

CIL
EMU CRITICAL ITEMS LIST

12/24/91 SUPERSEDES DB/31/90

ANALYST:

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Date: 12/02/91

NAME P/W QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
HIGH PRESSURE GILL CONNECTION ITEM 213F, AND TPB SA/99042-3 (1)	1/1	213FFR04A: External gas leakage. CAUSE: Failure of seal; cap sealing surface damaged.	END ITEM: Leakage of emergency O2 supply to ambient. OFE INTERFACE: Premature depletion of SOP. MISSION: Abort EVA. CREW/VEHICLE: Possible loss of crewman with excessive leakage.	A. Design - Cap is soft silver/gold alloy and is non-reactive. Seal has teflon back up ring on one side and delta kal-F back-up ring on the other. A metal interface is located downstream, the O-ring dimensions and the rigidity of the parts provide squeeze under all load conditions. The sealing area is a sapphire ball on a Vespel seat. B. Test - Vendor Component Acceptance Test - The regulator manufacturer, CIT, performs an external leakage test to assure seal integrity. POA tests - The item is external leakage tested on the secondary oxygen package (SOP). The SOP bottles are pressurized to 5000-6200 psig with a 2% O ₂ and 98% O ₂ mixture. The fill valve, the Test Port valve, and the Test Port are capped with the appropriate flight cap and torqued to 30-40 in-lbs. The item is tested in chamber vacuum and leakage must not exceed 5.55 x 10 ⁻⁵ acc/sec He. 5.55 x 10 ⁻⁵ acc/sec He represents total SOP leakage. Certification Test - The item completed 904 No Flow Hours during D/82 which is 50 times the certification requirement of 18 hours. The item completed 192 blowdown cycles during D/82 which is 9 times the cycle certification requirement of 22. The item completed the 25 year structural vibration and shock certification requirement during H0/83. No Class 1 engineering changes have been incorporated since this configuration was certified. C. Inspection - All details, gages and test facilities are cleaned and inspected to H03150 EN50A to preclude contamination clogging. Details, including the O-ring, O-ring grooves, and sealing surfaces, are 100% inspected per drawing dimensions and surface finish characteristics. Details are manufactured from material with certified physical and chemical properties. The run-in and final torque of all threaded connections are verified by Vendor and DCAS inspection.

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	1/1	213TR01A1		

B. Failure History -
 NEMU-200-A003 (6-27-80), NEMU-213-002 (6-18-81),
 NEMU-213-002 (6-19-81), NEMU-213-003 (7-14-81),
 NEMU-213-A006 (8-7-81), Fill valve leaked due to damaged
 seal from flaking silver detected on many units during
 initial heavy field use.
 Valve redesigned to use vespel seat and sapphire ball by
 EC42805-572.
 N-EMU-213-R010 (1/7/89), SOP (3/N 019) exhibited an
 external leakage rate above the allowed maximum. Leakage
 found at the fill port mounting flange caused by split
 O-ring due to silicone material age degradation. Improved
 age control and storage environment.

E. Ground turnaround -
 Tested for leakage per NEMU-R-001, SOP External Leakage.

F. Operational Use -
 Crew Response -
 EVA) Since EVA termination is required as soon as SOP is
 flowing, crew would abort EVA when excessive SOP usage is
 detected.
 Training - Standard EMU training covers this failure mode.
 Operational Considerations -
 EVA checklist procedures verify hardware integrity and
 systems operational status prior to EVA.
 Flight rules define go/no go criteria related to EMU
 pressure integrity and regulation.
 Flight rules define EMU as lost for loss of operational SOP.
 Real Time Data System allows ground monitoring of EMU
 systems.