

**SRB CRITICAL ITEMS LIST**

**SUBSYSTEM:** RANGE SAFETY COMMAND DESTRUCT

**ITEM NAME:** Safe and Arm Assembly

**PART NO.:** 10311-0003-801

**FM CODE:** A07

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**ITEM CODE:** 70-13

**REVISION:** Basic

**CRITICALITY CATEGORY:** 1

**REACTION TIME:** Immediate

**NO. REQUIRED:** 1

**DATE:** March 31, 1999

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**CRITICAL PHASES:** Final Countdown, Boost

**SUPERCEDES:** March 31, 1998

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**FMEA PAGE NO.:** F-47

**ANALYST:** K.C. Finch/S. Roney

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**SHEET 1 OF 3**

**APPROVED:** P. Kalia

**FAILURE MODE AND CAUSES:** Premature operation of one or both PETN explosive leads caused by:

- High Temperature
- Vibration/Shock
- Increased sensitivity due to contamination

**FAILURE EFFECT SUMMARY:** Actual mission, vehicle and crew loss due to vehicle fire or explosion on the pad or during boost.

**RATIONALE FOR RETENTION:**

**A. DESIGN**

Design specification USBI 10SPC-0230

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- Contamination control per paragraphs 3.1.2. (Increased Sensitivity)
- No autoignition at 215<sup>0</sup>F per paragraphs 3.3.8. (High Temperature)
- Vibration levels per paragraphs 3.4.1.2/3.4.3.2. (Vibration)
- Shock levels per paragraphs 3.4.1.3. (Shock)

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Predicted temperature will not exceed 106<sup>0</sup>F per SRB Thermal Design Data Book SE-019-068-2H, Table 4.9.1.1. (High Temperature).

Explosive material (PETN) certified to MIL-P-387. (Contamination)

Hermetically sealed device prevents the entry of contamination following manufacturing. (Contamination)

O Qualification

o S&A Assembly 10311-0003-801 is qualified per SDI QTR107190-2022 (Connector) and SDI RPT-106521 Volume I-IV (Includes (N)S) Test Report 8971 (CC-16837-14) Volumes I-IV. (COQ A-PYR-6135). (1 Missions - SRB)

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O Qualification Test

- Thermal Shock High temperature function (-70 to +165<sup>o</sup>)
- Vibration
- Pyrotechnic shock
- Autoignition (+215°F/1 Hour)

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B. TESTING

O Lot acceptance test per SDI Procedure ATP 106521

- o Leak test of entire lot. (Contamination)
- o Ambient temperature-electrical checkout (Function)
- o Vibration test of destructive LAT samples (ten percent of lot). (Vibration)
- o Radiographic Test (X-Ray/N-Ray)
- o Acceptance Vibration test of entire lot. (Vibration)

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C. INSPECTION:

VENDOR RELATED INSPECTION

O Receiving Inspection: All explosive material certifications and test reports are verified by USBI Quality Assurance and Contractor Quality Assurance per: (Contamination)

- o USBI Quality Assurance
  - USBI SIP 1485
- o Contractor Quality Assurance
  - SDI Manufacturing and Inspection Plan/Drawing T106521

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O PETN explosive lead lot acceptance test is conducted in accordance with E.T. ATP 816780 and SDI ATP 106521 and includes the following: (Contamination)

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- o Helium Leak test one hundred percent of lot.
- o N-ray inspection one hundred percent of lot.
- o X-Ray inspection one hundred percent of lot

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- O Assembly Operation: Moisture content determination, mass ratio, explosive loading and sealing process are verified one hundred percent by Contractor Quality Assurance and USBI Quality Assurance per: (Contamination)
  - o USBI Quality Assurance
    - USBI SIP 1485
  - o Contractor Quality Assurance
    - SDI Manufacturing and Inspection Plan/Drawing 106521. CN 035
- O Lot Acceptance Test: N-ray and X-ray films are inspected by certified vendor personnel and verified by USBI personnel. Vibration test is monitored by USBI Quality Assurance and witnessed by Contractor Quality Assurance one hundred percent. Leak test and ambient temperature test are witnessed one hundred percent by USBI Quality Assurance and Contractor Quality Assurance per: (Contamination, Vibration)
  - o USBI Quality Assurance
    - USBI SIP 1485
  - o Contractor Quality Assurance
    - SDI Acceptance Test Procedure ATP 106521 CN 035
- O Lot review and certification per USBI plan 10PLN-0049 CN 035
- O Critical Processes/Inspections/Operations: The following critical processes/inspections/operations are used to assure that explosive charge is properly sealed: (Contamination)
  - o Helium Leak Test per SDI ATP 106521
  - o N-Ray per SDI ATP 106521
  - o X-Ray per SDI ATP 106521
  - o Adhesive application to explosive leads per SDI ATP 106521 CN 035

KSC RELATED INSPECTION

- O Receiving Inspections
  - o Damage: Each nonelectric pyrotechnic device is visually inspected for evidence of damage and degradation, per OMRSD File V, Vol. 1, requirement number B000FL.005. CN 035
  - o S&A device is inspected per OMRSD File V, Vol. 1, requirement number B000FL.004. CN 035
- D. FAILURE HISTORY
- O Failure Histories may be obtained from the PRACA database.
- E. OPERATIONAL USE
- O Not applicable to this failure mode.