

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C57.12.28 (1999) Pad-Mounted Equipment - Enclosure Integrity

ASTM INTERNATIONAL (ASTM)

ASTM A 123/A 123M (2002) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A 153/A 153M (2005) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM D 2472 (2000) Sulphur Hexafluoride

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 386 (1995; R 2001) Standard for Separable Insulated Connector Systems for Power Distribution Systems Above 600V

IEEE C37.71 (2001) Standard for Three-Phase, Manually Operated Subsurface Load-Interrupting Switches for Alternating-Current Systems

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA C37.72 (1987) Manually-Operated Dead-Front Padmounted Switchgear with Load Interrupting Switches and Separable Connections for Alternating-Current Systems

1.2 GENERAL REQUIREMENTS

NOTE: If Section 16003S GENERAL ELECTRICAL PROVISIONS is not included in the project specification, applicable requirements therefrom should be inserted and the following paragraph deleted.

Sections 16003S GENERAL ELECTRICAL PROVISIONS and 16286S OVERCURRENT PROTECTIVE DEVICES apply to work specified in this section.

Connection Diagrams for heater connections shall be marked permanently on drawings and shipping covers.

1.3 SUBMITTALS

NOTE: Review Submittal Description (SD) definitions in Section 01330 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.][for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Connection Diagrams for heater connections shall be submitted in accordance with paragraph entitled, "General Requirements," of this section.

Detail drawings shall show mounting details and configuration for the following:

Load- Break Switches

SD-03 Product Data

Equipment and performance data shall be provided for the following items:

SF6 Load-Break Switches
Space Heaters
Mounting Frames
Accessories

SD-06 Test Reports

Test reports for the following shall be in accordance with [IEEE C37.71] and [NEMA C37.72].

Basic Impulse Insulation Level (BIL)
Withstand Voltage Rating
Momentary RMS Asymmetrical Rating
Leak Tests

SD-10 Operation and Maintenance Data

Operation and Maintenance Manuals shall be submitted for the following equipment:

Switches
Space Heaters

1.4 SHIPPING

Prior to shipment, leak tests shall be performed and the completed switch assembly shall be certified to have leak rate less than 10⁻⁷cubic (.0000001)centimeters per second by a helium mass spectrometer test. Switches shall be sealed and filled with SF6 to a nominal 70 kilopascal 10 psig positive pressure at 24 degrees C 75 degrees F.

PART 2 PRODUCTS

2.1 SWITCHES

Gas insulated load-break switches shall be of the [subsurface] [pad-mounted] [vault] [_____] type and shall be in accordance with [IEEE C37.71] [NEMA C37.72] and IEEE 386.

Sulphur hexafluoride (SF6) gas shall be in accordance with ASTM D 2472.

SF6 load-break switches shall be manually operated, load-interrupting type, load-break switches and shall be rated [15] [_____] kV [600] [_____] amperes, minimum, continuous and load break for operation on a [12.47] [_____] kV, 3-phase, 3-wire system. Switch shall have momentary rms asymmetrical rating of [22.5] [_____] kA and close rms symmetrical rating of [12.5] [_____] kA for [1 minute] [_____] 60 Hz withstand voltage rating of [35] [_____] kV and basic impulse insulation level (BIL) of [95] [_____] kV. Switches shall be the type indicated and shall be designed to show the internal wiring, indicating each switch position. Each switching way shall be provided with [600A dead break] [200A deep well] bushings.

Switch enclosures shall be in accordance with ANSI C57.12.28 and shall be equipped with ground bus capable of carrying the rated fault current for one second for each way.

Each switch shall have pressure gage, position viewing window and fill plug.

watts/square foot of outer surface area. Heaters shall be such that the power density does not exceed [4] [_____] watts per 650 square millimeter [4] [_____] watts per square inch of heater element surface. Heaters shall be rated at [240] [_____] volts for connection at [120] [_____] volts. Heaters shall be located at the lowest portion of each space to be heated. Terminals shall be covered. Thermostats shall be used to regulate the temperature.

Heaters shall be installed and operable at the time of shipment so that the heaters can be operated immediately on arrival at the site, during storage, or before installation. Connection locations shall be marked prominently on drawings and shipping covers with temporary leads for storage operation easily accessible without removal of shipping protection.

2.4 COORDINATION

Power fuses shall be coordinated with the circuit breaker settings in the substation and with the transformer rating. Time-current characteristics, minimum melt and total clear times shall be as required.

2.5 MOUNTING FRAMES

NOTE: Choose the following paragraphs when
pad-mounted switches are used. Subsurface switches
do not require frames since they mount directly to
the floor, walls, or ceiling.

Mounting frames of angle-iron construction, shall be furnished for all [pad] [_____] -mounted switches and shall be hot-dipped galvanized after fabrication in accordance with [ASTM A 123/A 123M] [ASTM A 153/A 153M].

After fabrication, all exposed ferrous metal surfaces of the pad mount enclosure shall be cleaned and painted.

Mounting frames shall be painted in accordance with NEMA C37.72.

2.6 FACTORY FINISH

NOTE: For all outdoor applications and all indoor
applications in a harsh environment refer to Section
09960 HIGH-PERFORMANCE COATINGS." High performance
coatings are specified for all outdoor applications
because ultraviolet radiation will break down most
standard coatings, causing a phenomena known as
chalking, which is the first stage of the corrosion
process. For additional information contact The
Coatings Industry Alliance, specific suppliers such
as Keeler and Long and PPG, and NACE International
(NACE).

Switches shall be provided with the manufacturer's standard paint finish when used for most indoor installations. For harsh indoor environments (any area subjected to chemical and/or abrasive action), and all outdoor installations, refer to Section 09960 HIGH-PERFORMANCE COATINGS.

PART 3 EXECUTION

3.1 INSTALLATION

Switches shall be installed in accordance with the manufacturer's instructions. Installation shall include all necessary hardware, insulators, and connections to line wire or bus.

3.2 GROUNDING

Switch tanks, mounting frames, and operating mechanisms shall be solidly bonded to the station ground counterpoise in accordance with [IEEE C37.71] [NEMA C37.72] and Section 16065S SECONDARY GROUNDING.

Incoming line position shall have a warning tag that states "CAUTION: INCOMING LINE, DO NOT GROUND."

3.3 FIELD TESTING

Load break switch assembly shall be disconnected from the power supply and feeder cables and the switch enclosure grounded before conducting insulation and high-voltage tests.

Load break switch assembly shall be given an insulation-resistance test with a 5000V insulation-resistance test set.

All tests shall be applied for not less than 5 minutes and until three equal consecutive readings one minute apart are obtained. Readings shall be recorded every 30 seconds during the first 2 minutes and every minute thereafter. Minimum acceptable resistance readings are 100 megohms.

Upon satisfactory completion of the insulation-resistance test, the load break switch shall be subjected to a high-voltage, 60-Hz withstand test. Test voltage shall be equal to 75 percent of the factory test values and shall be applied for one minute.

Upon satisfactory completion of the high-voltage, 60-Hz withstand test, the switch assembly shall be given a second insulation-resistance test as before. Results of the second insulation-resistance test shall be within 5 percent of the first test values and shall indicate no evidence of permanent injury by the high potential test.

Switch assembly shall be operated in the presence of the Contracting Officer. Final test reports shall be provided to the Contracting Officer. Reports shall have a cover letter/sheet clearly marked with the System name, Date, and the words "Final Test Reports - Forward to the Systems Engineer/Condition Monitoring Office/Predictive Testing Group for inclusion in the Maintenance Database."

-- End of Section --