

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ATMOSPHERIC REVIT. FMEA NO 06-1B -0503 -4 REV:09/07/85

ASSEMBLY : WATER COOLANT LOOP
P/N RI : ME284-0502-0001
P/N VENDOR:
QUANTITY : 2
: ONE PER LOOP
: TWO PER SUBSYSTEM

	VEHICLE	102	103	104
CRIT. FUNC:				LR
CRIT. HDW:				2
EFFECTIVITY:		X	X	X
PHASE(S):	PL	LO X	OO X	DO X LS

PREPARED BY: DES N. K. DONG
REL N. L. STEISLINGER
QE D. STOICA

APPROVED BY: *[Signature]*
SSM *[Signature]*
REL *[Signature]*
QE *[Signature]*

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

ITEM:
CHECK VALVE (SERVICING AID)

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

FAILURE MODE:
EXTERNAL LEAKAGE

CAUSE(S):
MECHANICAL SHOCK, VIBRATION, CORROSION, MATERIAL DEFECT

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

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

(B) LOSS OF COOLING OF AFFECTED COOLANT LOOP. FREE WATER IN CABIN.

(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 STANDBY UNTIL REQUIRED.

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).

(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 GR MAX AT 90 PSIG, PROOF PRESSURE AT 135 PSIG. CRACK PRESSURE TEST AT 0.5 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 1 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 - SYSTEM DECAY TEST IS PERFORMED AT 85 - 95 PSIG, 6 CC/MIN MAX LEAKAGE. PUMP OUT PRESSURE AND ACCUMULATOR QUANTITY ARE CONTINUOUSLY MONITORED WHEN THE VEHICLE IS POWERED UP AND SERVE AS AN INDICATION OF EXTERNAL LEAKAGE.

OMRSD - PUMP ACCUMULATOR QUANTITY AND OUTLET PRESSURE ARE CONTINUOUSLY MONITORED WHILE THE VEHICLE IS POWERED UP DURING EACH TURNAROUND, AND SERVE AS AN INDICATION OF EXTERNAL LEAKAGE. 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 EXTERNAL LEAKAGE FAILURE MODE. THE CHECK VALVE HAS SUCCESSFULLY PERFORMED WITHOUT FAILURE THROUGH THE DURATION OF THE SHUTTLE PROGRAM.

(E) OPERATIONAL USE

TBS.