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Standard
for
FUSES ABOVE 600 VOLTS



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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 A.I.E.E. 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 electrical 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 A.I.E.E. 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 A.I.E.E. 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.

A.I.E.E. Standards published in a single volume as each revision was adopted have been 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 on 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 Working Committee of the Standards Committee which was made as representative as possible for the work in hand, by an A.I.E.E. 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 electrical machinery and apparatus, with special reference to the conditions of acceptance tests.

The A.I.E.E. 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 practise. Any suggestions looking toward improvement 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 A.I.E.E. Standards Committee, 33 West 39th Street, New York.

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The major work of preparing this revised report was carried out by a Subgroup of the A.I.E.E. Committee on Protective Devices.

SUBGROUP ON FUSES

I. W. Gross, Chairman
American Gas and Electric Company
R. T. Henry, Buffalo, Niagara & Eastern Power Corp.
H. E. Kent, Edison Electric Institute
A. H. Powell, General Electric Co.
H. L. Rawlins, Westinghouse Elec. & Mfg. Co..
H. A. Triplett, Schweitzer & Conrad, Inc.

STANDARDS OF THE American Institute of Electrical Engineers

FUSES ABOVE 600 VOLTS

(Adopted by Board of Directors, February 27, 1945)

SCOPE

These standards apply to all types of fuses whether for indoor or outdoor service, except fuses for 600 volts and below.

SERVICE CONDITIONS

25-1 Usual Service Conditions—A fuse conforming to these standards shall be suitable for operation at its standard rating:

(a) When and where the temperature of the cooling medium does not exceed 40C.

(b) Where the altitude does not exceed 3300 feet (1000 meters).

25-2 Unusual Service Conditions—The use of a fuse where the ambient temperature is higher than 40C or at altitudes greater than 3300 feet (1000 meters) shall be considered as special.

Voltage Rating: For application at altitudes greater than 3300 feet (1000 meters) it is recommended that the standard voltage rating of the fuse should be multiplied by the following factors to obtain the modified rating:

Altitude in Feet	Correction Factors
3300 (1000 meters)	1.00
4000 (1200 ")	0.98
5000 (1500 ")	0.95
10000 (3000 ")	0.80

Temperature Rise: For fuses intended for service at altitudes greater than 3000 feet (1000 meters) it is provisionally agreed that the permissible temperature rise during test at low altitudes (up to 3300 feet) shall be less than that specified in these standards by 0.4 percent of the specified rise for each 330 feet (100 meters) of altitude in excess of 3300 feet (1000 meters) at which the actual installation is to take place. (See Par. 25-156.)

25-3 Conditions Affecting Constructional or Protective Features—There are further unusual conditions which, where they exist, should receive special consideration. Such conditions should be brought to the attention of those responsible for the application, manufacture and operation of the

fuses. Fuses for use in such cases may require special construction or protection. Among such unusual conditions are:

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

(b) Exposure to abnormal vibration, shocks, or tilting.

(c) Exposure to excessively high or low temperatures.

(d) Exposure to unusual transportation or storage conditions.

(e) Unusual space limitations.

(f) Unusual operating duty, frequency of operation, difficulty of maintenance, etc.

DEFINITIONS

Definitions as given herein apply specifically to the apparatus treated in this standard. For other definitions applying to fuses, see American Standard Definitions of Electrical Terms, ASA C42.

General

25-50 Fuse—A fuse is an over-current protective device with a circuit-opening fusible member directly heated and destroyed by the passage of overcurrent through it.

25-51 Vented Fuse—A vented fuse is a fuse which during circuit interruption may eject forcibly arc gases, solid particles, liquid or other material into the surrounding atmosphere.

25-52 Non-Vented Fuse—A non-vented fuse is a fuse which during circuit interruption does not eject forcibly arc gases, solid particles, liquid or other material into the surrounding atmosphere.

Construction

25-53 Current-Responsive Element—The current responsive element of a fuse is the conducting section with predetermined characteristics, the melting

and/or severance of which initiates the interruption function of the fuse. (The current responsive element may consist of the combination of a fusible element and, when used, a strain element.)

25-54 Conducting Element—The conducting element of a fuse is the conducting means, including the current responsive element, for completing the electric circuit between the terminals of the fuse holder.

25-55 Arc Extinguishing Medium—The arc extinguishing medium of a fuse is the material included in the fuse to facilitate current interruption.

25-56 Refill Unit—A refill unit of a fuse is an assembly comprising a conducting element, the complete arc extinguishing medium and parts normally required to be replaced after each circuit interruption to restore the fuse to its original operating condition.

25-57 Fuse Link—A fuse link is a replaceable part or assembly comprised entirely or principally of the conducting element required to be replaced after each circuit interruption to restore the fuse to operating condition.

25-58 Fuse Tube—A fuse tube is a tube of insulating material which encloses the conducting element.

25-59 Fuse Holder—A fuse holder is an assembly of a fuse tube or tubes, together with parts necessary to enclose, and provide means of making contact with, the conducting element and the fuse clips. The fuse holder does not include the conducting element.

25-60 Fuse Unit—A fuse unit is an assembly comprising a conducting element mounted in a fuse holder with parts and materials in the fuse holder essential to the operation of the fuse.

25-61 Fuse Clips (Fuse Contacts)—Fuse clips are the contacts on the fuse support for connecting the fuse holder into the circuit.

25-62 Fuse Support (Fuse Mounting)—A fuse support is an assembly of base, insulating means, and fuse clips for mounting a fuse holder and connecting it into the circuit.

25-63 Fuse Cutout—A fuse cutout is an assembly of a fuse support and fuse holder which may or may not include the conducting element.

(a) *Enclosed Fuse Cutout*—An enclosed fuse cutout is a fuse cutout in which the fuse clips and fuse holder are mounted completely within an enclosure.

(b) *Open Fuse Cutout*—An open fuse cutout is a fuse cutout in which the fuse support and fuse holder are exposed.

(c) *Oil Fuse Cutout*—An oil fuse cutout is an enclosed fuse cutout in which all or a part of the fuse support is mounted in oil with provision for partial or complete immersion of the conducting element.

Modifying Terms

25-67 Liquid-Fuse Unit—A liquid-fuse unit is a fuse unit in which the arc is drawn through a liquid.

25-68 Solid-Material-Fuse Unit—A solid-material-fuse unit is a fuse unit in which the arc is drawn through a hole in solid material.

25-69 Filled-Fuse Unit—A filled-fuse unit is a fuse unit in which the arc is drawn through powdered, granular or fibrous material.

25-70 Expulsion-Fuse Unit—An expulsion-fuse unit is a vented fuse unit in which the expulsion effect of gases produced by the arc and the lining of the fuse holder, either alone or aided by a spring, extinguishes the arc.

25-71 Renewable-Fuse Unit—A renewable-fuse unit is a fuse unit which, after circuit interruption, may be restored for service.

(a) *Field Renewable-Fuse Unit*—A field renewable-fuse unit is a fuse unit which, after circuit interruption may be readily restored for service by the replacement of the fuse link or refill unit.

(b) *Factory Renewable-Fuse Unit*—A factory renewable-fuse unit is a fuse unit which, after circuit interruption, must be returned to the manufacturer to be restored for service.

25-73 Drop-Out Fuse—A drop-out fuse is a fuse in which the fuse holder automatically drops into an open circuit position after the fuse has interrupted the circuit.

25-74 Disconnecting Fuse—A disconnecting fuse is a fuse in which a fuse unit performs the function of a disconnecting blade.

25-75 Fuse Disconnecting Switch—A fuse disconnecting switch is a disconnecting switch containing an insulating blade for the support of a fuse unit.

25-76 Indicating Fuse—An indicating fuse is a fuse which automatically indicates that the fuse has interrupted the circuit.

25-77 Reclosing Fuse—A reclosing fuse is a combination of several fuse holders or fuse units mounted on a fuse support or supports, mechanically or electrically interlocked, so that one fuse can be connected into the circuit at a time and the functioning of that fuse automatically connects the next fuse into the circuit, with or without additional time delay, thereby permitting one or