

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
POROUS PLATE SUBLIMATOR, ITEM 140 ----- SV783850-24 (1) OR ----- SV805279-5 (1)	2/1R	140FM07A External leakage, coolant. Failure, seal bypass leakage.	END ITEM: Water leakage to ambient. GFE INTERFACE: Depletion of the water reservoir. MISSION: Terminate EVA when the water supply drops below CWS limits. CREW/VEHICLE: None for single failure. Possible loss of crewman with loss of SOP. TIME TO EFFECT /ACTIONS: Minutes. If there is insufficient cooling water remaining to permit return, activate the SOP by opening the purge valve. TIME AVAILABLE: Minutes. TIME REQUIRED: Seconds. REDUNDANCY SCREENS: A-PASS	A. Design - External leakage is prevented by elastomeric 0-ring seals. One 0-ring seal is made of silicone and the other is made of fluorosilicone. The 0-ring design dimensions and rigidity of assembly provide 0-ring squeeze under all load conditions. The temperature and pressure are not extreme (32 deg. F to 120 deg. F and 28.1 psid maximum). B. Test - Component Acceptance Test - A leakage test is performed on the coolant loop per AT-E-140-2. With the coolant loop pressurized to 28.1 - 29.1 psig leakage is observed for 60 minutes minimum and must not exceed 3 scc/hr. 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 25 years (ref. EMUM1-0243, EMUM1-1269). This component (Item 140) is certified for the coolant loop proof pressure of 42.2 psid because the calculated safety factor for yield is 15.1 (for bulging of the coolant loop plates) at the 28.1 psid maximum operating pressure. C. Inspection - 0-ring grooves are 100% inspected per drawing dimensions and 32 finish. 0-rings are inspected for surface characteristics per SVHS3432; 100% for Class I and II 0-rings, and at least 1.5 AQL for Class III. D. Failure History - J-EMU-140-A001 (8-23-82) - Leakage between sublimator and valve module which was caused by bent alignment pins causing misalignment of the sublimator to the valve module. Corrective action changed the pin material from aluminum to stainless steel and also the receptable diameter was increased to make mating easier. H-EMU-100-A004 (12-8-80) - Water leak at sublimator valve module interface caused by a rough coating surface and protruding dowel pin. Corrective action was a change to the procedure for local touch up coatings. EMU-140-A001 (12-21-79) - External water leakage caused by twisted 0-rings. Corrective action was a change to assembly procedure requiring lubrication of the fluorosilicone 0-ring with Braycote 601 before assembly. H-EMU-140-D017 (7-29-86) - External coolant leakage caused by pitted p.d. george coating on bore i.d. of main sublimator core. corrective action was to add a special examination of the coated surface critical areas. Also an in-process coolant leakage test was added. H-EMU-140--002 (11/04/94) - Supplemental Sublimator S/N 019 became debonded from main sublimator core due to a contaminated bond surface by an unidentified "oil-like" substance. Drawing bonding requirements have been clarified. Op sheets

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		140FM07A	B-PASS C-PASS	will be revised to add a step to abrade surfaces prior to bonding. E. Ground Turnaround - Tested for non-EET processing per FEMU-R-001, Water Servicing, Leakage and Gas Removal. None for EET processing. F. Operational Use - Crew Response - EVA: When CWS data confirms depletion on primary water, terminate EVA. Training - Crewman are trained for one man EVA scenario. Operational Considerations - Flight rules define go/no go criteria related to EMU thermal control. EVA checklist and FDF procedures verify hardware integrity and systems operational status prior to EVA. Real Time Data System allows ground monitoring for EMU systems.

EXTRAVEHICULAR MOBILITY UNIT
SYSTEMS SAFETY REVIEW PANEL REVIEW
FOR THE
I-140 SUBLIMATOR
CRITICAL ITEM LIST (CIL)

EMU CONTRACT NO. NAS 9-97150

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