

Grumman Corporation

# CRITICAL ITEMS LIST

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ASSY NOMENCLATURE: MANIPULATOR FOOT RESTRAINT

PREPARED BY: L. HAIN & F. PERAZZO

REPORT NO: DMS 87-84

REVISION: A

ASSEMBLY PART NO: 8ED 2040400

DATE: 17 MAY 1988

FMEA REF REV	NAME, QTY & DRAWING REF DESIGNATION	CRIT	FAILURE MODE AND CAUSE	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
B3	Vertical Stanchion Slaw Latch  QTY (1)  Dwg C95-122	2/2	B3 - Latch fails in opened position due to contamination or galling	<p><b>END ITEM</b> Unable to close latch</p> <p><b>GFE INTERFACE</b> None, since MFR will be jettisoned</p> <p><b>MISSION</b> Loss of MFR; unable to accomplish subsequent mission objectives</p> <p><b>CREW/VEHICLE</b> None</p>	<p><b>A. Design</b> Materials per tables 1 &amp; 2 of MSFC-SPEC-522A are certified for traceability/quality. Anodic hardcoating per MIL-A-8625C on aluminum 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.</p>

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## CRITICAL ITEMS LIST

GRUMMAN

ASSEMBLY NAME: MANIPULATOR FOOT RESTRAINT

PREPARED BY: L. HAHN &amp; F. PERAZZO

REPORT NO. 845-81 R 5

ASSEMBLY PART NO: SED 1018100

REVISION: B

DATE: 4 JULY 1985

FMEA REF REV	NAME, QTY & DRAWING REF DESIGNATION	CRIT	FAILURE MODE AND CAUSE	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
83	Vertical Stanchion Slew Latch  QTY (1)  Dwg C95-122	2/2	B3 - Latch fails in opened position due to contamination or galling	<u>END ITEM</u> Unable to close latch           <u>GEE INTERFACE</u> None, since MFR will be jettisoned           <u>MISSION</u> Loss of MFR, unable to accomplish subsequent mission objectives           <u>CREW/VEHICLE</u> None	<u>B. TEST HISTORY</u> 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 386-101.01 at Grumman (7/7/83). Demonstrated stanchion end play less than .5 inch for two pound load in any direction and deflection less than 3 inches lateral and 2 inches longitudinal for 1 hundred pound loads. 3. Vibration and shock test per procedure 386-94.01 at Grumman (7/7/83). Demonstrated ability to withstand design levels without structural failure with no significant resonance. Several screens required the application of lockie. 4. APCAMFR ultimate load tests per STS 83-1944 at Rockwell (8/83). Loads applied in 16 steps, each comprising 10% of limit load no yield was observed at the ultimate load of 14 x limit. 5. Thermal vacuum test at JSC (7/29/84). MFR was operated at ambient temperature, plus 224 f and -127 f (average lowest achievable chamber temp) at an average vacuum of .0004 torr. 6. Center of gravity test at JSC (12/2/84). 7. Moment of inertia swing test at JSC (1/4/85) <u>C. INSPECTION</u> 1. NAVPRO 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 Deltapage. 3. Thermal Control Coating process is controlled by inspectors, spot prime, cure, post coating and cure, and sample testing for coating thickness, coating adhesion, and ultraviolet absorption. <u>D. FAILURE HISTORY</u> None (per PRACA delabate). The MFR has been successfully utilized on live missions, STS 11, 13, 51A, 51L, and 84C. <u>E. TURNAROUND</u> Inspection per S2801A 05801M/C 10 DEC 1987 includes a functional test of all MFR operating functions and a general visual inspection. <u>F. OPERATIONAL USE</u> 1. Operational Effect of Failure - MFR could not be stowed. It possibly could not be used on a second EVA if it had to be jettisoned. 2. Crew Action - Crew could slip vertical stanchion in place using lid-down device if available or jettison the MFR. 3. Crew Training - Crew would receive training on any generic bedown equipment available. 4. Mission Constraints - None. 5. In Flight Checkout - Crew will manually verify latch closed at the end of stow operation.

 ENGINEERING  
 PROPOSED