

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	QTY	FAILURE MODE AND CAUSE	FAILURE EFFECT ON	RATIONALE FOR ACCEPTANCE
REF	REV				END ITEM	
3F		EVA WINCH, (2) SED 33101570	2/R	<p>Mode: Ratchet assembly sticks</p> <p>Cause: • Material failure • Contamination</p>	<p>1. Unable to cradle RMS or payload which prevents 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 2 c. High strength stainless steel construction d. Tolerances used on parts to minimize binding caused by temperature extremes or contamination and to allow for dry film lubrication <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 +150°F for 100 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

PREPARED BY P. F. Hogue

WIPERSEEDING DATE

APPROVED BY F. O. Ross

DATE 4/22/88

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SYSTEM: 4.1, 4.2 AND 4.3

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FMEA		NAME, QTY & DRAWING REF DESIGNATION	CRITY	FAILURE MODE AND CAUSE	FAILURE EFFECT OR END ITEM	RATIONALE FOR ACCEPTANCE
REF	REV					
3F		EVA WINCH, (2) SEP 33101570 (Continued)	2/1R	<p>Mode: Ratchet assembly sticks</p> <p>Cause: • Material failure • Contamination</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. Unable to cradle RMS or payload which prevents closing payload bay doors.</p> <p>2. Unable to close payload bay doors.</p> <p>4. Failure History.</p> <p>H1004 - 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 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 TPS 2822001R.</p> <p>H1007, H1008 - During thermal testing at the -200°F cold functional test, the ratchet control lever would not move into its detents, the rope could not be reeled out, and the crank grip would not unstow. All units were lubricated with Dow Corning Intelykote 321R and functionally tested successfully (TPS 57B2001E).</p> <p>5. Operation Use.</p> <p>a. <u>Operational Effect of Failure</u> - If the ratchet assembly sticks in neutral, use of the winch is lost. If the ratchet assembly sticks so as to jam the ratchet handle, the winch can still be used. The impact will be the handle will spin around as the rope is pulled out.</p> <p>b. <u>Crew Action</u> - 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 PHD will be used as described above.</p> <p>c. <u>Crew Training</u> - This crew action will be incorporated into the EVA crew training flow.</p> <p>d. <u>Mission Constraints</u> - None identified.</p> <p>e. <u>In-flight checkout</u> - The ratchet assembly will be inspected during its use.</p>	<p>1. Inspection <u>Manufacturing</u> (Completed)</p> <p>a. Verify the as built configuration.</p> <p>b. Accomplish NDE on piece parts prior to assembly.</p> <p>c. Verify certificate of compliance for materials.</p> <p>d. Clean and apply lubrication according to drawing requirements.</p> <p><u>Turnaround</u></p> <p>a. Perform visual inspection of separable parts for evidence of damage.</p> <p>b. Inspect for surface contamination and clean according to P528/PA-05001.</p> <p>c. Verify completion of functional test for reacceptance.</p>

PREPARED BY: P. F. Hooper

SUPERSEDING DATA

APPROVED BY: J. O. Kolk

DATE: 02/20/88

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