

CRITICAL ITEMS LIST (CIL)

SYSTEM: Propulsion/Mechanical  
 SUBSYSTEM: LH2 Penetrations  
 REV & DATE: J, 12-19-97  
 DCN & DATE:  
 ANALYSTS: J. Attar/H. Claybrook

FUNCTIONAL CRIT: 1  
 PHASE(S): b  
 HAZARD REF: S.06

FAILURE MODE: Leakage  
 FAILURE EFFECT: b) Loss of mission and vehicle/crew due to fire/explosion.  
 TIME TO EFFECT: Seconds  
 FAILURE CAUSE(S): A: Structural Failure  
 B: Disengagement of Adapter  
 REDUNDANCY SCREENS: Not Applicable  
 FUNCTIONAL DESCRIPTION: Provides LH2 tank pressure sensing capability for the ullage pressure transducers.

<u>FMEA ITEM CODE(S)</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY</u>	<u>EFFECTIVITY</u>
2.10.7.1	57L6-40	Adapter	4	LWT-54 & Up

REMARKS:

CRITICAL ITEMS LIST (CIL)  
CONTINUATION SHEET

SYSTEM: Propulsion/Mechanical  
SUBSYSTEM: LH2 Penetrations  
FMEA ITEM CODE(S): 2.10.7.1

REV & DATE: J, 12-19-97  
DCN & DATE: 004, 6-30-99

RATIONALE FOR RETENTION

DESIGN:

- A: The adapters are installed in the ullage sense pressure ports located on the LH2 tank forward dome electrical feedthru cover. Sense pressure is utilized by the ullage pressure transducers for control of LH2 tank pressurization. The adapters are designed to meet the required ultimate (2.0) and yield (1.5) safety factors for pressure (ET Stress Report 826-2188). Material selected in accordance with MMC-ET-SE16 and controlled by MMA Product Assurance Plan assures conformance of composition, material compatibility and properties. Procurement of adapters is governed by material, fabrication, processing, test and inspection specification per MMC standard 57L6. The adapters were selected based on operational experience and their capability to meet ET requirements for Class 3 threads and leakage performance. Installation loads are sufficient to provide screening for major flaws.
- B: The adapter is selected from the Approved Standard Parts List (ASPL 826-3500), installed and torqued as specified on the engineering installation drawings, and lockwired to the manhole cover to preclude disengagement.

TEST:

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

MPTA Firings/Tankings: Ullage pressure transducers sense pressure system adapters (4 places) have been used throughout the test program that included 62.5 minutes of firing time, 23 cryogenic cycles and 47 pressurization cycles. There was no evidence of structural damage due to operation or environment.

Acceptance:

MAE:

- A, B: Perform leakage test on the adapters after installation (MMC-ET-TM04k).

Launch Site:

- A, B: Perform leakage test (OMRSD File IV for LWT-54 thru 84, 89 thru 93).

INSPECTION:

Vendor Inspection - Lockheed Martin Surveillance:

- A: Verify materials selection and verification controls (MMC-ET-SE16 and standard drawing 57L6).

MAE Quality Inspection:

- A, B: Verify installation and witness torque (drawing 80931003779).  
A, B: Witness leakage test (MMC-ET-TM04k).

Launch Site:

- A, B: Witness leakage test (OMRSD File IV for LWT-54 thru 84, 89 thru 93).

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.