

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ACTIVE THERMAL CONTROL FMEA NO 06-3B -0416 -3 REV:03/09/88

ASSEMBLY : AMMONIA BOILER SUBSYSTEM	ABORT,	CRIT. FUNC: 1
P/N RI : MC250-0005-0007	AOA, RTLS, TAL	CRIT. HDW: 1
P/N VENDOR: 74716000	VEHICLE 102	103 104
QUANTITY : 1	EFFECTIVITY: X	X X
: ONE INLET FOR BOTH	PHASE(S): PL LO	OO DO X LS
: AMMONIA TANKS		

	REDUNDANCY SCREEN: A-	B-	C-
PREPARED BY:	APPROVED BY:	APPROVED BY (NASA):	
DES J. MORGAN	DES <i>[Signature]</i>	SSM <i>[Signature]</i>	4/15
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ITEM:
 LINES AND FITTINGS, AMMONIA SYSTEM.

FUNCTION:
 PROVIDES FLOW PATH FOR AMMONIA FROM THE TWO AMMONIA TANKS TO A SINGLE AMMONIA BOILER INLET AND OVERBOARD VENT. THE AMMONIA BOILER SYSTEM IS USED DURING POSTLANDING OPERATIONS, LAUNCH ABORTS, AND AS A BACKUP SYST. DURING NORMAL DEORBITS.

FAILURE MODE:
 RESTRICTED FLOW, BOILER MANIFOLD INLET AND OVERBOARD VENT.

CAUSE(S):
 CONTAMINATION, STRUCTURAL DAMAGE.

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

(A) LOSS OF AMMONIA BOILER SYSTEM COOLING. AMMONIA CANNOT FLOW THROUGH THE BOILER.

(B) LOSS OF FREON COOLANT LOOP HEAT REJECTION BY THE AMMONIA BOILER.

(C) LOSS OF AMMONIA BOILER DURING POSTLANDING MAY CAUSE LOSS OF PAYLOAD COOLING.

(D) LOSS OF AMMONIA BOILER WHEN REQUIRED DURING DEORBIT WILL RESULT IN LOSS OF VEHICLE COOLING WHICH MAY CAUSE LOSS OF CREW/VEHICLE.

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

(A) DESIGN
 INNER DIAMETER OF INLET TUBING IS 0.335 INCH, WALL THICKNESS IS 0.020 INCH. INNER DIAMETER OF OVERBOARD VENT IS 0.96 INCH. AMMONIA IS LOADED THROUGH A 15 MICRON ABSOLUTE FILTER IN GSE. MATERIALS ARE CRES 304L AND 21-6-9 STAINLESS STEEL AND ARE COMPATIBLE WITH AMMONIA.

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(B) TEST

QUALIFICATION TEST - QUALIFICATION TESTED FOR 100 MISSION LIFE.
VIBRATION TESTED AT 0.01 G²/HZ FOR 48 MIN/AXIS ² - SHOCK TESTED AT +/- 2
G/AXIS.

ACCEPTANCE TEST - FLOW CHECK DURING ATP FUNCTIONAL TEST.

OMRSD - NH₃ SYSTEM FUNCTIONAL VERIFICATION WITH AMMONIA DURING
TURNAROUND. NH₃ BOILER SYSTEM "A" AND "B" START-UP DURING TURNAROUND.
AMMONIA SAMPLE VERIFIED TO MEET SE-S-0073 REQUIREMENTS PRIOR TO LOADING.

(C) INSPECTION

RECEIVING INSPECTION

DAMAGE AND LEAKAGE ARE INSPECTED VISUALLY BY INSPECTION. RAW MATERIAL
AND PROCESS CERTIFICATIONS VERIFIED BY INSPECTION.

CONTAMINATION CONTROL

CLEANLINESS OF INTERNAL SURFACES TO LEVEL 300 IS VERIFIED BY INSPECTION
CONTAMINATION CONTROL PROCESSES AND CORROSION PROTECTION PROVISIONS ARE
VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

MANUFACTURING, INSTALLATION AND ASSEMBLY OPERATIONS VERIFIED BY SHOP
TRAVELER MIPS.

CRITICAL PROCESSES

PARTS HEAT TREATMENT AND PASSIVATION ARE VERIFIED BY INSPECTION. WELDS
AND BRAZE JOINTS ARE VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION

PENETRANT INSPECTION OF WELDS VERIFIED BY INSPECTION.

TESTING

INSPECTION MONITORS TESTS TO VERIFY PROPER SUBSYSTEM OPERATION. ANALYSIS
OF FLUID SAMPLES IS VERIFIED BY INSPECTION PRIOR TO SERVICING.

HANDLING/PACKAGING

HANDLING AND STORAGE ENVIRONMENTS ARE VERIFIED BY INSPECTION.

(D) FAILURE HISTORY

NO APPLICABLE FAILURE HISTORY.

(E) OPERATIONAL USE

IF SOME AMMONIA COOLING IS AVAILABLE, CONTINUE TO USE AMMONIA BOILER
SYSTEM. PERFORM VEHICLE PRIORITY POWERDOWN AS REQUIRED FOR LOSS OF
VEHICLE COOLING.