

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE**  
**NUMBER: 02-1B-030 -X**

**SUBSYSTEM NAME: LANDING/DECELERATION - BRAKE/SKID CONTROL SYS**  
**REVISION: 0 01/06/98**

---

**PART DATA**

---

	<b>PART NAME</b>	<b>PART NUMBER</b>
	<b>VENDOR NAME</b>	<b>VENDOR NUMBER</b>
	: BRAKE SKID CONTROL	
LRU	: MLG BRAKE SYSTEM HYDRO-AIRE	MC621-0055 33-017500

---

**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:**  
BRAKE/SKID CONTROL MODULE INLET FILTER.

**QUANTITY OF LIKE ITEMS: 8**  
TWO PER MODULE

**FUNCTION:**  
FILTERS INLET HYDRAULIC FLUID TO BRAKE/SKID CONTROL MODULE SWITCHING VALVE.

**FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE**

**NUMBER: 02-1B-030- 01**

**REVISION#: 0 12/20/96**

**SUBSYSTEM NAME: LANDING/DECELERATION - BRAKE/SKID CONTROL SYS**

**LRU: MLG BRAKE SYSTEM**

**CRITICALITY OF THIS**

**ITEM NAME: BRAKE/SKID CONTROL MODULE INLET FILTER**

**FAILURE MODE: 1R3**

**FAILURE MODE:**  
CLOGGED.

**MISSION PHASE: LS LANDING/SAFING**

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

**CAUSE:**  
CONTAMINATION.

**CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO**

<b>REDUNDANCY SCREEN</b>	A) PASS
	B) FAIL
	C) PASS

**PASS/FAIL RATIONALE:**  
A)

B)  
FAILS SCREEN "B" BECAUSE THERE IS NO INDICATION OF THIS FAILURE AFTER GROUND CHECKOUT AND BEFORE BRAKES ARE USED.

C)

**- FAILURE EFFECTS -**

**(A) SUBSYSTEM:**  
NO EFFECT - HYDRAULIC SYSTEM NO.3 WILL PROVIDE PRESSURE TO THE MODULE.

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

**FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL FAILURE MODE  
NUMBER: 02-1B-030- 01**

**(C) MISSION:**

PROBABLE LOSS OF MISSION/CREW/VEHICLE WITH TWO ADDITIONAL FAILURES; LOSS OF HYDRAULIC SYSTEM NO. 3 AND ANY FAILURE THAT COULD CAUSE LOSS OF THE REMAINING BRAKES ON THE AFFECTED STRUT.

**(D) CREW, VEHICLE, AND ELEMENT(S):**  
SAME AS (C)

**(E) FUNCTIONAL CRITICALITY EFFECTS:**

---

**-DISPOSITION RATIONALE-**

---

**(A) DESIGN:**

THE HYDRAULIC SYSTEM FILTER MODULE IS 5 MICRON ABSOLUTE AND IS SIZED TO FILTER THE BULK OF ANY CONTAMINATE(S). THE BRAKE/SKID CONTROL HYDRAULIC MODULE INLET AND OUTLET FILTERS ARE 5 MICRON NOMINAL, 15 MICRON ABSOLUTE AND THE SERVO VALVE FILTER IS 15 MICRON NOMINAL, 40 MICRON ABSOLUTE.

**(B) TEST:**

QUALIFICATION TESTS: ENVIRONMENTAL TESTING INCLUDES; HUMIDITY, SALT FOG, VIBRATION ACCELERATION AND SHOCK - TEST SPECIMEN ARE SUBJECTED TO FUNCTIONAL TESTS BEFORE AND AFTER EACH ENVIRONMENT TEST. EQUIPMENT NORMALLY OPERATING DURING EXPOSURE TO THESE ENVIRONMENTS ARE ALSO FUNCTIONALLY MONITORED DURING QUALIFICATION TESTING.

ACCEPTANCE TESTS ARE PERFORMED ON ALL UNITS DELIVERED FOR FUNCTIONAL USE. THESE TESTS INCLUDE; COMPONENT FUNCTIONAL TESTS AND PROOF PRESSURE TESTING: ALL HYDRAULIC COMPONENTS ARE CAPABLE OF WITHSTANDING 60,000 PRESSURE IMPULSE CYCLES WHILE AT FLUID TEMPERATURE OF 200 DEG F.

HIGH TEMPERATURE TESTING IS PERFORMED ON ALL EQUIPMENT EXCEPT THE CONTROL BOX AND COMMAND TRANSDUCER PER METHOD 501, PROCEDURE I, OF MIL-STD-810, TEST TEMP IS 275 DEG F.

LOW TEMP TESTING IS CONDUCTED AT MINUS 80 DEG F AND MINUS 65 DEG F.

OMRSD: FILTER DIFFERENTIAL PRESSURE INDICATION CHECKS; DURING THIS CHECK HYDRAULIC SYSTEMS 1,2 AND 3 FILTERS ARE CHECKED FOR CLEANLINESS (REPLACEMENT IS ACCOMPLISHED WHILE MAINTAINING CLEANLINESS TO LEVEL 190).

HYDRAULIC SWITCHING/CONTROL VALVE:

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL FAILURE MODE  
NUMBER: 02-1B-030- 01**

TEST CONDITIONS -

- (1) WOW SIGNAL ACTIVATED
  - (2) HYDRAULIC SYSTEM 1,2 & 3 SUPPLY PRESSURE AT 3000 PLUS OR MINUS 200 PSI
  - (3) ANTISKID NOT ACTIVATED (FAIL LIGHT ON)
- THIS TEST VERIFIES OPERATION OF THE BRAKE MODULE AS DIRECTED BY THE ANTI-SKID CONTROL BOXES "A" AND "B".

FREQUENCY - ALL VEHICLES AT GROUND TURNAROUND

**(C) INSPECTION:**

RECEIVING INSPECTION  
MATERIAL AND PROCESS CERTIFICATIONS VERIFIED BY INSPECTION.

CONTAMINATION CONTROL  
CLEANLINESS AND CORROSION PROTECTION REQUIREMENTS ARE VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION  
FILTER VISUALLY AND DIMENSIONALLY VERIFIED DURING FABRICATION.

CRITICAL PROCESSES  
WELDING IS VERIFIED BY INSPECTION.

TESTING  
ATP IS VERIFIED BY INSPECTION.

PACKAGING/HANDLING  
HANDLING AND PACKAGING REQUIREMENTS ARE VERIFIED BY INSPECTION.

**(D) FAILURE HISTORY:**  
NONE.

**(E) OPERATIONAL USE:**  
NONE

---

- APPROVALS -

---

EDITORIALLY APPROVED	: RI
EDITORIALLY APPROVED	: JSC
TECHNICAL APPROVAL	: VIA JSC

*Robert Stel* 12/20/96  
*Alan Stearns*  
 :96-CIL-011