

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : LIFE SUPPORT FMEA NO 06-2E -0411 -1 REV:10/29/8  
 ASSEMBLY : VENT AND DUMP EQUIPMENT CRIT. FUNC:  
 P/N RI : ME284-0518-0021 CRIT. HOW:  
 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- 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:

INABILITY TO OPEN, RESTRICTED FLOW

CAUSE(S):

CORROSION, VIBRATION, MECHANICAL SHOCK, CONTAMINATION

EFFECT(S) ON:

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

(A, B) INABILITY TO DUMP WASTE WATER.

(C) LOSS OF WASTE WATER STORAGE CAPACITY MAY LIMIT MISSION DURATION.

(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 BELLOWS ASSEMBLY, WHICH INCLUDES THE POPPET 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 IS 0.051 INCHES. MATERIALS 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 PER AXIS, RANDOM VIBRATION TESTS - 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 AND SINUSOIDAL VIBRATION TEST - 5 TO 35 HZ AT 0.25 G PEAKS FOR 5 MINUTE PER AXIS.

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ACCEPTANCE TEST - PROOF PRESSURE TEST AT 73 PSIG H<sub>2</sub> FOR 5 MINUTES. BURST PRESSURE TESTED AT 90 PSIG APPLIED SIMULTANEOUSLY TO INLET AND OUTLET PORTS. PRESSURE DROP TESTED AT 44/55 PSIA. FUNCTIONAL TESTING MINIMUM OPENING/CLOSING VOLTAGE OF 10-18 VDC; RESPONSE TIME, OPEN/CLOS 0.2 SEC; MAXIMUM TRANSIENT VOLTAGE OF 50 VDC OPEN/CLOSE COILS.

OMRSD: FUNCTIONAL OPERATION THROUGH THE VALVE IS VERIFIED BEFORE EACH FLIGHT.

(C) INSPECTION

RECEIVING INSPECTION

RAW MATERIAL IS VERIFIED BY INSPECTION.

CONTAMINATION CONTROL

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

WELDING AND BRAZING PROCESSES ARE VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

COIL ASSEMBLY OF D.C. SOLENOID VALVE IS INSPECTED FOR DAMAGE AND CHECKED OUT AT SUBASSEMBLY LEVEL FOR INSULATION RESISTANCE, DIELECTRIC STRENGTH, AND POLARITY. PARTS PROTECTION, 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

OPERATING VOLTAGES AND LATCH FORCES ARE CALIBRATED AND VERIFIED BY INSPECTION DURING FINAL ACCEPTANCE OF MAGNETIC LATCH. ACCEPTANCE TEST PROCEDURE IS VERIFIED BY INSPECTION.

HANDLING/PACKAGING

PARTS PROTECTION IS VERIFIED BY INSPECTION.

(D) FAILURE HISTORY

ONE FAILURE OCCURRED WHERE A COTTON SWAB (USED DURING THE BRAZING PROCESS FOR CLEANING PURPOSES), WAS FOUND LODGED IN THE GALLEY VALVE TUBING. AN "AWARE" (NUMBER 167) WAS WRITTEN AND DISTRIBUTED THROUGHOUT THE FIELD TO ALERT PERSONNEL TO VERIFY TUBES ARE CLEAR BEFORE BRAZING. THE "AWARE" IS ALSO LISTED IN THE BRAZER'S MANUFACTURING ORDERS.

(CAR #AD1687)

(E) OPERATIONAL USE

THE CREW WOULD RETURN TO THE PRIMARY LANDING SITE BEFORE THE WASTE TANK BECOMES HARD FILLED (PER FLIGHT RULE).