

SRB CRITICAL ITEMS LIST

SUBSYSTEM: STRUCTURES AND MISCELLANEOUS ITEMS

ITEM NAME: Electrical Bond Straps for the Forward Skirt Access Door

PART NO.: 10160-0422 FM CODE: A01
10160-0403

ITEM CODE: 60-02-21 REVISION: Basic

CRITICALITY CATEGORY: 1 REACTION TIME: Immediate

NO. REQUIRED: 4 per SRB DATE: March 31, 1999

CRITICAL PHASES: Boost, Separation SUPERCEDES: March 31, 1997

FMEA PAGE NO.: E-26C ANALYST: R. Raley/V. Patel

SHEET 1 OF 2 APPROVED: P. Kalia

FAILURE MODE AND CAUSES: Failure of Electrical Bond Strap(s) and/or loss of RTV-133 sealant caused by:

- O Aerodynamic loading combined with Improper Material, Improper Installation, or Improper Fabrication (Electrical Bond Strap(s) only)
- O Aerodynamic loading combined with Improper Material, Improper Substrate Preparation, Improper Application (For RTV-133 Applications on Electrical Bond Strap(s) and FWD Skirt Access Door only)

FAILURE EFFECT SUMMARY: Loss of mission, vehicle and crew due to detachment of the electrical bond strap(s) and/or RTV-133 sealant becoming debris impacting and damaging the Orbiter/ET.

RATIONALE FOR RETENTION:

A. DESIGN

- O The material of the Electrical Bond Straps is 1100-0 Aluminum. Four bond straps are used on each access door. RTV-133 sealant is to be applied around the strap edges and over the fastener heads.
- O The materials selected in the design were aluminum alloy sheet 1100-0 per QQ-A-250/1 or 3003H14 per QQ-A-250/2.
- O RTV-133 sealant is applied to prevent moisture intrusion. RTV-133 is purchased in accordance with Drawing 10753-0014.
- O The Electrical Bond Straps were qualified for flight by analysis (Ref. Analysis Report JRL-041-90-E). Analysis shows that a design factor of safety of 2.56 exists between the Electrical Bond Straps and the predicted maximum loading during ascent.
- O Analysis shows that a minimum factor of safety of 42 exists for the worst case effect of loading and temperature on material strength of RTV-133. (Ref. Analysis Report MDC-350-98-SA)
- O RTV-133 is qualified for flight as documented in Certification of Qualification (COQ) USBI COQ A-TPS-8102.

B. TESTING

- Testing is performed to assure minimum hardness requirements are met per 10PRC-0025 (Improper Material)

CN 035

C. INSPECTION

VENDOR RELATED INSPECTION

- USBI SIP 1453 controls the USBI QAR inspection criteria at the vendor's facility for the bond straps. (Improper Fabrication)
- Materials are accepted on the basis of supplier certifications. Certifications are verified by USBI QAR per SIP 1453 for the bond straps. (Improper Material)

○ CRITICAL PROCESSES/INSPECTIONS:

- RTV-133 10PRC - 0025

CN 035

KSC RELATED INSPECTION

- Electrical Bond Straps for the Forward Skirt Access Door is installed per MIL-B-5087. (Improper Installation)
- The installation of Forward Skirt Access Door Electrical Bond Straps is conducted per drawing 10100-0014 (SRB Ordnance Installation). (Improper Installation)
- Verification of Bonding is conducted by USBI QA in accordance with OMRSD File V, Vol. I, Requirement number B75000.020. (Improper Installation)
- RTV-133 is applied in accordance with DWG 10100-0014 and 10PRC-0025. (Improper Application)
- RTV-133 substrate surface preparation is performed in accordance with 10PRC-0025. (Improper Application; Improper Substrate Preparation)
- RTV-133 application is performed in accordance with 10PRC-0025. (Improper Application)
- Final inspection of RTV-133 is performed per 10PRC-0025:
 - Verify no loose sealant, absence of voids and bubbles over 1/8" diameter per 10PRC-0025. (Improper Material, Improper Application, Improper Substrate Preparation)
 - Verify continuous application, as applicable, with no voids or breaks per 10PRC-0025. (Improper Material, Improper Application)
 - Verify minimum hardness requirements are met per 10PRC-0025. (Improper Material)

CN 035

CN 035

CN 035

CN 035

CN 035

CN 035

CN 035

CN 035

D. FAILURE HISTORY

- Criticality Category 1:
 - Failure Histories may be obtained from the PRACA database.

E. OPERATIONAL USE

- Not applicable to this failure mode.