NOUN P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
SECONDARY O2 BOTTLE ITEM 210 1V770660-1 (2)	1/1	210/M02: Rupture. CAUSE: Structural Material defect, weld defect, or fatigue.	END ITEM: Material, fatigue crack or weld defect propagation to fracture. SYS INTERFACE: Release of bottle shrapnel may cause structural damage to the EMU and surrounding equipment. MISSION: Abort EVA. CREW/VEHICLE: Possible crew injury or loss of crewman resulting from shrapnel.	A. Design - The secondary oxygen bottle is fabricated of Inconel 718 (AMS 5664). This material was used for the Apollo OPS bottle. It was selected for this application because of its oxygen compatibility for the service, its high strength and its ability to be brazed. The brazing is required to attach a tube to the bottle shell to provide gas heating during blow down. The bottle is designed for a burst pressure of twice operating and a proof of 1 1/2 times operating. The design fatigue cycle requirement is 4 times the use cycles of 500 operating and 21 proof. Calculated operating fatigue life is 40,000 cycles. In addition, a fracture mechanics analysis has been done. This analysis shows that, at operating pressure, a defect which propagates through the wall will cause a leak and not a rupture. In addition, any defect not detected by radiographic or fluorescent inspection will not propagate through the wall within 4 times the use cycles. B. Test - Component Acceptance Test - The SOP bottle acceptance test procedure is specified in SVHS2819 Table B. Test performed by vendor are as follows: PARA. NO. — TEST 4.2.4 — Proof Pressure 4.2.4 — Helium Leak Check 4.2.4 — Volumetric Expansion These tests demonstrate freedom from cracks large enough to propagate through the wall in less than four times the expected usage cycles. Raytheon Standard source inspection monitors the bottle acceptance tests. This includes proof, leakage, radiographic inspection, and examination of interior surfaces. PDA Test - The item is proof pressure tested at 11,100 - 11,300 psig with GN2 for 3 minutes minimum, and then visually inspected for evidence of distortion, cracks or other defects. Sequentially, the item is externally leak tested with a 2% He and 98% GN2 mixture at a pressure of 5800 - 6200 psig in chamber vacuum. Leakage must not exceed 5.55 x 10-5 scc/sec

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
	1/1	210(N02)		GNo. This value represents total GOP leakage.

(Continued) A historical log records the total bottle cycles, the total time that a bottle is pressurized above 3000 psig and the max pressure level attained in any given cycle. This information is recorded at Hamilton Standard and in the field. Upon completion of POA testing, the item is visually final inspected for damage to external surfaces, mounting points and general appearance.
Certification Test -
The item completed burst and cycle testing with the following results: Cycles at Operating Pressure:
Actual - 1200; Spec - 580; Date - 9/81.
Burst Pressure: Actual - 15,700 psi; Spec - 14,860 psi; Date - 9/81.
Cycles at Proof Pressure: Actual - 100; Spec - 25; Date - 9/81.

C. Inspection -
Material or Weld Defect - The material, Inconel 718, is verified by chemical analysis. Fluorescent penetrant inspection is performed to detect any surface defect in the welds and the parent metal of tank, x-ray inspection is performed to detect any cracks, voids or other irregularities in the welds and parent metal of tank.
Fatigue - Visual examination of external surfaces to determine if physical damage has occurred due to the tests subjected to the tank. These inspections are performed at vendor and monitored by Hamilton Standard source inspection. At Hamilton Standard, a visual inspection is performed to ensure that there are no observed contamination, nicks, scratches or burrs.

G. Failure History -
None.

E. Ground Turnaround -
Tested for rupture per PEMS-H-001, Item test check.

F. Operational Use -
Crew Response -

CIL
EMU CRITICAL ITEMS LIST

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09/01/90 SUPERSEDES / / ANALYST:

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
	1/1	FMEA/MOZ:		PreEVA/PostEVA/EVA: No response possible. Training - No training specifically covers this failure mode. Operational Considerations - Not applicable.