



TRIDENT

A WÄRTSILÄ COMPANY



## TRIDENT UNDERWATER SERVICES

Dry-docking a vessel for critical repairs or planned refurbishment has significant implications in terms of both time and cost. With Trident Underwater services, the work can be performed by specialist diver technicians, eliminating the need for dry docking. This reduces both maintenance costs and downtime while minimising the impact on your vessel's operation.

### FAST, HIGH-QUALITY REPAIR AND REFURBISHMENT 24/7

Trident Underwater services cover the underwater repair, refurbishment and maintenance of your vessel's machinery and equipment as well as the propulsion system, seals and hull.

Our specialist teams of certified diver technicians and propulsion experts serve you around the clock, and can be dispatched in a matter of hours. Wherever in the world your vessel is, we can provide fast-response and class-approved repairs as well as inspections, refurbishment and equipment installation or replacement.

We advise vessel owners and classification societies on the most optimal and cost-effective repair and refurbishment solutions based on a thorough underwater assessment of the equipment or systems in question. Our methods not only meet the requirements set out by manufacturers and classification societies, they are also safe for the environment.

### KEY BENEFITS

- Minimise or eliminate vessel downtime and off-hire by scheduling work to coincide with port calls instead of performing the work in dry dock
- Peace of mind from certified repair and refurbishment services that offer the same quality as topside work
- Improve planning and efficiency of dry docking maintenance schedules
- Benefit from flexible 24/7 service and global availability
- Ensure repair and refurbishment work complies with all applicable environmental standards

# OUR SERVICES

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## MACHINERY & EQUIPMENT: UNDERWATER MAINTENANCE AND REPAIR

Get safe, reliable and cost-efficient repair or complete replacement of the following:

- Steerable and transverse thrusters
- Stabilisers
- Rudders
- Other machinery and equipment, including scrubbers, box coolers and sensors

For repair or replacement work on thrusters, as well as for welding and seal replacement, our specially trained diving technicians access the equipment inside a safe, dry hyperbaric habitat. We can also install a preservation bag on steerable thrusters to protect them from corrosion, marine growth and oil contamination while a vessel is laid up.



## PROPELLER SYSTEMS: UNDERWATER MAINTENANCE AND REPAIR

Our expert underwater technicians can evaluate the condition of your vessel's propeller and plan a cost-effective repair on site. Our propeller services cover the following:

- Blade straightening, crack repair and replacement of damaged sections
- Repair or modification of leading and trailing edges
- Diameter and blade-area reduction
- Correction of propeller-induced engine overload
- Anti-singing edge modifications
- Installation of energy-saving devices such as the Wärtsilä EnergoProFin
- Visual inspection and evaluation to determine propeller condition







## SHAFT SEALING SYSTEMS: UNDERWATER MAINTENANCE AND REPAIR

We can perform fast and high-quality underwater repair or replacement work on your vessel's sealing systems while it is anchored or during cargo-handling operations. Our sealing system services include:

- Lip-type seal bonding, and installation or removal of spacer rings
- Wet repair and replacement of face-type seals
- CPP blade seal replacement
- Refurbishment of transverse or steerable thruster shaft and blade seals
- Stabiliser fin seal and crux seal repair



## HULL: UNDERWATER MAINTENANCE AND REPAIR

We offer a comprehensive range of professional underwater maintenance, cleaning and inspection services for vessel hulls, including:

- Hull cleaning
- Temporary and permanent shell-plate repair
- In-Water class surveys
- Dry dock extension, pre-purchase, hull coating and damage assessment inspections

## WORLD-LEADING INNOVATION IN R&D

The Trident approach to research and development has helped us set new standards for servicing vessels below the waterline.

Our innovations include:

- The award-winning FLEX-DAM hyperbaric habitat for propulsion shaft seal replacement
- The TRITON series of underwater hull-coating treatment systems
- Custom-designed tools for efficient machining of steel and propeller materials
- Innovative cofferdam designs for performing permanent weld repairs afloat



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