

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ACTIVE THERMAL CONTROL FMEA NO 06-3E -0311 -1 REV:08/89/
 ASSEMBLY : FLASH EVAPORATOR ASSY CRIT. FUNC: 1R
 P/N RI : MC250-0017-0970 CRIT. HDW: 2
 P/N VENDOR: SV764170 VEHICLE 102 103 104
 QUANTITY : 1 EFFECTIVITY: X X X
 : ONE REQUIRED PHASE(S): FL 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 *[Signature]* SSM *[Signature]*
 REL D. RISING REL *[Signature]*
 QE W. SMITH QE *[Signature]*

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 TO SUPPLEMENT RADIATOR COOLING.

FAILURE MODE:
 RESTRICTED FLOW, FREON LOOP.

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

EFFECT(S) ON:
 (A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE
 (A, B) POSSIBLE LOSS OF FLOW IN ONE FREON COOLANT LOOP FOR VEHICLE COOLING.
 (C) POSSIBLE LOSS OF MISSION. EARLY MISSION TERMINATION FOR LOSS OF ON COOLANT 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
 PARTIAL RESTRICTION OF MULTIPLE PASSAGES WOULD RESULT IN PERFORMANCE DEGRADATION. MATERIAL IS ANODIZED ALUMINUM WHICH IS COMPATIBLE WITH WATER AND F-21. FLOW PASSAGES ARE 0.05 INCHES WITH A 0.006 INCH THICK FIN ON A 9.3 INCH DIAMETER CORE.

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(B) TEST

QUALIFICATION TEST - QUALIFICATION TESTED FOR A 100 MISSION LIFE. VIBRATION TESTED AT 0.3 G²/HZ FOR 60 MIN/AXIS AND SHOCK TESTED AT +/- 20 G/AXIS.

ACCEPTANCE TEST - ACCEPTANCE INCLUDES PERFORMANCE FLOWRATE TESTS. CORE INTEGRITY WILL BE VERIFIED DURING ATP VACUUM TESTING.

CMRSD - FCL FLOW RATES ARE CHECKED PRIOR TO EACH FLIGHT. PRE AND POST-FLIGHT CHECKOUT PRESSURE DROP CHECK. FLUIDS CONTROLLED TO SE-S-0073. FREON SYSTEM SERVICED THROUGH A 10 MICRON FILTER.

(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 ARE VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

MANUFACTURING, INSTALLATION AND ASSEMBLY OPERATIONS ARE VERIFIED BY INSPECTION. MATERIAL AND HANDLING EQUIPMENT CONFORMANCE TO REQUIREMENTS ARE VERIFIED BY INSPECTION. TREADED 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, PERFORMED BY INSPECTION.

TESTING

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. SYSTEM PROOF PRESSURE TEST VERIFIED BY INSPECTION.

HANDLING/PACKAGING

HANDLING AND STORAGE ENVIRONMENTS ARE VERIFIED BY INSPECTION.

(D) FAILURE HISTORY

NO FAILURE HISTORY.

(E) OPERATIONAL USE

ON-BOARD ALARM, FREON FLOW, WILL INDICATE HARDWARE FAILURE. FREON PUMP WILL BE TURNED OFF AND LOSS OF ONE FREON LOOP POWERDOWN WILL BE PERFORMED. ENTRY AT NEXT PRIMARY LANDING SITE.