

**SHUTTLE CRITICAL ITEMS LIST - ORBITER**

SUBSYSTEM : ATMOSPHERIC REVIT.      FMEA NO 06-1A -1126 -4      REV: 07/08/88

ASSEMBLY : AIRLOCK PRESS & DEPRESS						CRIT. FUNC: 1R
P/N RI : MC250-0004-0003						CRIT. HDW: 2
P/N VENDOR: 2765-0001-1 CARLETON						
QUANTITY : 1	VEHICLE	102	103	104		
: ONE PER SUBSYSTEM	EFFECTIVITY:	X	X	X		
:	PHASE(S):	PL	LO	OO X DO	LS	

PREPARED BY:		REDUNDANCY SCREEN:	A-PASS	B-PASS	C-PASS
DES S. CASTILLO	APPROVED BY:				
REL D. RISING	DES <i>[Signature]</i>	APPROVED BY (NASA):			
QE W. SMITH	REL <i>[Signature]</i>	SSM <i>[Signature]</i>			
	QE <i>[Signature]</i>	REL <i>[Signature]</i>			
		QE <i>[Signature]</i>			

**ITEM:**  
DEPRESSURIZATION VALVE, AIRLOCK

**FUNCTION:**  
PROVIDES CAPABILITY FOR DEPRESSURIZATION OF THE AIRLOCK BY VENTING AIR OVERBOARD THROUGH THE VACUUM VENT LINE. THE VALVE HAS TWO FLOW POSITIONS FIXED BY DETENTS IN THE ACTUATION MECHANISM.

**FAILURE MODE:**  
EXTERNAL LEAKAGE

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

- EFFECT(S) ON:**
- (A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE
  - (A) LEAKAGE OF AIR WHEN THE AIRLOCK IS PRESSURIZED.
  - (B) INCREASED USE OF OXYGEN/NITROGEN SUPPLY.
  - (C) EXCESSIVE USE OF CONSUMABLES MAY LIMIT MISSION DURATION. POSSIBLE LOSS OF EVA CAPABILITY.
  - (D) SECOND ASSOCIATED FAILURE (VACUUM VENT ISOLATION VALVE FAILED OPEN) MAY CAUSE LOSS OF EVA CREW OR LOSS OF EMERGENCY EVA CAPABILITY.

**DISPOSITION & RATIONALE:**

- (A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE
- (A) DESIGN  
THE VALVE COMPRISES A MANUALLY-OPERATED BUTTERFLY VALVE WHICH MAY BE DETENTED IN ANY ONE OF THREE PRE-DETERMINED POSITIONS FROM FULLY OPEN TO FULLY CLOSED.  
  
UNIT IS FLANGE MOUNTED WITH A SINGLE SILASTIC-675 SILICONE RUBBER O-RING WHICH COMPENSATES FOR ROUGHNESS OF FLANGE PREVENTING EXTERNAL LEAKAGE HOUSING IS A356.0-T61 ALUMINUM ALLOY.

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3) TEST

QUALIFICATION TEST FOR 100 MISSION LIFE: ACCELERATION OF +/- 5 G FOR FIVE MINUTES PER AXIS. SINUSOIDAL VIBRATION OF 5 TO 35 HZ AT +/- 0.25 G PEAK PER AXIS. RANDOM VIBRATION OF 0.09 G<sup>2</sup>/HZ FOR 48 MIN/AXIS. DESIGN SHOCK - 30 G PER AXIS. OPERATING LIFE - OPERATED OFF/NORMAL/EMERGENCY POSITIONS WITH 15 PSIG APPLIED FOR 750 CYCLES. LEAKAGE MONITORED DURING OR AFTER THESE TESTS LIMITED TO 5 SCCM MAXIMUM.

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

CMRSD - 2 PSID CABIN LEAK CHECK DURING COUNTDOWN. 3.2 PSID LEAK CHECK AFTER INSTALLATION. VACUUM DECAY LEAK CHECK OF VACUUM VENT DUCT EVERY FLIGHT.

C) INSPECTION

RECEIVING INSPECTION  
MATERIALS VERIFIED AT RECEIVING INSPECTION.

CONTAMINATION CONTROL  
CORROSION PROTECTION PROVISIONS AND CONTAMINATION CONTROL PLAN VERIFIED BY INSPECTION. CLEANLINESS LEVELS OF 200A AND 100 ML RINSE TESTS VERIFIED.

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. O-RINGS VERIFIED BY INSPECTION.

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. ANODIZATION OF ALUMINUM PARTS VERIFIED BY INSPECTION.

TESTING  
ATP VERIFIED BY INSPECTION.

HANDLING/PACKAGING  
PARTS PROTECTION VERIFIED BY INSPECTION.

D) FAILURE HISTORY  
NO APPLICABLE FAILURE HISTORY.

E) OPERATIONAL USE  
CLOSE THE VACUUM VENT ISOLATION VALVE TO LIMIT THE LEAK RATE TO LESS THAN 4 LBS/HRs WHEN AIRLOCK IS PRESSURIZED.