

# IEEE Recommended Practice for Installation Design and Installation of Vented Lead-Acid Batteries for Stationary Applications

Sponsor

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**IEEE Power Engineering Society**

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**Abstract:** Recommended design practices and procedures for storage, location, mounting, ventilation, instrumentation, preassembly, assembly, and charging of vented lead-acid batteries are provided. Required safety practices are also included. These recommended practices are applicable to all stationary applications. However, specific applications, such as emergency lighting units, semiportable equipment, and alternate energy applications, may have other appropriate practices and are beyond the scope of this recommended practice.

**Keywords:** alarms, assembly, data collection, float operation, flooded cells, freshening charge, installation design criteria, installation procedures, instrumentation, internal ohmic measurements, mounting, precautions, protective equipment, receiving and storage, resistance readings, seismic, testing, vented lead-acid batteries, ventilation

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## Introduction

[This introduction is not part of IEEE Std 484-2002, IEEE Recommended Practice for Installation Design and Installation of Vented Lead-Acid Batteries for Stationary Applications.]

Stationary lead-acid batteries play an ever-increasing role in industry today by providing normal response and instrument power and backup energy for emergencies. This recommended practice fulfills the need within the industry to provide common or standard practices for the design of battery installations and the battery installation procedures. The methods described are applicable to installations and battery sizes using vented lead-acid batteries. The installations considered herein are designed for float operation with a battery charger serving to maintain the battery in a charged condition as well as to supply the normal dc load.

This recommended practice may be used separately, and when combined with IEEE Std 450™-1995, IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications, and IEEE Std 485™-1997, 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 battery installation. As a recommended practice, this document presents procedures and positions preferred by the IEEE.

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# IEEE Recommended Practice for Installation Design and Installation of Vented Lead-Acid Batteries for Stationary Application

## 1. Overview

This recommended practice is divided into seven clauses. Clause 1 provides the scope of this recommended practice. Clause 2 lists references to other standards that are useful in applying this recommended practice. Clause 3 provides definitions that are either not found in other IEEE documents, or have been modified for use with this recommended practice. Clause 4 establishes the safety precautions to be followed during battery installation. Clause 5 contains the recommended design criteria for storage, location, mounting, ventilation, instrumentation, preassembly, assembly, and charging of vented lead-acid batteries. Clause 6 presents the recommended design procedures for storage, location, mounting, ventilation, instrumentation, preassembly, assembly, and charging of vented lead-acid batteries. Clause 7 describes the suggested records to be maintained.

This recommended practice also contains three annexes. Annex A provides methods for measuring connection resistances. Annex B provides information on internal ohmic measurements. Annex C provides bibliographical references.

### 1.1 Scope

This recommended practice provides recommended design practices and procedures for storage, location, mounting, ventilation, instrumentation, preassembly, assembly, and charging of vented lead-acid batteries. Required safety practices are also included. This recommended practice is applicable to full float stationary applications where a battery charger normally maintains the battery fully charged and provides the direct current (dc) loads. However, specific applications, such as emergency lighting units, semiportable equipment, and alternate energy applications, may have other appropriate practices that are beyond the scope of this recommended practice.

The portions of this recommended practice that specifically relate to personnel safety are mandatory instructions and are designated by the word shall; all other portions are recommended practices and are designated by the word should.

Sizing, maintenance, capacity testing, charging equipment, dry-charged cells, and consideration of other types of batteries are beyond the scope of this recommended practice.

## 1.2 Purpose

This recommended practice is meant to provide organizations with criteria to be used for storage, location, mounting, ventilation, instrumentation, preassembly, assembly, and charging of vented lead-acid batteries.

## 2. References

This recommended practice shall be used in conjunction with the following publications. When the following specifications are superseded by an approved revision, the revision shall apply.<sup>1</sup>

IEEE Std 450<sup>TM</sup>-1995, IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications.<sup>2</sup>

IEEE Std 485<sup>TM</sup>-1997, IEEE Recommended Practice for Sizing Lead-Acid Storage Batteries for Stationary Applications.

## 3. Definitions

For the purposes of this recommended practice, the following terms and definitions apply. *The Authoritative Dictionary of IEEE Standards Terms and Definitions*, Seventh Edition [B2]<sup>3</sup> should be referenced for terms not defined in this clause.

**3.1 vented battery:** A battery in which the products of electrolysis and evaporation are allowed to escape freely to the atmosphere. These batteries are commonly referred to as “flooded.” *Syn:* **vented cell.**

## 4. Safety

The safety precautions listed herein shall be followed during battery installation. Work on batteries shall be performed only by knowledgeable personnel with proper, safe tools and protective equipment.

### 4.1 Protective equipment

The following equipment for safe handling of the battery and protection of personnel shall be available:

- a) Goggles and face shields
- b) Acid-resistant gloves
- c) Protective aprons and overshoes
- d) Portable or stationary water facilities for rinsing eyes and skin in case of contact with acid electrolyte
- e) Bicarbonate of soda mixed approximately 0.1 kg/L of water to neutralize acid spillage<sup>4</sup>

<sup>1</sup>The IEEE standards or products referred to in Clause 2 are trademarks owned by the Institute of Electrical and Electronics Engineers, Incorporated.

<sup>2</sup>IEEE publications are available from the Institute of Electrical and Electronics Engineers, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, USA (<http://standards.ieee.org/>).

<sup>3</sup>The numbers in brackets correspond to the Bibliography in Annex C.

<sup>4</sup>0.1kg/L converts to 1 lb to 1 gal, English units.