

CRITICAL ITEMS LIST (CIL)

SYSTEM: Propulsion/Mechanical
 SUBSYSTEM: GH2 Vent/Relief
 REV & DATE: J, 12-19-97
 DCN & DATE:
 ANALYSTS: J. Attar/H. Claybrook

FUNCTIONAL CRIT: 1R
 PHASE(S): b, c
 HAZARD REF: P.01

FAILURE MODE: Blockage

FAILURE EFFECT: b) Loss of mission and vehicle/crew due to structural failure of LH2 tank.
 c) Loss of life due to early LH2 tank structural failure resulting in impact outside designated footprint.

TIME TO EFFECT: Seconds

FAILURE CAUSE(S): Foreign Object

REDUNDANCY SCREENS: Screen A: PASS
 Screen B: FAIL - No detection method for failure mode in flight.
 Screen C: PASS

FUNCTIONAL DESCRIPTION: Provides backup sensing and bleeding capabilities within the intertank to the sense line.

<u>FMEA ITEM CODE(S)</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY</u>	<u>EFFECTIVITY</u>
2.8.11.1	80923021030-002	Bleed Drifce	1	LWT-54 & Up

REMARKS:

CRITICAL ITEMS LIST (CIL)
CONTINUATION SHEET

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RATIONALE FOR RETENTION

DESIGN:

The vent valve relief setting is referenced to ambient pressure through a 1/4 inch tube run that penetrates the Intertank at station 1075 on the minus Z axis. The system terminates with an elbow, the open end of which is the primary sense port. A secondary bleed orifice is installed in the line within the Intertank which is environmentally controlled during launch operations.

The bleed orifice is fabricated from a 57L9-4 flared tube cap fitting. The cap fitting was selected based on operational experience and its capability to meet ET requirements for class 3 threads and leakage performance.

Flow testing is required that assures the sense system is operable.

Redundancy Description:

The vent valve relief pressure is referenced to ambient pressure through a sense line terminating outside the intertank. Redundancy for the sense port is provided by the auxiliary bleed orifice located in the sense line within the Intertank compartment.

Effect of First Redundancy Loss:

Loss (blockage) of the bleed orifice will have no effect on system operation. The bleed orifice is the redundant secondary sense port and primary sense port pressure sensing will be unaffected.

Effect of Second Redundancy Loss:

In event of loss (blockage) of the ambient sense port and the auxiliary bleed, the sense pressure will be the locked up ambient pressure at the time of blockage. The relief pressure will be higher by the difference between the locked up and actual ambient pressure. Structural failure of the LH2 tank by overpressurization will occur only if the flow control valves fail open.

TEST:

The Bleed 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:

Inspect (visually) for cleanliness during installation (drawing 80923021009).

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.