

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : LIFE SUPPORT FMEA NO 06-2E -0315 -2 REV:10/29/8

ASSEMBLY : WASTE LIQUID STORAGE CRIT. FUNC: 2
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 OO X DO LS
: ONE PER SUBSYSTEM

REDUNDANCY SCREEN: A-PASS B-FAIL C-PAS
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 STORAGE TANK OUTLET SOLENOID, 90V62LV17

FUNCTION:

PROVIDES CONTROL OF WASTE WATER FLOW DURING DRAINING AND SERVICING OF THE WASTE STORAGE TANK. VALVE IS NOT USED DURING FLIGHT.

FAILURE MODE:

INTERNAL LEAKAGE

CAUSE(S):

MECHANICAL SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECT(S) ON:

(A)SUBSYSTEM (B)INTERFACES (C)MISSION (D)CREW/VEHICLE

(A) STORED WASTE WATER WILL LEAK INTO DRAIN LINE TO DRAIN QUICK DISCONNECT.

(B, C, D) NO EFFECT.

(E) FUNCTIONAL CRITICALITY EFFECT - SECOND ASSOCIATED-FAILURE (DRAIN LINE EXTERNAL LEAK) CAN CAUSE LEAKAGE OF WASTE WATER INTO CANNY AND LOWER EQUIPMENT BAY. LOSS OF ALL LEAK ISOLATION CAPABILITY CAN CAUSE EARLY MISSION TERMINATION.

REDUNDANCY SCREEN B FAILS BECAUSE THE FAILURE IS UNDETECTABLE DUE TO NO INSTRUMENTATION ON THE DRAIN LINE.

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. THE BELLOWS ASSEMBLY, WHICH INCLUDES THE POPPET AND SHAFT, IS INSTALLED IN THE HOUSING AND WELDED TO FLANGE JOINTS WITHIN THE HOUSING. THE POPPET STROKE AND THE CIRCUMFERENTIAL GAP BETWEEN THE POPPET AND SEAT ARE 0.051 INCH. MATERIALS ARE COMPATIBLE WITH WORKING FLUIDS. ALL CRES DETAIL PARTS ARE PASSIVATED PER S-3009.

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(B) TEST

QUALIFICATION TESTS FOR 100 MISSION LIFE INCLUDE: SHOCK TESTED AT 20 G PER AXIS, RANDOM VIBRATION TEST - 48 MINUTES PER AXIS AT THE RATE OF PLUS 6 db/OCTAVE FROM 20 TO 100 HZ; CONSTANT AT 0.4 G SQ/HZ FROM 100 TO 350 HZ; DECREASING AT THE RATE OF MINUS 6 db/OCTAVE FROM 350 TO 2000 HZ, AND SINUSOIDAL VIBRATION TEST - SWEEPS 5 TO 35 HZ AT 1 OCTAVE/MINUTE AT 0.25 G PEAKS FOR 5 MINUTES PER AXIS.

ACCEPTANCE TESTS - PROOF PRESSURE TEST AT 73 PSIG He FOR 5 MINUTES. EXTERNAL LEAKAGE TESTED AT 73 PSIG He FOR 5 MINUTES. INTERNAL LEAKAGE DETERMINED WITH A DIFFERENTIAL He PRESSURE OF 10 PSIG AND 45 PSIG FROM INLET TO OUTLET AND FROM OUTLET TO INLET - 20 SCCH He MAXIMUM IN 15 MINUTES. BURST PRESSURE TEST AT 90 PSIG, APPLIED SIMULTANEOUSLY TO INLET AND OUTLET PORTS. CONNECTORS ARE LEAK-TESTED TO VERIFY SEAL. PRESSURE DROP TEST AT 44/55 PSIA. FUNCTIONAL TEST - MINIMUM OPENING/CLOSING VOLTAGE OF 10-18 VDC; RESPONSE TIME - OPEN/CLOSE 0.2 SEC; MAX TRANSIENT VOLTAGE OF 50 VDC OPEN/CLOSE COILS.

OMRSD: VERIFIES NO LEAKAGE AFTER FINAL CLOSING OF VALVE.

(C) INSPECTION

RECEIVING INSPECTION

RAW MATERIALS ARE VERIFIED BY INSPECTION. COIL ASSEMBLY OF THE D.C. SOLENOID VALVE IS INSPECTED FOR DAMAGE AND CHECKED OUT AT SUBASSEMBLY LEVEL FOR INSULATION RESISTANCE, DIELECTRIC STRENGTH, AND POLARITY.

CONTAMINATION CONTROL

CORROSION PROTECTION PROVISIONS AND CONTAMINATION CONTROL PLAN ARE VERIFIED BY INSPECTION. SEALS ARE EXAMINED FOR DAMAGE AND CLEANLINESS. ALL CRITICAL POPPET AND SLEEVE SURFACES ARE INSPECTED USING 40X MAGNIFICATION FOR CONTAMINATION.

CRITICAL PROCESSES

WELDING PROCESS IS VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

MANUFACTURING PROCESSES, INSTALLATION, AND ASSEMBLY ARE VERIFIED BY INSPECTION. ALL DETAIL PARTS ARE INSPECTED UNDER 40X MAGNIFICATION FOR SURFACE FINISH, BURRS, DAMAGE, AND CONTAMINATION.

NONDESTRUCTIVE EVALUATION

RADIOGRAPHIC EXAMINATION IS VERIFIED BY INSPECTION.

TESTING

ACCEPTANCE TEST IS VERIFIED BY INSPECTION.

HANDLING/PACKAGING

PARTS PROTECTION IS VERIFIED BY INSPECTION.

(D) FAILURE HISTORY

NO FAILURES.

(E) OPERATIONAL USE

NO CREW ACTION REQUIRED.