SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :SEPARATION MECHANISMS-MECH FMEA NO 02-3A -U6 -1 REV:10/09/87

ASSEMBLY :UMBILICAL SEPARATION SYSTEM
P/N RI :V070-565371(RH)
:V070-565396(LH)
QUANTITY :2

CRIT. FUNC: 1
CRIT. HDW: 1

VEHICLE EFFECTIVITY:	102	103	104
	X	X	X

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

REDUNDANCY SCREEN: A- B- C-

PREPARED BY:
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ITEM:
UMBILICAL CLOSEOUT CURTAIN

FUNCTION:
PROVIDES COMPARTMENTATION BETWEEN THE ORBITER AFT FUSELAGE AND THE EXTERIOR ENVIRONMENT. CARRIES POSITIVE AND NEGATIVE LOADS DURING ASCENT.

FAILURE MODE:
STRUCTURAL FAILURE

CAUSE(S):
DEFECTIVE PART/MATERIAL OR MANUFACTURING DEFECT, FAILURE/DEFLECTION OF INTERNAL PART, FATIGUE

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

(A) LOSS OF PRESSURE RETENTION CAPABILITY.

(B) POSSIBLE OVER/UNDER PRESSURIZATION OF AFT FUSELAGE.

(C,D) STRUCTURAL FAILURE OF UMBILICAL CLOSEOUT CURTAIN COULD CAUSE AN EXCESSIVE DIFFERENTIAL PRESSURE ACROSS THE X-STA 1307 AFT BULKHEAD WHICH COULD REDUCE THE STRUCTURAL INTEGRITY OF THE ORBITER AND THEREFORE RESULT IN POSSIBLE LOSS OF CREW/VEHICLE DURING ASCENT/DESCENT.

DISPOSITION & RATIONALE:
(A)DESIGN (B)TEST (C)INSPECTION (D)FAILURE HISTORY (E)OPERATIONAL USE

(A) DESIGN
DESIGN LIFE 100 FLIGHTS; CURTAIN IS COMPOSED OF DIAPHRAGM (0.10 INCH THICK 180 GLASS CLOTH FUSED BETWEEN TWO LAYERS OF 0.30 INCH THICK SMC1050 SILICONE RUBBER), GLASS FABRIC INSULATOR, KNITTED MONEL MESH, BERYLLIUM COPPER LIGHTNING SHIELD (ELECTRICAL GROUNDING STRIPS), SILICONE RUBBER/ ALUMINUM SHEET RUB STRIP, 302 CRES SUPPORT PLATE. DESIGNED FOR X- AND Y-AXIS MOTION TESTING AT -150 DEG F, DELTA PRESSURE OF 3.26 PSI. BURST PRESSURE CAPABILITY OF APPROXIMATELY 50 PSID.

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(B) TEST

COMPONENT QUALIFICATION TESTS: QUALIFIED/CERTIFIED BY SIMILARITY TO V070-565371-007 IN SIMULATED ORBITER LAUNCH/MOTION KINEMATICS/ RETRACTION, ENVIRONMENT, PRESSURE PROFILE AND CRYOGENIC-TEMPERATURE (-150 DEG F). 400 LIFE-CYCLE QUALIFICATION TESTS AFTER STS-4 (QUALIFICATION FOR 100 MISSION LIFE) PER CR-45-565371-007A AND TAR-STS-84-0271. 2.38 INCH SIMULATED RETRACTION, AVERAGE LEAKAGE WAS 8.0 SCFM FOR 400 CYCLES AT +/-3.26 PSID PRESSURE. NO DEGRADATION TO DIAPHRAGM WAS ACCEPTABLE. CURTAIN REVERIFIED AFTER 400TH CYCLE.

ACCEPTANCE TEST: EACH COMPOSITE DIAPHRAGM IS INSPECTED TO DRAWING REQUIREMENTS AND TESTED FOR PEEL STRENGTH - BEFORE INSTALLATION TO ASSEMBLY. EACH INNER DIAPHRAGM IS PRESSURE TESTED PER MLO308-0124, BEFORE INSTALLATION TO ASSEMBLY.

OMRSD: VISUALLY INSPECT AFTER EACH FLIGHT FOR RIPS, TEARS, DELAMINATION, BENT SPRINGS, HOLES IN MONEL MESH THAT EXCEED 1/2 INCH (PER V070-565371 LH2- SIDE AND V070-565396 LO2-SIDE).

(C) INSPECTION

RECEIVING INSPECTION

HARDWARE INSPECTION IN ACCORDANCE WITH QUALITY PLANNING REQUIREMENTS DOCUMENT (QPRD). KNITTED MESH-MONEL AND INSULATOR GLASS FABRIC MATERIAL VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

ALL DETAIL PARTS ARE INSPECTION VERIFIED. TOOLING AIDS ARE UTILIZED FOR ACCURACY ON DETAIL FABRICATION. MAXIMUM WAVINESS OF 0.25 ON TOTAL SURFACE CONTOUR VERIFIED BY INSPECTION. DIAPHRAGM, BRIDGE SPRINGS, AND MONEL MESH ARE VERIFIED PER INSPECTION PROCEDURE OF V070-565371.

CRITICAL PROCESSES

CORROSION PROTECTED PER MA0608-301. PLATE TAB AREA FLUXED CLEANED, SOLDERED. RESIDUE CLEANED AND VERIFIED BY INSPECTION.

TESTING

ALL ACCEPTANCE PRESSURE TESTING OF DIAPERAGMS PER MLO308-0124 AND PARAMETERS ARE INSPECTION VERIFIED.

(D) FAILURE HISTORY

NONE.

(E) OPERATIONAL USE

NONE.