

MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)  
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EXPERIMENTAL INVESTIGATION ON EFFECT OF PRESSURE AND MASS FLOW RATE ON  
CRYOGENIC LINE CHILL DOWN PROCESS**Abstract**

The chill down process of cryogenic fluid transfer line is an indispensable and well-handling needed process before the normal operation. In the most of previous research, the mass flow rate of cryogenic fluid is passively determined by the pressure and diameter of the transfer line. The effect of each of mass flow rate and pressure is not well understood by now. In this paper, the mass flow rate of cryogenic fluid and the system pressure are decoupled by controlling the valve opening at the exit of the test section. The main test section is a 7 m long, 12.7 mm outer diameter and 1.25 mm wall thickness stainless steel horizontal pipe. The heat transfer characteristics are analyzed for various experimental cases, and the effect of mass flow rate and pressure to the cryogenic line chill-down process is presented. **KEYWORDS:** Cryogenic fluid; Line chill-down; Two-phase flow; Mass flow rate; Pressure; Heat transfer characteristics.