

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ATMOSPHERIC REVIT. FMEA NO 06-1B -0547 -3 REV:09/07/2

PUMP IS MATED TO THE INLET AND OUTLET MANIFOLDS OF THE PUMP PACKAGE. MATERIALS ARE CORROSION RESISTANT AND COMPATIBLE WITH WATER.

(B) TEST

ACCEPTANCE TEST - PROOF PRESSURE AT 136-139 PSIG FOR GREATER THAN MINUTES. LEAKAGE RATE OF MORE THAN 0.005 CC/HR H₂O MAXIMUM AT 91 +/- PSID.

QUALIFICATION TEST - PROOF PRESSURE AT 136-139 PSIG FOR MINIMUM 5 MINUTE BURST PRESSURE OF 180 PSIG. SUBJECTED TO RANDOM VIBRATION SPECTRUM ENVELOPE OF 20 TO 150 HZ INCREASING AT 6 DB/OCTAVE TO 0.03 G**2/HZ CONSTANT AT 0.03 G**2/HZ FROM 150 TO 1000 HZ, DECREASING AT 6 DB/OCTAVE FROM 1000 TO 2000 HZ FOR 48 MINUTES PER AXIS IN THREE ORTHOGONAL AXES. DESIGN SHOCK - THREE TERMINAL SAWTOOTH PULSES OF 20 G PEAK AMPLITUDE A 11 MS DURATION APPLIED IN BOTH DIRECTIONS ALONG EACH OF THREE ORTHOGONAL AXES.

IN-VEHICLE TESTING - SYSTEM DECAY TEST IS PERFORMED AT 85 - 95 PSIG, CC/MIN MAX LEAKAGE. PUMP OUT PRESSURE AND ACCUMULATOR QUANTITY CONTINUOUSLY MONITORED WHEN THE VEHICLE IS POWERED UP AND SERVE AS INDICATION OF EXTERNAL LEAKAGE.

OMRSD - PUMP ACCUMULATOR QUANTITY AND OUTLET PRESSURE ARE CONTINUOUSLY MONITORED WHILE THE VEHICLE IS POWERED UP DURING EACH TURNAROUND, SERVE AS AN INDICATION OF EXTERNAL LEAKAGE. WATER IS SAMPLED PER S1 0073 DURING SERVICING.

(C) INSPECTION

RECEIVING INSPECTION

INCOMING PARTS ARE VERIFIED FOR MATERIAL, PHYSICAL PROPERTIES AND PROCESS CERTIFICATION.

CONTAMINATION CONTROL

CLEANLINESS IS MAINTAINED AND VERIFIED TO REQUIRED LEVEL. INSPECTOR VERIFIES CORROSION PROTECTION PROVISIONS.

ASSEMBLY/INSTALLATION

DIMENSIONS AND SURFACE FINISHES VERIFIED BY INSPECTION. ORIENTATION CONNECTOR MASTER KEYWAY IS DETERMINED AND VERIFIED BY INSPECTION. MOUNTING FEET COATED FOR ELECTRICAL BONDING PURPOSE IS VERIFIED.

NONDESTRUCTIVE EVALUATION

LEAK CHECK IS VERIFIED BY INSPECTION.

CRITICAL PROCESSES

WELD OF THE FILTER HOUSING TO PUMP INLET FLANGES IS VERIFIED. TUBE WELDS ARE VERIFIED BY INSPECTION. ADHESIVE BONDING OF FILTER IS CHECKED.

TESTING

ATP IS VERIFIED BY INSPECTION.

HANDLING/PACKAGING

ALL PACKAGING FOR SHIPMENT IS VERIFIED BY INSPECTION.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ATMOSPHERIC REVIT. FMEA NO 06-1B -0547 -3 REV:09/07/8

(D) FAILURE HISTORY

THREE FAILURES HAVE OCCURRED:

AC0831-010, 7/28/81 AT THE SUPPLIER. EXTERNAL LEAKAGE WAS 1800 SCCS SHOULD BE 2.5 SCCS MAX. LEAK WAS AT THE HIGH PRESSURE FITTING ON THE DELTA P TRANSDUCER DUE TO MISALIGNMENT CAUSED BY TOLERANCE BUILDUP. CORRECTIVE ACTION - FUTURE UNITS UTILIZED A NEW FRAME WHICH ELIMINATED THE VARIATIONS CAUSED BY SHEET METAL TOLERANCE. TUBE INSTALLATION PROCEDURES WERE REVISED TO VERIFY ALIGNMENT PRIOR TO INSTALLATION.

AC5361-010, 3/16/83 IN ATP AT THE SUPPLIER. A FLARED TUBE FITTING LEAK HELIUM AT 7.9×10^{-4} SCCS; SHOULD BE 5.5×10^{-4} SCCS MAX. LEAKAGE WAS AT PUMP OUTLET LINE TO DELTA P TRANSDUCER AND WAS CAUSED BY TOLERANCE BUILDUP. CORRECTIVE ACTION - A STRESS RELIEVING (ANNEALING) OPERATION WAS ADDED TO THE MANUFACTURING PROCESS SHEETS TO MAKE THE TUBE OF UNIFORM HARDNESS THROUGHOUT ITS LENGTH TO FACILITATE REFORMING, REQUIRED, AT ASSEMBLY.

AC6938-010, 10/25/83 AT THE SUPPLIER. EXTERNAL LEAKAGE WAS 1.8×10^{-3} SCCS GHE AT FLARED TUBE THAT CONNECTS THE DELTA P TRANSDUCER INTO THE HIGH PRESSURE SIDE OF THE PUMP. THE FITTING WAS FOUND TO BE UNDERTORQUED - 100 IN-LB VS 140 IN-LB REQUIRED. CORRECTIVE ACTION - ASSEMBLY AND IN-PROCESS TESTING WERE REVISED TO ADD A PROOF AND LEAK TEST PRIOR TO ASSEMBLY OF THE ACCUMULATOR ON THE PUMP PACKAGE SO THAT THE COUPLING NUTS ARE ACCESSIBLE FOR LEAK TESTING AND RETORQUING.

(E) OPERATIONAL USE
TBS.