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UPGRADE THE CENTRIFUGAL MULTIPLE-EFFECT DISTILLER FOR DEEP SPACE MISSIONS

Abstract

Potable water supply is one of the main tasks for ISS and future deep space missions. Centrifugal Multiple-Effect Distiller (CMED) (also known as CDS) designed and manufactured for Honeywell in 2002-2007. It is one of the best modern technologies for water recovery. CDS with 5 stages produces 6 liters per hour, recovery 93%. For example, VCD works on the ISS and has recovery 85%. For future deep space missions, the presence of 7...15% brine is a big drawback. In order to reduce the amount of liquid waste, different brine concentration systems have been developed in recent years. The paper provides a description and test results of a new single-stage flash boiling centrifugal distiller (CFD), in which evaporation occurs in the volume (without evaporative surface). This greatly simplifies the process and allows preventing deposits and significantly increasing the water recovery (up to 97%).