

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ACTIVE THERMAL CONTROL FMEA NO 06-3B -0416 -1 REV:08/25/88

ASSEMBLY : AMMONIA BOILER SUBSYSTEM CRIT. FUNC: 1R
 P/N RI : MC250-0005-0007 CRIT. HDW: 2
 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 IS
 : AMMONIA TANKS

			REDUNDANCY SCREEN	A-PASS	B-PASS	C-PASS
PREPARED BY:		APPROVED BY:		APPROVED BY (NASA):		
DES	J. MORGAN	DES	<i>[Signature]</i>	SSM	<i>[Signature]</i>	
REL	D. RISING	REL	<i>[Signature]</i>	REL	<i>[Signature]</i>	
QE	W. SMITH	QE	<i>[Signature]</i>	QE	<i>[Signature]</i>	

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 SYSTEM DURING NORMAL DEORBITS.

FAILURE MODE:
 EXTERNAL LEAKAGE, BETWEEN TANKS AND ISOLATION VALVES.

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

EFFECT(S) ON:
 (A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE
 (A, B) LOSS OF ONE OF TWO AMMONIA SYSTEMS FOR VEHICLE COOLING.
 (C) REDUCED LENGTH OF PAYLOAD POSTLANDING COOLING.
 (D) SECOND ASSOCIATED FAILURE (LOSS OF REDUNDANT AMMONIA SUPPLY) CAN CAUSE LOSS OF VEHICLE COOLING AND RESULT IN LOSS OF CREW/VEHICLE.

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

(A) DESIGN
 PROOF PRESSURE FACTOR OF 2.0 AND BURST PRESSURE OF 4.0 TIMES MAXIMUM EXPECTED OPERATING PRESSURE. LINE WALL THICKNESS IS .020, 304L AND 21-6-9 CRES STAINLESS STEEL. MATERIALS ARE CORROSION RESISTANT AND COMPATIBLE WITH AMMONIA.

(B) TEST
 QUALIFICATION TEST - QUALIFICATION TESTED FOR 100 MISSION LIFE. VIBRATION TESTED AT 0.01 G²/HZ FOR 48 MIN/AXIS AND SHOCK TESTED AT +/- 20 G/AXIS.
 ACCEPTANCE TEST - NH₃ SYSTEM JOINT LEAKAGE TEST AFTER ASSEMBLY.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :ACTIVE THERMAL CONTROL FMEA NO 06-3B -0416 -1 REV:08/25/88

OMRSD - EXTERNAL LEAKAGE IS CHECKED USING A HELIUM MASS SPECTROMETER FOR LEAKAGE NOT TO EXCEED 1×10^{-4} SCCS GHE AT 50 PSIG. NH_3 SYSTEM FUNCTIONAL VERIFICATION EVERY TWO FLIGHTS. AMMONIA SAMPLE VERIFIED TO MEET SE-S-0073 REQUIREMENTS PRIOR TO SERVICING.

(C) INSPECTION

RECEIVING INSPECTION

MATERIAL AND PROCESS CERTIFICATIONS ARE VERIFIED BY INSPECTION. MATERIAL AND EQUIPMENT CONFORMANCE TO CONTRACT REQUIREMENTS IS VERIFIED BY INSPECTION.

CONTAMINATION CONTROL

CLEAN INTERNAL SURFACE 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. VISUAL INSPECTION FOR DAMAGE AND LEAKAGE PERFORMED BY INSPECTION.

CRITICAL PROCESSES

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

NONDESTRUCTIVE EVALUATION

RADIOGRAPHIC INSPECTION OF BRAZES AND PENETRANT INSPECTION OF WELDS ARE VERIFIED BY INSPECTION.

TESTING

INSPECTION MONITORS TESTS TO VERIFY PROPER SUBSYSTEM OPERATION.

HANDLING/PACKAGING

HANDLING AND STORAGE ENVIRONMENTS ARE VERIFIED BY INSPECTION.

(D) FAILURE HISTORY

(CAR AD2090) DURING LEAK CHECK AFTER INSTALLATION INTO OV-104, THE TUBE CONNECTION ON THE HIGH PRESSURE SIDE OF THE ISOLATION VALVE LEAKED. THE CAUSE WAS FOUND TO BE AN IMPROPERLY TORQUED B-NUT.

(E) OPERATIONAL USE

GROUND CONTROLLER WILL IDENTIFY AMMONIA LEAKAGE. USE REDUNDANT AMMONIA SYSTEM WHEN NEEDED.