

SRB CRITICAL ITEMS LIST

SUBSYSTEM: RECOVERY

ITEM NAME: Linear Shaped Charge (LSC) Assembly

PART NO.: 10310-0002-801

FM CODE: A02

ITEM CODE: 40-04-05

REVISION: Basic

CRITICALITY CATEGORY: 1

REACTION TIME: Immediate

NO. REQUIRED: 1

DATE: March 1, 2002

CRITICAL PHASES: Final Countdown,
Boost, Separation

SUPERCEDES: March 31, 1998

FMEA PAGE NO.: C-52A

ANALYST: S. Finnegan

SHEET 1 OF 3

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FAILURE MODE AND CAUSES: Premature operation caused by:

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

FAILURE EFFECT SUMMARY: Premature operation of the LSC during final countdown will cause impact of the nose cap and frustum assembly with the ET or Orbiter resulting in loss of vehicle, mission and crew. Premature operation during boost or separation will cause abnormal aerodynamic forces leading to loss of vehicle control. The prematurely deployed nose cap and frustum assembly will impact other vehicle elements causing loss of vehicle, mission and crew.

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RATIONALE FOR RETENTION:

A. DESIGN

- o Design specification USA SRBE 10SPC-0038
 - No autoignition below 350F, paragraph 3.3.6.3 (High Temperature)
 - Shock level per paragraph 3.4.1.4 (Shock)
 - Vibration level per paragraph 3.4.1.3 (Vibration)
 - Contamination control per paragraph 3.1.2 (Increased Sensitivity due to Contamination)
- o Predicted temperature will not exceed 150⁰F per SRB Thermal Design Data Book SE-019-068-2H, Table 4.9.1.1. (High Temperature)

- o Explosive material (HMX) certified to MIL-H-45444. (Contamination)
- o Hermetically sealed device prevents the entry of contamination following manufacturing. (Contamination)
- o Qualification
 - Autoignition (>275°F) (High Temperature)
 - Operating high temperature (250°F for 30 minutes) (High Temperature)
 - Thermal shock (High Temperature)
 - Vibration (Shock/Vibration)
 - Pyrotechnic shock (Shock/Vibration)
 - 10 pound impact (Shock)
 - Qualification per OEA Aerospace Test Reports 3653(01) QTR, 3653(01)ATR, 4555(05)ATR, 0954(02) DQTR and 10134(01) DQTR

B. TESTING

- o Lot acceptance test per OEA Aerospace Procedure 4983(01)ATP (All Failure Causes)
 - Helium leak test of entire lot
 - High temperature (250°F) function test of 10 percent of the lot for qualification testing
- o Lot acceptance test per OEA Aerospace Procedure 4983(02) ATP. (Contamination)
 - Radiographic examination of entire lot of LSC cord

C. INSPECTION

VENDOR RELATED INSPECTION

- o Receiving Inspection. All explosive material certifications and test reports are verified one hundred percent. (Contamination)
 - USA SRBE Quality Assurance
USA SRBE Source Inspection Plan (SIP) 1135
- o Assembly Operation: Moisture content determination and explosive core loading determination are verified one hundred percent by Contractor Quality Assurance and USA SRBE Quality Assurance. (Contamination)
 - USA SRBE Quality Assurance
USA SRBE SIP 1135

- Contractor Quality Assurance
 - OEA Aerospace Acceptance Test Procedure 4983(02) ATP
- o Lot Acceptance Test: X-ray films of LSC cord are examined by certified vendor personnel and verified by USA SRBE personnel. High temperature function test is witnessed one hundred percent. (All Failure Causes)
 - USA SRBE Quality Assurance
 - USA SRBE SIP 1135
 - Contractor Quality Assurance
 - OEA Aerospace Acceptance Test Procedure 4983(02) ATP
- o Lot review and certification per USA SRBE Plan 10PLN-0028.
- o Critical Processes/Inspections: The following critical processes and inspections are used to verify that explosive charge is properly sealed and free from manufacturing residues, processing debris and contamination. (Contamination)
 - X-ray of LSC cord per OEAA 4983(02) ATP
 - Adhesive Bonding per OEAA 4983(03) MP

KSC RELATED INSPECTION

- o Receiving Inspection
 - Damage: Visual inspection of pyrotechnic device for damage, degradation, corrosion, misalignment or moisture is performed per OMRSD File V, Vol. 1, requirement number B000FL.005. (Contamination)
 - Verify that the LSC Assembly has been flight certified by MSFC as required by NSTS 08060 per OMRSD File V, Volume 1, requirement no. B000FL.002. (All Failure Causes)
- o Installation Inspection
 - Ordnance Installation: Proper installation of the CDF assembly to the detonator subassembly LSC on the frustum is verified per 10REQ-0021, para. 1.1.4.1. (All Failure Causes)

D. FAILURE HISTORY

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

E. OPERATIONAL USE

- o Not applicable to this failure mode.