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MARINE EXPANSION TANKS

1ST EDITION

EMPOWERING PERFORMANCE

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INTRODUCING EXPANSION TANKS

IN A CLOSED-LOOP MARINE COOLING SYSTEM, THE EXPANSION TANK PLAYS A VITAL ROLE IN MAINTAINING STABLE PRESSURE AND ENSURING RELIABLE CIRCULATION OF FRESHWATER COOLANT.

HOW IT WORKS?

The seawater pump draws seawater through the sea inlet box and forces it through the central box cooler. Depending on the system configuration, part of this flow may pass through the cylinder cooler before being discharged overboard.

Meanwhile, the internal freshwater pump draws coolant from the buffer (expansion) tank and circulates it through the central box cooler. The cooled (freshwater) then flows through the main engine's air coolers to the lubricating oil cooler, the gearbox, and possibly the auxiliary cooler, back to the expansion tank. A separate main engine cylinder cooling water system can also be configured, with one of the two cylinder cooling water pumps withdrawing cooling water from the expansion tank.

To ensure effective air separation, coolant must circulate from bottom to top, allowing air bubbles to rise and escape through the expansion tank's air vent. This natural upward flow occurs because warm water has a lower specific gravity than cold water.

A pressure relief valve may be connected to the expansion tank to collect excess water, maintaining safe system pressure.

The level in the buffer tank can be checked using a glass gauge.

For larger engines, the freshwater cooling system can be divided into:

- High Temperature (HT) Circuit
- Low Temperature (LT) Circuit

Many variations are possible. The hot freshwater from the HT system can be cooled directly by seawater, or by mixing it with the low-temperature (LT) freshwater system. The high-temperature and low-temperature systems can also be separate, in which case each has its own expansion tank.



WHAT IS AN EXPANSION TANK?

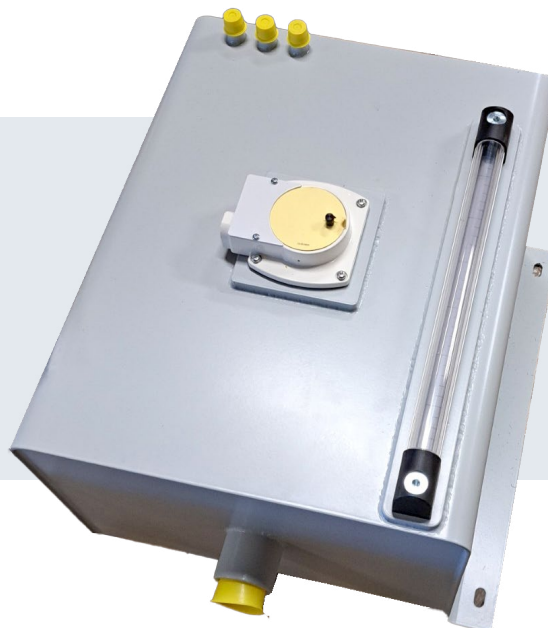
An expansion tank is a small but critical part of a closed-loop cooling system. It handles the natural pressure changes that occur as coolant heats up and expands during engine operation.

Without it, pressure would build up inside the system, which could lead to:

- Leaks
- Blown seals
- Damage to key components

In marine cooling systems - especially those using box coolers or shell-and-tube heat exchangers - the expansion tank acts as a pressure relief buffer. It gives the coolant somewhere to go when it expands, helping the system maintain steady pressure and flow.

The purpose of an expansion tank is to ensure the engine runs efficiently by maintaining proper pressure for the circulation pump. These tanks are crucial for the health and performance of closed-loop engine cooling systems.



WHY YOU NEED AN EXPANSION TANK

Every closed-loop cooling system requires an expansion tank, but it is especially critical on ships. Engines and onboard equipment generate a lot of heat, causing frequent expansion and contraction of coolant.

That's where the tank comes in:

- Preventing overpressure in the cooling system
- Maintaining proper coolant volume and circulation
- Allowing trapped air to escape, preventing air locks

In marine installations, the tank is typically positioned above the cooling system, often above the box cooler in the sea chest, to act as the highest point of the circuit. This setup enables proper venting and easy visual monitoring of coolant levels.

NRF expansion tanks are designed for seamless integration with NRF box coolers and NRF shell-and-tube heat exchangers, giving customers a complete cooling package from a single trusted supplier.



NRF MARINE EXPANSION TANKS

As a trusted supplier of marine box coolers and shell-and-tube heat exchangers, NRF now completes its marine cooling portfolio with a dedicated line of marine-grade expansion tanks. Built to perform under harsh onboard conditions, our tanks are compatible with any freshwater-based closed-loop cooling system.

AVAILABLE TANK VOLUMES

✓	5 liters
✓	24 liters
✓	40 liters
✓	60 liters

These four capacity options provide flexibility to suit different vessel sizes, engine power ranges, and system layouts.

Each NRF marine expansion tank includes:

STANDARD FEATURES

✓	Mechanical level gauge for quick visual inspection
✓	Murphy level switch for automated alarm or shutdown integration
✓	Durable construction, suitable for marine environments
✓	Temperature rating: 95 - 100 degrees
✓	Maximum operating pressure: 0.5 - 1.5 bar
✓	Material: Steel
✓	Coating

For tailored solutions, contact NRF's Marine Division at marine@nrf.eu.

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