

SRB CRITICAL ITEMS LIST

SUBSYSTEM: SEPARATION

ITEM NAME: CDF Initiator, Forward and Aft BSM's

PART NO.: 10308-0003-801

FM CODE: A03

ITEM CODE: 30-01-05, 30-02-05

REVISION: Basic

CRITICALITY CATEGORY: 1

REACTION TIME: Immediate

NO. REQUIRED: 8 Forward and 8 Aft

DATE: March 31, 1999

CRITICAL PHASES: Boost

SUPERCEDES: March 31, 1997

FMEA PAGE NO.: B-17, B-32

ANALYST: B. Crawford/V. Patel

SHEET 1 OF 3

APPROVED: P. Kalia

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FAILURE MODE AND CAUSES: Premature Operation caused by:

- o Shock/ Vibration
- o High temperature
- 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 10SPC-0032
 - No Autoignition at 240°F per paragraphs 3.2.5.2 and 3.3.7.2. (High Temperature)
 - Shock levels per paragraph 3.4.1.4
 - Vibration levels per paragraph 3.4.1.3
 - Contamination control per paragraphs 3.1.2 and 3.1.3
- o Predicted temperature will not exceed 134°F (Fwd) and 110°F (Aft) per SRB Thermal Design Data Book SE-019-068-2H, Table 4.9.1.1. (High Temperature)
- o Explosive material (PETN) Certified to MIL-P-387 (Contamination)
- o Output mix per OEA Aerospace Drawing 5616107 or Pacific Scientific Drawing 2-900108 (Contamination)
 - Magnesium per MIL-M-382
 - Cupricoxide reagent grade

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- o Contamination from liquids is controlled by USBI specification 10SPC- 0032, para. 3.1.2. (Contamination)
- o Hermetically sealed device prevents the entry of contamination following manufacturing. (Contamination)
- o Qualification
 - Proven design qualified for Saturn V per North American Aviation Qualification Test Summary 67MS1147.
 - Delta Qualification for SRB
 - o Demonstrated autoignition temperature per 10SPC-0032
 - o High temperature functional test (190°F) (High Temperature)
 - o Pyrotechnic Shock (Vibration/Shock)
 - o Vibration (Vibration)
 - Delta qualification per OEA Aerospace test report 10-5616100 or Pacific Scientific test report 4984 QTR 9803.

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B. TESTING

- o Lot Acceptance Tests are conducted per OEA Aerospace Acceptance Test Procedure 7-5616100 or Pacific Scientific Acceptance Test Procedure ATP 51-4894.
 - Radiographic examination of all specimens. (Contamination)
 - Vibration, All destructive lot samples. (Vibration)
 - High temperature test 5 percent of the lot. (High Temperature)
 - Helium leak test. (Contamination)

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C. INSPECTION

The following inspections are performed.

VENDOR RELATED INSPECTION

- o Receiving Inspection: Explosive material certifications and test reports are verified one hundred percent. (Contamination)
 - USBI Quality Assurance
USBI Source Inspection Plan (SIP) 1350
 - Contractor Quality Assurance
OEA Aerospace Manufacturing Procedure 40-5616100 or Pacific Scientific Manufacturing Procedure MP 51-4894.
- o Assembly Operation: Moisture content determination, explosive loading and sealing process are verified and leak test is witnessed one hundred percent by contractor Quality Assurance and USBI Quality Assurance. (Contamination)

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- USBI Quality Assurance
USBI Source Inspection Plan 1350
- Contractor Quality Assurance
OEA Aerospace Manufacturing Procedure 40-5616100 or Pacific Scientific Manufacturing Procedure MP 51-4894. CN 035
- 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. Helium leak test is witnessed one hundred percent. (All Failure Causes)
- USBI Quality Assurance
USBI SIP 1350
- Contractor Quality Assurance
OEA Aerospace Acceptance Test Procedure 7-5616100 or Pacific Scientific Acceptance Test Procedure ATP 51-4894. CN 035
- o Lot review and certification per USBI Plan 10PLN-0032.
- o Critical Processes/Inspections: The following critical processes and inspections are used to assure structural integrity of the bulkhead and that the explosive charge is properly sealed. (All Failure Causes)
 - X-ray per OEA Aerospace ATP 7-5616100 or Pacific Scientific ATP 51-4894.
 - N-ray per OEA Aerospace ATP 7-5616100 or Pacific Scientific ATP 51-4894.
 - Helium Leak Test per OEA Aerospace ATP 7-5616100 or Pacific Scientific ATP 51-4894. CN 035

KSC RELATED INSPECTION

- o Receiving Inspection
 - The CDF Initiator is inspected for foreign material and damage during BSM inspection by SPC Quality Assurance per OMRSD File V, Vol. 1 requirement no. B000FL-005. (Contamination)
 - Verify that CDF Initiators 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
 - The CDF Initiator is inspected for contamination and damage per 10REQ-0021, para. 1.1.4.2 (Forward) and para. 2.1.1.3 (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.