

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
PURGE VALVE, ITEM 314 ----- SV787027-3 (1)	2/1R	314FM02 Fails to close. Failure, jamming of locking device. Contamination of sliding parts.	END ITEM: Unable to seal suit. Automatic venting/purge of the EMU. The flow is limited to 4.74-4.986 lb/hr dry O2 at 3.45 psia with 60 deg. F inlet temperature. GFE INTERFACE: If EVA, the SOP would automatically activate when the pressure drops to 3.33 psid. MISSION: Terminate EVA. Loss of use of one EMU. CREW/VEHICLE: None for single failure. Possible loss of crewman with loss of SOP. TIME TO EFFECT /ACTIONS: Seconds. TIME AVAILABLE: Minutes. TIME REQUIRED: Minutes. REDUNDANCY SCREENS: A-PASS	A. Design - Jamming of the valve is prevented by an inlet filter to control contamination in the close tolerance sliding parts and by polylube coating. The locking device is spring loaded into the detents. Each of two handles must be depressed simultaneously to actuate the valve between the open and closed position. B. Test - Component: Force Test performed per Air-Lock ATP 9900-03 verifies that the force required to bottom either button must be within 1.0-4.0 lbs. The force required to move the Plunger up or down must be less than 5 lbs. DCM O2/H2O Manifold Assy Test AT-E-385 - Verifies that with 4.5 psid applied, the force required to depress detent lock shall be 1.0-4.0 lbs; force to open & close shall be 3.0 & 5.0 lbs maximum, respectively; finger torque; operation shall be smooth. PDA: The purge valve undergoes testing per SEMU-60-015. A purge valve force test first verifies that the force required to depress each of the detent locks is 1.0-4.0 lbs. Second it verifies that the force required to open the purge valve is 3 lbs max and the force required is 5 lbs max with the valve pressurized to 4.4-4.6 psid. Third it verifies that the valve operates smoothly when a finger torque is applied to the upper and then the lower tips of the detent buttons while the valve is being opened and closed. A leakage test is also performed in which the purge valve is pressurized to 4.2-5.2 psid with oxygen. Leakage is measured for a 10 minute minimum test period and must not exceed 20 scc/hr. A failed open valve would fail this test. To prevent contamination of the item, the test rig and test fixtures used are cleaned to HS3150 EM50A and a 15 micron absolute filter is installed in the setup just upstream of the purge valve. Certification: Certified for a useful life of 15 years (ref. SEMU-46-006). C. Inspection - AIR-LOCK cleans the Purge Valve detail parts to HS3150 EM150B and maintains cleanliness during assembly and test. The valve screen is visually inspected at Final Inspection. HS source inspection visually examines the Purge Valve. D. Failure History - The old design (P/N SV767703), J-EMU-314-001/ (8/10/81) deals with a sticking condition which occurred during normal open/close operation of the valve. Investigation revealed that areas requiring lubrication (vendor drawing 9618, Note: 5) were not lubricated. Corrective action consisted of the addition of callouts for lubrication on HS drawing SV767703. SI-3MU-15 was issued to lubricate valves in the field. RDR J-EMU-200-005 (10/18/82) documents an erratic jamming/sticking condition during normal open/close operation. Investigation shows that the design,

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		314FM02	B-PASS C-PASS	<p>coupled with dimensional outages could cause valve jamming to occur. Final corrective action was a redesign, which resulted in the present configuration, P/N SV787027.</p> <p>RDR H-EMU-314-A001 (4/28/83), "Excessive Force Required to Close the Purge Valve" (Spec: 5 lbs max, Actual: 6.5 lbs). Subsequent investigation shows dimensional outages to be the cause. Remedial action per engineering change 42806-139-1 was vendor print changes to accommodate anodize buildup, thus assuring smooth operation of the valve.</p> <p>E. Ground Turnaround - Tested for non-EET processing per FEMU-R-001, Pre-Flight Final SEMU Gas Structural and Leakage. FEMU-R-001 Para 8.2 EMU Preflight KSC Checkout for EET processing.</p> <p>F. Operational Use - Crew Response - PreEVA: Troubleshoot problem, if no success, discontinue use of EMU, consider third EMU if available. EVA: When CWS data confirms an accelerated drop in primary O2 tank pressure, terminate EVA. Special Training - Standard EMU training covers this failure mode. Operational Considerations - DCM purge valve not used for nominal operations during EVA. EVA checklist procedures verify hardware integrity and systems operational status prior to EVA. Flight rules define go/no go criteria related to EMU pressure integrity and regulation. Real Time Data System allows ground monitoring of EMU systems.</p>

EXTRAVEHICULAR MOBILITY UNIT
SYSTEMS SAFETY REVIEW PANEL REVIEW
FOR THE
I-314 PURGE VALVE
CRITICAL ITEM LIST (CIL)

EMU CONTRACT NO. NAS 9-97150

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