

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

IEEE Power & Energy Society

Sponsored by the  
Stationary Batteries Committee

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IEEE  
3 Park Avenue  
New York, NY 10016-5997  
USA

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

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**Stationary Batteries Committee**  
of the  
**IEEE Power & Energy Society**

Approved 9 December 2010

**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. This recommended practice also provides guidance to determine when batteries should be replaced. 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 450-2010, 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 semi-portable 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™, IEEE Recommended Practice for Installation Design and Installation of Vented Lead-Acid Batteries for Stationary Applications and IEEE Std 485™, IEEE Recommended Practice for Sizing Lead-Acid Batteries for Stationary Applications, will provide the user with a general guide to sizing, designing, placing in service, maintaining, and testing a vented lead-acid storage battery installation. IEEE Std 535 provides a standard for qualification of Class 1E lead storage batteries for nuclear power generating stations.

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Joseph Stevens  
H. F. Taylor  
Richard Tressler  
Kurt Uhler  
Lesley Varga  
Allan Williamson

The following members of the individual balloting committee voted on this recommended practice. Balloters may have voted for approval, disapproval, or abstention.

William J. Ackerman  
Michael Adams  
S. Aggarwal  
Samuel Aguirre  
Steven Alexanderson  
Edward Amato  
Phyllis Archer  
Stan Arnot  
Curtis Ashton  
Ali Al Awazi  
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Scott Hietpas  
Werner Hoelzl  
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James Parello  
Bansi Patel  
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Joseph Stevens  
Gary Stuedter  
S. Thamarasan  
Wayne Timm  
Richard Tressler  
Michael Tucker  
Joe Uchiyama  
Eric Udren  
Lesley Varga  
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Ahmed Zobaa

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*IEEE Standards Program Manager, Document Development*

Soo H. Kim  
*IEEE Standards Program Manager, Technical Program Development*

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## 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.