

V.E
PJM DESIGN & APPLICATION OF
LOAD-INTERRUPTING SWITCHES (CIRCUIT SWITCHERS)

1.0 GENERAL REQUIREMENTS

- 1.1. The nominal voltage ratings of the effectively grounded transmission systems are 230 kV. The 230 kV system frequently operates at 242 kV continuously. Load-interrupting switches and all parts shall be capable of operating at these voltages.
- 1.2. PJM load-interrupting switches which are designed to operate at 230 kV shall be designed for these voltages and shall be equipped to operate at these levels as indicated in these requirements.
- 1.3. High voltage air disconnect switches associated with load interrupting devices shall meet the requirements outlined in the latest version of "PJM Design and Application of Air Disconnect Switches".

2.0 SPECIFICATION

- 2.1 All load-interrupting switches shall meet or exceed the latest applicable ANSI, IEEE, NEMA, ASME and ASTM Standards and Loading Guides. In case of conflict, these standards shall govern in the order stated.
- 2.2 Load-interrupting switches (circuit switchers) shall be designed with adequate electrical and mechanical characteristics for the specific electrical system on which it is installed and for the application for which it is intended. These include but shall not be limited to: continuous current rating, short-circuit capability, interrupting capabilities, operating voltage, BIL, transient recovery voltage and environmental conditions.

Special consideration shall be given to all switching applications, specifically cable, capacitor and reactor switching. Careful analysis of switching application is requisite to proper switch application.

- 2.3 Load-interrupting switches shall be designed for an in service operating life, considering normal routine maintenance, comparable to other electrical apparatus in the system to which it is applied.
- 2.5 The following ratings apply to 230 kV load-interrupting switches installed on the 230 kV system:

2.5.1.	Voltage Class	230 kV
2.5.2.	Maximum Rated Voltage	242 kV
2.5.3.	BIL	900 (kV peak minimum)

Load-interrupting switch BIL shall be carefully selected based on system studies, insulation coordination, and surge protection provided. Consideration shall be given to insulation capabilities to ground and insulation capability across an open switch. BIL must be carefully selected to avoid open switch flashover.

3.0 APPLICATION & SPECIAL CONSIDERATIONS

- 3.1 Local environmental conditions should be considered when selecting creep requirements for load-interrupting switch bushings.
- 3.2 Load-interrupting switches, at a minimum, shall be designed to operate at ANSI required ambients of -30°F to +105°F (-35°C to +40°C). All disconnects and load-interrupting switches shall be designed to operate satisfactorily in the ambients dictated at their installed location. Some locations in PJM have required -40°C capability.
- 3.3 Load-interrupting switches shall successfully open and close with a 3/4 inch of radial ice.

4.0 EMERGENCY RATINGS

- 4.1 Emergency ratings of electrical system apparatus, including load-interrupting switches (circuit switchers), are critical to the reliable operation of the PJM system. Ratings of load-interrupting switches (circuit switchers) applied to the PJM system should be determined using manufacturers guidelines.

5.1 MAINTENANCE

See section V.L.2.E for maintenance requirements.