

SRB CRITICAL ITEMS LIST

SUBSYSTEM: RANGE SAFETY COMMAND DESTRUCT  
 ITEM NAME: CDF Manifold  
 PART NO.: 10312-0001-106, -107 FM CODE: A03  
 ITEM CODE: 70-15 REVISION: Basic  
 CRITICALITY CATEGORY: 1 REACTION TIME: Immediate  
 NO. REQUIRED: 2 DATE: March 1, 1995  
 CRITICAL PHASES: Final Countdown, Boost, Separation, Retrieval SUPERCEDES: January 28, 1991  
 FMEA PAGE NO.: F-56 ANALYST: T. L. Burke/J. Fletcher  
 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 firing of the Range Safety destruct ordnance during countdown, boost or separation leads to fire and explosion of the Orbiter/ET resulting in loss of mission, vehicle and crew.

RATIONALE FOR RETENTION:

A. DESIGN

- Design specification USBI 10SPC-0036
  - No autoignition at 275°F per paragraphs 3.2.5.2 and 3.3.7.2. (High Temperature)
  - Shock levels per paragraph 3.4.1.4. (Shock)
  - Vibration levels per paragraph 3.4.1.3. (Vibration)
  - Contamination control per paragraphs 3.1.2 and 3.1.3. (Increased sensitivity due to contamination)
- Predicted temperature will not exceed 100°F per SRB Thermal Design Data Book SE-019-068-2H, Rev. C, Table 4.9.1.1. (High Temperature)
- Explosive material (RDX Type I) certified to MIL-R-398. (Contamination)
- Hermetically sealed explosive cord prevents the entry of contamination following manufacturing. (Contamination)

## O Qualification for SRB and ET

- o Proven design qualified for Saturn V per North American Aviation Qualification Test Summary 67MS1148.
- o Delta Qualification for SRB per Explosive Technology Test Report 3612(01) QTR, Revision B, 0954(03) DQTR, and 10133(01) DQTR.
  - Autoignition temperature (400°F) demonstrated (High Temperature)
  - Operating high temperature (195°F) (High Temperature)
  - 8 and 40 foot drop (Shock)
  - Pyrotechnic shock (Shock)
  - Acceleration (Shock)
  - Vibration (Vibration)
- o Delta qualification per Explosive Technology Test Report 3612 (01) QTR Rev. B, 0954(03) DQTR and 10133(01) DQTR. (COQ A-PYR-6101-1)

## B. TESTING

- O Lot acceptance test per Explosive Technology Procedure 4824 (01) ATP.
  - o Radiographic tests of the entire lot. (Contamination, Shock/Vibration)
  - o Vibration of all destructive LAT samples. (Vibration/Shock)
  - o High temperature (+195°F) function test of five percent of the lot. (High Temperature)

## C. INSPECTION

The following inspections are performed.

## VENDOR RELATED INSPECTION

- O Receiving Inspection. All explosive material certifications and test reports are verified one hundred percent. (Contamination)
  - o USBI Quality Assurance  
USBI SIP 1136
  - o Contractor Quality Assurance  
Explosive Technology Acceptance Test Procedure ET 4824(01) MP
- O Assembly Operation: Moisture content determination and explosive loading are verified one hundred percent by Contractor Quality Assurance and USBI Quality Assurance per: (Contamination)

- o USBI Quality Assurance  
USBI SIP 1136
- o Contractor Quality Assurance  
Explosive Technology Acceptance Test Procedure ET 4824(01) MP
- O Lot Acceptance Test. N-ray and X-ray films are examined 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. High temperature functions test is witnessed one hundred percent. (All Failure Causes)
  - o USBI Quality Assurance  
USBI SIP 1136
  - o Contractor Quality Assurance  
Explosive Technology Acceptance Test Procedure 4824(01) MP
- O Lot review and certification per USBI Plan 10PLN-0036.
- O Critical Processes/Inspections/Operations: The following critical processes/inspections/ operations are used to verify that explosive charge is properly sealed. (All Failure Causes)
  - o N-ray per ET 4824(01) MP (Contamination)
  - o X-ray per ET 4824(01) MP (Contamination)
  - o Helium Leak Test per ET 4824(01) MP (Contamination)
  - o Adhesive Application per ET 4824(02) MP (Contamination)

## KSC RELATED INSPECTION

- O Receiving Inspection
    - o Damage: Each nonelectric pyrotechnic device is visually inspected for evidence of damage, degradation, corrosion, misalignment or moisture per OMRSD File V, Vol. 1, requirement number B000FL.005. (Contamination)
  - o Installation Inspection
    - Verify proper installation of the CDF assemblies to the CDF manifolds per 10REQ-0021, para. 1.1.4.1. (Contamination)
- D. FAILURE HISTORY
- O Criticality Category 1:
    - o No SRB failure history for this failure mode.

FM Code: 70-15-A03

Date: March 1, 1995

E. OPERATIONAL USE

Not applicable to this failure mode.