

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : SEPARATION MECHANISMS-MECH FMEA NO 02-3A -A5 -1 REV:10/09/87

ASSEMBLY : AFT STRUCTURAL ATTACH
P/N RI : V072-565231
P/N VENDOR:
QUANTITY : 2

	VEHICLE	102	103	104
EFFECTIVITY:	X	X	X	
PHASE(S):	PL X	LO X	OO	DO LS

PREPARED BY:
DES R. H. YEE
REL M. B. MOSKOWITZ
QE E. M. GUTIERREZ

REDUNDANCY SCREEN: A- B- C-
APPROVED BY: APPROVED BY (NASA):
DES R. H. YEE SSM
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ITEM:
BOLT, AFT ATTACH

FUNCTION:
IN CONJUNCTION WITH A FRANGIBLE NUT, STRUCTURALLY TIES TOGETHER THE ORBITER/EXTERNAL TANK (ET) IN TWO PLACES AT THE AFT ATTACH POINTS.

FAILURE MODE:
STRUCTURAL FAILURE

CAUSE(S):
CORROSION, DEFECTIVE PART/MATERIAL OR MANUFACTURING DEFECT, EXCESSIVE LOAD

EFFECT(S) ON:
(A)SUBSYSTEM (B)INTERFACES (C)MISSION (D)CREW/VEHICLE
(A,B,C,D) POSSIBLE LOSS OF CREW/VEHICLE.

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

(A) DESIGN
DESIGN MARGIN EQUAL TO OR GREATER THAN 1.4; FABRICATED OF INCONEL 718 (FOR HEAT/CORROSION RESISTANCE) FOR ONE-TIME USAGE. DESIGN STRESS ANALYSIS REPORTS SD77-SH-0178 AND ST985-0254.

(B) TEST
COMPONENT QUALIFICATION TESTS: 7 TORQUE-UP/PRELOAD TESTS OF THE BOLT (214,000 AND 253,000 LB); 6 STATIC LOAD TESTS (AT LIMIT LOAD, LIMIT LOAD WITH TORQUE, AND 1.4 LIMIT LOAD); 1 JOINT COMPLIANCE TEST; BOLT BENDING MEASUREMENT.

SYSTEM QUALIFICATION TESTS: SYSTEM QUALIFIED AS PART OF THE AFT ATTACH SEPARATION SYSTEM PER CR-45-565201-001 AND TAR-STS-81-0443; 8 ROOM TEMPERATURE PYRO FIRINGS WITH BOLT RETRACTIONS (4 AT 214,000 LB AND 4 AT 253,000 LB PRELOAD). QUALIFIED FOR 6.0 LOADS (Fx = 75,300 LB; Fy = 104,800 LB; Fz = 316,800 LB) BY AN OFF-LIMITS 5.4 LOADS QUALIFICATION TEST WITH LIMIT LOADS (Fx = 233,800 LB; Fy = 56,400 LB; Fz = 325,000 LB) THAT WERE 10% HIGHER THAN THOSE REQUIRED FOR 5.4 LOADS; 6.0 LOADS ON THE AFT ORBITER/ET JOINT ARE 8% HIGHER THAN THOSE FOR 5.4 LOADS.

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ACCEPTANCE TESTS: STRAIN GAGE BENCH LOAD CALIBRATION (FROM 0 TO 300,000 LB AND ACCURATE TO WITHIN +/-5%) ALL UNITS - TWO RUNS EACH, PER MLO208-0047. E.O. IN WORK FOR STRAIN GAGE BENCH LOAD CALIBRATION TO 315,000 LB DUE TO 6.0 LOAD ANALYSIS.

OMRSD: TURNAROUND TEST INCLUDES NUT AND BOLT PREFLIGHT FIT CHECK. NO TURNAROUND INSPECTION REQUIRED - NEW HARDWARE REQUIRED FOR EACH FLIGHT (OLD HARDWARE EXPENDABLE WITH ET).

(C) INSPECTION

RECEIVING INSPECTION

INCONEL CERTIFICATION VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

MACHINE PER DRAWING DIMENSIONS AND ANSI Y14.5 WITH INSPECTION VERIFICATION. STRAIN GAGES INSTALLED AND VERIFIED PER MLO321-0002. LOAD CALIBRATED PRIOR TO POTTING AND VERIFIED.

NONDESTRUCTIVE EVALUATION

HEAT-TREAT AND NONDESTRUCT TESTING (NDT) VERIFIED BY INSPECTION. PENETRANT INSPECT, HARDNESS, FLAWS (VISUAL) PER MT0501-508, CLASS 1. PARTS PROTECTION TO MAINTAIN CLEANLINESS AND PREVENT DAMAGE TO BOLT VERIFIED BY INSPECTION.

(D) FAILURE HISTORY

NONE.

(E) OPERATIONAL USE

NONE.