NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
		120CFM02A		
CHECK VALVE ITEM 120C ---------- SV785844-17 (1)	1/1	Internal leakage, check valve fails to close. Piece part structural, flapper distorted, torn or broken due to an undetected material flaw or contamination under the check valve flapper.	END ITEM: Backflow of feedwater supply tank pressurant through check valve 120C to ambient (through test port F orifice) when O2 actuator is moved to 'OFF' position. Inability to create a differential pressure across the item 120B low mode relief valve piston to open the low mode poppet. GFE INTERFACE: Inability to create a 1 psi differential pressure across the item 120B low mode relief valve piston to open the low mode poppet. Loss of flow path from 15 psi pressure source to suit to elevate suit pressure to 8 psig for Bends Treatment. MISSION: Loss of ability to pressurize suit	A. Design - The check valve consists of a silicone flapper, stainless steel washer and stainless steel seat. The washer provides the preload of the check valve against the valve seat. The valve is protected by a 25 micron filter during normal operation. The filtration at test port F is provided in the rig thereby minimizing contaminants during testing. B. Test - Component Acceptance Test - Check valve leakage tests are performed per AT-E-120-2. Internal leakage through the check valve shall not exceed 185 sccm N2 (173 sccm O2) for initial checking. In addition, a maximum leakage of 10 SCCM of N2 (9.36 SCCM O2) across the check valve is allowed with a 0.4 - 0.6 psid across the check valve. All rig lines and test fixtures are cleaned to HS3150 EM50A and a 2 micron filter is installed just upstream of the item to keep contamination from entering the check valve. PDA Test - Testing per SEMU-60-010 would detect an excessively leaking Item 120C check valve. Internal leakage through the check valve shall not exceed 185 sccm N2 (173 SCCM O2) for initial checking. In addition, with T-11 capped and 0.4 - 0.6 psid across the item 120C check valve from TPG, the leakage through TPF shall be less than 10 SCCM of N2 (9.36 SCCM of O2). With a 2.0 - 2.1 cubic ft simulated suit volume, hyperbaric (BTA) pressurization capability to 5.8 - 6.6 psig is demonstrated with a maximum of four O2 actuator cycles. For each cycle the pressure increase must be a minimum of 0.54 psig. Certification Test - Certified for a useful life of 25 years (ref EMUM-1418). C. Inspection - A cleanliness level of HS3150 EM50A is maintained during assembly and testing of the valve. This cleanliness level requires a mandatory inspection for verification. The silicone used to manufacture the flapper undergoes 100% materials inspection as part of receiving inspection. The silicone flapper is visually inspected under 10x magnification for defects and flaws associated with molding. D. Failure History - B-EMU-120-A011 (10/25/89) - During a simulated Bends Treatment, the PLSS failed to achieve 6.0 psig suit pressure due to reverse leakage through the 120C Check Valve. The Check Valve umbrella flapper was not mechanically retained against the seat, and allowed oxygen backflow preventing the opening of the 120B low mode relief valve. EC 163402-507 revises the check valve geometry by adding a locating washer to preload the elasotomeric flapper (umbrella) against the valve seat. This assures that reverse flow sealing will occur at low flows. In addition, the component and assembly tests have been revised to assess the ability of the check valve to operate in a hyperbaric suit environment. B-EMU-120-A012 (4/30/92) - Excessive leakage across the Item 120C Check Valve during a bends treatment simulation due to corrosion deposits from the check valve filter migrating under the silicone check valve seat. EC 163402-261

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
		120CFM02A		
			to 8.0 psig. Loss of Bends Treatment capability. CREW/VEHICLE: Probable loss of crewman from decompression sickness. TIME TO EFFECT /ACTIONS: Seconds. TIME AVAILABLE: N/A TIME REQUIRED: N/A REDUNDANCY SCREENS: A-N/A B-N/A C-N/A	replaces the stainless steel check valve filter with an Inconel check valve filter and brazed retainer. J-EMU-120--007 (9/13/89) - Tracked by B-120-A012 B-EMU-120-A013 (4/19/90) - Tracked by B-120-A012 B-EMU-120-T001 (9/11/92) - During a simulated Bends Treatment, the PLSS failed to achieve 5.8-6.6 psig suit pressure, caused by reverse leakage through the 120C check valve due to a lodged foreign particle. No corrective action taken. B-EMU-120-A016 (12/3/93) - Excessive leakage of the DMRV check valve assembly during ETA performance testing due to contamination wedged between the silicone check valve flapper and seat. No corrective action taken to prevent contamination migration to PLSS from the test rigs. E. Ground Turnaround - Tested for non-EET processing per FEMU-R-001, Item 120D Flow and SEMU Hyperbaric Capability Demonstration. None for EET processing. F. Operational Use - Crew Response - PostEVA: No response. No single failure workaround. Training - Standard EMU training covers this failure mode. Operational Considerations - Not applicable.

EXTRAVEHICULAR MOBILITY UNIT

SYSTEMS SAFETY REVIEW PANEL REVIEW

FOR THE

I-120 DUAL MODE RELIEF VALVE

CRITICAL ITEM LIST (CIL)

EMU CONTRACT NO. NAS 9-97150

Prepared by: _____ 3/27/02
HS - Project Engineering

Approved by: _____
NASA - SSP/SSM

_____
HS - Reliability

_____
NASA - EMU/SSM

_____
HS - Engineering Manager

_____
NASA - S&MA

_____
NASA - MOD

_____
NASA - Crew

_____
NASA - Program Manager