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C2Po1E-06: Influence of the heat exchanger form and phase change for zero boil off tank

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The self-pressurization and pressure control in a zero boil off tank partially filled with liquid nitrogen is investigated numerically. This research analyzes the influence of phase change and forms of the heat exchanger for cryogenic liquid storage in zero boil of tank using numerical method. The phase change model in simulation comes from the Schrage equation which to describe the mass transfer that occurred in the tank and several different accommodation coefficients derived from the equation are used to simulate the case. Two kinds of different heat exchanger that conduct the refrigeration power in zero boil off tank are compared the effects in reducing thermal stratification and controlling the pressure. Results show that the accommodation coefficients in phase change model has a big influence on the cryogenic liquid storage in zero boil off tank and there exists a magnitude about 10^{-5} which is proper to describe the evaporation and condensation in the tank. Two kinds of heat exchanger can reduce the thermal stratification and the pressure but the one whose fin attach the inner wall of the tank is more effectively.

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