

Advanced battery systems for ships
contributing to a clean, cost-efficient
and comfortable operation



Saft technology

Meets expectations for safe, reliable, durable performance

The marine industry is fast adapting to meet ever tighter environmental regulations. Designers are playing a vital part in this evolution by integrating new ship architecture concepts with cutting-edge battery technologies to reduce emissions and increase efficiency and profitability.

Saft's rugged battery solutions are present in full-electric and hybrid-electric transportation applications worldwide. With over 50 years experience of converging high-end battery technology with a wide spectrum of needs, Saft is today's ideal partner to meet the civil marine goals of tomorrow.

Outstanding record

Saft is recognised around the world for its technological achievement in the design and manufacture of battery systems for international industrial programmes.

The company is already working with key partners in a growing and demanding market on programmes to provide Lithium-ion battery solutions for modes of clean transportation.

Saft: complete battery systems for several categories of ship

Passenger vessels

- Cruise liners
- Ferries
- Ro-Pax
- Urban transport

Workboats

- Tugs (harbour, escort...)
- Offshore vessels
- Administration ships
- Fishing vessels

Inland shipping

- River-sea shuttles
- Pushers/tugs
- Freight

Leisure vessels

- Mega yachts (> 24m)
- Medium size yachts



Surpassing expectations to meet stringent operational targets

Social

- Environmental constraints (short-sea, coastal and inland shipping)
- Safety
- Territory extension on the seas
- Increased comfort (reduced noise and vibration)

Economic

- Fuel efficiency (optimisation of global energy consumption)
- Ship's productivity
- Exploitation flexibility



Fully integrated solutions for

hybrid-electric and/or full electric propulsion

Batteries are used primarily to –

- maintain idle or station-keeping positions while avoiding diesel engine running at non-optimal load
- enable battery-only operation for entry and exit of the harbour and restricted areas in a zero-emission mode
- provide additional power to prime movers and meet peak power demands

auxiliary systems, hotel load

Batteries provide power for the following functions -

- propulsion, manoeuvring and motion control, including thrusters, stabilisers, energy recovery systems
- ship service, including lighting systems, ballast pumps, HVAC...
- cargo and duty services, including pumps, winches, actuators...

emergency back-up

Batteries are also used in UPS and back-up power systems to support –

- computer systems
- communication systems
- process control systems
- emergency lighting

In addition, batteries are used to start auxiliary generator sets and main engines.

Rack-mounted Li-ion battery systems



**Soft Li-ion
technology:
Modular
Scalable
Reliable
from kW to
MW needs**



Operational benefits

- Enable full electric propulsion within a compact volume (entering and exiting harbours and restricted areas)
- Load-leveiling function to keep high level of fuel efficiency and reduced number of generating sets
- Stand-by power at shore
- Design flexibility (improved scalability and modularity)

Benefits vs. conventional technologies

- Reduced mass and volume
- Very long calendar, storage and cycling life
- Faster charging time
- Maintenance-free
- High power (continuous and pulses) and voltages (up to 1000 V)



As part of an integrated solution, Saft's battery systems reduce...



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' releases to air and water year after year, minimizes water usage, reduces fossil energy consumption and associated CO₂ emissions, and ensures that its customers have recycling solutions available 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.

This collection network meets the requirements of the EU batteries directive. A list of our 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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