



**Industrial Batteries (UK) Limited**

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

**Application Note No.1**

**Industrial Batteries (UK) Limited**

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## Standby Generators and Engine Starting

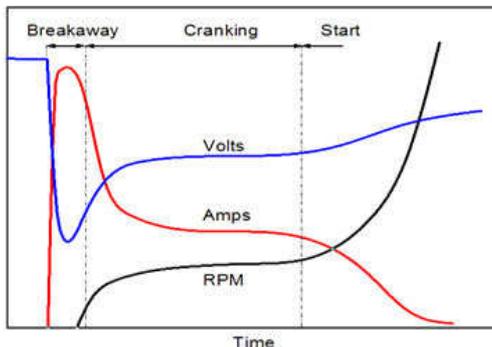
Batteries are used to provide the starting current for the engines used in generator systems and fire pumps and are therefore essential for the correct functioning of the system. The engines used are mostly diesel engines but some are gas-fuelled.

They are also used in combustion turbines where they provide, in addition to the starting current, the power for the oil pumps and control loads.

The systems using these engines are found in critical situations in industry, hospitals, buildings, the financial sector and the military. They have not fundamentally changed over the years and are designed to give high reliability and long life.

It is important that all the components in the application should be able to support these requirements and it is implicit that the starter battery is critical for the achievement of a successful system.

The starting cycle for an engine consists of three distinct sections as shown in the diagram on the left.



The first part of the cycle is the initial effort to begin the engine turning. This 'breakaway' is the most critical part of the cycle as it requires the highest discharge current and falls to the lowest battery voltage.

Once the breakaway has been achieved the engine moves to a cranking cycle where it is turning but has not yet started. During this cranking cycle the voltage, current and engine speed remains relatively constant.

Finally the engine starts, the current falls rapidly and the voltage rises as the battery recovers.

The starting batteries provided with the standby plant need to be of sufficient capacity to maintain cranking speed at or above the threshold speed recommended by the engine manufacturer through a cranking period of up to 60 seconds and at the minimum site temperature required. The current required from the battery and the size of the battery will depend on many factors other than the size of engine being started. These include the number of starter motors being used (usually 1 or 2), the oil viscosity being used, the ambient temperature and the number of repeated cycles required before the engine starts.

There are a number of International Standards which specify the number of start attempts the battery/starter should be capable of achieving and the temperature at which this should be achievable.

The requirements of critical systems of these types are much more severe than the simple case of starting an engine in a vehicle and, given the high cost of potential failure, it is surprising how little emphasis is placed on the correct choice of storage battery for starting standby generator sets.

Starting batteries are available in two main types, nickel-cadmium and lead acid. The automotive lead battery is often fitted for the starting duty by generator set manufacturers because of their low cost. However, the major cause of unreliability of standby generators is the use of this type of battery for starting.

The automotive/truck battery is of the thin pasted plate construction, designed to provide high starting currents at a minimum cost. It has been developed for the stop/start conditions of vehicles with a life expectancy of 2-4 years under non-critical conditions. Such batteries are not designed for a standby role in which the battery must remain for long periods on float charge. This battery is unable to hold its charge for much longer than a month and, if a separate charger is not used, the system must be run regularly to ensure a charged battery, a routine which is wasteful of fuel and can be overlooked.

Regarding lead acid batteries, the only practical option for starting applications is an automotive/ truck battery. Higher quality lead-acid batteries used in standby industrial applications are more reliable and have longer life, but the plates are thicker and, having a much lower performance, are unsuitable for starting applications. Thus the choice for engine starting is between Ni-Cd and lead-acid automotive/truck batteries.

### **Nickel-Cadmium offers complete reliability**

The main advantages of the Ni-Cd battery can be summarised as follows:

- No sudden failure - Even a well-maintained truck battery will typically fail unexpectedly and catastrophically during breakaway, whereas Ni-Cd starting capability degrades slowly and predictably.
- No frequent battery replacements - Ni-Cd life is much longer than for truck batteries and its life is affected much less by high temperatures
- Engine starting batteries must provide very high currents on a reliable basis and Ni-Cd batteries not only have a high performance, but are much more reliable than lead-acid truck batteries.
- The nickel-cadmium battery has the ability to work over very wide temperature range with particularly good low temperature discharge performance.



When the cost of repeated replacements and unexpected failure is factored in, nickel-cadmium is the most cost-effective option for engine starting.

### **Our Battery Ranges**

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



- The HCP range which uses a high performance pocket plate construction in a wide capacity range from 9Ah to 920Ah.
- The XHP range which uses sintered positive and plastic bonded negative plates. They are high performance low maintenance products with excellent low temperature capability, a small footprint and 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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