

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ATMOSPHERIC REVIT. FMEA NO 06-1B -0542 -1 REV: 08/15/8

ASSEMBLY : WATER PUMP CRIT. FUNC: 13
P/N RI : MC621-0008-0455/56 CRIT. HDW: 2
P/N VENDOR: SV778969-1 HAM STD VEHICLE 102 103 104
QUANTITY : 2 EFFECTIVITY: X X X
: ONE PER LOOP PHASE(S): PL LO X OO X DO X LS
: TWO PER SUBSYSTEM

REDUNDANT SCREEN: A-PASS B-N/A C-PAS
PREPARED BY: APPROVED BY: APPROVED BY (NASA):
DES N. K. DUONG *[Signature]* SSM *[Signature]*
REL N. L. STEISSLINGER *[Signature]* REL *[Signature]*
QE D. STOICA *[Signature]* QE *[Signature]*

ITEM:
FILTER, COOLANT PUMP INLET

FUNCTION:
FILTER (10/25 MICRON) PROTECTS WATER COOLANT LOOP PUMPS FROM SYSTEM CONTAMINATION.

FAILURE MODE:
RESTRICTED FLOW, CLOGGED

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

EFFECT(S) ON:
(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE

(A) REDUCED FLOW RATE. WORST CASE - BLOCKED FLOW AND LOSS OF ONE WATER COOLANT LOOP.

(B) NO EFFECT - REDUNDANT LOOP PROVIDES COOLING.

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

(D) POTENTIAL LOSS OF CREW/VEHICLE UPON SUBSEQUENT LOSS OF REDUNDANT WATER COOLANT LOOP. SCREEN B IS N/A BECAUSE REDUNDANT LOOP IS IN STANDBY UNTIL REQUIRED.

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

(A) DESIGN
CORROSION RESISTANT STEEL ELEMENT, LARGE FILTER AREA (50 SQ. IN. MIN). PLEATED STAINLESS WIRE MESH WITH FLUID ENTERING OUTER CYLINDER, PASSING THROUGH FILTER, AND LEAVING ANNULUS.

(B) TEST
ACCEPTANCE TEST - THE PRESSURE DROP OF A CLEAN FILTER SHALL EXCEED 0.4 PSID AT 950 LB/HR. FILTER RATED AT 25 MICRONS ABSOLUTE AND MICRONS AT 98% FILTRATION.

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QUALIFICATION TEST - PACKAGE CERTIFIED FOR TRANSIENT VIBRATIONS, STRUCTURAL VIBRATIONS, SHOCK, AND LANDING SHOCK BY SIMILARITY. MAXIMUM PRESSURE DROP OF 0.4 PSID AT 950 LB/HR, MAXIMUM PRESSURE DIFFERENTIAL OF 50 PSID. FILTER RATED AT 25 MICRONS ABSOLUTE AND 10 MICRONS AT 98% FILTRATION. FILTRATION AND COLLAPSING TESTS WERE PERFORMED.

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-6-0073 DURING SERVICING.

(C) INSPECTION

RECEIVING INSPECTION
RECEIVING INSPECTION VERIFIES INCOMING MATERIALS BY VISUAL INSPECTION OF MATERIAL AND PROCESS CERTIFICATION.

CONTAMINATION CONTROL
INTERNAL AND EXTERNAL SURFACE CLEANLINESS IS MAINTAINED AND VERIFIED PER M.S. REQUIREMENTS. IMPLEMENTATION OF ULTRASONIC CLEANING AND CLEAN ROOM ASSEMBLY ARE VERIFIED.

ASSEMBLY/INSTALLATION
DIMENSIONS AND ASSEMBLY OPERATIONS ARE VERIFIED BY INSPECTION.

CRITICAL PROCESSES
THE WELDING OF FILTER HOUSING TO INLET FLANGES IS VERIFIED BY INSPECTION. HELIUM LEAK CHECK IS VERIFIED. PART PASSIVATION IS VERIFIED BY INSPECTION.

TESTING
ATP IS VERIFIED BY INSPECTION.

HANDLING/PACKAGING
PACKAGING PROCEDURES AND REQUIREMENTS FOR SHIPMENT ARE VERIFIED BY INSPECTION.

(D) FAILURE HISTORY
NO FAILURE HISTORY APPLICABLE TO RESTRICTED FLOW FAILURE MODE. THE FILTER HAS SUCCESSFULLY PERFORMED WITHOUT FAILURE THROUGH THE DURATION OF THE SHUTTLE PROGRAM.

(E) OPERATIONAL USE
TBS.