NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
CHECK VALVE/VENT FLOW SENSOR, ITEM 121 SV771036-29 (1)	2/2	121FM04A: Flapper fails to close. (Check valve fails open). CAUSE: Contamination causes flapper bearing seizure. Piece/part structural, warped disc.	END ITEM: Reverse flow path through check valve seat (during purge mode operation). OFE INTERFACE: PreEVA SOP checkout would fail. MISSION: Loss of use of one EMU. CREW/VEHICLE: None.	A. Design - The moving force balance mechanism is protected from vent flow contamination by the CCC filter. Also, the mechanism is located in an isolated compartment for further protection. The materials of construction are selected to prevent corrosion. The design utilizes bearing shields to prevent an increase in bearing friction. The minimum factor of safety for the 121 force balance mechanism exists at the hook to block interface. The hook and block assembly attaches to the rate compensating spring through a threaded swivel block. The estimated nominal load for the spring is .93 lbs., while the maximum load is estimated to be 1.5 lbs. The 1.5 lb. exerts a force sufficient to cause yielding at one of the weld sites of the hook and block assembly. The calculated yield point for the hook, using minimum wire diameter and materials properties, is .91 lbs. The hook and block assembly has been subjected to an overload test which demonstrated the initial onset of yielding at 1.1 lbs. The test load was gradually increased to 6.6 lbs., continuing to bend the hook without an ultimate failure. An ultimate failure is required to cause the valve to fail open. The hook is 17-7 PH stainless steel, and is electron beam welded to a 347 stainless steel block. When welded, the heat affected zone of the hook has low resistance to stress corrosion cracking. A stress corrosion test was run on four hook and block assemblies. B. Test - Component Acceptance Test - Special installation and removal procedures have been incorporated in acceptance test to insure no damage is incurred to the flapper, or counterweight assembly. A valve seating test is performed in the check direction, with an inlet pressure of 3.5 psig, the flow to close the flapper shall not exceed 2.0 lbs/hr. PDA Test - Per SEMU-60-010 with the item installed in the PLSS and an inlet pressure of 3.5 psig in the check direction the flow to close the flapper shall not exceed 3.0 lbs/hr. The test fixtures and interfacing hoses are cleaned to MS3150 EN150. The test facility is cleaned to MS3150 EM50A.

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	2/2	121FM04A:		Certification Test - The item completed 3,655 flow and 1,983 check cycles which fulfilled the 15 year life requirement during 3/85. No engineering changes have been incorporated since this configuration was certified. C. Inspection - Flapper bearing due to corrosion: Switch roller and flapper bearings are vendor supplied lubricated ball bearings monitored by N.S. source inspection. Cleanliness level of switch roller and flapper bearings are maintained to NS1590 CL2. To minimize particulate contamination, all other details are maintained to NS3150 GN150. Warped disc: Discs are subjected to three surface flatness screening requirements to determine their warp potential. In the free state, flatness is to be within .010 inches. After humidity exposure (disc suspended over a beaker of distilled water at 120 degrees F 24 hours minimum, flatness is to be within .005 inches with an applied load of 15-16 grams). After exposure disc is suspended in an oven at 100 c for 64 hours, flatness is to be within .005 inches with an applied load of 15-16 grams. D. Failure History - J-EMU-121-001 (11-5-80) - Warped flapper valve due to moisture. Screened details by water-soak test (humidity exposure). J-EMU-121-A001 (7-10-81) - High leakage due to warped flapper valve. Poppet disc became warped in the direction of shiny side when wet. Corrective action was to install shiny side on valve's seating surface. J-EMU-121-002 (9-30-82) - High leakage due to warped flapper valve. Change manufacturing procedure from a one ply to a four ply disc. H-EMU-121-A002 (1-31-84) - Excessive check valve leakage due to warped disc. Revised disc manufacturing procedure to eliminate residual stresses (0-90 degrees - 0-90 degrees orientation). E. Ground Turnaround - Tested per FEMU-R-001, SOP checkout circuit leakage.

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	2/2	121HN04A:		

F. Operational Use -
Crew Response -
PreEVA: Trouble shoot problem, if no success consider EMU 3 if available. Otherwise terminate EVA.
EVA: No response, single failure undetectable by crew or ground.
Training - Standard EMU training covers this failure mode.
Operational Considerations - Flight rules define go/no go criteria related to EMU vent flow sensor. EVA checklist procedures verify hardware integrity and systems operational status prior to EVA. Real time Data System allows ground monitoring of EMU systems.