

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
 DCN & DATE:
 ANALYSTS: J. Schnackel/H. Claybrook

FAILURE MODE: Blockage
 FAILURE EFFECT: a) Loss of Mission and vehicle/crew due to geysering followed by water hammer effect results in leakage of LQ2 feedline and loss due to fire/explosion
 TIME TO EFFECT: Minutes
 FAILURE CAUSE(S): Foreign Obstruction
 REDUNDANCY SCREENS: Screen A: PASS
 Screen B: N/A - Item nonfunctional in flight.
 Screen C: PASS
 FUNCTIONAL DESCRIPTION: Controls GHe flowrate approximately .012 lbs per second into the aft elbow of the LQ2 feedline which provides propellant conditioning and prevents geysering.

<u>FMEA ITEM CODE(S)</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY</u>	<u>EFFECTIVITY</u>
2.4.25.2	80921011938-002	Orifice	1	LWT-54 & Up

REMARKS:

CRITICAL ITEMS LIST (CIL)
CONTINUATION SHEET

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RATIONALE FOR RETENTION

DESIGN:

The orifice (.052 inch diameter) is installed between the manifold and the downstream tube assembly. Helium flow is controlled to approximately .012 lb/sec. The orifice is fabricated from 304 CRES and is identical to the standard adapter configuration (57L6) except for the orifice flow restriction in the flow path. The Launch Facility provides 25 micron filtration and gas sampling for particles no greater than 100 microns. In addition, filters installed in the helium inject system upstream of the orifice also provide 25 micron filtration capability. Component cleanliness is in accordance with STP5008.

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. Orifice blockage 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 Orifice is certified. Reference HCS MMC-ET-TM08-L-P015.

Acceptance:

MAF:

Perform flow test (MMC-ET-TM04k).

Launch Site:

Perform flow test (OMRSD File IV).

INSPECTION:

MAF Quality Inspection:

Witness flow test (MMC-ET-TM04k).

Launch Site:

Witness flow test (OMRSD 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.