

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE
NUMBER: 02-6-G10 -X**

SUBSYSTEM NAME: HYDRAULICS

REVISION: 1 07/24/98

PART DATA

	PART NAME	PART NUMBER
	VENDOR NAME	VENDOR NUMBER
LRU	:HOSE ASSEMBLY TITFLEX	ME271-0079

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
HOSE ASSEMBLY, MAIN LANDING GEAR STRUT ACTUATOR EXTEND LINE

REFERENCE DESIGNATORS: 67V58FH54
67V58FH57

QUANTITY OF LIKE ITEMS: 2
ONE AT EACH MAIN LANDING GEAR ACT EXTEND PORT

FUNCTION:
THE HOSE ASSEMBLY TRANSMITS HYDRAULIC FLUID FROM THE HYDRAULIC SYSTEM
HARD LINES TO THE LANDING GEAR STRUT ACTUATORS.

FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE

NUMBER: 02-6-G10-01

REVISION#: 1 07/24/98

SUBSYSTEM NAME: HYDRAULICS

LRU: HOSE ASSEMBLY

ITEM NAME: HOSE ASSEMBLY

CRITICALITY OF THIS
FAILURE MODE: 1R2

FAILURE MODE:

RUPTURE, HOSE

MISSION PHASE: DO DE-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY:	102	COLUMBIA
	103	DISCOVERY
	104	ATLANTIS
	105	ENDEAVOUR

CAUSE:

DEFECTIVE MATERIAL OR MANUFACTURE

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN	A) PASS
	B) PASS
	C) PASS

PASS/FAIL RATIONALE:

A)

B)

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:

ASCENT/ORBIT - NONE, ISOLATED. ENTRY (WITH DOWNGEAR COMMAND) LOSS OF SYSTEM NUMBER ONE.

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(B) INTERFACING SUBSYSTEM(S):

LOSS OF NOSEWHEEL STEERING AND HYDRAULIC LANDING GEAR DEPLOYMENT CAPABILITY. PYROTECHNIC DEPLOYMENT STILL AVAILABLE. LOSS OF ONE OF THREE HYDRAULIC POWER SYSTEMS TO BRAKES. HYDRAULIC FLUID ON TPS SCREED MAY CAUSE DEGRADED TPS BONDS.

(C) MISSION:

NONE

(D) CREW, VEHICLE, AND ELEMENT(S):

NONE

(E) FUNCTIONAL CRITICALITY EFFECTS:

POSSIBLE LOSS OF CREW/VEHICLE WITH TWO FAILURES: THIS FAILURE. PLUS PYROTECHNIC LANDING GEAR DEPLOYMENT FAILURE

-DISPOSITION RATIONALE-

(A) DESIGN:

HOSE INNER CORE IS EXTRUDED TFE. REINFORCEMENT IS 304 STAINLESS STEEL WIRE BRAID HOSE IS SINGLE PLAITS OF SMALL DIAMETER, TIERED, TENSION CONTROLLED TYPE 304 STAINLESS STEEL WIRE BRAID QUALIFIED TO MIL-H-38360, GENERAL REQUIREMENTS FOR HOSE ASSEMBLY - TFE, HIGH TEMPERATURE, HIGH PRESSURE. SYNTHETIC CARBON BASE, AIRCRAFT. HOSE END-FITTINGS ARE STAINLESS STEEL PROGRESSIVE-SWAGED WITH POSITIVE BRAID LOCK AND CONFORM TO MIL-H-38360. AUTOMATIC PYROTECHNIC DEPLOY BACKUP FOR UNLOCKING GEARS

(B) TEST:

QUALIFICATION.

RETURN HOSE

- IMPULSE ENDURANCE CYCLING - 100,000 CYCLES 0-2,250-0 PSI AT 450 DEGREES F IN ACCORDANCE WITH FIGURE 3 MIL-H-25579, WITH A RATE OF 70 CYCLES/MIN.
- BURST PRESSURE - 6,000 PSI AT 70 DEGREES F.

PRESSURE HOSE

- IMPULSE ENDURANCE CYCLING - 250,000 CYCLES 0-4,500-0 PSI IN ACCORDANCE WITH FIGURE 3 MIL-H-38360, WITH A RATE OF 70 CYCLES/MIN 80 PERCENT AT 400 DEGREES F, 20 PERCENT AT 70 DEGREES F.
- BURST PRESSURE - 12,000 PSI AT 70 DEGREES F.

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HOSE AND SWIVEL

- ENDURANCE CYCLING - 50,000 DEFLECTION CYCLES, 50 PERCENT AT 0 DEG F 50 PERCENT AT 275 DEGREES F, WITH A RATE OF 30 CYCLES/MIN. SIMULTANEOUSLY, IMPULSE CYCLES PER FIGURE 2 OF MIL-J-5513, GENERAL REQUIREMENTS FOR HYDRAULIC SWIVEL JOINTS.

ACCEPTANCE:

- PROOF PRESSURE - RETURN 3,000 PSI; PRESSURE 6,000 PSI.
- LEAK TEST - WITH OIL, 3,000 PSI INTERNAL PRESSURE APPLIED.
- LEAK TEST - WITH AIR UNDER WATER, 5-10 PSI INTERNAL PRESSURE APPLIED FOR NOT LESS THAN 2 MINUTES

GROUND TURNAROUND TEST

ANY TURNAROUND CHECKOUT TESTING IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD

(C) INSPECTION:

RECEIVING INSPECTION

INCOMING MATERIAL IS VERIFIED BY INSPECTION AND COMPANY METALLURGIST. INCOMING MATERIAL IS TESTED AND VERIFIED BY INSPECTION, ON A SAMPLING BASIS, TO ENSURE CERTIFICATION IS CORRECT

CONTAMINATION CONTROL

CLEANLINESS LEVEL 190 PER MAO110-301 IS VERIFIED BY INSPECTION.

CRITICAL PROCESSES

WELDING AND SWAGING PROCESSES ARE VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION

RADIOGRAPHIC INSPECTION IS PERFORMED TO ENSURE THE FOLLOWING: HOSE AND BRAID ARE PROPERLY BOTTOMED IN END FITTING; BUTT WELD TUBING IS CHECKED FOR FREEDOM FROM CRACKS, POROSITY, INCLUSIONS, OR VOIDS. RADIOGRAPH IS EXAMINED UNDER MAGNIFICATION.

ASSEMBLY/INSTALLATION

MANUFACTURING AND ASSEMBLY PROCESSES VERIFIED BY INSPECTION.

TESTING

PROOF AND LEAK TESTS PERFORMED BY TEST LAB UNDER DELEGATION OF QUALITY ASSURANCE MANAGER ATP IS VERIFIED BY INSPECTION.

HANDLING/PACKAGING

INSPECTION VERIFIES PACKAGING PRIOR TO SHIPMENT.

(D) FAILURE HISTORY:

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CURRENT DATA ON TEST FAILURES, FLIGHT FAILURES, UNEXPLAINED ANOMALIES, AND OTHER FAILURES EXPERIENCED DURING GROUND PROCESSING ACTIVITY CAN BE FOUND IN THE PRACA DATA BASE.

(E) OPERATIONAL USE:

NONE: RAPID LEAK RATE WOULD DEplete HYDRAULIC SYSTEM BEFORE ACTION COULD BE TAKEN.

- APPROVALS -

EDITORIALLY APPROVED

: BNA

: J. Kamura 7-30-98

TECHNICAL APPROVAL

, VIA APPROVAL FORM

: 95-CIL-009_02-6