

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
WATER SHUTOFF VALVE, ITEM 137 ----- SV767660-10 (1)	2/2	137FM02A Fails open.  Electrical open in the solenoid coil or electrical connector; poppet jams due to contamination; spring fractures; failure of electronic switch (diode resistor, or transistor opens or shorts).	END ITEM: Unable to place the sublimator "off-line" at the end of the EVA mission or shut off feedwater supply during EVA.  GFE INTERFACE: Water leakage to ambient through sublimator.  MISSION: Loss of EMU.  CREW/VEHICLE: None.  TIME TO EFFECT /ACTIONS: Minutes.  TIME AVAILABLE: N/A  TIME REQUIRED: N/A  REDUNDANCY SCREENS: A-N/A B-N/A C-N/A	A. Design - The valve seat is protected by a 140 micron nominal inlet filter. Spring is low stressed, has infinite life at small stroke of valve. The electronics drive module is fabricated using "S" level reliability passive components and JANTXV level semi-conductors.  B. Test - Vendor Acceptance Test (Kaiser-Eckel Valve Co.) - Performance testing per Vendor Acceptance Procedures will detect electrical open circuits and any failure to components of the electrical switch by failure to meet the voltage stabilization, response, or current draw requirements. Jamming of the poppet and/or spring fracture would be noted during leakage tests per Vendor Acceptance Tests.  PDA Test - A combined water circuits leakage test is run per SEMU-60-010. In this test the water circuits are pressurized to 15.7-15.9 psig with water for 60 minutes minimum. Leakage must not exceed 6 scc/hr.  Certification Test - Certified for a useful life of 20 years (ref. EMUM-1030).  C. Inspection - Poppet jams open due to contamination. A cleanliness level of HS3150 EM150 is maintained during assembly and testing of the valve. A 140 micron filter is located at both the valve inlet and outlet to protect the valve from contamination.  Electrical related failures. All external lead wires associated with the item are inspected during source inspection and again during PLSS assembly.  Fractured spring. A vendor acceptance test for performance will detect a failure of this nature.  D. Failure History - EMU-137-D002 (1/18/79) Unable to actuate valve to closed position due to contamination. Procedure for lubricating the external "O" seals revised, as well as cleaning and drying operations.  EMU-137-C001 (3/10/79) Cause and corrective action are the same as EMU-137-D002.  EMU-137-C002 (3/10/79) Cause and corrective action the same as EMU-137-D002.  B-EMU-137-A001 (8/10/92) - Item 137, Shut off valve failed open when the feedwater valve switch was off. The failure could not be reproduced. No corrective action taken.  B-EMU-137-A002 (7/23/00) - Numerous water droplets found around Sublimator and

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		137FM02A		<p>Porous Plate while performing item #135 Valve relief and reset check &amp; 132 A 7 B calibration procedure P528/SEMU-636/Y, Step 2.1. Discrepancy exists against the #137 Feedwater shutoff valve. Supplier (Kaiser) manufacturing process introduced contaminants. Corrective actions previously implemented (ref. H-EMU-137-D006) against Kaiser after manufacture of this valve.</p> <p>E. Ground Turnaround - Tested for non-EET processing per FEMU-R-001, Water Servicing, Leakage and Gas Removal. None for EET processing.</p> <p>F. Operational Use - Crew Response Pre/Post EVA: When detected perform water dump of feedwater tanks. Consider using third EMU, if available. EMU is go for SCU ops. EVA: No response, single failure undetectable by crew or ground. Training Standard EMU training covers this failure mode. Operational Considerations - 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. Real Time Data System allows ground monitoring of EMU systems.</p>

EXTRAVEHICULAR MOBILITY UNIT  
SYSTEMS SAFETY REVIEW PANEL REVIEW  
FOR THE  
I-137 FEEDWATER SHUTOFF VALVE  
CRITICAL ITEM LIST (CIL)

EMU CONTRACT NO. NAS 9-97150

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