

CRITICAL ITEMS LIST

ASSY NOMENCLATURE: LAUNCH/LANDING BRACKETRY

SYSTEM: CREW ESCAPE SYSTEM

REVISION:

ASSY P/N: SGD27101333

SUBSYSTEM: POLE CREW ESCAPE SYSTEM

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FMEA		NAME, QTY & DRAWING REF DESIGNATION	CRIT'Y	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	RATIONALE FOR ACCEPTANCE
REF	REV					
2.1.2		PIP PIN STARBOARD SIDE UPPER/LOWER FITTINGS (2), SED27101402, SED27101403	1/1	<p>2.1.2 Mode: Starboard fitting pip pin fails, releasing one attachment point of the pole</p> <p>Cause:</p> <ul style="list-style-type: none"> ● Contamination ● Ball detent fails ● Vibration 	Loss of pole attachment to Orbiter, releasing pole in middeck	<p>1. Design Features. The design features which minimize the probability of this failure mode are:</p> <p>a. The pin is manufactured in accordance with MIL-STD-17984. The shank, spindle, handle, retention balls, collar, and spring of the pin are fabricated from corrosion resistant steel. The components are passivated after lubrication.</p> <p>b. The pin is a single acting, self-retaining device which employs pin retention balls that recess only when the release button is depressed. The 0.5 inch diameter pin is 0.01 inch smaller than the diameter of the fitting bushings through which the pin is inserted. The tip of the pin is chamfered which serves as an aid in its installation.</p> <p>c. The location and alignment of the fitting bushings/bearings are defined by the engineering drawings. The bushings are press fit to prevent misalignment. The starboard fitting is designed with a -0.5 to +1.0 inch "slip" to accommodate Orbiter vehicle expansion or contraction.</p> <p>d. A spare, identical pin is carried in the Orbiter crew cabin for use in reinstalling the PCES for landing phases in the event the primary pin should fail.</p> <p>e. The pip pin was designed to a safety factor of 1.4.</p>

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212		PIP PIN STARBOARD SIDE UPPER/LOWER FITTINGS (2), SED27101402, SED27101403	1/1	<p>2.1.2 Mode: Starboard fitting pip pin fails, releasing one attachment point of the pole</p> <p>Cause:</p> <ul style="list-style-type: none"> • Contamination • Ball detent fails • Vibration 	Loss of pole attachment to Orbiter, releasing pole in middeck	<p>2. Testing/Analyses.</p> <p>a. <u>Acceptance Tests</u></p> <p>(1) Acceptance vibration test (AVT)</p> <ul style="list-style-type: none"> • Duration: 3 minutes/axis • Levels: 20 - 80 Hz, increasing 3dB/Octave 80 - 350 Hz, at 0.04g²/Hz 350 - 2000 Hz, decreasing 3dB/Octave <p>(2) Functional test (prior to and after AVT).</p> <ul style="list-style-type: none"> • Initial process, controlled PCES deployment and recocking • Noncontrolled deployment with equivalent aerodynamic loads on pole tip • Manual deployment with ratchet assembly <p>b. <u>Certification Tests</u> (These tests were performed at the system level)</p> <p>(1) Qualification acceptance vibration tests (QAVT).</p> <ul style="list-style-type: none"> • Duration: 5 times AVT, 15 minutes/axis • Levels: 20 - 80 Hz, increasing 3dB/Octave 80 - 350 Hz, at 0.067g²/Hz 350 - 2000 Hz, decreasing 3dB/Octave <p>(2) Functional test (after QAVT).</p> <ul style="list-style-type: none"> • Controlled deployment and recocking of PCES • Noncontrolled deployment with equivalent aerodynamic loads on the pole tip

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Segment No.	No. of Missions	Vibration Duration/Axis																			
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212		PIP PIN STARBOARD SIDE UPPER/LOWER FITTINGS (2), SED27101402, SED27101403	1/1	<p>2.1.2 Mode: Starboard fitting pip pin fails, releasing one attachment point of the pole</p> <p>Cause:</p> <ul style="list-style-type: none"> Contamination Ball detent fails Vibration 	Loss of pole attachment to Orbiter, releasing pole in middeck	<p>(7) Fungus (by analysis).</p> <ul style="list-style-type: none"> Non-nutrient to fungi in accordance with MIL-STD-810D, method 508.3 or materials adequately treated (refer to MF0004-014C, paragraph 3.1.1.c) <p>(8) Humidity (by analysis).</p> <ul style="list-style-type: none"> The PCES materials list was analyzed to certify compliance with MF0004-014, paragraph 3.1.1.e. <p>(9) Salt spray (by analysis).</p> <ul style="list-style-type: none"> The PCES materials list was analyzed to certify compliance with MF0004-014, paragraph 3.3.3.7. <p>(10) Sand/dust (by analysis)</p> <table border="0"> <tr> <td> <ul style="list-style-type: none"> Sand diameter 0.0031 to 0.039 inches suspended sand 1.2 lbs. per cubic ft. wind speed 33 ft/sec hardness 7 to 8 Moh scale </td> <td> <ul style="list-style-type: none"> Dust diameter 0.000039 to 0.003 inches suspended dust 3.7 to 0.7 lb/cu ft wind speed 33 ft/sec hardness 7 to 8 Moh scale </td> </tr> </table> <p>(11) Additional certification tests/analyses.</p> <ul style="list-style-type: none"> Transportation - packaging, shock, and vibration: Packaging designed and protective procedures developed in accordance with FED-STD-101 On/off cycle life test (by testing): PCES deployed 20 times, refer to (4) above Transient vibration (by analysis) Structural fatigue (by analysis) Corrosion: (by analysis) Handling shock, crash shock, and landing shock (by analyses) Acceleration and cabin atmosphere (by analysis) Full life and limited life certification (by analysis) 	<ul style="list-style-type: none"> Sand diameter 0.0031 to 0.039 inches suspended sand 1.2 lbs. per cubic ft. wind speed 33 ft/sec hardness 7 to 8 Moh scale 	<ul style="list-style-type: none"> Dust diameter 0.000039 to 0.003 inches suspended dust 3.7 to 0.7 lb/cu ft wind speed 33 ft/sec hardness 7 to 8 Moh scale
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DATE:

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