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Standard
for
LOW-VOLTAGE AIR CIRCUIT BREAKERS
(and Application Guide)



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Development of the Standards of the American Institute of Electrical Engineers

Recognizing the importance in the development of electrical engineering, of standardization in the electrical field, the AIEE in 1898 appointed a Committee on Standardization, consisting of seven members having qualifications and experience from designing, manufacturing and operating standpoints. The report of this Committee was accepted at a meeting of the Institute in June 1899.

Experience gained in applications of the standards and further developments in electric apparatus and methods showed the necessity of revision, and a committee was appointed which after consultation with manufacturing and operating engineers presented the first revised report on Standardization Rules of the AIEE in June 1902.

The next revision was undertaken by a committee of ten, which presented its report in May 1906.

In September 1906, a Standards Committee of eleven members was appointed for further revision, and its report was presented in June 1907.

The appreciation of the importance and value of standardization resulted in the formation of a Standing Committee, with the title of Standards Committee of the AIEE. This became effective in the Constitution of June 1907. The scope and amount of work necessitated increasing the number of members from time to time until in 1922 there were 37 members divided into a number of subcommittees specializing on various subjects.

AIEE Standards published in a single volume as each revision was adopted were generally accepted as standards of the electrical industry of the United States since the adoption of the first report in 1899. Subsequent reports on standards were made and published, in some cases in several editions. The dates of adoption by the Board of Directors of such reports are as follows: June 20, 1902; June 21, 1907; June 27, 1912; July 10, 1914; June 30, 1915; June 28, 1916; November 8, 1918; October 8, 1920, and June 29, 1922.

On June 29, 1922, in view of the increasing complexity of the work, a reorganization of the Standards Committee was effected, and a working organization established which provided for an increase in standardization work and for the appointment of Working Committees of the Standards Committee of non-Institute members.

The present plan under which the Institute Standards are being issued involves the separation of the complete body of standards into more than forty sections, each published as a separate pamphlet and dealing with a specific subject. Each section of the standards has been formulated either by a subcommittee of the Standards Committee which was made as representative as possible for the work in hand, by an AIEE Technical Committee or subcommittee, or by a Sectional Committee organized according to the procedure of the American Standards Association. The division of the standards into a number of separate publications simplifies the process of keeping the standards revised to conform with the latest development and enables those interested in a particular field to obtain in concise form the material relating to that field. In framing the Institute Standards the chief purpose has been to define terms and conditions which characterize the rating and behavior of electric machinery and apparatus, with special reference to the conditions of acceptance tests.

The AIEE Standards Committee takes this occasion to draw attention to the value of suggestions based upon experience gained in the application of the standards to general practice. Any suggestions looking toward improvements in the standards will be welcomed for the guidance of the Committee in preparation of future editions, and should be communicated to the Secretary of the AIEE Standards Committee, 33 West 39th Street, New York 18, N. Y.

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The Institute wishes to acknowledge its indebtedness to those who have so freely given their time and knowledge and have conducted experimental work on which many of the AIEE Standards are based.

This proposed standard was prepared by a Working Group for Low-Voltage Air Circuit Breakers of the AIEE Committee on Switchgear. The personnel of this Working Group was as follows:

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Standard of the American Institute of Electrical Engineers

LOW-VOLTAGE AIR CIRCUIT BREAKERS

SCOPE

This standard applies to all air circuit breakers with interrupting rating over 10,000 amperes as follows:

- A. Air circuit breakers 1500 volts or less alternating current and 3000 volts or less direct current. Special purpose air circuit breakers for the control of generators, rectifiers and for heavy duty applications, in addition to meeting these standards generally have other requirements not yet standardized.
- B. All field discharge breakers comprising air circuit breaker contact elements with field discharge contacts added, of any ampere rating single pole or multipole.
- C. Air circuit breakers assembled as integral units in supporting and enclosing housings of insulation material for voltage ratings up to and including 600 volts alternating current, 250 volts direct current.
- D. Air circuit breakers, when in individual enclosures usually built of steel for separate mounting.

SERVICE CONDITIONS

- 20-1 **Usual Service Conditions**—Equipment conforming to this standard shall be suitable for operation at its standard rating, provided that:

(a) The temperature of the cooling air (ambient temperature) does not exceed 40C if the equipment has copper-to-copper contacts or equivalent.

(b) The temperature of the cooling air (ambient temperature) does not exceed 55C if the equipment has all contacts silver-surfaced or equivalent, and in addition has all conducting joints, including terminal connections, either—

- (1) soldered or silver-surfaced and separately held mechanically, or
- (2) brazed, welded or silver-soldered and provided that such operation does not result in temperatures in excess of 90C for Class O, 105C for Class A or 130C for Class B insulations.

(c) The altitude does not exceed 3300 ft. (1000 meters).

- 20-2 **Unusual Temperature & Altitude Service Conditions**—The application of equipment at higher ambient temperatures or at higher altitudes than specified in Usual Service Conditions shall be considered as special.

Standard equipment may be applied at higher ambient temperatures or at higher altitudes than specified, but its performance may be affected and special consideration should be given to these applications.

- 20-3 **Other Conditions Which May Affect Design & Application**—Where other unusual conditions exist they should be brought to the attention of those responsible for the design and application of the equipment. Examples of such conditions are:

(a) Damaging fumes or vapors, excessive or abrasive dust, explosive mixtures of dust or gases, steam, salt spray, excessive moisture or dripping water, etc.

(b) Abnormal vibration, shocks, or tilting.

(c) Excessively high or low temperature.

(d) Unusual transportation or storage conditions.

(e) Unusual space limitations.

(f) Unusual operating duty, frequency of operation, difficulty of maintenance, poor wave form, unbalanced voltage, special insulation requirements, etc.

- 20-4 **Applications at Altitudes Greater than 3300 Feet (1000 meters)**—Circuit breakers may be used at altitudes greater than 3300 feet (1000 meters) provided their current rating and voltage rating are multiplied by the following factors to obtain the voltage and current at which the application may be made.

Altitude	Rating Correction Factors	
	Current	Voltage
3300 feet (1000 meters)	1.00	1.00
5000 feet (1500 meters)	0.99	0.95
10000 feet (3000 meters)	0.96	0.80
20000 feet (6000 meters)	0.90	0.56

For other values see AIEE Standard No. 1B

DEFINITIONS

Definitions as given herein apply specifically to the apparatus treated in this standard. For addi-