

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ATMOSPHERIC REVIT. FMEA NO 06-1A -1601 -4 REV: 01/19/88

ASSEMBLY : AIRLOCK CRIT. FUNC: 1
 P/N RI : MC250-0004-0012 CRIT. HDW: 1
 P/N VENDOR: 2763-0001-9
 QUANTITY : 2 VEHICLE 102 103 104
 EFFECTIVITY: X X X
 PHASE(S): PL X LO X OO X DO X LS X

REDUNDANCY SCREEN: A- B- C-
 PREPARED BY: DES D. L. SANDERSFELD DES APPROVED BY: *[Signature]* APPROVED BY (NASA):
 REL N. L. STEISSLINGER REL SSM *[Signature]*
 QE W. J. SMITH QS QE *[Signature]* REL *[Signature]* QE *[Signature]*

ITEM:
 EQUALIZATION VALVE CABIN/AIRLOCK HATCH

FUNCTION:
 PROVIDES FOR EQUALIZING PRESSURE ACROSS THE INNER HATCH. EACH VALVE OPERATES INDEPENDENTLY WITH POSITIVE DETENTS AT TWO FLOW POSITIONS. VALVE CAN BE ACTUATED FROM EITHER SIDE OF HATCH.

FAILURE MODE:
 EXTERNAL LEAKAGE

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

- EFFECT(S) ON:
 (A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE
 (A) EXCESSIVE LOSS OF CABIN AIR WHEN AIRLOCK IS DEPRESSURIZED.
 (B) INABILITY TO DEPRESSURIZE AIRLOCK AND TO OPEN OUTER HATCH.
 (C) LOSS OF EVA CAPABILITY.
 (D) LOSS OF EMERGENCY EVA CAPABILITY.

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

(A) DESIGN
 UNIT IS FLANGE MOUNTED WITH A SINGLE SILASTIC-675 SILICONE RUBBER O-RING WHICH COMPENSATES FOR ROUGHNESS OF FLANGE PREVENTING EXTERNAL LEAKAGE. HOUSING IS FABRICATED OF A356.0-T61 ALUMINUM ALLOY AND IS X-RAYED TO DETECT CRACKS.

(B) TEST
 QUALIFICATION TEST - FOR 100 MISSION LIFE: ACCELERATION OF 5 G FOR FIVE MINUTES PER AXIS. SINUSOIDAL VIBRATION - 5 TO 35 HZ AT +/- 0.25 G PEAK PER AXIS. RANDOM VIBRATION - 0.09 G**2/HZ FOR 48 MINUTES PER AXIS. DESIGN SHOCK - 20 G PER AXIS. THERMAL VACUUM/THERMAL CYCLE - WITH VALVE CLOSED AND CAP ON, UNIT EXPOSED TO 120 TO 130 F AND VACUUM OF 1 X 10 EX.

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-6 TORR FOR 24 HOURS. LOW/HIGH TEMP CYCLE - HELD AT -40 TO -50 F FOR 3 HOURS AND AT +120 TO 130 F FOR 3 HOURS. OPERATING LIFE - OPERATED OFF/NORMAL/EMERGENCY POSITIONS WITH 15 PSIG APPLIED FOR 800 CYCLES. LEAKAGE MONITORED DURING OR AFTER THESE TESTS LIMITED TO 5 SCCM MAX.

ACCEPTANCE TEST - PROOF PRESSURE 25 PSIG GN2, WITH VALVE OPEN AND CLOSED LEAK CHECK AT 15 PSIG, 5 SCCM MAX - VALVE OPEN AND CLOSED AND REVERSE LEAKAGE.

OMRSD - CONTINGENCY TEST AT 15 PSIG AFTER LRU REPLACEMENT AND CONTINGENCY TEST AT 3.2 PSID IN VEHICLE. GROSS LEAKAGE TEST AT 2 PSID BEFORE EACH FLIGHT.

(C) INSPECTION

RECEIVING INSPECTION

MATERIALS VERIFIED AT RECEIVING INSPECTION. ALUMINUM HOUSING CASTINGS ARE HYDROSTATIC PROOF PRESSURE TESTED AT 32 PSID.

CONTAMINATION CONTROL

CORROSION PROTECTION PROVISIONS AND CONTAMINATION CONTROL PLAN VERIFIED BY INSPECTION. CLEANLINESS LEVELS AND 100 ML RINSE TESTS VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

MANUFACTURING PROCESSES, INSTALLATION AND ASSEMBLY VERIFIED BY INSPECTION. TORQUES VERIFIED BY INSPECTION. DIMENSIONAL CHECKS PERFORMED BY INSPECTION. INSPECTION PERFORMS MIPs FOR CONCENTRICITY AND PERPENDICULARITY.

NONDESTRUCTIVE EVALUATION

ALUMINUM HOUSING CASTINGS ARE X-RAYED AND DYE PENETRANT INSPECTED TO DETECT CRACKS, VERIFIED BY INSPECTION.

CRITICAL PROCESSES

PASSIVATED PARTS AND HEAT TREATMENT VERIFIED BY INSPECTION. MECHANICAL SOLDERING OF DEBRIS SCREEN VERIFIED BY INSPECTION. ANODIZATION OF ALUMINUM PARTS VERIFIED BY INSPECTION.

TESTING - NO ASSOCIATED FAILURES
ATP VERIFIED BY INSPECTION.

HANDLING/PACKAGING

PARTS PROTECTION VERIFIED BY INSPECTION.

(D) FAILURE HISTORY

NO FAILURES.

(E) OPERATIONAL USE

NO CREW ACTION REQUIRED.