Grumman Corporation

CRITICAL ITEMS LIST

ASSY NOMENCLATURE: MANIPULATOR FOOT RESTRAINT

ASSEMBLY PART NO: SED 80103160

PREPARED BY: L. HAHN & F. PERAZZO

REPORT NO: RMS-87-FR-8

REVISION: A

DATE: 17 MAY 1988

GRUMMAN

FMEA REF	FMEA REV	NAME, QTY & DRAWING REF DESIGNATION	CRIT	FAILURE MODE AND CAUSE	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
A2	A	Adaptive Payload Carrier (APC) Interface Mechanism QTY (1) DWG C95-101	2/2	A2 - Latch fails to close due to defective material, contamination or galling.	END ITEM Unable to close latch GFE INTERFACE Unable to connect MFR to APC MISSION Loss of MFR; unable to accomplish subsequent mission objectives. CREW/VEHICLE None	A. Design Materials per tables 1 & 2 of MSFC-SPEC-522A are certified for traceability/quality. Anodic hardcoating per MIL-A-8625C on alumin. 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.

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ASSY NOMENCLATURE: MANIPULATOR FOOT RESTRAINT

ASSEMBLY PART NO: SED 53403150

PREPARED BY: L. HAHN & F. PERAZZO

REPORT NO. RMS 87 R 0

REVISION: - B

DATE: 6 JULY 1988

FMEA REF	FMEA REV	NAME, QTY & DRAWING REF DESIGNATION	CRIT	FAILURE MODE AND CAUSE	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
A2	A	Adaptive Payload Carrier (APC) Interface Mechanism QTY (1) DWG C95-101	2/2	A2 - Latch fails to close due to defective material, contamination or galling.	END ITEM Unable to close latch GFE INTERFACE Unable to connect MFR to APC MISSION Loss of MFR, unable to accomplish subsequent mission objectives. CREW/VEHICLE None	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 380-101.01 at Grumman (7/7/83). Demonstrated stanchion end play less than .5 inch for one pound load in any direction and deflection less than 3 inches lateral and 2 inches longitudinal for 1 hundred pound load. 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. Several screws required the application of loctite. 4. APC/MFR ultimate load tests per STS 83-0044 at Rockwell (5/83). Loads applied in 10 steps, each comprising 10% of final 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 -112 F (average lowest achievable chamber temp) at an average vacuum of .00006 torr. 6. Center of gravity test at JSC (12/21/84). 7. Moment of inertia swing test at JSC (1/1/85). C. INSPECTION 1. NAVPAD inspects all production end 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, (test panels, cure, post coating and cure), and sample testing for coating thickness, coating adhesion, and emittance/solar absorptivity. D. FAILURE HISTORY None (per PRACA database). The MFR has been successfully utilized on five missions, STS 11, 13, 51A, 51I, and 61C. E. TURNAROUND Inspection per 528-PIA-05.001 N/C 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 - MFR could not be restowed. It possibly could not be used on a second EVA if it had to be jettisoned. 2. Crew action - Crew could strap MFR in place using a tiedown device if available or jettison the MFR. 3. Crew training - Crew would receive training on any generic tiedown equipment available. 4. Mission constraints - None 5. In flight Checkout - Crew will visually verify latch closed at end of stow operation.