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 Proposal Number X3.04-9372

Identification and Significance of Innovation

- Goal: Reduce use of consumables and conserve water
- Water vapor exchanger enables use of regenerable CO₂ absorber without venting excessive water
- Membrane water vapor exchanger (WVX) places no additional burden on thermal control system

Phase I Proof of Feasibility

- Developed fabrication methods for efficient WVX
- Designed and built a proof-of-concept WVX
- Demonstrated high water recovery efficiency (90%)
- Demonstrated very low pressure losses
- Demonstrated very low CO₂ permeation rate

Expected TRL at the end of Phase II: 6

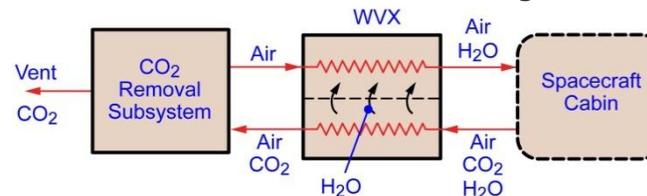
Phase II Technical Objectives

- At least 90% water recovery efficiency
- Very low pressure drop, compact, and lightweight
- Design for optimal performance with regenerable CO₂ absorbers

Phase II Work Plan

- Scale up and optimize design
- Build a prototype core
- Measure performance in separate effects tests
- Demonstrate operation with CO₂ absorber
- Demonstrate durability

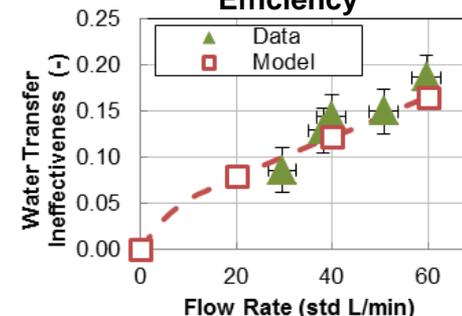
The WVX Prevents Water From Venting with CO₂



Proof-of-Concept WVX Built in Phase I



Demonstrated High Efficiency



NASA and Non-NASA Applications

- Creare's WVX offers very high average water flux through membranes and very low pressure drop
- NASA application: Environmental control and life support systems on future manned exploration spacecraft
- NASA application: Advanced life support systems for International Space Station
- Non-NASA application: Recuperative cathode air humidifiers for fuel cell power systems

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