SECTION 265119 - LED INTERIOR LIGHTING

Revise this Section by deleting and inserting text to meet Project-specific requirements.

This Section uses the term "Architect." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

Luminaires are usually scheduled on Drawings. To coordinate this Section with a Drawing schedule, see the "Luminaire Schedule" Article in the Evaluations.

See "Sustainable Design Considerations" Article in the Evaluations for a discussion of sustainable design requirements that may impact the editing of this Section.

1. GENERAL
   * + 1. RELATED DOCUMENTS

Retain or delete this article in all Sections of Project Manual.

* + - * 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
      1. SUMMARY
         1. Section Includes:

Cylinder.

Downlight.

Highbay, linear.

Highbay, nonlinear.

Linear industrial.

Lowbay.

Parking garage.

Recessed, linear.

Strip light.

Surface mount, linear.

Surface mount, nonlinear.

Suspended, linear.

Suspended, nonlinear.

Materials.

Luminaire support.

* + - 1. DEFINITIONS

Retain terms that remain after this Section has been edited for a project.

* + - * 1. CCT: Correlated color temperature.
        2. CRI: Color Rendering Index.
        3. Fixture: See "Luminaire."
        4. IP: International Protection or Ingress Protection Rating.
        5. LED: Light-emitting diode.
        6. Lumen: Measured output of lamp and luminaire, or both.
        7. Luminaire: Complete lighting unit, including lamp, reflector, and housing.
      1. SUBMITTALS
         1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
         2. Manufacturer’s installation instructions shall be provided along with product data.
         3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
         4. Product Data: For each type of product.

Arrange in order of luminaire designation.

Include data on features, accessories, and finishes.

Include physical description and dimensions of luminaires.

Include emergency lighting units, including batteries and chargers.

Include life, output (lumens, CCT, and CRI), and energy-efficiency data.

Photometric data and adjustment factors based on laboratory tests[**, complying with IES "Lighting Measurements Testing and Calculation Guides" for each luminaire type. The adjustment factors shall be for lamps and accessories identical to those indicated for the luminaire as applied in this Project**] [**IES LM-79**] [**and**] [**IES LM-80**].

Retain or "Manufacturers' Certified Data" or "Testing Agency Certified Data" subparagraph below. Retain first subparagraph if photometric data, based on testing by accredited manufacturers' laboratories, is considered adequate for luminaires in this Project. Retain second subparagraph if photometric data for one or more luminaires are based on independent laboratory tests; coordinate with the Interior Lighting Fixture Schedule on Drawings to indicate which units shall meet this requirement. See the Evaluations.

Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.

Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.

* + - * 1. Shop Drawings: For nonstandard or custom luminaires.

Include plans, elevations, sections, and mounting and attachment details.

Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

Include diagrams for power, signal, and control wiring.

Retain "Samples" paragraph for custom luminaires and single-stage samples. Retain "Samples for Initial Selection" and "Samples for Verification" paragraphs for two-stage Samples.

* + - * 1. Samples: For each luminaire and for each color and texture with standard factory-applied finish.
        2. Samples for Initial Selection: For each type of luminaire with custom factory-applied finishes.

Include Samples of luminaires and accessories involving color and finish selection.

* + - * 1. Samples for Verification: For each type of luminaire.

Include Samples of luminaires and accessories to verify finish selection.

* + - * 1. Product Schedule: For luminaires and lamps.[**Use same designations indicated on Drawings.**]
        2. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.

Retain "Coordination Drawings" paragraph below for situations where limited space necessitates maximum utilization for efficient installation of different components or if coordination is required for installation of products and materials by separate installers. Coordinate paragraph with other Sections specifying products listed below. Preparation of coordination drawings requires the participation of each trade involved in installations within the limited space.

* + - * 1. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

Luminaires.

Suspended ceiling components.

Partitions and millwork that penetrate the ceiling or extend to within 12 inches of the plane of the luminaires.

Structural members to which [**equipment**] [**and**] [**or**] luminaires will be attached.

Initial access modules for acoustical tile, including size and locations.

Items penetrating finished ceiling, including the following:

Other luminaires.

Air outlets and inlets.

Speakers.

Sprinklers.

Access panels.

Ceiling-mounted projectors.

<**Insert item**>.

Moldings.

<**Insert feature**>.

Coordinate "Qualification Data" paragraph below and as may be supplemented in "Quality Assurance" Article.

* + - * 1. Qualification Data: For testing laboratory providing photometric data for luminaires.

Retain "Seismic Qualification Data" paragraph below if required by seismic criteria applicable to Project. Coordinate with Section 260548.16 "Seismic Controls for Electrical Systems." See ASCE/SEI 7 for certification requirements for equipment and components.

* + - * 1. Seismic Qualification Data: For luminaires, accessories, and components, from manufacturer.

Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

* + - * 1. Product Certificates: For each type of luminaire.
        2. Product Test Reports: For each type of luminaire, for tests performed by [**manufacturer and witnessed by a qualified testing agency**] [**a qualified testing agency**].
        3. Sample warranty.
      1. CLOSEOUT SUBMITTALS
         1. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.

Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

* + - 1. MAINTENANCE MATERIAL SUBMITTALS
         1. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

Lamps: [**Ten for every 100**] <**Insert quantity**> of each type and rating installed. Furnish at least one of each type.

Diffusers and Lenses: [**One for every 100**] <**Insert quantity**> of each type and rating installed. Furnish at least one of each type.

Globes and Guards: [**One for every 20**] <**Insert quantity**> of each type and rating installed. Furnish at least one of each type.

* + - 1. QUALITY ASSURANCE
         1. Luminaire Photometric Data Testing Laboratory Qualifications:

Retain one of two subparagraphs below, or both, to specify qualifications for laboratories providing photometric data. Retain first subparagraph for testing laboratories that are associated with a luminaire manufacturer's production facility. Retain second subparagraph for testing laboratories that are independent of a luminaire manufacturer's production facility.

Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.

Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7, accredited under the NVLAP for Energy Efficient Lighting Products, and complying with the applicable IES testing standards.

Retain first paragraph or second paragraph below, or both, for luminaires with integral lamps.

* + - * 1. Provide luminaires from a single manufacturer for each luminaire type.
        2. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.
        3. Mockups: For interior luminaires in room or module mockups, complete with power and control connections.

Obtain Architect's approval of luminaires in mockups before starting installations.

Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

* + - 1. DELIVERY, STORAGE, AND HANDLING
         1. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.
      2. WARRANTY

When warranties longer than one year are required and would exceed the "one-year period for correction of Work," verify with Director’s Representative that warranties stated in this article are not less than remedies available to Owner under prevailing local laws.

* + - * 1. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

Verify available warranties and warranty periods.

* + - * 1. Warranty Period: [**Five**] <**Insert number**> year(s) from date of Substantial Completion.

1. PRODUCTS

Manufacturers and products listed in SpecAgent and MasterWorks Paragraph Builder are neither recommended nor endorsed by the AIA or Deltek. Before inserting names, verify that manufacturers and products listed there comply with requirements retained or revised in descriptions and are both available and suitable for the intended applications.

Terminology used to describe products complies with NEMA LE 6 product classifications. These classifications were current at the time this Specification was updated, but may not be inclusive of products required for the Project. For additional products, add new articles, describe characteristics not already included in the specification, and choose the appropriate manufacturer listing.

* + - 1. PERFORMANCE REQUIREMENTS
         1. Seismic Performance:

Retain one of first two subparagraphs below with "Seismic Qualification Data" paragraph in "Informational Submittals" Article for projects requiring seismic design. Delete both subparagraphs if performance requirements are indicated on Drawings. Model building codes and ASCE/SEI 7 establish criteria for buildings subject to earthquake motions. Coordinate requirements with structural engineer.

Luminaires shall withstand the effects of earthquake motions determined in accordance with [**ASCE/SEI 7**] <**Insert requirement**>.

Luminaires and lamps shall be labeled vibration and shock resistant.

Retain subparagraph below to define the term "withstand" as it applies to this Project. Definition varies with type of building and occupancy and is critical to valid certification. Option is used for essential facilities where equipment must operate during and immediately after an earthquake.

The term "withstand" means "the luminaire will remain in place without separation of any parts when subjected to the seismic forces specified[**and the luminaire will be fully operational during and after the seismic event**]."

* + - * 1. Ambient Temperature: [**41 to 104 deg F**] [**5 to 104 deg F**].

Delete "Relative Humidity" subparagraph below for outdoor units.

Relative Humidity: Zero to 95 percent.

* + - * 1. Altitude: Sea level to [**1000 feet**] <**Insert altitude**>.
      1. LUMINAIRE REQUIREMENTS
         1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
         2. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

Label shall include the following lamp characteristics:

"USE ONLY" and include specific lamp type.

Lamp diameter, shape, size, wattage, and coating.

CCT and CRI.

* + - * 1. Recessed luminaires shall comply with NEMA LE 4.

Retain "NRTL Compliance" and "FM Global Compliance" paragraphs below for hazardous location lighting.

* + - * 1. NRTL Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by an NRTL.
        2. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.
        3. California Title 24 compliant.
      1. CYLINDER <**Insert drawing designation**>.

Retain this article for exposed, wall-mounted luminaires, used for direct or indirect lighting.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=11301) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Cooper Lighting Solutions; Signify North America Corp](http://www.specagent.com/Lookup?uid=123457164881).

[Focal Point](http://www.specagent.com/Lookup?uid=123457164893).

[Lithonia Lighting; Acuity Brands Lighting, Inc](http://www.specagent.com/Lookup?uid=123457164880).

Or equal.

* + - * 1. Nominal Operating Voltage: [**120 V ac**] [**240 V ac**] [**277 V ac**] [**12 V dc**] [**24 V dc**].
        2. Lamp:

Minimum [**250**] [**575**] [**1000**] <**Insert number**> lm.

Minimum allowable efficacy of [**80**] <**Insert number**> lm/W.

CRI of [**minimum**] [**65**] [**70**] [**80**] <**Insert number**>. CCT of [**2700 K**] [**3000 K**] [**4100 K**] <**Insert value**>.

Rated lamp life of [**35,000**] [**50,000**] <**Insert number**> hours to L70.

Dimmable from 100 percent to zero percent of maximum light output.

Internal driver.

User-Replaceable Lamps:

Bulb shape complying with ANSI C78.79.

Lamp base complying with [**ANSI C81.61**] [**or**] [**IEC 60061-1**].

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Housings:

[**Extruded-aluminum**] <**Insert option**> housing and heat sink.

[**Clear**] <**Insert color**> [**anodized**] [**powder-coat**] [**painted**] finish.

* + - * 1. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
        2. Diffusers and Globes:

[**Tempered Fresnel glass**] [**Prismatic glass**] [**Diffuse glass**] [**Clear glass**] [**Prismatic acrylic**] [**Clear, UV-stabilized acrylic**] <**Insert material**>.

Retain "Acrylic Diffusers" subparagraph below if fifth or sixth option in "Diffusers and Globes" paragraph above is retained.

Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

Retain "Glass" subparagraph below if first, second, third, or fourth option in "Diffusers and Globes" paragraph above is retained.

Glass: Annealed crystal glass unless otherwise indicated.

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. With integral mounting provisions.
        2. Standards:

ENERGY STAR certified.

RoHS compliant.

UL Listing: Listed for damp location.

* + - 1. DOWNLIGHT <**Insert drawing designation**>.

Retain this article for luminaires that have the entire housing and mounting apparatus installed flush with a finished (not drop-in ceiling tiles) ceiling.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=11302) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Cooper Lighting Solutions; Signify North America Corp](http://www.specagent.com/Lookup?uid=123457164986).

[Focal Point LLC](http://www.specagent.com/Lookup?uid=123457164990).

[Lithonia Lighting; Acuity Brands Lighting, Inc](http://www.specagent.com/Lookup?uid=123457164982).

Or equal.

* + - * 1. Nominal Operating Voltage: [**120 V ac**] [**240 V ac**] [**277 V ac**] [**12 V dc**] [**24 V dc**].
        2. Lamp:

Minimum [**250**] [**575**] [**1000**] <**Insert number**> lm.

Minimum allowable efficacy of [**80**] <**Insert number**> lm/W.

CRI of [**minimum**] [**65**] [**70**] [**80**] <**Insert number**>. CCT of [**2700 K**] [**3000 K**] [**4100 K**] <**Insert value**>.

Rated lamp life of [**35,000**] [**50,000**] <**Insert number**> hours to L70.

Dimmable from 100 percent to zero percent of maximum light output.

Internal driver.

User-Replaceable Lamps:

Bulb shape complying with ANSI C78.79.

Lamp base complying with [**ANSI C81.61**] [**or**] [**IEC 60061-1**].

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Housings:

[**Extruded-aluminum**] <**Insert option**> housing and heat sink.

[**Clear**] <**Insert color**> [**anodized**] [**powder-coat**] [**painted**] finish.

Universal mounting bracket.

Integral junction box with conduit fittings.

* + - * 1. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
        2. Diffusers and Globes:

[**Fixed**] [**Adjustable**] lens.

[**Spot**] [**Medium**] [**Wide**] light distribution.

[**Tempered Fresnel glass**] [**Prismatic glass**] [**Diffuse glass**] [**Clear glass**] [**Prismatic acrylic**] [**Clear, UV-stabilized acrylic**] <**Insert material**>.

Retain "Acrylic Diffusers" subparagraph below if fifth or sixth option in "Diffusers and Globes" paragraph above is retained.

Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

Retain "Glass" subparagraph below if first, second, third, or fourth option in "Diffusers and Globes" paragraph above is retained.

Glass: Annealed crystal glass unless otherwise indicated.

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Standards:

ENERGY STAR certified.

RoHS compliant.

UL Listing: Listed for damp location.

Recessed luminaires shall comply with NEMA LE 4.

* + - 1. HIGHBAY, LINEAR <**Insert drawing designation**>.

Retain this article for linear luminaires installed in locations where floor-to-ceiling height is more than 20 feet in commercial or industrial applications that do not require a rated luminaire.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=11303) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Cooper Lighting Solutions; Signify North America Corp](http://www.specagent.com/Lookup?uid=123457165006).

Lithonia Lighting; Acuity Brands Lighting, Inc.

[RAB Lighting](http://www.specagent.com/Lookup?uid=123457165012).

Or equal.

* + - * 1. Nominal Operating Voltage: [**120 V ac**] [**240 V ac**] [**277 V ac**] [**12 V dc**] [**24 V dc**].
        2. Lamp:

Minimum [**250**] [**575**] [**1000**] <**Insert number**> lm.

Minimum allowable efficacy of [**80**] <**Insert number**> lm/W.

CRI of [**minimum**] [**65**] [**70**] [**80**] <**Insert number**>. CCT of [**2700 K**] [**3000 K**] [**4100 K**] <**Insert value**>.

Rated lamp life of [**35,000**] [**50,000**] <**Insert number**> hours to L70.

Dimmable from 100 percent to zero percent of maximum light output.

Internal driver.

User-Replaceable Lamps:

Bulb shape complying with ANSI C78.79.

Lamp base complying with [**ANSI C81.61**] [**or**] [**IEC 60061-1**].

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Housings:

[**Extruded-aluminum**] <**Insert option**> housing and heat sink.

[**Clear**] <**Insert color**> [**anodized**] [**powder-coat**] [**painted**] finish.

With integral mounting provisions.

* + - * 1. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
        2. Diffusers and Globes:

[**Tempered Fresnel glass**] [**Prismatic glass**] [**Diffuse glass**] [**Clear glass**] [**Prismatic acrylic**] [**Clear, UV-stabilized acrylic**] <**Insert material**>.

Retain "Acrylic Diffusers" subparagraph below if fifth or sixth option in "Diffusers and Globes" paragraph above is retained.

Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

Retain "Glass" subparagraph below if first, second, third, or fourth option in "Diffusers and Globes" paragraph above is retained.

Glass: Annealed crystal glass unless otherwise indicated.

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Standards:

ENERGY STAR certified.

RoHS compliant.

UL Listing: Listed for damp location.

* + - 1. HIGHBAY, NONLINEAR <**Insert drawing designation**>.

Retain this article for nonlinear luminaires installed in locations where floor-to-ceiling height is more than 20 feet in commercial or industrial applications that do not require a rated luminaire.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=11304) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Cooper Lighting Solutions; Signify North America Corp](http://www.specagent.com/Lookup?uid=123457165020).

Lithonia Lighting; Acuity Brands Lighting, Inc.

[RAB Lighting](http://www.specagent.com/Lookup?uid=123457165023).

Or equal.

* + - * 1. Nominal Operating Voltage: [**120 V ac**] [**240 V ac**] [**277 V ac**] [**12 V dc**] [**24 V dc**].
        2. Lamp:

Minimum [**250**] [**575**] [**1000**] <**Insert number**> lm.

Minimum allowable efficacy of [**80**] <**Insert number**> lm/W.

CRI of [**minimum**] [**65**] [**70**] [**80**] <**Insert number**>. CCT of [**2700 K**] [**3000 K**] [**4100 K**] <**Insert value**>.

Rated lamp life of [**35,000**] [**50,000**] <**Insert number**> hours to L70.

Dimmable from 100 percent to zero percent of maximum light output.

Internal driver.

User-Replaceable Lamps:

Bulb shape complying with ANSI C78.79.

Lamp base complying with [**ANSI C81.61**] [**or**] [**IEC 60061-1**].

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Housings:

[**Extruded-aluminum**] <**Insert option**> housing and heat sink.

[**Clear**] <**Insert color**> [**anodized**] [**powder-coat**] [**painted**] finish.

Universal mounting bracket.

Integral junction box with conduit fittings.

* + - * 1. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
        2. Diffusers and Globes:

[**Tempered Fresnel glass**] [**Prismatic glass**] [**Diffuse glass**] [**Clear glass**] [**Prismatic acrylic**] [**Clear, UV-stabilized acrylic**] <**Insert material**>.

Retain "Acrylic Diffusers" subparagraph below if fifth or sixth option in "Diffusers and Globes" paragraph above is retained.

Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

Retain "Glass" subparagraph below if first, second, third, or fourth option in "Diffusers and Globes" paragraph above is retained.

Glass: Annealed crystal glass unless otherwise indicated.

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Standards:

ENERGY STAR certified.

RoHS compliant.

UL Listing: Listed for damp location.

* + - 1. LINEAR INDUSTRIAL <**Insert drawing designation**>.

Retain this article for linear luminaires installed in commercial or industrial applications where a rated luminaire is required.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=11305) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Cooper Lighting Solutions; Signify North America Corp](http://www.specagent.com/Lookup?uid=123457165030).

[Lithonia Lighting; Acuity Brands Lighting, Inc](http://www.specagent.com/Lookup?uid=123457165028).

[RAB Lighting](http://www.specagent.com/Lookup?uid=123457165034).

Or equal.

* + - * 1. Lamp:

Minimum [**5,000**] <**Insert number**> lm.

Minimum allowable efficacy of [**80**] <**Insert number**> lm/W.

CRI of [**minimum**] [**65**] [**70**] [**80**] <**Insert number**>. CCT of [**2700 K**] [**3000 K**] [**4100 K**] <**Insert value**>.

Rated lamp life of [**35,000**] [**50,000**] <**Insert number**> hours to L70.

Dimmable from 100 percent to zero percent of maximum light output.

Internal driver.

User-Replaceable Lamps:

Bulb shape complying with ANSI C78.79.

Lamp base complying with [**ANSI C81.61**] [**or**] [**IEC 60061-1**].

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Housings:

[**Extruded-aluminum**] <**Insert option**> housing and heat sink.

[**Clear**] <**Insert color**> [**anodized**] [**powder-coat**] [**painted**] finish.

* + - * 1. Housing and Heat Sink Rating:

Retain applicable certifications or standards below.

Class 1, Division 2 Group(s) [**A**] [**B**] [**C**] [**and**] [**D**].

NEMA 4X.

IP 54.

IP 66.

Marine and wet locations.

CSA C22.2 No 137.

<**Insert standard or certification**>.

* + - * 1. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
        2. Diffusers and Globes:

[**Tempered Fresnel glass**] [**Prismatic glass**] [**Diffuse glass**] [**Clear glass**] [**Prismatic acrylic**] [**Clear, UV-stabilized acrylic**] <**Insert material**>.

Retain "Acrylic Diffusers" subparagraph below if fifth or sixth option in "Diffusers and Globes" paragraph above is retained.

Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

Retain "Glass" subparagraph below if first, second, third, or fourth option in "Diffusers and Globes" paragraph above is retained.

Glass: Annealed crystal glass unless otherwise indicated.

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. With integral mounting provisions.
        2. Standards:

ENERGY STAR certified.

RoHS compliant.

* + - 1. LOWBAY <**Insert drawing designation**>

Retain this article for luminaires installed in locations where floor-to-ceiling height is equal to or less than 20 feet in a commercial or industrial application.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=11306) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Cooper Lighting Solutions; Signify North America Corp](http://www.specagent.com/Lookup?uid=123457165039).

[Lithonia Lighting; Acuity Brands Lighting, Inc](http://www.specagent.com/Lookup?uid=123457165037).

RAB Lighting.

Or equal.

* + - * 1. Nominal Operating Voltage: [**120 V ac**] [**240 V ac**] [**277 V ac**] [**12 V dc**] [**24 V dc**].
        2. Lamp:

Minimum [**5,000**] [**10,000**] <**Insert number**> lm.

Minimum allowable efficacy of 80 lm/W.

CRI of [**minimum**] [**65**] [**70**] [**80**] <**Insert number**>. CCT of [**2700 K**] [**3000 K**] [**4100 K**] <**Insert value**>.

Rated lamp life of [**35,000**] [**50,000**] <**Insert number**> hours to L70.

Dimmable from 100 percent to zero percent of maximum light output.

Internal driver.

User-Replaceable Lamps:

Bulb shape complying with ANSI C78.79.

Lamp base complying with [**ANSI C81.61**] [**or**] [**IEC 60061-1**].

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Housings:

[**Extruded-aluminum**] <**Insert option**> housing and heat sink.

[**Clear**] <**Insert color**> [**anodized**] [**powder-coat**] [**painted**] finish.

* + - * 1. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
        2. Diffusers and Globes:

[**Tempered Fresnel glass**] [**Prismatic glass**] [**Diffuse glass**] [**Clear glass**] [**Prismatic acrylic**] [**Clear, UV-stabilized acrylic**] <**Insert material**>.

Retain "Acrylic Diffusers" subparagraph below if fifth or sixth option in "Diffusers and Globes" paragraph above is retained.

Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

Retain "Glass" subparagraph below if first, second, third, or fourth option in "Diffusers and Globes" paragraph above is retained.

Glass: Annealed crystal glass unless otherwise indicated.

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Standards:

ENERGY STAR certified.

RoHS compliant.

UL Listing: Listed for damp location.

* + - 1. PARKING GARAGE <**Insert drawing designation**>.

Retain this article for luminaires installed in covered parking facilities.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=11307) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Cooper Lighting Solutions; Signify North America Corp](http://www.specagent.com/Lookup?uid=123457165045).

[Current Lighting Solutions, LLC (Current, powered by GE)](http://www.specagent.com/Lookup?uid=123457165048).

Lithonia Lighting; Acuity Brands Lighting, Inc.

Or equal.

* + - * 1. Nominal Operating Voltage: [**120 V ac**] [**240 V ac**] [**277 V ac**] [**12 V dc**] [**24 V dc**].
        2. Lamp:

Minimum [**2,000**] <**Insert number**> lm.

Minimum allowable efficacy of [**75**] <**Insert number**> lm/W.

CRI of [**minimum**] [**65**] [**70**] [**80**] <**Insert number**>. CCT of [**2700 K**] [**3000 K**] [**4100 K**] <**Insert value**>.

Rated lamp life of [**35,000**] [**50,000**] <**Insert number**> hours to L70.

Dimmable from 100 percent to zero percent of maximum light output.

Internal driver.

User-Replaceable Lamps:

Bulb shape complying with ANSI C78.79.

Lamp base complying with [**ANSI C81.61**] [**or**] [**IEC 60061-1**].

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Housings:

[**Extruded-aluminum**] <**Insert option**> housing and heat sink.

[**Clear**] <**Insert color**> [**anodized**] [**powder-coat**] [**painted**] finish.

Low-profile housing and heat sink.

Fully gasketed and sealed.[**IP 65 rated.**]

Stainless-steel latches.

Integral pressure equalizer.

* + - * 1. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
        2. Diffusers and Globes:

[**Tempered Fresnel glass**] [**Prismatic glass**] [**Diffuse glass**] [**Clear glass**] [**Prismatic acrylic**] [**Clear, UV-stabilized acrylic**] <**Insert material**>.

Retain "Acrylic Diffusers" subparagraph below if fifth or sixth option in "Diffusers and Globes" paragraph above is retained.

Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

Retain "Glass" subparagraph below if first, second, third, or fourth option in "Diffusers and Globes" paragraph above is retained.

Glass: Annealed crystal glass unless otherwise indicated.

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. With integral mounting provisions.
        2. Standards:

ENERGY STAR certified.

RoHS compliant.

UL Listing: Listed for damp location.

* + - 1. RECESSED, LINEAR <**Insert drawing designation**>.

Retain this article for a linear-style luminaire that is recessed and mounted with the aperture flush to the ceiling. Use this type for "troffer"- or "panel"-type luminaires.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=11308) Subject to compliance with requirements, provide products by one of the following:

[Cooper Lighting Solutions; Signify North America Corp](http://www.specagent.com/Lookup?uid=123457165058).

[Finelite](http://www.specagent.com/Lookup?uid=123457165059).

[Lithonia Lighting; Acuity Brands Lighting, Inc](http://www.specagent.com/Lookup?uid=123457165054).

Or equal.

* + - * 1. Nominal Operating Voltage: [**120 V ac**] [**240 V ac**] [**277 V ac**] [**12 V dc**] [**24 V dc**].
        2. Lamp:

Minimum [**1,500**] [**2,000**] [**3,000**] <**Insert number**> lm.

Minimum allowable efficacy of [**85**] <**Insert number**> lm/W.

CRI of [**minimum**] [**65**] [**70**] [**80**] <**Insert number**>. CCT of [**2700 K**] [**3000 K**] [**4100 K**] <**Insert value**>.

Rated lamp life of [**35,000**] [**50,000**] <**Insert number**> hours to L70.

Dimmable from 100 percent to zero percent of maximum light output.

Internal driver.

User-Replaceable Lamps:

Bulb shape complying with ANSI C78.79.

Lamp base complying with [**ANSI C81.61**] [**or**] [**IEC 60061-1**].

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Housings:

[**Extruded-aluminum**] <**Insert option**> housing and heat sink.

[**Clear**] <**Insert color**> [**anodized**] [**powder-coat**] [**painted**] finish.

With integral mounting provisions.

* + - * 1. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
        2. Diffusers and Globes:

[**Tempered Fresnel glass**] [**Prismatic glass**] [**Diffuse glass**] [**Clear glass**] [**Prismatic acrylic**] [**Clear, UV-stabilized acrylic**] <**Insert material**>.

Retain "Acrylic Diffusers" subparagraph below if fifth or sixth option in "Diffusers and Globes" paragraph above is retained.

Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

Retain "Glass" subparagraph below if first, second, third, or fourth option in "Diffusers and Globes" paragraph above is retained.

Glass: Annealed crystal glass unless otherwise indicated.

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Standards:

ENERGY STAR certified.

RoHS compliant.

UL Listing: Listed for damp location.

NEMA LE 4.

* + - 1. STRIP LIGHT <**Insert drawing designation**>.

Retain this article for a luminaire with a linear-style lamp with no reflector, diffuser, or lens.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=11309) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Cooper Lighting Solutions; Signify North America Corp](http://www.specagent.com/Lookup?uid=123457164906).

[Current Lighting Solutions, LLC (Current, powered by GE)](http://www.specagent.com/Lookup?uid=123457164907).

[Lithonia Lighting; Acuity Brands Lighting, Inc](http://www.specagent.com/Lookup?uid=123457164905).

Or equal.

* + - * 1. Nominal Operating Voltage: [**120 V ac**] [**240 V ac**] [**277 V ac**] [**12 V dc**] [**24 V dc**].
        2. Lamp:

Minimum [**750**] <**Insert number**> lm.

Minimum allowable efficacy of [**75**] [**80**] <**Insert number**> lm/W.

CRI of [**minimum**] [**65**] [**70**] [**80**] <**Insert number**>. CCT of [**2700 K**] [**3000 K**] [**4100 K**] <**Insert value**>.

Rated lamp life of [**35,000**] [**50,000**] <**Insert number**> hours to L70.

Dimmable from 100 percent to zero percent of maximum light output.

Internal driver.

User-Replaceable Lamps:

Bulb shape complying with ANSI C78.79.

Lamp base complying with [**ANSI C81.61**] [**or**] [**IEC 60061-1**].

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Housings:

[**Extruded-aluminum**] <**Insert option**> housing and heat sink.

[**Clear**] <**Insert color**> [**anodized**] [**powder-coat**] [**painted**] finish.

With integral mounting provisions.

* + - * 1. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping of luminaire without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
        2. Diffusers and Globes:

[**Tempered Fresnel glass**] [**Prismatic glass**] [**Diffuse glass**] [**Clear glass**] [**Prismatic acrylic**] [**Clear, UV-stabilized acrylic**] <**Insert material**>.

Retain "Acrylic Diffusers" subparagraph below if fifth or sixth option in "Diffusers and Globes" paragraph above is retained.

Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

Retain "Glass" subparagraph below if first, second, third, or fourth option in "Diffusers and Globes" paragraph above is retained.

Glass: Annealed crystal glass unless otherwise indicated.

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Standards:

ENERGY STAR certified.

RoHS compliant.

UL Listing: Listed for damp location.

* + - 1. SURFACE MOUNT, LINEAR <**Insert drawing designation**>.

Retain this article for surface-mounted, linear-style luminaires with a housing, reflector, and/or lens in applications, such stairwell or passageway lighting.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=11310) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Cooper Lighting Solutions; Signify North America Corp](http://www.specagent.com/Lookup?uid=123457164919).

[Finelite](http://www.specagent.com/Lookup?uid=123457164920).

[Lithonia Lighting; Acuity Brands Lighting, Inc](http://www.specagent.com/Lookup?uid=123457164915).

Or equal.

* + - * 1. Nominal Operating Voltage: [**120 V ac**] [**240 V ac**] [**277 V ac**] [**12 V dc**] [**24 V dc**].
        2. Lamp:

Minimum [**750**] <**Insert number**> lm.

Minimum allowable efficacy of [**75**] [**80**] <**Insert number**> lm/W.

CRI of [**minimum**] [**65**] [**70**] [**80**] <**Insert number**>. CCT of [**2700 K**] [**3000 K**] [**4100 K**] <**Insert value**>.

Rated lamp life of [**35,000**] [**50,000**] <**Insert number**> hours to L70.

Dimmable from 100 percent to zero percent of maximum light output.

Internal driver.

User-Replaceable Lamps:

Bulb shape complying with ANSI C78.79.

Lamp base complying with [**ANSI C81.61**] [**or**] [**IEC 60061-1**].

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Housings:

[**Extruded-aluminum**] <**Insert option**> housing and heat sink.

[**Clear**] <**Insert color**> [**anodized**] [**powder-coat**] [**painted**] finish.

With integral mounting provisions.

* + - * 1. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
        2. Diffusers and Globes:

[**Tempered Fresnel glass**] [**Prismatic glass**] [**Diffuse glass**] [**Clear glass**] [**Prismatic acrylic**] [**Clear, UV-stabilized acrylic**] <**Insert material**>.

Retain "Acrylic Diffusers" subparagraph below if fifth or sixth option in "Diffusers and Globes" paragraph above is retained.

Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

Retain "Glass" subparagraph below if first, second, third, or fourth option in "Diffusers and Globes" paragraph above is retained.

Glass: Annealed crystal glass unless otherwise indicated.

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Standards:

ENERGY STAR certified.

RoHS compliant.

UL Listing: Listed for damp location.

* + - 1. SURFACE MOUNT, NONLINEAR <**Insert drawing designation**>

Retain this article for surface-mounted, nonlinear luminaires with a housing, reflector, and/or lens in applications, such as a stairwell or passageway lighting.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=11311) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Cooper Lighting Solutions; Signify North America Corp](http://www.specagent.com/Lookup?uid=123457164941).

[Focal Point LLC](http://www.specagent.com/Lookup?uid=123457164944).

[Lithonia Lighting; Acuity Brands Lighting, Inc](http://www.specagent.com/Lookup?uid=123457164939).

Or equal.

* + - * 1. Nominal Operating Voltage: [**120 V ac**] [**240 V ac**] [**277 V ac**] [**12 V dc**] [**24 V dc**].
        2. Lamp:

Minimum [**750**] <**Insert number**> lm.

Minimum allowable efficacy of [**75**] [**80**] <**Insert number**> lm/W.

CRI of [**minimum**] [**65**] [**70**] [**80**] <**Insert number**>. CCT of [**2700 K**] [**3000 K**] [**4100 K**] <**Insert value**>.

Rated lamp life of [**35,000**] [**50,000**] <**Insert number**> hours to L70.

Dimmable from 100 percent to zero percent of maximum light output.

Internal driver.

User-Replaceable Lamps:

Bulb shape complying with ANSI C78.79.

Lamp base complying with [**ANSI C81.61**] [**or**] [**IEC 60061-1**].

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Housings:

[**Extruded-aluminum**] <**Insert option**> housing and heat sink.

[**Clear**] <**Insert color**> [**anodized**] [**powder-coat**] [**painted**] finish.

With integral mounting provisions.

* + - * 1. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
        2. Diffusers and Globes:

[**Tempered Fresnel glass**] [**Prismatic glass**] [**Diffuse glass**] [**Clear glass**] [**Prismatic acrylic**] [**Clear, UV-stabilized acrylic**] <**Insert material**>.

Retain "Acrylic Diffusers" subparagraph below if fifth or sixth option in "Diffusers and Globes" paragraph above is retained.

Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

Retain "Glass" subparagraph below if first, second, third, or fourth option in "Diffusers and Globes" paragraph above is retained.

Glass: Annealed crystal glass unless otherwise indicated.

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Standards:

ENERGY STAR certified.

RoHS compliant.

UL Listing: Listed for damp location.

* + - 1. SUSPENDED, LINEAR <**Insert drawing designation**>

Retain this article for linear-style luminaires suspended from a structure used for general illumination. These luminaires may incorporate lenses, louvers, and multiple light distribution patterns for different applications, such as office lighting.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=11312) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Finelite](http://www.specagent.com/Lookup?uid=123457164961).

[Focal Point LLC](http://www.specagent.com/Lookup?uid=123457164962).

[Lithonia Lighting; Acuity Brands Lighting, Inc](http://www.specagent.com/Lookup?uid=123457164956).

Or equal.

* + - * 1. Nominal Operating Voltage: [**120 V ac**] [**240 V ac**] [**277 V ac**] [**12 V dc**] [**24 V dc**].
        2. Lamp:

Minimum [**1,500**] [**2,000**] [**3,000**] <**Insert number**> lm.

Minimum allowable efficacy of [**85**] <**Insert number**> lm/W.

CRI of [**minimum**] [**65**] [**70**] [**80**] <**Insert number**>. CCT of [**2700 K**] [**3000 K**] [**4100 K**] <**Insert value**>.

Rated lamp life of [**35,000**] [**50,000**] <**Insert number**> hours to L70.

Dimmable from 100 percent to zero percent of maximum light output.

Internal driver.

User-Replaceable Lamps:

Bulb shape complying with ANSI C78.79.

Lamp base complying with [**ANSI C81.61**] [**or**] [**IEC 60061-1**].

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Housings:

[**Extruded-aluminum**] <**Insert option**> housing and heat sink.

[**Clear**] <**Insert color**> [**anodized**] [**powder-coat**] [**painted**] finish.

With integral mounting provisions.

* + - * 1. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
        2. Diffusers and Globes:

[**Tempered Fresnel glass**] [**Prismatic glass**] [**Diffuse glass**] [**Clear glass**] [**Prismatic acrylic**] [**Clear, UV-stabilized acrylic**] <**Insert material**>.

Retain "Acrylic Diffusers" subparagraph below if fifth or sixth option in "Diffusers and Globes" paragraph above is retained.

Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

Retain "Glass" subparagraph below if first, second, third, or fourth option in "Diffusers and Globes" paragraph above is retained.

Glass: Annealed crystal glass unless otherwise indicated.

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Standards:

ENERGY STAR certified.

RoHS compliant.

UL Listing: Listed for damp location.

* + - 1. SUSPENDED, NONLINEAR <**Insert drawing designation**>

Retain this article for nonlinear luminaires, such as track lighting, pendant lighting, or a similar application used for accent or decorative lighting.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=11313) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Cooper Lighting Solutions; Signify North America Corp](http://www.specagent.com/Lookup?uid=123457165073).

[Focal Point LLC](http://www.specagent.com/Lookup?uid=123457165076).

[Lithonia Lighting; Acuity Brands Lighting, Inc](http://www.specagent.com/Lookup?uid=123457165071).

Or equal.

* + - * 1. Nominal Operating Voltage: [**120 V ac**] [**240 V ac**] [**277 V ac**] [**12 V dc**] [**24 V dc**].
        2. Lamp:

Minimum [**1,500**] [**2,000**] [**3,000**] <**Insert number**> lm.

Minimum allowable efficacy of [**85**] <**Insert number**> lm/W.

CRI of [**minimum**] [**65**] [**70**] [**80**] <**Insert number**>. CCT of [**2700 K**] [**3000 K**] [**4100 K**] <**Insert value**>.

Rated lamp life of [**35,000**] [**50,000**] <**Insert number**> hours to L70.

Dimmable from 100 percent to zero percent of maximum light output.

Internal driver.

User-Replaceable Lamps:

Bulb shape complying with ANSI C78.79.

Lamp base complying with [**ANSI C81.61**] [**or**] [**IEC 60061-1**].

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Housings:

[**Extruded-aluminum**] <**Insert option**> housing and heat sink.

[**Clear**] <**Insert color**> [**anodized**] [**powder-coat**] [**painted**] finish.

Universal mounting bracket.

Integral junction box with conduit fittings.

* + - * 1. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
        2. Diffusers and Globes:

[**Tempered Fresnel glass**] [**Prismatic glass**] [**Diffuse glass**] [**Clear glass**] [**Prismatic acrylic**] [**Clear, UV-stabilized acrylic**] <**Insert material**>.

Retain "Acrylic Diffusers" subparagraph below if fifth or sixth option in "Diffusers and Globes" paragraph above is retained.

Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

Retain "Glass" subparagraph below if first, second, third, or fourth option in "Diffusers and Globes" paragraph above is retained.

Glass: Annealed crystal glass unless otherwise indicated.

Retain "Lens Thickness" subparagraph below for all diffuser and globe types.

Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

* + - * 1. Standards:

ENERGY STAR certified.

RoHS compliant.

UL Listing: Listed for damp location.

* + - 1. MATERIALS
         1. Metal Parts:

Free of burrs and sharp corners and edges.

Sheet metal components shall be steel unless otherwise indicated.

Form and support to prevent warping and sagging.

* + - * 1. Steel:

ASTM A36 for carbon structural steel.

ASTM A568 for sheet steel.

* + - * 1. Stainless Steel:

Manufacturer's standard grade.

Manufacturer's standard type, ASTM A240.

* + - * 1. Galvanized Steel: ASTM A653.
        2. Aluminum: ASTM B209.
      1. METAL FINISHES
         1. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.
      2. LUMINAIRE SUPPORT
         1. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.
         2. Wires: ASTM A641, Class 3, soft temper, zinc-coated steel, [**12 gage**] <**Insert size**>.
         3. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.
         4. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

1. 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. TEMPORARY LIGHTING
          1. If approved by the Architect, use selected permanent luminaires for temporary lighting. When construction is sufficiently complete, clean luminaires used for temporary lighting and install new lamps.
       3. INSTALLATION
          1. Comply with NECA 1.
          2. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
          3. Install lamps in each luminaire.
          4. Supports:

Sized and rated for luminaire weight.

Able to maintain luminaire position after cleaning and relamping.

Provide support for luminaire without causing deflection of ceiling or wall.

Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.

* + - * 1. Flush-Mounted Luminaires:

Secured to outlet box.

Attached to ceiling structural members at four points equally spaced around circumference of luminaire.

Trim ring flush with finished surface.

* + - * 1. Wall-Mounted Luminaires:

[**Attached to structural members in walls**] [**Attached to a minimum 20 gauge backing plate attached to wall structural members**] [**Attached using through bolts and backing plates on either side of wall**] <**Insert means of attachment**>.

Do not attach luminaires directly to gypsum board.

* + - * 1. Suspended Luminaires:

Ceiling Mount:

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

[**Two**] <**Insert number**> 5/32-inch- <**Insert value**> diameter aircraft cable supports [**adjustable to**] [**10 feet in length**] <**Insert length**>.

[**Pendant mount**] [**Four-point pendant mount**] with [**5/32-inch-**] <**Insert value**> diameter aircraft cable supports [**adjustable to**] [**10 feet in length**] <**Insert length**>.

Hook mount.

Pendants and Rods: Where longer than 48 inches, brace to limit swinging.

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.

Continuous Rows of Luminaires: Use 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.

Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

* + - * 1. Ceiling-Grid-Mounted Luminaires:

Secure to any required outlet box.

Retain first subparagraph below to require ceiling grid to be connected to building structure at four corners of luminaire opening.

Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.

Retain subparagraph below if ceiling grid is not connected to building structure at four corners of the luminaire opening.

Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.

* + - 1. IDENTIFICATION
         1. Identify system components, wiring, cabling, and terminals.
      2. FIELD QUALITY CONTROL
         1. Perform the following tests and inspections:

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

Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.

Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.

* + - * 1. Luminaire will be considered defective if it does not pass operation tests and inspections.
        2. Prepare test and inspection reports.
      1. ADJUSTING

Verify with Director’s Representative that adjusting service is required for Project.

* + - * 1. Occupancy Adjustments: When requested within [**12**] <**Insert number**> months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to [**two**] <**Insert number**> visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.

During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.

Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

Adjust the aim of luminaires in the presence of the Architect.

END OF SECTION 265119