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# Guide for Handling and Maintenance of Alternating Current Outdoor High-Voltage Circuit Breakers



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*Guide for Handling and Maintenance of  
Alternating Current Outdoor High-Voltage Circuit Breakers*

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## Foreword

This guide was written to provide basic principles and guidance on maintaining alternating current outdoor high-voltage circuit breakers. Proposed or recommended revisions should be submitted to:

NEMA Technical Operations Department  
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This guide was developed by the Switchgear Section of the Power Equipment Division. Section approval of the guide does not necessarily imply that all section Members voted for its approval or participated in its development. At the time it was approved, the Section was composed of the following Members:

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## Section 1 Scope

### 1.1 Scope

This document provides information on receiving, storage, handling, installation, inspection, and maintenance of alternating current outdoor high-voltage circuit breakers.

It is impossible to cover here in detail all guidelines for each of the different types of circuit breakers manufactured, but the following information is given relative to the most important points to be considered. The instructions specified by the manufacturer shall be carefully studied and followed.

The requirements of ANSI/NFPA 70B, ANSI/NFPA 70E, ANSI C2, and applicable OSHA regulations shall be adhered to in connection with any maintenance or operation of high-voltage circuit breakers. Before performing any work in the vicinity of high-voltage circuit breakers, all conductors shall be first tested to verify the absence of voltage and then grounded using appropriate test equipment and adequate grounding equipment conforming to ASTM F-855, using appropriate personal protective equipment. Any conductors which are not adequately grounded shall be treated as being energized.

Note: In this document, "circuit breaker" means "alternating current outdoor high-voltage circuit breaker" unless otherwise stated or implied in the context.

### 1.2 References

- 1) ANSI C2 (NEC) *National Electrical Safety Code*, (NESC)
- 2) ANSI/IEEE C37.04 *Standard Rating Structure for AC High-Voltage Circuit Breakers with Rated Maximum Voltage above 1000 V*
- 3) ANSI/IEEE C37.122.3 *Guide for Sulphur Hexafluoride (SF<sub>6</sub>) Gas Handling for High Voltage (over 1000 Vac) Equipment*
- 4) ANSI/IEEE 3- *Recommended Practice in the Selection of Reference Ambient Conditions for Test Measurements of Electrical Apparatus*
- 5) ANSI/NFPA 70B- *Recommended Practice for Electrical Equipment Maintenance*
- 6) ANSI/NFPA 70E- *Standard for Electrical Safety in the Workplace*
- 7) ASTM D-877-02 *Standard Test Method for Dielectric Breakdown Voltage of Insulating Liquids Using Disk Electrodes*
- 8) ASTM F855 *Standard Specifications for Temporary Protective Grounds to Be Used on De-energized Electric Power Lines and Equipment*
- 9) CIGRE Brochure No. 276, "*Practical SF<sub>6</sub> Handling Instructions*," Paris, France, 2005.
- 10) IEC 60376-3, "*Specification of Technical Grade Sulfur Hexafluoride (SF<sub>6</sub>) for Use in Electrical Equipment*," Geneva, Switzerland, 2006.
- 11) IEC 61480 Ed 2.0, "*Guidelines for the Checking and Treatment of Sulfur Hexafluoride (SF<sub>6</sub>) Taken from Electrical Equipment and Specification for its Re-use*," Geneva, Switzerland, 2004.
- 12) IEC 62271-303, "*Use and Handling of Sulfur Hexafluoride (SF<sub>6</sub>)*," Geneva, Switzerland.
- 13) IEEE 80- *Guide for Safety in AC Substation Grounding*
- 14) NEMA SG-10 *Guide to OSHA and NFPA 70E Safety Requirements When Servicing and Maintaining Medium-Voltage Switchgear and Circuit Breakers Rated Above 1000 Volts*