SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :ACTIVE THERMAL CONTROL FMEA NO 06-3C -0220 -1 REV:08/26/

ASSEMBLY :FREON THERMAL LOOP
P/N RI :MC250-0001-0270
P/N VENDOR:SV729792-2
QUANTITY :2
:TWO,ONE PER LOOP
:

		CRIT. FUNC:	
		CRIT. HDW:	
VEHICLE	102	103	104
EFFECTIVITY:	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	O. TRAN	DES	SSM
REL	D. RISING	REL	REL
QE	W. SMITH	QE	QE

ITEM:
VALVE MODULE, FLOW PROPORTIONAL.

FUNCTION:
THE VALVE MODULE PROPORTIONS THE FLOW OF FREON TO THE PAYLOAD HEAT EXCHANGER AND THE WATER/FREON INTERCHANGER.

FAILURE MODE:
EXTERNAL LEAKAGE.

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

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

(A,B) POSSIBLE LOSS OF ONE FREON COOLANT LOOP FOR VEHICLE COOLING.

(C) POSSIBLE LOSS OF MISSION. EARLY MISSION TERMINATION FOR LOSS OF FREON LOOP.

(D) SECOND ASSOCIATED FAILURE (LOSS OF REDUNDANT 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
THE VALVE CONSISTS OF A STAINLESS STEEL HOUSING AND SPOOL. THE SPOOL HAS 8 DIFFERENT SIZED ORIFICES - THE SMALLEST IS 0.062 INCHES. 25 MICRON (ABS) FILTERS AT THE INLET AND OUTLET OF THE VALVE PROTECT AGAINST CONTAMINATION. MATERIALS USED ARE CORROSION RESISTANT AND COMPATIBLE WITH FREON 21. DESIGN PROOF PRESSURE IS 1.5 AND BURST PRESSURE IS 2.0 TIMES THE MAXIMUMOPERATING PRESSURE. REDUNDANT DYNAMIC KALREZ SEALS ARE USED TO SEAL BETWEEN THE FREON AND AMBIENT. THE MODUL IS BRAZED INTO THE PCL SYSTEM.

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(B) TEST
QUALIFICATION TEST - QUALIFICATION TESTED FOR 100 MISSION LIFE. VIBRATION TESTED AT 2.0 G^2/HZ FOR 84 MIN/AXIS, SHOCK TESTED AT +/- 20 G EACH AXIS. THE VALVE WAS CYCLED 1000 TIMES WITH NO FAILURES OF THIS TYPE.

ACCEPTANCE TEST - COMPONENT ATP INCLUDES LEAK CHECK.

OMRSD - FCL ARE LEAK CHECKED PRIOR TO EACH FLIGHT. FREON CHEMICAL ANALYSIS PER SE-S-0073 DURING SERVICING. VEHICLE FREON IS SERVICED THROUGH A 10 MICRON (ABS) GSE FILTER.

(C) INSPECTION

RECEIVING INSPECTION
RAW MATERIAL AND PURCHASED COMPONENTS REQUIREMENTS ARE VERIFIED BY RECEIVING INSPECTION. COATING AND PLATING MATERIALS AND PROCESSES ARE VERIFIED BY INSPECTION.

CONTAMINATION CONTROL
FORMAL CONTAMINATION CONTROL PLAN IS VERIFIED BY INSPECTION. CONTAMINATION CONTROL PROCESSES AND CLEAN AREAS ARE VERIFIED BY INSPECTION. CORROSION PROTECTION PROVISIONS ARE VERIFIED BY INSPECTION. SYSTEM FLUID SAMPLES ARE PERIODICALLY ANALYZED FOR CONTAMINATION AND VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION
PARTS PROTECTION, MANUFACTURING PROCESSES, INSTALLATION AND ASSEMBLY OPERATIONS ARE VERIFIED BY INSPECTION ON SHOP TRAVELERS. MEASUREMENT STANDARDS AND TEST EQUIPMENT IMPLEMENTATION PER REQUIREMENTS OF MIL SPECIFICATIONS ARE VERIFIED BY INSPECTION. TORQUE CERTIFICATION IS VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION
LEAK TEST IS VERIFIED BY INSPECTION.

TESTING
FUNCTIONAL TEST IS MONITORED BY INSPECTION TO VERIFY FLOWRATE IS WITHIN SPECIFIED LIMITS.

HANDLING/PACKAGING
HANDLING, PACKAGING, AND STORAGE REQUIREMENTS ARE VERIFIED BY INSPECTION.

(D) FAILURE HISTORY
NO FAILURE HISTORY.

(E) OPERATIONAL USE
ON-BOARD ALARMS, FREON FLOW, WILL PROVIDE INDICATION OF HARDWARE FAILURE. FREON PUMP WILL BE TURNED OFF AND LOSS OF ONE FREON LOOP POWERDOWN WILL BE PERFORMED. ENTRY AT NEXT PRIMARY LANDING SITE.