

DRAFT – ICES 2013 Abstract

Performance of a Water Recirculation Loop Maintenance Device and Process for the Advanced Spacesuit Water Membrane Evaporator

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A water loop maintenance device and process to maintain the water quality of the Advanced Spacesuit Water Membrane Evaporation (SWME) water recirculation loop has been undergoing a performance evaluation. The SWME is a heat rejection device under development at the NASA Johnson Space Center to perform thermal control for advanced spacesuits. One advantage to this technology is the potential for a significantly greater degree of tolerance to contamination when compared to the existing Sublimator technology. The driver for the water recirculation maintenance device and process is to further enhance this advantage through the leveraging of fluid loop management lessons-learned from the International Space Station (ISS). A bed design that was developed for a Hamilton Sundstrand military application, and considered for a potential ISS application with the Urine Processor Assembly, provides a low pressure drop means for water maintenance in a recirculation loop. The bed design is coupled with high capacity ion exchange resins, organic adsorbents, and a cyclic methodology developed for the Extravehicular Mobility Unit (EMU) Transport Water loop. The maintenance process further leverages a sorbent developed for ISS that introduces a biocide in a microgravity-compatible manner for the Internal Active Thermal Control System (IATCS). The leveraging of these water maintenance technologies to the SWME recirculation loop is a unique demonstration of applying the valuable lessons learned on the ISS to the next generation of manned spaceflight Environmental Control and Life Support System (ECLSS) hardware.