NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
		311FM04		
SUIT PRESSURE GAGE, ITEM 311 --- SV767706-6 (1)	2/1R	External gas leakage. Seal failure, leakage in the Bourdon tube.	END ITEM: Suit gas leakage to ambient. GFE INTERFACE: Excessive consumption of the primary oxygen supply. The SOP is automatically activated during EVA if the suit 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. If EVA, return to the vehicle. TIME AVAILABLE: Minutes. TIME REQUIRED: Immediate. REDUNDANCY SCREENS: A-PASS	A. Design - The unit has two leakage paths, one through an inlet face type O/Seal and the other through bourdon tube soldered joints. The seal is elastomeric material. A non-acid base flux is used on the bourdon tube inlet joint, and the tube end is sweated closed without using flux. The bourdon tube is not highly stressed at proof pressure and the oxygen/temperature environment is not severe. B. Test - Acceptance Test (Kratos, Inc.): A leakage test is performed by pressurizing the item to 5.3 psid with helium. A leak detector "sniffer" is used to determine that the unit leakage does exceed 2x10-5 scc/sec. PDA: An external leakage test is performed per SEMU-60-015. The pressure gage is pressurized to 4.2-4.5 psid with oxygen. Leakage is measured for a 10 minute minimum test period and must not exceed 20 scc/hr. Certification: Certified for a useful life of 20 years (ref. EMUM-1003). C. Inspection - Seal failure. O-ring grooves are 100% inspected per drawing dimensions and surface finish. O-rings are inspected for surface characteristics per SVHS 3432; 100% for class I & II, and at least 1.5 AQL for class III. Leakage in the bourdon tube. The vendor acceptance test for leakage will detect a failure of this nature. D. Failure History - H-EMU-311-A002 (8/19/81) - Fracture in bourdon tube due to corrosion resulting from the contamination. Incorporated improved post-soldering cleaning procedures and eliminated flux from the end closure joint. H-EMU-311-A003 (3/13/83) - The O/seal between the base plate and fitting missing. Drawing was revised to show O/seal location and more detailed cross-section of the gage. H-EMU-311-A005 (2/11/00) - Suit Pressure Gage leaked while undergoing test to support H-EMU-385-A002. Leak caused by void in solder joint that attaches Bourdon tube to central gage fitting. Manufacturing process degraded when supplier ownership changed. HS to improve supplier engineering/purchasing documents to control mfg. process. HSM10 and SVP510 to be modified. E. Ground Turnaround - Tested for non-EET processing per FEMU-R-001, Pre-Flight Final SEMU Gas Structural and Leakage. None for EET processing. F. Operational Use - Crew Response -

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
		311FM04		
			B-PASS C-PASS	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 02 tank pressure, terminate EVA. Special Training - Standard EMU training covers this failure mode. Operational Considerations - 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.

EXTRAVEHICULAR MOBILITY UNIT

SYSTEMS SAFETY REVIEW PANEL REVIEW

FOR THE

I-311 SUIT PRESSURE GAGE

CRITICAL ITEM LIST (CIL)

EMU CONTRACT NO. NAS 9-97150

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

Approved by: 11/21/02
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NASA - S & MA

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NASA - Crew

NASA - Program Manager