

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL HARDWARE**

**NUMBER:M8-1SS-E032A -X**

**SUBSYSTEM NAME: ECLSS - ARPCS**

**REVISION: 0**

**10/06/99**

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**PART DATA**

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	<b>PART NAME</b>	<b>PART NUMBER</b>
	<b>VENDOR NAME</b>	<b>VENDOR NUMBER</b>
<b>LRU</b>	<b>:CAP, FLOW REDUCING CARELTON TECHNOLOGIES</b>	<b>V628-643069 2785-0018-5</b>

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**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:**

EXTERNAL AIRLOCK MANUAL DEPRESS VALVE FLOW REDUCING CAP. HOLES ARE DRILLED IN CAP TO CONTROL EXTERNAL AIRLOCK DEPRESS FLOW RATE. USED ONLY DURING DEPRESSURIZATION OF THE EXTERNAL AIRLOCK PRIOR TO AN EVA WITH PAYLOADS THAT REQUIRE REDUCED DEPRESS IMPINGEMENT LOADS.

**QUANTITY OF LIKE ITEMS: 1**  
**ONE**

**FUNCTION:**

CAPS ONTO EXTERNAL AIRLOCK MANUAL DEPRESSURIZATION VALVE PRIOR TO EVA TO PROVIDE CONTROLLED DEPRESS RATE THROUGH THE VALVE. CAN BE REMOVED BY CREW IN A PRESSURE GARMENT ASSEMBLY AND IS TETHERED TO PREVENT MOVEMENT AWAY FROM THE VALVE ASSEMBLY. THE FLOW REDUCING CAP WILL BE REMOVED AND REPLACED WITH A SEALING CAP PRIOR TO REPRESS OF THE EXTERNAL AIRLOCK AFTER AN EVA.

**REFERENCE DOCUMENTS: VS828-643069**

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

**NUMBER: MB-1SS-E032A-02**

**REVISION#: 1 12/02/99**

**SUBSYSTEM NAME: ECLSS - ARPCS**

**LRU: CAP, FLOW REDUCING**

**ITEM NAME: CAP, FLOW REDUCING**

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

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**FAILURE MODE:  
INABILITY TO REMOVE**

**MISSION PHASE: OO ON-ORBIT**

**VEHICLE/PAYLOAD/KIT EFFECTIVITY:**

103	DISCOVERY
104	ATLANTIS
105	ENDEAVOUR

**CAUSE:  
MATERIAL DEFECT, FATIGUE, CORROSION**

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

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**REDUNDANCY SCREEN**

- A) PASS
- B) PASS
- C) PASS

**PASS/FAIL RATIONALE:**

A)

B)

C)

**METHOD OF FAULT DETECTION:**  
DETECTED AT TIME OF REMOVAL AFTER THE EVA PRIOR TO INSTALLATION OF THE SEALING CAP ON THE ASSOCIATED MANUAL DEPRESS VALVE.

**CORRECTING ACTION: MANUAL**

**CORRECTING ACTION DESCRIPTION:**  
NO CREW ACTION REQUIRED UNTIL MANUAL DEPRESS VALVE INTERNALLY LEAKS. THEN DURING EVA CREW COULD USE ANY AVAILABLE MATERIAL, INCLUDING DUCT TAPE, TO SEAL LEAK.

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE**

**NUMBER: M8-155-E032A-02**

**REMARKS/RECOMMENDATIONS:**

FLOW REDUCING CAP RESTRICTS THE EXTERNAL AIRLOCK DEPRESS RATE AND CONTROLS THE RESULTING EXHAUST PLUME.

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**- FAILURE EFFECTS -**

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**(A) SUBSYSTEM:**

LOSS OF SECONDARY SEAL TO EXTERNAL AIRLOCK MANUAL DEPRESS VALVE IF FLOW REDUCING CAP CANNOT BE REMOVED IN ORDER TO INSTALL THE SEALING CAP.

**(B) INTERFACING SUBSYSTEM(S):**

NO EFFECT. DEPRESS VALVE PROVIDES PRIMARY SEAL. LOSS OF ISOLATION BETWEEN EXTERNAL AIRLOCK AND OUTSIDE ATMOSPHERE FOLLOWING INTERNAL LEAKAGE OF ASSOCIATED DEPRESS VALVE RESULTING IN AN INCREASED USE OF CONSUMABLES.

**(C) MISSION:**

NO EFFECT FIRST FAILURE. FLOW REDUCING CAP TO BE REMOVED AFTER EVA COMPLETION AND THE SEALING CAP INSTALLED.

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

NO EFFECT FIRST FAILURE.

**(E) FUNCTIONAL CRITICALITY EFFECTS:**

FIRST FAILURE - NO EFFECT.

SECOND ASSOCIATED FAILURE (MANUAL DEPRESS VALVE INTERNAL LEAKAGE), IF OCCURS DURING EVA CAN RESULT IN INABILITY TO REPRESSURIZE EXTERNAL AIRLOCK AND COULD PREVENT EVA CREWMEMBER'S RETURN TO CREW CABIN - CRITICALITY 1R2 CONDITION.

**DESIGN CRITICALITY (PRIOR TO DOWNGRADE, DESCRIBED IN (F)): 1R2**

**(F) RATIONALE FOR CRITICALITY DOWNGRADE:**

IN ORDER TO ENTER THE CREW CABIN AFTER THE EVA MISSION, THE CREW MEMBER MUST RETURN TO THE EXTERNAL AIRLOCK, REMOVE THE FLOW REDUCING CAP AND REPLACE IT WITH THE SEALING CAP IN ORDER TO BE ABLE TO REPRESSURIZE THE EXTERNAL AIRLOCK WITH A LEAKING MANUAL DEPRESS VALVE. IF THE FLOW REDUCING CAP CANNOT BE REMOVED, THEN DUCT TAPE OR ANY OTHER SUITABLE MATERIAL CAN BE USED TO SUFFICIENTLY SEAL THE HOLES IN THE FLOW REDUCING CAP TO PERMIT THE EXTERNAL AIRLOCK TO BE REPRESSURIZED. LOSS OF ABILITY TO SEAL THE HOLES IN THE FLOW REDUCING CAP (THIRD FAILURE) MAY CAUSE POSSIBLE

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE  
NUMBER: MB-1SS-E032A-02

LOSS OF CREWMEMBERS IF EXTERNAL AIRLOCK VOLUME CANNOT BE REPRESSURIZED  
FOR CREW RETURN TO CREW CABIN - CRITICALITY 1R3 CONDITION.

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- TIME FRAME -

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TIME FROM FAILURE TO CRITICAL EFFECT: MINUTES

TIME FROM FAILURE OCCURRENCE TO DETECTION: SECONDS

TIME FROM DETECTION TO COMPLETED CORRECTING ACTION: MINUTES

IS TIME REQUIRED TO IMPLEMENT CORRECTING ACTION LESS THAN TIME TO EFFECT?  
YES

RATIONALE FOR TIME TO CORRECTING ACTION VS TIME TO EFFECT:  
CREW WOULD HAVE ENOUGH TIME TO SEAL THE FLOW REDUCING CAP BY  
PERFORMING IN-FLIGHT MAINTENANCE.

HAZARD REPORT NUMBER(S): ORBI 162

HAZARD(S) DESCRIPTION:  
INABILITY TO RETURN FROM EVA DUE TO AIRLOCK HATCH FAILURES AND / OR  
REPRESSURIZATION OF THE AIRLOCK (ORBI 162).

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- APPROVALS -

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S&RE ENGINEERING  
DESIGN ENGINEER

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