

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
COOLING CONTROL VALVE, ITEM 321 ----- SV789693-1 (1)	2/2	321FM02: Internal leakage (insufficient cooling). CAUSE: Seal failure, housing, static seal (center) failure. Increased clearance between spool and housing.	END ITEM: Excessive coolant flow from bypass circuit to LCO port. GFE INTERFACE: Insufficient cooling during maximum load periods. MISSION: Fermilab EHA due to common discomfort (hot). CREW/VEHICLE: None.	A. Design - The center static (silicone) seal is a radial type O-ring seal. The seal is made of Viton material and its design configuration, dimensions, and rigidity of assembly provide squeeze under all loading conditions. Sufficient cooling is available to operate at 1600 BTU/hr metabolic rate with 69 BTU/hr bypass flow. The clearances between the valve parts coupled with some sealing effectiveness will limit bypass flow below this value. B. Test - Component Acceptance: An internal leakage test is performed per AT-E-321-2 in which the valve is set in the "CM" cold position. A flow of 234-245 lb/hr @20 is established thru the valve and a differential pressure of 1.8-2.0 psid is set between the bypass circuit and the sublimator port. Leakage from the bypass circuit to the cooling circuit must not exceed 5.1 lb/hr. Certification: The item completed 10,000 cold-hot-cold cycles during 7/85 which fulfills the cycle certification requirement of 4,024. Engineering Changes 42805-229 (facilitated valve acceptance at BCM level by providing consistency between component spec. and S/RD II) and 42806-519 (Clarified Flow Requirement) have been incorporated and certified by analysis/similarity since this configuration was tested. C. Inspection - Housing static seal (center) failure. O-ring grooves are 100% inspected per drawing dimensions and surface finish. O-rings are inspected for surface characteristics per SWS 3432; 100% for class I & II and at least 1.5 AOL for class III. Increased clearance between spool and housing. Internal leakage caused by increased clearance between the housing and spool are prevented by inspection of the sealing bore in the housing and the spool outer diameter to insure proper fits. These details are further controlled by "matched sets" after the completion of torque test.

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	2/2	321FMB2		<p>D. Failure History - None.</p> <p>E. Ground Ferreround - Tested per FEMU-R-001, Cooling Control Valve and Common Connector Flow/Date P Test.</p> <p>F. Operational Use - Crew Response - Detection - Sensory (crewmn discomfort). Pre/PostEVA: Troubleshoot problem, if no success, consider third EMU if available. otherwise, continue EVA operations using purge valve to remove heat. EVA: If cooling becomes a problem, diminish level of activity and try to stay away from direct sunlight. If cooling is still inadequate, terminate EVA. Special Training - Standard training covers this failure mode. Operational Considerations - EVA checklist procedures verify hardware integrity and systems operational status prior to EVA. Flight rules define go/no go criteria related to EMU thermal control. Real Time Data System allows ground monitoring of EMU systems.</p>