SP-150345
(New)

SPECIAL PROVISIONS
FOR
ELECTRICAL AND LIGHTING

Dubuque County
NHSX-032-1(40)--3H-31
NHSX-032-1(42)--3H-31

Effective Date
December 19, 2017

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

PART 1 GENERAL

1.01 Specification Includes

A. Wire and cable for 600 volts and less, including wiring connectors and connections.

B. Grounding and bonding components, including all components necessary to complete the grounding system(s) consisting of:
   1. Rod electrodes.
   2. Conduit bushings with Ground Lugs for all RGC conduit sections installed for lighting conduits.
   3. Copper grounding electrode conductor.

C. Supports for Conduit and equipment, including anchors and fasteners.

D. Conduit, fittings and conduit bodies.

E. Pull and junction boxes.

F. Exterior Light Fixture Assembles.

   1. Roadway Light Assembly (S1); complete assembly to include but not be limited to anchor bolts, base plate, custom base cover, pole, mast arm, luminaire and lamps, connectors, fasteners, etc.

   2. Large Pier Lantern Light Assembly (S2); complete assembly to include but not be limited to LED luminaires, LED power supplies, power supply enclosure boxes, connectors, fasteners, etc.

   3. Small Pier Lantern Light Assembly (S3); complete assembly to include but not be limited to LED luminaires, LED power supplies, power supply enclosure boxes, connectors,

fasteners, etc.

4. Lower Truss-mounted Light Assembly (S4); complete assembly to include but not be limited to luminaire, lamp, boxes, connectors, fasteners, etc.
5. Upper Truss-mounted Light Assembly (S5); complete assembly to include but not be limited to luminaire, lamp, boxes, connectors, fasteners, etc.
6. Exterior Pier Light Assembly (S6); complete assembly to include but not be limited to luminaire, lamp, boxes, connectors, fasteners, etc.

1.02 Measurement and Payment

A. Bridge Electrical

1. Method of Measurement: No measurement of Bridge Electrical.
2. Basis of Payment; Percent complete of Bridge Electrical.
3. Unit Adjustment Prices: For the purpose of adjusting the Contract Amount due to increases or decreases in the scope of work, submit Unit Adjustment Prices for each work item as scheduled and described on the contract documents. The Unit Adjustment Price will include all material, equipment, labor, and all items incidental to and required for a complete installation of the scheduled work item.

B. Exterior Light Fixture Assembly

1. Method of Measurement: The Engineer will count the installed Exterior Light Fixture Assembly: Roadway Light Fixture Assembly (S1), Large Pier Lantern Light Assembly (S2), Small Pier Lantern Light Assembly (S3), Lower Truss-mounted Light Assembly (S4), Upper Truss-mounted Light Assembly (S5), Pier Exterior Light Assembly (S6).
2. Basis of Payment: Payment for each Exterior Light Fixture Assembly will include all labor, materials, equipment, and supervision required to furnish and install the complete Lighting Fixture.
3. Unit Price for Exterior Light Fixture Assembly will include but not be limited to all specified assembly components, mounting hardware, lamps, wiring devices, labor, and all items incidental to and required for a complete installation.

1.03 References

A. ANSI C78.379 - American National Standard for Electric Lamps -- Reflector Lamps -- Classification of Beam Patterns; 2006.

B. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2005.

C. IESNA RP-8 - American National Standard Practice for Roadway Lighting; Illuminating Engineering Society of North America; 2000(R2005) (ANSI/IES RP8).

D. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; 2006.

E. NECA 101 - Standard for Installing Steel Conduit (Rigid, IMC, EMT); National Electrical Contractors Association; 2006.

F. NECA/IESNA 501 - Recommended Practice for Installing Exterior Lighting Systems; 2006.

G. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association; 2003.

H. NFPA 70 - National Electrical Code; National Fire Protection Association; 2017.

1.04 Submittals

A. Submit product data sheets for rod electrodes, connectors, and conductor.

B. Submit pull and junction box data sheet including size, Manufacturer’s testing reports, and color

information.

C. Exterior Light Fixture Assembly

1. Product Data describing all exterior light fixture assembly components.
2. Shop Drawings: Submit legible, dimensioned drawings of exterior light fixture assemblies. Submit shop drawings for each exterior light fixture assembly component in a booklet form organized with a separate sheet for each component and assembled in order of exterior light fixture assembly "Type" (S1 – S6) as designated on the Drawings. Shop drawings shall clearly indicate all proposed accessories on each sheet. A "Lamp Schedule" spreadsheet shall be submitted noting exterior light fixture assembly "Type" (S1 – S6) and the lamp designation/lamp manufacturer which will be provided in each exterior light fixture assembly**.**
3. Electrical Ratings and Photometric Data with certified results of independent laboratory tests for exterior light fixture assemblies and specified lamps.
4. Field test reports indicating and interpreting test results specified in Part 3 of this Special Provision.
5. Maintenance data for exterior light fixture assemblies to include in the operation and maintenance manual specified in Standard Specifications.
6. Contractor shall submit a complete "lead time" list demonstrating the anticipated lead time for every exterior light fixture assembly type on the project based upon the available data supplied by the manufacturer at the time of submittal. All lead times shall be based on "release for order" and be provided in weeks- assuming normal ground transportation methods or other standard delivery process.

1.05 Performance Requirements

A. Grounding System Resistance: 5 ohms maximum.

1.06 Delivery, Storage, and Handling

A. Accept conduit on site. Inspect for damage.

B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

C. Protect electrical devices and materials for moisture damage.

1.07 Quality Assurance

A. Perform work in accordance with National Electrical Code and/ or other applicable local codes enforced upon time of bid.

B. Electrical Component Standard: Provide components that comply with NFPA 70 and that are listed and labeled by UL where available.

C. Listing and Labeling: Provide fixtures, emergency lighting units, and accessory components specified in this Special Provision that are listed and labeled for their indicated use and installation conditions on Project.

D. Special Listing and Labeling: Provide fixtures for use in damp and wet locations that are specifically listed and labeled for such use.

E. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.

F. Conform to requirements of NFPA 70.

1.08 Definitions

A. Light Assembly: A complete lighting unit that includes all materials shown on plans, listed in Exterior Light Fixture Assembly Schedule and described in this Special Provision.

B. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.09 Substitutions

A. Pre-bid substitution submittals for comparable products described herein shall consist of a physical description, dimensioned drawing and complete photometric and electric data of the proposed exterior light fixture assembly. As requested by the Engineer, working samples of exterior light fixture assembly substitutions must also be supplied for visual check of finish and operating characteristics. Photometric reports must list the actual candela values for the luminaire's distribution in at least three planes. Candela curves, foot-candle and lumen tables and iso-footcandle contours are not acceptable. Contractor will be responsible for all costs (architecture time, lighting designer time, engineering time, manufacturer's costs, distributor costs, etc.) incurred to replace equipment not approved if non-approved substitutions are made by the distributor, manufacturer's representative, or subcontractor. No substitutions will be considered without compliance with this paragraph.

B. No substitutions will be allowed due to delays in receiving exterior light fixture assemblies for the project due to negligence by the Contractor in delaying the release of a full or partial order including all exterior light fixture assembly components. Contractor shall assume all responsibility for "express" shipping or other non-standard shipping means if product is required in order to avoid delays in the project.

1.10 Coordination

A. Furnish bolt templates and pole mounting accessories to installer of pole foundations.

B. Verify all measurements in field prior to ordering and installing fixtures.

C. Coordinate fixtures, junction boxes, mounting hardware, and any other items, including work of other trades, required to be mounted on or in concrete. Confirm compatibility of light fixture with the proposed installation prior to ordering all light fixtures.

PART 2 PRODUCTS

2.01 Wiring Requirements

A. Above Grade Exterior Locations: Use only building wire with Type THWN insulation in raceway.

B. Underground and Below Grade Installations: Use only building wire with Type XHHW insulation in raceway.

C. Use solid conductor for feeders and branch circuits No. 10 AWG and smaller.

D. Use stranded conductors for control circuits.

2.02 Wiring Connectors

A. Spring Wire Connectors: Use Spring Wire Connectors only on No. 10 AWG and smaller wiring in completely enclosed above grade applications

B. Compression Connectors: Use Insulated Copper Compression connectors, for all insulated wire below grade applications. Use Uninsulated Copper Compression connectors, for all bare copper wire below grade applications. Make all crimps with the Manufacturer specified tool and dies using the specified number of crimps.

2.03 Electrodes

A. Rod Electrodes: Copper.
   1. Diameter: 5/8 inch.

2. Length: 10 feet.

2.04 Connectors and Accessories

A. Mechanical Connectors: Bronze.

B. Grounding Electrode Conductor: No. 8 Solid Bare copper.

C. Equipment Grounding Conductor: No. 8 Stranded Bare Copper

2.05 Conduit and Equipment Supports

A. Hangers, Supports, Anchors, and Fasteners - General: Corrosion-resistant materials of size and type adequate to carry the loads of equipment and conduit, including weight of wire in conduit.

B. Supports: Fabricated of structural steel or formed steel members; galvanized.

2.06 Conduit Requirements

A. Conduit Size: As shown on plans. Comply with NFPA 70.

B. The minimum bending radius of conduit for secondary (600V or less) wiring is six times the inside diameter of the conduit.

C. Concrete encased conduit: Use Rigid Galvanized Steel conduit.

D. Exposed Conduit: Use Rigid Galvanized Steel conduit.

E. Conduit installed within steel tube: Use Flexible Metal Conduit.

F. Conduit connections to decorative lantern fixtures: Use liquidtight flexible metal conduit.

G. Refer to Iowa DOT standard

2.07 Metal Conduit

A. Rigid Steel Conduit: ANSI C80.1.

B. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.

2.08 Liquidtight Flexible Metal Conduit

A. Description: Interlocked steel construction with PVC jacket.

B. Fittings: NEMA FB 1.

2.09 Flexible Metal Conduit

A. Description: Interlocked steel construction.

B. Fittings: NEMA FB 1. Material to match conduit.

2.10 Pull and Junction Boxes

A. Pull box, 12 inches by 12 inches by 6 inches deep, NEMA 3R, gasketed screw cover, galvanized steel box with Gray painted cover.

2.11 Light Emitting Diode (LED) Luminaires

A. Furnish products as indicated on Schedule included on the contract documents.

B. Conform to UL 1598 and CSA C22.2 No. 250.

C. Provide BIN information for LEDs with shop drawings.

D. Provide LED forward voltage rating with shop drawings.

PART 3 EXECUTION

3.01 Low Voltage Wire and Connectors Installation

A. Install wire and cable securely, in a neat and workmanlike manner, as specified in NECA 1.

B. Route wire and cable as required to meet project conditions.

C. Use wiring methods indicated.

D. Pull all conductors into raceway at same time.

E. Use suitable wire pulling lubricant for building wire No. 4 AWG and larger.

F. Neatly train and lace wiring inside boxes, equipment, and supply cabinets.

G. Clean conductor surfaces before installing lugs and connectors.

H. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

I. Identify and color code wire and cable. Identify each conductor with its circuit number or other designation indicated.

3.02 Grounding Installation

A. Install ground electrodes at each in-grade handhole and at each electrical supply cabinet as indicated on the plans.

B. Provide grounding electrode conductor, No. 8 bare copper minimum, in each lighting circuit conduit and connect to each ground bushing with a minimum No. 8 bare copper tap on each RGC conduit section.

3.03 Conduit and Equipment Supports Installation

A. Install hangers and supports as required to adequately and securely support electrical system components, in a neat and workmanlike manner, as specified in NECA 1 and as shown on the drawings.

1. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.

B. Rigidly weld support members or use hexagon-head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.

3.04 Conduit and Fittings Installation

A. Install conduit securely, in a neat and workmanlike manner, as specified in NECA 1.

B. Install steel conduit as specified in NECA 101.

C. Arrange supports to prevent misalignment during wiring installation.

E. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.

F. Fasten conduit supports to bridge structure and surfaces under provisions of Conduit and Equipment Supports.

G. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.

H. Route exposed conduit parallel and perpendicular to structure.

I. Route conduit in and under slab as indicated on plans. Minimum depth for all underground conduits shall be 36 inches unless encased in slab.

J. Cut conduit square using saw or pipe cutter; de-burr cut ends.

K. Bring conduit to shoulder of fittings; fasten securely.

L. Provide suitable fittings to accommodate expansion and deflection where conduit crosses expansion joints.

M. Provide suitable pull string in each empty conduit except sleeves and nipples.

N. Use suitable caps to protect installed conduit against entrance of dirt and moisture.

O. Ground and bond all RGC lighting conduit sections.

3.05 Pull and Junction Box Installation

A. Install boxes securely, in a neat and workmanlike manner, as specified in NECA 1.

B. Install in locations as shown on plans, and as required for splices, taps, wire pulling, equipment connections, and as required by NFPA 70.

3.06 Lighting Assembly Installation

A. Install exterior light fixture assembly securely, in a neat and workmanlike manner, as specified in NECA 501.

B. Set exterior light fixture assembly plumb, square, and level with structure, and secure according to manufacturer's written instructions and approved Shop Drawings. Support fixtures independent of conduit serving fixtures.

C. Install lamps as required in each exterior light fixture assembly.

D. Bond luminaires, metal accessories, and metal poles to branch circuit equipment grounding conductor or structural steel.

3.07 Lighting Assembly Field Quality Control

A. Perform field inspection, testing, and adjusting in accordance with Standard Specifications.

B. Operate each exterior light fixture assembly after installation and connection. Inspect for improper connections and operation.

3.08 Lighting Assembly Adjusting and Cleaning

A. Clean exterior light fixture assembly of dirt and debris upon completion of installation.

B. Once exterior light fixture assembly and necessary architectural elements have been fully installed, Engineer will supervise and direct Contractor in the field for final proper aiming of each adjustable exterior light fixture assembly. Engineer and Contractor shall come to a mutual agreement on a specific date and time (after sunset), at which all of the adjustable exterior light fixture assemblies shall be aimed. All materials and labor necessary for the final aiming and adjusting of these exterior light fixture assemblies shall be included in the Contractor’s unit price for each exterior light fixture assembly and shall not warrant a change order or additional expense to the Contracting Authority.