

1703 - ELECTRIC LIGHTING AND TRAFFIC SIGNAL EQUIPMENT

SECTION 1703

ELECTRIC LIGHTING AND TRAFFIC SIGNAL EQUIPMENT

1703.1 DESCRIPTION

This specification covers general materials, electrical conduit and miscellaneous hardware for highway lighting and traffic signal systems. Construct these systems in accordance with, and at locations indicated in the Contract Documents or designated by the Engineer.

1703.2 REQUIREMENTS

a. General Materials. Whether the installation involves a single Contract or tied contracts, use a single manufacturer when purchasing all major items of electrical equipment to be used on the project(s). Make all attempts to maintain the same type and consistency of products to promote uniformity, singular responsibility and serviceability. Provide equipment that is new, the best standard product of a manufacturer regularly engaged in the production of this type of equipment, the manufacturer's latest approved design and of best quality and workmanship.

Provide a complete lighting/traffic signal system. Provide and install all equipment necessary for the complete and satisfactory operation of the lighting/traffic signal system whether specifically mentioned or not.

b. Electrical Conduit.

(1) **Metallic Conduit and Fittings.** Provide a rigid steel conduit suitable for use as a raceway for wires or cables of an electrical system. Comply with all requirements of American National Standards Institute (ANSI) C80.1. Protect the exterior surface with a metallic zinc coating and on the interior surface with zinc, enamel or other equivalent corrosion-resistant coating. Metallic conduit fittings are to be zinc coated and comply with ANSI C80.4.

(2) **Nonmetallic Conduit and Fittings.**

(a) **Polyvinyl Chloride (PVC) Conduit.** Provide a Schedule 40 or Schedule 80 rigid polyvinyl chloride conduit complying with the latest edition of the National Electrical Manufacturing Association (NEMA) Standard TC-2. Comply with NEMA Standard TC-3 on all PVC conduit fittings. Fabricate from polyvinyl chloride having the same chemical and physical properties as the conduit, which is made in accordance with the manufacturer's recommendations. Underwriters, Inc. (UL) labels are required on all conduit and fittings.

(b) **Polyethylene Conduit.** Provide a smooth wall, Schedule 40 or Schedule 80, high-density polyethylene duct complying with NEMA Standard TC-7.

(3) Supply conduits complying with the dimensional requirements shown in the Contract Documents.

c. Miscellaneous Hardware. Hot dip galvanize or electroplate with zinc or cadmium all miscellaneous hardware such as bolts, nuts, washers, studs, pins, terminals, springs and similar fastenings in accordance with the following requirements:

(1) **Hot Dipped Galvanized.** Comply with requirements stated in ASTM A 153. Complying with the requirements stated under Class C or D for threaded fittings.

(2) **Electroplated Articles.** Provide sufficient coating to complying with ASTM B 633.

1703.3 TEST METHODS

For hot dipped galvanized materials, determine acceptable coating thickness as stated in ASTM A 90, ASTM B 499 or methods stated in ASTM B 633.

For electroplated articles, measure thickness by any one of the methods specified in ASTM B 633 and, in addition, by eddy current techniques. The eddy current methods, ASTM B 244 may be utilized provided appropriate calibration procedures and standards have been applied. The ASTM B 659 provides a guide to these methods. The magnetic methods of ASTM B 499, referenced in ASTM B 633, and eddy current techniques are nondestructive and are preferred.

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1703.4 PREQUALIFICATION

a. Traffic Signals. Prequalification or preapproval by the Bureau of Traffic Engineering is required of all materials stated in the Contract Document's Bill of Materials before use on KDOT projects. Upon approval by the Bureau of Traffic Engineering, the material will be added to the prequalified list of materials maintained by the Bureau of Construction and Materials. When a manufacturer or supplier is intending to supply traffic signal materials under these specifications, proceed as follows:

- (1) Submit an original catalog cut, shop drawing, drawing and/or data sheets on the material.
- (2) Send a signed certification letter from the manufacturer or fabricator certifying that the material complies with the applicable specifications. Submit this information to:

KDOT
Bureau of Transportation Safety and Technology
Eisenhower State Office Building
700 SW Harrison Street
Topeka, Kansas 66603-3754

b. Lighting. Not Applicable.

1703.5 BASIS OF ACCEPTANCE

Acceptance of material provided under this specification will be based on the following:

a. Traffic Signals.

- (1) Prequalification for traffic signal materials as specified in **subsection 1703.4**.
- (2) Traffic Signal Materials List: Before the installation of traffic signals, submit for the approval of the Engineer a complete list of traffic signal materials proposed for installation. Submit the list as soon as practicable. Include items on the list for all quantities which are indicated in the Bill of Materials. Include the make, model and other descriptive data as may be required by the Engineer to identify the product. Sign the list certifying that the project-provided materials fulfill the requirements above. The Engineer will compare the items on the traffic signal materials list to the prequalified list. If all of the items match, the Engineer will sign the traffic signal materials list attesting that the materials are approved for use on the project. Forward a copy of the list to each of the following: Bureau Chief of Construction and Materials, Bureau Chief of Transportation Safety & Technology, and the maintaining agency's contact person indicated in the Contract Documents.

In the event the Contractor wishes to provide any item that is not on the prequalified list, provide the Engineer with the information for prequalification per **subsection 1703.4**. Forward this information to the Bureau of Transportation Safety & Technology for review and approval, along with possible addition to the prequalified list.

- (3) Electrical conduit: Receipt and approval of a Type D certification as specified in **DIVISION 2600** and visual inspection for condition and compliance with dimensional or other requirements.

(4) Structural steel poles and mast arms:

(a) Receipt and approval of a copy of the certified mill test reports for each heat or lot of material showing process of manufacture and compliance with chemical and physical requirements of the applicable specifications. Submit these reports to the Engineer of Tests.

(b) Satisfactory results of tests performed at destination to determine the weight of the zinc coating.

(c) Provide detailed shop drawings on all poles from the traffic signal pole manufacturer. Include drawings of the poles, mast arm and luminaire arm (on combination poles) dimensions, arm attachment details, handhole details, and anchor bolt details. Include the signal weight, projected areas and mounting arrangement the poles are designed to accommodate. Submit design calculations along with the shop drawings. Approved shop drawings will be included on the prequalified list.

For traffic signal poles that are not covered by the approved manufacturer's standard shop drawings, submit 3 copies of the detailed shop drawings, along with the design calculations to the Engineer for approval by the Bureau of Transportation Safety & Technology.

(d) Along with the traffic signal materials list, submit the necessary traffic signal pole ordering information. The Engineer will review the information for compliance with the plan dimensions for pole height, mast arm length/mounting height and luminaire arm length/mounting height.

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(e) Visual inspection at destination for condition, compliance with dimensions and requirements as indicated by the approved documents.

(5) Materials such as ferrous-and non-ferrous metals or other materials are governed by other sections of these specifications.

b. Lighting.

(1) Electrical conduit: Receipt and approval of a Type D certification as specified in **DIVISION 2600** and visual inspection for condition and compliance with dimensional or other requirements.

(2) Structural steel poles and mast arms:

(a) Receipt and approval of a copy of the certified mill test reports for each heat or lot of material showing process of manufacture and compliance with chemical and physical requirements of the applicable specifications. Submit these reports to the Engineer of Tests.

(b) Satisfactory results of test performed at destination to determine the mass of the zinc coating.

(c) Visual inspection at destination for condition and compliance with dimensions or other requirements.

(3) Materials such as ferrous-and non-ferrous metals or other materials are governed by other sections of these specifications.

(4) Materials for electric lighting installations not covered elsewhere in these specifications are shown in the Contract Documents. Base acceptance of these materials on the following:

(a) Approval of shop drawings, catalog cuts, brand names or other requirements as shown in the Contract Documents. Submit 7 copies of all catalog cuts, shop drawings, etc. to the following address for approval:

KDOT
Bureau of Transportation Safety and Technology
Eisenhower State Office Building
700 SW Harrison Street
Topeka, Kansas 66603-3754

(b) Visual inspection at destination for condition and compliance with requirements as indicated by the approved documents.