



# MYTEX

## CASE STUDY

Advanced Retrofit Solutions  
for Cruise Ship  
Wastewater Treatment

## Background

The maritime industry faces increasing pressure to improve wastewater treatment due to stricter regulations. Since June 1<sup>st</sup>, 2021, Resolution MEPC.227(64) by the International Maritime Organization (IMO) enforces tougher effluent standards for onboard sewage treatment in Baltic Sea special areas. Existing systems risk noncompliance if they fail to meet new approval criteria.

Key changes include stricter nitrogen and phosphorus discharge limits to reduce sea nitrification. Blackwater discharge in the Baltic Sea special area is now prohibited unless vessels use certified systems meeting effluent standards of less than 10mg/L nitrogen and 1.0mg/L phosphorus.

To comply with these standards, five cruise vessels required upgrades to their MBR (Membrane Bioreactor) systems. The existing systems failed to meet quality and durability needs, leading the operator to adopt an innovative retrofit solution with MYTEX membranes, ensuring regulatory compliance and improved operational efficiency.

## Challenges

- **Quality and Durability Issues:** The previous modules underperformed, leading to customer dissatisfaction.
- **Seamless Retrofit:** The new solution had to fit into the existing module frames to avoid costly modifications.
- **Operational Reliability:** The solution needed to provide long-term performance with minimal maintenance.

## Solutions

To meet these requirements, the existing MBR systems were retrofitted with MYTEX membranes. MYTEX membranes were validated as a reliable alternative that integrates seamlessly into the existing infrastructure without requiring extensive modifications.

### Key Features of the Retrofit:

- **Precision Fit:** MYTEX membrane blocks were customized designed to fit directly into the existing module frames, ensuring a smooth and cost-effective retrofit process.
- **Enhanced Handling:** The modular blocks can be easily managed by two individuals, eliminating the need for tank modifications.
- **Superior Longevity:** With a design optimized for durability, the system is expected to operate for five years without requiring tank access for maintenance.
- **Regulatory Compliance:** The retrofit ensures full compliance with IMO MARPOL MEPC.227(64) standards, a critical requirement for this cruise ship operations. With MYTEX we reached the following:

#### *Effluent Quality*

*Coliform Bacteria discharge is 100/100ml*

*TSS: 35mg/l, BOD: 25mg/l*

*COD: 125mg/l, pH: 6-8*

*Total Nitrogen: 20mg/l*

*Total Phosphors: 1.0mg/l*

## Implementation

The MYTEX RETROFIT was completed across five cruise ships in 2022 and 2023, with each vessel outfitted with 4,950m<sup>2</sup> of MYTEX membranes. The projects were executed seamlessly, leveraging the compatibility and performance reliability of MYTEX technology.

## Results

- ✓ **Improved Performance:** Enhanced treatment quality has resolved the prior issues faced by the operator.
- ✓ **Operational Efficiency:** Simplified maintenance and extended lifespan significantly reduce operational disruptions.
- ✓ **Cost Savings:** By utilizing the existing frames, the need for extensive structural modifications was eliminated.

## Conclusion

This MYTEX RETROFIT project underscores the adaptability and reliability of MYTEX membranes in meeting the unique challenges of cruise ship wastewater treatment. By combining technical innovation with precision engineering, the solution not only delivered superior performance but also aligned with the operator's cost and operational efficiency goals.

For more information about MYTEX membranes and RETROFIT solutions, please contact us.



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