

Where trust needs to go deep.

Main batteries for your submarines.



exidegroup.com

Our battery brands, depending on your location:

HHAGEN
Batterie

TUDOR
BATTERIES

E / **ENERGIZING**
A NEW
WORLD

Safe operations below the surface.

Exide Technologies: a global leader
in main batteries for submarines.

There are few areas of application where reliable battery power is as critical as in submarine operations – when underwater, main batteries are often the sole power supply. Quality differences between manufacturers can be vast: due to the product's complexity and uniqueness, much of it is made by hand rather than through automated production. Exide Technologies can claim to offer by far the best product on the market.

Building on:

- **100+ years experience** in diesel-electric propulsion batteries
- **55+ years experience** on back-up batteries for nuclear-powered submarines
- **An extensive know-how** on production processes
- **A strong reputation** for reliability and a broad product lineup
- **A trusted brand associated with** safety, quality and performance

Whether you are part of a navy procurement or maintenance team for existing submarines, or a shipyard project team building new ones, Exide Technologies is here to provide the solution best suited to your needs, offering you:

Proven safety & reliability, high performance and constant operational readiness.

Your advantages with Exide Technologies.



Performance:

- Excellent behavior in low- and high-rate discharges
- Reduced self-discharge
- 1250+ cycles guaranteed*
- Low hydrogen emissions



Reliability:

- 9+ years life span*
- Capacity near the nominal within the warranty period**
- Longest proven service life on the market
- Highly robust & safe internal structure, with no electronics
- Redundancy of production means: two plants



Fair price:

- The lowest Total Cost of Ownership (TCO) on the market



Easy to operate:

- Optimized for reduced maintenance
- Instructions in your language
- Exide trainings & 24/7 support
- Delivery of dry batteries possible



Responsibility:

- Recyclable lead-acid cells
- Circular supply chain of lead-based raw materials
- ISO 9001, 14001, 27001, 45001, 50001 certified plants
- Zero accident through strict safety policies



Full integration:

- Full compliance to customer & STANAG specifications
- Customization to perfectly fit in the battery room
- Plug-and-play battery solutions
- With Exide or customer BMS

* if batteries are strictly used and maintained according to operating instructions

** for propulsion applications: around 100% reached at the end of the warranty period

A deep dive into excellence.

Why Exide Technologies batteries are better:

- Cells built in Germany or Spain (for the Spanish market) with state-of-the-art technologies and an optimized design
- Cells including Hagen's established design features:
 - Copper-stretched metal (CSM) negative grids
 - State-of-art clamped-rubber sealing of the terminals (with slotted disks)
- Optimized energy density
- Active materials and alloys adapted to the application and the customer specification
- Premium components and accessories, including a shock-resistant glass-fiber-reinforced container
- Produced with the highest quality standards, with full transparency

We follow your specification:



Best-in-class to respect dimensions and tolerances



Upon request: Delivery with customized connectors, air agitation, water circulating and BMS systems



Discharge rates/scenarios and rated capacities

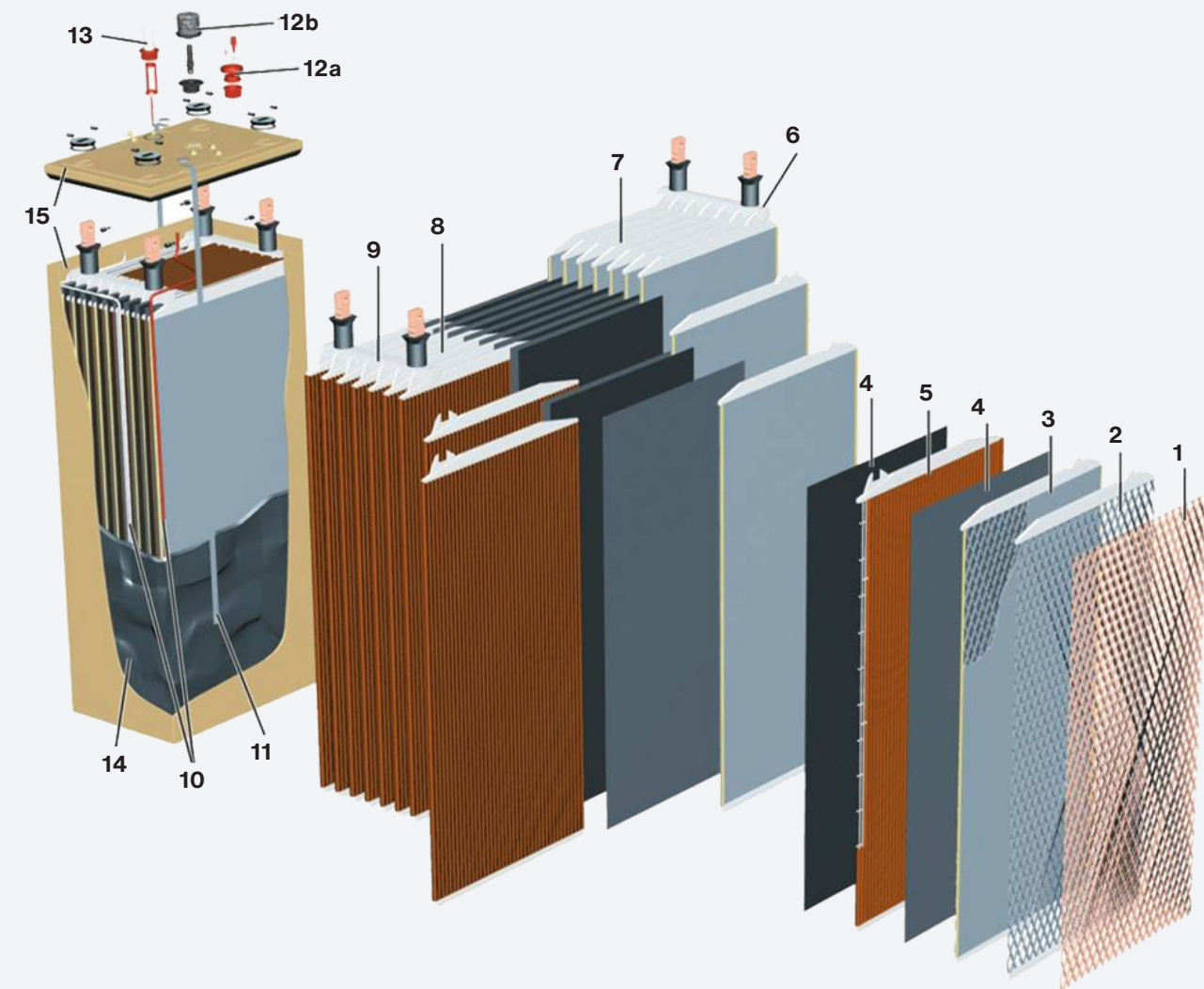


Qualification & factory acceptance tests



Quality for longevity: 12+ year old batteries are still in safe operations.

Submarine cell in detail:



- | | | | |
|---|------------------------------|-----|--|
| 1 | Negative plate with CSM-grid | 9 | Positive pole bridge |
| 2 | Lead-coated negative plate | 10 | Agitation pipes |
| 3 | Negative plate | 11 | Lead-strip for insulation check |
| 4 | Separators | 12a | Service plug or valve (vent system) |
| 5 | Positive tubular plate | 12b | Backflash arrestor (alternative vent system) |
| 6 | Negative pole bridge | 13 | Acid level indicator |
| 7 | Negative plate set | 14 | Rubber bag |
| 8 | Positive plate set | 15 | Glass-fiber composite lid and container |



At your service: with more service.

Exide Technologies is here to make it easy.



Support with on-board battery installation and dismantling



Tools, spare parts and assistance for regular maintenance



Commissioning of batteries on site, also with our discharging/charging equipment



Execution of corrective maintenance tasks



Tools and measuring apparatus for cell monitoring

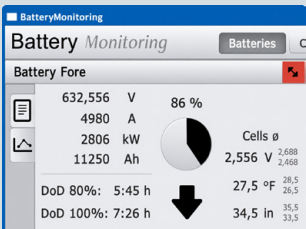


Training of navy and shipyard staff members

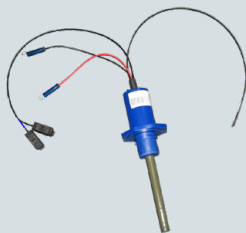
Our Battery Monitoring System (BMS):

- Full systems available (hardware and software)
- Voltage, temperature & electrolyte level measurements
- Battery management features based on Exide's long experience on battery and cells data along their life

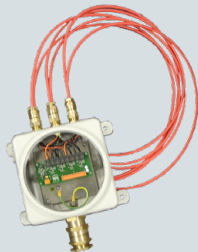
Customizable human-machine interface



Robust plug-and-play sensor (with reliable communication)



Electronics with long-term availability components



Quality speaks for itself. So do our customers.

"Batteries with a performance which exceeds our expectations in terms of durability and efficiency."

A navy procurement officer.

"Your battery is our life insurance."

Squadron commander of a NATO navy.

"Fruitful collaboration during the last 30 years."

A shipyard project manager.

Our commitment goes beyond technology.



Scan the QR code to access the digital brochure.



Employer of choice.

We are promoting equality, diversity, and inclusion within our workforce.



Batteries for a greener future.

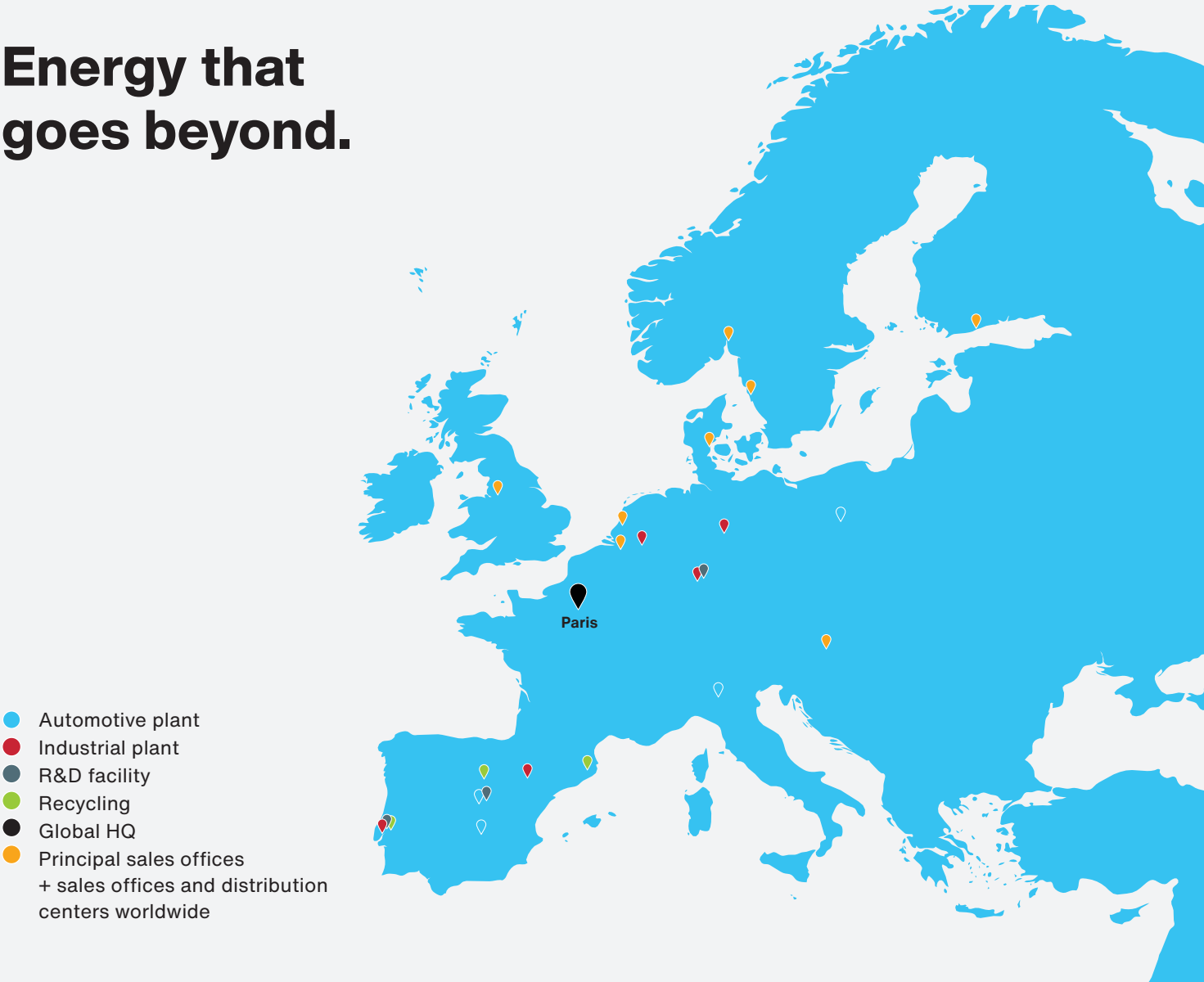
We tackle climate change by reducing our footprint and focusing on sustainability.



Sustainable and ethical growth.

We commit to safe, ethical actions, driven by values beyond regulations.

Energy that goes beyond.



Headquarters

Exide Technologies SAS
5-7, Allée des Pierres Mayettes
92636 Gennevilliers
France

Plants for your submarine batteries

Exide Technologies Mobility GmbH
Odertal 35
37431 Bad Lauterberg
Germany

Exide Technologies SLU
Pol. Ind. Empresarium, C/Acebo, 5
50720 La Cartuja Baja (Zaragoza)
Spain

