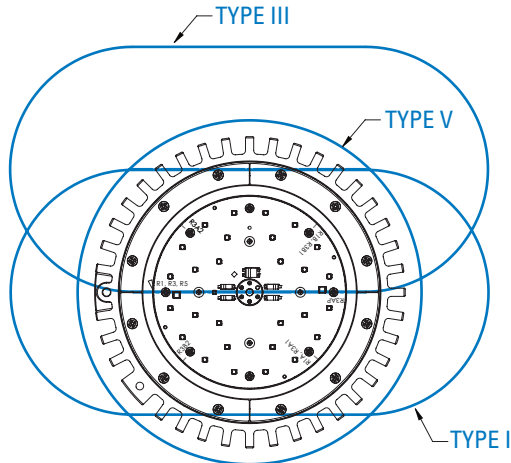
UL/cUL Listed
IEC/ATEX
Wet Locations
Type 4X

2L

Optics options:

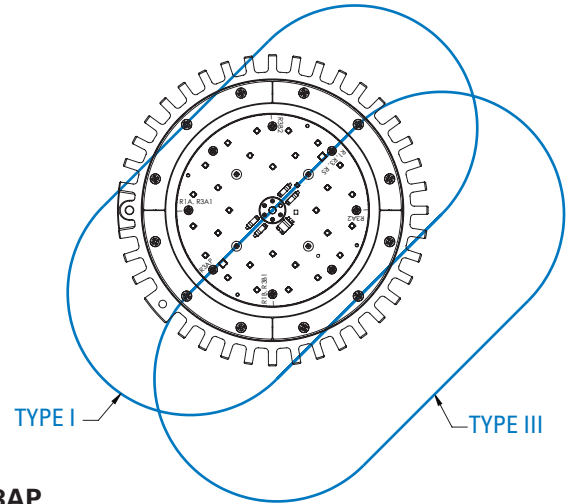
R1, R3 and BLANK

Type I, III and V optics with all mounts minus ceiling



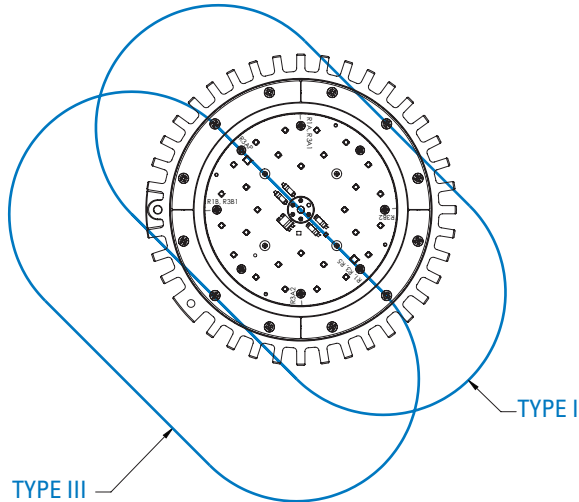
R1A and R3A1

Type I and Type III ceiling mount only



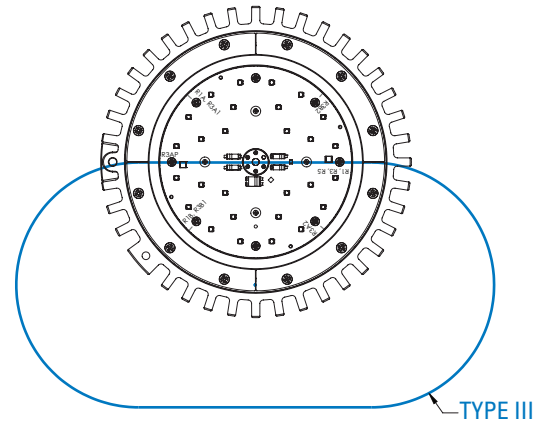
R1B and R3B1

Type I and Type III ceiling mount only



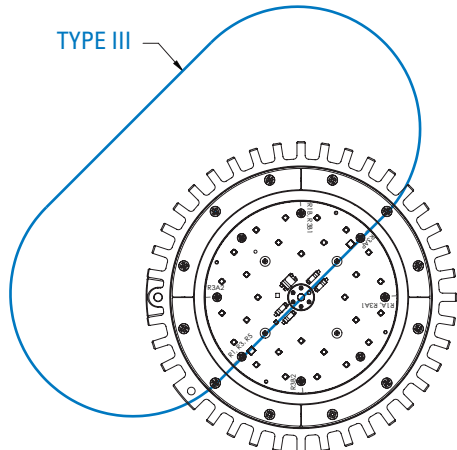
R3AP

Type III wall mount



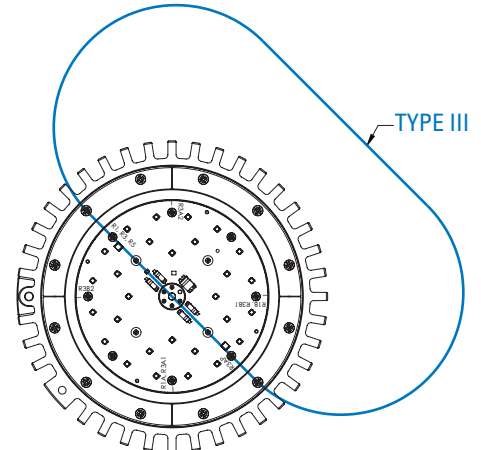
R3A2

Type III ceiling mount only



R3B2

Type III ceiling mount only



IEC/ATEX certifications applicable for voltage ranges: 100-277 VAC, 127-250 VDC.

Champ VMVL LED luminaires

3,000 to 13,000 lumens

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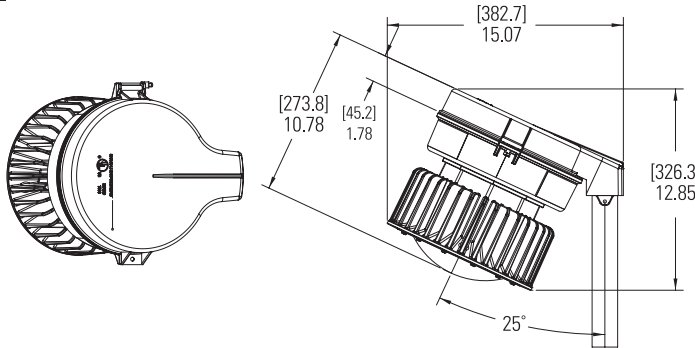
UL/cUL Listed
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Wet Locations
Type 4X

2L

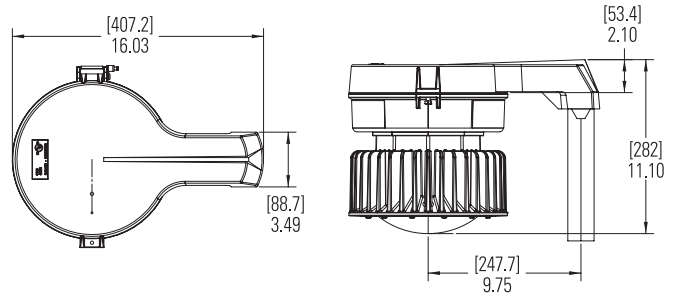
2L

Dimensions:

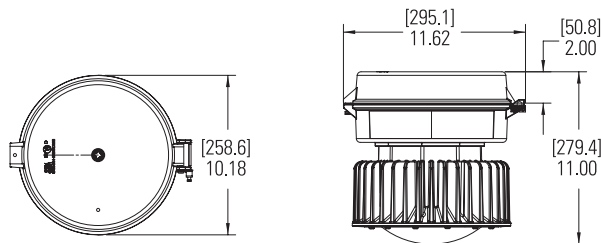
Stanchion - 25° angled



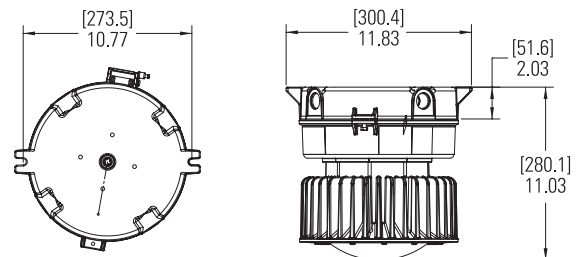
Stanchion - straight



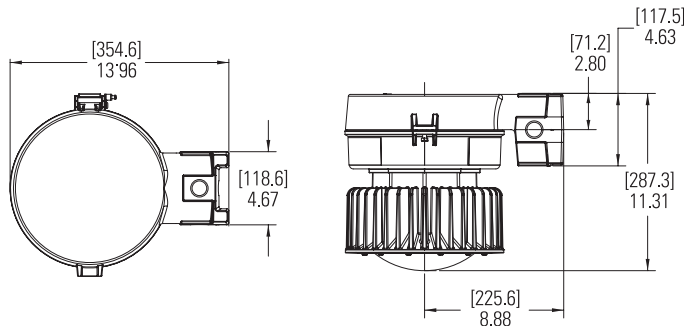
Pendant



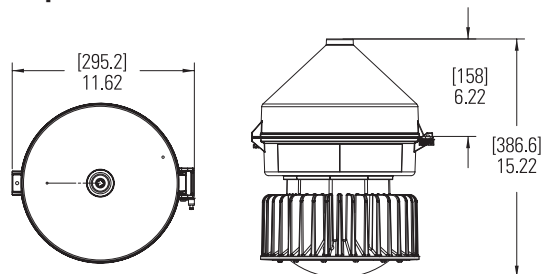
Ceiling



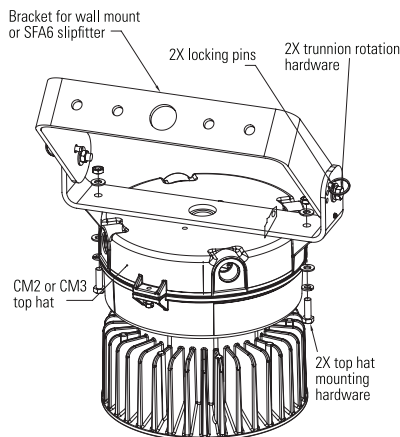
Wall



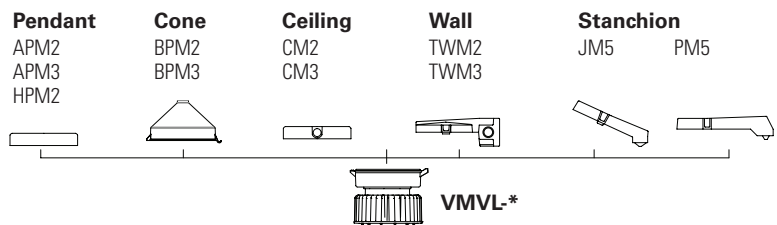
Cone pendant



Trunnion



Mounting module series:



IEC/ATEX certifications applicable for voltage ranges: 100-277 VAC, 127-250 VDC.