

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : LANDING/DECELERATION-PYRO FMEA NO P2-1A -104 -1 REV:12/02/87

ASSEMBLY : NOSE LANDING GEAR  
 P/N RI : SKD26100100-205  
 P/N VENDOR:  
 QUANTITY : 1  
 : ONE ASSEMBLY

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

PREPARED BY:		REDUNDANCY SCREEN:	A-	B-	C-
DES	R. H. YEE	APPROVED BY:	12/4/87	APPROVED BY (NASA):	1-7-88
REL	MA B. MOSKOWITZ	DES	<i>H. Yee for G. Cochran</i>	SSM	<i>RWH James D. ...</i>
QE	E. M. GUTIERREZ	REL	<i>[Signature]</i>	REL	<i>[Signature] 12-16-87</i>
		QE	<i>[Signature]</i>	QE	<i>[Signature] 1-7-88</i>

ITEM:  
 EXTENSION THRUSTER, NOSE LANDING GEAR

FUNCTION:  
 PYRO THRUSTER PROVIDES ASSIST IN INITIAL PHASE EXTENSION IN WHICH THE GEAR DOORS ARE OPENED (FIRES EVERY FLIGHT).

FAILURE MODE:  
 FAILS TO FUNCTION

CAUSE(S):  
 DUAL CARTRIDGE FAILURE, JAMMED PISTON, STRUCTURAL FAILURE (EXPELS PISTON), BROKEN INTERNAL SPRING, LOSS OF INTERNAL O-RING

- EFFECT(S) ON:
- (A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE
  - (A) NOSE GEAR FAILS TO EXTEND.
  - (B) EXPELLED PISTON MAY DAMAGE NOSE GEAR AND/OR TIRES.
  - (C) NONE.
  - (D) POSSIBLE LOSS OF CREW/VEHICLE.

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

(A) DESIGN  
 THRUSTER DESIGNED TO OPERATE WHEN FIRED BY A SINGLE CARTRIDGE CONTAINING 85% OF EXPLOSIVE CHARGE; DUAL INTERNAL SPRINGS ENSURE PISTON FOLLOWS AND IS IN CONTACT AT ALL TIMES WITH THE GEAR STRUT; DESIGN MARGIN EQUAL TO OR GREATER THAN 1.4.

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(B) TEST

QUALIFICATION TESTS: HYDROSTATIC BURST PRESSURE TEST (1.7 X PROOF PRESSURE), VIBRATION, LOCKED SHUT FIRING, NO OPPOSING FORCE FIRING, SINGLE 85% CARTRIDGE FIRING, MASS OFF-SET FIRING, -65 DEG F/AMBIENT/+200 DEG F FIRINGS (3 EACH). CERTIFICATION REQUIREMENTS (CR) 26-325-0006-0002, QTR OEA INC. #2737-8; SKD26100100.

ACCEPTANCE TESTS: EXAMINATION OF PRODUCT, DYE PENETRANT, WEIGHT, HYDROSTATIC PROOF PRESSURE (5000 PSI), INTERNAL PRESSURE LEAK TEST, X-RAY, PISTON SPRING LOAD TEST. OEA INC. ATP #2737-7/H; SKD26100100.

SYSTEM LEVEL TESTS (AT DOWNEY): DEPLOYMENT TEST AT AMBIENT WITH OPPOSING AIRLOADS. LTR 1755-3301.

OMRSD: THE NOSE GEAR EXTENSION THRUSTER IS REPLACED EVERY FLIGHT.

(C) INSPECTION

CONTAMINATION CONTROL

CONTAMINATION CONTROL AND CORROSION PROTECTION PROCESSES AND STORAGE ENVIRONMENTS ARE MONITORED AND VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

ASSEMBLIES ARE X-RAYED TO ASSURE FREEDOM FROM VOIDS AND CRACKS AND TO VERIFY CORRECT ASSEMBLY AND PRESENCE OF ALL DETAILED PARTS. VISUAL INSPECTION, IDENTIFICATION PERFORMED, AND PARTS PROTECTION VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION

X-RAYS ARE REVIEWED BY VENDOR, DCAS, AND NASA ENGINEERING AND QUALITY.

CRITICAL PROCESSES

SELECTED MANUFACTURING/ASSEMBLY STEPS ARE IDENTIFIED BY NASA QUALITY ASSURANCE AND VERIFIED BY GOVERNMENT INSPECTION AS MANDATORY INSPECTION POINTS (MIPS). ALL MANUFACTURING PROCESSES, SUCH AS WELDING, PLATING, HEAT TREATING, PASSIVATION, AND ANODIZING ARE VERIFIED BY INSPECTION.

(D) FAILURE HISTORY

STS-8 FLIGHT ANOMALY (FIAR JSC-EP-0055/KSC PV2-058106) EJECTED PISTON FROM HOUSING; RESULTED IN REDESIGN TO DUAL INTERNAL SPRINGS TO ASSURE PISTON FOLLOWS AND IS IN CONTACT AT ALL TIMES WITH THE GEAR STRUT (PREVENTS PISTON FROM BEING EXPELLED WHEN THRUSTER FIRES AND PISTON IS NOT AT END OF STROKE WITH NO OPPOSING LOAD FROM STRUT).

(E) OPERATIONAL USE

NONE.