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LIFT TRUCKS ROOMS FOR BATTERY CHARGE

Which production company does not have today a lift truck for the internal handling of bulky materials? Now it's equipment present everywhere. Over the years, the electric-powered lift trucks have replaced older ones with diesel engines.

Surely, the benefits for the environment, in terms of harmful emissions, were significant, but who have focused until now on the dangers of the rooms destined to the batteries recharge?

Places for batteries recharge, normally lead or nickel cadmium made, can be external, usually under canopies, but more often they are internally, displaced in one or more parts of the industrial shed.

During the final phase of the charge, or while a too fast charging of lead or nickel-cadmium batteries, the electrolytic dissociation of water occurs producing hydrogen and oxygen, which, released into the atmosphere, create an explosive mixture when the hydrogen concentration in the air exceeds the 4%.

Regarding the traction batteries, of which we are discussing in this newsletter, the reference standard is the EN 50272-3. For stationary batteries, of which we'll speak about in a following newsletter, the reference is the EN 50272-2 standard.

These rules indicate how to calculate both the flow of ventilation air required and the surface of the ventilation openings.

Air flow

The air flow which prevents the formation of explosive atmospheres must be calculated with the following formula:

$$Q = 0.05 n I_{gas} C_{rt}/1000$$

In which

Q = flow of air ventilation in m³/h

n = number of battery cells

I_{gas} = current that produces the gas (mA/Ah)

C_{rt} = nominal battery capacity in Ah

The information required for the calculation shall be supplied by the battery manufacturer.

Obviously, if there are more batteries in the same place, the total ventilation will be the sum of the individual air flow.

Surface area of the ventilation openings

To ensure the air flow rate, shall be arranged openings with a minimum cross section calculated in this way:

$$A = 28Q$$

In which

A = area of the openings in cm²

Q = air flow in m³/h

The surface should not be encumbered by any obstacles that might restrict air circulation.

Classification of hazardous area

The dangerous areas are classified in accordance with EN 60079-10-1, which is mentioned in the EN 50272-3.

In any case, according to EN 50272-3 standard, the area in the proximity to the battery, is classified as Zone 1, for a distance “d” equal to 0,5 meters.

If you proceed to calculate the distance “d”, according to the method of calculation of the CEI 31-35, (Italian electrical committee) probably the distance would be greater.

In principle, since the EN 50272-3 is an European standard, there would be no need to extend the distance “d” of Zone 1, but to go in the direction of safety, however our advice is to rely the CEI Guide and consider more space around the battery pack, in particular upwards, being hydrogen a light gas.

Equipment

In order to prevent explosions in battery rooms is therefore necessary to:

- provide locals with ventilation openings according to EN 50272-3 and, if this is not possible, to provide forced ventilation;
- install electrical Ex 2G components in Zone 1, CE marked in accordance with the ATEX Directive 94/9/EC.