Ventilation and Breathing of Battery Rooms

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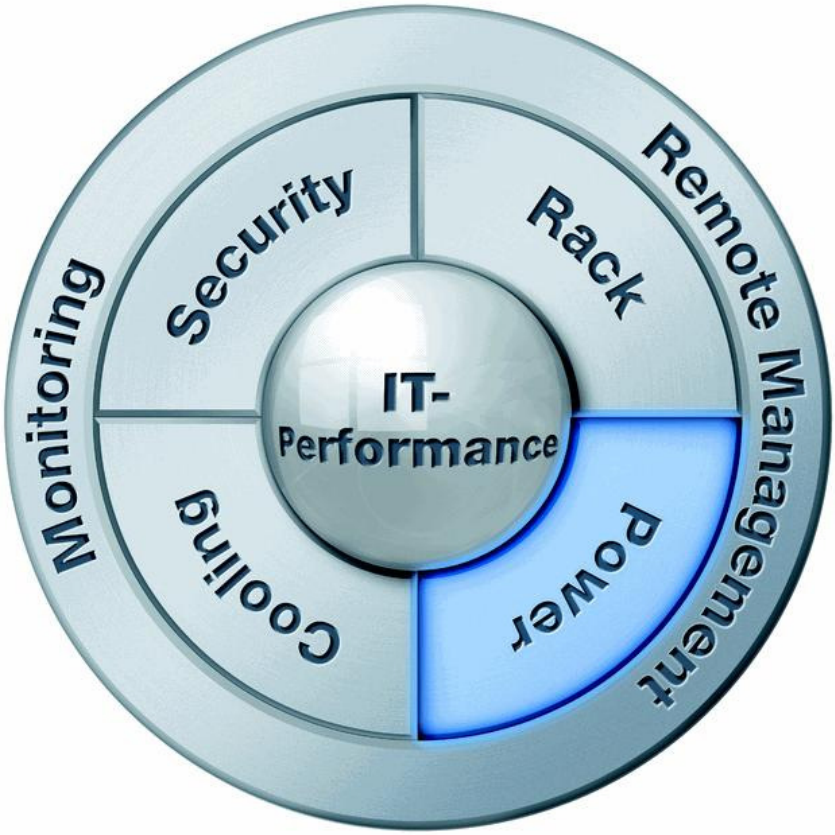
White Paper 06



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1 Introduction

One or more UPS systems are installed in each data centre to supply the server with power for a short bridging time. In large data centres, the UPS systems are often located in a separate room. However, in small data centres or in small works with only a small number of server enclosures, the UPS system is installed directly in or next to the enclosure. Maintenance-free or "closed" batteries are installed in some UPS systems. The batteries can be neither topped up with water nor maintained. The charging of a battery releases electrolyte that can damage health. The electrolyte is recombined for some closed batteries or released to the environment with a valve. Should a battery fault occur, in the worst case, this can cause bursting of the housing. Because the released gases can endanger the health, they must be fed away. DIN VDE 0510 Part 2 Section 9.4.3 describes the ventilation and breathing requirements for battery rooms.

2 Regulations

In accordance with DIN VDE 0510 Part 2 Section 9.4.3

...natural ventilation is permitted for lead batteries of maximum 3 kW charging capacity and for NiCd batteries of maximum 2 kW charging capacity. In addition, artificial (technical) ventilation must be provided. ...

3 Calculation of the Ventilation and the Breathing

(in accordance with DIN VDE 0510 Part 2 Section 7.1)

The ventilation of enclosures and rooms in which batteries are operated is considered to be adequate when at least the air volume flow determined by the following equation is guaranteed.

Air volume flow Q (m^3/h) = 0.05 * Number of cells (n) x I * x f1 x f2

*see Table 3 DIN VDE 0510 Part 2 page 10

For low-antimony lead batteries, the required air volume flow is reduced by 50% (f1 = 0.5).
For closed lead batteries, the air volume flow is reduced by a further 50% (f2 = 0.5).

4 Air Inlets and Outlets

DIN VDE 0510 Part 2 Section 7.2.1

The ventilation and breathing of electrical operating areas with batteries must be provided directly from/to outside or with dedicated ventilation pipes.

The air inlet and outlets in the operating areas must have the following minimum cross-sections.

$$A\ (cm^2) > 28 \times Q$$