

CRITICAL ITEMS LIST (CIL)

SYSTEM:	Propulsion/Mechanical	FUNCTIONAL CRIT:	1R
SUBSYSTEM:	Helium Inject	PHASE(S):	a
REV & DATE:	J, 12-19-97	HAZARD REF:	P-02, P.06
DCN & DATE:			
ANALYSTS:	J. Delmonte/H. Claybrook		

FAILURE MODE: Leakage

FAILURE EFFECT: a) Loss of mission and vehicle/crew due to geysering followed by water hammer effect results in leakage of LO2 feedline and loss due to fire/explosion.

TIME TO EFFECT: Minutes

FAILURE CAUSE(S):
 A: Structural Failure
 B: Disengagement of Plug

REDUNDANCY SCREENS:
 Screen A: PASS
 Screen B: N/A - Item nonfunctional in flight.
 Screen C: PASS

FUNCTIONAL DESCRIPTION: These plugs are used to close the upstream manifold machining holes.

<u>FMEA ITEM CODE(S)</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY</u>	<u>EFFECTIVITY</u>
2.4.14.1	57L7-6J	Plug	2	LWT-54 & Up

REMARKS:

CRITICAL ITEMS LIST (CIL)
CONTINUATION SHEET

SYSTEM: Propulsion/Mechanical
SUBSYSTEM: Helium Inject
FMEA ITEM CODE(S): 2.4.14.1

REV & DATE: J, 12-19-97
DCN & DATE:

RATIONALE FOR RETENTION

DESIGN:

A: The plug is installed in the manifold to prevent the overboard flow of helium. The plug is fabricated from 304 CRES and was selected for usage based on operational experience and its capability to meet ET requirements for Class 3 threads and leakage performance. Material selected in accordance with MMC-ET-SE16 and controlled per MMMA Approved Vendor Product Assurance Plan assures conformance of composition, material compatibility and properties. Procurement is governed by material, fabrication, processing, and inspection specification per 57L7 standard. Installation loads are sufficient to provide screening for major flaws.

B: The plug is installed and torqued as specified on the engineering installation drawing and is lockwired to preclude disengagement.

Redundancy Description:

The helium inject system on the ET and Orbiter SSME bleed provide LO2 conditioning that will prevent geysering. The systems are considered to be redundant and loss of helium injection is assessed criticality 1R.

Effect of First Redundancy Loss:

(Helium Injection) - Flow of LO2 from the tank to the SSME's by the active engine bleed system provides a cooling effect within the feedline and geysering will not occur. Plug leakage resulting in loss of helium injection will be detected by the facility flowmeter and the action taken is LO2 stop flow.

Effect of Second Redundancy Loss:

(SSME Bleed) - For worst case (no helium injection, stop flow, and engine bleeds closed) geysering will occur in approximately 100 minutes. Action is taken to safe (off load) the ET.

TEST:

The Plug is certified. Reference HCS MMC-ET-TM08-L-P015.

Acceptance:

MAF:

A, B: Perform leakage test (MMC-ET-TM04k).

INSPECTION:

Vendor Inspection - Lockheed Martin Surveillance:

A: Verify materials selection and verification controls (MMC-ET-SE16 and standard drawing 57L7).

MAF Quality Inspection:

B: Verify installation and witness torque (drawing 80921011941).

A, B: Witness leakage test (MMC-ET-TM04k).

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.