



## inTank – Brief System Description

The inTank™ BWTS utilizes liquid sodium hypochlorite (NaOCl) solution stored in bulk form and generated onboard via an electrochemical activation as the active substance to achieve the IMO Regulation D-2 ballast water discharge standard. It is effective in all water qualities, including fresh, brackish, and marine.

When a vessel uses the inTank™ BWTS, ballast water is taken up into ballast water tanks with no change to existing operating procedures, i.e. no treatment occurs during uptake. The inTank™ BWTS process occurs during the voyage, after uptake is completed – See Flow Diagram Below. Ballast water is pumped from one ballast water tank at a time, passed through the Dosing Module, and returned to the same ballast water tank through in-tank mixing nozzles. This circulation loop provides the means of applying and mixing oxidants contained in the NaOCl solution to the ballast tank to achieve target total residual oxidant (TRO) levels, enables monitoring of TRO levels inside the ballast water tanks, and is the method of applying and mixing a neutralizer solution prior to discharge. The following sub-sections detail the treatment process steps.

Treatment is initiated by the Treatment Module delivering a disinfectant to a ballast water tank through the Dosing Module until a pre-designated TRO is applied. After an initial hold time, the Dosing Module rechecks the TRO level in each tank, applying more disinfectant as required. This is repeated for all ballast tanks that require treatment. Prior to discharge, the Dosing Module checks the remaining residual oxidant level in the ballast tank and applies sodium thiosulfate (STS) to neutralize any remaining oxidant.

The inTank™ BWTS does not filter the ballast water, distinguishing it from most conventional in-line systems. To ensure consistent and successful inactivation of target organisms and pathogens, the concentration-time (CT) treatment approach is utilized. The in-tank recirculation capacity enables monitoring and re-dosing to meet the target combination of TRO dose and hold time. The ability to dose in-tank and re-dose as needed ensures effective treatment regardless of organic and inorganic loads (i.e., the oxidant demand) in the ballast water. In particular, the system is effective for treating organisms in sediment as the reapplication of disinfectant and in-tank mixing counteracts the ability of sediment to buffer chemical, which can otherwise result in low concentration areas within the ballast water tanks. Additionally, during the inTank™ treatment process, all associated ballast piping is treated.

## inTank – Flow Diagram

