

CRITICAL ITEMS LIST (CIL)

SYSTEM:	Electrical	FUNCTIONAL CRIT:	1
SUBSYSTEM:	Nose Cone Temperature	PHASE(S):	b
REV & DATE:	J, 12-19-97	HAZARD REF:	S.11
DCN & DATE:			
ANALYSTS:	L. Colon/A. Oser		

FAILURE MODE: Mechanical Failure of Sensor Element

FAILURE EFFECT: b) Loss of mission and vehicle/crew due to element debris exiting nose cone enclosure and impacting Orbiter.

TIME TO EFFECT: Seconds

FAILURE CAUSE(S): A: Impact Damage
B: Material Defect

REDUNDANCY SCREENS: Not Applicable

FUNCTIONAL DESCRIPTION: Measures nose cone cavity purge gas temperature. Data used to control facility heating system during cryo loading. (Measurement Number: T41T1820H, T41T1821H).

<u>FMEA ITEM CODE(S)</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY</u>	<u>EFFECTIVITY</u>
3.9.10.4	PD7400244-029 (327A09, 327A10)	Temperature Sensor	2	LWT-54 & Up

REMARKS:

CRITICAL ITEMS LIST (CIL)
CONTINUATION SHEET

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RATIONALE FOR RETENTION

DESIGN:

A, B: A sensor assembly is formed by routing platinum lead wires through a magnesium-oxide filled platinum-rhodium shaft. The platinum sensing element wires are Gas-Arc Welded to the platinum lead wires and uniformly wound around the ceramic coated shaft tip. The uniform element spacing is a machine controlled process. The element is then overcoated with a ceramic paste and oven fired. The element is moisture-proof using a Parylene-C coating. The platinum lead wires are brazed to the cooper lead wires and covered with shrink tubing. The element assembly is then brazed in a stainless steel case, using two different epoxy pottings to insulate the wires from the case. One epoxy is filled into the body covering the platinum wire and shrink tubing. Once this is cured the second epoxy is filled into the rest of the body covering the lead wires.

A, B: Failure indication:

Debris generation involves the shearing of the sensor element from the transducer assembly. This shearing action would cause erroneous sensor output indication.

TEST:

The sensor is qualified. Reference CDD MMC-ET-TM06-124.

Vendor:

A, B: Perform Calibration Test (PD7400244).

A, B: Perform Ice Point Resistance Test (PD7400244).

MAF:

A, B: Perform DC Resistance Test (TM04k).

Launch Site:

A, B: Perform DC Resistance Test (OMRSD File IV).

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INSPECTION:

Vendor Inspection - Lockheed Martin Surveillance:

- A, B: Perform visual inspection for cracks and defects in sensor (Rosemount MPS-204/MPS-201).
- A, B: Verify certification of weld operator (Rosemount SIP No. 16).
- A, B: Verify certification of braze operator (Rosemount SIP No. 21).
- A, B: Verify weld schedule certification (Rosemount MPS-204).

Lockheed Martin - Procurement Quality Representative:

- A, B: Witness Calibration Test (PD7400244).
- A, B: Witness Ice Point Resistance Test (PD7400244).
- A, B: Witness visual inspection (PD7400244).

MAF Quality Inspection:

- A, B: Witness DC Resistance Test (TM04k).
- A, B: Perform visual inspection (PD7400244).

Launch Site:

- A, B: Witness DC Resistance Test (CMRSD File IV).

FAILURE HISTORY:

Current data on test failures, unexplained anomalies and other failures experienced during ground processing activity can be found in the PRACA data base.