

CIL
EMU CRITICAL ITEMS LIST

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12/24/94 SUPERSEDES 12/24/92

ANALYST:

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
CO2 TRANSDUCER, ITEM 122 ----- SV76779B-3 (1) OR ----- Y SV809145-1 (1) OR IR CO2 TRANSDUCER, ----- Z SV809286-4 (1)	2/IR	T22FR05: External leakage, gas. CAUSE: Piece part failure of O-seal between transducer and PLSS.	EMO ITEM: Suit gas leakage to ambient. GFE INTERFACE: Excessive consumption of the primary oxygen supply. The SOP is automatically activated during EVA if the suit pressure drops to 3.33 psid. MISSION: Terminate EVA. Loss of use of one EMU. CREW/VEHICLE: None for single failure. Possible loss of crewman with loss of SOP.	A. Design - P/N's SV76779B/SV809145; The external leak path is through a radial type O-seal. The O-ring design dimensions and rigidity of assembly provide O-ring squeeze under all conditions. The temperatures and pressures are not extreme, (32 degrees F to 120 degrees F and 5.3 psid). The O-seal material is a fluorocarbon elastomer rubber per MIL-R-83248, Class I, Type I. P/N SV809286: The external leak path is through 8 radial type and 3 face type O-seals. The O-ring design dimensions and rigidity of assembly provide O-ring squeeze under all conditions. The temperatures and pressures are not extreme, (32 degrees F to 120 degrees F and 8.8 psid). The O-seal material is a fluorocarbon (viton) elastomer rubber per MIL-R-83248, Class I, Type I. B. Test - P/N's SV76779B/SV809145: Component Acceptance Test - Leakage is not checked during acceptance testing. External leakage is not applicable at the component level. PDA Test - A leakage check is run per SEMU-60-B18 which pressurized the vent loop to 4.3 psig and the leakage rate measured. This rate shall be less than 4.6 cc O2/min. This insures there is no gross leakage at the sensor mounting interface. Certification Test - The item completed the 15 year structural vibration and shock certification requirement during 10/83. Class I engineering changes 42806-120 (revised partial pressure requirement), 42806-168 (new sensor cover), 42806-192 (new filter), 42806-264-1 (revised output graph), and 42806-292 (calibration test change) have been incorporated and certified by analysis/similarity since this configuration was certified. P/N SV809286: Component Acceptance Test - The transducer is proof pressure tested at 13.0+/-2 psi then, with the transducer sensing cell circuit pressurized

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	2/1R	122FN051		<p>to 0.8-0.6 psid nitrogen, the leakage rate shall not exceed 10 cc/hr.</p> <p>PDA Test - A leakage check will be run per SEMU-60-010 which pressurizes the vent loop to 4.3 psig and the leakage rate will be measured. This rate shall be less than 4.6 cc O2/min. This will insure that there is no gross leakage at the sensor mounting interface.</p> <p>Certification Test - The item completed the 15 year structural vibration and shock certification requirement during 11/94.</p> <p>C. Inspection - P/N's 54767798/54809145: The sensor is dimensionally and visually inspected to see that it meets B/P requirements. This insures that the O-ring groove and surfaces will be capable of maintaining the O-seal without leakage. The O-seals are screened for surface characteristics per SVHS3452, Class III to insure there are no defects which would cause a leakage path.</p> <p>P/N 54809286: The transducer O-ring grooves and surface finishes are inspected to B/P requirements. This ensures that the O-ring grooves and surfaces will be capable of maintaining the O-seal without leakage. The O-seals are screened for surface characteristics per SVHS3452, Class III to ensure there are no defects which might cause a leakage path.</p> <p>D. Failure History - P/N 54767798 J-EMU-122-M001 (4-10-80) A leak was found in the item 122 mounting flange during PLSS acceptance testing. The cause of failure was determined to be a defective O-seal at the sealing surface. No corrective action other than O-seal replacement was taken.</p> <p>P/N 54809145: None.</p> <p>P/N 54809286: None.</p>

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	Z/R	122FN05:		<p>E. Ground Turnaround - P/R's SV767798/SV809145/SV809286: Leakage is tested during Ground Turnaround per FEMU-R-001, para. 7.3.3.2.1.1, Gas Structural and Leakage.</p> <p>F. Operational Use - P/M's SV767798/SV809145/SV809286: Crew Response - PreEVA: When detected during leak check, trouble shoot problem, if no success consider EMU 3 is available. EMU no go for EVA. EVA: When CMS data confirms an accelerated primary O2 use rate, terminate EVA. Training - Standard EMU training covers this mode. Operational Considerations - Flight rules define go/no go criteria related to EMU suit pressure integrity. Consider periodic vacuum O2 recharge to recover EMU operation. Flight rules define require EVA termination when minimum primary consumables remain. EVA checklist procedures verify hardware integrity and systems operational status prior to EVA. Real Time Data System allows ground monitoring of EMU systems.</p>