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STANDARDS

FOR

ELECTRIC ARC WELDING APPARATUS



Approved as
AMERICAN STANDARD
by the
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September 6, 1933

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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 has been made as representative as possible for the work in hand 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 developments 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.

This standard, which has received approval as an American Standard, is a revision of the former A.I.E.E. Standard of March, 1925. The revision was prepared by a Sectional Committee of the American Standards Association, working under the joint sponsorship of the N.E.M.A. and the A.I.E.E.

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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STANDARDS

OF THE

American Institute of Electrical Engineers

ELECTRIC ARC WELDING APPARATUS

(Approved by the Board of Directors A.I.E.E. January 21, 1933)

(Approved by N.E.M.A., December 8, 1932)

(Approved as American Standard September 6, 1933)

SCOPE

The standards in this section apply to the following types of electric arc welding apparatus:

- (1) D-c generators
- (2) Motor-generator sets (including dynamotors)
- (3) A-c transformers
- (4) Resistors.

SERVICE CONDITIONS

38-1 Usual Service Conditions.—Machines conforming with these standards shall be suitable for carrying their rated load:

- (a) When and where the temperature of the cooling medium does not exceed 40 deg cent.
- (b) Where the altitude does not exceed 1000 meters (3300 ft).

38-2 Unusual Service Conditions.—The use of machines in cooling mediums having temperatures higher than 40 deg cent or at altitudes greater than 1000 meters (3300 ft) should be considered as special.

38-3 Conditions Affecting Constructional or Protective Features.—There are conditions which, while not usually affecting the rating, may require special consideration, principally with respect to constructional or protective features. Where such conditions exist it is recommended that they be brought to the manufacturer's attention. Among such conditions are:

- (a) Exposure to damaging fumes.
- (b) Operation in damp places.
- (c) Exposure to excessive dust.
- (d) Exposure to gritty dust.
- (e) Exposure to steam.
- (f) Exposure to excessive oil vapor.
- (g) Exposure to explosive gases.
- (h) Exposure to salt air.
- (i) Exposure to abnormal vibration or shock.

DEFINITIONS

Definitions of other welding terms will be found in the published standards of the American Welding Society and in "Definitions of Electrical Terms" prepared by the Sectional Committee on Electrical Definitions working under the spon-

sorship of the A.I.E.E. whose Preliminary Report No. 2 was issued in August 1932.

38-50 Weld.—A localized consolidation of metals.

38-51 Fusion Welding.—A process of welding metals in the molten, or molten and vapor state, without the application of mechanical pressure or blows.

38-52 Manual (Hand) Weld.—A weld made by an operator unaided by any mechanical guiding device.

38-53 Automatic Weld.—A weld made with equipment which automatically controls the entire welding operation, including the feed of the welding wire and the passage of the arc along the weld.

38-54 Semi-automatic Weld.—A weld made with a device which automatically controls the feed of the welding wire,—the manipulation of the wire being controlled by hand.

38-55 Base (Parent) Metal.—The material which is welded (or cut).

38-56 Weld Metal.—The material composing the weld.

38-57 Filler Metal.—The material that is added to the base metal to produce the weld in some forms of the fusion welding process. (See "Welding Rod" and "Arc Welding Electrode").

38-58 Arc Welding.—A fusion welding process wherein the welding heat is obtained from an electric arc formed either between the base metal and an electrode, or between two electrodes with or without the use of gases.

38-59 Carbon Arc Welding.—An arc welding process wherein a hard carbon or graphite electrode is used and filler metal, if required, is supplied by a welding rod.

38-60 Shielded Carbon Arc Welding.—A carbon arc welding process wherein the molten filler and weld metals are effectively protected from the air by supplemental means.

38-61 Metal Arc Welding.—An arc welding process wherein the electrode used is a metal rod or wire, which when melted by the arc, supplies the filler metal in the weld.