CRITICAL ITEMS LIST

ASSY NOMENCLATURE: *EVA WINCH*

ASSY P/N: *SED 33101570*

SYSTEM: *4.1, 4.2 AND 4.3*

SUBSYSTEM: *5.3*

FMEA REF	FMEA REV	NAME, QTY & DRAWING REF DESIGNATION	CRIT'Y	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	RATIONALE FOR ACCEPTANCE
3G		EVA WINCH, (2) --- SED 33101570	2/1R	Mode: Ratchet select lever breaks Cause: • Material failure	1. Unable to cradle RMS or payload which prevents closing payload bay doors. 2. Unable to close payload bay doors. Redundancy - 1. RMS jettison system. 2. Second EVA winch	1. **Design Features to Minimize Failure Mode** a. Safety factor of 1.4. b. High strength aluminum alloy construction. 2 **Test or Analysis to Detect Failure Mode** <u>Acceptance</u> Functional Test -- Complete functional testing to assure that the controls operate smoothly and that the rope can be extended and retracted <u>Certification</u> a Qualification test consists of: working load test with 200 lb and 800 lb static loads, verification of smooth operation with static loads applied, verification that a max force (during one hand operation) of approximately 50 lbs is exerted during ratcheting with the crank grip in the 90° position b. Stress analysis to certify this tool for 584 lb. working load with 1.4 safety factor c. Thermal qualification testing to certify this tool for a temperature environment of -200°F to + 350°F for 160 hours <u>Turnaround</u> a Complete functional testing will be performed once a year or after each mission use to assure that the controls operate smoothly and that the rope can be extended and retracted b. Replace Kevlar rope after each mission use c Inspect Kevlar rope for fraying or other damage once a year

PREPARED BY *P. F. Hooper* SIGNATURE/DATE APPROVED BY *T. O. Ross* DATE *9/19/88*

SHUTTLE PROGRAM
ATTACHMENT 1
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CRITICAL ITEMS LIST

ASSY NOMENCLATURE: *EVA WINCH*
ASSY P/N: *SED 33101570*
SYSTEM: *4.1, 4.2 AND 4.3*
SUBSYSTEM: *5.3*

FMEA REF	FMEA REV	NAME, QTY & DRAWING REF DESIGNATION	CRIT'Y	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	RATIONALE FOR ACCEPTANCE
3G		EVA WINCH, (2) SED 33101570 (Continued)	2/1R	Mode: Ratchet select lever breaks Cause: • Material failure	1. Unable to cradle RMS or payload which prevents closing payload bay doors. 2. Unable to close payload bay doors. Redundancy - 1. RMS jettison system. 2. Second EVA winch.	3. **Inspection.** Manufacturing (Completed) a. Verify the as built configuration. b. Accomplish NDE on piece parts prior to assembly c. Verify certificate of compliance for materials. Turnaround a. Perform visual inspection for potential damage, surface contamination, and clean according to PS28/PIA-05001 b. Verify completion of functional test for reacceptance. 4. **Failure History.** IH0004 - A deterioration of the control handle positioning springs that correctly position the spool pawl. New springs and spring guides have been fabricated and installed on all winch assemblies, with the exception of S/N 1001, the qualification unit. All units fitted with the new spring guide assemblies were functionally tested by reeling out 5 feet of rope, retracting by automatic reel in and ratchet handle, and verifying ratchet-out feature. Reference FPS 3B220018. 5. **Operations Use.** a. Operational Effect of Failure. If the ratchet assembly ends up in neutral or clockwise ratcheting, use of the winch is lost. Operational use is the same as above for the other failures involving total loss of the winch. If the ratchet assembly ends up in gear for counter clockwise ratcheting, the winch can still be used. The impact will be the ratchet handle will spin around as the rope is pulled out. b. Crew Action. If the winch is useable, the crew will be careful to avoid the movement of the ratchet handle as the rope is pulled out. If the winch is lost totally, the PRD will be used as described above. c. Crew Training. This crew action will be incorporated into the EVA crew training flow. d. Mission Constraints. None identified. e. In flight Checkout. The ratchet assembly will be inspected during its use.

PREPARED BY: R. Z. [illegible] SUPERVISOR/DATE: APPROVED BY: T. D. Ross DATE: 9/26/98

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