

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
SUIT PRESSURE REGULATOR, ITEM 113D ----- SV778873-14 (1)	2/1R	113DFM01B Fails open, internal gas leakage. Contamination, spring fracture, stem jamming, ball actuator or return plunger jams, balance stem leakage.	END ITEM: High O2 delivery rate to the suit. The flow into the suit is restricted by the Item 113B to 7.5 lbs/hr max. GFE INTERFACE: Increase in suit pressure above 8.0 psid. Suit pressure can increase to 13.95 max in 12 seconds. Rapid depressurizati on of suit can occur. MISSION: IV crewmember must monitor suit pressure (via the BTA Pressure Gauge) to detect and respond to an increase in suit pressure. Inability to do so will result in suit overpressurizat ion and failure. Terminate Bends Treatment procedure. CREW/VEHICLE: Loss of crewmember undergoing Bends	A. Design - Stem clearance is 0.001-0.0015 inch. Material combination resists galling and wear (stem is Inconel 718, body is Al-Bronze). Valve and sense cavity are protected by 25 micron upstream and downstream filters. Springs operate at a stress below yielding. Leakage paths are through two silicone lip seals on the seat assembly, a static radial o-seal on the balance stem, a dynamic radial o-seal on the balance stem and through the ball and seat interface. The lip seals have metal to metal loaded fit downstream of the seal and the lip is configured so that pressure forces the lip against the adjacent parts. The o-ring seals' design configuration, dimensions and rigidness of assembly provide squeeze under all load conditions. B. Test - Vendor Component Acceptance: The manufacturer, CTI, performs a sea level performance test to assure that the regulator has not failed open. Contamination is reduced/minimized by cleaning all of the internal details and oxygen passageways to HS3150 EM50A. The test facility and gases also meet this requirement. PDA Test -Regulator performance tests verify the ability of the regulator to control the outlet pressure. In the IV mode, at 850-950 psia inlet, flows of .31-.35 lb/hr and .04-.06 lb/hr, the regulator must maintain the outlet pressure of 0.4-1.4 psig. At an inlet pressure of 75-85 psia and a flow of .31-.35 lb/hr it must maintain the outlet at 0.4-1.4 psig. In the EVA and PRESS modes at 850-950 psia inlet and flows of .31-.35 lbs/hr and .04-.06 lb/hr, the regulator must regulate the outlet pressure to 4.2-4.4 psig. At 75-85 psia inlet and a flow of .31-.35 lb/hr it must regulate to 4.2-4.4 psig. Internal leakage test are performed per SEMU-60-010 with the regulator in the IV and EVA modes. In the IV mode, the inlet to the regulator is set at 850-950 psia and the outlet is maintained at 1.5-1.7 psig. Leakage through the regulator must not exceed 20 scc/minute. Certification Test -The item completed twenty years worth (13,370 cycles) of its cycle certification requirement in 02/99 (ref. EMUM1-0083). C. Inspection - All details, gases and test facilities are cleaned and inspected to HS3150 EM50A to preclude contamination clogging. Details, including the o-ring, o-ring grooves and sealing surfaces are 100% inspected per drawing dimensions and surface finish characteristics. Details are manufactured from material with certified physical and chemical properties. The running and final torque of all threaded connections are verified by Vendor and DCAS inspection. A trial assembly is run on all details and then they are visually inspected. The demand valve pintle and balance stem is manually depressed to assure free motion. D. Failure History - H-EMU-115-D001 (12/23/81). Valve stem clearance too small causing jamming. Stem clearance opened by EC 42803-667. E. Ground Turnaround - Tested per FEMU-R-001, V1103 Performance Data and Item 113 Regulator Check. F. Operational Use - Crew Response - Bends Treatment: IV crewmember will terminate the Bends

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		113DFM01B	<p>Treatment with suit failure due to overpressurization resulting in rapid suit depressurization. Rapid depressurization of the suit may result in FOD generation (overpressurization of the Item 480 CCC may result in the release of LiOH dust which is an eye and lung irritant) and/or injury to IV crewmembers and damage to the vehicle.</p> <p>TIME TO EFFECT /ACTIONS: Immediate.</p> <p>TIME AVAILABLE: Minutes.</p> <p>TIME REQUIRED: Minutes.</p> <p>REDUNDANCY SCREENS: A-PASS B-PASS C-PASS</p>	<p>Treatment procedure (In-Suit) if the pressure on the BTA Gauge increases while the O2 Actuator is in the PRESS position. The IV crewmember has 10 seconds to detect and react in order to keep suit pressure below 11 psid. 11 psid is the max cert. vent loop burst pressure. Consider use of another suit to continue Bends Treatment procedure. Training - Standard EMU training covers this failure mode. Operational Considerations - Prior to EVA, EMU pressurization functions are verified. EMU function for nominal operation is also monitored during EVA. IV crewmember must monitor suit pressure to detect and respond to an increase in suit pressure. Inability to do so will result in suit overpressurization, suit failure, rapid suit depressurization, and loss of crewmember undergoing Bends Treatment</p>

EXTRAVEHICULAR MOBILITY UNIT
SYSTEMS SAFETY REVIEW PANEL REVIEW
FOR THE
I-113 PRIMARY PRESSURE CONTROL MODULE
CRITICAL ITEM LIST (CIL)

EMU CONTRACT NO. NAS 9-97150

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