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PRINT DATE: 09/21/90

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ATTACHMENT
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FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE

NUMBER: 06-1A-1124-X

SUBSYSTEM NAME: ARS - AIRLOCK

REVISION : 2 09/21/90

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU :	PRESSURE CAP CARLETON TECHNOLOGIES	MC250-0004-0010 2763-2001-7

PART DATA

- EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
CAP, EQUALIZATION VALVE, AIRLOCK/PAYLOAD BAY

QUANTITY OF LIKE ITEMS: 2
ONE PER VALVE; TWO PER MATCH

FUNCTION:
ATTACHES TO THE EQUALIZATION VALVE TO PREVENT INTERNAL LEAKAGE THROUGH
THE VALVE. CAN BE REMOVED BY A CREWMAN IN A PRESSURE GARMENT ASSEMBLY
AND IS TETHERED TO PREVENT MOVEMENT AWAY FROM THE VALVE ASSEMBLY.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 06-1A-1124-01

SUBSYSTEM: ARS - AIRLOCK
LRU :PRESSURE CAP
ITEM NAME: PRESSURE CAP

REVISION# 2 09/21/90 R

CRITICALITY OF THIS
FAILURE MODE:1R2

FAILURE MODE:
INABILITY TO MATE

MISSION PHASE:
00 ON-ORBIT

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

CAUSE:
CONTAMINATION, CORROSION, PHYSICAL BINDING/JAMMING, MECHANICAL SHOCK.

■ 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:
CAP COULD NOT BE INSTALLED TO PREVENT INTERNAL LEAKAGE THROUGH
EQUALIZATION VALVE.

(B) INTERFACING SUBSYSTEM(S):
NO EFFECT - VALVE PROVIDES PRIMARY SEAL.

(C) MISSION:
NO EFFECT.

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(D) CREW, VEHICLE, AND ELEMENT(S):
NO EFFECT.

- (E) FUNCTIONAL CRITICALITY EFFECTS:
SECOND ASSOCIATED FAILURE (VALVE INTERNAL LEAKAGE) MAY CAUSE LOSS OF EMERGENCY EVA CAPABILITY AND POSSIBLE LOSS OF EVA CREWMAN.

- DISPOSITION RATIONALE -

(A) DESIGN:

CAP IS FABRICATED FROM 6061-T6 ALUMINUM. THE 0.180 INCH DIAMETER BLEED HOLE HAS A SPRING-LOADED SILICONE RUBBER SEAL. CAP IS THREADED TO MATE WITH VALVE AND IS SEALED BY A SILICONE RUBBER O-RING SEAL ON VALVE.

■ (B) TEST:

QUALIFICATION TEST FOR 100 MISSION LIFE: CAP IS INSTALLED ON VALVE FOR VALVE QUALIFICATION TEST. ACCELERATION OF 5 G FOR 5 MINUTES PER AXIS. SINUSOIDAL VIBRATION - 5 TO 35 HZ AT 0.25 G PEAK PER AXIS. RANDOM VIBRATION - 0.09 G**2/HZ FOR 48 MINUTES PER AXIS. DESIGN SHOCK - 20 G PER AXIS. THERMAL VACUUM/THERMAL CYCLE - WITH VALVE CLOSED AND CAP ON, UNIT EXPOSED TO 120 TO 130 F AND VACUUM OF 1 X 10 EXP -6 TORR FOR 24 HOURS. LOW/HIGH TEMPERATURE CYCLE - HELD AT -40 TO -50 F FOR 3 HOURS AND AT +120 TO +130 F FOR 3 HOURS.

ACCEPTANCE TEST - PROOF PRESSURE 25 PSIG GN2. EXTERNAL LEAKAGE 14 - 16 PSIG, 5.0 SCCM MAX LEAKAGE, WITH VALVE OPEN AND CAP INSTALLED.

IN-VEHICLE TESTING - 3.2 PSID CABIN LEAK TEST.

OMRSD - GROSS LEAKAGE TEST AT 2 PSID BEFORE EACH FLIGHT VERIFIES NO GROSS LEAKAGE THROUGH BOTH THE VALVE AND CAP SIMULTANEOUSLY. CAPS, MATING SURFACES, AND O-RINGS ARE INSPECTED FOR DAMAGE PRIOR TO INSTALLATION.

(C) INSPECTION:

RECEIVING INSPECTION
MATERIAL VERIFIED BY PHYSICAL-CHEMICAL REPORTS AT RECEIVING INSPECTION.

CONTAMINATION CONTROL

CORROSION PROTECTION REQUIREMENTS VERIFIED BY INSPECTION. CLEANLINESS LEVEL OF 200A AND 100 ML RINSE TESTS ARE VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

MANUFACTURING PROCESSES, INSTALLATION AND ASSEMBLY VERIFIED BY

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INSPECTION. DIMENSIONAL CHECKS VERIFIED BY INSPECTION. SEAL
INSPECTION AND INSTALLATION VERIFIED BY INSPECTION.

CRITICAL PROCESSES
SPECIAL TEFLON IMPREGNATED ANODIZATION (NITUFF) VERIFIED BY
INSPECTION. SEAL MOLDING VERIFIED BY INSPECTION, INCLUDING DUREMETER
HARDNESS TEST TO VERIFY CURE.

TESTING
ATP VERIFIED BY INSPECTION.

HANDLING/PACKAGING
PARTS PROTECTION VERIFIED BY INSPECTION.

(D) FAILURE HISTORY:
NO FAILURE HISTORY.

(E) OPERATIONAL USE:
NO CREW ACTION REQUIRED FOR FIRST FAILURE.

- APPROVALS -

RELIABILITY ENGINEERING:	D. R. RISING	<i>DRR</i>	: <u><i>[Signature]</i></u>
DESIGN ENGINEERING	: K. KELLY	<i>KK</i>	: <u><i>[Signature]</i></u>
QUALITY ENGINEERING	: M. SAVALA	<i>MS</i>	: <u><i>[Signature]</i></u> 9/27/90
NASA RELIABILITY	:	<i>SPB</i>	: <u><i>[Signature]</i></u> 11/14/90
NASA SUBSYSTEM MANAGER	:		: <u><i>[Signature]</i></u> 11/14/90
NASA QUALITY ASSURANCE	:		: <u><i>[Signature]</i></u> 10/28/90