

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : LANDING/DECELERATION-LGC FMEA NO 02-1A -113 -1 REV:09/19/

ASSEMBLY : NOSE LANDING GEAR (NLG)
P/N RI : V070-510601
P/N VENDOR:
QUANTITY : 2
: TWO
:

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

CRIT. FUNC:
CRIT. HDW:
DO X LS

PREPARED BY:
DES R. A. GORDON
REL J. S. MULLEN
QE W. J. SMITH

REUNDANCY SCREEN: A- B- C-
 APPROVED BY:
 DES R. Gordon 7/2/88 APPROVED BY (NASA):
 REL J.S. Mullen SSM [Signature]
 QE W.J. Smith REL [Signature]

ITEM:
FITTING ASSEMBLY - FORWARD AND AFT - NOSE LANDING GEAR DOOR UPLOCK HO

FUNCTION:
PROVIDES A MOUNTING INTERFACE FOR THE NLG DOOR UPLOCK HOOKS.

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 FLOWS
 POSSIBLE STRUCTURAL INTERNAL DAMAGE TO COMPARTMENT.
 (C, D) POSSIBLE LOSS OF MISSION/CREW/VEHICLE DUE TO RE-ENTRY OVERHEATING

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 DURING
 EXPOSURE TO EXPECTED ORBITER ENVIRONMENTS.

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(B) TEST

QUALIFICATION TESTS: COMPONENTS VERIFIED FOR STRUCTURAL INTEGRITY AND PROOF LOADS, WITH FUNCTIONAL/KINEMATIC/ENDURANCE CYCLING ON SIMULATOR. DOOR LOADS (AERO) VERIFIED IN SIMULATOR FOR WORST CASE CONDITION.

THE FITTING ASSEMBLIES WERE 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 QUALIFICATION LIFE CYCLES FOR A TOTAL OF 400 CYCLES. (THE LANDING GEAR WAS CYCLED UP AND LOCKED TO DOWN AND LOCKED EACH TIME). THESE TESTS WERE PERFORMED WITH MAXIMUM DOOR OPENING AIR LOADS ON THE DOOR WITH THE APPROPRIATE AIR LOADS ON THE SHOCK STRUT ASSEMBLY. THE GEAR ACTUATOR LOAD WAS LIMITED TO 25,000 LBS. WHILE RESTRICTING THE DOWN MOTION OF THE GEAR. THE MAXIMUM TENSION LOAD IN THE RETRACT LINK WAS 10,100 LBS AND MAXIMUM COMPRESSION LOAD WAS 8,300 LBS.

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 WHEELWELLS IS PERFORMED TO VERIFY THE CONDITION AND SECURITY OF THESE ITEMS.

FREQUENCY - ALL VEHICLES AT GROUND TURNAROUND.

(C) INSPECTION

RECEIVING INSPECTION

MATERIALS AND PROCESS CERTIFICATIONS ARE VERIFIED BY INSPECTION.

CONTAMINATION CONTROL

CLEANLINESS REQUIREMENTS AND CORROSION PROTECTION PER DRAWING AND APPLICABLE SPECIFICATION ARE VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

MACHINING VERIFIED ON MANUFACTURING ORDERS TO BE TO DRAWING TOLERANCES AND APPLICABLE MACHINING SPECIFICATIONS.

CRITICAL PROCESSES

HEAT-TREAT FOR MAXIMUM CRYOGENIC PROPERTIES PER APPLICABLE HEAT TREAT SPECIFICATION PRIOR TO APPLICATION OF PLATING, AND CHROMIUM PLATING PER APPLICABLE SPECIFICATION ARE VERIFIED BY INSPECTION. APPLICATION OF DRY FILM LUBE TO SPECIFIC AREAS PER DRAWING AND DRY FILM LUBE SPECIFICATION AND BUSHING INSTALLATION PER DRAWING AND BUSHING INSTALLATION SPECIFICATION ARE VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION

PENETRANT INSPECTION OF DETAIL PARTS PER MTO501-504 IS VERIFIED BY INSPECTION.

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TESTING

ACCEPTANCE TESTING IS VERIFIED BY INSPECTION.

PACKAGING/HANDLING

HANDLING AND PACKAGING REQUIREMENTS ARE VERIFIED BY INSPECTION.

(D) FAILURE HISTORY
NONE.

(E) OPERATIONAL USE
NONE.