

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : LIFE SUPPORT FMEA NO 06-2E -0411 -3 REV:10/29/
 ASSEMBLY : VENT AND DUMP EQUIPMENT FUNC:
 P/N RI : ME284-0518-0021 CRIT. HDW:
 P/N VENDOR: 75790-0021 VEHICLE 102 103 104
 QUANTITY : 1 EFFECTIVITY: X X X
 : PHASE(S): PL LO X OO X DO LS
 : ONE PER SUBSYSTEM

REDUNDANCY SCREEN: A- B- C-
 PREPARED BY: APPROVED BY: APPROVED BY (NASA):
 DES S. CASTILLO DES *[Signature]* SSM *[Signature]*
 REL L. SCHASCHL REL *[Signature]* REL *[Signature]*
 QE M. SAVALA QE *[Signature]* QE *[Signature]*

ITEM:
 VALVE, WASTE WATER DUMP ISOLATION SOLENOID, 2 POSITION

FUNCTION:
 PROVIDES LEAK ISOLATION CAPABILITY FOR THE WASTE WATER DUMP LINE.

FAILURE MODE:
 EXTERNAL LEAKAGE

CAUSE(S):
 CORROSION, VIBRATION, MECHANICAL SHOCK

EFFECT(S) ON:
 (A)SUBSYSTEM (B)INTERFACES (C)MISSION (D)CREW/VEHICLE
 (A, B) FREE WATER IN THE LOWER ECLSS EQUIPMENT BAY AND CABIN.
 (C) LOSS OF WASTE WATER STORAGE CAPACITY MAY LIMIT MISSION DURATION.
 FREE WASTE WATER IN CABIN MAY ALSO LEAD TO EARLY MISSION TERMINATION.
 (D) NO EFFECT.

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

(A) DESIGN
 EACH HOUSING HALF (INCLUDING THE INLET AND OUTLET TUBES), IS MADE FROM FORGING OF 304L STAINLESS STEEL VACUUM MELT MATERIAL, FORGED PER MIL-F-7190 CLASS C. THE HOUSING HALVES ARE WELDED TOGETHER. MATERIAL ARE COMPATIBLE WITH WORKING FLUIDS. ALL CRCS DETAIL PARTS ARE PASSIVATED PER S-3009.

(B) TEST
 QUALIFICATION TESTS FOR 100 MISSION LIFE INCLUDE: SHOCK TESTED AT 20 G PER AXIS, RANDOM VIBRATION TESTS - 48 MINUTES PER AXIS AT THE OF RATE PLUS 6 db/OCTAVE FROM 20 TO 100 HZ; CONSTANT AT 0.4 G SQ/HZ FROM 100 T 350 HZ; DECREASING AT THE RATE OF MINUS 6 db/OCTAVE FROM 350 TO 2000 H AND SINUSOIDAL VIBRATION TEST - 5 TO 35 HZ AT 0.25 G PEAKS FOR 5 MINUT PER AXIS.

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ACCEPTANCE TESTS - PROOF PRESSURE TEST AT 73 PSIG He FOR 5 MINUTES.
EXTERNAL LEAKAGE TESTED AT 73 PSIG He FOR 5 MINUTES. BURST PRESSURE
TESTED AT 90 PSIG APPLIED SIMULTANEOUSLY TO INLET AND OUTLET PORTS.

OMRSD: VERIFIES NO EXTERNAL LEAKAGE PRIOR TO EACH FLIGHT.

(C) INSPECTION

RECEIVING INSPECTION

MATERIAL AND PROCESS CERTIFICATION IS VERIFIED BY INSPECTION.

CONTAMINATION CONTROL

ALL DETAIL PARTS ARE CLEANED PER HI APPROVED SUPPLIER. CORROSION
PROTECTION PROVISIONS AND CONTAMINATION CONTROL PLAN ARE VERIFIED BY
INSPECTION. ALL CRITICAL POPPET AND SLEEVE SURFACES ARE INSPECTED WITH
40X MAGNIFICATION FOR CONTAMINATION. SEALS ARE EXAMINED FOR DAMAGE AND
CLEANLINESS.

CRITICAL PROCESSES

ALL CRES DETAILS ARE PASSIVATED TO PRECLUDE CORROSION. WELDING AND
PASSIVATION PROCESSES ARE VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

ALL DETAIL PARTS ARE INSPECTED UNDER 40X MAGNIFICATION FOR SURFACE
FINISH, BURRS, DAMAGE AND CONTAMINATION. SUBASSEMBLY LEVEL VERIFICATIO
FOR INSULATION RESISTANCE, DIELECTRIC STRENGTH, AND POLARITY ARE
VERIFIED BY INSPECTION. ALL CRITICAL POPPET AND SLEEVE SURFACES ARE
LAPPED AND INSPECTED WITH 40X MAGNIFICATION. MANUFACTURING PROCESSES,
INSTALLATION AND ASSEMBLY ARE VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION

PENETRANT INSPECTION IS VERIFIED.

TESTING

WELDS ARE VERIFIED BY PROOF PRESSURE TESTING WHICH IS WITNESSED BY
INSPECTION. OPERATING VOLTAGES AND LATCH FORCES ARE CALIBRATED AND
VERIFIED BY INSPECTION DURING FINAL ACCEPTANCE OF MAGNETIC LATCH.
EXTERNAL LEAKAGE TEST IS PERFORMED DURING ACCEPTANCE TEST AND IS
VERIFIED BY INSPECTION.

HANDLING/PACKAGING

PARTS PROTECTION IS VERIFIED BY INSPECTION.

(D) FAILURE HISTORY

ONE FAILURE OF IDENTICAL VALVE IN SUPPLY WATER SYSTEM. THE BASIC
FORGING MATERIAL WAS CONTAMINATED WITH A HIGH CARBON INCLUSION.
CORROSION OCCURRED IN THE VALVE HOUSING CAUSING A LEAK RATE OF TWO
DROPS PER MINUTE. ALL VALVES MADE FROM THIS FORGING WERE REMOVED
(SCRAPPED) FROM THE PROGRAM. (CAR #06F020)

(E) OPERATIONAL USE

CREW WOULD PERFORM THE WASTE WATER LEAK ISOLATION PROCEDURE, WHICH IS
PART OF NORMAL CREW TRAINING.