

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ATMOSPHERIC REVIT. FMEA NO 06-1B -0503 -2 REV: 09/07/88

ASSEMBLY : WATER COOLANT LOOP CRIT. FUNC: 1R
 P/N RI : ME284-0502-0001 CRIT. HDW: 2
 P/N VENDOR: VEHICLE 102 103 104
 QUANTITY : 2 EFFECTIVITY: X X X
 : ONE PER LOOP PHASE(S): PL LO X OO X DO X LS
 : TWO PER SUBSYSTEM

PREPARED BY: DES N. K. DUONG
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 QE D. STOICA

REDAUNDANCY SCREEN: APPROVED BY: A-PASS B-N/A C-PASS
 APPROVED BY (NASA):
 SSM
 REL
 QE

ITEM:
 CHECK VALVE (SERVICING AID)

FUNCTION:
 PROVIDES FLOW DIRECTIONAL CONTROL WHEN THE WATER COOLANT LOOP IS BEING SERVICED.

FAILURE MODE:
 INABILITY TO OPEN, RESTRICTED FLOW

CAUSE(S):
 MECHANICAL SHOCK, VIBRATION, CONTAMINATION, CORROSION, PHYSICAL BINDING, JAMMING

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

(A) LOSS OF REDUNDANCY - LOSS OF ONE WATER COOLANT LOOP.

(B) NO EFFECT - REDUNDANT LOOP PROVIDES COOLING.

(C) POSSIBLE EARLY MISSION TERMINATION FOR LOSS OF ONE WATER COOLANT LOOP.

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

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

(A) DESIGN
 UPSTREAM SYSTEM 10 MICRON FILTER, CRES VALVE WITH EPR SEAT AND TAPERED POPPET, HIGH PURITY WATER SYSTEM, 300 LEVEL CLEAN SYSTEM, LOW CRACKING PRESSURE (0.5 PSID). VALVE INSIDE DIAMETER IS 0.585 INCH.

(B) TEST
 ACCEPTANCE TEST - INTERNAL LEAKAGE ACROSS SEAL SHALL NOT EXCEED 0.06 LBS OF H2O/MINUTE AT 70 F AND 90 PSIG. EXTERNAL LEAK 1 X 10 EXP -4 SCCS GH7 MAX AT 90 PSIG, PROOF PRESSURE AT 135 PSIG. CRACK PRESSURE TEST AT 0.3 PSID MAX. PRESSURE DROP TEST AT 0.5 PSID MAX, AT 1.9 GPM H2O.

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QUALIFICATION TEST - PROOF PRESSURE 135 PSIG, NO EVIDENCE OF LEAKAGE, HIGH TEMP TEST (+275 F), ACCELERATION TEST, ENDURANCE TEST. VIBRATION SPECTRUM ENVELOPE OF 20 TO 150 HZ INCREASING AT 6 DB/OCTAVE TO 0.09 G**2/HZ AT 150 HZ, CONSTANT AT 0.09 G**2/HZ FROM 150 TO 900 HZ, DECREASING AT 9 DB/OCTAVE FROM 900-2000 HZ FOR 48 MINUTES PER AXIS IN 3 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 IS CONTINUOUSLY MONITORED WHEN THE VEHICLE IS POWERED UP; SERVES AS AN 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
INCOMING PARTS ARE VERIFIED FOR MATERIAL AND PROCESS CERTIFICATION.

CONTAMINATION CONTROL
ALL PART CLEANLINESS IS MAINTAINED AND VERIFIED TO LEVEL 300.

ASSEMBLY/INSTALLATION
DIMENSIONS AND SURFACE FINISHES ARE VERIFIED. TORQUE APPLICATION IS VERIFIED BY INSPECTION PER DRAWING SPEC. KRYTOX 240 AC LUBRICATED SEALS AND THREADS ARE VERIFIED. MANDATORY INSPECTION POINTS ARE INCLUDED IN ASSEMBLY PROCEDURE.

NONDESTRUCTIVE EVALUATION
HELIUM LEAK TEST IS VERIFIED BY INSPECTION.

CRITICAL PROCESSES
PARTS PASSIVATION IS VERIFIED BY INSPECTION.

TESTING
ATP IS VERIFIED BY INSPECTION.

HANDLING/PACKAGING
PACKAGING FOR SHIPMENT IS VERIFIED BY INSPECTION.

(D) FAILURE HISTORY
NO FAILURE HISTORY APPLICABLE TO INABILITY TO OPEN FAILURE MODE. THE CHECK VALVE HAS SUCCESSFULLY PERFORMED WITHOUT FAILURE THROUGH THE DURATION OF THE SHUTTLE PROGRAM.

(E) OPERATIONAL USE
TBS.