FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE
NUMBER: 06-1B-0860-X

SUBSYSTEM NAME: ARS - COOLING
REVISION : 7 06/26/92

	PART NAME / VENDOR NAME	PART NUMBER / VENDOR NUMBER
■ LRU :	REGENERABLE CO2 REMOVAL SYSTEM	MC623-0016
■ SRU :	VALVE, CHECK	SV806957

PART DATA

■ EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
ULLAGE SAVE COMPRESSOR OUTLET CHECK VALVE

■ QUANTITY OF LIKE ITEMS: 1

■ FUNCTION:
PREVENTS AIR BACK FLOW AT THE OUTLET OF THE ULLAGE SAVE COMPRESSOR.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 06-1B-0860-02

REVISION# 7 06/26/92 R

SUBSYSTEM: ARS - COOLING
LRU :REGENERABLE CO2 REMOVAL SYSTEM
ITEM NAME: VALVE, CHECK

CRITICALITY OF THIS FAILURE MODE:2/2

■ FAILURE MODE:
FAILS CLOSED, RESTRICTED FLOW

MISSION PHASE:
OO ON-ORBIT

■ VEHICLE/PAYLOAD/KIT EFFECTIVITY: 102 COLUMBIA
: 105 ENDEAVOUR

■ CAUSE:
MECHANICAL SHOCK, VIBRATION, CORROSION, CONTAMINATION

■ CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

■ REDUNDANCY SCREEN A) N/A
■ B) N/A
■ C) N/A

PASS/FAIL RATIONALE:
■ A)

■ B)

■ C)

■ MASTER MEAS. LIST NUMBERS: V61P2901A
: V61P2902A
: V61P2911A
: V61P2912A

- FAILURE EFFECTS -

■ (A) SUBSYSTEM:
INABILITY TO RECOVER AIR FROM SORBENT BEDS PRIOR TO EXPOSURE TO VACUUM. THE RCRS MUST BE OPERATED IN COMPRESSOR LATCH OUT MODE.

■ (B) INTERFACING SUBSYSTEM(S):
EXCESSIVE LOSS OF CONSUMABLES.

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■ (C) MISSION:
POSSIBLE EARLY MISSION TERMINATION DUE TO EXCESSIVE USE OF CONSUMABLES.

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

■ (E) FUNCTIONAL CRITICALITY EFFECTS:

- DISPOSITION RATIONALE -

■ (A) DESIGN:
THE VALVE IS A POPPET FLOW TYPE WHICH IS SPRING LOADED CLOSED AND IS NON-JAMMING IN BOTH THE OPEN AND CLOSED POSITION. THE VALVE BODY IS MADE OF 6061-T6 ALUMINUM WITH 302 CRES SPRING. THE VALVE IS CIRCLE SEAL CARTRIDGE TYPE WITH A VITON SEAT AND A CRACKING PRESSURE OF 0.5 PSI.

■ (B) TEST:
QUALIFICATION TEST: FOR 100 MISSION LIFE. VALVE IS BEING TESTED WHEN INSTALLED IN HIGHER RCRS ASSEMBLY LEVEL. RANDOM VIBRATION 48 MINUTES PER AXIS FOR 3 OTHOGONAL AXIS AT THE RATE OF PLUS 6 db/oct FROM 20 TO 45 HZ; CONSTANT AT 0.003 g2/HZ FROM 45 TO 1000 HZ; DECREASING AT THE RATE OF MINUS 6 db/oct FROM 1000 TO 2000 HZ. SHOCK TEST BY ANALYSIS AT 20 G TERMINAL SAWTOOTH PULSE FOR 11 MILLISECOND DURATION.

ACCEPTANCE TEST: FLOW TEST IS VERIFIED DURING ACCEPTANCE TESTING. THE VALVE IS SUBJECTED TO PROOF PRESSURE AT 27 PSIA WHICH IS EQUIVALENT TO 1.5 TIMES THE MAXIMUM OPERATING PRESSURE WITH NO DEFORMATION OR DEGRADATION IN PERFORMANCE.
OMRSD:
ANY TURNAROUND CHECKOUT TESTING IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD AT SYSTEM LEVEL.

■ (C) INSPECTION:
RECEIVING INSPECTION
INCOMING PART IDENTIFICATION AND CERTIFICATION VERIFIED BY INSPECTION. PROOF, LEAK (INTERNAL/EXTERNAL), FLOW, CRACKING PRESSURE AND WEIGHT VERIFICATION PART OF VENDOR ATP. DIMENSIONAL VERIFICATION AND ATP VERIFIED BY N. S. SOURCE INSPECTION. ANODIZE VERIFIED BY INSPECTION.

CONTAMINATION CONTROL
CONTAMINATION CONTROL PROCESSES AND CLEAN AREAS VERIFIED BY INSPECTION.

PRINT DATE: 06/29/92

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PART CLEAN LEVEL VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION
INSTALLATION OPERATIONS VERIFIED BY INSPECTION.

CRITICAL PROCESSES
TORQUE OPERATIONS VERIFIED TO H. S. REQUIREMENTS.

TESTING
IN PROCESS TESTED AS PART OF COMPRESSOR/MUFFLER VERIFICATIONS (REVERSE LEAK). RCRS UNIT ATP VERIFIED BY INSPECTION. VIBRATION TEST OF ORIGINAL DEVELOPMENT TEST UNIT AS A DETAIL OF RCRS ASSEMBLY VERIFIED BY INSPECTION DURING QUALIFICATION TESTING.

HANDLING/PACKAGING
HANDLING AND PART PROTECTION PER H. S. REQUIREMENTS.

■ (D) FAILURE HISTORY:
NO FAILURE HISTORY.

■ (E) OPERATIONAL USE:
1) SHUT DOWN THE RCRS WHEN CONSUMABLES LEVEL IS LOW.

2) INSTALL NEW LIOH CANISTERS FOR CO2 REMOVAL. THE LIOH CANISTER SUPPLY IS ADEQUATE FOR 3 DAYS (MINIMUM).

- APPROVALS -

RELIABILITY MANAGER	: T. J. EAVENSON	: K. L. Preston for T. J. Eavenson 6/30/92
DESIGN ENGINEERING	: P. J. CHEN	:
QUALITY ENGINEERING	: E. OCHOA	: K. L. Preston for T. J. Eavenson 6/30/92
NASA RELIABILITY	:	: 9/8/92
NASA SUBSYSTEM MANAGER	:	: 9/8/92
NASA QUALITY ASSURANCE	:	: 9-1-92

6/30/92