



# **Non-Spillable, Valve-Regulated Lead-Acid (VRLA) Batteries used in HP Products**

## **PURPOSE OF THIS DOCUMENT**

Hewlett-Packard Company (HP) is providing the information in this document voluntarily as a service to its customers. The products addressed in this document are generally defined as “articles” that are exempt from requirements for Material Safety Data Sheets (MSDS) such as under the Hazard Communication Standard of the U.S. Occupational Safety and Health Administration (OSHA), 29 CFR 1910.1200, European Union Regulation (EC) 1907/2006, and similar requirements in other countries. In particular, these products are manufactured according to a specific design, have an end-use dependent upon such design, are not intended to release chemicals during normal use or handling, and do not normally release more than trace amounts of hazardous chemicals.

The information in this document is based on documents provided by the battery manufacturers, and is intended to provide a generalized view of the information in such documents for the convenience of HP’s customers. The information in this document is not intended to be comprehensive, nor is it a substitute for the information provided by the battery manufacturers in their Product Information Sheets or similar documents. To the extent that the manufacturer’s information differs from any information in this document, the manufacturer’s information should govern.

## **PRODUCT IDENTIFICATION**

The products covered by this document are HP-branded Non-Spillable, Valve Regulated Lead-Acid (VRLA) battery packs designed and marketed for use with HP Uninterruptible Power Systems (UPS) or otherwise provided by HP for use in or with such electronic products. These batteries are rechargeable, typically operate at 12V and weigh 2 to 3 kg. In most cases, the batteries are installed in electronic equipment, however, this document is focused only on the battery cells.

The VRLA battery cells may be produced by several different manufacturers. Information about specific batteries can be found in documents provided by the manufacturers. HP has not conducted an independent assessment of the information in the manufacturer’s documents.

## **HAZARDS IDENTIFICATION**

These batteries contain combustible materials. Improper handling or use of the battery may lead to case distortion, leakage, heat generation, or violent rupture. Direct contact between the battery contents and the skin or eyes may cause irritation or thermal burns. Inhalation of vapors generated from burning or leaking batteries may cause respiratory and eye irritation. Ingestion of the contents of a leaking battery may irritate the internal and external mouth areas. Leakage, caustic burns, and perforation may occur two or more hours after ingestion of the battery contents.

## COMPOSITION

Inorganic lead compounds and an electrolyte solution (typically consisting of water and sulfuric acid) are the primary components of every VRLA battery contained in HP-branded electronic products. The composition information below is intended to provide an approximate view of the constituents of these batteries. For information on the composition of specific battery types, please see the information available from the individual battery manufacturers.

**Table 1: Typical VRLA Chemical Composition**

| Chemical                        | CAS No.   | Approx. Weight Percentage |
|---------------------------------|-----------|---------------------------|
| <b>Inorganic Lead Compound</b>  |           |                           |
| Lead                            | 7439-92-1 | 70.0 %                    |
| Antimony                        | 7440-36-0 | 0.2 %                     |
| Tin                             | 7440-31-5 | 0.006 %                   |
| Calcium                         | 7440-70-2 | 0.002 %                   |
| Arsenic                         | 7440-38-2 | 0.003 %                   |
| <b>Electrolyte</b>              |           |                           |
| Sulfuric acid                   | 7664-93-9 | 24 %                      |
| <b>Case Material</b>            |           |                           |
|                                 |           | 6 %                       |
| Polypropylene                   | 9003-07-0 |                           |
| Polystyrene                     | 9003-53-6 |                           |
| Acrylonitrile Butadiene Styrene | 9003-56-9 |                           |
| Polyvinylchloride               | 9002-86-2 |                           |

Some manufacturer documents also list inert metals (e.g., stainless steel, iron, aluminum, or copper), but these materials are not included in the table above because they are unlikely to be of regulatory concern, the concentrations are not known, and inclusion might reduce the concentrations of the constituents specified in the table. Although these chemicals are the ones identified in the documents from the manufacturers, HP believes that other compounds may be present, particularly in used batteries, due to chemical reactions that take place within the batteries during use. Finally, the information in the table is based on the composition of the VRLA battery cells only, and does not reflect constituents that may be present in any other parts of a battery pack.

## FIRE FIGHTING MEASURES

**FLASH POINT:** NA

**LOWER EXPLOSIVE LIMIT (LEL):** 4.1% (as hydrogen gas)

**UPPER EXPLOSIVE LIMIT (UEL):** 74.2% (as hydrogen gas)

**EXTINGUISHING MEDIA:** Dry chemical, carbon dioxide, foam. Do not use water on live electrical circuits.

## **SPECIAL FIRE FIGHTING PROCEDURES & PROTECTIVE EQUIPMENT:**

If batteries are on charge, shut off power. Avoid breathing vapors. Use positive pressure, self-contained breathing apparatus. Beware of acid splatter during water application; wear acid-resistant protective gear. Firefighting water runoff and dilution water may be toxic, corrosive and may cause adverse environmental impacts

## **UNUSUAL FIRE AND EXPLOSION HAZARDS:**

Highly flammable hydrogen gas is generated during charging and operation of VRLA batteries. To avoid risk of fire or explosion, keep sparks or other sources of ignition away from batteries. Do not allow metallic materials to simultaneously contact negative and positive terminals of cells and batteries. Follow manufacturer's instructions for installation and service.

## **FIRST AID MEASURES**

Under normal condition of use, the chemicals are contained in sealed assemblies. Risk of exposure occurs only if the battery is mechanically abused. Contents of an opened battery can cause respiratory/skin/eye irritation. In the event that physical damage to battery cells results in leakage of chemical contents, individuals coming in contact with those chemicals should follow these steps:

### **INHALATION:**

Sulfuric acid: If breathing is difficult, remove individual to fresh air immediately. If symptoms persist, seek medical attention. Lead: Remove from exposure, gargle, wash nose and lips; consult physician.

### **INGESTION:**

Sulfuric acid: Give large quantities of water; do NOT induce vomiting; consult physician. Lead: Consult physician immediately.

### **SKIN CONTACT:**

Sulfuric acid: Flush with large amount of water for at least 15 minutes. Remove contaminated clothing, including shoes. Lead: Wash immediately with soap and water.

### **EYE CONTACT:**

Sulfuric Acid and Lead: Flush immediately with large amounts of water for at least 15 minutes; consult physician.

## **HANDLING AND STORAGE**

**Advice on safe handling:** Do not reverse the positive and negative terminals of the battery when mounting; allow battery terminals to contact each other or other metals; short-circuit the battery; heat the battery; disassemble the battery or mix different types of batteries. Do not damage, crush, or incinerate the battery.

**Advice on storage:** Batteries should be stored in well-ventilated, dry, and cool conditions. For normal storage, temperatures should be between -20°C (-4°F) to 35°C (95°F). Do not expose the battery to water or direct sunlight. Packaging should be durable to ensure batteries are not damaged during transport.

## DISPOSAL CONSIDERATIONS

**Do not incinerate.** Dispose of batteries in accordance with any applicable federal, state/provincial, and local regulations. Contact between discarded batteries and other metals could lead to case distortion, leakage, overheating, or violent rupture. To avoid these results, positive (+) and negative (-) terminals of the battery should be insulated prior to disposal.

HP encourages the environmentally sound recycling of these products. Contact your local government for recycling or collection practices in your area. HP has joined the Call2Recycle™ recycling program of the Rechargeable Battery Recycling Corporation. In the U.S. and Canada, please call 1-800-8-BATTERY or go to [www.rbrc.org](http://www.rbrc.org) for information on recycling your used rechargeable batteries.

## TRANSPORTATION

**Nonspillable Valve Regulated Lead Acid Batteries, ID Number: UN2800**

**Proper Shipping Name and Description: Batteries, Wet, Nonspillable**

### GROUND TRANSPORT REQUIREMENTS

Transport requirements for ground shipment of these batteries may vary from country to country, although the rules are harmonized to a substantial degree. Under the US regulations, the battery packs covered by this document have been tested and meet the non-spillable criteria listed in 49 CFR 173.159(f) and 173.159a, thus, they are subject only to the requirements in 49 CFR 173.159a. Key requirements include the following:

1. The batteries and their outer packaging must be plainly and durably marked as either “NONSPILLABLE” or “NONSPILLABLE BATTERY.”
2. The batteries must be prepared for transport so as to prevent short circuits, damage to terminals, a dangerous evolution of heat, and unintentional activation of any devices or equipment in the package.

### AIR TRANSPORT REQUIREMENTS

International air transport requirements have been established by the International Civil Aviation Organization (“ICAO”) and the International Air Transport Association (“IATA”). The IATA Dangerous Goods Regulations provide as follows in Section 4.4, Special Provision A67:

Nonspillable batteries meeting the requirements of **Packaging Instruction 872** are not subject to these Regulations when carried as cargo if, at a temperature of 55°C, the electrolyte will not flow from a ruptured or cracked case. The battery must not contain any free or unabsorbed liquid. Any electrical battery or battery powered device, equipment or vehicle having the potential of dangerous evolution of heat must be prepared for transport so as to prevent:

- a) A short circuit (e.g. in the case of batteries, by the effective insulation of exposed terminals, or in the case of equipment, by disconnection of the battery and protection of exposed terminals), and
- b) Unintentional activation

The words “Not Restricted” and a reference to **Special Provision A67** must be included in the description of the substance on the Air Waybill, when an Air Waybill is issued.

The battery packs covered by this document have been tested and meet the non-spillable criteria listed in IATA Packing Instruction 872 and Special Provision A67. Thus, these batteries

are excepted from all IATA regulations provided that the requirements of Special Provision A67 and Packing Instruction 872 are satisfied.

Individual countries and/or carriers may impose additional requirements for air shipments. For example, the following requirements apply to air shipments to, from or through the US:

**USG-11** A nonspillable wet electric storage battery may only be regarded as not subject to the IATA Regulations if the battery and its outer packaging are plainly and durably marked "NONSPILLABLE" or "NONSPILLABLE BATTERY" and the battery meets the conditions for being regarded as not subject to these Regulations contained in Special Provisions A67.

See also 49 CFR 172.24(d)(1)(i) (for air shipments sent pursuant to ICAO/IATA requirements); 49 CFR 173.159a (for other U.S. air shipments).

## **VESSEL TRANSPORT REQUIREMENTS**

International vessel transport requirements have been established by the International Maritime Organization ("IMO") in the International Maritime Dangerous Goods ("IMDG") Code. The battery packs covered by this document have been tested and meet the non-spillable criteria listed in IMDG Code Special Provision 238.1 and 238.2; therefore, they are not subject to the provisions of the IMDG Code provided that the battery terminals are protected against short circuits and securely packaged for transport.

Individual countries and/or carriers may impose additional requirements for vessel shipments. For vessel shipments to, from, or through the US, the batteries can generally be sent pursuant to the IMDG Code, or pursuant to separate US regulations. See 49 CFR 172.25 and 173.159a.

## **FOR ADDITIONAL INFORMATION**

For more information, consult the U.S. DOT's Hazardous Materials Regulations (49 CFR). You may also consult the U.S. DOT online information at <http://hazmat.dot.gov>, or call the U.S. DOT Hazardous Materials Information Center at 1-800-467-4922. International air shipments may additionally be subject to the Dangerous Goods Regulations of the International Air Transport Association (IATA). For more information, see <http://www.iata.org>. Additional information, such as Product Information Sheets may be found on the battery cell manufacturer's web sites listed below:

***Yuasa Batteries***  
***CSB Batteries***

## **DISCLAIMER**

This document is provided without charge to customers of HP and its subsidiaries. It is based on information provided to HP by the independent manufacturers of the battery products. HP has not independently assessed the information provided by the manufacturers, and neither endorses nor guarantees the accuracy or completeness of any of the information contained herein. This document should not be construed as guaranteeing specific properties of the products as described or suitability for a particular application.

## **ISSUE DATE**

This document was issued on June 30, 2015.