

SRB CRITICAL ITEMS LIST

SUBSYSTEM: RANGE SAFETY COMMAND
DESTRUCT

ITEM NAME: Linear Shaped Charge

FM CODE: A02

PART NO.: 10313-0002-801, 10313-0003-801, 10313-0003-802
10313-0004-801, 10313-0004-802, 10313-0012-801, 10313-0012-802,
10313-0013-801, 10313-0013-802, 10313-0013-803, 10313-0014-801

CN 025

ITEM CODE: 70-16

REVISION: Basic

CRITICALITY CATEGORY: 1

REACTION TIME: Immediate

NO. REQUIRED: 1

DATE: March 31, 1999

CRITICAL PHASES: Final Countdown,
Boost, Separation

SUPERCEDES: March 31, 1998

CN 030

CN 035

FMEA PAGE NO.: F-59

ANALYST: S. Roney

SHEET 1 OF 4

APPROVED: P. Kalia

FAILURE MODE AND CAUSES: Premature operation caused by:

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

FAILURE EFFECT SUMMARY: Premature detonation of the Range Safety Linear Shaped Charge during countdown, boost or separation leads to fire and explosion of Orbiter/ET resulting in loss of mission, vehicle and crew.

RATIONALE FOR RETENTION:

A. DESIGN

Design Specification 10SPC-0037

- No autoignition at 350°F per paragraph 3.2.5.2. (High Temperature)
- Shock levels per paragraphs 3.3.4.1 and 3.3.4.2. (Shock)
- Vibration levels per paragraph 3.4.1.3. (Vibration)
- Contamination control per paragraph 3.1.2. (Contamination)

Predicted temperature will not exceed 122°F per SRB Thermal Design Data Book SE-019-068-2H, Rev. C, Table 4.9.1.1. (High Temperature)

Explosive Material: (Contamination)

- HMX certified to Grade B, Class 1 per MIL-H-45444 (LSC).
- RDX certified to Type II, Class 3 per MIL-R-398. (Transfer Booster)

- Hermetically sealed device prevents the entry of contamination following manufacturing. (Contamination)
- Qualification
 - Autoignition (High Temperature)
 - Operating high temperature (200°F) (High Temperature)
 - Thermal shock (High Temperature)
 - Vibration (Vibration)
 - Pyrotechnic shock (Shock)
 - 8 & 40 foot drop (LSC only) (Shock)
 - 10 pound impact (Shock)
 - Qualification per OEA Aerospace Test Reports 3653(01)QTR Rev. B, 4249(01) DQTR, 4984(01)DQTR, 0954(01) DQTR and 10135(01) DQTR. (COQ A-PYR-6111-4)

B. TESTING

- Lot acceptance test per OEA Aerospace Procedure 4984(02)ATP
 - Radiographic examination of entire lot. (Contamination)
 - Helium leak test of the entire lot. (Contamination)
 - Vibration test of destructive LAT samples (ten percent of lot). (Vibration)
 - High temperature (200°F) function test of five percent of the lot. (High Temperature)

C. INSPECTION

VENDOR RELATED INSPECTION

- Receiving Inspection: All explosive material certification and test reports are verified one hundred percent by USBI Quality Assurance and Contractor Quality Assurance per: (Contamination)
 - USBI Quality Assurance
USBI SIP 1138
 - Contractor Quality Assurance
OEA Aerospace Acceptance Test Procedure 4984(02) ATP
- Assembly operation (LSC and transfer booster): N-ray and X-ray films are inspected one hundred percent by certified vendor personnel and verified by USBI personnel. Helium leak test is witnessed one hundred percent by USBI Quality Assurance and Contractor Quality Assurance per: (Contamination)

- o USBI Quality Assurance
 - USBI SIP 1138
- o Contractor Quality Assurance
 - OEA Aerospace Acceptance Test Procedure 4984(02) ATP
- O Lot Acceptance Test (Components): X-ray film is inspected by certified vendor personnel and verified by USBI personnel. Moisture content determination and core load determination test data are verified one hundred percent by USBI Quality Assurance and Contractor Quality Assurance. Detonation velocity and severance tests are witnessed one hundred percent by USBI Quality Assurance and Contractor Quality Assurance per: (Contamination)
 - o USBI Quality Assurance
 - USBI SIP 1138
 - o Contractor Quality Assurance
 - OEA Aerospace Acceptance Test Procedure 4984(02)ATP
- O Lot Acceptance Test (RSS Destruct Assemblies): X-ray and N-ray films are inspected by certified vendor personnel and verified by USBI personnel. Helium leak test is witnessed one hundred percent by USBI and Contractor Quality Assurance per : (Contamination)
 - o USBI Quality Assurance
 - USBI SIP 1138
 - o Contractor Quality Assurance
 - OEA Aerospace Acceptance Test Procedure 4984(02)ATP
- O Lot Review and Certification per USBI plan 10PLN-0037.
- O Critical Processes/Inspections/Operations: The following critical processes/inspections/operations are used to verify that LSC is free from cracks, voids, moisture and contamination.
 - o X-ray per ET 4984(02) ATP
 - o N-ray per ET 4984(02) ATP
 - o Helium Leak Test per ET 4984(02) ATP
 - o Adhesive Applications per ET 4984(2) MP
 - o Nickel Seal Welded Per OEAA Standard 3.3.8-3 Laser Beam Welding

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KSC RELATED INSPECTION

- O Receiving inspection
 - o Each Linear Shaped Charge (LSC) Destruct Assembly is visually inspected for evidence of damage, degradation, corrosion, misalignment or moisture per OMRSD File V, Vol. 1, requirement number B000FL.005.

O Installation Inspection

- o Installation of LSC subassemblies into systems tunnel is verified by SPC Quality Assurance. (Contamination)

D. FAILURE HISTORY

- O Failure Histories may be obtained from the PRACA database.

E. OPERATIONAL USE

- o Not applicable to this failure mode.