

Soft solutions for medical devices

Critical power when you need it most



SAFT

When power failure is not an option



Doctors, nurses and first responders should not need to worry whether critical medical equipment will operate properly. That's why Saft's battery solutions for medical devices are made to meet the toughest standards of reliability, durability and efficiency.

Driving the market for medical device batteries



The challenge for medical OEMs: keeping costs down

Medical device OEMs and their suppliers share certain core needs in a highly competitive market. Batteries integrated in their devices must:

- Have a **low total cost of ownership (TCO)**, with high reliability, no maintenance and long life
- Be **user friendly**, and safe to use
- Rely on **advanced medical know-how** and integrate **innovative technologies**
- Be **customized** for the specific application, and **compliant** with all regulatory requirements
- Have **global sourcing**, to enable device manufacturing anywhere in the world

Customer story: Surviving end-stage heart failure



For patients with end-stage heart failure – many waiting for a transplant – a ventricular assist device (VAD) is vital for pumping blood through the body. Berlin Heart offers three devices: the implantable INCOR® and the external EXCOR® Adult for adult patients, and the EXCOR® Pediatric, which is the only VAD available and approved for pediatric patients. Berlin Heart VADs rely on Saft's rechargeable Li-ion MP batteries.

“Saft batteries are mission critical for our VADs: they provide totally reliable mobile power,” said Sebastian Muench, Marketing Team Leader at Berlin Heart. “Mobility is also an important feature for our patients; it lets them enjoy an improved quality of life, as they can walk around freely.”

About Saft

The world's leading designer and manufacturer of advanced-technology batteries, Saft serves a diversified group of industries, including aviation, space, defense, rail, telecoms, civil electronics and industrial standby. We offer a broad portfolio of technologies, including Ni-based, primary lithium and lithium ion. Strongly committed to innovation, Saft invests 9% of sales in R&D, with research programs in electrochemistry, new materials, and many others. With 100 years' experience, the company has a strong global presence.

Your solution for medical applications

Saft offers the widest portfolio of technologies for medical applications, including a full range of primary lithium and Li-ion products. Saft's high-power, high-energy batteries feature unparalleled performance with very long lifetime (>20 years), the broadest environmental conditions, high reliability and unquestionable safety.



Deep medical expertise, and ISO 13485 certified

With over 30 years of experience in the medical field, Saft has a proven track record in an extensive range of medical devices. Saft has an in-depth knowledge of medical standards and regulations, and is ISO 13485 certified.

Tailored solutions

Because every customer's needs are different, Saft tailors each solution. Saft can model your solution, provide performance predictions, carry out end testing, and much more. Then, with a system design capability, Saft can act as project manager and deliver turnkey solutions for battery management software design and for electronics, thermal and mechanical applications. We integrate advanced, smart features such as State-Of-Charge (SOC) and State-Of-Health (SOH) in our solutions.

A strong commitment to innovation

As the world leader in advanced batteries, Saft invests heavily in R&D. The company has a unique community of scientists, with 30 PhDs and more than 450 engineers who collaborate with customers in joint innovations.

Global reach, and a secure supply chain

Saft has a global presence, with manufacturing in North America, Europe and Asia. Our clients are in close proximity to our development centers, and we offer a vast sales and distribution network. With a secure supply chain and world-class quality assurance system, Saft exercises full control of all processes from electrochemistry through finished systems, and maintains redundant industrial lines.

A proven track record, and proven technologies

Saft batteries have been integrated in a broad range of advanced medical devices.

- Prosthetic devices
- Neurostimulation
- Remote monitoring
- Critical care
- Respiratory assistance
- Defibrillators
- Operating theater
- Patient mobility

Customer story: Fighting blindness with a bionic vision system



IRIS®II, Bionic Vision System, is intended to elicit visual perception for people who have lost their sight to retinal dystrophies, enabling them to lead more independent lives. Pixium Vision, the developer, integrated Saft batteries into its bionic vision system.

“Saft's Li-ion miniaturized battery system is critical to the success of IRIS®II, not only by providing reliable autonomous power, but by helping minimize the size and weight of the overall system compared to IRIS®I, making it even easier and more comfortable to use.”



Saft: the right choice for patient care

In the healthcare field, batteries have become an essential component in the delivery of medical services – in the hospital, for emergency medical services, and for home care. Saft has a proven track record in providing reliable, long-life, advanced battery solutions used by healthcare providers around the world.

Home hospitalization

- Remote patient monitoring
- Wearable devices
- Neurostimulation
- E-health



Prosthetic devices

- Robotic prostheses
- Artificial heart



Patient care

- Drug delivery
- Critical care



Patient monitoring

- Medical carts
- Point-of-care testing



Customer story: Remote ECG monitoring



The LifeWatch Mobile Cardiac Telemetry (MCT) ECG monitor, developed by LifeWatch, relies on Saft's primary lithium cells. The small, lightweight sensor and chest electrodes transmit a patient's ECG wirelessly to a dedicated cellphone monitor for analysis. If an arrhythmia is detected, the device automatically sends the data to LifeWatch Monitoring Centers for analysis and physician notification, if required.

"Quality and reliability are vital for this heart monitoring device," said Erik Leverenz, V.P. Supply Chain, LifeWatch Services, Inc. "We simply cannot leave battery technology to chance, which is why we put our trust in Saft batteries."

Patient mobility

- Gurneys
- Lifts
- Beds
- Wheelchairs



Customer story: Powering a smart operating table



For physicians and nurses working long shifts in the operating theater, a reliable operating table is crucial for patient outcome. STERIS developed the Gmax™ transfer operating table, which relieves strain on the clinical team through advanced ergonomics. The Gmax™ integrates Saft's rechargeable Li-ion battery solution, giving the operating table autonomous power for a complete 8-hour shift on a single charge.

"Saft's MP batteries have proved to be ideal thanks to their compact, high-quality, safety-certified construction, which delivers the key combination of performance, reliability and long life," said Jean-Marie l'Hégarat, R&D Director for STERIS.

Operating theater

- Surgical tools
- Operating tables
- Lights

Patient diagnosis

- Imaging

Infrastructure

- Centralized UPS

Emergency care

- AED
- Respiratory assistance

Customer story: Reviving a victim of cardiac arrest



When there is a sudden cardiac arrest emergency, first responders need a reliable automated external defibrillator (AED) to resuscitate the victim. Since the mid-1990s, Cardiac Science has integrated Saft Li-SO₂ technology into their industry-leading Powerheart® AEDs, which are powered by proprietary medical-grade batteries.

"Our AEDs are stored in vehicles or used at fire scenes where temperature conditions are not ideal," said Thomas Penn, VP of R&D and Program Management at Cardiac Science Corporation. "In these environments, Saft's Li-SO₂ battery is the ideal solution, with its excellent performance, long shelf life and high pulse capability."

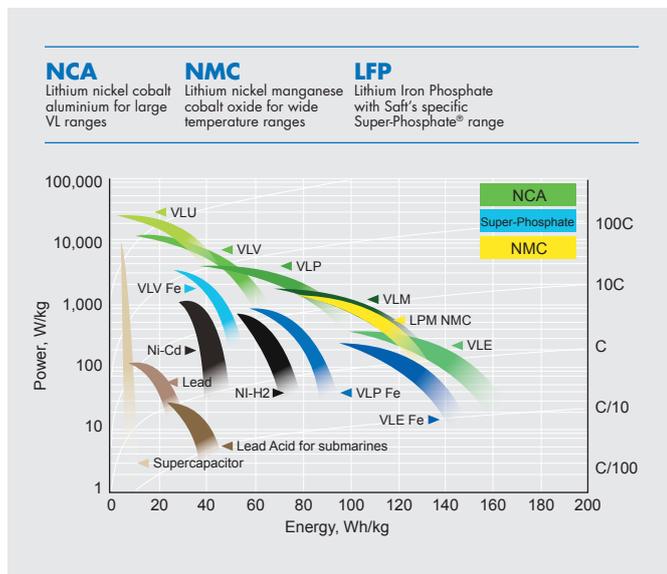
Saft: providing value for medical applications



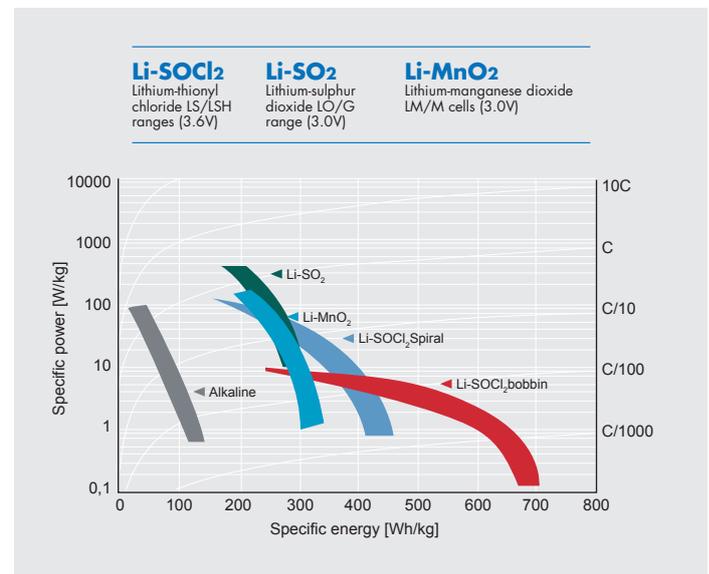
A specialist in electrochemistry, Saft offers the widest portfolio of technologies, including primary lithium and rechargeable batteries in both cylindrical and prismatic form. Together with its battery packs and systems, Saft offers a fully integrated value chain for all your medical needs.

Saft technologies for medical devices

Rechargeable lithium (Li-Ion) technologies



Primary lithium technologies



A fully integration value chain

Saft has vast experience and a proven track record in designing and producing battery packs and systems. We provide and integrate all components, including hardware, software, HMI, safety devices, electronics, chargers, and thermal, electrical and mechanical subsystems.

Saft solutions: the widest portfolio for your medical needs

Features	Saft's solutions	Technology	Home hospitalization	Prosthetic devices	Emergency care
Long life	LS / LSH range	Primary • Li-SOCl ₂	■		
High power	LO range	Primary • Li-SO ₂			■
Energy & power	LM / M range	Primary • Li-MnO ₂	■		■
High energy	MP range	Rechargeable • NMC Blend	■	■	
Long life	MP xtd range	Rechargeable • NMC			■
Very high power	Large VL range	Rechargeable • NCA			
Sterilizable	VL - HT range	Rechargeable • NMC			
High safety	SLFP range	Rechargeable • LFP			

Committed to end-to-end customer support

Saft provides a wide array of support and services, both before you buy and after, so you can be sure of having a robust, reliable and well-maintained solution over a long service life.

Design

- Design consulting to help you select the optimal battery system
- Made-to-measure solutions designed for your needs

Testing

- Lifetime modeling
- Customized testing
- Support for equipment certification

Operations management

- Asset management
- Maintenance services
- Ongoing staff training

Field deployment

- Quick and efficient installation and commissioning
- Help with creating a lead-time schedule
- Answers to your questions about proximity and reproducibility
- Staff training

Retrofit

- Help in planning for and managing your product's obsolescence
- Advice on collection and recycling according to local regulations



Customer story: Providing power 24-7 for mobile medical carts



Mobile medical carts are vital for day-to-day hospital operations, both to ensure patient care and comply with EHR requirements. Yet most carts today rely on Li-ion cells from the consumer market that can't meet the intensive operational demands of mobile medical applications. To remedy this, Saft is partnering with the Dutch start-up, DCPower4C to develop the Circadian® System, which integrates Saft's innovative MP xtd Li-ion cell technology in a lightweight, universal hot-swap battery system that provides reliable power 24-7.

"With Saft's Li-ion cells as an integral part of our Circadian® System, hospitals can achieve a significant reduction in TCO and improve our ROI on going digital," said Martyn Sly-Jex, Sales Director at DCPower4C.

Patient care	Patient monitoring	Patient mobility	Operating theater	Patient diagnosis	Infrastructure
■	■				
■	■		■		
■	■	■			
				■	■
			■		
■	■			■	

Saft is fully compliant with all key standards

- Fully proven in medical applications, and ISO 13485 certified
- Compliant with UL 1642, IEC 60086-4, IEC 62133

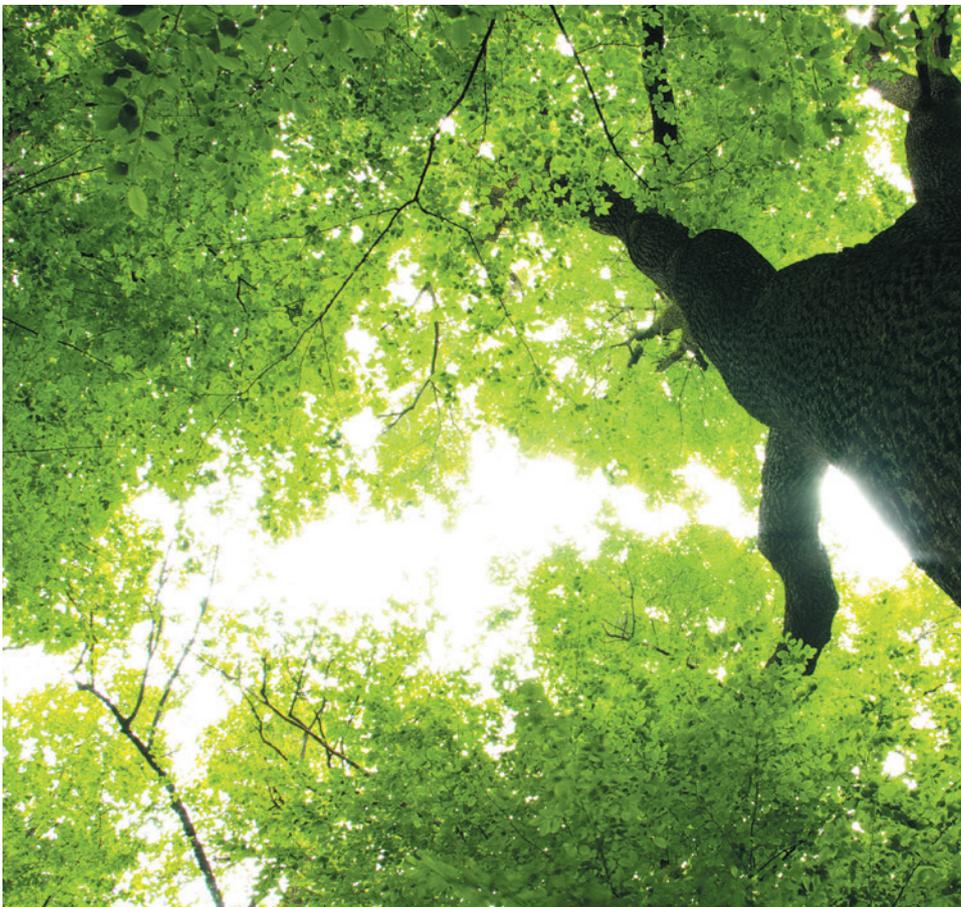


Saft is committed to the highest standards of environmental stewardship

As part of its environmental commitment, Saft gives priority to recycled raw materials over virgin raw materials, reduces its plants' air and water releases year after year, minimizes water usage, reduces fossil energy consumption and associated CO₂ emissions, and ensures that its customers have recycling solutions for their spent batteries.

Regarding industrial batteries, Saft has had partnerships for many years with collection companies in most EU countries, in North America and in other countries. This collection network receives and dispatches our customers' batteries at the end of their lives to fully approved recycling facilities, in compliance with the laws governing trans-boundary waste shipments.

Saft has selected a recycling process for industrial lithium-ion cells with very high recycling efficiency. A list of our current collection points is available on our web site. In other countries, Saft assists users of its batteries in finding environmentally sound recycling solutions. Please contact your sales representative for further information.



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