

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : LANDING/DECELERATION-LGC FMEA NO 02-1A -098 -1 REV:09/19/

ASSEMBLY : NOSE LANDING GEAR (NLG)			CRIT. FUNC:
P/N RI : V070-510601			CRIT. HDW:
P/N VENDOR:	VEHICLE	102	103 104
QUANTITY : 2	EFFECTIVITY:	X	X X
: TWO	PHASE(S):	PL LO	OO DO X LS
:			

PREPARED BY:		REDUNDANCY SCREEN:	A-	B-	C-
DES R. A. GORDON	APPROVED BY:				
REL J. S. MULLEN	DES <i>R. A. Gordon 7/2/88</i>	APPROVED BY (NASA):			
QE W. J. SMITH	REL <i>[Signature]</i>	SSM <i>[Signature]</i>			
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ITEM:
NOSE LANDING GEAR DOOR HOOK ASSEMBLY

FUNCTION:
LOCKS NLG DOOR AFTER THE GEAR IS RETRACTED AND RELEASES DOORS FOR OPE DURING GEAR DEPLOYMENT.

FAILURE MODE:
STRUCTURAL FAILURE

CAUSE(S):
OVERLOAD, DEFECTIVE PART/MATERIAL.

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

(A, B) LEAKAGE THRU DOOR SEAL EXPOSES COMPARTMENT TO HIGH THERMAL FLOW POSSIBLE STRUCTURAL INTERNAL DAMAGE TO COMPARTMENT.

(C, D) POSSIBLE LOSS OF MISSION/CREW/VEHICLE DUE TO RE-ENTRY OVERHEATI

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

(A) DESIGN
DESIGNED TO A MINIMUM FACTOR OF SAFETY OF 1.4 WITH STANDARD MATERIAL ALLOWABLES. MATERIALS USED ARE NOT SUSCEPTIBLE TO CORROSION DUE TO EXPOSURE TO EXPECTED ORBITER ENVIRONMENT.

(B) TEST
QUALIFICATION TESTS: DOOR HOOK ASSEMBLY VERIFIED FOR STRUCTURAL INTEGRITY AND PROOF LOADS, WITH FUNCTIONAL/KINEMATIC/ENDURANCE CYCLING SIMULATOR. DOOR LOADS (AERO) VERIFIED IN SIMULATOR FOR WORST CASE CONDITION. CERTIFICATION INCLUDES A FATIGUE LOAD TEST SPECTRUM REPRESENTING THE EQUIVALENT LOADING FOR THE LIFE OF THE NOSE GEAR. A SCATTER FACTOR OF 4.0 WAS APPLIED SUCH THAT THE SPECTRUM WAS REPEATED

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A TOTAL OF FOUR TIMES.

THE DOOR HOOK ASSEMBLY WAS ALSO CERTIFIED AS AN INTEGRAL PART OF THE NLG/MLG MECHANISM INSTALLATION (LANDING GEAR OPERATION) - 32 CYCLES OF THE LANDING GEAR DURING ALT, 15 DEVELOPMENT CYCLES AND 353 QUALIFICATIO LIFE CYCLES FOR A TOTAL OF 400 CYCLES. (THE LANDING GEAR WAS CYCLED FR UP AND LOCKED TO DOWN AND LOCKED EACH TIME). THESE TESTS WERE PERFORM WITH MAXIMUM DOOR OPENING AIR LOADS ON THE DOOR WITH THE APPROPRIATE AI LOADS ON THE SHOCK STRUT ASSEMBLY.

ENVIRONMENT:

HIGH TEMP TESTS; 3 CYCLES AT 140 ~~DEG F~~
COLD TEMP TESTS; 3 CYCLES AT -35 DEG F TO -40 DEG F

ACCEPTANCE TESTS: ACCEPTANCE INCLUDES VERIFICATION THAT CERTIFIED MATERIALS AND PROCESSES WERE USED. ACCEPTANCE TESTS ALSO VERIFY DIMENSIONS, WEIGHTS AND FINISHES.

OMRSD: NLG WHEELWELL ZONAL INTERNAL DETAIL INSPECTION; A VISUAL DETAILED INSPECTION OF THE NLG WHEELWELL IS PERFORMED TO VERIFY THE CONDITION AND SECURITY OF THE DOOR HOOKS.

FREQUENCY - ALL VEHICLES AT GROUND TURNAROUND.

(C) INSPECTION

RECEIVING INSPECTION

MATERIAL AND PROCESS CERTIFICATIONS ARE VERIFIED BY INSPECTION.

CONTAMINATION CONTROL

CORROSION PROTECTION PER MA0608-301 IS VERIFIED BY INSPECTION.
CLEANLINESS REQUIREMENTS VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

ENGINEERING SPECIFICATION PROVIDES DETAIL INSTRUCTIONS FOR COMPONENT ASSEMBLY, INSTALLATION, ADJUSTMENT, AND FUNCTIONAL OPERATION. MANUFACTURING OPERATION RECORD BOOK REFLECTS THESE INSTRUCTIONS WITH PROVISIONS FOR STEP BY STEP VERIFICATION BY INSPECTION. DIMENSIONS AND SURFACE ROUGHNESS ARE VERIFIED BY INSPECTION. BUSHING INSTALLATION IS VERIFIED BY INSPECTION. INSTALLATION OF THREADED FASTENERS PER MA0101-301 VERIFIED BY INSPECTION.

CRITICAL PROCESSES

HEAT TREATING AND CHROME PLATING ARE VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION

PENETRANT INSPECTION OF DETAIL PARTS IS VERIFIED BY INSPECTION.

TESTING

ATP IS VERIFIED BY INSPECTION.

PACKAGING/HANDLING

HANDLING AND PACKAGING REQUIREMENTS ARE VERIFIED BY INSPECTION.

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(D) FAILURE HISTORY
NONE.

(E) OPERATIONAL USE
NONE.