

12/24/91 SUPERSEDES 10/31/90

ANALYST:

NAME P/N OFF	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
CONTAMINANT CONTROL CARTRIDGE, ITEM 489 ----- SV792600-00 (1)	2/YMA	400FMO1: Fails to remove CO2.  CRUSE: Premature expenditure of LiOH, channeling, free moisture, failure of the storage caps to seal.	END ITEM: Decreased chemical reaction (chemisorption) level of CO2 with LiOH.  GFE INTERFACE: Increase in EMU CO2 level.  MISSION: Terminate EVA.  CREW/VEHICLE: None for single failure. Possible loss of crewman with loss of SBP.	A. Design - To prevent channeling or a "short" charge, the cartridge is vibrated as LiOH is funneled into the container and tamped at specified height levels during filling to insure that the LiOH bed is homogeneous. A foam rubber pad preloads the bed preventing LiOH particles from shifting during CCC handling and use. Protective caps with radial O-seals isolate the LiOH from its storage environment. Caps placed over the vent hole protects against contaminants entering the item during storage and handling. A teflon screen prevents free moisture from mixing with the LiOH.  B. Test - Certification test - Certification testing fulfilled useful life requirements of CCC S/PB, S/PB SV792600-2 and S/PB SV767790-2 design note (1) operational life. The item completed canned man endurance testing to LiOH breakthrough during 8/86. The item was subjected to the cold case 7 hour ENH profile and upon completion of these conditions a metabolic rate of 1,000 Btu was used until breakthrough, this completed the 7 hr S/PB requirement and continued to work nominally for an average additional time period of 4.4 hours. No Class 1 EC's have been incorporated since this configuration was certified.  C. Inspection - Premature expending of LiOH is prevented by using only govt. furnished LiOH and NIP inspection of approved lot No.'s prior to charging the unit. The chemicals are weighed during assembly to verify that the proper amount has been used. This weight is recorded and inspected. Free moisture and CO2 are prevented from contaminating the unit by using -65 degree D.P. nitrogen gas atmosphere during charging. All gases (N2 and O2) are tested frequently during charging and are verified by inspection throughout the assembly. Storage cap seals are inspected at their detail level to insure proper seal contact for the vented (taped) dust cap. Parts are double bagged and N2 purged to maintain the isolation of the LiOH chemical bed.  D. Failure History - 4-EMU-460-C007 (8-B-88) During a cold wall canned man test,

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EMU CRITICAL ITEMS LIST

12/26/91 SUPERSEDES 10/31/90

ANALYST:

Page: 2  
Date: 12/03/91

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
	2/1RA	400FHD1:		<p>the contaminant control cartridge "broke through"; the CO2 level exceeded by 15mmHg. This was caused by the ECC being exposed to moist gas flow during rig set-up. The procedures have been modified so that the PLS is "bypassed" during chamber preparation.</p> <p>J-EMU-480-001 (3-13-84) During EMU testing, a high level of CO2 was detected. It was determined that the particular batch of L10H being used could not perform adequately at low humidity levels. The acceptance test procedures for L10H have been revised to specify low humidity performance levels.</p> <p>E. Ground Turnaround - L10H is batch lot approved, and cartridge packing and storage are controlled to prevent exposure to ambient air per FEHM-A-001.</p> <p>F. Operational Use - Crew Response - PreEVA: Upon receipt of message from CUS concerning CO2 level, minimize physical activity, begin monitoring the CO2 value. If received during depress, also stop depress. If CO2 value continues to rise, cease activities, consider in-suit L10H change out. EVA: Upon receipt of message from CUS concerning CO2 level, minimize physical activity, begin monitoring the CO2 value. If CO2 value continues to rise, crewmember will assess physical condition for high CO2 using helmet purge valve. If conditions exist, the EVA is terminated, this EMU is go for standby on SCU with helmet purge valve open. Training - Crewmembers are trained in high CO2 symptom recognition and response. Operational Considerations - Reference Loss/Failure Flight Rules: An EMU is considered lost if unable to maintain a safe CO2 level; EMU is clear for standby on SCU following termination for high CO2. EVA checklists and PDF procedures verify hardware integrity and systems operational status prior to EVA. EMU CUS provides readout on EMU status. Real Time Data System allows ground monitoring of EMU systems.</p>