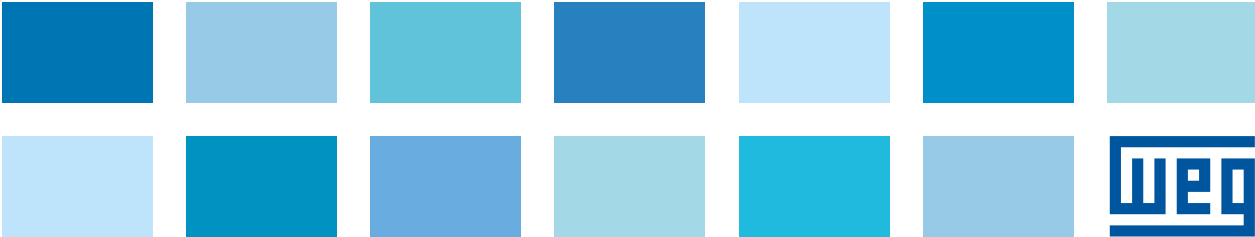




# WEG Solutions for Marine Market



# Global Presence

## Structure

WEG is **Brazilian based company** established in **1961** in the south of the country, with over **28,000 employees** spread around the world. The company has the highest Brazilian content available in the market. WEG is the largest electric motor manufacturer in Latin America offering to its customers a wide service network covering the whole world. WEG's ongoing commitment in keeping vessels in operation has been the key factor in building a long-lasting relationship with all our customers.



**Availability** = Local spare parts + Large service network + All products made in Brazil + Reliability



**Partnership** = Local engineering support + Single point of contact + Call center 24h



**Competitiveness** = High local content + World class technologies + Integrated solutions + Product designed for marine applications and approved by the class societies



**WEGnology** = More than 60 vessels operating with WEG complete electrical package





# Global Company with Largest Service Structure in Brazil



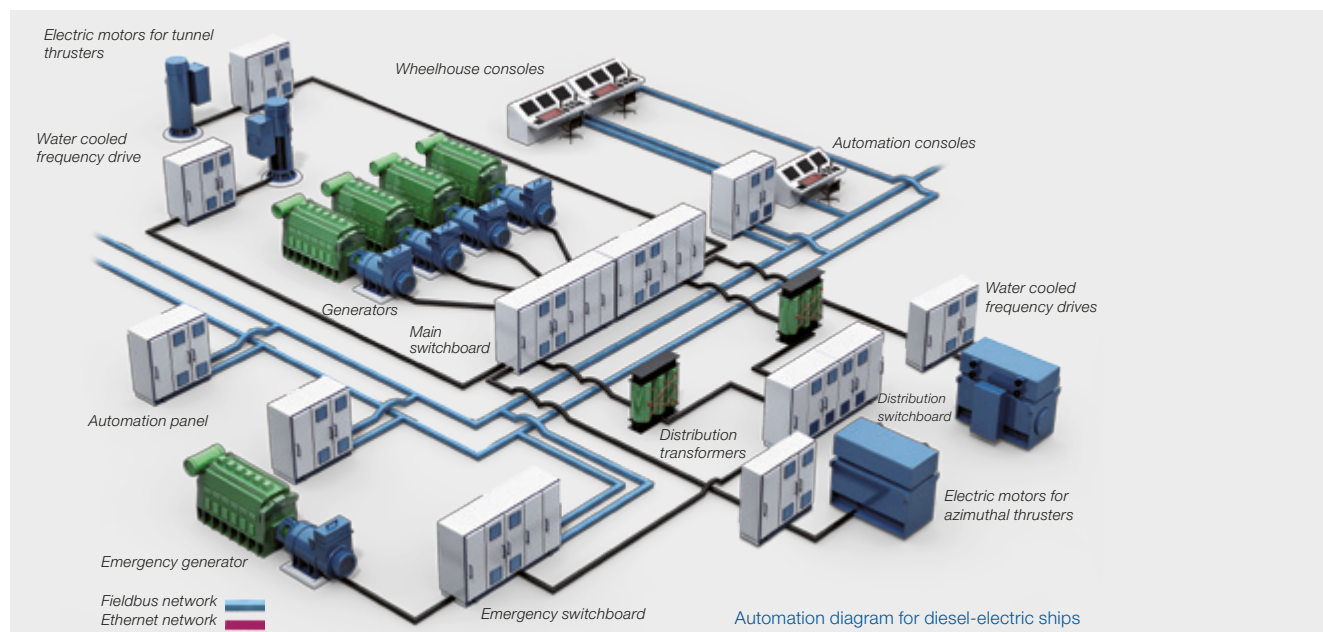
**Over 400 Service Agents and Service Centers in Brazil**



# Solutions for the Marine Market

WEG has the complete solution in motors, generators, automation, transformers and coatings for the marine market.

Besides state-of-the-art products and services, WEG can supply integrated engineering services, automation systems including the dynamic positioning system and other specific solutions for the vessels.



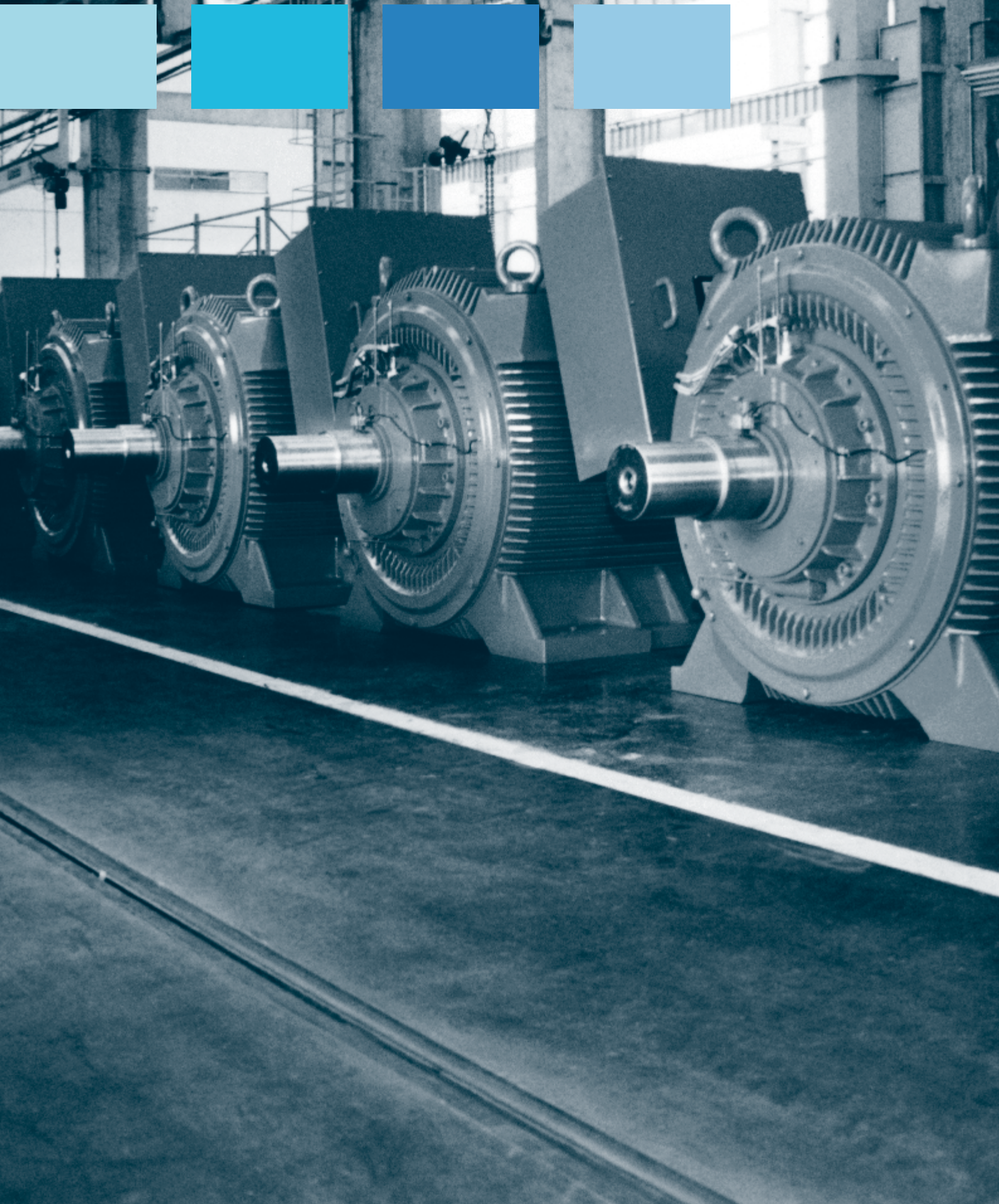
## Scope of Supply

### WEG Supplies Solutions for Several Types of Vessels

- Electric motors for main and side propulsion
- Water cooled frequency inverters to drive fixed pitch propellers
- Starting panels for controllable pitch propeller and side thrusters
- Monitoring and controlling system for power generation
- Main and emergency dry type transformers
- Low / medium voltage main and emergency switchboards
- Distribution panels and motor starters
- Electric generator
- Generators for auxiliary or emergency gen-sets
- Automation: alarm system, power management system and cargo control and monitoring systems
- Shore supply panels
- Coatings
- Wheelhouse and ECR consoles
- Engineering Control Room - ECR (prefabricated electrical room)
- Integrated engineering service
- Commissioning and start-up
- Remote support



# Motors

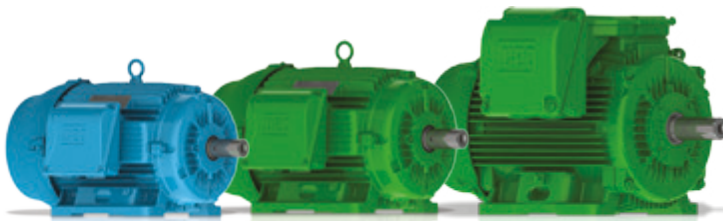


## Efficiency and reliability for marine market.

WEG motors are designed to lower operating costs, ensuring higher energy efficiency and operating reliability and requiring less maintenance.

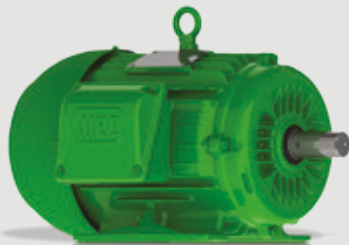
### Advantages and Applications of WEG Motors

- Compact with excellent performance
- High mechanical strength, low vibration and noise levels
- Design versatility allowing several applications in the marine industry



### W22 Line

- W22 Plus: according to the standards currently in force <sup>1)</sup>
- W22 Premium: exceeds the efficiency level specified in standards
- W22 Super Premium: exceeds by two levels the efficiency specified in standards
- Output ratings: 0.16 to 750 cv <sup>2)</sup>
- Frame sizes: 63 to 355A/B <sup>2)</sup>
- Number of poles: 2, 4, 6 and 8 <sup>2)</sup>
- Applications: transfer pumps, recirculation pumps, cooling pumps, anchor winches, lifting gear, compressors



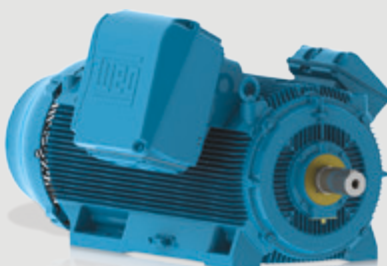
### W22Xn Line

- Follows the highest safety standards
- Guarantees safety in areas where the presence of an explosive atmosphere may not be present, but can offer risks
- Flexibility to adapt to the most different applications
- Output range: 0.16 to 750 HP
- Frame sizes: 63 to 355A/B
- Number of poles: 2, 4, 6 and 8
- Applications: transfer pumps, fireman's pumps



### WELL Line

- Longer lifetime
- Longer lubrication intervals
- High resistance to aggressive and corrosive environments
- Lower operating costs
- Output range: 0.5 to 750 HP
- Frames sizes: 90S to 355A/B
- Number of poles: 2, 4, 6 and 8
- Applications: transfer pumps, recirculation pumps, cooling pumps



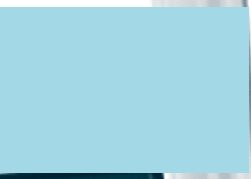
### HGF Line

- High performance in the toughest applications
- High strength, durability and low maintenance costs
- Output range: up to 1,100 HP
- Frame sizes: 315, 355 and 400
- Number of poles: 2, 4, 6, 8, 10 and 12
- Applications: bow thrusters, stern thrusters, azimuthal thrusters

Notes: 1) According to ABNT NBR 17094;

2) For W22 Super Premium: Output range: 30 to 250 HP / Frames: 200M to 355M/L / 2, 4 and 6 poles.

# Automation





## On board **technology** for integrated solution.

WEG offers complete packages of switchboards, frequency inverters, UPS and battery chargers, all integrated and developed by state-of-the-art engineering.



Main switchboard

### Low and Medium Voltage Electrical Switchboards

- Applications: main electric switchboards, distribution and emergency switchboards
- Modular and flexible assembly options
- Custom made, designed according to ship arrangements
- MCC and local starter panels



Water cooled frequency drive

### Low and Medium Voltage Variable Frequency Drives

WEG Variable Frequency Drives are used to control the speed and to protect the motor against overload, short-circuit, overtemperature, ground fault, overvoltage, undervoltage, output phase loss, etc.

Variable Frequency Drives can be supplied air or water cooled.

- Applications: thrusters or cargo loads
- Product design allows high compact level, reliability and easy maintenance
- Up to 4,160 V / 7,500 kW
- Up to 690 V / 3,800 kW
- Normal (110%/1min) and heavy duty (150%/1min)
- Complete diagnostic and monitoring functions able to communicate with all well-known networks
- PLC functions



Engineering operation station

### Low and Medium Voltage Soft-Starters

WEG Soft-Starters are used to protect and limit starting current of electric motors that do not require speed variation.

The HMI allows easy parameter set up and makes the commissioning and operation easier.

- Applications: propulsion motors with variable pitch propellers, compressors, pumps, fans
- Benefits: low cost, less impact in the generation plant during motor start



Power management system

### Automation

The WEG automation system for vessels is properly designed and allows controlling and monitoring of the ship from the control room.

Main functions:

- Alarm system which allows monitoring and recording of records all vessel alarms
- Power management system which allows controlling and protecting generators and loads automatically
- Cargo system which allows monitoring and controlling valves, pumps, tanks and dry bulks



Rectifier

### Critical Power

Complete line of rectifiers, battery chargers, batteries and uninterruptible power supply systems.



## Flexible solutions for sustainable energy.

WEG offers complete solutions for vessel and platform rig power generation and propulsion systems. The products are developed with high quality standards and up-to-date technologies meeting worldwide demands supported by qualified engineering and power generation experts.



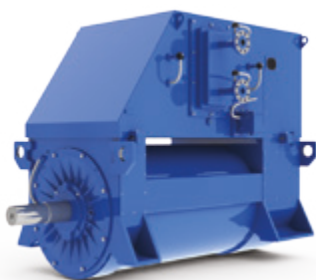
### WGM Motor

- Applications: bow thrusters, stern thrusters, azimuthal thrusters, fire-fighting pumps, rudder propellers
- Output range: up to 3,150 kW
- Voltages: 440 to 6,600 V
- Speed: 3,600 to 500 rpm
- Water jacket design
- Advantages: low noise level, suitable for variable frequency drive operation, minimum thermal dissipation to the environment and compact construction



### Master Line Motor

- Applications: bow thrusters, stern thrusters, azimuthal thrusters, fire-fighting pumps
- Output range: up to 50,000 kW
- Voltages: up to 13,800 V
- Speed: 300 to 3,600 rpm
- Open self-ventilated cooling system. This motor line can also be supplied with air-to-air heat exchangers, air-to-water heat exchangers or with independent cooling system, whenever required
- Advantages: design versatility and outstanding operating conditions which result in high performance and low-maintenance



### Synchronous Alternators

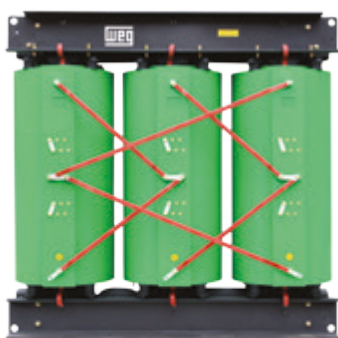
- Applications: auxiliary, emergency, harbor or shaft alternators which are driven by low or high speed diesel or gas engines
- Output: from 7.5 kVA
- Low voltage: 110 to 690 V
- High voltage: 2,300 to 13,800 V
- Poles: from 4 poles
- Advantages: suitable for parallel operation (load sharing) or single operation, self-ventilated or water cooled. These generators are designed to meet all electrical requirements (e.g. low-harmonic distortion) and mechanical requirements demanded by operating conditions in different kinds of vessels

# Transmission & Distribution

## Excellence in energy supply technologies.

To meet the needs of the marine industry, WEG Transmission & Distribution offers a complete line of dry transformers. The windings of these transformers are encapsulated with high quality epoxy resin by the vacuum-pressure impregnation (VPI) process which ensures a safer design for the increasingly reduced spaces, where installation and downtime costs for maintenance and repair play a decisive role in purchasing the product.

WEG dry transformers are the best option for confined spaces as they do not present any risk of explosion and do not allow fire to spread.



### Dry Transformer

- Application: main distribution transformers, lighting transformers, motor and frequency inverter power supply transformers
- Output range: up to 20,000 kVA
- Class F insulating material: 155 °C
- Epoxy resin: Araldite® CW229
- Standards: ABNT - NBR10295/ IEC60076-11

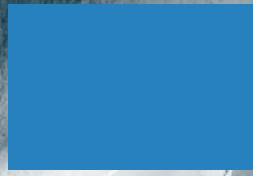
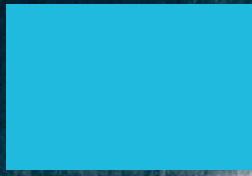
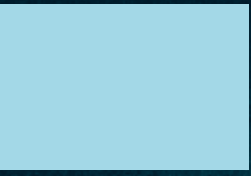
### Dry Transformer - AFWF Cooling System

- Output range: up to 5,000 kVA
- Voltage classes: 7.2, 15, 24.4 or 36.2 kV
- Class F insulating material: 155 °C
- Standards: ABNT - NBR10295 / IEC60076-11
- HV windings are made of copper or aluminum strip conductors and LV windings are made of copper or aluminum foil conductors
- Windings are impregnated with the most advanced resin available in the market (Araldite® CW229)
- AFWF cooling system (air forced (AF)/water forced (WF)). Temperature is continuously controlled by the temperature controlling system
- When installed in electrical rooms, up to 95% of losses are dissipated in the water circuit of the heat exchanger, thus reducing or eliminating the need to use air conditioning in the room



Ideal for the Marine Market

# Coatings



## Certificates

WEG is certified by several international standards.



## Coatings providing **full protection.**

WEG Coatings supplies a wide range of products for several marine and offshore applications from shop primers for steel plates to high build, anticorrosive epoxy coatings and high performance antifouling systems allowing dry-docking intervals of up to 5 years.

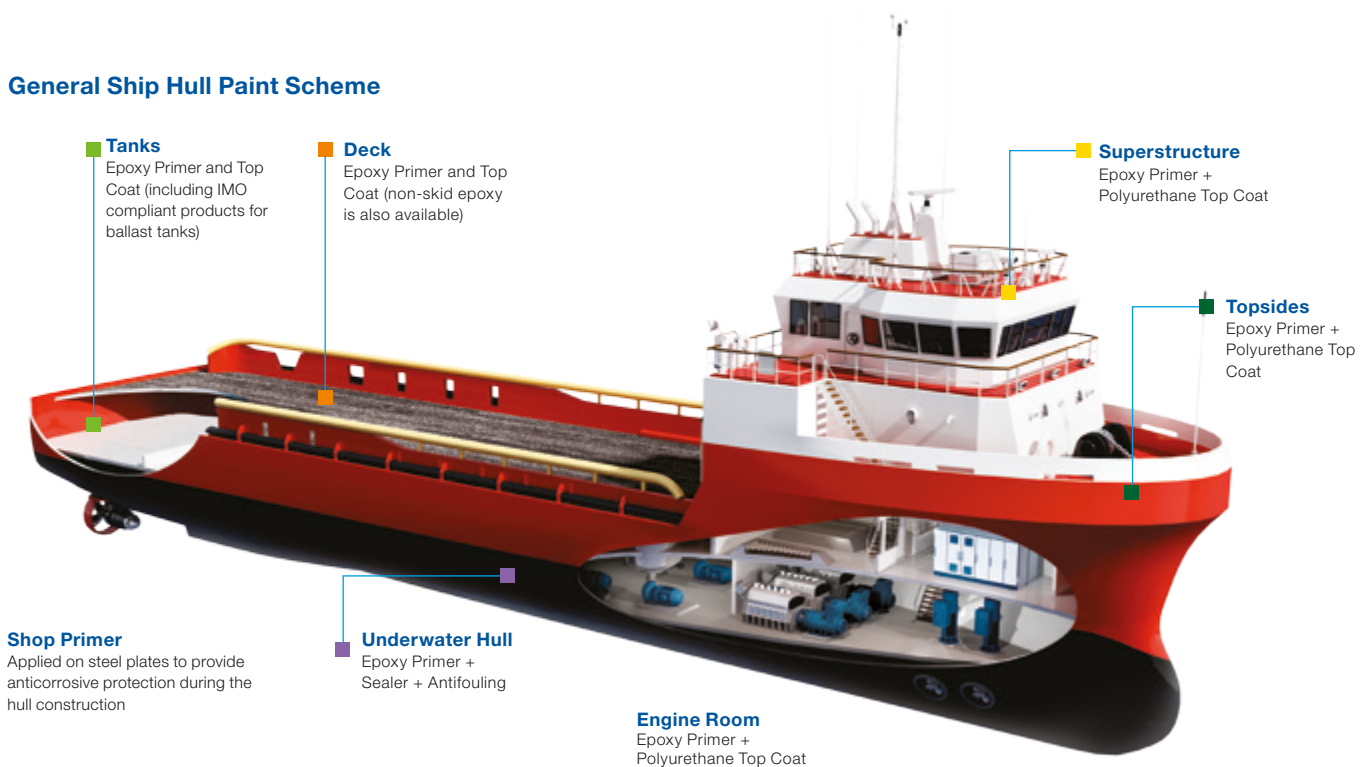
### High Performance Antifouling Coatings Learn More About WEG Ecoloflex SPC

The WEG Ecoloflex SPC was the first hydrolytic self-polishing and tin-free antifouling system developed in the world. The antifouling system contains a copolymer with special patented technology developed by Nippon Paint Marine Coatings. ***Its performance has been proven on over 10,000 vessels during an operation period of 59-61 months.***

### Main Products

- Wegzinc 401 - Weldable zinc silicate shop primer
- Weg Tar Free 712 N 2851 - Polyamide epoxy primer/top coat
- Wegpoxi Wet Surface 89 PW - High build surface tolerant epoxy maintenance coating
- Wegpoxi Wet Surface 88 HT - High thickness IMO-compliant epoxy polyamine primer/top coat for humid surfaces
- Lackpoxi Wet Surface N 2680 - High thickness solvent-free IMO-compliant epoxy polyamine primer/top coat for humid surfaces
- Weg Ecoloflex SPC - Tin-free and self-polishing antifouling
- Wegpoxi DRD 331 - High abrasion resistant epoxy primer/top coat
- Wegthane HPA 501 - Acrylic-aliphatic polyurethane top coat

### General Ship Hull Paint Scheme



# Services and Support

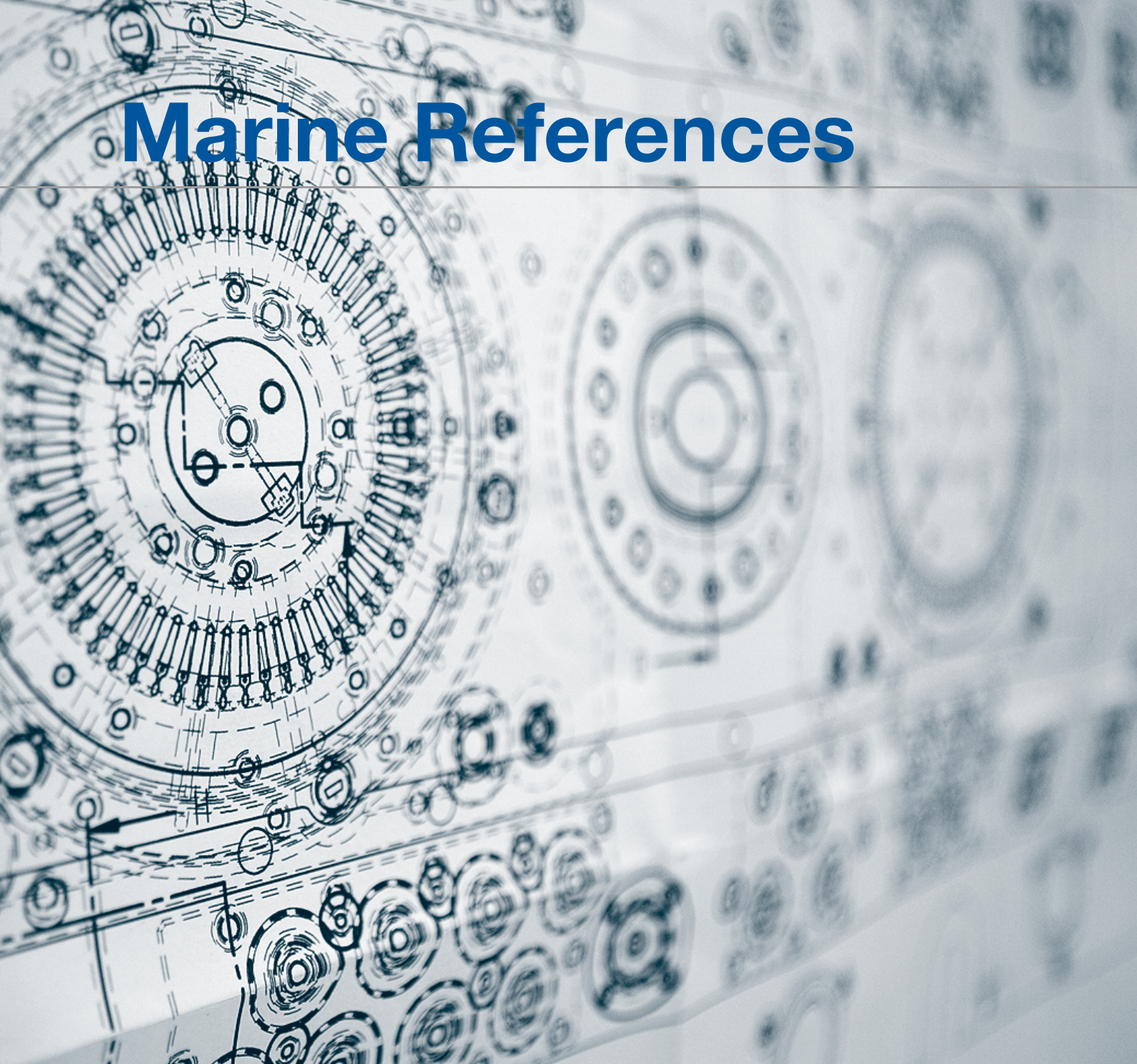
A large industrial shipyard with multiple cranes and a large vessel under construction. The scene is dominated by the dark, metallic structures of the ship and the complex network of cables and beams of the cranes. The sky is a pale, overcast grey. In the foreground, four rectangular blocks of varying shades of blue and cyan are arranged horizontally, partially overlapping the bottom edge of the shipyard image.

WEG provides inspection, repair and repowering services for medium and large machines, including other brands. These services are carried out at WEG's facilities or on site. WEG also offers a wide range of coatings for equipment maintenance and protection purposes.

## Services

- Biggest service structure in Brazil, and also based in the main strategic countries around the world
- Repair structure
- Remote services
- Basic engineering service and integration
- Commissioning and start-up

# Marine References



WEG has one hundred references in the marine market, including names of well-known shipyards and shipowners around the world.

WEG products and systems are designed to meet all marine application requirements. On request, all these products can be supplied with test certificates from class societies such as ABS, Bureau Veritas, DNV, Germanischer Loyds, Lloyd's Registers and others.

## Worldwide Companies that Approve WEG Products.



# WEG Worldwide Operations

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For those countries where there is not a WEG own operation, find our local distributor at [www.weg.net](http://www.weg.net).



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