SECTION 262813 - FUSES

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

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

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:

Cartridge fuses rated 600 V ac and less for use in the following:

Control circuits.

Motor-control centers.

Panelboards.

Switchboards.

Enclosed controllers.

Enclosed switches.

* + - 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. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				5. Product Data: For each type of product. Include construction details, and material descriptions include the following for each fuse type indicated:

Retain "Ambient Temperature Adjustment Information" subparagraph if variations in fuse performance due to ambient temperature extremes can affect system performance.

Catalog sheets.

Specifications.

Retain subparagraphs below if final system short-circuit and coordination studies will be performed by the designer or will be assigned to an independent consultant. These curves are beneficial to Owner for future additions or reevaluations of settings of overcurrent protective devices.

Installation instructions.

Some manufacturers no longer offer curves on translucent graph paper for manual, visual comparison of fuse-protection and equipment-damage curves since there seems to be little demand for this format. However, curves can normally be downloaded from manufacturers' Web sites or be obtained, in electronic form, from various coordination software vendors as part of a subscription service. Retain first option in first subparagraph below if data will be used in software final system short-circuit and coordination studies. Retain third option if visual curve comparisons will be performed by the designer without access to coordination software or the printed curves will be retained by the Owner for future use.

* + - 1. MAINTENANCE

Coordinate this article with other electrical Sections, and Sections in other Divisions specifying fuses, for quantities of spare fuses to include. Do not include spare fuses in this Section if spare fuses are already specified in other electrical Sections or in Sections in other Divisions.

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

Fuses: Six spare fuses of each size and category, including any accessories required for a complete installation.

Special tools if required for installation or removal of fuses.

* + - 1. FIELD CONDITIONS

For fuses installed outdoors or in unusual environmental conditions, revise this article to indicate minimum and maximum ambient temperatures and expected humidity range. See "Ambient Air Temperature Compensation" paragraph in the Evaluations.

* + - * 1. Where ambient temperature to which fuses are directly exposed is less than 40 deg F<**Insert temperature**>or more than 100 deg F<**Insert temperature**>, apply manufacturer's ambient temperature adjustment factors to fuse ratings.
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.

* + - 1. MANUFACTURERS
				1. Mersen Inc. https://ep-us.mersen.com/
				2. CooperIndustriesInc.'s/BussmanDiv. http://www.cooperindustries.com/content/public/en/bussmann/electrical.html
				3. Littlefuse Inc. https://www.littelfuse.com/
				4. Source Limitations: Obtain fuses, for use within a specific product or circuit, from single source from single manufacturer.
			2. FUSES RATED 600V OR LESS

Fuse "Class" defines fuse performance category, including interrupting rating. See Evaluations for more information on fuse characteristics. Include current rating and class for cartridge fuses either on Drawings or in "Fuse Applications" Article.

* + - * 1. Characteristics: NEMA FU 1, current-limiting, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.

Type RK-1: [**250**] [**600**]-V, zero- to 600-A rating, 200 kAIC[**, time delay**].

Type RK-5: [**250**] [**600**]-V, zero- to 600-A rating, 200 kAIC[**, time delay**].

Type L: 600-V, 601- to 6000-A rating, 200 kAIC[**, time delay**].

* + - * 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. Comply with NEMA FU 1 for cartridge fuses.
				3. Comply with NFPA 70.
				4. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.
1. EXECUTION
	* + 1. EXAMINATION
				1. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.
				2. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.
				3. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.
				4. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.
				5. Proceed with installation only after unsatisfactory conditions have been corrected.
			2. FUSE APPLICATIONS

Retain this article if fuse class and type designations are not indicated on Drawings. Indicate fuse ampere ratings on Drawings. See Evaluations for discussions of fuse classes and types. Retain fuse classes and types by coordinating required average melt characteristics and peak let-through currents with Section 260573.16 "Coordination Studies." See "Cartridge versus Plug Fuses" Article in the Evaluations for additional guidance in making selections.

In small systems, the fuse characteristics might be shown on the system single-line diagram. In larger or more complex systems, a separate fuse application chart would be more advantageous.

* + - * 1. Cartridge Fuses:

Multiple fuse types might be specified for an application from the following types for a single project. If more than one class is selected for any of the following applications, indicate on the Drawings which class is required for each fuse of that application type. Consider using a chart to clearly indicate usage.

Service Entrance: [**Class L, fast acting**] [**Class L, time delay**] [**Class RK1, fast acting**] [**Class RK1, time delay**]

Feeders: [**Class L, fast acting**] [**Class L, time delay**] [**Class RK1, fast acting**] [**Class RK1, time delay**] [**Class RK5, fast acting**] [**Class RK5, time delay**]

Motor Branch Circuits: [**Class RK1**] [**Class RK5**], time delay.

Large Motor Branch (601-4000 A): Class L, time delay.

Other Branch Circuits: [**Class RK1, time delay**] [**Class RK5, time delay**].

If retaining subparagraph below, verify open indication is available in the fuse type or fuse covers included in the Specifications. If indication is desired for some fuse types and not others, include a list of fuses that require indication.

Provide open-fuse indicator fuses or fuse covers with open fuse indication.

* + - 1. INSTALLATION
				1. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.
				2. Install spare-fuse cabinet(s) in location shown on the Drawings or as indicated in the field by **Director’s Representative**].
			2. IDENTIFICATION
				1. Install labels complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems" and indicating fuse replacement information inside of door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION 262813