1 PRINT DATE: 02/17/8

SHUTTLE CRITICAL ITEMS LIST - ORBITER NUMBER: 06-1B3-0571-X

SUBSYSTEM NAME: ARS - COOLING

REVISION : 0 02/17/89 W

| | | PART NAME<br>VENDOR NAME | PART NUMBER<br>VENDOR NUMBER |
|---|---|---|---|
| LRU | : | LINES AND FITTINGS | V070-613890 |
| LRU | : | LINES AND FITTINGS | V070-613891 |
| LRU | : | LINES AND FITTINGS | V070-613896 |
| LRU | : | LINES AND FITTINGS | V070-634460 |

**QUANTITY OF LIKE ITEMS:** 2
ONE SET PER LOOP
TWO SETS PER SUBSYSTEM

**DESCRIPTION/FUNCTION:**
LINES AND FITTINGS

PROVIDES FOR THE MOVEMENT OF THE WATER BETWEEN THE VARIOUS HEAT EXCHANGERS FOUND WITHIN THE ARS.

SHUTTLE CRITICAL ITEMS LIST - ORBITER NUMBER: 06-1B3-0571-02

REVISION: 11/04/88

SUBSYSTEM: ARS - COOLING
LRU : LINES AND FITTINGS CRITICALITY OF THIS
ITEM NAME: LINES AND FITTINGS FAILURE MODE: 1R2

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FAILURE MODE:
RESTRICTED FLOW

MISSION PHASE:

LO LIFT-OFF
OO ON-ORBIT
DO DE-ORBIT

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

CAUSE:
CONTAMINATION, CORROSION, MECHANICAL SHOCK

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

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REDUNDANCY SCREEN A) PASS

B) N/A

C) PASS

A)

B)
SCREEN B IS N/A BECAUSE REDUNDANT LOOP IS IN STANDBY UNTIL REQUIRED.

C)

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- FAILURE EFFECTS -

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(A) SUBSYSTEM:
REDUCED OR LOST COOLING CAPABILITY OF ONE WATER COOLANT LOOP.

(B) INTERFACING SUBSYSTEM(S):
LOSS OF COOLING OF AFFECTED WATER COOLANT LOOP.

(C) MISSION:
POSSIBLE EARLY MISSION TERMINATION FOR LOSS OF ONE WATER COOLANT LOOP FOR CABIN AND AVIONICS COOLING.

(D) CREW, VEHICLE, AND ELEMENT(S):
POTENTIAL LOSS OF CREW/VEHICLE UPON SUBSEQUENT LOSS OF REDUNDANT WATER COOLANT LOOP.

RATIONALE FOR CRITICALITY:

- DISPOSITION RATIONALE -

(A) DESIGN:
TUBES ARE MADE OF 3/16, 1/4, 3/8, 5/8 INCH O.D., 0.016 INCH WALL THICKNESS 21-6-9 CRES PER SPECIFICATION MB0160-035 CLASS 2. FITTINGS ARE MADE OF 17-4 PH AND 321 CRES AND BRAZED PER MA0107-311. THE PLUMBING IS ATTACHED TO SECONDARY STRUCTURE WITH METAL SADDLE CLAMPS BOLTED TO ALUMINUM LINE BLOCK. HIGH PURITY WATER, FLUID PRESSURE AND QUANTITY INSTRUMENTATION, 10-MICRON FILTER, 300 LEVEL CLEANLINESS. WATER FILTERS ARE PLEATED STAINLESS STEEL WIRE MESH WITH A FILTRATION RATING OF 25 MICRON ABSOLUTE, 10 MICRON NOMINAL. FILTRATION AREA IS 50 SQ. IN.

(B) TEST:
CERTIFICATION - FUNGUS, OZONE, SALINITY AND SAND AND DUST ARE CERTIFIED BY ANALYSIS PER MF0004-014. TEMPERATURE CERTIFICATION BY ANALYSIS FOR -10 F TO 120 F. PRESSURE BY ANALYSIS UP TO 360 PSIG. SHOCK AND VIBRATION BY ANALYSIS PER MF0004-014.

IN-VEHICLE TESTING - PUMP CHECKS ARE PERFORMED AND PUMP OUT PRESSURE IS CONTINUOUSLY MONITORED WHEN THE VEHICLE IS POWERED UP; SERVES AS AN INDICATION OF BLOCKAGE IN THE LOOP.

OMRSD - PUMP OUTLET PRESSURE IS CONTINUOUSLY MONITORED WHEN THE VEHICLE IS POWERED UP DURING EACH TURNAROUND AND SERVES AS AN INDICATION OF BLOCKAGE IN THE LOOP. WATER IS SAMPLED PER SPEC SE-S-0073 DURING

SERVICING.

(C) INSPECTION:
RECEIVING INSPECTION
MATERIAL AND PROCESS CERTIFICATIONS VERIFIED BY INSPECTION.

CONTAMINATION CONTROL
CONTAMINATION AND CORROSION CONTROL REQUIREMENTS ARE VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION
INSTALLATION PER TUBING INSTALLATION SPECIFICATION VERIFIED BY INSPECTION. DIMENSIONS, TOLERANCES AND SURFACE FINISHES ARE VERIFIED. SEALING SURFACES ARE VERIFIED.

NONDESTRUCTIVE EVALUATION
LEAK TEST AND BRAZE JOINT RADIOGRAPHIC INSPECTIONS ARE VERIFIED BY INSPECTION.

CRITICAL PROCESSES
TUBE BRAZING 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 APPLICABLE TO RESTRICTED FLOW FAILURE MODE. THE LINES AND FITTINGS HAVE SUCCESSFULLY PERFORMED WITHOUT FAILURE THROUGH THE DURATION OF THE SHUTTLE PROGRAM.

(E) OPERATIONAL USE:
TBS.

- APPROVALS -

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|---|---|---|
| RELIABILITY ENGINEERING | N. L. STEISSLINGER | |
| DESIGN ENGINEERING | N. K. DUONG | |
| QUALITY ENGINEERING | D. R. STOICA | |
| NASA RELIABILITY | | |
| NASA DESIGN | | 11/17/88 |
| NASA QUALITY ASSURANCE | | |