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IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications

IEEE Power and Energy Society

Developed by the
Stationary Battery Committee

IEEE Std 450™-2020
(Revision of IEEE Std 450-2010)

IEEE

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Approved 3 December 2020

IEEE SA Standards Board

Abstract: Maintenance, test schedules, and testing procedures that can be used to optimize the life and performance of permanently installed, vented lead-acid storage batteries used for standby service are provided. Guidance to determine when batteries should be replaced is also provided. This recommended practice is applicable to standby service stationary applications where a charger maintains the battery fully charged and supplies the dc loads.

Keywords: acceptance test, battery capacity, battery installation, battery maintenance, battery replacement criteria, battery service test, battery terminal voltage, connection resistance measurements, electrolyte level, equalize charge, float voltage, IEEE 450™, modified performance test, performance test, service test, specific gravity, standby power applications, state of charge, test-discharge rate, vented lead-acid battery

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Introduction

This introduction is not part of IEEE Std 450-2020, IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications.

Stationary lead-acid batteries play an ever-increasing role in industry today by providing normal control and instrumentation power and back-up energy for emergencies. This recommended practice fulfills the need within the industry to provide common or standard practices for battery maintenance, testing, and replacement. The installations considered herein are designed for standby service with a battery charger serving to maintain the battery in a charged condition as well as to supply power to the normal dc loads. However, specific applications, such as emergency lighting units and semiportable equipment, may have other appropriate practices that are beyond the scope of this recommended practice.

This recommended practice may be used separately and, when combined with IEEE Std 484™ and IEEE Std 485™, will provide the user with a general guide to sizing, designing, placing in service, maintaining, and testing a vented lead-acid storage battery installation.[1] IEEE Std 535™ [B5] provides a standard for qualification of Class 1E lead storage batteries for nuclear power generating stations.[2]

[1]Information on references can be found in Clause 2.
[2]The numbers in brackets correspond to those of the bibliography in Annex M.

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IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications

1. Overview

1.1 Scope

This document provides recommended maintenance, test schedules, and testing procedures that can be used to optimize the life and performance of permanently installed, vented lead-acid storage batteries used in standby service. It also provides guidance to determine when batteries should be replaced. This recommended practice is applicable to standby service stationary applications where a battery charger normally maintains the battery fully charged and provides the dc loads.

The maintenance and testing programs described in this recommended practice represent "the best program" based on the information available at the time this document was developed. The user should evaluate these practices against their operating experience, operating conditions, manufacturer's recommendations, resources, and needs in developing a maintenance program for a given application. These maintenance and testing recommendations were developed without consideration of economics, availability of testing equipment and personnel, or relative importance of the application. Development of a maintenance and testing program for a specific application requires consideration of all issues, not just the technical issues considered in this document.

1.2 Purpose

The purpose of this recommended practice is to provide the user with information and recommendations concerning the maintenance, testing, and replacement of vented lead-acid batteries used in stationary applications.

1.3 Word usage

The word *shall* indicates mandatory requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted (shall equals is required to).[3,4]

[3]The use of the word *must* is deprecated and shall not be used when stating mandatory requirements, *must* is used only to describe unavoidable situations.
[4]The use of *will* is deprecated and shall not be used when stating mandatory requirements, *will* is only used in statements of fact.

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