

SRB CRITICAL ITEMS LIST

SUBSYSTEM: STRUCTURES & MISCELLANEOUS ITEMS

ITEM NAME: Nose Cone Assembly

PART NO.: 10123-0001

FM CODE: A01

ITEM CODE: 60-02-01

REVISION: Basic

CRITICALITY CATEGORY: 1

REACTION TIME: Immediate

NO. REQUIRED: 1

DATE: March 1, 1995

CRITICAL PHASES: Boost, Separation

SUPERCEDES: September 15, 1989

FMEA PAGE NO.: E-10

ANALYST: Reynolds/S. Glasgow

SHEET 1 OF 2

APPROVED: P. Kalia

FAILURE MODE AND CAUSES: Structural failure of the thruster shear flange from internal overpressure caused by:

- Vent blockage: Vent blockage could be caused by topcoat or TPS over-spray, trash left in during buildup, and/or ice.

FAILURE EFFECT SUMMARY: Loss of mission, vehicle, and crew due to higher aerodynamic loads or damage to Orbiter/ET from generated debris.

RATIONALE FOR RETENTION:

A. DESIGN

- The nose cone assembly is expected to obtain an internal pressure of 1.5 psi during ascent (open vents). Under these conditions, the safety factor for the thruster shear flange is +3.31.

The maximum internal pressure that the nose cone assembly can sustain and not fail the thruster shear flange is 10.7 PSI. With blocked vents the internal pressure of the nose cone assembly can reach 16.5 PSI. The design provides a factor of safety of +0.71 against the 16.5 PSI pressure.

- The nose cone assembly is sealed. Venting is accomplished by the use of three designed vents in the frustum located symmetrically around its circumference at station X SRB 299.

The Nose Cap was qualified for flight by analysis. The Frustum was qualified for flight by test and analysis. The qualification is documented in USBI Certificate of Qualification (COQ) A-STR-7111-2.

B. TESTING

- No testing is performed during each flow applicable to this failure mode.

C. INSPECTION

VENDOR RELATED INSPECTION

- Critical Processes/Inspections:

- None

ASSEMBLY/CHECKOUT RELATED INSPECTIONS

- The SRB vent/drain holes are visually verified to be clear of any obstruction or foreign matter per 10REQ-0021, para. 1.1.2.1. (Vent Block)

PRELAUNCH CHECKOUT RELATED INSPECTIONS

- The three nose cone/frustum vent holes are visually verified to be clear of any obstruction or foreign material prior to Rollout (KSC) per OMRSD File V, Vol. 1, Requirement Number B08SB0.061. (Vent Block)
- To prevent ice buildup on vent holes, a minimum ambient temperature restriction of 36°F, for wind speeds greater than 14 knots and 0 to 100% relative humidity, has been imposed on the launch commit criteria. (Vent Block)

D. FAILURE HISTORY

- Criticality Category 1:

- Failure Histories may be obtained from the PRACA database.

E. OPERATIONAL USE

- Not applicable to this failure mode.