



**Industrial Batteries (UK) Limited**

*Main distributor of Alcad Ni-Cd Batteries in the UK and suppliers of Battery Support Services*

### **Application Note No.3**

**Industrial Batteries (UK) Limited**

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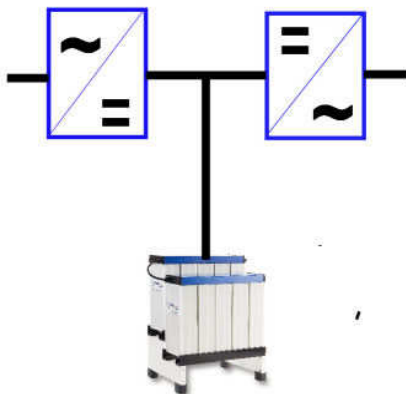
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## **Uninterruptible Power Supply (UPS)**

An uninterruptible power supply (UPS) is a device which maintains a continuous supply of power to electrical equipment by supplying power from a separate source when mains power is not available. It is located between the power source (typically utility power) and the load it is protecting. When a power failure or abnormality occurs, the UPS will switch from utility mains power to its own power source almost instantaneously.

A UPS is typically used to protect computers, telecommunication equipment or other electrical equipment where an unexpected power disruption could cause injuries, fatalities, serious business disruption or data loss and it ranges in size from a few hundred watts to megawatts.

A UPS should not be confused with a standby generator, which does not provide protection from a momentary power interruption and may result in an interruption when it is switched into service, whether manually or automatically. Such generators can be placed before the UPS to provide cover for lengthy outages.



Modern UPS systems are categorised as on-line or off-line. An on-line UPS always powers the load from its own internal energy supply, which is in turn continuously charged by the input power. In an off-line system the load is powered directly by the input power and the backup power circuitry is only invoked when the utility power fails. Many UPS below a few kVA are of the off-line type which are cheaper, though inferior, to on-line systems which have no delay between a power failure and backup power being supplied.

A true uninterruptible system is an on-line double-conversion system. In this system alternating current (AC) comes from the power grid, goes to the battery (direct current or DC), then is converted back to AC power.

The first question to ask when choosing a UPS system should be whether the unit going to be placed inside a controlled environment or not? If the answer to this question is yes, then the quality of the controlled environment needs to be established and the battery sized accordingly. If the answer is no, then it is important not to put in a system more appropriate for a controlled environment. It doesn't matter that you choose the correct dimensions, power, backup time, etc. If you place an indoor UPS in a non-controlled environment, the useful life of this system will be considerably shortened, threatening the integrity and backup of the equipment you are protecting with the UPS.

In order to provide the desired protection, the application requirements and the UPS capability must be correctly matched. Valve regulated lead acid batteries have a useful lifetime of up to five years and, in determining when to replace batteries, it is important to remember that the VRLA battery can be completely exhausted after five years and lose their ability to hold a charge gradually up to that time. UPS systems have replaceable batteries, but require a qualified technician or electrician to replace them, and so battery replacement is costly. Temperature is relevant as there is a large reduction in lifetime for lead acid batteries at temperatures exceeding 25 °C. This is not so significant with nickel cadmium batteries where the affect is electrochemically less important and predictable.

The purpose of having a back-up system is to provide security and, in the event of mains power failure, the battery must work. If the battery does not work then this is worse than having no system installed as this provides a false security

The requirements of a battery for a reliable UPS system can be summarised as follows:

- High reliability to ensure system security.
- No unexpected failure of the system when required to perform its duty.
- Life equal to or exceeding that of the UPS
- High performance: Typical duty is often 10-30 minutes.
- Low maintenance (which is more than simply water replenishment! )
- Abuse resistance and resistance to high levels of ripple.
- Ability to accept high recharge currents for fast recharge
- Good cycling capability (depending on location and application)
- Resistance to higher temperature particularly when cabinet mounted or in a difficult environment.
- Cost effective over the entire life of the system

**Nickel-Cadmium offers the following advantages to ensure complete system reliability and security.**

- ✓ Ni-Cd offers complete reliability with lifetimes of up to 20 years
- ✓ Ni-Cd has no sudden failure or the possibility of thermal runaway
- ✓ Ni-Cd capability degrades slowly and predictably
- ✓ Ni-Cd lifetimes at elevated temperature are degraded far less than lead acid
- ✓ Ni-Cd has no frequent battery replacements due to long lifetime and reliability
- ✓ Ni-Cd life is typically longer than that of the UPS system
- ✓ Ni-Cd cycling ability is well within the requirements of most UPS applications
- ✓ Ni-Cd high reliability and low operating costs make it highly cost effective



UPS systems back up highly critical loads and MUST operate in an emergency. Ni-Cd is the only battery type that does not exhibit sudden failure. Factors that cause failure in lead-acid batteries, such as cycling and ripple, have little or no affect on Ni-Cd, which offers truly reliable, trouble-free service

#### **Our Battery Ranges for UPS systems.**



IBLUK supply premium quality industrial nickel-cadmium batteries from the leading manufacturers Alcad and Saft. Our range of Alcad batteries for UPS include:

- For discharges longer than 1 hour the Vantage ultra low maintenance range uses the advantages of proven Ni-Cd flooded electrolyte technology in a range of pocket plate recombination products from 8 Ah to 850 Ah.
- Designed for discharges of 1 hour or less the XHP range uses sintered positive and plastic bonded negative plates. These high performance low maintenance products have an excellent temperature capability, a small footprint and are available in a capacity range from 11 to 320 Ah

#### **IBLUK Support**

Industrial Batteries (UK) Limited has been serving the industrial battery market in the United Kingdom since 1997 and specialises in nickel-cadmium industrial battery supply and support.

We will size the optimum battery for your application from our extensive ranges, provide battery layouts, supply battery stands where required and help you to choose the most cost effective solution.

We also provide battery training, maintenance equipment, accessories and support services. Please do not hesitate to contact us.

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