

12/24/94 SUPERSEDES 12/24/92

ANALYST:

NAME P/N QTY	CRI1	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
<p>POROUS PLATE SUBLIMATOR, ITEM 140 ----- SV783850-20 (1)</p> <p>----- Z OR SV805279-3 (1)</p>	2/1R	<p>140FM02: Restricted flow, sublimator clogs.</p> <p>CAUSE: Contamination in feedwater.</p>	<p>END ITEM: Blockage of water flow path to vacuum through porous plate.</p> <p>QFE INTERFACE: Degradation in heat rejection capability. Increase in coolant temperature and vent flow despoint. Possible helmet fogging.</p> <p>MISSION: Terminate EVA.</p> <p>CREW/VEHICLE: None for single failure. Possible loss of crewman with loss of SOP.</p>	<p>A. Design - The sublimator feedwater circuit is protected from contamination by the Item 136 inlet filter (30 micron, nominal) and the Item 137 inlet filter (140 micron, nominal). The water tanks are drained and refilled just prior to flight to prevent water contamination levels from increasing due to bladder leachants. The porous plates are made of stainless steel to minimize corrosion and the design allows easy removal to facilitate cleaning or replacement of porous plates.</p> <p>B. Test - Test: Component Acceptance Test - All rig lines and test fixtures used during testing per AF-E-140-2 are cleaned to NS 3150 EN150 to prevent them from contaminating the sublimator. Performance test ensures that the sublimator is not clogged. The heat transfer coefficient must be a minimum of 120 Btu/Hr F.</p> <p>PDA Test - None.</p> <p>Certification Test - The item was performance tested during 8/85 with water containing 30 ppm contamination. The performance remained within specification. The following engineering changes have been incorporated and certified: 42803-555, (incorporated Increased Capacity Sublimator), 42806-277 (expanded Porous Plate Flow Range), 42806-287 (added Koropan/Polyurethans to prevent corrosion), 42806-306 (incorporated a revised Screw/Washer Configuration), 42806-361 (modified Porous Plate Flow Requirement), 42806-801-1 (replaced Naylor skin with Kaptan skin).</p> <p>C. Inspection - The internal circuits of the sublimator are verified clean per NS3150 EN150. The Kaptan skin position is verified during assembly and post assembly inspection operations.</p>

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	2/1R	1409R02:		

D. Failure History -

EMU-140-0001 (9/14/79) -

Low Cooling was caused by contamination; the porous plate was partially plugged. As a corrective action the porous plate was cleaned and EC 42882-630 was incorporated to minimize corrosion by the application of additional protective coatings.

M-EMU-100-0025 (8/15/80) -

The porous plate was contaminated with aluminum oxide from the PLSS valve module resulting in high outlet dewpoint. Corrective action: Incorporated coating improvements to minimize corrosion.

J-EMU-160-0001 (9/8/80) -

Low cooling due to contaminated porous plate by LCVC leachant and oil from TMG. Corrective Action: Replaced tygon tubing with EVA (Ethylene Vinyl Acetate) and outgassed the TMG.

J-EMU-000-001 (10/22/80) -

Sublimator performance low caused by phthalate ester from LCVC and oil outgassed from foam under antenna. Corrective Action: Limited LCVC charge line and replaced foam under antenna with runax.

J-EMU-100-012 (1/21/83), J-EMU-100-013 (11/3/83) -

Inadequate sublimator cooling caused by clogged porous plates. Corrective Action: Not to use porous plates with low flow rates and to refill the water tanks prior to flight.

E. Ground Turnaround -

Tested per FEMU-R-001 Chamber run verifies the performance of the sublimator. The porous plates are changed during Ground Turnaround.

F. Operational Use -

Crew Response -

EVA: If cooling insufficient or helmet fogging occurs, terminate EVA. Open helmet purge vlv to anti-fog helmet if required.

Training -

Crewmen are trained for one man EVA scenario.

CIR
 EMU CRITICAL ITEMS LIST

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	2/1R	140PM02:		Operational Considerations - Flight rules define go/no go criteria related to EMU thermal control. Flight rules define EMU go to remain on SCU (available for rescue if required). EVA checklist and FDP procedures verify hardware integrity and systems operational status prior to EVA. Real Time Data System allows ground monitoring of EMU systems.