

IEEE/ASHRAE Guide for the Ventilation and Thermal Management of Batteries for Stationary Applications

Co-Sponsors

IEEE Power and Energy Society
Stationary Batteries Committee



and

ASHRAE
Guideline Project Committee 21 (GPC 21)



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

IEEE Std 1635™-2018/
ASHRAE Guideline 21-2018
(Revision of
IEEE Std 1635-2012/
ASHRAE Guideline 21-2012)

**IEEE Std 1635™-2018/
ASHRAE Guideline 21-2018**
(Revision of
IEEE Std 1635-2012/
ASHRAE Guideline 21-2012)

IEEE/ASHRAE Guide for the Ventilation and Thermal Management of Batteries for Stationary Applications

Co-Sponsors

**Energy Storage and Stationary Battery Committee
of the
IEEE Power and Energy Society**

and

**ASHRAE
Guideline Project Committee 21 (GPC 21)**

Approved 15 June 2018

ASHRAE Guideline Project Committee 21 (GPC 21) / ASHRAE

Approved 7 May 2018

IEEE-SA Standards Board

Abstract: Vented lead-acid (VLA), valve-regulated lead-acid (VRLA), and nickel-cadmium (Ni-Cd) stationary battery installations are discussed in this guide, written to serve as a bridge between the electrical designer and the heating, ventilation, and air-conditioning (HVAC) designer. Ventilation of stationary battery installations is critical to improving battery life while reducing the hazards associated with hydrogen production. This guide describes battery operating modes and the hazards associated with each. It provides the HVAC designer with the information to provide a cost effective ventilation solution.

Keywords: ASHRAE Guideline 21, battery, battery cabinets, battery gassing, battery room, battery vaults, forced ventilation, hydrogen, IEEE 1635™, natural ventilation, stationary battery, thermal management, ventilation, ventilation system maintenance

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

ASHRAE
1791 Tullie Circle, NE, Atlanta, Georgia 30329-2305, USA

Copyright © 2018 by The Institute of Electrical and Electronics Engineers, Inc., and ASHRAE.
All rights reserved. Published 31 July 2018. Printed in the United States of America.

IEEE is a registered trademark in the U.S. Patent & Trademark Office, owned by The Institute of Electrical and Electronics Engineers, Incorporated.

ASHRAE is a registered trademark in the U.S. Patent & Trademark Office, owned by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc.

EnerSys trademark is the property of EnerSys and its affiliates.

ICC, International Code Council, IFC, and International Fire Code are registered trademarks of the International Code Council.

National Electrical Code, NEC, and NFPA 70 are registered trademarks of the National Fire Protection Association, Inc.

National Electrical Safety Code and NESC are both registered trademarks and service marks of The Institute of Electrical and Electronics Engineers, Inc.

Telcordia is a registered trademark of Ericsson Inc. Environmental Specifications

UL is a registered trademark of UL LLC © 2016.

PDF: ISBN 978-1-5044-4931-1 STD23140
Print: ISBN 978-1-5044-4932-8 STDPD23140

IEEE prohibits discrimination, harassment, and bullying.

For more information, visit <http://www.ieee.org/web/aboutus/whatis/policies/p9-26.html>.

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher.