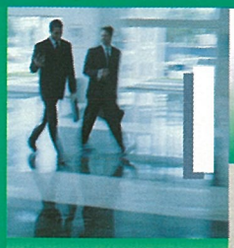
Saft



INTERNATIONAL
Saft's customer magazine

Number 17 Summer 2002

p. 6

Rescue choppers fly farther, longer with Saft's ultra low-maintenance Ni-Cds

Visit www.saftbatteries.com

To our customers

As you will see, things have been moving along successfully at Saft. My predecessor, André Tain, who wrote to you on this page in the previous issue of Saft International, is now enjoying his well-earned retirement. He devoted over two decades to Saft – and to you, our customers. I have taken over as CEO after 12 years with Saft.

As you will read in this latest edition of Saft International, much of our recent news concerns our nickel-cadmium (or Ni-Cd) technology. Nickel-cadmium is a truly tried-and-tested battery technology which is continuing to break new ground and conquer new markets. Why? Its impressive reliability and ruggedness, its ability to withstand extreme conditions and its life-cycle costs make it the obvious choice in many different applications, whether they are environmentally sensitive, highly demanding or very cost-conscious.

John Searle

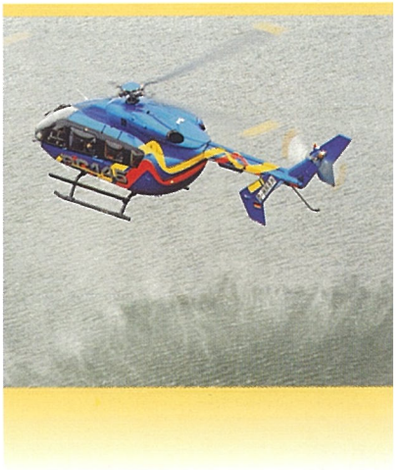
Ni-Cd applications described in this issue span back-up power for utilities, helicopters for security forces, or satellites for Earth observation.

Along with our strong performance in nickel-cadmium, lithium batteries are also experiencing good growth around the world, thanks to your confidence in us, particularly in the utility and security markets, and you'll find stories on them in these pages as well.

All of us at Saft value your trust in our products, systems, service and technology. I look forward to leading this team, and meeting as many of you as possible in the coming weeks and months.

John Searle
Chief Executive Officer

In this issue



Saft International – A magazine for Saft's customers and business partners.
Editor-in-chief: Jill Ledger.
Texts: John Davidson (except pp. 16-17).
Graphic design: Parquet & Lanceau.
Photo credits: DR X, Saft, DigitalVision®, Thierry Bouyer, Bombardier, ESA, Nasa, Valeo.
Cover: Eurocopter

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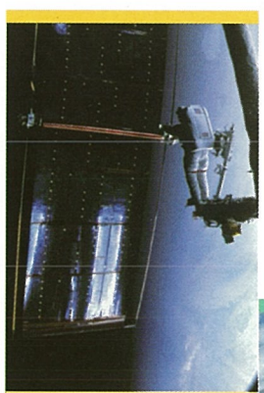

Alaska Ni-Cd order ensures high-tech jobs in Sweden

A huge order for Ni-Cd batteries from power utility GVEA in Alaska, in the U.S., is ensuring jobs and economic prosperity for Sweden. At the same time it takes account of serious environmental constraints in both North America and Europe.

Set in the pristine countryside of Sweden's south, Saft's Oskarshamn factory is gearing up to build the safety backup power for residents on the other side of the globe — in Alaska. The customer, utility GVEA, evaluated many types of battery technologies, including most notably lead-acid batteries. The latter cost less — in terms of purchase price — than the Ni-Cd technology that ultimately won the GVEA business.
But Ni-Cds offer so many advantages over lead-acid batteries, in terms of environmental responsibility and life-cycle costs, that the Alaska utility chose the solution that is being manufactured by the Oskarshamn plant, in Sweden.
Power-plant builder ABB is prime contractor for GVEA, and has subcontracted battery responsibility to Saft.
Saft's Swedish plant meets all environmental requirements, in terms of its waste management, production and product recycling.

Recyclable Ni-Cd

The Alaskan power utility, Golden Valley Electric Association, is building a 230-kilovolt transmission line between Healy and Fairbanks, both in Alaska. The addition of a battery energy storage system (or BESS) will supply 40 megawatts of reserve power capacity to the grid for 15 minutes. In case of a power failure, GVEA can continue providing current to homes and businesses that might otherwise "freeze" — literally. Saft's Ni-Cds will perform that service.
Sweden has its own Ni-Cd recycling plant that Saft supports. Indeed, 30% of the cadmium for the systems to be built for GVEA will come from recycled batteries. The recycling plant collects spent Ni-Cds from across Scandinavia as well as elsewhere in Europe. Under special agreements, spent Ni-Cd batteries from elsewhere around the world are also reprocessed by the facility.

Jobs...and more

The Alaska contract represents job security for the Swedish plant. In terms of manufacturing, 30 people are employed specifically to make the first batch of batteries. Additionally, four high-tech personnel and project leaders are addressing specific technical issues. The BESS contract improves the skill of technical engineers as well as those of production-line workers and those in planning and even logistics, such as shipping.
Suppliers to Saft's Oskarshamn plant will also benefit from the business. Saft is investing about a million euros in machinery and equipment, often bought locally, including nearly half for BESS

Ni-Cd manufacture — and recycling: Saft's 430 employees at its Oskarshamn, Sweden, plant, achieve annual sales of SKr500m and take delivery from 47 main suppliers, many of them local Swedish companies. The facility also recycles spent Ni-Cd cells, recovering the cadmium for re-use in new fully capable batteries and the nickel for use in steel factories.

alone, plus another half for BESS and future improvements to upgrade the plant's manufacturing capabilities.

H.R. benefits

According to Anders Olsson-Fogelberg, part of Saft's team in Oskarshamn, "This order gives us the possibility to develop the company's ability further in terms of technology level, skills, machinery status and still more." He adds, "We have to increase the value of technology and intelligence in our products very quickly because very simple product systems can be produced in low-cost countries like China."

The BESS order, says Olsson-Fogelberg, boosts the high-tech potential of his human resources (or H.R.) Skills improve, he says, for manufacturing, planning and shipping people. So Sweden benefits still more from this Alaska Ni-Cd order.

Product edge

The new Ni-Cd batteries offer many advantages, compared to their lead-acid competitors. For one thing, the Ni-Cds are shipped in once for 15-20 years. Lead-acid batteries would have required shipping every 3-4 years, thus contributing to air pollution from the trucks that brought them in. Lower handling and transportation costs put Ni-Cds at a fifth of lead-acid costs (the former are changed every 15 years, the latter every three years). Additionally, with Ni-Cd batteries, the electrolyte doesn't need to be replaced for up to 20 years. For remote locations such as the BESS installation, this type of performance saves considerably on operating expense.

So the Ni-Cd solution for Alaska is also a value-producer in Sweden. ■

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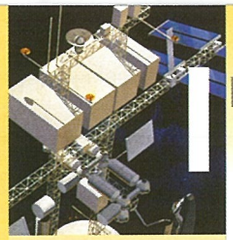
Ni-Cds in numbers for Sweden

The Alaska BESS project represents significant returns for Europe — and especially Sweden.

A few of the numbers that count in this contract with Alaska's GVEA:

- 10% volume increase for Saft's Swedish plant,
- 30 jobs in terms of direct hires for manufacturing,
- Four high-tech hires (technicians and project leaders),
- 13,700 Ni-Cd cells to be manufacured,
- 85,000 m^2 of plates,
- 70,000 meters of heat-seal joints to be built. ■



Innovation

Security chopper flies farther — and lighter

Eurocopter machines named EC135/145 will soon be flying farther and longer — because they weigh less. In part because of their Ni-Cd low-maintenance batteries, from Saft.

Security forces in Europe and elsewhere rely on helicopter surveillance of sensitive zones, particularly in border areas. Eurocopter's EC135/145 is designed for missions such as border security. And France is looking to buy the rotary-wing aircraft for its border surveillance purposes. Why? Among the advantages are lighter batteries, since the EC145 features for the first time ultra-low-maintenance Ni-Cd batteries, supplied by Saft.

Eurocopter's Joachim Behles states, "We have been testing the new-technology Saft batteries intensively, prior to certification. They weigh less, and they give us the power performance that our helicopters require. Additionally, they're ultra-low maintenance, so our customers will have lower operating expenses with these batteries."

Two security forces in France that operate helicopter fleets as well as a number of air rescue operators have already placed orders for the EC145 to upgrade their fleets. Longer flights and less maintenance are positive factors in their evaluation of rotary-wing aircraft.

Ready for rescue: Eurocopter Deutschland (Germany) builds the EC135/145s. With Saft's latest Ni-Cd battery technology, the choppers will fly longer and farther because of the Saft advances.

Chopping down weight

The EC145 is a multi-mission helicopter with a spacious cabin and flat floor, making it ideal for transport of up to nine passengers as well as for use for VIPs and search-and-rescue operations. Large side doors afford easy access to both cockpit and cabin, facilitating loading of stretchers or equipment.

The Saft batteries offer considerable weight savings compared to the earlier technology. A 40-Ah Saft Ni-Cd weighs 33.7 kg, nearly 8% less than the EC145's previous battery. And Saft's higher-energy (44-Ah) battery weighs just 2% more while providing 10% more power. The EC145's power requirements have risen as its on-board technologies have improved. Cockpit avionics now feature liquid-crystal displays (LCDs) instead of tubes, and the aircraft are required to have 30-minute back-up power for cockpit electronics – and also to winch up rescue victims.

The Saft batteries supply back-up power for these electronics as well as for such essential gear as landing lamps. Their state-of-the-art battery technology – known as "sintered/plastic-bonded electrodes" (or sintered PBE) – reduces maintenance costs for operators of helicopter (and fixed-wing aircraft) fleets. For Eurocopter and its customers, adoption of the Saft Ni-Cd technology should mean benefits, up and down the line. Behles notes, "Our customers want lower operating costs, and extended operation of our helicopters. The new batteries are one part of that development." ■

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French regional trains to run with Matrics

Sweden's Bombardier Transportation will be "hard-wiring" Saft's latest rail Ni-Cds, known as Matrics MRX, as its preferred battery for the next-generation regional express trains that it's building for the French national railway (or SNCF).

Ready for regional transport: the Bombardier trains, chosen by France's SNCF, will feature the latest in rail battery technology.

For more than two decades, Saft's plant in Sweden has been supplying on-board batteries for rolling-stock manufactured by the Bombardier rail transportation factory, also in Sweden. The latest contract, announced in April 2002, confirms the confidence that the Bombardier electrical system engineers place in Saft's battery technology and Saft people. It also stands out because the OEM has asked Saft to supply a complete power system along with the battery.

Matrics is the next-generation family of rechargeable Ni-Cd batteries for rail applications specifically designed by Saft for the mass-transit rail market.

The letters "Matrics" stand for mass-transit integrated compact rail system.

Saft's Matrics solution for Bombardier's SNCF contract features two 72-volt batteries delivering capacities of 115 and 130 Ah. They are installed in each three- or four-car trainset.

Bombardier's Swedish plant is owned by its Canadian parent, Bombardier, which also buys Saft Ni-Cds for its regional and executive-jet aircraft.

Customized power: Saft's Matrix family adapts to each rail application. For the SNCF's regional trains, built by Bombardier in Sweden, Saft is supplying a complete system including a "steel raft" with fuses and two 58-cell battery trays.

Why Ni-Cd?

The SNCF did not specifiy Ni-Cd batteries for its regional trains. But Bombardier did, for a number of reasons. Notably because of Ni-Cd's long lifetime – plus the lower life-cycle costs of Ni-Cd, compared to lead-acid batteries. Installation and maintenance are also easier for SNCF technicians, thanks to the advanced technology of Saft's Matrics MRX.

The new Ni-Cd rail technology from Saft takes up less space while packing the same – or greater – power. The batteries are shipped as a power solution, part of a slim, light-weight package that's housed in a flame-retardant case made of polypropylene (a type of composite).

The batteries' cells feature sintered technology for the negative electrode, combined with plastic-bonded electrodes for the positive. The package power solution designed by Saft means that SNCF engineers only need to plug in the "plus" and "minus" cables to the train's electrical system.

The next-generation Ni-Cd result slashes 40% off the size and volume of conventional batteries.

Articulated architecture

Bombardier's high-capacity regional train is available in several models. Its seating capacity ranges from 160-220 passengers per car. SNCF's next-generation regional trains will travel at speeds of up to 160 km/h.

The Bombardier train can run on diesel or electrical power – or a combination of them. Its articulated architecture features wide car-bodies and gangways (between cars) as well as continuous low-floor bodies that provide excellent access as well as greater comfort, visibility and security for passengers.

Contract value

Deliveries of the trains will start in the first quarter of 2004. Eight trains are scheduled for delivery each month.

For the OEMs, the overall contract for 500 trains ordered by SNCF is valued at 1.65 billion euros. The order from Bombardier is Saft's largest for its next-generation Matrics batteries. The technology was specifically developed for rail customers seeking still smaller and lighter battery packages that are optimized for maximum performance, reduced maintenance and low life-cycle cost.

Batteries' job

What's the role of the Saft battery on the new SNCF regional trains, built by Bombardier? Saft's integrated water-filling system is important for the Matrics MRX batteries. It fills all cells from a single central point, significantly reducing battery maintenance requirements. It enables easy, fast and accurate cell top-up, maximizing a Ni-Cd's useful life.

Each integrated Saft Matrics battery system for the Bombardier/SNCF contract comprises 58 MRX cells, rated at either 115 or 130 Ah. Both ampere-ratings have a nominal 72-V voltage.

The Saft batteries on-board the SNCF regional trains supply back-up power for brakes, lights, door-opening, fans and the communications systems. ■

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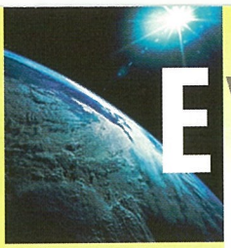
MRX in a nutshell

Here are the major characteristics of the new Saft Matrics MRX battery family.

- Sintered-PBE Ni-Cd cell technologies
- Available in blocks of three to 10 cells
- Parallel or series connection
- Capacities range from 70 to 260 Ah.

For rail operators seeking to enhance the compact size and weight advantages, Saft can supply Matrics MRX batteries as integrated turnkey power systems with customized trays and battery boxes. ■



Launchers and eco-payloads rely (heavily!) on Ni-Cds

In the next frontier – space – nickel-cadmium batteries give the power that launches often heavy payloads into Earth orbit. And the Ni-Cds keep them operating there successfully. Long term.

Launch of Envisat, an observation satellite built by the European Space Agency (or ESA) grabbed newspaper headlines in early 2002. At nine metric tons, Envisat was an ultra-heavy satellite that the next-generation Ariane V effortlessly carried to the stars…at least as far as Earth observers watching the spotless launch were concerned. Envisat's eight Earth-observation applications weighed significantly on the eco-mission, raising its total weight.

Saft modestly delivered not just the Ni-Cd batteries for all of Envisat's applications – economically and cost-efficiently. It also delivered on its launcher requirements, supplying the batteries – once again Ni-Cds – for the Ariane V rocket that lofted the heavy satellite into its planned orbit.

Launched on a rocket with on-board power for commands and telemetry from Saft's Ni-Cd batteries, Envisat will be providing critical information on environmental changes around the globe over its 10-year – or greater – lifetime.

All Ni-Cd, in space: Envisat's Earth-observation role is performed by a number of on-board payloads, all running on Ni-Cd power when the spacecraft's solar panels can't get sunlight. Saft supplied all the Ni-Cd power for this eco-spacecraft.

In orbit, it also relies on Ni-Cd power for all its scientific applications when solar panels get no sunlight.

Europe's most powerful satellite

From space, Envisat is making the most complete set of observations of conditions on land, oceans and icecaps as well as in the atmosphere. It helps scientists understand how changes to one climate affect others. It's key to ESA's plans to monitor the Earth's environment over the next decade.
Envisat carries instruments to collect information that will help scientists understand each part of Earth's system and predict interactivity. It is Europe's most powerful Earth-observation satellite.
Ni-Cd batteries have been used since the dawn of the space era, due to their outstanding performance and extreme reliability. Nickel-hydrogen (NiH_2) batteries, which cost twice or three times as much as Ni-Cds, are used for geostationary satellites – those that fly in geosynchronous orbits (above precisely the same spot on the Earth). Ni-Cd power, however, remains the technology of choice for most low-earth orbit satellites as well as micro-satellites. These spacecraft generally perform missions such as Earth observation and ocean survey.

Vibes, temp extremes: Ni-Cd outperforms

An Ariane launch tests a technology's ability to survive extraordinary levels of stress, due to the vibration as the rocket's motors roar the payload into the right orbit. Once there, in space, temperatures range from frigid sub-zero to the fierce heat of direct exposure to the sun's rays, without the safety of the Earth's atmosphere. In both cases, Ni-Cd batteries are rugged enough to survive – often performing successfully well beyond their planned lifetimes. Recently, a satellite known as the Marecs B2 was "de-orbited" after more than 17 years of service, all with Saft Ni-Cds. The battery was still operational. In fact, in over 180 launches, Saft has never experienced a space failure – winning it the most impressive record of any battery supplier to space programs.
Launcher batteries additionally survive even the demise of their "host rockets". When Ariane 501 failed, its Saft battery was recovered from the ocean depths. The Ni-Cd battery was still operational, despite all the shocks and stress that it had suffered.
Saft, nickel-cadmium batteries...and space. An unbeatable combination, as history shows. In saving the environment, and in making cost-effective contributions to space-based services. ■

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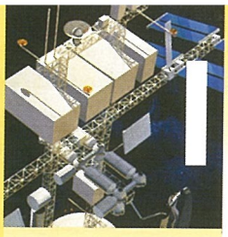
Spot-5's successful May launch

An Ariane launcher took Europe's Spot-5 satellite to its orbit in early May. Saft's Ni-Cds flew once again on both rocket and spacecraft.

With Spot-5, France, Belgium and Sweden are launching a new generation of SPOT satellites, ensuring continuity of service until 2012. Two Spot-5s will provide improved ground resolution (5m instead of 10m in panchromatic mode) and new stereo imaging capability.
In its so-called "supermode" resolution, the ground observation visibility sharpens still further, to 2.5m, enabling the creation of still more precise relief maps.
EADS was prime contractor for the Spot-5 with major industrial responsibility entrusted to Belgian and Swedish contractors, in particular ETCA and Alcatel Bell (in Belgium) and Saab Ericsson (Sweden).
Saft supplied the Ni-Cd batteries for the Ariane launcher as well as for the Spot spacecraft. ■



Hubble's view sharpens

NASA astronauts servicing the Hubble telescope last March relied on lithium batteries supplied by Saft – and the batteries are now standard on power tools used on Shuttle missions.

Working with their American partners, Saft's engineers at the battery company's Maryland plant developed and qualified the lithium batteries for the power-ratchet tool (or PRT – photo, far night) used by NASA astronauts in performing service work on the Hubble telescope. The lithium batteries replaced silver-zinc technology used previously.

The space mission grabbed headlines around the world, as the upgrade substantially expands the telescope's capabilities to peer deep into space. Saft and its partners – the Goddard Space Flight Center in Maryland, the Johnson Space Center in Texas, and Orbital Science Corp. in Maryland – began the process of qualifying the lithium battery technology for Shuttle missions four years ago.

An Orbital Science engineer at the space center reported March 7: "A...lithium-ion battery was used successfully today in the PRT during installation of the new [advanced camera system] into the Hubble Telescope."

Saft's lithium-ion batteries provided half-second 8-amp pulses for the power tools that Mission Specialists John Grunsfeld and Rick Linnehan used as they "untorqued" and "torqued" 36 mechanical fasteners on the telescope's electrical system. The fastening procedures needed to be done rapidly and safely to ensure the mission's success.

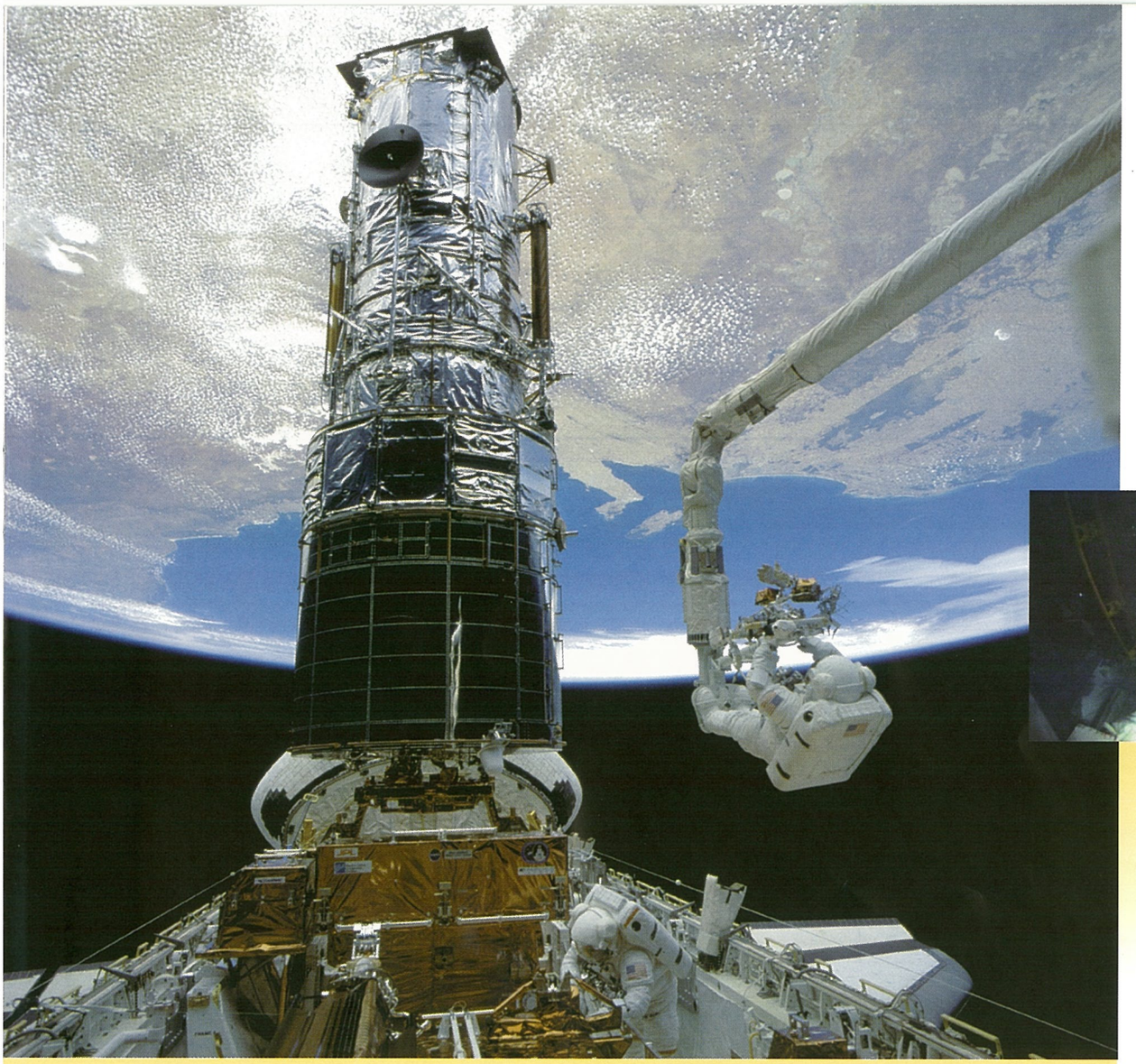
Orbital Science now owns a half-dozen Saft lithium battery packs. With the silver-zinc technology, the company had to order a battery each time a launch was planned because of their short shelf-life. Saft's lithium-ion batteries have a reasonable expectation shelf-life of at least five years.

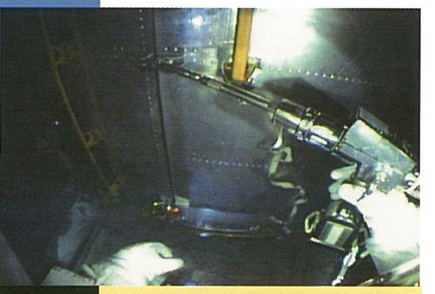
During the servicing period, the Hubble's power was shut down – a situation which can't last longer than 10 hours. Otherwise, the spacecraft's systems may be permanently damaged by the temperature extremes experienced in the Shuttle's 97-minute orbits, exposing the solar panels to heat extremes of 86° C and freezing cold as low as -70° C. In fact, the astronauts succeeded March 6 in replacing the electrical system in just seven hours in an operation that was characterized as the equivalent of a "heart transplant".

Battery background

Saft's lithium batteries are now approved as standard for Shuttle missions that will follow this Hubble servicing performed by the Columbia crew. The batteries' lithium-ion cells each weigh just 40 grams and are packaged in a robust metal battery case that integrates into the PRT.

The development and qualification program that Saft undertook with its partners included testing the lithium-ion batteries' performance in conditions of shock, vibration and thermal vacuum. A major concern during the testing was to ensure that the cells would not leak electrolyte. Procedures were rigorous and redundant. In all, three Saft rechargeable batteries, each containing eighteen





Hubble repair, a question of tools: which are battery-powered. In the case of this latest Shuttle mission, astronauts used tools that Saft's lithium batteries powered. And the repair was a success.

lithium-ion cells, flew with the Columbia astronauts on the Hubble servicing mission.

Saft lithium batteries flew on a Shuttle last year for preliminary testing purposes. The high-power cells that comprise the battery are Saft's 18650s, which measure just 18 x 6 x 50 mm.

Hubble benefits

Astronomers and others investigating the far reaches of the universe will benefit enormously from the Hubble's new capabilities. One Maryland professor of astronomy put it this way: "If two fireflies were less than two meters apart in Tokyo, Hubble's view with the advanced camera for surveys [installed on the March mission] would be so sharp that, with the telescope placed in Washington, an observer would be able to see whether it was two fireflies or just one."

The astronauts performed five space walks on five consecutive days to service the Hubble telescope, using the power tools with Saft's lithium batteries. The servicing increases Hubble's power by a factor of 10. The Hubble orbits 600 km (360 miles) above the Earth.

Risks of "bypass surgery"

Dr. Robert Staniewicz, a Saft Maryland-based scientist, comments: "The rigorous qualification process to enable our lithium-ion technology batteries to fly on the Shuttle was an opportunity for us at Saft to demonstrate our advanced technology capabilities, not just in terms of research and design, but also in manufacturing. We are pleased to work alongside such prestigious space partners as NASA and Orbital Sciences, and look forward to further participation in mission-critical power assignments for space applications. Our lithium batteries have already been selected for deployment on commercial spacecraft being built for Eutelsat by Astrium. Lighter weight and improved performance from Li-ion batteries are critical factors for orbital and other space missions, and Saft is unique in our ability to deliver batteries to customers from our specialized facilities either in the U.S. or those in Europe."

Hubble project scientist Dave Leckrone said, "As with any beloved relative, you're worried about sending them in for bypass surgery or…heart transplant, but you realize that the risk of not doing it is severe. In this case, the risk of not changing out the power control unit is severe." NASA could not guarantee that all of Hubble's systems would come to life once the new power control unit was plugged in and the telescope turned back on. But officials said the risk was lower than the potential for failure from the old unit.

And the mission has proved a tremendous success, as post-repair photos taken by Hubble have amply proved. ■

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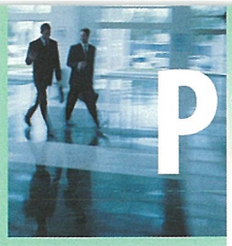

Partnership

U.K. battery collection: a recipe to be shared

Britain's nickel-cadmium industrial battery collection scheme – known by a catchy name: "Bat-Re-Back" – has such a good track record that its recipe could easily be copied by others.

Easy pick-up: Saft's industrial Ni-Cds for recycling.

For the U.K. collection program, Saft has partnered with G&P Batteries, a specialist waste management company providing environmentally friendly solutions for all batteries. Saft has associated itself with G&P for industrial Ni-Cd batteries, no matter which manufacturer supplied them. The batteries generally rate 10Ah and above (although a few are smaller) and are filled with an electrolyte solution of potassium hydroxide (alkaline in nature).

The Saft-G&P scheme collects, consolidates and sends for recycling all batteries of this type when they come from a U.K. source. The partners collect whole batteries, so that those disposing of them are not required either to empty cells of electrolyte or to dismantle them. The battery simply needs to be removed from its installation and placed in an area where it can be collected.

"We are a licensed collector," points out Saft's John Taylor, "and send on the Ni-Cds for full recycling to a dedicated plant on the continent." He adds: "Not wishing to be complacent, we wanted to enhance the scheme Saft already employed to collect industrial Ni-Cd batteries in order to obtain the maximum possible percentage of return on Ni-Cds, whether they are Saft-brand or any other brand." He already reports an increase in collection.

Hotline recycling

Its own fleet of vehicles is dedicated to collection of batteries across the U.K., G&P officials state, "Waste batteries must be handled, stored, transported and recovered in a way laid down by regulations."

To help users of Ni-Cd (and other) batteries, Saft and G&P have set up a hotline phone number so that customers with spent batteries can easily get recycling information. The users concerned in the U.K. are mainly the customers of original equipment manufacturers in rail transportation as well as standby suppliers of chargers. The military and aerospace markets are also targeted.

Simplifying the process

Some U.K. organizations and customers, waiting for a cost-effective and environmentally-friendly way of disposing of Ni-Cds, have simply put them into storage. John Taylor states, "Thanks to Bat-Re-Back, collection is easy and affordable, and we can look forward to helping even more customers recycle Ni-Cds. Saft has always been committed to collection and recycling. Once we get hold of spent batteries, processing isn't an issue," he continues. "We needed a more efficient scheme to get the Ni-Cds back and provide customers with certification that gave them the assurance that their industrial Ni-Cd battery was being collected and recycled in a professional manner." Simpler collection means more recycling. ■

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Entel PCS qualifying Ni-Cds

Hot as Chile's mountain range? Saft's Ni-Cds are working – and thriving – in the temperature-stressed conditions of telecoms base stations.

Chile's largest mobile operator, Entel PCS, is qualifying Ni-Cd batteries in its outdoor cabinets.

Uninterrupted service is the greatest desire of both mobile operators – and their subscribers. In a liberalized market economy like Chile's, players are drawn increasingly towards the technology that will ensure such service levels. For Entel PCS, a subsidiary of Italy's TIM, this service commitment has meant testing of a next-generation battery technology for its outdoor cabinets.

These cabinets suffer under blistering outside conditions in Chile's climate, particularly in summer. The sun roasts the cabinets during daytime at temperatures more than 30°C and mountain-like cold temperatures then chill the cabinets at night to just 10°C, or even lower. And during winter, the thermometer dips far lower, especially at higher altitudes – way below freezing point.

Chile has earned a reputation as one of the world's most liberalized marketplaces, where technology needs to prove its worth through return on investment. Saft's batteries are part of that story.

Ni-Cd to the rescue

For the competitive mobile player Entel PCS, Saft's Ni-Cds offer several advantages. The cellular operator is testing several 24-volt NCX batteries that are used, with their 375-Ah capacity, to back up extensions to mobile base stations. Existing air-conditioned (AC) shelters are already packed with radio, transmission and power electronics along with valve-regulated lead-acid batteries (or VRLA – which require air-conditioning to ensure secure operation). Saft NCX batteries protect Entel PCS's extensions such as additionol Ericsson gear.

"A simple, locally-built steel cabinet without AC is sufficient for Saft's Ni-Cd batteries. Lead-acid batteries would have prematurely aged in these conditions," observes Henrik Lefvert, Saft's man in South America.

One more reason to think through life-cycle Ni-Cd costs and environmental advantages in making a battery selection. ■

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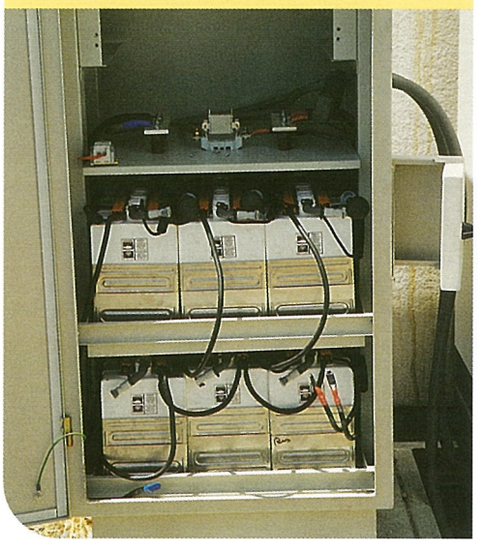
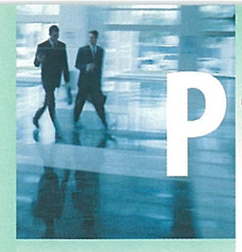




Partnership

Valeo and Saft collaborate to develop 42-V smart battery system

A global supplier of automotive components and systems, Valeo will be working with Saft to develop an advanced battery management system for new 42-volt electrical networks.

The decrease of CO2 emission calls for the modification of the powertrains of existing vehicles. Among several solutions, some will use alternative battery technologies to 14-volt lead acid. Such high power batteries, plus an advanced battery management system enable the implementation of new functions from idle stop to electrical assistance of the thermal engine.
Saft's agreement with Valeo, unveiled last April, is expected to focus initially on Valeo's systems for future powertrains known as "mild hybrid", which can boost fuel efficiency up to 20%. Ideal for applications in many types of vehicles, the typical "mild-hybrid" is comprised of a motor-generator supplied by the high power battery through a power electronic control unit. The motor-generator is connected to a high-efficiency engine either by a belt or directly on the crankshaft.

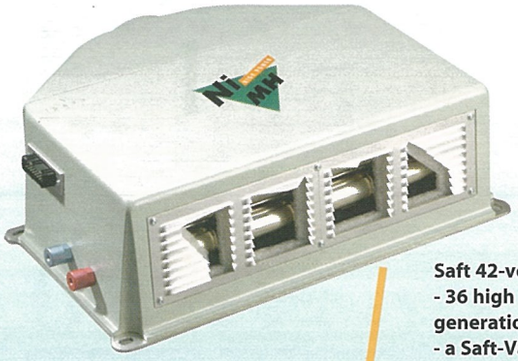
Smart battery systems

Valeo's mild-hybrid systems (as described here) have a unique feature called "start-stop". When a mild-hybrid vehicle comes to a stop, the system goes into "idle stop" mode, automatically shutting down the engine to stop fuel consumption and gas emissions. To get the vehicle moving again, the motor restarts the engine and provides some drive force to accelerate it. When decelerating or braking, the motor acts as a generator to convert braking energy into electrical energy that is recovered by the battery. Today's approach is to make sure that enough electrical energy is available in the vehicle in any situation. This leads to a huge increase in generator power . In such a new mild hybrid system, electrical energy must be managed and the battery associated to its management system will play an increasing role..
"As part of our marketing and technology strategy," says Martin Haub, Valeo's vice president, research & development and product marketing, "we are continuing to sign partnerships with companies who have technical expertise that complements and strengthens the strategic innovations that we deliver to car makers." He adds: "This collaboration with Saft is the latest one in a series that will further enhance our expertise in 42-volt and hybridization systems."

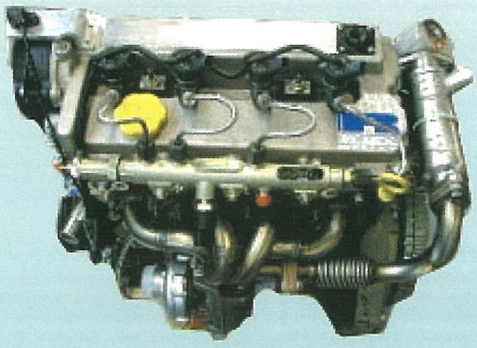
Complex technology

Saft's partnership with Valeo has enabled it to handle the challenge of very complex technical points (like heat exchange, acoustics, vibration and more). The first-generation 42-volt battery developed by Saft for this application has further demonstrated the technology's ability to adapt to different charge states at temperatures that are compatible with normal use. The expertise developed with Valeo has spurred Saft to launch development of a complete new-generation battery range for higher-voltage on-board systems that the automotive industry will need. The

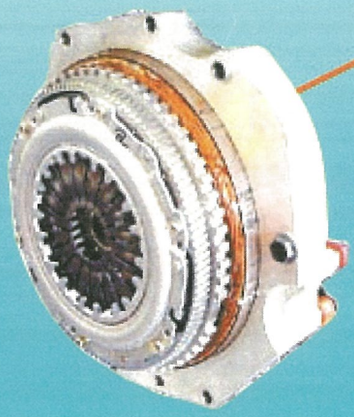
i-MoGen is a mild hybrid vehicle, based on a current production Opel Astra



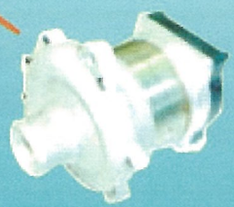
Saft 42-volt Ni-MH battery includes :
- 36 high power Ni-MH cells (first generation)
- a Saft-Valeo battery management system prototype.
The battery delivers 10 kW and 600 Wh weighing only 17 kg.



Ricardo downsized engine 1.2 litre, 4 cyl. Diesel



Valeo 42-volt electric machine supplies : torque boost, regenerative braking, stop-start, efficient generation



42-V ancillaries : water pump, fans, heater

batteries feature not just advanced system techniques but also progress that Saft has achieved in electrochemistry.
Saft's aim is to integrate the new battery range seamlessly into the existing structure of vehicle families. In the long run, the batteries will supply 20% more power – in the same volumetric space – compared to today's systems.

Visionary innovation

A mixed battery range (with some emphasizing power, and others energy) is in development within Saft for hybrid and EV purposes. Saft fields battery technologies that range from nickel-cadmium to lithium-ion by way of nickel-metal hydride, all applied to transportation.

Valeo practices a "visionary approach" to customer-driven innovation. It enables the company to anticipate (and exceed) customer expectations more efficiently and effectively than earlier methods did. Valeo also focuses on identifying and exploiting opportunities for technology integration – a priority that Saft shares. ■

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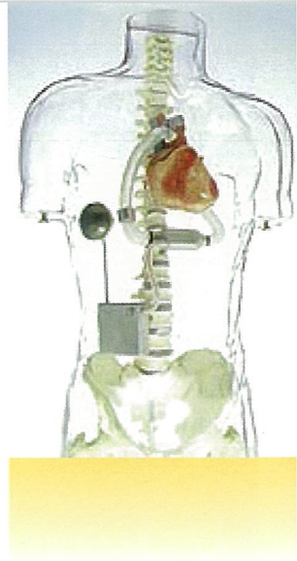

Berlin Heart saves lives...with lithium

Patients wearing Berlin Heart vascular-assist devices (VADs) are rescued every day, thanks in part to Saft's lithium batteries.

An overworked heart, awaiting a transplant, may require extra help until the right donor is available. During this important period, a vascular-assist device (or VAD) from Germany's Berlin Heart can make the difference. Berlin Heart makes a number of VADs that aid in coronary functions. Saft makes the high-tech batteries that supply the power necessary for the implants.

Saft has adapted its wide range of battery technologies specifically for life-saving heart implantation systems. The Saft batteries feature some of the latest advances in fail-safe power reliability, an absolutely indispensable requirement for batteries in this medical application. They support a number of vascular-assist devices manufactured by Berlin Heart, a supplier of leading-edge systems that have helped save the lives of many patients suffering from heart and circulation diseases.

Medical application

Berlin Heart's INCOR I is a VAD that in the long term is capable of stabilizing a diseased heart's circulation. The range of applications extends from cardiac support prior to transplantation (bridge to transplant) to heart support leading to recovery (bridge to recovery), which subsequently renders a transplant unnecessary. Blood coming from the heart flows into an axial pump and then on to what are known as an impeller and a stationary diffuser wheel.

While the INCOR I is an axial pump, the INCOR II is a pulsatile system which functions approximately in the same way as a natural heart. It pumps blood in pulses, according to the rhythm of the patient's heart, thereby assisting the diseased heart in circulating the patient's blood. In doing so, the system eases the heart's workload to such a degree that its functional ability improves noticeably.

"Tremendous additional potential"

Ecaterina Hauser, a Germany-based sales manager of Saft, comments: "Our MP batteries provide unparalleled autonomy for the most demanding mobile devices. The MP cells marry the power of rechargeable lithium-ion technology to advanced battery construction. They are strongly built, corrosion-resistant and low-magnetic." The cells don't contain lithium metal; instead, they operate based on insertion and extraction of lithium ions into and out of their electrodes. Other applications where the same technology is used include satellites, uncrewed air vehicles, hand-held terminals and still others.

Thomas Kober, Berlin Heart's CEO, observes, "With these new systems capable of taking over the function of a biological heart, we will reach tremendous additional potential in specific therapy fields." ■

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Battery background

From among Saft's broad portfolio of battery solutions, its Specialty Battery group offered a rechargeable lithium technology known as medium prismatic, or MP, for the drivers that are used with Berlin Heart's INCOR I and II VADs. (Prismatic battery cells are flat compared to the round shape of cylindrical cells.) The external driver is powered by two redundant batteries consisting of two MP 174865 cells (each cell measures approximately 17 x 48 x 65 mm). This small size is one key reason that the MP batteries are attractive for this application.

Each Saft MP 174865 cell weighs just 121 grams yet packs a capacity rated at 4.3 ampere-hours with nominal voltage of 3.6 volts. Low weight, slim dimensions, high reliability and the specific power required for the application are the features that led Berlin Heart to select Saft batteries. They can operate the external control unit for up to 10 hours without recharging, and they can be fully recharged in just 60 minutes when a so-called "pulse" charge technology is used. They also recharge to greater than 85% of their initial capacity – even after 500 charging cycles.

Swiss bank backs up with Ni-Cds

Crédit Suisse, a global banking and insurance group, has switched from lead-acid batteries to Ni-Cds from Saft for back-up power supply for its mission-critical IT systems. Lower life-cycle costs were a key factor in the technology switch.

Reliability of lead-acid batteries is limited to four years, according to the technology assessment officers of Crédit Suisse – and in some environments this life-time is much shorter still. Saft's Ni-Cds, on the other hand are guaranteed for 12 years. Statron, Saft's representative in Switzerland, installed 26 SPH batteries in two computer rooms at the bank's Zurich headquarters at the turn of the century.

With the success of this first Ni-Cd installation, Crédit Suisse has since ordered nearly twice as many more Saft SPH batteries (42, to be precise).

Half of the batteries in the original order have a 300-kilovolt-ampere capacity, and the other half 250kVA. Each one supplies 15 minutes of power for information technology (IT) systems in case the mains power fails.

Unpredictable lead-acid failure

Through Statron, Saft recommended the high-power SPH batteries for their greater reliability and cost-effectiveness compared to lead-acid batteries. The bank's technology engineers visited Saft's Bordeaux manufacturing plant to witness the performance of the SPH family.

Crédit Suisse had experienced unpredictable failure of some lead-acid batteries resulting in the loss of vital customer data. This led to plans for a four-year replacement cycle to guarantee reliability. The advanced electrode design of Saft's SPHs ensures higher output and operation within the narrow voltage "window" required by uninterruptible power supply systems.

Low SPH maintenance

The financial industry's annual spend on protecting critical IT systems is huge, according to Saft's Dominique Debon. And the installed UPS base predominantly uses the more expensive lead-acid alternative to Ni-Cds, as calculated by life-cycle costs. "Crédit Suisse, a major bank, now recognizes the lifetime cost and reliability benefits of Ni-Cd batteries," notes Debon. "We're convinced that other financial institutions will follow."

An annual visual check of electrolyte levels is all that SPH batteries require. In the IT banking application, it is not expected that the NiCds' electrolyte will need to be topped up. The batteries' technology also features greater tolerance of electrical abuse (such as overcharging). And they perform better at extreme temperatures, too, unlike lead-acid. ■

Lined up for service: Saft Ni-Cds provide secure back-up power for Crédit Suisse's data transactions.

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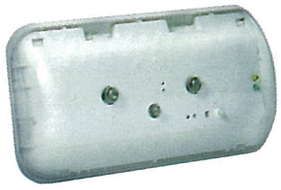
Ni-Cd still outperforms Ni-MH for security lighting systems



Second-generation high-temperature nicad technology offers extended battery lifetime, lower cost and full recyclability for emergency lighting.

Security lighting is one of those features of modern life that most people are unaware of – until something goes wrong. But on such occasions (during a power cut, or in the event of fire or even earthquakes), we have every reason to be grateful for those battery-powered lighting units placed unobtrusively over doorways and in corridors and hallways of public buildings. They may not provide huge amounts of light, but they ensure orderly evacuation in an emergency and do save lives.

In advanced industrial countries, security lighting systems must by law be installed in public buildings of all descriptions: offices and factories, shops and supermarkets, cinemas, clubs and dance-halls, garages and car-parks, as well as banks, schools, hotels, restaurants, libraries, swimming pools – in fact, just about every place people frequent outside the home. Clearly, a key consideration in choosing batteries for these self-contained emergency units is reliability. They must work consistently every time, and they must do so at least throughout a four-year period and, if possible, for as long as ten years. What's more, they must provide lighting for between one and three hours (the minimum statutory requirements vary among countries) – long enough for people to leave the building and for rescue teams to carry out their work.

Application-driven technology

The best way to ensure that these criteria for security lighting units are met is by using rechargeable batteries under permanent charge. Other solutions run the risk of failure through inadequate maintenance.

The question is then which battery technology is best suited to these requirements: nickel-cadmium (Ni-Cd) or nickel-metal hydride (Ni-MH)?

Although standard nicad was the technology of choice 10 or 15 years ago, it proved unsatisfactory in certain respects. Since then, however, nicad batteries have been redesigned for this application and some components changed, including electrode separators and the electrolyte. As a result nicad batteries are safer and better able to withstand permanent charge at high temperatures. (In general, the higher the temperature, the shorter the battery lifetime – each 10°C rise reduces battery life by half, though less so in the case of new nicad.)

This means that battery lifetime rose from three or four years up to eight or more – considerably in excess of the statutory minimum in Europe.

By contrast, Ni-MH batteries still have trouble meeting these requirements, especially when on permanent charge at the high temperatures that are usually present inside such equipment. In fact their lifetime is generally only about two to three years, which is insufficient. The problem with Ni-MH is linked to the technology itself: the negative electrode is composed of a mixtures of metals, and these become corroded over time. Attempts to solve this problem have so far had limited success, largely because corrosion is a very complex phenomenon.

Apart from performance, there is also the broader question of marketability. Nicad not only offers better overall performance than Ni-MH, but it does so at a more affordable price. Technical considerations alone are insufficient to determine whether one technology can be substituted for the other. As it is, nicad performs better on both counts.

Full recyclability

Another crucial factor favoring nicad concerns battery end-of-life and recycling. Nicad collection and recyling facilities already exist and have for several years, enabling the cadmium collected from depleted security lighting packs to be fully recycled and used in making new batteries.

In the Netherlands, for example, there is a network of municipal collection points where batteries are picked up by a separate agency for recycling. In Belgium, under the Bebat system, collection and recycling are handled privately. At a European level, the CollectNiCad organization is responsible for overseeing and improving nicad collection.

For Ni-MH, although collection facilities exist, full recycling is not yet possible, because the negative electrode cannot be re-used. One reason for this is that the definition of the alloy has changed over the years; another is that different manufacturers use different definitions. As a result, there is no consistency of metal hydride among collected batteries, making it difficult to re-use it for new batteries. ■

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