

SRB CRITICAL ITEMS LIST

SUBSYSTEM: RANGE SAFETY COMMAND DESTRUCT

ITEM NAME: Safe and Arm Assembly

PART NO.: 10311-0003-801

FM CODE: A08

ITEM CODE: 70-13

REVISION: Basic

CRITICALITY CATEGORY: 1R

REACTION TIME: Immediate

NO. REQUIRED: 1

DATE: March 31, 1999

CRITICAL PHASES: Boost

SUPERCEDES: March 31, 1998

FMEA PAGE NO.: F-48

ANALYST: S. Roney/ K. C. Finch

SHEET 1 OF 4

APPROVED: P. Kalia

CN 035

CN 035

CN 035

CN 035

FAILURE MODE AND CAUSES: PETN explosive leads (both) fail to propagate the detonation train caused by:

- o Insensitive explosive degraded by moisture, contamination or chemical decomposition
- o Voids or cracks in the leads
- o Improper gap at external interface
- o Contamination or excessive gaps at internal interfaces
- o Overheating of charge
- o Insufficient charge
- o Vibration/shock

FAILURE EFFECT SUMMARY: Loss of the ability to detonate the destruct ordnance may result in loss of life or injury to the public in the case of an abort during the boost phase. One success path remains after the first failure. Operation is not affected until both paths are lost.

REDUNDANCY SCREENS AND MEASUREMENTS:

- 1) N/A
- 2) N/A
- 3) Fail - Contamination

RATIONALE FOR RETENTION:

A. DESIGN

- o Design specification USBI 10SPC-0230
 - o Contamination control per paragraphs 3.1.2. (Contamination)

CN 035

CN 035

- o Vibration levels per paragraph 3.4.1.2. (Cracks, Voids, Gaps)
- o Shock levels per paragraph 3.4.1.3 (Cracks, Voids, Gaps)
- O Explosive material (PETN) certified to MIL-P-387. (Contamination)
- O Predicted temperature will not exceed 106°F per SRB Thermal Design Data Book SE-019-068-2H, Table 4.9.1.1. (Overheating)
- O Explosive lead dimensions and internal interface/gap controlled dimensionally by SDI drawing 106521 (Excessive Gaps) CN 035
- O Moisture content and core loading controlled by SDI drawing 106521.(Insensitive explosive) CN 035
- O PETN charges on each end of lead controlled by SDI drawing 106521. (Contamination) CN 035
- O Qualification
 - o S&A Assembly 10311-0003-801 is qualified per SDI QTR107190- 2022 (Connector) and SDI RPT-106521 Volume I-IV (Includes (NTS) Test Report 8971 (CC-16837-14) Volumes I-IV. (COQ A-PYR-6135-1). (1 Mission - SRB) CN 035
- O Qualification Test CN 035
 - Thermal shock
 - Vibration
 - Shock
 - High temperature (+165°F) Function (All Failure Causes)
 - Low temperature (+20°F) Function (All Failure Causes)

B. TESTING

- O Lot acceptance test per SDI Procedure ATP 106521 . CN 035
 - o X-ray inspection of entire lot. (Gaps, voids, cracks)
 - o N-ray inspection of entire lot. (Gaps, voids, cracks)
 - o Vibration test of entire lot. (Vibration)
 - o Helium leak test of entire lot. (Contamination)
 - o Ambient function test in the armed position of five percent of the lot. (All Failure Causes)
 - o Temperature/humidity test of ten percent of the lot.
 - o Vibration test of ten percent of lot. (Vibration)
- O Explosive lead lot acceptance test are conducted in accordance with SDI procedure ATP 106521 and include the following: CN 035

- o Leak test of entire lot. (Contamination)
- o N-ray inspection of entire lot. (Gaps, voids, cracks)
- o Ambient function test of ten percent of lot. (All Failure Causes)

KSC TESTING

- O S&A preinstallation testing per OMRSD File V, Vol. 1, Req. B000FL.004.

C. INSPECTION

VENDOR RELATED INSPECTIONS

- O Receiving inspection: All explosive material certifications and test reports are verified by USBI Quality Assurance and contractor Quality Assurance per: (Contamination, insensitive explosive)
 - o USBI Quality Assurance
 - USBI SIP 1485
 - o Contractor Quality Assurance
 - SDI Manufacturing and Inspection Plan/Drawing T106521
- O PETN explosive lead acceptance test, N-Ray film is inspected by certified vendor personnel and verified by USBI personnel. Ambient function test is witnessed one hundred percent by USBI Quality Assurance and contractor Quality Assurance per: (All Failure Causes)
 - o USBI Quality Assurance
 - USBI SIP 1485
 - o Contractor Quality Assurance
 - SDI ATP 106521
- 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

CN 035

CN 035

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

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 : (All Failure Causes)

- o USBI Quality Assurance
 - USBI SIP 1485

- o Contractor Quality Assurance
 - SDI ATP 106521-

CN 035

- O Lot review and certification per USBI Plan 10PLN-0049

CN 035

- O Critical Processes/Inspections/Operations:

The following critical process/inspections/operations are used to assure that explosive charge is properly sealed.

- o X-Ray per SDI ATP 106521.
- o N-Ray per SDI ATP 106521.
- o Helium leak test per SDI ATP106521.
- o Adhesive application to PETN explosive leads per SDI ATP 106521.

CN 035

KSC RELATED INSPECTION

CN 035

- O S&A device is inspected per OMRSD File V, Vol. 1, Req. 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.