SUBSYSTEM: SEPARATION

ITEM NAME: Aeroheat Shield (AHS)

PART NO.: 10317-0003-801 (AHS)
10317-0009-801 (Cover Seal)

FM CODE: A01

DCN 033

ITEM CODE: 30-01-08

REVISION: Basic

CRITICALITY CATEGORY: 1

REACTION TIME: Immediate

NO. REQUIRED: 4 required per SRB

DATE: March 31, 1998

DCN 033

CRITICAL PHASES: Separation

SUPERCEDES: March 1, 1996

DCN 033

FMEA PAGE NO.: B-25

ANALYST: T. Burke/V. Patel

DCN 033

SHEET 1 OF 3

APPROVED: P. Kalia

DCN 033

FAILURE MODE AND CAUSES: Fails to achieve minimum opening angle caused by:

- o Improper material
  - Pawl
  - Frangible link
  - Hinge pin
  - Ratchet
- o Improper Heat treatment
  - Pawl
  - Hinge pin
- o Dimensional Non-conformances
  - Frangible Link
  - Hinge Pin

FAILURE EFFECT SUMMARY: Generation of aeroheat shield debris will result in loss of mission, vehicle and crew due to debris impacting the Orbiter/ET.

RATIONALE FOR RETENTION:

A. DESIGN

Design Specification is USBI 10SPC-0067

- o Material and heat treatment
  - Pawl is 17-4PH steel with heat treatment per MIL-H-6875 Condition H1025.
  - Frangible link is 304L SST Condition A sheet.
  - Ratchet is 321 SST bar Condition A.
  - Hinge pin is 304L SST bar. Each bar is independently certified to a yield strength of 66.6 to 72.5 ksi and to an ultimate strength which is within +/-10% of the average ultimate strength of all bars in the lot.

- Qualification tests of design are documented in CSD Report 5180-79-109. Eight qual units fired on BSM qual motors at 30°F and at 120°F. Other tests consisted of temperature cycling, altitude cycling, rain, salt fog and vibration.

B. TESTING:

- All listed vendor related tests are witnessed or monitored by vendor (or sub-tier vendor) QA personnel. When no designated QA organization exists at vendor, tests are witnessed/monitored by CSD QA personnel or tests are evaluated for compliance with specification requirements by CSD personnel.

- Hinge Pin - A tensile coupon test is performed on each bar of stock used. Any bar in a lot with ultimate tensile strength in excess of +/-10% of lot average is rejected. (Improper Material)

- All KSC related tests are witnessed or monitored by USBI or SPC personnel.

C. INSPECTION:

- All listed vendor related inspections are conducted 100% by vendor (or sub-tier vendor) QA personnel. Where no designated QA organization exists at a vendor, inspections are witnessed/monitored by CSD QA personnel or inspection records are evaluated for compliance with quality system requirements by CSD QA personnel.

- All listed KSC related inspections are conducted 100% by USBI or SPC personnel.

VENDOR RELATED INSPECTIONS

- Material

  Material certifications and actual chemical analysis and physical proper- ties are recorded and verified by data evaluation. (Improper Material)

- Dimensional Inspections

  - Frangible link fracture section is dimensionally inspected
  - Hinge pin waist diameters are dimensionally inspected

- Heat Treatment and Welding

  Heat treat data, welding and weld filler metal control is verified. (Improper Heat Treatment and Defective Welds)

KSC RELATED INSPECTIONS

- Receiving Inspection (All Failure Causes)

  - Verify for each AHS received there is no evidence of damage, corrosion, misalignment or moisture by visual inspection per OMRSD File V, Vol. I, requirement number B000FL.005.

D. FAILURE HISTORY:

- Failure Histories may be obtained from the PRACA database.

E. OPERATIONAL USE

- Not applicable to this failure mode.