

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ATMOSPHERIC REVIT. FMEA NO 06-1C -0166 -3 REV: 09/13/88  
ASSEMBLY : ATMOS MAKEUP CONTROL CRIT. FUNC: 1R  
P/N RI : MC276-0010-0380/0361 CRIT. HDW: 2  
P/N VENDOR: 76198000-0380/0361 FRCHLD. VEHICLE 102 103 104  
QUANTITY : 1 EFFECTIVITY: X X X  
: PHASE(S): PL LO X CO X DO X LS  
:

PREPARED BY: DES M. PRICE *M.P.* APPROVED BY: REDUNDANCY SCREEN: A-PASS B-N/A C-PASS  
REL N. L. STEISSLINGER *N.L.S.* DES *[Signature]* APPROVED BY (NASA):  
QE S. MOR *S.M.* REL *[Signature]* SSM *[Signature]* 6/27/87  
QE *[Signature]* REL *[Signature]* REL *[Signature]* 7/2/88  
QE *[Signature]*

ITEM:

QUICK DISCONNECT/CAP - NITROGEN SUPPLY, AIR BORNE HALF

FUNCTION:

PROVIDES THE ATTACHMENT POINT SO THAT THE GSE NITROGEN SUPPLY UNIT CAN SERVICE THE NITROGEN TANKS AND CHECK OUT THE SYSTEM.

FAILURE MODE:

EXTERNAL LEAKAGE

CAUSE(S):

MECHANICAL SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECT(S) ON:

(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE

(A) LOSS OF NITROGEN SUPPLY. THERE IS NO MEANS TO ISOLATE LEAK AND RETAIN NITROGEN USAGE CAPABILITY.

(B) LOSS OF INTERFACE PRESSURIZATION FOR CABIN MAKEUP, WATER TANKS AND AIRLOCK REPRESSURIZATION.

(C) ABORT DECISION - ONLY THE CABIN VOLUME/PRESSURE REMAIN TO SUPPORT ARPCS REQUIREMENTS.

(D) NO EFFECT. ONE CABIN VOLUME IS ADEQUATE FOR SAFE RETURN.

(E) FUNCTIONAL CRITICALITY EFFECT - LOSS OF N2 MAKE-UP CAPABILITY RESULTS IN LOSS OF ABILITY TO SUPPORT AN 8.0 PSIA CONTINGENCY AND LOSS OF ABILITY TO PURGE CABIN IN CASE OF A CONTAMINATED CABIN. SCREEN B IS N/A DUE TO UNLIKE REDUNDANCY OF CAP TO QD. EXTERNAL LEAKAGE OF CAP IS NOT DETECTABLE UNTIL INTERNAL LEAKAGE OF QD OCCURS.

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DISPOSITION & RATIONALE:

(A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE

(A) DESIGN

THE BODY OF THE QUICK DISCONNECT IS MADE OF INCONEL 718, CORROSION RESISTANT, O<sub>2</sub> COMPATIBLE STEEL. THE POPPET IS PASSIVATED 286 CRES AND THE POPPET SPRING IS OF ELGILOY RC55. ELGILOY IS SUPERIOR TO CARBON AND STAINLESS STEEL FOR COIL AND PLAT SPRINGS AND IS USED IN MANY APPLICATIONS REQUIRING HIGH FATIGUE STRENGTH, CORROSION RESISTANCE, AND DIMENSIONAL STABILITY. ALL MATERIALS AND PROCESSES USED ARE IN COMPLIANCE WITH RI SPEC MC999-0096.

(B) TEST

ACCEPTANCE TEST - PER ATP 76398002. PROOF PRESSURE IS 5000 PSIG, APPLIED FOR 5 MINUTES. INTERNAL LEAK RATE REQUIREMENT IS 2.7 SCCS OF GHE UNCAPPED, 0.005 SCCS CAPPED AT 3300 - 3400 PSIG. EXTERNAL LEAK RATE 1.0 SCCS MAX.

QUALIFICATION TEST - PER QTP ER 76396-28. DESIGN SHOCK - 20G TERMINAL SAWTOOTH PULSE OF 11 MS DURATION IN EACH DIRECTION OF THREE ORTHOGONAL AXES. RANDOM VIBRATION SPECTRUM - 20 TO 90 HZ INCREASING AT 6 DB/OCTAVE TO 1.0 G\*\*2/HZ, CONSTANT AT 1.0 G\*\*2/HZ FROM 90 TO 300 HZ, DECREASING AT 6 DB/OCTAVE FROM 300 TO 2000 HZ FOR 34 MINUTES PER AXIS AND 20 TO 40 HZ INCREASING AT 6 DB/OCTAVE TO 0.5 G\*\*2/HZ, CONSTANT AT 0.5 G\*\*2/HZ FROM 40 TO 150 HZ, DECREASING AT 6 DB/OCTAVE FROM 150 TO 2000 HZ FOR 14 MINUTES PER AXIS. DISCONNECT IS PRESSURIZED TO 3300 - 3400 PSIG DURING RANDOM VIBRATION AND SHOCK TESTING. LIFE CYCLE TESTING - PASSED 4000 CYCLE REQUIREMENT PLUS AN ADDITIONAL 6000 CYCLES WHICH WERE PERFORMED DUE TO A GROUND HALF COUPLING PROBLEM.

IN-VEHICLE TESTING - LINES ARE OVERPRESSURE TESTED WITH COMPONENTS INSTALLED AT 4125 - 4325 PSIG. JOINTS ARE LEAK TESTED AT 2900 - 3000 PSIG, 1 X 10 EXP -7 SCCS GHE MAX LEAKAGE.

OMRSD - LONG TERM SYSTEM LEAK TEST (PRESSURE DECAY) IS PERFORMED AFTER SYSTEM SERVICING, EACH TURNAROUND, AT FLIGHT LOAD PRESSURE. A THREE DAY MINIMUM DECAY TEST IS PERFORMED, WITH 5 PSI/DAY MAX LEAKAGE.

(C) INSPECTION

RECEIVING INSPECTION

RAW MATERIALS ARE VERIFIED BY INSPECTION FOR MATERIAL AND PROCESS CERTIFICATION.

CONTAMINATION CONTROL

CLEAN TO LEVEL 200A OF MA0110-301 AND 100 ML RINSE TESTS VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

INSTALLATION AND ASSEMBLY VERIFIED BY MIPS. TORQUES AND SURFACE FINISH ARE VERIFIED. SEALS ARE VISUALLY EXAMINED, PRIOR TO INSTALLATION, FOR DAMAGE AND CLEANLINESS.

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NONDESTRUCTIVE EVALUATION  
WELDS ARE RADIOGRAPHICALLY INSPECTED AND VERIFIED BY INSPECTION.

CRITICAL PROCESSES  
PARTS PASSIVATION AND WELDS ARE VERIFIED BY INSPECTION.

TESTING  
ATP VERIFIED BY INSPECTION.

HANDLING/PACKAGING  
HANDLING, PACKAGING, STORAGE AND SHIPPING PROCEDURES ARE VERIFIED.

(D) FAILURE HISTORY

ONE FAILURE HAS OCCURRED:  
AC2842-010, 8/8/83. IN LEAK TEST AT PALMDALE, QD LEAKED 10 X 10 EXP -6  
SCCS AT DYNATUBE TO QD HOUSING INTERFACE. MAX ALLOWABLE LEAK IS 1 X 10  
EXP -7 SCCS. THE SUPPLIER VERIFIED LEAKAGE IN THE EB WELD BEAD. THE EB  
WELD WAS REPEATED AND THE QD SUBSEQUENTLY PASSED ATP. CORRECTIVE ACTION  
- THE ATP WAS REVISED TO INCLUDE A LEAK CHECK ON THE DYNATUBE/HOUSING EB  
WELD.

(E) OPERATIONAL USE  
TBS.