

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
RELIEF VALVE AND ORIFICE, ITEM 145 ----- SV785860-3 (1)	2/2	145FM02A Internal leakage, fails open. Seat contamination, spring relaxes or fractures, retainer fails to close.	END ITEM: Oxygen flow path through valve seat. GFE INTERFACE: Higher than planned usage of emergency oxygen during the SOP regulator checkout sequences. SOP oxygen tanks partially depleted. MISSION: Loss of use of one EMU if SOP tank pressure is below 5800 psia. CREW/VEHICLE: None. TIME TO EFFECT /ACTIONS: Seconds. TIME AVAILABLE: N/A TIME REQUIRED: N/A REDUNDANCY SCREENS: A-N/A B-N/A C-N/A	A. Design - The large length to diameter ratio of the guide rod minimizes friction loads while the fluted edges of the rod make the interface tolerant to contamination. The spring is designed for over 10E+8 cycles. Valve seat is stainless steel and the ball is sapphire. B. Test - Component Acceptance: During testing per AT-E-145-2 the valve undergoes crack and reseal tests at both sea level and vacuum conditions. At sea level the valve must crack 4.0 or 3.8 psid and reseal at 3.7 or 3.5 psid depending on valve attitude. Crack and reseal are defined as a flow of 0.23 - 0.33 lb/hr N2. At altitude the valve must crack at 4.0 or 3.8 psid and reseal at 3.7 or 3.5 psid depending on valve attitude. Crack and reseal are defined as a flow of 0.23 - 0.33 lb/hr N2. All rig lines and test fixtures used are cleaned to HS3250 EM150A to prevent them from contaminating the valve. PDA: Crack and reseal tests are performed per SEMU-60-010. The valve must crack at 4.0 psid minimum and reseal at 3.7 psid minimum. Crack and reseal are defined as a flow of 0.25 - 0.35 lb/hr O2. Certification: Certified for a useful life of 25 years (ref. EMUM1-0106). C. Inspection - Seat contamination is prevented by cleaning all detail parts and fixtures to HS3150 EM150 level and maintaining this cleanliness throughout the assembly of the valve. After acceptance testing the valve is vacuum baked for 2 hours to remove any moisture which might collect in the valve. Spring failures are prevented by 100% inspection of dimensions and any physical defects. The spring material, AMS 5688-302 stainless steel, is verified by inspection of the spring lot material certification ticket and also testing two springs from each lot for material and passivation. They are also load and displacement tested to ensure for proper force at valve assembly. During assembly the valve is tested for proper cracking and reseal pressure by adjustment features of the valve. A 10 cycle test is performed before bonding the adjusting feature. The bonded feature is then torque tested and inspected to verify its tightness. Retainer jams are prevented by cleaning details and maintaining it during the valve (ITP) test and cycling is also done to ensure proper valve action. D. Failure History - H-EMU-145-A003 (01-11-83) The Item 145 valve was flowing excessively during the Item 121 check valve backflow test due to o-seal contamination. Corrective Action: to ensure acceptable valve performance, a high and low flow test will be performed during PIA and PDA testing.

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		145FM02A		<p>H-EMU-145-D005 (06/22/83) The Item 145 valve failed to reseal due to a combination of operator error and/or test rig leakage. Corrective Action: both IPT and Acceptance test procedures were improved.</p> <p>H-EMU-145-D007 (01/03/84) The valve cracked below the minimum specification pressure because the adjusting screw was moved during lockwiring. Corrective Action: the IPT was changed to require a flow into the valve while the adjusting screw is being lockwired.</p> <p>H-EMU-145-D004 (04/14/84) The valve cracked below the minimum specification pressure because the adjustment screw moved. Corrective Action: Engineering Change 42806-503-1 was issued to bond rather than lockwire the adjustment screw.</p> <p>B-EMU-145-A004 (3/24/88) The valve exhibited low flow and failed to reseal. Corrective Action: The I-145 is being replaced by the SOP check out fixture (SCOF) per CCA 309.</p> <p>E. Ground Turnaround - Tested for non-EET processing per FEMU-R-001, SOP Functional Test. FEMU-R-001 Para 8.2 EMU Preflight KSC Checkout for EET processing.</p> <p>F. Operational Use - Crew Response Pre EVA (SOP check) : Trouble-shoot problem, if no success consider EMU 3 if available. EMU no go for EVA with low SOP pressure.</p> <p>Training - Standard EMU training covers this failure mode.</p> <p>Operational Considerations - Flight rules define go/no criteria related to operational SOP. EVA checklist procedures verify hardware integrity and systems operational status prior to EVA.</p>

EXTRAVEHICULAR MOBILITY UNIT
SYSTEMS SAFETY REVIEW PANEL REVIEW
FOR THE
I-145 RELIEF VALVE AND ORIFICE
CRITICAL ITEM LIST (CIL)
EMU CONTRACT NO. NAS 9-97150

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