

CIL  
EMU CRITICAL ITEMS LIST

12/24/91 SUPERSEDES 01/02/90

ANALYST:

Page: 1  
Date: 12/03/91

NAME P/N QTY	CRIF	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
MUSH-TO-TALK SWITCH, 2/2 ITEM 365 ----- SV167794-1 (1)		<p>365FMS1: Fails in VOX disable (Acc.1 position.</p> <p>CRUSE1: Contact welds, jamming, shorting due to contamination.</p>	<p>END ITEM: Unable to position switch to VOX or PTI positions.</p> <p>GPE INTERFACE: Cannot transmit. Can only receive.</p> <p>MISSION: Terminate EVA.</p> <p>CREW/VEHICLE: None.</p>	<p>A. Design - The stationary contacts are part of the external terminal lugs. No interconnecting wiring to fail. Each switch position has dual contacts for redundancy. Switching mechanism and contacts are encased in a hermetically sealed case backfilled with dry nitrogen. Contact is accomplished through a roller type contact. This keeps switching forces to a minimum.</p> <p>B. Test - Component Acceptance Test - Vendor acceptance includes 500 actuation cycles, contact resistance, insulation resistance, and dielectric withstanding voltage tests.</p> <p>In-Process Test - Switch operation and continuity are verified during four separate in-process tests during DCN assembly.</p> <p>PDA Test - Switch operating force is checked during DCN PDA. Switch function is checked during DCN PDA electrical tests. Switch is vibrated and exposed to thermal cycles as part of the DCN during PDA.</p> <p>Certification Test - The item completed the 15 year structural vibration and shock cert requirement during 10/83. The item is cycle certified by similarity to the Item 368 switch. The Item 368 switch has completed 127,000 cycles during 8/85 which is 33 times the cycle cert requirement of 4,140 cycles. No Class 1 Engineering Changes have been incorporated since this configuration was certified.</p> <p>C. Inspection - To preclude failure due to internal contamination, the switches are assembled by the vendor in a Class 100,000 clean room. The switches are flushed internally using chloroethane 86 and Genevolve 0 to remove contaminants prior to case welding. After welding the switches are vacuum baked and backfilled with GN2 to a pressure of 3-5 psig and sealed. Leak checks are performed during subsequent processing to verify seal integrity.</p>

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12/24/91 SUPERSEDES 87/02/80

Page: 2  
Date: 12/03/91

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	2/2	365#M03:		<p>The x-ray inspections are performed, prior to run-in cycling and after vibration, to verify absence of weld splatter and loose pieces, and to verify contact alignment.</p> <p>D. Failure History - None.</p> <p>E. Ground Turnaround - Ground Turnaround tested per FEMU-R-889, Vacuum Performance and SEMU Communications Check.</p> <p>F. Operational Use - Crew Response - PreEVA: Troubleshoot problem, if no success, consider third EMU if available. Otherwise, EMU no go for EVA. EVA: Terminate EVA. Training - Standard training covers this failure mode. Operational Considerations - EVA checklist procedures verify hardware integrity and system operational status prior to EVA. Flight rules require that EVA be terminated if two-way communication between each EV crewmember and orbiter, either direct or through relay, is unavailable. Real Time Data System allows ground monitoring of EMU systems.</p>