Cheresources COM
Online Chemical Engineering Information

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We recommend using our search feature to find the title.

If you haven't visited our site before, you can find the main page at:

http://www.cheresources.com

Thanks for visiting our site,

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Content Based
Chemical Engineering

Ventilation Requirements due to hydrogen liberation

REFERENCES: NFPA 50A Gaseous Hydrogen Systems at Consumers Sites & NFPA 70 National Electrical Code

NOTE: Always begin a new case by retrieving the original file. Direct entry of data in cells that originally contain table lookups could cause functions to be lost, or incorrect calculations. I format cells requiring entry colored **RED**; calculated values are black.

BASIS: Charging batteries can release hydrogen gas. Unless precautions are taken to properly ventilate the area, the liberated hydrogen could create an explosive atmosphere.

This calculation basis assumes that 25 percent of the battery cells are releasing hydrogen at a given time. Building HVAC ventilation may be sufficient to provide the required dilution air for hydrogen. Calculate the dilution air required and compare the quantity to the design flow of air for general ventilation in the area. When natural ventilation is used the hazardous area is defined as: 3 ft. (1m) from the outside dimensions of the charging facility, and at a 45° inverted pyramid to the ceiling.

Air is 14 times heavier than hydrogen, therefore hydrogen rises rapidly. Watch for pockets near the ceiling where hydrogen could accumulate. It has a very low Minimum Ignition Energy (MIE); thus easily ignited.

1.) Enter identification at [C4]
2.) Enter the individual battery size (voltage) [C6].
3.) Enter the charging capacity rating at [C7]. And the number of chargers in this area at [C8].
4.) The required dilution air to maintain a concentration of no more than 1% hydrogen is shown at cell [D14]. This value ass/u/mes 25% of the cells are gassing simultaneuosly.
5.) For natural ventilation, the area required is calculated and shown at [D20] after entering the ceiling height at [D18].

Print out using direct Excel commands. This application is provided by Chemical Engineers Resource Website, visit cheresources.com for additional selections.

Print out using direct EXCEL commands.

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Ventilation Requirements Due To Hydrogen Liberation

AREA: Second floor charging station, bldg 052

Volts:	48	battery size
Amps:	50	charger ampere
Units:	32	number of chargers

(Amps) · (Volts) = 2400

· CFH, dilution air req'd @ 25% battery of the cells gassing

0.0033 · Amps · Volts = 253.44 Q, cfm

· pacity of a natural convection roof vent: $A\ (in^2) = 6.2 \cdot Q / h^{0.5}$

height of charging room = 10 ft

A = 496.89754 in^2, open area

04/11/04

Ventilation Requirements Due To Hydrogen Liberation

AREA: Second floor charging station, bldg 052

Volts:	48	battery size
Amps:	50	charger ampere
Units:	32	number of chargers

(Amps) · (Volts) = 2400

· CFH, dilution air req'd @ 25% battery of the cells gassing

0.000094 · Amps · Volts = 7.2192 Q, m^3/min

· ıcity of a natural convection roof vent: $A\ (cm^2) = 780 \cdot Q / h^{0.5}$

height of charging room = 3.048 m

A = 3225.3451 cm^2, open area