

IEEE Standard Requirements for High-Voltage Air Switches

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IEEE Standard Requirements for High-Voltage Air Switches

Sponsor
Switchgear Committee
of the
IEEE Power Engineering Society

Approved June 18, 1992
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Abstract: Requirements for all high-voltage enclosed indoor or outdoor and nonenclosed indoor or outdoor air switches rated in excess of 1000 V are specified. This includes requirements for such switch types as disconnecting, selector, horn-gap, grounding, interrupter, etc., for manual or power operation, except for distribution-enclosed single-pole air switches and distribution cutouts fitted with disconnecting blades. Definitions are given, and service conditions and ratings are discussed. Nameplate marking requirements are given.

Keywords: high-voltage air switches, indoor air switches, outdoor air switches

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Foreword

(This foreword is not a part of IEEE Std C37.30-1992, IEEE Standard Requirements for High-Voltage Air Switches.)

This publication is one of a series of American National Standards and IEEE Standards on high-voltage air switches that includes the following:

- IEEE Std C37.30-1992, IEEE Standard Requirements for High-Voltage Air Switches
- ANSI C37.32-1990, American National Standard Schedules of Preferred Ratings, Manufacturing Specifications, and Application Guide for High-Voltage Air Switches, Bus Supports, and Switch Accessories
- ANSI C37.33-1987, American National Standard for High-Voltage Air Switches—Rated Control Voltages and their Ranges
- IEEE C37.34-1971 (Reaff 1987), IEEE Standard Test Code for High-Voltage Air Switches (ANSI)
- IEEE C37.35-1976 (Reaff 1987), IEEE Guide for the Application, Installation, Operation, and Maintenance of High-Voltage Air Disconnecting and Load Interrupter Switches*
- IEEE C37.36b-1990, IEEE Guide to Current Interruption with Horn-Gap Air Switches (ANSI)
- IEEE C37.37-1979 (Reaff 1987), American National Standard Loading Guide for AC High-Voltage Air Switches (in excess of 1000 volts) (ANSI)

This standard includes previously approved supplements that cover ratings for ice-breaking ability, mechanical operations, mechanical terminal loads, and limits of corona and radio influence voltage as well as ratings based on total temperature limits for air-switch parts.

The changes in temperature limitations are intended to allow new materials to be used in switch construction. These limitations allow each material to be used at its maximum efficiency consistent with safe operating practices and acceptable durability, with minimum maintenance programs.

The allowable short-circuit temperatures for air-switch parts appear as starting (θ_1) and final (θ_2) temperature limits in the short-time current capability design guide formulas of 9.1.1 in ANSI C37.32-1990 and are referenced in 3.5.2.

This standard recognizes that air switches can be operated at allowable continuous currents in excess of rated continuous currents when reduced ambient temperatures prevail. A formula is provided to calculate the allowable continuous current for any ambient temperature at which the switch can operate without exceeding its temperature limits.

Indoor and outdoor air switches built prior to 1971 in accordance with previous American National Standards and IEEE Standards were allowed a 30 °C temperature rise over a maximum ambient of 40 °C. In this way, they operated at a maximum temperature of 70 °C. With a 25 °C ambient, these switches could operate at 1.22 times rated current without exceeding the 70 °C maximum temperature.

“Enclosed switches,” sometimes referred to as “indoor switches,” were permitted to operate at a 30 °C rise above a cooling air temperature of 55 °C within the enclosure. With a 25 °C outside ambient temperature, these switches could also be loaded to 1.22 times nameplate rating.

The temperature limits included in this standard preserve this 1.22 increase in current-carrying capability when ambient temperature is reduced from 40 °C to 25 °C. The effect of this change is to preserve average current-carrying capability over a range of ambient temperatures from 10 °C to 40 °C by limiting permissible temperature rise values. For example, silver-to-silver contacts operate at a maximum temperature of 105 °C in an ambient of 40 °C. However, the permissible temperature rise at rated current is not 65 °C but is limited to 53 °C

*Withdrawn by ANSI.

in order to maintain current-carrying capability at reduced ambients. The net effect of these changes is as follows:

- (1) To recognize the maximum operating temperature for each of a variety of materials commonly used in switch construction.
- (2) To recognize that switches can be operated at currents that are higher than the rated continuous current provided maximum temperature limits are not exceeded.
- (3) To provide classes of temperature-rise limits instead of the universal 30 °C permissible temperature rise allowed on switch current-carrying parts in standards prior to 1971.
- (4) To clarify the distinction between switches designed for indoor service and those for use in an enclosure.

These limits will provide for new economies in switch construction by allowing materials to be used to their full capability and, at the same time, will preserve the current-carrying capability of switches built in accordance with previous standards.

Requirements for interrupter switches used to switch capacitance loads are coordinated between IEEE Std C37.30-1992 and IEEE C37.34-1971.

Suggestions for improvement gained in the use of this standard will be welcome. They should be sent to the Secretary, IEEE Standards Board, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331 USA.

The Working Group on Air Switches of the High-Voltage Switches Subcommittee of the IEEE Switchgear Committee, which prepared this standard, had the following members at the time of approval:

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