

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : CREW MODULE SEALS FMEA NO 01-4 -CS51 -1 REV:03/29/88

ASSEMBLY : SIDE HATCH CRIT. FUNC: 11  
P/N RI : CRIT. HDW: :  
P/N VENDOR: MS9068-122 VEHICLE 102 103 104  
QUANTITY : 2 EFFECTIVITY: X X X  
:TWO PHASE(S): PL LO X OO X DO X LS

REDUNDANCY SCREEN: A-FAIL B-FAIL C-PASS  
PREPARED BY: APPROVED BY: APPROVED BY (NASA):  
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ITEM:  
SEAL, TEST PORT CAP, CABIN FILL, SIDE HATCH

FUNCTION:  
PREVENTS LEAKAGE OF CREW MODULE ATMOSPHERE THROUGH CABIN FILL TEST PORT WHEN CAP IS RE-INSTALLED AFTER PRE-LAUNCH CABIN LEAK CHECK.

FAILURE MODE:  
LEAKAGE

CAUSE(S):  
LOW TEMPERATURE, MATERIAL DEGRADATION, WEAR, SEAL DAMAGED OR DISPLACED

EFFECT(S) ON:  
(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE  
(A) FAILURE OF SINGLE SEAL HAS NO EFFECT. LOSS OF REDUNDANT SEAL WOULD RESULT IN THE LOSS OF CREW MODULE CONSUMABLES.  
(B) FAILURE OF A SINGLE SEAL HAS NO EFFECT. LOSS OF REDUNDANT SEAL WOULD RESULT IN THE LOSS OF CREW MODULE CONSUMABLES.  
(C) FAILURE OF A SINGLE SEAL HAS NO EFFECT. LOSS OF THE REDUNDANT SEAL WOULD RESULT IN LOSS OF CREW MODULE CONSUMABLES, HOWEVER, THIS WOULD NOT EXCEED THE MAKEUP CAPABILITY OF THE ARPCS BUT WOULD POSSIBLY RESULT IN EARLY TERMINATION OF MISSION.  
(D) FAILURE OF SINGLE SEAL HAS NO EFFECT. LOSS OF THE REDUNDANT SEAL AND AN ADDITIONAL SEAL FAILURE WITHIN THE CREW MODULE COULD RESULT IN A LEAK RATE EXCEEDING THE ARPCS MAKEUP CAPABILITY RESULTING IN LOSS OF CREW/VEHICLE.

REDUNDANCY SCREENS: SEAL FAILS SCREENS "A" AND "B" BECAUSE LEAK TEST OF EACH SEAL INDIVIDUALLY IS NOT FEASIBLE.

DISPOSITION & RATIONALE:  
(A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE  
(A) DESIGN  
REDUNDANT (DUAL) O-RING SEALS IN CAP ENGAGE BORE OF TEST PORT FITTING. CAP IS HAND TIGHTENED UNTIL CAP BOTTOMS ON FITTING. SEAL MATERIAL IS

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SILICONE RUBBER.   FITTING MATERIAL IS CRES.

**(B) TEST**

ACCEPTANCE TESTS: CREW MODULE PRESSURE TESTS PERFORMED AT 14.7 PSID AND 3.2 PSID.

QUALIFICATION TESTS: QUALIFICATION TESTS WERE NOT PERFORMED CERTIFICATION IS BASED ON ACCEPTANCE TESTS AND SEAL MATERIALS DATA.

OMRSD: GROUND TURNAROUND TESTS ARE NOT APPLICABLE. HOWEVER, IMMEDIATELY PRIOR TO LAUNCH WITH CAP RE-INSTALLED AND 2 PSID POSITIVE DIFFERENTIAL IN CREW MODULE, LEAK RATE IS MONITORED BY CREW TO VERIFY SIDE HATCH CLOSURE AND TEST CAP RE-INSTALLATION.

**(C) INSPECTION**

**RECEIVING INSPECTION**

RECEIVING INSPECTORS EXAMINE SEALS FOR DAMAGE AND FOR QUALITY OF WORKMANSHIP. THEY ALSO VERIFY THAT SUPPLIER SUBMITTED THE REQUIRED REPORTS.

**CONTAMINATION CONTROL**

RECEIVING INSPECTORS VISUALLY EXAMINE SEALS FOR ADHERENCE TO CLEANLINESS REQUIREMENTS. INSPECTORS ALSO VERIFY, PRIOR TO INSTALLATION, THAT THE SEAL AND SEALING SURFACE MEET THE CLEANLINESS REQUIREMENTS PER MAO106-328.

**ASSEMBLY/INSTALLATION**

THE SEALS ARE INSTALLED PER MAO106-328. INSPECTORS VERIFY THAT THE SEAL AND THE SEALING SURFACE ARE NOT DAMAGED BEFORE INSTALLATION.

**TESTING**

THE INSPECTORS VERIFY THE ACCEPTANCE TEST.

**HANDLING/PACKAGING**

THE RECEIVING INSPECTORS VERIFY THAT EACH SEAL IS PACKAGED SO AS TO PRECLUDE DAMAGE HANDLING AND STORAGE.

**(D) FAILURE HISTORY**

THERE HAVE BEEN NO ACCEPTANCE TEST, QUALIFICATION TEST, FIELD OR FLIGHT FAILURES ASSOCIATED WITH THIS FAILURE MODE.

**(E) OPERATIONAL USE**

IF LEAKAGE OCCURS, LOSS OF CREW MODULE CONSUMABLES CAN BE MONITORED AND ASSESSED FOR FEASIBILITY OF CONTINUING THE MISSION PER CABIN LEAK PROCEDURES AND FLIGHT RULES.