Specifier Notes: This product guide specification is written according to the Construction Specifications Institute (CSI) 3-Part Format as described in *MasterFormat® 2020 Edition.*

This section should be carefully reviewed and edited by the Architect or Engineer to meet the requirements of the project and local building code. Coordinate this section with other specification sections and the Drawings. Delete any information and specifier notes below in Parts 1, 2 or 3 which are not required or relevant for the project.

Section numbers are from *MasterFormat 2020 Edition.*

**SECTION 26 54 19**

**LED CLASSIFIED LOCATION LIGHTING**

1. **GENERAL**
   1. **summary**
      1. Section includes:
         1. [Surface mounted LED classified luminaires](#SurfaceMount)
         2. [Emergency Lighting](#Emergency)
         3. [Exit Lighting](#Exit)
         4. [Luminaire fittings](#Fittings)
      2. Related requirements:

Always retain first three subparagraphs below.

Section 018116 "Facility Environmental Requirements" specifies basis-of-design environmental conditions and performance criteria that are applicable to product selection and installation of the Work on the Project.

Section 018123 "Facility Seismic and Wind Criteria" specifies basis-of-design seismic and wind criteria for nonstructural components on the Project.

Section 260010 "Supplemental Requirements for Electrical" specifies additional requirements applicable to coordinating, scheduling, and sequencing of the Work specified in this Section.

Retain subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.

[**Section 260519 "Low-Voltage Electrical Power Conductors and Cables"**][**and**][**Section 260523 "Control-Voltage Electrical Power Cables"**] specifies wiring connections installed by this Section.

Section 260529 "Hangers and Supports for Electrical Systems" specifies channel and angle supports installed by this Section.

Section 260546 "Poles for Electrical Systems" specifies lighting standards, utility poles, and accessories referenced by this Section.

Section 260553 "Identification for Electrical Systems" specifies electrical equipment labels and warning signs installed by this Section.

Section 260923 "Lighting Control Devices" specifies automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors installed by this Section.

Section 260936 "Modular Dimming Controls" specifies architectural dimming systems with dimming installed by this Section.

Section 260943.16 "Addressable Luminaire Lighting Controls" and Section 260943.23 "Relay-Based Lighting Controls" specify manual or programmable control systems with low-voltage control wiring or data communication circuits installed by this Section.

* 1. **REFERENCES**
     1. National Fire Protection Association (NFPA):
        1. NFPA 70 National Electrical Code (NEC)
     2. Underwriters Laboratories, Inc. (UL):
        1. UL844 Luminaires for use in Hazardous (Classified) Locations
        2. UL1598 Luminaires
        3. UL1598A Supplemental Requirements for Luminaires for Installation on Marine Vessels
        4. UL924 Emergency Lighting Equipment (emergency battery back-up model)
        5. UL8750 Light Emitting Diode (LED) Equipment for Use in Lighting Products
        6. UL50 Enclosures for Electrical Equipment, Non-Environmental Considerations
        7. UL50E Enclosures for Electrical Equipment, Environmental Considerations
     3. CSA Group
        1. Canadian Electrical Code (CEC)
        2. CSA C22.2 No. 137 Luminaires for use in Hazardous (Classified) Locations
     4. National Electrical Manufacturers Association (NEMA)
  2. **SUBMITTALS - FOR REVIEW/APPROVAL**
     1. Luminaires: Include the following information:
        1. Product Listing: Include copy of unexpired approval letter, on letterhead of qualified electrical testing agency, certifying product's compliance with specified listing criteria.
        2. Manufacturer’s descriptive literature and technical specifications for each product
           1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
           2. Include operating characteristics, electrical characteristics, and furnished accessories.
           3. Include battery and charger data for emergency lighting units.
           4. Include ballast factor.
           5. Include life, output (lumens, CCT, and CRI), and energy-efficiency data.
           6. Include photometric data and adjustment factors obtained from qualified laboratory tests.
           7. Include schedule of submitted lighting products. Arrange schedule and accompanying product data in order by luminaire and lamp designations indicated on the Drawings.
        3. Manufacturer’s product drawing (2D or 3D), when requested
        4. Manufacturer’s installation and maintenance document
     2. Luminaire fittings: Include the following information
        1. Product Listing: Include copy of unexpired approval letter, on letterhead of qualified electrical testing agency, certifying product's compliance with specified listing criteria
        2. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
        3. Include operating characteristics, electrical characteristics, and furnished accessories.
        4. Include schedule of submitted lighting products. Arrange schedule and accompanying product data in order by luminaire and lamp designations indicated on the Drawings.
  3. **QUALIFICATIONS**
     1. The supplier of the assembly must be the manufacturer of the major components within the assembly.
     2. For the equipment specified herein, the manufacturer must be ISO 9001 or 9002 certified.
     3. The manufacturer of this equipment must have produced similar electrical equipment for a minimum period of ten (10) years. When requested by the engineer, an acceptable list of installations with similar equipment will be provided demonstrating compliance with this requirement.
     4. Products must be free of defects in material and workmanship
  4. **REGULATORY REQUIREMENTS**

1. All luminaires shall meet the following certifications:
   1. NEC and CEC
      1. [Class I, Division 1, Groups B,C,D] or [Class I, Division 2, Groups A,B,C,D]
      2. [Class II, Division 1, Groups E,F,G] or [Class II, Division 2, Groups F,G]
      3. Simultaneous Presence
      4. NEMA 4X, IP66
      5. Marine and Wet Location Rated
   2. UL Standards
      * 1. UL844
        2. UL1598 Luminaires
        3. UL1598A Marine
        4. UL8750
        5. UL50 and UL50E
2. CSA Standard
   * + 1. cUL Listed to CSA Standard CSA C22.2 No. 137
3. Additional Certifications
   * 1. National Sanitation Foundation (NSF) NSF ANSI 51 Approved
     2. Design Lights Consortium approved

**1.06 DELIVERY, STORAGE, AND HANDLING**

* + 1. Store products in manufacturer’s unopened packaging until ready for installation.

1. **PRODUCTS**
   1. **performance requirements**
      1. Regulatory Requirements: Products or components listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
   2. **surface mounted led classified luminaires**

This product type covers surface-mounted luminaires, including floor-, wall-, ceiling-, and pole-mounted luminaires. Ceiling-mounted luminaires include cord-, stem-, chain-, and cable-suspended luminaires, in addition to outlet box-mounted luminaires.

Section 2.02 contains the following Crouse-Hinds series hazardous area lighting categories: Floodlights; Highbay & Midbay lighting; Linear lighting; Lowbay & Targeted lighting

Retain “Basis of Design” and “Preferred Manufactures” subparagraphs and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers

* + 1. Champ™ FMVA LED Hazardous Area Floodlights

Crouse-Hinds series Champ FMVA LED is our flagship LED floodlight for Class I and Class II hazardous areas. Eleven versions of the Champ FMVA are available, ranging from 3,000 to 50,000 lumens, providing a reliable and long-life solution for a wide range of floodlighting applications.

Champ FMVA LED floodlights are certified for use in NEC, CEC and IEC hazardous locations, providing a single solution for applications around the world.

* + - 1. Basis of Design – Preferred Manufacturer

The listing of manufacturers below does not imply acceptance of their products that do not meet the specified ratings, features, and functions. Manufacturers listed below are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the engineer prior to bid date.

* + - 1. Preferred Manufacturers: Subject to compliance with these specification requirements, **provide products by the following:**
         1. Eaton Crouse-Hinds series
         2. Engineer-approved equal
      2. Source Limitations: Obtain products from single manufacturer.
      3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following:
         1. NEC and CEC

Class I, Division 2, Groups A,B,C,D

Class II, Division 1, Groups E,F,G (3L-7L and 20-50L models)

Class II, Division 2, Groups F,G (9L-15L models)

Class I, Zone 2 (9L-15L models and 20-50L models)

Simultaneous Presence (3L-15L models)

Type 4X, IP66

Marine and Wet Locations Rated

* + - * 1. UL Standards

UL844

UL1598 Luminaires

UL1598A Marine

UL8750

* + - * 1. CSA Standard

CSA C22.2 No. 137

* + - * 1. IEC and ATEX Certified (9L-15L models)
      1. Standard features:
         1. Electrical Requirements:

Nominal Operating Voltage: Standard input driver voltage of 100-277 VAC, 50/60 Hz with optional drivers having 347-480 VAC

Nominal Luminaire Operating Power Rating: [20 to 60 W] [70 to 150 W] [150 to 300 W] [Greater than 300 W] <Insert basis-of-design product's rated wattage>.

CRI: [80+] [90+].

Drivers will have built-in 0-10V dimming capability

External surge protection option for up to 6kV must be provided as a component within the complete luminaire

Power factor >0.90 and THD < 20%

System efficacy: Minimum 110 lumens per watt (LPW) for standard glass lens

* + - * 1. Design and Performance Requirements:

Output intensity: Not less than [2000 lm] [3000 lm] [5000 lm] [10,000 lm] [15,000 lm] [20,000 lm] [50,000 lm] <Insert lumens>

Fixtures must have L10 reliability and rated life of 60,000 hours minimum for continuous operation at 55°C operating ambient temperature

Fixture housing must be designed with heat fins to ensure proper air flow and facilitate dust shedding for effective heat dissipation

Enclosure Ingress Protection: UL 50E Type 4X or IEC 60529 IP66

Ballast or driver location: Internal and isolated from the primary heat source (LED engine) to maximize economic life.

Fixture must have serviceable and field-replaceable drivers and LED engines without removing fixture from its installation

LED fixtures must have correlated color temperature (CCT) of 5000K (cool white) with options for 4000K (neutral white) and 3000K (warm white).

Fixture must have a minimum CRI of 70 @ 5000K and L70 >= 60,000 @ 55ºC ambient

Fixtures must be available with [Narrow/Spot] [Medium] [Wide] light distribution

Mounting bracket must allow for angle positioning range of -60º to +45º

Mounting hardware: [Ceiling-mounted] [Pendant-mounted] [Wall-mounted ][Building-mounted] [Pole-mounted] <Insert desired mounting hardware>

Fixture must utilize lever-lock connectors for wiring connection from LEDs to drivers and from drivers to supply mains

Fixture must be designed to prevent covers, guards, visors and other components from falling off accidentally during installation or maintenance and when secured in operating position.

Fixture must have an operating ambient temperature range of at least -40ºC to +55ºC

Fixture must be successfully vibration tested in accordance with Section 33 of UL844

Fixture must be successfully impact tested in accordance with Section 68 of UL844

* + - * 1. Material and Finishes Requirements:

LED housing assembly and heat sink must be of extruded aluminum with low copper content for corrosion protection and heat dissipation; free of sharp edges and burrs

LED housing must be finished with epoxy powder coat finish for improved protection against corrosion.

The following lens material options must be available with light fixture: Heat and impact resistant glass; Heat- and UV-stabilized polycarbonate.

Diffused glass lens option must be available for applications requiring low glare

Fixture must utilize silicone gaskets between driver and LED housing, as well as the lens cover and LED board for NEMA 4X and/or IP66 ingress protection against dust and water

Fixtures must not contain mercury or any other hazardous chemicals

* + 1. Champ™ VMVL LED INTELLIGENT Hazardous Area Highbay/Midbay Light Fixtures

Crouse-Hinds series Champ VMVL LED Intelligent light fixtures combine our advanced LED lighting design with control, communications and sensing technology via an intuitive app-based interface. By utilizing grouping, scheduling, dimming, occupancy sensing and daylight harvesting, Champ Intelligent enables lighting systems to be easily optimized by site and eliminates the over-usage of lights.

Available from 3,000 to 7,000 lumens, Champ VMVL Intelligent lighting is engineered to provide maintenance-free illumination, long life and high performance in Class I, Division 2 and Class II, Division 1 areas.

* + - 1. Basis of Design – Preferred Manufacturer

The listing of manufacturers below does not imply acceptance of their products that do not meet the specified ratings, features, and functions. Manufacturers listed below are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the engineer prior to bid date.

* + - 1. Preferred Manufacturers: Subject to compliance with these specification requirements, provide products by the following:
         1. Eaton Crouse-Hinds series
         2. Engineer-approved equal
      2. Source Limitations: Obtain products from single manufacturer.
      3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following:
         1. NEC and CEC

Class I, Division 2, Groups A,B,C,D

Class II, Division 1, Groups E,F,G

Class I, Zone 2 AEx ec ia IIC; Class I, Zone. 2 Ex ec ia IIC

Simultaneous Presence

Type 4X, IP66

Wet Location Rated

* + - * 1. UL Standards

UL844

UL913

UL1598 Luminaires

UL1598A Marine

UL50E

* + - * 1. CSA Standard

CSA C22.2 No. 137

CSA C22.2 No 94.2

* + - * 1. IEC

Zone 21 AEx ia tb IIIC; Zone. 21 Ex ia tb IIIC

Ex ec ia IIC T\* Gc

Ex ia tb IIIC T\*°C Db

II 3 G Ex ec ia IIC T\* Gc

II 2 D Ex ia tb IIIC T\*°C Db

IECEx UL 19.0039X

DEMKO 19 ATEX 2118X

DEMKO 19 ATEX 2119X

* + - * 1. IEC and EN standards

IEC/EN 60079-0

IEC/EN 60079-7

IEC/EN 60079-11

IEC/EN 60079-31

* + - 1. Standard features:
         1. Electrical Requirements:

Nominal Operating Voltage: Standard input driver voltage of 120-277 VAC, 50/60 Hz +/-10%.

Nominal Luminaire Operating Power Rating: [20 to 60 W] <Insert basis-of-design product's rated wattage>.

CRI: [80+] [90+].

Drivers will have built-in 0-10V dimming capability; Fixture should be dimmable from 0-100%.

External surge protection option for up to 6kV must be provided as a component within the complete luminaire.

Power factor >0.90 and THD < 15%.

System efficacy: Minimum 150 lumens per watt (LPW) for 5000K CCT fixture with clear glass lens.

* + - * 1. Design and Performance Requirements:

Output intensity: Not less than [2000 lm] [3000 lm] [5000 lm] [10,000 lm] <Insert lumens>.

Fixtures must have L10 reliability and rated life of 60,000 hours minimum for continuous operation at 55°C operating ambient temperature.

Fixture housing must be designed with heat fins to ensure proper air flow and facilitate dust shedding for effective heat dissipation.

Enclosure Ingress Protection: UL 50E Type 4X or IEC 60529 IP66.

Ballast or driver location: Internal and isolated from the primary heat source (LED engine) to maximize economic life.

Fixture must have serviceable and field-replaceable drivers and LED engines without removing fixture from its installation.

LED fixtures must have correlated color temperature (CCT) of 5000K (cool white) with options for 4000K (neutral white), 3000K (warm white), 2200K (deep warm DarkSky ready), Amber and Green (Wildlife friendly options).

Fixture must have a minimum CRI of 70 @ 5000K and L70 >= 60,000 @ 55ºC ambient.

Fixtures must have options that generate Type I, III, and V light distribution patterns.

The following mounting modules must be available with light fixture: Ceiling-mount; Pendant-mount; Wall-mount; Stanchion-mount; Cone-mount for dust shedding <Insert desired mounting hardware>.

Fixture must utilize lever-lock connectors for wiring connection from LEDs to drivers and from drivers to supply mains.

Fixture must be designed to prevent covers, guards, visors and other components from falling off accidentally during installation or maintenance and when secured in operating position.

Fixture must have an operating ambient temperature range of at least -40ºC to +65ºC.

Fixture must be successfully vibration tested in accordance with Section 33 of UL844.

Fixture must be successfully impact tested in accordance with Section 68 of UL844.

Overall dimensional height of fixture without mounting brackets must not exceed 4.5” and with ceiling, pendant, and wall mounting modules must not exceed 7.5”.

* + - * 1. Material and Finishes Requirements:

LED housing assembly and heat sink must be of extruded aluminum with low copper content for corrosion protection and heat dissipation; free of sharp edges and burrs.

LED housing must be finished with epoxy powder coat finish for improved protection against corrosion.

The following lens material options must be available with light fixture: Heat and impact resistant glass; Heat- and UV-stabilized polycarbonate.

Diffused glass lens option must be available for applications requiring low glare.

Fixture must utilize silicone gaskets between driver and LED housing, as well as the lens cover and LED board for NEMA 4X and/or IP66 ingress protection against dust and water.

Fixtures must not contain mercury or any other hazardous chemicals.

All electronics shall either be encapsulated, potted or conformal coated with suitable material as a means of protection against humidity and corrosion.

All packaging material should be capable of withstanding vibration and shock test.

Retain “Sensing, communications and control requirements” when utilizing luminaires with built-in lighting control and insights capabilities.

* + - * 1. Sensing, communications and control requirements:

Fixture sensor shall provide the following sensing capabilities:

PIR occupancy sensing that automatically illuminates the area once presence is detected and turns light fixture back off when presence is no longer sensed for a set period of time.

Photo sensing that measures available daylight and adjusts the light level of the luminaire to maintain desired lumen levels (daylight harvesting).

Sensor must be integral to the light fixture with no field wiring required to install

Sensor must provide the option for factory installation at purchase or field installation at a later date.

Sensor pattern must be 360º and coverage radius must be equal to mounting height of the sensor.

Sensor measurement shall be reliably able to detect ±5% change in illuminance within 0 – 600lux.

Sensor must have suitable UV rating for outdoor applications or pass UL light resistance test.

Communications antenna shall utilize Bluetooth Low Energy (BLE) protocol to enable decentralized control of the lighting system without complex and expensive IT network gear.

Communications antenna shall be housed within the luminaire and maintain the luminaire’s hazardous (classified) ratings.

Communications antenna shall provide up to a 30-foot range fixture-to-fixture.

Communications antenna shall encrypt all data communicated between light fixtures within the BLE mesh.

Communications antenna shall encrypt all data communicated from light fixtures to the mobile interface application.

Fixture controller shall provide and manage the following intelligent lighting capabilities:

Dimming (0% to 100%).

Fixture grouping, which enables the same control settings to be applied to all fixtures at once, increasing efficiency and response time.

Scheduling, which enables grouped light fixtures to be on and off at pre-defined times and pre-defined light levels.

Controller shall provide option for automatic thermal-rollback to protect driver and LED during extreme temperature events.

Controller shall have a 90-minute on-board back-up memory to maintain system clock and lighting control profiles in event of power disruption.

System must be failsafe, i.e. catastrophic failure in fixture’s controller or sensor brings luminaire to 100% ON state.

Retain “System data and insights requirements” when utilizing luminaires with built-in lighting control and insights capabilities.

* + - * 1. System data and insights requirements:

System shall be able to collect and communicate the following data from each light fixture:

Fixture model

Firmware version

Sensor connection status

Luminaire power consumption

LED run time

Estimated remaining useful life of fixture

Retain “Software requirements” when utilizing luminaires with built-in lighting control and insights capabilities.

* + - * 1. Software requirements:

Software system shall be access-controlled with business driven user hierarchy, who shall have different levels of access based on their role.

Software shall have ability to group fixtures and control fixtures as a group.

Software shall be capable of automatically detecting and extracting information from devices for commissioning.

Software shall be vetted for cybersecurity and solutions provider shall be able to provide a report on internal cybersecurity tests performed when requested by the IT department.

Software shall enable users to set minimum and maximum light levels for every day in a week with each day broken up into four different time zones.

Software shall enable users to set occupancy delay time, reference light level for daylight harvesting, and photo sensor response time.

Software shall enable users to set special lighting profiles for a specific time period such as holidays, etc.

* + 1. Champ™ VMVL LED Hazardous Area Highbay/Midbay Light Fixtures

Crouse-Hinds series Champ VMVL LED is our flagship LED fixture for Class I, Division 2 and Class II hazardous area mid bay and high bay downlighting. It is available in nine models ranging from 3,000 lumens to 25,000 lumens. This offers a lighting solution for areas with mounting heights from 8’ all the way up to 60’.

Champ VMVL LED light fixtures are engineered to provide maintenance-free operation, while delivering long life and high lumen performance. The Type 4X fixture provides up to 142 lumens per watt, and custom Type I, III and V optics maximize light distribution and intensity.

* + - 1. Basis of Design – Preferred Manufacturer

The listing of manufacturers below does not imply acceptance of their products that do not meet the specified ratings, features, and functions. Manufacturers listed below are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the engineer prior to bid date.

* + - 1. Preferred Manufacturers: Subject to compliance with these specification requirements, provide products by the following:
         1. Eaton Crouse-Hinds series
         2. Engineer-approved equal
      2. Source Limitations: Obtain products from single manufacturer.
      3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following:
         1. NEC and CEC

Class I, Division 2, Groups A,B,C,D

Class II, Division 1, Groups E,F,G

Class I, Zone 2 AEx ec mb IICT\*GC (VMVL 3,000-13,000 lumen models); Class I, Zone 2, nA (VMVL 17,000-25,000 lumen models)

Simultaneous Presence

Type 4X, IP66

Wet Location Rated

* + - * 1. UL Standards

UL844

UL1598 Luminaires

UL1598A Marine

UL50

UL50E

* + - * 1. CSA Standard

CSA C22.2 No. 137

* + - * 1. IEC

IECEx UL 13.0052X (VMVL 3,000-13,000 lumen models); IECEx UL 14.0031X (VMVL 17,000-25,000 lumen models)

DEMKO 13 ATEX 1305741X (VMVL 3,000-13,000 lumen models); DEMKO 14 ATEX 1324722X (VMVL 17,000-25,000 lumen models)

DEMKO 13 ATEX 1475031X (VMVL 3,000-13,000 lumen models); DEMKO 14 ATEX 2274231X (VMVL 17,000-25,000 lumen models)

* + - 1. Standard features:
         1. Electrical Requirements:

Nominal Operating Voltage: Standard input driver voltage of 100-277 VAC, 50/60 Hz with optional drivers having 347-480 VAC.

Nominal Luminaire Operating Power Rating: [20 to 60 W] [70 to 150 W] [150 to 300 W] <Insert basis-of-design product's rated wattage>.

CRI: [80+] [90+].

Drivers will have built-in 0-10V dimming capability; Fixture should be dimmable from 0-100%.

External surge protection option for up to 10kV must be provided as a component within the complete luminaire.

Power factor >0.90 and THD < 15%.

System efficacy: Minimum 115 lumens per watt (LPW) for 5000K CCT fixture with clear glass lens.

* + - * 1. Design and Performance Requirements:

Output intensity: Not less than [3000 lm] [5000 lm] [10,000 lm] [15,000 lm] [20,000 lm] [25,000 lm] <Insert lumens>.

Fixtures must have L10 reliability and rated life of 60,000 hours minimum for continuous operation at 55°C operating ambient temperature.

Fixture housing must be designed with heat fins to ensure proper air flow and facilitate dust shedding for effective heat dissipation.

Enclosure Ingress Protection: UL 50E Type 4X or IEC 60529 IP66.

Ballast or driver location: Internal and isolated from the primary heat source (LED engine) to maximize economic life.

Fixture must have serviceable and field-replaceable drivers and LED engines without removing fixture from its installation.

LED fixtures must have correlated color temperature (CCT) of 5000K (cool white) with options for 4000K (neutral white), 3000K (warm white), Amber and Green (Wildlife friendly options).

Fixture must have a minimum CRI of 70 @ 5000K and L70 >= 60,000 @ 55ºC ambient.

Fixtures must have options that generate [Type I, III, and V] [wide, medium, narrow] light distribution patterns.

Optics must have ability to be clocked and preset to various positions from factory to accommodate alignment with conduit wiring entries to the fixture top hat

Fixtures must be available with refractor for applications requiring light to be directed to the sides and above the fixture (VMVL 3,000-13,000 lumen models).

The following mounting modules must be available with light fixture: Ceiling-mount; Pendant-mount; Wall-mount; Stanchion-mount; Cone-mount for dust shedding <Insert desired mounting hardware>.

Fixture must utilize lever-lock connectors for wiring connection from LEDs to drivers and from drivers to terminal block and supply mains.

Fixture must be designed to prevent covers, guards, visors and other components from falling off accidentally during installation or maintenance and when secured in operating position.

Fixture must have an operating ambient temperature range of at least -40ºC to +55ºC.

Fixture must be successfully vibration tested in accordance with Section 33 of UL844.

Fixture must be successfully impact tested in accordance with Section 68 of UL844.

Overall dimensional height of fixture without mounting brackets must not exceed 8.0” and with ceiling, pendant, and wall mounting modules must not exceed 11.5”.

* + - * 1. Material and Finishes Requirements:

LED housing assembly and heat sink must be of extruded aluminum with low copper content for corrosion protection and heat dissipation; free of sharp edges and burrs.

LED housing must be finished with epoxy powder coat finish for improved protection against corrosion.

The following lens material options must be available with light fixture: Heat and impact resistant glass; Heat- and UV-stabilized polycarbonate.

Diffused glass lens option must be available for applications requiring low glare.

Fixture must utilize silicone gaskets between driver and LED housing, as well as the lens cover and LED board for NEMA 4X and/or IP66 ingress protection against dust and water.

Fixtures must not contain mercury or any other hazardous chemicals.

All electronics shall either be encapsulated, potted or conformal coated with suitable material as a means of protection against humidity and corrosion.

All packaging material should be capable of withstanding vibration and shock test.

* + 1. Hazard-Gard™ EVLLA LED Explosionproof Highbay/Midbay Light Fixtures

The Class I, Division 1 Hazard-Gard EVLLA LED light fixture from Eaton's Crouse-Hinds Division combines safety and reliability with high performance LEDs and a solid state electronic driver that provide light where it’s needed.

These light fixtures are designed for explosionproof areas with mounting heights of up to 30 feet. The rugged design and efficient heat dissipation stands up to challenging, hazardous location conditions, while delivering long life and high lumen performance.

* + - 1. Basis of Design – Preferred Manufacturer

The listing of manufacturers below does not imply acceptance of their products that do not meet the specified ratings, features, and functions. Manufacturers listed below are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the engineer prior to bid date.

* + - 1. Preferred Manufacturers: Subject to compliance with these specification requirements, provide products by the following:
         1. Eaton Crouse-Hinds series
         2. Engineer-approved equal
      2. Source Limitations: Obtain products from single manufacturer.
      3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following:
         1. NEC and CEC

Class I, Division 1, Groups B,C,D

Class II, Division 1, Groups E,F,G

Class III, Simultaneous Presence

Type 4X, IP66

Wet Location Rated

* + - * 1. UL Standards

UL844

UL1598 Luminaires

UL1598A Marine

* + - * 1. CSA Standard

CSA C22.2 No. 137

* + - 1. Standard features:
         1. Electrical Requirements:

Nominal Operating Voltage: Standard input driver voltage of 100-277 VAC, 50/60 Hz with optional drivers having 347-480 VAC.

Nominal Luminaire Operating Power Rating: [20 to 50W] [50 to 75W] <Insert basis-of-design product's rated wattage>.

CRI: [70+ @5000K] [80+ @3000K].

Drivers will have built-in 0-10V dimming capability; Fixture should be dimmable from 0-100%.

External surge protection option for up to 6kV must be provided as a component within the complete luminaire.

Power factor >0.90 and THD < 15%.

System efficacy: Minimum 100 lumens per watt (LPW) for 5000K CCT fixture with clear glass lens.

* + - * 1. Design and Performance Requirements:

Output intensity: Not less than [3000 lm] [5000 lm] <Insert lumens>.

Fixtures must have L10 reliability and rated life of 60,000 hours minimum for continuous operation at 55°C operating ambient temperature.

Fixture construction must be factory sealed with not external sealing fittings required for Groups B, C, D

Fixture housing must be designed with heat fins to ensure proper air flow and facilitate dust shedding for effective heat dissipation.

Enclosure Ingress Protection: UL 50E Type 4X or IEC 60529 IP66.

Ballast or driver location: Internal and isolated from the primary heat source (LED engine) to maximize economic life.

Fixture must have serviceable and field-replaceable drivers and LED engines without removing fixture from its installation.

LED fixtures must have correlated color temperature (CCT) of 5000K (cool white) with options for 4000K (neutral white), 3000K (warm white).

Fixture must have a minimum CRI of 70 @ 5000K and L70 >= 60,000 @ 55ºC.

The following mounting modules must be available with light fixture: Ceiling-mount; Pendant-mount; Wall-mount; Stanchion-mount <Insert desired mounting hardware>.

Fixture must have an operating ambient temperature range of at least -25ºC to +55ºC.

Fixture must have a T6 temperature rating at 55ºC and a T5 temperature rating at 65ºC for Class I, Division 1 environments.

Fixture must be successfully vibration tested in accordance with Section 33 of UL844.

Fixture must be successfully impact tested in accordance with Section 68 of UL844.

Overall dimensional height of fixture with ceiling, pendant, stanchion or wall mounting modules must not exceed 16.5”.

* + - * 1. Material and Finishes Requirements:

LED housing assembly and heat sink must be of extruded aluminum with low copper content for corrosion protection and heat dissipation; free of sharp edges and burrs.

LED housing must be finished with epoxy powder coat finish for improved protection against corrosion.

The following lens material options must be available with light fixture: Shatter-resistant, explosionproof glass

Fixture must utilize silicone gaskets between driver and LED housing, as well as the lens cover and LED board for NEMA 4X and/or IP66 ingress protection against dust and water.

Fixtures must not contain mercury or any other hazardous chemicals.

All electronics shall either be encapsulated, potted or conformal coated with suitable material as a means of protection against humidity and corrosion.

All packaging material should be capable of withstanding vibration and shock test.

* + 1. Hazard-Gard™ XPLA and Pauluhn™ ZPLA Explosionproof LED Linear Light Fixtures

Crouse-Hinds series Hazard-Gard XPLA and Pauluhn ZPLA explosionproof linear LEDs are designed to replace fluorescent T12, T8 and T5HO lighting in Class I, Division 1 and Class II, Division 1 areas.

The XPLA/ZPLA is available in 2 foot and 4 foot versions with 3,800 lumens and 8,300 lumens respectively. The explosionproof fixture stands up to high vibration, hose down, shock and impact, while delivering long life and high lumen performance.

* + - 1. Basis of Design – Preferred Manufacturer

The listing of manufacturers below does not imply acceptance of their products that do not meet the specified ratings, features, and functions. Manufacturers listed below are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the engineer prior to bid date.

* + - 1. Preferred Manufacturers: Subject to compliance with these specification requirements, provide products by the following:
         1. Eaton Crouse-Hinds series
         2. Engineer-approved equal
      2. Source Limitations: Obtain products from single manufacturer.
      3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following:
         1. NEC and CEC

Class I, Division 1, Groups C,D

Class II, Division 1, Groups E,F,G

Class III, Simultaneous Presence

Type 4X, IP66

Wet Location Rated

* + - * 1. UL Standards

UL50E

UL844

UL924

UL1598 Luminaires

UL1598A Marine

UL8750

* + - * 1. CSA Standard

CSA C22.2 No. 137, 250

* + - 1. Standard features:
         1. Electrical Requirements:

Nominal Operating Voltage: Standard input driver voltage of 100-277 VAC, 50/60 Hz with optional drivers having 347-480 VAC.

Nominal Luminaire Operating Power Rating: [25 to 60 W] <Insert basis-of-design product's rated wattage>.

CRI: [70+ @5000K] [80+ @3000K].

Drivers will have built-in 0-10V dimming capability; Fixture should be dimmable from 0-100%.

External surge protection option for up to 6kV must be provided as a component within the complete luminaire.

Power factor >0.90 and THD < 15%.

System efficacy: Minimum 130 lumens per watt (LPW) for 5000K CCT fixture with clear glass lens.

* + - * 1. Design and Performance Requirements:

Output intensity: Not less than [5000 lm] [7,500 lm] <Insert lumens>.

Fixtures must have L10 reliability and rated life of 60,000 hours minimum for continuous operation at 55°C operating ambient temperature.

Fixture housing must be designed with heat fins to ensure proper air flow and facilitate dust shedding for effective heat dissipation.

Enclosure Ingress Protection: UL 50E Type 4X or IEC 60529 IP66.

Fixture must be high pressure hose tested at 3 gallons per minute, 2000 psi@ 5ft distance with a 1/16” nozzle for 30 minutes to prevent ingress due to high pressure hosing.

Thermal pad must be utilized instead of thermal grease for heat dissipation from PCB board.

Ballast or driver location: Internal and isolated from the primary heat source (LED engine) to maximize economic life.

Fixture design must have serviceable drivers accessible from the bottom of fixture and field replaceable without removing the fixture from a ceiling or wall mount installation.

The power supply or driver must be located in line with LED boards and not on top of them to maximize thermal dissipation and maintain lower driver baseplate temperatures

LED fixtures must have correlated color temperature (CCT) of 5000K (cool white) with options for 4000K (neutral white), 3000K (warm white).

Fixture must have a minimum CRI of 70 @ 5000K and L70 >= 60,000 @ 55ºC.

The fixture shall have standard wide (120 degree) optic.

The fixture must have 4 points of secondary retention integrated into the fixture for attaching safety cables.

Fixture must have a back flange with sliding ceiling, swivel and flush mount bracket options to adjust the distance between two brackets and allow for flexible installation; Fixture should also have pole mount options.

Fixture must utilize lever-lock connectors for wiring connection from LEDs to drivers and from drivers to supply mains.

Fixture must be designed to prevent covers, guards, visors and other components from falling off accidentally during installation or maintenance and when secured in operating position.

Fixture must have an operating ambient temperature range of at least -25ºC to +55ºC.

Fixture must have a T5 temperature rating at 55ºC for Class I, Division 1 environments.

Fixture must be successfully vibration tested in accordance with Section 33 of UL844.

Fixture must be successfully impact tested in accordance with Section 68 of UL844.

Overall dimensional height of fixture without mounting brackets must not exceed 4.8” and with mounting brackets must not exceed 8”.

* + - * 1. Material and Finishes Requirements:

LED housing assembly and heat sink must be of extruded aluminum with low copper content for corrosion protection and heat dissipation; free of sharp edges and burrs.

LED housing must be available with epoxy powder coat finish for improved protection against corrosion.

The following lens material options must be available with light fixture: heat and impact resistant glass

Diffused glass lens option must be available for applications requiring low glare.

Fixture must utilize gaskets between driver and LED housing, as well as the lens cover and LED board for NEMA 4X and/or IP66 ingress protection against dust and water.

Fixtures must not contain mercury or any other hazardous chemicals.

All electronics shall either be encapsulated, potted or conformal coated with suitable material as a means of protection against humidity and corrosion.

All packaging material should be capable of withstanding vibration and shock test.

* + 1. Champ™ MLLA and Pauluhn™ DLLA Hazardous Area LED Linear Light Fixtures

Crouse-Hinds series Champ MLLA and Pauluhn DLLA linear LEDs are specifically designed to replace fluorescent T12, T8 and T5HO lighting in Class I, Division 2 and Class II, Division 1 areas.

Available in 2 foot and 4 foot versions with 4,000 lumens and 8,000 lumens respectively, the MLLA/PLLA features a rugged and durable design with the industry’s most versatile and flexible mounting options.

* + - 1. Basis of Design – Preferred Manufacturer

The listing of manufacturers below does not imply acceptance of their products that do not meet the specified ratings, features, and functions. Manufacturers listed below are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the engineer prior to bid date.

* + - 1. Preferred Manufacturers: Subject to compliance with these specification requirements, provide products by the following:
         1. Eaton Crouse-Hinds series
         2. Engineer-approved equal
      2. Source Limitations: Obtain products from single manufacturer.
      3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following:
         1. NEC and CEC

Class I, Division 2, Groups A,B,C,D

Class II, Division 1, Groups E,F,G (MLLA model); Class II, Division 2,   
Groups F,G (DLLA model)

Class III, Simultaneous Presence

Type 4X, IP66

Marine and Wet Location Rated

* + - * 1. UL Standards

UL844

UL924

UL1598 Luminaires

UL1598A Marine

UL8750

* + - * 1. CSA Standard

CSA C22.2 No. 137, 141, 250

* + - 1. Standard features:
         1. Electrical Requirements:

Nominal Operating Voltage: Standard input driver voltage of 100-277 VAC, 50/60 Hz with optional drivers having 347-480 VAC.

Nominal Luminaire Operating Power Rating: [25 to 60 W] <Insert basis-of-design product's rated wattage>.

CRI: [70+ @5000K] [80+ @3000K].

DC input of 127/250 in addition to above mentioned 120-277 VAC input must be available on a single driver.

Drivers will have built-in 0-10V dimming capability and be capable of being wired to an external occupancy sensing/dimming device using two dimming leads; Fixture should be dimmable from 0-100%.

External surge protection option for up to 10kV must be provided as a component within the complete luminaire.

Power factor >0.90 and THD < 15%.

System efficacy: Minimum 130 lumens per watt (LPW) for 5000K CCT fixture with clear glass lens.

* + - * 1. Design and Performance Requirements:

Output intensity: Not less than [5000 lm] [7,500 lm] <Insert lumens>.

Fixtures must have L10 reliability and rated life of 60,000 hours minimum for continuous operation at 55°C operating ambient temperature.

Fixture housing must be designed with heat fins to ensure proper air flow and facilitate dust shedding for effective heat dissipation.

Enclosure Ingress Protection: UL 50E Type 4X or IEC 60529 IP66.

Fixture must be high pressure hose tested at 3 gallons per minute, 2000 psi@ 5ft distance with a 1/16” nozzle for 30 minutes to prevent ingress due to high pressure hosing.

Thermal pad must be utilized instead of thermal grease for heat dissipation from PCB board.

Ballast or driver location: Internal and isolated from the primary heat source (LED engine) to maximize economic life.

Fixture design must have serviceable drivers accessible from the bottom of fixture and field replaceable without removing the fixture from a ceiling or wall mount installation.

The power supply or driver shall be located on the driver housing to limit the heating effect from the LEDs to maintain lower driver control point temperatures.

LED fixtures must have correlated color temperature (CCT) of 5000K (cool white) with options for 4000K (neutral white), 3000K (warm white).

Fixture must have a minimum CRI of 80 @ 5000K, 4000K and 3000K and L70 >= 60,000 @ 55ºC.

The fixture shall be available with a standard wide (120 degree) optic

Retain #13 for high mast derrick applications where light is installed in a vertical mount position

The fixture shall be available with a full cut-off beam that reduces spillage and light loss for targeted illumination.

The fixture must have 4 points of secondary retention integrated into the fixture for attaching safety cables; Safety chains with locking carabineers must be available for secondary retention

Fixture must have ceiling/swivel, wall, flush, pole and pendant mounting options for flexible installation.

Fixture must utilize lever-lock connectors for wiring connection from LEDs to drivers and from drivers to supply mains.

Fixture must be designed to prevent covers, guards, visors and other components from falling off accidentally during installation or maintenance and when secured in operating position.

Fixture must have an operating ambient temperature range of at least -40ºC to +65ºC.

Fixture must have a T5 temperature rating at 55ºC for Class I, Division 2 environments.

Fixture must be successfully vibration tested in accordance with Section 33 of UL844.

Fixture must be successfully impact tested in accordance with Section 68 of UL844.

Overall dimensional height of fixture without mounting brackets must not exceed 4.5” and with mounting brackets must not exceed 8”.

* + - * 1. Material and Finishes Requirements:

LED housing assembly and heat sink must be of extruded aluminum with low copper content for corrosion protection and heat dissipation; free of sharp edges and burrs.

LED housing must be available with epoxy powder coat finish for improved protection against corrosion.

The following lens material options must be available with light fixture: heat and impact resistant glass; UV-treated domed polycarbonate

Diffused lens for glass and polycarbonate options must be available for applications requiring low glare.

Fixture must utilize silicone type gaskets between driver and LED housing, as well as the lens cover and LED board for NEMA 4X and/or IP66 ingress protection against dust and water.

Fixtures must not contain mercury or any other hazardous chemicals.

All electronics shall either be encapsulated, potted or conformal coated with suitable material as a means of protection against humidity and corrosion.

All packaging material should be capable of withstanding vibration and shock test.

* + 1. Pauluhn™ Summit Hazardous Area LED Linear Light Fixtures

Rated for Class I, Division 2 and Class II, Division 1 locations, the Summit was designed for food and beverage facilities and agriculture processing and storage. The fixture housing is angled to mitigate debris build-up and features a food rated epoxy powder coat finish. Plus, its robust design can withstand 1,500 PSI hose pressure for wash down applications.

Three models of the Summit are available, from 13,000 to 25,000 lumens.

* + - 1. Basis of Design – Preferred Manufacturer

The listing of manufacturers below does not imply acceptance of their products that do not meet the specified ratings, features, and functions. Manufacturers listed below are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the engineer prior to bid date.

* + - 1. Preferred Manufacturers: Subject to compliance with these specification requirements, provide products by the following:
         1. Eaton Crouse-Hinds series
         2. Engineer-approved equal
      2. Source Limitations: Obtain products from single manufacturer.
      3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following:
         1. NEC and CEC

Class I, Division 2, Groups A,B,C,D

Class II, Division 1, Groups F,G

Type 4X, IP66

Wet Locations Rated

NSF ANSI 51 Approved

* + - * 1. UL Standards

UL844

UL1598 Luminaires

UL8750

* + - * 1. CSA Standard

CSA C22.2 No. 137

* + - 1. Standard features:
         1. Electrical Requirements:

Nominal Operating Voltage: Standard input driver voltage of 100-277 VAC, 50/60 Hz with optional drivers having 347-480 VAC.

Nominal Luminaire Operating Power Rating: [100 to 125W] [125 to 150W] [150 to 250W] <Insert basis-of-design product's rated wattage>.

CRI: [70+ @5000K] [80+ @3000K].

DC input of 127/250 in addition to above mentioned 120-277 VAC input must be available on a single driver.

Drivers will have built-in 0-10V dimming capability and be capable of being wired to an external occupancy sensing/dimming device using two dimming leads; Fixture should be dimmable from 0-100%.

External surge protection option for up to 6kV must be provided as a component within the complete luminaire.

Power factor >0.90 and THD < 20%.

System efficacy: Minimum 105 lumens per watt (LPW) for 5000K CCT fixture with standard polycarbonate lens.

* + - * 1. Design and Performance Requirements:

Output intensity: Not less than [10000 lm] [15,000 lm] [25,000 lm] <Insert lumens>.

Fixtures must have L10 reliability and rated life of 90,000 hours minimum for continuous operation at 40°C operating ambient temperature.

Fixture housing must have minimum angle of 8⁰, with no external fins for maximum debris shedding.

Enclosure Ingress Protection: UL 50E Type 4X or IEC 60529 IP66.

Fixture must be high pressure hose tested at 3 gallons per minute, 2000 psi@ 5ft distance with a 1/16” nozzle for 30 minutes to prevent ingress due to high pressure hosing.

Ballast or driver location: Internal and isolated from the primary heat source (LED engine) to maximize economic life.

Fixture design must have serviceable drivers accessible from the bottom of fixture and field replaceable without removing the fixture from a ceiling or wall mount installation.

The fixture must have through-feed entries integrated into the fixture for multiple fixture wiring.

The power supply or driver must be located in line with LED boards and not on top of them to maximize thermal dissipation and maintain lower driver baseplate temperatures.

LED fixtures must have correlated color temperature (CCT) of 5000K (cool white).

Fixture must have a minimum CRI of 80 @ 5000Kand L70 >= 60,000 @ 55ºC.

Fixture must have ceiling/swivel, flush and cable/chain mounting options.

Fixture must utilize lever-lock connectors for wiring connection from LEDs to drivers and from drivers to supply mains.

Fixture must have an operating ambient temperature range of at least -40ºC to +55ºC.

Fixture must be successfully vibration tested in accordance with Section 33 of UL844.

Overall dimensional height of fixture without mounting brackets must not exceed 6.5” and with mounting brackets must not exceed 10.1”.

* + - * 1. Material and Finishes Requirements:

LED housing assembly and heat sink must be of extruded aluminum with low copper content for corrosion protection and heat dissipation; free of sharp edges and burrs.

LED housing must have an NSF/ANSI 51 approved epoxy powder coating finish for improved protection against corrosion.

The following lens material options must be available with light fixture: UV-treated domed polycarbonate

Diffused option for polycarbonate lens must be available for applications requiring low glare.

Fixture must utilize silicone type gaskets between driver and LED housing, as well as the lens cover and LED board for NEMA 4X and/or IP66 ingress protection against dust and water.

Fixtures must not contain mercury or any other hazardous chemicals.

All electronics shall either be encapsulated, potted or conformal coated with suitable material as a means of protection against humidity and corrosion.

All packaging material should be capable of withstanding vibration and shock test.

* + 1. Hazard-Gard™ EV LED Explosionproof Lowbay/Targeted Light Fixtures

The EV LED from Eaton's Crouse-Hinds Division is a Class I, Division 1 factory sealed LED light fixture for general lowbay illumination. The EV LED is available in two lumen output models, offering a replacement option for existing 70W-100W HID and 100W-200W incandescent fixtures.

* + - 1. Basis of Design – Preferred Manufacturer

The listing of manufacturers below does not imply acceptance of their products that do not meet the specified ratings, features, and functions. Manufacturers listed below are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the engineer prior to bid date.

* + - 1. Preferred Manufacturers: Subject to compliance with these specification requirements, provide products by the following:
         1. Eaton Crouse-Hinds series
         2. Engineer-approved equal
      2. Source Limitations: Obtain products from single manufacturer.
      3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following:
         1. NEC and CEC

Class I, Division 1, Groups C,D

Class I, Zones 1 & 2, Group IIB

Class II, Division 1, Groups E,F,G

Class III, Simultaneous Presence

Type 4X, IP66

Marine and Wet Location Rated

* + - * 1. UL Standards

UL844

UL1598 Luminaires

UL1598A Marine

* + - * 1. CSA Standard

CSA C22.2 No. 137

* + - 1. Standard features:
         1. Electrical Requirements:

Nominal Operating Voltage: Standard input driver voltage of 100-277 VAC, 50/60 Hz with optional drivers having 12-24 VDC.

Nominal Luminaire Operating Power Rating: [10 to 20W] [20 to 30W] <Insert basis-of-design product's rated wattage>.

CRI: [65+ @5600K] [80+ @3000K].

Power factor >0.90 and THD < 15%.

System efficacy: Minimum 100 lumens per watt (LPW) for 5000K CCT fixture with clear glass lens.

Drivers will have built-in 0-10V dimming capability

* + - * 1. Design and Performance Requirements:

Output intensity: Not less than [1500 lm] [2500 lm] <Insert lumens>.

Fixtures must have L10 reliability and rated life of 50,000 hours minimum for continuous operation at 55°C operating ambient temperature.

Fixture construction must be factory sealed with not external sealing fittings required for Groups B, C, D

Enclosure Ingress Protection: UL 50E Type 4X or IEC 60529 IP66.

LED fixtures must have correlated color temperature (CCT) of 5000K (cool white) with options 3000K (warm white) and Amber (Wildlife friendly).

Fixture must have a minimum CRI of 65 @ 5000K and L70 >= 60,000 @ 55ºC.

The following mounting modules must be available with light fixture: Ceiling-mount; Pendant-mount; Wall-mount; Stanchion-mount; Bulkhead mount <Insert desired mounting hardware>.

Fixture must have an operating ambient temperature range of at least -25ºC to +55ºC.

Fixture must have a T6 temperature rating at 55ºC for Class I, Division 1 environments.

Fixture must be successfully vibration tested in accordance with Section 33 of UL844.

Fixture must be successfully impact tested in accordance with Section 68 of UL844.

Overall dimensional height of fixture with ceiling, pendant, stanchion or wall mounting modules must not exceed 16.5”.

* + - * 1. Material and Finishes Requirements:

LED housing assembly and heat sink must be of extruded aluminum with low copper content for corrosion protection and heat dissipation; free of sharp edges and burrs.

LED housing must be finished with epoxy powder coat finish for improved protection against corrosion.

The following lens material options must be available with light fixture: Heat- and impact-resistant glass

Fixture must utilize silicone gaskets between driver and LED housing, as well as the lens cover and LED board for NEMA 4X and/or IP66 ingress protection against dust and water.

Fixtures must not contain mercury or any other hazardous chemicals.

All electronics shall either be encapsulated, potted or conformal coated with suitable material as a means of protection against humidity and corrosion.

All packaging material should be capable of withstanding vibration and shock test.

* + 1. Champ™ CPMV LED Hazardous Area Lowbay/Targeted Wallpacks

Crouse-Hinds series Champ CPMVs provide a low profile wallpack solution for Class I, Division 2 and Class II, Division 1 areas hazardous lighting applications.

They are available from 3,000 to 7,000 lumens and are ideal for vertical surface lighting where harsh and hazardous conditions require high quality, reliable illumination.

* + - 1. Basis of Design – Preferred Manufacturer

The listing of manufacturers below does not imply acceptance of their products that do not meet the specified ratings, features, and functions. Manufacturers listed below are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the engineer prior to bid date.

* + - 1. Preferred Manufacturers: Subject to compliance with these specification requirements, **provide products by the following:**
         1. Eaton Crouse-Hinds series
         2. Engineer-approved equal
      2. Source Limitations: Obtain products from single manufacturer.
      3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following:
         1. NEC and CEC

Class I, Division 2, Groups A,B,C,D

Class II, Division 1, Groups E,F,G

Simultaneous Presence

Type 4X, IP66

Marine and Wet Location Rated

* + - * 1. UL Standards

UL844

UL1598 Luminaires

UL1598A Marine

UL8750

* + - * 1. CSA Standard

CSA C22.2 No. 137

* + - 1. Standard features:
         1. Electrical Requirements:

Nominal Operating Voltage: Standard input driver voltage of 100-277 VAC, 50/60 Hz with optional drivers having 347-480 VAC

DC input of 125/250 in addition to above mentioned 120-277 VAC input must be available on a single driver.

Nominal Luminaire Operating Power Rating: [30 to 60 W] <Insert basis-of-design product's rated wattage>.

CRI: [80+] [90+].

Drivers will have built-in 0-10V dimming capability

External surge protection option for up to 6kV must be provided as a component within the complete luminaire

Power factor >0.90 and THD < 20%

System efficacy: Minimum 110 lumens per watt (LPW) for standard glass lens

* + - * 1. Design and Performance Requirements:

Output intensity: Not less than [3000 lm] [5000 lm] <Insert lumens>

Fixtures must have L10 reliability and rated life of 60,000 hours minimum for continuous operation at 55°C operating ambient temperature

Fixture housing must be designed with heat fins to ensure proper air flow and facilitate dust shedding for effective heat dissipation

Enclosure Ingress Protection: UL 50E Type 4X or IEC 60529 IP66

Ballast or driver location: Internal and isolated from the primary heat source (LED engine) to maximize economic life.

Fixture must have serviceable and field-replaceable drivers and LED engines without removing fixture from its installation

LED fixtures must have correlated color temperature (CCT) of 5000K (cool white) with options for 4000K (neutral white) and 3000K (warm white).

Fixture must have a minimum CRI of 70 @ 5000K and L70 >= 60,000 @ 55ºC.

Mounting hardware: [Wall-mounted ][Hub-mounted] [Yoke-mounted] <Insert desired mounting hardware>.

Yoke and Hub mounting brackets must allow for angle positioning range of -90º to +45º.

Fixture must utilize lever-lock connectors for wiring connection from LEDs to drivers and from drivers to supply mains

Fixture must have an operating ambient temperature range of at least -40ºC to +55ºC

Fixture must be successfully vibration tested in accordance with Section 33 of UL844

Fixture must be successfully impact tested in accordance with Section 68 of UL844

Overall dimensional height of fixture must not exceed 13.5”.

* + - * 1. Material and Finishes Requirements:

LED housing assembly and heat sink must be of extruded aluminum with low copper content for corrosion protection and heat dissipation; free of sharp edges and burrs

LED housing must be finished with epoxy powder coat finish for improved protection against corrosion.

The following lens material options must be available with light fixture: Heat and impact resistant glass; Heat- and UV-stabilized polycarbonate.

Diffused glass and diffused polycarbonate lens options must be available for applications requiring low glare

Fixture must utilize silicone gaskets between driver and LED housing, as well as the lens cover and LED board for NEMA 4X and/or IP66 ingress protection against dust and water

Fixtures must not contain mercury or any other hazardous chemicals

All packaging material should be capable of withstanding vibration and shock test.

* + 1. Vaporgard™ V2L/V3L Hazardous Area LED Lowbay/Targeted Light Fixtures

Crouse-Hinds series Vaporgard V2L/V3L LED light fixtures are designed for targeted illumination in Class I, Division 2 and Class II, Division 1 hazardous areas. Suitable for lower mounting heights, confined spaces, tunnels or utility rooms.

Vaporgard LED is available in 1,700 and 3,300 lumen models. Using four high power, high brightness LED arrays, this fixture delivers similar light levels to a 50W HID or 150-200W incandescent.

* + - 1. Basis of Design – Preferred Manufacturer

The listing of manufacturers below does not imply acceptance of their products that do not meet the specified ratings, features, and functions. Manufacturers listed below are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the engineer prior to bid date.

* + - 1. Preferred Manufacturers: Subject to compliance with these specification requirements, **provide products by the following:**
         1. Eaton Crouse-Hinds series
         2. Engineer-approved equal
      2. Source Limitations: Obtain products from single manufacturer.
      3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following:
         1. NEC and CEC

Class I, Division 2, Groups A,B,C,D

Class II, Division 1, Groups F,G

Type 4X, IP66

Marine and Wet Location Rated

* + - * 1. UL Standards

UL844

UL1598 Luminaires

UL1598A Marine

* + - * 1. CSA Standard

CSA C22.2 No. 137

* + - * 1. IEC and ATEX Certified
      1. Standard features:
         1. Electrical Requirements:

Nominal Operating Voltage: Standard input driver voltage of 100-277 VAC, 50/60 Hz.

DC input of 10-30 VDC in addition to above mentioned 120-277 VAC input must be available on a single driver.

Nominal Luminaire Operating Power Rating: [10 to 30 W] <Insert basis-of-design product's rated wattage>.

CRI: [70+]

Drivers will have built-in 0-10V dimming capability

Power factor >0.90 and THD < 20%

System efficacy: Minimum 110 lumens per watt (LPW) for standard glass lens

* + - * 1. Design and Performance Requirements:

Output intensity: Not less than [3000 lm] [5000 lm] <Insert lumens>

Fixtures must have L10 reliability and rated life of 60,000 hours minimum for continuous operation at 55°C operating ambient temperature

Fixture housing must be designed with heat fins to ensure proper air flow and facilitate dust shedding for effective heat dissipation

Enclosure Ingress Protection: UL 50E Type 4X or IEC 60529 IP66

Ballast or driver location: Internal and isolated from the primary heat source (LED engine) to maximize economic life.

Fixture must have serviceable and field-replaceable drivers and LED engines without removing fixture from its installation

LED fixtures must have correlated color temperature (CCT) of 5000K (cool white) with options for 4000K (neutral white) and 3000K (warm white).

Fixture must have a minimum CRI of 70 @ 5000K and L70 >= 60,000 @ 55ºC.

Mounting hardware: [Pendant-mounted ] [Wall-mounted] [Ceiling-mounted] [Stanchion-mounted] <Insert desired mounting hardware>.

Fixture must utilize lever-lock connectors for wiring connection from LEDs to drivers and from drivers to supply mains

Fixture must have an operating ambient temperature range of at least [-30ºC to +40ºC (V3L models)] [-30ºC to +55ºC (V2L models)]

Fixture must be successfully vibration tested in accordance with Section 33 of UL844

Fixture must be successfully impact tested in accordance with Section 68 of UL844

Overall dimensional height of fixture with wall, pendant, or ceiling module must not exceed 5.75”; Overall height of fixture with stanchion module must not exceed 8.25”.

* + - * 1. Material and Finishes Requirements:

LED housing assembly and heat sink must be of extruded aluminum with low copper content for corrosion protection and heat dissipation; free of sharp edges and burrs

LED housing must be finished with epoxy powder coat finish for improved protection against corrosion.

The following lens material options must be available with light fixture: Heat and impact resistant glass.

Diffused glass lens option must be available for applications requiring low glare.

Retain #5 for food processing and sanitation applications and other areas where debris could contaminate products or equipment.

Teflon coated glass lens option must be available for applications requiring the prevention of the spread of glass shards in the event of a broken lens

Fixture must utilize silicone gaskets between driver and LED housing, as well as the lens cover and LED board for NEMA 4X and/or IP66 ingress protection against dust and water

Fixtures must not contain mercury or any other hazardous chemicals

All packaging material should be capable of withstanding vibration and shock test.

* 1. **EMERGENCY LIGHTING**

This product type covers emergency lighting systems and light fixtures designed with self-contained battery system for emergency lighting applications.

Retain “Basis of Design” and “Preferred Manufactures” subparagraphs and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers

* + 1. Champ VMVL LED Hazardous Area Highbay/Midbay Light Fixtures with Integral Emergency Back-up

In the event of power loss or power interruption, Crouse-Hinds series Champ VMVL LEDs with battery back-up provide 90 minutes of emergency lighting.

* + - 1. Basis of Design – Preferred Manufacturer

The listing of manufacturers below does not imply acceptance of their products that do not meet the specified ratings, features, and functions. Manufacturers listed below are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the engineer prior to bid date.

* + - 1. Preferred Manufacturers: Subject to compliance with these specification requirements, provide products by the following:
         1. Eaton Crouse-Hinds series
         2. Engineer-approved equal
      2. Source Limitations: Obtain products from single manufacturer.
      3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following:
         1. NEC and CEC

Class I, Division 2, Groups A,B,C,D

Class II, Division 1, Groups E,F,G

Class III, Simultaneous Presence

Type 4X, IP66

Wet Location Rated

* + - * 1. UL Standards

UL844

UL1598 Luminaires

UL1598A Marine

UL924

* + - * 1. CSA Standard

CSA C22.2 No. 137

* + - 1. Standard features:
         1. Electrical Requirements:

Nominal Operating Voltage: Standard input driver voltage of 100-277 VAC, 50/60 Hz.

Nominal Luminaire Operating Power Rating: [30 to 60 W] [70 to 110 W] <Insert basis-of-design product's rated wattage>.

CRI: [80+] [90+].

Drivers will have built-in 0-10V dimming capability; Fixture should be dimmable from 0-100%.

External surge protection option for up to 4kV must be provided as a component within the complete luminaire.

Power factor >0.90 and THD <20%.

System efficacy: Minimum 100 lumens per watt (LPW) for 5000K CCT fixture with clear glass lens.

* + - * 1. Design and Performance Requirements:

Fixture must be designed with integral battery that provides 90 minutes of emergency lighting in the event of a power loss

Output intensity: Not less than [3000 lm] [5000 lm] [10,000 lm] <Insert lumens>.

Fixtures must have L10 reliability and rated life of 60,000 hours minimum for continuous operation at 55°C operating ambient temperature.

Fixture housing must be designed with heat fins to ensure proper air flow and facilitate dust shedding for effective heat dissipation.

Enclosure Ingress Protection: UL 50E Type 4X or IEC 60529 IP66.

Ballast or driver location: Internal and isolated from the primary heat source (LED engine) to maximize economic life.

Fixture must have serviceable and field-replaceable drivers and LED engines without removing fixture from its installation.

LED fixtures must have correlated color temperature (CCT) of 5000K (cool white) with options for 4000K (neutral white), and 3000K (warm white).

Fixture must have a minimum CRI of 70 @ 5000K and L70 >= 60,000 @ 55ºC.

Fixtures must have options that generate [Type I, III, and V] [wide, medium, narrow] light distribution patterns.

Optics must have ability to be clocked and preset to various positions from factory to accommodate alignment with conduit wiring entries to the fixture top hat

The following mounting modules must be available with light fixture: Ceiling-mount; Pendant-mount; Wall-mount; Stanchion-mount; Cone-mount for dust shedding <Insert desired mounting hardware>.

Fixture must utilize lever-lock connectors for wiring connection from LEDs to drivers and from drivers to terminal block and supply mains.

Fixture must have an operating ambient temperature range of at least -40ºC to +55ºC.

Fixture must be successfully vibration tested in accordance with Section 33 of UL844.

Fixture must be successfully impact tested in accordance with Section 68 of UL844.

Overall dimensional height of fixture without mounting modules must not exceed 14.0”.

* + - * 1. Material and Finishes Requirements:

LED housing assembly and heat sink must be of extruded aluminum with low copper content for corrosion protection and heat dissipation; free of sharp edges and burrs.

LED housing must be finished with epoxy powder coat finish for improved protection against corrosion.

The following lens material options must be available with light fixture: Heat and impact resistant glass; Heat- and UV-stabilized polycarbonate.

Diffused glass lens option must be available for applications requiring low glare.

Fixture must utilize silicone gaskets between driver and LED housing, as well as the lens cover and LED board for NEMA 4X and/or IP66 ingress protection against dust and water.

Fixtures must not contain mercury or any other hazardous chemicals.

All electronics shall either be encapsulated, potted or conformal coated with suitable material as a means of protection against humidity and corrosion.

All packaging material should be capable of withstanding vibration and shock test.

* + 1. Hazard-Gard™ XPLA Explosionproof LED Linear Light Fixtures with Integral Emergency Back-up

In the event of power loss or power interruption, Crouse-Hinds series Hazard-Gard XPLA linear LEDs with battery back-up provide 90 minutes of emergency lighting.

* + - 1. Basis of Design – Preferred Manufacturer

The listing of manufacturers below does not imply acceptance of their products that do not meet the specified ratings, features, and functions. Manufacturers listed below are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the engineer prior to bid date.

* + - 1. Preferred Manufacturers: Subject to compliance with these specification requirements, provide products by the following:
         1. Eaton Crouse-Hinds series
         2. Engineer-approved equal
      2. Source Limitations: Obtain products from single manufacturer.
      3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following:
         1. NEC and CEC

Class I, Division 1, Groups C,D

Class II, Division 1, Groups E,F,G

Class III, Simultaneous Presence

Type 4X, IP66

Wet Location Rated

* + - * 1. UL Standards

UL50E

UL844

UL924

UL1598 Luminaires

UL1598A Marine

UL8750

* + - * 1. CSA Standard

CSA C22.2 No. 137, 250

* + - 1. Standard features:
         1. Electrical Requirements:

Nominal Operating Voltage: Standard input driver voltage of 100-277 VAC, 50/60 Hz with optional drivers having 347-480 VAC.

Nominal Luminaire Operating Power Rating: [25 to 60 W] <Insert basis-of-design product's rated wattage>.

CRI: [70+ @5000K] [80+ @3000K].

Drivers will have built-in 0-10V dimming capability; Fixture should be dimmable from 0-100%.

External surge protection option for up to 6kV must be provided as a component within the complete luminaire.

Power factor >0.90 and THD < 15%.

System efficacy: Minimum 130 lumens per watt (LPW) for 5000K CCT fixture with clear glass lens.

* + - * 1. Design and Performance Requirements:

Fixture must be designed with integral battery that provides 90 minutes of emergency lighting in the event of a power loss

Output intensity: Not less than [5000 lm] [7,500 lm] <Insert lumens>.

Fixtures must have L10 reliability and rated life of 60,000 hours minimum for continuous operation at 55°C operating ambient temperature.

Fixture housing must be designed with heat fins to ensure proper air flow and facilitate dust shedding for effective heat dissipation.

Enclosure Ingress Protection: UL 50E Type 4X or IEC 60529 IP66.

Fixture must be high pressure hose tested at 3 gallons per minute, 2000 psi@ 5ft distance with a 1/16” nozzle for 30 minutes to prevent ingress due to high pressure hosing.

Thermal pad must be utilized instead of thermal grease for heat dissipation from PCB board.

Ballast or driver location: Internal and isolated from the primary heat source (LED engine) to maximize economic life.

Fixture design must have serviceable drivers accessible from the bottom of fixture and field replaceable without removing the fixture from a ceiling or wall mount installation.

The power supply or driver must be located in line with LED boards and not on top of them to maximize thermal dissipation and maintain lower driver baseplate temperatures

LED fixtures must have correlated color temperature (CCT) of 5000K (cool white) with options for 4000K (neutral white), 3000K (warm white).

Fixture must have a minimum CRI of 70 @ 5000K and L70 >= 60,000 @ 55ºC.

The fixture shall have standard wide (120 degree) optic.

The fixture must have 4 points of secondary retention integrated into the fixture for attaching safety cables.

Fixture must have a back flange with sliding ceiling, swivel and flush mount bracket options to adjust the distance between two brackets and allow for flexible installation; Fixture should also have pole mount options.

Fixture must utilize lever-lock connectors for wiring connection from LEDs to drivers and from drivers to supply mains.

Fixture must have an operating ambient temperature range of at least -25ºC to +55ºC.

Fixture must have a T5 temperature rating at 55ºC for Class I, Division 1 environments.

Fixture must be successfully vibration tested in accordance with Section 33 of UL844.

Fixture must be successfully impact tested in accordance with Section 68 of UL844.

Overall dimensional height of fixture without mounting brackets must not exceed 4.8” and with mounting brackets must not exceed 8”.

* + - * 1. Material and Finishes Requirements:

LED housing assembly and heat sink must be of extruded aluminum with low copper content for corrosion protection and heat dissipation; free of sharp edges and burrs.

LED housing must be available with epoxy powder coat finish for improved protection against corrosion.

The following lens material options must be available with light fixture: heat and impact resistant glass

Diffused glass lens option must be available for applications requiring low glare.

Fixture must utilize gaskets between driver and LED housing, as well as the lens cover and LED board for NEMA 4X and/or IP66 ingress protection against dust and water.

Fixtures must not contain mercury or any other hazardous chemicals.

All electronics shall either be encapsulated, potted or conformal coated with suitable material as a means of protection against humidity and corrosion.

All packaging material should be capable of withstanding vibration and shock test.

* + 1. Champ™ MLLA Hazardous Area LED Linear Light Fixtures with Integral Emergency Back-up

In the event of power loss or power interruption, Crouse-Hinds series Champ MLLA LEDs with battery back-up provide 90 minutes of emergency lighting.

* + - 1. Basis of Design – Preferred Manufacturer

The listing of manufacturers below does not imply acceptance of their products that do not meet the specified ratings, features, and functions. Manufacturers listed below are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the engineer prior to bid date.

* + - 1. Preferred Manufacturers: Subject to compliance with these specification requirements, provide products by the following:
         1. Eaton Crouse-Hinds series
         2. Engineer-approved equal
      2. Source Limitations: Obtain products from single manufacturer.
      3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following:
         1. NEC and CEC

Class I, Division 2, Groups A,B,C,D

Class II, Division 1, Groups E,F,G

Class III, Simultaneous Presence

Type 4X, IP66

Marine and Wet Location Rated

* + - * 1. UL Standards

UL844

UL924

UL1598 Luminaires

UL1598A Marine

UL8750

* + - * 1. CSA Standard

CSA C22.2 No. 137, 141, 250

* + - 1. Standard features:
         1. Electrical Requirements:

Fixture must be designed with integral battery that provides 90 minutes of emergency lighting in the event of a power loss.

Nominal Operating Voltage: Standard input driver voltage of 100-277 VAC, 50/60 Hz with optional drivers having 347-480 VAC.

Nominal Luminaire Operating Power Rating: [25 to 60 W] <Insert basis-of-design product's rated wattage>.

CRI: [70+ @5000K] [80+ @3000K].

DC input of 127/250 in addition to above mentioned 120-277 VAC input must be available on a single driver.

Drivers will have built-in 0-10V dimming capability and be capable of being wired to an external occupancy sensing/dimming device using two dimming leads; Fixture should be dimmable from 0-100%.

External surge protection option for up to 10kV must be provided as a component within the complete luminaire.

Power factor >0.90 and THD < 15%.

System efficacy: Minimum 130 lumens per watt (LPW) for 5000K CCT fixture with clear glass lens.

* + - * 1. Design and Performance Requirements:

Output intensity: Not less than [5000 lm] [7,500 lm] <Insert lumens>.

Fixtures must have L10 reliability and rated life of 60,000 hours minimum for continuous operation at 55°C operating ambient temperature.

Fixture housing must be designed with heat fins to ensure proper air flow and facilitate dust shedding for effective heat dissipation.

Enclosure Ingress Protection: UL 50E Type 4X or IEC 60529 IP66.

Fixture must be high pressure hose tested at 3 gallons per minute, 2000 psi@ 5ft distance with a 1/16” nozzle for 30 minutes to prevent ingress due to high pressure hosing.

Thermal pad must be utilized instead of thermal grease for heat dissipation from PCB board.

Ballast or driver location: Internal and isolated from the primary heat source (LED engine) to maximize economic life.

Fixture design must have serviceable drivers accessible from the bottom of fixture and field replaceable without removing the fixture from a ceiling or wall mount installation.

The power supply or driver shall be located on the driver housing to limit the heating effect from the LEDs to maintain lower driver control point temperatures.

LED fixtures must have correlated color temperature (CCT) of 5000K (cool white) with options for 4000K (neutral white), 3000K (warm white).

Fixture must have a minimum CRI of 80 @ 5000K, 4000K and 3000K and L70 >= 60,000 @ 55ºC.

The fixture shall be available with a standard wide (120 degree) optic

Retain #13 for high mast derrick applications where light is installed in a vertical mount position

The fixture shall be available with a full cut-off beam that reduces spillage and light loss for targeted illumination.

The fixture must have 4 points of secondary retention integrated into the fixture for attaching safety cables; Safety chains with locking carabineers must be available for secondary retention

Fixture must have ceiling/swivel, wall, flush, pole and pendant mounting options for flexible installation.

Fixture must utilize lever-lock connectors for wiring connection from LEDs to drivers and from drivers to supply mains.

Fixture must have an operating ambient temperature range of at least -40ºC to +65ºC.

Fixture must have a T5 temperature rating at 55ºC for Class I, Division 2 environments.

Fixture must be successfully vibration tested in accordance with Section 33 of UL844.

Fixture must be successfully impact tested in accordance with Section 68 of UL844.

Overall dimensional height of fixture without mounting brackets must not exceed 4.5” and with mounting brackets must not exceed 8”.

* + - * 1. Material and Finishes Requirements:

LED housing assembly and heat sink must be of extruded aluminum with low copper content for corrosion protection and heat dissipation; free of sharp edges and burrs.

LED housing must be available with epoxy powder coat finish for improved protection against corrosion.

The following lens material options must be available with light fixture: heat and impact resistant glass; UV-treated domed polycarbonate

Diffused lens for glass and polycarbonate options must be available for applications requiring low glare.

Fixture must utilize silicone type gaskets between driver and LED housing, as well as the lens cover and LED board for NEMA 4X and/or IP66 ingress protection against dust and water.

Fixtures must not contain mercury or any other hazardous chemicals.

All electronics shall either be encapsulated, potted or conformal coated with suitable material as a means of protection against humidity and corrosion.

All packaging material should be capable of withstanding vibration and shock test.

* + 1. ELPSM2 Light-Pak Explosionproof LED Emergency Lighting System

Crouse-Hinds series ELPSM2 emergency lighting systems are certified for use in Class I, Division 1 and Class II, Division 1 locations to provide safe, reliable illumination for egress areas during failure or interruption of power to the normal lighting system.

* + - 1. Basis of Design – Preferred Manufacturer

The listing of manufacturers below does not imply acceptance of their products that do not meet the specified ratings, features, and functions. Manufacturers listed below are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the engineer prior to bid date.

* + - 1. Preferred Manufacturers: Subject to compliance with these specification requirements, provide products by the following:
         1. Eaton Crouse-Hinds series
         2. Engineer-approved equal
      2. Source Limitations: Obtain products from single manufacturer.
      3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following:
         1. NEC and CEC

Class I, Division 1, Groups B,C,D

Class II, Division 1, Groups E,F,G

Type 3R

* + - * 1. UL Standards

UL50E

UL844

UL924

UL1203

UL1598 Luminaires

UL8750

* + - * 1. CSA Standard

CSA C22.2 No. 137, 141-10

* + - 1. Standard features:
         1. Electrical Requirements:

Nominal Operating Voltage – Power Supply: Standard input driver voltage of 100-277 VAC, 50/60 Hz.

Nominal Operating Voltage – LED heads: 12 VDC

Nominal Luminaire Operating Power Rating: 4W

* + - * 1. Design and Performance Requirements:

Battery type: Nickel cadmium (Ni-Cd)

Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.

Status and Test Indication: Visible and accessible without opening luminaire

Retain "Integral Self-Test" Subparagraph below to eliminate necessity to manually perform periodic test required by codes for emergency equipment. Verify requirements of authorities having jurisdiction.

Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.

Manual Test: Fixture shall include an external push button to manually test emergency operation.

Light source: Two LED luminaires

Lighting system must have an operating ambient temperature range of at least   
-0ºC to +40ºC.

Lighting system must allow for LED lamp heads to be mounted directly to the enclosure or remotely mounted independently from enclosure

Maximum number of remote LED lamp heads: 2

Emergency Lighting System must include one integral [single sided] [double sided] exit sign (this option will remove 1 LED lamp head from the assembly)

* + - * 1. Material and Finishes Requirements:

Power supply enclosure and LED lamp heads must be of extruded aluminum with low copper content for corrosion protection and heat dissipation

Power supply enclosure and LED lamp heads must have epoxy powder coat finish for improved protection against corrosion.

Power supply enclosure must utilize gasket between cover and housing for NEMA 3R or better protection against dust and water.

* + 1. N2LPSM2 Light-Pak Hazardous Area LED Emergency Lighting System

Crouse-Hinds series N2LPSM2 emergency lighting systems are certified for use in Class I, Division 2 and Class II, Division 2 locations to provide safe, reliable illumination for egress areas during failure or interruption of power to the normal lighting system.

The N2LPSM2 is rated for NEMA 4X and Marine locations, making them ideal for applications where moisture, dirt, dust or corrosion will limit the life and reliability of ordinary emergency lighting systems.

* + - 1. Basis of Design – Preferred Manufacturer

The listing of manufacturers below does not imply acceptance of their products that do not meet the specified ratings, features, and functions. Manufacturers listed below are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the engineer prior to bid date.

* + - 1. Preferred Manufacturers: Subject to compliance with these specification requirements, provide products by the following:
         1. Eaton Crouse-Hinds series
         2. Engineer-approved equal
      2. Source Limitations: Obtain products from single manufacturer.
      3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following:
         1. NEC and CEC

Class I, Division 2, Groups B,C,D

Class I, Zone 2

Class II, Division 2, Groups F,G (does not apply to models with optional exit sign)

Type 4, 4X

Marine and Wet Locations rated

* + - * 1. UL Standards

UL844

UL924

UL1598A Luminaires

* + - * 1. CSA Standard

CSA C22.2 No. 137-M1981

CSA C22.2 No. 141-M1985

* + - 1. Standard features:
         1. Electrical Requirements:

Nominal Operating Voltage – Power Supply: Standard input driver voltage of 100-277 VAC, 50/60 Hz.

Nominal Operating Voltage – LED heads: 12 VDC

Nominal Luminaire Operating Power Rating: 6W

* + - * 1. Design and Performance Requirements:

Battery type: Nickel cadmium (Ni-Cd)

Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.

Status and Test Indication: Visible and accessible without opening luminaire

Retain "Integral Self-Test" Subparagraph below to eliminate necessity to manually perform periodic test required by codes for emergency equipment. Verify requirements of authorities having jurisdiction.

Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.

Manual Test: Fixture shall include an external push button to manually test emergency operation.

Light source: Two to six LED luminaires

Lighting system must have an operating ambient temperature range of at least   
-20ºC to +55ºC.

Lighting system must allow for LED lamp heads to be mounted directly to the enclosure or remotely mounted independent from enclosure

Maximum number of remote LED lamp heads: 6

Emergency Lighting System must allow for the inclusion of one integral [single sided] [double sided] exit sign.

Enclosure must allow for inclusion of a breather/drain that provides ventilation to minimize condensation and drains accumulated internal condensate.

* + - * 1. Material and Finishes Requirements:

Power supply enclosure must be of fiberglass-reinforced polyester for high degree of corrosion protection.

LED lamp heads must be of extruded aluminum with low copper content for corrosion protection and heat dissipation.

LED lamp heads must have epoxy powder coat finish for improved protection against corrosion.

Power supply enclosure must utilize gasket between cover and housing to ensure NEMA 4X protection against dust and water.

* 1. **EXIT LIGHTING**
     1. UX LED Hazardous Area Exit Signs

Eaton’s Crouse-Hinds series UX LED exit signs are designed specifically for marking escape routes and exits in Class I, Division 2 hazardous area and harsh environments.

The UX is NEMA4X / IP66 rated and approved for temperatures from -30°C to 50°C. A self-powered version comes standard with a nickel cadmium battery and self-diagnostics.

* + - 1. Basis of Design – Preferred Manufacturer

The listing of manufacturers below does not imply acceptance of their products that do not meet the specified ratings, features, and functions. Manufacturers listed below are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the engineer prior to bid date.

* + - 1. Preferred Manufacturers: Subject to compliance with these specification requirements, provide products by the following:
         1. Eaton Crouse-Hinds series
         2. Engineer-approved equal
      2. Source Limitations: Obtain products from single manufacturer.
      3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following:
         1. NEC and CEC

Class I, Division 2, Groups A,B,C,D

Type 4X, IP66

Wet Locations rated

NSF Splash Zone

* + - * 1. UL Standards

UL50

UL844

UL924

UL1598A Luminaires

* + - 1. Standard features:
         1. Electrical Requirements:

Nominal Operating Voltage: Standard input voltage of 100-277 VAC, 50/60 Hz.

Nominal Operating Power Rating: <2W

* + - * 1. Design and Performance Requirements:

Exit sign must be available with integral battery option for providing power/illumination in the event of a temporary power loss

Battery type: Nickel cadmium (Ni-Cd)

Retain next subparagraph for exit signs with self-powered integral battery

Exit sign must perform automatic self-diagnostic tests required by UL924 and NFPA101

Exit sign shall be field-configurable for red or green letters and directional chevrons

Mounting: [Surface] [Pendant]

Exit sign must have an operating ambient temperature range of at least   
-30ºC to +50ºC.

* + - * 1. Material and Finishes Requirements:

Housing construction: Die cast aluminum

Housing color: [Silver] [Black] [White] <Insert Color>

Lens: Impact- and Corrosion-resistant Polycarbonate

Hardware: Stainless steel

* + 1. Ex-Lite LED Hazardous Area Exit Signs

Crouse-Hinds series Ex-Lite exit signs are designed specifically for marking escape routes and exits in Class I, Division 2. Class I, Zone 1, and Class II, Division 2 hazardous areas.

The Ex-Lite is IP66 rated and approved for temperatures from -20°C to 50°C. A self-powered version comes standard with a nickel cadmium battery and self-diagnostics.

* + - 1. Basis of Design – Preferred Manufacturer

The listing of manufacturers below does not imply acceptance of their products that do not meet the specified ratings, features, and functions. Manufacturers listed below are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the engineer prior to bid date.

* + - 1. Preferred Manufacturers: Subject to compliance with these specification requirements, provide products by the following:
         1. Eaton Crouse-Hinds series
         2. Engineer-approved equal
      2. Source Limitations: Obtain products from single manufacturer.
      3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following:
         1. NEC and CEC

Class I, Division 2, Groups A,B,C,D

Class I, Zone 1, AEx em ib IIC (NEC); Class I, Zone 1, Ex em ib IIC (CEC)

Class II, Division 2, Groups F, G

IP66

* + - * 1. UL Standards

UL844

UL924

UL1203

* + - * 1. CSA Standards

CSA C22.2 No. 141-15

* + - 1. Standard features:
         1. Electrical Requirements:

Nominal Operating Voltage: Standard input voltage of 100-277 VAC, 50/60 Hz. and 110-250 VDC

* + - * 1. Design and Performance Requirements:

Exit sign must be available with integral battery option for providing power/illumination in the event of a temporary power loss

Battery type: Nickel cadmium (Ni-Cd)

Emergency lighting cycle: 3 hours

Retain next subparagraph for exit signs with self-powered integral battery

Exit sign must perform automatic self-monitoring and self-diagnostic tests required by UL924 and NFPA101

Exit sign shall be field-configurable for red text and directional chevrons.

Exit sign shall allow for conduit or cable entry to support NEC and IEC wiring methods.

Mounting: Wall/Surface

Exit sign must have an operating ambient temperature range of at least   
-30ºC to +50ºC.

* + - * 1. Material and Finishes Requirements:

Housing and lens cover construction: Die cast aluminum alloy

* + - * 1. Hardware: Stainless steel
  1. **luminaire fittings**
     1. Luminaire Fixture Hangers

Eaton has several Crouse-Hinds series fixture hanger families for the safe and reliable pendant suspension of its hazardous area LED lighting portfolio. Standard Features info applies to all families. Family-specific features are identified under “Other features”.

* + - 1. Basis of Design – Preferred Manufacturer:

The listing of manufacturers below does not imply acceptance of their products that do not meet the specified ratings, features, and functions.  Manufacturers listed below are not relieved from meeting these specifications in their entirety.  Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the engineer prior to bid date.

* + - 1. Preferred Manufacturers: Subject to compliance with these specification requirements, provide products by the following:
         1. Eaton Crouse-Hinds series
         2. Engineer-approved equal
      2. Source Limitations: Obtain products from single manufacturer.
      3. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following:
         1. NEC and CEC

[Class I, Division 1, Groups A,B,C,D] [Class I, Division 1, Groups C,D] [Class I, Division 2, Groups A,B,C,D]

[Class II, Division 1, Groups E,F,G] [Class II, Division 2, Groups F,G]

Class III

* + - * 1. UL Standards

UL1203

* + - * 1. CSA Standards

CSA C22.2 No. 30

* + - 1. Standard features:
         1. Sized and rated for luminaire weight.
         2. Capable of maintaining luminaire position after cleaning and relamping.
         3. Capable of supporting luminaire without causing deflection of ceiling or wall.
         4. Conduit hub size: [1/2”] [3/4”] [1”]
      2. Other features required by project:
         1. Environmental Ratings:

NEMA 3, 3R (specific to AHG series)

Wet locations (specific to AHG series)

* + - * 1. Fixture hanger shall also function as a conduit outlet box (specific to the following series: AL, EAHC/EFHC, EFH)
        2. Standard hangers for rigid conduit stems longer than 12” (EAHC/EFHC):

Luminaire weight limit: 125lbs

* + - * 1. Flexible ball and cushion hangers (AL, AHG, UNJ/UNJC, ARB, EFH series):

Shall permit luminaire to swing through an angle of [8º] [11º] [15º] [20°] <insert required angle degree] in any direction from the perpendicular

Luminaire weight limit: Cushion Type: [30lbs] [48 lbs] [65 lbs]; Ball Type: [60 lbs] [125 lbs]

* + - * 1. Flexible hook and loop hangers (UNE, UNH, UNHC):

Shall permit free swing in any direction to prevent damage to luminaire and conduit stem

Shall provide openings for passage of wires

Luminaire weight limit: Standard hook: 125lbs; Cushion type hook: 64 lbs

* + - * 1. Adjustable hangers (UNR):

Shall permit luminaire to be adjusted within the range of 0 to 90 degrees of its outlet box, enabling pendant type luminaires to illuminate vertical surfaces, or hang plumb when supporting outlet box is not horizontal.

Luminaire weight limit: 125lbs

**PART 3 EXECUTION**

* 1. **EXAMINATION**
     1. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
     2. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.
     3. Proceed with installation only after unsatisfactory conditions have been corrected.
  2. **INSTALLATION OF LIGHTING**
     1. Comply with manufacturer's published instructions.
     2. Reference Standards for Installation: Unless more stringent installation requirements are specified in Contract Documents or manufacturers' published instructions, comply with the following:
        1. Electrical Construction: ICC IBC, ICC IFC, NFPA 1, NFPA 70, and NECA NEIS 1.
        2. Grounding and Bonding: NECA NEIS 331 and Article 250 of NFPA 70.
        3. Work in Confined Spaces: NFPA 350.
        4. Work in Basements and Other Developed Subterranean Spaces: NFPA 520.
        5. Installation of Indoor Lighting Systems: NECA NEIS 500.
        6. Installation of Exterior Lighting Systems: NECA NEIS 501.
        7. Installation of Industrial Lighting Systems: NECA NEIS 502.
        8. Installation of Luminaires, Lampholders, and Lamps: Article 410 of NFPA 70.
        9. Installation of Extra-Low-Voltage Lighting: Article 411 of NFPA 70.
        10. Installation of Emergency Lighting and Exit Signs: ICC IBC, NFPA 101, and Parts IV and V in Article 700 of NFPA 70.
        11. Consult Architect for resolution of conflicting requirements.
     3. Special Installation Techniques:
        1. Install luminaires level, plumb, and square with finished floor or grade unless otherwise indicated.
        2. Install luminaires at height and aiming angle as indicated on the Drawings.
        3. Coordinate layout and installation of luminaires with other construction.
        4. Wall-Mounted Luminaire Support: [Attached to structural members in walls][Attached to a minimum 1/8 inch backing plate attached to wall structural members][Attached using through bolts and backing plates on either side of wall]<Insert means of attachment>.
           1. Do not attach luminaires directly to gypsum board.
        5. Suspended Luminaire Support:
           1. Ceiling Mount

Retain one or more of first three subparagraphs below for luminaires suspended from a ceiling. If retaining more than one subparagraph, indicate on Lighting Fixture Schedule on the Drawings.

Hook hangers.

[Two] <Insert number> wires.

[Two] [Four] <Insert number> aircraft cables.

* + - * 1. Pendants and Rods: Where longer than 48 inch, brace to limit swinging.
        2. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
        3. Continuous Rows of Luminaires: Provide tubing or stem for wiring at one point and [tubing or rod][wire support] for suspension for each unit length of luminaire chassis, including one at each end.
        4. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.
  1. **FIELD QUALITY CONTROL OF LIGHTING**
     1. Tests and Inspections:
        1. Perform manufacturer's recommended tests and inspections.

Coordinate "Operational Test" Subparagraph below with requirements in Section 260923 "Lighting Control Devices."

* + - 1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
      2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
      3. Verify operation of photoelectric controls.
      4. Exterior Illumination Tests:
         1. Measure light intensities at night. Use photometers with calibration referenced to NIST standards.
  1. **PROTECTION**
     1. After installation, protect lighting equipment from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION 26 54 19