SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :CREW MODULE SEALS FMEA NO 01-4 -CS22 -1 REV:03/29/8

ASSEMBLY :SIDE HATCH CRIT. FUNC:
P/N RI :V070-332555-001, V070-332556-001 CRIT. HDW:
P/N VENDOR:

VEHICLE	102	103	104
EFFECTIVITY:	X	X	X

QUANTITY :6
:4 V070-332555
:2 V070-332556

PHASE(S): PL LO X OO X DO X L

REDUNDANCY SCREEN: A-FAIL B-FAIL C-PA

PREPARED BY:		APPROVED BY:	APPROVED BY (NASA):
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ITEM:
SEALS, INNER PANES, SIDE HATCH WINDOW

FUNCTION:
THESE SEALS PREVENT LEAKAGE OF CREW MODULE ATMOSPHERE.

FAILURE MODE:
LEAKAGE

CAUSE(S):
CRACKS, LOW TEMPERATURE, MATERIAL DEGRADATION

EFFECT(S) ON:
(A)SUBSYSTEM (B)INTERFACES (C)MISSION (D)CREW/VEHICLE

(A) FAILURE OF SINGLE SEAL HAS NO EFFECT. LOSS OF REDUNDANT SEAL WOU RESULT IN THE LOSS OF CREW MODULE CONSUMABLES INTO THE PLENUM AND OVERBOARD.

(B) FAILURE OF A SINGLE SEAL HAS NO EFFECT. LOSS OF REDUNDANT SEAL WO RESULT IN THE LOSS OF CREW MODULE CONSUMABLES.

(C) FAILURE OF A SINGLE SEAL HAS NO EFFECT. LOSS OF THE REDUNDANT SEA WOULD RESULT IN LOSS OF CREW MODULE CONSUMABLES, HOWEVER, THIS WOULD N 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 AN ADDITIONAL SEAL FAILURE WITHIN THE CREW MODULE COULD RESULT IN A LE RATE EXCEEDING THE ARPCS MAKEUP CAPABILITY RESULTING IN LOSS OF CREW/VEHICLE.

REDUNDANCY SCREENS: SEAL FAILS SCREENS "A" AND "B" BECAUSE LEAK TEST O 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
THE PRESSURE PANE AND REDUNDANT PANE ARE ASSEMBLED AS A BENCH ASSEMBLY A SINGLE BOLTED UNIT WITH SPACER AND RETAINERS AND ALL SIX SEALS. EAC WINDOW PANE IS CLAMPED BETWEEN TWO O-RING SEALS. SEAL MATERIAL IS FLUOROCARBON ELASTOMER (VITON).

(B) TEST
ACCEPTANCE TESTS: MAXIMUM ALLOWABLE LEAKAGE IS VERIFIED AT 0.28 SCIM P PANE AT BENCH ASSEMBLY LEVEL. CREW MODULE PRESSURE TESTS PERFORMED AT 14.7 PSID AND 3.2 PSID.

QUALIFICATION TESTS: QUALIFICATION TESTS OF SIDE HATCH STRUCTURE PER T S104018 INCLUDED LEAK RATE, OUTER HATCH MOVEMENT AND CYCLING TEST; DESIGN ULTIMATE STATIC INTERNAL AND EXTERNAL PRESSURE LOADING TESTS; LIMIT PRESSURE AND OUTER HATCH MOVEMENT, CYCLING TEST.

OMRSD: NO TEST IS CAPABLE OF DETECTING SINGLE SEAL FAILURE. CREW MODU PRE-LIFTOFF PRESSURE TEST AT 2 PSID WOULD NOT DETECT DUAL SEAL FAILURE.

(C) INSPECTION

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

CONTAMINATION CONTROL
CLEANLINESS IS MAINTAINED PER MA0110-311. WINDOWS ARE VERIFIED TO BE VISIBLY CLEAN PER MA0110-301 JUST PRIOR TO AND JUST SUBSEQUENT TO ASSEMBLY. INSPECTORS ALSO VERIFY, BEFORE INSTALLATION, THAT THE SEALI SURFACE AND VITON SEAL ARE CLEAN, PER MA0106-328.
ASSEMBLY/INSTALLATION
SEALS ARE INSTALLED PER MA0106-328, PRIOR TO INSTALLATION AN INSPECTIO IS PERFORMED TO VERIFY THAT THE SEALING SURFACE IS NOT DAMAGED. THE THREADED FASTENERS ARE INSTALLED PER MA0101-301.

TESTING
THE WINDOW ASSEMBLY IS LEAK TESTED WITH A MAXIMUM ALLOWED LEAKAGE OF 0. SCIM PER PANE AT A 10 MICRON OR LESS VACUUM LEVEL, WHICH IS VERIFIED THROUGH AN INSPECTION. THE ACCEPTANCE LEAK TEST IS WITNESSED AND VERIFIED THROUGH INSPECTION.

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

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

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(E) OPERATIONAL USE

FOR DUAL SEAL LEAKAGE, LOSS OF CREW MODULE CONSUMABLES CAN BE MONITORE AND ASSESSED FOR FEASIBILITY OF CONTINUING THE MISSION PER CABIN LEAK PROCEDURES AND FLIGHT RULES.