CENELEC WORKSHOP AGREEMENT

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English version

Flow batteries - Guidance on the specification, installation and operation

This CENELEC Workshop Agreement has been drafted and approved by a Workshop of representatives of interested parties, the constitution of which is indicated in the foreword of this Workshop Agreement.

The formal process followed by the Workshop in the development of this Workshop Agreement has been endorsed by the National Committees of CENELEC but neither the National Committees of CENELEC nor the CEN-CENELEC Management Centre can be held accountable for the technical content of this CENELEC Workshop Agreement or possible conflicts with standards or legislation.

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Foreword

This CENELEC Workshop Agreement has been drafted and approved by a Workshop of representatives of interested parties by correspondence on 2013-03-18, the constitution of which was supported by CENELEC following the public call for participation made on 2011-09-21.

A list of the individuals and organizations which supported the technical consensus represented by the CENELEC Workshop Agreement is available to purchasers from the CEN-CENELEC Management Centre. These organizations are as follows:

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The formal process followed by the Workshop in the development of the CENELEC Workshop Agreement has been endorsed by the National Members of CENELEC but neither the National Members of CENELEC nor the CEN-CENELEC Management Centre can be held accountable for the technical content of the CENELEC Workshop Agreement or possible conflict with standards or legislation. This CENELEC Workshop Agreement can in no way be held as being an official standard developed by CENELEC and its members.

The final review/endorsement round for this CWA was started on 2013-02-13 and was successfully closed on 2013-03-18.The final text of this CWA was submitted to CENELEC for publication on 2013-03-18.

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Comments or suggestions from the users of the CENELEC Workshop Agreement are welcome and should be addressed to the CEN-CENELEC Management Centre.

Introduction

Flow Battery Hierarchy

This CENELEC Workshop Agreement (CWA) covers a number of separate types of Flow Batteries and Flow Battery Energy Storage Systems

Flow Batteries used for experimental, work, research, development, design or laboratory purposes are outside the scope of this Workshop Agreement. For purposes of this CWA, systems have been grouped into a hierarchy with three broad categories, based on their physical configuration:

Packaged Systems: Self-contained units, packaged, sold and installed as a single unit containing all parts of the Flow Battery, including the power conversion system, all contacts and fittings for connection to the local AC electricity network. Packaged systems may also be supplied as detailed above but configured for use on an off-grid AC or DC system.

Such devices will tend to be at the smaller power and energy levels. The user has restricted access to the Flow Battery Energy Storage System within the packaging. Examples include small Flow Battery devices designed for use as standalone installations for remote telecom systems.

Containerised systems: Units designed and packaged in shipping (ISO) containers, or similar large scale enclosures. The system is factory assembled, the containers are transported to the operating site, and installed in their as-supplied condition, with minimal on-site installation works.

Containerised systems may be supplied with the power conversion system or without a power conversion system and this latter unit would be configured for connection to a power conversion system or other electrical connection.

Large-scale installations: Installations, which may use a generic or specific design for an individual installation. These systems may be assembled from individual components listed in 3.34 or from sub-assemblies such as skid mounted modules complete with associated pipes, pumps, valves and sensors.

Flow Battery types

There are a number of different types of Flow Batteries, using different electrochemistries and layouts. Manufacturers may supply from a standard product range, or supply customised or bespoke Systems. Users of this CWA are advised to consult up-to-date references for details of each type of Flow Battery.

NOTE The definition of a Flow Battery is given in Section 3.34 of this CWA.

1 Scope

This CWA provides guidance on the specification, installation and operation of Flow Batteries. It facilitates the pre-commercial phase, when a potential client needs to compare technical requirements of different types of Flow Batteries, or simply needs to compare between Flow Batteries and conventional electricity storage devices. It gives potential clients confidence that the batteries are sufficiently robust to meet the requirements of the designated application. This CWA also provides guidance for conformity assessment bodies to benchmark the Flow Batteries' conformity with existing directives and other regulations.

2 Normative references

N/A

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply[1].

3.1
Area specific energy
system rated energy divided by the system footprint (see 3.36)

Note 1 to entry: This metric determines the area of an energy storage system for energy intensive applications.

3.2
Area specific power
system rated power divided by the system footprint (see 3.36)

Note 1 to entry: This metric determines the area of an energy storage system for power intensive applications for the rated system power.

3.3
Battery Housing including Facility Management System (i.e. heating, cooling)
enclosure of Flow Battery Energy Storage device to ensure that manufacturer specific climatic operating parameters are maintained

3.4
Battery Management System (BMS)
control and instrumentation system which is specific to the operating characteristics of the Flow Battery and ensures that the Flow Battery operates within its recommended design parameters

Note 1 to entry: The BMS is linked to other sub systems and components such as pumps, heat exchangers thermal/pressure/concentration sensors, within the Flow Battery.

3.5
Battery terminals
electrical connection points for all external electrical equipment (loads, external measuring equipment, and sources) to the Flow Battery

3.6
Calendar Lifetime
total lifetime of the Flow Battery for which the battery continues to operate within acceptable limits if the battery is in an operating condition but not subject to any cycling

[1] IEC definitions are shown at http://www.electropedia.org/iev/iev.nsf/index?openform&part=482