

SRB CRITICAL ITEMS LIST

SUBSYSTEM: SEPARATION

ITEM NAME: CDF Manifold, Forward and Aft BSMs

PART NO.: 10312-0001-102, 103  
10312-0001-104, 105

FM CODE: A03

ITEM CODE: 30-01-02, 30-02-02

REVISION: Basic

CRITICALITY CATEGORY: 1

REACTION TIME: Immediate

NO. REQUIRED: 2 Forward and 2 Aft

DATE: March 31, 1997

CRITICAL PHASES: Boost

SUPERCEDES: March 1, 1995

PMEA PAGE NO.: B-9, B-30

ANALYST: S. Parvathaneni

SHEET 1 OF 4

APPROVED: P. Kalia

DCN032

DCN032

DCN032

FAILURE MODE AND CAUSES: Premature Operation caused by:

- o High temperature
- o Shock/vibration
- o Increased sensitivity due to contamination

FAILURE EFFECT SUMMARY: Premature firing of the Aft or Forward Separation Motors results in loss of required separation thrust at separation leading to loss of mission, vehicle and crew.

RATIONALE FOR RETENTION:

A. DESIGN

- o Design specification USBI 10SPC-0036
  - No autoignition at 275°F, per paragraph 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)
- o Predicted temperature will not exceed 134°F (Forward) and 110°F (Aft) 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-398. (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 per OEA Aerospace Test Report 3612 (01) QTR, Revision B, 0954(03) DQTR and 10133(01) DQTR
  - o Autoignition Temperature demonstrated per 10SPC-0036 (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 (Vibration)

DCN032

#### B. TESTING

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

DCN032

#### 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 OEA4824(01) MP
- 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

DCN032

- Contractor Quality Assurance  
OEA Aerospace Acceptance Procedure 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 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) MP
- 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. (All Failure Causes)
  - N-ray per OEAA 4824(01) MP (Contamination)
  - X-ray per OEAA 4824(01) MP (Contamination)
  - Helium Leak Test per OEAA 4824(01) MP (Contamination)
  - Adhesive bonding per OEAA 4824(02) MP (Contamination)

DCN032

DCN032

DCN032

#### KSC RELATED INSPECTION

- o Receiving Inspection
    - Ordnance device shelf life is verified one hundred percent by Shuttle Processing Contractor Quality Assurance per OMRSD File II, Vol. 3, Table C00CA0.040-000. (Contamination)
    - Each nonelectrical pyrotechnic device is visually inspected for damage, degradation, corrosion, misalignment or moisture 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 1, requirement no. B000FL.002. (All Failure Causes)
  - o Installation Inspection
    - Proper installation of the CDF assemblies to the CDF manifolds is verified per 10REQ-0021, para. 1.1.4.1 (forward) and para. 2.1.1.1 (aft). (Contamination)
- D. FAILURE HISTORY
- o Failure Histories may be obtained from the PRACA database.
- E. OPERATIONAL USE
- o Not applicable to this failure mode.