

CIL
EMU CRITICAL ITEMS LIST

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ANALYST:

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
BACTERIA FILTER CARTRIDGE, ITEM 423 (1) DRAIN FILTER, (1) FILL FILTER (2 PER SCU) ----- SV784967-1	2/1R	423FMD2: Bacteria growth through drain line filter. CAUSE: Failure to replace cartridge on schedule, contamination of the iodine coated resin beads; channeling due to a failure of the preload spring, internal water bypass leakage around the cartridge seat.	END ITEM: Possible back growth of bacteria and algae from the waste water storage tank into the PLSS. EPE INTERFACE: Possible growth and clogging of PLSS water line components (water filters and sublimator porous plates). MISSION: Possible loss of EMU cooling capability and humidity removal capability. Terminate EVA for helmet fogging. CREW/VEHICLE: None for single failure. Possible loss of crewman with loss of SOP.	A. Design - The filter cartridge is packed with iodine impregnated beads to prevent bacteria migration into the Life Support System (LSS). These cartridges are replaced every 12 EVAs. To prevent internal bypass leakage, the cartridge seals are redundant with the area between the seals filled with a bifluoride. The cartridge preload springs are installed at a low stress level and have high cycle life capability (5 x 10 + 6 cycles to installed height and 10 + 5 solid height cycles). The bacteria filter cartridges are constructed from corrosion resistant materials (polypropylene, KEL-F, and Fluortex ETFE or FEP teflon). The filter system is constructed from corrosion resistant materials with the water in contact with stainless steel; polypropylene, and titanium. The viton seals have a minimum squeeze of 0.012 in. against 32 microinch sealing surfaces. B. Test - Component: Proper iodine bead packing is verified by flow vs. delta P testing at vendor. Certification: A cartridge was subjected to 15 years worth (515 pounds) of bacteria containing water (spec challenge solution) during 5/84. Throughout the test, the organism killing capability of the cartridge remained within specification requirements. Since that time, Engineering Changes 42806-688 and -992 have been incorporated to extend the limited life of this item from 6 EVAs to 12 EVAs (140lbs) and were certified based upon actual flight usage/delta P data. No detectable delta P rise with filter use has been recorded. Checkout: The cartridges are replaced every 12 or fewer EVAs. C. Inspection - Verification of proper iodine and quantity is accomplished

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	2/1R	423FM02:		<p>during filter packing at vendor. The cleanliness of the filter is maintained to level EN150 per SWS 3150 and the filter retained in water from the time it is originally packed.</p> <p>The preload spring is 100% inspected for meeting dimensional and force-displacement requirements.</p> <p>There are two radial (viton) seals (per cartridge) which prevent internal leakage past the filter. Both interfacing surfaces are 100% inspected to meet dimensional and surface finish requirements.</p> <p>Both o-seals are 100% inspected to meet dimensional and surface finish requirements.</p> <p>D. Failure History - None.</p> <p>E. Ground Turnaround - None between flights. However, the bacteria filter is changed out after twelve EVA's. This requirement is identified in ONRSD 462 and SEMU-47-001.</p> <p>F. Operational Use - Crew Response - Pre/PostEVA: Trouble shoot problem, if no success consider use of third EMU if available. Otherwise, EMU go for EVA prep without fan for SCU standby. EVA: If cooling is insufficient, terminate EVA. Use purge valve cooling. Special Training - Standard EMU training covers this failure mode. Operational Considerations - EMU water tanks are nominally charged from orbiter water tank C which has its own bacteria filtration. Flight rules define go/no go criteria related to EMU thermal control. EVA checklist procedures verify hardware integrity and systems operational status prior to EVA.</p>