

CRITICAL ITEMS LIST

ASSY NOMENCLATURE: POLE ARRESTOR ASSEMBLY

SYSTEM: CREW ESCAPE SYSTEM

REVISION:

ASSY P/N: SED27101363

SUBSYSTEM: POLE CREW ESCAPE SYSTEM

PAGE 1 OF 70

FMEA		NAME, QTY & DRAWING REF DESIGNATION	CRIT'Y	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	RATIONALE FOR ACCEPTANCE
REF	REV					
1.1.1		ENERGY ABSORBER ASSEMBLY (4), SED27101365-301	2/1R	<p>1.1.1 Mode: Fails to absorb pole force</p> <p>Cause:</p> <ul style="list-style-type: none"> • Defective material • Corrosion 	Damage to pole during deployment if more than one energy absorber fails	<p>1. Design Features. The design features which minimize the probability of this failure mode are:</p> <ol style="list-style-type: none"> a. The energy absorbers are designed to an ultimate safety factor of 1.4 for all mission phases b. The assembly components are fabricated of materials not conducive to corrosion. The absorber rod is fabricated from inconel 718 in accordance with specifications AMS 5662 and 5663. The rod is passivated after machining in accordance with QQ-P-35, and dye penetrant inspected with no cracks permissible. Dry lubricant is applied to the rod and friction washers during the assembly process. c. The friction washers are machined from CRES 416 material, in accordance with specification QQ-S-763, passivated after machining, and are heat treated. d. The body subassembly is machined from 6061-T651 aluminum, in accordance with specification QQ-A-225/B, and anodized in accordance with MIL-A-8625. e. The retainer plug is fabricated by the bonding together of nylon and aluminum with Hysol adhesive. The aluminum portion is anodized after fabrication. f. The absorber design employs friction washers to accommodate expected loads. Each absorber absorbs approximately 700 lbs. of the 2800 lb. peak load that is imposed by the kick spring and gravity forces. g. New sets of friction washers are installed in the PCES end items following their final pre-delivery uncontrolled (emergency) deployment test, i.e., the friction washers in PCES end items installed in the vehicle will be new and not have been stroked.

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PAGE 2 OF 70

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PCES - 2

S40210D
 ATTACHMENT -
 Page 47 of 115

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PAGE 3 OF 70

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1.1.1		ENERGY ABSORBER ASSEMBLY (4), SED27101365-301	2/1R	<p>1.1.1 Mode: Fails to absorb pole force</p> <p>Cause: ● Defective material ● Corrosion</p>	<p>Damage to pole during deployment if more than one energy absorber fails</p>	<p>(3) Flight random vibration tests, 48 minutes/axis, in 4 segments as follows:</p> <table border="1"> <thead> <tr> <th>Segment No.</th> <th>No of Missions</th> <th>Vibration Duration/Axis</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>6</td> <td>173 sec.</td> </tr> <tr> <td>2</td> <td>19</td> <td>548 sec</td> </tr> <tr> <td>3</td> <td>25</td> <td>720 sec.</td> </tr> <tr> <td>4</td> <td>50</td> <td>1440 sec.</td> </tr> </tbody> </table> <ul style="list-style-type: none"> ● Duration: Segment dependent (48 minutes/axis). ● Levels: 20 - 150 Hz, increasing 6dB/Octave 150 - 1000 Hz, at 0.03g²/Hz 1000 - 2000 Hz, decreasing 6dB/Octave <p>(4) Life cycle tests.</p> <ul style="list-style-type: none"> ● 14 controlled deployments ● 6 noncontrolled deployments (which stroke the energy absorbers) <p>(5) Design limit load and ultimate limit load tests.</p> <ul style="list-style-type: none"> ● With PCES fully deployed, a series of load ramps will be applied to the pole tip and verified no yielding below 100 percent of design limit ● With PCES fully deployed, a series of load ramps will be applied to the pole tip and verified no failure below 140 percent (1.4 safety factor) of design limit loads <p>(6) Thermal testing (by analyses).</p> <ul style="list-style-type: none"> ● Ground operations: 35 to 120°F ● Normal operations: 65 to 90°F ● Ascent/entry transients: 95°F maximum peak ● Ferry flight: Not applicable; PCES will be removed from Orbiter ● Launch/landing emergency escapes via PCES: 12 to 75°F ● Temperature (structure): 120°F maximum 	Segment No.	No of Missions	Vibration Duration/Axis	1	6	173 sec.	2	19	548 sec	3	25	720 sec.	4	50	1440 sec.
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PAGE 4 OF 70

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PCES - 4

S140210D
 ATTACHMENT -
 Page 49 of 115

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PAGE 5 OF 70

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PAGE 6 OF 70

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PCES-6

S40210D
 ATTACHMENT -
 Page 51 of 115