

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ACTIVE THERMAL CONTROL FMEA NO 06-3B -0414 -3 REV:08/25/  
 ASSEMBLY : AMMONIA BOILER SUBSYSTEM CRIT. FUNC: 1  
 P/N RI : MC276-0030-0011 CRIT. HDW:  
 P/N VENDOR: 60870-11 VEHICLE 102 103 104  
 QUANTITY : 4 EFFECTIVITY: X X X  
 : FOUR PHASE(S): PL LO OO DO X IS  
 : 2 PER TANK

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

ITEM:  
 QUICK DISCONNECT/CAP, AMMONIA FILL AND DRAIN.

FUNCTION:  
 PROVIDES CAPABILITY TO FILL AND DRAIN AMMONIA TANK, RETAINS AMMONIA IN TANKS WHEN DISCONNECTED AFTER SERVICING. THE AMMONIA BOILER SYSTEM IS USED DURING POSTLANDING OPERATIONS, LAUNCH ABORTS AND AS A BACKUP SYSTEM DURING NORMAL DEORBITS.

FAILURE MODE:  
 EXTERNAL LEAKAGE.

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

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 OF 1.5 AND BURST OF 2.0 TIMES MAXIMUM EXPECTED OPERATING PRESSURE. DESIGN BURST PRESSURE OF 1100 PSIG. POPPET IS SPRING LOADED CLOSED. MATERIALS USED ARE NYLON AND CRES STAINLESS STEEL WHICH ARE COMPATIBLE WITH AMMONIA.

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(B) TEST

QUALIFICATION TEST - QUALIFICATION TESTED FOR 100 MISSION LIFE.

- 1) LIFE CYCLES AT PRESSURE: 360/550/250 PSIG.
- 2) THERMAL CYCLES AT PRESSURE: 3 THERMAL CYCLES.
  - (A) HIGH TEMPERATURE - (275 F AT 360 PSIG; POPPET CLOSED AND CAPPED)
  - (B) LOW TEMPERATURE - (-100 F AT 360 PSIG; POPPET CLOSED AND CAPPED)
  - (C) HIGH TEMPERATURE - (275 F AT 360 PSIG; POPPET OPENED AND CAPPED)
- 3) VIBRATION - QD CAPPED AND PRESSURIZED AT 360 PSIG - AT 0.7 G<sup>2</sup>/HZ FOR 34 MIN/AXIS.
- 4) SHOCK TESTED AT +/- 20 G IN EACH AXIS.

OMRSD - AMMONIA SAMPLE VERIFIED TO MEET SE-S-0073 REQUIREMENTS PRIOR TO SERVICING. AMMONIA FILL AND DRAIN QD LEAK CHECK (GSE MATED AND DEMATED) DURING SERVICING. QD AND CAP INSPECTION DURING SERVICING.

(C) INSPECTION

RECEIVING INSPECTION

RAW MATERIAL AND PROCESS CERTIFICATIONS ARE VERIFIED BY INSPECTION.  
PARTS PROTECTION IS VERIFIED BY INSPECTION.

CONTAMINATION CONTROL

CONTAMINATION CONTROL PLAN AND CORROSION PROTECTION PROVISIONS ARE VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

MANUFACTURING, INSTALLATION, AND ASSEMBLY OPERATIONS ARE VERIFIED BY INSPECTION. CRITICAL DIMENSIONS AND FINISH OF SEALING SURFACES ARE VERIFIED BY INSPECTION.

CRITICAL PROCESSES

WELDING, HEAT TREATING AND PASSIVATION ARE VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION

LEAK TEST VERIFIED BY INSPECTION.

TESTING

ACCEPTANCE TEST, INCLUDING LEAKAGE TEST, IS VERIFIED BY INSPECTION.

HANDLING/STORAGE

HANDLING, PACKAGING AND STORAGE PROVISIONS ARE VERIFIED BY INSPECTION.

(D) FAILURE HISTORY

NO APPLICABLE FAILURE HISTORY.

(E) OPERATIONAL USE

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