

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : CREW MODULE SEALS FMEA NO 01-4 -CS30 -1 REV:03/29/8

ASSEMBLY : AIRLOCK STRUCTURE CRIT. FUNC: 1.
P/N RI : V075-332430-001,-002 CRIT. HDW:
P/N VENDOR: VEHICLE: 102 103 104
QUANTITY : 2 EFFECTIVITY: X X X
: ONE EACH PART NUMBER PHASE(S): PL LO OO X DO LS

PREPARED BY: REDUNDANCY SCREEN: A-FAIL B-FAIL C-PASS
DES W. HENRY APPROVED BY: APPROVED BY (NASA):
REL D. MAYNE DES W. H. Henry 7/24/88 SSM W. Smith 8/25
QE W. SMITH REL D. M. Mayne 5/26/88 REL R. E. L... 8/24
QE Stc J. Lowman 7-25-88 QE ... 7/10/88

ITEM:
SEALS, AIRLOCK TO BULKHEAD STRUCTURAL INTERFACE.

FUNCTION:
THESE SEALS PREVENT LEAKAGE OF CREW MODULE ATMOSPHERE.

FAILURE MODE:
LEAKAGE

CAUSE(S):
CRACKS, MATERIAL DEGRADATION, IMPROPER INSTALLATION, STRUCTURAL DEFORMATION

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 DURING EXTRAVEHICULAR ACTIVITY OPERATIONS.

(B) FAILURE OF A SINGLE SEAL HAS NO EFFECT. LOSS OF REDUNDANT SEAL WOULD RESULT IN THE LOSS OF CREW MODULE CONSUMABLES DURING EXTRAVEHICULAR ACTIVITY OPERATIONS.

(C) FAILURE OF A SINGLE SEAL HAS NO EFFECT. LOSS OF THE REDUNDANT SEAL WOULD RESULT IN LOSS OF CREW MODULE CONSUMABLES DURING EXTRAVEHICULAR ACTIVITY OPERATIONS, 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 DURING EXTRAVEHICULAR ACTIVITY OPERATIONS 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.

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DISPOSITION & RATIONALE:

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

(A) DESIGN

SEALS ARE CONCENTRIC O-RING FACE SEALS INSTALLED IN DOVETAIL GROOVES AIRLOCK FLANGE ADJACENT TO STRUCTURAL ATTACH BOLTS, WITH METAL TO METAL CONTACT AT SEALED INTERFACE. SEAL MATERIAL IS SILICONE RUBBER.

(B) TEST

ACCEPTANCE TESTS: AIRLOCK TO X576 BULKHEAD INTERFACE SEAL VERIFIED IN MANUFACTURING PRESSURE TEST TO 14.7 PSID AND CREW MODULE LEAK TEST TO PSID.

QUALIFICATION TESTS: QUALIFICATION TESTS WERE NOT PERFORMED, CERTIFICATION IS BASED ON ACCEPTANCE TESTS AND SEAL MATERIALS DATA. OMRSD: CREW MODULE LEAK TEST TO 2 PSID WOULD NOT DETECT DUAL SEAL LEAKAGE.

(C) INSPECTION

RECEIVING INSPECTION

RECEIVING INSPECTORS CHECK FOR CORRECT IDENTITY AND FOR DAMAGE, VERIFY THAT SUPPLIER SUBMITTED REQUIRED REPORTS, AND VERIFY PARTS ARE PROPERLY PACKAGED TO PREVENT DAMAGE DURING STORAGE.

CONTAMINATION CONTROL

INSPECTORS VERIFY, BEFORE INSTALLATION, THAT THE SEAL AND THE SEALING SURFACE ARE CLEAN PER MA0106-328.

ASSEMBLY/INSTALLATION

THE SEALS ARE INSTALLED PER MA0106-328. PRIOR TO INSTALLATION AN INSPECTION IS PERFORMED TO VERIFY THAT THE SEALING SURFACE IS NOT DAMAGED. INSPECTORS ALSO VERIFY SILICONE RUBBER SEAL SURFACE TO BE FREE OF DEFECTS, BLEMISHES, AND IRREGULARITIES PER DRAWING REQUIREMENTS, BEFORE INSTALLATION.

TESTING

THE AIRLOCK TO X576 BULKHEAD INTERFACE SEAL VERIFIED IN MANUFACTURING PRESSURE TEST TO 14.7 PSID AND CREW MODULE LEAK TEST TO 3.2 PSID.

HANDLING/PACKAGING

THE SUPPLIER PACKAGES DETAIL SEALS PER MK0116-001 REQUIREMENTS AND IDENTIFIES THEM BY PART NUMBER.

(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.