

CIL
EMU CRITICAL ITEMS LIST

02/24/91 SUPERSEDES 01/02/90

ANALYST:

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Date: 02/03/91

NAME P/N QTY	CBIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
COOLING CONTROL VALVE, ITEM 321 SV789693-1 (3)	2/2	321FKDS: Jamming, high torque. CAUSE: Entrained contamination, seal abrasion, loss of seal lubrication, excessive O-ring seal squeeze, insufficient clearance between handles and spool.	END ITEM: Unable to vary temperature control valve setting. OPE INTERFACE: Excessive ECG cooling or reduction in heat rejection capability. MISSION: Perinate EVA due to crew discomfort (hot or cold). CREW/VEHICLE: None.	A. Design - Two transport wear in-line filters (140 micron, 80U DCN side and 20 micron, F-141 Gas trap) protect the valve from contamination. In addition, supplemental water from the condensate circuit is filtered by a 20 micron filter contained in the E-127. Viton the O-seal material selected was chosen for its durability to withstand a dynamic application. Abrasion is minimized by the application of lubrication during assembly, the water environment, surface finish control, and use of Nitronic 60 to prevent abrasion. B. Test - Component Acceptance: An operating torque test is performed per AI-E-321-2 in which the valve is pressurized to 15.0-20.0 psig with a flow of 235-245 lbs/hr H2O thru the valve. The control knob is then cycled 10 times from "H" to "C" to "M". Next the torque required to rotate the control knob from "H" to "C" and from "C" to "H" is measured. This torque must be from 4-20 in-ozs. PDA: An operating torque test is performed per SEMU-68-015 in which the valve is pressurized to 15.0 -20.0 psig with a flow of 240-260 lbs/hr H2O thru the valve. The control knob is then cycled 10 times from "H" to "C" to "M". Next the torque required to rotate the control knob from "H" to "C" and from "C" to "H" is measured. This torque must be from 4-20 in-ozs. Certification: The item completed 10,000 cold-hot-cold cycles during 7/85 which fulfills the cycle certification requirement of 4,024. Engineering changes 42806-229 (facilitated valve acceptance at DCN level by providing consistency between component spec. and S/AD IT) and 42806-515 (clarified flow requirement) have been incorporated and certified by analysis/similarity since this configuration was tested. C. Inspection - Contamination. Failures are prevented by precision cleaning to SWS 3150 EM150 throughout assembly and test. Seal abrasion, loss of lubrication. The o-seals are lubricated

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2/2 321PH03:

with Braycote DVHS023 to prevent high torque and abrasion failures.
Excessive a-seat squeeze, insufficient clearance between handle and spool. These failures are prevented by the detail inspection of the spool and housing groove diameters and overall dimensions.

D. Failure History -
None.

E. Ground Turnaround -
Tested per FEMF-R-001, Cooling Control Valve and Cannon Connector Flow/Leakage Test.

F. Operational Use -
Crew Response -
Pre/PostEVA: Troubleshoot problem, if no success, consider third EMU if available. Otherwise, if cooling is excessive, use battery power and disconnect SCU when cooling is excessive. If cooling insufficient, use purge valve to remove heat. Continue EVA operations. EVA: If cooling is excessive, turn off feedwater supply to sublimator. Continue EVA. If cooling is insufficient, diminish level of activity and try to stay away from direct sunlight. If cooling is still inadequate, terminate EVA.
Special Training - No training specifically 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.