

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ACTIVE THERMAL CONTROL FMEA NO 06-3C -0305 -1 REV: 03/28/88  
 ASSEMBLY : FREON THERMAL LOOP CRIT. FUNC:   
 P/N RI : MC250-0035-1205 CRIT. HDW:   
 P/N VENDOR: RR42860 VEHICLE 102 103 104  
 QUANTITY : 2 EFFECTIVITY: X X X  
 : TWO PER VEHICLE PHASE(S): PL LO OO DO LS X  
 :

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

ITEM:  
CONNECTOR, FLUID/GSE HEAT EXCHANGER.

FUNCTION:  
PROVIDES CONNECTION FOR GROUND COOLING OF VEHICLE FREON. ALSO FUNCTIONS AS A RELIEF VALVE DURING FLIGHT.

FAILURE MODE:  
EXTERNAL LEAKAGE, GSE FREON 114.

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

EFFECT(S) ON:  
 (A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE  
 (A) POSSIBLE LOSS OF FREON 114 FROM GSE FREON 114 LOOP.  
 (B) POSSIBLE LOSS OF GSE COOLING CAPABILITY DURING GROUND OPERATIONS.  
 (C) POSSIBLE LOSS OF MISSION. LOSS OF PAYLOAD POSTLANDING COOLING.  
 (D) NO EFFECT.

DISPOSITION & RATIONALE:  
 (A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE  
 (A) DESIGN  
 DESIGN PROOF AND BURST PRESSURE FOR THE GSE LOOP ARE 1.5 AND 2.0 TIMES THE MAXIMUM OPERATING PRESSURE. THE HEAT EXCHANGER, CONNECTOR, AND THE INTEGRAL RELIEF VALVE PARTS ARE MADE OF STAINLESS STEEL AND THE SEALS IN THE RELIEF VALVE ARE TEFLON. THESE MATERIALS CORROSION RESISTANT AND COMPATIBLE WITH FREON 114.  
 (B) TEST  
 QUALIFICATION TEST - THE HEAT EXCHANGER AND CONNECTOR ARE QUALIFICATION TESTED FOR 100 MISSION LIFE. DESIGN PROOF PRESSURE IS 375 AND UNIT DID NOT RUPTURE UNTIL IS 2440 PSIG. THE CONNECTOR WAS VIBRATION TESTED AT 0.3 G<sup>2</sup>/HZ FOR 52 MIN/AXIS, AND SHOCK TESTED AT +/- 20 G/AXIS.  
 ACCEPTANCE TEST - FUNCTIONAL AND LEAK CHECKED DURING ATP.

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**SUBSYSTEM : ACTIVE THERMAL CONTROL FMEA NO 06-3C -0305 -1 REV:08/29/81**

**OMRSD - GSE LOOP IS LEAK CHECKED PRIOR TO EACH FLIGHT. FREON CHEMICAL ANALYSIS PER SE-3-0073 DURING SERVICING.**

**(C) INSPECTION**

**RECEIVING INSPECTION**

**RAW MATERIAL AND PROCESS CERTIFICATIONS ARE VERIFIED BY INSPECTION. INSPECTION VERIFIES PART PROTECTION. INSPECTION VERIFIES MATERIAL AND EQUIPMENT CONFORM TO SPECIFICATION.**

**CONTAMINATION CONTROL**

**SYSTEM FLUID SAMPLE ANALYZED FOR CONTAMINATION. CORROSION PROTECTION PROVISIONS ARE VERIFIED BY INSPECTION. CLEANLINESS (LEVEL 100) IS VERIFIED BY INSPECTION BEFORE AND AFTER ATP. ULTRASONIC CLEANING OF COMPONENTS IS VERIFIED BY INSPECTION.**

**ASSEMBLY/INSTALLATION**

**MANUFACTURING, INSTALLATION, AND ASSEMBLY OPERATIONS ARE VERIFIED BY INSPECTION.**

**CRITICAL PROCESSES**

**HEAT TREATMENT, WELDING AND PASSIVATION ARE VERIFIED BY INSPECTION.**

**TESTING**

**FUNCTIONAL TEST IS MONITORED FOR LEAKAGE BY INSPECTION.**

**HANDLING/PACKAGING**

**PROPER HANDLING AND STORAGE ENVIRONMENTS ARE VERIFIED BY INSPECTION.**

**(D) FAILURE HISTORY**

**NO FAILURE HISTORY.**

**(E) OPERATIONAL USE**

**FAILURE IS INDICATED BY ELEVATED EVAPORATOR OUT TEMPERATURE. IF COOLING CANNOT BE REGAINED, THE ORBITER WILL BE POWERED DOWN. POSSIBLE LOSS OF PAYLOADS WHICH REQUIRE ORBITER COOLING.**