

CRITICAL ITEMS LIST (CIL)

SYSTEM: Propulsion/Mechanical
 SUBSYSTEM: LO2 Propellant feed
 REV & DATE: J, 12-19-97
 DCN & DATE:
 ANALYSTS: J. DeMonte/H. Claybrook

FUNCTIONAL CRIT: 1
 PHASE(S): a, b
 HAZARD REF: P.D6

FAILURE MODE: Fragments

FAILURE EFFECT: a) Loss of mission and vehicle/crew due to fire/explosion resulting from particle impacting feedline wall.
 Loss of mission and vehicle/crew due to fire/explosion resulting from debris damaging turbo pump.
 b) Loss of mission and vehicle/crew due to fire/explosion resulting from particle impacting feedline wall.
 Loss of mission and vehicle/crew due to fire/explosion resulting from debris damaging turbo pump.

TIME TO EFFECT: Seconds

FAILURE CAUSE(S): Structural Failure of Anti-Vortex Baffle Assembly or Hardware

REDUNDANCY SCREENS: Not Applicable

FUNCTIONAL DESCRIPTION: The anti-vortex baffle, centered over the screen at the LO2 feed outlet, reduces fluid swirl resulting from coriolis effect about the outlet and prevents entrapment of gases in the delivered LO2.

<u>FMEA ITEM CODE(S)</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY</u>	<u>EFFECTIVITY</u>
2.1.3.2	80912651011-039	Anti-Vortex Baffle Assy	1	LWT-54 & Up

REMARKS:

CRITICAL ITEMS LIST (CIL)
CONTINUATION SHEET

SYSTEM: Propulsion/Mechanical
SUBSYSTEM: LO2 Propellant Feed
FMEA ITEM CODE(S): 2.1.3.2

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

RATIONALE FOR RETENTION

DESIGN:

The anti-vortex baffle is designed to prevent LO2 fluid cavitation and reduce fluid swirl. The vortex baffle consists of four vane assemblies each 80.00 inches long at right angles to each other. The vane assemblies are spliced together with a splash plate on top, cruciform splice plate down the center and splice plate at the bottom. Each vane is assembled with rivet and Hi-Lok fasteners. A catch pot trap cover is installed over the bottom splice plate to preclude rivets from entering the flow stream in the event of a failure. All threaded fasteners downstream of the screens are provided with locking features. The vortex baffle assembly is attached to the LO2 aft dome suction fitting with two bolts at the lower cap of each vane assembly. The anti-vortex baffle assembly is designed to the required yield (1.1) and ultimate (1.4) safety factors. (ET Stress Report 826-2188). Materials selected in accordance with MMC-ET-SE16 and controlled per MMA Approved Vendor Product Assurance Plan assures conformance of composition, material compatibility and properties. Attachment fasteners were selected from the Approved Standard Parts List (ASPL 826-3500), installed per STP2014 and torqued using values specified on Engineering drawings. Procurement of fasteners is by material, fabrication, processing and inspection specifications per MMC Standard drawings 25L1 and 25L3 and NAS1219 specification.

Downstream screens of 1000 microns are provided by the Orbiter.

TEST:

The Anti-Vortex Baffle Assy is certified. Reference MCS MMC-ET-TM08-L-P012.

MPTA Firings/Tankings: The anti-vortex baffle assembly has accumulated 62.5 minutes of firing time, 27 cryogenic cycles, and 42 pressurization cycles. There was no evidence of structural damage resulting from these exposures.

INSPECTION:

Lockheed Martin Procurement Quality Representative:

Verify materials selection and verification controls (standard drawings 25L1, 25L3, 25L6 and NAS1219).

MAF Quality Inspection:

Inspect (visually) attaching hardware for freedom of damage prior to installation (drawings 80912651011 and 80912651012).

Verify installation and witness torque procedure of attaching hardware downstream of feedline screen (drawing 80912651011 and STP2014 for NAS1219; drawing 80912651012 and STP2006 for 25L1 and 25L3).

Inspect (visually) for no damage during post installation shakedown inspection (MPP 80902000SCL for LWT-54 thru 68 and 80922011900 for LWT-69 & up).

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.