

Battery Charging Room Design Review Checklist

Preventive Medicine Data: 40-5e

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Battery Room Design Review Checklist

ACGIH Industrial Ventilation Manual, 27th Edition
UFC 3-410-04N, Industrial Ventilation, 25 October 2004
UFC 3-520-05, Stationary Battery Areas, 14 April 2008
UFC 3-420-01, Plumbing, 25 October 2004
UFC 3-600-01, Fire Protection Engineering for Facilities, 26 September 2006
NFPA 1, Fire Code, 2009 Edition
NFPA 70, National Electrical Code, 2011 Edition
NFPA 70E, Standard for Electrical Safety in the Workplace, 2004 Edition
NFPA 505, Fire Safety Standard for Powered Industrial Trucks, 2011 Edition
National Guard Design Guides, 2009

CONSTRUCTION **Battery Charging**

1. Does the exhaust system have both high- and low-level exhaust inlets (UFC 3-410-04N, ACGIH 27th Ed)?
2. Is the low-level exhaust inlet located within 1 ft (305 mm) of the floor (UFC 3-410-04N)?
3. Is the ductwork made of either PVC or fiberglass reinforced plastic (UFC 3-410-04N, UFC 3-520-05)?
4. Are work surfaces acid- or alkali- resistant (UFC 3-520-05, DG 415-1)?
5. Is an acid-resistant built-in workbench with shelves adjacent to a sink provided (DG 415-1)?

Stationary Battery Area

1. Located near the load being served (UFC 3-520-05)?
2. Are more than one type of battery being used? If so, are they in separate rooms (UFC 3-520-05)?
3. Is an overhead hoist or portable material handling equipment provided for the room (UFC 3-520-05)?
4. Is the floor covered with a slip-resistant material and acid- or alkali-resistant (UFC 3-520-05)?
5. Services not associated with the battery room will not pass through the room (UFC 3-520-05)?
6. The battery room is not used as access to another space. (UFC 3-520-05)

HVAC Battery Charging

1. Is the exhaust ventilation system separate from the general ventilation system so no air is recirculated (UFC 3-410-04N)?
2. Is all air exhausted directly outside (ACGIH 27th Ed, UFC 3-520-05)?
3. Is the fan motor outside the duct and battery room (UFC 3-410-04N, UFC 3-520-05)?
4. Is the exhaust fan spark-resistant and explosion proof (UFC 3-410-04N, UFC 3-520-05, DG 415-2)?
5. Is the exhaust fan interlocked with the battery charger (UFC 3-410-04N)?
6. Is the exhaust air volume from the exhaust fan at least (DG 415-2, DG 415-3)?

$$Q = 2 \text{ cfm/ft}^2,$$

Or using (UFC 3-410-04N):

$Q = (C/60)/PC$ where,

- Q = minimum required ventilation rate, cfm
- C = Hydrogen generated in cubic feet per hour (cfh) where,
 - $C = (FC/100) \times AH \times K \times N$
 - FC = Float current per 100 ampere-hour
 - AH = Ampere hour
 - K = Constant of 0.016 cubic feet of hydrogen per 1 ampere-hour/cell
 - N = Number of battery cells
- PC = percent concentration of hydrogen allowed in room ($PC = 0.01$ to keep the hydrogen concentration at 1%)

7. Is the exhaust airflow distributed so 1/3rd of the total exhaust rate is exhausted through the high-level inlet (UFC 3-410-04N)?
8. Is the supply air rate $\leq 95\%$ of the exhaust ventilation in order to maintain a negative pressure in the room (UFC 3-410-04N, UFC 3-520-05, ACGIH 26th Ed.)?
9. Is there an indicator light to show that the exhaust system is functioning properly (UFC 3-410-04N)?

Stationary Battery Area

1. Is the stationary battery area located along an exterior wall? If not, it needs a dedicated exhaust duct system (UFC 3-520-05)?
2. Is the HVAC system designed for continuous operation? (UFC 3-520-05)?
3. Does the exhaust fan have a green indicator light to indicate proper operation (UFC 3-520-05)?

PLUMBING

Battery Charging

1. Is an eyewash/emergency shower provided (UFC 3-410-04N, DG 415-2, DG 415-3)?
2. Is an audible and visible alarm activated by the eyewash/emergency shower (water flow initiated) located outside the battery room (UFC 3-420-01)?
3. Is the eyewash/emergency shower located with 25 ft (7.5 m) (highly corrosive chemical) of the hazard and easily accessible from any point in the room (UFC 3-410-04N)?

Stationary Battery Area

1. Is an eyewash/emergency shower provided (UFC 3-520-05)?
2. Are floor drains provided for the eyewash/emergency shower (UFC 3-520-05)?
3. Is the eyewash/emergency shower located within 20 ft (6 m) of the battery (UFC 3-520-05)?

ELECTRICAL

Battery Charging

1. Do lights, motors and switches meet National Electrical Code (NFPA 70)?
2. Are the charging circuits interlocked with the exhaust fan so when the lights are turned on the exhaust fan starts automatically (DG 415-2)?
3. Is the space constructed in accordance with NFPA 70 Article 480, Storage Batteries and Article 503, Class III locations (DG 415-1)?

Stationary Battery Area

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)?