

CRITICAL ITEMS LIST

ASSY NOMENCLATURE: EVA WINCH

SYSTEM: 4.1, 4.2 AND 4.3

ASSY P/N: SED 33101570

SUBSYSTEM: 5.3

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FMEA		NAME, QTY & DRAWING REF DESIGNATION	CRITY	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	RATIONALE FOR ACCEPTANCE
REF	REV					
3E		EVA WINCH, (2) SED 33101570	2/1R	<p>Mode: Ratchet handle breaks</p> <p>Cause: Material failure</p>	<p>1. Unable to cradle RMS or payload for closing payload bay doors.</p> <p>2. Unable to close payload bay doors.</p> <p>Redundancy -</p> <p>1. RMS jettison system.</p> <p>2. Second EVA winch.</p>	<p>1. Design Features to Minimize Failure Mode</p> <ul style="list-style-type: none"> a. Safety factor of 1.4. b. Safety margin of 25 c. Handle constructed of aluminum. <p>2. Test or Analysis to Detect Failure Mode.</p> <p><u>Acceptance</u></p> <p>Functional Test -- Complete functional testing to assure that the controls operate smoothly and that the rope can be extended and retracted</p> <p><u>Certification</u></p> <ul style="list-style-type: none"> a. Qualification test consists of working load test with 200 lb and 600 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. <p><u>Turnaround</u></p> <ul style="list-style-type: none"> 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

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REF	REV					
3E		EVA WINCH, (2) SED 33101570 (Continued)	2/1R	Mode: Ratchet handle 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. <u>Manufacturing</u> (Completed) a. Accomplish NDE on piece parts prior to assembly. b. Verify certificate of compliance on materials. c. Verify as-built configuration. <u>Turnaround</u> a. Perform visual examination for damage, surface contamination, and clean according to PS28/PIA-05001 b. Clean according to drawing requirements. 4. Failure History. J10004 - 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 SN 3001, 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 TPS 2B220018. 5. Operational Use. a. <u>Operational Effect of Failure</u> Use of the winch may be totally lost if the ratchet handle breaks, depending on where it breaks. If it breaks at places other than the base (rotation point) it may still be used, but with less mechanical advantage. Otherwise, the PRD would be used (see previous failure cases) b. <u>Crew Action</u> The vise grips may be used to improvise as a winch handle if the handle breaks at a point where there is still something left to grip c. <u>Crew Training</u> This crew action will be incorporated into the EVA crew training flow d. <u>Missin Constraints</u> None identified e. <u>In flight Check-out</u> The handle will be visually inspected at the time of use

PREPARED BY P. E. Hooper

SUPERSEDED DATE

APPROVED BY T. O. Ross

DATE 9/2/88

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