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PRINT DATE: 08/30/93

FAILURE MODES EFFECTS ANALYSIS (FMEA) - CRITICAL HARDWARE
NUMBER: 06-1B-0330-X

SUBSYSTEM NAME: ARS-COOLING

REVISION: 4 08/25/93

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	: CABIN FAN AND DEBRIS TRAP HALMITON STANDARD	MC621-0008-0311 SV755508
LRU	: FILTER, DEBRIS TRAP	SV787982

PART DATA

QUANTITY OF LIKE ITEMS: 1

FUNCTION:

REMOVES AIRBORNE PARTICLES GREATER THAN 40/70 MICRONS FROM THE AIR
FLOWING TO THE FANS THUS PROTECTING THE FANS AND DOWNSTREAM
COMPONENTS FROM DAMAGE OR CLOGGING.

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CRITICAL FAILURE MODE
NUMBER: 06-1B-0330-01**

REVISION# 4 08/25/93 R

SUBSYSTEM: ARS - COOLING
LRU: CABIN FAN AND DEBRIS TRAP
ITEM NAME: FILTER, DEBRIS TRAP

CRITICALITY OF THIS
FAILURE MODE: 1R2

FAILURE MODE:
RESTRICTED FLOW (CLOGGING)

MISSION PHASE:

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

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

CAUSE:
CONTAMINATION

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN A) PASS
B) PASS
C) PASS

PASS/FAIL RATIONALE:

A)

B)

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:
REDUCTION IN SYSTEM AIR FLOW.

(B) INTERFACING SUBSYSTEM(S):
DECREASE IN AIR FLOW AND FLIGHT DECK AVIONICS COOLING.

(C) MISSION:
POSSIBLE EARLY MISSION TERMINATION.

(D) CREW, VEHICLE, AND ELEMENT(S):
NO EFFECT.

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(E) FUNCTIONAL CRITICALITY EFFECTS:

SECOND ASSOCIATED FAILURE, INABILITY TO OPEN ACCESS DOOR TO CLEAN FILTER, MAY RESULT IN LOSS OF CREW/VEHICLE DUE TO LOSS OF FLIGHT DECK AVIONICS COOLING.

-DISPOSITION RATIONALE-

(A) DESIGN:

DESIGNED TO WITHSTAND 13 INCHES OF WATER. THE FILTER IS COMPOSED OF THREE 40/70 MICRON RATING STAINLESS STEEL WIRE MESH SECTIONS, EACH 7 X 7 INCH CROSS SECTION AND 130 SQ. IN. FILTER AREA. THE WIRE MESH SIZE IS 50 (0.0055 INCH) X 250 (0.0045 INCH) PER SQ. IN. THE SCREENS ARE BONDED AND RIVETED TO THE INSIDE OF THE FRAME. A RUBBER SEAL IS BONDED TO THE OUTSIDE OF THE FRAME TO PREVENT AIR BYPASS LEAKAGE. THE FILTER ASSEMBLY IS INSERTED INTO THE SLOTTED FAN HOUSING AND LID IS CLOSED TO SECURE SCREEN. THIS FILTER IS IMMEDIATELY UPSTREAM OF THE CABIN FAN; THERE ARE FILTERS UPSTREAM AT THE AVIONIC BOX INLETS. THE FILTER IS ACCESSIBLE FOR CLEANING IN FLIGHT.

(B) TEST:

ACCEPTANCE TEST - THERE IS NO ATP FOR THE INDIVIDUAL FILTER. OVERALL PERFORMANCE OF THE FAN PACKAGE INCLUDES THE FILTER.

QUALIFICATION TEST - THE NEW FILTER (40/70 MICRONS) WAS CERTIFIED BY SIMILARITY TO THE OLD CONFIGURATION (300 MICRONS).

OMRSD - CABIN FAN FILTER IS CLEANED EACH TURNAROUND AND LRU AVIONICS FILTERS ARE CLEANED EACH TURNAROUND AND ON A CONTINGENCY BASIS IN THE EVENT OF AN OPF/OMCF FLOW.

(C) INSPECTION:

RECEIVING INSPECTION

INCOMING MATERIALS ARE VERIFIED FOR MATERIAL AND PROCESS CERTIFICATION.

CONTAMINATION CONTROL

CORROSION PROTECTION PROVISIONS ARE VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

FRAME SEAL COATED WITH LUBRICATION KRYTOX 240AC IS VERIFIED PER DRAWING SPEC. INSPECTION VERIFIES BONDING BETWEEN SEAL AND FRAME PER REQUIREMENT. BUBBLE POINT WATER TEST IS VERIFIED BY INSPECTION. INSPECTION VERIFIES ABSENCE OF DEBRIS AND CLOGGING.

CRITICAL PROCESSES

HEAT TREATMENT OF FILTER FRAME IS VERIFIED BY INSPECTION. WELDING OF FILTER FRAME PIECES IS VERIFIED BY INSPECTION. BONDING COVERAGE OF FRAME EDGE TO SCREEN WIRE IS CHECKED.

TESTING

ATP IS VERIFIED BY INSPECTION.

HANDLING/PACKAGING

PACKAGING FOR SHIPMENT IS VERIFIED BY INSPECTION.

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(D) FAILURE HISTORY:

THERE HAVE BEEN NO CASES OF RESTRICTED FLOW; AS THE FILTER IS REMOVED AND CLEANED PERIODICALLY, THERE IS NO RESTRICTIVE BUILD-UP OF DEBRIS.

(E) OPERATIONAL USE:

CREW ACTION - DEPENDING UPON MISSION LENGTH, FILTER WILL BE CLEANED BY CREW 1 OR 2 TIMES DURING FLIGHT.

- APPROVALS -

EDITORIALLY APPROVED : RI
EDITORIALLY APPROVED : JSC
TECHNICAL APPROVAL : VIA CR

Handwritten signatures and dates:
: [Signature] 8/30/92
: [Signature] 9/1/93
: S7250J