

1187™

IEEE Recommended Practice for Installation Design and Installation of Valve-Regulated Lead-Acid Storage Batteries for Stationary Applications

IEEE Standards Coordinating Committee 29

Sponsored by the
IEEE Standards Coordinating Committee 29
on Stationary Batteries



Published by
The Institute of Electrical and Electronics Engineers, Inc.
3 Park Avenue, New York, NY 10016-5997, USA

31 May 2002

Print: SH94985
PDF: SS94985

Recognized as an
American National Standard (ANSI)

IEEE Std 1187™-2002
(Revision of
IEEE Std 1187-1996)

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

Approved 1 August 2002

American National Standards Institute

Approved 21 March 2002

IEEE-SA Standards Board

Abstract: This recommended practice provides guidance for the installation and installation design of valve-regulated lead acid (VRLA) batteries. This recommended practice is intended for all float-service stationary installations. However, specific applications, such as emergency lighting units and semiportable equipment, may have other appropriate practices and are beyond the scope of this recommended practice. Alternate energy applications are not covered.

Keywords: acceptance test, battery capacity, battery installation, battery installation design, battery maintenance, battery terminal voltage, battery testing, connection resistance measurements, float voltage, internal ohmic measurements, standby power applications, valve-regulated lead-acid battery

The Institute of Electrical and Electronics Engineers, Inc.
3 Park Avenue, New York, NY 10016-5997, USA

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Print: ISBN 0-7381-3251-9 SH94985
PDF: ISBN 0-7381-3252-7 SS94985

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Introduction

(This introduction is not part of IEEE Std 1187-2002, IEEE Recommended Practice for Installation Design and Installation of Valve-Regulated Lead-Acid Storage Batteries for Stationary Applications.)

Valve-regulated lead acid (VRLA) batteries are playing an ever-increasing role in control and power systems. In many cases, VRLA batteries are being substituted for vented lead-acid batteries. Their use is also expanding into many other applications where their unique characteristics are desirable. Both gelled electrolyte and absorbed electrolyte VRLA designs, covering a range of sizes and capacities, are now available for use in many traditional and nontraditional battery applications. This recommended practice fulfills the need within the industry to provide a common understanding of VRLA batteries and is applicable to float-service stationary installations. Alternative energy applications are not covered.

This recommended practice was prepared by the IEEE 1187 Working Group, Installation and Maintenance Subcommittee of the Standards Coordinating Committee 29 on Stationary Batteries. At the time this recommended practice was completed, the IEEE 1187 Working Group had the following membership:

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Contents

1. Scope.....	1
2. References.....	1
3. Definitions	2
4. Safety	2
4.1 Protective equipment	3
4.2 Precautions.....	3
4.3 Procedures.....	3
5. Installation design criteria.....	4
5.1 Location	4
5.2 Mounting.....	5
5.3 Seismic.....	5
5.4 Ventilation	5
5.5 Instrumentation and alarms.....	6
5.6 Parallel-battery strings.....	7
5.7 Charger design	7
5.8 Battery protection	7
6. Installation procedures	8
6.1 Receiving and storage.....	8
6.2 Assembly	8
6.3 Freshening/initial charge and testing	10
6.4 Connection to dc system	10
6.5 Measuring ac ripple current	11
6.6 Measuring battery temperature and ambient temperature	11
6.7 Measuring battery charging current.....	11
7. Records	11
Annex A (informative) Bibliography	12
Annex B (informative) Thermal runaway.....	13
Annex C (informative) Effect of elevated temperature on expected battery life	14
Annex D (informative) Connection resistance measurements	16
Annex E (informative) Cell/unit internal ohmic measurements.....	22
Annex F (informative) Metric conversions	23

IEEE Recommended Practice for Installation Design and Installation of Valve-Regulated Lead-Acid Storage 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 valve-regulated lead-acid (VRLA) storage batteries. Required safety practices are also included. This recommended practice is applicable to float-service stationary installations.

This recommended practice also contains six informative annexes. These provide additional tutorial information relating to topics introduced in the body of the document.

Battery sizing, maintenance, capacity testing, charging equipment, battery protection, and consideration of other types of batteries are beyond the scope of this recommended practice. Alternative energy applications are also 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*.

2. References

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

IEEE Std 485™-1997, IEEE Recommended Practice for Sizing Large Lead Storage Batteries for Generating Stations and Substations.^{1, 2}

IEEE Std 946™-1992, IEEE Recommended Practice for the Design of DC Auxiliary Power Systems for Generating Stations.

¹IEEE 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/>).

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IEEE Std 1184TM-1994, IEEE Guide for the Selection and Sizing of Batteries for Uninterruptable Power Systems.

IEEE Std 1188TM-1996, IEEE Recommended Practice for Maintenance, Testing, and Replacement of Valve-Regulated Lead-Acid Storage Batteries for Stationary Applications.

IEEE Std 1189TM-1996, IEEE Guide for Selection of Valve-Regulated Lead Acid (VRLA) Batteries for Stationary Applications.

IEEE Std 1375TM-1998, IEEE Guide for the Protection of Stationary Battery Systems.

NFPA 70-1999, National Electrical Code[®] (NEC[®]).³

3. Definitions

For the purposes of this recommended practice, the following terms and definitions apply. *The Authoritative Dictionary of IEEE Standards Terms*, Seventh Edition [B1],⁴ should be referenced for terms not defined in this clause.

3.1 acceptance test: Capacity test made on a new battery to determine that it meets specifications or manufacturer's ratings.

3.2 internal ohmic measurements: The measurement of either the internal impedance, conductance, or resistance of battery cells/units.

3.3 recombinant: Pseudonym for oxygen recombination. (IEEE Std 1189-1996).

3.4 terminal connection (battery): Connections made between cells or rows of cells or at the positive and negative terminals of the battery, which may include terminal plates, cables with lugs, and connectors.

3.5 unit (or module): Multiple cells in a single jar or container.

3.6 valve-regulated lead-acid (VRLA) cell: A cell that is sealed with the exception of a valve that opens to the atmosphere when the internal gas pressure exceeds atmospheric pressure by a preselected amount. VRLA cells provide a means for recombination of internally generated oxygen and the suppression of hydrogen gas evolution to limit water consumption.

4. Safety

As with other batteries, VRLA batteries are potentially dangerous and proper precautions must be observed in handling and installation. Work on batteries shall be performed only by knowledgeable personnel with proper safe tools and protective equipment.

³NFPA publications are available from Publications Sales, National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101, USA.

⁴The numbers in brackets correspond to those in the bibliography in Annex A.