

CIL
EMU CRITICAL ITEMS LIST

Page: 1
Date: 12/02/93

12/24/93 SUPERSEDES 12/24/91

ANALYST:

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
COOLING WATER LINES, ITEM 412B, 412C SV771722-T (1)	2/2	412BFD01: External leakage, cooling water, EMU attached. CAUSE: Failure of hose, or hose fitting seal failure.	END ITEM: Water leakage to ambient. GPE INTERFACE: Depletion of EMU cooling water. MISSION: Unable to use one EMU during airtack activity. CREW/VEHICLE: Possible crew discomfort (hot).	A. Design - The hose fittings are progressive swaged design, fabricated of stainless steel type 304 and 17-4 PH. The hose inner core material is convoluted polytetrafluoroethylene (TFE Teflon) laminated to woven glass cloth. The hose reinforcement is high temperature Nomex nylon braid. The hose is rated for 200 psi operating pressure, compared to the 40 psi operating pressure requirement for this item. The Nomex reinforcement provides abrasion resistance as well as giving support to the inner core. The hose fittings are a vendor patented design using threads per MIL-B-8879. The internal threads are dry film lubricated (Everlube #820A) and assembly torque for the fittings is controlled to 15-25 lbs. The hose fitting seal is a metal lip seal. Sealing is provided by surface finish control and the preload provided by the lip seal. B. Test - Component Acceptance: This hose/fitting is subjected to a proof pressurization of 48 psig and then a leakage test at 32 psig during which no visible water leakage is allowed. Max operating pressure is 23 psig. PDR: The cooling water lines integrity is tested in SEMU-60-005. The water line undergoes a proof test in which the lines are pressurized to 33.5-35.5 psig for 5 minutes minimum. Next, the hoses are leak tested by pressurizing the lines to 21.5 - 24.5 psig with water. While the hoses are pressurized, they are examined for evidence of leakage for a period of 60 minutes. No leakage is allowed. Certification: The item completed leakage testing to 23 psig, proof pressure testing to 36.5 psig, and was analyzed for its acceptability to burst pressure (46psig) during 1/82. The following engineering changes have been incorporated and certified since that time: 42806-202 and 202-1 (revised SCU potable water max. op. press. to 40 psig, proof press. to 60 psig and burst press. to 80 psig); 42806-45 (weight update); and 42806-691 (eliminate loosening of SCU multiple connector

12/24/93 SUPERSEDES 12/24/91

ANALYST:

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
	2/2	412BFMU:		act screws).

C. Inspection -

At receiving inspection, the fitting seal surfaces and the external hose surfaces are visually inspected. At final inspection after PDA test the hose (assembled to SCU at this point) is examined for damage to the external surface.

B. Failure History -

J-EMU-400-001 (1/6/81) hose punctured during assembly. Caution note added to procedure.
 H-EMU-412-A001 (6/28/83) Hose overstressed due to mishandling resulted in external leakage - operation sheets revised to require double wrenching of hose connections.

E. Ground Turnaround -

Tested per FERU-2-001, V1103-02 EMU Checkout In Orbiter.

F. Operational Use -

Crew Response -

Pre/PostEVA: Troubleshoot problem. If no success, discontinue use of SCU. Operate EMU on battery power. Consider sharing other SCU for cooling and O2 if battery constraints permit. Consider in-suit 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.