

## SRB CRITICAL ITEMS LIST

SUBSYSTEM: RECOVERY

ITEM NAME: CDF Manifold

PART NO.: 10312-0001-101

FM CODE: A02

ITEM CODE: 40-01-05

REVISION: BASIC

CRITICALITY CATEGORY: 1

REACTION TIME: Immediate

NO. REQUIRED: 1

DATE: March 31, 1997

CRITICAL PHASES: Final Countdown,  
Boost, Separation

SUPERCEDES: March 1, 1995

FMEA PAGE NO.: C-13

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SHEET 1 OF 4

APPROVED: P. Kalia

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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 will eject the nose cap. During final countdown, impact with the ET or Orbiter is possible leading to loss of vehicle, mission and crew. During boost or separation, abnormal aerodynamic forces on the vehicle or impact of the nose cap with the vehicle will cause loss of vehicle, mission and crew.

### RATIONALE FOR RETENTION:

#### A. DESIGN

- o Design specification USBI 10SPC-0036
  - No autoignition at 275°F per paragraph 3.2.5.2 (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)
- o Predicted temperature will not exceed 134°F per SRB Thermal Design Data Book SE-019-068-2H, Table 4.9.1.1. (High Temperature)

- o Explosive material (RDX) Type "A" certified to MIL-R-398C. (Contamination)
- o Hermetically sealed explosive cord prevents the entry of contamination following manufacturing. (Contamination)
- o Qualification
  - Proven design qualified for Saturn V per North American Aviation Qualification Test Summary 67MS1148.
  - Delta Qualification for SRB.
    - o Demonstrated Autoignition Temperature (400°F) (High Temperature)
    - o Operating High temperature (195°F) (High Temperature)
    - o 8 and 40 foot drop (Shock)
    - o Pyrotechnic shock (Shock)
    - o Acceleration (Shock)
    - o Vibration (Shock/Vibration)
  - Delta qualification per OEA Aerospace Test Report 3612 (01) QTR Rev. B, 0954(03) DQTR and 10133(01) DQTR

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B. TESTING

- o Lot acceptance test per OEA Aerospace Procedure 4824 (01) ATP
- Radiographic Tests of the entire lot (Shock/Vibration/Contamination)
- Vibration of all destructive LAT Samples 10 percent of lot (Shock/Vibration)
- High Temperature Function (195°F) 5% of the Lot. (High Temperature)

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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)
- USBI Quality Assurance  
USBI Source Inspection Plan 1136

- Contractor Quality Assurance
  - OEA Aerospace Acceptance Test Procedure 4824(01) ATP. (Certification of Bulk Material)
- o Assembly Operation. Moisture content determination and explosive loading are verified one hundred percent by Contractor Quality Assurance and USBI Quality Assurance. (Contamination)
  - USBI Quality Assurance
    - USBI Source Inspection Plan 1136
  - Contractor Quality Assurance
    - OEA Aerospace Acceptance Procedure 4824(01) ATP
- 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 personnel and high temperature function test is witnessed one hundred percent. (All Failure Causes)
  - USBI Quality Assurance
    - USBI Source Inspection Plan 1136
  - Contractor Quality Assurance
    - OEA Aerospace Acceptance Test Procedure 4824(01) ATP
- o Lot review and certification per USBI Plan 10PLN-0036.
- o Critical Processes/Inspections: The following critical processes and inspections are used to verify that explosive charge is properly sealed and free from moisture, contamination, cracks, voids or separation at interfaces. (All Failure Causes)
  - N-ray per OEAA 4824(01) ATP
  - X-ray per OEAA 4824(01) ATP
  - Helium leak Test per OEAA 4824(01) ATP
  - Adhesive bonding per OEAA 4824(02) MP

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KSC RELATED INSPECTION

- o Receiving Inspection
  - Damage. Visual inspection of pyrotechnic device for evidence of damage, degradation, corrosion, misalignment or moisture is performed per OMRSD File V, Vol.1, requirement number B000FL.005. (Contamination)
  - Verify that CDF Manifolds have been flight certified by MSFC as required by NSTS 08060 per OMRSD File V, Volume I, requirement no. B000FL.002. (All Failure Causes)

o Installation Inspection

- Ordnance Installation: Proper installation of the CDF assemblies to the CDF manifolds is verified per 10REQ-0021, paragraph 1.1.4.1. (Contamination)

D. FAILURE HISTORY

- o Failure Histories may be obtained from the PRACA database

E. OPERATIONAL USE

- o Not applicable to this failure mode.