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COMPARATIVE ANALYSIS OF WATER RECOVERY TECHNOLOGIES FOR LIFE SUPPORT SYSTEMS FOR DEEP SPACE MISSIONS

Abstract

Various methods of water recovery for the life support system for deep space missions are analyzed. It is shown that the use of membrane technologies does not allow achieving the desired results both in terms of the level of water recovery and energy consumption. The advantages and disadvantages of the centrifugal distiller installed on the ISS are analyzed. Its water recovery is only 85%, which does not allow the use of this system for deep space missions. The experimental results of the centrifugal multiple effect distiller study are shown. It is able to recover 92% of the water from the solution without any deposits on the heat transfer surface; the specific power consumption varies from 90 to 160 Whr/kg in a 3-stage distiller and from 70 to 120 Whr/kg in a 5-stage distiller. The technologies that allow extracting water from the obtained brine up to 99% are reviewed.