

SRB CRITICAL ITEMS LIST

SUBSYSTEM: STRUCTURES AND MISCELLANEOUS ITEMS

ITEM NAME: Aft Skirt Shim

PART NO.: 10183-0125

FM CODE: A01

ITEM CODE: 60-04-07

REVISION: Basic

CRITICALITY CATEGORY: 1

REACTION TIME: Immediate

NO. REQUIRED: 4

DATE: March 31, 1997

CRITICAL PHASES: Boost

SUPERCEDES: March 1, 1996

FMEA PAGE NO.: E-60

ANALYST: C. Reynolds/H. Longani

SHEET 1 OF 3

APPROVED: P. Kalia

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FAILURE MODE AND CAUSES: Loss of shim(s) or shim sidewalls during liftoff caused by:

- Improper substrate preparation.
- Improper preparation of shim adhering surface.
- Adhesive failure.
- Improper installation.

FAILURE EFFECT SUMMARY: Loss of mission, vehicle and crew due to damage to the Orbiter/ET from shim debris leading to fire and explosion during ascent, or structural breakup Orbiter during reentry.

RATIONALE FOR RETENTION:

A. DESIGN

The Aft Skirt Shim is designed to reduce/eliminate point loading stresses in the Aft Skirt by distributing the load from the Aft Skirt Holddown Post into the Aft Skirt Shoe. It also serves as the separation plane between the Shuttle System and the launch facility. To eliminate the possibility of the Shim or sidewalls becoming debris at liftoff, the Shim is adhesively bonded to the shoe and the sidewalls are cast to the shoe at all Holddown Post locations. The Aft Skirt Holddown Post is coated with a mold release agent.

10183-0125 shim is machined from a laminated, thermosetting phenolic sheet produced in accordance with Federal Specification L-P-509a, type 1, grade XXX. The sidewalls are formulated from EA-934 NA.

Shim and sidewall installation is in accordance with drawing 10115-0020 (Shoe Installation, Aft Skirt). Shim and substrate surface preparation, adhesive preparation and application, sidewall casting after shoe installation, and mold release agent application are performed per 10PRC-0040

A test program was conducted to improve the bond strength of the shim to shoe bond and is documented in report M&P-3032-033-91.

The Aft Skirt Shim is qualified by analysis and test as documented in Certificate of Qualification A-STR-7124.

B. TESTING

The shim materials vendor performs tests and certifies proper material, by lot, in accordance with drawing or 10753-0051. (Improper Material)

Bonding adhesive and sidewall materials vendor performs tests and certifies proper material, by lot, in accordance with source control drawing 10753-0036. (Improper Material)

C. INSPECTION

O Critical Processes/Inspections:

- o Shim bonding and sidewall casting per 10PRC-0040.

VENDOR RELATED INSPECTIONS

- O USBI QAR performs source inspection at the vendor's facility for P/N 10183-0125 Shim and verifies vendor inspection records and material certifications per SIP-1453. (Improper Material)
- O Material certifications are verified by USBI QAR as part of the receiving criteria, in accordance with drawing 10183-0125. (Improper Material)
- O USBI QA verifies the location/placement of "RELEASE SIDE" marking requirements on each Shim, in accordance with drawing 10183-0025. (Improper Installation)

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ASSEMBLY/CHECKOUT RELATED INSPECTIONS

- O Installation of the shim and sidewalls is in accordance with assembly drawing 10115-0020 (Shoe Installation, Aft Skirt) and is verified per 10REQ-0021, para. 4.10.1 including the following:
 - o Substrate preparation
 - o Preparation of shim adhering surface
 - o Adhesive preparation
 - o Cure sample hardness(Improper Substrate Preparation/ Improper Preparation of Shim Adhering Surface/ Adhesive Failure/ Improper Installation)
- O Verification of shim bondline integrity, that "release side" markings are not bonded to the shoe and absence of unacceptable sidewall defects and gaps are performed per 10PRC-0040. (Adhesive Failure/ Improper Installation).

D. FAILURE HISTORY

- Failure Histories may be obtained from the PRACA database.

E. OPERATIONAL USE

- Not applicable to this failure mode.