SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :ACTIVE THERMAL CONTROL FMEA NO 06-3C -0390 -1 REV:08/29

ASSEMBLY :FREON THERMAL LOOP
P/N RI :V070-634460,465,
P/N VENDOR:470 AND 475
QUANTITY :2
:TWO SETS (ONE FOR EACH
:F-21 LOOP)

CRIT. FUNC:
CRIT. HDW:

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-PA

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

ITEM:
LINES AND FITTINGS AND O_2 RESTRICTOR.

FUNCTION:
PROVIDE FOR FLOW OF FREON 21 THROUGH THE ACTIVE THERMAL CONTROL SUBSYSTEM AND PROVIDES HEAT TO CRYOGENIC LINE TO ENSURE GASEOUS O2 AT RESTRICTOR.

FAILURE MODE:
EXTERNAL LEAKAGE, FREON 21.

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

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

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

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

(D) SECOND ASSOCIATED FAILURE (LOSS OF REDUNDANT FREON COOLANT LOOP) W CAUSE LOSS OF ALL VEHICLE COOLING AND MAY RESULT IN LOSS OF CREW/VEHIC

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

(A) DESIGN
DESIGN SAFETY FACTOR. PROOF PRESSURE FACTOR OF 2.0 & BURST PRESSURE FACTOR OF 4.0 FOR LINES. PROOF PRESSURE FACTOR OF 1.5 & BURST PRESSURE OF 2.0 FOR COMPONENTS. LINE WALL THICKNESS OF 0.0016 INCHES. THE MATERIAL IS STAINLESS STEEL, WHICH IS COMPATIBLE WITH FREON 21.

(B) TEST
QUALIFICATION TEST - QUALIFICATION TESTED FOR A 100 MISSION LIFE. VIBRATION TESTED AT 0.3 G^2/HZ FOR 84 MIN/AXIS. SHOCK TESTED AT +/- 20 PER AXIS.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :ACTIVE THERMAL CONTROL FMEA NO 06-3C -0390 -1 REV:08/29/8

ACCEPTANCE TEST - COMPONENTS LEAK TESTED IN ACCEPTANCE SYSTEM CHECKOUT WILL VERIFY SYSTEM INTEGRITY, BY USING VEHICLE INSTRUMENTATION. SYSTEM IS PROOF PRESSURE TESTED & LEAK TESTED AFTER INSTALLATION.

OMRSD - FCL'S ARE LEAK CHECKED PRIOR TO EACH FLIGHT. FLUID USE CONTROLLED TO SE-S-0073.

(C) INSPECTION

RECEIVING INSPECTION
MATERIAL AND PROCESS CERTIFICATIONS VERIFIED BY INSPECTION.

CONTAMINATION CONTROL
PERIODICALLY ANALYZE SYSTEM FLUID SAMPLES FOR CONTAMINATION. CORROSION PROTECTION PER MAC608-301 IS VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION
MANUFACTURING, INSTALLATION AND ASSEMBLY OPERATIONS ARE VERIFIED BY INSPECTION. TORQUE AND THREADED FASTENER ARE VERIFIED BY INSPECTION.

CRITICAL PROCESSES
BRAZING AND ELECTRICAL BONDING ARE VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION
X-RAY IS VERIFIED BY INSPECTION.

TESTING
ATP IS VERIFIED BY INSPECTION.

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

(D) FAILURE HISTORY
NO FAILURE HISTORY.

(E) OPERATIONAL USE
ON-BOARD ALARMS, FREON INLET PRESSURE AND ACCUMULATOR QUANTITIES WILL INDICATE HARDWARE FAILURE. FREON PUMP WILL BE TURNED OFF AND LOSS OF ON FREON LOOP POWERDOWN WILL BE PERFORMED. ENTRY AT NEXT PRIMARY LANDING SITE.