SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :ATMOSPHERIC REVIT. FMEA NO 06-1A -1205 -3 REV:07/08/8

ASSEMBLY :AIRLOCK
P/N RI :MC276-0020-1013
P/N VENDOR:502040-1013
QUANTITY :2
:ONE PER LOOP
:TWO PER SUBSYSTEM

CRIT. FUNC: 1
CRIT. HDW:

VEHICLE	102	103	104
EFFECTIVITY:	X	X	X

PHASE(S): PL LO X OO X DO X LS

REDUNDANCY SCREEN: A-PASS B-PASS C-PAS

PREPARED BY:		APPROVED BY	APPROVED BY (NASA):
DES	S. CASTILLO	DES	SSM
REL	D. RISING	REL	REL
QE	W. SMITH	QE	QE

ITEM:
QUICK DISCONNECT/CAP OXYGEN SERVICING

FUNCTION:
PROVIDES A HIGH PRESSURE OXYGEN SOURCE IN THE AIRLOCK.

FAILURE MODE:
EXTERNAL LEAKAGE

CAUSE(S):
CORROSION, POROSITY, VIBRATION, MECHANICAL SHOCK.

EFFECT(S) ON:
(A)SUBSYSTEM (B)INTERFACES (C)MISSION (D)CREW/VEHICLE

(A) LOSS OF OXYGEN WHEN DISCONNECT IS PRESSURIZED.

(B) LOSS OF ONE REDUNDANT O_2 SUPPLY TO EMU.

(C) NO EFFECT.

(D) NO EFFECT.

(E) FUNCTIONAL CRITICALITY EFFECT - SECOND ASSOCIATED FAILURE (AIRLO EMU O_2 VALVE LEAK) CAN CAUSE LOSS OF EMERGENCY O_2 SUPPLY TO LES'S AND M RESULT IN LOSS OF CREW/VEHICLE.

DISPOSITION & RATIONALE:
(A)DESIGN (B)TEST (C)INSPECTION (D)FAILURE HISTORY (E)OPERATIONAL USE

(A) DESIGN
DYNAMIC SEALS ARE MADE OF PARCO 1235-70 SILICONE RUBBER. POPPET IS CRES 15-5 PH AMS 5659 WITH A 63/FINISH AND IS SPRING LOADED CLOSE HOUSING IS OF CRES 15-5 PH AMS 5659 WITH A 63/FINISH IN BORE. CAP STAINLESS STEEL WITH SILICONE O-RING SEAL. CAP IS INSTALLED BEFO FLIGHT AND PROVIDES REDUNDANT SEAL TO QD POPPET. MATERIALS A COMPATIBLE WITH GO2.

(B) TEST

QUALIFICATION TEST FOR 100 MISSION LIFE: SINUSOIDAL VIBRATION - 5 TO 35 HZ AT +/- 0.25 G PEAK PER AXIS. RANDOM VIBRATION - 0.2 G^2/HZ FOR 48 MINUTES PER AXIS. FOR 48 MINUTES/AXIS, WHILE PRESSURIZED TO 1050 PSIG WITH GN2. THERMAL CYCLE 5 TIMES FROM ROOM AMBIENT TO +160 F, TO -65 F, AND BACK TO AMBIENT. THREE CYCLES MATED AND TWO CYCLES DEMATED AND CAPPED. 1000 CYCLE OPERATING LIFE TEST. DESIGN SHOCK - 20 G TERMINAL SAWTOOTH PULSE OF 11 MILLISECONDS DURATION PARALLEL AND PERPENDICULAR TO AXIS (BOTH DIRECTIONS).

ACCEPTANCE TEST - EXAMINATION OF PRODUCT. PROOF TEST AT 1575 PSIG FOR THREE MINUTES CONNECTED AND DISCONNECTED, CAPPED AND UNCAPPED. OPERATION TEST - 5 CYCLES AT 0 PSIG AND AT 1050 PSIG. OVERTRAVEL TORQUE TEST. LEAKAGE TEST AT 12 PSIG AND 1050 PSIG - 3.33×10^{-3} SCCS MAX LEAKAGE - STANDARD TEST DISCONNECTED, AND WITH CAP INSTALLED (POPPET BLOCKED OPEN).

OMRSD - LEAK CHECK OF QD AFTER DEMATING AND PRIOR TO CAP INSTALLATION. LEAK CHECK OF AIRLOCK O2 SYSTEM PRIOR TO EACH FLIGHT.

(C) INSPECTION

RECEIVING INSPECTION
RAW MATERIALS ARE SENT TO OUTSIDE TEST LAB FOR MATERIAL/CHEMICAL ANALYSIS/CERTIFICATION.

CONTAMINATION CONTROL
CORROSION PROTECTION PROVISIONS VERIFIED BY INSPECTION. CONTAMINATION CONTROL VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION
MANUFACTURING PROCESSES, INSTALLATION AND ASSEMBLY VERIFIED BY INSPECTION. CRITICAL DIMENSIONS VERIFIED BY INSPECTION. SEALS VERIFIED BY INSPECTION.

CRITICAL PROCESSES
HEAT TREAT VERIFIED BY INSPECTION. PASSIVATED PARTS VERIFIED BY INSPECTION.

TESTING
ATP VERIFIED BY INSPECTION.

HANDLING/PACKAGING
PARTS PROTECTION VERIFIED BY INSPECTION.

(D) FAILURE HISTORY
NO FAILURE HISTORY.

(E) OPERATIONAL USE
THE CREW WILL CLOSE THE AIRLOCK EMU O2 VALVE UPSTREAM OF THE LEAKING QD AND WILL USE THE REMAINING SCU TO RECHARGE BOTH EMU'S WITH O2.