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## **C4Or1B-02: Comparison of liquefaction testing with liquid nitrogen and liquid oxygen**

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Liquid nitrogen is often used as a substitute for oxygen testing due to safety concerns, and the general similarity between their fluid properties. During the Cryogenic Fluid In-situ Liquefaction for Landers (CryoFILL) testing, an opportunity arose to compare liquid nitrogen and liquid oxygen behavior using the same test hardware in similar test conditions. Comparative testing would verify whether the system response to nitrogen and oxygen would behave in a similar manner. Tests that were investigated include system boil-off heat load determination, autogenous pressurization, cryocooler loop initiation, and cryocooler loop operations. Results from testing are shown and compared to verify that liquid nitrogen and liquid oxygen tests yield similar system responses, and that nitrogen can be used as a substitute for oxygen in developmental tests at cryogenic temperatures.

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