



## **2600SEG220 BATTERY CHANGING, CHARGING, AND STORING STANDARD**

### **1.0 PURPOSE**

To establish safety requirements for handling and storing liquid batteries for vehicles and other equipment.

### **2.0 BACKGROUND**

This Standard replaces the safety policy and procedures contained in Appendix H of the Personnel Manual of the former Panama Canal Commission (*PCPM*), Chapter 790.

### **3.0 SCOPE**

This Standard applies to all ACP employees, contractors, and third parties located within the facilities, industrial shops, and areas under ACP responsibility.

### **4.0 LEGAL FOUNDATION**

This Standard is established pursuant to Agreement No. 12 of the Board of Directors of the Panama Canal Authority, Risk Control and Occupational Health Regulations, Chapter I, Article 8.

### **5.0 DEFINITIONS**

The following definition is provided for the purpose of these standards:

- 5.1** Hydrometer: Device used to measure the electrolyte of a battery.

### **6.0 GENERAL**

- 6.1** Areas for Handling Batteries:

- 6.1.1** Specific and adequate places must be designated to charge and store batteries.

- 6.1.2** The electrical cables, accessories, and electrical switches that are used in rooms for charging batteries must be explosion proof.

- 6.1.3** Ventilation fans must ensure the correct diffusion and ventilation of sulphuric acid vapors and hydrogen gases from batteries in order to prevent buildup. Ventilation fans must provide at least six total air volume changes per hour.

- 6.1.4** Showers and eye washing facilities must be installed to quickly wash eyes and body in case of emergency. These showers must be located in close proximity and accessible in longer than 15 seconds. As a second option, a portable eye-washing pail or neutralizing package with enough volume to wash the eyes for a minimum of 15 minutes may be used.

- 6.1.5** In areas where batteries are charged or stored, warning signs prohibiting smoking, burning materials, and open flames shall be posted.

- 6.2** Battery Handling:

- 6.2.1** Employees that handle batteries should have adequate equipment and facilities for:

- 6.2.1.1** Cleaning with water and neutralizing spilled electrolytes.



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- 6.2.1.2 Ensuring fire protection.
      - 6.2.1.3 Protecting the battery charger against accidental damage caused when transporting parts.
    - 6.2.2 The minimum protective equipment to be used shall consist of:
      - 6.2.2.1 Chemical splash resistant protective goggles.
      - 6.2.2.2 Acid resistant rubber gloves.
      - 6.2.2.3 Acid resistant rubber apron.
      - 6.2.2.4 Face mask.
    - 6.2.3 The following requirements must be met when working with batteries:
      - 6.2.3.1 Battery electrolytes must be mixed in well-ventilated areas.
      - 6.2.3.2 Acids or bases must be slowly poured into the water while stirring.
      - 6.2.3.3 Water should never be poured into concentrated acid, acid solutions, or base.
      - 6.2.3.4 When taking specific gravity readings, the open end of the hydrometer must be covered with an acid resistant material to prevent electrolyte from splashing while moved from cell to cell.
      - 6.2.3.5 If possible, a conveyor belt, forklift, or equivalent mechanical device must be used to handle heavy loads.
      - 6.2.3.6 Neither tools which may generate sparks nor any other metallic objects are allowed near uncovered batteries.
      - 6.2.3.7 A siphon-type pitcher or tube must be used when pouring electrolyte.
  - 6.3 Disposal of Batteries: Waste batteries must not be discarded in inadequate containers or landfills, because their toxic elements may adversely affect the environment. For their final disposal, batteries must be sent to the Sales and Disposal of Excess Goods Unit (FAAD). For final disposal, contact the Policies and Programs Unit Supervisor (EACG-PP), Environmental Division (EAC).
  - 6.4 Training: Employees assigned to work with batteries must previously and periodically receive, as deemed necessary, training on the hazards of exposure to chemical materials, proper use of personal protective equipment, work practices, and emergency procedures in case of accidental acid spills or splashes. Contractor shall provide for the training of their own employees.
  - 6.5 File Maintenance and Data Access: The training files must be kept in receiving and supplying units. These files shall be accessible to employees in accordance with applicable ACP regulations.



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**7.0 RESPONSIBILITIES**

The responsibilities for ensuring compliance with this Standard are described in the Occupational Health and Safety Management Standard 2600SEG101.

**8.0 INQUIRIES**

Any information or clarifications on the contents or application of these standards must be requested in writing to Safety and Industrial Hygiene Unit (RSHS).

**9.0 EXCEPTIONS**

Deviations or temporary exceptions regarding compliance with these standards must be requested in writing to RSHS.

**10.0 TERM**

These standards shall remain in effect until revised or amended.

**11.0 REFERENCES**

- 11.1 Standard 2600SEG201, Information on Hazardous Materials, Panama Canal Authority.
- 11.2 File Retention Tables, File Management Section, ACP.
- 11.3 NFPA 70, Art. 480, National Fire Protection Association.
- 11.4 NFPA 70E, Chapter 9, National Fire Protection Association.