Grumman Corporation

CRITICAL ITEMS LIST

GRUMMAN

ASSY NOMENCLATURE: MANIPULATOR FOOT RESTRAINT

ASSEMBLY PART NO: [illegible]

PREPARED BY: L. HAHN & F. PERAZZO

REPORT NO: [illegible]

REVISION A

DATE: [illegible] MAY [illegible]

FMEA REF	FMEA REV	NAME, QTY & DRAWING REF DESIGNATION	CRIT	FAILURE MODE AND CAUSE	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
G3	A	Foot Platform Assembly (FPA) QTY (1) Dwg C95-123	1R/2	G3 - Boot clip fails to release EMU Boot due to contamination, galling or accidental damage/distortion	<u>END ITEM</u> FPA Boot Clip out-of-dimension <u>GFE INTERFACE</u> EMU Boot jammed in clip on Foot Platform Assembly <u>MISSION</u> None <u>CREW / VEHICLE</u> Possible loss of crewmember if redundant means to release boot are not effective	<u>A. Design</u> Materials per tables 1 & 2 of MSFC-SPEC-522A are certified for traceability/quality. Anodic hardcoating per MIL-A-8625C on aluminium interfaces with relative motion minimizes galling and wear. Contamination caused by corrosion by-products eliminated by extensive use of thermal control coating and solid (Moly di-sulfide) lubricant coating. Redundancy- the use of generic tools to pry boot out of clip is considered stand-by redundancy. The "B" screen is not applicable.

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GRUMMAN

ASSY NOMENCLATURE: MANIPULATOR FOOT RESTRAINT

ASSEMBLY PART NO: SED 39100159

PREPARED BY: L. HAHN & F. PERIAZZO

REPORT NO: RMS-87-R-8

REVISION: # B

DATE: 8 JULY 1988

FMEA REF	FMEA REV	NAME, QTY & DRAWING REF DESIGNATION	CRIT	FAILURE MODE AND CAUSE	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
G3	A	Foot Platform Assembly (FPA) QTY (1) Dwg C85-123	1R/2	G3 - Boot clip fails to release EMU Boot due to contamination, galling or accidental damage/distortion	**END ITEM** FPA Boot Clip out-of-dimension **GFE INTERFACE** EMU Boot jammed in clip on Foot Platform Assembly **MISSION** None **CREW / VEHICLE** Possible loss of crewmember if redundant means to release boot are not effective	**B. TEST HISTORY** 1. Acceptance test per procedure 380-94.01 at Grumman (7/7/83) before and after all tests. ATP includes functional tests of all operating functions and a general visual inspection. 2. Stiffness test per procedure 380-10101 at Grumman (7/7/83). Demonstrated stanchion end play less than .5 inch for a two pound load in any direction and deflection less than .3 inches lateral and .2 inches longitudinal for 1Hundred pound loads. 3. Vibration and shock test per procedure 380-98.01 at Grumman (7/7/83). Demonstrated ability to withstand design levels without structural failure with no significant resonance. 5 thread screws required the application of loctite. 4. APC/MFR ultimate load tests per STS83-0044 at Rockwell (9/83). Loads applied in 10 steps, each comprising 10% of limit load no yield was observed at the ultimate load of 1.4 x limit. 5. Thermal vacuum test at JSC (7/29/84). MFR was operated at ambient temperature, plus 224 F and -103 F (average lowest achievable chamber temp) at an average vacuum of .80086 torr. 6. Center of gravity test at JSC (12/2/84). 7. Moment of inertia swing test at JSC (1/1985). **C. INSPECTION** 1. MAVPRO inspects all production and items at completion of final assembly. 2. Anodic hard coated aluminum parts inspected for compliance to MIL-A-8625 C by DCAS. Certificate of compliance on file at Grumman Bethpage. 3. Thermal Control Coating process is controlled by inspections (post prime, mask, post coating and cure), and sample testing for coating thickness, coating adhesion, and emittance/solar absorption. **D. FAILURE HISTORY** None (per PRACA database). The MFR has been successfully utilized on five missions, STS 61, 63, 51A, 51I, and 61C. **E. TURNAROUND** Inspection per 5208/PIA 05801/NAC 10 DEC 1987 includes a functional test of all MFR operating functions and a general visual inspection. **F. OPERATIONAL USE** 1. Operational Effect of Failure: Crewman cannot ingress the airlock quickly if necessary. 2. Crew Action: Second crewman would attempt to pry heel from heel clip(s) on foot platform assembly. 3. Crew Training: Trained in the use of generic tools for this task. 4. Mission Constraints: none. 5. In Flight Checkout: Foot Platform is visually inspected at the time of use.