SHUTTLE CRITICAL ITEMS LIST - ORBITER NUMBER: 06-3D-0502-X

SUBSYSTEM NAME: ATCS - RADIATORS AND FLOW CONTROL
REVISION : 10/19/88

CLASSIFICATION		NAME	PART NUMBER
LRU	:	FLOW CONTROL ASSY, RADIATOR	224-00050
LRU	:	FLOW CONTROL ASSY, RADIATOR	MC203-0002-0050

QUANTITY OF LIKE ITEMS: 2
TWO, ONE PER LOOP

DESCRIPTION/FUNCTION:
VALVE, RADIATOR FLOW CONTROL.

CONTROLS FREON COOLANT TEMPERATURE FROM THE RADIATOR PANEL ASSEMBLY. CONTROL IS ACCOMPLISHED BY MIXING HOT FREON WITH COLD RADIATOR FREON.

SHUTTLE CRITICAL ITEMS LIST - ORBITER NUMBER: 06-3D-0502-04

REVISION: 10/19/88

SUBSYSTEM: ATCS - RADIATORS AND FLOW CONTROL
LRU :FLOW CONTROL ASSY, RADIATOR
ITEM NAME: FLOW CONTROL ASSY, RADIATOR

CRITICALITY OF THIS FAILURE MODE:2 2

FAILURE MODE:
FAILS IN BYPASS POSITION, MECHANICAL JAMMING

MISSION PHASE:
OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY:		
	102	COLUMBIA
	103	DISCOVERY
	104	ATLANTIS

CAUSE:
MECHANICAL SHOCK, CONTAMINATION, VIBRATION, CORROSION, PHYSICAL BINDING/ JAMMING.

CRITICALITY 1/1 DURING ANY MISSION PHASE OR ABORT? N

REDUNDANCY SCREEN A) N/A
B) N/A
C) N/A

PASS/FAIL RATIONALE:
A)

B)

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:
POSSIBLE LOSS OF FREON FLOW IN ONE RADIATOR PANEL LOOP FOR VEHICLE COOLING.

(B) INTERFACING SUBSYSTEM(S):
SAME AS A.

(C) MISSION:
POSSIBLE LOSS OF MISSION DUE TO THE LOSS RADIATOR COOLING TO SUPPORT PAYLOAD OPERATIONS, A CRITICALITY 2/2 EFFECT.

(D) CREW, VEHICLE, AND ELEMENT(S):
NO EFFECT.

RATIONALE FOR CRITICALITY:
FUNCTIONAL CRITICALITY EFFECT - ANY TWO ADDITIONAL FAILURES (OTHER FREON COOLANT LOOP, HI-LOAD EVAPORATOR, AND AMMONIA BOILER SYSTEM) WILL CAUSE LOSS OF VEHICLE COOLING CAPABILITY AND MAY RESULT IN LOSS OF CREW/VEHICLE, A CRITICALITY 1R3 (PPP) EFFECT.

- DISPOSITION RATIONALE -

(A) DESIGN:
THE RADIATOR FLOW CONTROL VALVE DESIGN CONSISTS OF A DOUBLE POPPET TYPE VALVE HEAD, EACH HEAD HAVING A TEFLON SEALING RING WHICH SEALS AGAINST A CHAMFER SEAT WITHIN THE VALVE BODY. MATERIAL IS STAINLESS STEEL, WHICH IS COMPATIBLE WITH FREON 21. THE FLOW CONTROL ASSEMBLY IS MOUNTED ON VIBRATION ISOLATORS. THERE IS A 65 MICRON FILTER IN THE FLOW CONTROL ASSEMBLY.

(B) TEST:
QUALIFICATION TEST - FLOW CONTROL ASSEMBLY IS QUALIFIED FOR A 100 MISSION LIFE. VIBRATION TESTED AR 0.1 G2/HZ FOR 48 MIN/AXIS AND SHOCK TESTED AT +/- 20 G/AXIS.

ACCEPTANCE TEST - VALVE FUNCTIONAL TEST IS PERFORMED DURING ATP. AVT IS DONE AT COMPONENT LEVEL AND AT A HIGHER ASSEMBLY LEVEL (FLOW CONTROL ASSEMBLY).

OMRSD - RADIATOR FLOW CONTROLLER CHECKOUT (MANUAL AND AUTO) EVERY FIVE FLIGHTS. RADIATOR FLOW CONTROL VALVE OPERATION VERIFIED PRIOR TO EACH FLIGHT. FREON CHEMICAL ANALYSIS PER SE-S-0073 DURING SERVICING. FREON IS SERVICED THROUGH A FINAL FILTER OF 25 MICRON SIZE.

(C) INSPECTION:
RECEIVING INSPECTION
RAW MATERIAL CERTIFICATIONS ARE VERIFIED BY INSPECTION. PART PROTECTION IS VERIPIED BY INSPECTION.

CONTAMINATION CONTROL
CONTAMINATION CONTROL PROCESSES, CONTAMINATION CONTROL PLAN AND CORROSION PROTECTION PROVISIONS ARE VERIFIED BY INSPECTION. FLUID SYSTEM IS VERIFIED BY INSPECTION TO BE FREE OF CONTAMINATION.

ASSEMBLY/INSTALLATION
MANUFACTURING, INSTALLATION AND ASSEMBLY ARE VERIFIED BY INSPECTION FOR CRITICAL DIMENSIONS.

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CRITICAL PROCESSES
WELDING IS VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION
X-RAY EXAMINATION OF FUSION WELDS IS VERIFIED BY INSPECTION.

TESTING
VIBRATION, FLOW RATE AND PRESSURE DROP REQUIREMENTS ARE VERIFIED BY INSPECTION DURING ATP.

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

(D) FAILURE HISTORY:
NO FAILURE HISTORY.

(E) OPERATIONAL USE:
ON-BOARD ALARM, EVAPORATOR OUT TEMPERATURE, WILL INDICATE HARDWARE FAILURE. FAILURE WILL CAUSE AN EARLY END OF MISSION. FREON PUMP WILL BE TURNED OFF AND A POWERDOWN PERFORMED. FREON PUMP WILL BE REACTIVATED FOR ENTRY.

- APPROVALS -

RELIABILITY ENGINEERING: D. R. RISING DER
DESIGN ENGINEERING : O. TRAN ONT
QUALITY ENGINEERING : W. J. SMITH
NASA RELIABILITY :
NASA DESIGN :
NASA QUALITY ASSURANCE :

11/8/88