

540200A 34

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :AUXILIARY POWER (APUS) FMEA NO 04-2 -FL11 -11 REV:09/11/87

ASSEMBLY :FUEL SUPPLY	ABORT,	CRIT. FUNC:	1R
P/N RI :MC286-0051-0001	RTLS, AOA, ATO, TAL	CRIT. HDW:	2
P/N VENDOR:WINTEC P/N 15228-583	VEHICLE	102	103 104
QUANTITY :3	EFFECTIVITY:	X	X X
:1 PER FEEDLINE	PHASE(S):	PL X LO X OO	DO X LS X

PREPARED BY:	REDUNDANCY SCREEN:	A-PASS	B-PASS	C-PASS
DES S M BARAUSKAS	APPROVED BY:	APPROVED BY (NASA):		
REL T R BOLTZ	<i>[Signature]</i>	SSM <i>[Signature]</i> 9-21-87		
QE W J SMITH	<i>[Signature]</i>	REL <i>[Signature]</i> 9-15-87		

ITEM: FILTER, LOW PRESSURE FUEL FEEDLINE.

FUNCTION: TO COLLECT CONTAMINANTS IN FUEL AND PREVENT THEM FROM CAUSING FAILURE IN DOWNSTREAM COMPONENTS.

FAILURE MODE: PLUGGED, (FLOW RESTRICTION)

CAUSE(S): CONTAMINATION ACCUMULATION

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

(A) FUNCTIONAL DEGRADATION. GRADUAL INCREASE IN PRESSURE DROP ACROSS THE FILTER WOULD ULTIMATELY RESULT IN FUEL STARVATION, TURBINE UNDERSPEED AND SAFE SHUTDOWN.

(B) POSSIBLE LOSS OF SHAFT POWER TO ONE HYDRAULIC PUMP.

(C) ABORT DECISION IS REQUIRED IF FAILURE OCCURS PRIOR TO ENTRY COMMITMENT.

(D) NO EFFECT UNTIL SECOND SYSTEM LOSS. CRIT I FOR SSME-INDUCED RTLS, ATO, AOA, OR TAL DUE TO THE POSSIBLE ADDITIONAL LOSS OF ASSOCIATED APU/HYD AND MAIN ENGINE.

(E) FUNCTIONAL CRITICALITY EFFECT - LOSS OF CREW/VEHICLE IF TWO OUT OF THREE APU'S LOST

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

(A) DESIGN S70-0613 FUEL SERVICING UNIT HAS 10-MICRON FILTER. INTERFACE LINES AND COUPLINGS ARE "CRES" WITH A 100-MICRON FILTER IN FLIGHT HALF FILL AND PRESSURIZATION COUPLING. FILTER SIZED FOR 100 MISSIONS. FILTER CAPACITY 1.0 GRAMS A.C COARSE DUST.

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(B) TEST

FILTER VERIFIED CLEAN DURING ATP WITH FLOW TESTS FILTER FUNCTIONALLY CERTIFIED DURING APUS INTEGRATED TESTS.

ALL THE COMPONENTS, LINES AND FITTINGS VERIFIED TO CLEANLINESS LEVEL 100 PER MA0110-301.

CERTIFICATION - VIBRATION 0.7G SQ/HZ, 200,000 PRESSURE CYCLES, CONTAMINANT TOLERANCE, COLLAPSE DELTA PRESSURE 400 PSI, BURST PRESSURE 1600 PSI.

OMRSD: OPERATION IS VERIFIED DURING T-5 MIN RUN EVERY FLOW.

(C) INSPECTION

RECEIVING INSPECTION

MATERIALS AND PROCESSES CERTIFICATIONS ARE VERIFIED BY INSPECTION.

CONTAMINATION CONTROL

CLEANLINESS TO LEVEL 100 IS VERIFIED BY INSPECTION. FLUID SAMPLES ARE INSPECTED FOR CONTAMINATION AND VERIFIED BY INSPECTION. CORROSION PROTECTION IS VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

ULTRASONIC CLEANING IS VERIFIED BY INSPECTION. BURR INSPECTION IS VERIFIED BY INSPECTION. MANUFACTURING, ASSEMBLY, AND INSTALLATION PROVISIONS ARE VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION

BUBBLE TEST IS VERIFIED BY INSPECTION.

CRITICAL PROCESSES

INSPECTION VERIFIES TIG WELDING AND RESISTANCE WELDING PER SPECIFICATION REQUIREMENTS.

TESTING

TEST EQUIPMENT AND TOOL CALIBRATION ARE VERIFIED BY INSPECTION. ATP IS WITNESSED AND VERIFIED BY INSPECTION.

HANDLING/PACKAGING

HANDLING, PACKAGING, STORAGE, AND SHIPPING PROCEDURES ARE VERIFIED BY INSPECTION.

(D) FAILURE HISTORY

NO FAILURES, HOWEVER, FORWARD AND REVERSE FLUSHING OF THE FILTER FROM STS-9 REVEALED EXCESSIVE PARTICULATE CONTAMINATION BEYOND ACCEPTABLE FUEL LIMITS.

(E) OPERATIONAL USE

IF APU SHUTS DOWN. REMAINING APU'S GO TO HIGH SPEED AND AUTOMATIC SHUTDOWN IS INHIBITED TO PRECLUDE INADVERTENT SHUTDOWNS.