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## **Numerical study and analysis of the non-uniform temperature in a cryogenic fluid tank**

A numerical study was performed on the non-uniform temperature of a cryogenic fluid in a horizontal liquid hydrogen tank under the condition of heat leak using CFD technique. Since a liquid hydrogen tank is a cylinder placed horizontally with respect to the vertical direction, the horizontal direction of transfer and flow can be ignored. A two-dimensional model was chosen to avoid the huge amount of computation. Meanwhile, a VOF model was chosen to study the two-phase interface and UDF was used to calculate the hydrogen phase change. Based on these techniques, the distributions of temperature, velocity and pressure were predicted on certain work condition. The results show that a natural convection heat transfer boundary layer was exists in the tank and that thermal stratification appears in the liquid hydrogen, thus causing the pressure of the tank tp raise sharply.

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