SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :ATMOSPHERIC REVIT. FMEA NO 06-1B -0501 -3 REV:08/12/88

ASSEMBLY :WATER COOLANT LOOP
P/N RI :MC276-0020-1371/1373
P/N VENDOR:502060-1371/1373 SYMETRICS
QUANTITY :4
:2 FILL
:2 DRAIN

CRIT. FUNC: 1R
CRIT. HDW: 2

VEHICLE EFFECTIVITY:	102	103	104
	X	X	X

PHASE(S): PL LO X OO X DO X LS

REDUNDANCY SCREEN: A-PASS B-PASS C-PASS

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ITEM:
DISCONNECT WITH CAPS - FILL AND DRAIN, AIRBORNE HALF

FUNCTION:
PROVIDE THE ATTACHMENT POINTS FOR SERVICING THE WATER COOLANT LOOPS AND ADJUSTING ACCUMULATOR QUANTITY.

FAILURE MODE:
EXTERNAL LEAKAGE

CAUSE(S):
MECHANICAL SHOCK, VIBRATION, CORROSION

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.

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

(A) DESIGN
MALE AIRBORNE QD IS A 3/8 INCH PUSH-PULL QUICK DISCONNECT COUPLING, OF STAINLESS STEEL CONSTRUCTION (CRES 15-5 PH AND 17-7 PH), AND HAS A SCREW-ON PRESSURE CAP ATTACHED WITH LANYARD. PRESSURE CAP SEAL IS ETHYLENE PROPYLENE RUBBER (EPR). SPRING LOADED STAINLESS STEEL POPPET. WHEN DISCONNECTED, THE POPPET CLOSES. EPR O-RING AND TEFLON BACK-UP RIN FORM A DOUBLE SEAL BETWEEN THE POPPET AND THE HOUSING.

(B) TEST
ACCEPTANCE TEST - PROOF PRESSURE 90 PSIG WITH DEIONIZED WATER. LEAK TE WITH GHE (1 X 10 EXP -4 SCCS MAX) FOR UNCOUPLED CONFIGURATION AND COUPLED CONFIGURATION (WITH THE USE OF A GSE TOOL). CAP IS ALSO LEAK

TESTED USING A HOLLOWED MALE HALF. FLUID LOSS TEST - 0.22 CC MAX PER CYCLE.

QUALIFICATION TEST - TEMP: CYCLED THREE TIMES BETWEEN -65 AND +160 F. HUMIDITY: 8-100%. SALINITY: 1% BY WEIGHT. ACCELERATION 5 G IN ALL 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. SIDE LOADS: 200 INCH-LB. TRANSIENT VIBRATION TEST: ONE SWEEP OF SINUSOIDAL VIBRATION FROM 5-35 HZ AT AN ACCELERATION AMPLITUDE OF PLUS AND MINUS 0.25 G, ONE OCTAVE/MINUTE SWEEP RATE. RANDOM VIBRATION TEST: ACCELERATION SPECTRAL DENSITY INCREASING AT 6 DB/OCTAVE FROM 20 TO 70 HZ, CONSTANT AT 0.1 G**2/HZ FROM 70 TO A POINT WHERE INCREASING AT 6 DB/OCTAVE WILL ACHIEVE 0.2 G**2/HZ AT 150 HZ, CONSTANT AT 0.2 G**2/HZ FROM 150 TO 300 HZ, DECREASING AT 6 DB/OCTAVE TO 0.12 G**2/HZ AND THEN CONSTANT TO 1000 HZ, DECREASING AT 9 DB/OCTAVE FROM 1000-2000 HZ. THE UNITS ARE PRESSURIZED TO 10 AND 90 PSIG WHILE VIBRATE FOR 48 MINUTES IN EACH AXIS; NO VISIBLE LIQUID LEAKAGE ALLOWED. BURST PRESSURE: 180 PSIG.

IN-VEHICLE TESTING - SYSTEM DECAY TEST IS PERFORMED AT 85 - 95 PSIG. 8 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
MATERIAL AND EQUIPMENT CONFORMANCE TO SPECIFICATION IS VERIFIED BY INSPECTION. RAW MATERIALS ARE SENT TO A TEST LAB FOR MATERIAL/CHEMICAL ANALYSIS/CERTIFICATION. SHOP TRAVELER INSPECTION IS PERFORMED FOR CORRECT RAW MATERIAL PRIOR TO MACHINING. IN-PROCESS INSPECTION IS REQUIRED FOR CRITICAL DIMENSIONS CERTIFICATIONS. PARTS PROTECTION VERIFIED BY INSPECTION.

CONTAMINATION CONTROL
SYSTEM FLUID SAMPLE ANALYSIS FOR CONTAMINATION IS VERIFIED BY INSPECTION CORROSION PROTECTION PROVISIONS ARE VERIFIED BY INSPECTION. CONTAMINATION CONTROL IS VERIFIED BY INSPECTION ON SHOP TRAVELERS.

ASSEMBLY/INSTALLATION
MANUFACTURING INSTALLATION, AND ASSEMBLY OPERATIONS ARE VERIFIED BY INSPECTION. CRITICAL DIMENSIONS AND FINISH OF SEALING SURFACES ARE VERIFIED BY INSPECTION.

CRITICAL PROCESSES
HEAT TREATMENT, INCLUDING ROCKWELL HARDNESS TEST, IS VERIFIED BY INSPECTION. PASSIVATION IS VERIFIED BY INSPECTION.

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TESTING
PROOF PRESSURE AND HELIUM LEAK TESTS ARE VERIFIED BY INSPECTION.

HANDLING/PACKAGING
PROPER HANDLING AND STORAGE ENVIRONMENTS ARE VERIFIED BY INSPECTION.

(D) FAILURE HISTORY
NO FAILURE HISTORY APPLICABLE TO EXTERNAL LEAKAGE FAILURE MODE. THE DISCONNECTS HAVE SUCCESSFULLY PERFORMED WITHOUT FAILURE THROUGH THE DURATION OF THE SHUTTLE PROGRAM.

(E) OPERATIONAL USE
TBS.