

CIL
EMU CRITICAL ITEMS LIST

12/26/91 SUPERSEDES 10/31/90

ANALYST:

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NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
BACTERIA FILTER, ITEM 416 ----- SV767709-14 (1)	2/2	416FN01A: External leakage, potable water, EMU attached. CAUSE: Failure of seal.	EMU IREN: Water leakage to ambient. GFE INTERFACE: Depletion of EMU water reservoir. MISSION: Unable to use EMU during airlock activity. CREW/VEHICLE: Possible crew discomfort (hot).	A. Design - face-type silicone and (viton) radial o-seals are designed to prevent external leakage. O-rings are made from elastomeric material. Surface finish and seal configuration provide seal squeeze under all loading conditions. Minimum seal squeeze for the face seal is 0.008 in. and for the radial seals, the minimum squeeze is 0.007 in. Straight through bolt hole design for covers and fittings provides centering of the radial o-seals, while the self locking fasteners assure continuous metal-to-metal contact at the face seal for constant squeeze. B. Test - Component In-Process - The filter assembly is tested for external leakage per SV767709-14 operations sheets operation 100 by pressurizing it to 30-41 psig with water. While the filter is pressurized it is examined for evidence of leakage for a period of minutes. No leakage allowed. PDA - The bacteria filter (housing and seals) integrity is tested in EMU-60-085. The filter assembly undergoes a proof test in which the filter is pressurized to 60-64 psig for 5 minutes minimum. Next, the filter is leak tested by pressurizing it to 30-41 psig with water. While the filter is pressurized, it is examined for evidence of leakage for a period of 60 minutes. No leakage is allowed. Certification - The item completed leakage testing to 25 psig, proof pressure testing to 34.5 psig, and was analyzed for its acceptability to burst pressure (46 psig) during 1/82. The following engineering changes have been incorporated and certified since that time: 42806-242 and 202-1 (revised SCU potable water max. op. press. to 40 psig, proof press. to 60 psig and burst press. to 80 psig); 42806-454 (weight update); and 42806-691 (eliminate loosening of SCU multiple coverwater set screws). C. Inspection - There are eight radial seals and one face seal that prevent external leakage. All nine interfacing surfaces are 100%

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	2/2	416FH01A:		<p>Inspected to meet dimensional and surface finish requirements. All o-rings are 100% inspected to meet dimensional and surface finish requirements. At final inspection, the filter assembly is examined for evidence of damage.</p> <p>D. Failure History - 0-EMU-400-400 (3/13/89) External water leakage occurred from the Item 416 Backflow Filter test ports 3PQ and 1PR caused by corrosion/pitting on the test port plug sealing surfaces. The stainless steel test port became corroded because of the water and iodine from the iodine impregnated epoxy beads used in the filter cartridge. No corrective action was taken.</p> <p>E. Ground Turnaround - Tested per FEMU-R-001, V1103-02 EMU to Orbiter Checkout.</p> <p>F. Operational Use - Eva Response - Pre/PostEVA: Troubleshoot problem. If no success, isolate leak by discontinuing use of SCW and closing airlock panel water supply valve. Operate EMU on battery power. Consider sharing other SCU for cooling and O2 if battery constraints permit. Consider in-flight battery swap using spare battery(s). Special Training - Standard EMU training covers this failure mode. Operational Considerations - At least one spare EMU battery is manifested for each flight. EVA checklist procedures verify hardware integrity and systems operational status prior to EVA.</p>