



## Work package 3 – WBT systems concept approval

### Executive Summary

The onboard feasibility installation analysis of the different systems concerns the compliance with the existing rules and regulations and the respect of the ship design State of the Art.

The analysis has been performed following the scheme for ship equipment or installation Concept Approval of Bureau Veritas.

The concept approval provides a confirmation of the project technical feasibility considering both the current state of art and the applicable rules. These applicable rules may be either the Classification Society's rules or other appropriate regulation, in particular SOLAS and IMO requirements.

The works performed during the MARTOB project referring the Water Ballast Treatment systems allow to grant the systems with a Classification Society (Bureau Veritas) Concept Approval certificate. Within the Bureau Veritas, Marine Division, Concept Approval Scheme, **Design Concept Approval certificates** have been granted to all developed systems.

Only two systems have been tested full scale onboard a ship:

Water Ballast Treatment by High Temperature Thermal Treatment

Water Ballast Treatment by Biological De-oxygenation

The systems may obtain a Final Concept Approval without main difficulty. To obtain the Final Concept Approval, additional works and documents covering the points 9 to 15 of table 2 have to be submitted for review to the Classification Society.

One system has been installed on board a ship and is operated since 2003, but without biological efficiency measurements:

BenRad Ballast Water Treatment

The BenRad method may obtain a Final Concept Approval when additional works and documents covering the points 7 to 15 of table 2 will have been submitted for review to the Classification Society.

The other systems have been tested in laboratory and on-shore at large scale:

Water Ballast Treatment by UV

Water Ballast Treatment by US

Water Ballast Treatment by Ozone

Water Ballast Treatment by Oxicide method

The UV and US systems may not obtain a Final Concept Approval if used alone, but jointed together, except if future works demonstrate their biological efficiency alone.

The UV plus US, Ozone and Oxicide method may obtain a Final Concept Approval when additional works and documents covering the points 7 and 9 to 15 of table 2 will have been submitted for review to the Classification Society.