

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ACTIVE THERMAL CONTROL FMEA NO 06-3C -0390 -2 REV: 08/89

ASSEMBLY : FREON THERMAL LOOP CRIT. FUNC:
P/N RI : V070-634460,465, CRIT. HDW:
P/N VENDOR: 470 AND 475 VEHICLE 102 103 104
QUANTITY : 2 EFFECTIVITY: X X X
: TWO SETS (ONE FOR EACH PHASE(S): PL LO X OO X DO X LE
: F-21 LOOP)

PREPARED BY: DES O. TRAN *O. Tran* APPROVED BY: *[Signature]* REDUNDANCY SCREEN: A-PASS B-PASS C-P.
REL D. RISING *D. Rising* DES *[Signature]* APPROVED BY (NASA):
QE W. SMITH *W. Smith* REL *[Signature]* SSM *[Signature]*
QE *[Signature]* REL *[Signature]* QE *[Signature]*

ITEM:
LINES AND FITTINGS AND O₂ 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:
RESTRICTED FLOW, FREON 21.

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

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 COOLANT LOOP.
(D) SECOND ASSOCIATED FAILURE (LOSS OF REDUNDANT FREON COOLANT LOOP) : 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
PUMP PACKAGE HAS 25 AND 61 MICRON FILTERS TO MINIMIZE CONTAMINATION. MINIMUM INNER DIAMETER OF LINES IS 0.359 INCH 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 G²/HZ FOR 84 MIN/AXIS. SHOCK TESTED AT +/- 2G PER AXIS.

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OMRSD - FLUID USE CONTROLLED TO SE-S-0073. FREON SYSTEM SERVICED THROUGH A 10 MICRON FILTER. FCL FLOWRATES ARE VERIFIED PRIOR TO EACH FLIGHT.

(C) INSPECTION

RECEIVING INSPECTION

MATERIAL AND PROCESS CERTIFICATIONS VERIFIED BY INSPECTION.

CONTAMINATION CONTROL

PERIODICALLY ANALYZE SYSTEM FLUID SAMPLES FOR CONTAMINATION. CORROSION PROTECTION PER MA0608-301 IS VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

MANUFACTURING, INSTALLATION AND ASSEMBLY OPERATIONS ARE VERIFIED BY INSPECTION. TORQUE AND TREADED 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 ALARM, FREON FLOW, WILL INDICATE HARDWARE FAILURE. FREON PUMP WILL BE TURNED OFF AND LOSS OF ONE FREON COOLANT LOOP POWERDOWN WILL BE PERFORMED. ENTRY AT NEXT PRIMARY LANDING SITE.