Stationary Battery Room Design Review Checklist

Approved for public release; distribution unlimited

General Medical: 500A, Public Health Data

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USAPHC

Stationary Battery Room
Design Review Checklist

UFC 3-520-05, Stationary Battery Areas, 14 April 2008
NFPA 1, Fire Code, 2012 Edition
NFPA 70, National Electrical Code, 2011 Edition
NFPA 70E, Electrical Safety in the Workplace, 2004 Edition (2012 Edition)
NFPA 10, Standard for Portable Fire Extinguishers, 2010 Edition
ISEA Z 358.1 -2009, American National Standard for Emergency Eyewash and Shower Equipment (Formerly ANSI Z 358.1)
ACGIH Industrial Ventilation Manual, 27th Edition

Architectural

1. Located near the load being served (UFC 3-520-05)?

2. Are more than one type of battery chemistry (i.e. lead-acid, nickel-cadmium, etc.) being used?
If so, are they in separate rooms (UFC 3-520-05)?

3. Are occupancy separation requirements between the battery room(s) and other portions of the building met (UFC 3-520-05, NFPA 1)?

4. Services not associated with the battery room will not pass through the room (UFC 3-520-05)?

5. The battery room is not used as access to another space. (UFC 3-520-05)

6. Is the floor covered with a slip-resistant material and acid- or alkali-resistant (UFC 3-520-05)?
For vented cell installation, are the wall and ceiling finish acid or alkali resistant (UFC 3-520-05)?

7. Is an overhead hoist or portable material handling equipment provided for the room (UFC 3-520-05)?

HVAC

1. Is the room mechanically ventilated (UFC 3-520-05)?

2. Is the ventilation system designed to maintain hydrogen concentrations in the room below 1% concentration (UFC 3-520-05, NFPA 70E, NFPA 1)?

Equation 1:

$$\text{Hydrogen rate (HR)} = \text{emission rate} \times \text{charging current per 100 Ah} \times \text{doubling factor} \times \frac{\text{cell capacity per 8 hour}}{\text{increment of cell capacity passing charging current}} \times \text{number of cells}$$

Equation 2:

$$\text{Ventilation rate (VR)} = \text{HR}/0.01$$

Note: NFPA 1 requires continuous ventilation at a rate of not less than 1cfm/ft^2 of floor area of the room or cabinet.

3. Is the supply air rate 95% of the exhaust ventilation in order to maintain a negative pressure in the room (UFC 3-520-05, ACGIH 27th Ed.)?

4. Is all air exhausted directly outside (UFC 3-520-05)?

5. Is the stationary battery area located along an exterior wall?
If not, it needs a dedicated exhaust duct system (UFC 3-520-05)?

6. Is makeup air being transferred from a Class 1 or Class 2 area in the facility as defined in ASHRAE 62.1 or supplied directly?
If supplied directly, is it filtered (UFC 3-520-05)?

7. Are fans roof-mounted with an upwardly directed discharge (UFC 3-520-05)?

8. Is the exhaust fan spark-resistant with an explosion proof motor (UFC 3-520-05)?

9. Are the air inlets no higher than the lowest tier of the battery rack?
Are the exhaust grilles located at the highest point of the room (UFC 3-520-05)?

10. Is the ductwork made of either polyvinyl chloride (PVC) or fiberglass reinforced plastic (FRP) (UFC 3-520-05)?

11. Is the HVAC system designed for continuous operation (UFC 3-520-05)?

12. Does the exhaust fan have a green indicator light to indicate proper operation (UFC 3-520-05)?

ELECTRICAL

1. Are battery racks, enclosures and cables bonded to ground with #6 AWG (UFC 3-520-05)?

2. Is there overcurrent protection for each battery string (UFC 3-520-05)?

3. Is there a disconnect device where the DC conductors leave the battery room (UFC 3-520-05)?

4. Are room lighting fixtures pendant or wall mounted and not provide a collection point for explosive gas (UFC 3-520-05)?

5. For rooms with vented cell batteries, are the lighting fixtures constructed with corrosion resistant materials (UFC 3-520-05)?

6. Will lighting fixture mounting interfere with the operation of lifting devices (UFC 3-520-05)?

7. Is instrumentation to measure battery, voltage with high and low alarms, battery current, and ground detection for ungrounded systems provided (UFC 3-520-05)?

EMERGENCY FACILITIES

1. Is there a portable or stationary water facility for rinsing eyes and skin provided within 20 feet of the battery (UFC 3-520-05, ISEA Z358.1-2009)?

FIRE PROTECTION REQUIREMENTS

1. Is a smoke detection system installed in the room/area (NFPA 1)?

2. Are portable fire extinguishers provided within and adjacent to the battery room (UFC 3-520-05, NFPA 10)?