

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ATMOSPHERIC REVIT. FMEA NO 06-1B -0516 -4 REV:09/07/8

ASSEMBLY : WATER PUMP CRIT. FUNC: 1R
P/N RI : MC621-0008-0096/97/98 CRIT. HDW: 2
P/N VENDOR: SV755543-4,5,6 HAM STD VEHICLE 102 103 104
QUANTITY : 12 EFFECTIVITY: X X X
: SIX PER LOOP PHASE(S): PL LO X OO X DO X LS

PREPARED BY: DES N. K. DUONG
REL N. L. STEISSLINGER
QE D. STOICA

REDUNDANT SCREEN
APPROVED BY: *[Signature]*
DES *[Signature]*
REL *[Signature]*
QE *[Signature]*

A-PASS B-N/A C-PASS
APPROVED BY (NASA): *[Signature]*
SSM *[Signature]*
REL *[Signature]*
QE *[Signature]*

ITEM:
DISCONNECT, SELF SEALING
PUMP PACKAGE - INLET, OUTLET, AND BYPASS

FUNCTION:
PROVIDES THE ATTACHMENT POINTS FOR THE WATER COOLANT PUMP ASSEMBLY TO THE WATER COOLANT LOOP AND THE BYPASS CIRCUIT SO THAT THE COOLANT PUMP ASSEMBLY CAN BE REMOVED AND REPLACED AS AN LRU.

FAILURE MODE:
RESTRICTED FLOW

CAUSE(S):
MECHANICAL SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECT(S) ON:
(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE

(A) DECREASED COOLING CAPABILITY - LOSS OF ONE WATER COOLANT LOOP.

(B) NO EFFECT - REDUNDANT LOOP WILL PROVIDE COOLING.

(C) POSSIBLE EARLY MISSION TERMINATION FOR LOSS OF ONE WATER COOLANT LOOP FOR CABIN AND AVIONICS COOLING.

(D) POTENTIAL LOSS OF CREW/VEHICLE UPON SUBSEQUENT LOSS OF REDUNDANT WATER COOLANT LOOP. SCREEN B IS N/A BECAUSE REDUNDANT LOOP IS INOPERATIVE UNTIL REQUIRED.

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

(A) DESIGN
MADE OF 17-4 PH STAINLESS STEEL. ALL ITEMS ARE SELF-SEALING COUPLINGS OF STAINLESS STEEL WITH ELASTOMERIC SEALS. AN EXTERNAL SEAL IS SEALED BEFORE THE VALVE POPPET IS UNSEALED FOR FLOW.

(B) TEST
ACCEPTANCE TEST - EXTERNAL LEAKAGE OF 0.001 CC/HR MAXIMUM AT 90 PSI
PROOF PRESSURE OF 135 PSIG.

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QUALIFICATION TEST - EXTERNAL LEAKAGE OF 0.001 CC/HR MAXIMUM AT 90 PSI PROOF PRESSURE OF 135 PSIG, BURST PRESSURE OF 180 PSIG, COLLAPSE PRESSURE OF 22.5 PSID. SUBJECTED TO RANDOM VIBRATION SPECTRUM ENVELOPE OF 20 150 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 20 HZ FOR 48 MINUTES PER AXIS IN THREE ORTHOGONAL AXES. DESIGN SHOCK THREE TERMINAL SAWTOOTH PULSES OF 20 G PEAK AMPLITUDE AND 11 MS DURATION APPLIED IN BOTH DIRECTIONS ALONG EACH OF THREE ORTHOGONAL AXES.

IN-VEHICLE TESTING - PUMP CHECKS ARE PERFORMED AND PUMP OUT PRESSURE CONTINUOUSLY MONITORED WHEN THE VEHICLE IS POWERED UP; SERVES AS INDICATION OF BLOCKAGE IN THE LOOP.

OMRSD - PUMP OUTLET PRESSURE IS CONTINUOUSLY MONITORED WHEN THE VEHICLE IS POWERED UP DURING EACH TURNAROUND AND SERVES AS AN INDICATION OF BLOCKAGE IN THE LOOP. WATER IS SAMPLED PER SPEC SE-S-0073 DURING SERVICING.

(C) INSPECTION

RECEIVING INSPECTION

RAW MATERIALS ARE VERIFIED FOR MATERIAL AND PROCESS CERTIFICATION.

CONTAMINATION CONTROL

EXTERNAL AND INTERNAL SURFACE CLEANLINESS IS MAINTAINED AND VERIFIED ACCORDANCE WITH H.S. REQUIREMENTS. INSPECTION VERIFIES CORROSION PROTECTION PROVISIONS.

ASSEMBLY/INSTALLATION

ORIENTATION OF CONNECTOR MASTER KEYWAY IS DETERMINED AND VERIFIED BY INSPECTION. TORQUE APPLICATION IS VERIFIED PER DRAWING REQUIREMENTS. KOROPON TREATED SURFACE OVERCOATED WITH POLYURETHANE IS VERIFIED BY INSPECTION. PARTS ARE INSPECTED VISUALLY AND IN-PROCESS INSPECTION IS IMPLEMENTED.

CRITICAL PROCESSES

WELDING OF FILTER HOUSING TO PUMP INLET FLANGES IS VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION

LEAK TEST IS VERIFIED BY INSPECTION.

TESTING

ATP, INCLUDING RANDOM VIBRATION TEST, IS VERIFIED BY INSPECTION.

HANDLING/PACKAGING

PACKAGING AND STORAGE REQUIREMENTS ARE VERIFIED BY INSPECTION.

(D) FAILURE HISTORY

NO FAILURE HISTORY APPLICABLE TO RESTRICTED FLOW FAILURE MODE. TEST DISCONNECT HAS SUCCESSFULLY PERFORMED WITHOUT FAILURE THROUGHOUT THE DURATION OF THE SHUTTLE PROGRAM.

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(E) OPERATIONAL USE
TBS.