SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :ACTIVE THERMAL CONTROL FMEA NO 06-3E -0311 -3 REV:08/29/

ASSEMBLY :FLASH EVAPORATOR ASSY
P/N RI :MC250-0017-0970
P/N VENDOR:SV764170
QUANTITY :1
:ONE REQUIRED
:

CRIT. FUNC: 1
CRIT. HDW: 1

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-PAS

PREPARED BY:		APPROVED BY:	APPROVED BY (NASA):
DES	J. MORGAN	DES	SSM
REL	D. RISING	REL	REL
QE	W. SMITH	QE	QE

ITEM:
FLASH EVAPORATOR, WATER.

FUNCTION:
REMOVES WASTE HEAT FROM THE FREON COOLANT LOOPS BY THE EVAPORATION OF SUPPLY WATER. THE ASSEMBLY CONSISTS OF A HIGH LOAD AND A TOPPING EVAPORATOR. THE HIGH LOAD AND TOPPING BOTH OPERATE DURING LAUNCH AND REENTRY PHASES. THE TOPPING OPERATES ALONE DURING THE ON-ORBIT PHASE T SUPPLEMENT RADIATOR COOLING.

FAILURE MODE:
INTERNAL LEAKAGE, FREON TO FREON.

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

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

(A) THE TWO FREON COOLANT LOOPS WILL BE INTERCONNECTED RESULTING IN TRANSFER OF COOLANT FROM ONE LOOP TO THE OTHER UNTIL PRESSURE IN BOTH LOOPS IS EQUALIZED.

(B) NO EFFECT.

(C) POSSIBLE LOSS OF MISSION. EARLY MISSION TERMINATION FOR FIRST FAILURE.

(D) SECOND ASSOCIATED FAILURE (EXTERNAL LEAKAGE OF EITHER FREON COOLANT LOOP) WILL CAUSE LOSS OF ALL VEHICLE COOLING AND MAY RESULT IN LOSS OF CREW/VEHICLE.

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

(A) DESIGN
PROOF PRESSURE OF 1.5 AND BURST OF 2.0 TIMES MAXIMUM OPERATING PRESSURE OF 320 PSI. INNER WALL THICKNESS IS .039 NOMINAL. MATERIAL IS ANODIZE ALUMINUM WHICH IS COMPATIBLE WITH FREON 21.

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(B) TEST
QUALIFICATION TEST - QUALIFICATION TESTED FOR A 100 MISSION LIFE. VIBRATION TESTED AT 0.3 G^2/HZ FOR 60 MIN/AXIS AND SHOCK TESTED AT +/- 20 G/AXIS.

ACCEPTANCE TEST - PRE-ASSEMBLY AND ATP LEAK CHECKS ARE PERFORMED. CORE LEAK INTEGRITY IS VERIFIED DURING ATP VACUUM TESTING.

OMRSD - FREON COOLANT LOOPS ARE LEAK CHECKED PRIOR TO EACH FLIGHT. FREO CHEMICAL ANALYSIS PER SE-S-0073 DURING SERVICING.

(C) INSPECTION

RECEIVING INSPECTION
RAW MATERIAL AND PROCESS CERTIFICATIONS ARE VERIFIED BY INSPECTION.

CONTAMINATION CONTROL
INTERNAL CLEANLINESS OF EACH LOOP IS VERIFIED BY INSPECTION. ANALYSIS OF SYSTEMS FLUID SAMPLES FOR CONTAMINATION ARE VERIFIED BY INSPECTION. CONTAMINATION CONTROL PROCESSES AND CORROSION PROTECTION PROVISIONS VERIFIED.

ASSEMBLY/INSTALLATION
MANUFACTURING, INSTALLATION AND ASSEMBLY OPERATIONS ARE VERIFIED BY INSPECTION. MATERIAL AND HANDLING EQUIPMENT CONFORMANCE TO REQUIREMENTS ARE VERIFIED BY INSPECTION. THREADED INSERTS ARE INSTALLED WITH KOROPON COATING AND VERIFIED BY INSPECTION.

CRITICAL PROCESSES
ANODIZING AND WELDING REQUIREMENTS ARE VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION
WELDS ARE PENETRANT INSPECTED. X-RAY INSPECTION OF CYLINDRICAL CORE-RIN AND CORE-INLET, VERIFIED BY INSPECTION.

TESTING
SYSTEM PROOF PRESSURE TEST USING FREON IS VERIFIED BY INSPECTION. ACCEPTANCE TEST INSPECTION POINTS INCLUDED EXAMINATION OF MECHANICAL AND FLUID INTERFACE, FINAL TUBE LOCATION, EXAMINATION OF ALL EXTERNAL OR VISIBLE INTERNAL SURFACES, AND MONITOR TO DETECT LEAKS. FUNCTIONAL TEST IS MONITORED FOR LEAKAGE BY INSPECTION.

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

(D) FAILURE HISTORY
NO FAILURE HISTORY.

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(E) OPERATIONAL USE
GROUND CONTROLLER WILL IDENTIFY HARDWARE FAILURE. PUMP INLET PRESSURES CONVERGE AND ACCUMULATOR QUANTITIES DIVERGE. BOTH LOOPS WILL OPERATE NORMALLY. A LEAK IN EITHER LOOP WILL CAUSE LOSS OF BOTH LOOPS, THEREFC IT IS TREATED AS A LOSS OF ONE FREON LOOP. ENTRY AT NEXT PRIMARY LANDI SITE.