NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
		137FM04		
WATER SHUTOFF VALVE, ITEM 137 --- SV767660-10 (1)	2/2	Internal water leakage. Seat contamination, housing seal leakage.	END ITEM: Water leakage to ambient through the sublimator (140). GFE INTERFACE: Depletion of the water reservoir. MISSION: Loss of use of one EMU. CREW/VEHICLE: None. TIME TO EFFECT /ACTIONS: Minutes. Discontinue use of EMU. TIME AVAILABLE: Minutes. TIME REQUIRED: Seconds. REDUNDANCY SCREENS: A-N/A B-N/A C-N/A	A. Design - The Item 137 is protected by a 38 micron filter upstream of the Item 136, and its own 140 micron filter. In addition, an elastomeric seal minimizes the sensitivity to contamination. Internal leakage is prevented by two static face seals and one static radial seal. O-seal configuration and rigidness of assembly provide squeeze under all load conditions. B. Test - Vendor Acceptance Test (Kaiser-Eckel Valve Co.) - Internal leakage is tested with 47 psig applied at the inlet and no bubbles allowed in 5 minutes. 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 - Seat Contamination. A 140 micron filter is located at both the valve inlet and outlet to protect the valve from contamination. Housing seal leakage. O-ring grooves are 100% inspected per drawing dimensions and surface. O-rings are inspected for surface characteristics per SVHS 3432; 100% for class I & II, and at least 1.5 AQL for class III. D. Failure History - J-EMU-137--001 (1-27-83) Internal leakage in OFF position due to contamination on seat. Corrective Action: a 150 micron inlet filter screen was added. J-EMU-137-002 (6-18-84) Internal leakage occurred with the feedwater switch in OFF position. This was due to contamination of the valve by materials not indigenous to the PLSS. Corrective Action: a 140 micron filter was incorporated to protect the valve. B-EMU-137-D005 (3/14/95) - Two feedwater shutoff valves exhibited seat leakage beyond spec during acceptance testing, leaking two bubbles each vs. spec of no bubbles for 5 minutes. Investigation concluded that the valves were tested immediately following the 100 cycle open/close test and had not stabilized to room temperature. Two hour temp stabiliztion period has been implemented prior to leakage test. B-EMU-137-D006 (6/24/99) - Feedwater shutoff Valves S/N 027 & S/N 028 failed Internal Leakage Test at Kaiser Fluid Technologies (KTF) per ATP33501 para. 9.2. Spec: No bubbles at 47 +/- 3 psid N2 while submerged for 5 minutes minimum. Act: 3 bubbles in 2.5 minutes and 2 bubbles in 2.5 minutes, respectively. Contaminants, caused by detail part materials used in construction of the valves, prevented valve

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		137FM04		poppets from seating properly. KFT manufacturing outlines for item 137 and 171 valves were revised to remove/prevent contamination during valve assembly. E. Ground Turnaround - Tested for non-EET processing per FEMU-R-001, Water Servicing, Leakage and Gas Removal. FEMU-R-001 Para 8.2 EMU Preflight KSC Checkout for EET processing. F. Operational Use - Crew Response - Pre EVA: Troubleshoot problem. If no success, consider EMU3 if available. EMU go for SCU ops. Post EVA: When detected perform water dump of feedwater tanks. Training - Standard EMU training covers this failure mode. Operational Considerations - EVA checklist procedures verify hardware integrity and systems operational status prior to EVA.

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

Prepared by: _____ 3/27/02
HS - Project Engineering

Approved by: _____
NASA - S&MA/SSM

_____
HS - Reliability

_____
NASA - EMU/SSM

_____
HS - Engineering Manager

_____
NASA - S & MA

_____
NASA - MOD

_____
NASA - Crew

_____
NASA - Program Manager