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

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IEEE Power and Energy Society
Stationary Batteries Committee

and

ASHRAE
Guideline Project Committee 21 (GPC 21)

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Abstract: Vented lead-acid (VLA), valve-regulated lead-acid (VRLA), and nickel-cadmium (NiCd) 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 maximize battery life while minimizing 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 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

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Introduction

This introduction is not part of IEEE Std 1635-2012/ASHRAE Guideline 21-2012, IEEE/ASHRAE Guide for the Ventilation and Thermal Management of Batteries for Stationary Applications.

The primary purpose of this guide is to assist users involved in the design and management of new stationary battery installations. The focus is the environmental design and management of the installation to maximize battery reliability as well as the safety of personnel and equipment. This guide is a joint effort by the IEEE and ASHRAE.

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

1. Overview

1.1 Scope

This guide discusses the ventilation and thermal management of stationary battery systems as applied to the following:

- Vented (flooded) lead-acid (VLA)
- Valve-regulated lead-acid (VRLA)
- Nickel-cadmium (NiCd)

For each category, both the technology and the design of the battery are described in order to facilitate user understanding of the environmental issues associated with each type of technology.

The scope of this document includes only stationary batteries under conditions of expected use. Multiple operating modes are identified.

The ventilation practices described in this guide represent the "best practice" based on the information available at the time this document was developed. The user should evaluate these practices against their operating experience, operating conditions, number and size of battery systems, manufacturer's recommendations, resources, and needs in developing an environment that maximizes safety and is