SYSTEM:	Propulsion/Mechanical	FUNCTIONAL CRIT:	1
SUBSYSTEM:	Helium Inject	PHASE(S):	a, b
REV & DATE:	J, 12-19-97	HAZARD REF:	P.02, P.10
DCN & DATE:	001, 6-15-98		
ANALYSTS:	J. Attar/H. Claybrook		

FAILURE MODE: Leakage

FAILURE EFFECT:
a) Loss of mission and vehicle/crew due to fire/explosion.
b) Loss of mission and vehicle/crew due to fire/explosion.

TIME TO EFFECT: Seconds

FAILURE CAUSE(S):
A: Scratched/Nicked/Misaligned
B: Deterioration
C: Mating Surface Defects

REDUNDANCY SCREENS: Not Applicable

FUNCTIONAL DESCRIPTION: Prevents leakage of GHe between downstream check valves, manifold/plug and orifice.

FMEA ITEM CODE(S)	PART NO.	PART NAME	QTY	EFFECTIVITY
2.4.22.1	55L5-4R	K-Seal	2	LWT-54 & up
2.4.24.1	55L5-8R	K-Seal	2	LWT-54 & up

REMARKS: These items are grouped as the failure mode, causes and effects are the same.

SYSTEM:	Propulsion/Mechanical	REV & DATE:	J, 12-19-97
SUBSYSTEM:	Helium Inject	DCN & DATE:	
FMEA ITEM CODE(S):	2.4.22.1, 2.4.24.1		

RATIONALE FOR RETENTION

DESIGN:

A-C: The K-seals are located downstream of the check valves. These Harrison K-Seals have been used on various space vehicles where cryogenic propellant sealing was required. Design features that aid in sealing are: dual sealing surfaces, heel seal (provides mechanical stop and carries hoop tension), soft coating on the seals (seals surface finish imperfections) and flexible tapered lips (maintains uniform stress levels). Seals are manufactured from A-286 CRES and coated with Dupont TFE primer followed by Dupont black TFE enamel.

A: Improper handling and installation leads to leakage which is detected by test. If the flange joint is disassembled, seal reuse/replacement is specified and controlled by STP2012.

B: Procurement of seals is governed by material, fabrication, processing, and inspection specifications per MMC Standard 55L6. Coating material compatibility testing is specified for oxygen service per NHB 8060.1.

C: Mating surface finish is specified on engineering drawings to assure performance within the capability of the seal. Fitting torque requirement is specified on the Engineering installation drawing and is lockwired to preclude disengagement.

TEST:

The K-Seal is certified. Reference HCS MMC-ET-TM08-L-P008.

Qualifications: MMMA conducted a study that compared the K-seal performance at ET environments with past usage environments experienced by the seal. The study concluded that the seal design is qualified by similarity for all ET environments.

Acceptance:

MAF:

A-C: Perform seal leakage test (MMC-ET-TM04k).

INSPECTION:

Vendor Inspection - Lockheed Martin Surveillance:

B: Verify materials selection and verification controls (MMC-ET-SE16 and Standard drawing 55L5).

MAF Quality Inspection:

A: Inspect (visually) seal surfaces for freedom of nicks, radial scratches or other imperfections during installation (drawing 80921011941).

A, C: Verify installation and witness torque (drawings 80921011941 and 80921011930).

C: Inspect sealing surfaces for freedom of nicks, radial scratches or other imperfections during installation (acceptance drawing 82620000001).

A-C: Witness seal 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.