

# 2009 INTERNATIONAL FIRE CODE

For

## STATIONARY STORAGE BATTERY SYSTEMS

The following sections were cited from the 2007 California Fire Code which has adopted the changes set forth by the 2009 International Fire Code regarding the regulation of VRLA batteries. New York, Washington, and Oregon have followed suit and the IFC is pursuing the adoption of these code changes for the remainder of the US states.

**608.3 Thermal runaway.** VRLA battery systems shall be provided with a listed device or other approved method to preclude, detect and control thermal runaway.

**608.4 Room design and construction.** Enclosure of stationary battery systems shall comply with the California Building Code. Battery systems shall be allowed to be in the same room with the equipment they support.

**608.4.1 Separate Rooms.** When stationary batteries are installed in a separate equipment room accessible only to authorized personnel, they shall be permitted to be installed on an open rack for ease of maintenance.

**608.4.2 Occupied work centers.** When a system of VRLA, lithium-ion, or other type of sealed, nonventing batteries is situated in an occupied work center, it shall be allowed to be housed in a noncombustible cabinet or other enclosure to prevent access by unauthorized personnel.

**608.4.3 Cabinets.** When stationary batteries are contained in cabinets in occupied work centers, the cabinet enclosures shall be located within 10 feet (3048 mm) of the equipment that they support.

**608.5 Spill control and neutralization.** An approved method and materials for the control and neutralization of a spill of electrolyte shall be provided in areas containing lead-acid, nickel-cadmium or other types of batteries with free-flowing liquid electrolyte. For purposes of this paragraph, a "spill" is defined as any unintentional release of electrolyte.

**Exception:** VRLA, lithium-ion or other types of sealed batteries with immobilized electrolyte shall not require spill control.

**608.5.1 Nonrecombinant battery neutralization.** For battery systems containing lead-acid, nickel-cadmium or other types of batteries with free-flowing electrolyte, the method and materials shall be capable of neutralizing a spill from the largest lead-acid battery to a pH between 7.0 and 9.0.

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**608.5.2 Recombinant battery neutralization.** For VRLA or other types of sealed batteries with immobilized electrolyte, the method and material shall be capable of neutralizing a spill of 3 percent of the capacity of the largest VRLA cell or block in the room to a pH between 7.0 and 9.0.

**Exception:** Lithium-ion batteries shall not require neutralization.

**608.6 Ventilation.** Ventilation of stationary storage battery systems shall comply with Sections 608.6.1 and 608.6.2.

**608.6.1 Room ventilation.** Ventilation shall be provided in accordance with the California Mechanical Code and the following:

**608.6.1 Room ventilation.** Ventilation shall be provided in accordance with the *California Mechanical Code* and the following:

1. For flooded lead acid, flooded nickel-cadmium, and VRLA batteries, the ventilation system shall be designed to limit the maximum concentration of hydrogen to 1 percent of the total volume of the room; or
2. Continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute per square foot [1ft<sup>3</sup>/min/ft<sup>2</sup> or 0.0051 m<sup>3</sup>/(s · m<sup>2</sup>)] of floor area of the room.

**Exception:** Lithium-ion batteries shall not require ventilation.

**608.6.2 Cabinet ventilation.** When VRLA batteries are installed inside a cabinet, the cabinet shall be approved for use in occupied spaces and shall be mechanically or naturally vented by one of the following methods:

1. The cabinet ventilation shall limit the maximum concentration of hydrogen to 1 percent of the total volume of the cabinet during the worst-case event of simultaneous “boost” charging of all the batteries in the cabinet; or
2. When calculations are not available to substantiate the ventilation rate, continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute per square foot [1 ft<sup>3</sup>/min/ft<sup>2</sup> or 0.0051 m<sup>3</sup>/(s · m<sup>2</sup>)] of floor area covered by the cabinet. The room in which the cabinet is installed shall also be ventilated as required in Section 608.6.1.

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Table 608.1

### Battery Requirements

Requirement	NONRECOMBINANT BATTERIES		RECOMBINANT BATTERIES	
	Flooded Lead Acid Batteries	Flooded Nickel-Cadmium (Ni-Cd) Batteries	Valve Regulated Lead Acid (VRLA) Batteries	Lithium-Ion Batteries
Safety caps	Venting caps (608.2.1)	Venting caps (608.2.1)	Self-sealing Flame-arresting caps (608.2.2)	No caps
Thermal runaway management	Not required	Not required	Required (608.3)	Not required
Spill control	Required (608.5)	Required (608.5)	Not required	Not required
Neutralization	Required (608.5.1)	Required (608.5.1)	Required (608.5.2)	Not required
Ventilation	Required (608.6.1; 608.6.2)	Required (608.6.1; 608.6.2)	Required (608.6.1; 608.6.2)	Not required
Signage	Required (608.7)	Required (608.7)	Required (608.7)	Required (608.7)
Seismic protection	Required (608.8)	Required (608.8)	Required (608.8)	Required (608.8)
Smoke detection	Required (608.9)	Required (608.9)	Required (608.9)	Required (608.9)

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