

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ACTUATION MECH-PED FMEA NO 02-4B -403 -1 REV:03/08/88

ASSEMBLY : PAYLOAD BAY DOOR, LEFT SIDE  
P/N RI : V070-594302  
P/N VENDOR:  
QUANTITY : 4

	CRIT. FUNC:	1		
	CRIT. HDW:	1		
VEHICLE		102	103	104
EFFECTIVITY:		X	X	X
PHASE(S):	PL	LO	OO X DO	LS

PREPARED BY:		REDUNDANCY SCREEN:	A-	B-	C-
DES	M. A. ALLEN	APPROVED BY:			
REL	M. B. MOSKOWITZ	DES	<i>D. Campbell</i>	APPROVED BY (NASA):	
QE	W. J. SMITH	REL	<i>[Signature]</i>	SSM	<i>R.C. Moore 3/18/88</i>
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ITEM:

STRUCTURE, PASSIVE SHEAR FITTING, ROLLER AND CLAW

FUNCTION:

REACTS TORSIONAL LOADS ON MID FUSELAGE BY TRANSFERRING FORE AND AFT SHEAR LOADS BETWEEN LEFT AND RIGHT PAYLOAD BAY DOORS AT CENTERLINE JOINT. ENGAGES WITH CLAW FITTING ON RIGHT DOORS.

FAILURE MODE:

FAILS TO ENGAGE

CAUSE(S):

ADVERSE TOLERANCES/WEAR, CONTAMINATION/FOREIGN OBJECT/DEBRIS, FAILURE/DEFLECTION OF INTERNAL PART, IMPROPER RIGGING/ADJUSTMENT, THERMAL DISTORTION

EFFECTS ON:

(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE

(A, B) DEGRADES CAPABILITY TO CLOSE PAYLOAD BAY DOORS. POSSIBLE DAMAGE TO DOOR.

(C, D) POSSIBLE LOSS OF CREW/VEHICLE IF PAYLOAD BAY DOORS CANNOT BE CLOSED AND LATCHED.

DISPOSITION & RATIONALE:

(A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE

(A) DESIGN

ROLLER HAS DUAL ROTATING SURFACES, CLAW ENTRY WIDTH IS 50 PERCENT GREATER THAN ROLLER DIAMETER, ROLLER AXIS RADIAL TO DOOR HINGE AXIS, ONE PAIR OF CLAW AND ROLLER FITTINGS FOR EACH PAIR OF DOOR PANELS, COMPENSATION FOR THERMAL EXPANSION OF DOOR PANELS AT EXPANSION JOINTS BETWEEN PANELS.

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(B) TEST

QUALIFICATION TESTS: THE ACTUATOR IS CERTIFIED PER CR-28-287-0040-0001H (REF. FMEA/CIL NO. 02-4B-005-1). THE PAYLOAD BAY DOOR (PBD) LATCHING MECHANISM IS CERTIFIED PER CR-29-594360-001E FOR CENTERLINE LATCH MECHANISM. SYSTEM QUALIFICATION TEST ON 15 FOOT PBD TEST ARTICLES (087) INCLUDED: ACCEPTANCE - TO CONFORM ALL COMPONENTS HAVE BEEN ASSEMBLED AND RIGGED PER MLO308-0022. ORBITAL FUNCTIONS - 3 THERMAL CONDITIONS WITH SIMULATED THERMAL DISTORTIONS OF BULKHEADS AND SILL LONGERONS AND ONE CENTERLINE OVERLAP AND ONE CENTERLINE GAP TEST. OPERATIONAL LIFE TESTS - A TOTAL OF 360 CYCLES WERE CONDUCTED ON THE FORWARD AND 334 CYCLES WERE CONDUCTED ON THE AFT CENTERLINE LATCHES. ACOUSTIC TESTS - PER MF0004-014C SPEC. CERTIFICATION BY ANALYSIS/SIMILARITY - HUMIDITY, FUNGUS, OZONE, PACKAGING, THERMAL VACUUM. SALT SPRAY, SAND/DUST, SHOCK-BASIC DESIGN ULTIMATE LOADS, ACCELERATION, MARGIN OF SAFETY AND MISSION ACOUSTIC LIFE.

ACCEPTANCE TESTS: THE CENTERLINE LATCHING MECHANISMS WERE RIGGED PER CONTROLLED SPECIFICATION MLO308-0022. OPERATION OF LATCHES ARE VERIFIED DURING CHECKOUT AT KSC WHICH INCLUDES PAYLOAD BAY DOOR FUNCTIONAL AND FINAL CHECKOUT PRIOR TO FLIGHT.

OMRSD: GROUND TURNAROUND INCLUDES VISUAL INSPECTION DURING SUBSYSTEM FUNCTIONAL CHECKOUT. PROPER FUNCTION OF THE COMPONENTS IS VERIFIED PERIODICALLY AS PART OF THE MAINTENANCE SAMPLING PROGRAM.

(C) INSPECTION

RECEIVING INSPECTION

RAW MATERIALS AND PROCESSES CERTIFICATIONS VERIFIED BY INSPECTION.

CONTAMINATION CONTROL

ASSEMBLY IS PERFORMED IN CLEAN ENVIRONMENT VERIFIED BY INSPECTION.  
CORROSION PROTECTION VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

INSTALLATION OF THREADED FASTENERS IS PER SPECIFICATION, BUT FINAL TORQUE IS ACCOMPLISHED AT INSTALLATION AND ADJUSTMENT ON VEHICLE AND IS VERIFIED BY INSPECTION. ALL DETAILS ARE VERIFIED BY INSPECTION PRIOR TO ASSEMBLY. DETAIL HARDWARE IS FABRICATED ON INDIVIDUAL MANUFACTURING ORDERS AND IS VERIFIED BY INSPECTION AND MACHINED PER SPECIFICATION.

NONDESTRUCTIVE EVALUATION

PENETRANT INSPECTION IS VERIFIED BY INSPECTION.

CRITICAL PROCESSES

HEAT TREATING IS VERIFIED BY INSPECTION.

TESTING

ACCEPTANCE TESTING VERIFIED BY INSPECTION.

HANDLING/PACKAGING

HANDLING AND PACKAGING REQUIREMENTS ARE VERIFIED.

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(D) FAILURE HISTORY

THERE HAVE BEEN NO ACCEPTANCE TEST, QUALIFICATION TEST, FIELD OR FLIGHT FAILURES ASSOCIATED WITH THIS FAILURE MODE.

(E) OPERATIONAL USE

THERMAL CONDITIONING OF VEHICLE CAN BE DONE TO ATTEMPT TO ALLEVIATE PROBLEM.