

Electric propulsion systems



SYM
NAVAL

SYM Naval is a shipyard with a strong technical culture, focused on innovation and with a firm commitment to sustainability.

In the current context, the naval sector faces the challenge of adapting to the growing demands for sustainability and energy efficiency.

The remarkable increase in the adoption of alternative energies, driven by regulatory pressure and the demand for more sustainable solutions, highlights the need for this transition.

At SYM Naval, we have developed our own electrification system, Blu-e Propulsion.

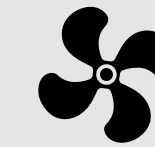
A 100% electric propulsion system, offering completely emission-free operation. It is presented as **a perfect solution for oceans and other environmentally sensitive areas such as ports and coastal zones.**

Motorization



100% Electric

Propulsion systems



Conventional Shaft and Propeller Propulsion



Azimuthal Propulsion





SYM NAVAL

SYM Naval applies a centralized leadership model and proven engineering to guarantee efficient results with optimized costs, thanks to shared workload management and the active transfer of experience and technology.

This philosophy also extends to our network of suppliers, allowing us to meet deadlines with the required level of quality.

Every vessel built by SYM Naval reflects a rigorous and committed approach to industry. From the design phase to final delivery, **the port vessels developed by the company combine custom engineering, clean technology, and European quality standards, with execution 100% tailored to the client's specific needs and the operating environment.**



Shipyard in Spain (Vilanova i la Geltrú)



Shipyard in the Dominican Republic (Boca Chica)



Own workshops and collaborators in Panama

+300

COMPLETED NAVAL PROJECTS

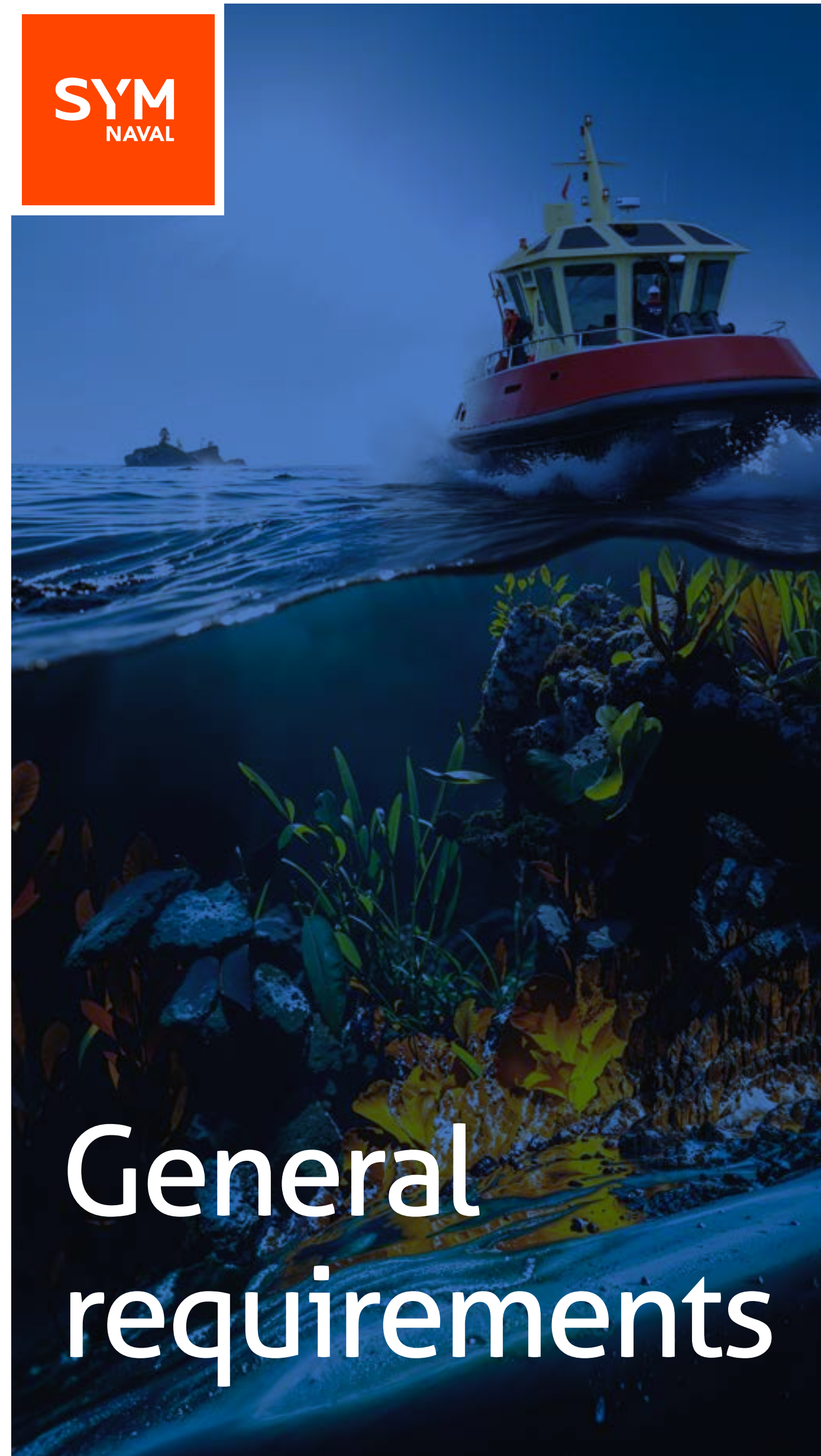
+25

YEARS OF EXPERIENCE



GLOBAL COVERAGE





General requirements

General requirements

Environmental operating conditions

No.	Items	Unit	Project demand value
1	Outdoor ambient temperature	Maximum temperature	45
		Minimum temperature	-5
		Average annual temperature	30
		Maximum temperature difference	25
2	Humidity	Average daily relative humidity	≤95 relative humidity, non-condensing
		Average monthly relative humidity	≤90 relative humidity, non-condensing
3	Altitude	m	≤2000
4	Pollution level	Non-uniform field, contamination level III	
5	Anti-corrosion level	/	C5-H



Latest generation LFP batteries

The key to a sustainable future in the shipbuilding industry

The use of LFP batteries is positioned as a leading solution in the marine sector due to its numerous advantages.

Despite having a lower energy density than other technologies, these batteries are preferred in the maritime industry for **their longer lifespan, lower cost, robustness, and improved safety, standing out for their thermal stability and the elimination of the risk of self-sustaining fires.**

Battery System Components

CELL

Battery, the smallest unit of a battery system.



BATTERY MODULE

Cell Grouping (basic batteries)



BATTERY PACK

Battery Module Grouping with BMS.



BATTERY BANK

Electrical connection of several battery packs with BMS.



BATTERY SYSTEM

It includes at least 2 independent Battery Banks and Cooling Panels. With its own EMS.



BATTERY MODULE

Compliance with IACS standards

- Lightweight design
- Efficient liquid cooling and heat dissipation
- Independent and safe preprocessing
- Thermal Run Away without propagation
- Intuitive panel and adaptable general installation
- **IP67 protection for the entire series**
- 1C charge and discharge rate
- Plug & play battery swapping

Custom-designed battery modules for each project. Examples with technical specifications.

Battery Module	Nominal voltage/VDC	Nominal Capacity/AH	Life Cycle	Nominal energy/kWh	Weight (kg)
BP-B3-2P18S-1	57.6	210	6.000 / 8.000	12.096	100±5
BP-B3-3P12S-1	38.4	315	6.000 / 8.000	12.096	100±5
BP-B2-1P12S-12	38.4	280	6.000 / 8.000	10.751	83±5
BP-B2-1P18S-1	57.6	280	6.000 / 8.000	16.12	118±5
BP-B3-1P36S-11	115.2	304	6.000 / 8.000	35.020	225±5



BATTERY PACK

Maximum electrical safety

- Modular design for easy transport, installation, and construction.
- Integrated liquid cooling system for precise battery temperature control, ensuring safety and extending battery life.
- Custom configuration of Battery Module to achieve the required defined voltage.
- Independent operation: one can be in charge mode while the other is in discharge mode.
- Each battery pack can have its own onboard battery charger (OBC).

BATTERY BANK

Consistency and stability

- Liquid cooling and remote temperature equalization.
- Standard interface output (GB and CCS2).
- Port power compatibility.
- Minimum composition of 2 Battery Packs to achieve redundancy.
- Minimum configuration of Battery Packs in parallel to achieve the necessary system power/capacity. Flexible configuration.



A long track record backed by leading national and international clients

Throughout our history, we have built vessels for leading shipowners in Europe, America, and other strategic regions.

Our experience includes the delivery of tugboats of varying capacities and configurations, as well as the development of **the first 100% electric tugboat in Spain**, a milestone that demonstrates our capacity for innovation and leadership in sustainability.

** Each delivery reinforces our reputation as a strategic partner to national and international shipowners, ensuring that every vessel is delivered certified and flying its destination flag.*



SYM Naval Constructions

Spain

BOLUDA CORPORACIÓN MARÍTIMA

4 TUGBOATS DELIVERED AND 2 UNDER CONSTRUCTION

CONSULMAR

1 FULLY ELECTRIC TUGBOAT DELIVERED AND 1 UNDER CONSTRUCTION (UP TO 19 TONS BOLLARD PULL)

TRADEBE

MARPOL-COMPLIANT LIQUID WASTE COLLECTION VESSEL WITH A FLASH POINT < 60°C

GALAXIDY

1 FISH FARM CATAMARAN

International

HAROUGE OIL OPERATIONS (LIBIA)

TWO TUGBOATS DELIVERED AND A THIRD IN THE SIGNING PROCESS

PTP (PANAMÁ)

1 TUGBOAT UNDER CONSTRUCTION

PONTEMAR (ARGENTINA)

2 TUGBOATS DELIVERED

SMGM (NUEVA CALEDONIA)

1 TUGBOAT DELIVERED



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