

Alcad Solar batteries **shine** in renewable energy applications

Renewable energy applications in the Asia Pacific region present a major challenge for storage batteries. As well as having to maintain reliable service in isolated locations and hostile environments, they are subjected to widely fluctuating demands and charging patterns. Alcad's new Solar range of nickel-cadmium batteries has been designed to provide the ideal solution.

The key questions to ask when selecting a storage battery

A typical renewable energy system will comprise photovoltaic (PV) or windpower generators either singly, or in some combination with conventional fuel-powered generators to create a stand-alone hybrid system. The battery bank for energy storage plays a key role in ensuring the autonomy of the system, so it must be just as dependable, and offer the same service life, as the generator and control elements.

When selecting a storage battery it is vital to remember that it will be placed under very different demands from standby and emergency power batteries. There are some key questions to ask:

- Will the battery be able to withstand both daily and seasonal cycling, and a variable DOD (depth of discharge) and SOC (state of charge)?
- The intermittent nature of the energy source will impose fluctuating charging voltages and currents. Will the battery be able to cope with this?
- Can the proposed battery function in extreme temperatures, both high and low?
- Will the battery offer reliable, unattended operation, with minimal maintenance?
- Does the battery have a rugged construction to ensure it will survive transportation to remote sites?
- Can the battery be installed easily by unskilled labour and with limited handling equipment?
- Most important of all. Will the battery deliver the long-term reliability and availability needed to ensure the cost-effective operation of the renewable energy system over an anticipated 20-years service life?

Alcad Solar – specialised Ni-Cd batteries for renewable energy installations

Many renewable energy installations use VRLA (valve regulated lead acid) batteries. However, the tropical climate and tough operating conditions in the Asia Pacific region are sometimes at the limit of acceptable conditions for this type of battery. This can shorten battery life and/or provoke early failures, causing the entire system to under-perform.

In the 1980s, Alcad introduced its new Vantage range of rechargeable nickel-cadmium batteries with a robust pocket plate construction. And this design has become established as the ideal, reliable and cost-effective alternative to VRLA in demanding applications worldwide. The design has now been further refined and improved to create the Alcad Solar range, developed specifically to deliver totally reliable service and low maintenance for renewable energy installations.

Complex charging conditions

Alcad Solar batteries are designed to continue to operate at any state of charge, and reach a high state of charge without boost or reconditioning charges. This makes it easy to manage the complex charging patterns essential for efficient operation of the renewable energy system by avoiding the need to over-compensate for unpredictable charging conditions with high charging voltages.

Alcad Solar batteries are compatible with all current PV charge regulators and conventional industrial battery chargers. They have a typical charging voltage of 1.5 V per cell that minimises water consumption, eliminating unscheduled service calls.



Extreme temperatures

A robust pocket plate construction and stable electrochemistry enables Alcad Solar to operate comfortably within a temperature range of -20°C to $+50^{\circ}\text{C}$, and they can tolerate extremes of -50°C to $+70^{\circ}\text{C}$. At extremely low temperatures its capacity diminishes, but this is not permanent. For illustration, even at -40°C , the batteries will deliver 80 percent capacity for a 120 hour discharge.

Long term low maintenance

Alcad Solar features a robust pocket plate construction and shock-resistant polypropylene casing material. This enables it to withstand both

physical abuse, such as during transport to a remote site, and electrical abuse. For example. Alcad Solar is completely unaffected by accidental overcharge (ie in the case of charge regulator failure) and deep discharge or inversion.

In addition, the alkaline electrolyte does not react with the nickel-plated steel components, so the structure of the battery stays intact and unchanged throughout its life. Alcad Solar therefore requires very low maintenance and, most importantly, it will provide totally reliable and predictable performance over a 20-year service lifetime. With no manpower or equipment expenses for battery replacement, troubleshooting or repair, minimal maintenance and reduced need to travel to remote installations, Alcad Solar will significantly lower the life cycle cost of both the batteries and the whole renewable energy system.

Increased reliability can also reduce demands on expensive diesel generators, which helps to further reduce overall system running costs.

Four-year maintenance intervals

Alcad Solar features an optimised electrode design, combined with Alcad's well proven internal gas recombination technology (in line with IEC 62 259). These design features provide improved behaviour under unstable charging conditions and significantly extend the intervals for topping-up with water – to more than four years, depending on the application – reducing operating costs to a minimum.

Alcad's water filling system is available for Solar range cells from 185 Ah upwards. It enables fast, automatic and accurate topping-up, further extending maintenance intervals.

Operating where lead acid batteries cannot

Nickel-cadmium technology is inherently safe and resistant to over-,under- and complete discharging. Even at temperatures below -20°C, Alcad Solar continues to perform without risk of corrosion or sulphation when cycled at a low state of charge.

The Alkaline electrolyte will not freeze and remains stable during operation. In contrast, under similar conditions lead acid batteries suffer from plate degradation, shortened life and risk of 'sudden death' failure.

Wide range of capacities

Alcad Solar batteries are available in a range of nominal capacities from 45 Ah up to 1110 Ah and are delivered ready filled and charged. They are fully recyclable and Alcad provides a service to collect and dispose of all its batteries at the end of their service life.

Conclusion

The extended capability offered by Alcad Solar batteries provides a high-performance, reliable and cost-effective energy storage solution for renewable applications in the Asia Pacific region. ■



For more information on Alcad Solar batteries contact: Hans-Erik Johnson by email at Johnson.Hans-Erik@alcad.com or call +46 491 68100 www.alcad.com