

SRB CRITICAL ITEMS LIST

SUBSYSTEM: RECOVERY

ITEM NAME: CDF Initiator, Thruster Pressure Cartridge

PART NO.: 10308-0003-802

FM CODE: A02

ITEM CODE: 40-01-04A

REVISION: Basic

CRITICALITY CATEGORY: 1

REACTION TIME: Immediate

NO. REQUIRED: 3

DATE: March 1, 2002

CRITICAL PHASES: Final Countdown,
Boost, Separation

SUPERCEDES: March 31, 1999

FMEA PAGE NO.: C-12B

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

RATIONALE FOR RETENTION:

A. DESIGN

- o Design specification USA SRBE 10SPC-0032
 - No autoignition below 240°F, paragraph 3.2.5.2
 - 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
- 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 (PETN) Certified to MIL-P-387. (Contamination)
- o Output mix per UPCO Aerospace Drawing 5616107 or Pacific Scientific Drawing 2-900108. (Contamination)
 - Magnesium per MIL-M-382
 - Cupric oxide reagent grade

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- o Contamination from liquids is controlled by USA SRBE specification 10SPC-0032, para. 3.1.2. (Contamination)
- o Hermetically Sealed device prevents the entry of contamination following manufacturing. (Contamination)
- o Qualification
 - Qualified for SRB as reported by UPCO Aerospace Report 10-5616100 or Pacific Scientific Test Report 4984 QTR 9803.

B. TESTING

- o Lot Acceptance Tests are conducted per UPCO Aerospace Acceptance Procedure 7-5616100 or Pacific Scientific Acceptance Test Procedure ATP 51-4894.
 - Radiographic examination of entire lot. (Contamination)
 - Vibration tests of all destructive LAT samples. (Shock/Vibration)
 - High temperature (250°F) function test of 5 percent of the lot. (High Temperature)
 - Helium leak test. (Contamination)

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.
 - USA SRBE Quality Assurance
USA SRBE Source Inspection Plan (SIP) 1350
 - Contractor Quality Assurance
UPCO Aerospace 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 USA SRBE Quality Assurance. (Contamination)
 - USA SRBE Quality Assurance
USA SRBE Source Inspection Plan (SIP) 1350
 - Contractor Quality Assurance
UPCO Aerospace Procedure 40-5616100 or Pacific Scientific Manufacturing Procedure MP 51-4894
- o Lot Acceptance Test. N-ray and X-ray films are examined by certified vendor personnel and verified by USA SRBE personnel. Vibration test is monitored by USA SRBE personnel and Helium leak test is witnessed one hundred percent. (All Failure Causes)
 - USA SRBE Quality Assurance
USA SRBE Source Inspection Plan (SIP) 1350
 - Contractor Quality Assurance
UPCO Aerospace Procedure 7-5616100 or Pacific Scientific Acceptance Test Procedure ATP 51-4894

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- o Critical Processes/Inspections: The following critical processes and inspections are used to assure that explosive charge is properly sealed and free from cracks, voids, moisture, separation, or contamination. (Contamination)
 - X-ray per UPACO Aerospace ATP 7-5616100 or Pacific Scientific ATP 51-4894.
 - N-ray per UPACO Aerospace ATP 7-5616100 or Pacific Scientific ATP 51-4894.
 - Helium Teak Test per UPACO Aerospace ATP 7-5616100 or Pacific Scientific ATP 51-4894.

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KSC RELATED INSPECTION

- o Receiving Inspections
 - The CDF Initiator is inspected for foreign material and damage 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 None

E. OPERATIONAL USE

- o Not applicable to this failure mode.