| NAME P/N QTY | CRIT | FAILURE MODE & CAUSES | FAILURE EFFECT | RATIONALE FOR ACCEPTANCE |
|---|---|---|---|---|
| | | 120BFM01 | | |
| DUAL MODE RELIEF VALVE, ITEM 120B<br>---<br>SV785844-17<br>(1) | 2/1R | External gas leakage.<br><br>Seal failure. | END ITEM:<br>Primary 02 leakage to ambient.<br><br>GFE INTERFACE:<br>Excessive consumption of the primary oxygen supply. The SOP is automatically activated during EVA if the suit pressure drops to 3.33 psia.<br><br>MISSION:<br>Terminate EVA. Loss of use of one EMU.<br><br>CREW/VEHICLE:<br>None for single failure. Possible loss of crewman with loss of SOP.<br><br>TIME TO EFFECT /ACTIONS:<br>Seconds.<br><br>TIME AVAILABLE:<br>Minutes.<br><br>TIME REQUIRED:<br>Immediate.<br><br>REDUNDANCY SCREENS:<br>A-PASS<br>B-PASS<br>C-PASS | A. Design -<br>External leakage is prevented by a radial "0"-seal, the diaphragm seal, and the diaphragm. The radial "0"-seal is an elastomeric type which provides conformance to the surfaces to be sealed. The diaphragm seal is molded as part of the diaphragm and is designed to seal as a face "0"-seal. The diaphragm is of silicone material and designed to operate in the unstretched position to minimize diaphragm stressing. Any external leakage is vented through a controlled orifice on the ambient side of the high pressure mode.<br><br>B. Test -<br>Component Acceptance Test -<br>Two external leakage tests are performed per AT-E-120-1. In the first test the item is pressurized to 14.6 - 15.6 psig with N2 and then submerged in water for 10 minutes minimum. The maximum allowable leakage is 0.06 scc/min. In the second test the item is presurized to 22.2 - 18.2 psig with N2 and then submerged in water for 10 minutes minimum. The leakage is not to exceed 0.1 scc/min.<br><br>PDA Test -<br>An external leakage test is performed per SEMU-60-010. The 02 feedwater circuit is pressurized to 14.6 - 15.7 psig with a mixture of 98% N2 and 2% He. A helium sniff test must reveal no evidence of leakage.<br><br>Certification Test -<br>Certified for a useful life of 25 years (ref EMUM-1418).<br><br>C. Inspection -<br>The 0-seals are inspected for surface characteristics per SVHS3432; 100% for Classes I and II, at least a 1.5 AQL for Class III. The diaphragm is 100% inspected for defects and for meeting general surface finish requirements including plunger interface surface. The plunger is 100% inspected to insure the diaphragm interface surface meets surface finish requirements specified on drawing.<br><br>D. Failure History -<br>H-EMU-120-D006 (1-30-86) -<br>Excessive external gas leakage when tested per AT-E-115 paragraph 9.2. A discrepancy was noted between the component level testing and the shear plate level testing. Corrective action was taken to incorporate an additional component level external leakage check at an inlet of 15 psid instead of 25 psid. This allows the dual mode relief valve to be tested at shear plate conditions prior to installations onto the shear plate assembly.<br><br>E. Ground Turnaround -<br>Tested for non-EET processing per FEMU-R-001, Final SEMU Gas Structural and Leakage. None for EET processing.<br><br>F. Operational Use -<br>Crew Response - PreEVA: No response, single failure unlikely to be detected by crew or ground.<br>EVA: When CWS data confirms an accelerated primary 02 use rate, terminate EVA. If CWS data confirms a loss of suit pressure integrity coupled with an |

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|---|---|---|---|---|
| | | 120BFM01 | | accelerated primary 02 use rate, abort EVA.<br>Training - Standard EMU training covers this mode.<br>Operational Considerations - Flight rules define go/no go criteria related to EMU suit pressure regulation. Consider periodic vacuum 02 recharge to recover EMU operation. EVA checklist and FDF procedures verify hardware integrity and operational status prior to EVA. Real Time Data System provides ground monitoring of EMU systems. |

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 - SR&QA/SSM

_____
HS - Reliability

_____
NASA - EMU/SSM

_____
HS - Engineering Manager

_____
NASA - S&MA

_____
NASA - MOD

_____
NASA - Crew

_____
NASA - Program Manager