

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ACTIVE THERMAL CONTROL FMEA NO 06-3C -0104 -2 REV: 03/09/88

ASSEMBLY : FREON PUMP ASSY						CRIT. FUNC: :
P/N RI : MC250-0001-0436						CRIT. HDW: :
P/N VENDOR: SV764110		VEHICLE	102	103	104	
QUANTITY : 4		EFFECTIVITY:	X	X	X	
: FOUR PER PACKAGE.		PHASE(S):	PL	LO X	CO X	DO X
				LS		

REDUNDANCY SCREEN: A-FAIL B-FAIL C-PAS

PREPARED BY:		APPROVED BY:		APPROVED BY (NASA):	
DES O. TRANCAT	DES	<i>[Signature]</i>	SSM	<i>[Signature]</i>	4/15/88
REL D. RISING	REL	<i>[Signature]</i>	REL	<i>[Signature]</i>	7/15/88
QE W. SMITH	QE	<i>[Signature]</i>	QE	<i>[Signature]</i>	

ITEM:

FILTER, PUMPS AND CHECK VALVE INLET.

FUNCTION:

THE FILTERS ARE PROVIDED AT THE INLET OF EACH PUMP AND CHECK VALVE TO PROTECT THOSE COMPONENTS FROM PACKAGE GENERATED CONTAMINATION AND PROTECT THE FCL FROM SYSTEM CONTAMINATION IN THE EVENT OF A PUMP PACKAGE INLET FILTER FAILURE.

FAILURE MODE:

TEAR OR OPENING IN FILTER ELEMENT (LOSS OF FILTRATION).

CAUSE(S):

CORROSION, VIBRATION, MECHANICAL SHOCK.

EFFECT(S) ON:

(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE

(A) LOSS OF PUMP OR CHECK VALVE FILTRATION. POSSIBLE DAMAGE TO PUMP ROTOR OR CHECK VALVE.

(B) POSSIBLE LOSS OF ONE REDUNDANT PUMP.

(C) NO EFFECT

(D) NO EFFECT

(E) FUNCTIONAL CRITICALITY EFFECT - LOSS OF FREON 21 FLOW (LOSS OF PUMP INLET FILTER OR CHECK VALVE FILTER ON REDUNDANT PUMP, AND LOSS OF REDUNDANT FREON COOLANT LOOP) CAN CAUSE LOSS OF ALL VEHICLE COOLING AND CAN RESULT IN LOSS OF CREW/VEHICLE. REDUNDANCY SCREENS 'A' AND 'B' FAIL BECAUSE FILTERS CANNOT BE VISUALLY INSPECTED ON THE GROUND OR IN FLIGHT AND LOSS OF FILTRATION CAUSES NO IMMEDIATE CHANGE IN ANY FREON COOLANT LOOP PARAMETER.

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DISPOSITION & RATIONALE:

(A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE

(A) DESIGN

FILTER IS 61 MICRON ABSOLUTE AND IS CAPABLE OF WITHSTANDING A 96 PSID PRESSURE DIFFERENTIAL IN DIRECTION OF FLOW WITHOUT FAILURE VERSUS 76 PSI MAXIMUM PUMP DIFFERENTIAL PRESSURE. MATERIAL USED IS STAINLESS STEEL WHICH IS COMPATIBLE WITH FREON 21.

(B) TEST

QUALIFICATION TEST - PUMP PACKAGE QUALIFICATION TESTED FOR 100 MISSION LIFE. PUMP PACKAGE VIBRATION TESTED AT 0.023 G²/HZ FOR 84 MIN/AXIS, SHOCK TESTED AT +/- 20 G EACH AXIS.

ACCEPTANCE TEST - PRESSURE DROP CHECK OF FILTER PRIOR TO INSTALLATION INTO PUMP PACKAGE. FUNCTIONAL CHECK OF PUMP PACKAGE DURING ATP WILL VERIFY FLOW AND PUMP PACKAGE DELTA PRESSURE.

OMRSD - FREON CHEMICAL ANALYSIS PER SE-S-0073 DURING SERVICING.

(C) INSPECTION

RECEIVING INSPECTION

RAW MATERIAL AND PURCHASED COMPONENT REQUIREMENTS ARE VERIFIED BY INSPECTION. MANUFACTURING PROCESSES, INCLUDING PARTS PROTECTION, ARE VERIFIED BY INSPECTION.

CONTAMINATION CONTROL

CONTAMINATION CONTROL PROCESSES AND CORROSION PROTECTION PROVISIONS ARE VERIFIED BY INSPECTION. ULTRASONIC CLEANING PROCESS IS VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

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

CRITICAL PROCESSES

WELDING VERIFIED BY INSPECTION.

TESTING

ATP IS VERIFIED BY INSPECTION.

HANDLING/PACKAGING

HANDLING, PACKAGING AND STORAGE REQUIREMENTS ARE VERIFIED BY INSPECTION.

(D) FAILURE HISTORY

NO APPLICABLE FAILURE HISTORY.

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(E) OPERATIONAL USE

FIRST FAILURE IS UNDETECTABLE IN FLIGHT - NO CREW ACTION REQUIRED. FOR SECOND FAILURE (PUMP DAMAGE), ON-BOARD ALARM FOR LOW FREON FLOW WILL INDICATE LOSS OF PUMP OUTPUT. SWITCH TO THE REDUNDANT PUMP. IF LOSS OF BOTH PUMPS OCCURS, PERFORM "LOSS OF ONE FREON LOOP POWERDOWN" AND DEORBIT TO THE NEXT PRIMARY LANDING SITE.