

IEEE Standard for Electrical Safety Practices in Electrolytic Cell Line Working Zones

IEEE Industry Applications Society

Developed by the
Petroleum and Chemical Industry Committee

IEEE Std 463™ -2019
(Revision of IEEE Std 463-2013)

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Petroleum and Chemical Industry Committee
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Approved 5 September 2019

IEEE-SA Standards Board

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Abstract: Means for improved safeguarding of personnel while operating or maintaining equipment located in electrolytic cell line working zones are provided in this standard. Related requirements for equipment and electrical conductor installations are also included. The general types of electrolytic cells covered include, but are not limited to, the direct current cells used in the production of aluminum, cadmium, sodium chlorate, chlorine, copper, fluorine, hydrogen peroxide, magnesium, sodium, and zinc.

Keywords: cell line working zone, electrical conductor installations, electrical safety, electrolytic cell line, IEEE 463™

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Introduction

This introduction is not part of IEEE Std 463-2019, IEEE Standard for Electrical Safety Practices in Electrolytic Cell Line Working Zones.

In 1974, the Electrical Cell Line Working Group of the Petroleum and Chemical Industry Committee prepared a trial-use standard for Electrical Safety Practices in Electrolytic Cell Line Working Zones. Comments on the trial-use standard were incorporated into a full-use IEEE standard, which was published as IEEE Std 463-1977. The standard was developed to provide electrical safety practices for the unique conditions of the working areas of electrolytic cell installations. It defines the extent of the area covered and sets forth means of improved safeguarding of personnel in the area. The means are based on many years of successful experience in the industry.

In 2018, a working group was formed for the purpose of reviewing and updating the standard.

This standard covers conditions that are different from the general safety requirements in electrical installations stated in IEEE Std 141™-1993, IEEE Recommended Practice for Electric Power Distribution for Industrial Plants (The Red Book) [B2],¹ and IEEE Std 142™-1991, IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems (The Green Book) [B3].

This standard was used as a source document for Article 668, Electrolytic Cell, of the National Electrical Code®(NEC®) (NFPA 70) and Article 310 of Chapter 3, Safety Requirements for Special Equipment, of the Standard for Electrical Safety in the Workplace (NFPA 70E).^{2,3}

Due to the design and operation requirements of electrolytic cell lines the work practices used in the cell line working zone differ from general safe work practices around electrical hazards. Electrolytic cell lines are operated ungrounded. Work practices in this area require specific work practices to minimize workers being exposed to electrical hazards in the cell line working zone.

This standard is of general necessity as each electrolytic cell line should be specifically evaluated due to the widely varied conditions of electrolytic cell areas. The selection of safeguards includes consideration of the nature and exposure of an electrical hazard as well as restriction of operation of the plant.

¹The numbers in brackets correspond to those of the bibliography in Annex C.

²The NEC is published by the National Fire Protection Association (<http://www.nfpa.org/>). Copies are also available from the Institute of Electrical and Electronics Engineers (<http://standards.ieee.org/>).

³NFPA publications are published by the National Fire Protection Association (<http://www.nfpa.org/>).

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1. Overview

This standard provides recommendations to help improve safeguarding of personnel while operating or maintaining equipment located in electrolytic cell line working zones. The standard also includes related requirements for equipment and electrical conductor installations within the cell line work zone.

1.1 Scope

This standard covers means of improved safeguarding of personnel while operating or maintaining equipment located in electrolytic cell line working zones. Included are related requirements for equipment and electrical conductor installations. The general types of electrolytic cells covered include, but are not limited to, the direct current (dc) cells used in the production of aluminum, cadmium, sodium chlorate, chlorine, copper, fluorine, hydrogen peroxide, magnesium, sodium, and zinc.

This standard does not cover the following:

- Any electrical equipment that is neither part of the electrolytic process equipment nor installed or used in the cell line working zone
- Electroplating and anodizing facilities
- AC cells or furnaces
- Electrothermally process furnaces
- Arc furnaces
- Melting or heat treating facilities
- Cells for hydrogen production
- Cells used as a source of electric energy

1.2 Purpose

The purpose of this standard is to provide methods for practical improved safeguarding of personnel operating or maintaining equipment in electrolytic cell line working zones from electrical hazards. The cell line working zone is defined in [Clause 4](#).