

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE
NUMBER: 02-1D-203 -X

SUBSYSTEM NAME: LANDING DECELERATION - NWS - MECHANISM
REVISION: 2 02/21/92

PART DATA

	PART NAME	PART NUMBER
	VENDOR NAME	VENDOR NUMBER
LRU	: INWS HYDRAULIC ACTUATOR ASSY	MC621-0058-0019
SRU	: FILTER	MC621-0058-0019I

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
FILTER

REFERENCE DESIGNATORS:

QUANTITY OF LIKE ITEMS: 1
ONE

FUNCTION:
FILTERS FLUID AT INLET TO INWS ACTUATOR.

FAILURE MODES EFFECTS ANALYSIS FMEA – CIL FAILURE MODE

NUMBER: 02-1D-203- 01

REVISION#: 3 08/03/97

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LRU: INWS HYDRAULIC ACTUATOR ASSY

**CRITICALITY OF THIS
FAILURE MODE: 1R3**

ITEM NAME: FILTER

**FAILURE MODE:
CLOGGED**

MISSION PHASE: DO DE-ORBIT

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

**CAUSE:
CONTAMINATION**

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN	A) PASS
	B) FAIL
	C) PASS

**PASS/FAIL RATIONALE:
A)**

**B)
FAILS SCREEN "B" SINCE INWS IS NOT POWERED UNTIL LANDING GEAR DOWN
COMMAND AND STEERING CANNOT BE ACTIVATED UNTIL WEIGHT ON NOSE GEAR.**

C)

- FAILURE EFFECTS -

**(A) SUBSYSTEM:
LOSS OF HYDRAULIC FLUID FLOW THROUGH ACTUATOR - LOSS OF NOSEWHEEL
STEERING CAPABILITY.**

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**(B) INTERFACING SUBSYSTEM(S):
SAME AS (A)**

**(C) MISSION:
NO EFFECT FIRST FAILURE.**

**(D) CREW, VEHICLE, AND ELEMENT(S):
POSSIBLE LOSS OF CREW/VEHICLE WITH TWO ADDITIONAL FAILURES - LOSS OF
DIFFERENTIAL BRAKING (WHICH IS CONSIDERED UNLIKE REDUNDANCY).**

**(E) FUNCTIONAL CRITICALITY EFFECTS:
CRIT 1R BECAUSE LOSS OF NWS MAY ALLOW VEHICLE TO DEPART RUNWAY
RESULTING IN POSSIBLE LOSS OF CREW/VEHICLE.**

-DISPOSITION RATIONALE-

**(A) DESIGN:
SYSTEM DESIGNED TO COMPLY WITH THE REQUIREMENTS OF MIL-H-5440 AND MIL- C-
5503 WITH REGARD TO PREVENTING CONTAMINATION. SHUTTLE HYDRAULIC SYSTEM
FLUID CLEANLINESS IS HELD TO LEVEL 190.**

HYDRAULIC SYSTEM FILTER IS 5 MICRON ABSOLUTE, GROUND SUPPORT EQUIPMENT
HYDRAULIC FILTER IS 3 MICRON ABSOLUTE AND ACTUATOR FILTER IS 5 MICRON
NOMINAL 15 MICRON ABSOLUTE.

**(B) TEST:
QUALIFICATION TESTS: A COMPONENT QUALIFICATION TEST WAS PERFORMED
BEFORE THE FILTER WAS USED IN THE ACTUATOR - DURING THIS TEST THE FILTER IS
TOTALLY CLOGGED AND SUBJECTED TO 4,000 PSI. THE PASS/FAIL CRITERIA FOR THIS
TEST DOES NOT ALLOW ANY UNLOADING OF THE FILTER INTO THE DOWNSTREAM**

SYSTEM. FILTER IS SUBJECTED TO ALL QUALIFICATION TEST ENVIRONMENTS AND
PRESSURE TESTING DURING ACTUATOR/INWS SYSTEM TESTS: SUPPLY PRESSURE
TEST, RETURN PRESSURE TEST, IMPULSE CYCLING TEST AND OPERATING LIFE CYCLIC
TESTS.

ACCEPTANCE TESTS: ACCEPTANCE TESTS ARE PERFORMED ON ALL UNITS DELIVERED
BY THE SUPPLIER WHICH INCLUDE: COMPONENT FUNCTIONAL TEST AND FLUID
CLEANLINESS.

| GROUND TURNAROUND TEST

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ANY TURNAROUND CHECKOUT TESTING IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD. THE OMRSD DATA PROVIDED BELOW IS NO LONGER BEING KEPT UP-TO-DATE. IF THERE IS ANY DISCREPANCY BETWEEN THE GROUND TESTING DATA PROVIDED BELOW AND THE OMRSD, THE OMRSD IS THE MORE ACCURATE SOURCE OF THE DATA.

NWS1 AND NWS2 SWITCH - DURING THIS TEST THE NWS SYSTEM IS ACTUATED THROUGH IT'S NORMAL MODE OF OPERATION WITH THE NLG TORQUE LINKS DISCONNECTED.

FILTER DIFFERENTIAL PRESSURE INDICATION CHECKS; DURING THIS CHECK THE HYDRAULIC SYSTEM #1 FILTER IS CHECKED FOR CLEANLINESS (REPLACEMENT IS ACCOMPLISHED WHILE MAINTAINING CLEANLINESS TO LEVERL 190).

(C) INSPECTION:

RECEIVING INSPECTION

RAW MATERIAL AND PROCESS CERTIFICATION ARE VERIFIED BY INSPECTION. TEST REPORTS AND RECORDS ARE MAINTAINED.

CONTAMINATION CONTROL

ALL HYDRAULIC FLUID INTERNAL SURFACES ARE MAINTAINED AT LEVEL 190 CLEANLINESS. SYSTEM CLEANLINESS IS VERIFIED ON A REGULAR BASIS BY FLUID SAMPLING ANALYSIS. SYSTEM HYDRAULIC FLUID IS ANALYZED FOR WATER AND FREON CONTENT (100 PPM MAX).

ASSEMBLY INSTALLATION

ALL DETAIL PARTS ARE INSPECTED AND FLUSHED WITH SOLVENT PRIOR TO ASSEMBLY. DIMENSIONS ARE VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION

BUBBLE POINT TESTING IS VERIFIED BY INSPECTION.

CRITICAL PROCESSES

EPOXY BONDING IS VERIFIED BY INSPECTION.

TESTING

THE ATP IS VERIFIED BY INSPECTION.

HANDLING/PACKAGING

PACKAGING AND HANDLING FOR SHIPMENT IS VERIFIED BY INSPECTION TO BE IN ACCORDANCE WITH REQUIREMENTS.

(D) FAILURE HISTORY:

NONE

(E) OPERATIONAL USE:

NONE

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- APPROVALS -

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