SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :ACTIVE THERMAL CONTROL FMEA NO 06-3C -0230 -3 REV:08/29/

ASSEMBLY :FREON THERMAL LOOP
P/N RI :V070-615124-0005
P/N RI :V070-635102X
P/N VENDOR:
QUANTITY :17
:SEVENTEEN/VEHICLE

CRIT. FUNC: 1
CRIT. HDW:

VEHICLE	102	103	104
EFFECTIVITY:	X	X	X

PHASE(S): PL LO X OO X DO X LS

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

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

ITEM:
COLDPLATES, RGA AND AFT.

FUNCTION:
REMOVES WASTE HEAT FROM THE RATE GYRO ASSEMBLIES (RGA) AND AFT AVIONICS EQUIPMENT. THE COLDPLATES ARE LOCATED IN PARALLEL NETWORK IN THE MIDBODY AND IN THREE AFT AVIONICS BAYS.

RGA	V070-615124 (4 REQUIRED)
DSLA, RJDA, ASA, DSC	V070-635101 (1 REQUIRED)
MDM, MEC, MDM	V070-635102 (2 REQUIRED)
APU, ATVC, MEA, EIU	V070-635103 (3 REQUIRED)
LCA, PCA, PCA	V070-635104 (3 REQUIRED)
UP, DSC, ASA, FTS, DSLA	V070-635105 (1 REQUIRED)
UP, ASA, DSC, MDM	V070-635106 (1 REQUIRED)
MDM, ATVC, MDM	V070-635107 (1 REQUIRED)
RJDA, ASA, MDM	V070-635108 (1 REQUIRED)

FAILURE MODE:
EXTERNAL LEAKAGE.

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

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 FIRST FAILURE.

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

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

(A) DESIGN
DESIGN SAFETY FACTOR - PROOF PRESSURE OF 1.5 AND BURST PRESSURE OF 2.0 TIMES MAXIMUM OPERATING PRESSURE. STANDARD PIN-FIN DESIGN CONFIGURATION COLDPLATES ARE MADE OF ALUMINUM, WHICH IS CORROSION RESISTANT AND COMPATIBLE WITH FREON 21.

(B) TEST
QUALIFICATION TEST - QUALIFICATION TESTED FOR 100 MISSION LIFE. VIBRATION TESTED AT 0.023 G^2/HZ FOR 84 MIN/AXIS FOR THE RGA COLDPLATES AND 48 MIN/AXIS FOR THE AFT COLDPLATES. SHOCK TESTED AT +/- 20G IN EACH AXIS. QUALIFIED BY SIMILARITY TO COLDPLATES IN APOLLO. DESIGN BURST PRESSURE IS 1280 PSIG. SIMILAR APOLLO COLDPLATES TESTED FAILED AT 1590, 1700, 1440, AND 2190 PSIG.

ACCEPTANCE TEST - COLDPLATE IS LEAK TESTED IN ATP. COLDPLATE FLUSH AND SAMPLE FOR CLEANLINESS AFTER ASSEMBLY.

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

(C) INSPECTION

RECEIVING INSPECTION
COMPONENTS MANUFACTURED TO DRAWING AND APPLICABLE SPECIFICATION ARE VERIFIED BY INSPECTION. RAW MATERIAL AND PROCESS CERTIFICATIONS VERIFIED BY INSPECTION.

CONTAMINATION CONTROL
HARDWARE CLEANLINESS PER REQUIREMENTS IS VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION
INSTALLATION AND ASSEMBLY ARE VERIFIED BY INSPECTION. INSPECTION FOR DAMAGE VERIFIED BY INSPECTION.

CRITICAL PROCESSES
BRAZING IS VERIFIED BY INSPECTION. ETCHING IS VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION
PENETRANT INSPECTION OF ANY DINGS OR IMPRESSIONS IS VERIFIED BY INSPECTION

TESTING
PROOF TEST IS VERIFIED BY INSPECTION. LEAK TEST IS VERIFIED BY INSPECTION. FUNCTIONAL TEST MONITORED FOR FLOWRATE. SYSTEM FLUIDS SAMPLED AND ANALYZED FOR CONTAMINATION AND VERIFIED BY INSPECTION.

HANDLING/PACKAGING
HANDLING AND PACKAGING REQUIREMENTS VERIFIED BY INSPECTION.

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(D) FAILURE HISTORY
NO FAILURE HISTORY

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