

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

Sponsor

**IEEE Standards Coordinating Committee 29
on Stationary Batteries**

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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 and 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 484-1996, 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 450-1994, IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications, and IEEE Std 485-1983, IEEE Recommended Practice for Sizing Large Lead Storage Batteries for Generating Stations and Substations, 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 Applications

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 applies to all stationary applications. However, specific applications, such as emergency lighting units and semiportable equipment, and alternate energy applications, may have other appropriate practices and 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.

2. References

This recommended practice shall be used in conjunction with the following publications:

IEEE Std 100-1992, The New IEEE Standard Dictionary of Electrical and Electronics Terms (ANSI).¹

IEEE Std 450-1995, IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications (ANSI).

IEEE Std 485-1983, IEEE Recommended Practice for Sizing Large Lead Storage Batteries for Generating Stations and Substations (ANSI).

¹IEEE publications are available from the Institute of Electrical and Electronics Engineers, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, USA.

3. Definitions

The following definition applies to the subject matter of this recommended practice. For other definitions, refer to IEEE Std 100-1992 and other documents referenced in clause 2.

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 (1 lb to 1 gal) of water to neutralize acid spillage
- f) Class C fire extinguisher
- g) Adequately insulated tools
- h) Lifting devices of adequate capacity, when required

NOTES

1—The use of bicarbonate of soda to neutralize acid spills may result in production of a hazardous waste. Users should be aware of their responsibilities for handling waste. Compliance with appropriate local, state, and federal governmental regulations in this matter is recommended.

2—Some battery manufacturers do not recommend the use of CO₂ Class C fire extinguishers due to the potential of thermal shock.

4.2 Precautions

The following safety precautions shall be followed prior to and during installation:

- a) Ensure that metal racks are connected to ground in accordance with applicable codes.
- b) Inspect all lifting equipment for functional adequacy.
- c) Restrict all unauthorized personnel from the battery area.
- d) Prohibit smoking and open flame, and avoid the chances of arcing in the immediate vicinity of the battery.
- e) Keep the top of the battery clear of all tools and other foreign objects.
- f) Ensure that illumination requirements are met.
- g) Ensure unobstructed egress from the battery area.
- h) Ensure that the battery area is ventilated during charging.
- i) Avoid the wearing of metallic objects such as jewelry while working on the battery.