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IEEE Recommended Practice for Sizing Lead-Acid Batteries for Stationary Applications

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IEEE Power and Energy Society

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Energy Storage and Stationary Battery Committee

IEEE Std 485™-2020
(Revision of IEEE Std 485-2010)

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IEEE Recommended Practice for Sizing Lead-Acid Batteries for Stationary Applications

Sponsor

Energy Storage and Stationary Battery Committee
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IEEE Power and Energy Society

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Abstract: Methods for defining the dc load and for sizing a lead-acid battery to supply that load for stationary battery applications in float service are described in this recommended practice. Some factors relating to cell selection are provided for consideration. Installation, maintenance, qualification, testing procedures, and consideration of battery types other than lead-acid are beyond the scope of this recommended practice. Design of the dc system and sizing of the battery charger(s) are also beyond the scope of this recommended practice.

Keywords: battery duty cycle, cell selection, dc load, full-float operation, IEEE 485™, lead-acid batteries, rated capacity, sizing, stationary applications, valve-regulated lead-acid (VRLA) cell, vented battery, vented lead-acid (VLA)

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Introduction

This introduction is not part of IEEE Std 485-2020, IEEE Recommended Practice for Sizing Lead-Acid Batteries for Stationary Applications.

The storage battery is of primary importance for the satisfactory operation of stationary applications including but not limited to generating stations, substations, telecommunications, and other stationary applications. This recommended practice is based on commonly accepted methods used to define the load and determine adequate battery capacity. The method described is applicable to all installations and battery sizes.

The installations considered herein are designed for 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 does not apply to "cycling" applications. (See IEEE Std 1660™ [B7].[1])

This recommended practice was prepared by the Vented Lead Acid Sizing Working Group of the Energy Storage and Stationary Battery Committee. It may be used separately, but when combined with IEEE Std 450™[2] and IEEE Std 484™ (for vented lead acid batteries) or IEEE Std 1187™ and IEEE Std 1188™ (for valve-regulated lead-acid [VRLA] batteries), it provides the user with a general guide to designing, placing in service, and maintaining the applicable lead-acid battery installation.

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

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1. Scope

Methods are described for defining the dc load and for sizing a lead-acid battery to supply that load for stationary battery applications in float service. Some factors relating to cell selection are provided for consideration. Installation, maintenance, qualification, testing procedures, and consideration of battery types other than lead acid are beyond the scope of this recommended practice. The design of the dc system and sizing of the battery charger(s) are also beyond the scope of this recommended practice.

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they shall be understood and used, so each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

IEEE Std 450™, IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications.[3,4]

IEEE Std 484™, IEEE Recommended Practice for Installation Design and Installation of Vented Lead-Acid Batteries for Stationary Applications.

IEEE Std 1184™-2006, IEEE Guide for Batteries for Uninterruptible Power Supply Systems.

IEEE Std 1187™, IEEE Recommended Practice for Installation Design and Installation of Valve-Regulated Lead-Acid Storage Batteries for Stationary Applications.

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

IEEE Std 1881™, IEEE Standard Glossary of Stationary Battery Terminology.

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